

5A Series

Double-Acting Cylinder Actuator for Rotary Valves

Instruction Manual (Rev. A)



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Safety Precautions

IMPORTANT - Please read before installation

Masoneilan™ 5A Series Double-Acting Actuator instructions contain **DANGER**, **WARNING**, and **CAUTION** labels, where necessary, to alert you to safety related or other important information.

Read the instructions carefully before installing and maintaining your control valve. **DANGER** and **WARNING** hazards are related to personal injury. **CAUTION** hazards involve equipment or property damage. Operation of damaged equipment can, under certain operational conditions, result in degraded process system performance that can lead to injury or death. Total compliance with all **DANGER**, **WARNING**, and **CAUTION** notices is required for safe operation



This is the safety alert symbol. It alerts you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.



Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



Indicates a potentially hazardous situation which, if not avoided, could result in serious injury.



Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.



When used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, could result in property damage.

Note: Indicates important facts and conditions.

Introduction

The following instructions should be thoroughly reviewed and understood prior to installing, operating or performing maintenance on this equipment. Throughout the text, safety and/or caution notes will appear and must be strictly adhered to, otherwise, serious injury or equipment malfunction could result.

Baker Hughes has a highly skilled After Sales Department available for start-up, maintenance and repair of our Masoneilan valves and component parts.

Arrangements for this service can be made through your local Baker Hughes Representative or After Sales Department. When performing maintenance, use only Masoneilan replacement parts. Parts are obtainable through your local Baker Hughes Representative or Spare Parts Department. When ordering Masoneilan parts, always include Model and Serial Number of the unit being repaired.

Description

The installation and maintenance instructions apply to Masoneilan 5A Series double-acting actuators.

The 5A Series is a double-acting actuator offered for Globe Rotary Valves. It offers high capacity while providing excellent seat leakage performance in both directions. The ability to quick removal and replacement of the valve components during maintenance saves valuable plant downtime.

This manual is a supplementary explanation of the instruction manual regarding the installation, removal, and maintenance of the Double-Acting Cylinder Actuator that is installed on the *Camflex*™ II valve.

Double-acting air cylinders can be mounted on Camflex valves size 6" and above. It is usually used to replace the standard spring-diaphragm actuator when the valve pressure drop is high or when the air pressure is insufficient.

The actuator piston operates only by compressed pneumatic air, and no spring is used. One side of the piston is loaded with air at a constant pressure through positioner. In contrast to this pressure, the output pressure of the operation instrument is exhausted through accessories.

If a safer actuation system is required when the air source is drained, the valve is fitted with an air volume tank and transfer valve operates for the desired actuation.



CAUTION

Verification of the Camflex valve shaft mechanical stress is mandatory according to the shaft material and service temperature

1. Actuator Disassembly (see Figures 1-3)

As shown in Figures 1 & 2, the actuator is always mounted on the left side of the yoke and closes the valve when the actuator stem retracts into the cylinder. However, it can be installed vertically or horizontally to the pipes, according to the surrounding obstacles.

WARNING

Before performing maintenance, isolate the valve to release the process pressure and shut off the supply to the actuator and the signal air line.

Follow the steps below to change the actuator mounting position, or remove the actuator and yoke from the valve.

- A. Remove two cover screws (30) and remove front cover (32) and rear cover (29).
- B. Remove the snap-in bottom cover (11).
- C. Return the handwheel (53) so that it does not interfere with the operation of the lever (34). If you have a limit stop as an option, return the limit stop as well.
- D. Remove retaining ring (5) and clevis pin (7).
- E. Attach the lift or support to the actuator.



Make sure the proper lifts or supports are used before proceeding to the next step. Also, make sure that the air piping is removed.

- F. Loosen the cap screw (36) and lock washer (37) holding the cylinder (71) and remove it.
- G. Remove the cylinder (71) from the yoke (33).

CAUTION

If the valve is reassembled with the same actuator mounting position.

To facilitate positioning and reassembly, a matching mark on the yoke and lever in the fully closed position is provided - see Figure 2.

- H. Loosen the lever cap screw (49).
- I. Remove the packing flange stud nut (13A).
- J. Install the lift or support on the yoke (33).
- K. Loosen the body stud nut (27)
- L. Remove the yoke from the body.
- M. Refer to Figure 4 to determine the desired mounting position of the actuator on the valve body.

