

FUJIKURA BF CYLINDER HANDLING INSTRUCTION

Note : Keep this Handling Instruction in a place so that it can be used whenever required.

1. Precautions for Safety

⚠ CAUTION:

Be sure to observe the following precautions for safety.

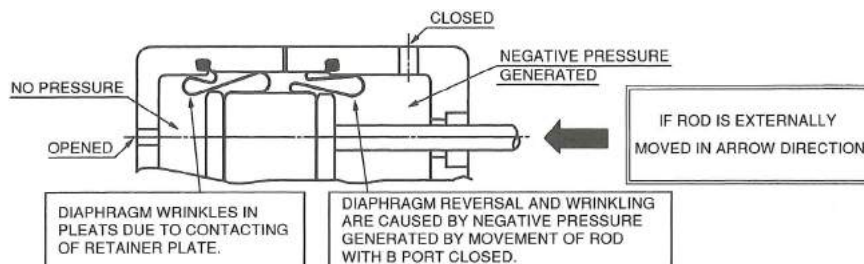
If not so, the BF Cylinder could not only make its full peculiar functions, but also might cause the cylinder-coupled machine to do unexpected operation, resulting in occurrence of an accident involving a human life.

1

The thin diaphragm(s) contained in BF Cylinder are in an unstable state when no operating pressure is applied. Should Cylinder Rod be pulled out or pushed in during such condition, the diaphragm(s) would be caused to reverse or wrinkle in pleats between Piston and Cylinder wall as illustrated. Be sure to apply a slight (at most 0.1 kgf/cm²) pressure in BF Cylinder before moving Rod externally.

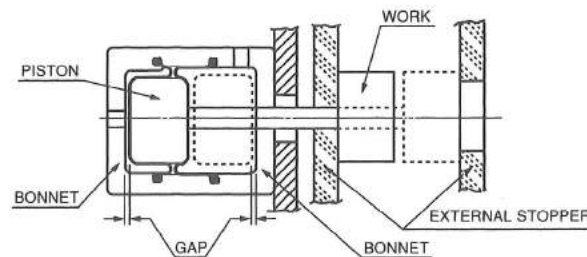
2

Do not carry BF Cylinder about with its Rod grasped so that the same troubles as stated in 1 will not occur.



3

Internal shock load on Bonnet acted by Piston may cause failure of BF Cylinder body. Provide external stoppers on the machine parts at the stroke ends or reinforcing members (such as tie rods) on Cylinder to allow Cylinder body to be free from shock load.



4

When BF Cylinder is required to operate at a very low speed or to carry fluctuating load, select a Cylinder size of good output allowance.

5

Do not apply lateral or eccentric axial load at the Rod end.

6

If necessary, install accessory pneumatic equipment in the pipe line preferably in close proximity to BF Cylinder.

7

Cylinder speed control should be performed by means of meter-out device.

8

Use filter and pressure reducing valve in the pipe line.

9

Automatic oiling device such as oiler may be installed in the pipe line. In this case, use well refined mineral oil such as hydraulic fluid.

10

BF Cylinders are used for a variety of applications. Customers are requested to pay reasonable attention according to each way of use or operating circumstances.

11

For protecting BF Diaphragm(s) from failure, do not apply excess pressure to BF Cylinder exceeding the specified allowable maximum operating pressure.

2. Cautions for Handling

Customers are advised to read thoroughly the following Handling Instructions before placing the BF Cylinder at service, and are requested, when replacing its diaphragm, to handle it with care observing the cautions stated below, because BF Diaphragm is sensitive functional rubber parts.

2-1. Prevention of BF Diaphragm's wrinkling

- a) Do not move Rod externally with no operating pressure applied for preventing BF Diaphragm's wrinkling in pleats. (Fig.1)

Once generated, the wrinkling can not be corrected even though air pressure is applied on the high pressure side, and would cause premature failure of BF Diaphragm during service operation.

As a general rule, Rod must be moved by operating air force.

