Mokveld Valves bv

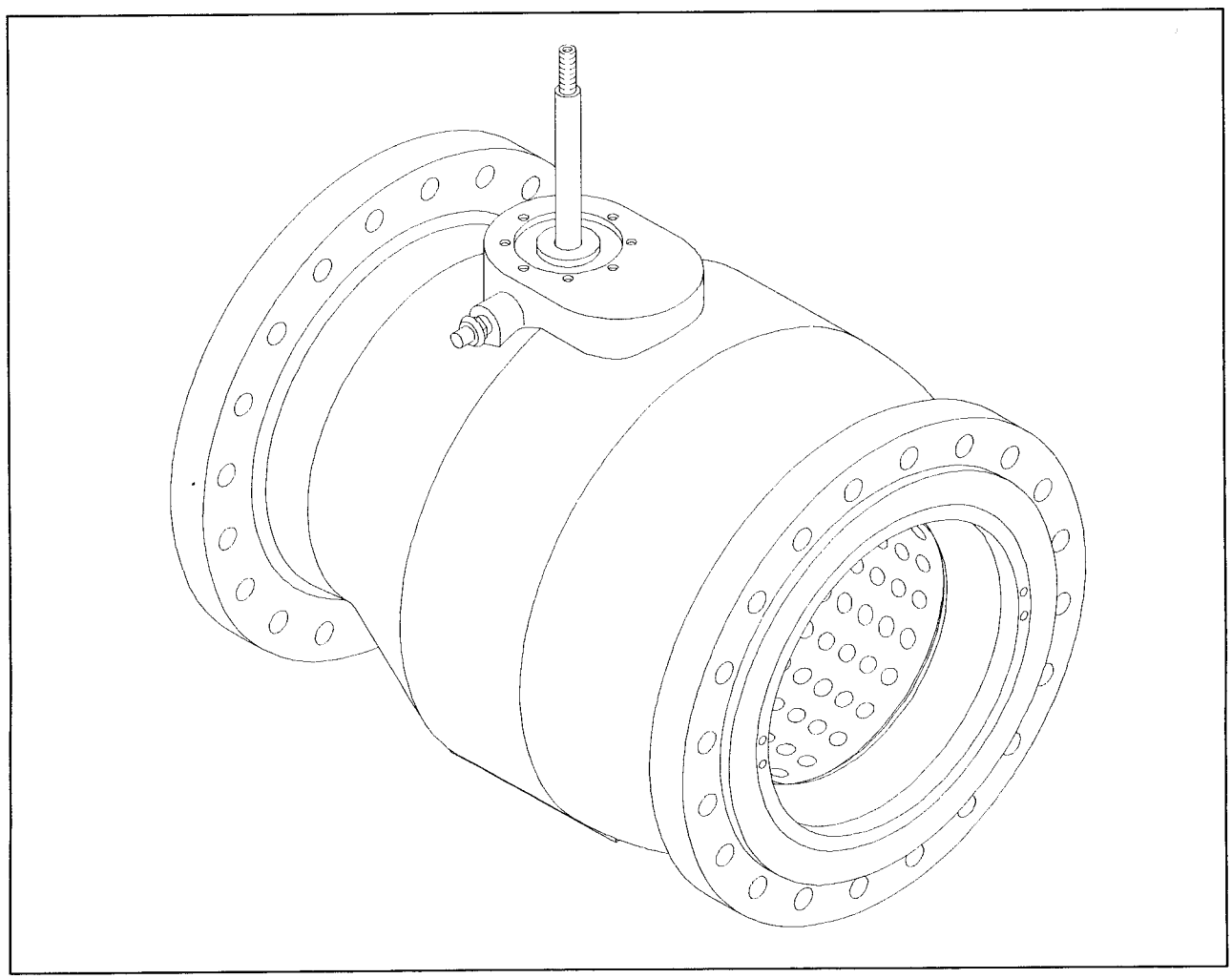
Installation, Operating and Maintenance Manual

Client	: Pidec Europe GmbH	Document no.	: 37995-100
P.O. no.	: 1182-POR-IN-649	Rev.	: 00
End User	:	Date	: 01 March 2005
Location	: 2nd Zagron Meth. Plant		
		Prepared	: GLAV
Mokveld W.O. No.	: 14548	Checked	: JNIJ
		Approved	: CGUN

Mokveld serial no.	Type	Size/Class	Mokveld Actuator
37995-001	RZD-RQX	16" /300RF	M575-1VS-4

Mokveld **S94**

User's Manual
RZD
Control valve



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June 1997

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1. INTRODUCTION

1.1 General

This manual describes the installation, use and maintenance procedures for Mokveld R ZD control valve.

Should there be problems regarding this manual, please contact Mokveld. In all correspondence always state the details provided on the nameplate. The nameplate is located on the body of the control valve.

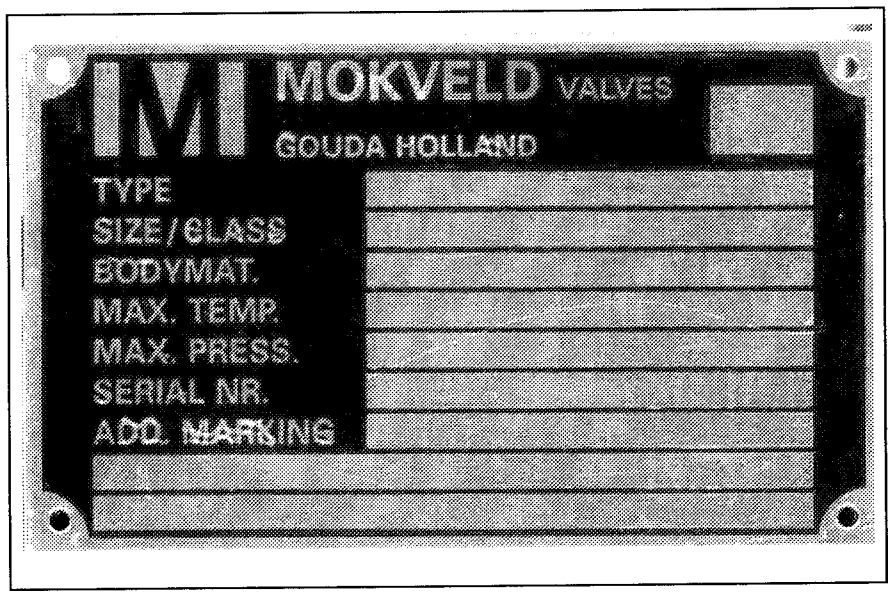

Fig. 1.1 Nameplate

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1.2 Product description

The RZD control valve is an axial closing piston valve. This control valve is especially constructed to throttle the streaming fluid. Important characteristics of the control valve are:

- A good stream-flow of the fluid
  The shape of the body of the control valve ensures that the fluid can flow through easily. This shape also ensures that the fluid stream-flow is equal, whatever position the control valve is in. This way, turbulence and noise level is at a minimum.

