NX-ILM400

IO-Link makes sensor level information visible and solves the three major issues at manufacturing sites!
The screwless clamping terminaml block reduces wiring work.

- 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.

Corresponding to our shared **Value Design for Panel** concept for the specifications of products

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*3 make replacement of IO-Link sensors easier.
- 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) *3
- Up to four sensors can be connected.
*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. When the Omron IO-Link master unit is used

Communications Specifications

Item	Specification
Communications protocol	IO-Link protocol
Baud rate	COM1 (4.8 kbps), COM2 (38.4 kbps), or COM3 (230.4 kbps)
Topology	1:1
Communications media	Unshielded cable
Communications distance	20 m max.
Compliant standards	• IO-Li k Interface and System Specification Version1.1.2 * • IO-Li k Test Specification Version1.1.2

* OMRON IO-Link products do not support the IO-Link preoperate state.

System Configuration

Support Software:
- IO-Link Master Unit settings: Use the Sysmac Studio.*1
- IO-Link device settings: Use CX-ConfiguratorFDT.*2

NJ/NX-series CPU Unit
with an EtherCAT Master

Connection to the
peripheral USB port or
built-in EtherNet/IP port on
an NJ/NX-series CPU Unit

.xml

ESI files
IODD files

Built-in EtherCAT port

RJ45

EtherCAT

Support Software:
- IO-Link Master Unit settings:
  Use the Sysmac Studio for
  the NX-type IO-Link Master
  Unit.
  Connection is not possible to
  a GX-type IO-Link Master
  Unit.

- IO-Link device settings:
  Use the CX-ConfiguratorFDT
  for the NX-type IO-Link
  Master Unit.
  Connection is not possible to
  a GX-type IO-Link Master
  Unit.

RJ45

NX-type IO-Link
Master Unit

M12

GX-type IO-Link
Master Unit

Connect the computer to the
peripheral USB port on the
EtherCAT Coupler Unit.

.xml

ESI files
IODD files

EtherCAT Coupler Unit

IO-Link

IO-Link

IO-Link communications
(4 wires per device)

IO-Link devices
(from OMRON or another
company)*3

IO-Link devices
(from OMRON or another
company)*3

*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.

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, CE: EU Directives, RCM: RCM mark, and KC: KC Registration.
- Contact your OMRON representative for further details and applicable conditions for these standards.

NX-series IO-Link Master Unit

Product Name	Specification			Model	Standards
	Number of IO-Link ports	I/O refreshing method	I/O connection terminals		
NX-series IO-Link Master Unit	4	Free-Run refreshing	Screwless clamping terminal block	**NX-ILM400**	UC1, CE, RCM, KC

Peripheral Devices

Sensor I/O Connectors
Order a cable with a connector on one end to connect a sensor. 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 recommended products.

Optional Products

Product name	Specification	Model	Standards
Unit/Terminal Block Coding Pins	Pins for 10 Units (30 terminal block pins and 30 Unit pins)	**NX-AUX02**	---

Product Name	Specification				Model	Standards
	No. of terminals	Terminal number indications	Ground terminal mark	Terminal current capacity		
Terminal Block	16	A/B	Not provided	10 A	**NX-TBA162**	---

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			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, EtherCAT Slave, and the HMI. Sysmac Studio runs on the following OS. Windows XP (Service Pack 3 or higher, 32-bit version)/Windows Vista(32-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) The Sysmac Studio Standard Edition DVD includes CX-Configurator FDT to set up IO-Link Master Units and IO-Link devices. For details, refer to the Sysmac Integrated Catalogue (P072).	--- (Media only)	DVD	**SYSMAC-SE200D**	---
		1 license *	---	**SYSMAC-SE201L**	

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

NX-ILM400

General Specification

Item		Specification
Enclosure		Must be built into a panel.
Grounding methods		Ground to 100 Ω or less.
Operating environment	**Ambient operating temperature**	0 to 55°C
	Ambient operating humidity	10% to 95% (with no condensation or icing)
	Atmosphere	Must be free from corrosive gases.
	Ambient storage temperature	−25 to 70°C (with no condensation or icing)
	Altitude	2,000 m max.
	Pollution degree	Pollution degree 2 or less: Conforms to JIS B3502 and IEC 61131-2.
	Noise immunity	Conforms to IEC 61000-4-4, 2 kV (power line).
	Overvoltage category	Category: Conforms to JIS B3502 and IEC 61131-2.
	EMC immunity level	Zone B
	Vibration resistance	Conforms to IEC 60068-2-6. 5 to 8.4 Hz with amplitude of 3.5 mm, 8.4 to 150 Hz, acceleration of 9.8 m/s^2 100 min each in X, Y, and Z directions (10 sweeps of 10 min each = 100 min total)
	Shock resistance	Conforms to IEC 60068-2-27. 147 m/s^2, 3 times each in X, Y, and Z directions
Applicable standards *		UL 61010-2-201, ANSI/ISA 12.12.01, EU: EN 61131-2, RCM, KC, and IO-Link conformance

* Refer to the OMRON website (www.ia.omron.com) or ask your OMRON representative for the most recent applicable standards for each model.

