CKD

SM－275429-A/2

INSTRUCTION MANUAL

BLOCK MANIFOLD

W4G2-SERIES

SERIAL TRANSMISSION

INPUT/OUTPUT BLOCK

NW4G※2－IN/OUT

- Please read this instruction manual carefully before using this product, particularly the section describing safety.
- Retain this instruction manual with the product for further consultation whenever necessary.

2nd Edition

CKD Corporation

For Safety Use

To use this product safety, basic knowledge of pneumatic equipment, including materials, piping, electrical system and mechanism is required (to the level pursuant to JIS B 8370 Pneumatic System Rules).

We do not bear any responsibility for accidents caused by any person without such knowledge or arising from improper operation.

Our customers use this product for a very wide range of applications, and we cannot keep track of all of them. Depending on operating conditions, the product may fail to operate to maximum performance, or cause an accident. Thus, before placing an order, examine whether the product meets your application, requirements, and how to use it.

This product incorporates many functions and mechanisms to ensure safety. However, improper operation could result in an accident. To prevent such accidents, read this operation manual carefully for proper operation.

Observe the cautions on handling described in this manual, as well as the following instructions:

⚠ PRECAUTIONS

- Incorrect address settings of serial transmission slave stations could cause the solenoid valve and the cylinder to malfunction.
- For operation if serial transmission slave stations, read the communication system operation manual carefully.
- Do not touch electric-wiring connections (exposed live parts): this will cause an electric shock. During wiring, keep the power off. Also, do not touch these live parts with wet hands.

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NW4G※2-IN/OUT
Serial Transmission Input/Output Block
Manual No. SM-275429-A/2

Dec.20.2002
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1. PRODUCT

1.1 General outline of the system

1) NW4G※2-IN/OUT

is an optional I/O unit designed to be connected to the serial transmission slave station of the manifold solenoid valve MW4G2-series and MW4G4-series, and provides the following features.

(1) Valves and sensors around the manifold solenoid valve can also be controlled through the network (serial transmission).
(2) This input/output block is an environmental-proof product applicable to the protection structure IP65 (dust-proof and jet-proof).
(3) For wiring direction, both side and upper wiring directions are provided. This ensures reduction of the installation space.
(4) For input unit, an input unit type, the power supply of which is commonly used by the slave station or the power of which is supplied from the outside can be selected.
(5) An over-current protection circuit is built-into the output unit.

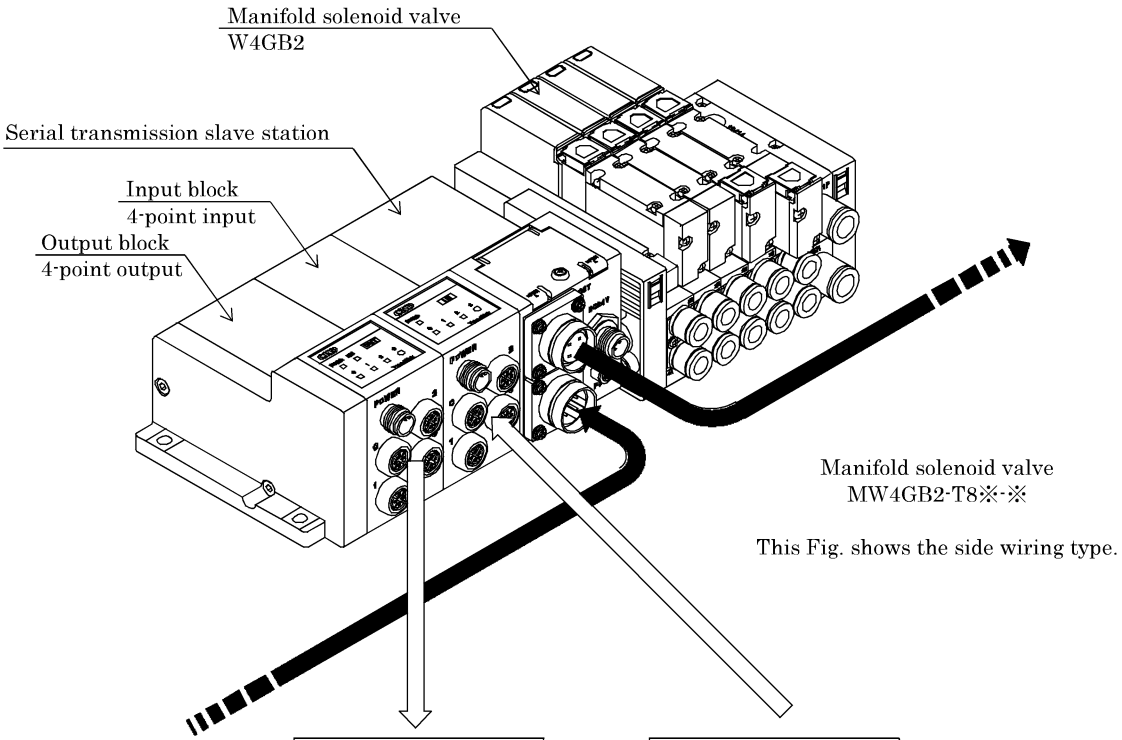
⚠ CAUTION:

This instruction manual mainly describes the serial transmission input/output block (NW4G※2-IN / OUT).
For details about manifold solenoid valve (MW4G※2-T8※、MW4G※2/4-T7※) and communication system to be used, read relevant User's Manuals to fully understand the functionality and performance before starting operation.

1．2 Structure of the System

This input/output block is an optional I/O unit to be connected to the serial transmission slave station of the manifold solenoid valve MW4G2-series and MW4G4-series.
Basically, this input/output block is operated using PLC (Programmable Logic Controller) through the slave station to exchange the input and output signals with peripheral devices.

Configuration example



Output devices
Solenoid valve Lamp Relay Buzzer ・ ・ ・ etc.

Input devices
Cylinder switch Photo-electric switch Proximity switch Push-button switch Limit switch ・ ・ etc.

1．3 Specifications

1) Specifications of input block

Item		NW4G□2-IN-N-K	NW4G□2-IN-N-B	NW4G□2-IN-P-K	NW4G□2-IN-P-B
Number of input points		4 points			
Rated input voltage		24 VDC			
Rated input current		7mA			
Input type		Sink type		Source type	
ON voltage		DC 15V or more (between each input terminal and voltage line)		DC 15V or more (between each input terminal and grounding line)	
OFF voltage/OFF current		DC 5V or less (same as above)/1.5 mA or less		DC 5V or less (same as above)/1.5 mA or less	
Input response time	OFF→ON	15 ms. or less			
	ON→OFF	18 ms. or less			
Power supply		Power supply common to slave station	External power supply	Power supply common to slave station	External power supply

2) Specifications of output block

Item		NW4G□2-OUT-N-B	NW4G□2-OUT-P-B
Number of output points		4 points	
Rated input voltage		24 VDC	
Output insulation method		Photo-coupler insulation	
Maximum load current		1A/1 point (3A/common)	
Residual voltage		1.5 V or less	
Leak current		0.1 mA or less	
Input type		Sink type	Source type
Input response time	OFF→ON	1 ms. or less	1 ms. or less
	ON→OFF	1 ms. or less	2 ms. or less
Protective circuit		Over-current protection/Reverse connection protection (Power connector)	
Fuse		For external load power supply: 5A (replaceable)	

