Installation, Operating and Maintenance Instructions

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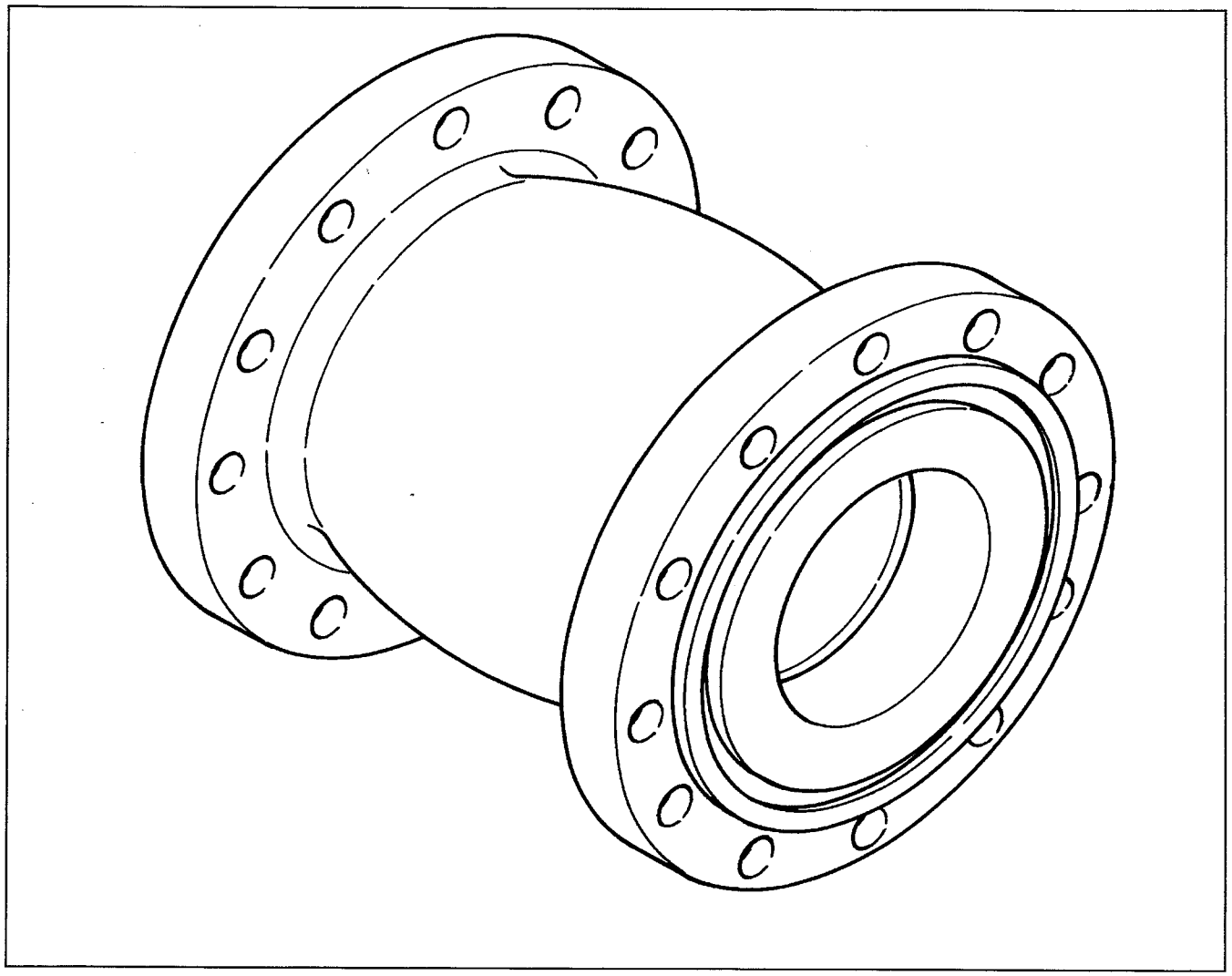
Mokveld serial no.	Type	Size/Class	Tag. No.	Location
38292-001	TKZ-Y-0	16"/ 900RF	20SPV001	MUG-20-02-001

Mokveld Valves bv

Installation and Maintenance Manual

TKZ-Y Check Valve



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November 1996

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1. INTRODUCTION

1.1 General

Installation and maintenance procedures for Mokveld TKZ-Y non-return valves are described in this manual.

Should any procedure described in this manual not be fully understood, please contact Mokveld. In all correspondence, please state the details provided on the nameplate of the valve. The nameplate is located on the body of the non-return valve.

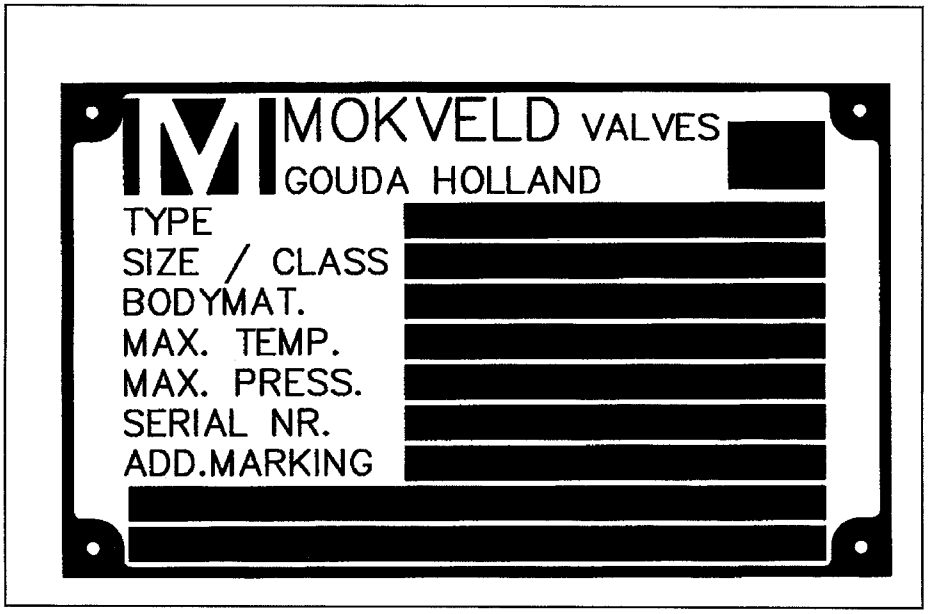

Fig. 1.1 The name plate

Address:

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2800 AE Gouda
Holland
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Telex 20631

1.2 Guarantee conditions and liability

Mokveld Valves B.V. provides, unless otherwise stated in the contract, a guarantee on the non-return valves as laid down in the general conditions of sale. The conditions of sale are registered with the Gouda Chamber of Commerce (20/01/1982).