- Leak proof sealing
  The sealing consists of a trapeze shaped ring made of soft sealing material. A special construction ensures that the sealing is pressed by the prevailing pressure of the fluid. This way the sealing is leak proof

- Controlling the fluid flow
  The closing mechanism of the control valve consists of a perforated cylinder (the cage) in which a hollow piston can move up and down. The position of the piston with regard to the cage and the shape of the perforation of the cage determines how much fluid is allowed to flow through the control valve.

- Fast closing time
  The closing mechanism is constructed in such a way that the piston hardly undergoes any resistance following the pressure differences in the control valve. This way the control valve can be operated by a relatively light and fast actuator.

- Actuation
  A rod is mounted to the piston. The rod has a toothing under a 45° angle. This piston rod is operated by a driving shaft, which has a similar indenting and fits onto the toothing on the piston rod. Whenever the driving shaft is moved up the piston moves backward and the control valve is opened.

1.3 Guarantee and liability

Mokveld Valves BV provides, unless otherwise stated in the contract, a guarantee on the control valve as laid down in the general conditions of the sale. The conditions of sale are registered with the Gouda Chamber of Commerce (20-01-82).

1.4 Warning signs

The following signs are used in this manual

Warning regarding a dangerous procedure or situation that could lead to bodily harm or damage to the control valve.

General warning sign regarding dangerous materials.

Point of attention.

Caution with regard to lifting.

Caution with regard to lifting.

2. SAFETY

Safety precautions are essential in order to avoid accidents, injury to people and damage to the equipment.
Safety precautions must always be observed to ensure a safe working environment.

2.1 Safety measures

Before carrying out any maintenance on the control valve, the following safety measures must be taken:

1) De-pressurising

Before the control valve is disassembled, the control valve must be de-pressurised. Do this according to local regulations

2) Dangerous materials

Pipes can contain dangerous liquid or gas residues. These materials can be explosive, inflammable, toxic or radioactive; for example H_2S-containing gas, mercury or radioactive deposits..

1) Determine which product was previously used in the pipeline.
2) Make sure the pipeline has been cleaned.
3) Make sure the flange gaskets are asbestos free.
4) If necessary, use the protective clothing and tools specified by local regulations.

3) Oils and greases and cleaning agents

Avoid extended skin exposure to oils and greases. A lot of these materials are hazardous for the health of the operator

Always use gloves and always wash your hands after using oils and/or grease

4) Cleansing agents

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

5) Working environment

Always make sure that the environment in which maintenance is being carried out on the control valve is clean and free of obstacles. Never leave tools lying about and clean up any spilled grease and oil immediately. Always wear protective headgear

☞ **On many work floors, wearing of protective headgear is mandatory.**

6) Crane

The lifting equipment used must be of sufficient capacity to carry the weight of the whole control valve including the valve parts. The weight is stated on the dimensional drawing of the control valve in the documentation package of the control valve. The weights of the individual parts are on the parts list. All lifting aids such as chains, cables, belts, hooks and lifting eyes must be capable of lifting the valve including the valve parts.
The crane must not be damaged.
The crane must recently have undergone inspection and certified by a certified body.

⚠ **Only lift the control valve using the lifting eyes.**

7) Electrical safety

If the control valve is operated electrically or is connected in any other way to an electrical mains supply, there is a danger of electrical shock. Always follow local regulations in regard to installing, grounding and use of electrical apparatus. Follow the I.E.E. and the I.E.E.E. regulations whenever local regulations are not applicable.

8) Specific safety measures

For safety measures regarding the actuator, see the actuator manual

2.2 Environment

A replaced valve and/or spare parts must be recycled or processed ecologically . If in doubt, contact Mokveld Valves BV for advice.

3. TRANSPORTATION AND STORAGE

3.1 Transport and moving

The control valve is usually packed in a crate. The total weight of the crate including the contents is stated on the crate. Keep in mind the weight stated on the crate when transporting and moving the crate.

Use a sound and reliable crane or forklift able to cope with the weight of the crates and contents. Always lift the control valve using the lifting eyes.

Strictly follow the instructions on the crate

3.2 Checking the delivery

The control valve is delivered so that it can be assembled and used immediately. Check if you have received all the parts by checking the supplied parts list. Also check to see if any parts are damaged. Immediately contact Mokveld Valves BV. if parts are missing or the delivery is damaged in any way.

3.3 Storage of the control valve and parts

Follow these guidelines if the control valve is not immediately assembled and subsequently stored elsewhere.

3.3.1 Storage of the control valve up to 1 year maximum

The control valve can be stored for a maximum of 1 year without undertaking extra precautions. In this case, the control valve, lids and plugs must not be removed from the crate.

3.3.2 Storage of the control valve longer than 1 year

If the control valve is stored for more than 1 year, for example as a spare control valve, special measures must be taken regarding the storage of the control valve. Comply with the following recommendations:

- The control valve and spare parts must be stored in a building, which is not exposed to adverse weather conditions.
- Keep the control valve in its original crates.
- Place the control valve on a stable floor.
- Do not stack control valves on top of each other or on top of another object. Keep the top end of the crates free of obstacles, do not stack anything on the crates.
- The temperature in the area must be between -10°C and 40°C.
- The relative humidity in the warehouse area must not exceed 55%.
- Check the control valve every year as follows :

1) Remove the packaging from the control valve. The lids and plugs that protect the openings of the control valve must **not** be removed.
2) Check the outside of the control valve for dirt, corrosion or damages.
3) If necessary, clean the outside of the control valve.
4) Repair any damages found.
5) Return the control valve back to the way it was originally packaged.

3.3.3 Storage of spare parts

Comply with the following recommendations when storing the delivered spare parts.

Storage of steel parts

1) Spray corrosion sensitive parts with an anti corrosion fluid.
2) After 4 months in storage, these parts need to be treated with water repelling grease.
3) Replace the grease every 6 months.

