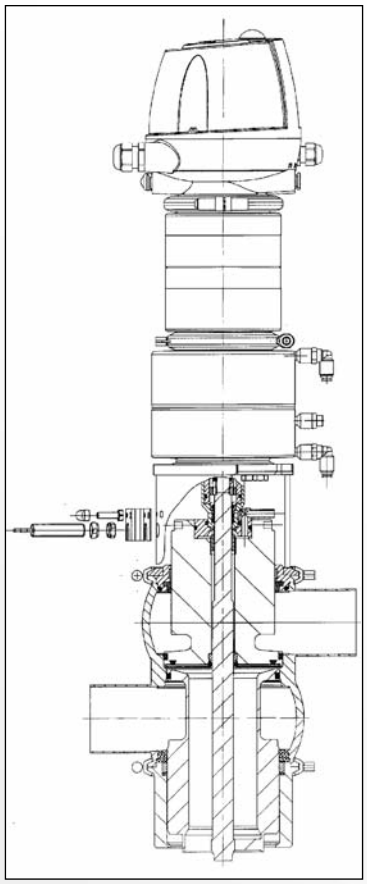
Liquids to Value



Mounting Instructions

VARIVENT®
Mixproof Valve M_OB (06)

Made by GEA Tuchenhagen

Issue 2010-05 Revision 4
Valve code ending ...B/06
Part no. 430-466
English

Contents

Remark:
Please see Chapter "Test Procedures for Tuchenhagen PMO Valve Type M_O, in Operating Instructions "Control Module T.VIS M-1 for PMO Valve Type M_O (B/06)", step 5, page 16

Introduction

Manufacturer's name and address

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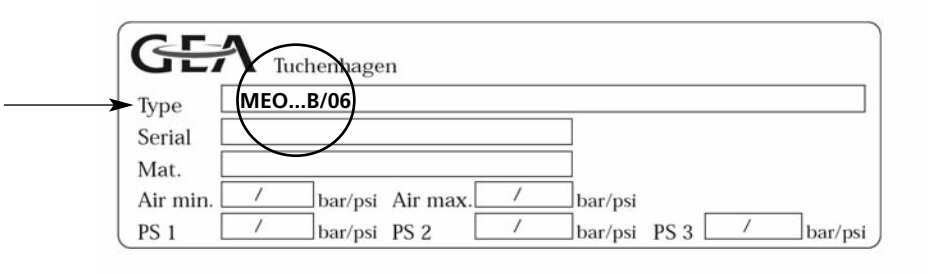
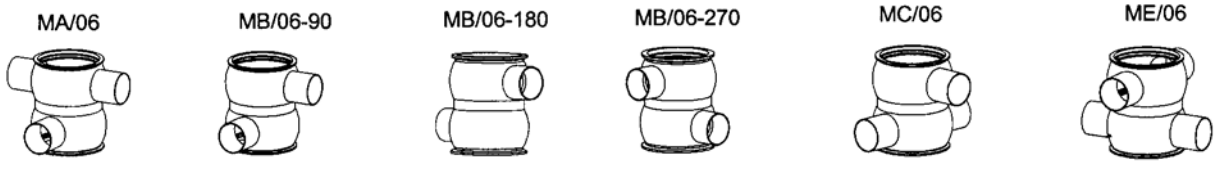
Identification of GEA Tuchenhagen valves



GEA Tuchenhagen valves are fitted with a type plate located in the middle of the actuator.
Please specify the complete valve identification code in all correspondence and when ordering spare parts.
In these operating instructions, the GEA Tuchenhagen valves are designated with the following letter combinations (see circle above): MSA, MSB, MSC and MSE.



Important Abbreviations and terms

BS	British standard
bar	Unit of measure for pressure
approx.	approximately
°C	Unit of measure for temperature degrees centigrade
dm^3_n	Unit of measure for volume cubic decimetre Volume (litre) under standard conditions
DN	DIN nominal width
DIN	Deutsche Norm (German standard) *DIN Deutsches Institut für Normung e.V.* *(German institut for Standardization)*
EN	European standard
EPDM	Material designation *Short designation acc. to DIN/ ISO 1629* *Ethylene propylene diene (monomer) rubber*
GEA	GEA AG group of companies *GEA stands for Global Engineering Alliance*
FPM	Material designation *Short designation acc. to DIN/ ISO 1629* *Fluorine rubber*
h	Unit of measure for time hour
HNBR	Material designation *Short designation acc. to DIN/ ISO 1629* *Hydrated acrylonitrile butadiene rubber*
IP	Protection class
ISO	International standard of the *International Organization for Standardization*
kg	Unit of measure for weight kilogram
kN	Unit of measure for force kilo Newton
l	Unit of measure for volume litre
max.	maximum
mm	Unit of measure for length millimetre
µm	Unit of measure for length micrometre
M	metric
Nm	Unit of measure for work Newton metre *Unit for torque* 1 Nm = 0,737 lbft Pound-Force (lb) + Feet (ft)
PA	Polyamide
PE-LD	Polyethylen low density
SET-UP	Self-learning installation For commissioning and maintenance the SET-UP procedure carries out all necessary settings for the generation of messages.
Size	Size of spanners
see Chapt.	see Chapter
s. ill.	see illustration
T.VIS®	Tuchenhagen Valve Information System
V DC	Volt direct current
V AC	Volt alternating current
W	Unit of measure for power Watt
TIG	Welding technique tungsten inert-gas welding
Inch OD	Pipe dimension acc. to British standard (BS), Outside Diameter
Inch IPS	US pipe dimension Iron Pipe Size

Safety Instructions

Designated use

The valve is designed exclusively for the purposes described below. Using the valve for purposes other than those mentioned is considered contrary to its designated use. GEA Tuchenhagen cannot be held liable for any damage resulting from such use; the risk of such misuse lies entirely with the user.
The prerequisite for the reliable and safe operation of the valve is proper transportation and storage as well as competent installation and assembly.
Operating the valve within the limits of its designated use also involves observing the operating, inspection and maintenance instructions.

Personnel

Personnel entrusted with the operation and maintenance of the valve must have the suitable qualification to carry out their tasks. They must be informed about possible dangers and must understand and observe the safety instructions given in the relevant manual. Only allow qualified personnel to make electrical connections.

Modifications, spare parts, accessories

Unauthorized modifications, additions or conversions which affect the safety of the valve are not permitted.
Safety devices must not be bypassed, removed or made inactive.
Only use original spare parts and accessories recommended by the manufacturer.

General instructions

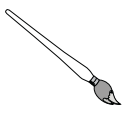
The user is obliged to operate the valve only when it is in good working order.
In addition to the instructions given in the operating manual, please observe the following:
– relevant accident prevention regulations
– generally accepted safety regulations
– regulations effective in the country of installation
– working and safety instructions effective in the user's plant.
– Installation and operating instructions if used within potentially explosive areas.

Marking of safety instructions in the operating manual

Special safety instructions are given directly before the operating instructions. They are marked by the following symbols and associated signal words.
It is essential that you read and observe the texts belonging to these symbols before you continue reading the instructions and handling the valve.

Symbol	Signal word	Meaning
	**DANGER**	Imminent danger, which may cause severe bodily injury or death.
	**CAUTION**	Dangerous situation, which may cause slight injury or damage to material.
		When working in potentially explosive atmospheres, strictly observe the instructions for commissioning and maintenance

Further symbols

Symbol	Meaning
•	Process / operating steps which must be performed in the specified order.
✗	Information about the optimum use of the valve.
–	General enumeration
	points to be lubricated

