Handling Precautions

Remote I/O RT series

IO-Link master unit

RT-XLMSA08N

Thank you for purchasing CKD product.
Please review the precautions in this Handling Precautions thoroughly for safe operation of this product.
Incorrect usage may result in malfunction and dangers.
Keep this Precautions in a safe and convenient place for future reference.
For further information, refer to the instruction manual and product catalog.

Refer to the Handling Precautions of End unit for assembling and installing devices, and the Handling Precautions of Power supply unit for wiring power supply.

⚠ CAUTION

- An electric shock may occur by touching the electrical wiring connection (bare live part). Make sure to power off before wiring. Also, do not touch the live parts with bare hands.
- This product is DC dedicated. Use the product within the specified power supply voltage.
- Fully understand the contents of other units connected to this product before use.
- For details on the entire remote IO system including this product, refer to the "Remote I/O RT Series Instruction Manual: System Construction".
- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Accessories	This Handling Precautions, tie rod (2 pieces)

1 Specifications

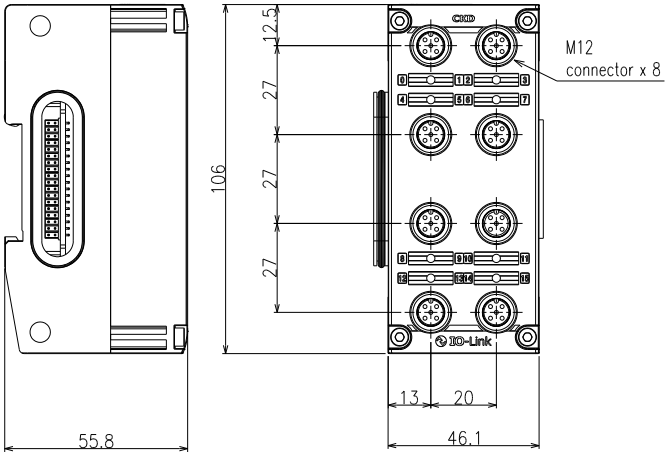
Always use the product within its specifications.

Item			Specifications
Model No.			RT-XLMSA08N
Size (W x H x D)		mm	46.1×106×55.8
Net weight		g	Approx. 245
Degree of protection			IP65 / IP67 (when connected) ※1
Working temperature range		℃	-10 to +55
Relative humidity		%RH	30 to 85
Ambient atmosphere			No corrosive gases or heavy dust
Installation location			Indoor use
Altitude		m	Up to 2000
Pollution degree			3
IO-Link specifications	Communication protocol		IO-Link V1.1
	Baud rate	kbps	COM1: 4.8, COM2: 38.4, COM3: 230.4
	Number of ports		8
	Connector		M12 (Class A) 5-pin female
	Device Supply current	A	0.2 /port
	Power supply (for unit/input)	V	DC24
	Rated input voltage(for 2-pin	V	DC24
	Rated input current(for 2-pin	mA	Depending on the polarity, specifications differ as follows: PNP: 5 TYP. NPN: 4 TYP.
	Data length	byte	Maximum input: 64/ Maximum output: 64 per unit
Digital input specifications	Input type		PNP/NPN
	Maximum number of Input points		16
	Response time	ms	ON: 0.5 or less / OFF: 1.0 or less
	Power supply (for unit/input)	V	DC24
	Rated input voltage	V	DC24

	Rated input current	mA	Depending on the pin number and polarity, specifications differ as follows: 4-pin PNP: 5 TYP. 4-pin NPN: 4 TYP. 2-pin PNP: 5 TYP. 2-pin NPN: 4 TYP.
Digital output specifications	Output type		PNP/NPN
	Maximum number of output points		8
	Response time	ms	ON: 0.5 or less / OFF: 1.0 or less
	Max. load current	A	0.2 /port
	Power supply (for unit/input)	V	DC24
Internal current consumption		mA	For unit/input: 100 or less; For output: none
LED			For indicating device/ IO-Link communication / I/O status: 16 pieces
Operation mode setting			Set for each port by IO-Link, digital input (PNP/NPN), digital output (PNP/NPN) or disabled.
Port-to-port sync communication			Synchronizes the communication timing with IO-Link devices between ports.
Forced input/output setting			Sets input values regardless of the actual inputs, and outputs regardless of the process data.

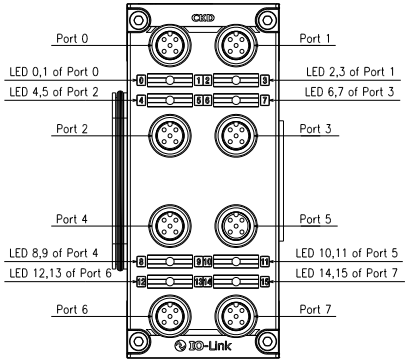
※1 IP65/IP67 is not part of the UL certification.