Storage of O-rings, seals and gaskets

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

- Do not store the o-rings and seals longer than 5 years.
- Do not store the gaskets longer than 7 years
- Store o-rings, seals and gaskets lying flat on a flat surface.
- Store o-rings, seals and gaskets in a dark place.
- Protect store o-rings, seals against exposure to ozone
- The temperature in the warehouse area must be between 15°c and 30°c and the relative humidity in the warehouse must be below 55%.

4. PREPARATION AND COMMISSIONING

4.1 Tools and materials needed

In order to assemble the control valve into the pipeline, the following tools are needed.

- A standard tool box.
- Flange gaskets.
- If necessary, a anti corrosion fluid for the flange bolts.
- A reliable crane with sufficient hoisting capacity that has recently been inspected by a certified inspector.
- A torque wrench with accompanying socket set.

4.2 Preparation

1) Check if the block valve is situated in the inlet pipeline main. Close this block valve or make sure that the flow of the fluid normally found in the pipeline is blocked.

2) Make sure that the pipeline in which the control valve is to be installed is rinsed clean and that no foreign objects are left lying around

3) Check if the pipeline is able to carry the weight of the control valve being installed. Ensure that the large valves rest on a foundation (lined with PTFE). This foundation must be capable to carry the weight of the control valve and the enclosed fluid (see the technical specifications in the supplement for the weight and the dimension of the control valve).

4.3 Unpacking

4) Carefully remove the crate in which the control valve is packaged.

5) Check if all necessary parts are present.

6) Check all parts for damage and corrosion. Immediately contact Mokveld Valves BV. if parts are damaged in anyway.

4.4 Assembly in the pipeline

7) Check if the following recommendations have been complied with:
   - The control valve must not be submitted to excessive force by attached mains or apparatus.
   - The pipeline into which the control valve is installed must be able to expand and contract without putting excessive force on the body of the control valve.
   - The arrow on the control valve indicating the direction of flow must correspond with the flow direction of the fluid.

Do not use excessive force when assembling the control valve.

8) Mount the crane onto a steadfast surface. Test the crane.

9) Remove protective lids and plugs from the control valve.

10) Clean the flanges.

11) Check the flanges for any damage. Contact Mokveld Valves BV. if damage is found.

Use a suitable crane, capable of lifting the weight of the control valve.

12) Lift the control valve into the correct position.

13) Check if the direction of flow is the same as the direction of the arrow on the body of the control valve.

14) Mount the flange gasket.

15) Attach the control valve to the pipeline with the flange bolts. Protect the corrosion sensitive bolts with an anti corrosive substance.

16) Apply a layer of paint if necessary.

4.5 Preparation for commissioning

17) Check if the control valve is mounted correctly and if the control valve is closed.

18) Check if the protective layer of the control valve and all other parts has not been damaged during assembly. If necessary, repair any damage found.

19) Check if all nuts and bolts are in place. Check if all bolts, nuts and washers made of carbon steel or any other corrosion sensitive material are treated with an anti corrosive coating.

20) Check if the actuator is installed correctly (see the actuator manual).

21) Check the power supply of the actuator.

22) Check the operation of the actuator using local control.

23) Check the operation of the actuator using the remote control.

24) When the control valve has undergone all the above check points (17 - 23) successfully, it may be commissioned.

4.6 Commissioning

25) Check if the control valve is completely closed. If this is not the case, close the control valve (also see the actuator manual).

The test pressure in the control valve, in closed position, must not exceed 1,1 times the maximum permitted pressure. In an opened valve the test pressure must not exceed 1,5 times the maximum permitted pressure.

26) Pressurised the pipeline.

27) Open the block valve of the inlet pipeline.

28) Close the block valve of the inlet pipeline.

29) Open the block valve all the way (also see the actuator manual).

30) Close the block valve completely (also see the actuator manual).

31) Open the block valve of the supply main.

5. OPERATION

The control valve is operated by the actuator. Follow the directions in the operating manual of the actuator in order to operate the control valve.

Actuators can vary from a simple hand wheel to hydraulic, pneumatic and electrically driven types. Advanced systems for controlling the actuator can also be supplied where required. It is also possible to change the type of actuator or controls for a valve that has already been installed.

Handwheel operated valve:
A valve with a handwheel can be opened by turning the handwheel anti-clock-wise and can be closed by turning the handwheel clockwise.

Hydraulic, Pneumatic and electronic operated Valve:
For operating a hydraulic & Pneumatic operated valve please regard the schematic instrumentation drawing for this valve.
For hydraulic, pneumatic and electronic operated Valves: the valve is operated using the actuator. To operate the valve, follow the instructions in the operator manual for the actuator.

6. MAINTENANCE AND INSPECTION

Regular maintenance prolongs the life span of the control valve.
Therefore always carry out:

- an external inspection every month (see paragraph 6.1).
- a full maintenance overhaul every 5 years or more frequently if necessary (see paragraph 6.2).

6.1 Monthly inspection

An external inspection must be carried out every month. Proceed as follows.

1) Check the paint layer or the protective coating on the body of the control valve for damages. If necessary, carry out repairs if the paint layer or the coating is damaged (see the attached technical details in the supplement for information on which paint type or coating must be used).

2) Check the retainer ring of the mounting bolts and all other bolts of the actuator. If necessary, tighten them again.

3) Check the flange joint of the control valve and the pipeline for leakage. If necessary, replace the flange gasket. In order to change the flange gasket, the control valve must be removed from the pipeline (see paragraph 6.2).

