

KOGANEI

EtherCAT Compliant

I/O Terminal YS8

User's Manual

Ver.2.0

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2. Revision History

Date of revision	Description of revision
12/2/2022	First printing
2/6/2024	P.49 14-2-3. Sync Manager Communication Object 1C12,1C13 Access rule revised.



CAUTION

With regard to the handling of and precautions for solenoid valves, be sure to read the Safety Precautions and Handling Instructions and General Precautions in the catalog on the Koganei website before use.

3. Safety Precautions (I/O Terminal)

Please read these Safety Precautions carefully before selecting a model and using the product in question, and make sure to use it properly.

The following precautions are intended to ensure safe and proper product usage and to prevent any harm coming to you, other people, or property.

Be sure to observe them in conjunction with the ISO 4414 (Pneumatic fluid power - General rules and safety requirements for systems and their components) and JIS B 8370 (General rules for pneumatic systems) safety regulations.

The instructions are divided into "Danger," "Warning," "Caution," and "Request" categories in accordance with the degree of danger and impairment.

	DANGER	Indicates a clear, predictable hazard. Failure to avoid this hazard may result in death or serious injury. Damage or destruction of property may also occur.
	WARNING	Indicates a hazard that, while not an immediate threat, may become a threat under certain circumstances. Failure to avoid this hazard may result in death or serious injury. Damage or destruction of property may also occur.
	CAUTION	Indicates a hazard that, while not an immediate threat, may become a threat under certain circumstances. Failure to avoid this hazard may result in light or moderate injury. Damage or destruction of property may also occur.
	REQUEST	While there is no potential for injury, this should be observed to use the product properly.

■ This product was designed and manufactured to be a component for general industrial machinery.

- When selecting and handling the equipment, be sure to have the system designer, or someone in charge with sufficient knowledge and experience, read the "Safety Precautions, Catalog, User's Manual, and other materials before handling the equipment. Handling it improperly is dangerous.
- After reading the catalog, user manual, and other materials, be sure to keep them someplace where they can be read at any time by whoever is using the product.
- If the product is transferred or loaned, be sure to include the catalog, user's manual, and other materials in a conspicuous spot on the product so that the new owner will know how to use the product safely and properly.
- The hazard, warning, and caution items listed in this Safety Precautions section do not cover all cases. Please read the catalog and user manual carefully and always prioritize safety.



DANGER

Intended Uses

- Do not use this product for the following applications.
 1. Medical equipment related to the maintenance, management, or otherwise of human life and the human body
 2. Mechanisms and mechanical devices intended for moving or transporting people
 3. Important safety components for machinery

The product in question was not planned or designed for applications requiring a high degree of safety. Such applications may result in loss of human life.

Installation

- When installing the product, be sure it is securely held and fastened (including the workpiece). Injury may occur if the product falls over, drops, or operates in an abnormal manner.
- While the installation position is left up to the user, do not directly subject the main unit to strong shocks or vibrations.
- Do not splash water onto the product.
Splashing water onto the product, washing it, or using it underwater may result in injury, electric shock, or fire due to abnormal operation.
- Do not use the product in the presence of hazardous materials such as ignitable or flammable materials. This product is not explosion-proof. It is possible for it to ignite either sponta-

neously or with an ignition source.

Wiring

- Be sure to turn off the power when wiring, installing, or inspecting the product. Failure to do so may result in accidents, electric shock, or malfunctions.
- Wire the product properly as indicated in this manual. Thoroughly check the configuration of the wiring, switches, and so on before turning on the power.
- For the module's input and output power supplies, use a stabilized DC power supply within the rated range that is insulated from AC currents. Uninsulated power supplies may result in electric shock. An unregulated power supply may cause the peak value to exceed the rated value, damage the module, or cause its accuracy to deteriorate.

Disassembly and Modification

- Never modify the product. Doing so may result in injury, electric shock, or fire due to abnormal operation.
- Do not disassemble, reassemble, or repair the product in an inappropriate manner that affects its fundamental structure, performance, or functions. Doing so may result in injury, electric shock, or fire.

During Operation

- Do not touch or place your hand or body near the product while it is in operation. In addition, do not adjust any built-in or attached mechanisms (e.g. attaching/detaching modules, wiring connectors, etc.) while the product is in operation. Doing so may result in injury.

 WARNING**How to Use**

- Do not exceed the scope of the product specifications when using the product.
Exceeding the scope of the product specifications may cause it to malfunction, stop functioning, or sustain damage.
It may also cause a significant decrease in the service life of the product.
- Do not throw the product into fire. The product may explode or generate toxic gases.
- Do not climb onto the product, use it as a foothold, or place objects onto it. Doing so may result in falls, injury due to the product falling or tipping over, product damage, malfunctions due to damage, unpredictable movement, and so on.

Installation

- Be sure to turn off the power when installing modules. Failure to turn off the power may result in module malfunctions or damage.
- Do not drop the product or subject it to abnormal vibrations or shock. Doing so may result in product failure or burnout.

Wiring

- Be sure to turn off the power when performing wiring work. Failure to do so may result in electric shock.
- After wiring is completed, confirm that there are no errors in the wiring.
- Do not use the same wiring route as power lines or high-voltage lines. Malfunctions may occur due to noise/surge interference in the signal line from the power lines or high-voltage lines.
- Do not connect the power supply in the reverse direction. Doing so may result in malfunction or burnout.
- Perform wiring for the input line and output line separately. Failure to do so may result in malfunctions.
- Do not subject the cables to repeated bending, pulling, pressure from heavy objects, or applications of force.
Wiring that subjects cables to repeated bending stress or tensile force may result in the cables snapping.
- Install noise filters or other adequate noise suppression measures when incorporating the product into equipment or devices. Malfunctions may occur due to noise interference.
- The frame ground should be as dedicated and as close to the module as possible. Too long of a distance may result in malfunctions due to noise interference.

While Supplying Power

- Do not connect or disconnect connectors with the power on. In addition, do not apply unnecessary stress on the connectors. Doing so may result in injury, equipment damage, or electric shock due to equipment malfunctions.
- Do not touch the terminals while power is being supplied. Doing so may cause result in electric shock.
- The input voltage and current must fall within the specified range. Use of a voltage or current in excess of the rated value may result in malfunctions or fire.
- Do not short-circuit the load. Doing so may result in malfunction or burnout.

Fail-safe

- Output may remain on or off due to welding or burnout of the output relays, destruction of the output transistors, or other factors. If this occurs, take external measures to ensure that the system operates on the safe side.
- When a communication failure occurs or an abnormality is detected in the internal state, output will occur in accordance with the settings. If this occurs, take external measures to ensure that the system operates on the safe side.
- When an abnormality is detected, output will occur in accordance with the settings, but the output will be turned off when the unit power supply (for control and input) is turned off, even if the output power supply is turned on. If this occurs, take external measures to ensure that the system operates on the safe side.

 CAUTION**How to Use**

- The input and output power supplies to the module should be separate power supplies. Operation cannot be guaranteed if they are operated from the same power supply.
- For the input and output power supplies to the module, make 0V the standard. Failure to do so may result in malfunctions.
- When increasing or decreasing the number of modules, do not exceed 2A of input or output supply power. Ensure that the sum of the current consumed by each module, the sensor supply current, and the load current does not exceed 2A. Exceeding 2A of current may result in malfunction or burnout.
- Use products with built-in surge absorbing elements for loads such as relays, bulbs, and lamps when directly driving loads that generate surge voltages. Failure to do so may result in malfunctions.

Installation

- Do not install or store the product in the following types of environments. Doing so may cause burnout, a cease in operation, or malfunctions.
 - Locations with direct exposure to sunlight
 - Locations where ambient temperature or relative humidity exceed the operating range
 - Locations subject to rapid temperature changes and condensation
 - Locations where corrosive or flammable gases are present
 - Locations where there is a lot of dust, dirt, salt, or iron powder
 - Locations exposed to splashes of water, oil, chemicals, etc.
 - Locations where the main unit is exposed to direct vibrations or shock
- When using the product in the following types of locations, take sufficient measures to shield it.
 - Near equipment that generates powerful high-frequency noise
 - Locations where noise is generated by static electricity, etc.
 - Locations where strong electric or magnetic fields are generated
 - Locations where there is a risk of radiation exposure
 - Locations with power lines nearby
- Discharge static electricity from your body by touching a grounded metal object before touching the product.
- Be sure to ground the product during installation.

Installation

- To protect the module, be sure to attach the module connection cover at the end of the module. Failure to do so may result in malfunction or failure.
- When attaching a module, be careful not to touch or bump against the connector terminals. If a module is installed and energized while the connector terminals are deformed, malfunctions may result due to poor contact.
- Tighten the screws at the connector with the torque specified in this manual. Loose screws may cause malfunctions.
- Please secure a working space for attaching the product. Failure to secure a working space will prevent daily inspections and maintenance, leading to the equipment stopping and product damage.

While Supplying Power

- Pay attention to the inrush current when the power is turned on. Depending on the connected load, the initial charging current may trigger the overcurrent protection function, causing the module to malfunction.

EtherCAT Connection

- The communication distance and the number of devices/connection method must be within the specifications. Also, do not connect to other networks such as EtherNet/IP or general in-house LAN.

EtherNet/IP Communication

- The communication distance and the number of devices/connection method must be within the specifications. Also, do not connect to other networks such as EtherCAT. Doing so may result in network downtime or malfunctions due to overloading.

 REQUEST**EMC Commands**

- While this product complies with EMC standards (EN61000-6-2, EN55011), this is to ensure that machines and equipment incorporating the product can comply with EMC standards, and does not guarantee that all equipment incorporating the product will meet the essential requirements of the EMC standards. Final confirmation of conformity to EMC standards should be performed by the customer themselves.

General

- If you intend to use the product under conditions or in environments not described in the catalog, user's manual, and other materials, or if you intend to use the products for applications where safety is especially essential, such as air navigation facilities, combustion equipment, entertainment equipment, safety equipment, or other applications where a significant impact on human life or property is likely, please leave sufficient leeway for ratings and performance when using the product and implement fail-safes and other safety measures. Please be sure to consult with one of our sales representatives.
- This product is intended for use in Japan. If using the product overseas, it is necessary to check the safety standards of the country in question. Please contact the nearest sales office.
- Unused or obsolete products and consumables should be appropriately disposed of as industrial waste.
- Third-party software is embedded in this product. Refer to <https://official.koganei.co.jp/common/html/3rd-party-license>.

html for information about licenses and copyrights related to this software.

- For hazards, warnings, and precautions not listed in this Safety Precautions section, refer to Safety Precautions (shared between air valves and other control equipment and between thermal refining, auxiliary, and vacuum equipment) in the web catalog (<https://official.en.koganei.co.jp/product/safety>).
- For product inquiries, please contact our nearest sales office or technical service center. The address and telephone number are shown at the end of this document.

 Other

- Please observe the following items.
1. When assembling a pneumatic system using this product, use genuine parts or compliant parts (recommended parts). When performing maintenance and servicing, use genuine parts or compliant parts (recommended parts). Observe the designated techniques and methods.
 2. Do not disassemble or reassemble the product in an inappropriate manner that affects its fundamental structure, performance, or functions.

We assume no responsibility for any failure to observe all safety precautions.

Warranty and Disclaimers**1. Warranty Period**

The warranty period for our products is one year after delivery. *Some products have a 2-year warranty. Please contact our nearest sales office or technical service center for details.

2. Warranty Scope and Disclaimers

- (1) If a product purchased from us or an authorized dealer or distributor fails through fault of our own within the warranty period, we will repair or replace the product free of charge. Even when within the warranty period, some products have a specified lifetime in terms of number of operations and other aspects, so confirm with the nearest sales office or technical service center.
- (2) Our product warranties are for the products themselves. Therefore, we are not liable for any incidental damages (e.g. costs incurred for repair or replacement of the product) resulting from product failure or a deterioration in its functions or performance.
- (3) We shall not be liable for any damage induced by or resulting from failures of our products, any deterioration in our products' function or performance, or any damage caused to other equipment due to said failures or deterioration.
- (4) We shall not be liable for any damage that results from use or storage of our products beyond the scope of the product specifications described in our catalogs and instruction manuals, or from actions other than those described in the precautions for installation, installation, adjustment, maintenance, and so on.
- (5) We shall not be liable for any damage caused by fire, natural disasters, the actions of a third party, or intentional or negligent actions of a customer that are not the responsibility of our company.

4. Glossary

Terminology	Description
Communication protocol	Defines the communication procedures and protocols for communications on a network.
Connection	Method for communications between devices and PLC. This is primarily used for I/O data communications.
ESI file	Information about connections to EtherCAT devices.
Flash memory	Memory device that keeps data, even if the power is turned off.
Network topology	Format of connections between devices on a network.
Vendor ID	A unique identifier for the manufacturer. It differs for each communication standard.
MAC address	Identification number that is physically assigned to devices on a network to uniquely identify the devices. They are in a 48-bit format.
100BASE-TX	Ethernet standard regulated by IEEE802.3. Twisted-pair cables (UTP category 5 or better, STP) are used for this standard.
CoE (CAN application protocol over Ethernet)	CAN application protocol service over EtherCAT
Object dictionary	Data structure containing descriptions of data type objects, communications objects, and application objects.
SDO (Service Data Object)	Asynchronous mailbox communication in CoE. Able to read/write all object dictionaries.
SDO communication	A type of EtherCAT communication. Communication using SDOs for information transmission at any time.
PDO (Process Data Object)	A structure described by mapping parameters with one or more process data entities.
PDO communication	A type of EtherCAT communication. Communication using PDOs for real-time information exchange at regular intervals.
I/O expansion module	A generic term for components that extend the input/output functions of a communication module.
Unit	A collection of communication modules and I/O expansion modules connected to a communication module.