3) Common specifications

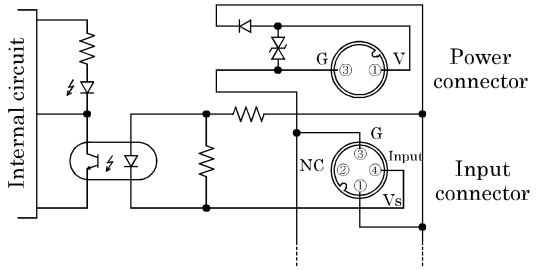
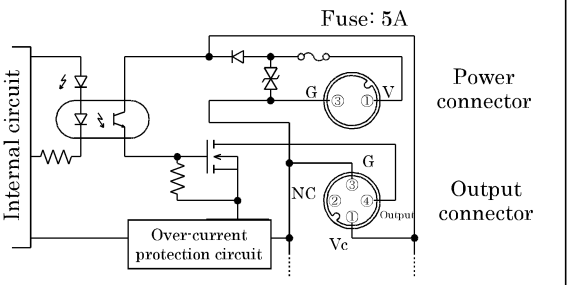
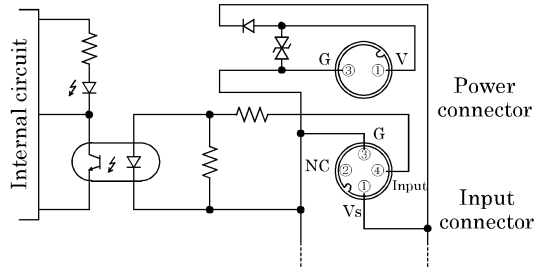
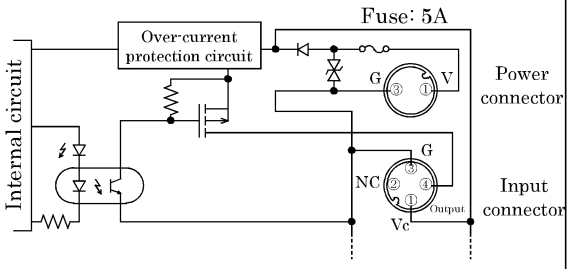
Item		Specification values
Insulation resistance		30 MΩ or more between electrically live terminal and non-electrically live metallic part (To be measured with DC500V Megger)
Withstanding voltage		AC 500V is applied between electrically live terminal and non-electrically live metallic part for 1 min.
Vibration proof	Durability	10Hz～150Hz～10Hz, 1 octave/min., single amplitude of 0.75 mm or acceleration of 98 m/s^2, whichever is smaller, 15 sweeps in each of three axis directions X, Y, and Z.
	Incorrect operation	10Hz～150Hz～10Hz, 1 octave/min., single amplitude of 0.5 mm or acceleration of 68.6 m/s^2, whichever is smaller, 4 sweeps in each of three axis directions X, Y, and Z.
Shock proof		294 m/s^2, three times, in three directions
Operating ambient temperature		-5 ～ 55°C
Operating ambient humidity		30 ～ 85%RH (No dew condensation allowed.)
Operating atmosphere		No corrosive gas exists.
Operation indications		LED indications (Power and Input/output statuses)

⚠ CAUTION:

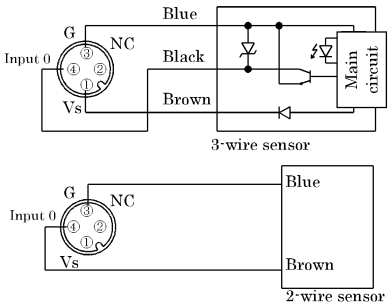
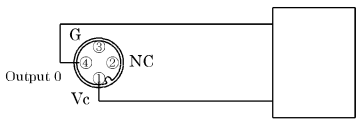
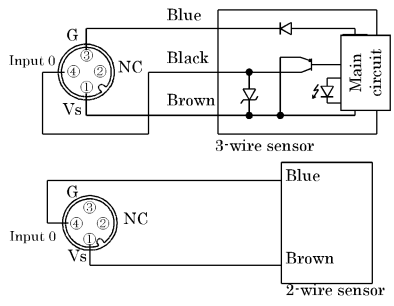
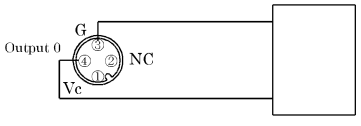
- If the same power supply is commonly used by the input block and slave station, select an appropriate sensor so that the consumption current of the slave station power supply (unit side) becomes the following level.
  - ① Applicable to CC-Link NW4G※2-T8G※ : 600 mA or less
  - ② Applicable to DeviceNet NW4G※2-T8D※ : 600 mA or less
  - ③ Applicable to AS-i NW4G※2-T8M※ : 250 mA or less
- The maximum load current per output block is 3A when the current values of four output points are totaled. If the current level exceeds the maximum load current, this may cause a malfunction.
  The consumption current is calculated and the product is operated within the specification range.

1.4 Circuit structure

1) Input and output types (simple circuit diagram)

