Safety Precautions

Be sure to read this section before use.
Refer to Intro Page 59 for general precautions for using valves.

Product-specific cautions: 3, 5-port pilot operated valve W4G2 Series

Design/selection

1. Working environment

⚠ CAUTION

■ IP65 (IEC60529 [IEC529:1989-11]) standards are applied to the test.
Avoid use in conditions where water or coolant directly contacts the valve.

Explanation of IP65 protection characteristic codes and test method

● Degree of protection

Note: IP65 is based on the following testing method.

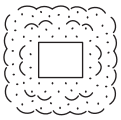
■ IEC (International Electrotechnical Commission) standards

(IEC60529 [IEC529:1989-11])

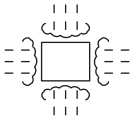
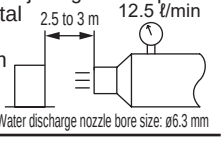
IP - □ □

Protection characteristic codes (International Protection)

1st characteristic No. (degree of protection for foreign solid matter)

Grade	Degree of protection	
6	Dust proof 	No inflow of dust

2nd characteristic No. (degree of protection for water entry)

Grade	Degree of protection		Overview of test method (fresh water is used)
5	Protection against water jets 	No harmful effects occur even when water is sprayed with nozzles from all directions.	With the testing equipment in the figure below, the sample (exterior) is exposed to water jetting of 1 m^2 per minute for a total of more than 3 minutes from all directions. 

2. 100 VAC specifications

⚠ CAUTION

■ The 100 VAC specification has an integrated full-wave rectifier.
Depending on the SSR used to turn ON/OFF the solenoid valve, recovery failure of the valve may result.
Use caution when selecting SSRs. (Consulting the manufacturer of the relay or PLC is recommended.)

3. Serial transmission device unit

⚠ CAUTION

■ The device unit enters the following status in the case of a communication error.
(1) All input signals are OFF.
(2) All output signals are OFF. (However, if the device unit has an output mode setting switch, it enters the set status.)

Design/selection

4. Surge suppressor

⚠ CAUTION

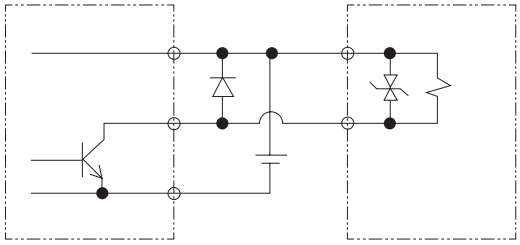
■ The surge suppressor attached with the solenoid valve is intended to protect the output contacts for the solenoid valve drive. There is no significant protection for the other peripheral devices, and devices could be damaged or could malfunction due to a surge. As well, surges generated by other devices may be absorbed and cause damage such as burning. Note the following points.

(1) The surge suppressor functions to limit solenoid valve surge voltage, which can reach several hundred volts, to a low voltage level that the output contact can withstand. Depending on the output circuit used, this may be insufficient and could result in damage or malfunction. Check whether the surge suppressor can be used within the surge voltage limit of the solenoid valve in use, the output device's withstand pressure and circuit structure, and by the degree of return delay time. When necessary, provide other surge countermeasures. The solenoid valve with surge suppressor can suppress the inverse voltage surge that may occur when the solenoid valve is off to the level in the table below.

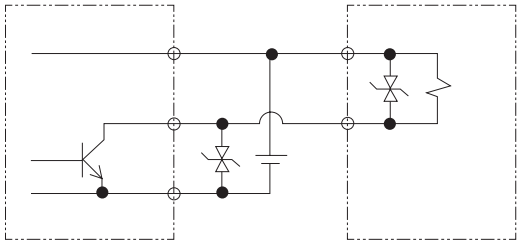
Specification voltage	Inverse voltage when OFF
12 VDC	Approx. 27 V
24 VDC	Approx. 47 V

(2) If the output unit is an NPN, a surge voltage equaling the voltage shown in the table above plus the power supply voltage may be applied to the output transistor. Make sure to implement a contact protection circuit to avoid the risk.