Note : When manual driving of Rod with zero operating-pressure is required from necessity,

- (1) In Single acting type cylinder:
With the air port opened to atmosphere, pull Rod out slowly with as small stroke as possible.
- (2) In Double acting type cylinder:
With the air port of exhaust side plugged up by finger and the air port of suction side opened to atmosphere, move Rod slowly so that the air is released gradually from the plugged port to maintain invariably some residual pressure in the exhaust side.

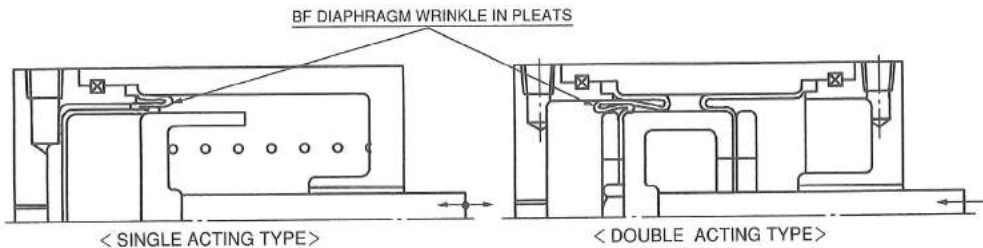


Fig.1

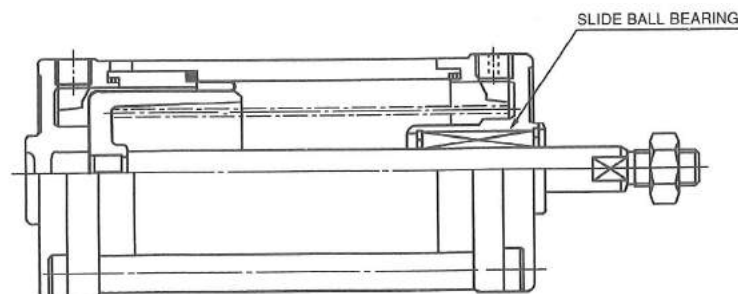
- b) Be sure BF Cylinder is kept always with its Rod upward during handling to prevent unexpected rod protrusion due to gravity. (For return-spring-less Single acting type and also for Double acting type cylinders, especially special care must be taken for Super Cylinder of spring-less type.)
- c) Provide meter-out device respectively by means of speed control valve preferably in close proximity to each air port of Cylinder so that a residual pressure of at least 0.1 kgf/cm² may be applied on each BF Diaphragm in the exhausting stroke during cylinder operations. (For Double acting cylinders only.)

2-2. Prevention of BF Diaphragm's Twisting

- a) As a rule, do not apply torque to rotate Rod during handling for avoiding BF Diaphragm failure.
- b) Do not apply torque to rotate Rod especially with pressure applied on Piston or even with no pressure applied in case after long term use.

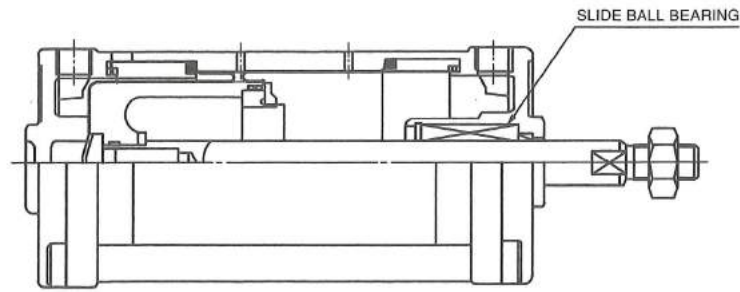
2-3. Lateral Load on Rod

- a) Do not apply lateral load on the Rod end.
Bending deflection of Rod due to lateral load would cause increased frictional resistance, leading to premature wear of the bearing metal of the BF Cylinder.
- b) In a design case involving unavoidable lateral load, or when minimum rod-friction is desired, a type of BF Cylinder with slide ball bearing Super Cylinder is available for use. (Consult our company.) (Fig.2-1, 2-2)



BF CYLINDER - SINGLE ACTING TYPE

Fig.2-1



BF CYLINDER - DOUBLE ACTING TYPE

Fig.2-2

2-4. No lubrication oil is required.