Special hazardous spots

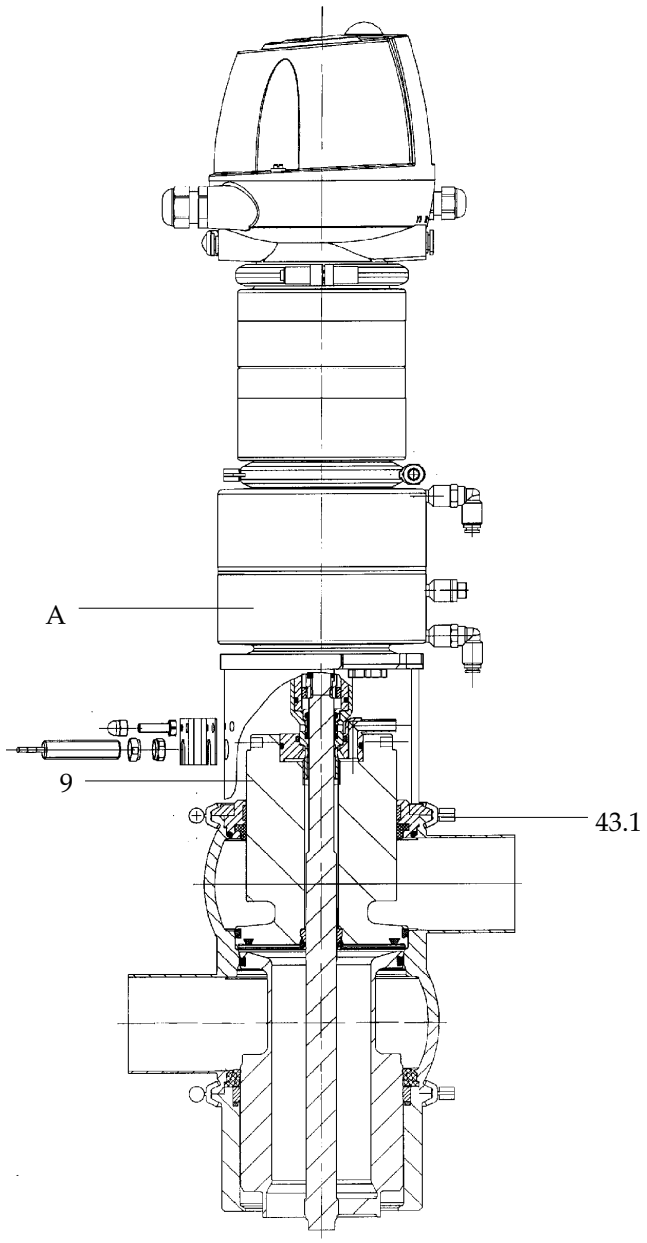
DANGER

In the event of malfunctions set the valve out of operation (disconnect the valve from the power and the air supply) and secure it against reactivation.
Immediately rectify the fault.

Never put your hand into the lantern (9) or into the valve housing.

When the hinged clamps (43.1) of the non-actuated valve (spring-closing action) are detached, there is danger of injury, since the released spring pressure suddenly lifts the actuator(A).

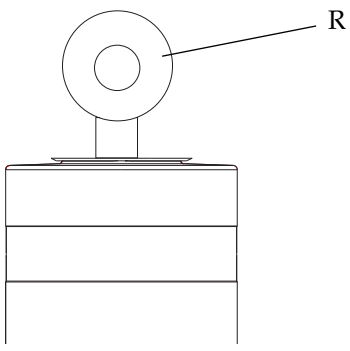
Therefore, prior to detaching the hinged clamp (43.1), release the spring
tension:
– through the pneumatic emergency switchbar.
– by pressurizing the actuator with compressed air.



CAUTION

Housing sockets have very sharp edges. Therefore wear suitable protection gloves during transport or installation of the valves.

For transportation and installation of the valve, it is imperative to remove the control module and the valve stem and to use the screwed-in eye bolt (R), part no. 221-104.98 for lifting the valve.



Designated Use

The Double-seat Mixproof Valve type M_OB with lifting actuator MN is used for mixproof shut-off of high quality, non-abrasive products at points of intersection in pipe systems.
It is resistant to pipe hammers.

CAUTION
Do not install the valve with actuator spring-to-open, because the valve may open in case of power / air failure and cause product intermixing.

Double-seat Mixproof Valve, type M_OB are pressure keeping equipment parts (without safety function) in the sense of the press. to Appendix II in Article 3, Section 3. In case of deviations thereof, a separate Declaration of Conformity will be handed out together with the equipment.

Transport and Storage

Checking the consignment

Upon receipt of the valve check whether the
– type and serial number on the type plate correspond to the data in the order and delivery documents and
– the equipment is complete and all components are in good order.

The forwarding agent must immediately be notified of any transport damage detectable from the outside and/or missing packages (confirmation on the consignment note). The consignee shall take recourse against the forwarding agent immediately in writing and inform GEA Tuchenhagen accordingly.
Transport damages which cannot be recognized immediately shall be brought to the forwarder´s notice within 6 days. Later claims on damages shall be born by the consignee.

Transport

DANGER
For transport of the package units/valves only use suitable lifting gears and slings. Observe the instruction symbols on the package and on the valve.
Handle the valve with care to avoid damage caused by shock or careless loading and unloading.
The plastic materials of the control modules are susceptible to breaking.
For the transportation of the valve, it is imperative to remove the control module and the valve stem and to use the screwed-in eye bolt, part no. 221-104.98 for lifting the valve, see Chapt. „Special hazardous spots“.

Storage

In the case that during transport or storage the valve was exposed to temperatures ≤ 0°C, it must be stored in a dry place against damage.
We recommend, prior to any handling (dismounting the housings / activation of actuators) an intermediate storage of 24 h at a temperature of ≥ 5 °C so that any ice crystals formed by condensation water may melt.

Design and Function

Design

A actuator

B control module

1 sealing ring

2 rod guide ring

3 sealing disk

5 O-Ring

7 V-ring RA

8 V-ring

9 lantern

15 valve disk M/06

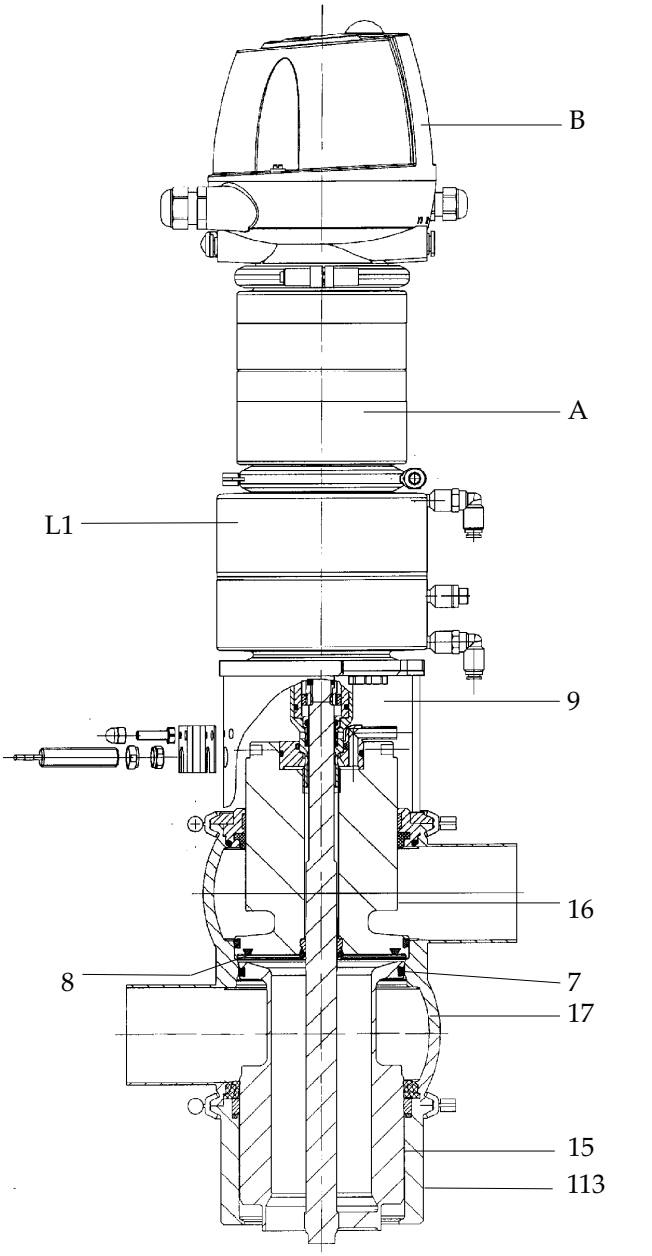
16 double valve disk M/06

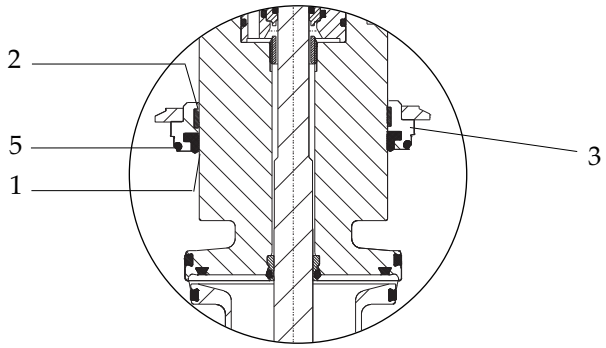
L1 lifting actuator MN

17 valve housing

113 balancer cleaning device

✗For housing configurations see spare parts drawing.





