Fluid Control Components: Warnings and Cautions

Refer to the "General Purpose Valves (No.CB-03SA-1)" for precautions on general fluid control components. Be sure to read this section before use.

Product-specific cautions: Direct acting 2-port solenoid valve CXU10-FAB3, CXU30-FAB4U
Pilot kick 2-port solenoid valve CXU30-ADK

Design/selection

1. Safety design

⚠WARNING

- This product cannot be used as an emergency shut-off valve.
  The valves listed in this catalog are not designed as valves to ensure safety such as emergency shutoff valves. When using in such a system, always take separate measures that will ensure safety.
- Take measures to prevent physical harm or property damage in the event of failure of this product.

⚠CAUTION

- Leakage current from other fluid control components
  When using a PLC with a CR circuit to absorb the surge voltage generated from a switching element, etc., the leakage current could adversely affect the operation of the solenoid valve. Keep leakage current to less than the value given in the safety precautions for each product in this catalog or the value given for each product.

2. Working fluid

⚠WARNING

- Quality of fluid
  Foreign matter such as rust or dirt in fluid causes operation faults or leaks, and lowers product performance. Provide measures to remove foreign matter.
- Fluid temperature
  Use the product within the fluid temperature range.

3. Working environment

⚠WARNING

- Only explosion-proof solenoid valves and air operated valves can be used in an explosive atmosphere. Explosion-proof solenoid valves are not available for air units.
  Select from General Purpose Valves (No. CB-03SA-1).
- When using with AC voltage, a thrumming noise may be heard depending on the working conditions.
  If the noise is a problem because of the working environment, select DC voltage.
- Do not use this product in a corrosive gas atmosphere or an atmosphere that could affect the component materials.
- Do not use this product near a heat generating source or in a location where it may be exposed to radiant heat.
- Use this product within the specified ambient temperature range.
- When using this product in a cold climate, take the necessary measures to prevent freezing. When wrapping insulation around the solenoid valve, etc., do not wrap around the coil section.
- Take appropriate safeguards according to the degree of protection listed in the catalog specifications.
- Take appropriate safeguards when using this product in places where oil or welding spatter, etc. could come in contact with it.

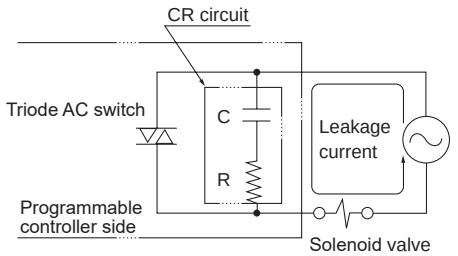
4. Securing of space

⚠CAUTION

- Securing maintenance space
  Secure sufficient space for maintenance and inspection.

5. Leakage current

- Leakage current from other fluid control components
  When operating the solenoid valve with a programmable controller, etc., check that the output leakage current from the programmable controller is within the following specifications.



Model No. \ Voltage	100 VAC	200 VAC	12 VDC	24 VDC
CXU10-FAB3 CXU30-FAB4U	6 mA or less	3 mA or less	1 mA or less	2 mA or less
CXU30-ADK	6 mA or less	3 mA or less	2 mA or less	1 mA or less

Mounting, installation and adjustment

1. Installation

⚠ CAUTION

- Always thoroughly read the instruction manual before installing this product.
- Do not apply external force to the coil during installation.
- After installation, check for leaks from pipes, for proper wire connections and that the product is installed correctly.

2. Piping

⚠ CAUTION

- If the pipe vibrates when the solenoid valve is opened and closed, securely fix the piping.
- The solenoid valve may chatter depending on the circuit. Contact CKD if chattering occurs.
- If the piping cross-sectional area on the fluid inlet is reduced, the operation may become unstable due to differential pressure failure during valve operation. The piping on the fluid inlet must have a size that matches the valve port size, and must have no restricted sections. (CXU30-ADK)

3. Wiring

⚠ CAUTION

- Use the products within the allowable voltage range. Usage outside the allowable voltage range may lead to malfunction or coil damage.
- Provide a circuit breaker, such as a fuse, on the control circuit to protect electrical equipment.
- If the electric circuit system is vulnerable to solenoid surge, use a solenoid with a surge suppressor (optional), or insert a surge absorber, etc., in parallel to the solenoid.
- As a guide, use a wire with a nominal cross section of 0.5 mm^2 or more. Make sure that excessive force is not applied to the lead wire.
- Use of a switching circuit which does not generate contact chattering will increase the durability of the solenoid valves and motor driven valves.

Use/maintenance

1. Maintenance and inspection

⚠ WARNING

- Do not touch coils or actuators with hands or body parts while the power is ON or immediately after it is turned OFF.
  The solenoid valve coil and actuator will heat up when energized. Depending on the product, direct contact could cause burns.
- Do not touch the electrical wiring connections (bare, live parts) with hands or body when they are energized. There is a risk of electric shock.
  Touching electrical wiring connections while power is on may lead to electrical shock.
- Use the product within the max. working pressure and max. operating pressure differential ranges.
- To ensure ideal use, inspect the product every six months. This frequency varies with the frequency of use.

⚠ CAUTION

- Do not use valves as footing or place any heavy objects on top of the valves.
- If you use the products under a continuously energized state or infrequently, contact CKD.
- If the product has been out of use for one month or more, perform a test run before starting the actual operation.
- Carefully read the instruction manual before starting maintenance.
- Always turn the power OFF and release any fluids or pressure before starting maintenance.
- Check for clogging of the filter.

Use/maintenance

2. Disassembly/assembly

⚠CAUTION

- When cleaning the product, use a low-polluting cleaning agent such as a neutral detergent. (Note that the rubber parts must be replaced. There is a risk of expansion.)
- Contact CKD with questions about repair parts, etc.
- The coil assembly set screws should be tightened to the following tightening torque for disassembly and assembly.

Model No.	Coil assembly set screw
CXU10-FAB3	1.1 to 1.8 Nm
CXU30-FAB4U	
CXU30-ADK	

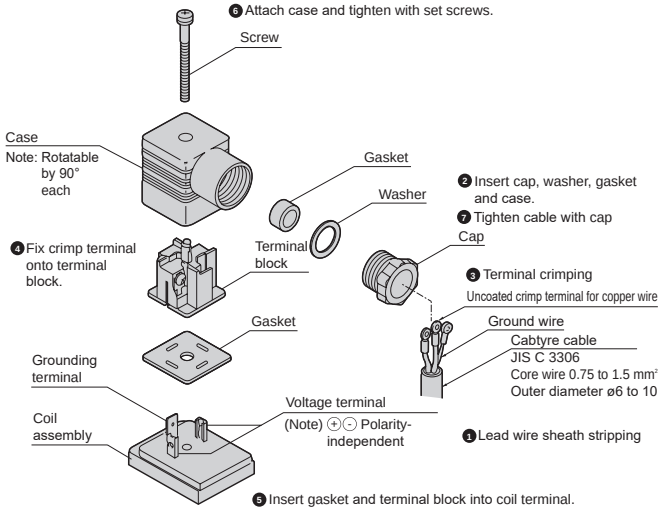
3. How to connect the terminal box

- DIN terminal box with lamp (Pg11)

(1) Use the following cabtyre cable.
- Cable O.D.: ø6 to ø10
- Nominal sectional area: 0.5 to 1.5 mm^2

(2) Put the crimp terminal for copper wire on the cabtyre cable's lead wire and crimp the terminal. The terminal box thread size is M3.

(3) Tighten the screws with the following tightening torque.
- Set screw tightening torque: 0.5 N·m
- Terminal screw tightening torque: 0.5 N·m



Wire with steps❶ to ❼.

* The orientation of the cord can be changed by removing the terminal block from the case, rotating it by 90°, and then replacing the block into the case.

4. Leakage

- Instantaneous leakage

With the pilot operated 2-port solenoid valve, if the pressure is suddenly applied when the pump starts while the valve is closed, the instantaneous valve may open causing fluid to leak. Caution is required during use.
(CXU30-ADK)

Fluid Control Components: Warnings and Cautions

Be sure to read this section before use.
Read safety precautions in “General Purpose Valves (catalog No. CB-03-1SA)” as well.

Product-specific cautions: Pilot operated 2-port solenoid valve for compressed air CXU10-EXA Series

Design/selection

1. Checking the specifications

⚠WARNING

■ Use the product in the range of conditions specified for the product.
Using this product with pressure or temperature outside the specifications range may result in damage or operation failure.
(Refer to specifications)
Contact CKD when using fluids other than compressed air.

■ Working fluids
Active gases cannot be used, so contact CKD when these applications are required.