5. Overview

I/O terminals are devices that can be connected to various open field networks to reduce the amount of wiring and enable distributed installation of input/output devices. Up to 20 F10 and F15 series manifold solenoid valves (32 control points) and up to 8 I/O expansion modules can be connected.

6. Specifications

This section describes the specifications for the communication modules and I/O expansion modules that comprise the I/O terminal.

6-1. General Specifications

Operating temperature range	5 to 50 °C
Operating humidity range	35 to 85% RH (non-condensation)
Operating atmosphere	No corrosive gases and no excessive dust
Vibration resistance	49.0m/s ²
Shock resistance	98.1m/s ²
Dielectric strength	1000 VAC for 1 minute (between all external terminals and the case)
Noise resistance	IEC61000-4-4 compliant, level 3
Insulation resistance	10 MΩ or more (between all external terminals and the case, using a 500 VDC insulation resistance tester)
Standard	CE marking compliant

6-2. Communication Module

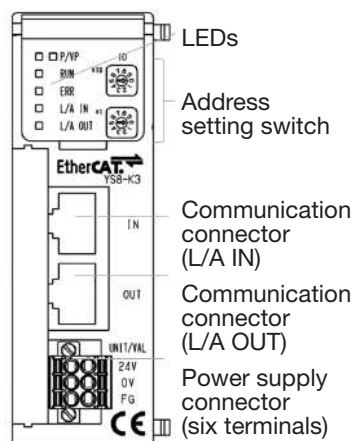
This section describes the specifications, names, and functions for the EtherCAT-Compliant communication module YS8-K3.

6-2-1. Specifications

Model	YS8-K3
Internal current consumption	100mA or less (excluding I/O modules and solenoid valves)
Input power supply	DC24V $\pm$ 10%, 2A
Output power supply	DC24V $\pm$ 10%, 2A
Vendor ID	791
Transmit PDO size	Initial value 0 byte Maximum 40 bytes
Receive PDO size	Initial value 4 bytes Maximum 28 bytes
Communication interface	RJ45 8-pole modular connector $\times$ 2
Physical layer	100BASE-TX
Transmission medium	Category 5 (100BASE-TX) or higher, shielded Twisted pair cable recommended
Maximum cable length	100m
Communication speed	100 Mbps
Node address settings	Fixed, software settings
Supported protocols	CoE
Object	SDO (Service Data Object), PDO (Process Data Object)
EthterCAT	CTT V.2.3.0.0
Mass	117g

6-2-2. Major Parts and Functions

YS8-K3 (Front)

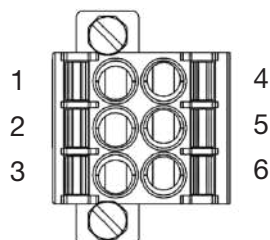


LED displays and descriptions

Name	Status	Color	Details
P	☐ Not lit	Green	No module power supply
	☒ Lit green	Green	Module power supplied
VP	☐ Not lit	Green	Output power off
	☒ Lit green	Green	Output possible
RUN	☐ Not lit	Green	No module power supply or INIT
	☒ Flashing (Blinking)	Green	PRE-OPERATIONAL
	☒ Flashing (Single Flash)	Green	SAFE-OPERATIONAL
	☒ Lit	Green	OPERATIONAL
ERR	☐ Not lit	Red	No abnormalities
	☒ Flashing	Red	Abnormality detected
L/A	☐ Not lit	Green	No connection
	☒ Flashing	Green	EtherCAT frame receiving
	☒ Lit	Green	Normal communication

For details, refer to “15. What to do in the event of an abnormality.”

Power supply (applicable wire: AWG24-16)



Pin No.	Signal name	Pin No.	Signal name
1	UNIT 24V (For units)	4	VAL 24V (For output)
2	UNIT 0V (For units)	5	VAL 0V (For output)
3	FG	6	FG

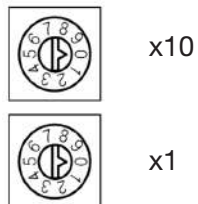
Power supply for units: Supplies power to the communication module, I/O modules, and the channels of the input module.

Power supply for outputs: Supplies power to the valve and the channels of the output module.

6-2-3. Hardware Switch

Address setting switch

The address setting switches allow the node addresses of the slaves in the EtherCAT network to be set.



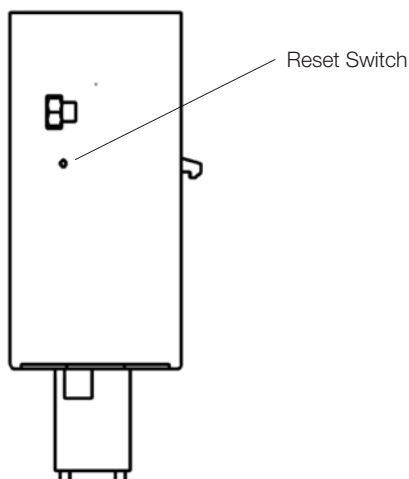
Setting value	Description
00 ^{*1}	Sets the node address according to the software. Refer to "8. Node Address Settings" for details.
01-99	Sets the node address.

^{*1} Factory setting

Reset Switch

YS8-K3 settings can be restored to the factory default settings by pressing and holding the reset switch for more than four seconds while power is supplied to the control and input power supplies. Refer to the list of factory default settings for the factory default settings.

YS8-K3 (top)



6-2-4. Connectable I/O Expansion Modules

Four I/O expansion modules of the same type can be connected to the communication module, for a total of up to eight I/O expansion modules.

The table below shows the types of I/O expansion modules that can be connected.

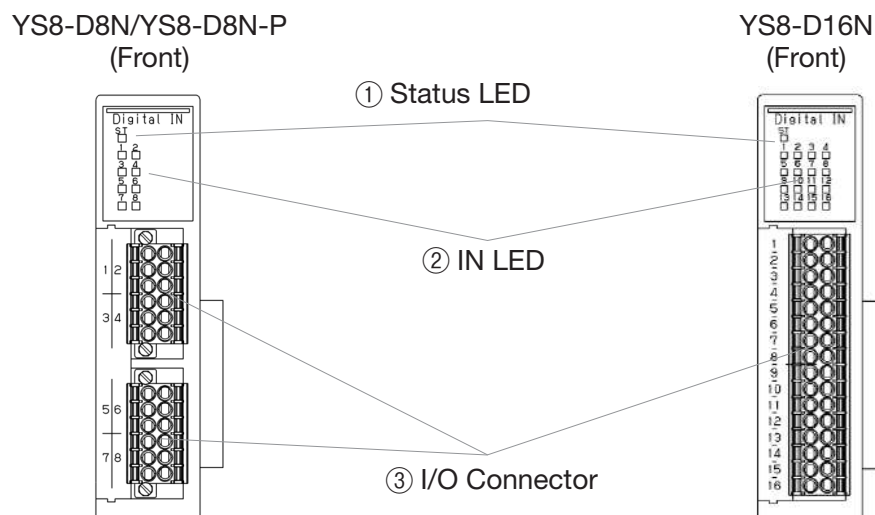
Type	Model	Maximum number of connections
Digital input	YS8-D16N YS8-D8N YS8-D8N-P	4
Analog input	YS8-A4N	4
Digital output	YS8-D8S YS8-D8S-M	4
Analog output	YS8-A2S	4

*If nine or more I/O expansion modules are connected and the communication module is turned on, the communication module will not connect to the host controller. Review the number of I/O expansion module connections.

6-3. Digital Input Module

This section describes the names and specifications for the various parts of I/O expansion modules YS8-D8N/YS8-D8N-P/YS8-D16N.

6-3-1. Major Parts and Functions



	Name	Description
①	Status LED (ST-LED)	Indicates the module status ☐ Not lit : Unit power is off ☒ Lit green: Normal state ☒ Lit red : Overcurrent detected
②	IN LED	Indicates the input status ☐ Not lit : Non-conducting state ☒ Lit green: Conducting state
③	I/O Connector	Input connector For the wiring method, refer to the terminal assignment and circuit diagram

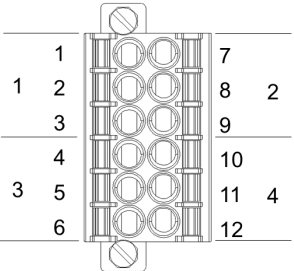
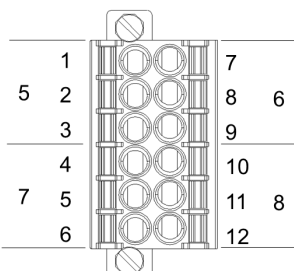
6-3-2. Specifications

Model	YS8-D16N	YS8-D8N	YS8-D8N-P
Input specifications	NPN		PNP
Number of input points	16 points	8 points	
Maximum sensor supply current	—	1A/Module	
Rated input current	7.5mA or less (at 26.4V) *per point		
ON voltage/ON current	15V or more/3.9mA or more (When NPN input occurs, between input terminal and +24V) (When PNP input occurs, between input terminal and 0V)		
OFF voltage/OFF current	5V or less/1mA or less (When NPN input occurs, between input terminal and +24V) (When PNP input occurs, between input terminal and 0V)		
Input resistance	3.6KΩ		
Protective function	Overcurrent detection		
Internal current consumption	10mA or less (excluding sensor supply current)		
Mass	90g		

*When an overcurrent is detected, the input is forcibly turned off and the connection to the PLC is disconnected. Even if the cause of the overcurrent is addressed, the unit will not automatically recover. Disconnect the power supply, address the cause, and then turn it on again.

6-3-3. Terminal Assignments and Internal Circuitry

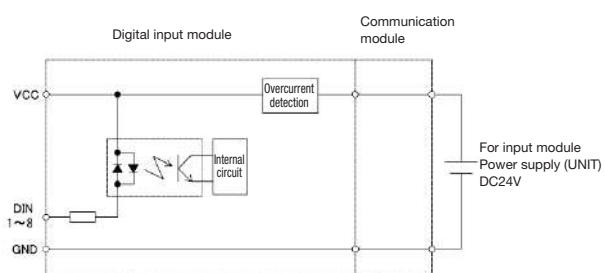
YS8-D8N / YS8-D8N-P

Shape	Channel	Pin No.	Signal name	Channel	Pin No.	Signal name
	1	1	VCC1	2	7	VCC2
		2	DIN1		8	DIN2
		3	GND1		9	GND2
	3	4	VCC3	4	10	VCC4
		5	DIN3		11	DIN4
		6	GND3		12	GND4
	5	1	VCC5	6	7	VCC6
		2	DIN5		8	DIN6
		3	GND5		9	GND6
	7	4	VCC7	8	19	VCC8
		5	DIN7		11	DIN8
		6	GND7		12	GND8

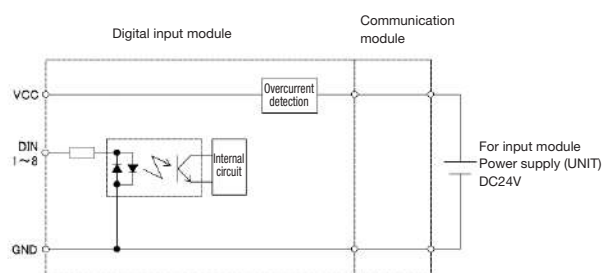
*VCC is shared internally.

*GND is shared internally.

YS8-D8N internal circuit



YS8-D8N-P internal circuit

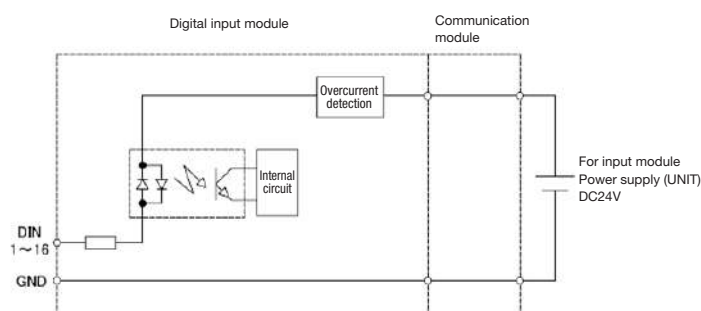


YS8-D16N pin assignments

Shape	Channel	Pin No.	Signal name	Pin No.	Signal name
	1	1	DIN1	17	GND
	2	2	DIN2	18	GND
	3	3	DIN3	19	GND
	4	4	DIN4	20	GND
	5	5	DIN5	21	GND
	6	6	DIN6	22	GND
	7	7	DIN7	23	GND
	8	8	DIN8	24	GND
	9	9	DIN9	25	GND
	10	10	DIN10	26	GND
	11	11	DIN11	27	GND
	12	12	DIN12	28	GND
	13	13	DIN13	29	GND
	14	14	DIN14	30	GND
	15	15	DIN15	31	GND
	16	16	DIN16	32	GND

*GND is shared internally.

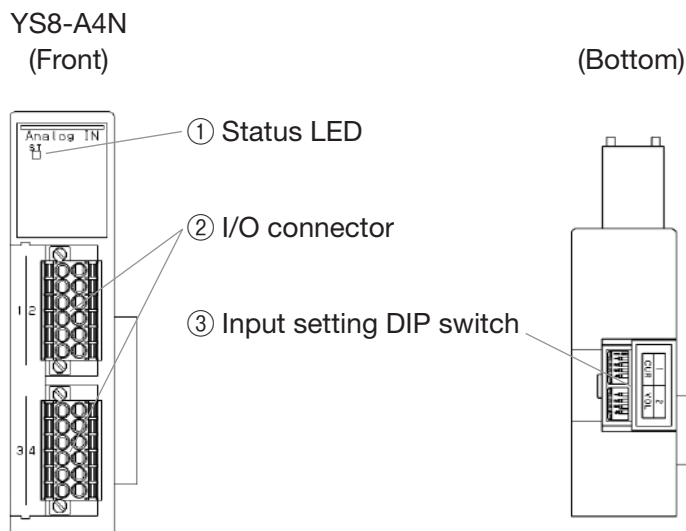
YS8-D16N Internal circuit



6-4. Analog Input Module

This section describes the names and specifications for the various parts of the YS8-A4N I/O expansion module.