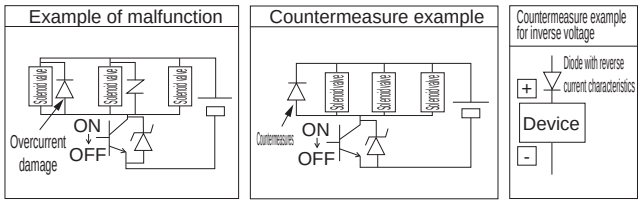
[Output transistor protection circuit: Installation example 1]



[Output transistor protection circuit: Installation example 2]



(3) If another device or solenoid valve is connected in parallel to the solenoid valve, the inverse voltage surge generated when the valve is OFF would apply to those devices. Even in the case of a solenoid valve with 24 VDC surge suppressor, a surge voltage may reach negative tens of volts for some models. This inverse voltage may cause damage or malfunction to other components connected in parallel. Avoid parallel connection of devices susceptible to inverse polarity voltages, e.g., LED indicator lamp. When driving several solenoid valves in parallel, the surge from other solenoid valves may enter the surge suppressor of one solenoid valve, and it may burn depending on the current value. When driving several solenoid valves with surge suppressors in parallel, surge current could concentrate at the surge suppressor with the lowest limit voltage and cause similar burning. Due to the variations in surge suppressor limit voltage that exist even among solenoid valves of the same model No., in the worst case the surge suppressor may burn out. Avoid driving multiple solenoid valves in parallel.



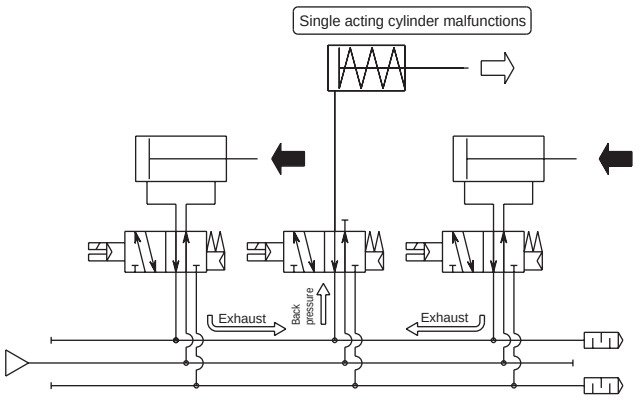
(4) The surge suppressor incorporated in the solenoid valve will often be short-circuited if it is damaged by overvoltage or overcurrent from other solenoid valves. Where there is a failed surge suppressor, if a large current flows when the output is ON, in the worst case scenario, the output circuit or solenoid valve could be damaged or ignited. Do not continue energizing in a state of failure. Additionally, to prevent large currents from continuing to flow, connect an overcurrent protection circuit to the power supply and drive circuit, or use a power supply with overcurrent protection.

Check valve

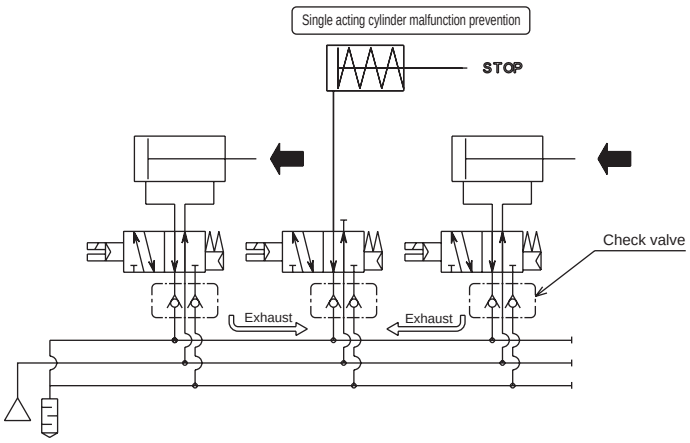
⚠ CAUTION: The exhaust check valve is a check valve. If the cylinder rod is manually operated directly without pressurization, the check valve opens and the air flow is shut off, preventing cylinder rod adjustment.

Generally, the double acting cylinder connected at the manifold to single acting cylinders or ABR connection valves may malfunction when adversely affected by the back pressure led in by operation of other cylinders. It is possible to select a model equipped with a "check valve" which prevents this malfunctioning. However, this cannot be installed on an all ports closed valve or PAB connection valve where there is no leakage of back pressure.

