

# EtherCAT® Remote I/O Terminals

## GX-Series

CSM\_GX\_DS\_E\_9\_6

## Realizes high-speed communication to match a variety of applications

### • Digital I/O Terminals

Inputs/Outputs the digital ON/OFF signals.

### • Analog I/O Terminals

Inputs/Outputs the analog signal of 0-5V or 4-20mA, etc., and executes A/D or D/A conversion.

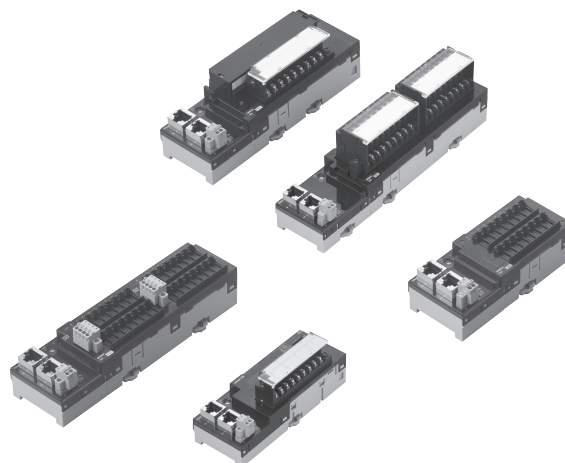
### • Encoder Input Terminal

Performs conversion for pulse input signals from an encoder.

### • Expansion Units

Attached to the Digital I/O Unit to expands the I/O points.

Can be attached to a two-tier terminal block type with 16 inputs, 16 outputs, and 16 relay outputs.



## General Specifications

It is common specifications of Digital I/O Terminal, Analog I/O Terminal and Encoder Input Terminal GX-Series. Refer to the pages of specifications for individual I/O terminals for details.

For General Specification of IO-Link Master Unit(GX-ILM08C), refer to page 31.

Item	Specification
Unit power supply voltage	20.4 to 26.4 VDC (24 VDC $-15\%$ to $+10\%$ )
I/O power supply voltage	20.4 to 26.4 VDC (24 VDC $-15\%$ to $+10\%$ )
Noise resistance	Conforms to IEC 61000-4-4, 2 kV (power line)
Vibration resistance	Malfunction 10 to 60 Hz with amplitude of 0.7 mm, 60 to 150Hz and 50 m/s <sup>2</sup> in X, Y, and Z directions for 80 minutes <Relay Output Unit GX-OC1601 only> 10 to 55 Hz with double-amplitude of 0.7 mm X, Y, and Z directions for 80 minutes
Impact resistance	150 m/s <sup>2</sup> with amplitude of 0.7 mm <Relay Output Unit GX-OC1601 only> 100 m/s <sup>2</sup> (3 times each in 6 directions on 3 axes)
Dielectric strength	600 VAC (between isolated circuits)
Isolation resistance	20 MΩ or more (between isolated circuits)
Ambient operating temperature	$-10$ to $55$ °C
Operating humidity	25% to 85% (with no condensation)
Operating atmosphere	No corrosive gases
Storage temperature	$-25$ to $65$ °C
Storage humidity	25% to 85% (with no condensation)
Terminal block screws tightening torque *	M3 wiring screws: 0.5 N•m M3 terminal block mounting screws: 0.5 N•m
Mounting method	35-mm DIN track mounting

\* Applicable only to 2-tier terminal block and 3-tier terminal block type slaves.

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## EtherCAT Communications Specifications

### Communications Specifications of GX-Series EtherCAT Remote I/O Terminal

Item	Specification
<b>Communication protocol</b>	Dedicated protocol for EtherCAT
<b>Modulation</b>	Base band
<b>Baud rate</b>	100 Mbps
<b>Physical layer</b>	100BASE-TX (IEEE802.3)
<b>Connectors</b>	RJ45 shielded connector × 2 CN IN: EtherCAT input CN OUT: EtherCAT output
<b>Topology</b>	Daisy chain
<b>Communications media</b>	Category 5 or higher (cable with double, aluminum tape and braided shielding is recommended.)
<b>Communications distance</b>	Distance between nodes (slaves): 100 m max.
<b>Noise resistance</b>	Conforms to IEC 61000-4-4, 1 kV or higher
<b>Node address setting method</b>	Set with decimal rotary switch or Sysmac Studio
<b>Node address range</b>	1 to 99: Set with rotary switch 1 to 65535: Set with Sysmac Studio
<b>LED display</b>	PWR × 1 L/A IN (Link/Activity IN) × 1 L/A OUT (Link/Activity OUT) × 1 RUN × 1 ERR × 1
<b>Process data</b>	Fixed PDO mapping
<b>PDO size/node</b>	2 bit to 256 byte
<b>Mailbox</b>	Emergency messages, SDO requests, SDO responses, and SDO information
<b>SYNCHRONIZATION mode</b>	Digital I/O Slave Unit and Analog I/O Slave Unit: Free Run mode (asynchronous) Encoder Input Slave Unit: DC mode 1

## Version Information

### Unit Versions

Units	Models	Unit Version	
		Unit version 1.0	Unit version 1.1
GX-Series EtherCAT Slave Units	GX-□□□□□□	Supported	Supported
Compatible Sysmac Studio version		Version1.00 or higher *	Version1.00 or higher

\* The function that was enhanced by the upgrade for Unit version1.1 can not be used. For detail, refer to "Function Support by Unit Version".

### Function Support by Unit Version

The following tables show the relationship between unit versions and CX-Programmer versions.

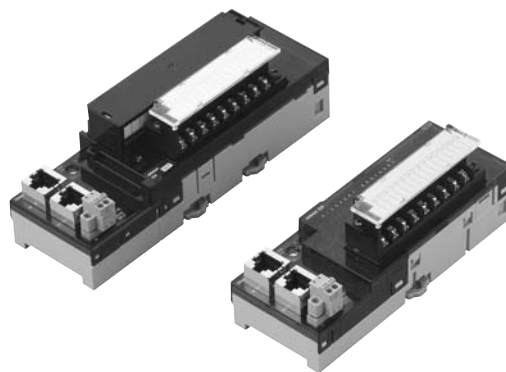
#### Unit Versions and Programming Devices

Unit Model	GX-Series EtherCAT Slave Units	
	GX-□□□□□□	
Item	Unit version 1.0	Unit version 1.1
Sysmac error status	No Supported	Supported
Save the node address setting	No Supported	Supported
Serial Number Display	No Supported	Supported
ESI standard (1.0)	Supported	Supported
SII data check	No Supported	Supported

# GX-□D16□1/OC1601

## High-speed digital I/O terminal with the screw type terminal block for EtherCAT communications

- Detachable screw terminal block facilitates the maintenance.
- The expansion unit can be connected.  
(One expansion unit per one I/O terminal unit.)  
Input/output point can be flexibly increased depending on the system.
- Input response time can be switched for high-speed processing.
- Selectable node address setting methods: setting with rotary switch and with tool software.  
When setting the nodes with rotary switch, setting is easy and node identification becomes possible for maintenance.



## Expansion Units

One Expansion Unit can be combined with one Digital I/O Terminal (GX-ID16□1/OD16□1/OC1601). The following Expansion Units are available. They can be combined in various ways for flexible I/O capacity expansion.

Model	I/O points	Input capacity	Output capacity
XWT-ID08	8 DC inputs (NPN)	8	0
XWT-ID08-1	8 DC inputs (PNP)	8	0
XWT-OD08	8 transistor outputs (NPN)	0	8
XWT-OD08-1	8 transistor outputs (PNP)	0	8
XWT-ID16	16 DC inputs (NPN)	16	0
XWT-ID16-1	16 DC inputs (PNP)	16	0
XWT-OD16	16 transistor outputs (NPN)	0	16
XWT-OD16-1	16 transistor outputs (PNP)	0	16

## General Specifications

For Common Specifications of I/O terminals, refer to page 1.

### Input Section Specifications

#### 16-point Input Terminals

Item	Specification	
	GX-ID1611	GX-ID1621
Input capacity	16 points	
Internal I/O common	NPN	PNP
ON voltage	15 VDC min. (between each input terminal and the V terminal)	15 VDC min. (between each input terminal and the G terminal)
OFF voltage	5 VDC max. (between each input terminal and the V terminal)	5 VDC max. (between each input terminal and the G terminal)
OFF current	1.0 mA max.	
Input current	6.0 mA max./input (at 24-VDC) 3.0 mA min./input (at 17-VDC)	
ON delay	0.1 ms max.	
OFF delay	0.2 ms max.	
Input filter value	Without filter, 0.5 ms, 1 ms, 2 ms, 4 ms, 8 ms, 16 ms, 32 ms (Default setting: 1 ms)	
Number of circuits per common	16 inputs/common	
Input indicators	LED display (yellow)	
Isolation method	Photocoupler isolation	
I/O power supply method	Supply by I/O power supply	
Unit power supply current consumption	90 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
I/O power supply current consumption	5 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
Weight	180 g max.	
Expansion functions	Enabled	
Short-circuit protection function	No	

**Note:** For the I/O power supply current value to V and G terminals, refer to GX Series Operation Manual (Cat. No. W488).

### Output Section Specifications

#### 16-point Output Terminals

Item	Specification	
	GX-OD1611	GX-OD1621
Output capacity	16 points	
Rated current (ON current)	0.5 A/output, 4.0 A/common	
Internal I/O common	NPN	PNP
Residual voltage	1.2 V max. (0.5 ADC, between each output terminal and the G terminal)	1.2 V max. (0.5 ADC, between each output terminal and the V terminal)
Leakage current	0.1 mA max.	
ON delay	0.5 ms max.	
OFF delay	1.5 ms max.	
Number of circuits per common	16 points/common	
Output indicators	LED display (yellow)	
Isolation method	Photocoupler isolation	
I/O power supply method	Supply by I/O power supply	
Unit power supply current consumption	90 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
I/O power supply current consumption	5 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
Weight	180 g max.	
Expansion functions	Enabled	
Output handling for communications errors	Select either hold or clear	
Short-circuit protection function	No	

**Note:** For the I/O power supply current value to V and G terminals, refer to GX Series Operation Manual (Cat. No. W488).

#### Relay 16-point Output Terminals

Item	Specification
	GX-OC1601
Output capacity	16 points
Mounted relays	DRTA-NY5W-K
Rated load	Resistance load 250 VAC 2 A/output, common 8 A 30 VDC 2 A/output, common 8 A
Rated ON current	3 A/output
Maximum contact voltage	250 VAC, 125 VDC
Maximum contact current	3 A/output
Maximum switching capacity	750 VAAC, 90 WDC
Minimum applicable load (reference value)	5 VDC 1mA
Mechanical service life	20,000,000 operations min.
Electrical service life	100,000 operations min.
Number of circuits per common	8 points/common
Output indicators	LED display (yellow)
Isolation method	Relay isolation
I/O power supply method	The relay drive power is supplied from the unit power supply.
Unit power supply current consumption	210 mA max. (for 20.4 to 26.4-VDC power supply voltage)
Weight	290 g max.
Expansion functions	Enabled
Output handling for communications errors	Select either hold or clear
Short-circuit protection function	No

### Precautions for Correct Use

- With a current of between 2 and 3 A (8 to 10 A per common), either ensure that the number of points per common that simultaneously turn ON does not exceed 4 or ensure that the ambient temperature does not exceed 45 °C. Also, there are no restrictions if the current does not exceed 2 A (8 A per common).
- The rated current is the value for assuring normal operation, and not for assuring durability of the relays. The relay service life depends greatly on factors such as the operating temperature, the type of load, and switching conditions. The actual equipment must be checked under actual operating conditions.

## Input and Output Section Specifications

### 8-point Input and 8-point output Terminals

#### General Specifications

Item	Specification	
	GX-MD1611	GX-MD1621
Internal I/O common	NPN	PNP
I/O indicators	LED display (yellow)	
Unit power supply current consumption	80 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
Weight	190 g max.	
Expansion functions	No	
Short-circuit protection function	No	

#### Input Section

Item	Specification	
	GX-MD1611	GX-MD1621
Input capacity	8 points	
ON voltage	15 VDC min. (between each input terminal and the V terminal)	15 VDC min. (between each input terminal and the G terminal)
OFF voltage	5 VDC max. (between each input terminal and the V terminal)	5 VDC max. (between each input terminal and the G terminal)
OFF current	1.0 mA max.	
Input current	6.0 mA max./input (at 24-VDC) 3.0 mA min./input (at 17-VDC)	
ON delay	0.1 ms max.	
OFF delay	0.2 ms max.	
Input filter value	Without filter, 0.5 ms, 1 ms, 2 ms, 4 ms, 8 ms, 16 ms, 32 ms (Default setting: 1 ms)	
Number of circuits per common	8 points/common	
Isolation method	Photocoupler isolation	
I/O power supply method	Supply by I/O power supply	
I/O power supply current consumption	5 mA max. (for 20.4 to 26.4-VDC power supply voltage)	

#### Output Section

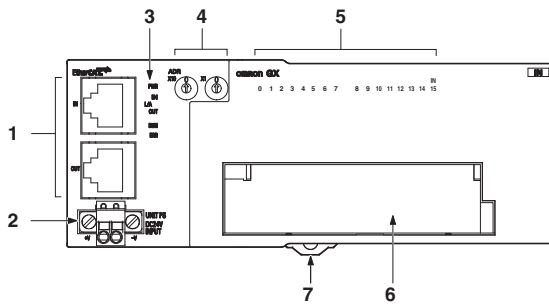
Item	Specification	
	GX-MD1611	GX-MD1621
Output capacity	8 points	
Rated output current	0.5 A/output, 2.0 A/common	
Residual voltage	1.2 V max. (0.5 ADC, between each output terminal and the G terminal)	1.2 V max. (0.5 ADC, between each output terminal and the V terminal)
Leakage current	0.1 mA max.	
ON delay	0.5 ms max.	
OFF delay	1.5 ms max.	
Number of circuits per common	8 points/common	
Isolation method	Photocoupler isolation	
I/O power supply method	Supply by I/O power supply	
I/O power supply current consumption	5 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
Output handling for communications errors	Select either hold or clear	

**Note:** For the I/O power supply current value to V and G terminals, refer to GX Series Operation Manual (Cat. No. W488).

## Components and Functions

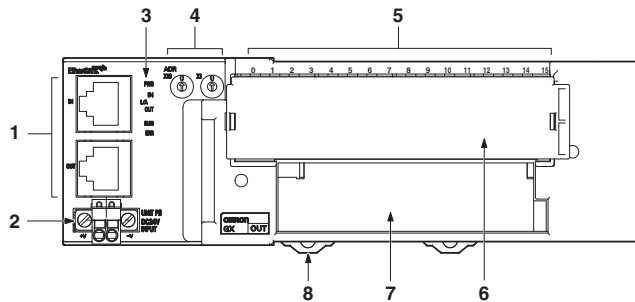
16 Inputs Terminal GX-ID1611/ID1621

16 Outputs Terminal GX-OD1611/OD1621



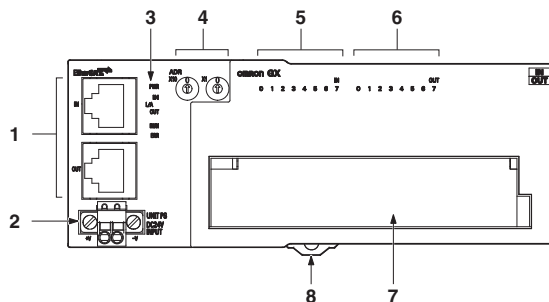
No.	Name	Function
1	Communications connector	(CN IN) Connects the communications cable which comes from the Master Unit side. (CN OUT) Connects the communications cable of the next I/O terminal.
2	Unit Power Supply Connector	Connect the unit power supply (24 VDC).
3	Status indicator	It indicates the communication state and the operation state of I/O terminals.
4	Node address Switch	It sets node addresses of terminals (decimal). Setting range is 00 to 99.
5	Input terminal: Input indicator (0 to 15) Output terminal: Output indicator (0 to 15)	Indicates the state of input/output contact (ON/OFF). Input terminal: Not lit: Contact OFF (input OFF state) Lit in yellow: Contact ON (input ON state) Output terminal: Not lit: Contact OFF (output OFF state) Lit in yellow: Contact ON (output ON state)
6	Terminal Block	Connects external devices and the I/O power supply. V, G: I/O power supply terminals 0 to 15: Input terminals
7	DIN track mounting hook	Fixes a slave to a DIN track.

Relay 16-point Output Terminals GX-OC1601



No.	Name	Function
1	Communications connector	(CN IN) Connects the communications cable which comes from the Master Unit side. (CN OUT) Connects the communications cable of the next I/O terminal.
2	Unit Power Supply Connector	Connect the unit power supply (24 VDC).
3	Status indicator	It indicates the communication state and the operation state of I/O terminals.
4	Node address Switch	It sets node addresses of terminals (decimal). Setting range is 00 to 99.
5	Output indicator (0 to 15)	Indicates the state of output contact (ON/OFF). Not lit: Contact OFF (input OFF state) Lit in yellow: Contact ON (input ON state)
6	Output Relay	Turn ON/OFF the contacts.
7	Terminal Block	Connects external devices and the I/O power supply. COM0, COM1: Common terminals 0 to 15: Output terminals
8	DIN track mounting hook	Fixes a slave to a DIN track.

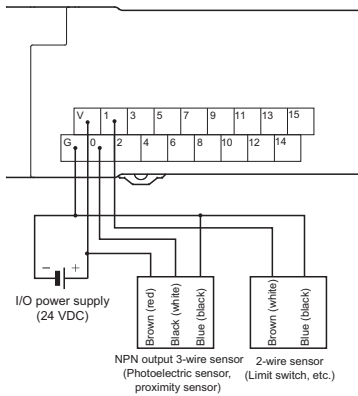
8 Inputs Terminal / 8 Outputs Terminal GX-MD1611/MD1621



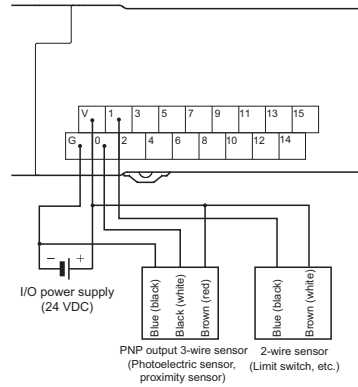
No.	Name	Function
1	Communications connector	(CN IN) Connects the communications cable which comes from the Master Unit side. (CN OUT) Connects the communications cable of the next I/O terminal.
2	Unit Power Supply Connector	Connect the unit power supply (24 VDC).
3	Status indicator	It indicates the communication state and the operation state of I/O terminals.
4	Node address Switch	It sets node addresses of terminals (decimal). Setting range is 00 to 99.
5	Input indicator (0 to 7)	Indicates the state of input contact (ON/OFF). Not lit: Contact OFF (input OFF state) Lit in yellow: Contact ON (input ON state)
6	Output indicator (0 to 7)	Indicates the state of output contact (ON/OFF). Not lit: Contact OFF (output OFF state) Lit in yellow: Contact ON (output ON state)
7	Terminal Block	Connects external devices and the I/O power supply. <Left side> V1, G1: Input I/O terminals 0 to 7: Input terminals <Right side> V2, G2: Output I/O terminals 0 to 7: Output terminals
8	DIN track mounting hook	Fixes a slave to a DIN track.