OMRON

Function Specification

Item		Specification
Unit name		IO-Link Master Unit
Model		NX-ILM400
Number of ports		4
Communications specifications	Communications protocol	IO-Link protocol
	Baud rate	COM1: 4.8kbps COM2: 38.4kbps COM3: 230.4kbps
	Topology	1:1
	Compliant standards	• IO-Link Interface and System Specification Version1.1.2 • IO-Link Test Specification Version1.1.2
Power supply to devices* in IO-Link Mode or SIO (DI) Mode	Rated voltage	24 VDC (20.4 to 28.8 VDC)
	Maximum load current	0.2 A/port
	Short-circuit protection	Provided.
Digital inputs (in SIO (DI) Mode)	Internal I/O common	PNP
	Rated voltage	24 VDC (20.4 to 28.8 VDC)
	Input current	5 mA typical (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, 256 ms
Digital outputs (in SIO (DO) Mode)	Internal I/O common	PNP
	Output type	Push-pull
	Rated voltage	24 VDC (20.4 to 28.8 VDC)
	Operating load voltage range	20.4 to 28.8 VDC
	Maximum load current	0.1 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 28.8 VDC)
	Input current	2 mA typical (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, 256 ms
Cable specifications	Cable type	Unshielded
	Length	20 m max.
	Electrostatic capacity between lines	3 nF max.
	Loop resistance	6 Ω max.
External connection terminals		Screwless Clamping Terminal Block (16 terminals)
I/O refreshing method		Free-Run refreshing
Dimensions		12 × 100 × 71 mm (W×H×D)
Isolation method		Photocoupler isolation
Insulation resistance		20 MΩ min. at 100 VDC (between isolated circuits)
Dielectric strength		510 VAC for 1 min, leakage current: 5 mA max. (between isolated circuits)
I/O power supply method		Supply from the NX bus
NX Unit power consumption		0.80 W
Current consumption from I/O power supply		50 mA
Weight		67 g

NX-ILM400

Item	Specification
Circuit configuration	
Terminal connection diagram	
Installation orientation and restrictions	Installation orientation: 6 possible orientations Restrictions:
Protective functions	Load short-circuit protection

OMRON

Function Specifications

Function			Description
Basic Functions	**Communications**	**Cyclic communications**	I/O data (process data) in the IO-Link devices is cyclically shared 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 shared with the host communications master, with the IO-Link Master Unit operating as the host communications slave. 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 host communications master 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 host communications master and the IO-Link devices. 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, or Disable Port This allows you to combine IO-Link communications and digital I/O in a single terminal or 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 IO-Link 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 host controller can use the Input Data Enabled Flags to determine whether input data * is valid. This is not possible if EtherNet/IP is used for host communications.
Application Functions	**Load rejection during host communications error**		This function turns OFF outputs from the IO-Link Master Unit when an error occurs in host communications in IO-Link Mode or in an SIO mode. This prevents output operations with incorrect values from host communications.
	Reading IO-Link total communications retries		The IO-Link total communications retries 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		You can set a filter processing time interval for digital inputs in SIO (DI) Mode or for digital inputs for pin 2 in IO-Link Mode. This lets you eliminate data corruption that can result from noise or switch chattering. This function can also be used to implement an ON delay and an OFF delay.
	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		The event log records events (including errors) that occur in the IO-Link Master Unit and the IO-Link devices. This enables partial troubleshooting for NJ/NX-series Controllers.

* The input data includes IO-Link input data in IO-Link communications, the digital input data that is input with pin 2, and digital input data in SIO (DI) Mode.

Version Information

NX Unit		Corresponding Unit Versions/Version *						
		EtherCAT				EtherNet/IP		
Model	**Unit version**	**Communications Coupler Unit**	**CPU Units**	**Sysmac Studio**	**CX-Configurator FDT**	**Communications Coupler Unit**	**Sysmac Studio**	**CX-Configurator FDT**
NX-ILM400	Ver.1.0	Ver.1.0 or later	Ver.1.12 or later	Ver.1.16 or higher	Ver.2.2 or higher	Ver.1.0 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.
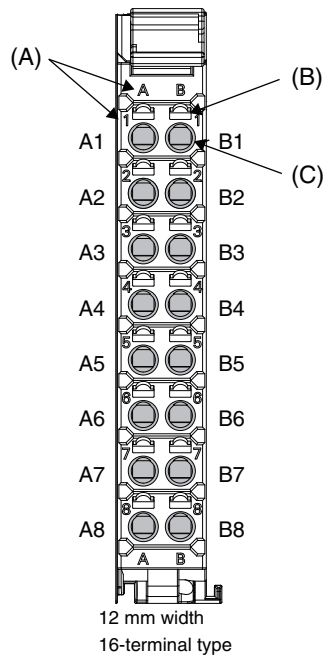
External Interface