	Input block	Output block
Sink type		
Source type		

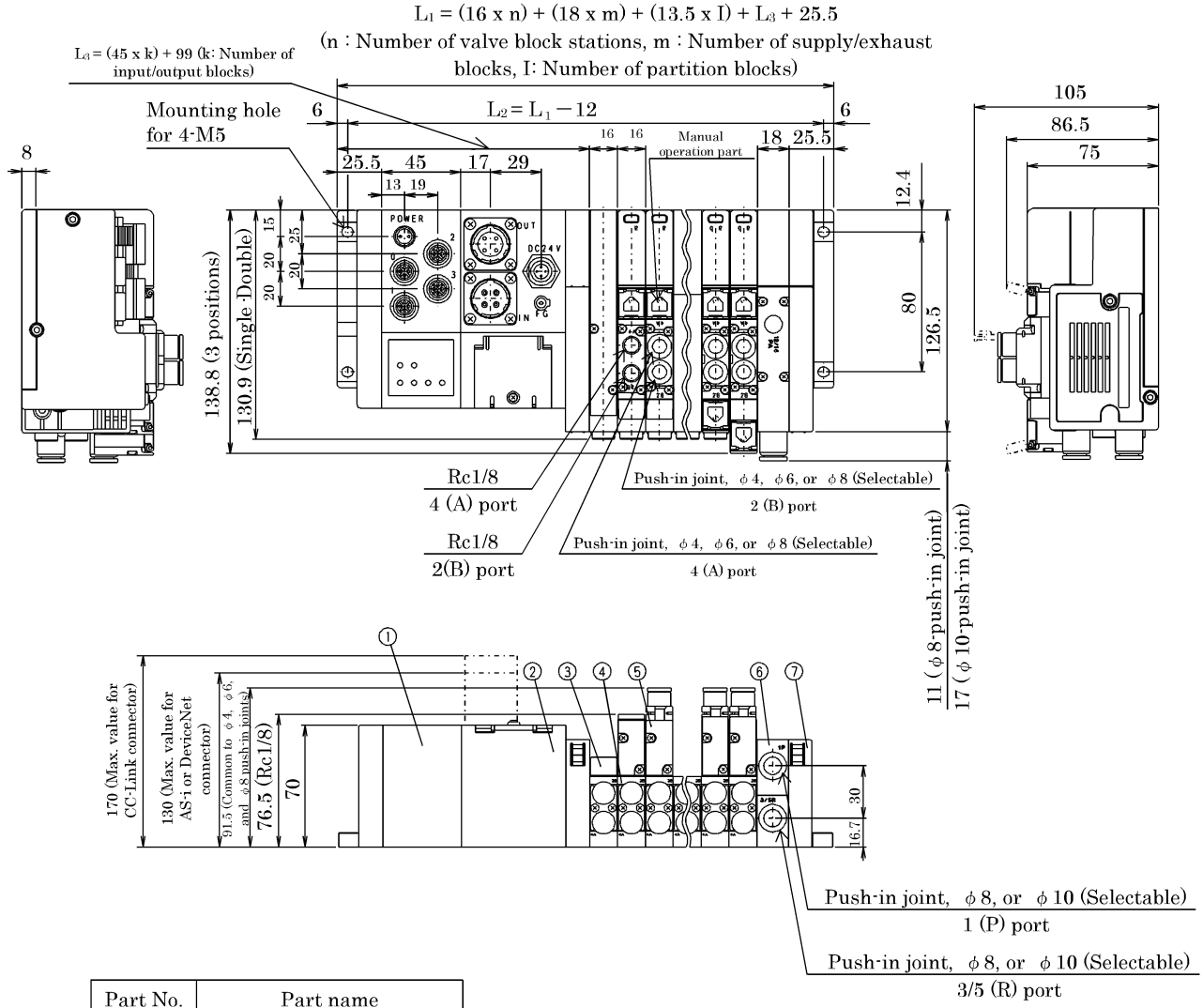
2) External connection diagram

	Input block	Output block
Sink type		 Load (solenoid valve and lamp, etc.) ⚠CAUTION: If an inductive load is connected, an appropriate protection circuit, such as surge killer or diode must be mounted.
Source type		 Load (solenoid valve and lamp, etc.) ⚠CAUTION: If an inductive load is connected, an appropriate protection circuit, such as surge killer or diode must be mounted.

1.5 External dimensions of solenoid valve

1) Upper wiring type

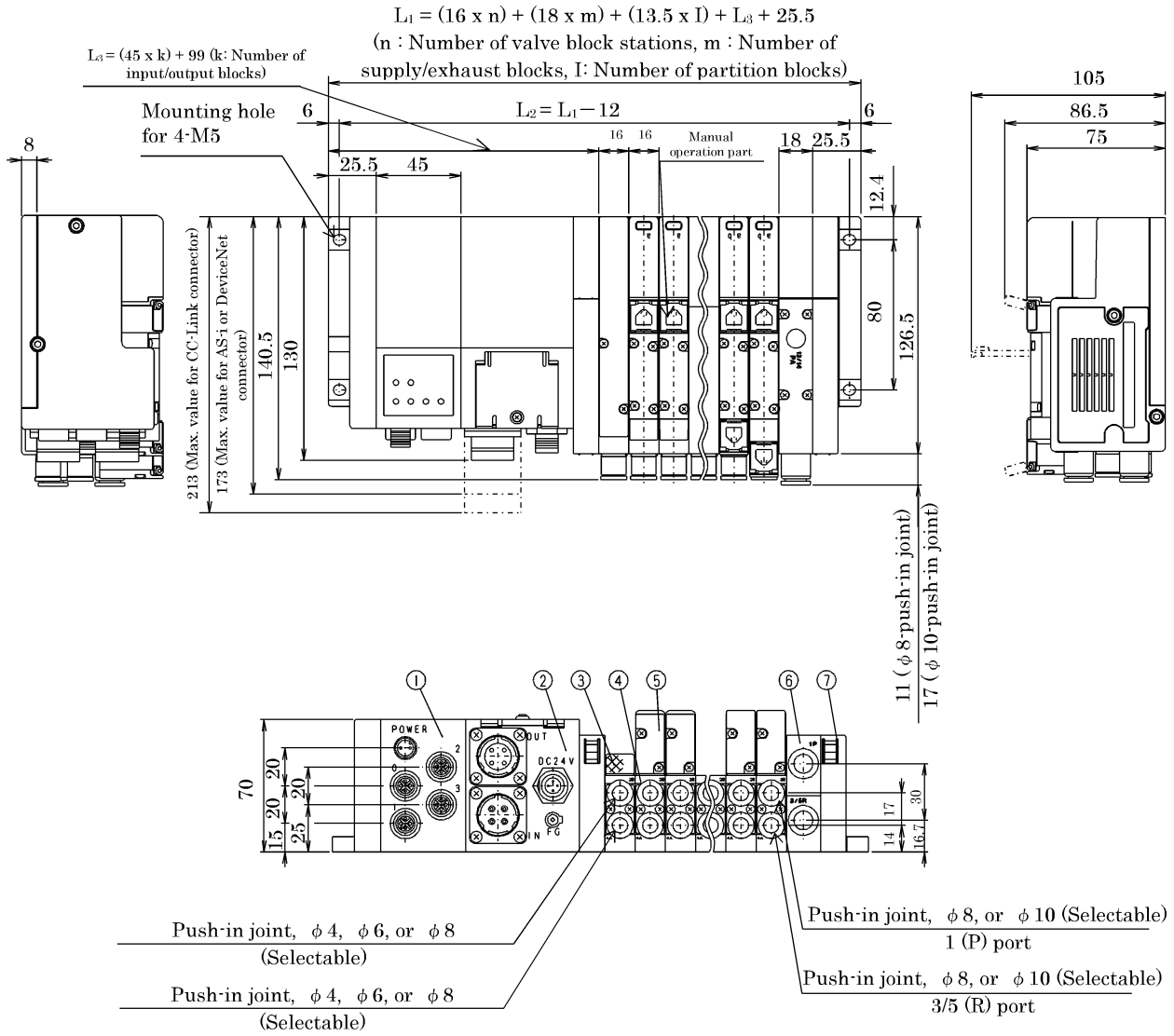
- MW4GA2※0-T8※



Part No.	Part name
1	Input/output unit
2	Electric block T8G※
3	Masking plate
4	Valve block
5	Solenoid valve main body
6	Supply/exhaust block
7	End block R

