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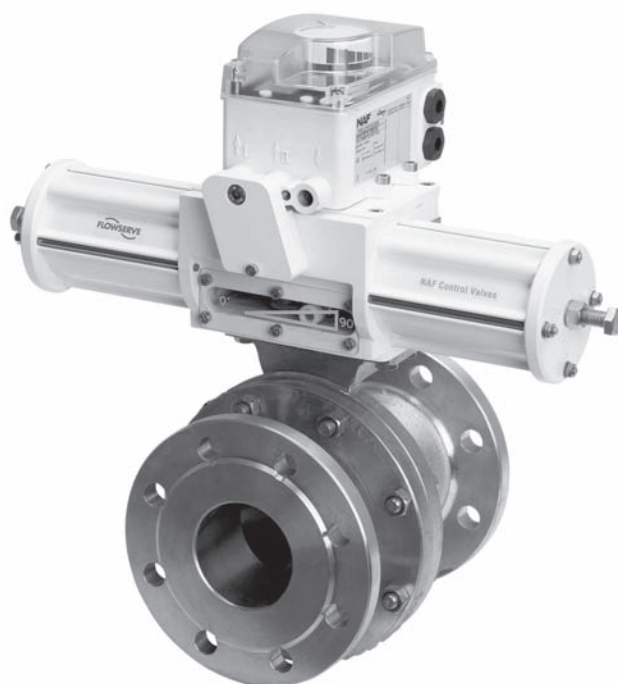
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SAFETY

- Assess all the risks to eliminate the risk of personal injury and material damage. Read these instructions thoroughly!
- Always use the necessary protective equipment and comply with applicable safety directives when working with hazardous or hot/cold medium.
- Never operate a valve without first ensuring that there is no risk of crush injuries. The risk is highest with automatic valves.
- Take necessary safety precautions to prevent unintentional manoeuvre - i.e to atmosphere.
- Never dismantle a valve or part of a valve without ensuring that the line is free of pressure and any content.
- Ball valves must always be dismantled in semi-open position to avoid trapping pressure and medium.
- Always check that the valve type and material is suitable for its intended use. This applies especially to highly oxidising and corrosive medium. Observe also the risk of erosion and explosion as well as decaying medium. If in doubt, always request a written recommendation from NAF AB.

1. General

This instruction is valid for NAF-Trunnball ball valves in accordance with catalogue sheet Fk 41.66 GB.



2. Lifting

All lifting must be made in the valve itself and not in the actuator. The joint between the valve and the actuator is designed principally for carrying the operating torque and the deadweight of the actuator (see Fig. 1).

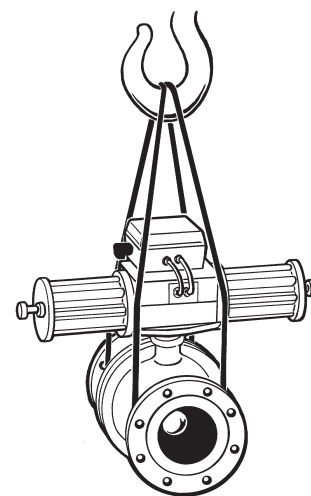


Fig. 1. Lifting of the valve

3. Receiving inspection

All valves leaving our works are inspected and tested in accordance with the relevant requirements or in accordance with the special conditions specified by the customer. Valves equipped with actuators are subject to functional testing and are adjusted in such a manner that every unit is completely ready for direct installation in the pipework. However, in view of damage that may have occurred during transport, it is advisable that receiving inspection is performed, if possible.

We would suggest the following inspection procedure:

- Check that the **valve delivered is correct in terms of type, size, equipment, etc.**
- Examine the valve, actuator and valve positioner **regarding possible damages.**

4. Installation

Before installing the valve, ensure that **the pipework is free from impurities**, that the pipe ends between which the valve is to be installed are parallel and are correctly aligned, and that the distance between the pipe ends corresponds to the valve length, including gaskets. **The valve must not be used for drawing together or aligning incorrectly run pipes** as this will cause needless loads on the valve and pipe which may lead to difficult damages during operation. See Fig. 2.