NXILM-400
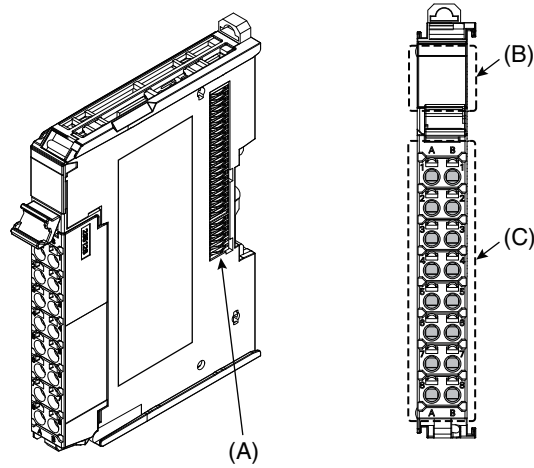
Letter	Name	Function
(A)	NX bus connector	This connector is used to connect each Unit.
(B)	Indicators	The indicators show the current operating status of the Unit.
(C)	Terminal block	The terminal block is used to connect external devices. The number of terminals depends on the type of Unit.

Terminal Blocks

12 mm width
16-terminal type

Letter	Name	Function
(A)	Terminal number indications	Terminal numbers for which A and B indicate the column, and 1 to 8 indicate the line are displayed. The terminal number is a combination of column and line, i.e. A1 to A8 and B1 to B8. The terminal number indications are the same regardless of the number of terminals on the terminal block.
(B)	Release holes	Insert a flat-blade screwdriver into these holes to connect and remove the wires.
(C)	Terminal holes	The wires are inserted into these holes.

Applicable Terminal Blocks for Each Unit Model

Unit model	Terminal Blocks				
	Model	No. of terminals	Terminal number indications	Ground terminal mark	Terminal current capacity
NX-ILM400	NX-TBA162	16	A/B	Not provided	10A

Applicable Wires

Using Ferrules

If you use ferrules, attach the twisted wires to them.
Observe the application instructions for your ferrules for the wire stripping length when attaching ferrules.
Always use plated one-pin ferrules. Do not use unplated ferrules or two-pin ferrules.

The applicable ferrules, wires, and crimping tool are given in the following table.

Terminal types	Manufacturer	Ferrule model	Applicable wire (mm² (AWG))	Crimping tool
Terminals other than ground terminals	Phoenix Contact	AI0,34-8	0.34 (#22)	Phoenix Contact (The figure in parentheses is the applicable wire size.) CRIMPFOX 6 (0.25 to 6 mm², AWG 24 to 10)
		AI0,5-8	0.5 (#20)	
		AI0,5-10		
		AI0,75-8	0.75 (#18)	
		AI0,75-10		
		AI1,0-8	1.0 (#18)	
		AI1,0-10		
		AI1,5-8	1.5 (#16)	
		AI1,5-10		
Ground terminals		AI2,5-10	2.0 *1	
Terminals other than ground terminals	Weidmuller	H0.14/12	0.14 (#26)	Weidmueller (The figure in parentheses is the applicable wire size.) PZ6 Roto (0.14 to 6 mm², AWG 26 to 10)
		H0.25/12	0.25 (#24)	
		H0.34/12	0.34 (#22)	
		H0.5/14	0.5 (#20)	
		H0.5/16		
		H0.75/14	0.75 (#18)	
		H0.75/16		
		H1.0/14	1.0 (#18)	
		H1.0/16		
		H1.5/14	1.5 (#16)	
		H1.5/16		

*1. Some AWG 14 wires exceed 2.0 mm² and cannot be used in the screwless clamping terminal block.

When you use any ferrules other than those in the above table, crimp them to the twisted wires so that the following processed dimensions are achieved.

8 to 10 mm

1.6 mm max.
(Terminals other than ground terminals)

2.0 mm max.
(Ground terminals)

2.4 mm max.
(Terminals other than ground terminals)

2.7 mm max.
(Ground terminals)
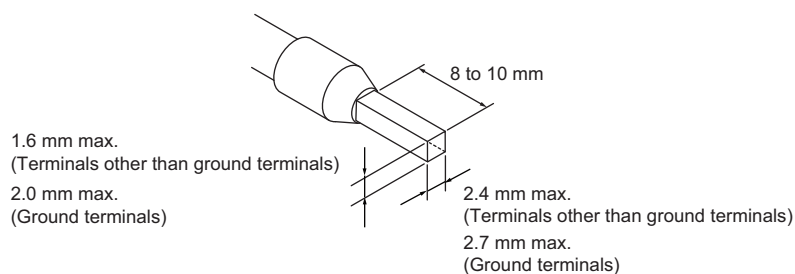
Using Twisted Wires/Solid Wires

If you use the twisted wires or the solid wires, use the following table to determine the correct wire specifications.