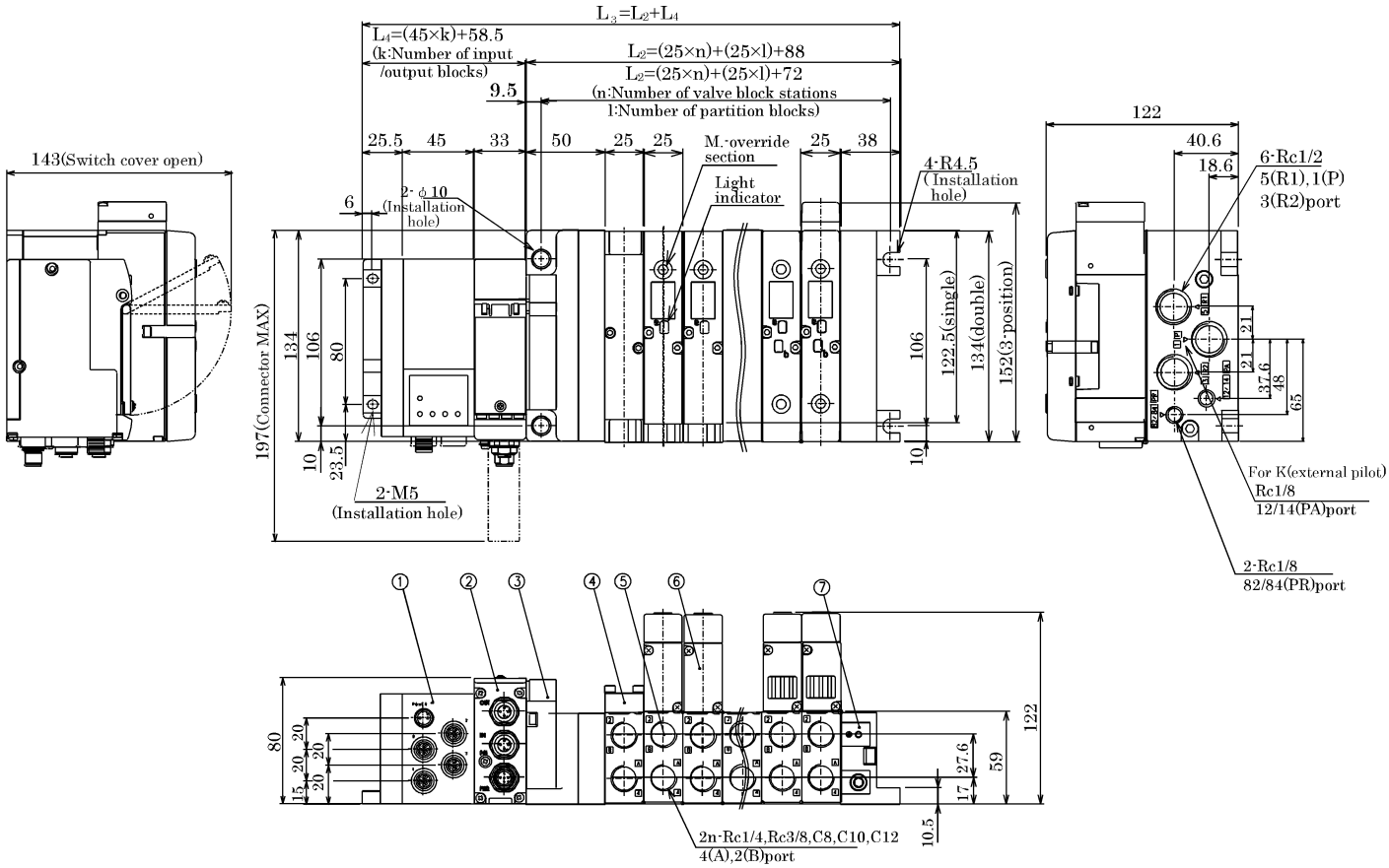
2) Side wiring type

- MW4GB2※0-T8※



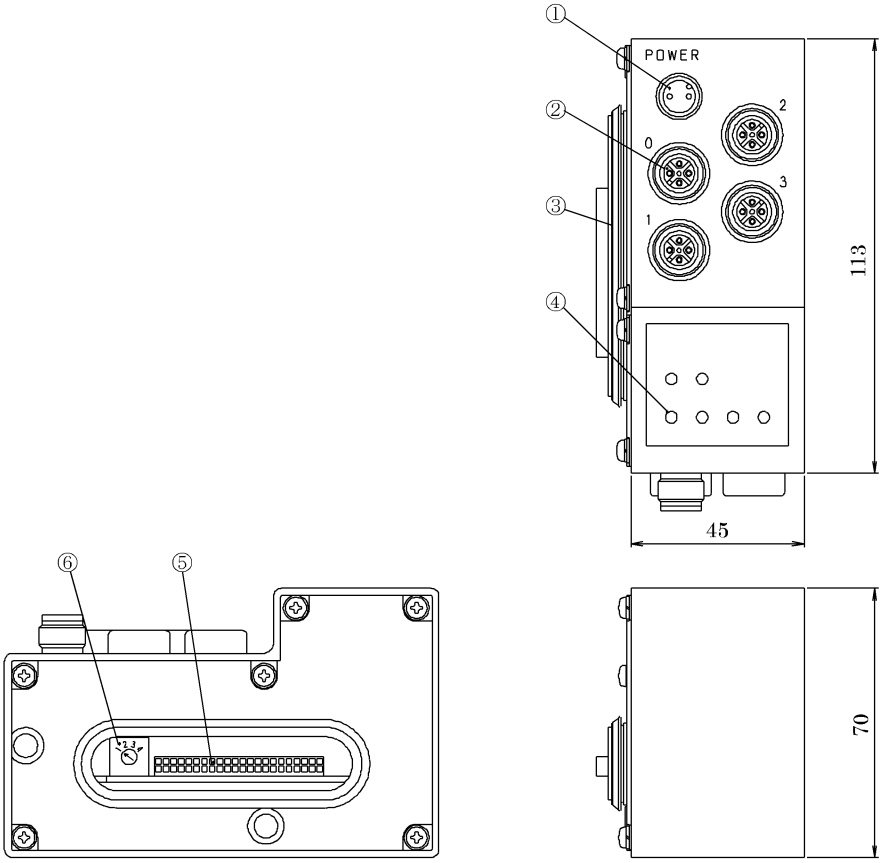
Part No.	Part name
1	Input/output unit
2	Electric block T8G※
3	Masking plate
4	Valve block
5	Solenoid valve main body
6	Supply/exhaust block
7	End block R

- MW4GB4※0-T7※



Part No.	Part name
1	Input/output unit
2	Electric block T7EC※
3	Coupling block
4	Masking plate
5	Valve block
6	Solenoid valve main body
7	End block

1.6 Outside view of input/output block



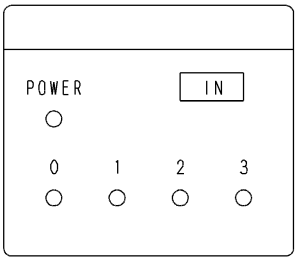
① Power connector (M12 connector, male-pin)
External power supply is connected to this connector.
② Input/output connector (M12 connector, female-pin)
Input and output devices are connected to this connector.
③ Connection duct gasket
This gasket is used for water-proof of the connection part.
④ Indication lamps
LED indications show the operating status of the input/output block.
⑤ Connection connector (To be installed on both sides of the main body)
This connector connects an adjacent slave station and input/output connector.
⑥ Rotary selector switch (Output block)
This switch is used to set an address for the output point.

