

Contents

SAFETY

General	1
Lifting	2
Receiving inspection	3
Installation	4
Flange gaskets	5
Starting up	6
List of materials and spare parts	7
Ordering of spare parts	8
Maintenance	9
To remove the valve from the pipework	9.1
To inspect and replace the ball and seat rings	9.2
Valves with PTFE seat rings	9.3
T-version	9.4
Valves with chromium-plated ball and seat rings in alloy 6	9.5
Valves with ball in alloy 6 and seat ring	9.6
To change the upper stem seal	9.7
To change the stem bearing and seal	9.8
To inspect and replace the packing of graphite type	9.9
Fitting the actuator to the valve	10



SAFETY

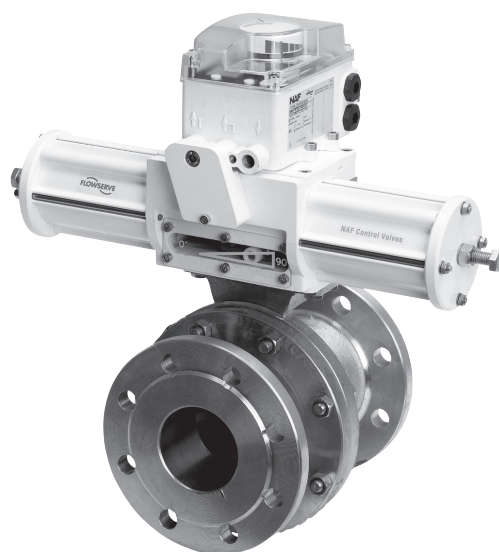
- Assess all the risks to eliminate the risk of personal injury and material damage. Read these instructions thoroughly!
- Always use the necessary protective equipment and comply with applicable safety directives when working with hazardous or hot/cold medium.
- Never operate a valve without first ensuring 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

The instructions and list of spare parts in the succeeding are applicable to NAF-Duball ball valves in accordance with catalogue sheet Fk 41.61GB.

The product codes of NAF-Duball valves are as follows:

888225-XXXX ¹⁾	888226-XXXX ¹⁾	888227-XXXX ¹⁾
888425-XXXX ¹⁾	888426-XXXX ¹⁾	888427-XXXX ¹⁾
888525-XXXX ¹⁾	888526-XXXX ¹⁾	888527-XXXX ¹⁾
888625-XXXX ¹⁾	888626-XXXX ¹⁾	888627-XXXX ¹⁾
888725-XXXX ¹⁾	888726-XXXX ¹⁾	888727-XXXX ¹⁾



888295-XXXX ¹⁾	888296-XXXX ¹⁾	888297-XXXX ¹⁾
888495-XXXX ¹⁾	888496-XXXX ¹⁾	888497-XXXX ¹⁾
888595-XXXX ¹⁾	888596-XXXX ¹⁾	888597-XXXX ¹⁾
888695-XXXX ¹⁾	888696-XXXX ¹⁾	888697-XXXX ¹⁾
888795-XXXX ¹⁾	888796-XXXX ¹⁾	

¹⁾ XXXX=Size

2. Lifting

All lifting must be carried out on the valve itself and not on 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).

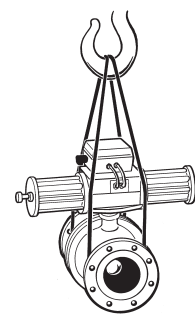


Fig. 1. Lifting of the valve

3. Receiving Inspection

All valves leaving our works are inspected and tested in accordance with the relevant requirements or in accordance with the special provisions specified by the purchaser. Valves equipped with actuators are subjected 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 be carried out, 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 comming operation. See Fig. 3.

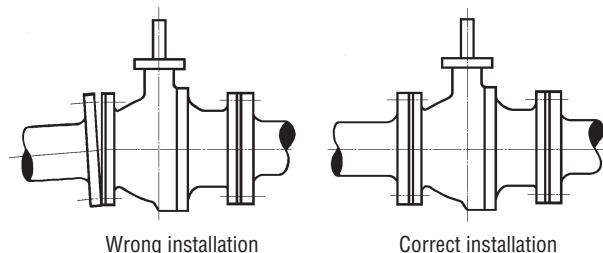


Fig. 3. Ensure that the pipe ends align and have the correct distance

NAF-Duball valves can be installed in any position and for either direction of flow. However, we recommend that, if installed in a horizontal run of pipe, the valve should be mounted with the stem pointing vertically upwards.