■ If the product is used under conditions where the pressure differential between the primary side and secondary side while the valve is open is below 0.01 MPa, the diaphragm may vibrate, resulting in a short service life. When using under conditions where there is a chance that the differential pressure or flow rate can become very small as described below, it is recommended that the pilot air external exhaust be used. Contact CKD for details.
- When the primary or secondary side of solenoid valve has a needle valve
- When multiple solenoid valves connected in parallel piping are opened simultaneously (The drop in solenoid valve source pressure causes the pressure difference between the primary side and the secondary side to diminish.)

2. Safety design

⚠WARNING

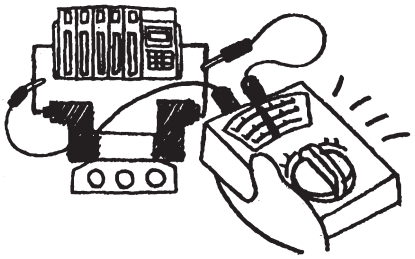
■ Take measures to prevent physical harm or property damage in the event of failure of this product.

⚠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.

Programmable controller



Using 100 VAC	2.0 mA or less
Using 24 VDC	1.8 mA or less

■ Observe the following precautions when using nylon tubes or urethane tubes for piping material.
- Use flame-resistant tubes where spatter could scatter.
- 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.

3. Working environment

■ Use clean air.
- Do not use the compressed air if it contains chemicals, synthetic oils containing organic solvents, salt, or corrosive gas, as it can cause damage and/or operation failure.
- The ozone content in the compressed air should be 0.1 ppm or less. A higher ozone content may cause malfunction and leakage.

■ Protection characteristics (IPX5) of DIN terminal box connection
IPX5 (IEC60529 (IEC529:1989-11)) standards are applied to the test. Avoid use in conditions where water or coolant directly contacts the valve.

Explanation of IPX5 protection characteristic codes and test method

● Degree of protection

Note: IP-X5 is based on the following testing method.

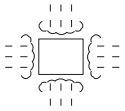
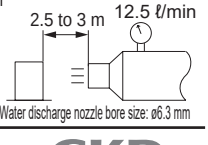
■ IEC (International Electrotechnical Commission) standards (IEC60529 [IEC529:1989-11])

IP- □ □

Degree of protection (International Protection)

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

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.	In the following testing device, water is sprayed at the exterior of the test piece at a rate of 1 m^2 per minute from every direction for a total of three minutes or longer. 

4. Durability

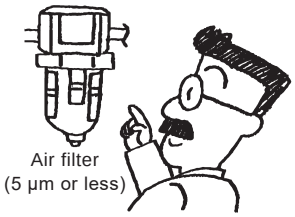
⚠WARNING

■ Using the solenoid valve with continuous energizing can cause a deterioration of performance. Contact CKD when using the solenoid valve under such conditions.

5. Pneumatic source

⚠CAUTION

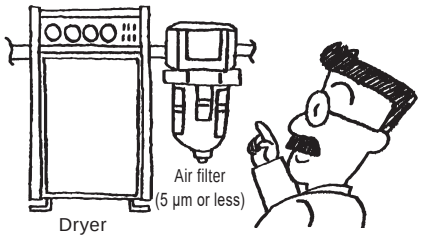
■ Install a pneumatic filter just before the pneumatic component in the circuit.



■ 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.

■ 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.

■ 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, locking, or internal leakage in the sliding parts.

6. Surge suppressor

⚠CAUTION

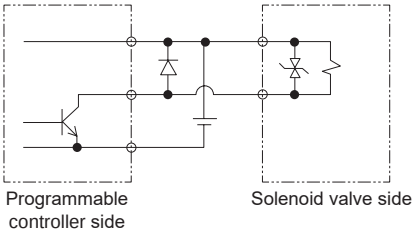
■ The surge suppressor enclosed within the solenoid valve is for protecting the output contact for that solenoid valve drive only. There is no significant protection for the other peripheral devices, and devices could be damaged or could malfunction due to a surge. As well, surges generated by other 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. CKD's solenoid valve with surge suppressor can counter inverse voltage surge which occurs when the valve is turned OFF to the level shown in the table below.

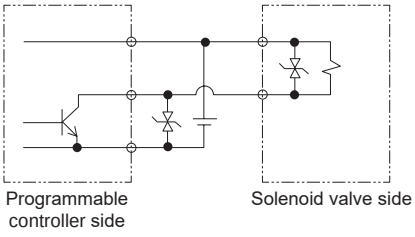
Specification voltage	Inverse voltage when OFF
24 VDC	Approx. 47V

- 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.

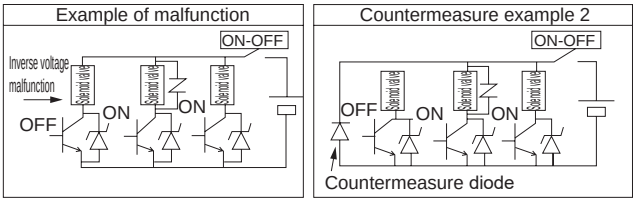
[Output transistor protection circuit: Installation example 1]



[Output transistor protection circuit: Installation example 2]



- 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 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.



- 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.

7. 100 VAC specifications

⚠CAUTION

■ The 100 VAC specification has an integrated full-wave rectifier circuit.

Depending on the type of 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.)

Mounting, installation and adjustment

1. Installation

⚠WARNING

■ After mounting, do not clean or paint with water or solvent.
● Otherwise some resin parts may be damaged.

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

■ 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.

■ Before supplying compressed air after connecting pipes, check that there are no air leaks at any pipe connections.
● Use the product after applying a leakage detection agent on pipe connections with a brush, and checking for air leaks.

3. Piping

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

4. Lead wire connection

⚠CAUTION

■ Connect the lead wire appropriately.

The following lead wire should be used:

Electro connect code	Description	Conductor size	Conduct X-sect area	Outer ø of insulator	Outer ø of covering
Blank	Grommet lead wire	AWG#24	0.22 or equiv.	1.42	-

5. DIN terminal box

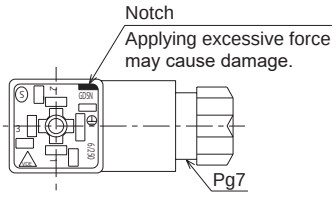
⚠WARNING

■ As there is a risk of electric shock when assembling or disassembling the terminal box, perform the assembly and/or disassembly after turning OFF the power supply.

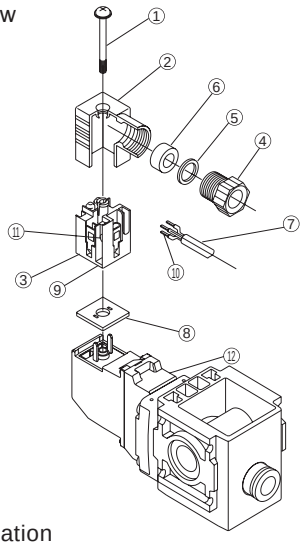
⚠CAUTION

■ Disassembly
● Loosen screw (1) and pull cover (2) in the direction of screw (1) to remove the connector from coil assembly (12).
● Pull out screw (1) from cover (2).
● Notch (9) (next to the GDSN mark) can be found at the bottom of terminal block (3). Insert a compact flathead screwdriver in the gap between housing (2) and terminal block (3) and pry to remove terminal block (3) from cover (2) (Refer to Fig. 1). Remove the terminal block without applying excessive force. There is a risk of damage.
● Remove cable gland (4) and take out washer (5) and rubber packing (6).

Fig. 1



Exploded view



■ Wiring

● Wiring preparation

- The applicable dimensions for cable (7) are as the VCTF2(3) core (bore size: ø3.5 to 7) defined in JIS C3306.
- The length of the lead wire stripping of the cable is 10 mm.
- Both stranded wires and solid wires can be used for wiring.
- When using a stranded wire, avoid connecting a pre-soldered wire.
- When using a crimp sleeve (10) at the end of the twisted wire, select H0.5/6 (0.3 to 0.5 mm^2) or H0.75/6 (0.75 mm^2) made by Weidmüller Japan, or an equivalent product. Crimp sleeves are not included.

● Wiring

- Pass cable (7) through cable gland (4), washer (5) and rubber packing (6) in this order, and insert it into cover (2).
- Connect to terminals 1 and 2. There is no polarity.
- The recommended tightening torque is 0.2 to 0.25 N·m.

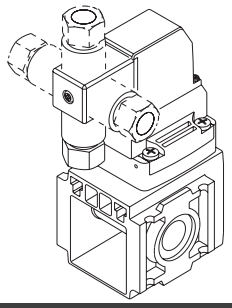
■ Assembly

● Set the wired terminal block (3) on cover (2). (Push in until it clicks.)
* The terminal block can be set in any of the four different directions (Fig. 2).