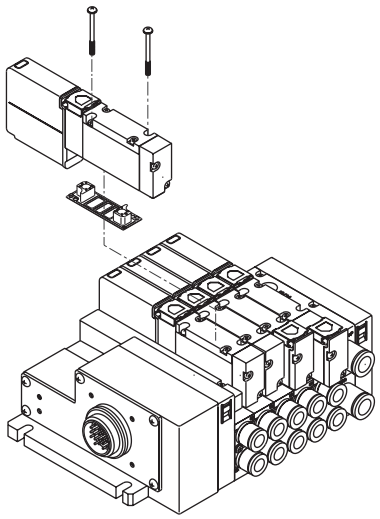
Example of pneumatic pressure system that may malfunction



4G series pneumatic pressure system

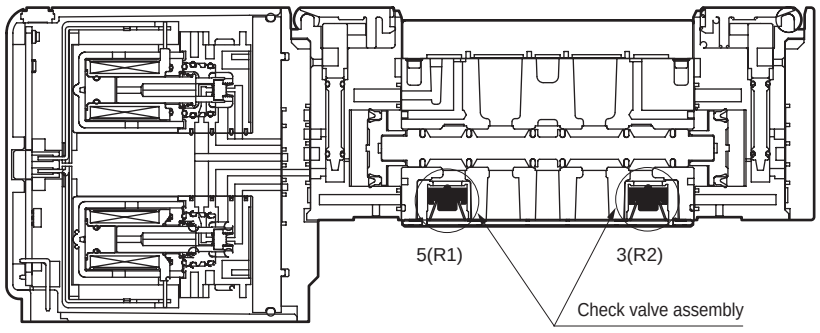


Internal structure



Check valve equipped standard specifications

Model No.	Flow path switching	Option (H) selection
NW3GA210	NC	With
NW3GA2110	NO	With
NW4G$^{A}_{B}$$_{Z}$210	2-position single	With
NW4G$^{A}_{B}$$_{Z}$220	2-position double	With
NW4G$^{A}_{B}$$_{Z}$230	All ports closed	None
NW4G$^{A}_{B}$$_{Z}$240	ABR connection	With
NW4G$^{A}_{B}$$_{Z}$250	PAB connection	None



Mounting, installation and adjustment

1. Port indication

⚠ CAUTION

■ For the piping port positions, piping port displays such as 1P, 4A, etc., corresponding to ISO and JIS standards are displayed.

● There is no restriction in valve mounting orientation. The 4 (A) and 2 (B) port positions and 5 (R1) and 3 (R2) port positions are reversed between W4G Series and 4K Series. Check the port codes carefully before piping to prevent reverse operation of cylinders.

Applications	ISO standards	JIS standards
Supply port	1	P
Output port	4	A
Output port	2	B
Exhaust port	5	R1
Exhaust port	3	R2

2. External pilot (K) piping port

⚠ CAUTION

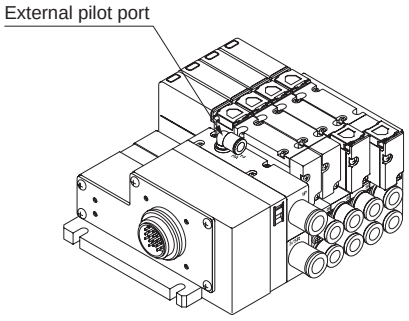
■ The external pilot (K) has a separate pilot air supply. ø6 push-in fitting is used to supply the pilot air, so be careful that the piping connection position is correct. Malfunctions could occur if the piping is incorrect.

Port indication

Applications		Indication (ISO standards)
Pilot air	Air supply port	12/14

* Port A/B pressurization and port R pressurization are not possible.

MW4G2



The external pilot air supply port is the ø6 push-in fitting on the top of the supply and exhaust block.