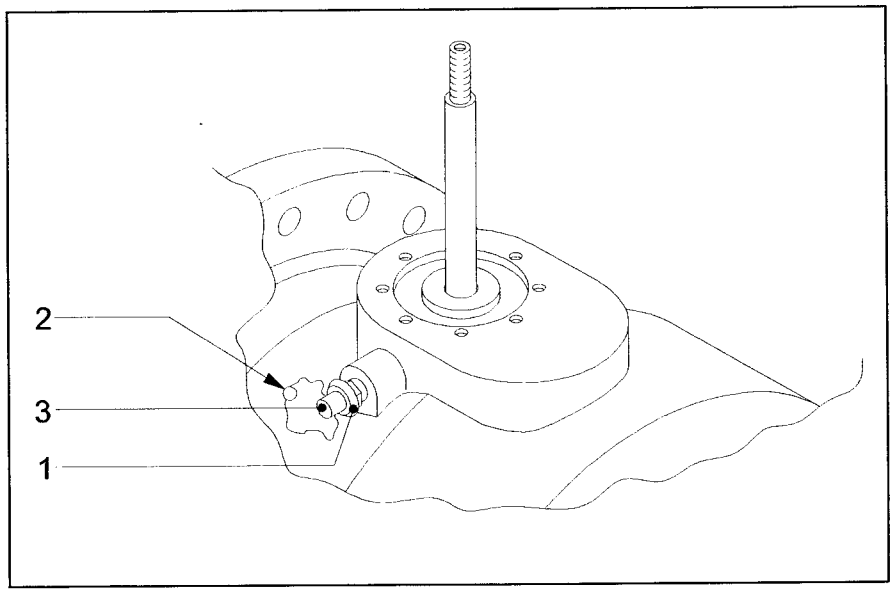


Fig. 6.1 Checking the pressure relief valve

1. *Pressure relief valve*
2. *Lead seal*
3. *Screw in plug to close valve.*

4) Check if liquid, gas or grease is leaking from the pressure relief valve (see 1, fig. 6.1). If liquid, gas or grease is leaking from the pressure relief valve, then a piston rod sealing is broken. Replacing this sealing is a specialist' job and must only be carried out by a Mokveld Valves BV service engineer or by service personnel trained by Mokveld.

5) In case of emergency, a leak in the pressure relief valve can be dealt with as follows.
   - Break the lead seal on the pressure relief valve.
   - Close the pressure relief valve by tightening the screw.

The inner body is now pressurised and the valve will no longer function according to its specifications.
The valve must be repaired as soon as possible.
Be aware that the valve with a closed relief valve may not fully close any more.
To fully close a valve with a closed relief valve, open the relief valve temporarily.

6) Check the electrical wiring of the actuator is still in good condition. Also, check if the turnbuckles are still tightened. If necessary, tighten the turnbuckles.

6.2 5 – year inspection

Carry out internal maintenance on the control valve at least every 5 years, or regularly if specific local directions and circumstances require. When carrying out an internal inspection, the control valve must be removed from the pipeline.

6.2.1 Disassembly from the pipeline

Make sure that the valve and pipeline are completely de-pressurised. Check if the lead seal of the pressure relief valve is in place (see fig 6.1). This means that the pressure relief valve is not closed.

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

Use a reliable crane with sufficient capacity to lift the control valve.

1) De-pressurise the supply lines of the actuator make sure the electrical connections of the actuator have no voltage.
2) Disconnect the supply lines from the actuator and all other lines connection to the actuator (see the operating manual of the actuator).
3) Make sure the crane is situated on a good, solid base. Test the crane.
4) Connect the crane hook to the lifting eyes on the valve body.
5) Ensure that the lifting cable is under sufficient tension to prevent the control valve from slipping when disconnected from the pipeline.
6) Loosen all flange screws and remove them. If RTJ-flanges have been used, ensure that there is sufficient space in the longitudinal direction of the pipeline before removing the control valve.
7) Lift the control valve up vertically.
8) Remove the flange gaskets.

Do not re-use the flange gaskets. Dispose of old flange gaskets in an environmentally friendly manner.

9) Place the control valve on a good, solid base or means of transportation.
10) Secure the control valve so it cannot roll away.
11) Place the valve so that the direction of flow is in the horizontal position.
12) Uncouple the control valve from the crane.

6.2.2 Internal cleaning and inspection

Caution! If relevant, be sure not to damage the internal coating of the control valve.

Dispose of the waste products in an environmentally friendly manner.

13) Lift, pump or blow the fluid residue from the control valve.

14) Carefully clean the inside of the control valve. Remove remaining residue.

15) Thoroughly inspect the surfaces on the inside of the control valve. Ensure that the inside of the control valve or the interior coating hasn't been damaged by loose debris.

16) Check all visual parts for damages and/or corrosion.

17) Contact Mokveld Valves BV if any interior damage to the control valve is found.

6.3 Assembly in the pipeline

When the control valve is ready for operation, after internal inspection, cleansing and if necessary, repairs, it can be installed back into the pipeline. For this, follow the procedure described in paragraph 4.4.

7. MALFUNCTIONS

Take note of the following diagram, should the control valve show any signs of malfunction.

PROBLEM	POSSIBLE CAUSE	SOLUTION
A) The control valve does not open and close.	Actuator control malfunction.	1) Check the actuator's energy supply (mains and compressed air). Repair the power supply if necessary. 2) Check if the power supply of the actuator's operating system is functioning (see the actuator manual). If necessary, repair the actuator.
	Actuator malfunction	1) Test the actuator as described in the accompanying manual. 2) Go on to problem C in this table if, after testing the actuator, no fault is found.
B) The control valve does not open and close completely.	Actuator is not installed correctly.	1) Check the installation of the actuator (see the actuator manual). If necessary, re-install the actuator.
	Actuator's operating system malfunctions.	1) Check the actuator's energy supply (mains and compressed air). Repair the power supply if necessary. 2) Check if the power supply of the actuator's operating system is functioning (see the actuator manual). If necessary, repair the actuator.
	Actuator malfunction.	1) Test the actuator as described in the accompanying manual. 2) Go on to problem C in this table if, after testing the actuator, no fault is found.
C) The control valve does not open or close and the actuator isn't malfunctioning	The piston is blocked or the control valve is damaged on the inside	1) Remove the control valve from the pipeline and check if the piston is blocked (see paragraph 6.2.) If necessary remove the object blocking the piston. 2) Check the control valve for internal damages. Contact Mokveld Valves BV if any interior damage to the control valve is found.
D) The control valve shows signs of minor fluid leakage in the closed position.	The sealing is (slightly) damaged.	1) Open and close the control valve a few times. 2) Check if the control valve is still leaking. 3) If the control valve is still leaking then the sealing needs to be replaced. For this, contact Mokveld Valves BV.
E) The control valve shows signs of major fluid leakage in the closed position.	The control valve is not fully shut.	1) Check the actuator's functioning (see problems B and D in this table).
	The control valve is damaged internally by loose debris.	1) Remove the control valve from the pipeline and check if the piston is blocked (see paragraph 6.2). If necessary remove the object blocking the piston. 2) Check the control valve for internal damages. Contact Mokveld Valves BV if any interior damage to the control valve is found.

8. ORDERING SPARE PARTS

Spare parts can be ordered from Mokveld Valves BV

It is recommended to keep a complete set of sealings in stock.

A complete parts list is attached in the supplement of the operating manual of this valve (assembly drawing and parts list).