Terminals		Wire type				Wire size	Conductor length (stripping length)
		Twisted wires		Solid wire			
Classification	Current capacity	Plated	Unplated	Plated	Unplated		
All terminals except ground terminals	2 A max.	Possible	Possible	Possible	Possible	0.08 to 1.5 mm² AWG28 to 16	8 to 10 mm
	Greater than 2 A and 4 A or less		Not Possible	Possible *1	Not Possible		
	Greater than 4 A	Possible *1		Not Possible			
Ground terminals	---	Possible	Possible	Possible *2	Possible *2	2.0 mm²	9 to 10 mm

*1. Secure wires to the screwless clamping terminal block. Refer to the Securing Wires in the USER'S MANUAL for how to secure wires.
*2. With the NX-TB□□□1 Terminal Block, use twisted wires to connect the ground terminal. Do not use a solid wire.
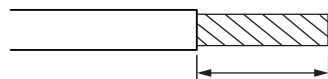
Conductor length (stripping length)

<Additional Information> If more than 2 A will flow on the wires, use plated wires or use ferrules.

NX-ILM400

Dimensions

NX-ILM400
12 mm Width

14.1

12.0

0.55

1.5

100

104.5

1.5

65.2

71

80.1

Related Manuals

Man.No	Model	Manual	Application	Description
W567	NX-ILM400	IO-Link Master Unit User's Manual	Learning hardware information, wiring, and specifications for the NX-series IO-Link Master Unit and checking a list of NX objects.	Describes detailed part specifications, installation, and wiring and also provides tables of specifications and NX objects for the NX-series IO-Link Master Unit.
W570	NX-ILM400 GX-ILM08C	IO-Link System User's Manual	Learning everything from an introduction to details about IO-Link Systems, including mainly software information common to all IO-Link masters, Support Software operating methods, and troubleshooting. **Note:** Refer to the manuals for the individual Master Units for hardware information specific to each Master Unit and a list of the objects for each Master Unit.	Provides an overview of IO-Link Systems and explains the system configuration, communications specifications, communications methods, I/O data, parameters, models, Support Software, and troubleshooting. Refer to the following manuals for the individual IO-Link Master Units for hardware information and specifications specific to each Master Unit and a list of the NX objects for each Master Unit. NX-series IO-Link Master Unit: W568 GX-series IO-Link Master Unit: W488-E1-05 or later
W488-E1-05	GX-ID ☐☐☐☐ GX-OD ☐☐☐☐ GX-OC ☐☐☐☐ GX-MD ☐☐☐☐ GX-AD ☐☐☐☐ GX-DA ☐☐☐☐ GX-EC ☐☐☐☐ GX-ILM ☐☐☐ XWT-ID ☐☐ XWT-OD ☐☐	EtherCAT Slave Units User's Manual	Learning hardware information on the GX-series IO-Link Master Unit and checking a list of objects.	Describes part names, functions, installation, and wiring and also provides tables of specifications and NX objects for the NX-series IO-Link Master Unit (W488-E1-05 or later). Also describes the hardware, setup methods, and functions of the EtherCAT Remote I/O Terminals.
W502	NX701-☐☐☐☐ NJ501-☐☐☐☐ NJ301-☐☐☐☐ NJ101-☐☐☐☐	NJ/NX-series Instructions Reference Manual	Learning detailed specifications on the basic instructions of an NJ/NXseries CPU Unit.	The instructions in the instruction set (IEC 61131-3 specifications) are described. When programming, use this manual together with the *NX-series CPU Unit Hardware User's Manual* (Cat. No. W535) or *NJ-series CPU Unit Hardware User's Manual* (Cat. No. W500) and *NJ/NX-series CPU Unit Software User's Manual* (Cat. No. W501).
W505	NX701-☐☐☐☐ NJ501-☐☐☐☐ NJ301-☐☐☐☐ NJ101-☐☐☐☐	NJ/NX-series CPU Unit Built-in EtherCAT® Port User's Manual	Using the built-in EtherCAT port on an NJ/NX-series CPU Unit.	Information on the built-in EtherCAT port is provided. This manual provides an introduction and provides information on the configuration, features, and setup. Use this manual together with the *NX-series CPU Unit Hardware User's Manual* (Cat. No. W535) or *NJ-series CPU Unit Hardware User's Manual* (Cat. No. W500) and *NJ/NX-series CPU Unit Software User's Manual* (Cat. No. W501).
W503	NX701-☐☐☐☐ NJ501-☐☐☐☐ NJ301-☐☐☐☐ NJ101-☐☐☐☐	NJ/NX-series Troubleshooting Manual	Learning about the errors that may be detected in an NJ/NX-series Controller.	Concepts on managing errors that may be detected in an NJ/NX-series Controller and information on individual errors are described. Use this manual together with the *NX-series CPU Unit Hardware User's Manual* (Cat. No.W535) or *NJ-series CPU Unit Hardware User's Manual* (Cat. No. W500) and *NJ/NX-series CPU Unit Software User's Manual* (Cat. No. W501).
W525	NX- ☐☐☐☐☐☐	NX-series Data Reference Manual	Referencing lists of the data that is required to configure systems with NX-series Units	Lists of the power consumptions, weights, and other NX Unit data that is required to configure systems with NX-series Units are provided.
W519	NX-ECC☐☐☐	NX-series EtherCAT® Coupler Unit User's Manual	Learning how to use an NX-series EtherCAT Coupler Unit and EtherCAT Slave Terminals	The system and configuration of EtherCAT Slave Terminals, which consist of an NX-series EtherCAT Coupler Unit and NX Units, are described along with the hardware, setup, and functions of the EtherCAT Coupler Unit that are required to configure, control, and monitor NX Units through EtherCAT.
W504	SYSMAC-SE2☐☐☐	Sysmac Studio Version 1 Operation Manual	Learning about the operating procedures and functions of the Sysmac Studio.	Describes the operating procedures of the Sysmac Studio.