6-4-1. Major Parts and Functions



	Name	Description						
①	Status LED (ST-LED)	Indicates the module status ☐ Not lit : Unit power is off ☒ Lit green: Normal state ☒ Lit red : Overcurrent detected						
②	I/O Connector	Input connector For the wiring method, refer to the terminal assignment and the circuit diagram						
③	Input setting DIP switch	DIP switch to select input mode. <table border="1"> <thead> <tr> <th>0 – 5V (Factory setting)</th><th>0 – 10V</th><th>0 – 20mA</th></tr> </thead> <tbody> <tr> <td> </td><td> </td><td> </td></tr> </tbody> </table>	0 – 5V (Factory setting)	0 – 10V	0 – 20mA			
0 – 5V (Factory setting)	0 – 10V	0 – 20mA						

*The power must be off when switching the DIP switches.

6-4-2. Specifications

Model	YS8-A4N	
Input specifications	Voltage	Current
Number of input points	Four points	
Maximum sensor supply current	1A/Module	
Rated input voltage/current	15V	40mA
Input impedance	1MΩ	250Ω
Input signal range	0-5V/0-10V	0-20 mA
Resolution	12bit	
Conversion accuracy (25°C)	±0.5%F.S.	
Protective function	Overcurrent detection	
Internal current consumption	30mA or less (excluding sensor supply current)	
Mass	90g	

*When an overcurrent is detected, the input is forcibly turned off and the connection to the PLC is disconnected. Even if the cause of the overcurrent is addressed, the unit will not automatically recover. Disconnect the power supply, address the cause, and then turn it on again.

6-4-3. Terminal Assignments and Internal Circuitry

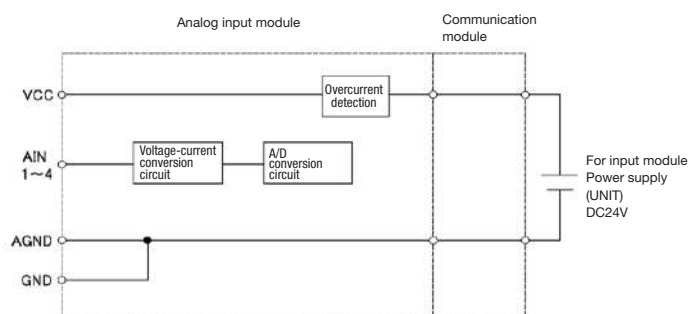
YS8-A4S pin assignments

Shape	Channel	Pin No.	Signal name	Channel	Pin No.	Signal name
	1	1	VCC1	2	7	VCC2
		2	AIN1		8	AIN2
		3	AGND1		9	AGND2
		4	GND1		10	GND2
		5	N.C.		11	N.C.
		6	N.C.		12	N.C.
	3	1	VCC3	4	7	VCC4
		2	AIN3		8	AIN4
		3	AGND3		9	AGND4
		4	GND3		10	GND4
		5	N.C.		11	N.C.
		6	N.C.		12	N.C.

*VCC is shared internally.

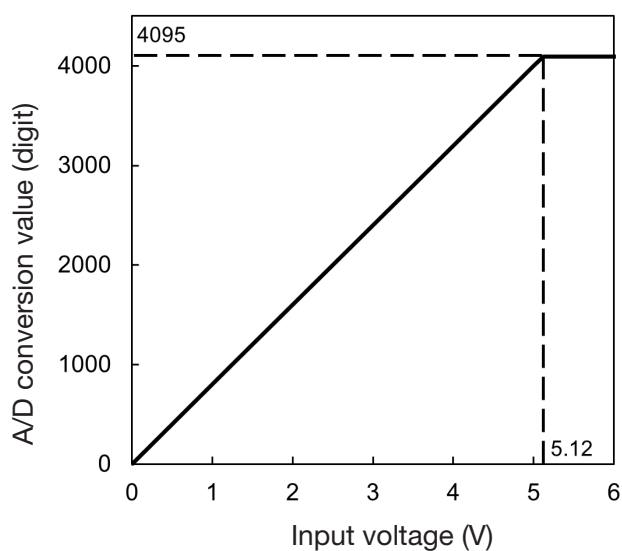
*AGND and GND are shared internally.

YS8-A4N circuit diagram



6-4-4. A/D conversion table

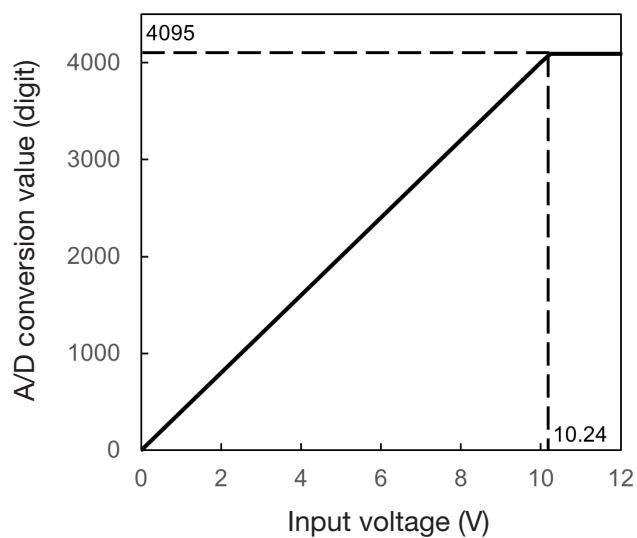
Input range 0-5V



Input voltage (V)	A/D conversion value
0	0
0.5	400
1	800
1.5	1200
2	1600
2.5	2000
3	2400
3.5	2800
4	3200
4.5	3600
5	4000
5.12	4095
6	4095

*The A/D conversion value is 4095 for inputs of 5.12V or higher.

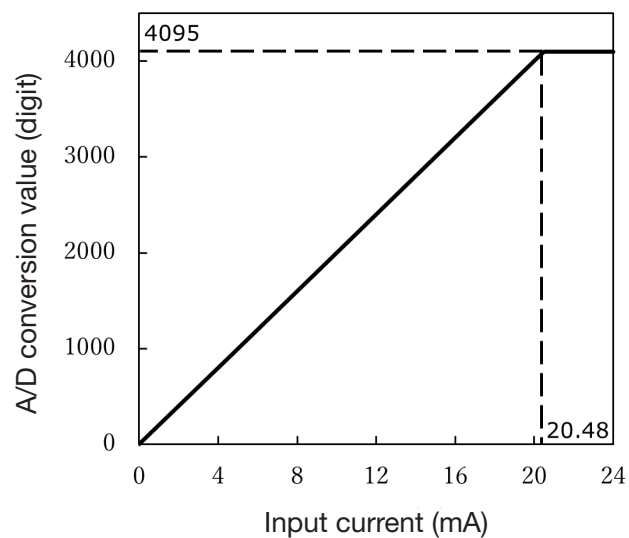
Input range 0-10V



Input voltage (V)	A/D conversion value
0	0
1	400
2	800
3	1200
4	1600
5	2000
6	2400
7	2800
8	3200
9	3600
10	4000

*The A/D conversion value is 4095 for inputs above 10.24V.

Input range 0-20mA



Input current (mA)	A/D conversion value
0	0
2	400
4	800
6	1200
8	1600
10	2000
12	2400
14	2800
16	3200
18	3600
20	4000

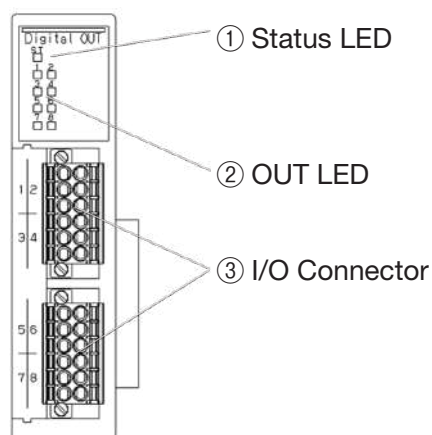
*The A/D conversion value is 4095 for inputs of 20.48mA or more.

6-5. Digital Output Module

This section describes the part names and specifications for the YS8-D8S/YS8-D8S-M I/O expansion modules.

6-5-1. Major Parts and Functions

YS8-D8S/YS8-D8S-M
(Front)



	Name	Description
①	Status LED (ST-LED)	Indicates the module status ☐ Not lit : Power supply for output OFF ☒ Lit green: Normal state ☒ Lit red : Overcurrent detected
②	OUT LED	Indicates the output status ☐ Not lit : Non-conducting state ☒ Lit green: Conducting state
③	I/O Connector	Output connector For the wiring method , refer to the terminal assignment and circuit diagram

6-5-2. Specifications

Model	YS8-D8S	YS8-D8S-M
Output Specifications	Sink	Source
Number of output points	8 points	
Maximum load current	0.5A/channel, 1A/module	
Protective function	Overcurrent detection, output short-circuit protection	
Internal current consumption	30mA or less (excluding sensor supply current)	
Mass	90g	

*When an overcurrent is detected, the output is forcibly turned off and the connection to the PLC is disconnected. Even if the cause of the overcurrent is addressed, the unit will not automatically recover. Disconnect the power supply, address the cause, and then turn it on again.

6-5-3. Pin Assignments and Internal Circuitry

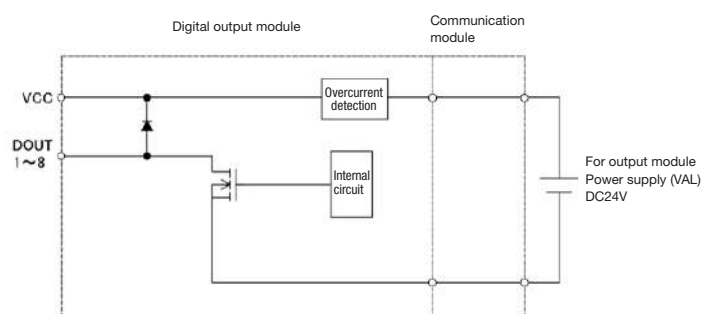
YS8-D8S pin assignments

Shape	Channel	Pin No.	Signal name	Channel	Pin No.	Signal name
	1	1	VCC1	2	7	VCC2
		2	DOUT1		8	DOUT2
		3	N.C.1		9	N.C.2
	3	4	VCC3	4	10	VCC4
		5	DOUT3		11	DOUT4
		6	N.C.3		12	N.C.4
	5	1	VCC5	6	7	VCC6
		2	DOUT5		8	DOUT6
		3	N.C.5		9	N.C.6
	7	4	VCC7	8	19	VCC8
		5	DOUT7		11	DOUT8
		6	N.C.7		12	N.C.8

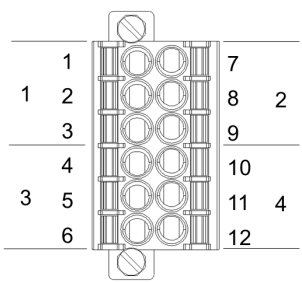
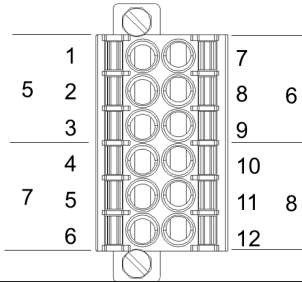
*VCC is shared internally.

*The VCC connected to the load should be connected to the same module as the DOUT.

YS8-D8S internal circuit

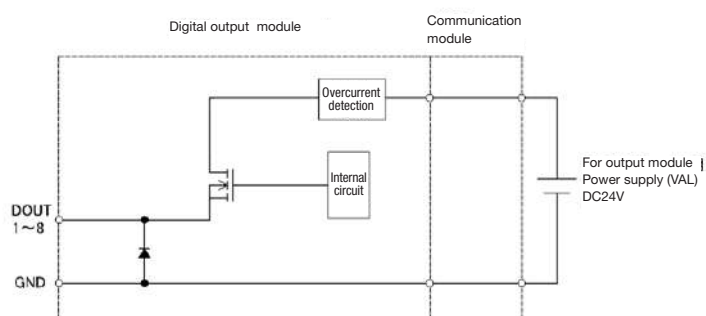


YS8-D8S-M pin assignments

Shape	Channel	Pin No.	Signal name	Channel	Pin No.	Signal name
	1	1	N.C.1	2	7	N.C.2
		2	DOUT1		8	DOUT2
		3	GND1		9	GND2
	3	4	N.C.3	4	10	N.C.4
		5	DOUT3		11	DOUT4
		6	GND3		12	GND4
	5	1	N.C.5	6	7	N.C.7
		2	DOUT5		8	DOUT7
		3	GND5		9	GND7
	7	4	N.C.6	8	10	N.C.8
		5	DOUT6		11	DOUT8
		6	GND6		12	GND8

*GND is shared internally.