● Insert rubber packing (6) and washer (5) in this order into the cable through-hole in cover (2), and securely tighten cable gland (4).
Remarks: The recommended tightening torque for the cable gland is 1.0 to 1.5 N·m.
Pull the cable to check that it does not become loose.

● Place gasket (8) between the bottom part of terminal block (3) and the plug of coil assembly (12), insert the connector, insert screw (1) from over cover (2) and tighten it.
Remarks: The recommended tightening torque for screws is 0.2 to 0.25 N·m.

Fig. 2



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 the 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. Contact CKD when energizing this device continuously.

■ Instantaneous leakage
With the pilot operated 2-port valve, if the pressure is suddenly applied when the compressor starts while the valve is closed, the instantaneous valve may open causing fluid to leak. Caution is required during use.

■ Disassembly
Do not disassemble this valve.
Once disassembled, the valve may not retain its valve performance.

■ The coil and AC rectification stack generate heat while the valve is energized and immediately after energization. Do not touch these parts with your hands or other body parts.

■ Pressure differential
Under the following conditions, make sure to set the pressure so that the pressure differential while the valve is open does not drop below 0.01 MPa. If a pressure differential (between the primary side and secondary side) of at least 0.01 MPa cannot be secured while the valve is open, the diaphragm may vibrate, resulting in a short service life.

● When a needle valve is mounted on the secondary side

● When multiple solenoid valves connected in parallel piping (module and manifold connection) are opened simultaneously (The drop in source pressure causes the pressure difference between the primary side and the secondary side to diminish.)

● If sufficient pressure differential between the primary side and the secondary side cannot be secured while the valve is open, or if the pressure difference is unknown, the pilot air external exhaust is recommended. Contact CKD for details.

■ Note that the secondary side pressure is retained when the primary side pressure drops below the secondary side pressure while the solenoid valve is open. (While the solenoid valve is closed, fluid flows from the secondary side to the primary side.)

■ When installing the valve, make sure that no tension is applied to the coil lead wire.

■ When carrying the product, hold the body.
(Do not dangle the product from the lead wire when carrying it.)

■ When the regulator and solenoid valve are directly coupled, the parts could mutually vibrate, causing resonance and chattering.

■ If the piping cross-sectional area on the fluid inlet is reduced, the operation may become unstable due to differential pressure failure during valve operation. For the fluid supply side, use piping of a piping size that matches the port size of the valve.

■ Depending on the conditions of your usage, the operation of the solenoid valve may become unstable after being left unattended for an extended period of time. Always perform a test run before using the product for actual operations.

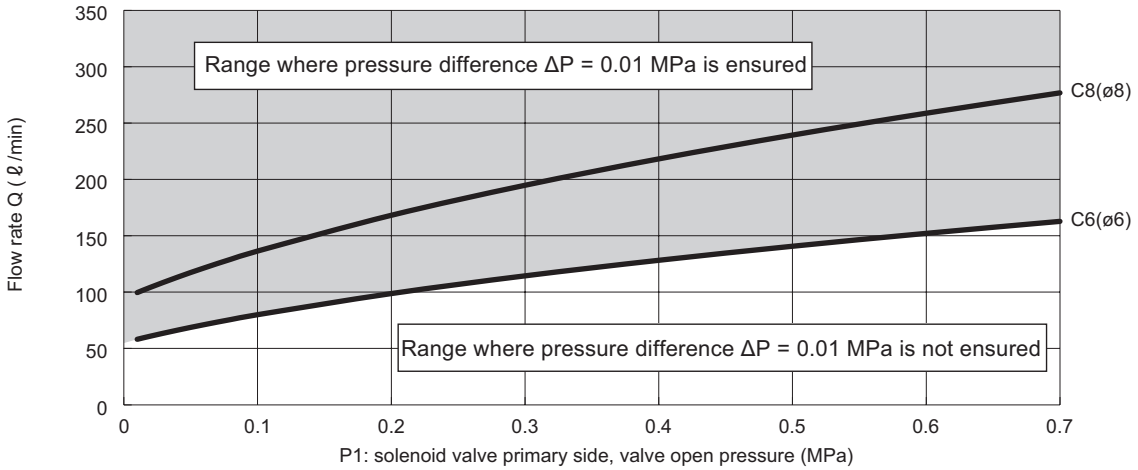
■ Avoid using the product for applications that involve continuous fitting rotation or oscillations. Fittings may become damaged.

Use/maintenance

2. CXU10-EXA standard product Internal exhaust specifications: Ensuring the min. working pressure differential

Relevant model No.: CXU10-$^{EXA}_{GEXA}$-[port size] -0 [coil option] -[voltage code]

This pilot operated solenoid valve opens and closes based on differential pressure before and after the solenoid valve. Hence, a pressure difference (ΔP = P1 - P2) of at least 0.01 MPa must be ensured for accurate operation of the valve. If pressure differential ΔP cannot be secured, the diaphragm may vibrate upon use, resulting in a short service life. Pressure difference ΔP is determined by the flow rate Q that flows through the solenoid valve. The larger the flow rate Q is, the greater the pressure difference ΔP will become. The guideline values for the "flow rate required" for ensuring a pressure difference ΔP of at least 0.01 MPa while the valve is open are as shown in the figure below.



(1) When selecting a product, check the above figure to make sure that the necessary pressure difference ΔP is secured with the required flow rate.

(2) Note that, particularly in the following cases, the required pressure differential ΔP and flow rate may not be secured:
- When flow rate is reduced before/after the solenoid valve by using a needle valve, nozzle, or long piping
- When air supply on the primary side of the solenoid valve is low (insufficient regulator capacity, a throttling section, long piping, etc.)
- When air consumption of a component sharing the air supply source (regulator, etc.) on the primary side of the solenoid valve increases constantly or temporarily.
- When the flow rate changes/decreases due to the fluctuation of the source pressure of the air supply on the primary side of the solenoid valve
- When multiple solenoid valves are opened simultaneously

(3) When operating a manifold with multiple valves opened simultaneously, be sure to select components so that the following flow rate will be ensured.
Operation flow rate/solenoid valve × No. of valves opened simultaneously = Required operation flow rate < supply flow rate.

(Example) If P1= 0.3 MPa when 1 solenoid valve is open, the flow rate that can be ensured when the pressure difference ΔP=0.01 MPa is approximately 110 ℓ/min (operation flow rate). When 3 manifolds are opened simultaneously, 110 ℓ/min×3 manifold stations = 330 ℓ/min (operation flow rate) < the supply flow rate.

(4) If the required operation flow rate cannot be secured, or if the flow rate cannot be checked, consider the use of the pilot air external exhaust (custom-made product) or contact CKD.

3. Pilot air external exhaust specifications

■. With the custom-made product, a small amount of pilot air is released outside of the product when the valve opens based on solenoid valve operation. Before using the product, consider the impact of the externally exhausted fluid on the ambient environment. Fluid exhaust sounds are audible while the valve is operating. This is not a malfunction.

Pneumatic components

Safety Precautions

Be sure to read this section before use.
Refer to "Pneumatic Valves (No.CB-023SA)" for general precautions on valves.

Product-specific cautions: Pilot operated 5-port valve CXU30-4G2R Series / Shut-off 3-port solenoid valve CXU30-VE

Design/selection

1. Surge suppressor

⚠CAUTION

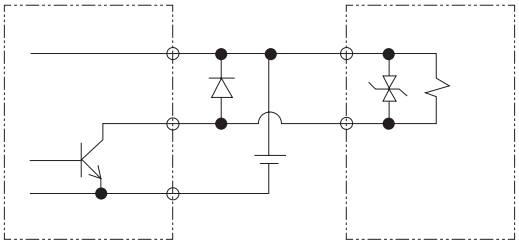
■ The surge suppressor enclosed within the solenoid valve is for protecting the output contact for that solenoid valve drive only. There is no significant protection for the other peripheral devices, and devices could be damaged or could malfunction due to a surge. As well, surges generated by other 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. CKD's solenoid valve with surge suppressor can counter inverse voltage surge which occurs when the valve is turned OFF to the level shown in the table below.

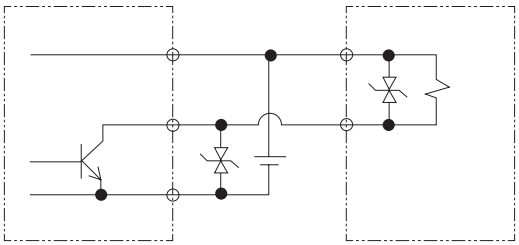
Specification voltage	Inverse voltage when OFF
24 VDC	Approx. 47 V

● 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.