Note: Refer to the instructions for the individual Sensors for information on IO-Link Sensors.

MEMO

OMRON

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*3 make replacement of IO-Link sensors easier.
- 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) *3
- 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. When the Omron IO-Link master unit is used

Communications Specifications

Item	Specification
Communications protocol	IO-Link protocol
Baud rate	COM1 (4.8 kbps), COM2 (38.4 kbps), or COM3 (230.4 kbps)
Topology	1:1
Communications media	Unshielded cable
Communications distance	20 m max.
Compliant standards	• IO-L k Interface and System Specification Version1.1.2 * • IO-L k Test Specification Version1.1.2

* OMRON IO-Link products do not support the IO-Link preoperate state.

GX-ILM08C

System Configuration

Support Software:
- IO-Link Master Unit settings: Use the Sysmac Studio.*1
- IO-Link device settings: Use CX-ConfiguratorFDT.*2

NJ/NX-series CPU Unit
with an EtherCAT Master

Connection to the
peripheral USB port or
built-in EtherNet/IP port on
an NJ/NX-series CPU Unit

.xml

ESI files
IODD files

RJ45

Built-in EtherCAT port

Support Software:
- IO-Link Master Unit settings:
  Use the Sysmac Studio for
  the NX-type IO-Link Master
  Unit.
  Connection is not possible to
  a GX-type IO-Link Master
  Unit.

- IO-Link device settings:
  Use the CX-ConfiguratorFDT
  for the NX-type IO-Link
  Master Unit.
  Connection is not possible to
  a GX-type IO-Link Master
  Unit.

EtherCAT

RJ45   NX-type IO-Link   M12   GX-type IO-Link
        Master Unit   Master Unit

Connect the computer to the
peripheral USB port on the
EtherCAT Coupler Unit.

.xml

ESI files
IODD files

IO-Link

EtherCAT Coupler Unit

IO-Link

IO-Link communications
(4 wires per device)

IO-Link devices
(from OMRON or another
company)*3

IO-Link devices
(from OMRON or another
company)*3

*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.

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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, CE: EU Directives, RCM: RCM mark, and KC: KC Registration.
- Contact your OMRON representative for further details and applicable conditions for these standards.

EtherCAT Slave Terminals IO-Link Master Unit

Product Name	Specification			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)	**GX-ILM08C**	CE, RCM, KC

Peripheral Devices

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 Wire Gauge and Number of Pairs: AWG22, 2-pair Cable Cable color: Black	Smartclick (M12 Straight/M12 straight) *NEW*	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 Wire Gauge and Number of Pairs: AWG22, 2-pair Cable Cable color: Black	Smartclick (M12 Straight/RJ45 straight) *NEW*	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**

Note: For details, Contact your OMRON representative.

Sensor I/O Connectors

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.

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.

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			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, EtherCAT Slave, and the HMI. Sysmac Studio runs on the following OS. Windows XP (Service Pack 3 or higher, 32-bit version)/Windows Vista(32-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) The Sysmac Studio Standard Edition DVD includes CX-Configurator FDT to set up IO-Link Master Units and IO-Link devices. For details, refer to the Sysmac Integrated Catalogue (P072).	--- (Media only)	DVD	**SYSMAC-SE200D**	---
		1 license *	---	**SYSMAC-SE201L**	

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

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^2 for 80 minutes each in X, Y, and Z directions
Shock resistance	150 m/s^2 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
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	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) or ask your OMRON representative for the most recent applicable standards for each model.