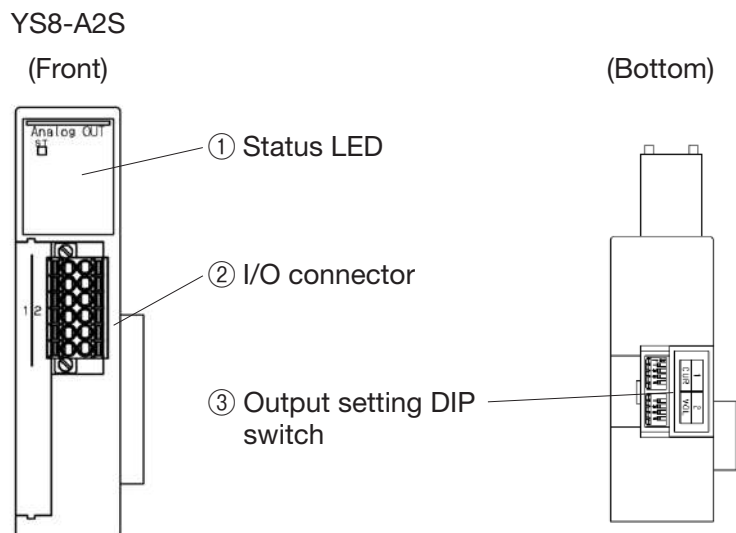
YS8-D8S-M Internal circuit



6-6. Analog Output Module

This section describes the names and specifications of the various parts of the YS8-A2S I/O expansion module.

6-6-1. Major Parts and Functions



	Name	Description						
①	Status LED (ST-LED)	Indicates the module status ☐ Not lit : Power supply for output OFF ☒ Lit green: Normal state ☒ Lit red : Overcurrent detected						
②	I/O Connector	Output connector Refer to the circuit diagram for wiring to the connector.						
③	Output setting DIP switch	The DIP switch for selecting the output mode. <table border="1"> <thead> <tr> <th>0 – 5V (Factory setting)</th><th>0 – 10V</th><th>0 – 20mA</th></tr> </thead> <tbody> <tr> <td> </td><td> </td><td> </td></tr> </tbody> </table> *The output power must be off when switching the DIP switches.	0 – 5V (Factory setting)	0 – 10V	0 – 20mA			
0 – 5V (Factory setting)	0 – 10V	0 – 20mA						

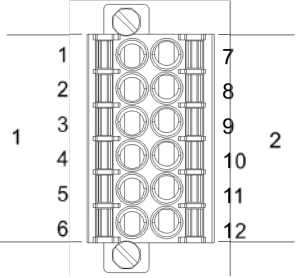
6-6-2. Specifications

Model	YS8-A2S	
Output Specifications	Voltage	Current
Number of output points	Two points	
Maximum load current	1A/Module	
Load impedance	1k Ω or more	600 Ω or less
Output signal range	0-5V/0-10V	0-20 mA
Resolution	12bit	
Conversion accuracy (25°C)	$\pm 0.5\%$ F.S.	
Protective function	Overcurrent detection, output short-circuit protection	
Internal current consumption	30mA or less (excluding sensor supply current)	
Mass	90g	

*When an overcurrent is detected, the connection to the PLC is disconnected. Even if the cause of the overcurrent is addressed, the unit will not automatically recover. Disconnect the power supply, address the cause, and then turn it on again.

6-6-3. Pin Assignments and Internal Circuitry

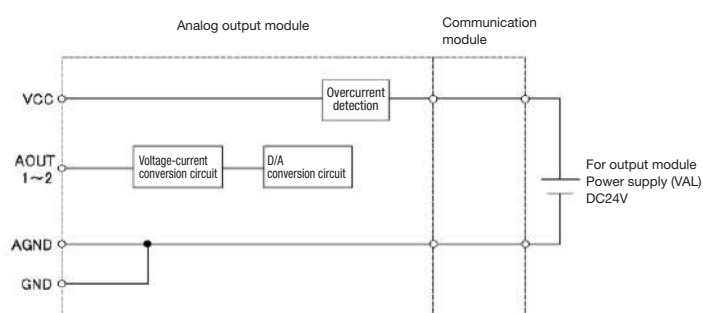
YS8-A2S Pin assignments

Shape	Channel	Pin No.	Signal name	Channel	Pin No.	Signal name
	1	1	VCC1	2	7	VCC2
		2	AOUT1		8	AOUT2
		3	AGND1		9	AGND2
		4	GND1		10	GND2
		5	N.C.		11	N.C.
		6	N.C.		12	N.C.

*VCC is shared internally.

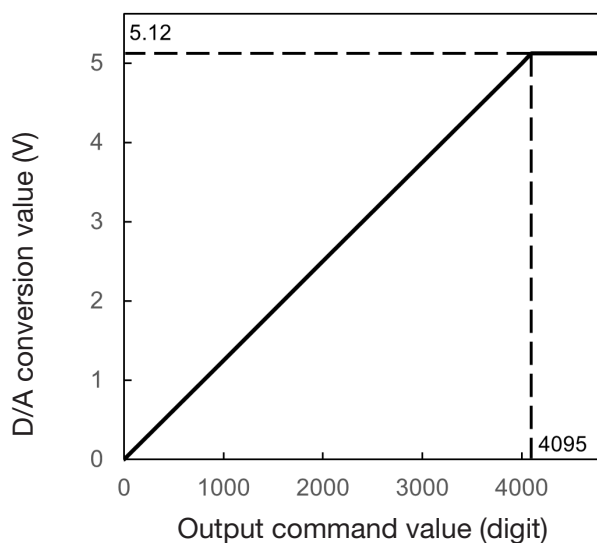
*AGND and GND are shared internally.

YS8-A2S internal circuit



6-6-4. D/A Conversion Table

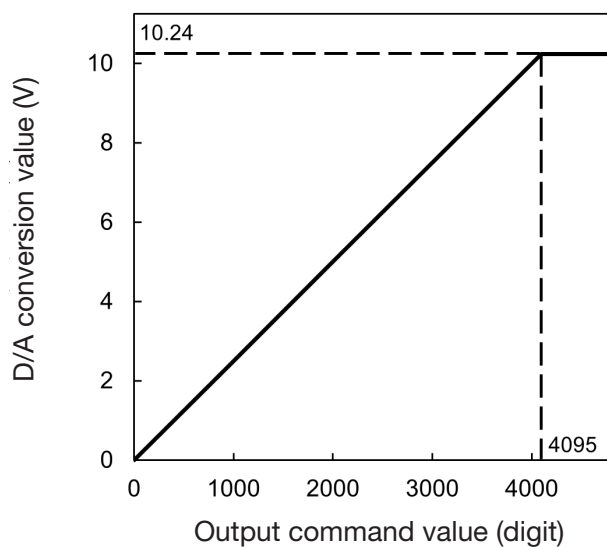
Output range 0-5V



Output command value	D/A conversion value (V)
0	0
400	0.5
800	1
1200	1.5
1600	2
2000	2.5
2400	3
2800	3.5
3200	4
3600	4.5
4000	5

*Output is 5.12V for outputs specified at 4095 or above.

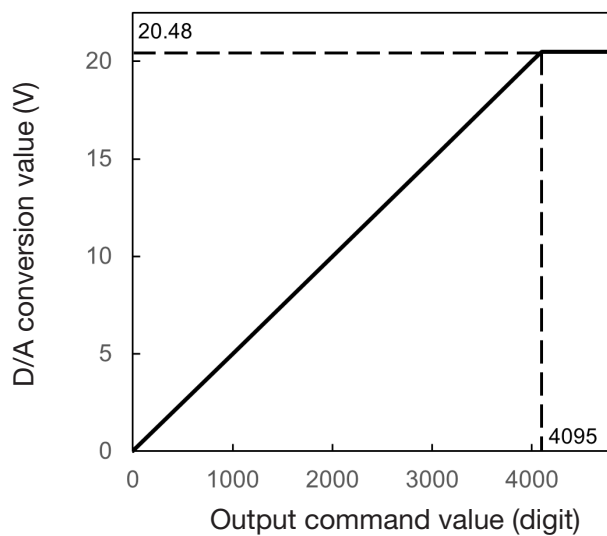
Output range 0-10V



Output command value	D/A conversion value (V)
0	0
400	1
800	2
1200	3
1600	4
2000	5
2400	6
2800	7
3200	8
3600	9
4000	10

*10.24V output for output commands of 4095 or higher

Output range 0-20mA



Output command value	A/D conversion value (mA)
0	0
400	2
800	4
1200	6
1600	8
2000	10
2400	12
2800	14
3200	16
3600	18
4000	20

*Output is 20.48mA for output commands of 4095 or above.

7. ESI file

Download from <https://official.en.koganei.co.jp/>

8. Node Address Settings

Please select the setting method according to the address you wish to set.

Address to be set	Setting method
1 - 99	Setup using physical switch <recommended>
Other than the above	8-2 Setup Using Support Software

8-1. Setup Using Physical Switch

Specify the host address directly using the address switch.

1	Make sure that the I/O terminal power is off.						
2	Change the address setting switch. The following is the range that can be set. <table border="1"> <thead> <tr> <th colspan="2">Address setting switch</th></tr> </thead> <tbody> <tr> <td></td><td>x10</td></tr> <tr> <td></td><td>x1</td></tr> </tbody> </table> Combination of 1 - 99 The setting will be reflected the next time the power is turned on.	Address setting switch			x10		x1
Address setting switch							
	x10						
	x1						

8-2. Setup Using Support Software

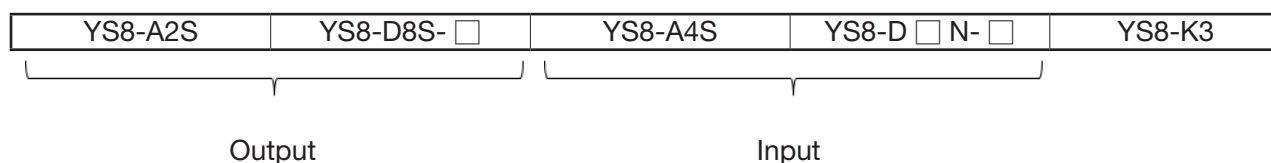
Setting the address setting switch to "00" allows you to set the address to any desired address.

1	Make sure that the I/O terminal power is off.
2	Change the address setting switch to "00". Address setting switch  x10  x1
3	Use the PLC vendor's support software to configure the address. For details, refer to the manual of the PLC being used. •OMRON Corporation: NJ, NX series •Beckhoff: TwinCAT3

9. Increasing/Decreasing Number of I/O Expansion Modules

9-1. Precautions for Increasing/Decreasing Number of Modules

- Be sure to turn off the power to the communication module before increasing or decreasing the number of I/O expansion modules. Attaching or detaching modules with the power on may result in malfunctions.
- Please work on a horizontal plane when increasing or decreasing the number of I/O expansion modules.
- The connecting rods (additional parts YS8Z-1 - YS8Z-8) used to connect the communication module and the I/O expansion module cannot be increased or decreased in number. Please prepare connecting rods that match the number of I/O expansion modules before connecting the I/O expansion modules.
- Be sure to attach the cover (additional part YS8Z-C) to the connection of the leftmost module when operating. Operating without the cover may cause a malfunction.
- While there are no restrictions on the order in which I/O expansion modules are installed, the following configuration is recommended to make it easier to understand the relationship between the I/O data allocation and the I/O expansion modules.
 - Modules should be grouped together by type.
 - The analog output should be at the end, followed by digital output, analog input, and digital input.



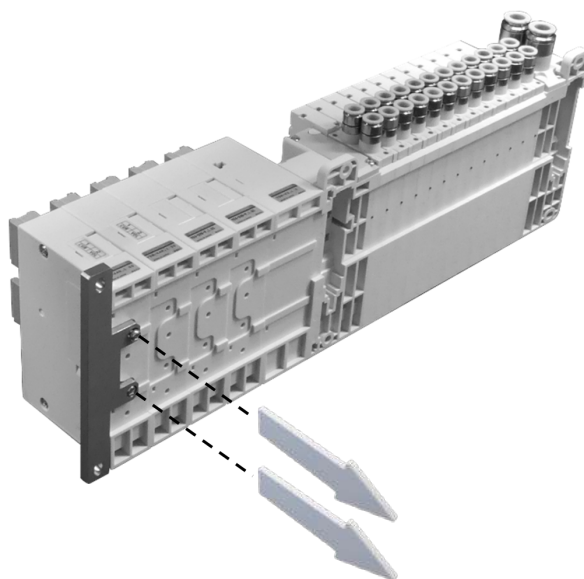
9-2. How to Increase/Decrease Number of I/O Expansion Modules

As an example of how to increase or decrease the number of modules, we will explain how to increase the number of I/O terminals by adding a digital input module (YS8-D8N) to an I/O terminal with the following initial configuration.