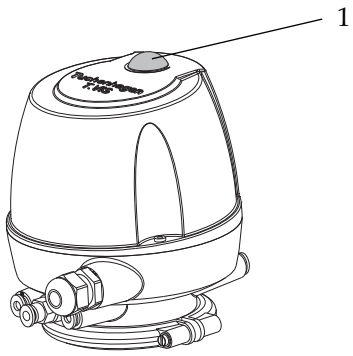
Function

The valve M_OB with lifting actuator MN
– works with a radial gasket seat design
  and
– is resistant to pressure hammers up to 50 bar.

Leakageproof shut-off

In valve M_OB with lifting actuator MN, the upper and the lower valve housing are each fitted with a valve seat. The chamber between the valve disks is connected to the open environment by an isolation outlet integrated into the lower valve spindle.
Should seal damage occur, leaking fluid flows safely into the open. Defective seals can thus easily be detected. The penetration of leaking fluids from one pipe into the other is excluded under normal operating conditions.

Actuator function



Actuator with spring closing function (Z)
The valve is closed in the non-actuated position.

Distinguishing feature with **control module T.VIS** on completed installation (SET-UP):
– Permanent light (1)
  green: Valve in non-actuated position

– Permanent light (1)
  yellow: actuated valve position

Installation and Operation

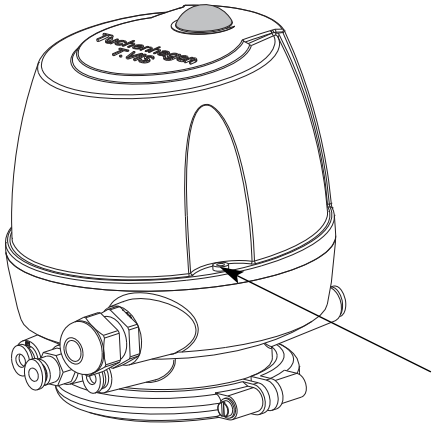
Make sure that
– the valve is installed in the pipe system free of stress
  and
– no foreign materials (e. g. tools, bolts) are enclosed in
  the system.

Installation position

The standard installation position of the valve is upright and in no case more than 15 degrees to the vertical. Care must be taken that the valve housing, the pipe system and the leakage outlet system can drain properly.

Control module T.VIS

✗Tighten firmly all three screws at the cap in order to prevent dust and splash water from penetrating into to the control module.



CAUTION

Using valve M with lifting actuator in connection with the control module T.VIS A-7, the LEFF Function in the control module must not be activated.

DANGER

If liquids are running in the pipe system, they can gush out when the line is opened and cause injury to people. Therefore, prior to detaching pipe connection fittings or clamp connections:

– drain and – if necessary – rinse or clean the pipe.
– disconnect the pipe segment with the valve to be mounted from the rest of the pipe system to secure the pipe against incoming product.

Valve with detachable housing connections

Valves with detachable housing connections can be installed directly into the pipe system, if suitable connection fittings are used.

Valve with welded connections

CAUTION

For welding operations, all internals must be removed from the valve housing.

DANGER

When the hinged clamps at the actuator or at the housing of the valve are detached, there is danger of injury, since the released spring pressure suddenly lifts the actuator.
Therefore, prior to detaching the valve housing, lift the double valve disk by actuating the valve with compressed air by connection X, see hosing diagrams in the Chapter "Pneumatic Connections".

- Make sure that no foreign materials are enclosed in the system.
- Actuate the valve once by applying compressed air.
- Check lift stroke of the valve disk and that of the double disk.
- Prior to the first product run clean the pipe system.
- During commissioning, regularly check the seals for leakage. Replace defective seals.
- Release the spring tension.
- Dismantle the valve insert (follow the instructions under "Dismantling").
- Weld the housing (without seal rings) stress-free into the pipe system and for this purpose:
- Fit in the housing and tack it.

CAUTION

Prior to welding, always seal the housing, otherwise the housing gets distorted during the welding operations.

- Seal the housing.
- Purge the housing on the inside with forming gas to remove oxygen from the system.
- Use a suitable welding method.
  GEA Tuchenhagen recommends the TIG welding method with pulsating current.
- Weld the housing into the pipe system, if necessary using a welding filler.
- After welding, passivate the seam.

Pneumatic Connections

Air requirement

The amount of compressed air required for switching operations of the valve depends on the type of actuator.

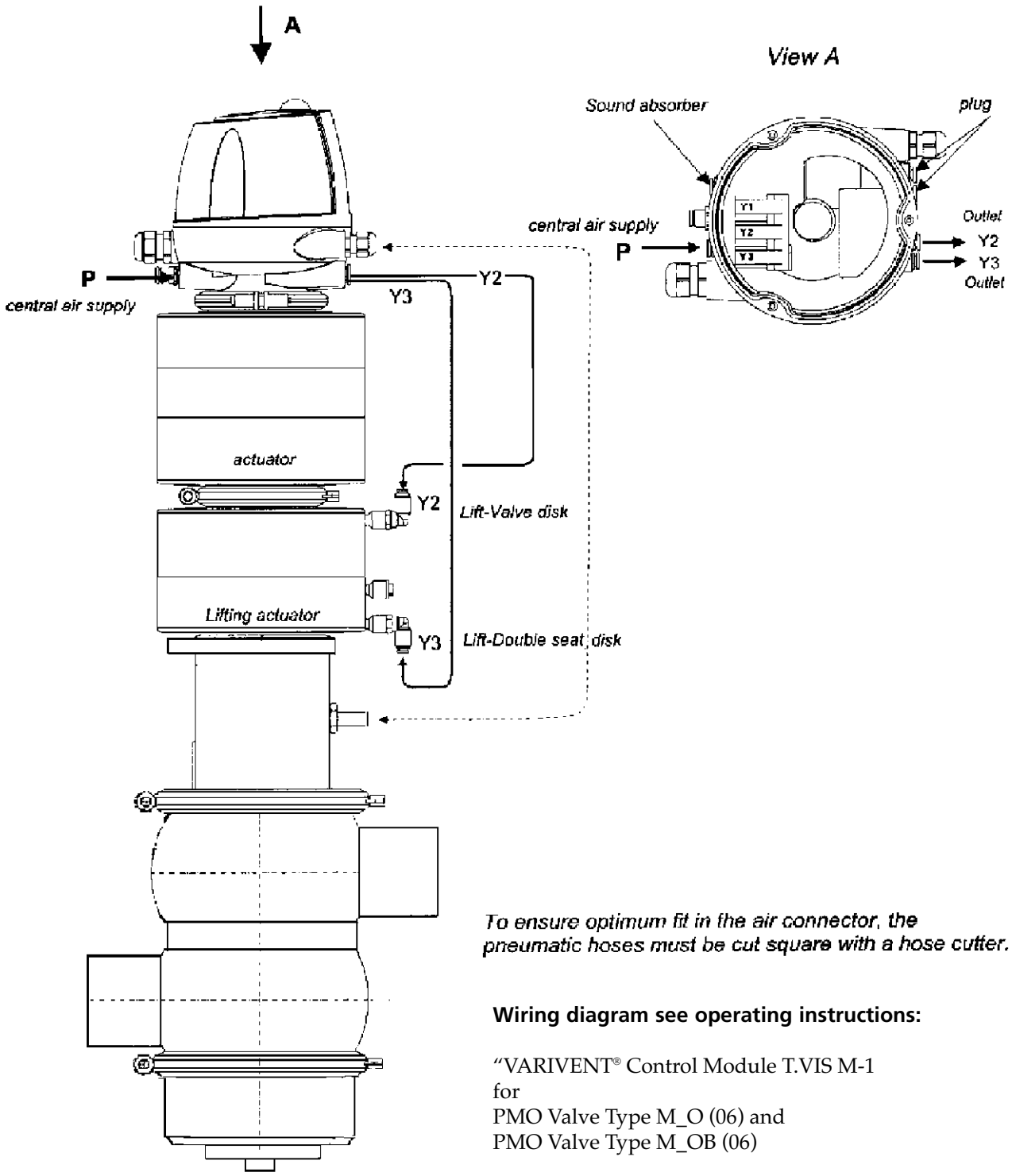
Antriebstyp *Actuator type*	**Luftbedarf (dm^3_n/Hub)* für** *Air needed (dm^3_n/ stroke)* for* **Gesamthub** *Total stroke*
BD/BL Ø100	0,66
BD/CL Ø125	0,89
DF5/DLM5 Ø160	2,07
EK62/ELR6	4,45

* $1\,dm^3_n$ /Hub = $1\,l_n$ /Hub ≈ $61\,inch^3$/Hub

Antriebstyp *Actuator type*	**Luftbedarf (dm^3_n/Hub)* für Lifthub** *Air needed (dm^3_n/ stroke)* for Lifting* **Ventilteller** *stroke of valve disk (lower disk)*	 **Doppelteller** *stroke of double seat disk (upper disk)*
BL Ø100	0,36	0,08
CL Ø125	0,55	0,14
DLM5 Ø160	1,04	0,19
EL6	2,25	0,30

Installing the air hose

- Carry out hosing according to hosing diagram, see the following page.