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 assembly 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

9. SUPPLEMENTS

The following details relative to specific orders are a part of this manual.

- Drawing with dimensions
- Assembly drawing
- Information relevant to the lubrication of the valve
- Adjustment instructions.
- User's Manual Actuator.

9.1 Information relevant to the lubrication of the valve

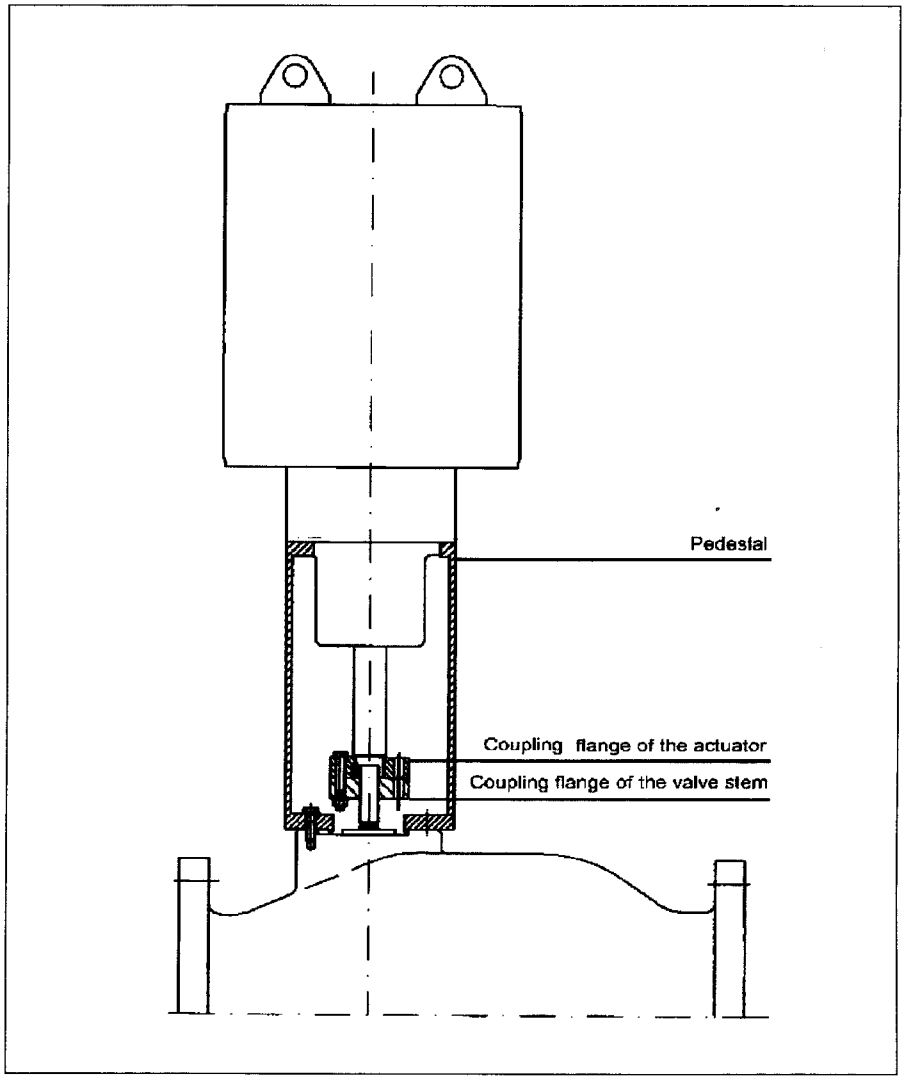
Applicable lubricants

The following lubricants are needed to assemble the valve. The use of compatible lubricants is allowed.

Number and designation as referred to in the text	Lubricant	Application
Grease No. 1	Lubcon ALN 4602	Seal rings Toothing stem/piston
Grease No. 3	DowCorning Molykote Rapid G	Thread of bolts and parts
Locking agent No. 2	Loctite Screwlock (no. 222)	Thread of locking screws and parts

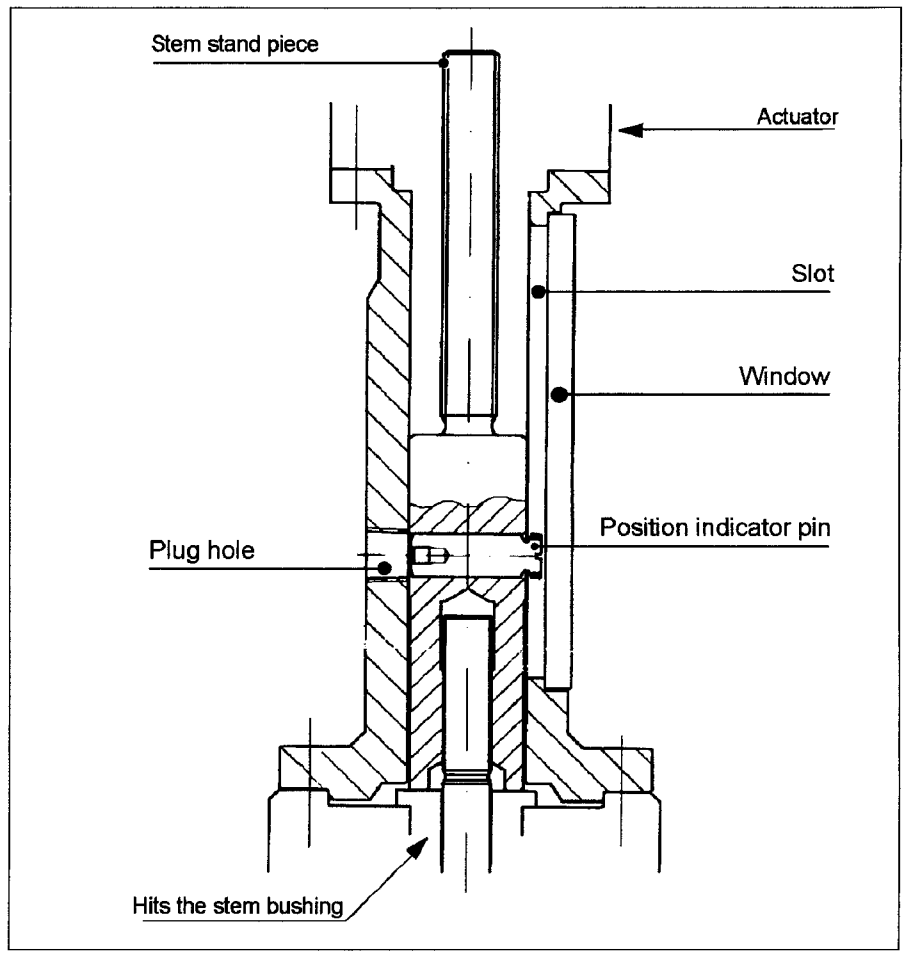
9.2 Instructions for adjusting the (linear) actuator on the valve.