## Wiring

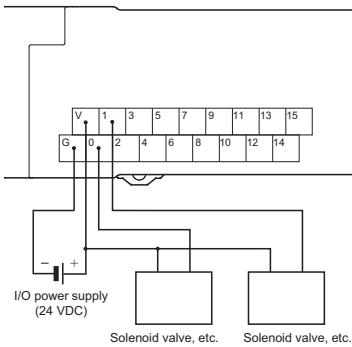
### GX-ID1611 (NPN)



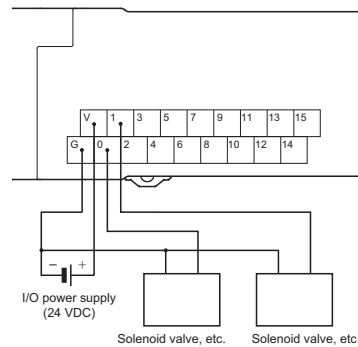
### GX-ID1621 (PNP)



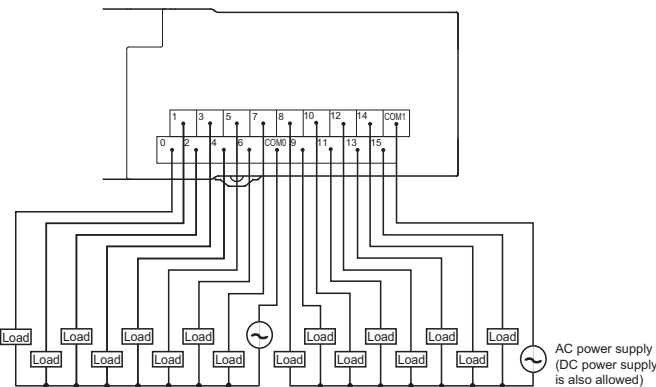
### GX-OD1611 (NPN)



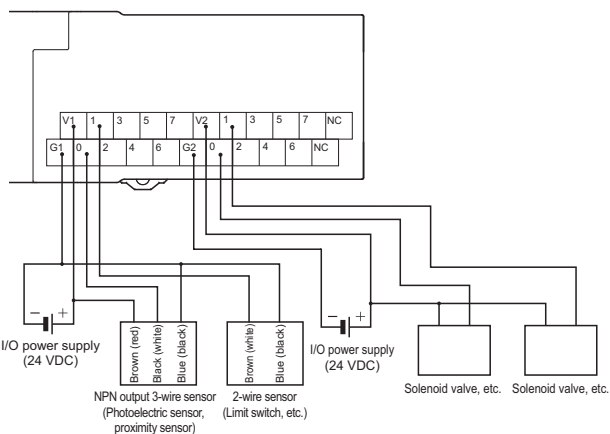
### GX-OD1621 (PNP)



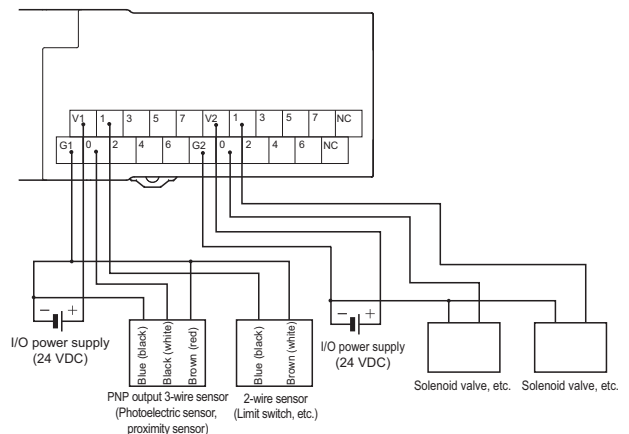
### GX-OC1601



### GX-MD1611 (NPN)



### GX-MD1621 (PNP)



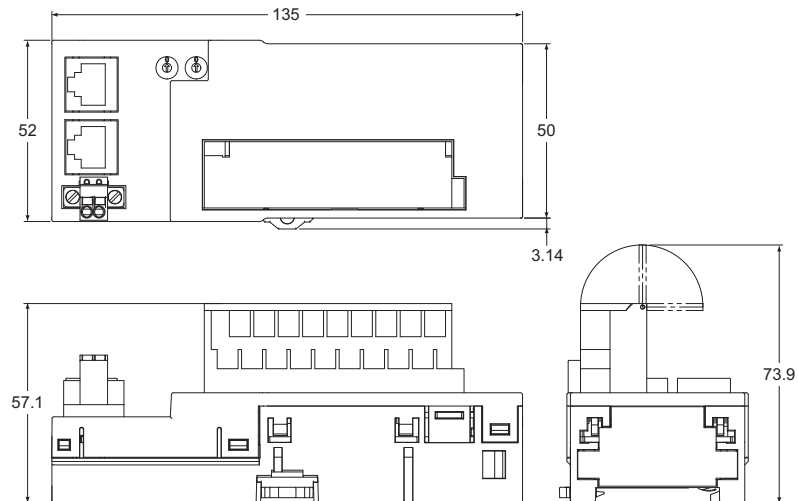
**Note:** Wire colors have been changed according to revisions in the JIS standards for photoelectric and proximity sensors. The colors in parentheses are the wire colors prior to the revisions.

# GX-Series Digital I/O Terminal 2-tier Terminal Block Type

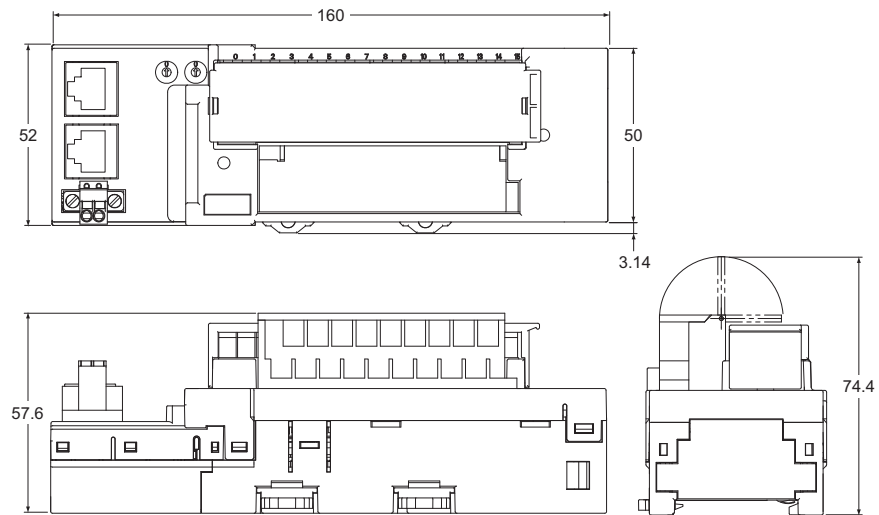
## Dimensions

(Unit: mm)

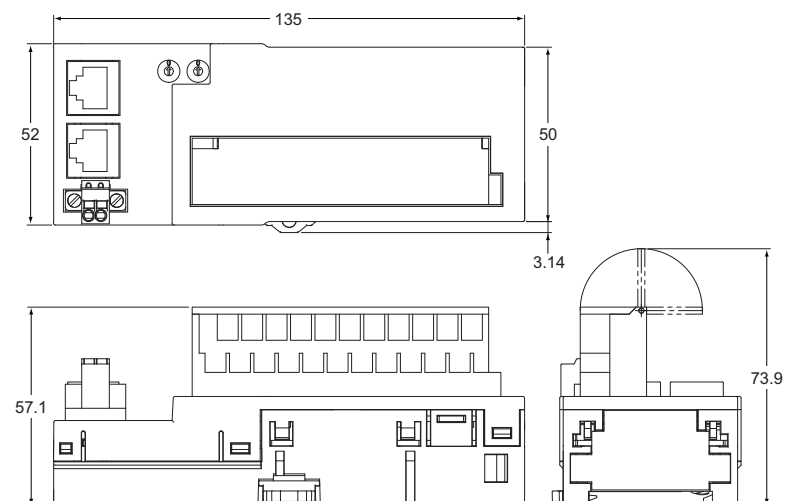
GX-ID1611/ID1621  
GX-OD1611/OD1621



GX-OC1601



GX-MD1611/MD1621

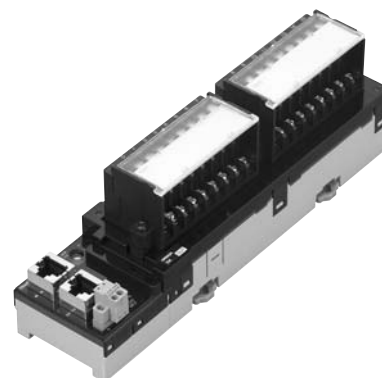




**A common terminal is provided for each contact.**

**It eliminate the needs for relay terminal blocks**

- It is unnecessary to share the common terminal among multiple contacts.  
Easy-to-find wiring locations.
- Detachable screw terminal block facilitates the maintenance.
- Input response time can be switched for high-speed processing.
- Selectable node address setting methods: setting with rotary switch and with tool software.  
When setting the nodes with rotary switch, setting is easy and node identification becomes possible for maintenance.



## General Specifications

For Common Specifications of I/O terminals, refer to page 1.

### Input Section Specifications

#### 16-point Input Terminals

Item	Specification	
	GX-ID1612	GX-ID1622
Input capacity	16 points	
Internal I/O common	NPN	PNP
ON voltage	15 VDC min. (between each input terminal and the V terminal)	15 VDC min. (between each input terminal and the G terminal)
OFF voltage	5 VDC max. (between each input terminal and the V terminal)	5 VDC max. (between each input terminal and the G terminal)
OFF current	1.0 mA max.	
Input current	6.0 mA max./input (at 24-VDC) 3.0 mA min./input (at 17-VDC)	
ON delay	0.1 ms max.	
OFF delay	0.2 ms max.	
Input filter value	Without filter, 0.5 ms, 1 ms, 2 ms, 4 ms, 8 ms, 16 ms, 32 ms (Default setting: 1 ms)	
Number of circuits per common	8 points/common	
Input indicators	LED display (yellow)	
Isolation method	Photocoupler isolation	
I/O power supply method	Supply by I/O power supply	
Input device supply current	100 mA/point	
Unit power supply current consumption	90 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
I/O power supply current consumption	5 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
Weight	370 g max.	
Expansion functions	No	
Short-circuit protection function	No	

**Note:** For the I/O power supply current value to V and G terminals, refer to GX Series Operation Manual (Cat. No. W488).

### Output Section Specifications

#### 16-point Output Terminals

Item	Specification	
	GX-OD1612	GX-OD1622
Output capacity	16 points	
Rated current (ON current)	0.5 A/output, 4.0 A/common	
Internal I/O common	NPN	PNP
Residual voltage	1.2 V max. (0.5 ADC, between each output terminal and the G terminal)	1.2 V max. (0.5 ADC, between each output terminal and the V terminal)
Leakage current	0.1 mA max.	
ON delay	0.5 ms max.	
OFF delay	1.5 ms max.	
Number of circuits per common	8 points/common	
Output indicators	LED display (yellow)	
Isolation method	Photocoupler isolation	
I/O power supply method	Supply by I/O power supply	
Output device supply current	100 mA/point	
Unit power supply current consumption	90 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
I/O power supply current consumption	5 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
Weight	370 g max.	
Expansion functions	No	
Output handling for communications errors	Select either hold or clear	
Short-circuit protection function	No	

**Note:** For the I/O power supply current value to V and G terminals, refer to GX Series Operation Manual (Cat. No. W488).

## Input and Output Section Specifications

### 8-point Input and 8-point output Terminals

#### General Specifications

Item	Specification	
	GX-MD1612	GX-MD1622
Internal I/O common	NPN	PNP
I/O indicators	LED display (yellow)	
Unit power supply current consumption	90 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
Weight	370 g max.	
Expansion functions	No	
Short-circuit protection function	No	

#### Input Section

Item	Specification	
	GX-MD1612	GX-MD1622
Input capacity	8 points	
ON voltage	15 VDC min. (between each input terminal and the V terminal)	15 VDC min. (between each input terminal and the G terminal)
OFF voltage	5 VDC max. (between each input terminal and the V terminal)	5 VDC max. (between each input terminal and the G terminal)
OFF current	1.0 mA max./input	
Input current	6.0 mA max./input (at 24-VDC) 3.0 mA min./input (at 17-VDC)	
ON delay	0.1 ms max.	
OFF delay	0.2 ms max.	
Input filter value	Without filter, 0.5 ms, 1 ms, 2 ms, 4 ms, 8 ms, 16 ms, 32 ms (Default setting: 1 ms)	
Number of circuits per common	8 points/common	
Isolation method	Photocoupler isolation	
I/O power supply method	Supply by I/O power supply	
Input device supply current	100 mA/point	
I/O power supply current consumption	5 mA max. (for 20.4 to 26.4-VDC power supply voltage)	

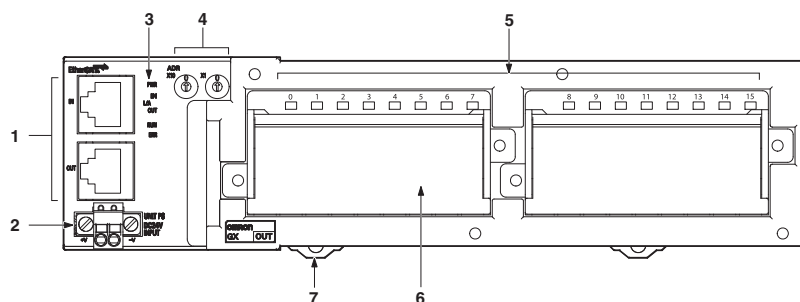
#### Output Section

Item	Specification	
	GX-MD1612	GX-MD1622
Output capacity	8 points	
Rated output current	0.5 A/output, 2.0 A/common	
Residual voltage	1.2 V max. (0.5 ADC, between each output terminal and the G terminal)	1.2 V max. (0.5 ADC, between each output terminal and the V terminal)
Leakage current	0.1 mA max.	
ON delay	0.5 ms max.	
OFF delay	1.5 ms max.	
Number of circuits per common	8 points/common	
Isolation method	Photocoupler isolation	
I/O power supply method	Supply by I/O power supply	
Output device supply current	100 mA/point	
I/O power supply current consumption	5 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
Output handling for communications errors	Select either hold or clear	

**Note:** For the I/O power supply current value to V and G terminals, refer to GX-Series Operation Manual (Cat. No. W488).

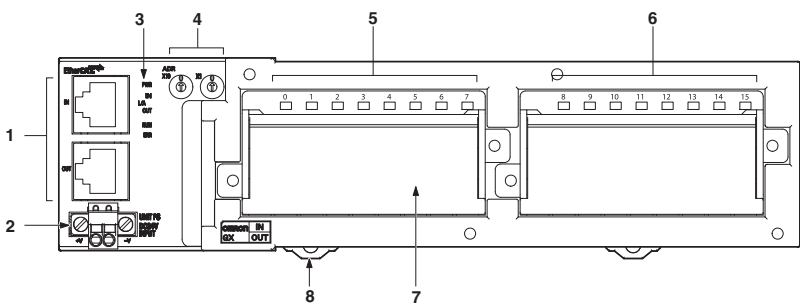
## Components and Functions

16 Inputs Terminal GX-ID1612/ID1622  
16 Outputs Terminal GX-OD1612/OD1622



No.	Name	Function
1	Communications connector	(CN IN) Connects the communications cable which comes from the Master Unit side. (CN OUT) Connects the communications cable of the next I/O terminal.
2	Unit Power Supply Connector	Connect the unit power supply (24 VDC).
3	Status indicator	It indicates the communication state and the operation state of I/O terminals.
4	Node address Switch	It sets node addresses of terminals (decimal). Setting range is 00 to 99.
5	Input terminal: Input indicator (0 to 15) Output terminal: Output indicator (0 to 15)	Indicates the state of input/output contact (ON/OFF). Input terminal: Not lit: Contact OFF (input OFF state) Lit in yellow: Contact ON (input ON state) Output terminal: Not lit: Contact OFF (output OFF state) Lit in yellow: Contact ON (output ON state)
6	Terminal Block	Connects external devices and the I/O power supply. <Left side> V1, G1: I/O power supply terminals 0 to 7: Output terminals <Right side> V2, G2: I/O power supply terminals 8 to 15: Input terminals (Output terminals)
7	DIN track mounting hook	Fixes a slave to a DIN track.

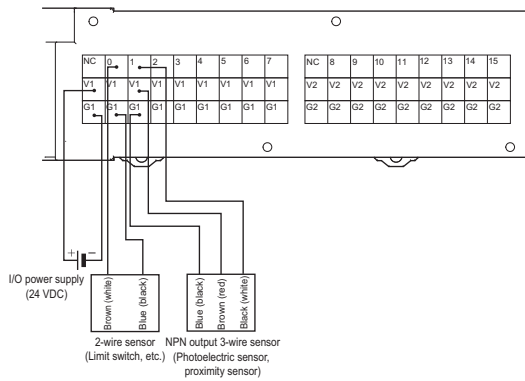
### 8 Inputs Terminal / 8 Outputs Terminal GX-MD1612/MD1622



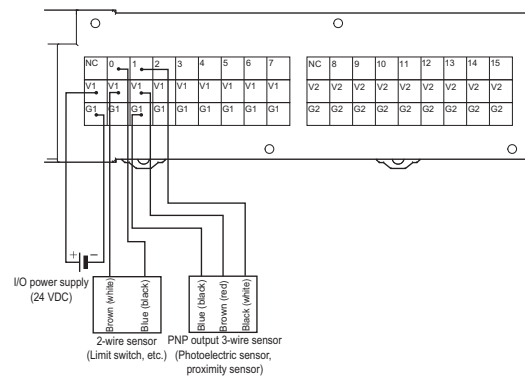
No.	Name	Function
1	Communications connector	(CN IN) Connects the communications cable which comes from the Master Unit side. (CN OUT) Connects the communications cable of the next I/O terminal.
2	Unit Power Supply Connector	Connect the unit power supply (24 VDC).
3	Status indicator	It indicates the communication state and the operation state of I/O terminals.
4	Node address Switch	It sets node addresses of terminals (decimal). Setting range is 00 to 99.
5	Input indicator (0 to 7)	Indicates the state of input contact (ON/OFF). Not lit: Contact OFF (input OFF state) Lit in yellow: Contact ON (input ON state)
6	Output indicator (0 to 7)	Indicates the state of output contact (ON/OFF). Not lit: Contact OFF (output OFF state) Lit in yellow: Contact ON (output ON state)
7	Terminal Block	Connects external devices and the I/O power supply. <Left side> V1, G1: Input I/O power supply terminals 0 to 7: Input terminals <Right side> V2, G2: Output I/O power supply terminals 0 to 7: Output terminals
8	DIN track mounting hook	Fixes a slave to a DIN track.