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, 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

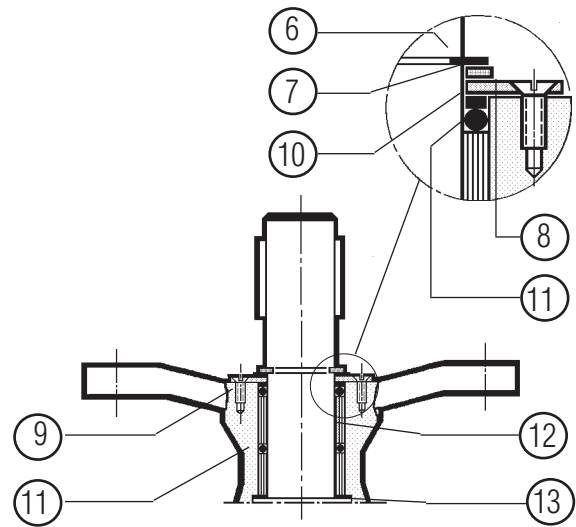
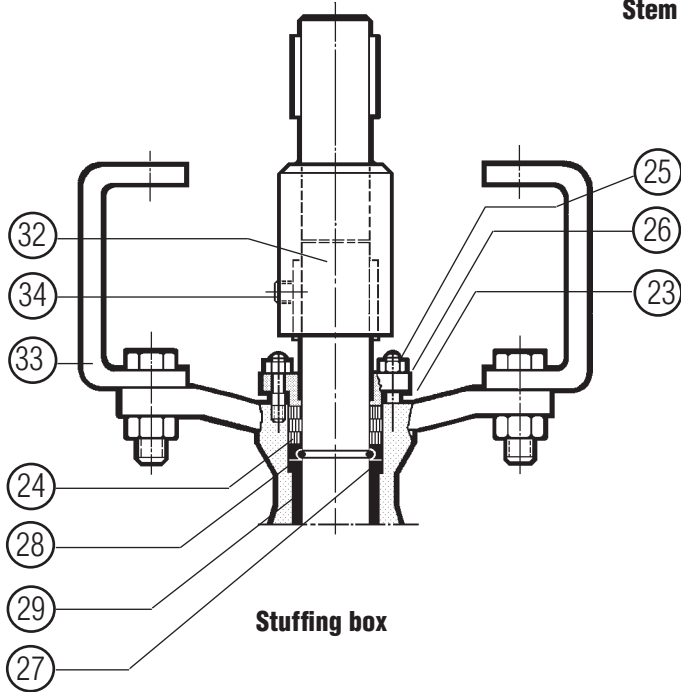
Item	Qty	Part	Material
1	1	Body	EN 1.4408/CF8M
2	1	Body	EN 1.4408/CF8M
3	1	Ball	EN 1.4408/CF8M
4*	2	Seat ring	PTFE carbon reinforced 10%
5	1	Stem assembly	EN 1.4460
6	1	Circlip	Spring steel
7	1	Backing ring	PTFE
8	1	Washer	A4
9	**	Screw	A4
10*	1	Backing ring	PTFE
11*	2	O-ring	EPDM
12*	2	Bushing	PTFE carbon reinforced
13*	1	Anti-friction washer	PTFE carbon reinforced
14*	1	Seal ring	PTFE
15	1	Bolt	A4
16	1	Nut	A4
17	1	Stud	A4
18	2	Key	Steel
19	1	Ball	EN 1.4408/CF8M hard chrome plated
20	1	Ball	Alloy 6
21	2	Seat ring	SS/Alloy 6
22*	2	Seat seal	PTFE carbon reinforced
23	1	Gland cover	EN 1.4408/CF8M
24*	1	Boxpacking	Graphite
25	2	Bolt	A4
26	2	Nut	A4
27	1	Split ring	EN 1.4436
28	1	Ring	Alloy 6
29	2	Bushing	Alloy 6
30*	1	Seal ring	Graphite
31*	2	Seal ring	Graphite
32	1	Stem extension	EN 1.4460
33	2	Actuator yoke	Zink plated steel
34	1	Stop screw	A4