1. Actuator Disassembly (Cont.) (see Figures 1-3)



Remove the yoke (33), lever (34), and packing flange (14) together.

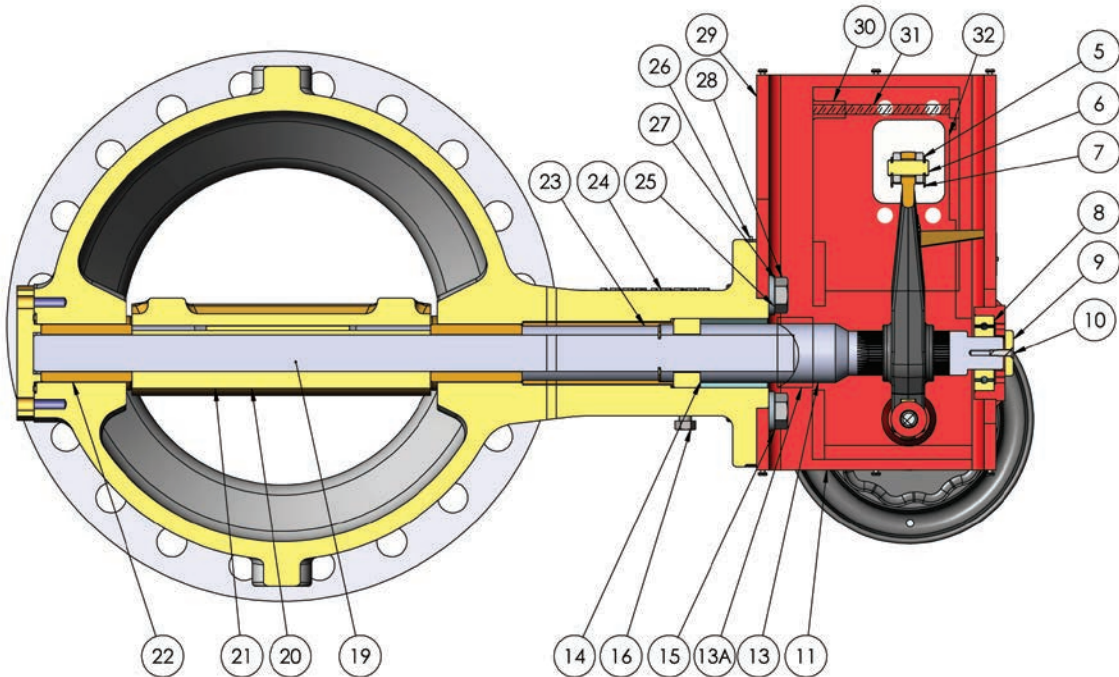


Figure 1

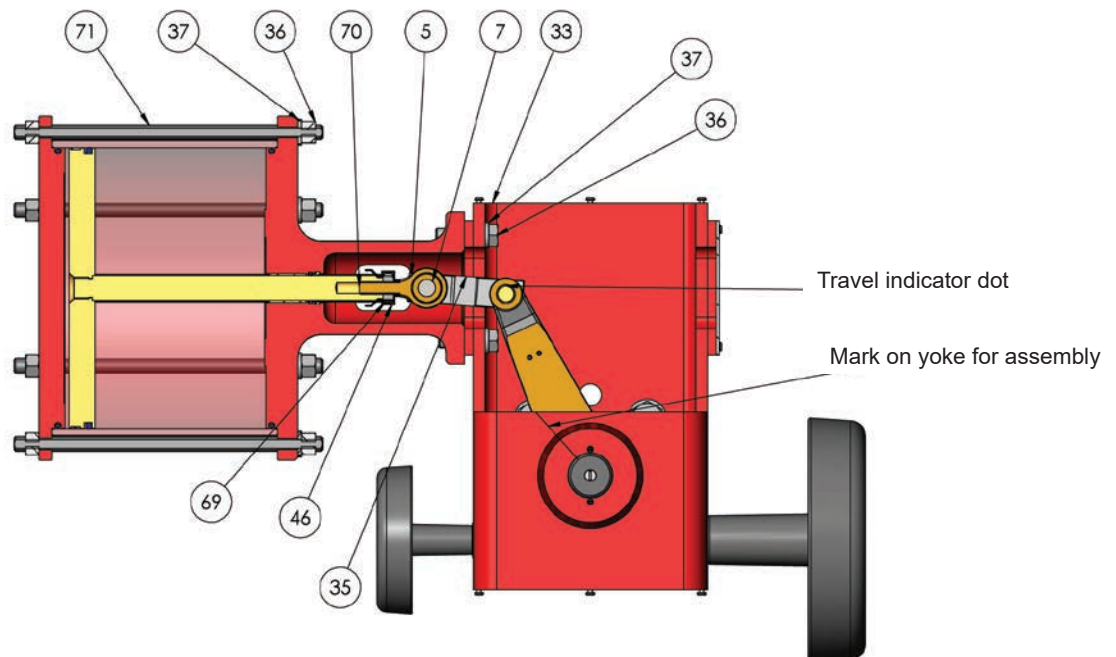


Figure 2

1. Actuator Disassembly (Cont.) (see Figures 1-3)