1.3 Inspection of packing list

Determine whether the delivery is complete by checking it against the enclosed packing list.
Inspect the delivery for damage. Contact Mokveld Valves B.V. immediately if the delivery is incomplete and/or damaged.

1.4 Safety

Safety precautions are essential in order to avoid accidents, injury to people and damage to the equipment.

1.5 Warning signs

The following symbols are used in this manual:

Warning of a dangerous procedure or a situation in which bodily harm or damage to the valve can be caused.

General warning sign regarding dangerous materials.

Item requiring particular attention.

Caution with regard to lifting.

Recommendations concerning ecological procedures.

1.6 Environment

Mokveld Valves B.V. strongly recommends that replaced valves and/or their parts be ecologically recycled. If in doubt, please contact Mokveld Valves B.V. for advice.

2. BEFORE PROCEEDING

2.1 Using this manual

This manual recommends the most effective maintenance procedures. Read it carefully before carrying out the described procedures in order to avoid personal injury and damage to the valve.

When carrying out maintenance work, follow the flow-chart in Paragraph 2.2. It provides references to the corresponding paragraphs in Chapter 3 applicable to the maintenance work in hand.

Chapter 4 describes recommended periodical maintenance.
Chapter 5 describes the storage procedures.
Chapter 6 contains cross-sectional drawings in which the various parts are indicated.

2.2 Flow-chart inspection/maintenance

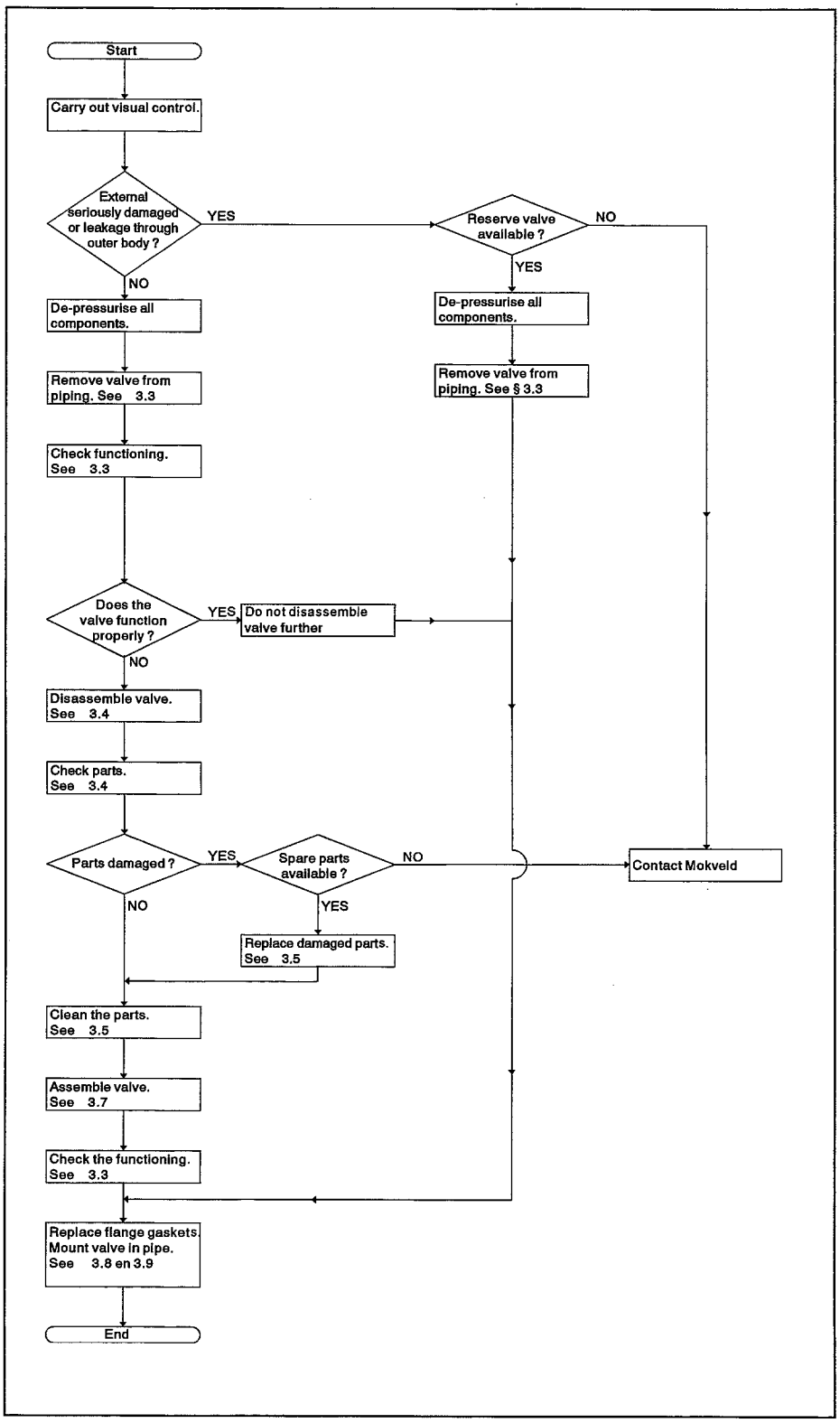


Fig. 2.2 Flow-chart

3. INSTALLATION AND DISASSEMBLY

If a new valve has been installed and the recommendations in Paragraph 3.1 have already been followed, proceed directly to the instructions provided in Paragraphs 3.8 and 3.9.

3.1 Safety measures

Before disassembling the valve, the following safety measures must be taken:

1) De-pressurising valve and all components

Before the valve is disassembled, valve and associated pipe(s) must be de-pressurised according to the locally applicable regulations.

2) Dangerous materials

Pipes can contain dangerous liquid or gas residues. This material can be explosive, inflammable, poisonous or radioactive; for example, H_2O-containing gas, mercury or radioactive deposits.

1) Determine the product previously used in the pipeline.
2) Ensure that the pipeline has been cleaned.
3) Ensure that the flange gaskets do not contain asbestos.
4) If necessary, use the protective clothing and tools demanded by the locally applicable (safety) regulations.

3) Oils and grease

Avoid extended exposure of oils and lubricants to the skin. **Always** use gloves.

4) Cleansing agents

Always use cleansing agents strictly according to the supplier's instructions.

5) Lifting gantry

The lifting equipment must be of sufficient capacity to carry the weight of the valve and the valve parts. The weight is stated on the dimensional drawing of the non-return valve in the documentation package. The weights of the individual parts are stated in the packing list.
All lifting aids such as chains, cables, tires, hooks and lifting eyebolts must be of sufficient capacity to carry the valve and the valve parts.
Do not use damaged or defective lifting equipment. It must recently have undergone an inspection and been certified by an certified body.

3.2 Lubricants and tools

3.2.1 Lubricants

The following lubricants are necessary for assembly of the valve. The use of equivalent lubricants is permitted.