* Recommended spare parts

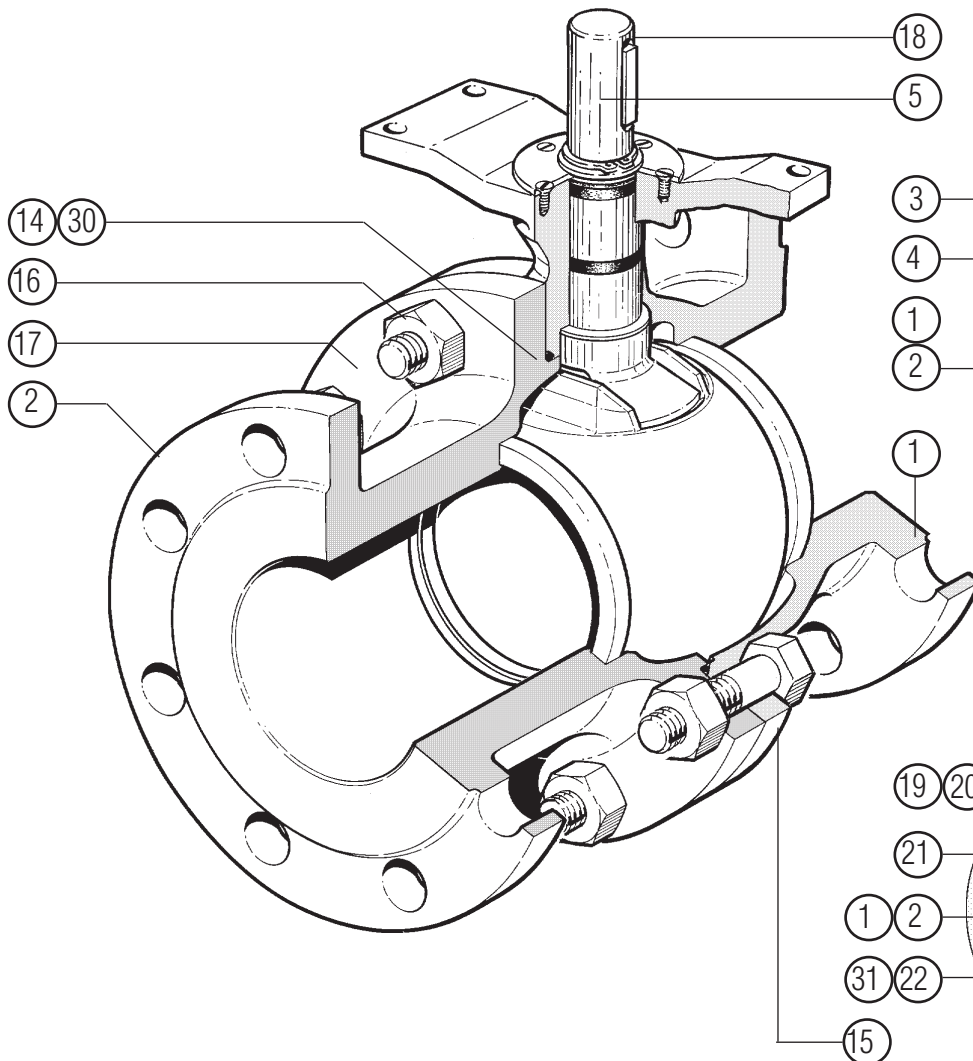
** Qty depends on the DN.

Items 23—34 are for the stuffing box version for 350°C. Material combinations others than those specified are available to order - consult your NAF representative.

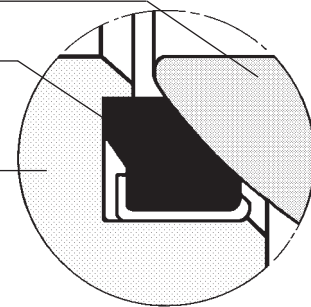
Stem Sealing



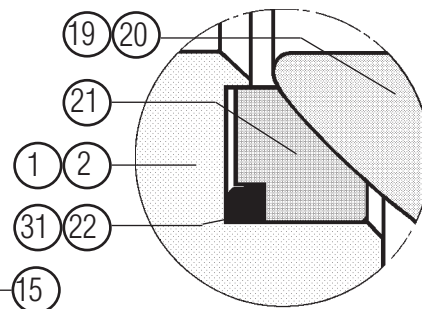
O-ring sealings



Seat Ring



PTFE-seat



Seat in alloy 6

8. Spare Parts

State the following data when ordering spare parts:

1. Product code of the valve - incl. DN according to Fk 41.61 and the Manuf. No. specified on the identification plate of the valve.
2. Description of the part, its item No and quantity required. See table section 7.

Ordering example: 888296-0200,
manuf. No 1234567,
Seatring item 4
Quantity 2 pcs.

See also section 9.6 item 3.

9. 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.

9.1 To remove the valve from the pipework

The procedure for inspection and maintenance requires no special tools.

Ensure that the valve is free of pressure.