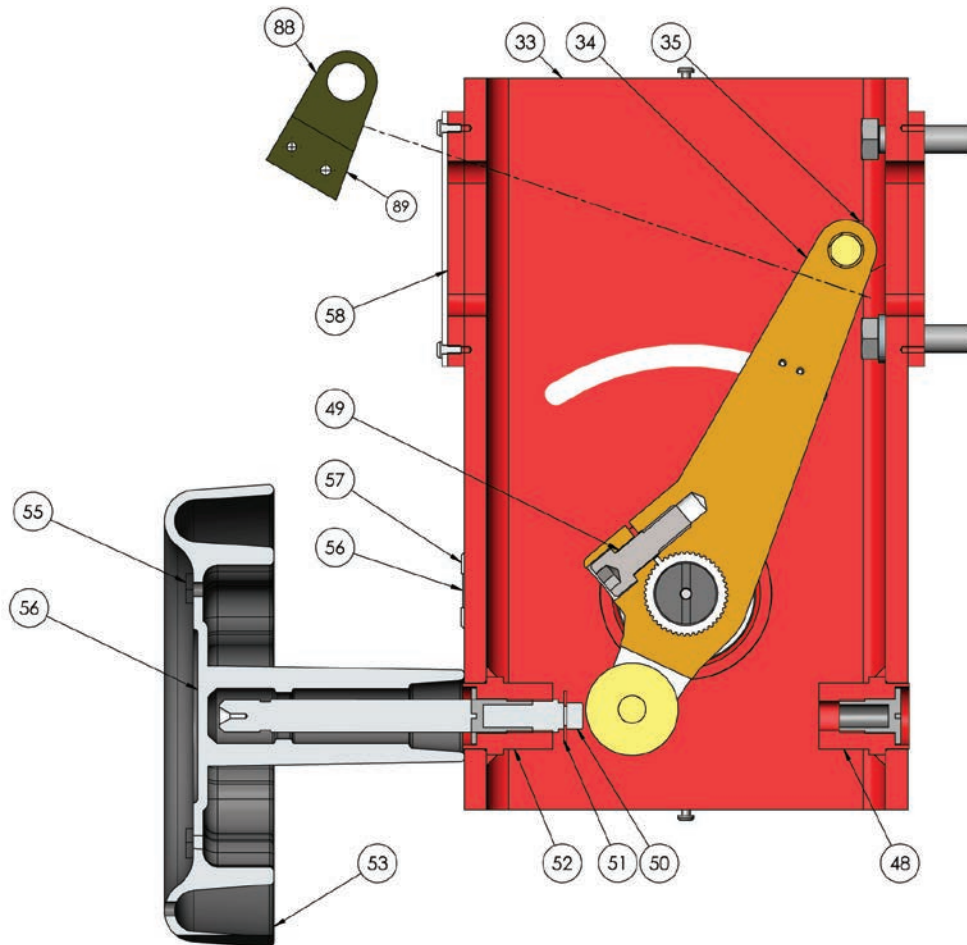


Figure 3

Note: The actuator is always mounted on the left side of the yoke with the valve closed when the actuator stem retracts. Installation is limited to the locations shown. Mounting positions limited to 2 only.

