Safety Precautions

Be sure to read this section before use.

When designing and manufacturing equipment using CKD products, the manufacturer is obligated to ensure that the safety of the mechanism, pneumatic control circuit and/or water control circuit and the system that runs the electrical controls are secured.
It is important to select, use, handle and maintain CKD products appropriately to ensure their safe usage.
Observe warnings and precautions to ensure device safety.
Check that device safety is ensured, and manufacture a safe device.

WARNING

1 This product is designed and manufactured as a general industrial machine part.
It must be handled by an operator having sufficient knowledge and experience.

2 Use this product in accordance with specifications.

This product must be used within its stated specifications. In addition, never modify or additionally machine this product.
This product is intended for use in general industrial machinery equipment or parts. It is not intended for use outdoors (except for products with outdoor specifications) or for use under the following conditions or environments. (Note that this product can be used when CKD is consulted prior to its usage and the customer consents to CKD product specifications. The customer should provide safety measures to avoid danger in the event of problems.)

❶ Use for applications requiring safety, including nuclear energy, railways, aircraft, marine vessels, vehicles, medical devices, devices or applications in contact with beverages or foodstuffs, amusement devices, emergency cutoff circuits, press machines, brake circuits, or safety devices or applications.
❷ Use for applications where life or assets could be significantly affected, and special safety measures are required.

3 Observe organization standards and regulations, etc., related to the safety of the device design and control, etc.

ISO4414,JIS B 8370(Pneumatic fluid power - General rules and safety requirements for systems and their components)
JFPS2008(Principles for pneumatic cylinder selection and use)
Including the High Pressure Gas Safety Act, Industrial Safety and Health Act, other safety rules, organization standards and regulations, etc.

4 Do not handle, pipe, or remove devices before confirming safety.

❶ Inspect and service the machine and devices after confirming safety of the entire system related to this product.
❷ Note that there may be hot or charged sections even after operation is stopped.
❸ When inspecting or servicing the device, turn OFF the energy source (air supply or water supply), and turn OFF power to the facility. Discharge any compressed air from the system, and pay enough attention to possible water leakage and leakage of electricity.
❹ When starting or restarting a machine or device that incorporates pneumatic components, make sure to secure system safety, such as pop-out prevention measures.

5 Observe the warnings and cautions on the following pages to prevent accidents.

■ Precautions are ranked as “DANGER”, “WARNING”, and “CAUTION” in this section.

DANGER:	In the case where the product operation is mishandled and/or when the urgency of a dangerous situation is high, it may lead to fatalities or serious injuries.
WARNING:	A dangerous situation may occur if handling is mistaken, leading to fatal or serious injuries.
CAUTION:	A dangerous situation may occur if handling is mistaken, leading to minor injuries or property damage.

Note that some items indicated with “CAUTION” may lead to serious results depending on the conditions.
All items contain important information and must be observed.

Warranty

1 Warranty period

The product specified herein is warranted for one (1) year from the date of delivery to the location specified by the customer.

2 Warranty coverage

If the product specified herein fails for reasons attributable to CKD within the warranty period specified above, CKD will promptly provide a replacement for the faulty product or a part thereof or repair the faulty product at one of CKD's facilities free of charge.

However, following failures are excluded from this warranty:

1) Failure caused by handling or use of the product under conditions and in environments not conforming to those stated in the catalog, the Specifications, or the Instruction Manual.
2) Failure caused by use of the product exceeding its durability (cycles, distance, time, etc.) or caused by consumable parts.
3) Failure not caused by the product.
4) Failure caused by use not intended for the product.
5) Failure caused by modifications/alterations or repairs not carried out by CKD.
6) Failure caused by reasons unforeseen at the level of technology available at the time of delivery.
7) Failure caused by acts of nature and disasters beyond control of CKD.

The warranty stated herein covers only the delivered product itself. Any loss or damage induced by failure of the delivered product is excluded from this warranty.

Note: For details on the durability and consumable parts, contact your nearest CKD sales office.

3 Compatibility check

The customer is responsible for confirming the compatibility of CKD products with the customer's systems, machines and equipment.

Precautions for export

1 Security Trade Control

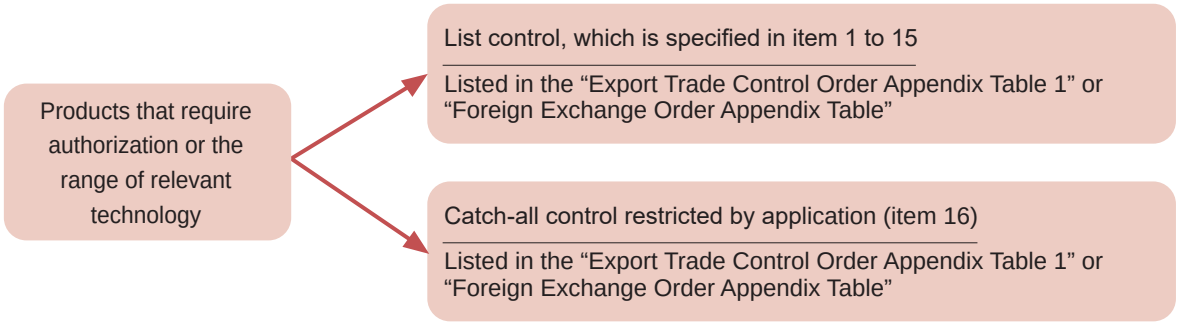
The products in this catalog and their related technologies may require approval before export or provision.

For the sake of maintaining world peace and safety, there may be cases in which approval under the Foreign Exchange and Foreign Trade Control Law is required in advance, depending on the country to where the product or related technology is being exported or provided.

The scope of products and related technologies requiring approval are listed in the Export Trade Control Order Appendix Table 1 or Foreign Exchange Order Appendix Table.

The Export Trade Control Order Appendix Table 1 and Foreign Exchange Order Appendix Table contain the following two types of information.