Lubricant	Application
Gleitmo 100S	(screw) thread
Loctite screwlock nr. 222	(screw) thread of safety nuts and safety bolts
Lubcon ALN 4602	O-rings

3.2.2 Tools

The following tools are necessary for installation and disassembly of the valve.

- A standard tool set
- Additional tools (refer to the table on the next page)

A) For the removal of the rear plug:
- up to 4" Allen key
- from 4" to 24" special equipment that fits into the holes located in the rear plug
- from 24" to 48" as described in Paragraph 3.3. Two threaded rods are necessary and a flat bar of sufficient length to be used as a lever.

B) For putting the spring under tension:
- a threaded rod, minimum length = 0.6 x length of the non-return valve.
- two screw nuts which fit onto the threaded rod.
- a flat bar with a hole in the middle. Maximum length = inner diameter of non-return valve. The diameter of the hole must be large enough for the threaded rod.

C) For loosening the seat ring:
- a bar according to the measurements given in the table.

D) For removing the seat ring:
- Two threaded ends or bolts

E) For removing the disc and rod:
- lifting eyebolt, threaded end or bolt. Two lifting eyebolts may be needed for 6" to 24" non-return valves suitable for high pressure.

Table: Additional Tools necessary for disassembling the non-return valve

Gauge	Pressure class*	A	B	C			D	E
		Width of spanner jaws or distance x diameter hole (mm)	Treaded rod	Seat ring auxiliary			Treaded end or bolt	lifting eye-bolt, threaded end or bolt
			diam. (mm)	length l (mm)	width w (mm)	height h (mm)		
2"	L	1x allen key, jaw width. 5	M3	50	10	10	M3	M3
	H	1x allen key, jaw width. 5	M3	42	10	10	M3	M3
3"	L	1x allen key, jaw width. 7	M4	73	10	10	M4	M4
	H	1x allen key, jaw width. 5	M4	64	10	15	M4	M4
4"	L	1x allen key, jaw width. 7	M4	96	10	15	M5	M4
	H	1x allen key, jaw width. 7	M4	86	10	15	M5	M4
6"	L	18 x ? 5	M4	135	12	25	M6	M4
	H	18 x ? 5	M4	117	12	25	M6	2 x M6
8"	L	30 x ? 6	M6	182	12	25	M6	M6
	H	30 x ? 6	M6	160	12	25	M6	2 x M6
10"	L	40 x ? 6	M6	233	16	30	M6	M6
	H	40 x ? 6	M6	199	16	30	M6	2 x M6
12"	L	50 x ? 6	M10	280	16	30	M6	M10
	H	50 x ? 6	M10	242	16	30	M6	2 x M6
14"	L	50 x ? 6	M10	310	30	35	M8	M10
	H	50 x ? 6	M10	265	16	35	M8	2 x M8
16"	L	50 x ? 6	M10	360	30	40	M8	M10
	H	50 x ? 6	M10	305	30	40	M8	2 x M8
18"	L	65 x ? 6	M12	405	30	40	M8	M12
	H	65 x ? 6	M12	345	30	40	M8	2 x M8
20"	L	65 x ? 6	M12	450	40	40	M8	M12
	H	65 x ? 6	M12	380	30	50	M8	2 x M8
24"	L	100 x ? 10,2	M12	540	40	55	M10	M12
	H	100 x ? 10,2	M12	455	40	50	M10	2 x M8
28"	L	130 x M12	M12	630	40	55	M10	M12
30"	L	130 x M12	M16	675	40	65	M10	M16
32"	L	130 x M12	M16	710	50	65	M10	M16
36"	L	200 x M12	M16	815	50	65	M10	M16
40"	L	200 x M12	M16	910	60	65	M12	M16
42"	L	200 x M12	M16	955	60	65	M12	M16
48"	L	210 x M12	M16	1100	60	65	M12	M16

* L =Non-return valves suitable for low pressure (ANSI 150-600)

* H =Non-return valves suitable for high pressure (ANSI 900-2500)

3.3 Removal from the pipeline

Make sure that the valve and the pipeline are completely depressurised.

Take the necessary safety measures if the pipeline has recently contained dangerous materials.

Use a crane of sufficient capacity to lift the weight of the non-return valve.

1) Site the crane on a sound and proper base.

2) Connect the crane hook to the eyebolts on the valve body. Use rope loops around the valve body if there are no eyebolts on it. Make sure the loops do not slide along the valve.

3) Ensure that the lifting cable is under sufficient tension to prevent the valve from dropping when removed from the pipeline.

4) Loosen all flange bolts and remove them. If RJ-flanges have been used, ensure that there is sufficient space in the longitudinal direction of the pipeline before removing the valve.

5) Lift the valve vertically.

6) Remove the flange gaskets.

Do not re-use the flange gaskets. Dispose of old flange gaskets in an ecologically reliable manner.

7) Place the valve on a rigid and sturdy base.

8) Uncouple the valve from the crane.

☞ **If possible, transport the valve to a well-equipped workshop.**

9) Place the valve in the horizontal position.

10) Chock the valve so that it cannot roll.

Function checking

11) The function of discs with light springs can be checked without

special equipment. Open and close the disc completely by pressing it inward. Check that the valve rod slides evenly. If not, there is a problem with the bearings. Pay attention to this during disassembly.

12) Remove the rear plug on the outlet side of the non-return valve.

Body up to 4"

- Use an Allen key (refer to the table in Paragraph 3.2.2, column A).

Body from 6" to 24"