BF Cylinder requires no lubrication oil because of BF Diaphragm's rolling action, eliminating the need to install oiler in the pipe line.

2-5. Do not tighten excessively the pipe joints of Cylinder.

Although BF Cylinder body is made of high strength aluminum alloy, care must be taken to ensure that the pipe threads of Cylinder are not damaged due to excessive tightening of connecting pipe joints.

2-6. Internal shock load on Bonnet acted by Piston may cause failure of BF Cylinder body. Provide external stoppers on the machine parts at the stroke ends or reinforcing members (such as tie rods) on Cylinder to allow Cylinder body to be free from shock load.(Fig.3)

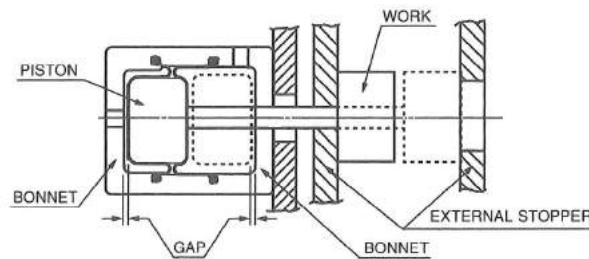


Fig.3

2-7. Installing BF Diaphragm

a) When replacing BF Diaphragm, be sure BF Diaphragm is installed so that the fabric side comes in contact with the side walls of Cylinder and Piston and the rubber side faces inside the annular convolution (pressure side).(Fig.4)

⚠ CAUTION:

If reversely installed, BF Diaphragm would be damaged promptly during service operation.

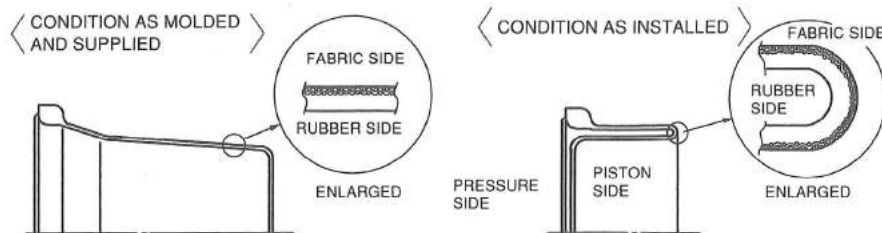


Fig.4

b) Apply lubricant such as molybdenum disulfide powder to both surfaces of BF Diaphragm before installing.

3. Installing BF Cylinder to Machine

3-1. Installing BF Cylinder Body to Machine Body

Regardless of the Cylinder type (single acting or double acting) and the installing position (upward, downward, or sideways), provide, as a rule, a temporary lock to hold Rod at the fully retracted position before installing Cylinder body (or Bonnet) to the machine body.

3-2. Coupling Rod End to Movable Parts of Machine

- a) Apply a slight air pressure thru the rod side port to assure regular rolling action of BF Diaphragm of front side.
- b) Then, apply an air pressure thru the piston side port to protrude Rod all the way out.

Note : (b) term is not necessary for an upwardly installed Cylinder.

- c) Tighten securely the nut to couple Rod end to the movable parts of machine with the rod end double flats held by a spanner wrench to prevent rotation of Rod.

3-3. Preventing wrinkling in Pleats of BF Diaphragm to be caused by Unexpected Protrusion of Rod (for Cylinders to be installed downward).

In cases where BF Cylinder is installed downward, special attention must be paid to prevent the wrinkling in pleats of BF Diaphragm caused by unexpected protrusion of Rod under the condition when air pressure supply is cut off.

- a) Prior to transporting or transferring the BF Cylinder-installed machine, provide a temporary mechanical lock on Rod.
- b) After finishing daily operating work, move Rod all the way down to stop at this safe position, then cut off whole air pressure supply.