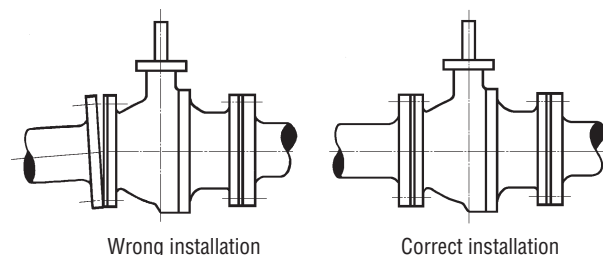


Fig. 2. Ensure that the pipe ends align and have the correct distance

NAF-Trunnball valves can be installed in any position and with optional flow direction.

However, we recommend that, if installed in a horizontal run of pipe, the valve should be mounted with the stem pointing vertically upwards. If the valve is installed in a vertical run of pipe, the body half (2) according to fig. 3 should be at the top to enable the ball and the seat ring to be replaced without the need for removing the valve from the pipework.

The pipes should be supported on each side of the valve, in order to relieve the valve of loads and avoid vibrations.

Locate the valve so that it will be easily accessible for inspection and service, particularly if the valve is equipped with an actuator and a valve positioner.

5. Flange Gaskets

Gaskets with sizes according to ANSI B16.5 1988, Table E1 Figure E2, SS 359 or DIN 2690 are recommended.

6. Starting up

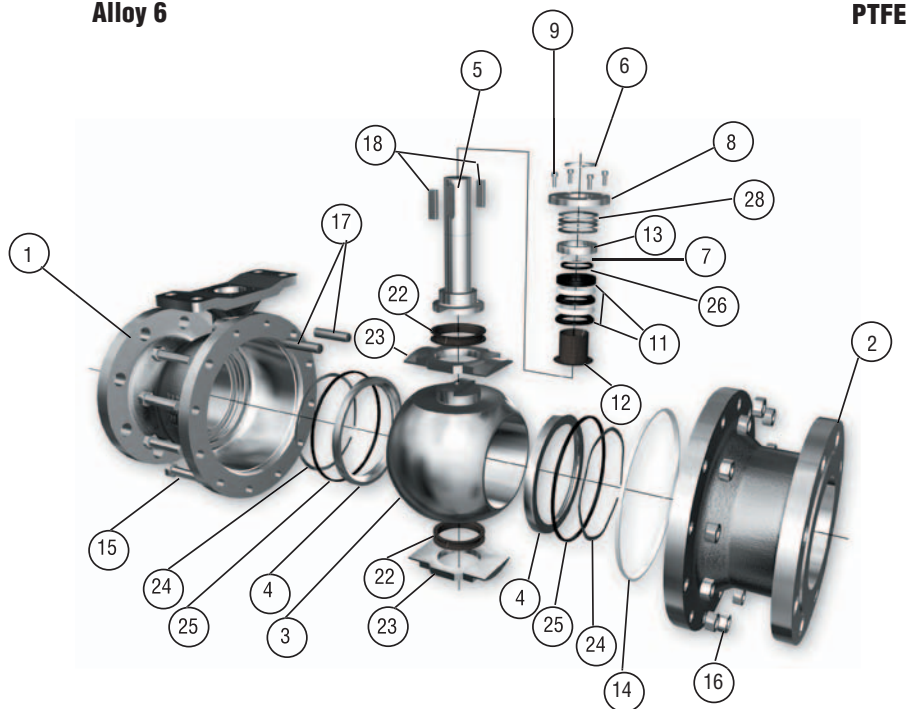
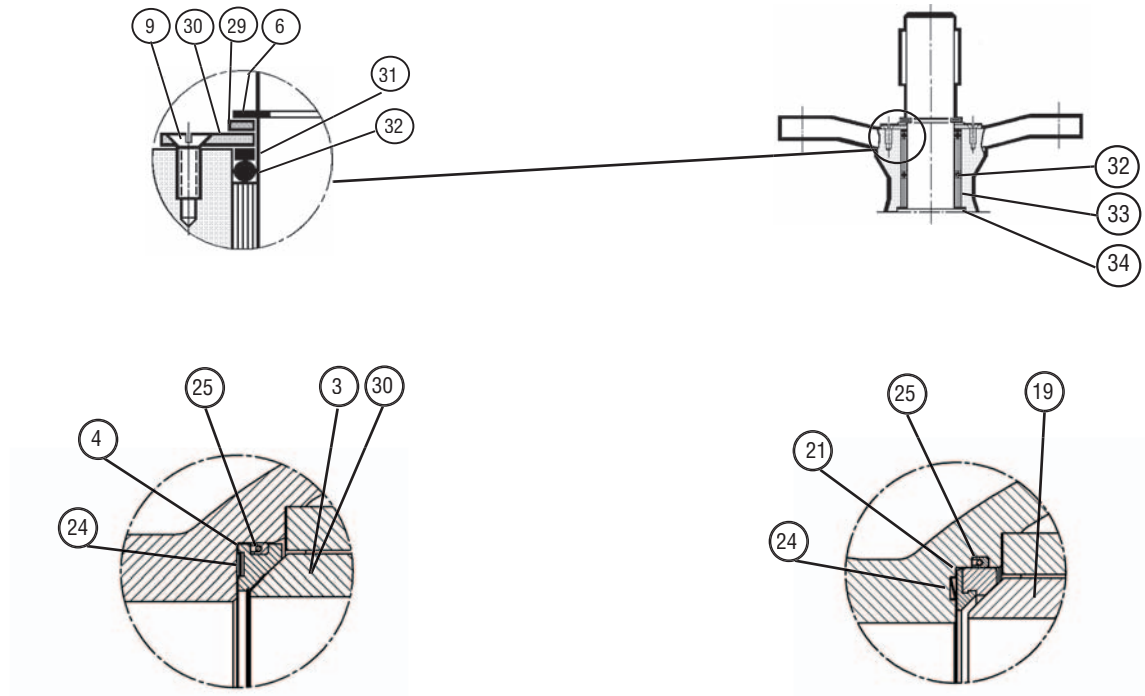
Before starting up, flush the pipework - with all valves in the open position - so that any impurities that may damage the sealing surfaces of the valve and impede its operation will be flushed away.