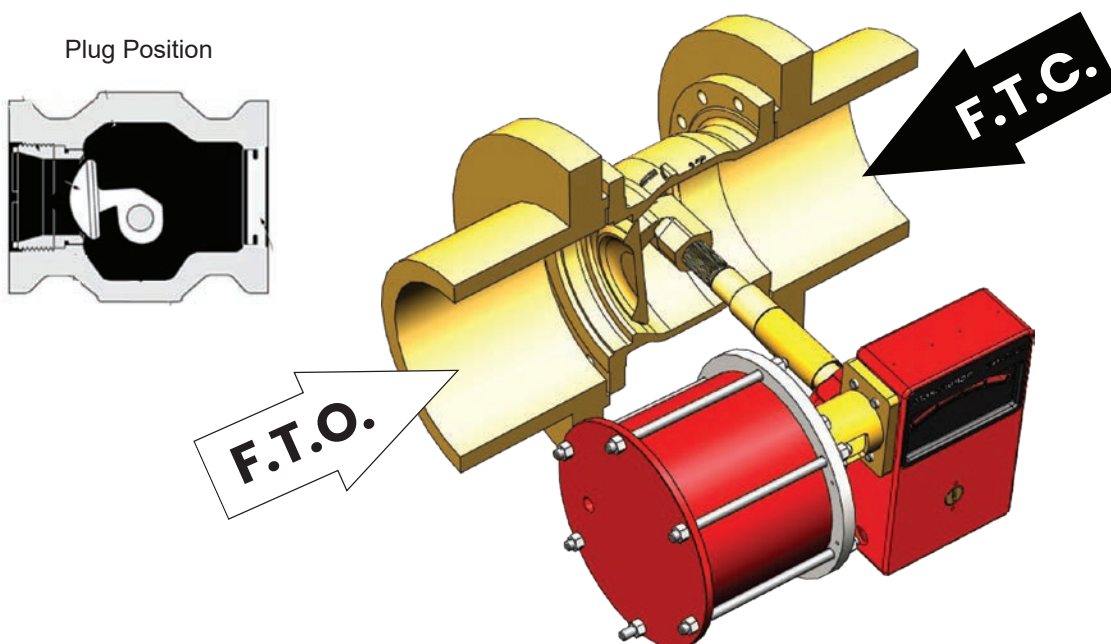


Figure 4

2. Maintenance

Preventive maintenance of double-acting cylinder actuators is to check the shaft for damage such as an o-ring and prevent premature wear. Replacement o-rings can be obtained through our agency or sales office. If problems occur during maintenance, please contact our factory.

Also pay utmost attention to the sliding surface damage and surface roughness of the cylinder internal diameter.

Pay particular attention to:

- Burrs and surface roughness of the O-ring groove
- Burrs, sliding part damage,
- Surface roughness of the piston rod
- Damage and deterioration of the O-ring
- Sliding part damage of the piston

3. Reassembly

Follow the procedure below to reassemble after necessary maintenance or to change the mounting position of the valve and actuator.

- A. Determine the correct mounting position for the valve and actuator.
- B. If necessary, change the mounting positions of the body stud (28) and packing flange stud (13).

CAUTION

When the yoke is installed, the body stud (28) (shorter stud) must be in the opening of the yoke.

- C. Make sure the grommet (12) and shaft bearing (8) are mounted on the yoke. Rotate the shaft and seat the plug.
- D. Insert the yoke and packing flange (14) into the shaft (19).

Note: *Insert the packing flange (14) into the shaft (19) with the concave side facing the packing (17).*

- E. Make sure that the groove on the packing flange (14) fits into the packing flange stud (13).
- F. With the packing flange on the shaft, pass the shaft through the grommet (12) of the yoke (33).

- G. Put the lever on the shaft so that the boss on one side of the shaft hole of the lever (34) faces the shaft bearing (8), and engage the spline.

CAUTION

When the plug is fully closed, engage the shaft and lever so that the lever indicator dot indicates the fully closed position. Temporarily attach the front cover and check the position of the indicator dot. If the fully closed position indicator line on the front cover is not aligned with the indicator dot, reposition the lever.

- H. Completely insert the shaft into the shaft bearing (8).
- I. Install and tighten body stud nut (27).
- J. Attach the packing flange stud nut (13A) and tighten it with your finger.
- K. Move the lever (34) on the shaft (19) towards the body and tighten the lever cap screw (49)
- L. Pull the shaft, along with the lever, firmly towards the shaft bearing of the yoke to engage the shaft shoulder and shaft bearing.
- M. Loosen the lever cap screw (49), move the lever (34) to the position where it hits the shaft bearing (8), and tighten the lever cap screw again.
- N. As shown in Figure 2, be sure to install the cylinder on the left side of the yoke and fix it with the four cap screws (36) and lock washers (37).
- O. Proceed to the next section, Actuator Stem Adjustment.