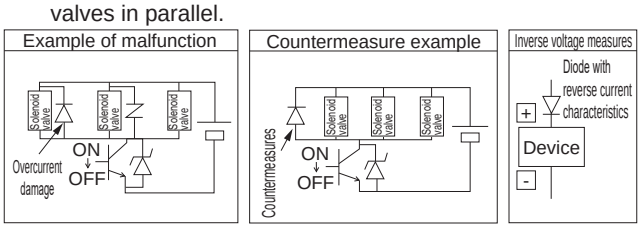
[Output transistor protection circuit: Installation example 1]



[Output transistor protection circuit: Installation example 2]



● 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 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.



● 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.

2. 100 VAC specifications

⚠CAUTION

■ The 100 VAC specification has an integrated full-wave rectifier circuit. Depending on the type of 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. Exhaust check valve

⚠CAUTION

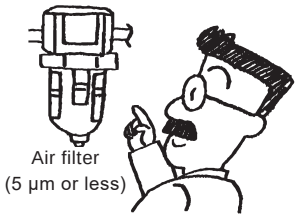
■ The exhaust check valve is a check valve. Note that when operating the cylinder rod directly without pressurization, the check valve opens and the cylinder rod does not move. (CXU30-4G2R)

- The solenoid valve for 2-position single, 2-position double and 3-position ABR connection mounted to CXU30-4G2R is provided with the "exhaust check valve" as standard.
- With components that are affected by a small amount of leakage or pressure of low sliding cylinders, etc., the functions may not operate properly.
- If you do not need the release check valve, contact CKD. Otherwise, choose a gasket "4G2R-GASKET" which is not equipped with a release check valve.

4. Pneumatic source

⚠CAUTION

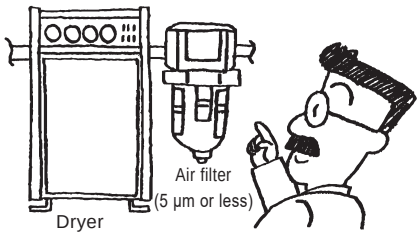
■ Install a pneumatic filter just before the pneumatic component in the circuit.



■ 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.

■ 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.

■ 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, locking, or internal leakage in the sliding parts.

5. How to use

⚠WARNING

■ The 3(R) port is a dedicated exhaust port. Do not apply any pressure or use in a way that causes negative pressure to form here.

⚠CAUTION

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

- The supply pressure may drop out of the operating range resulting in malfunction.

Mounting, installation and adjustment

1. Lead wire connection

⚠ CAUTION

■ Lead wire standards differ depending on the type of electrical connections. Connect wires according to the lead wire to be used.

Electro connect code	Description	Conductor size	Conduct X-sect area	Outer ø of insulator
E□	E-connector (with lead wire)	AWG#26	0.13 or equiv.	1.3

For electrical connections, check that tension by lead wires is not applied to the solenoid valve coil.

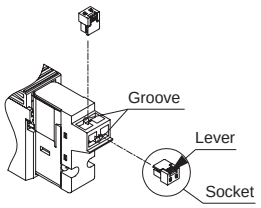
2. How to use E-connector

⚠ CAUTION

■ The E-connector has top and side connectors to which sockets can be connected. The socket assembly is enclosed with shipment. Select the connection direction based on the installation environment.

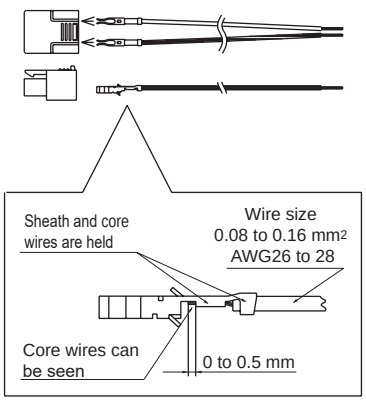
■ How to mount and remove socket

- When mounting the socket, hold the lever and socket with fingers and insert straight into the square window on the connector body. Align the lever finger with the groove on the connector body and lock it. When mounting from the top, position the socket so that the lever faces the front. When mounting from the side, position the socket so that the lever is in an upward direction.
- When pulling out the socket, press down the lever to release its finger from the groove, then pull straight out.



■ How to connect lead wire

- Strip the end of the lead wire by about 3 mm. Align the end of core wires, insert them into the contact terminal, and crimp with a crimp tool. When crimping, check that both the sheath and core wires are held, and 0 to 0.5 mm of the core wire end is visible.
- After crimping, position the contact terminal as shown below, and insert into the square window on the socket. The terminal locks when it is inserted to the end. After inserting, pull the terminal lightly to check that it is locked.



3. DIN terminal box

⚠ WARNING

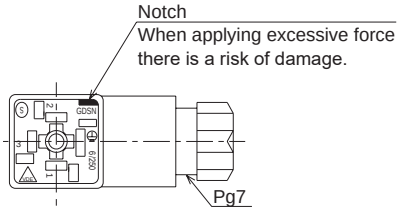
■ As there is a risk of electric shock when assembling or disassembling the terminal box, perform the assembly and/or disassembly after turning OFF the power supply.

⚠ CAUTION

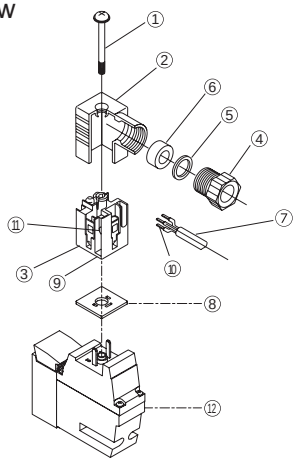
■ Disassembly

- Loosen screw (1) and pull cover (2) in the direction of screw (1) to remove the connector from coil assembly (12).
- Pull out screw (1) from cover (2).
- Notch (9) (next to the GDSN mark) can be found at the bottom of terminal block (3). Insert a compact flathead screwdriver in the gap between housing (2) and terminal block (3) and pry to remove terminal block (3) from cover (2) (Refer to Fig. 1). Remove the terminal block without applying excessive force. There is a risk of damage.
- Remove cable gland (4) and take out washer (5) and rubber packing (6).

Fig. 1



Exploded view



■ Wiring

- Wiring preparation
  - · The applicable dimensions for cable (7) are the VCTF2(3) core (ø3.5 to 7) defined in JIS C3306.
  - · The length of the lead wire stripping of the cable is 10 mm.
  - · Both stranded wires and solid wires can be used for wiring.
  - · When using a stranded wire, avoid connecting a pre-soldered wire.
  - · When using a crimp sleeve (10) at the end of the twisted wire, select H0.5/6 (0.3 to 0.5 mm^2) or H0.75/6 (0.75 mm^2) made by Weidmüller Japan, or an equivalent product. Crimp sleeves are not included.
- Wiring
  - · Pass cable (7) through cable gland (4), washer (5) and rubber packing (6) in this order, and insert it into cover (2).
  - · Connect to terminals 1 and 2. There is no polarity.
  - · The recommended tightening torque is 0.2 to 0.25 N·m.

Mounting, installation and adjustment

■ Assembly

● Set the wired terminal block (3) on cover (2). (Push in until it clicks.)
* The terminal block can be set in any of the four different directions (Fig. 2).

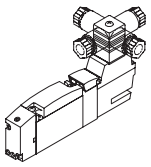
● Insert rubber packing (6) and washer (5) in this order into the cable through-hole in cover (2), and securely tighten cable gland (4).

Remarks: The recommended tightening torque for the cable gland is 1.0 to 1.5 N·m.
Pull the cable to check that it does not become loose.

● Place gasket (8) between the bottom part of terminal block (3) and the plug of coil assembly (12), insert the connector, insert screw (1) from over cover (2) and tighten it.

Remarks: The recommended tightening torque for screws is 0.4 to 0.45 N·m.

Fig. 2



4. Installation

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

Use/maintenance

1. CXU30-4G2R Series

⚠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.

■ When using the AC voltage type in a continuously energized state, the temperature of the coil's outer surface will be high. It may cause burns. Do not touch it when it is energized.

2. CXU30-VE Series

⚠CAUTION

■ This valve is specifically designed to start and stop a device. This valve should not be used for cylinder repeat operation or as a normal 3-way valve.

■ Provide heat removal measures when you use the products with continuous current application for an extended period of time.

3. Manual override

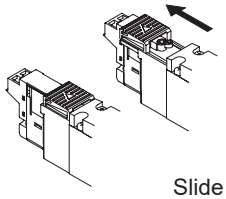
⚠WARNING

■ CXU30-4G2R and CXU30-VE Series are internal pilot operated solenoid valves. 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 protection cover is provided 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.

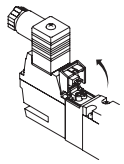
■ The manual override is used for both non-locking and locking. Holding down and turning the button locks the valve. For locking, be sure to press down and turn. If manual override is turned without being pressed down, it could be damaged or air could leak.