2 External dimensions (M12 type)



Dimensional unit: mm

3 Names and functions of each part



4 LED indicators

These LEDs indicate the status of each point.

Name	LED number	Overview		
		Illumination color	Operation mode	Description
Even number (Left) LED	0,2,4,6, 8,10,12,14	Red, Green, Yellow (Refer to the next table)	IO-Link mode	Indicates the communication status of IO-Link on pin 4.
			Digital input mode	Indicates the status of digital input 1 on pin 4.
			Digital output mode	Indicates the status of digital output 1 on pin 4.
Odd number (Right) LED	1,3,5,7, 9,11,13,15	yellow (Refer to the next table)	IO-Link mode Digital input mode	Indicates the status of digital input 2 on pin 2.

Status	Meaning	
	Even number (left) LED	Odd number (right) LED
Red on	Internal bus communication disconnected	-
Red blinking (fast)	Memory read/write error	-
Red blinking (slow)	Power line error detection or Signal line error detection	-
Yellow on	Digital input 1 or digital output 1: ON	Digital input 2: ON
Yellow blinking (fast)	Allocation error	Reflect setting waiting
Yellow blinking (slow)	Process data size error (system error) or device mismatch (unit input error)	-
Green blinking (slow)	Unable to detect IO-Link devices or IO-Link COMM error	-
Green on	In IO-Link communication	-
OFF	One of the following: Power OFF state, in disable mode, digital input 1 OFF state, digital output 1 OFF state, when WDT is reset	One of the following: Power OFF state, disable mode, digital input 2 OFF state, when WDT is reset

5 Wiring

Function description and connection of the terminals are as following.

⚠ CAUTION

- An electric shock may occur by touching the electrical wiring connection (bare live part). Make sure to power off before wiring. Also, do not touch the live parts with bare hands.
- Do not apply tension or impact to the M12 connector and network cable. Long cables can exert unexpected momentum and impact due to its weight, and this can consequently damage the connectors and devices. Take appropriate measures such as secure the wiring to the machine or device midway.
- Do not wire the input/output line and other power line in parallel to prevent problems caused by noise.
- Discharge static electricity that has built up on your body by touching a grounded metal object before handling the device. Static electricity may cause damage to the product.

5.1 Connecting and wiring to the M12 connector

The connector plug for input/output is not supplied with the product. Separately purchase a plug that satisfies the specifications. Wiring the cable to the connecter plug enables the plug to connect to the connector socket for input/output on the product.

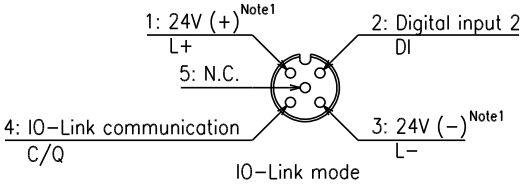
Recommended connector with cable

XS2H-D421-* (cable with connector plug at one end) Mfd by Omron Corporation

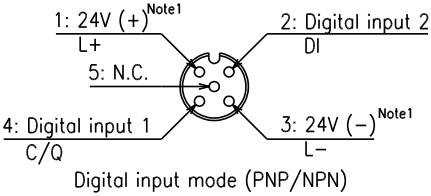
⚠ CAUTION

- Use a cable suitable for the working voltage and current.
- Provide sufficient bending radius for the cable and do not bend it forcibly.

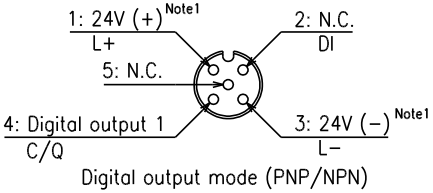
5.2 Pin arrangement and connecting example



IO-Link mode



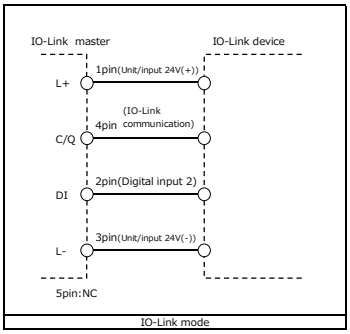
Digital input mode (PNP/NPN)



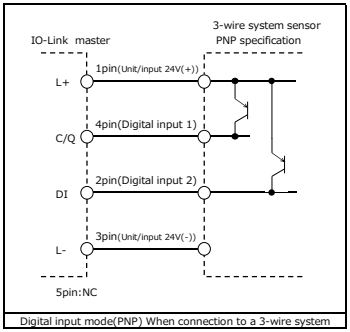
Digital output mode (PNP/NPN)