· "List controls" specified for items 1 to 15
· "Catch-all controls" that do not indicate specifications by item, but restriction by application (Section 16)



An application for approval is received by the Security Export Licensing Division of the Ministry of Economy, Trade and Industry or local bureaus of the Ministry of Economy, Trade and Industry.

2 Products and related technologies in this catalog

The products and related technologies in this catalog are subject to the catch-all control of the Foreign Exchange and Foreign Trade Control Law.

When exporting or providing the products or related technologies in this catalog, ensure that they are not used for arms or weapons.

3 Contact

Contact your local CKD Sales Office for information on the Security Trade Control of products and related technologies in this catalog.

Design/selection

1. Checking the specifications

WARNING

■ Use the product in the range of conditions specified for the product.

The product in this catalog is designed for use only in a compressed air system. Use with pressure or temperature exceeding the specifications range may result in damage or operation faults. (Refer to specifications) Contact CKD when using fluids other than compressed air.

2. Safety design

WARNING

■ Understand the characteristics of compressed air before designing a pneumatic circuit.

- The same functions as the mechanical, hydraulic, and electrical methods cannot be anticipated if instantaneous stopping and holding are required during an emergency stop.
- Pop-out, air discharge, or leakage due to air compression and expansion may occur.
- The supply and exhaust of the valve must operate simultaneously. When the supply is operated in advance, the actuator switching will be delayed. When the exhaust is operated in advance, the actuator speed will be uncontrollable, causing the popping out phenomenon.

■ Make sure that the switching signals of the 2-position and 3-position double solenoids are never energized at the same time.

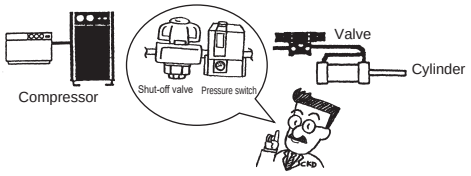
■ When using a 3-position all ports closed valve with a custom stroke, the properties of compressed air make it impossible to brake at an accurate position. In addition, as valves and cylinders, etc., are designed to allow small volumes of air leakage, pressure retention applications are not available, as they may cause the stop position to change or cause a pressure drop.

■ Pay attention to the electric circuit during emergency stop and to the cylinder operation during power outages.

- If the 2-position double solenoid is started and then switched, it will hold that status unless a reverse operation electrical signal is input.

■ Install a “pressure switch” and “shut-off valve” on the device’s compressed air supply side.

- The pressure switch will disable operation until the set pressure is reached. The shut-off valve releases compressed air into the pneumatic pressure circuit to prevent accidents caused by operation of pneumatic components under residual pressure.



■ Do not constrict the air supply piping.

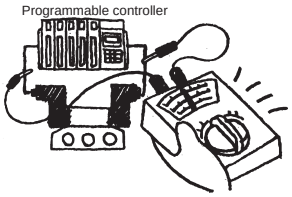
- A drop in pressure due to simultaneous operation of multiple stations may cause malfunctions.

■ Take measures to prevent physical harm or property damage in the event of failure of this product.

CAUTION

■ Check for leakage current to avoid malfunction caused by leakage current from other fluid control components.

- When using a programmable controller, leakage current may affect the solenoid valve and cause malfunction. Note that the values that are affected by leakage current depend on the solenoid valve.



Using 100 VAC	3.0 mA or less (*1)
Using 200 VAC	1.5 mA or less
Using 12 VDC	1.5 mA or less (*2)
Using 24 VDC	1.8 mA or less (*2)

*1: 1.2 mA or less for the 4G Series.
*2: 1.0 mA or less with the MN4S0 series, 4S0 series, and 3M0 series.

■ Observe the following precautions when using nylon tubes or urethane tubes for piping material.

- Use flame-resistant tubes or metal steel pipes in an environment where spattering may occur.
- Use hydraulic hose when piping is for both hydraulic and pneumatic use.
- When using the standard push-in fitting on the spiral tube, fix the base of the tube with a hose clamp. Rotation may occur, causing a reduction in holding force.
- Use a fastening fitting in a high-temperature atmosphere. The push-in fitting cannot be used.

3. Working environment

WARNING

■ Confirm before use that the product will withstand the working environment.

- This product cannot be used in an atmosphere containing corrosive gas, chemical liquids, solvents, water or steam. If water, oil, or metal chips (spatter or cutting chips, etc.) could come in contact with the product, provide appropriate protection.
- Consult with CKD if ozone is generated in the supplied air. (Ozone-proof products are available.)
- Products other than explosion-proof solenoid valves cannot be used in an atmosphere containing explosive gas.

■ Install the product where it will not be exposed to rain, water, direct sunlight, or high temperatures.

(The explosion-proof 4F ** OE series and outdoor 4F-W series are available for outdoor use.)

■ Do not use this product in a corrosive environment.

Use in such an environment could lead to damage or operation failure.

⚠CAUTION

■Use clean air.
- If compressed air contains chemicals, synthetic oils containing organic solvents, salt, or corrosive gas, do not use as it can cause damage and/or operation failure.

4. Durability

⚠WARNING

■Decide on a method of lubricating pneumatic components, and provide correct maintenance.
- Is it a no-lubrication?
- Is it a lubrication?

Specify either of the above for control of lubricant.

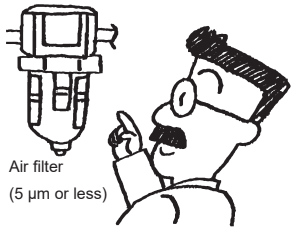
■Ultra dry air is not suitable for pneumatic components.
- Ultra dry compressed air will shorten the life of pneumatic components. For use, be sure to use a solenoid valve for DC voltage drive.

■Continuous energizing during use may accelerate degradation of the solenoid valve. Contact CKD when using the solenoid valve under such conditions.
- When using a product with continuous energization, be sure to use items with DC voltage specifications or fluoro rubber specifications.