The above Fig. shows the upper wiring type.

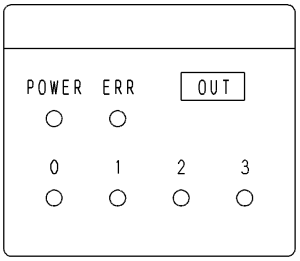
1.7 LED indications

The LED indications show the operating status of this input/output block.
For details about contents of LED indications, refer to the Table below.

Input block



Output block

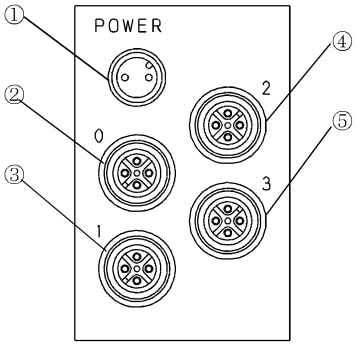


LED name	Indication contents
POWER	Lit while the power is being supplied.
ERR	Lit if the over-current protection circuit is activated.
0～3	Lit if the input/output of relevant point is activated.

⚠ CAUTION:

- If the POWER LED is not lit while the power is being supplied to the output block, the fuse may be blown up. If the fuse is blown up, replace it with a new one while referring to section 5.2, Maintenance.
- If a conductive load, such as buzzer is connected to the output block, the output block may not function. At this time, turn OFF the power and restart the operation. Since the output block includes a protective circuit to prevent breakage caused by incorrect wiring or over-current, such conductive load must be connected through a relay.
- If the over-current protective circuit of the output block is activated and the ERR LED is lit, the output of the output point, through which the over-current has been flowed, is stopped and this status is kept until the output signal is reset.
  If this occurs, turn OFF the power, remove the cause of the over-current, and then restart the operation.

1.8 Connection positions



Marking	Terminal name	Function
1	Power connector	External power supply is connected to this connector. (M12 connector, male-pin)
2	Input/output connector No. 0	Input/output device is connected to this connector. (M12 connector, female-pin) Input devices: Switch, sensor, etc. Output devices: Solenoid valve, relay, lamp, etc.
3	Input/output connector No. 1	
4	Input/output connector No. 2	
5	Input/output connector No. 3	

⚠ CAUTION:

- Touching the electrical wiring connection part (bare live part) may cause an electric shock. Before starting the wiring work, always shut-down the power completely. Additionally, do not touch any electrically live part by wet hand.
- When the same power supply is commonly used by the input/output block and slave station, carry out appropriate water-proof measures, such as attaching of water-proof cap to the power connector.
- To avoid any problems due to noise, observe the following when wiring:

① If it is predicted that the noise may affect, provide a power source for every manifold solenoid valve wherever possible, and provide wiring individually.

② Minimize the wiring distance whenever possible.

③ Do not share a common power source with equipment such as an inverter or motor, etc. which can be a possible source of noise.

④ Do not wire the power line and signal line in parallel with another power line.

2. CAUTION

- Connect the power supply cable and input/output cable correctly within the specifications so that any incorrect wiring is not performed.
- Pay special attention so that any tensile force or impact is not applied to the power supply cable and input/output cable.
- Before turning ON the power, make sure that the various connection cables and connectors are connected firmly.
- Disassembly, modification, and/or repair made by the customer may cause a trouble or malfunction. Never attempt to disassembly, modify, and/or repair the unit.
- Many precision devices are mounted inside the unit. Do not drop the unit or apply vibration or impact to the unit.
- If any connector is disconnected or connected with the electric power supplied, this may cause a trouble or malfunction. Do not disconnect or connect any connector with the electric power supplied.

3. OPERATION

3.1 Input and output point No. assignments

1) Hexadecimal expression

Input/output No.	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Output exclusive type	Y00	Y01	Y02	Y03	Y04	Y05	Y06	Y07	Y08	Y09	Y0A	Y0B	Y0C	Y0D	Y0E	Y0F	Y10	Y11	Y12	Y13	Y14	Y15	Y16	Y17	Y18	Y19	Y1A	Y1B	Y1C	Y1D	Y1E	Y1F
Input/output mixing type	X00	X01	X02	X03	X04	X05	X06	X07	X08	X09	X0A	X0B	X0C	X0D	X0E	X0F	Y10	Y11	Y12	Y13	Y14	Y15	Y16	Y17	Y18	Y19	Y1A	Y1B	Y1C	Y1D	Y1E	Y1F
Applicable to AS-i (MW4G2-T8M※)				ASI 1								ASI 2																				
	X00	X01	X02	X03	Y00	Y01	Y02	Y03	X00	X01	X02	X03	Y00	Y01	Y02	Y03																