1. Ensure that the recommended spare parts and - important - also the 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.**

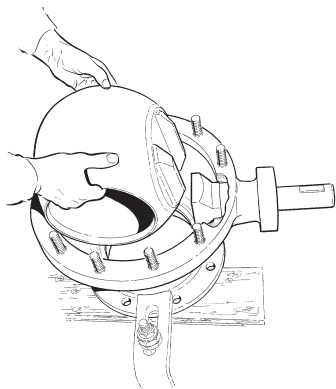


Fig. 5. Lifting the ball with the valve in closed position - here with the valve on a work bench, but it can be done with mounted actuator.

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

9.2 To inspect and replace the ball and seat rings

1. **The actuator need not be removed** for replacing the seat rings and ball.
2. Operate the valve to make **certain that it will be completely empty**. Close the valve.
3. Remove the body half (2).
4. Remove the ball, which is easy to carry out when the valve is in the closed position - Fig. 5.
5. Carefully inspect the ball and seat rings.
6. Clean all parts thoroughly. First use hot water and then some degreasing agent, if necessary. Don't scrape any of the machined surfaces with hard tools.

9.3 Valves with PTFE seat rings

1. To ensure good tightness of the valve, fit new seat rings if the original ones are worn or damaged.
2. Inspect the ball. Minor damage to the sealing surface can be removed by rubbing down with fine emery cloth. If the ball has sustained major damage, it must be replaced to ensure satisfactory sealing.
3. Fit a new sealing ring (14) between the two halves of the body.
4. Coat the ball with Molycote U. If the valve is intended for service in an oxygen system, the ball can be coated with grease for oxygen.
5. Lubricate all stainless steel bolts with suitable grease, such as Crane Packing's Thread-Grade or Gleitmo 600.

- Fit the ball in the body half (1) - Fig. 4 - and then fit the other body half (2). Make sure that the centrepunch marks made in accordance with item 6 in section 9.1 are lined up. Tighten the bolted joint of the two halves of the body alternately in several stages, and finally tighten according to the torque as below.

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

- Operate the valve between the closed and open positions.
- If possible, pressure test the valve with water to check its tightness - Fig. 7. **Make sure that the cavities of the valve are properly filled with liquid before pressure testing.**

Pressure Class	Test pressure, bar	
	Open valve	Closed valve
PN10	15	11
PN25	38	28
PN40	60	44
Class 150	30	22
Class 300	75	28

9.4 T-version

Seating with double o-rings must be vented during mounting. The easiest way to do this is to use a feeler gauge - see fig 6.

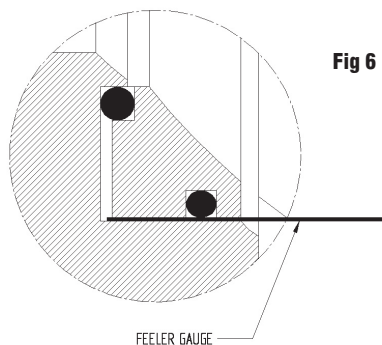


Fig 6

9.5 Valves with chromium-plated ball and seat rings in alloy 6

- Check the sealing surfaces of the seat rings. A groove on the inside of the facilitates withdrawal. Minor damage to the rings can be rubbed down with fine emery cloth. Check the rings on a face plate to ensure that they are perfectly flat. Don't lap the rings and the chromium-plated ball together. Change the rings if they are severely damaged.
- Inspect the sealing surface of the ball. Minor damage may be rubbed down 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. If the ball is severely damaged, the complete ball set must be replaced.
- Fit the sealing ring (22 alt. 31) behind the seat rings.

N.B. the sealing rings must be fitted with the sharp edge towards the body half (see Fig. 4).

- Grease the ball with a suitable grease, such as Klüber Unisilicone L641 or similar.
- Continue assembling the valve as described in items 5 - 9 in section 9.3.