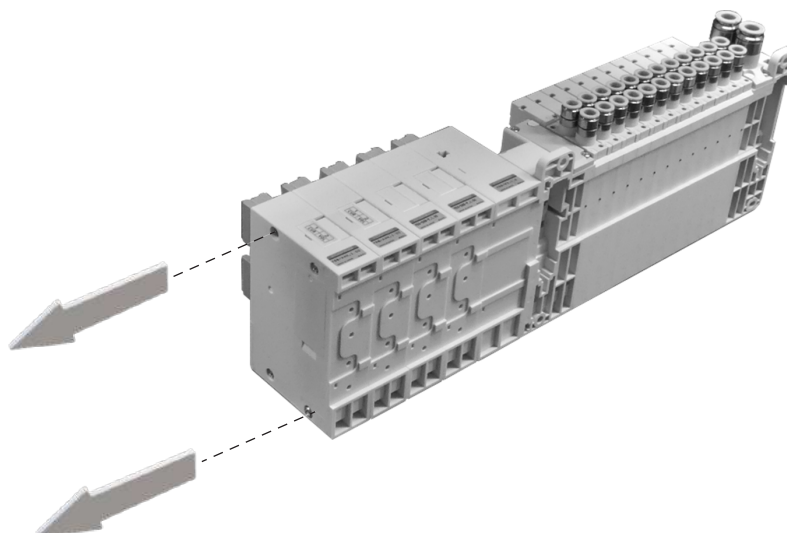
Initial configuration: YS8EK3-4 mod.1-2: YS8-D8N, mod.3-4: YS8-A4N

Items required for additional connections: Digital output module (YS8-D8S)
connecting rod for 5-series (additional part YS8Z-5)

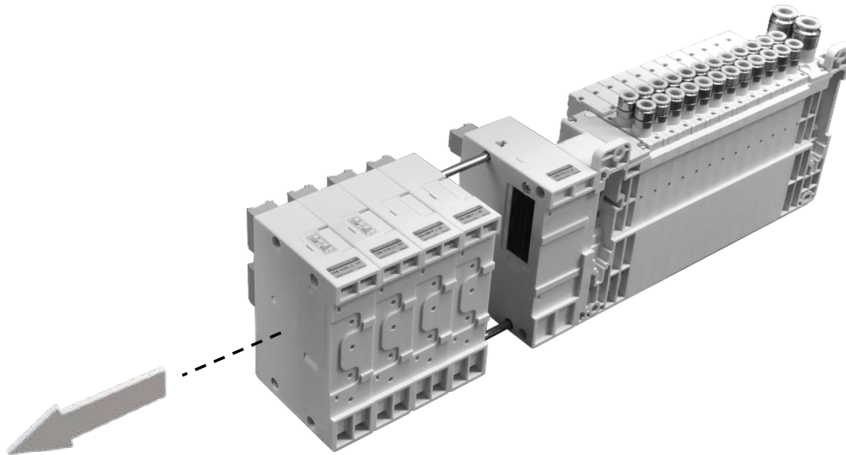
- ① To add an I/O expansion module to the I/O terminal end, remove the screws at the positions shown in the figure below and remove the mounting brackets.



- ② Remove the screws and washers from the I/O terminal at the positions shown in the figure below.

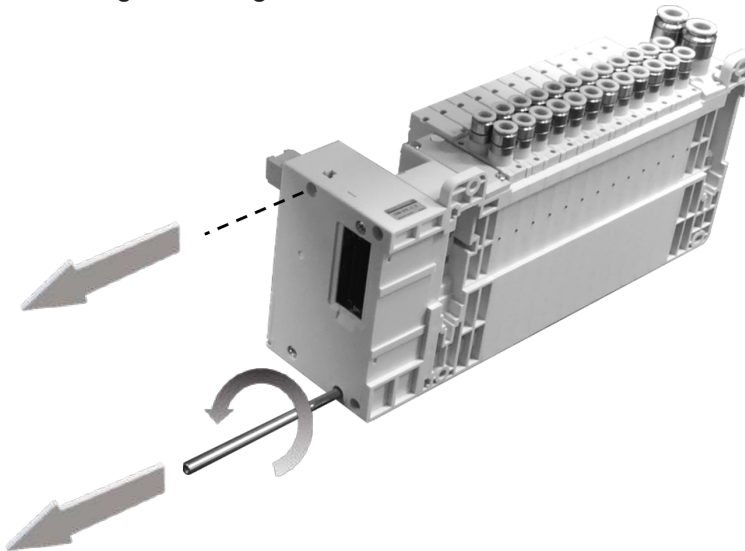


- ③ Disconnect the I/O expansion module from the communication module.

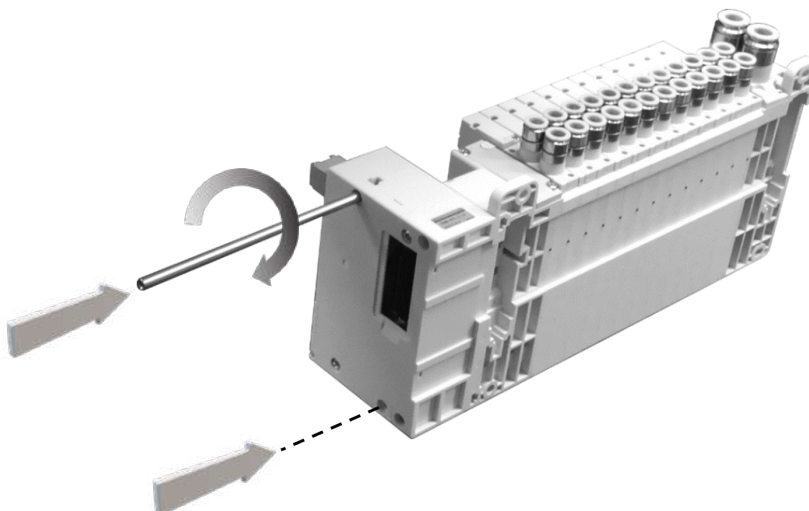


- ④ Remove the connecting rod from the communication module.

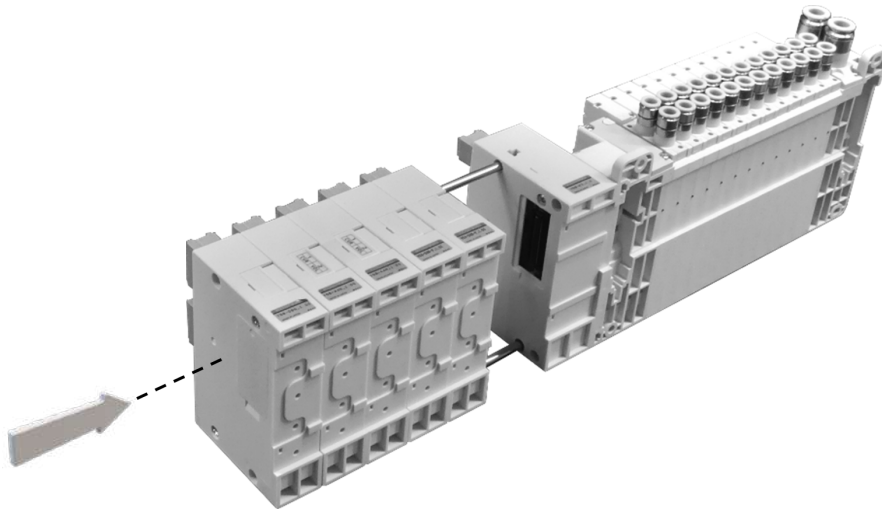
*Keep the connecting rod together with the screws and washers shown in ②. It will be used when reverting to the original number of connections.



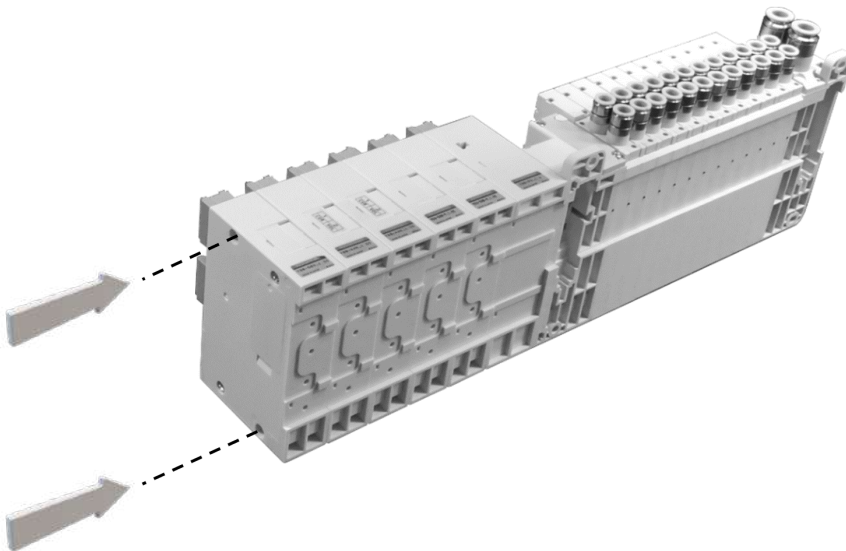
- ⑤ Connect the connecting rod of additional part YS8Z-5 to the communication module.



- ⑥ Insert the expansion I/O module along the connecting rod and connect it to the communication module.

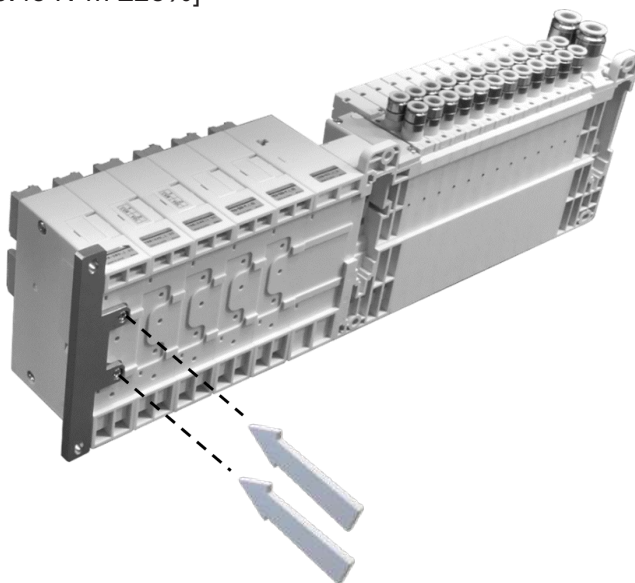


- ⑦ Prepare the washers and screws included with the additional part YS8Z-5 and screw them into the positions shown in the figure below. [Tightening torque 0.49 N·m $\pm$ 20%]

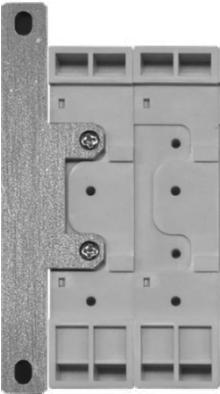


- ⑧ If an expansion I/O module is added to the end, install the mounting bracket removed in ① and screw it in the same way using the screws removed in ①. Refer to the table below for the installation positions of the metal fittings.

[Tightening torque 0.49 N-m $\pm$ 20%]



Fitting mounting position

Direct mount	DIN fittings	DIN fittings (When F15 split type manifold is connected)
		

*Refer to F series solenoid valve catalog No. V3155 for information on how to remove or install manifold solenoid valves.

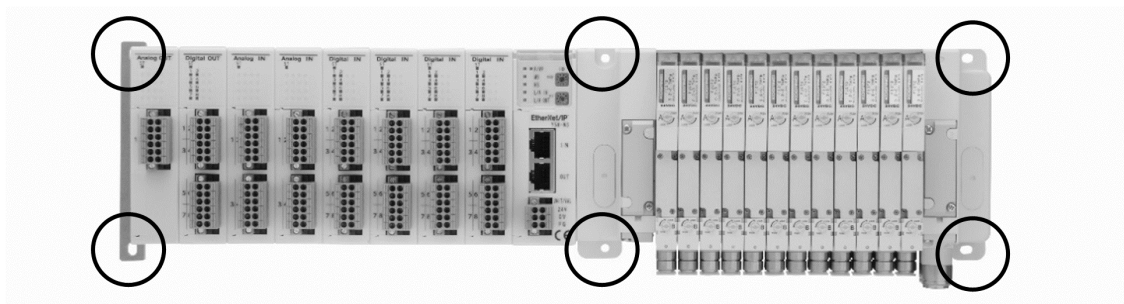
10. Installation

This section describes how to install I/O terminals.

10-1. Installation via Direct Mounting

Obtain M4 screws and screw them perpendicularly to the mounting holes.

[Tightening torque $1.47 \text{ N} \cdot \text{m} \pm 15\%$]

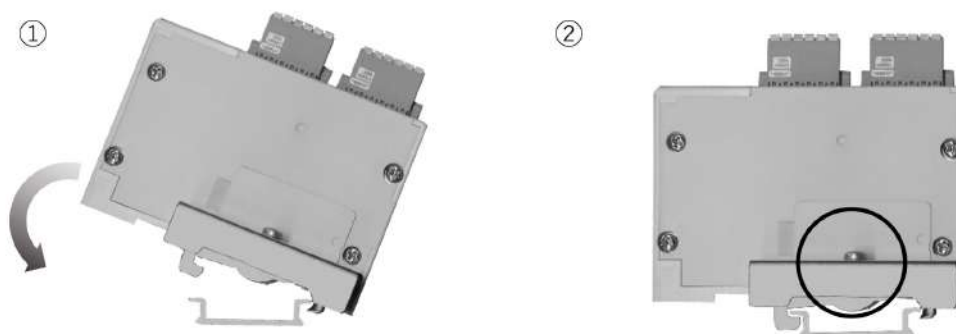


10-2. Installation to DIN rail

- ① Install the I/O terminal to the DIN rail.

First hook the lower hook of the DIN rail fitting to the DIN rail, then push the I/O terminal body down and fit it into the DIN rail.

- ② Fasten the DIN rail mounting bracket with screws. [Tightening torque $1.47 \text{ N} \cdot \text{m} \pm 15\%$]



*Refer to F series solenoid valve catalog No. V3155 for information on how to remove or install manifold solenoid valves.

11. Wiring Precautions

- Be sure to **turn off** the power supply when wiring to the connectors or inserting/removing the connectors.

Wiring with the power on may result in electric shock or product failure.

- Wiring for both power supply connectors and connectors for I/O expansion modules should be performed according to the following specifications.