To ensure optimum fit in the air connector, the pneumatic hoses must be cut square with a hose cutter.

Wiring diagram see operating instructions:

"VARIVENT® Control Module T.VIS M-1
for
PMO Valve Type M_O (06) and
PMO Valve Type M_OB (06)

Part no. 430-398-US

- Shut off the compressed air supply.
- Push the air hose into the air connector in the control module.
- Reopen the compressed air supply.

Electrical Connections

DANGER

Only allow qualified personnel to make electrical connections. Prior to making electrical connections check the maximum permissible operating voltage.

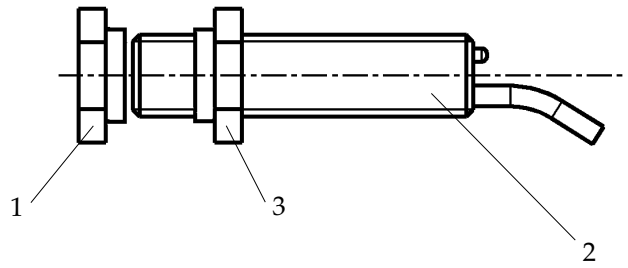
Observe the installation and operating instructions if used within potentially explosive areas!

- Make the electrical connection for the valve in accordance with the operating instructions for the control module.

Adjust the proximity switches

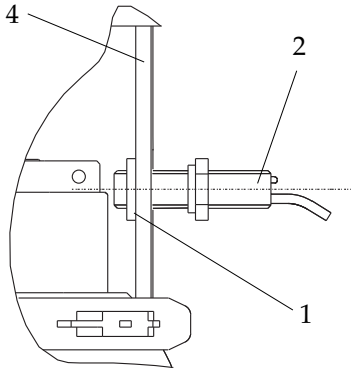
In the control module

✗ Proximity switches in the control module are adjusted at factory.
Due to transport and installation the adjustment may alter and may need re-adjustment (see operating instructions Control module).



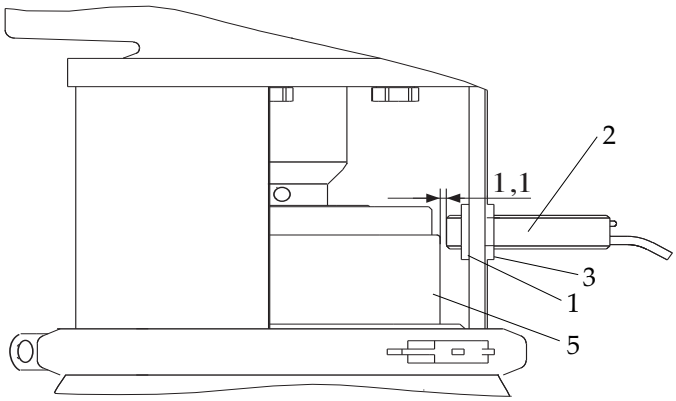
In the lantern

- Screw off first nut (1) from sensor (2).
- Unscrew second nut (3) until approx. 10 mm before the end of the sensor.



- Insert proximity switch (2) into the corresponding bore in the lantern (4).
- Position nut (1) inside and screw-in proximity switch (2).

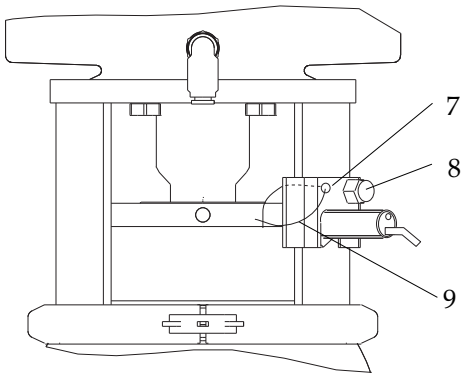
- Hold position of the nut (1) in lantern and with the help of a feeler gauge screw in the sensor (2) until a distance of approx. 1.1 mm (0,43 inch) to the upper double disk (5) remains.
- Tighten nut (3).



CAUTION

- Actuate the valve once to check the switching function. The diode will go off, as soon as the double disk is moving upwards.

- If necessary, adjust the gap clearance until the correct switch point is achieved.
- Pull safety plate (7) for the switch over the shaft of the proximity switch.
- Insert the hex. screw from the inside into the corresponding bore and tighten from the outside with the cap nut (8)
- Thread seal wire (9) through the bore and seal.



Commissioning

- Make sure that no foreign materials are enclosed in the system.
- Actuate the valve once by applying compressed air.
- Check lift stroke of the valve disk and that of the double disk.
- Prior to the first product run clean the pipe system.
- During commissioning, regularly check the seals for leakage. Replace defective seals.

Malfunction, Cause, Remedy

CAUTION

In the event of malfunctions immediately deactivate the valve and secure it against inadvertent reactivation. Defects may only be rectified by qualified personnel observing the safety instructions.

Malfunction	Cause	Remedy
Valve does not work	Error in control system	Check plant configuration
	No compressed air Air pressure too low	Check air supply Check air hoses for free passage and leaks
	Error in electric system	Check actuation /external controller and routing of electric lines
	Solenoid valve defective	Replace solenoid valve
	the valve is operating against the hydraulically closed pipe	open pipe
Double valve disk oscillates during lifting or does not open	Air pressure too low	Increase air pressure
	Product pressure too high	Reduce product pressure
Valve does not close	Dirt/foreign materials between valve seat and valve disk	Clean valve housing and valve seat
Valve closes too slowly	O-rings dry in the actuator and in the control module (friction losses)	Grease O-rings
Leakage at the valve housing	O-rings in the housing defective	Dismantle valve housing, replace O-rings
Leakage at the leakage outlet (closed position)	Valve disk V-ring defective	Dismantle valve insert replace V-rings

Maintenance

Inspections

Between the maintenance periods, the valves must be checked for leakage and proper function.

Product contact seals

- Check at regular intervals:
  – upper sealing ring
  – O-rings between the valve housings
  – V-rings in the valve disks. Deficiency visible at the leakage on the leakage outlet during the closed position of the valve.
  – lower sealing ring

Pneumatic connection

- Check the operating pressure at the pressure reducing and filter station.
- Clean the air filter in the filter station at regular intervals.
- Check whether the air hose sits firmly in the air connector.
- Check the air hoses for bends and leaks.
- Check function of the solenoid valves.

Electrical connection

- Check the cap nut on the cable gland for firm seat.
- Check the cable connections at the luster terminal.

Maintenance intervals

To ensure the highest operational reliability of the valves, all wearing parts should be replaced at longer intervals.

The actual maintenance intervals can only be determined by the plant user, since they depend on the operating conditions, for instance
– daily period of operation
– switching frequency
– type and temperature of the product
– type and temperature of the cleaning solution
– ambient conditions

Application	Maintenance interval (recommendations)
Media at temperatures from 60 °C to 130 °C (140 °F to 266 °F)	around every 3 months
Media at temperatures < 60 °C (<140 °F)	around every 12 months

Prior to dismantling the valve

DANGER

Before detaching the pipe connection and the hinged clamp connections on the valve housings, always take the following preparatory measures:

- Make sure that during maintenance and repair work no process is in operation in the area concerned.
- All pipe system elements attached to the valve must be drained and, if necessary, cleaned or rinsed.
- Shut off the control air supply, unless it is required for dismantling the valve.
- Disconnect the power supply.
- If possible, take the valve out of the pipe segment together with all housings and housing connections.