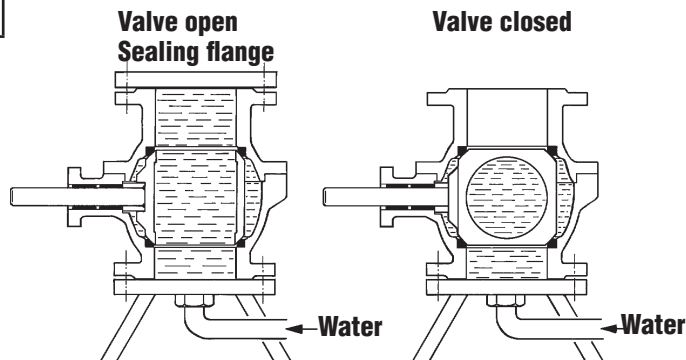


Fig. 7. Pressure test of the valve with water

9.6 Valves incl. NAF Pocket ball with Stellite ball and seat ring.

1. The instructions for these valves are the same as those in section 9.5 above. If the sealing surfaces are damaged, we recommend that the valve is returned to NAF for overhaul. This applies in particular if the ball must be ground before lapping. Assemble the valve before dispatching it to NAF.
2. The ball and seat rings can be temporarily overhauled 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.
3. New rings can be supplied ground and lapped together with a "Master-ball". Some following machining of the rear side of the rings may be necessary in order to keep the correct measure. It is always recommended to order a complete Ball set.
4. Balls in alloy 6 must be carefully cleaned and greased before they are fitted. Use a suitable solvent for cleaning. Then grease the ball with Klüber Barrierta L55/3 H8 or similar. This coat of grease must be very thin.

9.7 To change the upper stem seal with O-rings

If the stem seal is leaking, change the upper O-ring (10). The valve need not be removed from the pipework for this work. The entire stem bearing should be re-placed on the next overhaul occasion as described in the next section.

Make sure that the valve is not under pressure.

1. Remove the actuator. Begin by removing the plastic cover and the four bolts securing the valve positioner, and then remove the valve positioner. Then remove the nuts securing the actuator from the underside to the actuator mounting plate.
2. Remove the actuator. Remove the keys.
3. Remove the circlip (6) and backing ring (7) - Fig. 4.
4. Back off the bolts (9), and remove the washer (8) and the PTFE backing ring (10).
5. Fit a new upper O-ring (11). Coat the new O-ring with silicone grease before fitting it.
6. Assemble in the reverse order.

9.8 To change the stem bearing and seal

Remove the valve from the pipework. Note the instructions in sections 2 and 9.2 concerning lifting and emptying of the valve.

1. Remove the actuator as described in item 1 and 2 in section 9.7.
2. Remove the circlip (6) and backing ring (7) - Fig. 4.
3. Back off the bolts (9), and remove the washer (8) and PTFE backing ring (10).
4. Remove the valve as described in section 9.2.
5. Press the stem down into the body and remove it.
6. Remove the upper O-ring (11).
7. Press up the two bearing bushes (12) and the O-ring (11) between them.
8. Grease the new bushes and O-rings with silicone grease and fit them in position. Also fit a new thrust washer (13) to the stem.
9. Fit the stem and other parts in the reverse order.

10. Assemble the valve as described in section 9.3. However, first assess whether the seat rings should be replaced or whether the seat rings and ball should be lapped together.
11. If possible, pressure test the valve, and retighten the bolted joint as described in section 9.3.

9.9 To inspect and replace the packing of graphite type

The stuffing box usually requires inspection and adjustment after the valve has been taken into service. After a certain period of time in service, it may sometimes also be necessary to repack the valve.

1. Remove the actuator as described in section 9.7.
2. Remove the nuts (26) and remove the gland bush (23) and the packing (24).
3. Clean the surfaces of the the shaft, gland bush (23) and the recess in the valve body.
4. Carefully examine the surface of the shaft which must be completely free from marks and scratches.
5. Grease the lower part of the shaft that is in contact with the bushing (29) and the split ring (27). Avoid to grease the boxpacking. Use a suitable grease, such as Molykote Paste U or Gleitmo 700.
6. Fit new packing (24). Then fit the gland bush (23) and the nuts (26).
7. Tighten the nuts (26) sufficiently to ensure that the packing is correctly seated and that it is in contact with both the shaft and the valve body.

Note: Check the condition of the packing and, after the valve has been taken into service, retighten the nuts (26), if necessary.

10. Fitting the Actuator to the Valve

1. Fit the actuator. The actuator may be fitted either in line with the connected pipes or transversely to them. For fitting 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 fitting the actuator. The valve is in the closed position when the keyway in the stem faces 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 fitted with the actuator and valve in the open position.)

3. Before fitting a new actuator, check that the actuator slides easily onto the stem when the keys are not fitted. Also check that the keys fit freely into the keyways in the hollow shaft of the actuator. Deburr if necessary. Grease the hollow shaft of the actuator and push it in over the threaded sleeve. Fit the actuator onto the stem. Fit the bolts and nuts, and tighten them.
4. Fit and adjust the valve positioner, if any - Fi 41.82.
5. Check the operation and check that the end stops have been correctly preset. If necessary, adjust - but then adjust any limit switches at the same time.

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