Wire size	AWG24-16
Length of bare wire	10.0mm

- When wiring with stranded wires, twist the wires so that there are no whiskers.
- Do not solder the wire ends.
- When removing the connectors from the modules, loosen the connector screws (except with YS8-D16N) and pull the connector straight out of the module.
- When installing the connectors to the modules, be sure to fasten the connector screws.
(except with YS8-D16N)
[Tightening torque 0.12 ±15%]

12. I/O Data Allocation

Real-time data transfer via EtherCAT is performed through PDO data exchange. The PDO mapping settings must be configured according to the I/O expansion module connected to the communication module.

The PDO mapping settings are configured using the support software provided by the PLC vendor. For details, refer to the manual for the PLC being used.

- OMRON NJ, NX series
- Beckhoff TwinCAT3

12-1. Relationship Between I/O Data Assignment and I/O Modules

The PDO mapping settings must be configured according to the I/O expansion module connected to the communication module. The following configuration is an example of the relationship between I/O data allocation and I/O expansion modules.

Assign module numbers for each module type in order from right to left.

YS8-A2S	YS8-D8S- ☐	YS8-D8S- ☐	YS8-A4S	YS8-A4S	YS8-D ☐ N- ☐	YS8-D ☐ N- ☐	YS8-D ☐ N- ☐	YS8-K3	Valve
Analog Output 1 (AO1)	Digital Output 2 (DO2)	Digital Output 1 (DO1)	Analog Input 2 (AI2)	Analog Input 1 (AI1)	Digital Input 3 (DI3)	Digital Input 2 (DI2)	Digital Input 1 (DI1)	Communication Module	

Input modules and corresponding objects

I/O module	AI2	AI1	DI3	DI2	DI1
PDO	1A11H	1A10H	1A02H	1A01H	1A00H
Corresponding Object	3201H	3200H	3002H	3001H	3000H

Output modules and corresponding objects

I/O module	AO1	DO2	DO1	VALVE
PDO	1620H	1611H	1610H	1600H
Corresponding Object	3600H	3401H	3400H	2000H

12-2. Relationship Between I/O Data Allocation and Solenoid Valves

The relationship between the solenoid valves and the allocation of I/O data varies according to the "wiring specifications" specified in the order number of the manifold.

Wiring specifications, blank (packed wiring): Wired according to specifications of mounted valves.

-W (double wiring): All wiring is for double solenoids, regardless of the specifications of the mounted valves.

If wiring specifications are "blank" (packed wiring)

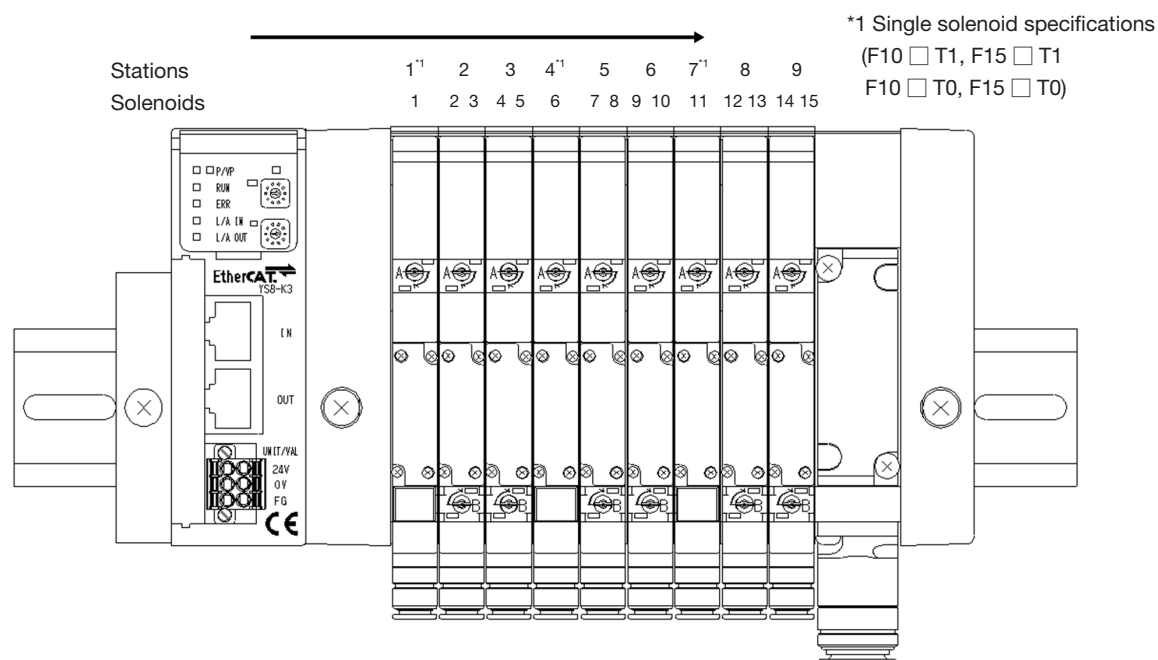
The valves specified in the single solenoid specifications (*1) when ordering are wired to solenoid A only, and are not wired to solenoid B because wiring is done according to specifications for the mounted valves.

This means that it cannot function as a double solenoid valve after it is delivered because no current flows to solenoid B, even if it is switched from a single solenoid valve to a double solenoid valve.

When wiring specifications are "-W" (double wiring)

All wiring is for double solenoids.

Assign in order from left to right.



(Example of above configuration) F10M9TJ-JR-K3

stn. 1	F10T1-A1 DC24V
stn. 2, 3	F10T2-A1 DC24V
stn. 4	F10T1-A1 DC24V
stn. 5, 6	F10T2-A1 DC24V
stn. 7	F10T1-A1 DC24V
stn. 8, 9	F10T2-A1 DC24V

Output supported by example configuration

Bits	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
	VALVE 1															
	VALVE 2															

Blank (packed wiring)

Stations	-	9		8		7	6		5		4	3		2		1
Solenoids	-	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Stations	-	-		-		-	-		-		-		-		-	
Solenoids	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

-W (double wiring)

Stations	8		7		6		5		4		3		2		1	
Solenoids	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Stations	-		-		-		-		-		-		-		9	
Solenoids	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18	17

 : Unused area

12-3. Input Data Allocation Details [I/O Terminal → Scanner]

The initial value of the input data size is 0 bytes, and the maximum is 40 bytes.

The PDO mapping settings must be configured according to the I/O expansion module being used.

Name	PDO (hex)	Corresponding Object (hex)	Number of bytes	I/O allocation
Digital Input 1	1A00	3000	2	Select
Digital Input 2	1A01	3001	2	Select
Digital Input 3	1A02	3002	2	Select
Digital Input 4	1A03	3003	2	Select
Analog Input 1	1A10	3200	8	Select
Analog Input 2	1A11	3201	8	Select
Analog Input 3	1A12	3202	8	Select
Analog Input 4	1A13	3203	8	Select

The following table shows the relationship between the input data objects and I/O expansion modules, as well as the channel allocation within the objects.

Name	Object		Format	Bit							
	Index	SubIndex		7	6	5	4	3	2	1	0
Digital Input 1	3000	0	U16	Ch8	Ch7	Ch6	Ch5	Ch4	Ch3	Ch2	Ch1
				Ch16	Ch15	Ch14	Ch13	Ch12	Ch11	Ch10	Ch9
Digital Input 2	3001	0	U16	Ch8	Ch7	Ch6	Ch5	Ch4	Ch3	Ch2	Ch1
				Ch16	Ch15	Ch14	Ch13	Ch12	Ch11	Ch10	Ch9
Digital Input 3	3002	0	U16	—							
Digital Input 4	3003	0	U16	—							
Analog Input 1	3200	1	U16	Ch1							
				Reserved				Ch1			
		2	U16	Ch2							
				Reserved				Ch2			
		3	U16	Ch3							
				Reserved				Ch3			
		4	U16	Ch4							
				Reserved				Ch4			
Analog Input 2	3201	1	U16	Ch1							
				Reserved				Ch1			
		2	U16	Ch2							
				Reserved				Ch2			
		3	U16	Ch3							
				Reserved				Ch3			
		4	U16	Ch4							
				Reserved				Ch4			
Analog Input 3	3202	1 - 4	U16	—							
Analog Input 4	3203	1 - 4	U16	—							

Precautions for I/O Data Allocation for Input Modules

- While YS8-D8N and YS8-D8N-P have 8-channel specifications, note that the I/O area uses 2 bytes (16 channels). The latter byte is a reserved area and cannot be used.
- The YS8-A4N channels store the AD conversion value in the first 12 bits of the allocated 2-byte I/O area.

12-4. Output Data Allocation Details [Scanner → I/O Terminal]

The initial value of output data size is four bytes.

The PDO mapping settings must be configured according to the I/O expansion module being used.

Name	PDO (hex)	Corresponding Object (hex)	Number of bytes	I/O allocation
Valve	1600	2000	4	Fixed
Digital Output 1	1610	3400	2	Select
Digital Output 2	1611	3401	2	Select
Digital Output 3	1612	3402	2	Select
Digital Output 4	1613	3403	2	Select
Analog Output 1	1620	3600	4	Select
Analog Output 2	1621	3601	4	Select
Analog Output 3	1622	3602	4	Select
Analog Output 4	1623	3603	4	Select

The following table shows the relationship between output data objects, valves, and I/O expansion modules, as well as the allocation of channels within the objects.

Name	Object		Format	Bit							
	Index	SubIndex		7	6	5	4	3	2	1	0
Valve	2000	1 - 32	BOOL [32]	Ch8	Ch7	Ch6	Ch5	Ch4	Ch3	Ch2	Ch1
				Ch16	Ch15	Ch14	Ch13	Ch12	Ch11	Ch10	Ch9
				Ch24	—						Ch17
				Ch32	—						Ch25
Digital Output 1	3400	0	U16	Ch8	Ch7	Ch6	Ch5	Ch4	Ch3	Ch2	Ch1
				Reserved							
Digital Output 2	3401	0	U16	Ch8	Ch7	Ch6	Ch5	Ch4	Ch3	Ch2	Ch1
				Reserved							
Digital Output 3	3402	0	U16	—							
Digital Output 4	3403	0	U16	—							
Analog Output 1	3600	1	U16	Ch1							
				Reserved				Ch1			
		2	U16	Ch2							
				Reserved				Ch2			
Analog Output 2	3601	1	U16	Ch1							
				Reserved				Ch1			
		2	U16	Ch2							
				Reserved				Ch2			
Analog Output 3	3602	1, 2	U16	—							
Analog Output 4	3603	1. 2	U16	—							

Precautions for I/O Data Allocation for Output Modules

- While YS8-D8S and YS8-D8S-M have 8-channel specifications, note that the I/O area uses 2 bytes (16 channels). The latter byte is a reserved area and cannot be used.
- The YS8-A2S channels performs DA conversion of the value stored in the first 12 bits of the allocated 2-byte I/O area. The high-order 4 bits cannot be used.

13. Parameter Settings

YS8-K3 has parameters that can be set for each module/channel. The various parameters can be set using the support software provided by the PLC vendor or SDO communication.

Support software is provided by the PLC vendor. For details, refer to the manual for the PLC being used.

- OMRON NJ, NX series
- Beckhoff TwinCAT3

Refer to the manufacturer-specific area in the object dictionary area when configuring via SDO communication.

13-1. Parameter Definitions

No	Parameter Name	Definition	Target	Setting value	Setting Details
1	Valve Failure Reaction	Sets the output state of the valve when a communication error occurs.	Valve	0 (Initial value)	Turns the output off.
				1	Maintains the output when a communication error occurs.
2	Digital Input On Delay Time 1 - 4	Sets the input delay time for each channel.	Digital input module	0 (Initial value)	No delay time.
				1	3 msec
				2	10 msec
				3	25 msec
3	Analog Input Filter Measured Value 1 - 4	Sets the analog filter moving average frequency for each channel.	Analog input module	0 (Initial value)	No filter applied.
				1	Two moving averages
				2	Four moving averages
				3	Eight moving averages
4	Digital Output Group Failure Reaction 1 - 4	Sets the digital output state for each module when a communication error occurs.	Digital output module	0 (Initial value)	Turns the output off.
				1	Maintains the output when a communication error occurs.
5	Analog Output Group Failure Reaction 1 - 4	Sets the analog output state for each module when a communication error occurs.	Analog output module	0	Turns the output off.
				1 (Initial value)	Maintains the output when a communication error occurs.

*The parameter settings are maintained even after the power is turned off.
After changing the settings, do not turn off the power for one second.

13-2. Parameter Description

13-2-1. [Valve / Digital Output Group / Analog Output Group] Failure Reaction

Intended Uses

Maintains or clears the output state when a communication error is detected.

Examples

- Disconnection of communication cable during communication with PLC.
- Communication error due to emergency stop during PLC operation, etc.
- Overcurrent detection in I/O expansion modules.

Applicable Modules

Communication module: YS8-K3 (valve output)

Digital output module: YS8-D8S, YS8-D8S-M

Analog output module: YS8-A2S

*Settings can be configured on a module-by-module basis.

*There is a 3 ms clear time when resuming communication.

13-2-2. Digital Input On Delay Time

Intended Uses

Prevents data changes and stabilizes input when the contact state is unstable due to chattering or noise.

Details

Sets the input ON delay time. The input is turned ON only if it remains ON for the set time after the input is turned ON. The input ON delay time can be set to 0 ms (no input ON delay), 3 ms, 10 ms, or 25 ms.

Applicable Modules

Digital input module: YS8-D8N, YS8-D8N-P, YS8-D16N

*Parameters can be set for each channel.

13-2-3. Analog Input Filter Measured Value

Intended Uses

When the input value fluctuates and is unstable due to noise and other factors, the input value is stabilized by taking a moving average.