See also Fi 41.82 - Instruction Manual for NAF valve positioner giving useful hints for starting up.

7. List of Materials and Spare Parts

Item No.	Qty.	Part	Material
1	1	Body	EN 1.4408/CF8M
2	1	Body	EN 1.4408/CF8M
3	1	Ball hard chrome	EN 1.4408/CF8M/Hcr
4	2	Seat ring	Alloy 6
5	1	Stem, assembly	EN 1.4460
6	1	Circlip	Spring steel
7	1	Backing ring	PTFE
8	1	Upper lid	EN 1.4436
9	4	Screw	A4
11	1	Packing box	PTFE/PTFE+25%C
12	1	Bushing	PTFE+1.4401
13	1	Anti-friction washer	EN 1.4436
14	1	Sealing ring	PTFE
15	10	Screw	A4-80
16	12	Nut	A4
17	2	Screw	A4-80
18	2	Key	A4
19	1	Ball	EN 1.4408/CF8M
20	1	Ball	Alloy 6
21	2	Seatring	EN 1.4436/PTFE+25%C
22	1	Bearing	PTFE+1.4401
23	2	Trunnion plate	EN 1.4470
24	2	Spring	ASTM A316
25	2	Sealing ring	PTFE+15%Graphite
26	1	O-ring	FPM
28	1	Spring	ASTM A316
29	1	Supporting ring	Spring steel
30	1	Washer	A4
31	1	Supporting ring	PTFE
32	2	O-ring	EPDM
33	2	Bushing	PTFE reinforced carbon
34	1	Sliding washer	PTFE reinforced carbon

Stem Sealing
with o-rings type 898X9X-XXXX



Type 898_EF-XXXX-BABADA

Fig. 3
NAF-Trunnball
Spare parts
Stem sealings and seatrings versions

7. Ordering of Spare Parts

When placing orders for spare parts, specify:

1. Product code of the valve, incl. DN according to Fk 41.66 and the manuf. No. specified on the identification plate of the valve.
2. Description of the part, item No and the quantity required - see table below.

Ordering example

For NAF 8982EF-0200-BABADA, Manuf. No. 1234567
Seat ring, item 4. Qty 2 pcs.