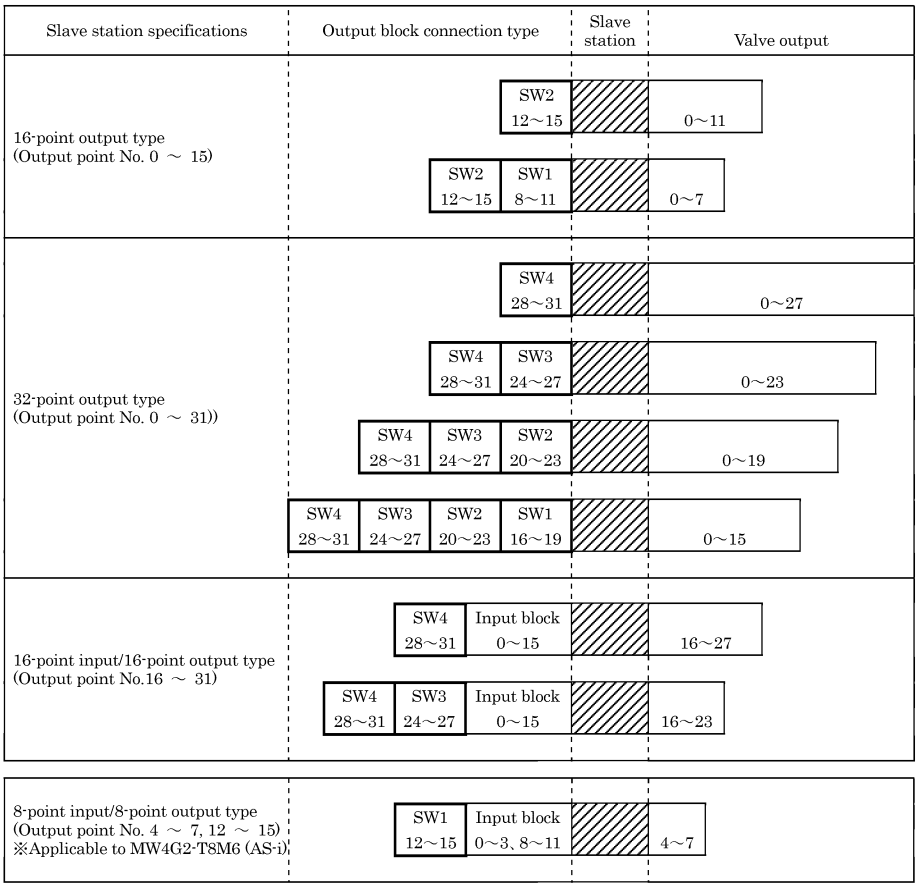
2) Decimal expression

Input/output No.	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Output exclusive type	Y0 00	Y0 01	Y0 02	Y0 03	Y0 04	Y0 05	Y0 06	Y0 07	Y0 08	Y0 09	Y0 10	Y0 11	Y0 12	Y0 13	Y0 14	Y0 15	Y1 00	Y1 01	Y1 02	Y1 03	Y1 04	Y1 05	Y1 06	Y1 07	Y1 08	Y1 09	Y1 10	Y1 11	Y1 12	Y1 13	Y1 14	Y1 15
Input/output mixing type	X0 00	X0 01	X0 02	X0 03	X0 04	X0 05	X0 06	X0 07	X0 08	X0 09	X0 10	X0 11	X0 12	X0 13	X0 14	X0 15	Y1 00	Y1 01	Y1 02	Y1 03	Y1 04	Y1 05	Y1 06	Y1 07	Y1 08	Y1 09	Y1 10	Y1 11	Y1 12	Y1 13	Y1 14	Y1 15
Applicable to AS-i (MW4G2-T8M※)				ASI 1								ASI 2																				
	X0 00	X0 01	X0 02	X0 03	Y0 00	Y0 01	Y0 02	Y0 03	X0 00	X0 01	X0 02	X0 03	Y0 00	Y0 01	Y0 02	Y0 03																

X※※ shows inputs while Y※※ shows outputs.

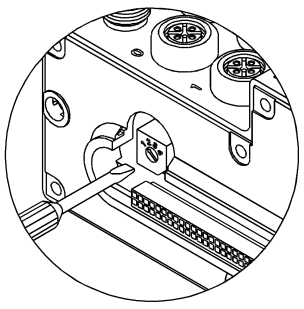
3.2 Rotary selector switch settings and output point Nos.

1) MW4G※2-T8※ (slave station: OPP5) is connected.



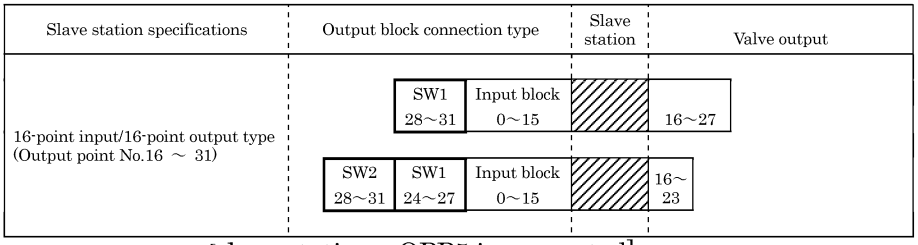
SW※ ※～※ …Rotary selector switch setting No.
…Output point No. assignment

※ One bold frame shows one output block unit.



Rotary selector switch

2) MW4G※2-T7※、MW4G※4-T7※ (slave station:W4G-OPP8) is connected.



SW※ ※～※ ···Rotary selector switch setting No.
···Output point No. assignment

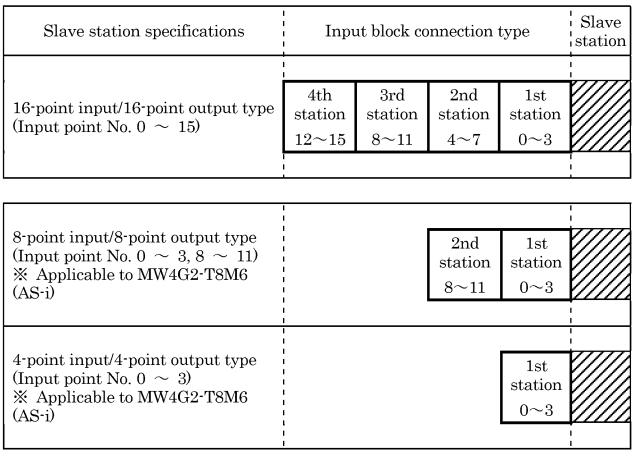
※ One bold frame shows one output block unit.

※It's different from [slave station : OPP5 is connected] in the rotary selector switch setting No. of the output block.

⚠ CAUTION:

- The input/output block connection No. is set sequentially from the serial transmission station side. If the input and output blocks are mixed, the input blocks are put before output blocks.
- If duplicated output point No. is set, this may cause a malfunction.
  Always check the assignment and range of the output point No., and the rotary selector switch setting.
  It's different in setting of the rotary selector switch setting No. depending on slave stations.

3.3 Input point Nos. (Input block)



SW※ ※～※ ···Rotary selector switch setting No.
···Output point No. assignment

※ One bold frame shows one output block unit.

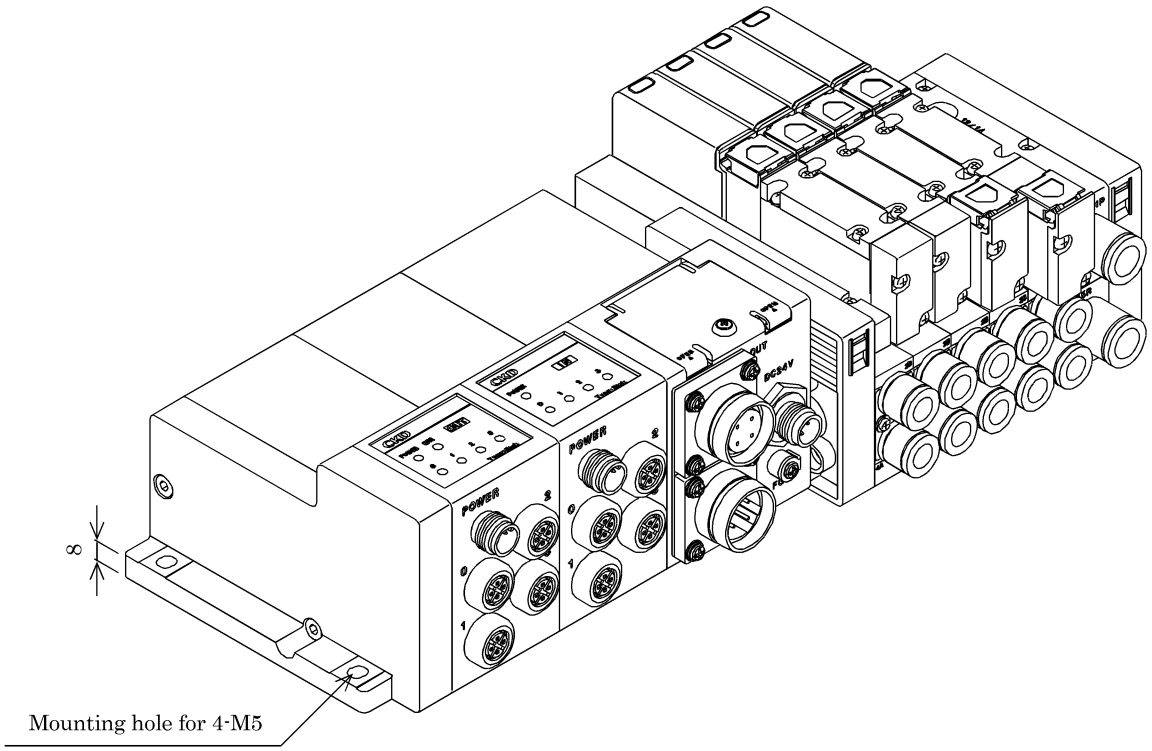
⚠ CAUTION:

- No switch settings are provided on the input block. Specified input point No. is assigned by the arrangement.
- The above Table shows the maximum number of input block stations in response to the specifications of the slave station. Additionally, it is possible to set a value less than the maximum number of connections.

4. INSTALLATION

4.1 Installation

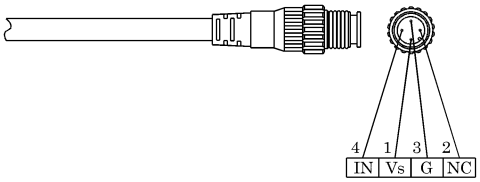
Install the input/output block firmly by screwing the screws into the mounting holes. (M5 screw, Proper tightening torque: 1.2N･m)



4.2 Water-proof connectors

1) Input/output cable

- Sensor connector for input unit (male-pin)



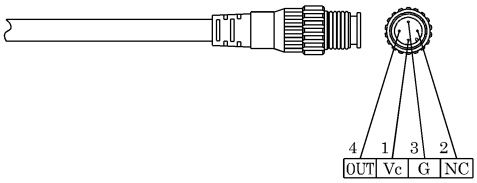
3-wire sensor

No.	Signal name	Sink type/Source type
1	Vs	Power supply for sensor (+)
2	NC	No-connection
3	G	Power supply for sensor (-)
4	IN	Input signal

2-wire sensor

No.	Signal name	Sink type	Source type
1	Vs	No-connection	Power supply for sensor (+)
2	NC	No-connection	No-connection
3	G	Power supply for sensor (-)	No-connection
4	OUT	Input signal	Input signal

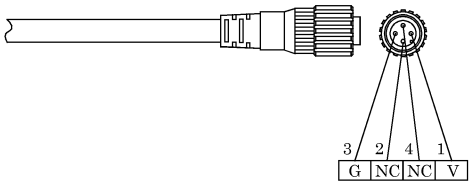
- External load connector for output unit (Male-pin)



No.	Signal name	Sink type	Source type
1	Vc	Power supply for load (+)	No-connection
2	NC	No-connection	No-connection
3	G	No-connection	Power supply for load (-)
4	OUT	Output signal	Output signal

2) Power cable

- External power supply connector (Female-pin)



No.	Signal name	Remarks
1	V	External power supply (+)
2	NC	No-connection
3	G	External power supply (-)
4	NC	No-connection

Recommended connectors Manufacturer: OMRON

◆Input/output cable

Connector with cable
・Model XS2H-D421-※ (One-side connector plug)

Assembly type connector
・Model XS2G-D4C※ (Crimping type)
・Model XS2G-D42※ (Soldering type)
・Model XS2G-D4S※ (Screw wiring type)

◆Power cable

Connector with cable
・Model XS2F-D421-※ (One-side connector socket)

Assembly type connector
・Model XS2C-D4C※ (Crimping type)
・Model XS2C-D42※ (Soldering type)
・Model XS2C-D4S※ (Screw wiring type)

※ Do not use any L-type connector.

⚠ CAUTION:

- Always tighten the connector firmly by hand. (Appropriate tightening torque: 0.4 to 0.5N・m)
- After checking the polarities and rated voltage carefully, perform the connections.
- Select a power cable and Input/Output cable after calculating the current consumption.
- When designing the system to supply power to duplex number of slave stations and remote I/O stations, choose and wire the source of power cord with a consideration of voltage drop.
- Pay special attention so that any tensile force or impact is not applied to the power cable and Input/Output cable. Additionally, if the wiring distance is long, unexpected force due to own weight or shock may be applied, causing the unit to break. Therefore, to prevent such troubles, take appropriate measures, such as securing of the wires and cables to the machine.
- Never make terminal No. 1 (V) and No. 3 (G) of the input/output cable short-circuited when turning ON the power. Doing so may cause the product to malfunction. Always carry out the insulation work.

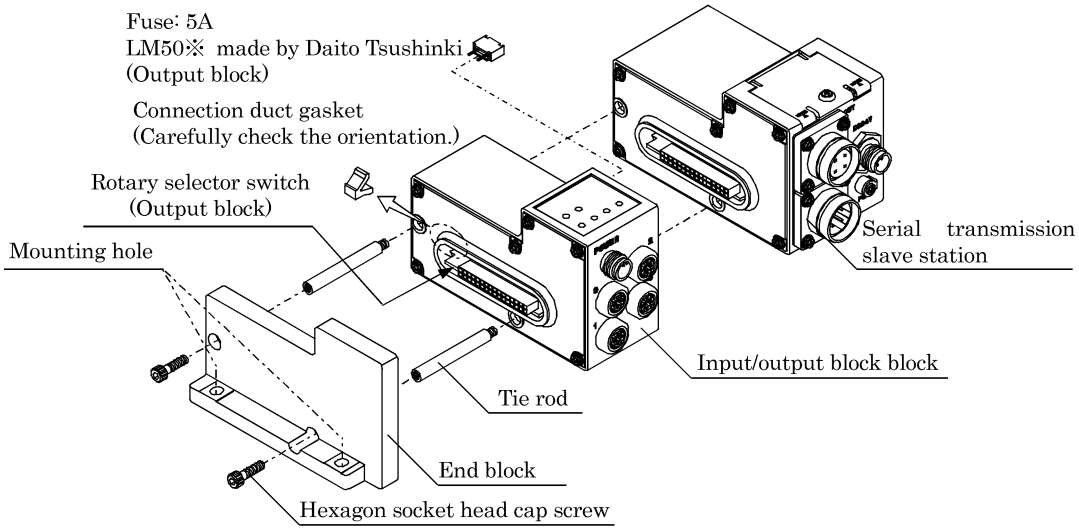
5. MAINTENANCE

5.1 Addition of input/output block

(1) Turn OFF the unit power supply and external power supply.
(2) Remove the hexagon socket head cap screws and pull out the input/output blocks from the tie rod to a position where an input/output block is added.
(3) When adding an output block, set the rotary selector switch shown in section 3.2.
(Care should be taken since adjacent existing output blocks also need to be set again.)
(4) Pass an input/output block to be added through the tie rod and push it firmly so that no clearance is produced between adjacent blocks.
(5) After checking that all blocks are connected properly without clearance, tighten the hexagon socket head cap screws. (Proper tightening torque: 1.4 ～ 1.6N･m)
(6) After checking the safety, turn ON the unit power supply and external power supply.