4. Actuator Adjustment (see Figures 2-4)

Adjusting the actuator stem and lever is very important to get a tight shutoff and the full stroke of the actuator.

Adjustments are usually required when the actuator-yoke assembly changes the relationship with the body.

CAUTION

Adjustment is always performed with the lever (34) and plug (4) in the fully closed position and the actuator stem retracted into the fully closed position.

Follow the steps below with the actuator and yoke attached to the body

- A. Please connect the air supply pipe to the actuator.
- B. Remove the cap screw (30) and the front cover (32) and rear cover (29).
- C. Apply air pressure to the actuator and move it to the intermediate position.

CAUTION

Do not operate the handwheel.

Note: *Some Camflex models have an adjustable indicator (88) that is fastened with two screws (89). In that case, remove it before completing Step D.*

- D. Remove the clevis pin clip (5) and clevis pin (7).
- E. Move the actuator stem to the most retracted position.

Note: *In the mode in which the valve opens when the air pressure increases, release the air pressure on the output side of the positioner shown in Fig. 5. In the mode in which the valve is closed by increasing the air pressure, apply the positioner supply pressure of the valve used to the positioner output side so that the actuator stem retracts completely.*

- F. Manually move the lever (34) to the fully closed position.
- G. The clevis pin hole of the lever (34) and the hole of the clevis (35) should be assembled.

- H. Move the lever to the fully open position.
- I. Depending on the actuator mode, either apply or release air pressure to the actuator, move the end bearing lock nut (46) to a position where it can be reached, and loosen the lock nut (46).
- J. Rotate the rod end bearing (69) in the direction aligning to lever.
- K. Move the lever (34) to the intermediate position.
- L. Depending on the actuator mode, gradually apply or release air pressure so that the holes of the clevis (35) and lever (34) are aligned.
- M. Insert the clevis pin

Note: *Install the clevis pin (7) so that it extends toward the front cover (32).*

- N. Install the clevis pin clip (5) so that it extends toward the front cover (32).
- O. Tighten rod end bearing lock nut (46)
- P. Install Adjustable Indicator (88) if used
- Q. Attach the front cover (32) and rear cover (29) and fasten with the cover screw (30).

Note: *It is recommended to try operating the valve for one cycle in order to check the functioning properly and the indicator core.*

- R. Install valve in use, set handwheel as limit stop if necessary, and tighten handwheel locknut (52).

5. Actuator Operation Change

If required, the actuator operation (valve closed when air pressure increases or valve open when air pressure increases) can be changed. Figure 5 shows on which

side of the actuator the air tubing should be connected to achieve the desired actuation. Figure 5 shows an example of piping when using a volume tank.

CAUTION

The actuator will always close the valve when the actuator stem is retracted.