5. Pneumatic source

⚠CAUTION

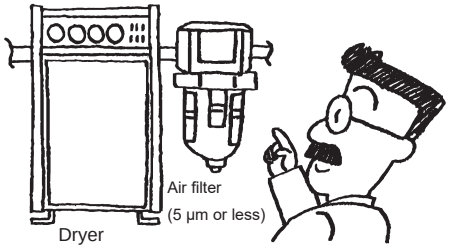
■Install a pneumatic filter just before the pneumatic component in the circuit.



■Do not supply anything other than compressed air.

■Use clean compressed air that does not contain corrosive gases.

■Use dry compressed air that does not cause moisture inside the piping.



- Moisture will occur if the temperature drops in the pneumatic piping or pneumatic components.
- Operation faults could occur if moisture enters the air flow path of pneumatic components and temporarily blocks passage.
- Moisture could cause rust, making the pneumatic components fail.
- The drain will flush the lubricant oil and cause a lubrication defect.

■Use compressed air that does not contain oil oxides, tar, carbon, etc., from the air compressor.
- If oil oxides, tar, or carbon enter the pneumatic components and solidify, resistance at the sliding section will increase, leading to operation failure.
- If the supplied lubricant mixes with oil oxides, tar, carbon, etc., the sliding section of the pneumatic component could be worn down.

■Use compressed air that does not contain solid foreign matter.
- Any solid foreign matter in the compressed air can enter the pneumatic components and cause wear or locking in the sliding parts.

6. Usage method

⚠WARNING

■ Do not narrow the exhaust port of the manifold valves.

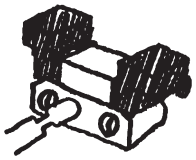
● There may be cases where other cylinders are subject to unintended operation due to back pressure generated from the exhaust of the switching valve. In this case, individually install a manifold two-sided exhaust type or a single exhaust spacer equipped type with the valve causing the situation.

⚠CAUTION

■ Make sure that the instantaneous energizing/ manual override of the double solenoid 2 position valve is 0.1 seconds or more.
However, as the cylinder may malfunction due to secondary side load conditions, it is recommended that energizing/manual override is performed until the cylinder reaches the stroke end position.

■ For manual override of the push type, push the manual override straight.

■ Do not use the product with the air supply port throttled or released to atmospheric pressure.



Do not restrict the air supply port!

● With the internal pilot, the supply pressure may drop lower than the specified range and cause malfunctioning. In this case, use the external pilot.

■ Continuous energizing for long periods may accelerate degradation of the solenoid valve. Consult with CKD when energizing this device continuously.
Furthermore, use caution under the following working conditions, as with continuous energization:
- When performing continuous energizing for a long period of time or when the energized time in a single day will be longer than the non-energized time

Install with an eye to heat dissipation.

■ With the internal pilot solenoid valve, turn the power ON after applying the supply pressure.
The main valve may stop at an unintended position and prevent proper switching.

7. Securing of space

⚠CAUTION

■ Secure sufficient space around the solenoid valve for installation, removal, wiring, and piping work.

8. Clearly indicated in the instruction manual

⚠CAUTION

■ Indicate the maintenance conditions in the device's instruction manual.

● The product's performance may drop too low to maintain an appropriate safety level depending on usage conditions, working environment and maintenance status. With correct maintenance, the product functions can be used to the fullest.

Mounting, installation and adjustment

1. Installation

⚠ WARNING

■ When mounting a valve, do not use a mounting method that relies on support from the piping.
- Mount and fix the valve body.

■ After mounting, do not clean or paint with water or solvent.
- Otherwise some resin parts may be damaged.
- Paint could plug the pilot exhaust port and result in malfunctions.

■ Do not narrow the exhaust port to a smaller one than the bore size of the piping connection port. (The pilot exhaust port is also included as an exhaust port)
- Either attach a silencer or install a solenoid valve so that the exhaust port is facing downwards.
  A suctioning effect may be generated at the exhaust port due to valving element operations and cause the intake of foreign matter near the exhaust port.
  If the exhaust port is facing upwards, foreign matter may fall into it.
- The actuator will not operate correctly if the exhaust air is not discharged smoothly. With the manifold, the exhaust air may prevent the correct operation of other solenoid valves.

■ Do not block the pilot exhaust port (PR port).
- Pilot pressure will not be discharged and will fail to operate.

■ Remove the valve packaging and dust-proof seal of the piping port just before starting piping.
- Removing the dust-proof seal of the piping port before the piping work starts could allow foreign matter to enter the valve from the piping port and cause failure or misoperation.

■ Check that tubing is not worn or damaged.
- Tubing could collapse, rupture, or become dislocated.

2. Pre-operation confirmation

⚠ CAUTION

■ When supplying compressed air after connecting pipes, do not suddenly apply high pressure.
- The pipe connection could dislocate, causing the pipe tube to fly out, leading to accidents.
- Caution: If compressed air is supplied too slowly, sealing pressure may not be generated depending on the internal sealing mechanism of the solenoid valve and may cause air leakage.

■ As air leakage may occur when compressed air is supplied with the two 3-port valves integrated (differential pressure return) without piping to the output port, be sure to supply the compressed air after piping the output port.

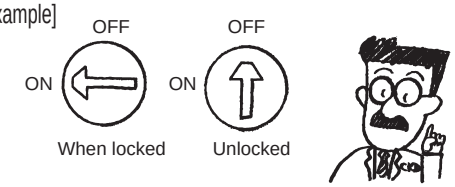
■ Before supplying compressed air after connecting pipes, check that there are no air leaks at any pipe connections.
- Apply a leakage detection agent to pipe connections with a brush and check for air leaks.

3. Adjustment

⚠ WARNING

■ When the manual operation device of the solenoid valve has been operated, always be sure to operate the device after reset to the origin (default position). Be sure to check that the non-locking has automatically returned or that the locking is in a state where the lock is released (OFF state).

[Example]



Note: As this varies depending on the model, refer to the pages of each model for operation methods.

- The solenoid valve will operate as soon as the pneumatic source power is turned ON, which is hazardous.
- When the manual override device is used for operation at the operating position, abnormal operation is a risk.

