Pneumatic Equipment

Safety precautions

Always read this section before starting use.
Refer to the general information on pneumatic cylinders (CB-029S) for information on cylinders and cylinder switches.

Individual precautions: Rotary Super Fan SFR, SFRT Series

Design and Selection

⚠ WARNING

- **Do not stop the equipment during use or keep the pressure maintained by containing pneumatic pressure inside the product.**
  If the product is not equipped with an external stoppage device, by containing the air with a directional control valve and performing an intermediate stop, it may not be possible to maintain the stop position due to air leaks, etc., possibly resulting in injury to the human body, and/or damage to devices and equipment.

- **If the equipment is subject to load fluctuations, up and down operations, or changes in frictional resistance, take these factors into consideration to ensure a safe design.**
  Failure to observe this may cause the rotary actuator's operating speed to rise, resulting in injury to the human body and/or damage to machinery and equipment.

- **Do not use rotary actuators as cushioning mechanisms.**
  If abnormal pressure is applied, or air leaks, there will be a significant loss in deceleration capability, possibly resulting in injury to the human body, and/or damage to machinery and equipment.

- **Make sure that fixed and coupling sections are securely fastened and will not become loose.**
  If the operating frequency is high, or if using rotary actuators in places subject to many vibrations, a particularly secure connection method should be employed.

- **Rotary actuator modification**

⚠ CAUTION

- **Even if the torque required by the load for the oscillating motion is low, the inertial force produced by the load may cause damage to the actuator. Always take the load inertial moment, kinetic energy, and oscillating time into consideration, and use the product at or lower than the allowable energy.**
  If used with greater than the allowable energy, always use an external stopper to absorb energy.

- **Do not apply torque exceeding the rated output to the product from an external source.**
  Applying an external force exceeding the rated output to the product may result in product damage.

- **If repeated oscillating angle accuracy is required, install an external stopper, and stop the load directly.**
  By stopping the load with a stopper installed on the rotary actuator, the oscillating angle may vary from the initial setting.

- **Use rotary actuators within the oscillating time range stipulated in the specifications.**
  If used at a low speed below this range, a stick-slip phenomenon will prevent the actuator from functioning smoothly.

⚠ CAUTION

- **Install a speed controller to control the rotary actuator oscillating speed.**
  Adjust the speed from a low setting, gradually increasing to the stipulated speed.

- **Rotary actuator switch precautions**
  Pay attention to the proximity of rotary actuators.
  If two or more rotary actuators are used with switches in close proximity, or if magnetic bodies move in very close proximity to the rotary actuators, switches may malfunction as a result of the interference from respective magnetic forces generated.
  Ensure a design that maintains a distance of at least 40 mm between rotary actuators.
  (If the permissible distance between rotary actuators is indicated, observe that distance.)

  Pay close attention to the Switch ON time at the intermediate position of the oscillating angle
  When the switch is set to the intermediate position of the oscillating angle, and the load is driven when the magnet is passing, if the oscillation speed is too fast, there will be times when the load cannot be fully operated. This is because when the switch is turned on, the operation time will be short. In this case, the oscillating speed will be,

$$V = \frac{\text{Switch operating range (degrees)}}{\text{Load operating time (ms)}} \times 1000 \text{ (deg./s)}$$

- **Output shaft play: SFR-□-180**
  As the rotation angle is amplified with a gear, some play will exist. Depending on the mounting orientation, this play may cause some interference. Please take this into consideration in the design.

Mounting, Installation & Adjustment

1. Common

⚠ WARNING

- **In the case of adjusting the angle by supplying air pressure, take extreme measures beforehand so that the equipment will not rotate.**
  Depending on the equipment orientation, when air pressure is supplied during adjustment, the equipment may rotate and/or fall resulting in injury to person(s) and/or damage to the equipment and devices.

- **Do not start the equipment until confirming the device is functioning properly.**
  Following installation, connect the compressed air and power supply, perform an appropriate function inspection and leak inspection, verify that the equipment has been properly installed and that it functions safely and soundly and then start the system.

- **If painting the equipment**
  If paint is applied to plastic parts, the plastic may be adversely affected by the paint or solvent, and therefore we ask that you contact us beforehand to confirm whether paint may be applied.
  Furthermore, do not cross out, peel off or paint over the writings on the metal plate on the rotary actuators.

- **If supplying pressure to adjust the rotary actuator oscillating angle, take measures beforehand to ensure that the rotary actuators do not rotate more than necessary.**
  Failure to prevent the rotary actuators rotating more than necessary could result in dangerous consequences.

- **If using shaft couplings, use ones with a degree of freedom.**
  The use of shaft couplings without a degree of freedom will result in twisting due to eccentricity, possibly resulting in operation failure and product damage, as well as injury to person(s) and/or damage to machinery and equipment.