Spare parts

Item No	Description	Qty	150 6"	200 8"	250 10"	300 12"	400 16"	450 18"	500 20"	600 24"	700 28"	800 32"
Stem sealing kit												
7	Supporting ring	1 pc	X	X	X	X	X					
11	Packing box	1 pc	X	X	X	X	X					
26	O-ring	1 pc	X	X	X	X	X					
31	Supporting ring	1 pc						X	X	X	X	X
32	O-ring	2 pcs						X	X	X	x	X
33	Bushing	2 pcs						X	X	X	X	X
34	Sliding washer	1 pc						X	X	X	X	X
Spring kit												
28	Spring washer	4 pcs	X	X	X	X	X					
Metaloplast bearing kit												
12	Metaloplast bearing	1 pc	X	X	X	X	X					
22	Metaloplast bearing	2 pcs	X	X	X	X	X	X	X	X	X	X
Bodyhalf sealing												
14	Bodyhalf sealing	1 pc	X	X	X	X	X	X	X	X	X	X
Seatring												
4	Alloy 6	1 pc	X	X	X	X	X	X	X	X	X	X
20	PTFE	1 pc	X	X	X	X	X	X	X	X	X	X
(2 pcs for each valve)												
Sealing behind the seatring												
25	Sealing	1 pc	X	X	X	X	X	X	X	X	X	X
(2 pcs for each valve)												
Wave spring												
24	Wave spring	1 pc	X	X	X	X	X	X	X	X	X	X
(2 pcs for each valve)												
Ball												
3	EN 1.4408	1 pc	X	X	X	X	X	X	X	X	X	X
19	EN 1.4408/Hcr	1 pc	X	X	X	X	X	X	X	X	X	X
20	Alloy 6	1 pc	X	X	X	X	X	X	X	X	X	X

8. Maintenance

Many valves are installed in such locations that their performance is of decisive importance to the entire process. Such valves should be inspected regularly and any faults should immediately be corrected.

8.1 To remove the valve from the pipework

No special tools are needed for the inspection and maintenance.

1. Ensure that the recommended spare parts and gaskets for the pipe flanges are available.
2. Close the valve.
Before dismantling the valve, **make certain that it is completely empty**. Operate the valve several times between the open and closed positions to ensure that the space between the valve body and ball is not under pressure.

Caution! The liquid in the valve may be harmful.

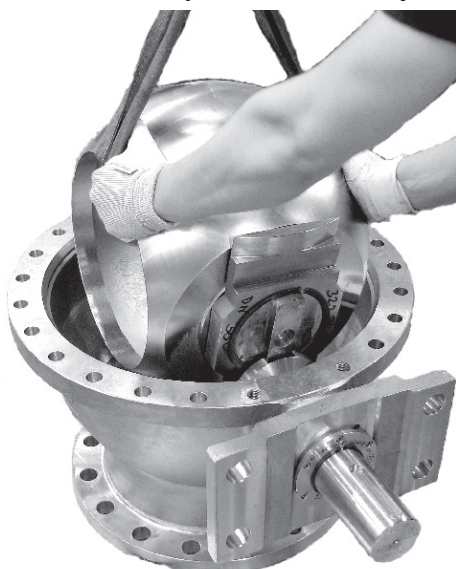


Fig. 4. Lifting the ball with the valve in closed position - here with the valve on a work bench. It can also be done with mounted actuator and the body (1) mounted in the pipework.

3. Shut off all compressed air connections and isolate all electrical connections to the actuator.
4. Disconnect all compressed air lines and electric cables connected to the actuator.
5. Loosen the flange joint between the valve and the pipework. Then lift out the valve. Don't use the actuator for lifting. **Apply all lifting forces to the valve itself and not to the actuator** - Fig. 1.

N.B. In certain applications, the pipe can be disconnected from one side of the valve, and the body half (2) - Fig. 3 - can be removed, without the need for removing the whole valve from the pipework.

6. **Mark the relative positions of the body halves by centre-punching before the dismantling**, since the pattern of the holes drilled in the valve flange and pipe flange may vary.

8.2 To inspect and replace the ball and seatings

1. **The actuator does not need to be removed** for replacing the seatring and ball.
2. Operate the valve to make **certain that it is completely empty**. Close the valve.
3. Remove the bodyhalf (2).
4. Remove the ball and the trunnion plates - easy to do when the valve is in closed position.
5. Remove the trunnion plates and the metaloplast bearing from the bearing journal of the ball.
6. Carefully inspect the ball and the seatings.
7. Clean all parts carefully. First use hot water and then, if necessary, some degreasing compound. Do not scrape any machined surfaces with hard tools.