4. Piping

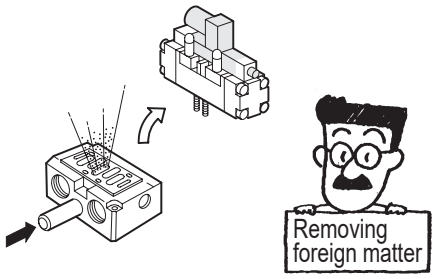
⚠CAUTION

■When connecting pipes, wrap sealing tape in the opposite direction from the threading, from the inside position to within 2 mm from the pipe end.

● If sealing tape protrudes from the pipe threads, it could be cut when screwing the bolts in. This could cause the tape to enter the solenoid valve, causing failures.

■Always flush just before piping pneumatic components.

● Any foreign matter that has entered during piping must be removed so it does not enter the pneumatic components.



■Use appropriate torque to tighten the pipes when connecting them.

● The purpose is to prevent air leakage and damage to bolts.
First tighten the bolts by hand to ensure that the threads are not damaged, then use a tool.

Port thread	Tightening torque N·m
M3	0.3 to 0.6
M5	1.0 to 1.5
Rc 1/8	3 to 5
Rc 1/4	6 to 8
Rc 3/8	13 to 15
Rc 1/2	16 to 18
Rc 3/4	19 to 36
Rc 1	32 to 42

■When piping to the product
Properly connect pipes by confirming the piping port position with the display, etc., on the product. Incorrect piping may cause irregular operation of the actuator.

■Connect piping so that connections are not dislocated by equipment movement, vibration, or tension.

● Control of actuator speed will be disabled if piping on the exhaust side of the pneumatic circuit is disengaged.
● When using the chuck holding mechanism, the chuck may be released, creating a hazardous state.
● Cut the push-in fitting tube at right angles with a dedicated tool.
● Confirm that the tube has been inserted properly, and make sure that there is no tension during use. The tube could be dislocated or damaged if there is any tension.

■Make sure that there is no torsion, tension or moment load applied to the fitting or the tube.

■Use the designated tube.

● Particularly in the case of super-flexible urethane tubes, attach insert sleeves for use.

■Securely insert the tube to the tube end, and make sure that the tube cannot be pulled off.

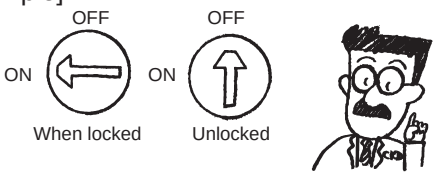
■Cut the tube with a dedicated cutter and always at a right angle.

Use/maintenance

1. Maintenance and inspection

WARNING

■ When the manual operation device of the valve has been operated, always be sure to operate the device after reset to the origin (default position). Be sure to check that the non-locking has automatically returned or that the locking is in a state where the lock is released (OFF state).
[Example]

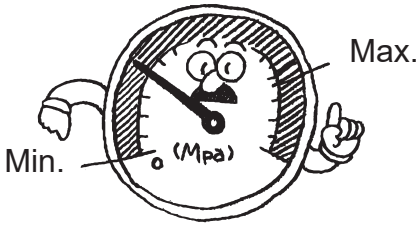


Note: As this varies depending on the model, refer to the pages of each model for operation methods.

- The solenoid valve will operate as soon as the power is turned ON, which is hazardous.
- When the manual override device is used for operation at the operating position, abnormal operation is a risk.

■ Conduct daily inspections and regular inspections to ensure that maintenance control is done correctly.
- If maintenance is not correctly managed, the product's functions could deteriorate markedly and lead to a shortened service life, faults and accidents.

1. Pressure management of supplied compressed air pressure
- Is the set pressure supplied? Does the pressure gauge indicate the set pressure while the equipment is operating?



2. Control of pneumatics filter
- Is the drain correctly discharged?
  Is the bowl or element clean enough to use?

3. Control of compressed air leaks from piping connections
- Is the state of the connection, especially at movable sections, normal?

4. Valve operational status control
- Are operations delayed? Is exhaust normal?

5. Control of pneumatic actuator operation
- Is operation smooth? Is the end stop state normal?
  Is coupling with the load normal?

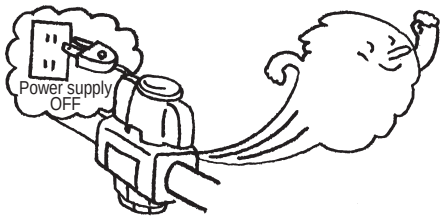
6. Lubricator control
- Is the oil volume adjustment normal?

7. Lubricant control
- Is the lubricant that is being supplied an official item?

2. Removal

WARNING

■ Before conducting maintenance, turn the power OFF, stop the supply of compressed air and make sure that there is no residual pressure.
- Observe the conditions to ensure safety.



3. Disassembly/assembly

WARNING

■ Read the relevant product's instruction manual thoroughly and fully familiarize yourself with the task before disassembling or assembling the solenoid valve.
- Personnel must be fully familiar with solenoid valve structure and operational principles and safety requirements.
- Pneumatic Pressure Skill Test Class 2 or higher level is required.

4. Pneumatic source

CAUTION

■ The no-lubrication function cannot be maintained once lubrication has been applied to a no-lubrication valve.
Once lubrication has been applied, it will be necessary to continue lubricating the valve.
- Decide on lubrication or no-lubrication for the pneumatic components and ensure that implementation of the corresponding method is properly managed.
- With the lubrication method, lubricants other than class 1 turbine oil ISO VG32 (no additives) cannot be used.

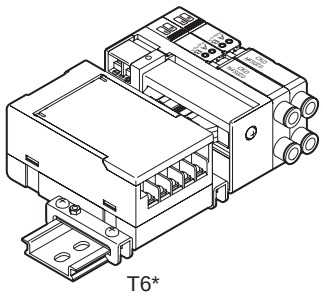
⚠ CAUTION

Install the wiring while sufficiently checking the polarity, voltage, and terminal numbers.