## Wiring

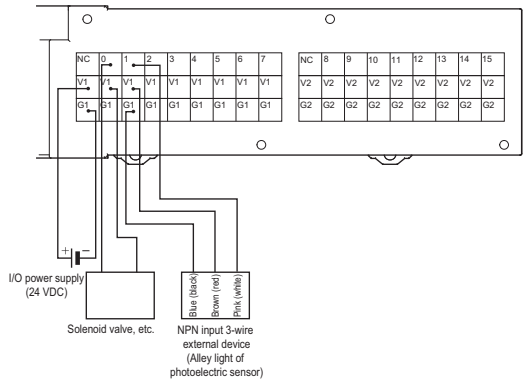
### GX-ID1612 (NPN)



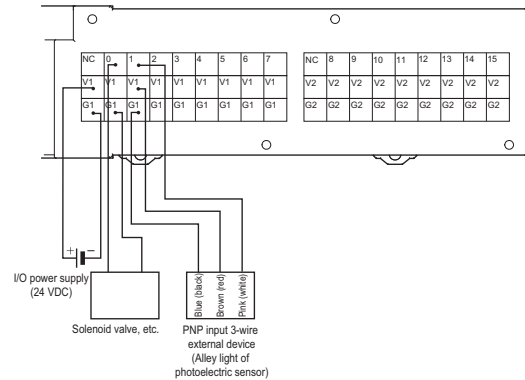
### GX-ID1622 (PNP)



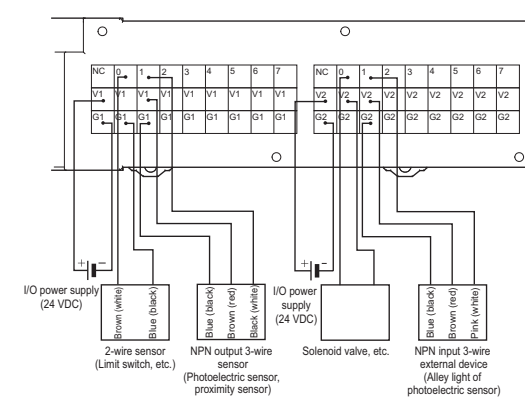
### GX-OD1612 (NPN)



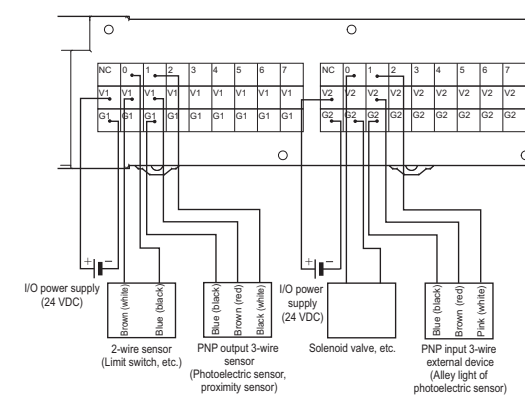
### GX-OD1622 (PNP)



### GX-MD1612 (NPN)



### GX-MD1622 (PNP)

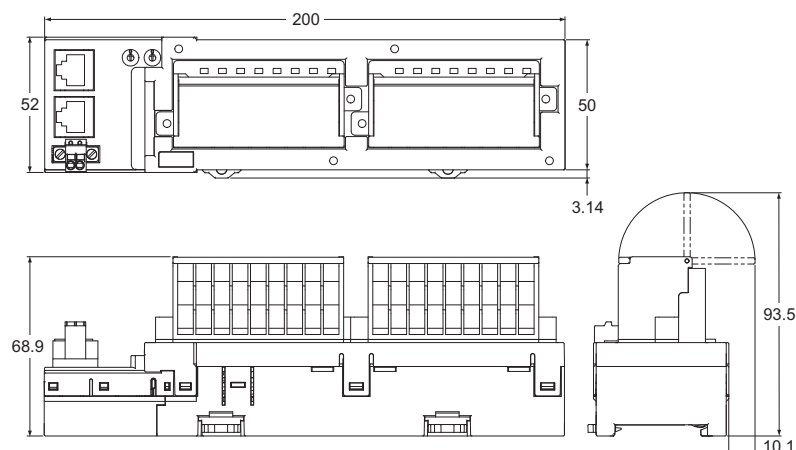


**Note:** Wire colors have been changed according to revisions in the JIS standards for photoelectric and proximity sensors. The colors in parentheses are the wire colors prior to the revisions.

## Dimensions

(Unit: mm)

GX-ID1612/ID1622  
GX-OD1612/OD1622  
GX-MD1612/MD1622

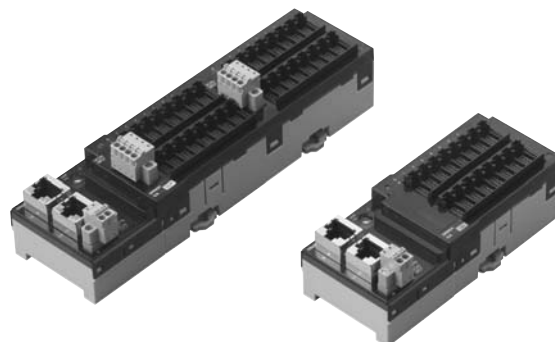


## Easy wiring using industry standard e-CON connectors.

## Special wiring tool is not necessary

- Digital I/O terminal with industry standard e-CON connectors.
- A common terminal is provided for each connector.  
The I/O terminal and the sensors can be connected directly.
- Input response time can be switched for high-speed processing.
- Selectable node address setting methods: setting with rotary switch and with tool software.

When setting the nodes with rotary switch, setting is easy and node identification becomes possible for maintenance.



## General Specifications

For Common Specifications of I/O terminals, refer to page 1.

### Input Section Specifications

#### 16-point Input Terminals

Item	Specification	
	GX-ID1618	GX-ID1628
Input capacity	16 points	
Internal I/O common	NPN	PNP
ON voltage	15 VDC min. (between each input terminal and the V terminal)	15 VDC min. (between each input terminal and the G terminal)
OFF voltage	5 VDC max. (between each input terminal and the V terminal)	5 VDC max. (between each input terminal and the G terminal)
OFF current	1.0 mA max.	
Input current	6.0 mA max./input (at 24-VDC) 3.0 mA min./input (at 17-VDC)	
ON delay	0.1 ms max.	
OFF delay	0.2 ms max.	
Input filter value	Without filter, 0.5 ms, 1 ms, 2 ms, 4 ms, 8 ms, 16 ms, 32 ms (Default setting: 1 ms)	
Number of circuits per common	16 points/common	
Input indicators	LED display (yellow)	
Isolation method	No isolation	
I/O power supply method	Supplied from unit power supply	
Input device supply current	50 mA/point	
Unit power supply current consumption	150 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
e-CON Connector insertion durability	50 times	
Weight	140 g max.	
Expansion functions	No	
Short-circuit protection function	Available (Operates at 50 mA/point min.)	

**Note:** For the I/O power supply current value to V and G terminals, refer to GX Series Operation Manual (Cat. No. W488).

#### 32-point Input Terminals

Item	Specification	
	GX-ID3218	GX-ID3228
Input capacity	32 points	
Internal I/O common	NPN	PNP
ON voltage	15 VDC min. (between each input terminal and the V terminal)	15 VDC min. (between each input terminal and the G terminal)
OFF voltage	5 VDC max. (between each input terminal and the V terminal)	5 VDC max. (between each input terminal and the G terminal)
OFF current	1.0 mA max.	
Input current	6.0 mA max./input (at 24-VDC) 3.0 mA min./input (at 17-VDC)	
ON delay	0.1 ms max.	
OFF delay	0.2 ms max.	
Input filter value	Without filter, 0.5 ms, 1 ms, 2 ms, 4 ms, 8 ms, 16 ms, 32 ms (Default setting: 1 ms)	
Number of circuits per common	32 points/common	
Input indicators	LED display (yellow)	
Isolation method	No isolation	
I/O power supply method	Supplied from unit power supply	
Input device supply current	50 mA/point	
Unit power supply current consumption	230 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
e-CON Connector insertion durability	50 times	
Weight	220 g max.	
Expansion functions	No	
Short-circuit protection function	Available (Operates at 50 mA/point min.)	

**Note:** For the I/O power supply current value to V and G terminals, refer to GX Series Operation Manual (Cat. No. W488).

## Output Section Specifications

### 16-point Output Terminals

Item	Specification	
	GX-OD1618	GX-OD1628
Output capacity	16 points	
Rated current (ON current)	0.5 A/output, 4.0 A/common	
Internal I/O common	NPN	PNP
Residual voltage	1.2 V max. (0.5 ADC, between each output terminal and the G terminal)	1.2 V max. (0.5 ADC, between each output terminal and the V terminal)
Leakage current	0.1 mA max.	
ON delay	0.5 ms max.	
OFF delay	1.5 ms max.	
Number of circuits per common	16 points/common	
Output indicators	LED display (yellow)	
Isolation method	Photocoupler isolation	
I/O power supply method	Supply by I/O power supply	
Output device supply current	100 mA/point	
Unit power supply current consumption	80 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
Current consumption from I/O power supply	10 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
e-CON Connector insertion durability	50 times	
Weight	130 g max.	
Expansion functions	No	
Output handling for communications errors	Select either hold or clear	
Short-circuit protection function	No	

**Note:** For the I/O power supply current value to V and G terminals, refer to GX Series Operation Manual (Cat. No. W488).

### 32-point Output Terminals

Item	Specification	
	GX-OD3218	GX-OD3228
Output capacity	32 points	
Rated current (ON current)	0.5 A/output, 4.0 A/common	
Internal I/O common	NPN	PNP
Residual voltage	1.2 V max. (0.5 ADC, between each output terminal and the G terminal)	1.2 V max. (0.5 ADC, between each output terminal and the V terminal)
Leakage current	0.1 mA max.	
ON delay	0.5 ms max.	
OFF delay	1.5 ms max.	
Number of circuits per common	16 points/common	
Output indicators	LED display (yellow)	
Isolation method	Photocoupler isolation	
I/O power supply method	Supply by I/O power supply	
Output device supply current	100 mA/point	
Unit power supply current consumption	100 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
Current consumption from I/O power supply	10 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
e-CON Connector insertion durability	50 times	
Weight	210 g max.	
Expansion functions	No	
Output handling for communications errors	Select either hold or clear	
Short-circuit protection function	No	

**Note:** For the I/O power supply current value to V and G terminals, refer to GX Series Operation Manual (Cat. No. W488).

## Input and Output Section Specifications

### 8-point Input and 8-point output Terminals

#### General Specifications

Item	Specification	
	GX-MD1618	GX-MD1628
Internal I/O common	NPN	PNP
I/O indicators	LED display (yellow)	
Unit power supply current consumption	120 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
e-CON Connector insertion durability	50 times	
Weight	140 g max.	
Expansion functions	No	
Short-circuit protection function	Available at input section only (Operates at 50 mA/point min.)	

# GX-Series Digital I/O Terminal e-CON Connector Type

## Input Section

Item	Specification	
	GX-MD1618	GX-MD1628
Input capacity	8 points	
ON voltage	15 VDC min. (between each input terminal and the V terminal)	15 VDC min. (between each input terminal and the G terminal)
OFF voltage	5 VDC max. (between each input terminal and the V terminal)	5 VDC max. (between each input terminal and the G terminal)
OFF current	1.0 mA max.	
Input current	6.0 mA max./input (at 24-VDC) 3.0 mA min./input (at 17-VDC)	
ON delay	0.1 ms max.	
OFF delay	0.2 ms max.	
Input filter value	Without filter, 0.5 ms, 1 ms, 2 ms, 4 ms, 8 ms, 16 ms, 32 ms (Default setting: 1 ms)	
Number of circuits per common	8 points/common	
Isolation method	No-isolation	
I/O power supply method	Supplied from unit power supply	
Input device supply current	50 mA/point	
I/O power supply current consumption	5 mA max. (for 20.4 to 26.4-VDC power supply voltage)	

## Output Section

Item	Specification	
	GX-MD1618	GX-MD1628
Output capacity	8 points	
Rated output current	0.5 A/output, 2.0 A/common	
Residual voltage	1.2 V max. (0.5 ADC, between each output terminal and the G terminal)	1.2 V max. (0.5 ADC, between each output terminal and the V terminal)
Leakage current	0.1 mA max.	
ON delay	0.5 ms max.	
OFF delay	1.5 ms max.	
Number of circuits per common	8 points/common	
Isolation method	Photocoupler isolation	
I/O power supply method	Supply by I/O power supply	
Output device supply current	100 mA/point	
I/O power supply current consumption	5 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
Output handling for communications errors	Select either hold or clear	

**Note:** For the I/O power supply current value to V and G terminals, refer to GX Series Operation Manual (Cat. No. W488).

## 16-point Input and 16-point output Terminals

### General Specifications

Item	Specification	
	GX-MD3218	GX-MD3228
Internal I/O common	NPN	PNP
I/O indicators	LED display (yellow)	
Unit power supply current consumption	140 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
e-CON Connector insertion durability	50 times	
Weight	220 g max.	
Expansion functions	No	
Short-circuit protection function	Available at input section only (Operates at 50 mA/point min.)	

## Input Section

Item	Specification	
	GX-MD3218	GX-MD3228
Input capacity	16 points	
ON voltage	15 VDC min. (between each input terminal and the V terminal)	15 VDC min. (between each input terminal and the G terminal)
OFF voltage	5 VDC max. (between each input terminal and the V terminal)	5 VDC max. (between each input terminal and the G terminal)
OFF current	1.0 mA max.	
Input current	6.0 mA max./input (at 24-VDC) 3.0 mA min./input (at 17-VDC)	
ON delay	0.1 ms max.	
OFF delay	0.2 ms max.	
Input filter value	Without filter, 0.5 ms, 1 ms, 2 ms, 4 ms, 8 ms, 16 ms, 32 ms (Default setting: 1 ms)	
Number of circuits per common	16 points/common	
Isolation method	No-isolation	
I/O power supply method	Supplied from unit power supply	
Input device supply current	50 mA/point	
I/O power supply current consumption	5 mA max. (for 20.4 to 26.4-VDC power supply voltage)	

## Output Section

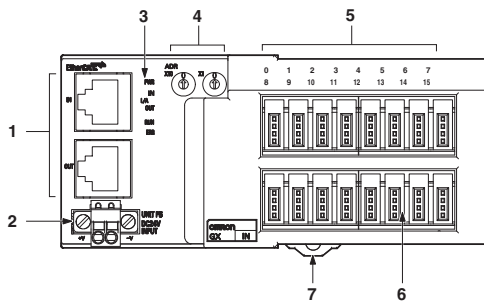
Item	Specification	
	GX-MD3218	GX-MD3228
Output capacity	16 points	
Rated output current	0.5 A/output, 2.0 A/common	
Residual voltage	1.2 V max. (0.5 ADC, between each output terminal and the G terminal)	1.2 V max. (0.5 ADC, between each output terminal and the V terminal)
Leakage current	0.1 mA max.	
ON delay	0.5 ms max.	
OFF delay	1.5 ms max.	
Number of circuits per common	16 points/common	
Isolation method	Photocoupler isolation	
I/O power supply method	Supply by I/O power supply	
Output device supply current	100 mA/point	
I/O power supply current consumption	5 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
Output handling for communications errors	Select either hold or clear	

**Note:** For the I/O power supply current value to V and G terminals, refer to GX Series Operation Manual (Cat. No. W488).



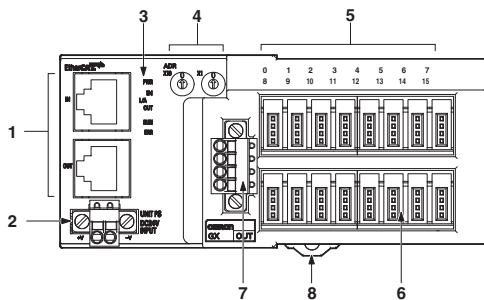
## Components and Functions

### 16 Inputs Terminal GX-ID1618/ID1628



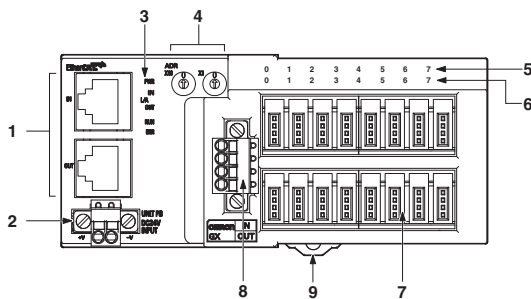
No.	Name	Function
1	Communications connector	(CN IN) Connects the communications cable which comes from the Master Unit side. (CN OUT) Connects the communications cable of the next I/O terminal.
2	Unit Power Supply Connector	Connect the unit power supply (24 VDC).
3	Status indicator	It indicates the communication state and the operation state of I/O terminals.
4	Node address Switch	It sets node addresses of terminals (decimal). Setting range is 00 to 99.
5	Input indicator (0 to 15)	Indicates the state of input contact (ON/OFF). Not lit: Contact OFF (input OFF state) Lit in yellow: Contact ON (input ON state)
6	I/O connector (0 to 15)	Connects an external device.
7	DIN track mounting hook	Fixes a slave to a DIN track.

### 16 Outputs Terminal GX-OD1618/OD1628



No.	Name	Function
1	Communications connector	(CN IN) Connects the communications cable which comes from the Master Unit side. (CN OUT) Connects the communications cable of the next I/O terminal.
2	Unit Power Supply Connector	Connect the unit power supply (24 VDC).
3	Status indicator	It indicates the communication state and the operation state of I/O terminals.
4	Node address Switch	It sets node addresses of terminals (decimal). Setting range is 00 to 99.
5	Output indicator (0 to 15)	Indicates the state of output contact (ON/OFF). Not lit: Contact OFF (output OFF state) Lit in yellow: Contact ON (output ON state)
6	I/O connector (0 to 15)	Connects an external device.
7	I/O power supply connector	Supplies the I/O power.
8	DIN track mounting hook	Fixes a slave to a DIN track.

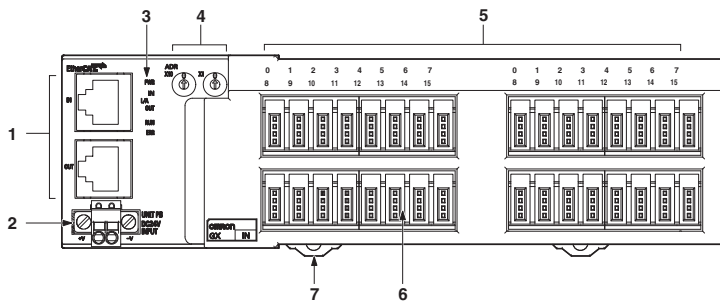
### 8 Inputs/8 Outputs Terminal GX-MD1618/MD1628



No.	Name	Function
1	Communications connector	(CN IN) Connects the communications cable which comes from the Master Unit side. (CN OUT) Connects the communications cable of the next I/O terminal.
2	Unit Power Supply Connector	Connect the unit power supply (24 VDC).
3	Status indicator	It indicates the communication state and the operation state of I/O terminals.
4	Node address Switch	It sets node addresses of terminals (decimal). Setting range is 00 to 99.
5	Input indicator (0 to 7)	Indicates the state of input contact (ON/OFF). Not lit: Contact OFF (input OFF state) Lit in yellow: Contact ON (input ON state)
6	Output indicator (0 to 7)	Indicates the state of output contact (ON/OFF). Not lit: Contact OFF (output OFF state) Lit in yellow: Contact ON (output ON state)
7	I/O connector (0 to 15)	Connects an external device. <Top side> For input device <Bottom side> For output device
8	I/O power supply connector	Supplies the I/O power. (For output device)
9	DIN track mounting hook	Fixes a slave to a DIN track.

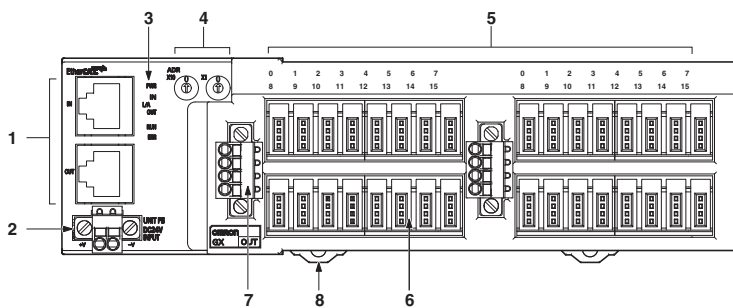


## 32 Inputs Terminal GX-ID3218/ID3228



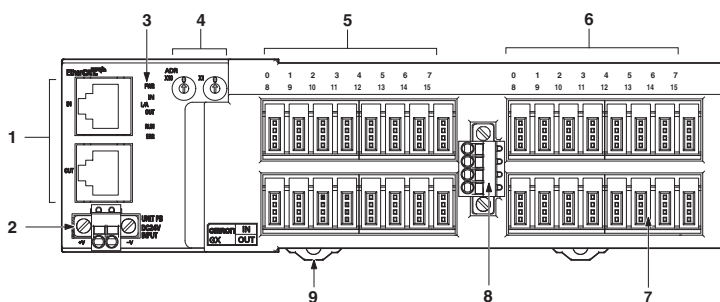
No.	Name	Function
1	Communications connector	(CN IN) Connects the communications cable which comes from the Master Unit side. (CN OUT) Connects the communications cable of the next I/O terminal.
2	Unit Power Supply Connector	Connect the unit power supply (24 VDC).
3	Status indicator	It indicates the communication state and the operation state of I/O terminals.
4	Node address Switch	It sets node addresses of terminals (decimal). Setting range is 00 to 99.
5	Input indicator (IN1 0 to 15, IN2 0 to 15)	Indicates the state of input contact (ON/OFF). Input terminal: Not lit: Contact OFF (input OFF state) Lit in yellow: Contact ON (input ON state)
6	I/O connector (0 to 15 × 2)	Connects an external device.
7	DIN track mounting hook	Fixes a slave to a DIN track.