8.3 Valves with seatings in PTFE

1. To ensure good tightness of the valve, change the seatings, wave springs and sealings if they are worn or damaged.
2. Mount the wave spring and sealing ring (pos 24 and 25) behind the seatring (pos 20).
3. Inspect the ball. Minor damage to the sealing surface can be removed by polishing with fine emery cloth. If the ball has major damages, it must be replaced to ensure satisfactory tightness.
4. Change sealing ring (14) between the two body-halves.
5. Change the metaloplast bearing in the trunnion plates.
6. Mount the bearing plates on the bearing journal of the ball.
7. Coat the ball with Molycote U. If the valve is intended for service in an oxygen system, the ball can be coated with silicone grease, which is approved for oxygen applications.
8. Lubricate all stainless steel bolts with suitable grease, i.e. Crane Packings's Thread-Grade or Gleitmo 600.
9. Mount the ball and the bearing cage in the bodyhalf (1) and then the upper bodyhalf (2). Make sure that the centrepunch marks made according to section 8.1 item 6 are lined up. Tighten the bolted joint of the two bodyhalves alternately in several stages and tighten them finally as per the table below.
10. Torque for tightning of the bolted joint:

Bolt	Torque NM	Bolt	Torque Nm
M12	76	UNC 1/2"	89
M16	187	UNC 5/8"	175
M20	364	UNC 3/4"	308
M24	629	UNC 7/8"	493
		UNC 1"	737

11. Operate the valve between closed and open positions.
12. If possible, pressure test the valve with water to check its tightness - Fig. 5. **Make sure that the cavities of the valve are properly filled** with water before the pressure testing. The valve should be pressure tested as follows:

Open valve: PN x 1,5

Closed valve: Max dp x 1,1

8.4 Valves with chromium-plated ball and seatings in alloy 6

1. Check the sealing surfaces of the seatings. A groove on the inside of the ring facilitates withdrawal. Minor damage to the rings can be polished with fine emery cloth. Check the rings on a face plate to ensure that they are perfectly flat. Do not lap the rings and the chromium-plated ball together. Change the rings if they are severely damaged.
2. Inspect the sealing surface of the ball. Minor damage may be polished with fine emery cloth. If the existing ball must be used for a further period of time, remove all sharp edges, dents and irregularities with a fine file or emery cloth. Check the circularity of the ball. The tolerance is 0.04 mm. If the ball is seriously damaged, it must be replaced.
3. Mount the wave spring and the sealing ring (24 and 25) behind the seating.
4. Change the sealing ring (14) between the body halves.
5. Lubricate the ball with a suitable grease, such as Molykote U.
6. Continue assembling the valve as described in section 8.3 item 8-12.

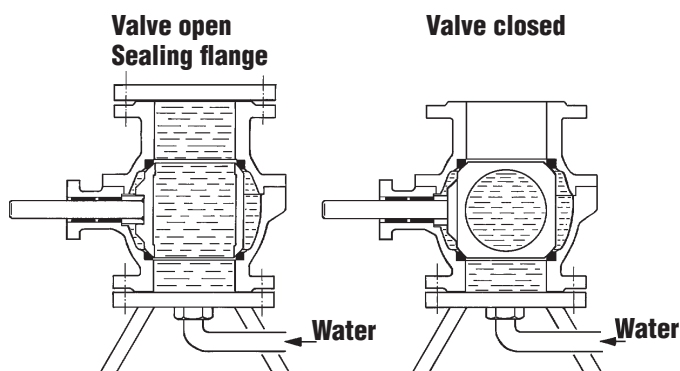


Fig. 5. Pressure test of the valve with water

8.5 Valves with ball and seatings in alloy 6.

1. The instructions for these valves are the same as those in section 8.4 above.
2. If the sealing surfaces are damaged, we recommend that the valve is returned to NAF for repair. This applies especially if the ball must be ground before lapping. Assemble the valve before dispatching it to NAF.
3. The ball and seat rings can be temporarily renovated by lapping them together. This can be done manually with a compound with grit size 200. Take great care to ensure that the ball and seat rings do not become oval.
4. Balls in alloy 6 must be carefully cleaned and lubricated before they are mounted. Use a suitable solvent for cleaning. Then lubricate the ball with silicone grease, such as Molykote Dow Corning FS3452. The coat of grease must be very thin. Then polish the ball with chamois leather or a piece of soft cloth.