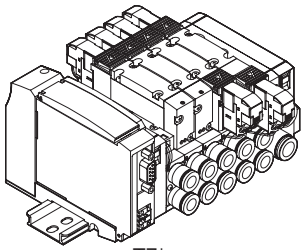
- A voltage drop may occur due to simultaneous energizing or cable length.
  Confirm that the voltage drop for the solenoid is within 10% of the rated voltage.

Serial transmission (T6*, T 7*, For T8*)

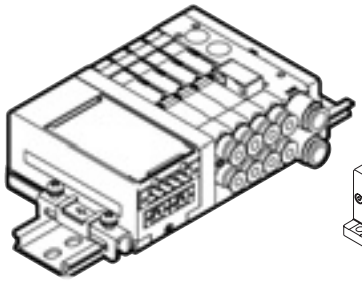
- The working voltage is 24 VDC dedicated.
- If operation may be affected by noise, wire the power supply independently for each manifold solenoid valve when possible.
- Keep the power supply cable as short as possible.
- Do not share power with an inverter or a component causing motor noise, etc.
- Do not lay the power wire, signal wire, and other power cables in parallel.
- The device units are dedicated for each manufacturer. There is no compatibility.
- For how to wire the device unit, follow the instructions provided from the PLC manufacturer. The terminal numbers of the device unit are displayed on the attachment side of the device unit.
- For information regarding the PLC, please contact the corresponding PLC manufacturer. Contact CKD for inquiries regarding the UNIWIRE system and SAVE NET.
- When installing a manifold solenoid valve vertically, install the device unit at the top end.
- For the T8* Series, be sure to use a waterproof cap and waterproof plug for connectors that the input/output device unit does not use.



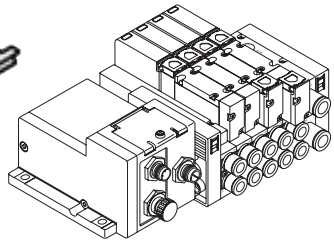
T6*



T7*
(4G Series)



T7*
(MN4E Series)



T8*
(W4G2 Series)

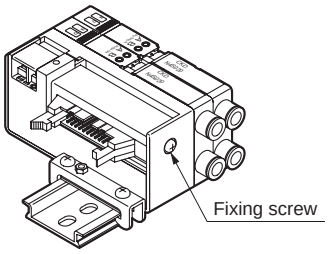
(2) Connector (T50, T50A)

- As it is necessary to match the signal arrangement of the PLC output unit with the signal arrangement on the valve side, direct connections with a PLC are currently limited. Connect with reference to the wiring connection examples (MN4E Series: page 949, M4G$^{A}_{B}$/MN4G$^{A}_{B}$ Series: page 835, MN4S0 Series: page 1220). For the cables, use dedicated cables for each PLC manufacturer.
- Working voltage is 24 VDC, 12 VDC dedicated.
- When connecting the T50, T50A type to a general output unit, use the + terminal (20, 10) of the 20P connector as the + side common, and use the NPN transistor output open collector type for the drive circuit. Contact CKD when using the PNP transistor output.
- Do not connect this solenoid valve to the input unit as major Breakdowns could occur in this Component and in peripherals. A malfunction may occur. Connect this solenoid valve to the output unit. Although common connectors are employed with the input units and output units of the relay terminal series of OMRON and Panasonic Electric Works Co., Ltd., the pin arrangement and polarity of the power supply are different. The pin arrangement of the T50 type of this solenoid valve is the same pin arrangement as the above output unit.

⚠ CAUTION

■ Install so that no force is applied to the connector section.The fixing screws may loosen if force is applied to the connector section.

- The connector rotates upwards and sideways.Further fasten the fixing screws after installation of the solenoid valve can fix the connectors.
- Make sure that the tightening torque of the fixing screws is 0.3 to 0.36 N・m.



Reduced wiring valve / product-specific cautions (MN4E, M(N)4G$^{A}_{B}$, MW4G2, MW4G4, MN4S0, M(N)4TB Series)

CAUTION

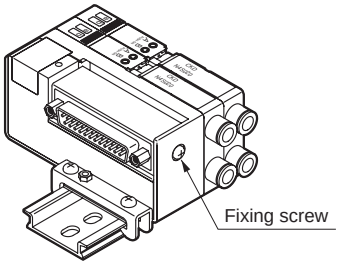
(3) Connector (T30, T31, T51, T52, T53, TM*)

- These models are dedicated for use with a working voltage of 12 and 24 VDC.
- Use the 4S0 Series with the + common.

CAUTION

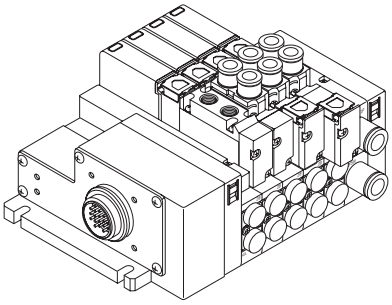
■ Install so that no force is applied to the connector section. The fixing screws may loosen if force is applied to the connector section.

- The connector rotates upwards and sideways. Further fasten the fixing screws after installation of the solenoid valve can fix the connectors.
- Make sure that the tightening torque of the fixing screws is 0.3 to 0.36 N·m.



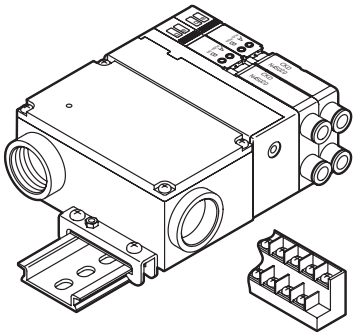
(5) Multi-connector (T20)

- Be sure to disconnect the power supply before inserting/ removing the connectors.
- Plug the connectors in all the way to ensure that the lock is engaged.

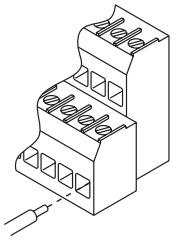


(4) Terminal block (T10, 11)

- Install the terminal block in a location that is out of reach or place a cover on the unit.