5.2 Replacement of fuse (output block)

(1) Turn OFF the unit power supply and external power supply.
(2) Remove the hexagon socket head cap screws and pull out the output block from the tie rod, the fuse of which needs to be replaced.
(3) Replace the fuse with a new one and pass the output block through the tie rod so that it is returned to the previous position. Push the output block firmly so that no clearance is produced between adjacent blocks.
(4) After checking that all blocks are connected properly without clearance, tighten the hexagon socket head cap screws. (Proper tightening torque: 1.4 ～ 1.6N･m)
(5) After checking the safety, turn ON the unit power supply and external power supply.



⚠ CAUTION:

- Before turning ON the power to the serial transmission slave station unit, check the slave station No., transmission speed, and output setting in case of communication error.
- If the cable or connector is stretched, this may cause faulty wiring or damage. Always carefully disconnect the cable or connector from the tie rod with the case of the input/output block kept held.
- When touching any electric wiring part (electrically live part), this may cause an electric shock hazard. Great care should be taken when touching the product with the power turned ON.

5.3 Troubleshooting

Troubleshooting

Contents of trouble	Probable cause	Corrective action
Unit does not function.	Power is not turned ON.	Turn ON the power.
	Fuse is blown up.	Replace the fuse with a new one. (Output block only)
Unit malfunctions.	Faulty wiring or incorrect wiring	Check the wiring again.
	Rotary selector switch setting is incorrect. (Output block)	Check the setting again.
	PLC address setting is incorrect.	Check the program again.
ERR is lit. (Output block)	Output device (lamp or solenoid, etc.) is short-circuited.	Replace the defective output device.
	Load current exceeds the maximum load current level.	Check the current value again.
	Capacitive load, such as buzzer is connected.	Connect the capacitive load through the relay.

6. HOW TO ORDER

6.1 Model No. of individual input/output block

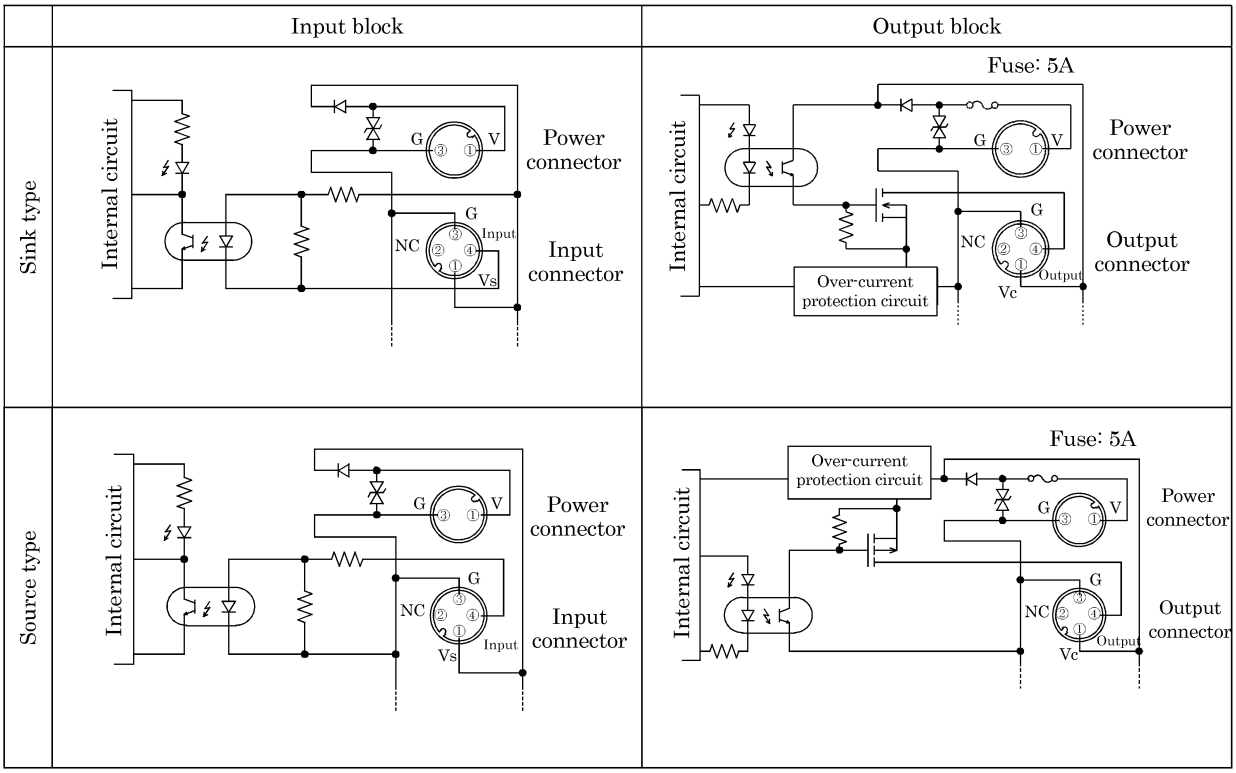
NW4G (A) 2 – (IN) – (N) – (K)
(a) (b) (c) (d)

(a) Wiring direction		(b) Input/output class		(c) Input/output type		(d) Type of power supply	
Symbol	Contents	Symbol	Contents	Symbol	Contents	Symbol	Contents
A	Upper wiring	IN	Input	N	Sink	K	Power supply common to serial transmission slave station (※1, ※2)
B	Side wiring	OUT	Output	P	Source	B	External power supply

※1 The output block uses only external power supply (B).

※2 When selecting the power supply common to the serial transmission slave station, the water-proof cap is attached to the power connector as standard accessory.

Input/output type (simple circuit diagram)

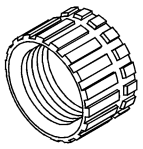


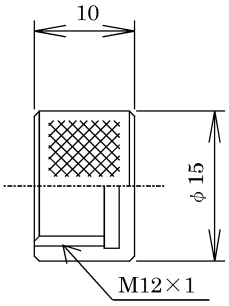
[SM-275429-A/2]

6.2 Parts for input/output block

1) Water-proof cap

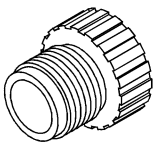
Model No.	Contents
W4G-XSZ-11	This cap is used for jet-proof of the power connector when the power supply common to the serial transmission slave station is used.

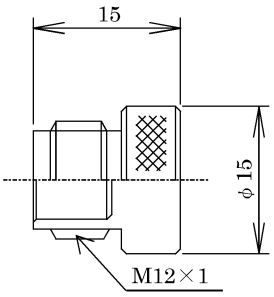




2) Water-proof plug

Model No.	Contents
W4G-XSZ-12	This plug is used for jet-proof of signal connectors not in use.





(Reference value)

Tightening torque: 0.4 ～ 0.5N·m