## 32 Outputs Terminal GX-OD3218/OD3228



No.	Name	Function
1	Communications connector	(CN IN) Connects the communications cable which comes from the Master Unit side. (CN OUT) Connects the communications cable of the next I/O terminal.
2	Unit Power Supply Connector	Connect the unit power supply (24 VDC).
3	Status indicator	It indicates the communication state and the operation state of I/O terminals.
4	Node address Switch	It sets node addresses of terminals (decimal). Setting range is 00 to 99.
5	Output indicator (OUT1 0 to 15, OUT2 0 to 15)	Indicates the state of output contact (ON/OFF). Not lit: Contact OFF (output OFF state) Lit in yellow: Contact ON (output ON state)
6	I/O connector (0 to 15 × 2)	Connects an external device.
7	I/O power supply connector	Supplies the I/O power.
8	DIN track mounting hook	Fixes a slave to a DIN track.

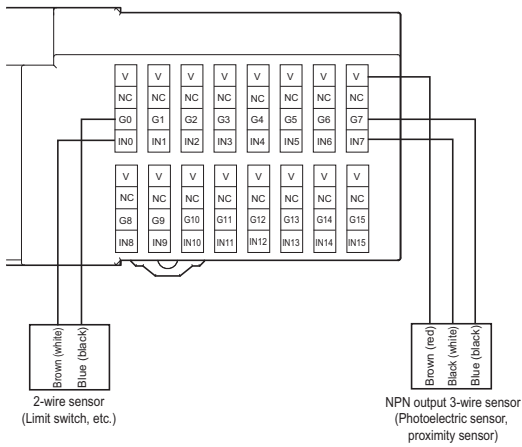
## 16 Inputs/16 Outputs Terminal GX-MD3218/MD3228



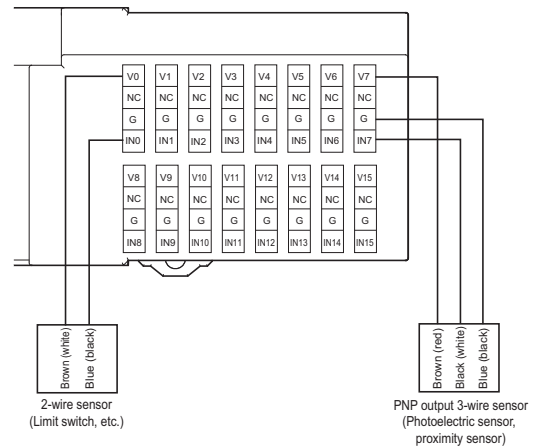
No.	Name	Function
1	Communications connector	(CN IN) Connects the communications cable which comes from the Master Unit side. (CN OUT) Connects the communications cable of the next I/O terminal.
2	Unit Power Supply Connector	Connect the unit power supply (24 VDC).
3	Status indicator	It indicates the communication state and the operation state of I/O terminals.
4	Node address Switch	It sets node addresses of terminals (decimal). Setting range is 00 to 99.
5	Input indicator (0 to 15)	Indicates the state of input contact (ON/OFF). Not lit: Contact OFF (input OFF state) Lit in yellow: Contact ON (input ON state)
6	Output indicator (0 to 15)	Indicates the state of output contact (ON/OFF). Not lit: Contact OFF (output OFF state) Lit in yellow: Contact ON (output ON state)
7	I/O connector (0 to 15 × 2)	Connects an external device. <Top side> For input device <Bottom side> For output device
8	I/O power supply connector	Supplies the I/O power. (For output device)
9	DIN track mounting hook	Fixes a slave to a DIN track.

## Wiring

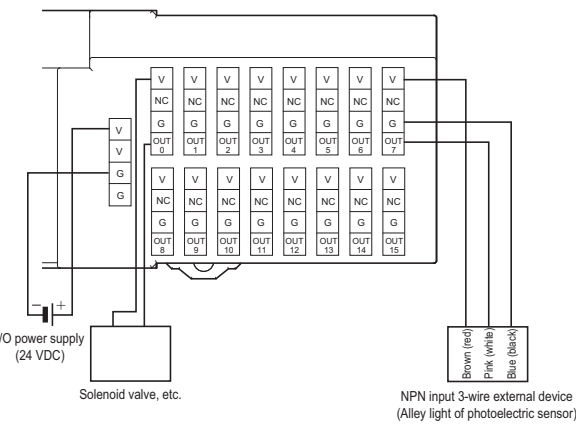
### GX-ID1618 (NPN)



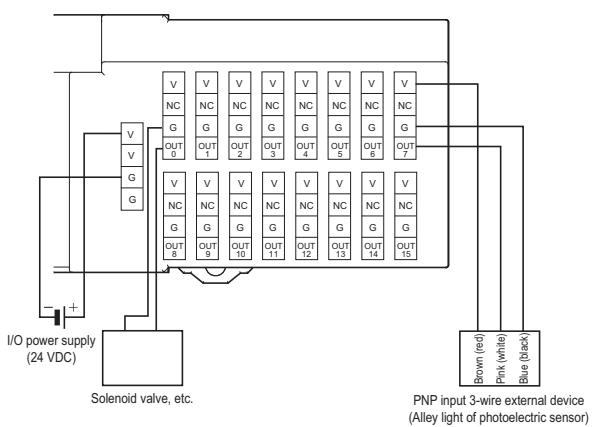
### GX-ID1628 (PNP)



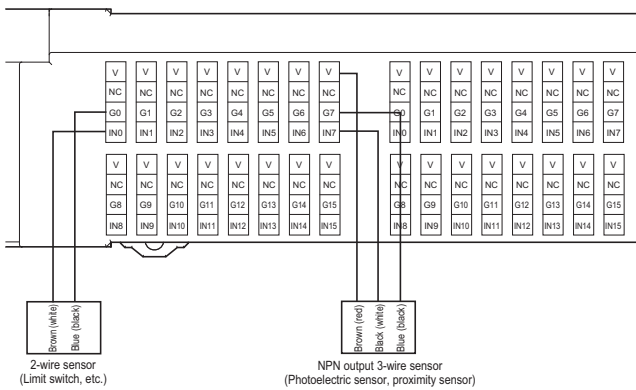
### GX-OD1618 (NPN)



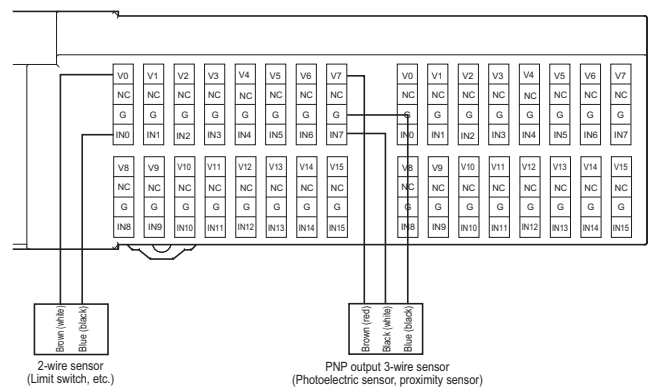
### GX-OD1628 (PNP)



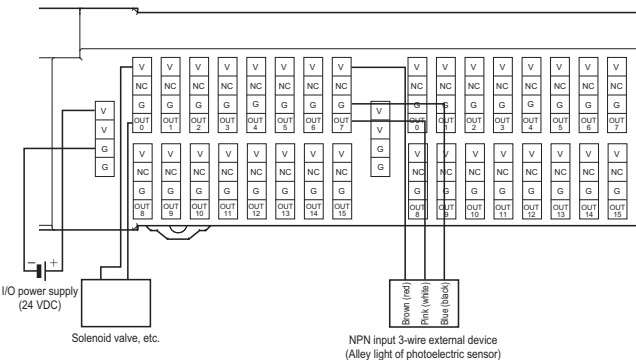
### GX-ID3218 (NPN)



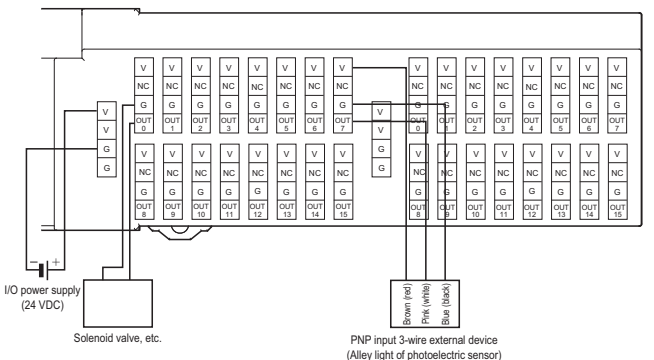
### GX-ID3228 (PNP)



### GX-OD3218 (NPN)

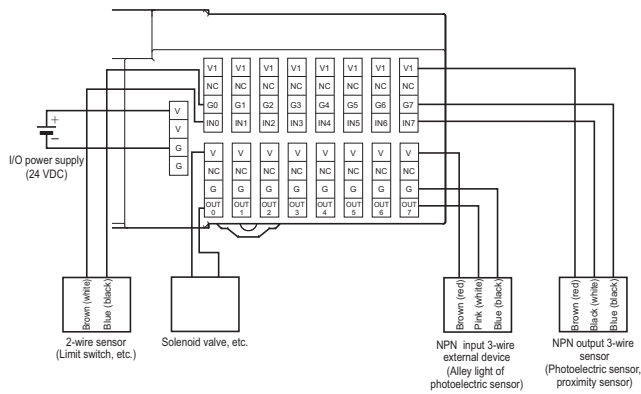


### GX-OD3228 (PNP)

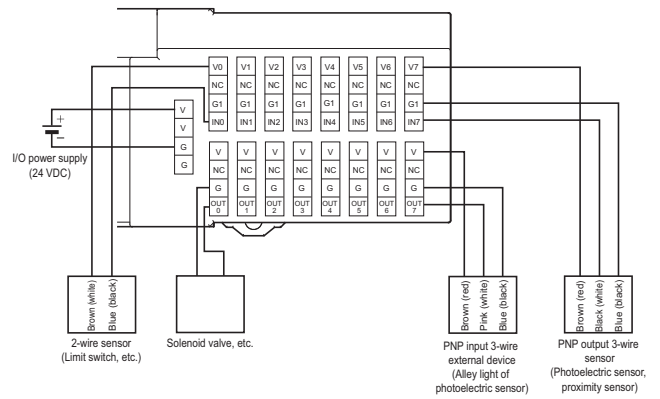


# GX-Series Digital I/O Terminal e-CON Connector Type

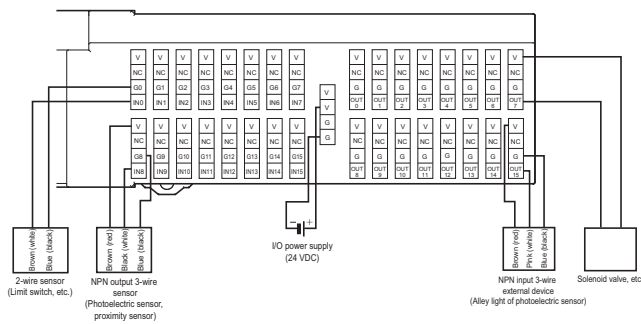
**GX-MD1618 (NPN)**



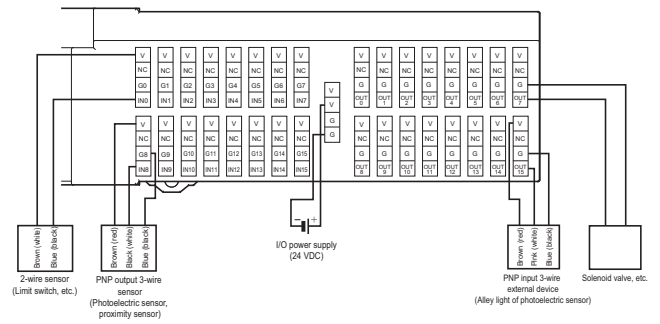
**GX-MD1628 (PNP)**



**GX-MD3218 (NPN)**



**GX-MD3228 (PNP)**

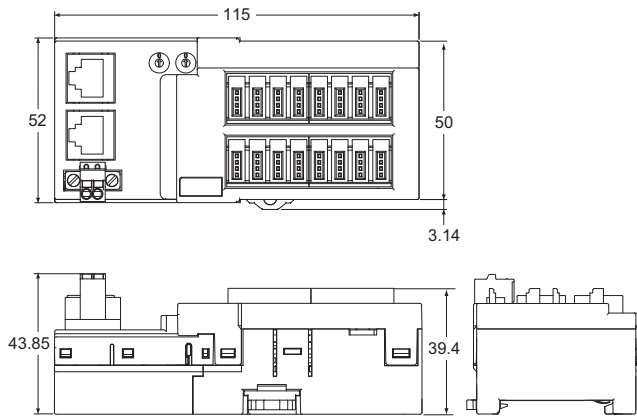


**Note:** Wire colors have been changed according to revisions in the JIS standards for photoelectric and proximity sensors. The colors in parentheses are the wire colors prior to the revisions.

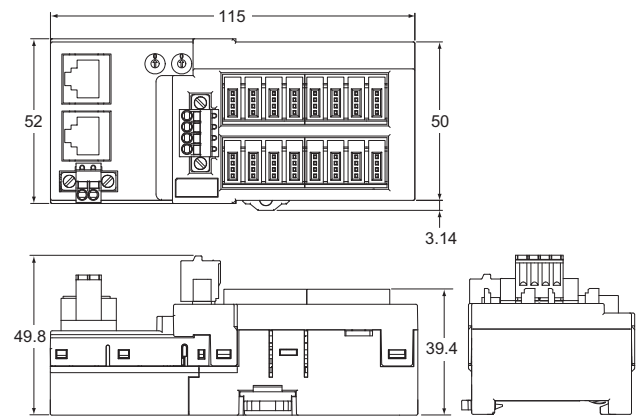
## Dimensions

(Unit: mm)

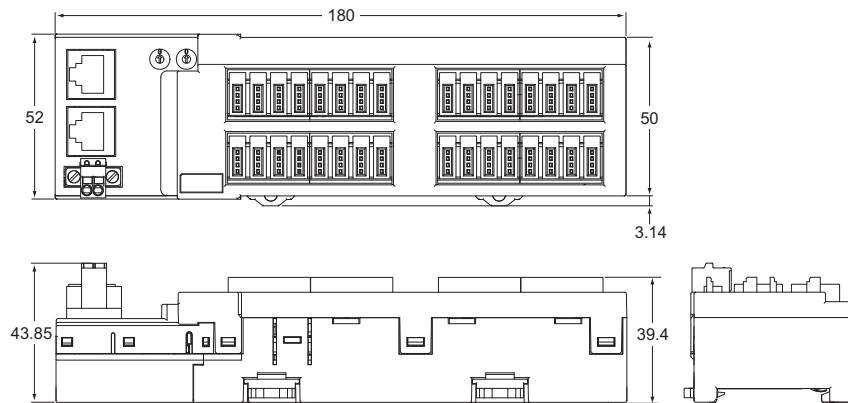
**GX-ID1618/ID1628**



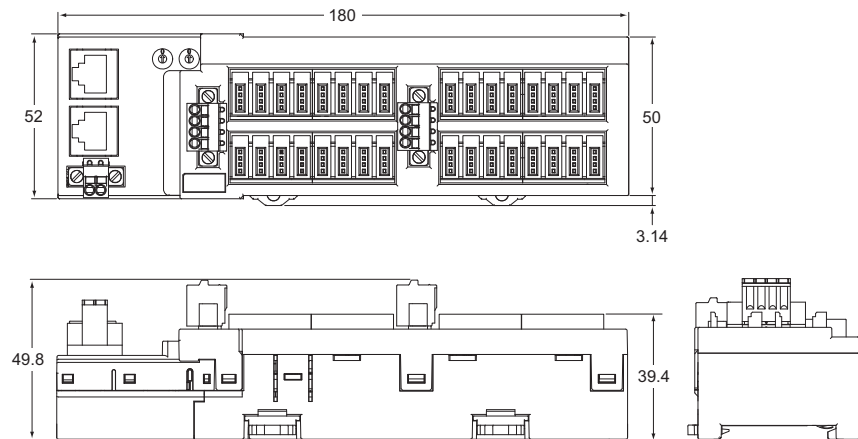
**GX-OD1618/OD1628  
GX-MD1618/MD1628**



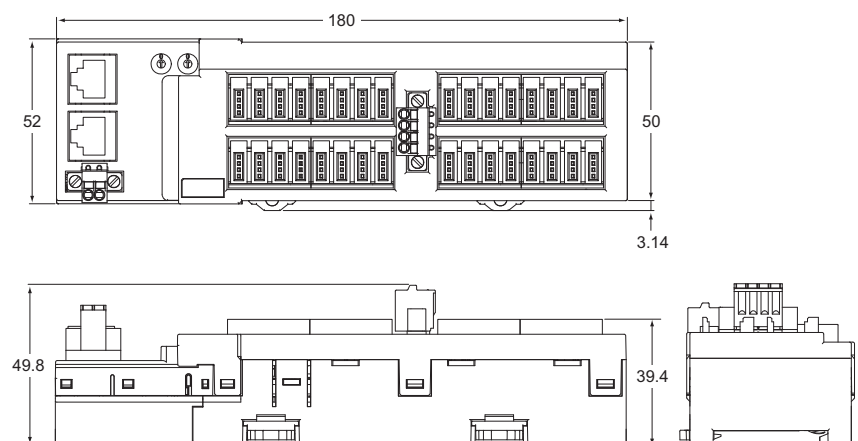
**GX-ID3218/ID3228**



**GX-OD3218/OD3228**



**GX-MD3218/MD3228**

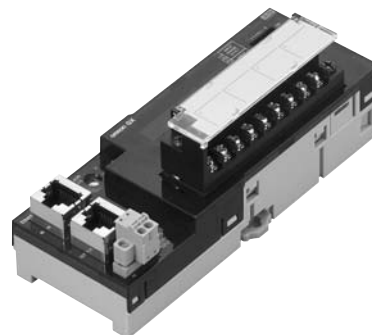


# Analog I/O Terminal 2-tier Terminal Block Type

# GX-AD0471/DA0271

## Analog I/O terminal with screw terminal block for EtherCAT communications

- The input/output range can be easily changed by the setting with the switch.
- Detachable screw terminal block facilitates the maintenance.
- Moving average calculation function.  
Settings within the range of 100 $\mu$ s-64ms. (For input only.)
- Disconnection detection function.  
(For input only and for usage with 1-5V or 4-20mA ranges.)
- Selectable node address setting methods: setting with rotary switch and with tool software.  
When setting the nodes with rotary switch, setting is easy and node identification becomes possible for maintenance.



## General Specifications

For Common Specifications of I/O terminals, refer to page 1.