T10 terminal appearance



T11 terminal appearance

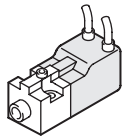
Electrical connection list (Discrete valve/individual wiring manifold)

* Refer to Intro Pages 30 to 33 for reduced wiring manifolds.

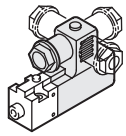
● Selection of electrical connections, manual operating devices, and options ■ : Yes

	Series	Description Page	Voltage (V) (Power consumption W)	Electrical connections				
2, 3-port valve	**3QB** Series **3QR** Series *1: Some models differ depending on the specifications.	1552 1558	Standard *1 12 VDC (2.0 W) 24 VDC (1.8 W)	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	
	3M Series	1591	Standard 24 VDC (0.6 W) Option 12 VDC (0.6 W) 6 VDC (0.9 W) 5 VDC (0.9 W)	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	
	Miniature pneumatic valve series **P/M/B51$^{2}_{3}$** *1: The A-connector is only supported with manifolds.	1633	Standard 100 VAC (1.8/1.4 W) 200 VAC (1.8/1.4 W) (50/60 Hz) 12 VDC (1.8 W) 24 VDC (1.8 W)	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	*1	28	29	
	3P Series *1: Some models in the 3P series differ in part.	1607	Standard *1 100 VAC (1.8/1.4 W) 200 VAC (1.8/1.4 W) (50/60 Hz) 24 VDC (1.8 W) Option 110 VAC (50/60 Hz) 220 VAC (50/60 Hz) 12 VDC	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	
	4K Series **(3KA1)**	1257	Standard 100 VAC (1.8/1.4 W) 200 VAC (1.8/1.4 W) (50/60 Hz) 24 VDC (1.8 W) Option 110 VAC (50/60 Hz) 220 VAC (50/60 Hz) 12 VDC	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	
4, 5-port valve	Miniature pneumatic valve series Discrete valve **W2P51*** **P/B5142** Individual wiring manifold **B*5142** **N*5142**	1633	Standard 100 VAC (1.8/1.4 W) 200 VAC (1.8/1.4 W) (50/60 Hz) 12 VDC (1.8 W) 24 VDC (1.8 W)	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	
	4S0 Series	1231	Standard 24 VDC (0.6 W) Option 12 VDC (0.6 W) 6 VDC (0.9 W) 5 VDC (0.9 W)	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	
	4K Series	1257	Standard 100 VAC (1.8/1.4 W) 200 VAC (1.8/1.4 W) (50/60 Hz) 24 VDC (1.8 W) Option 110 VAC (50/60 Hz) 220 VAC (50/60 Hz) 12 VDC	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	
	4F Series	1365	Standard 100 VAC (1.8/1.4 W) 200 VAC (1.8/1.4 W) (50/60 Hz) 24 VDC (1.8 W) Option 110 VAC (50/60 Hz) 220 VAC (50/60 Hz) 12 VDC (4F0, 4F1 standard)	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	

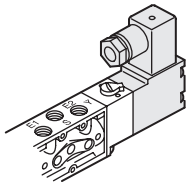
1 Grommet lead wire
Circuit diagram ⓐ



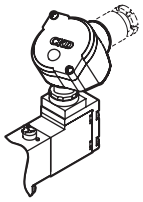
6 Compact terminal box
None (B)
Circuit diagram ⓑ



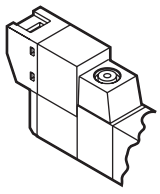
11 DIN terminal box
None
Circuit diagram ⓐ



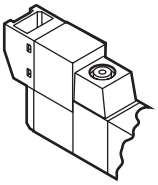
16 Round terminal box with light + Ground (A-15a) equipped
Circuit diagram ⓕ



21 C-connector
None (B) (C) (D)
Circuit diagram ⓖ



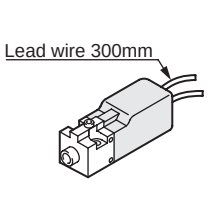
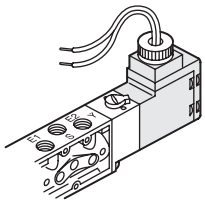
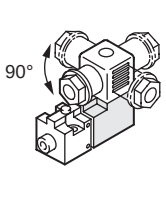
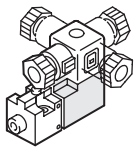
26 D-connector
None (B) (C) (D)
Circuit diagram ⓖ

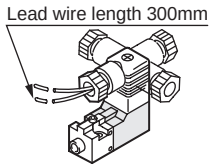
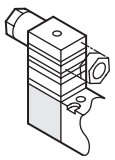
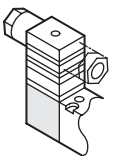
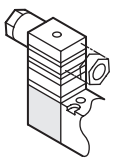


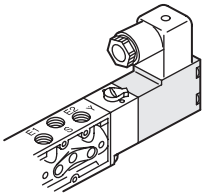
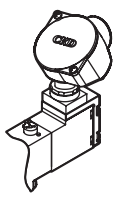
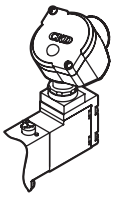
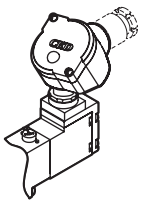
Refer to the next page for circuit diagrams ⓐ to ⓗ.