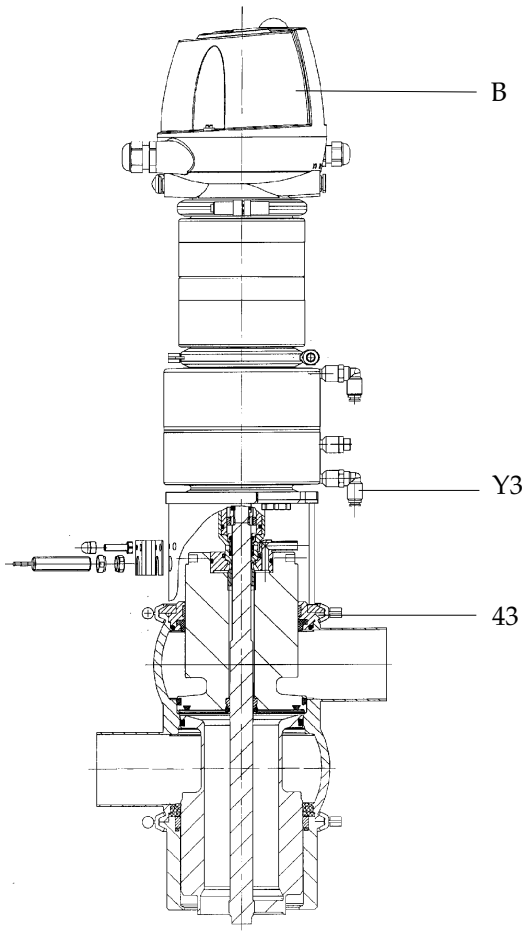
Dismantling

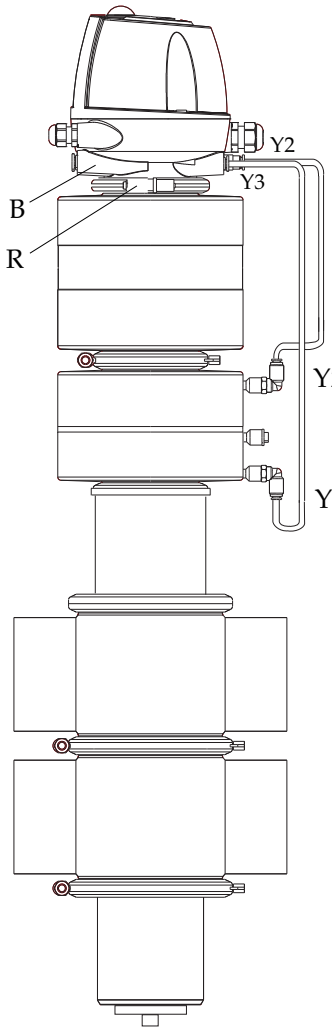
- Unscrew the hood (B) of the control module.

DANGER

When the hinged clamps (43) at the housing of the non-actuated valve are detached, the released spring force suddenly lifts the actuator. There is danger of injury. Therefore, prior to detaching the hinged clamps, release the spring tension by actuating the valve actuator with compressed air.

- Pressurize the actuator at (Y3).
- Detach the hinged clamps (43) between the housing and the lantern.
- Depressurize the actuator.





Y2 Lift – Ventilteller R
Lift – Valve disk R

Y3 Lift – Doppelsitzteller
Lift – Double seat disk

Dismantling the control module

- Remove the semi-annular clamps (R) at the control module (B).

✗ The pneumatic and electrical connections can remain at the control module.

- Remove the pneumatic connections at the actuator.
- Pull the control module (B) upwards and off.

Separating the valve from the housing

CAUTION

The surfaces of the balancer are sealing surfaces and must not be
damaged.
Take care when removing the valve from the pipe that the balancer does not hit the valve housing.
Carefully draw out the valve.

- Pull the valve insert out of the housing.

- Unscrew switching rod (B1) from the piston rod (A3) using a mandrel 4 mm.
- Remove hinged clamp (46) and pull actuator (A) together with slider (B3), rod guide ring (B4), adapter (L4) with O-ring (L8) and locking flange (L3) out of the lifting actuator (L1).
- Unscrew adapter (L4) using a face spanner from the piston rod (A3). Don't grease the thread of the adapter and the piston rod.
- Hold striker (L2) using a tubular hex. box spanner size 36.
- Set the head face spanner at (15.1) and unscrew valve disk (15).

CAUTION

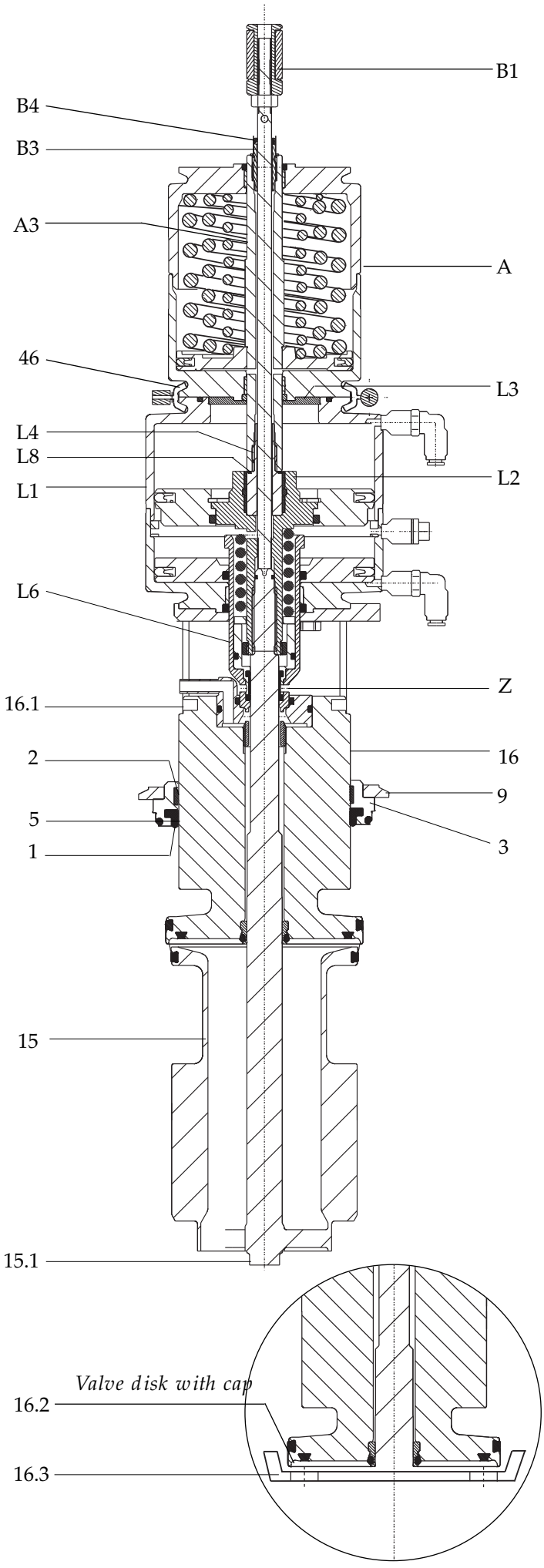
The running surfaces of the double seat disk (16) are sealing surfaces and must not – the same as the sealing disk (3) – be damaged.

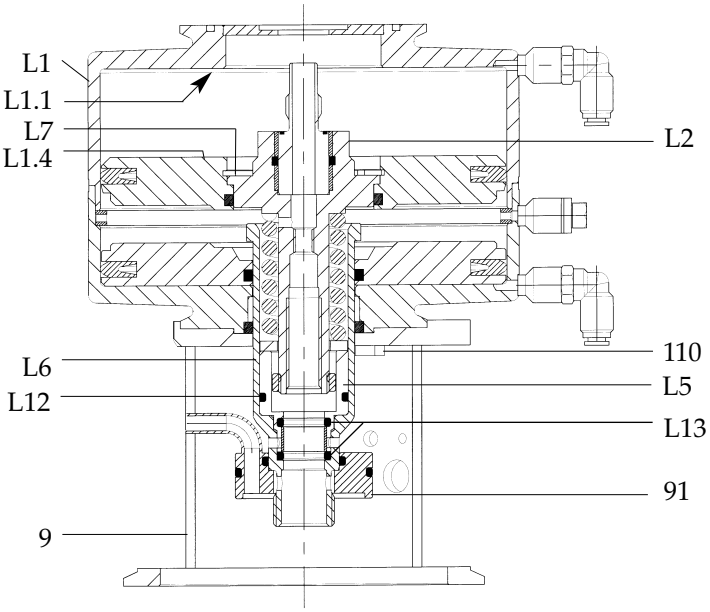
✗ While unscrewing the double seat disk, press the sealing disk (3) against the lantern (9).