### Input Section Specifications

#### 4-point Input Terminals

Item		Specification	
		Voltage input	Current input
Input capacity		4 points (possible to set number of enabled channels)	
Input range		0 to 5V 1 to 5V 0 to 10V -10 to +10V	4 to 20mA
Input range setting method		Input range switch: Common to input CH1/CH2, common to input CH3/CH4 SDO communication: Possible to set input CH1 to CH4 individually	
Maximum signal input		$\pm 15$ V	$\pm 30$ mA
Input impedance		1 M $\Omega$ min.	Approx. 250 $\Omega$
Resolution		1/8000 (full scale)	
Overall accuracy	25 °C	$\pm 0.3\%$ FS	$\pm 0.4\%$ FS
	-10 to +55 °C	$\pm 0.6\%$ FS	$\pm 0.8\%$ FS
Analog conversion cycle		500 $\mu$ s/input When 4 points are used: 2 ms max.	
A/D converted data		Other than $\pm 10$ V: 0000 to 1F40 Hex full scale (0 to 8000) $\pm 10$ V: F060 to 0FA0 Hex full scale (-4000 to +4000) A/D conversion range: $\pm 5\%$ FS of the above data ranges.	
Isolation method		Photocoupler isolation (between input and communications lines) No isolation between input signals	
Unit power supply current consumption		120 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
Weight		180 g max.	
Accessories		Four short-circuit metal fixtures (for current input) *	

\* Short-circuit metal fixtures are used for current input only, but store in a safe place when using for voltage inputs as well.

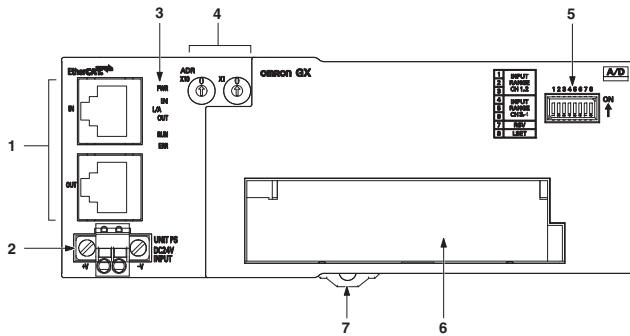
### Output Section Specifications

#### 2-point Output Terminals

Item		Specification	
		Voltage output	Current output
Output capacity		2 points (possible to set number of enabled channels)	
Output range		0 to 5V 1 to 5V 0 to 10V -10 to +10V	4 to 20mA
Output range setting method		Output range switch, SDO communications: Possible to set outputs CH1 and CH2 separately.	
External output allowable load resistance		5 k $\Omega$ min.	600 $\Omega$ max.
Resolution		1/8000 (full scale)	
Overall accuracy	25 °C	$\pm 0.4\%$ FS	
	-10 to +55 °C	$\pm 0.8\%$ FS	
Analog conversion cycle		500 $\mu$ s/input When 2 points are used: 1 ms max.	
D/A converted data		Other than $\pm 10$ V: 0000 to 1F40 Hex full scale (0 to 8000) $\pm 10$ V: F060 to 0FA0 Hex full scale (-4000 to +4000) D/A conversion range: $\pm 5\%$ FS of the above data ranges	
Isolation method		Photocoupler isolation (between output and communications lines) No isolation between output signals	
Unit power supply current consumption		150 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
Weight		190 g max.	

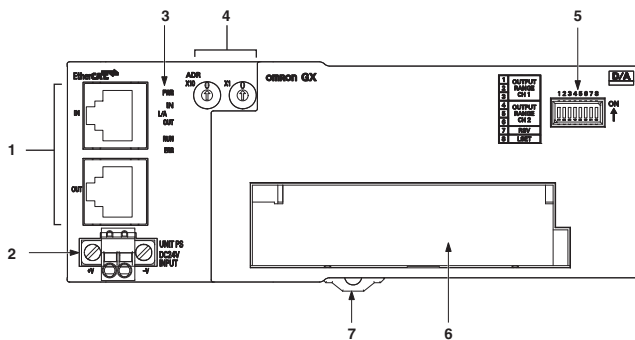
## Components and functions

### 4-points Analog Inputs Terminal GX-AD0471



No.	Name	Function
1	Communications connector	(CN IN) Connects the communications cable which comes from the Master Unit side. (CN OUT) Connects the communications cable of the next I/O terminal.
2	Unit Power Supply Connector	Connect the unit power supply (24 VDC).
3	Status indicator	It indicates the communication state and the operation state of I/O terminals.
4	Node address Switch	It sets node addresses of terminals (decimal). Setting range is 00 to 99.
5	Input range switch	DIP switch for setting input range.
6	Terminal Block	Terminal block for analog input signals V1 to V4: Voltage input terminals I1 to I4: Current input terminals AG: Analog GND NC: Not used
7	DIN track mounting hook	Fixes a slave to a DIN track.

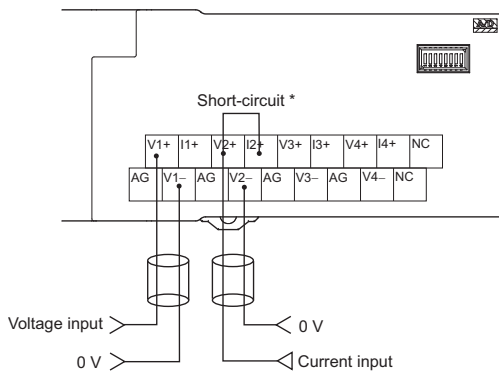
### 2-points Analog Inputs Terminal GX-DA0271



No.	Name	Function
1	Communications connector	(CN IN) Connects the communications cable which comes from the Master Unit side. (CN OUT) Connects the communications cable of the next I/O terminal.
2	Unit Power Supply Connector	Connect the unit power supply (24 VDC).
3	Status indicator	It indicates the communication state and the operation state of I/O terminals.
4	Node address Switch	It sets node addresses of terminals (decimal). Setting range is 00 to 99.
5	Output range switch	DIP switch for setting output range.
6	Terminal Block	Terminal block for analog output signals V1+, V2+: Voltage output positive terminals I1+, I2+: Current output positive terminals 1-, 2-: Voltage/current output negative terminals NC: Not used
7	DIN track mounting hook	Fixes a slave to a DIN track.

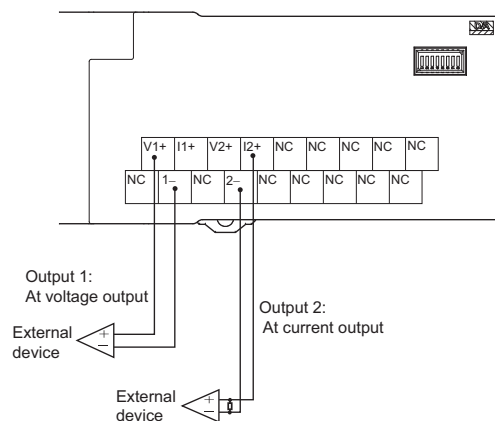
## Wiring

### GX-AD0471



\* Short-circuit the "V positive" terminal and "I positive" terminal at current input.  
Use the attached short-circuit metal fixture to short-circuit terminals.

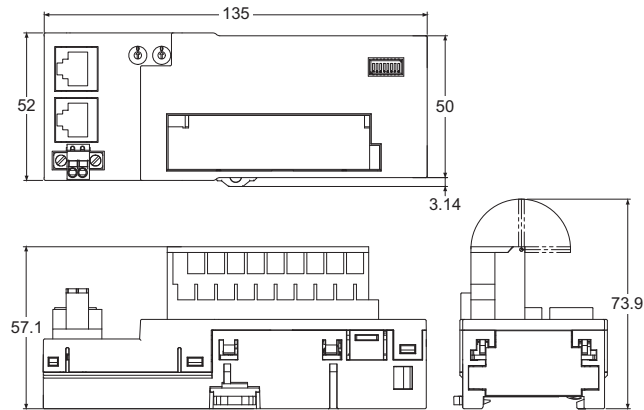
### GX-DA0271



## Dimensions

(Unit: mm)

GX-AD0471  
GX-DA0271

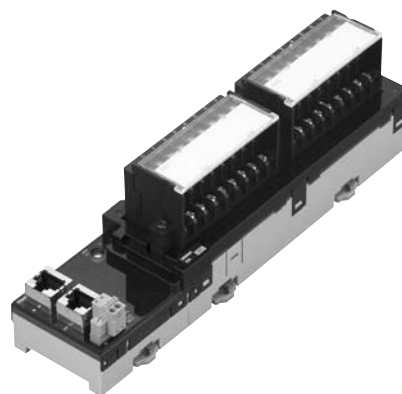


# Encoder Input Terminal 3-tier Terminal Block Type

# GX-EC0211/EC0241

## EtherCAT-compatible encoder input terminal which enables high-speed and accurate control

- Two counter function available. Pulse count within 32 bit range.
- Maximum input pulse frequency of 4MHz (Line driver input after quadrature). High-speed network EtherCAT enables high-speed and accurate control.
- Selectable two input types: Open collector input and line driver input.
- Built-in two external latch inputs and one reset input .
- Selectable node address settings: setting with rotary switches and setting on tool software.
- Detachable screw terminal will facilitate the maintenance work.



## General Specifications

For Common Specifications of I/O terminals, refer to page 1.

### Open collector inputs Type

#### Terminal specifications

Item	Specification
Counter point	2 points
Input signal	Counter phase A Counter phase B Counter phase Z Latch input (A/B) Counter reset input
Counter enabled status display	LED display (green)
Input indicators	LED display (yellow)
Unit power supply current consumption	130 mA max. (for 20.4 to 26.4 VDC power supply voltage)
Weight	390 g max.

### Pulse input specifications

Item	Specification			
	Counter phase A/B		Counter phase Z	
Input voltage	20.4 to 26.4 VDC (24 VDC -15 to +10%)	4.5 to 5.5 VDC (5 VDC $\pm 5\%$ )	20.4 to 26.4 VDC (24 VDC -15 to +10%)	4.5 to 5.5 VDC (5 VDC $\pm 5\%$ )
Input current	8.4 mA (at 24 VDC)	8.6 mA (at 5 VDC)	8.4 mA (at 24 VDC)	8.6 mA (at 5 VDC)
ON voltage	19.6 V min.	4.5 V min.	18.6 V min.	4.5 V min.
OFF voltage	4 V max.	1.5 V max.	4 V max.	1.5 V max.
Input restriction resistance	2.7 k $\Omega$	430 $\Omega$	2.7 k $\Omega$	430 $\Omega$
Maximum response frequency	Single phase 500 kHz (phase difference Multiplication $\times 4$ , 125 kHz)		125 kHz	
Filter switching	NA		NA	

### Latch/reset input specifications

Item	Specification	
	Latch input (A/B)	Reset input
Internal I/O common	NPN	
Input voltage	20.4 to 26.4 VDC (24 VDC -15 to +10%)	20.4 to 26.4 VDC (24 VDC -15 to +10%)
Input impedance	4.0 k $\Omega$	3.3 k $\Omega$
Input current	5.5 mA (at 24 VDC)	7 mA (at 24 VDC)
ON voltage/ON current	17.4 VDC min./3 mA min.	14.4 VDC min./3 mA min.
OFF voltage/OFF current	5 VDC max./1 mA max.	5 VDC max./1 mA max.
ON response time	3 $\mu$ s max.	15 $\mu$ s max.
OFF response time	3 $\mu$ s max.	90 $\mu$ s max.

**Note:** For the pulse input timing specifications, refer to USER'S MANUAL (Cat. No. W488).



## Line Driver inputs Type

### Terminal specifications

Item	Specification
Counter point	2 points
Input signal	Counter phase A Counter phase B Counter phase Z Latch input (A/B) Counter reset input
Counter enabled status display	LED display (green)
Input indicators	LED display (yellow)
Unit power supply current consumption	100 mA max. (for 20.4 to 26.4 VDC power supply voltage)
Weight	390 g max.

### Pulse input specifications

Item	Specification	
	Counter phase A/B	Counter phase Z
Input voltage	EIA standard RS-422-A line driver level	
Input impedance	120 $\Omega$ $\pm$ 5%	
gH level input voltage	0.1 V	
gL level input voltage	-0.1 V	
Hysteresis voltage	60 mV	
Maximum response frequency	Single phase 4 MHz (phase difference Multiplication $\times$ 4, 1 MHz)	1 MHz
Filter switching	NA	

### Latch/reset input specifications

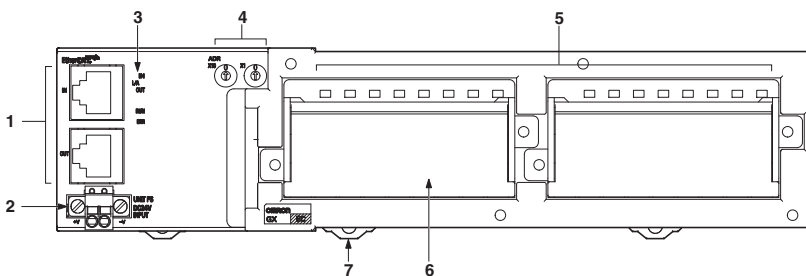
Item	Specification	
	Latch input (A/B)	Reset input
Internal I/O common	PNP	
Input voltage	20.4 to 26.4 VDC (24 VDC $-15$ to $+10\%$ )	20.4 to 26.4 VDC (24 VDC $-15$ to $+10\%$ )
Input impedance	4.0 k $\Omega$	3.3 k $\Omega$
Input current	5.5 mA (at 24 VDC)	7 mA (at 24 VDC)
ON voltage/ON current	17.4 VDC min./3 mA min.	14.4 VDC min./3 mA min.
OFF voltage/OFF current	5 VDC max./1 mA max.	5 VDC max./1 mA max.
ON response time	3 $\mu$ s max.	15 $\mu$ s max.
OFF response time	3 $\mu$ s max.	90 $\mu$ s max.

**Note:** For the pulse input timing specifications, refer to USER'S MANUAL (Cat. No. W488).

## Components and functions

Open collector inputs Type GX-EC0211

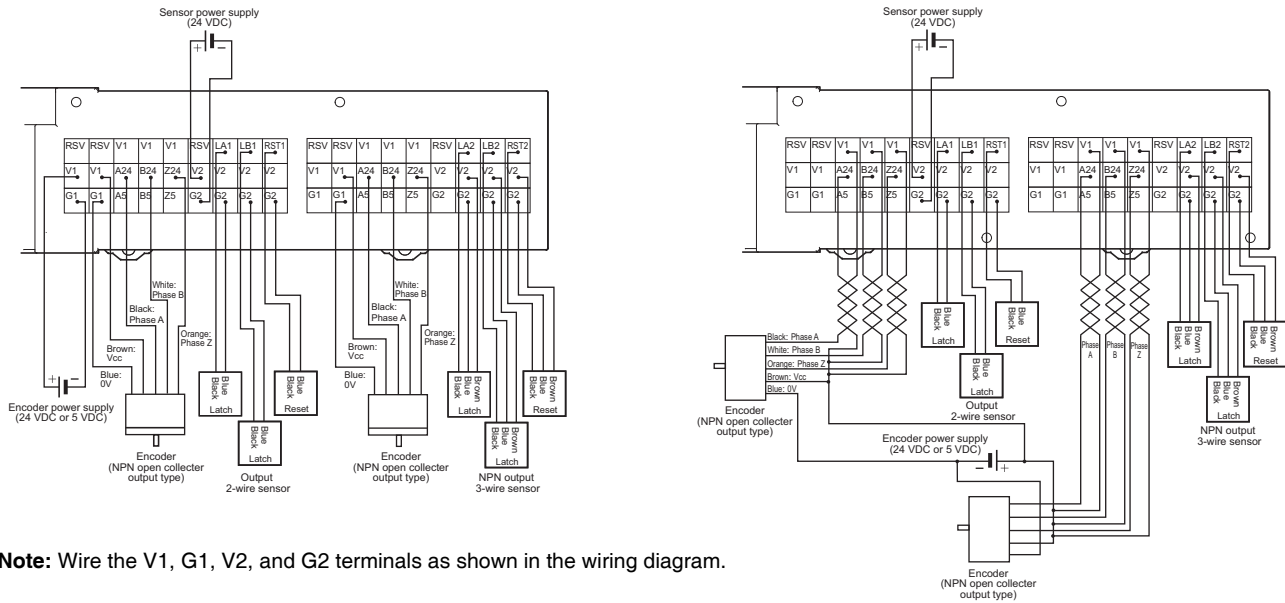
Line driver inputs Type GX-EC0241



No.	Name	Function
1	Communications Connectors	(CN IN) Connects the communications cable which comes from the Master Unit side. (CN OUT) Connects the communications cable of the next I/O terminal.
2	Unit Power Supply Connector	Connect the unit power supply (24 VDC).
3	Status Indicators	It indicates the communication state and the operation state of I/O terminals.
4	Node address Switches	It sets node addresses of terminals (decimal). Setting range is 00 to 99.
5	Inputs Indicators	The indicators show the status of the inputs of each channel. For details, refer to GX Series Operation Manual (Cat.No.W488).
6	Terminal Block	Connects external devices and the I/O power supply. For details, refer to GX Series Operation Manual (Cat.No.W488).
7	DIN track mounting hook	Fixes Slave Unit to a DIN track.

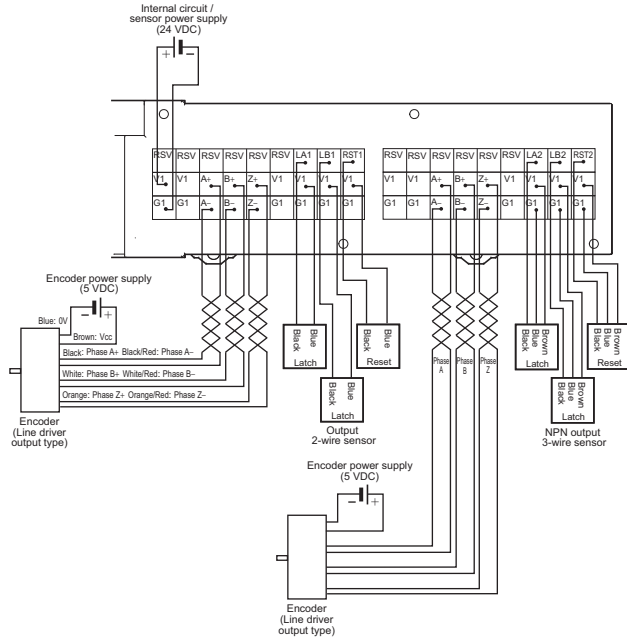
## Wiring

### Open collector inputs Type GX-EC0211



**Note:** Wire the V1, G1, V2, and G2 terminals as shown in the wiring diagram.

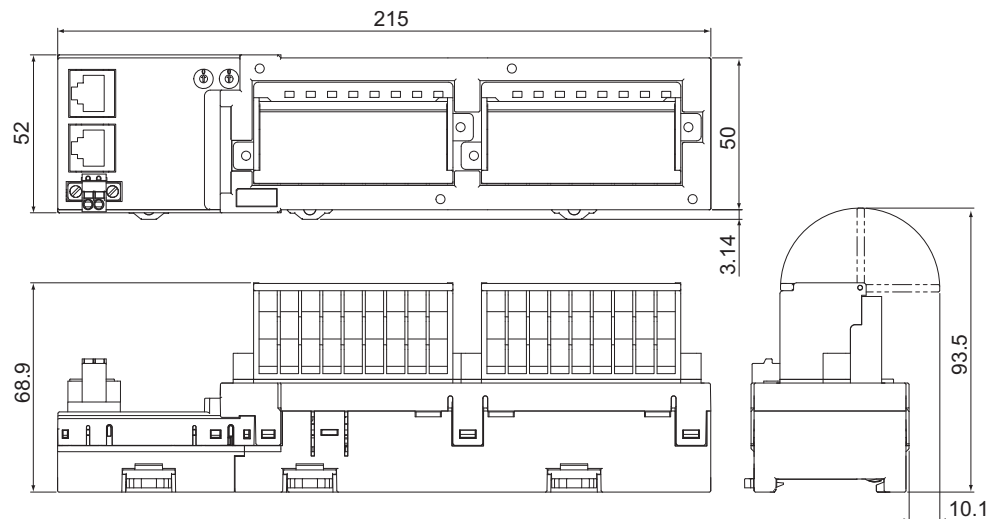
### Line driver inputs Type GX-EC0241



## Dimensions

(Unit: mm)

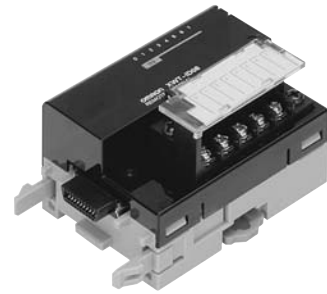
### GX-EC0211/EC0241



# XWT-□D08(-1)/□D16(-16)

## Expansion I/O Units make expansion easy!

- Flexible expansion with many different combinations.
- Removable I/O terminal block enables faster startup time and improved maintainability.
- Common expansion unit with DeviceNet (DRT2-Series) and CompoNet (CRT1-Series).