Details

Set the number of times sampling is performed when calculating the moving average of the analog input value. Sampling is performed for the set number of times in 3 ms cycles, and the average of the sampled data is used as the analog input value. The number of sampling times can be set to 1 (no moving average), 2, 4, or 8 times.

Applicable Modules

Analog input module: YS8-A4N

*Can be set for each channel.

14. Object Dictionary Area

Index (hex)	Area	Description
0000-0FFF	Data format area	Data format definition object area
1000-1FFF	CoE communication area	Shared areas for devices using the CoE protocol
2000-2FFF	Manufacturer-specific area 1	Object area for valves
3000-3FFF	Manufacturer-specific area 2	Object area for I/O modules
5000-5FFF	Manufacturer-specific area 3	Object area for statistical information

14-1. Data Format

Data Format Name	Abbreviation	Size	Data Scope
Boolean	BOOL	1 Bit	0, 1
Unsigned8	U8	1 Byte	0 - 255
Unsigned16	U16	2 Byte	0 - 65535
Unsigned32	U32	4 Byte	0 - 4294967295
VisibleString	STRING	-	-

14-2. CoE Communication Area**14-2-1. Communication Object**

Index (hex)	SubIndex	Data format	Access	Name	Remarks
1000	0	U32	RO	Device Type	
1008	0	STRING	RO	Device Name (= "YS8-K3")	
1009	0	STRING	RO	Hardware Version	
100A	0	STRING	RO	Software Version	
1011	-	-	-	Restore Default Parameters	
	0	U8	RO	Number of Entries(= 0x01)	
	1	U32	RW	Restore Default Parameters	Restore to factory defaults by writing 0x64616F6C.
1018	-	-	-	Identity Object	
	0	U8	RO	Number Of Entries (= 0x04)	
	1	U32	RO	Vendor ID (= 0x791)	KOGANEI CORPORATION
	2	U32	RO	Product Code (= 0x03)	
	3	U32	RO	Revision Number	
	4	U32	RO	Serial Number	

14-2-2. PDO Mapping Objects

Index (hex)	SubIndex	Data format	Access	Name	Remarks
1600	-	-	-	Valve Point PDO Mapping	
	0	U8	RO	Number Of Entries (= 0x20)	
	1-32	U32	RO	PDO Entries (= 0x2000)	
1610-1613	-	-	-	Digital Output PDO Mapping	
	0	U8	RO	Number Of Entries (= 0x01)	
	1	U32	RO	PDO Entries	
1620-1623	-	-	-	Analog Output PDO Mapping	
	0	U8	RO	Number Of Entries (= 0x02)	
	1-2	U32	RO	PDO Entries	
1A00-1A03	-	-	-	Digital Input PDO Mapping	
	0	U8	RO	Number Of Entries (= 0x01)	
	1	U32	RO	PDO Entries	
1A10-1A13	-	-	-	Analog Input PDO Mapping	
	0	U8	RO	Number Of Entries (= 0x04)	
	1-4	U32	RO	PDO Entries	

14-2-3. Sync Manager Communication Object

Index (hex)	SubIndex	Data format	Access	Name	Remarks
1C00	-	-	-	Sync Manager Communication Type	
	0	U8	RO	Sync Manager number used (= 0x04)	
	1	U8	RO	Sync Manager 0 (= 0x01)	Mailbox receipt
	2	U8	RO	Sync Manager 1 (= 0x02)	Mailbox transmission
	3	U8	RO	Sync Manager 2 (= 0x03)	Process data output
	4	U8	RO	Sync Manager 3 (= 0x04)	Process data input
1C12	-	-	-	Sync Manager 2 PDO Assignment	
	0	U8	RO / RW in PreOp	Receive PDO Mapping number	0 × 09 (default)
	1	U16	RO / RW in PreOp	Receive PDO Mapping1	0 × 1600 (default)
	2	U16	RO / RW in PreOp	Receive PDO Mapping2	0 × 1610 (default)
	3	U16	RO / RW in PreOp	Receive PDO Mapping3	0 × 1611 (default)
	4	U16	RO / RW in PreOp	Receive PDO Mapping4	0 × 1612 (default)
	5	U16	RO / RW in PreOp	Receive PDO Mapping5	0 × 1613 (default)
	6	U16	RO / RW in PreOp	Receive PDO Mapping6	0 × 1620 (default)
	7	U16	RO / RW in PreOp	Receive PDO Mapping7	0 × 1621 (default)
	8	U16	RO / RW in PreOp	Receive PDO Mapping8	0 × 1622 (default)
	9	U16	RO / RW in PreOp	Receive PDO Mapping9	0 × 1623 (default)
1C13	-	-	-	Sync Manager 3 PDO Assignment	
	0	U8	RO / RW in PreOp	Transmit PDO Mapping number	0 × 08 (default)
	1	U16	RO / RW in PreOp	Transmit PDO Mapping1	0 × 1A00 (default)
	2	U16	RO / RW in PreOp	Transmit PDO Mapping2	0 × 1A01 (default)
	3	U16	RO / RW in PreOp	Transmit PDO Mapping3	0 × 1A02 (default)
	4	U16	RO / RW in PreOp	Transmit PDO Mapping4	0 × 1A03 (default)
	5	U16	RO / RW in PreOp	Transmit PDO Mapping5	0 × 1A10 (default)
	6	U16	RO / RW in PreOp	Transmit PDO Mapping6	0 × 1A11 (default)
	7	U16	RO / RW in PreOp	Transmit PDO Mapping7	0 × 1A12 (default)
	8	U16	RO / RW in PreOp	Transmit PDO Mapping8	0 × 1A13 (default)

14-3. Manufacturer-specific Area 1 (Valve)

Index (hex)	SubIndex	Data format	Access	Name	Remarks
2000	-	-	-	Valve Point	Valve output status
	0	U8	RO	Number of Entries(= 0x20)	
	1-32	BOOL	RO	Valve Point N	Output status of valve N
2100	0	U8	RW	Valve Failure Reaction	Valve output setting for communication errors 0 = Clear (default) 1 = Hold
2400	-	-	-	Valve Activation Count	Total number of valve outputs
	0	U8	RO	Number of Entries(= 0x20)	
	1-32	U32	RW	Valve Activation Count N	Total number of valve N outputs

14-4. Manufacturer-specific Area 2 (I/O Expansion Modules)

Index (hex)	SubIndex	Data format	Access	Name	Remarks
3000	0	U16	RO	Digital Input 1	Digital input module 1 input status
3001	0	U16	RO	Digital Input 2	Digital input module 2 input status
3002	0	U16	RO	Digital Input 3	Digital input module 3 input status
3003	0	U16	RO	Digital Input 4	Digital input module 4 input status
3010	-	-	-	Digital Input ON Delay Time 1	Digital input module 1 input constant 0 = 0 ms (default) 1 = 3 ms 2 = 10ms 3 = 25ms
	0	U8	RO	Number Of Entries(=0x10)	
	1-16	U8	RW	On Delay Time N (N = SubIndex)	Channel N input constant
3011	-	-	-	Digital Input ON Delay Time 2	Digital input module 2 input constant 0 = 0 ms (default) 1 = 3 ms 2 = 10ms 3 = 25ms
	0	U8	RO	Number Of Entries(=0x10)	
	1-16	U8	RW	On Delay Time N (N = SubIndex)	Channel N input constant
3012	-	-	-	Digital Input ON Delay Time 3	Digital input module 3 input constant 0 = 0 ms (default) 1 = 3 ms 2 = 10ms 3 = 25ms
	0	U8	RO	Number Of Entries(=0x10)	
	1-16	U8	RW	On Delay Time N (N = SubIndex)	Channel N input constant
3013	-	-	-	Digital Input ON Delay Time 4	Digital input module 4 input constant 0 = 0 ms (default) 1 = 3 ms 2 = 10ms 3 = 25ms
	0	U8	RO	Number Of Entries(=0x10)	
	1-16	U8	RW	On Delay Time N (N = SubIndex)	Channel N input constant

Index (hex)	SubIndex	Data format	Access	Name	Remarks
3200	-	-	-	Analog Input 1	Analog input module 1 input status
	0	U8	RO	Number Of Entries(= 0x04)	
	1 - 4	U16	RO	Analog Input Value Of Ch N (N = SubIndex)	Channel N analog input value (0 - 4095)
3201	-	-	-	Analog Input 2	Analog input module 2 input status
	0	U8	RO	Number Of Entries(= 0x04)	
	1 - 4	U16	RO	Analog Input Value Of Ch N (N = SubIndex)	Channel N analog input value (0 - 4095)
3202	-	-	-	Analog Input 3	Analog input module 3 input status
	0	U8	RO	Number Of Entries(= 0x04)	
	1 - 4	U16	RO	Analog Input Value Of Ch N (N = SubIndex)	Channel N analog input value (0 - 4095)
3203	-	-	-	Analog Input 4	Analog input module 4 input status
	0	U8	RO	Number Of Entries(= 0x04)	
	1 - 4	U16	RO	Analog Input Value Of Ch N (N = SubIndex)	Channel N analog input value (0 - 4095)
3210	-	-	-	Analog Input Filter Measured Value 1	Analog input module 1 moving averages 0 = No (default) 1 = 2 Values 2 = 4 Values 3 = 8 Values
	0	U8	RO	Number Of Entries(= 0x04)	
	1 - 4	U8	RW	Filter Measured Value N (N = SubIndex)	Channel N moving averages
3211	-	-	-	Analog Input Filter Measured Value 2	Analog input module 2 moving averages 0 = No (default) 1 = 2 Values 2 = 4 Values 3 = 8 Values
	0	U8	RO	Number Of Entries(= 0x04)	
	1 - 4	U8	RW	Filter Measured Value N (N = SubIndex)	Channel N moving averages
3212	-	-	-	Analog Input Filter Measured Value 3	Analog input module 3 moving averages 0 = No (default) 1 = 2 Values 2 = 4 Values 3 = 8 Values
	0	U8	RO	Number Of Entries(= 0x04)	
	1 - 4	U8	RW	Filter Measured Value N (N = SubIndex)	Channel N moving averages

Index (hex)	SubIndex	Data format	Access	Name	Remarks
3213	-	-	-	Analog Input Filter Measured Value 4	Analog input module 4 moving averages 0 = No (default) 1 = 2 Values 2 = 4 Values 3 = 8 Values
	0	U8	RO	Number Of Entries(= 0x04)	
	1 - 4	U8	RW	Filter Measured Value N (N = SubIndex)	Channel N moving averages
3400	0	U16	RO	Digital Output1	Digital Output Module 1 output status
3401	0	U16	RO	Digital Output2	Digital Output Module 2 output status
3402	0	U16	RO	Digital Output3	Digital Output Module 3 output status
3403	0	U16	RO	Digital Output4	Digital Output Module 4 output status
3410	0	U8	RW	Digital Output Failure Reaction 1	Digital Output Module 1 output status during communication error 0 = Clear (default) 1 = Hold
3411	0	U8	RW	Digital Output Failure Reaction 2	Digital Output Module 2 output status during communication error 0 = Clear (default) 1 = Hold
3412	0	U8	RW	Digital Output Failure Reaction 3	Digital Output Module 3 output status during communication error 0 = Clear (default) 1 = Hold
3413	0	U8	RW	Digital Output Failure Reaction 4	Digital Output Module 4 output status during communication error 0 = Clear (default) 1 = Hold

Index (hex)	SubIndex	Data format	Access	Name	Remarks
3600	-	-	-	Analog Output 1	Analog Output Module 1 output status
	0	U8	RO	Number Of Entries(= 0x02)	
	1-2	U16	RO	Analog Output Value Of Ch N (N = SubIndex)	Channel N analog output value (0 - 4095)
3601	-	-	-	Analog Output 2	Analog Output Module 2 output status
	0	U8	RO	Number Of Entries(= 0x02)	
	1-2	U16	RO	Analog Output Value Of Ch N (N = SubIndex)	Channel N analog output value (0 - 4095)
3602	-	-	-	Analog Output 3	Analog Output Module 3 output status
	0	U8	RO	Number Of Entries(= 0x02)	
	1-2	U16	RO	Analog Output Value Of Ch N (N = SubIndex)	Channel N analog output value (0 - 4095)
3603	-	-	-	Analog Output 4	Analog Output Module 4 output status
	0	U8	RO	Number Of Entries(= 0x02)	
	1-2	U16	RO	Analog Output Value Of Ch N (N = SubIndex)	Channel N analog output value (0 - 4095)
3610	0	U8	RW	Analog Output Failure Reaction 1	Analog Output Module 1 output status during communication error 0 = Clear 1 = Hold (default)
3611	0	U8	RW	Analog Output Failure Reaction 2	Analog Output Module 2 output status during communication error 0 = Clear 1 = Hold (default)
3612	0	U8	RW	Analog Output Failure Reaction 3	Analog Output Module 3 output status during communication error 0 = Clear 1 = Hold (default)
3613	0	U8	RW	Analog Output Failure Reaction 4	Analog Output Module 4 output status during communication error 0 = Clear 1 = Hold (default)

14-5. Manufacturer-specific Area 3 (Statistical Information)

Index (hex)	SubIndex	Data format	Access	Name	Remarks
5000	-	-	-	Statistical Data	
	0	U8	RO	Number of Entries(= 0x0A)	
	1	-	-	Reserved	
	2	U16	RO	Power On Days	Time from power on to operation (in days)
	3	U32	RO	Power On Hours	Time from power on to operation (in hours)
	4	U32	RO	Power On Minutes	Time from power on to operation (in minutes)
	5	U32	RO	Power On Seconds	Time from power on to operation (in seconds)
	6	-	-	Reserved	
	7	U16	RO	Total Power On Days	Accumulated operating time (in days)
	8	U32	RO	Total Power On Hours	Accumulated operating time (in hours)
	9	U32	RO	Total Power On Minutes	Accumulated operating time (in minutes)
	10	U32	RO	Total Power On Seconds	Accumulated operating time (in seconds)