■ 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)



Slide type

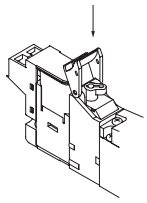
DIN terminal box



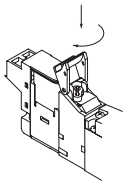
Rotation

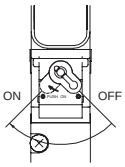
■ How to operate manual override

● Push & non-locking operation
Push in the direction of the arrow until it stops.
Release to cancel.



● Push & locking operation
Push manual override and turn 90° in the direction of the arrow.
The function is not canceled even when the button is released.





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

4. How to replace coil

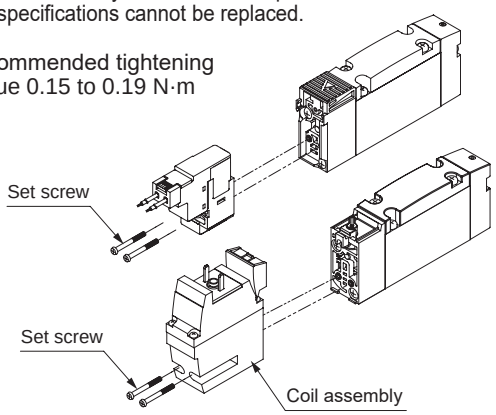
⚠WARNING

■ E-connector coil assembly
Replace the coil by removing the set screws shown below. Loosening other screws could cause operation failures. When installing, check that the gasket is installed on the coil side and tightening torque is proper. Improper installation could result in air leakage or operation failures.

■ DIN terminal box coil assembly

Replace the coil assembly by removing the set screws shown below. Loosening other screws could cause operation failures. When installing, check that the gasket is installed on the coil assembly side and tightening torque is proper. Improper installation could result in air leakage or operation failures.
The coil assembly of E-connector specifications and DIN terminal box specifications cannot be replaced.

Recommended tightening torque 0.15 to 0.19 N·m



5. Usage method

⚠CAUTION

■ Connect a silencer or exhaust filter, etc., on the exhaust port for safety and noise reduction.

6. Pressure switch

⚠CAUTION

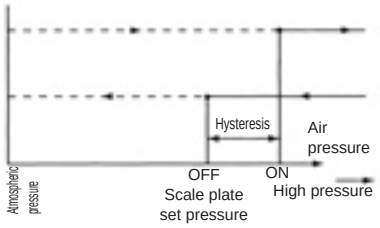
■ Setting pressure

● Pressure displayed on the scale plate is used as a guideline. When setting pressure, refer to the separate pressure gauge.

● Pressure displayed on the scale plate is the value when the contact is OFF.

To set the value when the contact is ON, set the pressure displayed on the scale plate to a value smaller than that from which hysteresis has been subtracted. If not set, operation may not take place at the set value (see the figure below). (Hysteresis refers to the pressure range from when the switch is turned on to the set pressure until the pressure drops and the switch turns OFF.)

Operation chart



■ Installation:

● Do not drop or bump the product when handling it.

● Wire such that repeated bending or tension are not applied to the lead wires. Failure to do so could lead to disconnection.

● Do not use the product near a strong magnetic field or large current (large magnet or spot welding machine, etc.). This may cause malfunction.

● To ensure the degree of protection equivalent to IP65 of the pressure switch, connect the M3 fitting which comes with the product and extend the tube so that water will not go inside. Tightening torque of M3 fitting is 0.3 to 0.6 N·m. Do not plug the atmospheric pressure inlet port. Plugging could cause malfunctions to occur. Not for outdoor use.

● Do not pressurize the atmospheric pressure inlet port or blow it with compressed air. Product performance could decrease or the product could be damaged.

■ Wiring

● Connecting the lead wire

(1) Do not connect the lead directly to the power supply. Connect the load serially. Failure to do so may result in burning out the lamp or melting the contact.

(2) When used for DC, connect the brown wire to the + side and the blue wire to the - side. The lamp will not come on if wires are connected in reverse.

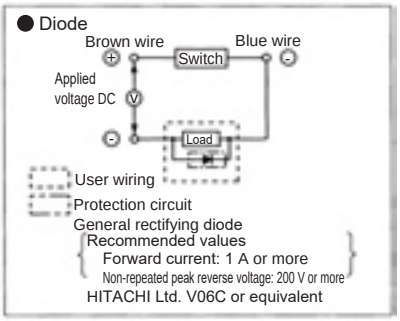
(3) When connected to the AC relay or PC input, the switch lamp may not come on if the circuit is half-wave rectified. In this case, the lamp comes on if the switch lead wire polarity is reversed.

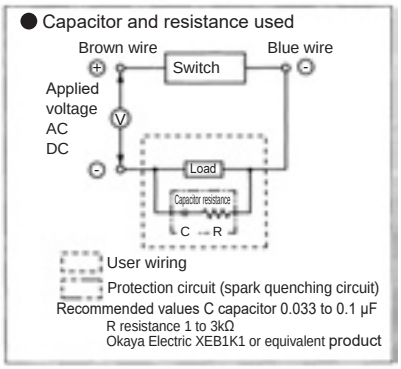
● Contact capacity

Do not exceed the specified load voltage or load current range. Failure to do so may result in burning out the lamp or melting the contact. The lamp may not come on if the current is less than the rated current.

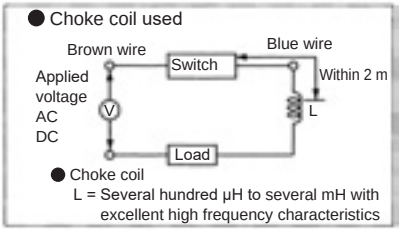
● Contact protection

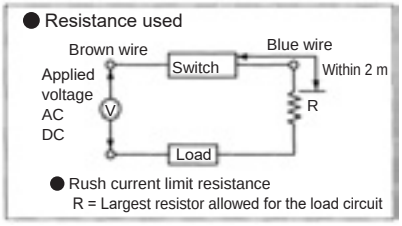
(1) When you use the product with a conductive load such as a relay, provide a contact protection circuit as shown below. The contact could melt if this protection circuit is not provided.





(2) If DC wiring exceeds 50 m or AC wiring exceeds 10 m, the wiring capacity will be reached, and a rush current will occur, damaging the switch or shortening the service life. Install a contact protection circuit if the wiring length is exceeded.





Safety Precautions

Be sure to read this section before use.
Refer to Intro Page 63 for precautions for general pneumatic components.

Product-specific cautions: Pneumatic components (F.R.L. unit (modular design))

Design/selection

1. Common

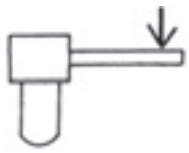
WARNING

■ This product is designed for industrial use. Do not use for medical purposes, or in any equipment or circuit that concerns human life.

■ The air filter, lubricator plastic bowl, lubricator drip window and pressure gauge lens are all made of polycarbonates. Cannot be used in environments containing synthetic oil, organic solvents, chemicals, coolant, screw locking agent, leak detection solutions, or hot water, etc., or where these substances may come in contact with the product. Refer to page 1067 for details on plastic bowl chemical resistance.

■ Piping load torque
Make sure that no piping load or torque is applied to the body or pipes.

Series	1000	2000	3000	4000	6000	8000
Max. torque N·m	10	10	50	50	100	100



With the 1000 Series in particular, application of a torque of 20 N·m or more on the piping is "hazardous" as the piping could be damaged. Use the product within the specified torque, even when using the pipe adaptor.

CAUTION

■ High moisture levels
Install the air dryer and drain separator before the air filter. If there is a lot of moisture from the compressor, hot and highly humid air could shorten the device's life or result in corrosion.

■ Dry air
Rubber parts for the regulator could deteriorate quickly, so use of a fluoro rubber valve assembly is recommended. Contact CKD when required.

■ Water-lubricated compressor circuit
Take measures to prevent chlorine-based substances from entering the compressed air.

■ Use the auto-drain under the working conditions below. Failure to observe this could result in operation faults.
NO auto-drain (exhaust when not pressurized): For "F"
- Use a compressor with a capacity of 0.75 kW (90 ℓ/min. [ANR]) or more.
- Set the working pressure to 0.1 MPa or more. (Air is purged with initial drainage until pressure reaches 0.1 MPa.)

NC auto-drain (no exhaust when not pressurized) For "F1"
- A compressor with a capacity of 0.75 kw or less can also be used.
- Set the working pressure to 0.15 MPa or more.

For 1000 Series NC auto-drain
- Set the working flow rate to less than or equal to the max. processing flow rate.
- Avoid use of this in places with high vibration, such as where a compressor is installed, because air could leak from the drain outlet when the float vibrates.
- Avoid drain overflow. It will cause operation faults.

