Safety Precautions

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

Product-specific cautions: Pilot operated 5-port valve W4G4 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

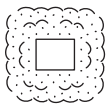
Note: IP65 is based on the following testing method.

■ IEC (International Electrotechnical Commission) standards (IEC60529 [IEC529:1989-11])

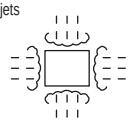
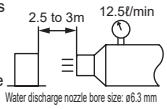
IP - □ □

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.	The sample (exterior) is exposed to water jetting of 1 m³ per minute for a total of 3 minutes or more from all directions with the testing equipment in the figure below. 

2. Surge suppressor

⚠ CAUTION

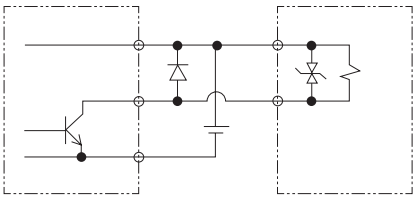
■ The surge suppressor attached with the solenoid valve is intended to protect the output contacts for the solenoid valve drive. There is no significant protection for the other peripheral devices, and devices could be damaged or could malfunction due to a surge. As well, surges generated by other devices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

● The surge suppressor functions to limit a voltage surge in the solenoid valve, 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.

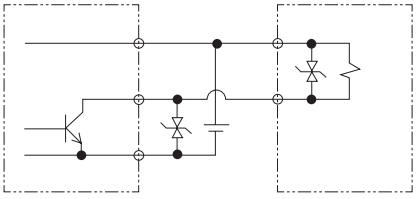
Specification voltage	Inverse voltage when OFF
12 VDC	Approx. 27 V
24 VDC	Approx. 47 V

● 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]



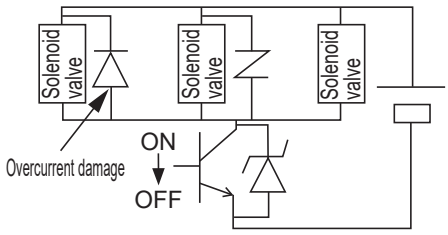
[Output transistor protection circuit: Installation example 2]



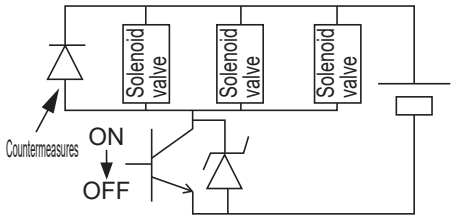
Design/selection

- 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 indicators. 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.

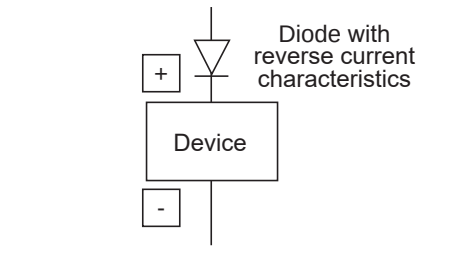
Example of malfunction



Countermeasure example



Countermeasure example for inverse voltage



- The surge suppressor incorporated in the solenoid valve will often be short-circuited if it is damaged by an excessive voltage or current from the 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.

3. Partition plug

- The partition plug is not capable of separating the pilot flow path. Use a partition block when separating the pilot flow path.

4. Exhaust cleaner

⚠CAUTION

- Details of the exhaust cleaner are also listed in “Pneumatic/Vacuum/Auxiliary Components General (Catalog No. CB-024SA)”.

Mounting, installation and adjustment

1. Common

⚠CAUTION

■ Port displays

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

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
Pilot air supply port	12/14	PA
Pilot exhaust port	82/84	PR

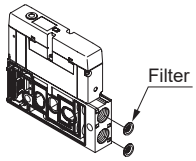
● There is no restriction in valve mounting orientation. Confirm the port codes and arrange the piping so that there are no reversed operations of the cylinder, etc.

2. Port filter

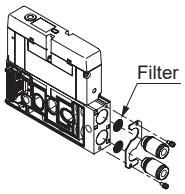
⚠CAUTION

■ 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.

A/B port filter example of embedding



Female thread



Cartridge fitting

3. Spacer regulator

⚠CAUTION

■ After pressure adjustment, in order to prevent the adjusting screw from becoming loose, fix the screw by tightening the hexagon nut.

4. Exhaust cleaner

⚠CAUTION

■ Install so that the exhaust cleaner is on the bottom side.

Use/maintenance

(1) Valve replacement

⚠CAUTION

■ When replacing the valve, install the valve so that the gasket does not fall out.

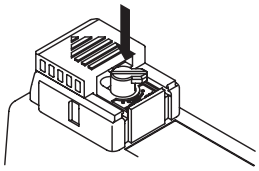
Mounting bolt	Screw size	Allen wrench size	Proper tightening torque (N·m)
Hexagon socket head cap screw	M4	Nominal 3	2.4 to 2.6

2. Manual override

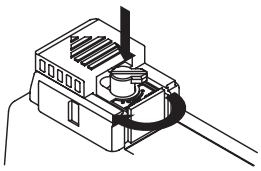
⚠WARNING

■ How to operate manual override

● Push & non-locking operation
Push straight on the center of the axis of the manual button.



● Push locking operation
By pressing the manual button till it hits the bottom and turning the button clockwise by 90 degrees, the button will lock.



■ When conducting manual operation, make sure that there are no people near the operating cylinder.
■ With the non-locking/locking shared type manual override, be sure to release the lock prior to normal operation. This may cause malfunction.
■ In the unlikely event that the product is damaged, discontinue use.

⚠CAUTION

■ When locking, if the button is turned without being pressed, be careful as this may cause damage to the manual controls.
■ Note that the protection cover will not close unless the lock is released.

3. Pilot air OFF function (M7)

⚠CAUTION

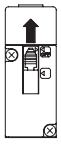
■ As the supply of pilot air when energized will be forced to STOP, it will be possible to switch the main valve even when the unit is energized.
In addition, be careful as when the OFF function is used, the cylinder will immediately operate with 2-position single or 3-position ABR connection and PAB connection.

Output port destination correspondence chart

Solenoid position			OFF function (energized, M7 switch)		Non-energized, manual
			No operation	Operation (OFF)	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)

■ How to operate the M7 switch

❶ When using the OFF function
Slide the M7 switch in the direction of the arrow until it stops. As it is locking, the OFF function will not be released even after the operator takes their hand off of the switch.



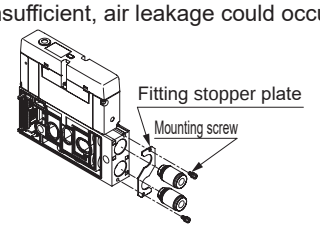
❷ During normal use
Always use upon returning the M7 switch to its original position.

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

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.



(1) Remove the mounting screw.
(2) Pull out the fitting stopper plate with the fitting.
(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. (Tightening torque 0.55 to 0.65 N·m)

Model No. of cartridge push-in fitting

Model	Part name	Model No.
W4G4	ø8 straight	4G4-JOINT-C8
	ø10 straight	4G4-JOINT-C10
	ø12 straight	4G4-JOINT-C12

5. Exhaust cleaner

⚠CAUTION

■ Do not apply excessive force to the exhaust cleaner. This will lead to damage of the exhaust cleaner.