GX-ILM08C

Function 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	• IO-Link Interface and System Specification Version1.1.2 • IO-Link Test Specification Version1.1.2
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		Load short-circuit protection

Function Specifications

Function			Description
Basic Functions	**Communications**	**Cyclic communications**	I/O data (process data) in the IO-Link devices is cyclically shared 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 shared with the host communications master, with the IO-Link Master Unit operating as the host communications slave. 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 host communications master 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 host communications master and the IO-Link devices. 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, or Disable Port This allows you to combine IO-Link communications and digital I/O in a single terminal or 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 IO-Link 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 host controller can use the Input Data Enabled Flags to determine whether input data * is valid. This is not possible if EtherNet/IP is used for host communications.
Application Functions	**Load rejection during host communications error**		This function turns OFF outputs from the IO-Link Master Unit when an error occurs in host communications in IO-Link Mode or in an SIO mode. This prevents output operations with incorrect values from host communications.
	Reading IO-Link total communications retries		The IO-Link total communications retries 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		You can set a filter processing time interval for digital inputs in SIO (DI) Mode or for digital inputs for pin 2 in IO-Link Mode. This lets you eliminate data corruption that can result from noise or switch chattering. This function can also be used to implement an ON delay and an OFF delay.
	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		The event log records events (including errors) that occur in the IO-Link Master Unit and the IO-Link devices. This enables partial troubleshooting for NJ/NX-series Controllers.

* The input data includes IO-Link input data in IO-Link communications, the digital input data that is input with pin 2, and digital input data in SIO (DI) Mode.

GX-ILM08C

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 Unit Versions/Version *		
		EtherCAT		
Model	Unit version	CPU Units	Sysmac Studio	CX-Configurator FDT
GX-ILM08C	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
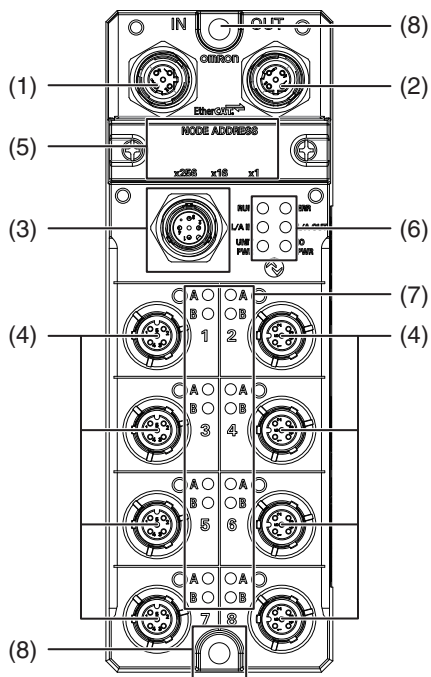
No.	Name	Function
(1)	EtherCAT communications connector, IN	EtherCAT cable connection: IN side M12 connector (D-coding, female)
(2)	EtherCAT communications connector, OUT	EtherCAT cable connection: OUT side M12 connector (D-coding, female)
(3)	Power supply connector	Connects to Unit power supply and 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.

GX-ILM08C

Wiring

IO-Link Mode

IOV
IOG
Power supply connector
IO-Link Device
DI white
IO-Link Master Unit
L+ brown
I/O connector
C/Q black
L- blue
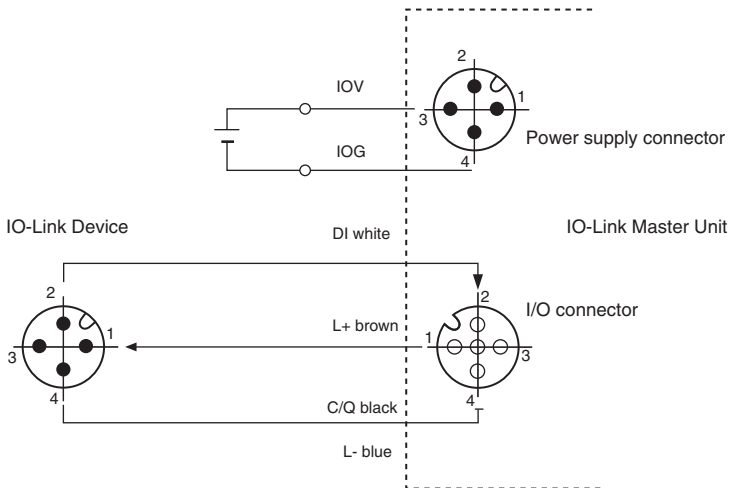
Note: Even if you connect to IO-Link devices without digital inputs for pin 2, connect pin 2 as shown in the above figure. This is because connectors on the IO-Link devices and the cable with connectors on both ends connect pin 2. However, because no data enters pin 2 of the IO-Link Master Unit, digital IO-Link input data is always OFF.

SIO (DI) Mode

Wiring Three-wire Sensors

IOV
IOG
Power supply connector
IO-Link Master Unit
L+ brown
I/O connector
Three-wire sensor, PNP type
C/Q black
L- blue
The DI terminal cannot be used.