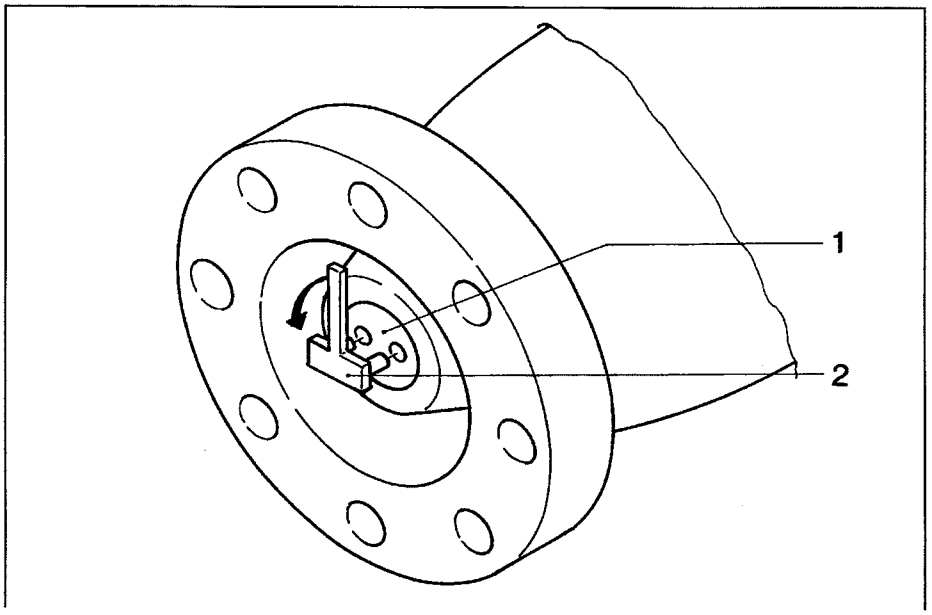
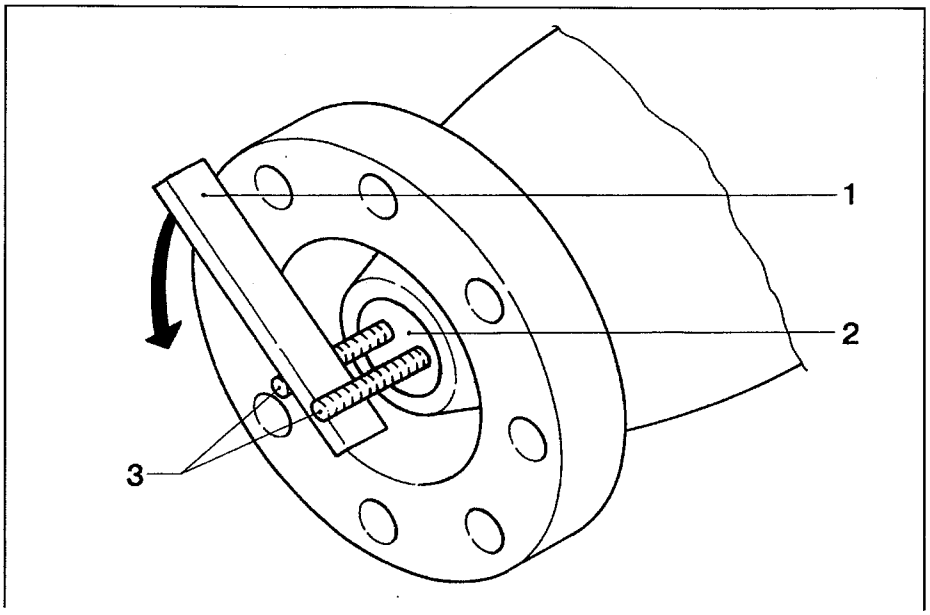


Fig. 3.1 Removal plug body 6" - 24"

1. Rear plug
2. Special key

- Use a suitable key for removing the rear plug (see table in Paragraph 3.2.2, column A).

Body from 28" to 48"



- Screw two threaded ends or bolts into the holes of the rear plug on the outlet side of the valve (refer to the table in Paragraph 3.2.2, column A).
- Loosen the plug in the direction of the arrow with the aid of a suitable metal bar.

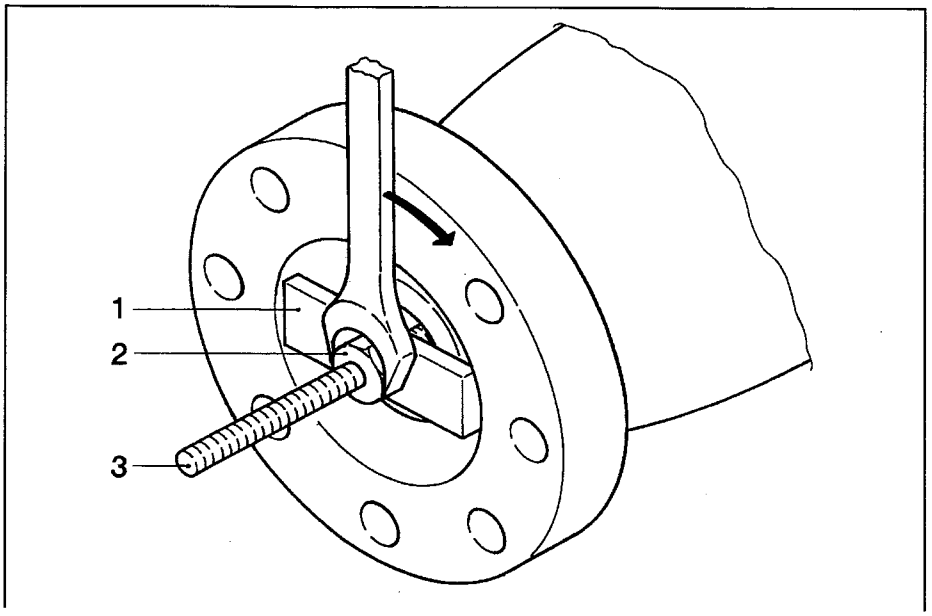


Fig. 3.3 Function checking /Putting disc under tension

1. *Bar with hole for threaded end*
2. *Spring Tension nut*
3. *Threaded end*

13) Screw a sufficiently long bolt as far as possible into the threaded hole on the rear of the valve rod (refer to the table in Paragraph 3.2.2, column B).

14) Lock the bolt with a suitable nut.

15) Slide a metal bar with a hole (just big enough for the bolt) over the bolt

Attention! During the following procedures, the spring will be put under tension.

16) Screw a spring tension nut onto the bolt.

Function checking

17) If not already completed in step 11, check the function of the valve as follows: with a spanner, rotate the spring tension nut in the direction of the arrow. Open and close the valve once completely. While rotating th nut, check that the disc slides evenly. If the disc slides unevenly, there i a problem with the bearings. Take this into account during the disassembly procedure.

18) Screw the nut to a position at which the valve is open approximately 5 mm.

3.4 Disassembly of the valve

3.4.1 Removal of the seat ring

1) Check that the distance between valve and seat ring is a minimum of 5 mm (refer to Paragraph3.3).

Be careful not to damage the flange and the interior of the valve.

Warning. The spring is under tension during the following procedures.