2. Regulator, filter/regulator

⚠WARNING

■ Output pressure exceeding the regulator's set pressure could result in damage or faulty operation of the secondary side devices. Be sure to install a safety device.

■ The regulator cannot process residual pressure (release secondary pressure) when the primary pressure is released.
Use a regulator with a check valve when residual pressure must be processed.

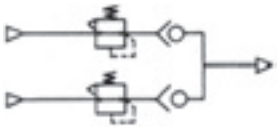
■ The regulator may not be usable with a secondary side sealed circuit or balance circuit.

⚠CAUTION

■ Pulsation may occur depending on the working and piping conditions. Lower the primary pressure if pulsation occurs.

■ The setting range for the regulator's secondary side pressure should be within 85% of that of the primary side. Otherwise, the pressure drop may increase.

■ When using regulators in parallel as below, do not use the OUT side as a closed circuit. If a closed circuit is required, install a check valve on the OUT side of each regulator.



3. Lubricator

⚠WARNING

■ Lubricator
Do not use lubrication with an air motor or bearings. Lubrication may not be possible when used very frequently, such as in a press machine.

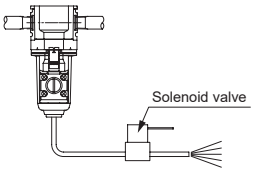
⚠CAUTION

■ If the working air quantity is low for the lubricator, oil may not drip. Check the min. air quantity required for dripping oil.

4. Drain separator

⚠CAUTION

■ The auto-drain may not operate correctly if a large amount of drain enters. If there is a large amount of drain, select the bowl option "M" and perform regular drainage using a solenoid valve or the like from the drain pipe.



5. Pressure switch

⚠CAUTION

■ When using the digital pressure sensor PPX or compact pressure switch PPD, avoid using it as a set with the lubricator. The switch is not a drip-proof structure, so operation could be disabled if the lubrication oil comes in contact with it.

6. Residual pressure exhaust valve

⚠WARNING

■ Precautions for the residual pressure exhaust valve
- The EXH port is dedicated for installation of the silencer. Tighten with a torque of 3 N·m or less (manual tightening). Do not connect pipes where their loads or torque, etc., may be applied to the EXH port.
- If exhaust operations are incomplete due to air quality, manually discharge air by operating the knob (turn and raise).

7. Module check valve

■ This valve cannot be used as a stop valve that requires no leakage. Slight leakage is allowed for in this product's specifications.

Mounting, installation and adjustment

1. Common

⚠ CAUTION

■ Avoid installing this product where it is subject to direct ultraviolet.

■ Flush and clean the pipes.

Dirt or foreign matter remaining in the piping will deteriorate product performance.

■ Make sure that no foreign matter enters the pipes when connecting the pipes and fittings.

When screwing in piping or fittings, check that swarf from port threads or sealant does not get inside. Dirt or foreign matter remaining in the piping will deteriorate product performance.

■ Using the F.R.L. correctly

1. Set the regulator pressure setting upward. After setting the pressure, lock the handle. Check primary pressure carefully before setting pressure.
2. Confirm the direction of the arrow indicating the air inlet before connecting. A reverse connection could result in improper operation.
3. Install the air filter and the lubricator case downward vertically. Drainage may be defective or drip check may become impossible.
4. Use of the auto-drain where vibration is present could cause faults and malfunctions.

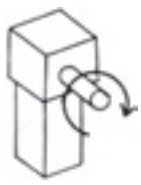
■ Drain piping of the auto-drain should be piped under the following conditions. Otherwise, malfunctions may result.

Use an inner diameter of ø5.7 or more and piping of 5 m or less for the drainage section. Do not use vertical piping.
Do not route it vertically. Pipe so that no lateral load is applied on the bowl.
When you tighten a fitting into an Rc1/4 female thread, hold the hexagon part of the cock.

■ Piping screw-in torque

Make sure that excessive torque is not applied on the body and piping when piping.

Series	1000	2000	3000	4000	6000	8000
Max. torque N·m	15	30	30	30	70	70



■ Drain piping

● The drain piping for the plastic bowl has a barbed nipple, and can be directly installed. However, confirm that the drain cock is closed before inserting the tube. Do not route it vertically. Pipe so that no lateral load is applied on the bowl. Do not fix the tube connected to the drain outlet with a lateral load applied. If drainage is performed with a lateral load applied, external leakage may occur. Contact CKD when attaching a separate valve to the tube tip that is inserted to the drain outlet to control drainage.

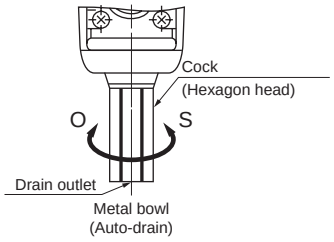
■ Tightening torque of drain cock

● The maximum tightening torque of the drain cock of the plastic bowl is as follows.

· 1000 Series: 0.1 N·m
· Others: 0.5 N·m

■ Drain piping of metal bowl with auto-drain

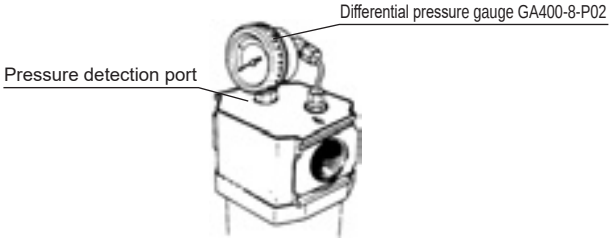
· When you tighten a fitting into the drain outlet female thread, hold the hexagon part of the cock. If tightened without fixing the hexagonal face, it may result in breakage. When using the metal bowl with auto-drain, if the drain is piped with a tightening fittng, manual operation is not possible.



■ Piping the unit with pressure detection port

F6000-□-W-Q/M6000-□-W-Q
MX6000-□-W-Q/F8000-□-W-Q
For M8000-□-W-Q/MX8000-□-W-Q

A pressure detection port is available as an option for F6000-W, M6000-W, MX6000-W, F8000-W, M8000-W and MX8000-W.
The life of the filter element or oil mist filter mantle assembly is visually checked by assembling the differential pressure gauge GA400-8-P02 into the pressure detection port.
When selecting option Q and X1 simultaneously for F6000-W and M6000-W and mounting differential pressure gauge GA400, raise the gauge with piping material so that it does not interfere.



Check the port position of the differential pressure gauge, the high pressure side and low pressure side, and mount properly.

2. Regulator, filter/regulator

⚠CAUTION

■ Regulator, filter/regulator

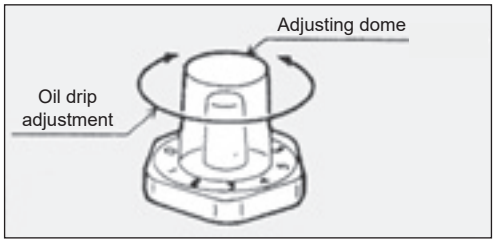
- Lightly tighten (0.6 N·m or less) mounting screws for embedded pressure gauge G401-OP, G401 and gauge plug.
- When installing the pressure gauge with a safety mark on the gauge plug, or when installing a general screw-in pressure gauge, tighten with a torque of 10 to 15 N·m or less.
- Do not move or swing the product by the adjustment knob on the regulator.
- Check that pressure exceeding the pressure gauge's full scale is not applied. The pressure gauge could be damaged. (Pay special attention when using the full scale 0.2 or 0.4 MPa pressure gauge.)

3. Lubricator

⚠CAUTION

■ Adjustment of the lubricator oil drip

- Adjust the oil rate by turning the adjusting dome with bare hands. For closing, tighten with a torque of 0.5 N·m or less. The numbers (scale) on the dial are a guide used after adjustment, and do not indicate the oil drip rate.



4. Drain separator

⚠CAUTION

■ Using the drain separator correctly

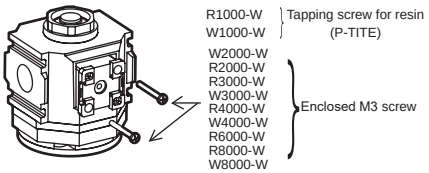
1. Confirm the direction of the arrow indicating the air flow direction before connecting, and make sure that the flow direction is correct when piping. If the flow direction is incorrect, the drain cannot be isolated. (It will cause the drain to flow out from the secondary side.)
2. Install the case downward and vertically. Otherwise, drain discharge failure could result.
3. Use of the auto-drain where vibration is present could cause faults and malfunctions.