- **Ensure sufficient space to carry out maintenance and inspection.**

- **Install external stoppers at a sufficient distance from rotary axes.**
  By installing stoppers near rotary axes, the reaction force acting on the stopper will be applied to the rotary axis due to the torque produced by the product itself, and this may result in damage on the rotary axis or bearing, as well as injury to person(s), and/or damage to devices and equipment.
  Note that backlash occurs at both ends of the SFR-□-180, and therefore the use of external stoppers is recommended.

- **In regard to the SFRT, do not loosen stoppers outside of the adjustment range.**
  If loosened outside of the adjustment range, stoppers may come off, resulting in injury to person(s) and/or damage to machinery and equipment.

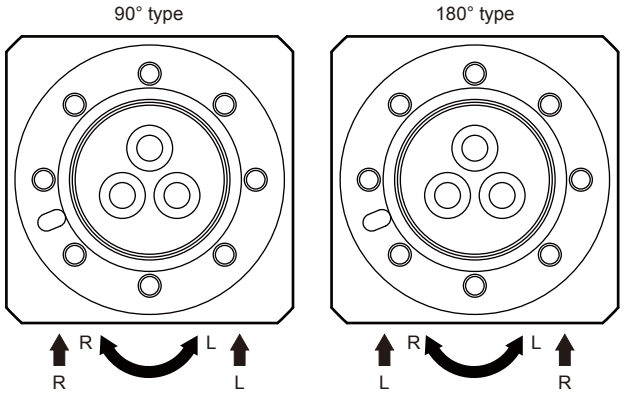
⚠ CAUTION

- **Do not wipe the metal plate areas, which indicates the model No., with organic solvents, etc.**
  Failure to observe this may result in the model No. being rubbed off.

- **Do not perform additional machining of the product.**
  Additional machining of the product will result in insufficient strength, possibly resulting in product damage, injury to person(s), and/or damage to devices and equipment.

- **Do not re-machine fixed orifices on piping ports. Enlarging the diameter of these fixed orifices will increase the actuator operating speed, resulting in a subsequent increase in impact force, and ultimately damage to the actuator. Furthermore, always install speed controllers for pipes, etc., before using the product.**

- **The 90° and 180° types differs in the oscillating direction due to the port.**
  Refer to "Operating Principle" in the catalog (page 5) for details on the operating principle.



R: Clockwise rotation (right rotation)

L: Counterclockwise rotation (left rotation)

- **When adjusting the angle, use within the adjustment range specified for the product.**
  Angle adjustment is only possible with the SFRT.
  Use of the product with the adjustment range (±5°) exceeded may result in operation failure and product damage.

Mounting, Installation & Adjustment

2. SFR Series

⚠ WARNING

- **The application of loads (thrust load) on the shaft in the axial direction may result in operation failure, and therefore loads must not be applied in this direction. If this is unavoidable, employ a mechanism using a thrust bearing as shown in Fig. 1.**

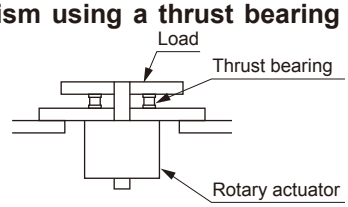


Fig. 1

- **The application of bending loads on the rotary actuator shaft end may result in operation failure, and should therefore be avoided.**

  If this is unavoidable, employ a mechanism through which only rotational force is transferred as shown in Fig. 2.
  In order to avoid shaft breakage, or bearing wear or seizing, etc., connect shaft ends and loads with flexible couplings, etc., that prevent twisting at any point in the oscillating range.

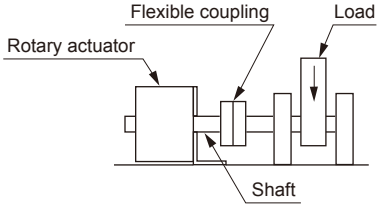


Fig. 2 Radial load

⚠ CAUTION

- **When mounting loads or jigs, etc., on the rotary actuator shafts, do so in such a way that the load is not received by the body as shown in Fig. 3.**

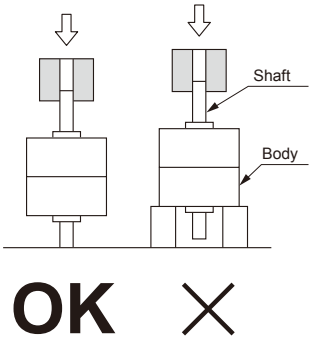


Fig. 3

- **Do not stand directly on shafts, or on devices connected to shafts.**

  Standing directly on shafts may damage bearings, etc.

Use & Maintenance

⚠ WARNING

- **Do not disassemble or modify the product body.**