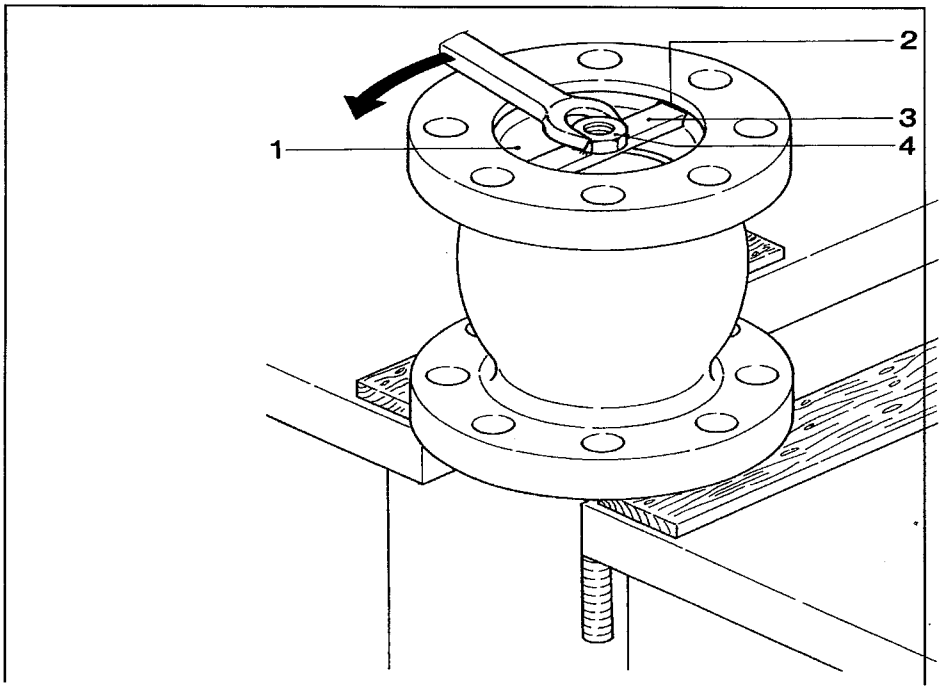


Fig. 3.4 Removal of the seat ring

1. *Seat ring*
2. *Groove*
3. *Seat ring auxiliary tool*
4. *Welded screw nut*

The workbench or platform on which the valve is placed must be sufficiently sturdy to bear the weight of the valve.

2) Place the valve upright on a suitable platform, the height of which must be at least half the length of the valve. The under side of the valve with the spring tension nut must remain accessible. Use wooden blocks to avoid damage to the flange.

3) Remove the securing nuts/securing screws from the seat ring.

4) Make a seat ring auxiliary tool:
   - Weld the largest possible nut onto a metal bar that fits into the grooves of the seat ring (see table in Paragraph 3.2.2, column C).

5) Put the seat ring auxiliary tool into the grooves of the seat ring. Prevent the tool from jumping from the seat ring grooves as it is unscrewed by, for example, screwing the attachment to the seat ring by means of the threaded holes in the grooves.

6) Unscrew the seat ring. Use a suitably sized spanner.

7) Remove the seat ring tool.

8) Screw the two bolts in the threaded holes of the seat ring (see the table of Paragraph 3.2.2, column D).

9) Carefully lift the seat ring perpendicularly from the body. Use the crane if necessary.

10) Put the seat ring on a clean and dry surface.

3.4.2 Removal of the disc

1) Ensure that the seat ring has been removed (see Paragraph 3.4.1).

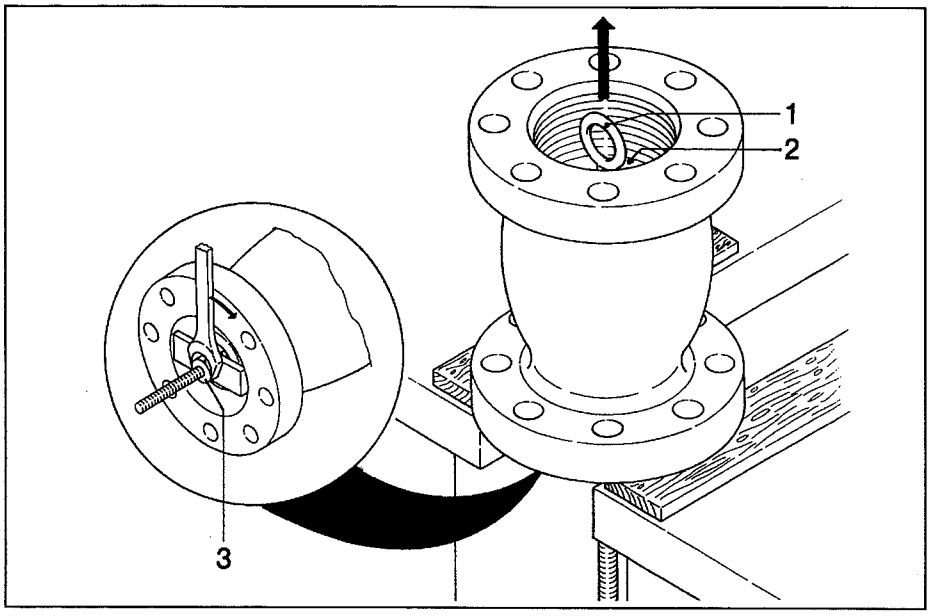


Fig. 3.5 Removal of the disc

1. *Lifting eye-bolt, threaded end or bolt*
2. *Disc*
3. *Spring tension nut*

Warning. During the following procedures the spring is under tension.

2) Screw one (or two) lifting eyebolts, bolts or threaded ends into the threaded hole of the disc (see the table in Paragraph 3.2.2, column E).

3) Connect the lifting eyebolt, bolt or threaded end to a crane.

Attention. Make sure that the disc does not jump from the body due to the tension of the spring.

Observe the bolt during the following procedure. If it rotates, it could jump from its position.

4) Unscrew the spring tension nut until the disc rests on the spring.

5) Draw a pencil line on the disc and the body to mark the corresponding positions. This will simplify re-assembly.

Be careful not to damage the thread of the body and the disc rod.

6) Remove the spring tension nut.

7) With the crane, carefully lift the disc from the body.

8) Place the disc (with its rod) on a clean and dry surface. Protect the rod and the main seal ring.

9) Remove the spring or springs from the body and store them in a clean and dry place.

3.4.3 Removal of the bearings

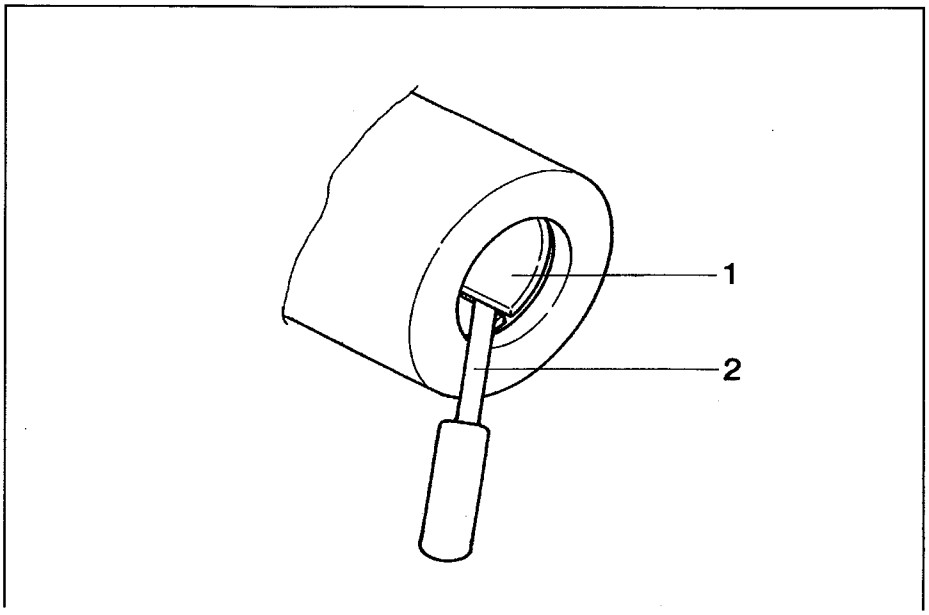


Fig. 3.6 Removal of bearings

1. Bearing
2. Screw driver or similar tool

1) Look for the cylinder-bearing slit.