5. Pressure switch

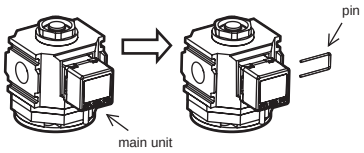
⚠CAUTION

■ Mounting of pressure switch (PPR)

- Insert the O-ring into the adaptor
  * Insert the O-ring into the 2 O-ring grooves
    Handle the O-rings with clean hands
- Mount the adaptor onto the body
  Mount the adaptor with the included 2 bolts (M3)
  * Be careful of the mounting location and direction so that the O-ring will not fall off.
  * Do not screw in one of the bolts completely, but to screw in both bolts as evenly as possible. (Tightening torque 0.5±0.1N·m)



- Mount the main unit, and then attach the included pin on the face on the adaptor side.



Note) Insert the pin all the way to the end. Also, confirm that the pin has been attached before pressurization.

6. Pressure gauge

⚠CAUTION

■ Pressure gauge

Repeated and sudden increase and decrease in pressure and pressure pulsation must be avoided because it could adversely affect the life of the pressure gauge. Either ease the pressure fluctuation in the circuit or contact CKD so that a pressure gauge with a cushioning screw can be prepared. Pressure exceeding the pressure range may damage the gauge.

Use/maintenance

1. Common

⚠ WARNING

- Perform a periodic inspection once every six months or less to check for any cracks, scratches and other damages of the air filter and plastic bowl of the lubricator.
  Replace the bowl with a new plastic or metal one if you find any damage.

- Check the air filter, lubricator plastic bowl and lubricator drip window periodically for contamination.
  - If parts are heavily contaminated or if transparency has decreased, replace with a new bowl and drip window.
  - Use water and household detergent to wash parts. Rinse them out well with clean water afterward.

- Removing bowl of filter and lubricator
  Stop the compressed air supply. Release the pressure in the bowls completely and make sure that there is no residual pressure before removing the bowls.

⚠ CAUTION

- Check the oil drip rate once a day.
  If the oil drip is faulty, problems could occur in the unit being lubricated.

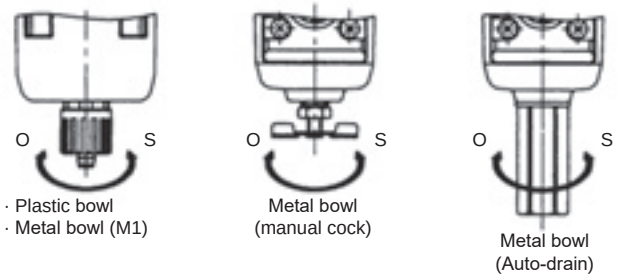
- Do not use a distributor to separate the air with oil mist and the air without oil mist. Oil in the lubricator may flow backward.

- As a clogged filter element may cause degradation of performance, perform periodical inspection and replacement of the element.

- Do not disassemble or modify the product.

- Read instructions and precautions enclosed with the product before use or maintenance.

Drainage method



· Plastic bowl
· Metal bowl (M1)

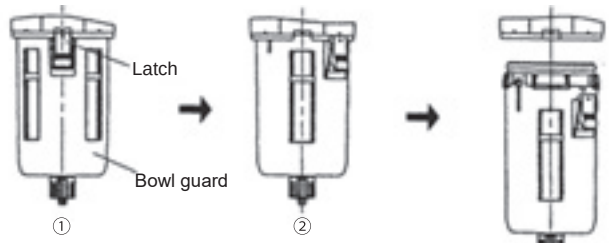
Metal bowl
(manual cock)

Metal bowl
(Auto-drain)

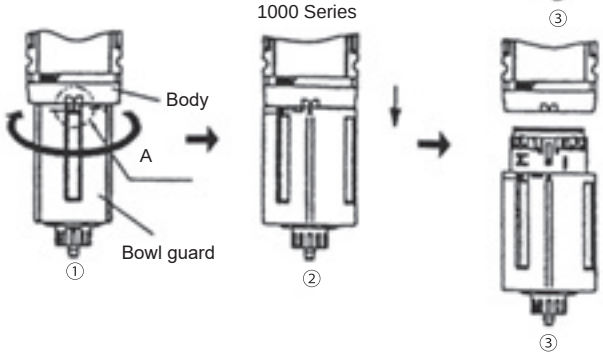
- Drainage starts when the cock is turned in the O direction, and the discharge stops when the cock is turned in the S direction. Tighten by hand in the S direction.
- When auto-drain is available, drainage is discharged automatically when it accumulates. Drainage can also be discharged manually.

Removing the resin bowl

2000, 3000, 4000, 6000, 8000 Series

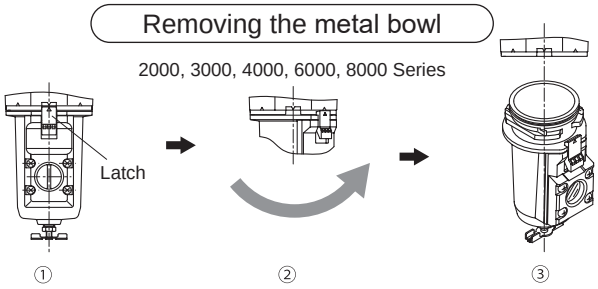


1000 Series



Removing the metal bowl

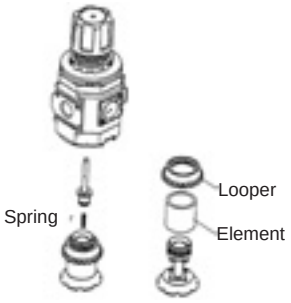
2000, 3000, 4000, 6000, 8000 Series



2. Filter/regulator

⚠ CAUTION

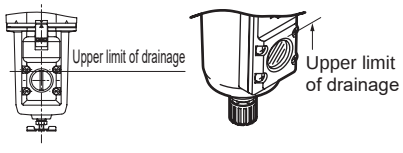
- Elements of W1000 to W8000
  Inspect the valve assembly when it is removed during maintenance.
  Do not lose springs, etc., during maintenance.



3. Filter

⚠ WARNING

- Drain so that air filter moisture does not accumulate beyond the upper limit.
  Components could malfunction if moisture flows into the secondary side.



Metal bowl　　Metal bowl

- The resin bowl must not be filled above the “upper drain limit” or “MAX LEVEL” stamped on the bowl guard.

⚠CAUTION

■Submicron 0.3 μm element
This filter cannot be flushed with air, water, etc., and be reused. When the pressure drops to 0.07 MPa, replace the element with a new one. (excluding 1000 and 2000 Series)

■ Oil mist filter
The mantle (element) life ends after one year (6000 hours) or when pressure drops to 0.1 MPa. (Excluding the X type) Replace the mantle with a new one at the end of its life. (Do not touch the urethane foam layer when replacing the mantle.)

■If a differential pressure indicator is provided, replace the mantle (element) before the differential pressure indicator's color changes completely to red.

4. Regulator, filter/regulator

⚠CAUTION

■Pull the pressure adjustment knob and release the lock before setting the regulator pressure. The regulator could be damaged if the pressure is set without unlocking it.

■The set pressure changes from the initial set point based on working environment and conditions, as well as aging of part materials. Check the pressure regularly, and reset if conditions have changed.

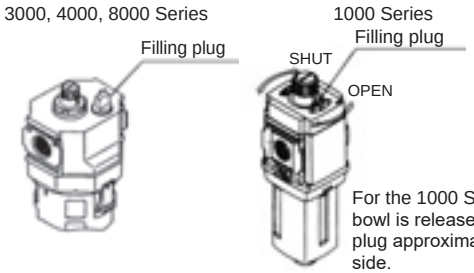
■When the regulator is left with the primary pressure released for long periods, return the set pressure to 0. External leakage may occur due to valve sticking.

5. Lubricator

⚠WARNING

■Use Class 1 turbine oil (no additives) ISO VG32 for the lubricator. Other oils could cause breakage or improper operation. ■Removing filling plug of lubricator

To prevent the filling plug from popping out, loosen the filling plug by one turn, and then completely depressurize the bowl before removing the filling plug. Wipe away any dirt around the filling plug that could scatter.



For the 1000 Series, pressure in the bowl is released by sliding the filling plug approximately 45˚ to the OPEN side.

- Close the filling plug after lubricating.
- Never remove the bowl without removing the filling plug (while the bowl is pressurized). (L3000 to L8000)
- With 1000 Series, never remove the bowl with the filling plug at the SHUT side (while the bowl is pressurized). (L1000)

⚠CAUTION

■Periodically replenish oil in the lubricator bowl so that it does not drop below the lower limit.

■When lubricating the L1000, pressure in the bowl is released by turning the filling plug. Refer to the section above for details on using the filling plug. (Lubrication is done while pipes are pressurized.) Check that there is no pressure in the bowl, remove the bowl and bowl guard, and then directly lubricate to the bowl. Refer to the previous page for details on removing the bowl.