8.6 To change the stem bearing and sealing on valves with packing box type PSDCL (DN150-DN400) i.e. type 8982EF-XXXX-BABADA

1. Dismount the actuator. Remove the screws that from the underside of the mounting plate of the valve keeps the actuator in place.
2. Lift off the actuator from the valve. Remove the keys.
3. Dismount the valve according to section 8.2.
4. Remove the circlip (6), loosen the screws (9) and remove the upper lid (8). Note! The upper lid is prespringloaded.
5. Remove the springs (28).
6. Press the stem down into the body and remove it.
7. Pick up the anti-friction washer (13), supporting ring (7), o-ring (26) and packing box (11).
8. Dismount the bushing (12) by pressing it into the body.
9. Mount a new bushing (12) by pressing it up through the body.
10. Lubricate a new packing box (11) with silicone grease before you press it down into the body. Note that the broadest of the 5 rings should be on top, see fig 3 on page 3.
11. Mount the stem by pressing it from the inside of the body and out.
12. Mount the supporting ring (7) in the anti-friction washer (13), lubricate a new o-ring (26) with silicone grease and mount it in the anti-friction washer. Mount the anti-friction washer with the o-ring downwards against the valve.
13. Mount the remaining parts in reverse order from item 5 to 1.

8.7 Change of the upper stem sealing with o-rings (DN450-DN800) i.e. type 898295-XXXX

Change the upper o-ring (32) if the stem sealing is leaking. It is not necessary to remove the valve from the pipe-works. Change the complete stem bearing according to section 8.8 at the next service. Make sure that the valve is pressureless.

1. Dismount the actuator. Remove the screws that from the underside of the mountingplate of the valve keeps the actuator in place.
2. Lift off the actuator from the valve. Remove the keys.
3. Remove the circlip (6) and the supporting ring (29).
4. Loosen the screws (9) and remove the washer (30) and the anti-friction washer in PTFE (31).
5. Change the upper o-ring sealing (32). Lubricate the new ring with silicone grease before it is mounted.
6. Mount in reverse order.

8.8 Replacement of stem bearing and sealing (DN450-DN800) i.e. type 898295-XXXX

Dismount the valve from the pipeworks. Please note the instructions in sections 2 and 8.2 concerning lifting and emptying of the valve.

1. Remove the actuator as described in section 8.7, item 1 and 2.
2. Remove the Circlip (6) and supporting ring (29).
3. Loosen the screws (9) and remove the washer (30) and the anti-friction washer of PTFE (31).
4. Dismount the valve according to section 8.2.
5. Press the stem down into the body and remove it.
6. Pick up the upper o-ring (32).
7. Push up both the bearing bushings (33) and the intermediate o-ring (32).
8. Mount new bushings and o-rings after they have been lubricated with Silicone grease. Change also the sliding washer (34) on the stem.
9. Mount the stem and the other parts in the reverse order.
10. Mount the valve according to section 8.3. Before that consider to change the seatrings or lapping of the seatrings and ball.
11. If possible, pressure test the valve and retighten the bolts according to section 8.3.

8.9 Mounting the actuator to the valve

1. Mount the actuator. The actuator may be mounted either in line with the connected pipes or transversely to them. For mounting in line with the connected pipes an intermediary plate is required

2. Ensure that both the valve and the actuator are in the closed position before mounting the actuator. The valve is in the closed position when the keyway on the stem is in the direction of flow. (An actuator which uses compressed air to close the valve and a return spring to open the valve should be mounted with the actuator and valve in the open position.)

N.B. The direction of closure must always be clockwise, as viewed from the actuator.

3. Before fitting a new actuator, check that the actuator slides easily onto the stem when the keys are not fitted. Check also that the keys fit freely into the keyways in the hollow shaft of the actuator. Deburr if necessary. Lubricate the hollow shaft of the actuator and push it in over the threaded sleeve. Mount the actuator onto the stem. Mount the bolts and nuts, and tighten them.
4. Check the function and check that the end stops have been correctly preset. If necessary, make adjustments.
If any accessories such as valve positioner or limit switches should be mounted, please see the corresponding manufacturer's instructions for installation and adjustment.