3. How to install manifold

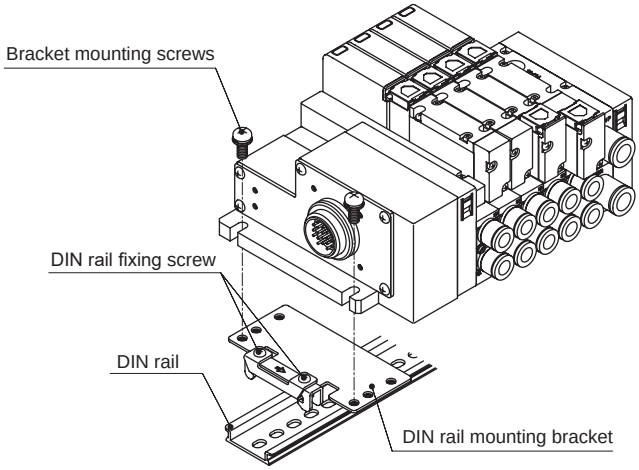
⚠ CAUTION

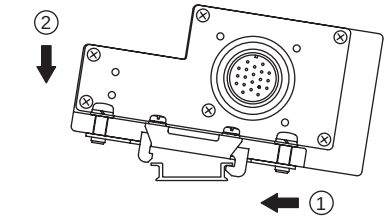
■ Mounting with DIN rail

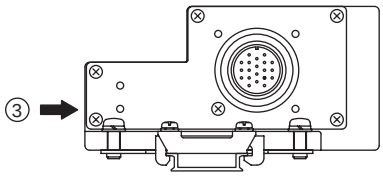
● In W4G2 Series, a direct mount manifold can be modified to DIN rail mount manifold. Note that inappropriate mounting may result in fall and damage of the manifold.
If the manifold weighs more than 1 kg in total, or when using in an environment with vibration or impact, fix the DIN rail onto the surface at 50 to 100 mm intervals, and sufficiently confirm that there is no problem with installation before starting operation. Although there is no restriction in mounting direction and orientation, attention should be paid to mounting screw loosening caused by resonance due to vibration that may cause the manifold to fall out during operation.

* For DIN rail mounting bracket kit and DIN rail, refer to the block configurations on page 1062.

■ How to install DIN rail







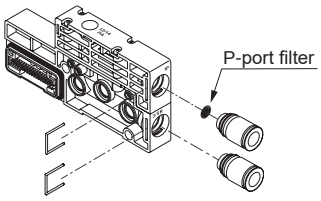
1. Attach the DIN rail mounting bracket. (Tightening torque: 1.8 to 2.3 N·m)
2. Engage the jaws with the DIN rail in order from (1) to (2).
3. Push in the direction of (3).
4. Tighten the DIN rail fixing screws. (Tightening torque: 1.2 to 1.6 N·m)

Mounting, installation and adjustment

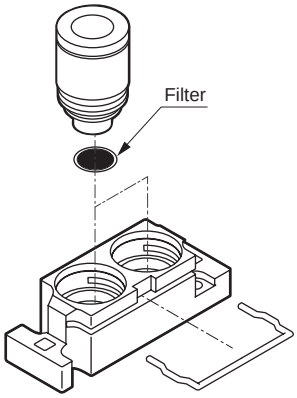
4. Port filter

⚠CAUTION

■ The port filter prevents the entry of foreign matter, and prevents problems from occurring in the valve. As this does not improve the quality of the compressed air, read Warnings and Precautions in the Introduction, then mount, install, and adjust the filter accordingly.
Do not detach or press down the port filter forcibly. The filter could deform, causing problems. If contaminants and foreign matters are found on the filter surface, blow them lightly, or remove them by tweezers, etc.



P-port filter (standard) example of embedding



A/B port filter option example of combination

5. Serial transmission device unit

⚠CAUTION

■ Be sure to shut off the power supply externally before installation and wiring. Failure to do so may result in electric shock or damage.

■ Check the rated voltage and terminal layout for correct wiring. If the connected power supply is not the rated voltage or wiring is wrong, fire or damage may occur.

■ Use the specified torque to tighten the waterproof connector and terminal screw. If tightening is done haphazardly, fire or malfunction may occur.

■ Do not bend or pull forcibly the communication cable and power cable connected to the unit.

■ Be sure to use the specified communication cable. Keep away from power lines and high-tension lines.

■ Do not use submerged in water.

Use/maintenance

1. Common

⚠CAUTION

■ Continuous energizing for long periods may accelerate degradation of the solenoid valve. Furthermore, use caution under the following working conditions, as with continuous energization:
· When energized time exceeds non-energized time in intermittent energizing
· When one energizing session exceeds 30 minutes in intermittent energizing
Consider heat dissipation when installing the product.

2. Valve replacement

⚠CAUTION

■ While replacing the valve, be careful not to drop the gasket and pilot check valve.

	Screw size	Proper tightening torque (N·m)
W4G2	M2.5	0.25 to 0.30

3. Manual override

⚠WARNING

General

■ This valve is an internal pilot operated. If air is not supplied to the P-port, the main valve will not be switched even if the manual override is operated.

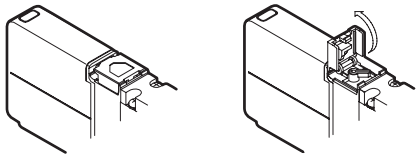
■ A manual protective cover is attached as standard. The protective cover is closed when shipped. Therefore, the manual override device cannot be seen when delivered. Open the protective cover to operate the manual override. Note that the protective cover will not close unless the locking manual override is released.