2) Slide a screwdriver or similar tool under the bearing.

3) Move the bearing backwards and forwards out of the rod guide.

☞ **With 2" - 4" bearings, the safety nut must be removed from the rod guide, after which the bearing can be removed.**

3.5 Parts inspection

3.5.1 Main seal ring

If the main seal ring is present, check it for damage, scratches and deformations.

3.5.2 Body inspection

Ensure that the body is:
- free from dirt and foreign objects.
- undamaged.
- free from corrosion stains, erosion or wear.

3.5.3 Rod guide inspection

Ensure that the rod guide is properly fitted and that it has no play.

3.5.4 Inspection of the remaining parts

Check all remaining parts for wear.

3.6 Replacement of the parts

Replace all parts that do not comply with the inspection requirements. Replace the parts only by original spare parts. Contact Mokveld Valves B.V for advice if any parts are not present.

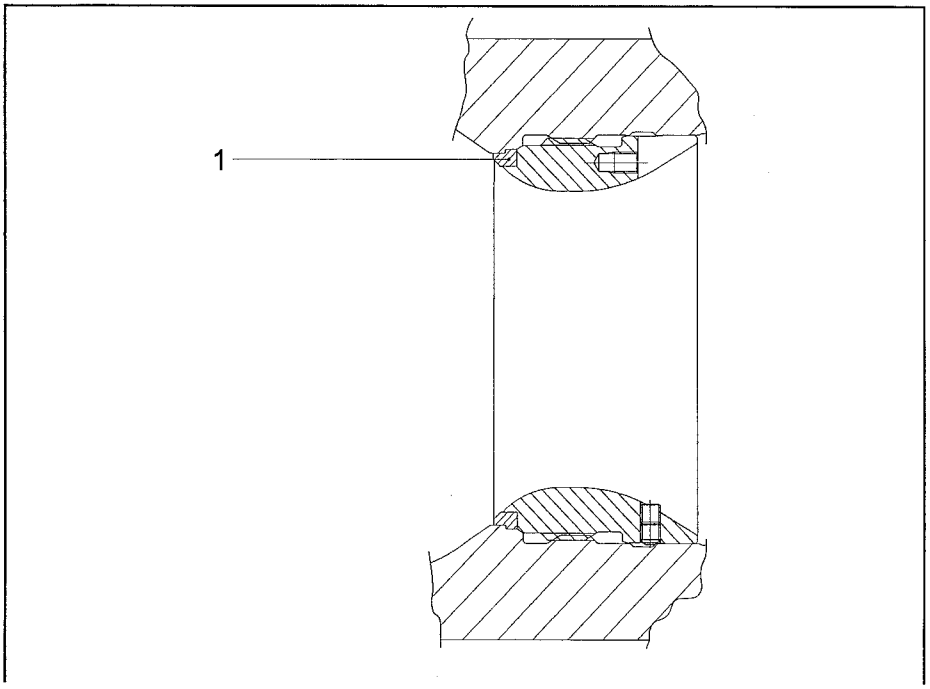


Fig. 3.7 Replacing main seal ring up to 12"

1. Main seal ring

3.6.1 Replacement of the main seal ring up to 12"

1) Remove the old main seal ring

2) Clean the groove of the main seal ring in the body.

3) Place the new main seal ring into the groove in the body.

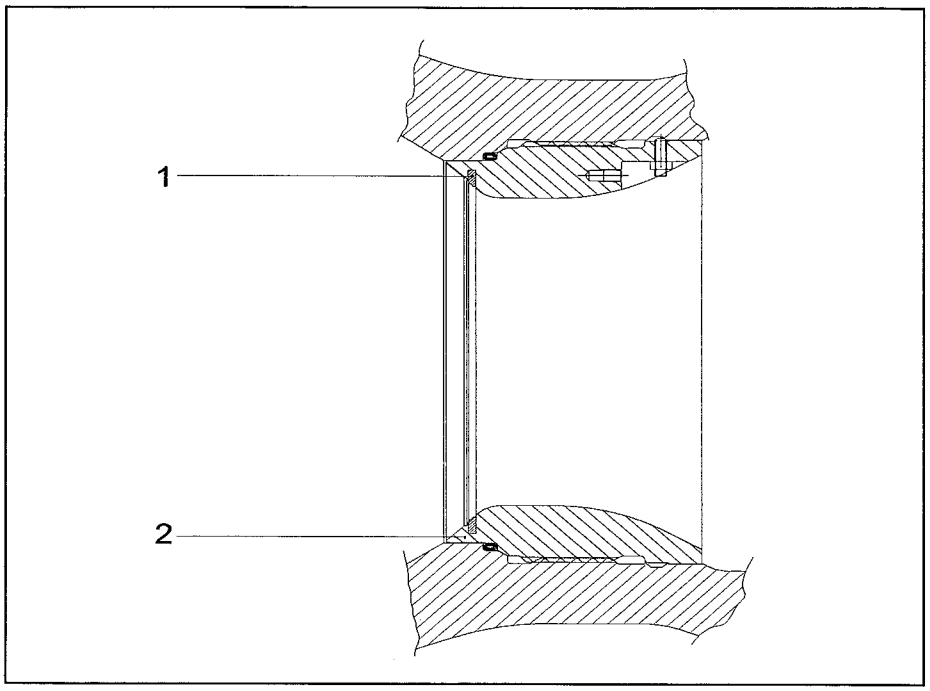


Fig. 3.8 Replacement of the main seal ring above 12""

1. Main seal ring
2. Securing rim

3.6.2 Replacement of the main seal ring above 12"

1) Place the seat ring on a clean, dry and level surface, with the main seal ring uppermost.

2) Cut through the old main seal ring without damaging the groove.

3) Carefully remove the old main seal ring.

4) Clean the groove.

5) Carefully bend the securing rim upwards so that the new main seal ring can be positioned.

6) Place the new main seal ring into the groove. Do not use excessive force.

7) Check the new main seal ring.

8) Using a suitable hammer, turn the securing rim carefully until the new main seal ring is retained in place.

3.6.3 Replacement of the remaining seals and O-rings

Always replace all seals and O-rings.

3.6.4 Replacement of the remaining parts

Always replace damaged parts. Worn or slightly damaged parts may be

polished with a very soft polish or with Scotch-brite.