■When lubricating the L3000 to L8000, loosen the filling plug slightly to release pressure in the bowl, then remove the filling plug. Refer to the section above for details on using the filling plug. (Removing the filling plug enables lubrication to be done while pipes are pressurized.) Relubrication can also be done through the filling plug hole. You can also refill the bowl directly by removing the bowl and the bowl guard. Refer to the previous page for details on removing the bowl.

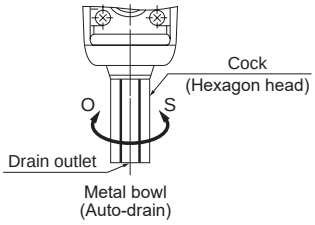
6.Drain separator

⚠CAUTION

■Drain piping
- The drain piping for the plastic bowl has a barbed nipple, and can be directly installed. However, confirm that the drain cock is closed before inserting the tube. Do not route it vertically. Pipe so that no lateral load is applied on the bowl. Do not fix the tube connected to the drain outlet with a lateral load applied. If drainage is performed with a lateral load applied, external leakage may occur. Contact CKD when attaching a separate valve to the tube tip that is inserted to the drain outlet to control drainage.

■Tightening torque of drain cock
- The maximum tightening torque of the drain cock of the plastic bowl is 0.5 N·m.

■Drain piping of metal bowl with auto-drain
- Fix the cock's hexagonal face before screwing the fitting etc., into the drain outlet's female threads. When using the metal bowl with auto-drain, if the drain is piped with a tightening fitting, manual operation is not possible.



Product-specific cautions: F.R.L. components

Chemical resistance of plastic

⚠ WARNING

- The chemical resistance of plastic parts is shown below.
- Avoid using products in an atmosphere where chemicals are contained in compressed air or atmosphere, or where they could adhere to parts.
- Use in the above state could lead to bowl damage and accidents.
- Avoid using with these types of chemicals or in an atmosphere containing these chemicals.
- A metal bowl is available if these chemicals must be used.

Chemical resistance of plastic bowl/body

Use a metal bowl in an atmosphere containing the following chemicals.
Check whether the testing solutions, sealants and adhesives contain the following chemicals.

Types of chemicals	Categories of chemicals	Main products of chemicals	General applications	Polycarbonate bowl	Nylon bowl	Nylon body
Inorganic chemicals	Acids	Hydrochloric acid, sulfuric acid, hydrofluoric acid, phosphoric acid, chromic acid, etc.	Acid washing of metals, acidic degreasing solution, coating treatment solution, etc.	×	×	×
	Alkalines	Alkalis such as caustic soda, caustic potash, calcium hydroxide, aqueous ammonia, sodium carbonate	Alkaline degreasing solution for metals Soluble coolant, leakage detection agent	×	○	○
	Inorganic salts	Sodium sulfide, sodium nitrate, potassium bichromate, sulfate of soda, etc.		×	○	○
Organic chemicals	Aromatic hydrocarbons	Benzene, toluene, xylene, ethyl benzene, styrene, etc.	Contained in paint thinner (benzene, toluene and xylene)	×	×	×
	Chlorinated aliphatic hydrocarbons	Methyl chloride, ethylene chloride, methylene chloride, acetylene chloride, chloroform, trichlene, perchlene, carbon tetrachloride	Organic solvent-based washing solution for metals (trichlene, perchlene, carbon tetrachloride, etc.)	×	○	○
	Chlorinated aromatic hydrocarbons	Chlorobenzene, dichlorobenzene, benzene hexachloride (B/H/C), etc.	Agricultural chemicals	×	○	○
	Petroleum components	Solvent naphtha, gasoline, kerosene		×	○	○
	Alcohols	Methyl alcohol, ethyl alcohol, cyclohexanol, benzyl alcohol	Used as antifreezing agent Leakage detection agent	×	×	×
	Phenol	Carbolic acid, cresol, naphthol, etc.	Disinfectant solution	×	×	×
	Ethers	Methyl ether, methyl ethyl ether, ethyl ether	Additive of brake oil	×	○	○
	Ketones	Acetone, methyl ethyl ketone, cyclohexanone, acetophenone, etc.		×	×	×
	Carboxylic acids	Formic acid, acetic acid, butyl acid, acrylic acid, oxalic acid, phthalic acid, etc.	Dyes/oxalic acid for aluminum processing, phthalic acid for paint base and leakage detection agents	×	×	×
	Esters	Dimethyl phthalate (DMP), diethyl phthalate (DEP), dibutyl phthalate (DBP), dioctyl phthalate (DOP)	Lubricant, synthetic oil, rust preventing agent additive plasticizer for synthetic resin	×	○	○
	Oxyacids	Glycol acid, lactic acid, malic acid, citric acid, tartaric acid		×	×	×
	Nitro compounds	Nitromethane, nitroethane, nitroethylene, nitrobenzene, etc.		×	○	○
	Amines	Methylamine, dimethylamine, ethylamine, aniline, acetanilide, etc.	Additive of brake oil	×	×	×
	Nitriles	Acetonitrile, acrylonitrile, benzonitrile, acetoisonitrile, etc.	Raw material for nitrile rubber	×	○	○

○: Resistant, ×: Non-resistant (plastic will become damaged.)

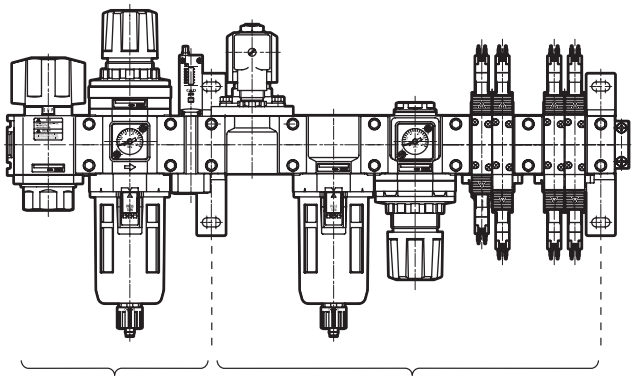
Safety Precautions

Be sure to read this section before use.
Refer to Intro Page 63 for precautions for general pneumatic components.

Product-specific cautions: Air unit CXU Series

Design/selection

■ Use the T-brackets at regular intervals.
When the assembly is supported on only one end, up to three stations can be used. When it is supported on both ends, up to five stations can be used.

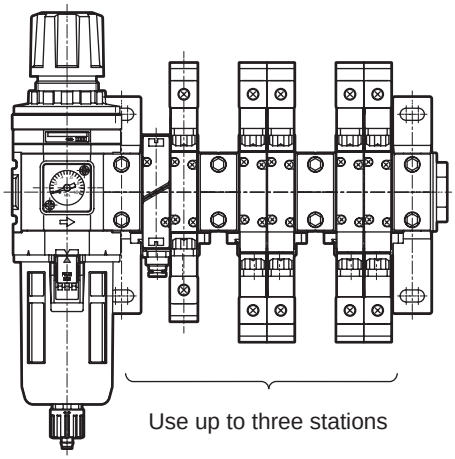


Use up to three stations for single support

Use up to five stations for double support

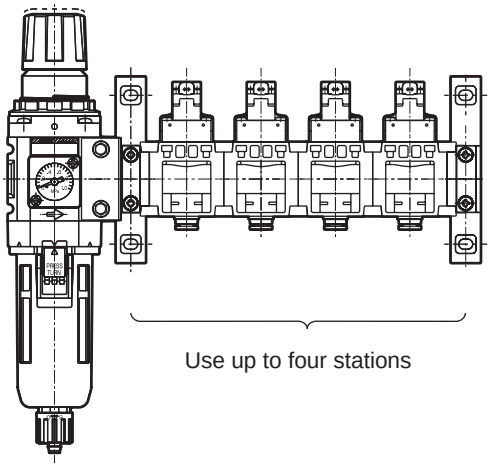
■ When a pilot operated 5-port valve (CXU30-4G2R) is used at max. flow rate, use with up to three stations.

One station consists of two solenoid valves. Up to six solenoid valves can be used.



Use up to three stations

■ When using a pilot operated 2-port solenoid valve (CXU10-EXA) at max. flow rate
As a guideline, use one station when a 1000 Series regulator is connected, and up to four stations when a 3000 Series regulator is connected.



Use up to four stations

Mounting, installation and adjustment

■ With the 1000 Series combined unit, the bracket may twist up on one side. In this case, tighten and fix the bracket with screws so that it is mounted stably and so no problems will arise with use.

■ Notes on selecting CXU13-UN
If the 1000 Series and 3000 Series are combined together with a single support, the joiner may be damaged by the load. Use double support.

■ Tighten the fixing screw for the 1000 Series joiner to a torque of 1 to 1.2 N·m; for the 3000 Series joiner to a torque of 3 to 4 N·m.