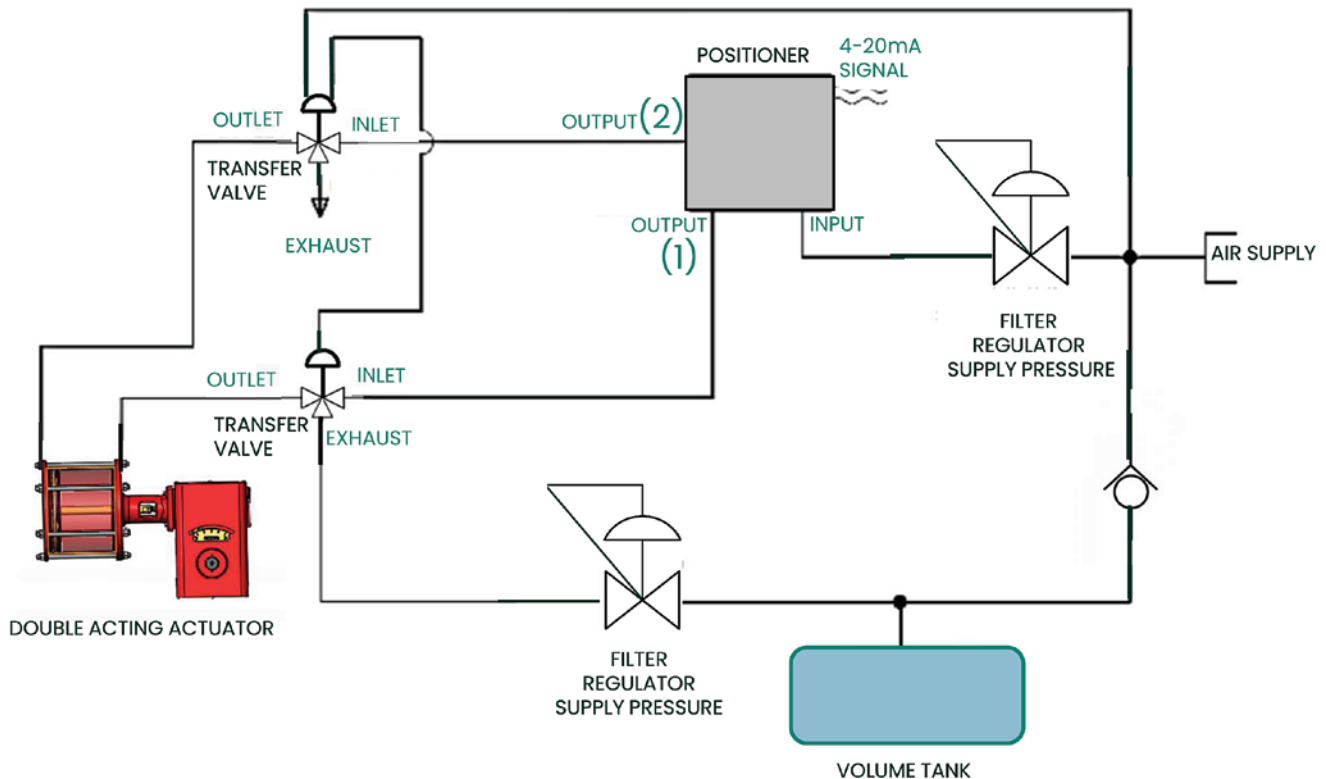


Figure 5

6. Installing the Handwheel

Mount the handwheel on the yoke both the sides (higher diameter wheel installed opposite to actuator, and lower diameter wheel installed on the actuator side - see Figure 2).

The handwheels can be easily removed by removing the toruarc ring (50). Also, after installing the handwheel, return the handwheel until the washer (51) hits the yoke lightly, and fix it with the handwheel lock (52) at that position.

Note: When using the handwheel, simply loosen the handwheel lock (52) and rotate it. Also, the handwheels can be used as a valve limit stop by locking it in place.

Parts Reference

Ref	Part name	Ref	Part name	Ref	Part name
1	Body	29	Rear cover	58	Boss cover
2	Seat ring	30	Cover screw	60	Cover-Flange
3	Retainer	31	Screw retainer	61	Gasket
4	Plug	32	Front cover	64	Stud
5	Clevis pin plug	33	Yoke	67	Stud
6	indicator dot	34	Lever	68	Nut
7	Clevis pin	35	Clevis	69	Rod End bearing
8	Bearing	36	Cap screw	70	Piston cylinder stem
9	Shaft cover	37	Lock washer	71	Piston cylinder
10	Cover screw	38	Spring Barrel	77	Limitstop
11	Bottom cover	39	Spring	78	Nut
12	Grommet	40	Diaphragm	88	Adjustable indicator
13	Packaging Flange Stud	41	Cap screw	89	Indicator screw
14	Packaging Flange	42	Diaphragm case	90	Inner O-ring
15	Packaging Follower	43	Piston-stem	91	Outer O-ring
16	Safety pin	44	Lock washer	92	Inner O-ring
17	Packing	45	Lock nut	93	Outer O-ring
18	Shaft retaining ring	46	Lock nut	94	Nut
19	Shaft	48	Thread plug	95	Inner O-ring
20	Spacer	49	Lever cap screw	96	Outer O-ring
21	Upper Guide	50	Truarc ring	100	Stop ring
22	Lower Guide	51	Handwheel Washer	101	Body Gasket
23	Packing Box ring	52	Handwheel lock	102	Bonnet
24	Warning plate	53	Handwheel shaft	103	Bonnet stud
25	Flow arrow	54	Handwheel plate	104	Bonnet nut
26	Plate screw	55	Plate screw	105	Lo-dB plate
27	Nut	56	Serial plate	106	Adaptor screw
28	Body stud	57	Plate screw	107	Adaptor

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