3.7 Valve re-assembly

Before re-assembling the valve, ensure that all parts are available and are n damaged. In addition, ensure that all necessary lubricants are available for use.

3.7.1 Positioning the bearings

1) Clean the grooves in the rod guide bearings.

☞ **Do not use oil or grease!!!**

2) Return the bearings to the rod guide.

3.7.2 Positioning the disc

1) Replace the spring. Make sure that the bent end of the spring engages the anti-rotation hole.

2) Screw a bolt into the rear of the rod guide.

3) Screw a lifting eyebolt in the threaded hole of the disc.

4) Lift the disc by crane.

5) Carefully lower the disc into the body.

6) Turn the disc until the bent end of the spring engages the anti-rotation hole.

7) Check that the marks made during disassembly correspond with each other.

8) Put a flat metal bar with a hole over the threaded rod.

⚠ **Attention. During the following procedure the spring is under tension.**

9) Screw a (spring tension) nut onto the threaded rod.

10) Tighten the disc by means of the spring tension nut. While rotating it, check that the disc rod slides evenly. Contact Mokveld Valves B.V. if this is not the case.

11) Continue rotating the nut until the valve has opened wide enough to mount the seat ring.

3.7.3 Mounting the seat ring

1) Screw threaded rods or bolts into the threaded holes of the seat ring.

2) Ensure, if applicable, that the O-ring is still present. Grease the O-ring with Lubcon ALN 4602.

3) Lift the seat ring with a crane.

4) Carefully lower the seat ring into the body until the screw threads touch.

5) Screw the seat ring back into the body with the seat ring tool until it is tight.

6) Secure the seat ring with the securing nuts.

7) Secure the securing nuts with Loctite screwlock no. 222.

⚠ **Pay attention that the** threaded rods don't move, since the possibility of separation of the threaded bolts with the seat ring then exists!

8) Loosen the spring tension nut slowly and carefully.

9) Check that there is no play between the seat ring and the disc.

10) Remove the spring tension nut and the threaded rod.

11) Screw the rear plug back in the body, and tighten it.

12) Remove the bolts or threaded ends from the rear plug.

13) Secure the rear plug (refer to the table in Paragraph 3.3).

3.8 Installation

Check that the following regulations have been observed:
- The pipeline in which the valve is to be installed must be clean.
- The pipeline must be strong enough to carry the weight of the valve.
- No force may be applied to the valve from connected pipes or equipment.
- Avoid tension caused by poor welding or an improperly mounted valve.
- The pipeline in which the valve is (to be) installed must be able to expand and contract without excessive force on the body.
- Heavy valves must be supported; this support must be capable of carrying the valve plus the weight of the connected pipes.
- The arrow on the valve indicating the flow direction must correspond to the flow direction of the fluid.
- Position the valve as stated on the nameplate.

1) Ensure that the pipeline is clean.

2) Test the crane.

3) Remove flange protectors, if present.

4) Clean the flanges and sealing surface.

5) Check the flanges for damage.

6) Lift the valve into the correct position.

7) Check the direction of flow.

8) Mount **new** flange gaskets (asbestos-free).

9) Bolt the valve to the pipe flanges, or weld as required.

10) Connect the sensor switches, if applicable.

11) Check whether the coating is damaged. If so, apply a layer of coating, i necessary.

Do not use levers or excessive force.

3.9 Commissioning the valve

Follow the procedures below to (re) commission the valve.

1) Ensure that:
   - the pipeline is clean.
   - the valve is installed in the correct direction of flow (orientation).
   - the valve is installed in the correct position.

2) Check the exterior for the following:
   - the mounting and disassembly have caused no damage.
   - all fixing means have been properly installed.
   - all adjoining pipes have been mounted correctly.

3) If a pressure test is carried out, the pressure may not be higher than 1.1 times the maximum working pressure. If it is necessary to test the pipes under higher pressures, a spool must replace the valve.

4) If everything is satisfactory, the non-return valve can be put into operation.

4. PERIODIC MAINTENANCE

- Carry out an external inspection every 6 months.
- Carry out general maintenance at least every 5 years.

Carry out periodic maintenance according to the locally applicable regulations.

4.1 External inspection

Carry out an external inspection every six months.
Check:

- the flange gaskets for leakage.
- the welded joints for cracks, or other damage.
- that the bolt connections of the flanges are still tight.
- for damage to the protective coating of the body.
- Electric wiring, if appropriate.

4.2 Maintenance

Carry out maintenance at least every 5 years, or as often as the specific circumstances require.
For this, follow the flow-chart in Chapter 2. Replace damaged parts and clean the remaining parts.

5. STORAGE OF THE NON-RETURN VALVE AND THE SPARE PARTS

It is imperative to comply with the following recommendations for long-term storage of the non-return valve and the corresponding spare parts.

5.1 Storage (for maximum of 3 months)

If the valve or spare parts are stored for only 3 months, no special safety measures need to be taken, providing storage is in a clean and dry environment.

5.2 Storage (for more than 3 months)

If the valve or spare parts are stored for more than 3 months, comply with the following recommendations:

- The valve or the spare parts must be stored in a building, which is not exposed to adverse weather conditions.
- the floor on which the valve is placed must be stable.
- the valve must be supported such that it cannot roll, slip or fall.
- the temperature of the warehouse must be between -10°C and 40°C.
- the relative humidity of the warehouse must be between 30% and 85%.
- grease the unprotected metallic parts with water-resistant grease. Replace the grease every 6 months.
- if the valve or the spare parts are stored for more than a year, a thorough inspection must be carried out before installing the valve or the spare parts.

5.3 Storage of O-rings and seals

When storing O-rings and seals, comply with the following recommendations:

- do not store O-rings and seals for more than 5 years.
- store O-rings and seals lying flat.
- Store O-rings and seals in a dark place, or lightproof bag.
- protect O-rings and seals against exposure to ozone.
- the temperature of the warehouse must be between 15°C and 30°C and the relative humidity below 55%.

6. SPARE PARTS

6.1 Ordering spare parts

Spare parts may be ordered from Mokveld Valves B.V.