- Install the actuator with the holder on the valve.
- Tighten the coupling flange of the stem all the way down.
- Put the valve into its closed position (do not put on a heavy load, the piston will stop against the seat retainer bushing).
- Make sure that the actuator is fully closed (the coupling flange of the actuator does not contact the coupling flange of the stem).
- Twist the coupling flange of the stem until it loosens and reaches the coupling flange of the actuator.
- Rotate the connection flange of the stem down through one revolution (= 360 degrees ± 90 degrees).
- Connect the flanges using the bolts (the piston will come loose from the seat retainer bushing).
- Install the other parts of the actuator.

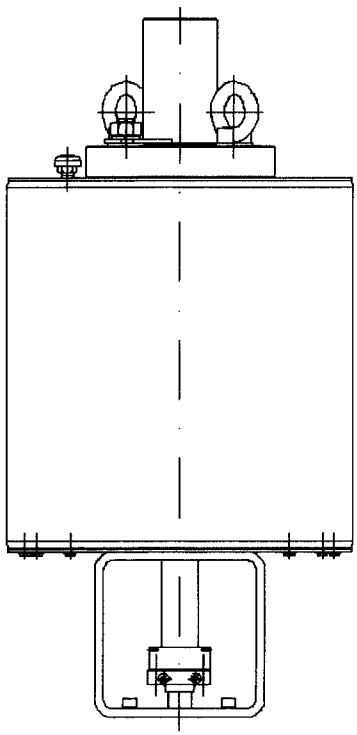


9.3 Instruction for adjusting the (rotation) actuator on the valve

- Install the holder for the actuator onto the valve.
- Put the valve into its closed position (do not put on a heavy load, the piston will stop against the seat retainer bushing).
- Twist the stand piece onto the stem so that it touches the stem bushing.
- Continue to twist it through one revolution (= 360 degrees ± 90 degrees) so that the position indicator pin can be mounted via the slot in the holder (the piston is loose from the seat retainer bushing).
- Install the other parts of the actuator.



User's Manual
Pneumatic Actuators



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March 2002

TABLE OF CONTENTS

1. INTRODUCTION

1.1 General

This manual describes the installation, use and maintenance of the pneumatic actuators for Mokveld control valves.

This is a general manual. Information about specific characteristics is included in the Appendix.

Please contact Mokveld Valves bv should anything in this manual be unclear. Always include in your correspondence the data given on the type plate. The type plate is located on the body of the actuator.

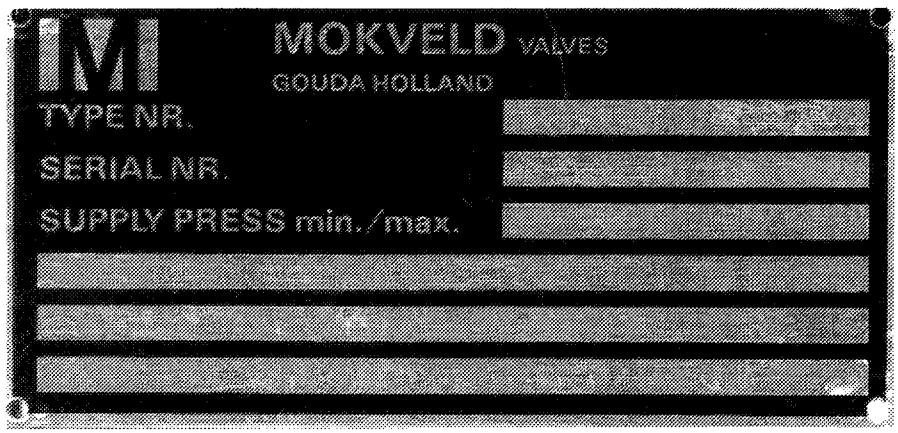

Fig. 1.1 Type plate

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www mokveld.com

1.2 Operating principle

The actuator works in combination with a Mokveld Valve. It ensures that the valve opens and closes the valve in the correct way.

The actuator is made up of two parts: an pneumatic cylinder for operating the actuator, and an hydraulic damper for dampening the opening or closing motion of the actuator.

The actuators are available in two versions.

- VS Spring closing
  The valve is opened by compressed air. Closing is realised by means of a single layer of springs. The type reference is 1VS.

- VO Spring opening
  The valve is closed by means of compressed air. It is opened by means of a single layer of springs. The type reference is 1VO.

1.3 Guaranty conditions and liability

Unless stated otherwise in the contract to the contrary, Mokveld Valves bv guarantees the actuators, as registered in the general terms and conditions of sale. The terms and conditions of sale were deposited with the Chamber of Commerce in Gouda, the Netherlands, on 20 January 1982.

1.4 Warning symbols

This manual uses the following symbols:


Warns of a dangerous action or situation that can lead to bodily injuries or to damage to the actuator.


Point of attention.


Danger for hoisted loads.


Designation of environmentally-friendly action.

2. SAFETY

Safety measures are important. They serve to prevent accidents, bodily injuries to people and damage to the actuator.
Safety measures must always be observed in order to guarantee a safe working situation.

2.1 Safety measures

Always observe the following safety measures before carrying out working activities on the actuator.

1) Releasing the pressure

Before work on the actuator can proceed, you must release the pressure from the valve accommodating the actuator. Release the pressure from the control valve and/or pipe following local guidelines.

2) Dangerous substances

In case of an actuator is actuated by flow line gas see warnings and precautions mentioned in the valve manual.

3) Oils and greases

Avoid long-term skin contact with oils and greases.

Always wear gloves

4) Cleaning agents

Always use the cleaning agents prescribed by supplier.

5) Environment

Make sure that the work environment is clean and dry. Proceed in an organised and neat manner. Do not leave tools lying around, and immediately clean up any spilled grease or oil. Actuators are sensitive products. Slight damage to a part can have a negative effect on the operation of the valve. In addition, always wear a safety helmet.

☞ **Many industrial sites require a helmet to be worn.**

6) Tools

Make sure that any tool you use is in order. Apply the appropriate safety measures. To this effect, consult the regulations for using the tool concerned.