CAUTION

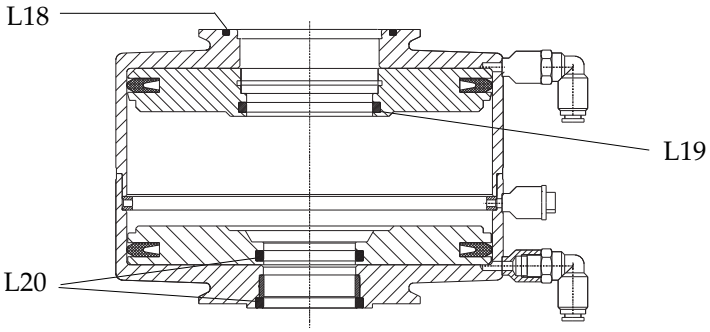
To prevent damage to the deflection edge (16.2) on the double valve disk, the deflection edge must be protected using the delivered cap (16.3).

- Hold the drive sleeve (L6) at (Z) with hook spanner.
- Insert pin punch into the bore (16.1) and unscrew double seat disk (16).
- Withdraw sealing disk (3) with rod guide ring (2), O-ring (5), sealing ring (1) from the lantern (9).





- Pull-off CIP connection (91) from the drive sleeve (L6).
- Put lifting actuator (L1) down for further disassembly.
- Push the piston (L1.4) with fitted striker (L2) and drive sleeve (L6) upwards against the lifting actuator flange (L1.1) and remove the circlip (L7) from the piston (L1.4) using nippers.
- Push striker (L2) complete with drive sleeve (L6) out of the lifting actuator (L1).
- Pull bushing (L5) out of the drive sleeve (L6), the O-rings (L12, L13) are then accessible.
- Remove 4 hex. nuts (110), pull-off lantern (9) from lifting actuator (L1).



- O-rings (L18, L19, L20) are now accessible.

Maintenance

Cleaning the valve

CAUTION

The shaft of the valve disk, the housing seat, the valve seat, the V-ring groove and the lower edge of the double disk are precision parts which must not be damaged!

- Dismantle the valve. See Chapter “Dismantling“.
- Carefully clean the individual components.

CAUTION

Observe the safety information sheets issued by the detergent manufacturer! Only use detergents which are non-abrasive and non-aggressive towards stainless steel.

Replacing the seals

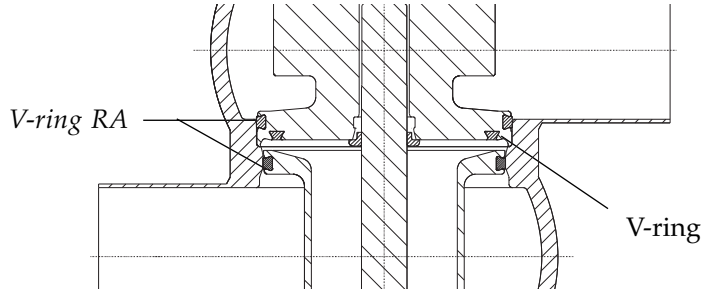
✗ Replace defective seals. Always replace the housing O-rings to ensure the tightness of the valve. Always use original spare parts.

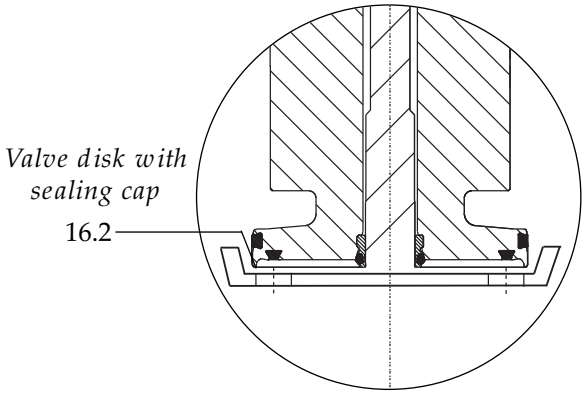
CAUTION
The deflection edge (16.2) at the bottom side of the double valve disk is very sharp. Risk of injury!

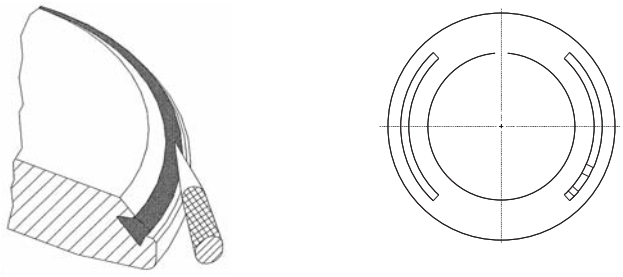
Do not use the deflection edge on the double valve disk for supporting the scriber!

CAUTION
Removing the V-ring with a scriber, the scriber may slip off. There is danger of injury.
Therefore clamp the valve disk into a vice fitted with protected jaws.
Also unscrew the curved end of the scriber, in order to protect the hand of the technician.

- Insert the scriber into the V-ring and lever it out.







Changing the V-ring

Use the insertion tool (part no. 229-109.88) to mount the new V-ring.

✗Do not grease the V-ring before inserting it. We recommend using water with household liquid soap (1 drop/1 l) as an aid to inserting V-rings. In order to prevent oxidation from infiltration prepare the liquid solution in a ceramic, plastic or stainless steel container.

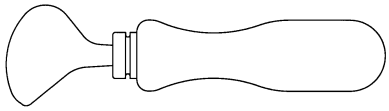
Before inserting the V-ring wet it a little on the back (side not in contact with the product). Take care that water does not enter the seal groove in the valve disk.

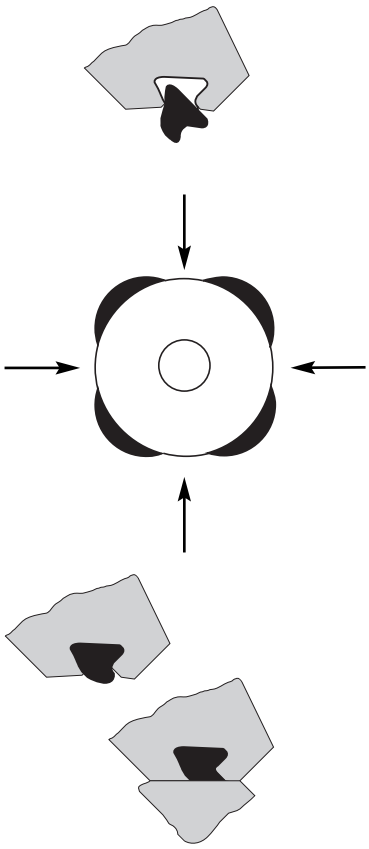
CAUTION
Observe the required installation position of the V-ring.

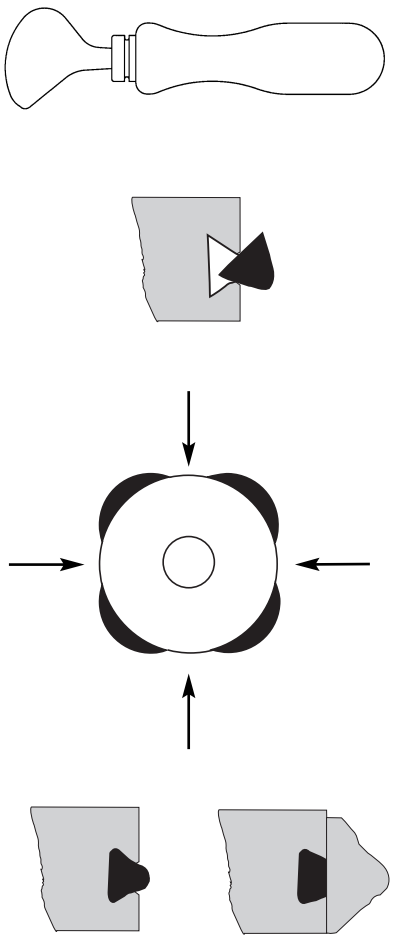
- Insert the V-ring (s. pict.).

- By use of the V-ring insertion tool, press the V-ring into the groove at several opposite places along the circumference.

- Insert the V-ring evenly into position.







Changing the V-ring RA

Use the insertion tool to mount the new RA V-ring.

✗Do not grease the V-ring RA before inserting it. We recommend using water with household washing-up liquid (1 drop/1l) as an aid to inserting V-rings. In order to prevent oxida-tion from infiltration prepare the liquid solution in a ceramic, plastic or stainless steel container.

Before inserting the V-ring RA, wet it a little on the back (side not in contact with the product). Take care that water does not enter the seal groove in the valve disk.

CAUTION
Observe the required installation position of the V-rings RA (s. illustr.).

- Insert the V-ring RA (s. illustr.).
- Using the V-ring insertion tool press the V-ring RA into the groove at several opposite places along the circumference.
- Insert the V-ring RA evenly into position.
- Replace all the other seals correspondingly marked in the spare parts drawing.