## General Specifications

For Common Specifications of I/O terminals, refer to page 1.

### Input Section Specifications

#### 8-point Input Expansion Units

Item	Specification	
	XWT-ID08	XWT-ID08-1
Internal I/O common	NPN	PNP
I/O capacity	8 inputs	
ON voltage	15 VDC min. (between each input terminal and the V terminal)	15 VDC min. (between each input terminal and the G terminal)
OFF voltage	5 VDC max. (between each input terminal and the V terminal)	5 VDC max. (between each input terminal and the G terminal)
OFF current	1.0 mA max.	
Input current	At 24 VDC: 6.0 mA max./input At 17 VDC: 3.0 mA min./input	
ON delay	1.5 ms max.	
OFF delay	1.5 ms max.	
Number of circuits per common	8 inputs/common	
Communications power supply current consumption	5 mA	
Weight	80 g max.	

#### 16-point Input Expansion Units

Item	Specification	
	XWT-ID16	XWT-ID16-1
Internal I/O common	NPN	PNP
I/O capacity	16 inputs	
ON voltage	15 VDC min. (between each input terminal and the V terminal)	15 VDC min. (between each input terminal and the G terminal)
OFF voltage	5 VDC max. (between each input terminal and the V terminal)	5 VDC max. (between each input terminal and the G terminal)
OFF current	1.0 mA max.	
Input current	At 24 VDC: 6.0 mA max./input At 17 VDC: 3.0 mA min./input	
ON delay	1.5 ms max.	
OFF delay	1.5 ms max.	
Number of circuits per common	16 inputs/common	
Communications power supply current consumption	10 mA	
Weight	120 g max.	

### Output Section Specifications

#### 8-point Input Expansion Units

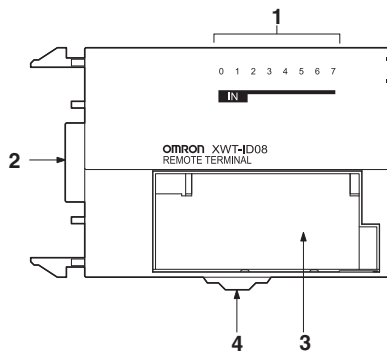
Item	Specification	
	XWT-OD08	XWT-OD08-1
Internal I/O common	NPN	PNP
I/O capacity	8 outputs	
Rated output current	0.5 A/output, 2.0 A/common	
Residual voltage	1.2 V max. (0.5 A DC, between each output terminal and the G terminal)	1.2 V max. (0.5 A DC, between each output terminal and the V terminal)
Leakage current	0.1 mA max.	
ON delay	0.5 ms max.	
OFF delay	1.5 ms max.	
Number of circuits per common	8 outputs/common	
Communications power supply current consumption	5 mA	
Weight	80 g max.	

#### 16-point Input Expansion Units

Item	Specification	
	XWT-OD16	XWT-OD16-1
Internal I/O common	NPN	PNP
I/O capacity	16 outputs	
Rated output current	0.5 A/output, 4.0 A/common	
Residual voltage	1.2 V max. (0.5 A DC, between each output terminal and the G terminal)	1.2 V max. (0.5 A DC, between each output terminal and the V terminal)
Leakage current	0.1 mA max.	
ON delay	0.5 ms max.	
OFF delay	1.5 ms max.	
Number of circuits per common	16 outputs/common	
Communications power supply current consumption	10 mA	
Weight	120 g max.	

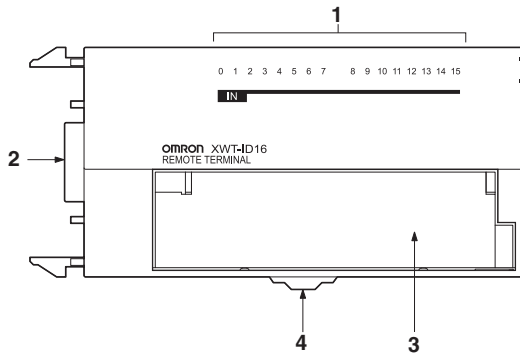
## Components and functions

### XWT-ID08/ID08-1



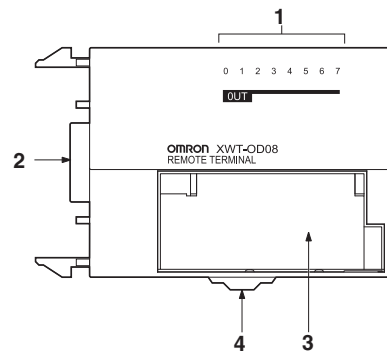
No.	Name	Function
1	Input indicator (0 to 7)	Indicates the state of input contact (ON/OFF). Not lit: Contact OFF (input OFF state) Lit in yellow: Contact ON (input ON state)
2	Terminal connector	Connects the connector on the right side of the slave.
3	Terminal block	Connects external devices and the I/O power supply. V, G: I/O power supply terminals 0 to 7: Input terminals
4	DIN track mounting hook	Fixes a slave to a DIN track.

### XWT-ID16/ID16-1



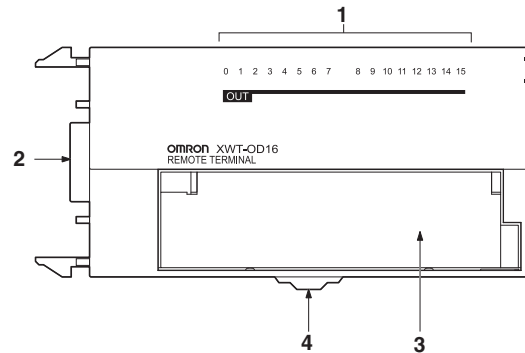
No.	Name	Function
1	Input indicator (0 to 15)	Indicates the state of input contact (ON/OFF). Not lit: Contact OFF (input OFF state) Lit in yellow: Contact ON (input ON state)
2	Terminal connector	Connects the connector on the right side of the slave.
3	Terminal block	Connects external devices and the I/O power supply. V, G: I/O power supply terminals 0 to 15: Input terminals
4	DIN track mounting hook	Fixes a slave to a DIN track.

### XWT-OD08/OD08-1



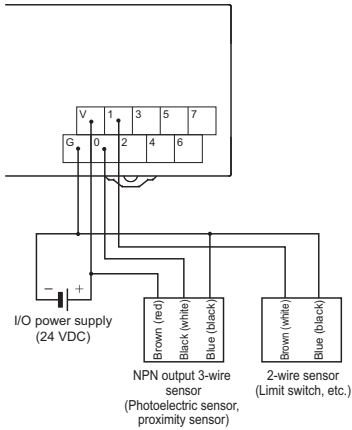
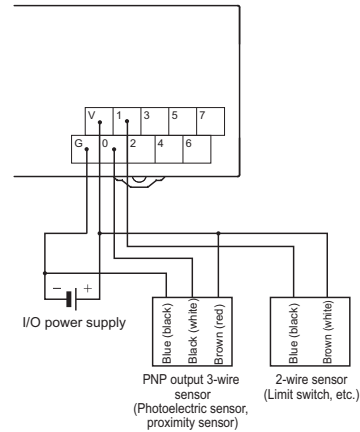
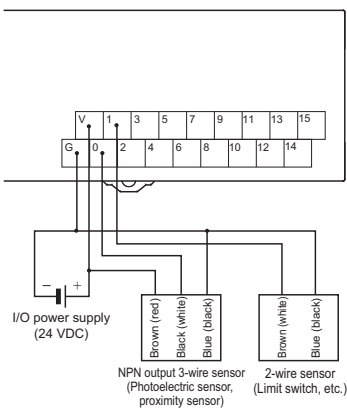
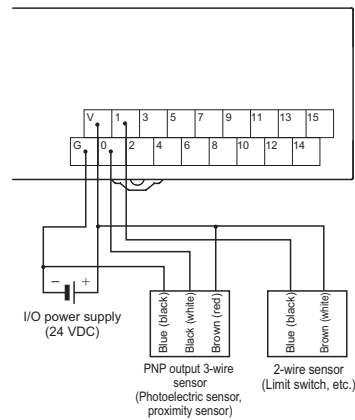
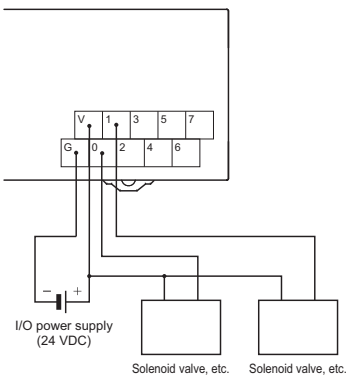
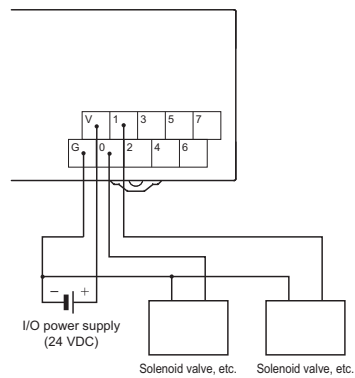
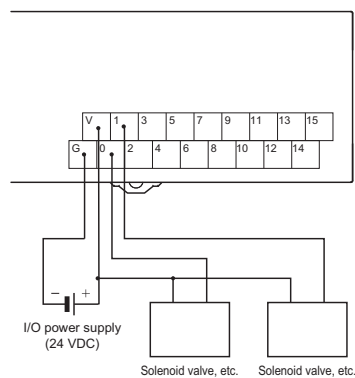
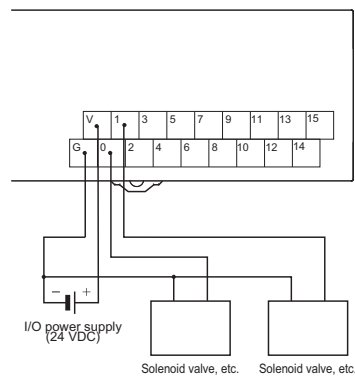
No.	Name	Function
1	Output indicator (0 to 7)	Indicates the state of output contact (ON/OFF). Not lit: Contact OFF (output OFF state) Lit in yellow: Contact ON (output ON state)
2	Terminal connector	Connects the connector on the right side of the slave.
3	Terminal block	Connects external devices and the I/O power supply. V, G: I/O power supply terminals 0 to 7: Output terminals
4	DIN track mounting hook	Fixes a slave to a DIN track.

### XWT-OD16/OD16-1



No.	Name	Function
1	Output indicator (0 to 15)	Indicates the state of output contact (ON/OFF). Not lit: Contact OFF (output OFF state) Lit in yellow: Contact ON (output ON state)
2	Terminal connector	Connects the connector on the right side of the slave.
3	Terminal block	Connects external devices and the I/O power supply. V, G: I/O power supply terminals 0 to 15: Output terminals
4	DIN track mounting hook	Fixes a slave to a DIN track.

# Wiring

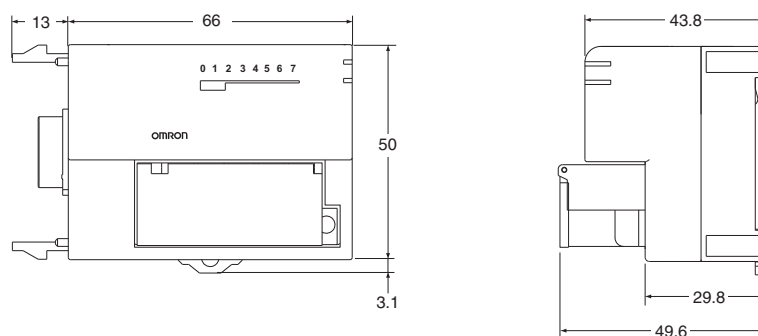
**XWT-ID08 (NPN)**

**XWT-ID08-1 (PNP)**

**XWT-ID16 (NPN)**

**XWT-ID16-1 (PNP)**

**XWT-OD08 (NPN)**

**XWT-OD08-1 (PNP)**

**XWT-OD16 (NPN)**

**XWT-OD16-1 (PNP)**


**Note:** Wire colors have been changed according to revisions in the JIS standards for photoelectric and proximity sensors. The colors in parentheses are the wire colors prior to the revisions.

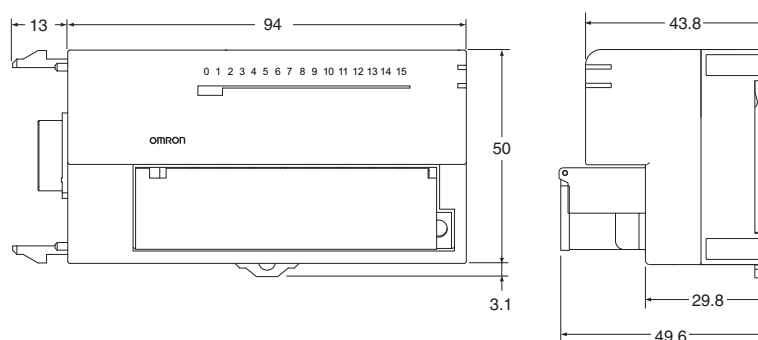
## Dimensions

(Unit: mm)

XWT-ID08/ID08-1  
XWT-OD08/OD08-1



XWT-ID16/ID16-1  
XWT-OD16/OD16-1



# IO-Link Master Unit

# GX-ILM08C

**IO-Link makes sensor level information visible and solves the three major issues at manufacturing sites!**

**The unit for M12 Smartclick connector can be used in watery, and dusty environments.**



- Downtime can be reduced.  
Notifies you of faulty parts and such phenomena in the Sensor in real time.
- The frequency of sudden failure can be decreased.  
Condition monitoring of sensors and equipment to prevent troubles.
- The efficiency of changeover can be improved.  
The batch check for individual sensor IDs significantly decreases commissioning time.

## Features

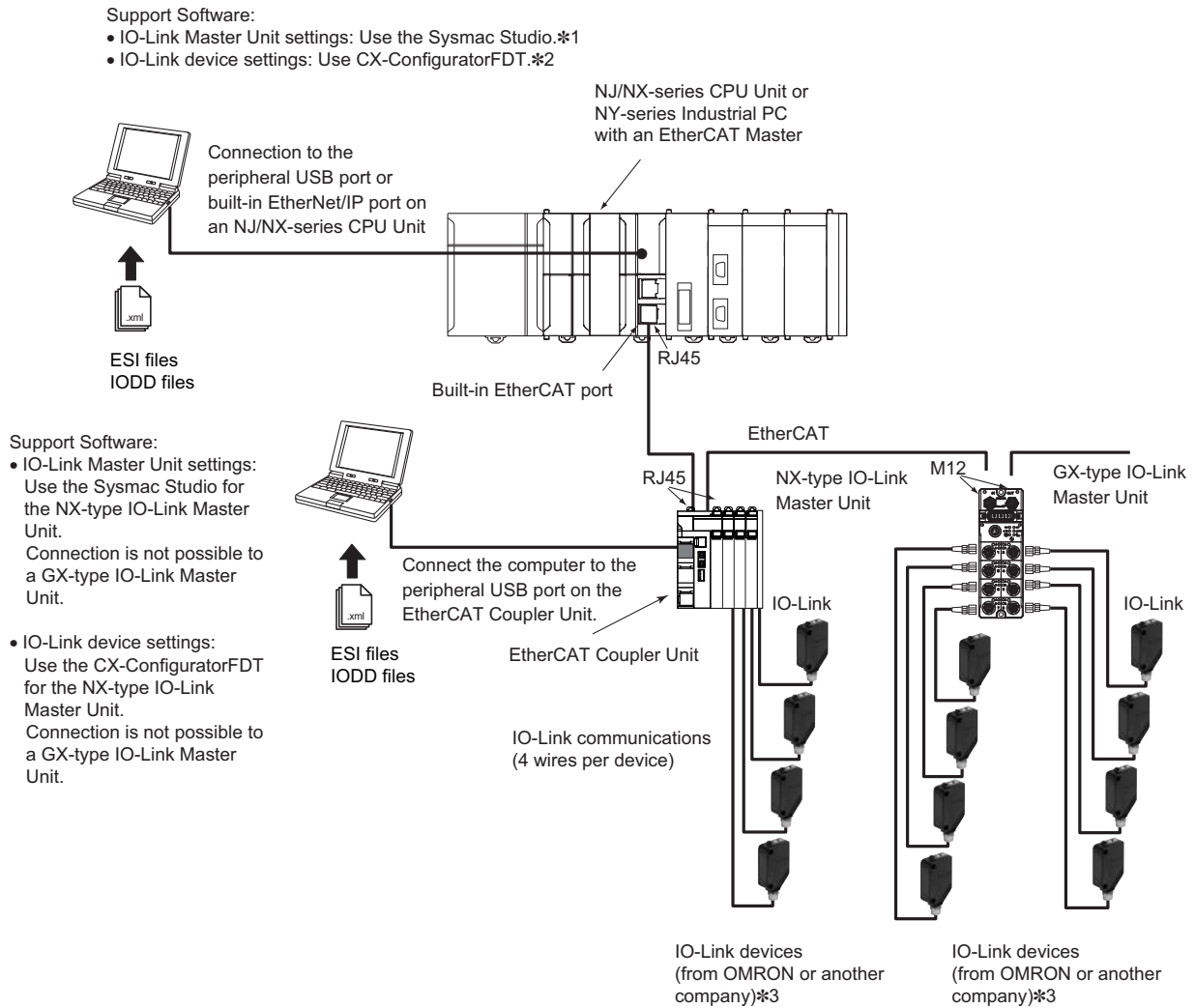
- The host controller can cyclically read control signals, status \*1, wiring, and power supply status of IO-Link sensors. Because an IO-Link System can cyclically read analog data such as the amount of incident light in addition to ON/OFF information, it can be used for predictive maintenance based on detection of such things as decreases in the amount of light.
- User-specified data in IO-Link devices can be read and written from the host controller when necessary.
- Digital signals can be input rapidly from IO-Link sensors \*2 during IO-Link communications.
- IO-Link sensors can be combined with non-IO-Link sensors.
- Incorrect connections of IO-Link sensors can be checked when IO-Link communications start.
- Backup and restoration of IO-Link device parameters make replacement of IO-Link sensors easier.
- IO-Link sensors can be easily replaced with non-IO-Link sensors without changing the data address settings. \*3
- Sensors can report their errors to the master, which facilitates locating errors from the host.
- The total number of retries in cyclic communications can be recorded. You can use this value to check for the influences of noise and other problems.  
(When EtherCAT is used as the host communication interface)
- Up to eight sensors can be connected. IP67 protection.

\*1 Examples for Photoelectric Sensors: Instability detection and sensor errors

\*2 IO-Link sensors that support digital inputs that use pin 2 of IO-Link Master Unit ports

\*3 Bit data of IO-Link sensor can be reflected in the address of the digital input data by using digital input collection.  
This function is supported with the unit version 1.1 or later.

## System Configuration



\*1. When a host controller from another company is used with EtherCAT host communications, use the EtherCAT software application from the other company for a GX-type IO-Link Master Unit.

**Note.** For an NX-type IO-Link Master Unit, connect the Sysmac Studio to the EtherCAT Coupler Unit, as shown above.

\*2. When a host controller from another company is used with EtherCAT host communications, for a GX-type IO-Link Master Unit, make the IO-Link device settings with message communications from the host controller from the other company.