Pin arrangement

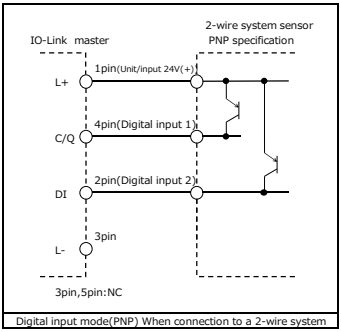
Note 1 Power supply for device (ex.sensor)



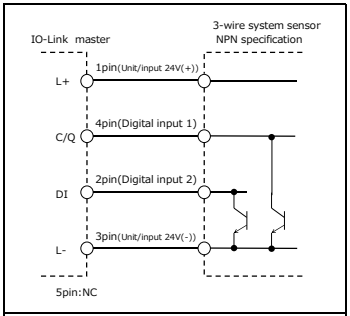
IO-Link mode



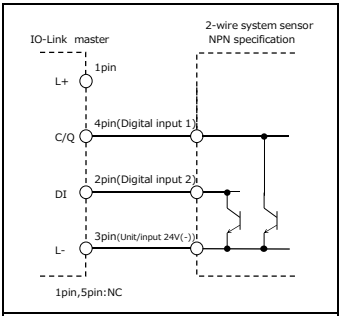
Digital input mode(PNP) When connection to a 3-wire system



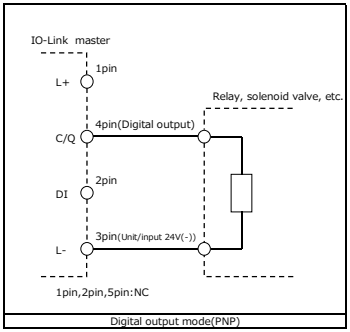
Digital input mode(PNP) When connection to a 2-wire system



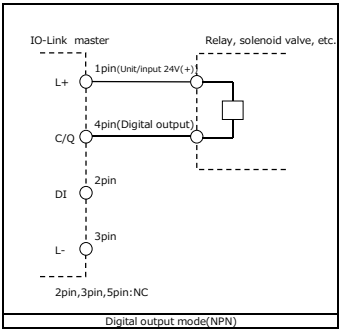
Digital input mode(NPN) When connection to a 3-wire system



Digital input mode(NPN) When connection to a 2-wire system



Digital output mode(PNP)



Digital output mode(NPN)

Connecting example

6 Maintenance

Refer to the "Remote I/O RT Series Instruction Manual: System Construction" for installing and removing this product.

⚠ CAUTION

- Do not pull the cable or connector forcibly as it may cause cable disconnection or damage.
- An electric shock may occur by touching the electrical wiring connection (bare live part).
- Do not install the unit with dirt or dust on the unit opening, gasket, O-ring, etc.

7 Function List

Function	Description	Related settings	Operation mode
Port operation setting	Selects an operation mode for each port on an IO-Link device.	Select operation mode	(Common for all modes)
Port diagnostic information for the unit	The diagnostic information for each of the IO-Link master unit's port. 16 bits per port, and each bit corresponds to an error type.	-	(Common for all modes)
Device information acquisition	Allows users to register IO-Link device configuration information to an IO-Link master unit by the PC software.	Device ID, etc.	IO-Link mode
Device verification	Verifies if the configuration information at startup matches with the one recorded in the IO-Link master unit.	[Device verification]	IO-Link mode
Backup/restoring settings data of an IO-Link device	Backs up the setting data of the connected IO-Link device in non-volatile memory in the product. In addition, restores the setting data of the IO-Link device that is backed up to this product to the IO-Link device.	[Backup settings] [Restore settings]	IO-Link mode
IO-Link communication cycle time setting	Sets the communication cycle time for each port. Sets to automatic or manual (1 to 25.5 ms).	[Communication cycle time]	IO-Link mode
Synchronization of cycle time between ports	Synchronizes the communication timing between ports. The communication cycle of the IO-Link device with the longest cycle time becomes the basis.	[Synchronization of cycle time between ports]	IO-Link mode
Error log	Stores error notifications through event communication or ISDU communication with IO-Link devices or errors of the master.	-	IO-Link mode
Input filter time in digital input mode	Sets the time before ON or OFF of the input signal is confirmed.	[Input filter time]	Digital input mode
Input hold time	Sets the minimum hold time after the input signal has been confirmed ON or OFF.	[Input hold time]	Digital input mode
Power line error detection	Detects an over-current or short-circuit on the pin 1 line (unit/input 24 V (+)).	[Power line error detection]	IO-Link mode, Digital input/output mode
Signal line error detection	Detects an over current or short circuit on the pin 4 line (digital output 1)	[Signal line error detection]	Digital output mode

