

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

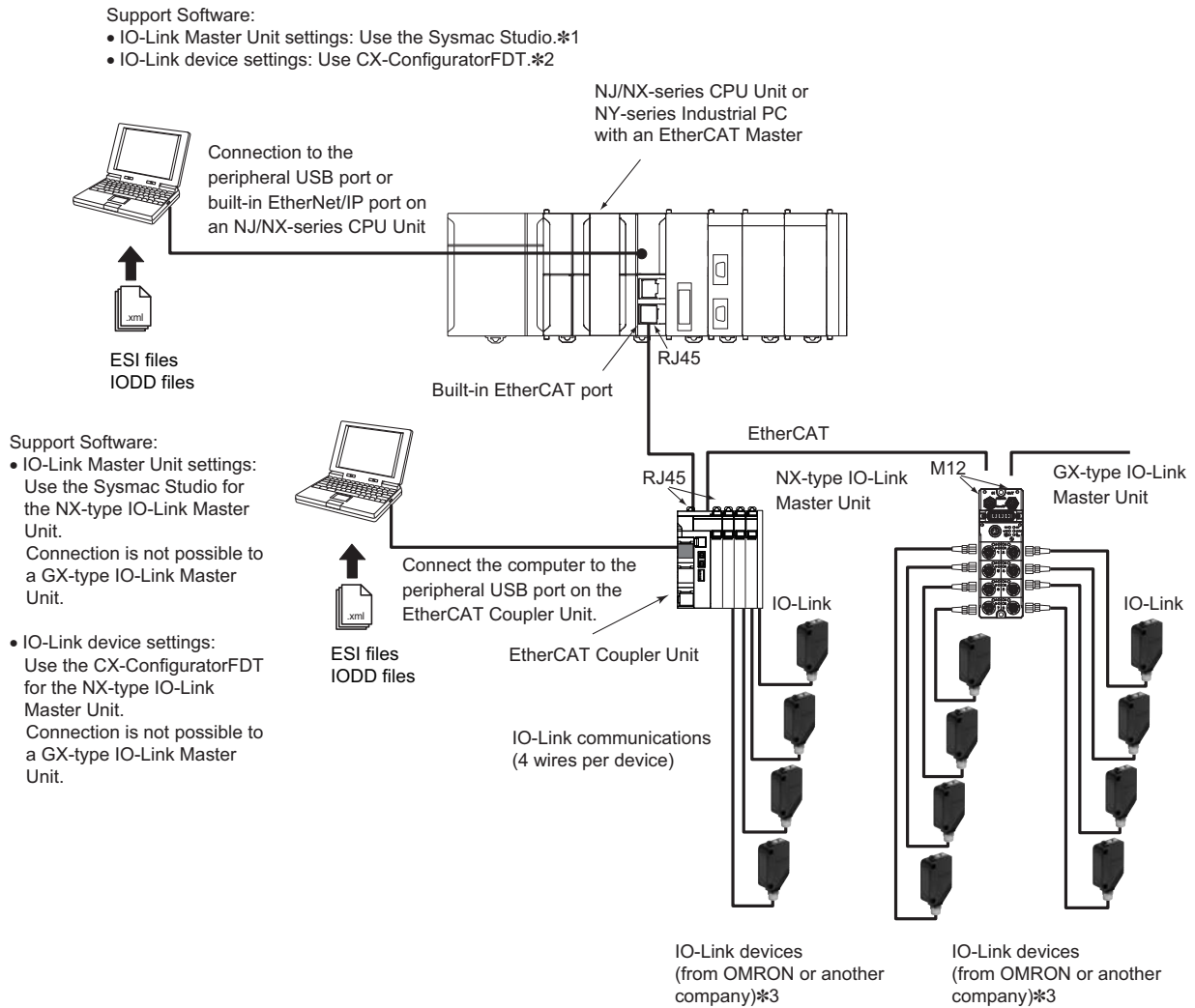
- The host controller can cyclically read control signals, status *1, wiring, and power supply status of IO-Link sensors. Because an IO-Link System can cyclically read analog data such as the amount of incident light in addition to ON/OFF information, it can be used for predictive maintenance based on 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	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
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) $\times$ 2 Power supply connector: M12 (A-coding, male) $\times$ 1 I/O connectors: M12 (A-coding, female) *1 $\times$ 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) 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	- IO-Link Interface and System Specification Version 1.1.2 - IO-Link Test Specification Version 1.1.2
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		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)