**Note.** For an NX-type IO-Link Master Unit, connect CX-ConfiguratorFDT to the EtherCAT Coupler Unit, as shown above.

\*3. You can also connect a combination of general-purpose sensors and other devices.



## General Specification

Item	Specification
Unit power supply voltage	20.4 to 26.4 VDC (24 VDC $-15\%/+10\%$ )
I/O power supply	20.4 to 26.4 VDC (24 VDC $-15\%/+10\%$ )
Noise resistance	Conforms to IEC 61000-4-4, 2 kV (power line).
Vibration resistance	Malfunction: 10 to 60 Hz with amplitude of 0.7 mm, 60 to 150 Hz and 50 m/s <sup>2</sup> for 80 minutes each in X, Y, and Z directions
Shock resistance	150 m/s <sup>2</sup> with amplitude of 0.7 mm
Dielectric strength	600 VAC (between isolated circuits)
Insulation resistance	20 MΩ min. (between isolated circuits)
Ambient operating temperature	-10 to 55°C
Ambient operating humidity	25% to 85% (with no condensation)
Ambient operating atmosphere	No corrosive gases
Altitude	2,000 m max.
Storage temperature	-25 to 65°C
Storage humidity	25% to 85% (with no condensation)
Degree of protection	IP67
Mounting	M5 screw mounting
Mounting strength	100 N
Communications connector strength	30 N
Connector types	Connectors for EtherCAT communications: M12 (D-coding, female) × 2 Power supply connector: M12 (A-coding, male) × 1 I/O connectors: M12 (A-coding, female) *1 × 8
Screw tightening torque *2	Round connectors (communications connector, power supply, and I/O): 0.39 to 0.49 N·m M5 (Unit mounted from the front): 1.47 to 1.96 N·m Cover for node address setting switches: 0.4 to 0.6 N·m
Applicable standards *3	UL 61010-2-201, EU: EN 61131-2, RCM, KC, IO-Link conformance, and EtherCAT conformance

\*1 Confirms to Class A when used as an IO-Link connector.

\*2 For SmartClick Connectors, insert the Connector all the way and turn it approx. 1/8 of a turn. Torque management is not required.

\*3 Refer to the OMRON website ([www.ia.omron.com](http://www.ia.omron.com)) or ask your OMRON representative for the most recent applicable standards for each model.

## Unit Specification

Item		Specification
Unit name		IO-Link Master Unit
Model		GX-ILM08C
Number of IO-Link ports		8
Communications specifications	Communications protocol	IO-Link protocol
	Baud rate	COM1: 4.8 kbps COM2: 38.4 kbps COM3: 230.4 kbps
	Topology	1:1
	Compliant standards	<ul style="list-style-type: none"> <li>IO-Link Interface and System Specification Version 1.1.2</li> <li>IO-Link Test Specification Version 1.1.2</li> </ul>
Device power supply * in IO-Link Mode or SIO (DI) Mode	Rated voltage	24 VDC (20.4 to 26.4 VDC)
	Maximum load current	0.2 A/port
	Short-circuit protection	Yes
Digital inputs (in SIO (DI) Mode)	Internal I/O common	PNP
	Rated voltage	24 VDC (20.4 to 26.4 VDC)
	Input current	5 mA typical (at 24 VDC)
	ON voltage/ON current	15 VDC min., 5 mA min.
	OFF voltage	5 VDC max.
	Input filter time	No filter, 0.25 ms, 0.5 ms, 1 ms (default), 2 ms, 4 ms, 8 ms, 16 ms, 32 ms, 64 ms, 128 ms, or 256 ms
Digital outputs (in SIO (DIO) Mode)	Internal I/O common	PNP
	Output type	Push-pull
	Rated voltage	24 VDC (20.4 to 26.4 VDC)
	Maximum load current	0.3 A/port
	Short-circuit protection	Provided.
	Leakage current	0.1 mA max.
	Residual voltage	1.5 V max.
Digital inputs for pin 2 (in IO-Link Mode)	Internal I/O common	PNP
	Rated voltage	24 VDC (20.4 to 26.4 VDC)
	Input current	2 mA (24 VDC)
	ON voltage/ON current	15 VDC min., 2 mA min.
	OFF voltage	5 VDC max.
	Input filter time	No filter, 0.25 ms, 0.5 ms, 1 ms (default), 2 ms, 4 ms, 8 ms, 16 ms, 32 ms, 64 ms, 128 ms, or 256 ms
Cable specifications	Cable type	Unshielded
	Cable length	20 m max.
	Electrostatic capacity between lines	3 nF max.
	Loop resistance	6 Ω max.
Dimensions		175 × 33 × 60 mm (W×H×D) (The height is 49.1 mm when the connectors are included.)
Isolation method		Photocoupler isolation
I/O power supply method		Supplied from the power supply connector.
Unit power supply current consumption		60 mA
I/O power supply current consumption		100 mA
Weight		430 g
Circuit layout		
Installation orientation and restrictions		Installation orientation: 6 possible orientations Restrictions: No restrictions
Protective functions		L+ terminal short-circuit protection C/Q terminal short-circuit protection

\* I/O power supply to devices:

This is the voltage and current value supplied to devices when the communications modes of the ports on the IO-Link Master Unit are IO-Link Mode or SIO (DI) Mode.

## Function Specification

Function		Description
Communications	Cyclic communications	I/O data (process data) in the IO-Link devices is cyclically exchanged with the IO-Link Master Unit as the IO-Link communications master. At the same time, this data and the status of the IO-Link Master Unit is cyclically exchanged with the controller, with the IO-Link Master Unit operating as a slave of the controller. Cyclic communications can be used to check the amount of detection performance deterioration in devices, and to check changes in usage conditions such as the amount of incident light for photoelectric sensors, stability detection margins, and excessive proximity for proximity sensors.
	Message communications	The controller can send messages (commands) to the IO-Link Master Unit and receive the response from the IO-Link Master Unit. The IO-Link Master Unit can also function as a gateway to send messages (commands and responses) between the controller and the IO-Link devices. Refer to <i>6-3 Message Communications</i> in the <i>IO-Link System User's Manual</i> (Cat. No. W568). During operation, you can change and adjust device parameters, such as threshold settings, tuning execution, and ON-delay time changes, from a program. Or, during operation, you can check the internal status, such as the operating times of devices.
Communications mode settings		You can select any of the following modes for each port: IO-Link Mode, SIO (DI) Mode, SIO (DO) Mode, and Disable Port This allows you to combine IO-Link communications and digital I/O in a single unit.
Digital inputs for pin 2		In IO-Link Mode, you can perform digital input with pin 2 while performing IO-Link communications.
Automatic baud rate setting for IO-Link communications		The IO-Link Master Unit automatically matches the specific baud rates (COM1, COM2, or COM3) of the IO-Link devices to communicate with the IO-Link devices. Therefore, it is not necessary to set the baud rate of the connected device for each port.
Connected device verification		This function is used to verify the configuration of IO-Link devices that are connected to the IO-Link Master Unit against the registered IO-Link Device Configuration Settings when the power supply is turned ON. The user can enable or disable connected device verification.
IO-Link communications error detection		This function detects I/O cable breaks, disconnections from IO-Link device ports, error-level device events, device configuration verification errors, and IO-Link device malfunctions.
Detection of short-circuits in I/O cables		This function detects short-circuits in I/O cables.
Notification of input data validity		The controller can use the Input Data Enabled Flags to determine whether the process input data for IO-Link communications is valid.
Load rejection for controller communications error		This function turns OFF outputs from the IO-Link Master Unit when a communications error occurs in communications with the controller in IO-Link Mode or in an SIO mode. This prevents incorrect output operations when communications error occurs.
IO-Link total communications lost frames		The IO-Link total communications lost frames can be read from the CX-ConfiguratorFDT. You can use this function to determine communications status as affected by I/O cable noise or other factors.
Digital input filter		This function is used to eliminate chattering and noise of the input signal for digital inputs in SIO(DI) Mode or for digital inputs for pin 2 in IO-Link Mode. It prevents data change and stabilizes the input signal even in situations where the input data changes due to chattering or noise and the bit status is unstable.
Digital input collection *		In IO-Link Mode, this function reflects the specified bit data in the input data from the IO-Link device on the digital input data of the IO-Link Master Unit. As a result, the bit data in the input data from the IO-Link device can be aggregated into the digital input data of the IO-Link Master Unit. One bit for each IO-Link port can be aggregated. This function cannot be used in SIO (DI) Mode and SIO (DO) Mode. If you use this function, digital inputs with pin 2 cannot be used.
Backup and restoration of parameter settings in IO-Link devices		This function is used to back up parameter settings in IO-Link devices in the IO-Link Master Unit or restore them to IO-Link devices. This eliminates the need to set parameters again after replacing an IO-Link device.
Event log		This function records events, such as errors and status changes, that occur in the IO-Link Master Unit and IO-Link devices.

\* This function is supported with the unit version 1.1 or later.

## EtherCAT Communications Specifications

Item	Specification
Communications protocol	EtherCAT protocol
Modulation	Baseband
Baud rate	100 Mbps
Physical layer	100BASE-TX (IEEE 802.3)
Connectors	M12 (D-coding, female) × 2 (shielded) CN IN: EtherCAT input CN OUT: EtherCAT output
Communications media	Category 5 or higher (cable with double, aluminum tape and braided shielding is recommended.)
Communications distance	Distance between nodes (Slave Units): 100 m max.
Noise resistance	Conforms to IEC 61000-4-4, 1 kV or higher.
Node address setting method	Set on hexadecimal node address switches or with a Configuration Tool.
Node address range	000 to FFF hex (0 to 4,095 decimal): Set on node address switches or with a Configuration Tool.
Indicators	UNIT PWR × 1 IO PWR × 1 L/A IN (Link/Activity IN) × 1 L/A OUT (Link/Activity OUT) × 1 RUN × 1 ERR × 1
Process data	Variable PDO mapping
PDO size/node	2 to 270 bytes
Mailbox	Emergency messages, SDO requests, SDO responses, and SDO information
Synchronization mode	Free Run Mode (asynchronous)

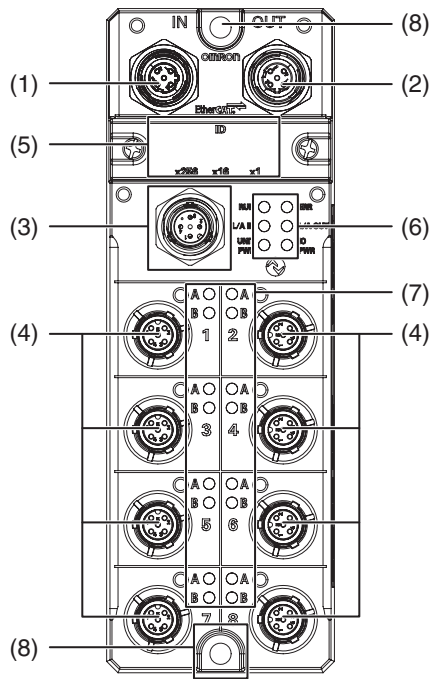
## Version Information

GX Unit		Corresponding versions *		
		EtherCAT		
Model	Unit version	CPU Units	Sysmac Studio	CX-ConfiguratorFDT
GX-ILM08C	Ver.1.1	Ver.1.12 or later	Ver.1.20 or higher	Ver.2.2 or higher
	Ver.1.0	Ver.1.12 or later	Ver.1.16 or higher	Ver.2.2 or higher

\* Some Units do not have all of the versions given in the above table. If a Unit does not have the specified version, support is provided by the oldest available version after the specified version. Refer to the user's manuals for the specific Units for the relation between models and versions.

## Component Names and Functions

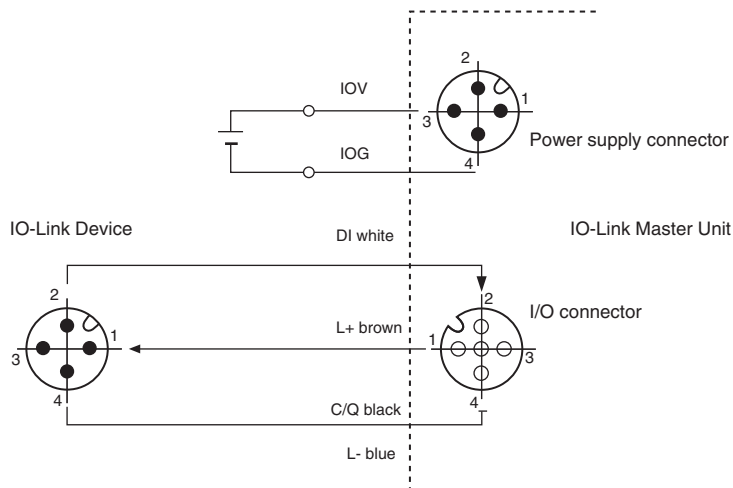
### GX-ILM08C



No.	Name	Function
(1)	EtherCAT communications connector, IN	EtherCAT cable connection: IN side M12 connector (D-coding, female)
(2)	EtherCAT communications connector, OUT	EtherCAT cable connection: OUT side M12 connector (D-coding, female)
(3)	Power supply connector	Connects to Unit power supply and I/O power supply cable. M12 connector (A-coding, male)
(4)	I/O connectors	Connect to IO-Link sensor cables (IO-Link connector type: Class A) M12 connectors (A-coding, female)
(5)	Node address setting switches	Used to set the EtherCAT node address.
(6)	Status indicators	Indicate the current status of the EtherCAT Slave Unit. (RUN, ERR, L/A IN, L/A OUT, UNIT PWR, and I/O PWR)
(7)	I/O indicators	Indicate the I/O status. (C/E and C/Q)
(8)	Mounting holes	Used to mount the Unit with M5 screws.

## Wiring

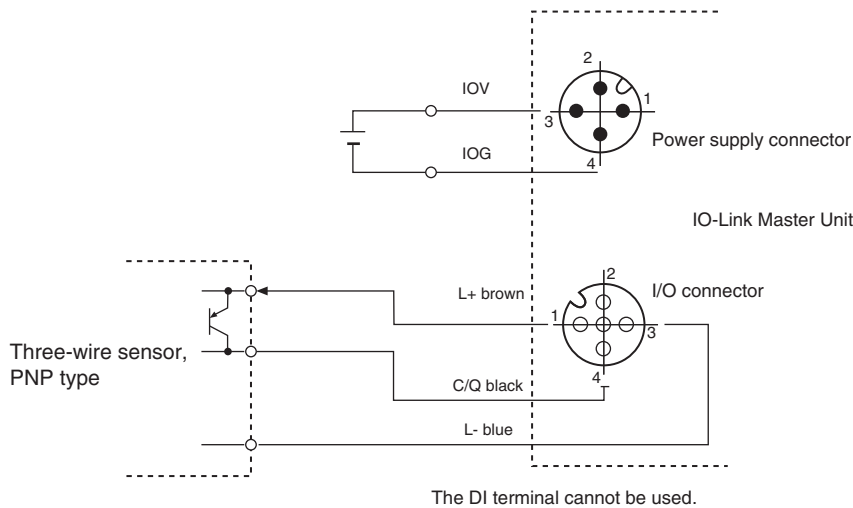
### IO-Link Mode



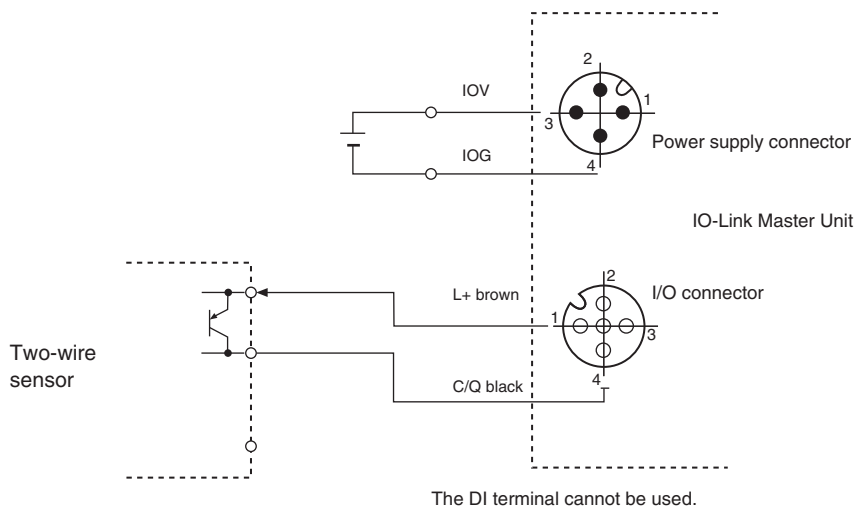
**Note:** Even if you connect to IO-Link devices without digital inputs for pin 2, connect pin 2 as shown in the above figure. This is because connectors on the IO-Link devices and the cable with connectors on both ends connect pin 2. However, because no data enters pin 2 of the IO-Link Master Unit, digital IO-Link input data is always OFF.

### SIO (DI) Mode

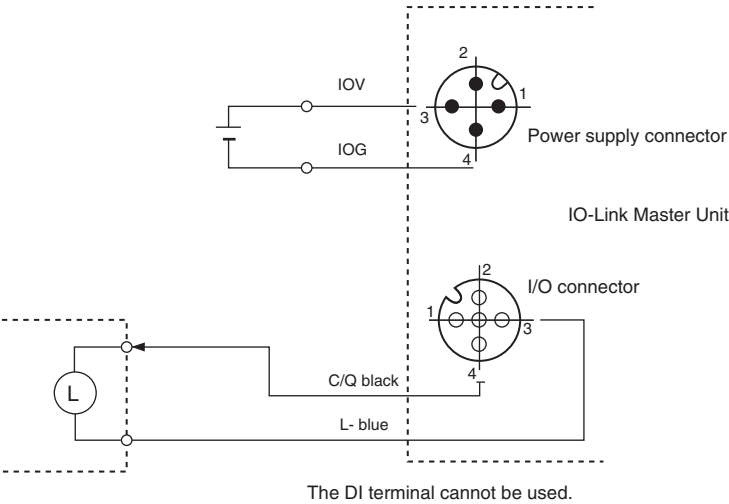
#### Wiring Three-wire Sensors



#### Wiring Two-wire Sensors



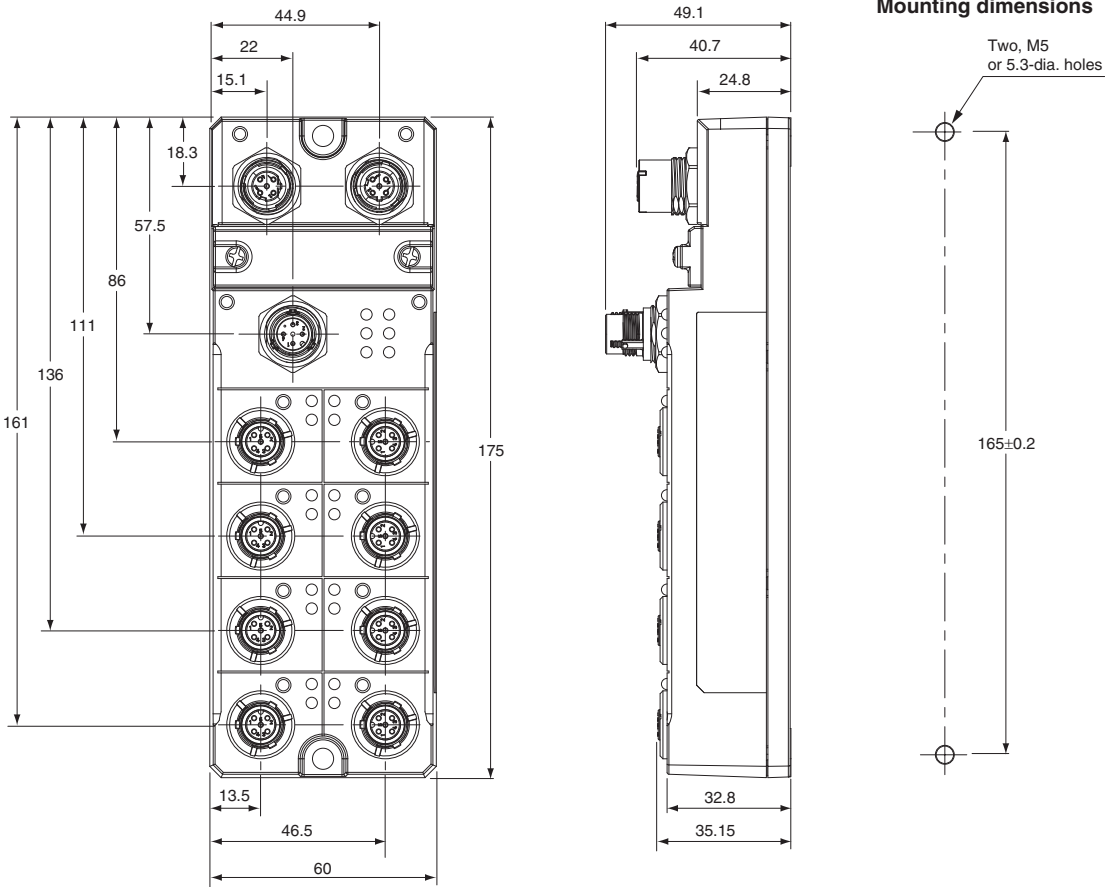
SIO (DO) Mode  
Wiring Output Devices



Dimensions

(Unit: mm)