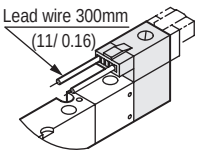
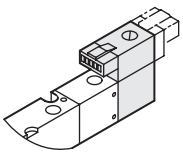
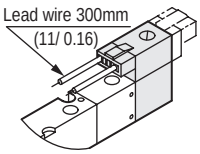
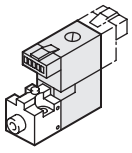
Electrical connections (wiring method)

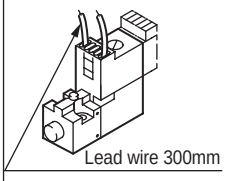
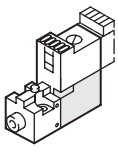
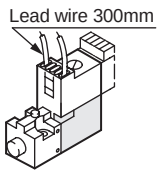
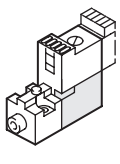
(None): Without lead wire (A): With lead wire (B): With indicator lamp
(C): With surge suppressor (D): Without socket

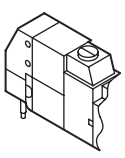
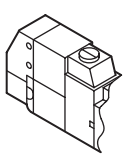
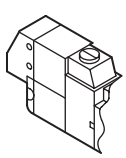
2	3	4	5
Grommet lead wire (C) Circuit diagram ⓑ	Conduit lead wire Circuit diagram ⓐ	Compact terminal box (G1/4) (None) Circuit diagram ⓐ	Compact terminal box (None) (B) Circuit diagram ⓒ
			

7	8	9	10
Compact terminal box (A) (B) Circuit diagram ⓓ	Terminal box (None) Circuit diagram ⓐ	Terminal box (None) (B) Circuit diagram ⓒ	Terminal box (None) (B) (C) Circuit diagram ⓒ
			

12	13	14	15
DIN terminal box (None) (B) Circuit diagram ⓒ	Round terminal box (G1/2 / G3/4) Circuit diagram ⓔ	Round terminal box (B) Circuit diagram ⓕ	Round terminal box + Ground (A-15a) equipped Circuit diagram ⓔ
			

17	18	19	20
C-connector (A) Circuit diagram ⓐ	C-connector (None) Circuit diagram ⓐ	C-connector (A) (B) (C) Circuit diagram ⓖ	C-connector (None) (B) (C) Circuit diagram ⓖ
			

22	23	24	25
D-connector (A) Circuit diagram ⓐ	D-connector (None) Circuit diagram ⓐ	D-connector (A) (B) (C) Circuit diagram ⓖ	D-connector (None) (B) (C) Circuit diagram ⓖ
			

27	28	29
A-connector (A) (B) (C) Circuit diagram ⓖ	A-connector (B) (C) Circuit diagram ⓖ	A-connector (D) (B) (C) Circuit diagram ⓖ
		

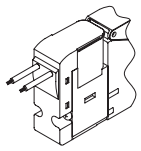
Refer to the next page for circuit diagrams of the electrical connections.

Electrical connection list (Discrete valve/individual wiring manifold)

● Selection of electrical connections, manual operating devices, and options ▭ : Available

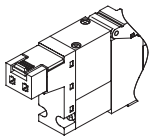
	Series	Page	Voltage (V) (Power consumption W)	Electrical connections					
3-port valve	**3QE** Series	1546	100 VAC 24 VDC 12 VDC 3 VDC 5 VDC	31	32	33	34	35	36
				37	38	39	40	41	42
				43	44	45			
3, 5-port valve	**4G1 to 3** Series **MN4G** Series	7 225	100 VAC 200 VAC 24 VDC (0.6 W) 12 VDC (0.6 W)	31	32	33	34	35	36
				37	38	39	40	41	42
				43	44	45			
	4G4 Series	697	100 VAC 110 VAC 24 VDC (1.0 W) 12 VDC (1.0 W)						
	W4G2 Series	965	100 VAC 24 VDC (0.6 W) 12 VDC (0.6 W)	31	32	33	34	35	36
				37	38	39	40	41	42
				43	44	45			
5-port valve	**W4G4** Series	1111	100 VAC 110 VAC 24 VDC (1.2 W) 12 VDC (1.2 W)	31	32	33	34	35	36
				37	38	39	40	41	42
				43	44	45			
	PV5G Series	1471	100 VAC 200 VAC 110 VAC 220 VAC 24 VDC (1.2 W) 12 VDC (1.2 W)	31	32	33	34	35	36
				37	38	39	40	41	42
				43	44	45			
	PV5 Series	1499	24 VDC (1.2 W)	31	32	33	34	35	36
				37	38	39	40	41	42
				43	44	45			
3, 4-port valve	**MN4E0** Series	863	24 VDC (0.6 W) 12 VDC (0.6 W)	46	47				
	MN4S0 Series	1191		48					

31 Grommet lead wire Ⓐ Circuit diagram ⓐ

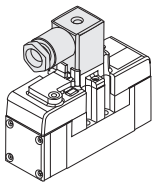


Note) AC voltage is not available.

37 E-connector with socket/terminal Ⓑ Ⓒ Circuit diagram ⓖ

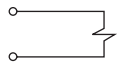


44 DIN terminal box Ⓑ Ⓒ

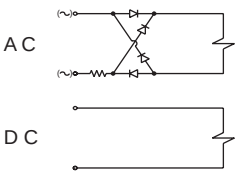


Circuit diagram

a Basic

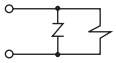


* With the 4G1 to 3 Series

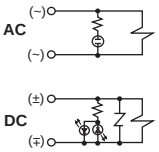


* Grommet lead wire for DC only

b With surge suppressor

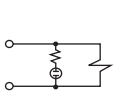


c With indicator lamp

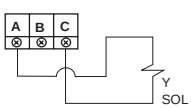


The DC model has a surge suppressor

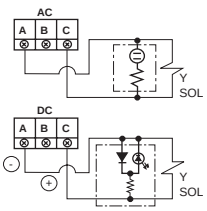
d Compact terminal box/with lamp



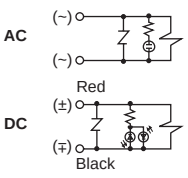
e Round terminal box/basic



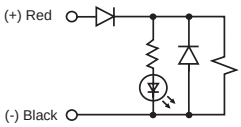
f Round terminal box/with lamp



g With surge suppressor and indicator lamp



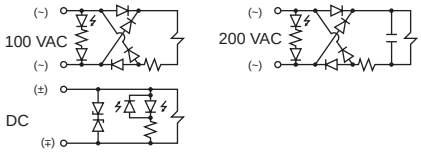
* For 4SO/4S1



* Note that models with surge suppressor and lamp have polarity.
* Diode is used as a surge suppressor.

g With surge suppressor and indicator lamp, cont.