7) Hoist

The hoist used must have enough capacity to bear the weight of the entire actuator plus parts. The weight is shown in the technical data included in the documentation package accompanying the actuator.
All hoisting aids (such as chains, cables, belts, hooks and hoisting eyes) must have enough capacity to bear the weight of the actuator plus parts. The hoist must be in good condition.
The hoist must have been recently checked and certified by a competent certifying body.

Hoist the actuator only by the lifting eyes intended for the purpose.

8) Electrical safety

When the actuator is connected to an electric system, there is the danger of electric tension. Always follow the local regulations with regard to the installation, earthing and use of electric equipment. Apply the I.E.E. and I.E.E.E. regulations if there are no local regulations.

2.2 Environment

A replaced actuator and/or replaced parts must be disposed of in an environmentally-friendly manner. Consult Mokveld Valves bv in the case of doubt.

3. TRANSPORTATION AND STORAGE

3.1 Transporting and moving

Adhere to the following regulations when transporting the actuator:

1) Always convey the actuator on a sturdy pallet capable of supporting the weight of the actuator.

2) Support the actuator using one or several mounting frames.

3) Use steel wrapping belts to secure the actuator on the pallet. Protect the paint layer of the actuator against damage caused by wrapping belts by applying protective foil.

4) During transportation, prevent the actuator from contacting any other objects being simultaneously transported.

5) Make sure that the pallet accommodates the actuator in such a way that it is easy to use a forklift truck or pallet trolley to pick up the actuator.

3.2 Checking the delivery

The actuator is delivered ready for installation and commissioning. Use the parts list included with the delivery to check that you have received all parts, and that the parts are undamaged. If you detect that the delivery is incomplete and/or damaged, immediately contact Mokveld Valves bv.

3.3 Storing actuator and parts

Use the following guidelines if the actuator is not immediately installed, but stored elsewhere.

- Store the actuator inside a building, so it cannot be affected by weather conditions.
- Keep the actuator in its original crates.
- Put the actuator on a floor that is sufficiently strong for the purpose.
- Do not stack the actuators on top of each other or on top of another object. Keep the top of the crates free.
- Make sure the ambient temperature is between -10 °C and 40 °C.
- Make sure the relative air humidity of the storage environment does not exceed 55%.

Use the following guidelines for storing the spare parts included in the delivery.

Storing steel parts

1) Spray corrosion-sensitive parts with an anti-corrosion agent.
2) After 4 months of storage, these parts must be covered with a water-repellent grease.
3) Replace the grease every 6 months.

Storing O rings, seals and packings

Use the following guidelines for storing O rings and seals.

- Do not keep O rings or seals for longer than 5 years.
- Do not keep packings for longer than 7 years.
- Keep O rings, seals and packings lying on a flat surface.
- Keep O rings, seals and packings in the dark.
- Protect O rings, seals and packings from ozone influences.
- The ambient temperature must be between 15 and 35 °C. The relative air humidity must be lower than 55%.

4. INSTALLATION AND COMMISSIONING

Usually, the Mokveld Valve is delivered complete with a mounted actuator. If a separate actuator is to be installed on the valve, proceed as follows:

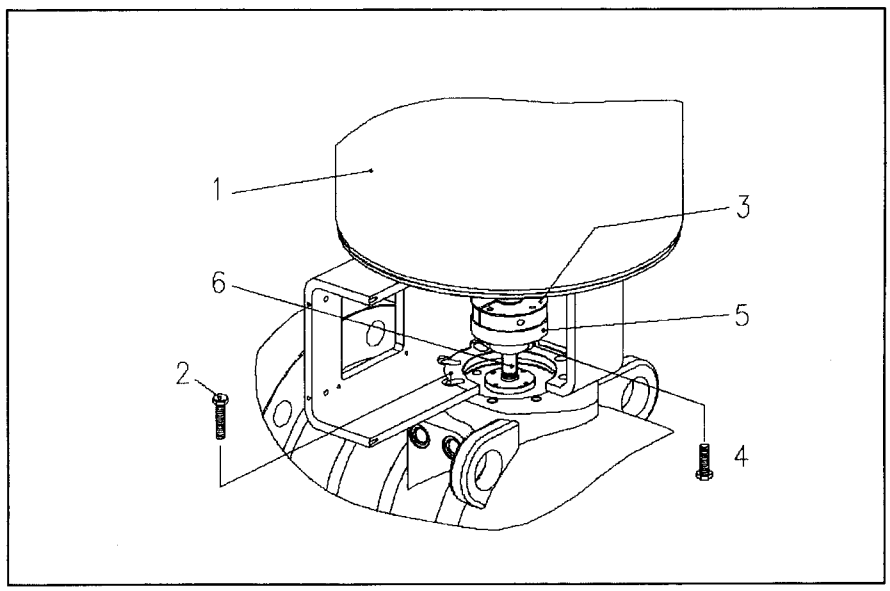


Fig. 4.1 Installation of the actuator

1. *Actuator*
2. *Mounting bolts actuator*
3. *Coupling flange of the actuator*
4. *Mounting bolts of the coupling flanges*
5. *Coupling flange of the spindle*
6. *Spindle*

It is advisable to have these activities carried out by a Mokveld Valves bv service engineer or by Mokveld trained service personnel.

Use a sound hoist suitable for hoisting the weight of the actuator.

1) Put the valve in the closed position by pushing in the spindle (6). Do not press too hard. Make sure that the piston contacts the seat-retainer ring.

2) Put the actuator (1) on the shut-off valve.

3) Tighten the actuator (1) using the mounting bolts (2).

4) Screw the coupling flange (5) onto the spindle. Continue to turn the coupling flange all the way in.

5) Connect the actuator (1) to the supply pipes as appropriate for the actuator concerned. See also the appendices and/or contact Mokveld Valves bv.

6) Put the actuator (1) in the closed position. The coupling flanges must not touch each other.

7) Loosen the coupling flange of the spindle (5) until it contacts the coupling flange of the actuator (3).

8) Screw the coupling flange of the spindle (5) back to the valve body by one turn (360° ± 90°).

9) Fasten the coupling flange (4) together using the bolts intended for this purpose. The piston will now come loose from the seat-retainer bush.

10) Mount the other parts and pipes. Check that any electric, pneumatic or hydraulic pipes have been connected correctly and free of leaks. See also the appendices and/or contact Mokveld Valves bv.