✗Used seals must not be refitted, since this would adversely affect the sealing function.

Lubrication of seals and threads

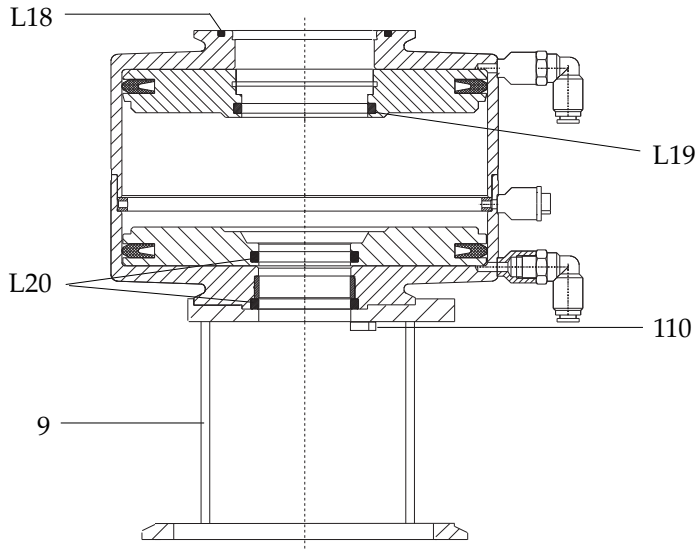
CAUTION
For product contact seals do not use conventional lubricants and oils.
Observe the safety information sheets issued by the lubricant manufacturers.

- Grease the threads of the valve disk and those of all screws. Don't grease the thread of the adapter and the piston rod.
- Do not grease the V-ring.
- Apply a very light film of grease to all seals – including the O-rings at the top and bottom of the piston rod for the actuator.
- Lubricate the balancer.

GEA Tuchenhagen recommends Rivolta F.L.G. MD-2 and PARALIQ GTE 703. These lubricants are approved for foodstuff and is resistant to beer froth and have the NSF-H1 (USDA H1)-registration.
PARALIQ GTE 703 can be ordered from GEA Tuchenhagen under part no. 413-064 and Rivolta F.L.G. MD-2 under part no. 413-071.

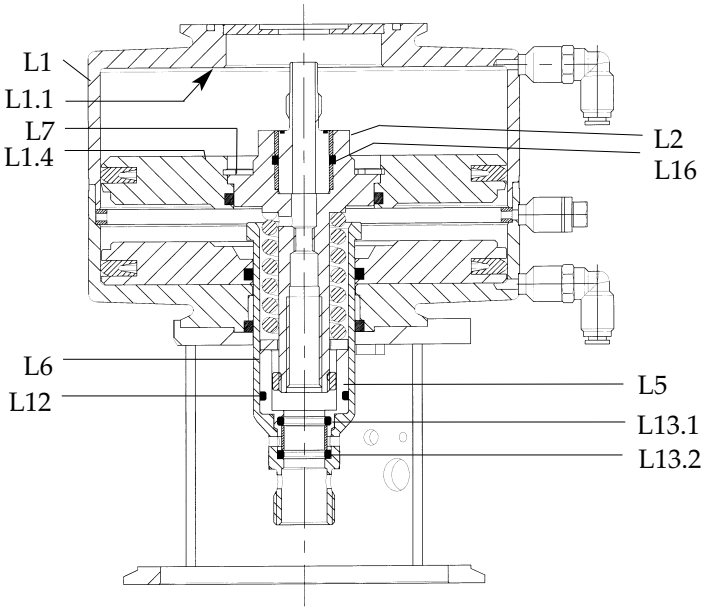
Assembly

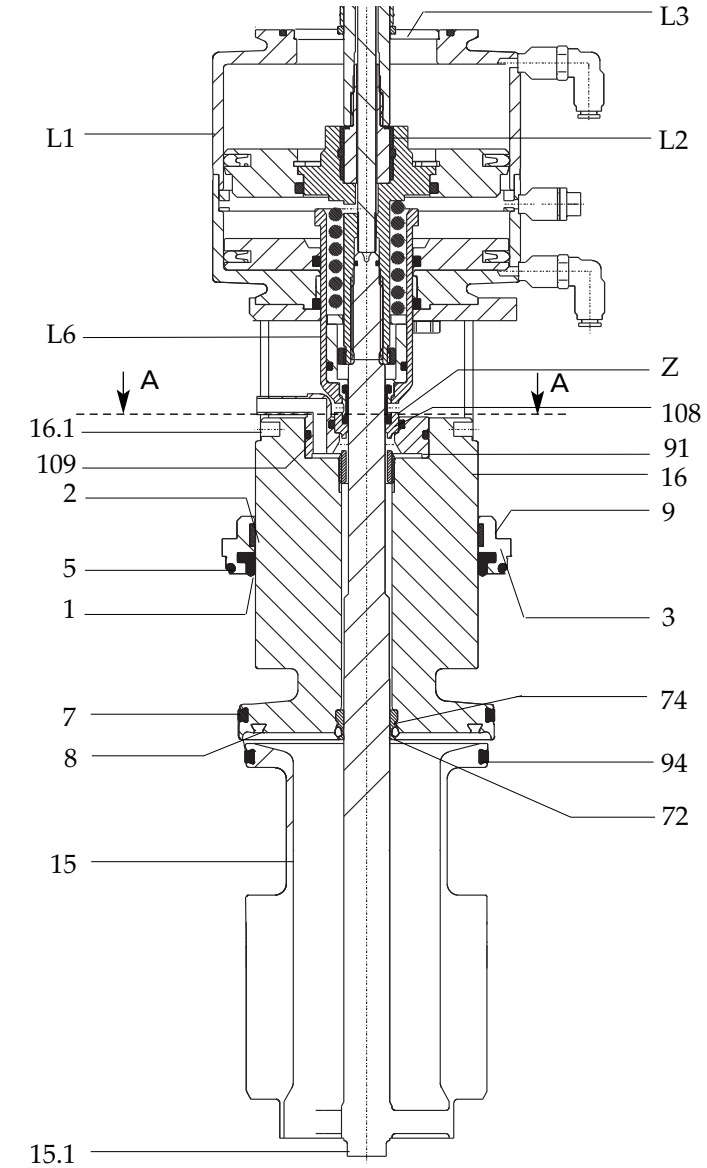
- Equip the lifting actuator MN (L1) with O-ring (L18, L19, L20) and fix it at the lantern (9) with 4 hex. nuts (110)

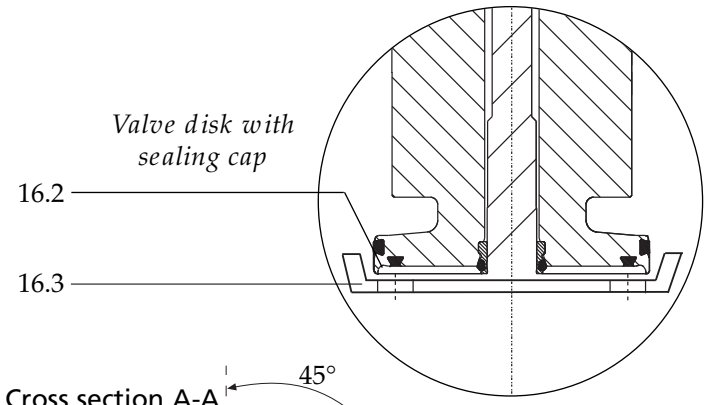


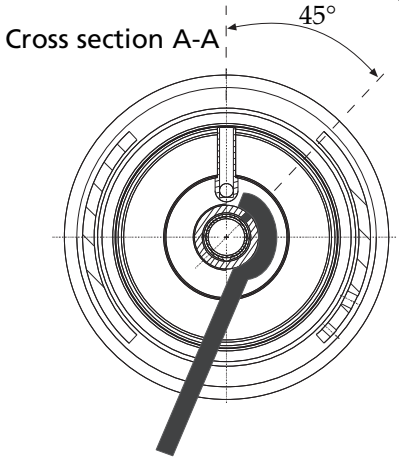
- Provide bushing (L5) with O-rings (12, 13.1) and plug it on to the mandrel, part no. 221-105.94 or 221-105.95. Then place O-ring (13.2) on the top and push everything into the drive sleeve (L6). Remove mandrel.

- Push striker (L2) complete with O-ring (L16) into the drive sleeve (L6) and pre-stress with mandrel (part no. 221-105.76) and tubular hex. box spanner size 36. Insert everything into the lifting actuator (L1) and fix with circlip (L7) at the piston (L1.4) and then relieve.