GX-ILM08C



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# Ordering Information

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## Interpreting Model Numbers

**GX-**            

1      2      3      4      5

### 1) Type

Code	Specifications
<b>ID</b>	DC Input
<b>OD</b>	DC Output
<b>MD</b>	DC Input/Output
<b>OC</b>	Relay Output
<b>AD</b>	Analog Input
<b>DA</b>	Analog Output
<b>EC</b>	Encoder Input

### 2) Number of I/O point

Code	Specifications
<b>02</b>	2 points (2CH)
<b>04</b>	4 points (4CH)
<b>16</b>	16 points
<b>32</b>	32 points

### 3) Input/Output type

Code	Digital Input/ Digital Output type	Analog Input/ Analog Output type	Encoder Input Type
<b>1</b>	NPN/Sinking	—	Open collector input, NPN
<b>2</b>	PNP/Sourcing	—	—
<b>4</b>	—	—	Line driver input, PNP
<b>7</b>	—	Multi 1 (Current/Voltage)	—

### 4) Connecting

Code	Specifications
<b>1</b>	Screw (Common) (2-tier Terminal Block)
<b>2</b>	Screw (Divided common) (3-tier Terminal Block)
<b>8</b>	e-CON

### 5) Figure/Function

Code	Digital Input/ Digital Output type	Analog Input/ Analog Output type	Encoder Input Type
<b>None</b>	Horizontal type	Standard type	—

## Ordering Information

### International Standards

- The standards are abbreviated as follows: U: UL, U1: UL (Class I Division 2 Products for Hazardous Locations), C: CSA, UC: cULus, UC1: cULus (Class I Division 2 Products for Hazardous Locations), CU: cUL, N: NK, L: Lloyd, and CE: EU Directives, RCM: RCM mark, and KC: KC Registration.
- Contact your OMRON representative for further details and applicable conditions for these standards.

## Digital I/O Terminal

### Terminal Block Type

Name	Specifications			Model	Standards
2-tier terminal blocks	Inputs	16 inputs	NPN	GX-ID1611	UC1, N, L, CE
			PNP	GX-ID1621	
	Outputs	16 outputs	NPN	GX-OD1611	
			PNP	GX-OD1621	
	Outputs	16 outputs	Relay	GX-OC1601	
	Inputs/Outputs	8 inputs/8 outputs	NPN	GX-MD1611	
			PNP	GX-MD1621	
	3-tier terminal blocks	Inputs	16 inputs	NPN	
PNP				GX-ID1622	
Outputs		16 outputs	NPN	GX-OD1612	
			PNP	GX-OD1622	
Inputs/Outputs		8 inputs/8 outputs	NPN	GX-MD1612	
			PNP	GX-MD1622	

### e-CON Connector Type

Name	Specifications			Model	Standards
e-CON Connector Type	Inputs	16 inputs	NPN	GX-ID1618	UC1, N, L, CE
			PNP	GX-ID1628	
	Outputs	16 outputs	NPN	GX-OD1618	
			PNP	GX-OD1628	
	Inputs/Outputs	8 inputs/8 outputs	NPN	GX-MD1618	
			PNP	GX-MD1628	
	Inputs	32 inputs	NPN	GX-ID3218	
			PNP	GX-ID3228	
	Outputs	32 outputs	NPN	GX-OD3218	
			PNP	GX-OD3228	
	Inputs/Outputs	16 inputs/16 outputs	NPN	GX-MD3218	
			PNP	GX-MD3228	

## Analog I/O Terminal

### 2-tier Terminal Block Type

Name	Specifications		Model	Standards
2-tier terminal block type	Analog inputs	4 inputs	GX-AD0471	UC1, N, L, CE
	Analog outputs	2 outputs	GX-DA0271	

## Encoder Input Terminal

### 3-tier Terminal Block Type

Name	Specifications		Model	Standards
3-tier Terminal Block Type	Open collector inputs	2 inputs	GX-EC0211	UC1, N, L, CE
	Line driver inputs	2 inputs	GX-EC0241	





## Expansion Units

Name	Specifications				Model	Standards
Expansion Units	Inputs	8 inputs	NPN	One Expansion Unit can be mounted to one GX-ID16□1/OD16□1/OC1601 Digital I/O Terminal.	XWT-ID08	UC1, N, CE
			PNP		XWT-ID08-1	
	Outputs	8 outputs	NPN		XWT-OD08	
			PNP		XWT-OD08-1	
	Inputs	16 inputs	NPN		XWT-ID16	
			PNP		XWT-ID16-1	
	Outputs	16 outputs	NPN		XWT-OD16	
			PNP		XWT-OD16-1	

## Recommended EtherCAT Communications Cables

Use Straight STP (shielded twisted-pair) cable of category 5 or higher with double shielding (braiding and aluminum foil tape) for EtherCAT.

### Cable with Connectors

Item	Appearance	Recommended manufacturer	Cable length (m)	Model
Cable with Connectors on Both Ends (RJ45/RJ45) Standard RJ45 plugs type *1 Wire Gauge and Number of Pairs: AWG26, 4-pair Cable Cable Sheath material: LSZH *2 Cable color: Yellow *3		OMRON	0.3	XS6W-6LSZH8SS30CM-Y
			0.5	XS6W-6LSZH8SS50CM-Y
			1	XS6W-6LSZH8SS100CM-Y
			2	XS6W-6LSZH8SS200CM-Y
			3	XS6W-6LSZH8SS300CM-Y
			5	XS6W-6LSZH8SS500CM-Y
Cable with Connectors on Both Ends (RJ45/RJ45) Rugged RJ45 plugs type *1 Wire Gauge and Number of Pairs: AWG22, 2-pair Cable Cable color: Light blue		OMRON	0.3	XS5W-T421-AMD-K
			0.5	XS5W-T421-BMD-K
			1	XS5W-T421-CMD-K
			2	XS5W-T421-DMD-K
			5	XS5W-T421-GMD-K
			10	XS5W-T421-JMD-K
Cable with Connectors on Both Ends (M12 Straight/M12 Straight) Shield Strengthening Connector cable *4 M12/Smartclick Connectors Wire Gauge and Number of Pairs: AWG22, 2-pair Cable Cable color: Black		OMRON	0.5	XS5W-T421-BM2-SS
			1	XS5W-T421-CM2-SS
			2	XS5W-T421-DM2-SS
			3	XS5W-T421-EM2-SS
			5	XS5W-T421-GM2-SS
			10	XS5W-T421-JM2-SS
Cable with Connectors on Both Ends (M12 Straight/RJ45) Shield Strengthening Connector cable *4 M12/Smartclick Connectors Rugged RJ45 plugs type Wire Gauge and Number of Pairs: AWG22, 2-pair Cable Cable color: Black		OMRON	0.5	XS5W-T421-BMC-SS
			1	XS5W-T421-CMC-SS
			2	XS5W-T421-DMC-SS
			3	XS5W-T421-EMC-SS
			5	XS5W-T421-GMC-SS
			10	XS5W-T421-JMC-SS

\*1 Standard type cables length 0.2, 0.3, 0.5, 1, 1.5, 2, 3, 5, 7.5, 10, 15 and 20 m are available. Rugged type cables length 0.3, 0.5, 1, 2, 3, 5, 10 and 15 m are available. For details, refer to Cat.No.G019.

\*2 The lineup features Low Smoke Zero Halogen cables for in-cabinet use and PUR cables for out-of-cabinet use. Although the LSZH cable is single shielded, its communications and noise characteristics meet the standards.

\*3 Cables colors are available in blue, yellow, or Green.

\*4 For details, contact your OMRON representative.


### Cables / Connectors

Wire Gauge and Number of Pairs: AWG24, 4-pair Cable

Item	Appearance	Recommended manufacturer	Model
Cables	—	Hitachi Metals, Ltd.	NETSTAR-C5E SAB 0.5 x 4P *
	—	Kuramo Electric Co.	KETH-SB *
	—	SWCC Showa Cable Systems Co.	FAE-5004 *
RJ45 Connectors	—	Panduit Corporation	MPS588 *

\* We recommend you to use above cable and connector together.

Wire Gauge and Number of Pairs: AWG22, 2-pair Cable

Item	Appearance	Recommended manufacturer	Model
Cables	—	Kuramo Electric Co.	KETH-PSB-OMR *
	—	JMACS Japan Co., Ltd.	PNET/B *
RJ45 Assembly Connector		OMRON	XS6G-T421-1 *

\* We recommend you to use above Cable and RJ45 Assembly Connector together.

**Note:** Connect both ends of cable shielded wires to the connector hoods.

## Software

### How to Select Required Support Software for Your Controller

The required Support Software depends on the Controller to connect. Please check the following table when purchasing the Support Software.

Product	Omron PLC System	Omron Machine Automation Controller System
Controller	CJ-series	NJ/NX-series
Software	FA Integrated Tool Package CX-One	Automation Software Sysmac Studio

### FA Integrated Tool Package CX-One

Product name	Specifications	Specifications		Model	Standards
		Number of licenses	Media		
<b>FA Integrated Tool Package CX-One Ver.4.□</b>	<p>The CX-One is a comprehensive software package that integrates Support Software for OMRON PLCs and components.</p> <p>CX-One runs on the following OS. OS: Windows XP (Service Pack 3 or higher, 32-bit version) / Windows Vista (32-bit/64-bit version) / Windows 7 (32-bit/64-bit version) / Windows 8 (32-bit/64-bit version) / Windows 8.1 (32-bit/64-bit version) / Windows 10 (32-bit/64-bit version)</p> <p>CX-One Version 4.□ includes CX-Programmer Ver.9.□ For details, refer to the CX-One catalog (Cat. No. R134)</p>	1 license *1	DVD *2	CXONE-AL01D-V4	—

\*1 Multi licenses (3, 10, 30, or 50 licenses) and DVD media without licenses are also available for the CX-One.

\*2 The CX-One is also available on CD (CXONE-AL□□C-V4).

### Automation Software Sysmac Studio

Please purchase a DVD and required number of licenses the first time you purchase the Sysmac Studio. DVDs and licenses are available individually. Each model of licenses does not include any DVD.

Product name	Specifications	Specifications		Model	Standards
		Number of licenses	Media		
<b>Sysmac Studio Standard Edition Ver.1.□</b>	<p>The Sysmac Studio is the software that provides an integrated environment for setting, programming, debugging and maintenance of machine automation controllers including the NJ/NX-series CPU Units, NY-series Industrial PC, EtherCat Slave, and the HMI.</p> <p>Sysmac Studio runs on the following OS. OS: Windows 7 (32-bit/64-bit version) / Windows 8 (32-bit/64-bit version) / Windows 8.1 (32-bit/64-bit version) / Windows 10 (32-bit/64-bit version)</p>	— (Media only)	DVD	SYSMAC-SE200D	—
	<p>The Sysmac Studio Standard Edition DVD includes Support Software to set up EtherNet/IP Units, DeviceNet slaves, Serial Communications Units, and Support Software for creating screens on HMIs (CX-Designer). For details, refer to your OMRON website.</p>	1 license *	—	SYSMAC-SE201L	—




\* Multi licenses are available for the Sysmac Studio (3, 10, 30, or 50 licenses).

## IO-Link Master Unit

Name	Specifications			Model	Standards
	Environmental resistance	Number of IO-Link ports	I/O connection terminals		
GX-series IO-Link Master Unit	IP67	8	M12 connector (A-cording, female)	<b>GX-ILM08C</b>	UC, CE, RCM, KC

## Recommended EtherCAT Communications Cables

Use Straight STP (shielded twisted-pair) cable of category 5 or higher with double shielding (braiding and aluminum foil tape) for EtherCAT.

Item	Appearance	Recommended manufacturer	Cable length (m)	Model
Cable with Connectors on Both Ends Shield Strengthening cable *1 Wire Gauge and Number of Pairs: AWG22, 2-pair Cable Cable color: Black	Smartclick (M12 Straight/M12 straight) 	OMRON	0.5	XS5W-T421-BM2-SS
			1	XS5W-T421-CM2-SS
			2	XS5W-T421-DM2-SS
			3	XS5W-T421-EM2-SS
			5	XS5W-T421-GM2-SS
			10	XS5W-T421-JM2-SS
Cable with Connectors on Both Ends Rugged type Shield Strengthening cable *1 Wire Gauge and Number of Pairs: AWG22, 2-pair Cable Cable color: Black	Smartclick (M12 Straight/RJ45 straight) 	OMRON	0.5	XS5W-T421-BMC-SS
			1	XS5W-T421-CMC-SS
			2	XS5W-T421-DMC-SS
			3	XS5W-T421-EMC-SS
			5	XS5W-T421-GMC-SS
			10	XS5W-T421-JMC-SS
Cable with Connectors on Both Ends (RJ45/RJ45) Rugged standard RJ45 plugs *2 Wire gauge and number of pairs: AWG22, 2-pair cable Cable color: Yellow		3M Japan Limited	0.25	3RHS4-1100-0.25M
			0.5	3RHS4-1100-0.5M
			1	3RHS4-1100-1M
			2	3RHS4-1100-2M
			5	3RHS4-1100-5M
			10	3RHS4-1100-10M

\*1 For details, Contact your OMRON representative.

\*2 Cables are available from 0.25 m to 100 m. Ask the manufacturer for details.

## Power Supply Cables

Item	Appearance	Recommended manufacturer	Cable length (m)	Model
Connector connected to cable, socket on one cable end Fire-retardant, Robot cable	Smartclick (M12 Straight)	OMRON	1	XS5F-D421-C80-F
			2	XS5F-D421-D80-F
			3	XS5F-D421-E80-F
			5	XS5F-D421-G80-F
			10	XS5F-D421-J80-F
Connectors connected to cable, socket and plug on cable ends Fire-retardant, Robot cable	Smartclick (M12 Straight/M12 straight)	OMRON	1	XS5W-D421-C81-F
			2	XS5W-D421-D81-F
			3	XS5W-D421-E81-F
			5	XS5W-D421-G81-F
			10	XS5W-D421-J81-F

**Note:** Refer to the *Round Water-resistant Connectors* in the category of *Sensor I/O Connector/Sensor Controller* on your local OMRON website for details.

## Sensor I/O Connectors

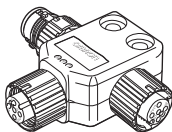
Order a cable with a connector on both ends to connect a sensor of connector type.

Item	Appearance	Recommended manufacturer	Cable length (m)	Model
Connectors connected to cable, M8 socket and M12 plug on cable ends Fire-retardant, Robot cable	M8 screw- M12 Smartclick (M8 Straight/M12 straight)	OMRON	0.2	XS3W-M42C-4C2-A
Connectors connected to cable, socket and plug on cable ends Fire-retardant, Robot cable	Smartclick (M12 Straight/M12 straight)	OMRON	1	XS5W-D421-C81-F
			2	XS5W-D421-D81-F
			3	XS5W-D421-E81-F
			5	XS5W-D421-G81-F
			10	XS5W-D421-J81-F

**Note:** Refer to the *Ordering Information* in the catalog of the sensor to connect or the *Sensor I/O Connectors/Sensor Controllers* on your local OMRON website for details.

## Power Supply T-Joint Connector

This connector is used when branching a GX-type Unit power supply.


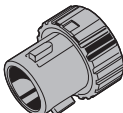
Item	Appearance	Specification	Connector type	Model
XS5R Plug/Socket T-Joint Connector		M12	Smartclick connector	XS5R-D427-5

## Waterproof Cover for Connectors

This is a waterproof cover for unused M12 GX connectors (female).

When you use this waterproof cover, you can maintain the IP67 protective structure.

The following two types of covers are available. Either one can be mounted on an EtherCAT communications connector or I/O connector.

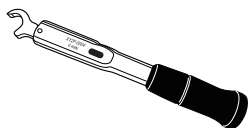
Item	Appearance	Specification	Connector type	Materials	Model
M12 Threaded Waterproof Cover *1		M12	Screw-type connector	Brass/nickel plated	XS2Z-22
Smartclick Waterproof Cover *2		M12	Smartclick connector	PBT	XS5Z-11

\*1 When mounting the M12 Threaded Waterproof Cover on a connector, always tighten it to a torque of 0.39 to 0.49 N·m.

\*2 When mounting a Smartclick Waterproof Cover on a connector, torque management is not required.

## Tool for M12 Threaded Connectors

The tool for tightening M12 Threaded Connectors is used when tightening to a specified torque.

Item	Appearance	Model
Torque Wrench		XY2F-0004

## Software

### Automation Software Sysmac Studio

Please purchase a DVD and required number of licenses the first time you purchase the Sysmac Studio. DVDs and licenses are available individually. Each model of licenses does not include any DVD.

Product name	Specification	Specification		Model	Standards
		Number of licenses	Media		
Sysmac Studio Standard Edition Ver.1.□□	The Sysmac Studio is the software that provides an integrated environment for setting, programming, debugging and maintenance of machine automation controllers including the NJ/NX-series CPU Units, NY-series Industrial PC, EtherCAT Slave, and the HMI.	--- (Media only)	DVD	SYSMAC-SE200D	---
	Sysmac Studio runs on the following OS. Windows 7(32-bit/64-bit version)/Windows 8(32-bit/64-bit version)/Windows 8.1(32-bit/64-bit version)/Windows 10(32-bit/64-bit version)  The Sysmac Studio Standard Edition DVD includes CX-ConfiguratorFDT to set up IO-Link Master Units and IO-Link devices. For details, refer to your OMRON website.	1 license *	---	SYSMAC-SE201L	

\* Multi licenses are available for the Sysmac Studio (3, 10, 30, or 50 licenses).

## Related Manuals

Cat. No.	Model number	Manual
W488	GX-□□□□□□□□	GX-Series EtherCAT Slave USER'S MANUAL
W570	NX-ILM400 GX-ILM08C	IO-Link System User's Manual
W505	NX701-□□□□ NX1P2-□□□□ NJ501-□□□□ NJ301-□□□□ NJ101-□□□□	NJ/NX-series CPU Unit Built-in EtherCAT Port User's Manual
W487	CJ1W-NC□81/NC□82	CJ Series Position Control Unit OPERATION MANUAL
W504	SYSMAC-SE2□□□	Sysmac Studio version 1 OPERATION MANUAL
W446	CXONE-AL□□□D-V□	CX-Programmer Operation Manual
W562	NY532-□□□□ NY512-□□□□	NY-series IPC Machine Controller Industrial Panel PC / Industrial Box PC Built-in EtherCAT® Port User's Manual
W560	NY532-□□□□ NY512-□□□□	NY-series Instructions Reference Manual

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