Safety Precautions

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

Individual precautions: F.R.L. unit (Compact)

Design/selection

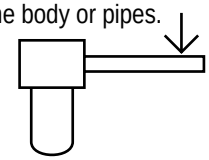
1. Common

⚠WARNING

■ The air filter, lubricator plastic bowl, lubricator drip window and pressure gauge lens are all made of polycarbonates. They 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 440 for details on plastic bowl chemical resistance.

■ Piping load torque
Avoid applying piping load or torque to the body or pipes.

	Rc1/8,Rc1/4
Max. torque N·m	15



⚠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.

■ Ultra 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.

■ Piston drain "D"
- Set the working pressure to 0.1 MPa or more.
- Do not use this device on equipment that experiences impacts.
- Automatic discharge used for intermittent flow. Drainage is not discharged under working conditions where air flows constantly.

2. Filter

⚠WARNING

■ The miniature (A1019, B7019, A3019) bowl does not have a bowl guard. Provide a guard on the device, etc., for safety.

⚠CAUTION

■ Do not select using the port size.

■ Use a pre-filter before the micro alescer filter/ micro-naught. Use a filter (5 μm) or submicron filter as the pre-filter.

3. Regulator, F.R. unit

⚠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.

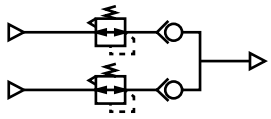
■ When using the regulator for secondary side sealed circuits or balance circuits
Contact CKD regarding these applications.

⚠CAUTION

■ The setting range for the regulator's secondary-side pressure should be within 85% of that of the primary side.

■ After setting pressure, do not release primary pressure or depressurize.

■ 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.



■ For miniature types (B2019, 2419, B6061, B7019), turning the knob in the L direction from the set pressure 0 activates the stopper and the knob does not turn.
Note that if torque is forcibly applied in the L direction, the knob may lock and become inoperable.

⚠CAUTION

■ Pulsation may occur depending on the working conditions or piping conditions.
Lower the primary pressure if pulsation occurs.
Select the proper size as pulsation can occur easily if the flow rate is extremely small in respect to the max. flow rate.

4. Lubricator

⚠WARNING

■ Do not use as lubrication for 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.

■ Check that the bowl is not pressurized before supplying oil. Check that the oil level in the bowl is between the upper and lower limits.

5. Relief valve

⚠CAUTION

■ When using released to the atmosphere, restrict the pressure before releasing.

Mounting, installation and adjustment

1. Common

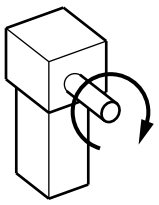
⚠CAUTION

■ Using the F.R.L. correctly

- Avoid installing this product where it is subject to direct ultraviolet.
- Set the regulator pressure setting upward. After setting the pressure, lock the handle. Check primary pressure carefully before setting pressure.
- Check the arrow indicating the air inlet before connecting. A reverse connection could result in improper operation.
- Install the air filter and lubricator vertically with the bowl facing downward. Drainage may be defective or drip check may become impossible.
- Use of the piston drain where vibration is present could cause faults and malfunctions.

■ Piping screw-in torque
Make sure that excessive torque is not applied on the body and piping when piping.

	Rc1/8,Rc1/4
Max. torque N·m	30



2. F.R. unit

⚠CAUTION

■ Turn the pressure adjustment handle clockwise to increase the secondary pressure and counterclockwise to lower the pressure.

■ Set the pressure while checking primary pressure.

■ If the pressure cannot be adjusted, check the valve assembly for the adherence of foreign matter, and check the O-ring for damage, etc.

3. Filter

⚠CAUTION

■ When piping, remove coolant and rust preventing agent, etc. Failure to observe will obstruct initial performance of the micro naught micro alescer filter, and shorten its life. Coolant and rust preventing agent on the inside of pipes enters compressed air and adversely affects expensive pneumatic components or devices.

4. Regulator, F.R. unit

⚠CAUTION

■ Note that for B7019, B2019, 2419 and B6061, if the knob is forcibly rotated in the L direction, it may lock.

Use/maintenance

1. Common

⚠ WARNING

■ Check the air filter, lubricator plastic bowl and lubricator drip window for cracks, damage and other deterioration.
Replace the bowl with a new plastic or metal one and new window 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 or 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.

■ Assembling parts for maintenance
- For maintenance, wash parts and assemble without entry of cutting chips or other foreign matter.

⚠ CAUTION

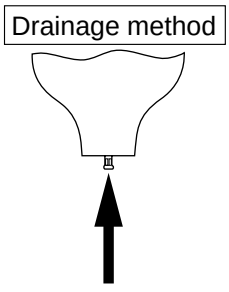
■ Check the oil drip rate once a day.
If the oil drip is faulty, problems could occur in the unit being lubricated.

■ Storage
Do not store this product in a hot, humid atmosphere or atmospheric conditions outside of the specified range for a prolonged period of time. Resin or rubber parts could deteriorate, and the resin bowl could become discolored. Contact CKD when storing products exceeding specifications.

2. 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.

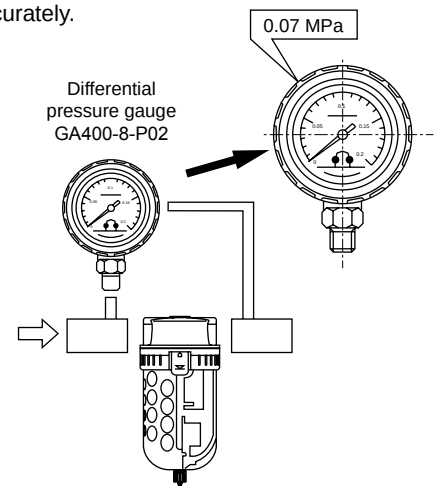


- Drainage starts when the top of the bowl is pressed.

■ Ensure that large amounts of drainage do not flow directly from the piping. Install a drain discharger if there is a large amount of direct drainage.

⚠ CAUTION

■ Filter/micro alescer
- Use the differential pressure gauge GA400-8-P02 to measure pressure drop. Measure the pressure drop accurately.



■ The micro alescer (oil removal filter) mantle (element) service life is reached when the pressure drops to 0.07 MPa. Replace the mantle with a new one at the end of its life. (Do not touch the urethane foam layer when replacing the mantle.)

3. Regulator

⚠ CAUTION

■ Pull the pressure adjustment knob and release the lock before setting the regulator pressure shown below. The regulator could be damaged if the pressure is set without unlocking it. that the knob locks again if it is turned with force in the L direction from the set pressure 0.

B2019
B6061
2419

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

Chemical resistance of plastic

4. Lubricator

⚠WARNING

- Use Class 1 turbine oil (no additives) ISO VG32 for the lubricator.
  Other oils could cause breakage or improper operation.
- Periodically replenish oil in the lubricator bowl so that it does not drop below the lower limit.

⚠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.
- Using in the above state could lead to bowl damage and accidents.
- Avoid use 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)	×	○	○
	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 coolant, 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, x: Non-resistant (plastic will become damaged.)