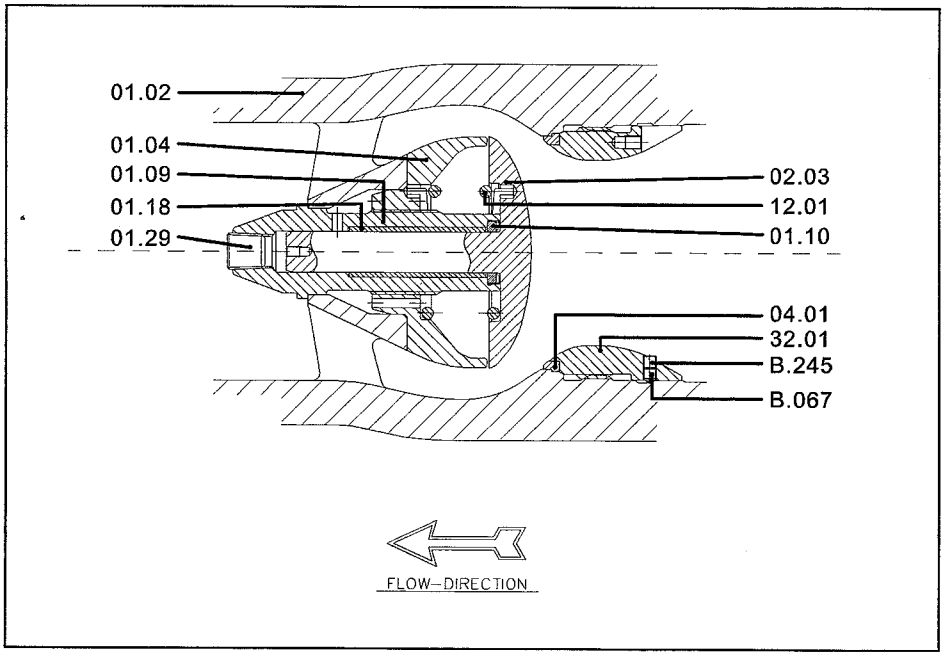
Provide the following details when ordering spare parts:
- the serial number (as stated on the name plate)
- the position number of the part on the technical drawing
- the quantity required

Order address:

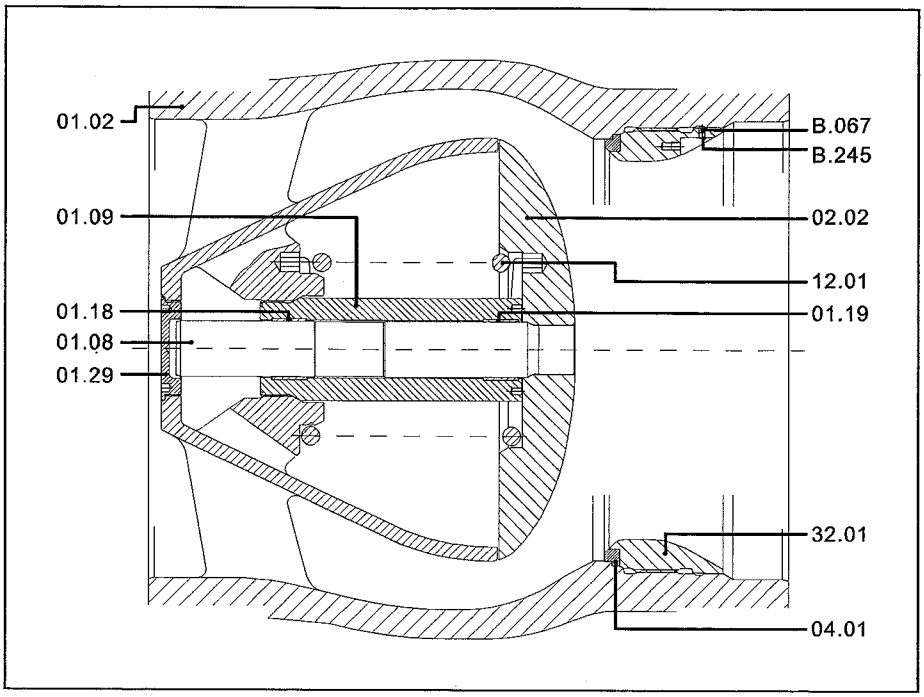
Mokveld Valves bv
P.O. Box 227
2800 AE Gouda
Holland
Tel. 31 (0)182 597500
Fax. 31 (0)182 517977
Telex 20631
E-mail: mokveld@mokveld.com

6.2 Table of spare parts

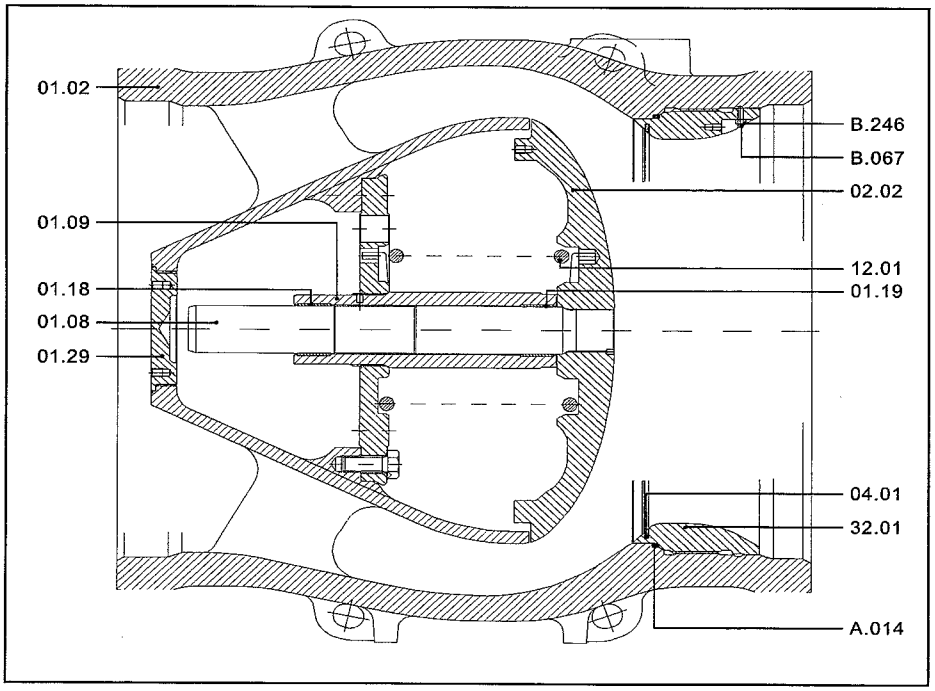
Pos.nr	Name	Number
01.02	Body	1
01.04	Inner body (only 2"...4")	1
01.08	Disc rod (not on 2"...4")	1
01.09	Rod Guidance	1
01.10	Lock Nut (only 2"...4")	1
01.18	Bearing Strip	1
01.19	Bearing Strip (not on 2"..4")	1
01.29	Rear Plug	1
02.02	Disc (not on 2"...4")	1
02.03	Disc/Disc rod (only 2"...4")	1
04.01	Main Seal Ring (optional)	1
12.01	Spring	1 or more
32.01	Seat Ring	1
A.014	O-Ring below seat ring (above 14")	1
B.067	Securing screw	2
B.245	Securing screw (up to 12")	2
B.246	Securing nut 14" and above	2



Non-return valves 2"- 4"



Non-return valves 6"- 24"



7. SUPPLEMENT

Technical details relative to the order