Function	Description	Related settings	Operation mode
Forced input settings	Forcibly change the IO-Link process input data or digital input signal of the IO-Link master unit from the PC software.	-	(Except for disable mode
Forced output settings	Forcibly change the IO-Link process output data or digital output signal of the IO-Link master unit from the PC software.	-	(Except for disable mode
Output settings in the event of communication error.	Specifies the digital output status in the event of a communication error if the DIP switch setting SW3 on the device unit is OFF.	[Operation in the event of a communication error]	Digital output mode

8 Connecting/ communicating with PLC

8.1 Connecting with PLC

⚠ CAUTION

- If using an IO-Link master unit, the size of the basic unit of communication on the side of a configuration tool of an upper controller (e.g. "PDO" for EtherCAT) should match the data size on the IO-Link master unit side. Mismatching prevents correct communication. If a mismatch occurs, the settings on the upper controller side must be corrected. There are two cases where mismatches occur:

  1) When the operation mode of the port on the IO-Link master unit is in the "IO-Link mode". The "input size" or "output size" of the IO-Link master unit does not match the size of the upper controller's basic unit of communication (e.g. "PDO" for EtherCAT).
  2) When the operation mode of the port on the IO-Link master unit is "other than IO-Link mode". Even though there is no input/output on the IO-Link master unit side to perform IO-link communication with IO-Link devices, there is a basic unit of communication (e.g. "PDO" for EtherCAT) that has assigned it on the upper controller side.

When communicating with an IO-Link device, make sure that the " upper controller settings", "process data size settings for this product", and "process data size for the connected IO-Link device" are matched. Refer to the instruction manual for the details.

8.2 Process data

8.2.1 Output

Data	Description	Size
Digital output 1 (Digital output mode)	Digital output value corresponding to pin number 4. 1 means ON state, and 0 means OFF state.	Fixed at 1 byte
Error log cleared (IO-Link mode)	A flag that clears error logs in the IO-Link master unit at the time of startup from 0 (OFF) to 1 (ON). At the same time, the "error log update" will be 0 (OFF).	Fixed at 1 byte
Process data port 0 (IO-Link mode)	Process output data for port 0.	N bytes (N = 0 to 32)
...	...	...
Process data port 7 (IO-Link mode)	Process output data for port 7.	N bytes (N = 0 to 32)

8.2.2 Input

Data	Description	Size
Digital input 1 (Digital input mode)	Digital input value corresponding to pin number 4. 1 means ON state, and 0 means OFF state.	Fixed at 1 byte
Digital input 2 (IO-Link mode or digital input mode)	Digital input value corresponding to pin number 2. 1 means ON state, and 0 means OFF state.	Fixed at 1 byte
Port error flag (All modes)	The flag is ON for each port when a power line error, signal line error to an external output device, or memory read/write error occurs.	Fixed at 1 byte
IO-Link error flag (IO-Link mode)	This flag is ON in the event of an error in IO-Link communication.	Fixed at 1 byte
Error log update (IO-Link mode)	This flag is ON when an event occurs in IO-Link communication.	Fixed at 1 byte
IO-Link input data enable flag (IO-Link mode)	A flag indicating whether the process input data of each port is enable or disable. It is 1 (ON) when enabled.	Fixed at 1 byte
Process data port 0 (IO-Link mode)	Process input data for port 0.	N bytes (N = 0 to 32)
...	...	...
Process data port 7 (IO-Link mode)	Process input data for port 7.	N bytes (N = 0 to 32)

PRECAUTIONS

- Make sure that cables and connectors are securely connected before turning on the power.
- Do not disassemble, modify, or repair the product as that may cause failure or malfunction.
- Do not drop or apply excessive vibrations or shocks to the product as the part inside are made precisely.
- Do not attach or detach the connector while the power is ON as that may cause a failure or malfunction.
- Mold and rust may develop on the product if it is exposed to high humidity during transportation. Include moisture absorbers and tightly seal the package.

For inquiries regarding this product, please contact the following or the nearest sales office.

CKD Corporation

Head Office and Plant
250, Ouji 2-chome, Komaki, Aichi, 485-8551, Japan
Phone: +81-(0)568-77-1111 /Fax: +81-(0)568-77-1123
Contact
250, Ouji 2-chome, Komaki, Aichi, 485-8551, Japan
Phone: +81-(0)568-74-1338 /Fax: +81-(0)568-74-1165
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