■ The manual override attached is standard for both the non-locking and locking. Holding down and turning the button locks the valve. Be sure to press down before rotating to lock. If manual override is turned without being pressed down, it could be damaged or air could leak.

■ How to open and close manual protection cover

Do not excessively force the manual protective cover when opening and closing it. Excessive external force could cause failures. (Below 5 N)

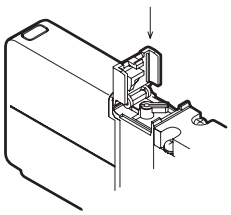
W4G2 Series Rotation



■ How to operate manual override

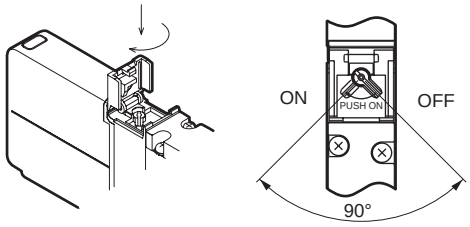
● Push non-locking operation

Push straight on the center of the axis of the manual button in the direction of the arrow, until it stops. Release to cancel.



● Push/locking operation

Push and hold the button and turn it 90° in the direction of the arrow. The function is not canceled even when the button is released.



■ When conducting manual operations, make sure that there are no people near the operating cylinder.

⚠CAUTION

■ Manual override with OFF function

Pilot air supply when energized is stopped forcibly, allowing you to switch the main valve even when power is applied. In addition, be careful as when the OFF function is used, the cylinder will immediately operate with 2-position single or 3-position ABR connection and PAB connection.

Output port destination correspondence chart

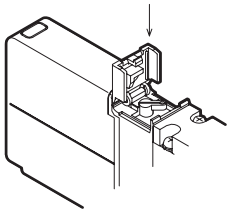
Solenoid position			OFF function (energized, manual override)		Non-energized, manual
			No operation	Operation	Operation
2-position	Single	Sol energized→ a	4(A)	2(B)	—
	Double	Sol energized→ a	4(A)	4(A)	2(B)
		Sol energized→ b	2(B)	2(B)	4(A)
3-position	All ports closed	Sol energized→ a	4(A)	4(A)	2(B)
		Sol energized→ b	2(B)	2(B)	4(A)
	ABR connection	Sol energized→ a	4(A)	—	2(B)
		Sol energized→ b	2(B)	—	4(A)
	PAB connection	Sol energized→ a	4(A)	4(A)/2(B)	2(B)
		Sol energized→ b	2(B)	4(A)/2(B)	4(A)

* Push non-locking operation for manual override on de-energized side

■ How to operate the manual override with OFF function

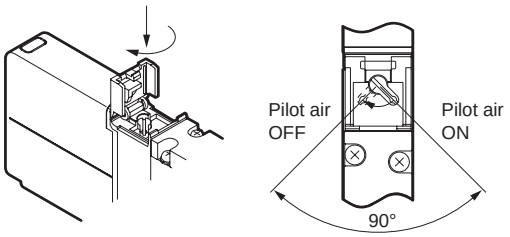
● Normal use (push/non-locking operation)

Push straight on the center of the axis of the manual button in the direction of the arrow, until it stops. Release to cancel.



● Using the OFF function (when energized, push/locking operation)

Push and hold the button and turn it 90° in the direction of the arrow. The function is not canceled even when the button is released.



■ When conducting manual operations, make sure that there are no people near the operating cylinder.

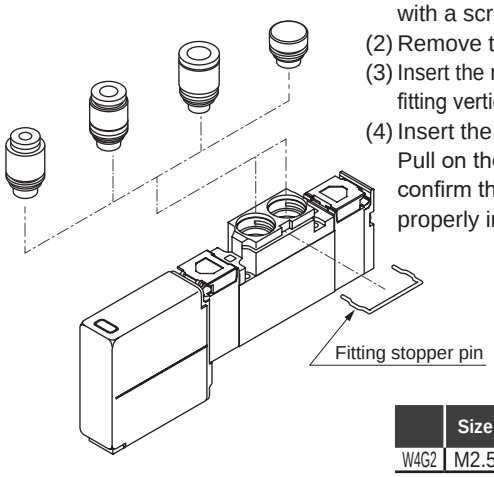
Use/maintenance

4. How to replace cartridge fitting

⚠CAUTION

■ Check procedures before changing the push-in fitting size. If installed incorrectly, or if the tightening of the mounting screw is insufficient, air leakage could occur.