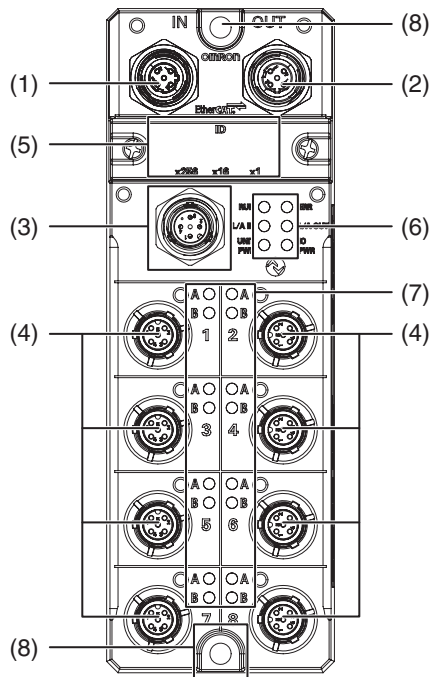
Version Information

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

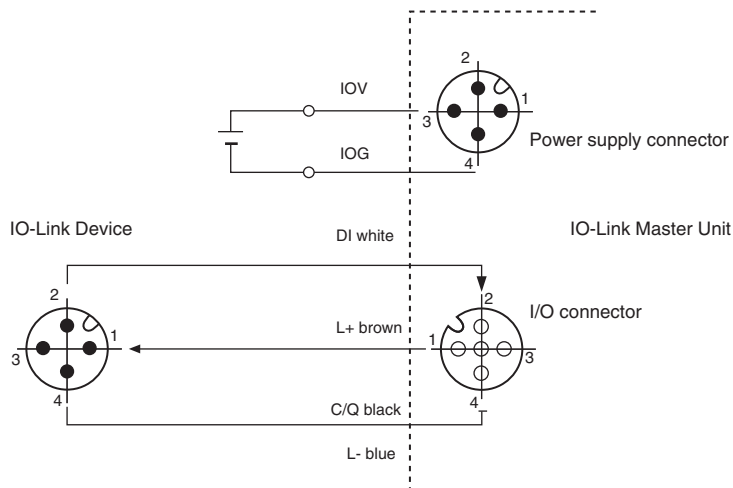
GX-ILM08C



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

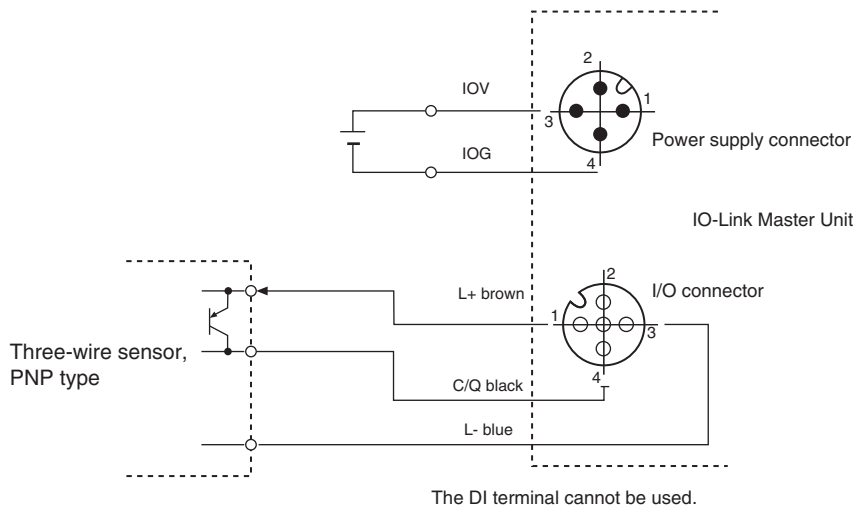
IO-Link Mode



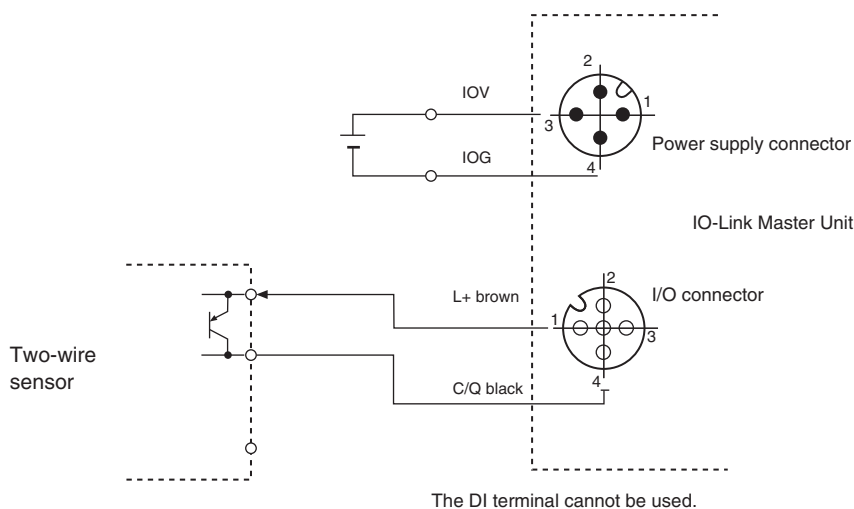
Note: Even if you connect to IO-Link devices without digital inputs for pin 2, connect pin 2 as shown in the above figure. This is because connectors on the IO-Link devices and the cable with connectors on both ends connect pin 2. However, because no data enters pin 2 of the IO-Link Master Unit, digital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

SIO (DI) Mode

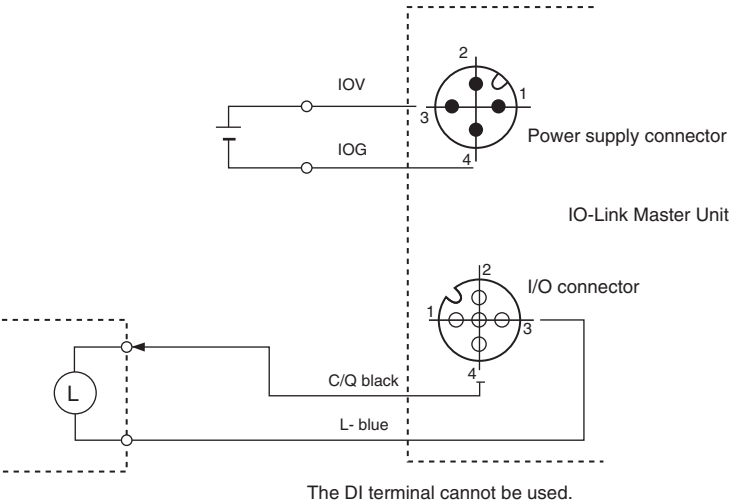
Wiring Three-wire Sensors



Wiring Two-wire Sensors



SIO (DO) Mode
Wiring Output Devices



Dimensions

(Unit: mm)

GX-ILM08C