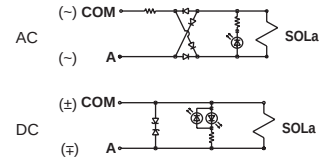
* For 4G1 to 3 Series



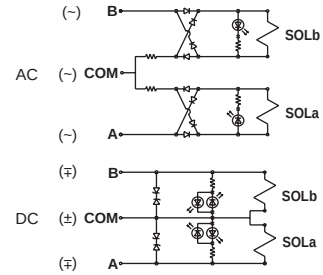
* A-connector for DC only

* For W4G2 Series

(Single)



(Double)



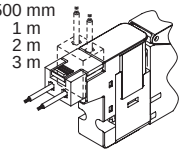
For circuit diagrams of ⓐ, ⓖ, and ⓗ, refer to the circuit diagrams of the following table.

Electrical connections (wiring method)

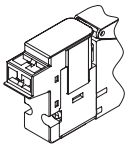
(None): Without lead wire Ⓐ: With lead wire Ⓑ: With indicator lamp
Ⓒ: With surge suppressor Ⓓ: Without socket

32 E-connector Ⓐ Circuit diagram ⓐ

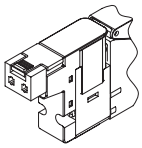
● **Lead wire length**
300 mm
500 mm
1 m
2 m
3 m



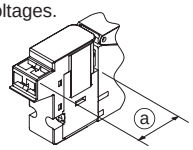
33 E-connector Ⓓ Circuit diagram ⓐ



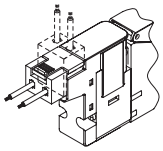
34 E-connector With socket/terminal



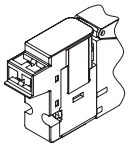
● For AC voltages, the ⓐ dimension is 3.5 mm longer than for DC voltages.



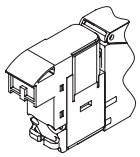
35 E-connector ⒶⒷⒸ Circuit diagram ⓖ



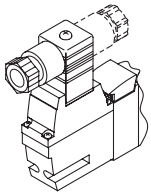
36 E-connector ⒷⒸⒹ Circuit diagram ⓖ



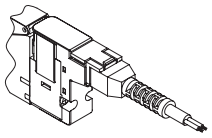
38 A-connector (downward) Ⓓ Circuit diagram ⓖ



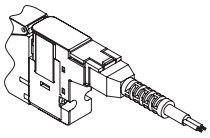
39 DIN terminal box ⒷⒸ Circuit diagram ⓗ



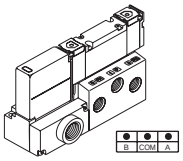
40 EJ type connector with cover Ⓐ Circuit diagram ⓐ



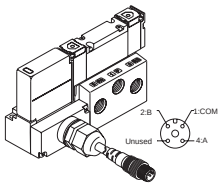
41 EJ type connector with cover ⒶⒷⒸ Circuit diagram ⓗ



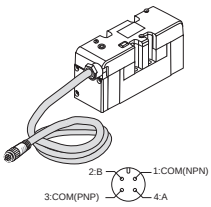
42 Terminal block Ⓑ Ⓒ Circuit diagram ⓖ



43 I/O connector ⒶⒷⒸ Circuit diagram ⓖ

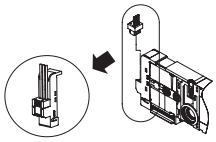


45 I/O connector ⒶⒷⒸ



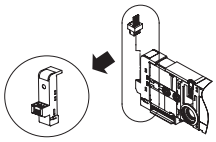
46 Individual wiring D-connector D* ⒶⒷⒸ Circuit diagram ⓖ

*** MN3E0/MN4E0 only**



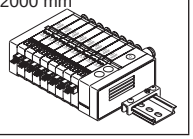
47 Individual wiring D-connector socket None, with socket/terminal D* ⒶⒷⒸ Circuit diagram ⓖ

*** MN3E0/MN4E0 only**



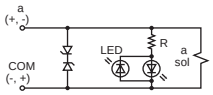
48 Individual wiring connector with lead wire C ⒶⒷⒸ Circuit diagram ⓖ

● **Lead wire length**
C : 300 mm
C0: 500 mm
C1:1000 mm
C2:2000 mm

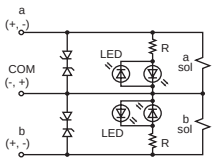


h DIN terminal box with surge suppressor/lamp

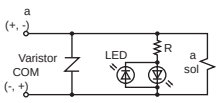
* With the MN4E Series
(Single)



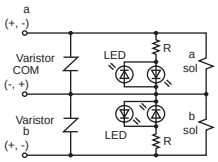
(Double)



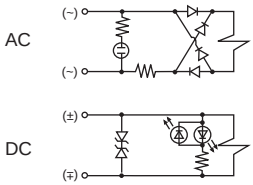
* For MN4S0 Series
(Single)



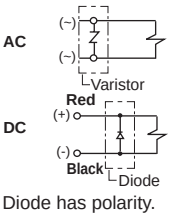
(Double)



* With the 4G Series

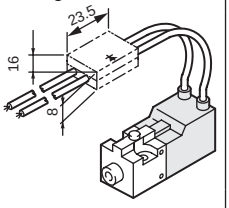


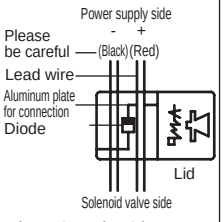
i Optional surge suppressor attached (AC/DC)



Diode has polarity.

Surge suppressor included
Use a surge suppressor when controlling the unit with semiconductors.
Use a lead wire that is 20/0.18.
With the DC model, only the grommet lead wire is the suppression type in the figure below.

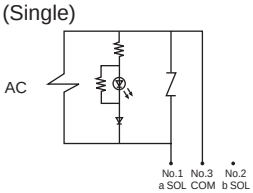




The AC and DC/B types have a varistor.
(There is no polarity.)

j DIN terminal box with surge suppressor/lamp

(Single)



(Double)