■ Body piping (A)

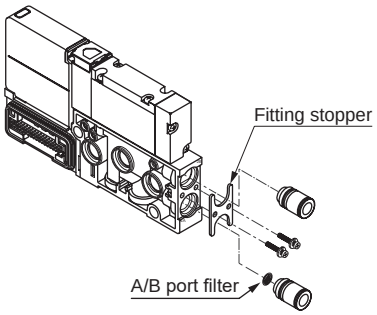


(1) Remove the stopper pin with a screwdriver.
(2) Remove the fitting.
(3) Insert the replacement fitting vertically to the end.
(4) Insert the stopper pin. Pull on the fitting to confirm that it is properly installed.

	Size	Tightening torque (N·m)
W4G2	M2.5	0.25 to 0.30

■ Base side piping (B)

■ Base bottom piping (Z)



(1) Remove the mounting screw.
(2) Pull out the stopper plate and fitting together.
(3) Align the groove of the replacement fitting with the stopper plate and assemble them temporarily.
(4) Assemble the stopper plate with the fitting, and tighten the mounting screw. Pull on the fitting to confirm that it is properly installed.

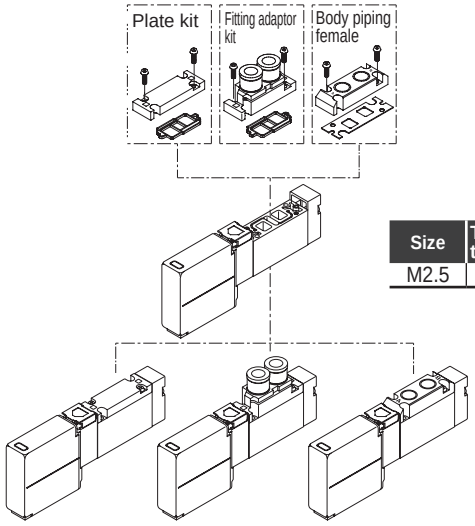
Model No. of cartridge push-in fitting

Part name	Model No.
ø4 straight	4G2-JOINT-C4
ø6 straight	4G2-JOINT-C6
ø8 straight	4G2-JOINT-C8
ø6 elbow	4G2-JOINT-CL6, CLL6
ø8 elbow	4G2-JOINT-CL8, CLL8
Plug cartridge	4G2-JOINT-CPG

5. How to change the piping connection

⚠CAUTION

■ When replacing the plate or fitting adaptor on the body, changing the body piping and base piping, or changing the push-in fitting and female thread of body piping, be sure to use an appropriate tightening torque since air may leak if the mounting screws are loose.



Size	Tightening torque (N·m)
M2.5	0.25 to 0.30

Plate kit

Kit model No.	Set parts
4G2-PLATE-KIT	Plate (1), gasket (1), mounting screw (2)

Fitting adaptor kit

Part name		Kit model No.	Set parts
ø4 fitting adaptor kit	For NC	4G2-JNT-ADAPTOR-KIT-C4NC	Fitting adaptor
	For NO	4G2-JNT-ADAPTOR-KIT-C4NO	Push-in fitting (2) (NC, NO: 1)
		4G2-JNT-ADAPTOR-KIT-C4	(NC, NO: Plug cartridge 1)
ø6 fitting adaptor kit	For NC	4G2-JNT-ADAPTOR-KIT-C6NC	Gasket
	For NO	4G2-JNT-ADAPTOR-KIT-C6NO	Stopper pin
		4G2-JNT-ADAPTOR-KIT-C6	Mounting screws (2)
ø8 fitting adaptor kit	For NC	4G2-JNT-ADAPTOR-KIT-C8NC	
	For NO	4G2-JNT-ADAPTOR-KIT-C8NO	
		4G2-JNT-ADAPTOR-KIT-C8	

Female thread adaptor kit

Kit model No.	Set parts
4G2-FML-ADAPTOR-KIT	Female thread adaptor (1), gasket (1), mounting screw (2)

6. Serial transmission device unit

⚠CAUTION

- Do not touch the terminals and connectors while power is applied. There is a risk of electric shock.
- Shut the power OFF externally before cleaning or tightening the screws.
- Do not disassemble or modify this product. Doing so may result in damage or malfunction.