Wiring Two-wire Sensors

IOV
IOG
Power supply connector
IO-Link Master Unit
L+ brown
I/O connector
Two-wire sensor
C/Q black
The DI terminal cannot be used.
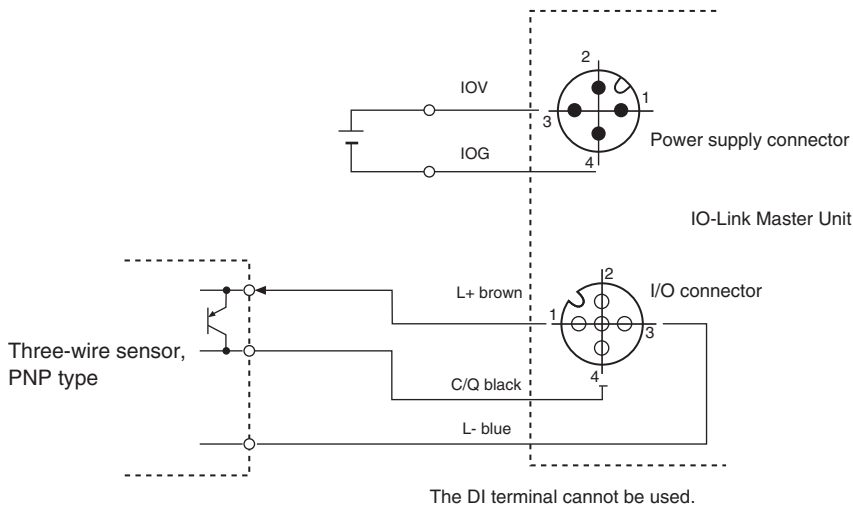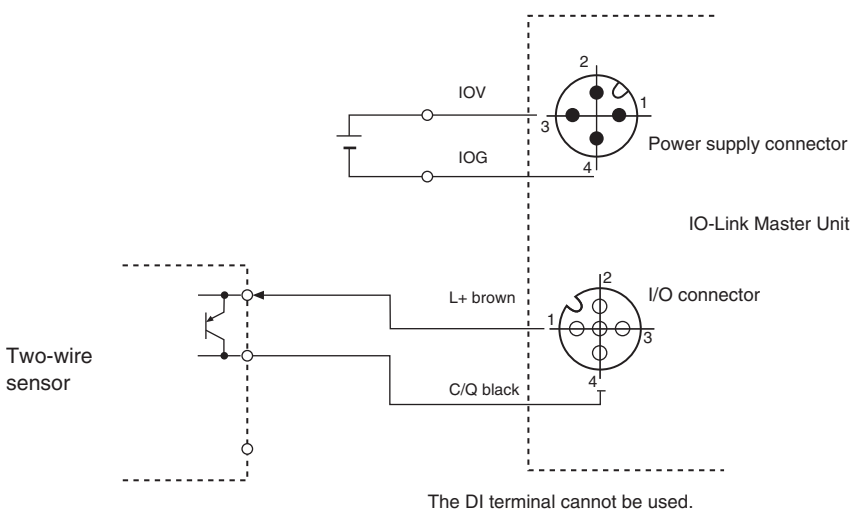
SIO (DO) Mode

Wiring Output Devices

IOV

IOG

2
3 1
4
Power supply connector

IO-Link Master Unit

2
1 3
4
I/O connector

C/Q black

L- blue

L

The DI terminal cannot be used.
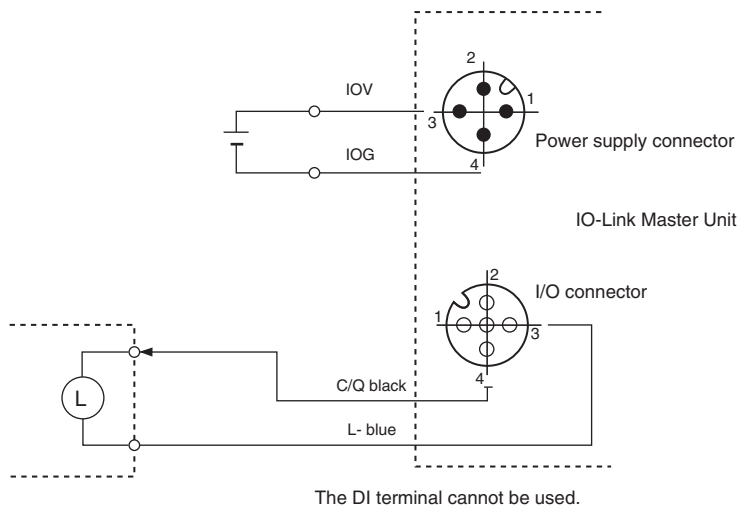
Dimensions   (Unit: mm)

GX-ILM08C

60

IN   OUT

omron

EtherCAT

NODE ADDRESS

x256   x16   x1

RUN ○ ○ ERR
L/A IN ○ ○ L/A OUT
UNIT ○ ○ IO
PWR   PWR

○A○ ○A○
B ○ ○ B
1   2

○A○ ○A○
B ○ ○ B
3   4

○A○ ○A○
B ○ ○ B
5   6

○A○ ○A○
B ○ ○ B
7   8

175
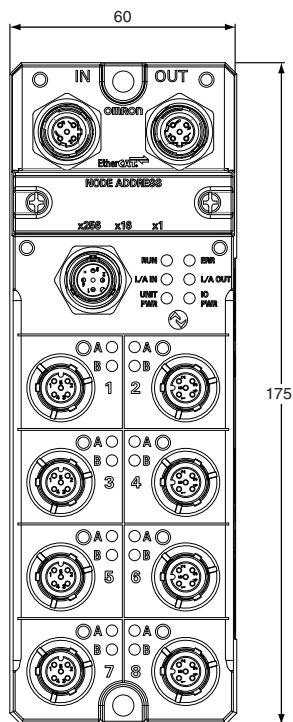
Height: 33 (49.1 mm when the connectors are included)