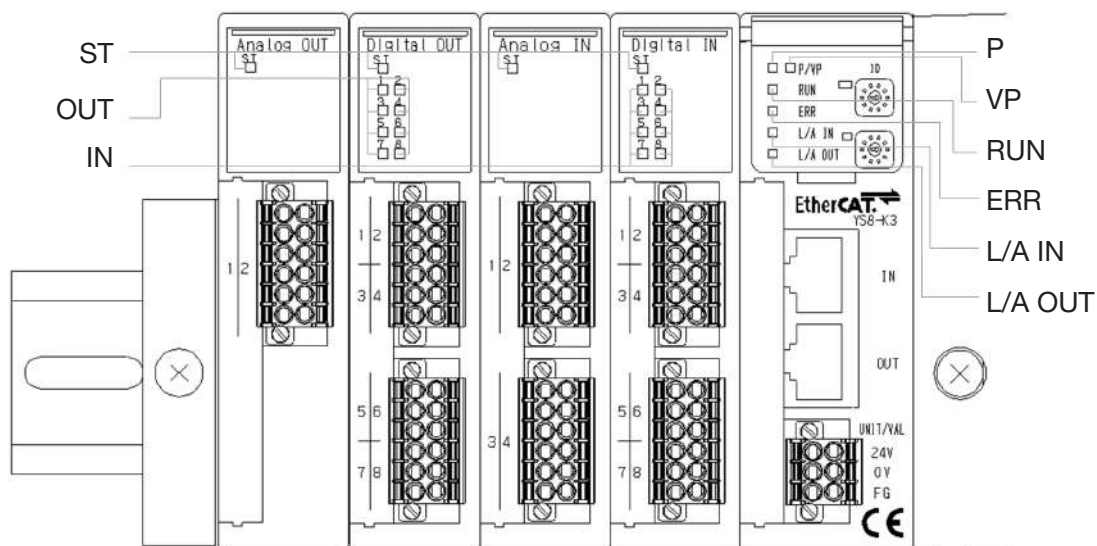
Factory Settings List

Item	Initial value	Name of object	Attribute
Accumulated operating time	0	Statistical Data	Total power on time
Valve output count	0	Valve Point	Count
Digital input Input constant	0 = 0 ms	Digital Input Point	On Delay Time
Analog input Moving average	0 = 0 times	Analog Input Point	Filter Measured Value
Output setting for communication errors	0 = Clear	Valve Point Group	Failure Reaction
Output setting for communication errors	0 = Clear	Digital Output Group	Failure Reaction
Output setting for communication errors	1 = Hold	Analog Output Group	Failure Reaction

15. Handling Abnormalities

The internal status can be diagnosed using the LEDS on the communication module and the I/O expansion modules.

15-1. LED positions



P – Power Supply

Status	Causes/Solutions
☒ Lit green	Unit power supply is installed properly.
☐ Off	There is no power supply for the unit. Confirm the unit power supply.

VP – Valve Power Supply

Status	Causes/Solutions
☒ Lit green	Power for output is being supplied.
☐ Off	There is no output power supply. Confirm the output power supply.

RUN – EtherCAT Operating Status

Status	Causes/Solutions
 Lit green	Status is normal. In an operational state under the EtherCAT standard.
 Flashing green (Single Flash)	Status is normal. In a safe-operational state under the EtherCAT standard.
 Flashing green (Blinking)	Status is normal. In a pre-operational state under the EtherCAT standard.
 Off	Status is normal. In an INIT state under the EtherCAT standard.

ERR – EtherCAT Error

Status	Causes/Solutions
 Off	Operating normally.
 Flashing red	A serious abnormality has been detected. Check the following potential causes. • Check if the ST LED on the I/O expansion module is lit red. The ST LED turns red when an overcurrent is detected. Please check the wiring of the applicable module. • An increase or decrease in I/O expansion modules is detected while power is being supplied. Please connect or disconnect I/O modules with the power turned off. • An excessive number of connections with the I/O expansion module is detected. You cannot connect more than eight I/O modules. • The connection settings may be incorrect. Reinstall the latest ESI file downloaded from the website. Reset the power supply after addressing the above potential causes. *Note that the YS8-A2S does not detect an increase or decrease in the number of connections.

L/A IN/OUT - Link Activity

Status	Causes/Solutions
 Lit green	Status is normal.
 Flashing green	EtherCAT frame sending/receiving.
 Off	No transmission. Confirm the status of the Ethernet cable wiring.

ST - Status

Status	Causes/Solutions
☒ Lit green	Status is normal.
☒ Lit red	Overcurrent detected. Confirm the I/O module wiring. Address the cause of the issue and reset the power supply.
☐ Off	There is no power supply for the module. Confirm the module power supply. For output modules, confirm the output power supply.

IN - Input

Status	Causes/Solutions
☒ Lit green	Digital input is on.
☐ Off	Digital input is off. If the input from the externally connected equipment cannot be recognized, check the wiring status.

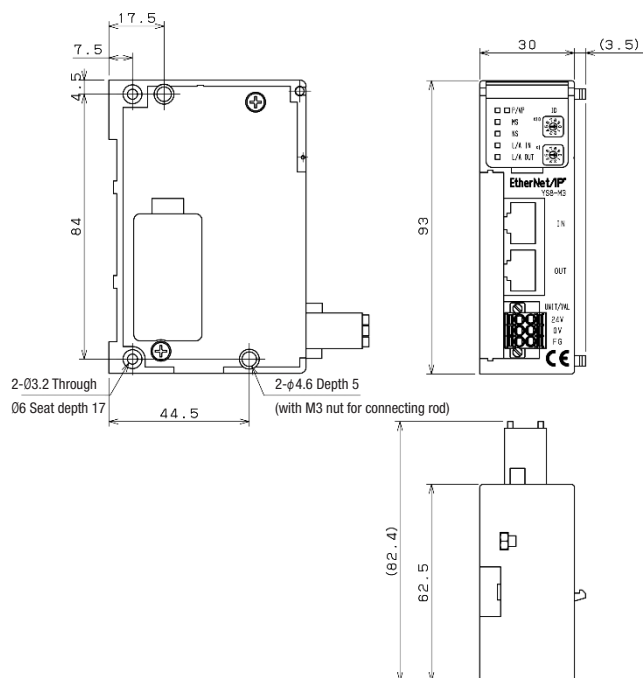
OUT - Output

Status	Causes/Solutions
☒ Lit green	Digital output is on. If the output cannot be recognized by the externally connected equipment, check the wiring status.
☐ Off	Digital output is off. Confirm the output power supply.

16. External Dimensions

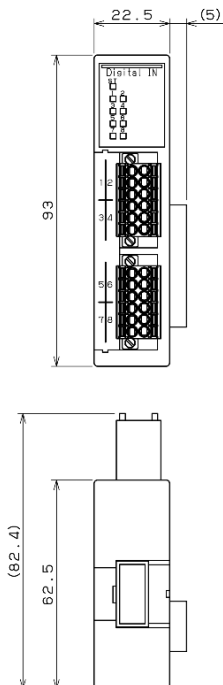
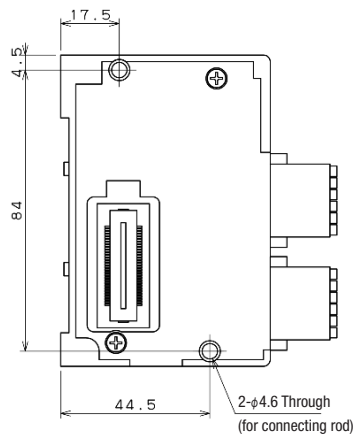
Communication module YS8-K3

(Unit : mm)

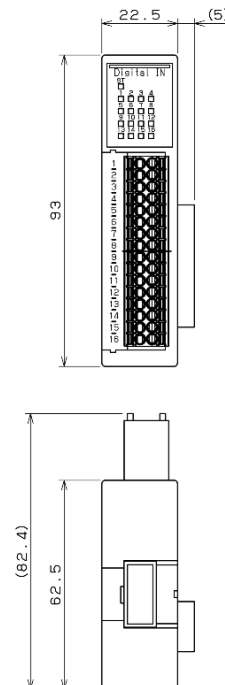
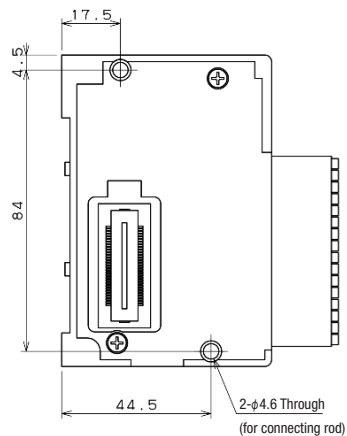


Digital input module

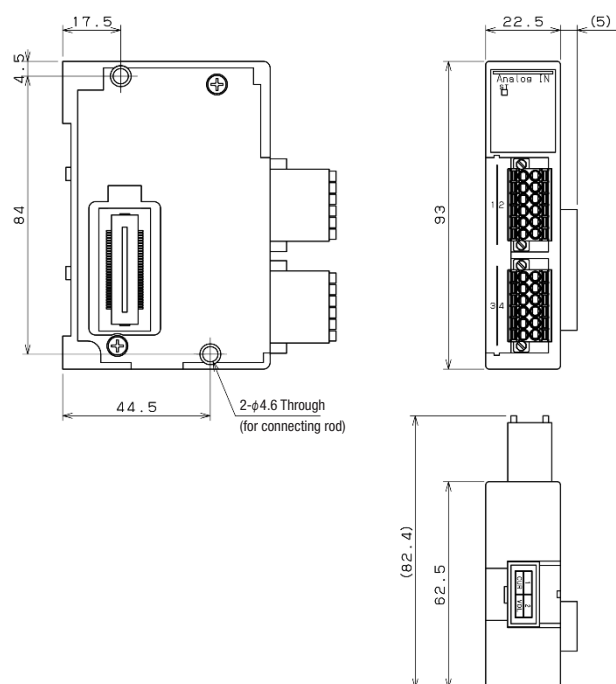
YS8-D8N / YS8-D8N-P



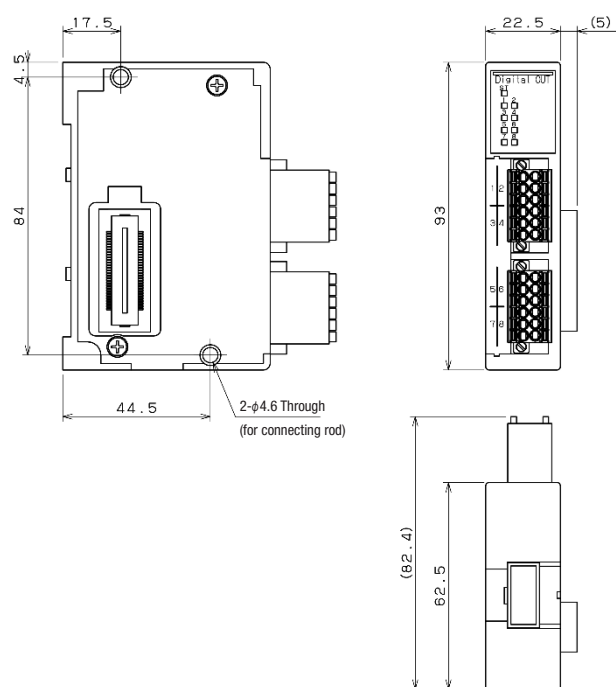
YS8-D16N



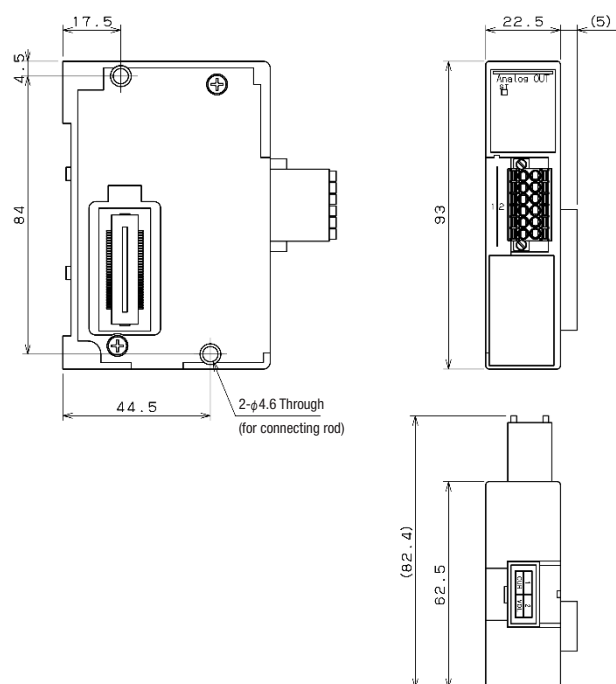
Analog input module YS8-A4N



Digital output module YS8-D8S/YS8-D8S-M



Analog output module YS8-A2S



(Unit : mm)

17. Appendix

17-1. Software Licenses and Copyrights

Third-party software is embedded in this product. See <https://official.koganei.co.jp/common/html/3rd-party-license.html> for information about licenses and copyrights for this software.

*For other information, detailed specifications, and precautions,
see the product catalog.

*For inquiries about the product, contact your nearest Koganei
sales office or the Overseas Department noted below.



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● The specifications or the appearance of this product are subject to change any time without prior notice.
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