11) Connect the compressed-air supply pipe to the actuator or to the instrument cabinet (see appendices). Check that the supplied compressed air or gas is clean and dry. Adjust the pressure of the supplied air (see appendix). The maximum pressure is 10 bar.

The actuator is now ready to operate the valve (see the user instructions for the valve).

5. OPERATION

The instruments of the actuators are produced in accordance with client-specific desires. Therefore the adjustment described in this section is a general description that applies to all actuators.
Client-specific operating elements of the pneumatic control can be found in the pneumatic diagram and/or dimension diagram included in the appendices. Consult Mokveld Valves bv as necessary.

Adjusting the closing/opening time

The actuator has been provided with a built-in hydraulic cylinder with an adjusted dampening of the final stroke. On the hydraulic cylinder, a block has been mounted with speed-control valve/s for adjusting the opening and closing time/s. This/these time/s has/have been adjusted by Mokveld bv. You may adjust the time as necessary by screwing in or screwing out the valve's knob (Screwing in a longer closing time).

Note. The hydraulic system has been provided with an accumulator with a pre-pressure of approx. 12 bar.

6. MAINTENANCE AND INSPECTION

Periodic maintenance will extend the life span of the actuator.
Therefore you must

- carry out an external expansion every 6 months.

Make sure waste substances are processed in an environmentally-friendly manner.

1) Clean the actuator.

2) Check the operation of the actuator.

3) In as far as possible check that parts
   - are undamaged
   - are free of corroded, eroded and/or worn spots

4) Check the paint coating or the protective coating of the actuator for damage. Carry out any repairs if the coating is damaged (see the order-specific technical data in the appendix for the paint or coating type to be used).

5) Check the tightness of all bolts and other parts of the actuator. Retighten as necessary.

6) Check the actuator for leaks.

7) Check the pneumatic and hydraulic connections of the actuator.

8) Check that the electric wires of the actuator are still in good condition. Also check that the unions have been tightened. Tighten the unions as necessary.

7. FAULTS

Consult the following fault table if the actuator does not function properly. Always contact Mokveld Valves bv in the case of doubt.

Problem	Possible cause	Solution
Actuator no longer opens or closes.	Supply- or control signal interrupted.	Check. Repair, if possible.
		Check actuator for leaks. Repair, if possible.
	Valve no longer moves.	See the manual for the valve.
Actuator opens or closes with a bang.	Hydraulic supply defective.	Check the hydraulic supply. Repair, as necessary.
	Leakage of hydraulic oil.	Check actuator for leaks. Repair, if possible.

8. ORDERING PARTS

Spare parts can be ordered from Mokveld Valves bv.

Use only original spare parts.

Submit the following data when ordering spare parts.

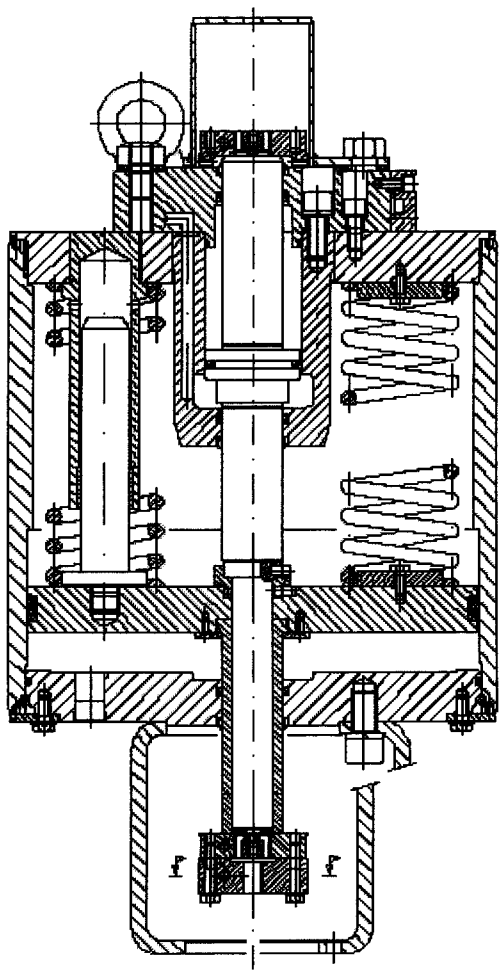
- The serial number (shown on the rating plate)
- The position number of the part on the composition drawing
- The number required

Ordering address:

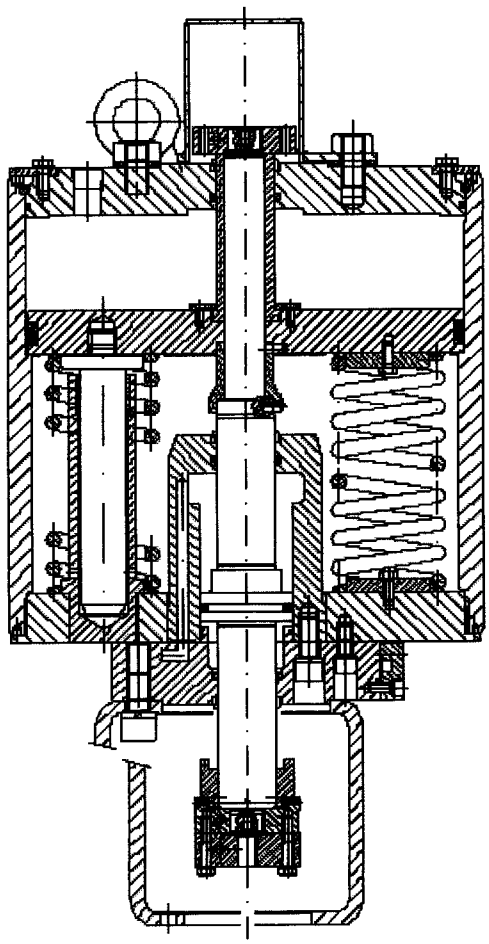
See page 1

9. APPENDICES

The order-specific data has been included with this manual and, as an example, a drawing of a spring closing and of a spring opening actuator.



TYPICAL PNEUMATIC ACTUATOR TYPE 1VS



TYPICAL PNEUMATIC ACTUATOR TYPE 1VO

Mokveld Valves bv

DRAWINGS

37995-102	Dimensional Drawing
37995-176	Schematic Instrumentation Drawing
37995-150	Assembly Drawing Valve
37995-151	Parts List Valve
37995-152	Assembly Drawing Actuator
37995-153	Parts List Actuator
37995-900	Nameplate Drawing