GX-ILM08C

Related Manuals

Man.No	Model	Manual	Application	Description
W488-E1-05	GX-ID □□□□ GX-OD □□□□ GX-OC □□□□ GX-MD □□□□ GX-AD □□□□ GX-DA □□□□ GX-EC □□□□ GX-ILM □□□ XWT-ID □□ XWT-OD □□	EtherCAT Slave Units User's Manual	Learning hardware information on the GX-series IO-Link Master Unit and checking a list of objects.	Describes part names, functions, installation, and wiring and also provides tables of specifications and NX objects for the NX-series IO-Link Master Unit (W488-E1-05 or later). Also describes the hardware, setup methods, and functions of the EtherCAT Remote I/O Terminals.
W570	NX-ILM400 GX-ILM08C	IO-Link System User's Manual	Learning everything from an introduction to details about IO-Link Systems, including mainly software information common to all IO-Link masters, Support Software operating methods, and troubleshooting. **Note:** Refer to the manuals for the individual Master Units for hardware information specific to each Master Unit and a list of the objects for each Master Unit.	Provides an overview of IO-Link Systems and explains the system configuration, communications specifications, communications methods, I/O data, parameters, models, Support Software, and troubleshooting. Refer to the following manuals for the individual IO-Link Master Units for hardware information and specifications specific to each Master Unit and a list of the NX objects for each Master Unit. NX-series IO-Link Master Unit: W568 GX-series IO-Link Master Unit: W488-E1-05 or later
W567	NX-ILM400	IO-Link Master Unit User's Manual	Learning hardware information, wiring, and specifications for the NX-series IO-Link Master Unit and checking a list of NX objects.	Describes detailed part specifications, installation, and wiring and also provides tables of specifications and NX objects for the NX-series IO-Link Master Unit.
W502	NX701-□□□□ NJ501-□□□□ NJ301-□□□□ NJ101-□□□□	NJ/NX-series Instructions Reference Manual	Learning detailed specifications on the basic instructions of an NJ/NXseries CPU Unit.	The instructions in the instruction set (IEC 61131-3 specifications) are described. When programming, use this manual together with the *NX-series CPU Unit Hardware User's Manual* (Cat. No. W535) or *NJ-series CPU Unit Hardware User's Manual* (Cat. No. W500) and *NJ/NX-series CPU Unit Software User's Manual* (Cat. No. W501).
W505	NX701-□□□□ NJ501-□□□□ NJ301-□□□□ NJ101-□□□□	NJ/NX-series CPU Unit Built-in EtherCAT® Port User's Manual	Using the built-in EtherCAT port on an NJ/NX-series CPU Unit.	Information on the built-in EtherCAT port is provided. This manual provides an introduction and provides information on the configuration, features, and setup. Use this manual together with the *NX-series CPU Unit Hardware User's Manual* (Cat. No. W535) or *NJ-series CPU Unit Hardware User's Manual* (Cat. No. W500) and *NJ/NX-series CPU Unit Software User's Manual* (Cat. No. W501).
W503	NX701-□□□□ NJ501-□□□□ NJ301-□□□□ NJ101-□□□□	NJ/NX-series Troubleshooting Manual	Learning about the errors that may be detected in an NJ/NX-series Controller.	Concepts on managing errors that may be detected in an NJ/NX-series Controller and information on individual errors are described. Use this manual together with the *NX-series CPU Unit Hardware User's Manual* (Cat. No.W535) or *NJ-series CPU Unit Hardware User's Manual* (Cat. No. W500) and *NJ/NX-series CPU Unit Software User's Manual* (Cat. No. W501).
W525	NX-□□□□□□	NX-series Data Reference Manual	Referencing lists of the data that is required to configure systems with NX-series Units.	Lists of the power consumptions, weights, and other NX Unit data that is required to configure systems with NX-series Units are provided.
W519	NX-ECC□□□	NX-series EtherCAT® Coupler Unit User's Manual	Learning how to use an NX-series EtherCAT Coupler Unit and EtherCAT Slave Terminals.	The system and configuration of EtherCAT Slave Terminals, which consist of an NX-series EtherCAT Coupler Unit and NX Units, are described along with the hardware, setup, and functions of the EtherCAT Coupler Unit that are required to configure, control, and monitor NX Units through EtherCAT.
W504	SYSMAC-SE2□□□	Sysmac Studio Version 1 Operation Manual	Learning about the operating procedures and functions of the Sysmac Studio.	Describes the operating procedures of the Sysmac Studio.

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• Solid State Relays

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