CAUTION

The running surfaces of the double seat disk (16) are sealing surfaces and must not – the same as the sealing disk (3) be damaged.

✗ While screwing the double seat disk, press the sealing disk (3) against the lantern.

CAUTION

The deflection edge (16.2) at the bottom side of the double valve disk is very sharp. Risk of injury!

To prevent damage to the deflection edge on the double valve disk, the deflection edge must be protected using the delivered cap (16.3) .

- Push CIP connection (91) equipped with O-rings (108, 109) on to the drive sleeve (l6). Hold drive sleeve at (Z) using a hook spanner, see cross section A-A. Tighten the double disk (16) complete with V-rings (7, 8), snap sealing (74), O-ring (72), sealing disk (3), O-ring (5), sealing ring (1), rod guide ring (2) by applying an pin punch at (16.1).

- Remove protecting cap (16.3).

- Hold striker (L2) with tubular hex. box spanner size 36 and tighten valve disk (15) together with installed V-ring (94) at bore Y with flexible head face spanner (15.1).

- Insert locking flange (L3) into the lifting actuator (L1).

- Don't grease the thread of the adapter and the piston rod. Screw adapter (L4) with O-ring (L8) at the piston side firmly into the piston rod (A3) of the actuator (a) using a face spanner.

- Fix slider (B3), complete with rod guide ring (B4) at the piston rod (A3) of the actuator (5) using a mandrel (4 mm).

- Insert actuator (A) into into the lifting actuator (L1) and fix with hinged clamp (46.1).

CAUTION

Take care not to damage the magnet in the switching rod!

- Put the switching rod (B1) through the piston rod (A3) and lock with valve disk (15), see spare parts list / dimension sheet switching rod (annex).

- Actuate lift stroke of double-disk at (Y3) and carefully introduce valve insert into the housing and fix with hinged clamp (46.2).

Semi-annular clamps

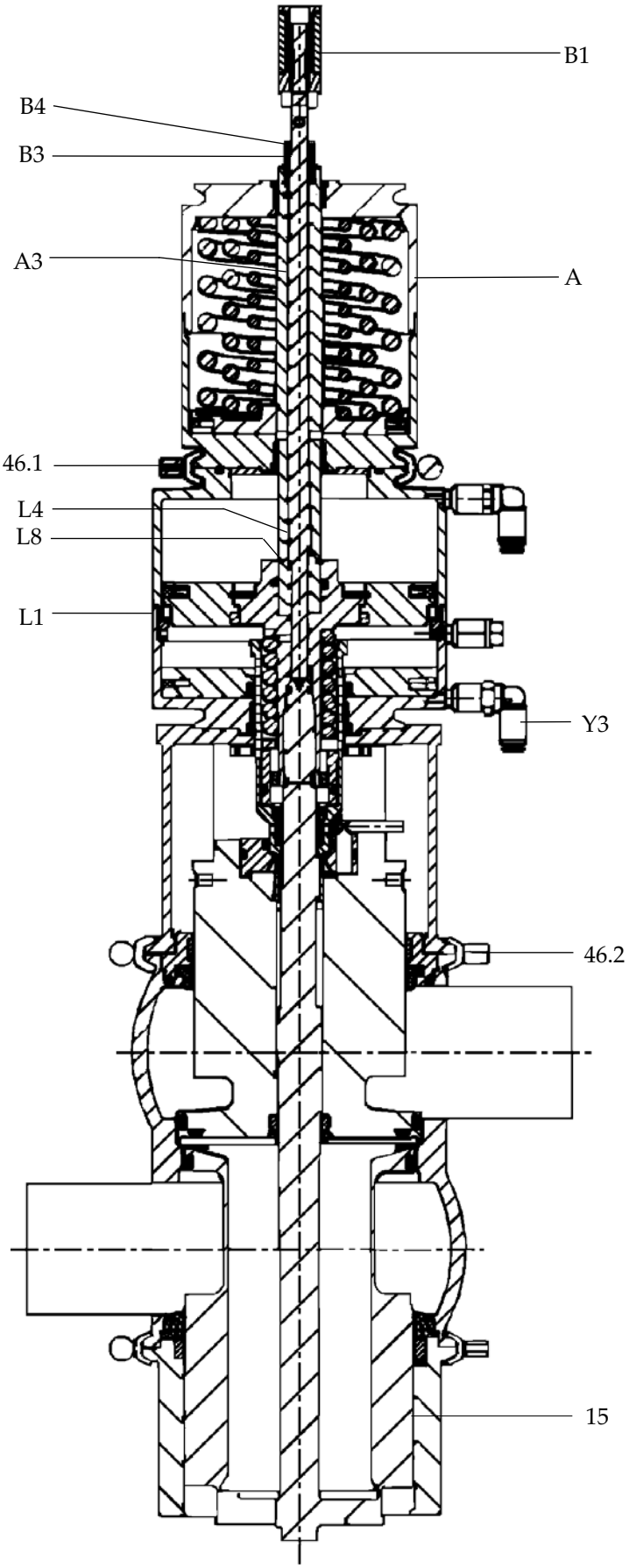
- Tighten the nuts of the semi-annular clamps at the control module with a torque of 1 Nm (0,7 lbft).

Hinged clamps

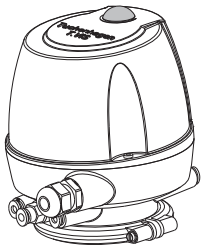
- Tighten the nuts of the hinged clamps with following torques:
  M 6 9 Nm (6,6 lbft)
  M 8 22 Nm (16,2 lbft)

Cast-semi-annular clamps

- Tighten the nuts of the cast-semi-annular clamps with a torque of 45 Nm (33 lbft).



Control module T.VIS



Checking the valve stroke

Control module S and T.VIS M-1
- Actuate the valve by applying compressed air.
- Check the function of the proximity switches and if necessary readjust it.
- Check whether the valve stroke (c) is correct.

Control module T.VIS A-7
- Actuate the valve by applying compressed air.
- Read stroke via palm.
- Check whether the valve stroke is correct.

Lifting strokes
- It is not nessecary to adjust the lifting strokes.

Valve size	Valve stroke C mm	Lifting stroke Double disk mm	Valve disk mm
inch OD			
11/2"	22	2,5…3,5	6
2	31	2,5…3,5	6
21/2"	35	2,5…3,5	6
3"	45	2,5…3,5	6
4"	45	2,5…3,5	6
6"	65	2,5…3,5	6

Disposal of valve actuators

DANGER

When actuators are opened, the prestressed spring can cause loss of life.
The spring tension can be as much as 24 kN. Therefore never try to force the actuator open. Only deactivated actuators may be scrapped.

✗ GEA Tuchenhagen accepts unopened actuators and arranges for proper disposal free of charge.

Technical Data

Size	1 ½" to 6" OD
Material of product contact parts	stainless steel 1.4404 Check corrosion resistance with respect to media and detergents.
Installation position	upright and in no case more than 15 degrees to the vertical, so that the leakage cavity can drain properly.
Ambient temperature	0...45 °C (32...113°F) standard
Valve	< 0 °C (< 32°F): use control air with low dew point. Protect valve stems against freezing < –15 °C (< 5°F): no solenoid valves in the control module > +50 °C (> 122°F): no solenoid valves in the control module
Proximity switch	–20...+80 °C (–4...176°F)
Product temperature and operating temperature	depending on the sealing material
Product pressure	10 bar max. (145 psi)
Resistant to pressure blows level	50 bar max.
Control air pressure	4 bar up to 8 bar 58 psi up to 116 psi
Control air	acc. to ISO 8573-1:2001
– Solid particle content:	quality class 6 particle size max. 5 μm part. density max. 5 mg/m^3
– Water content:	quality class 4 max. dew point +3 °C If the valve is used at higher altitudes or at low ambient temperatures, the dew point must be adapted accordingly.
– Oil content:	quality class 3, preferably oil free max. 5 mg oil in 1m^3 air
Air hose	
Metric	material PE-LD outside dia. 6 mm inside dia. 4 mm
Inch	material PA outside dia. 6,35 mm inside dia. 4,3 mm

Pipe ends – VARIVENT® system

Inch OD	outside diameter	wall thickness	inside diameter	outside diameter acc. to ASME-BPE
1"	25,4	1,65	22,1	x
1 1/2"	38,1	1,65	34,8	x
2"	50,8	1,65	47,5	x
2 1/2"	63,5	1,65	60,2	x
3"	76,2	1,65	72,9	x
4"	101,6	2,11	97,38	x
6"	152,4	2,77	146,86	x

Resistance of the Sealing Materials

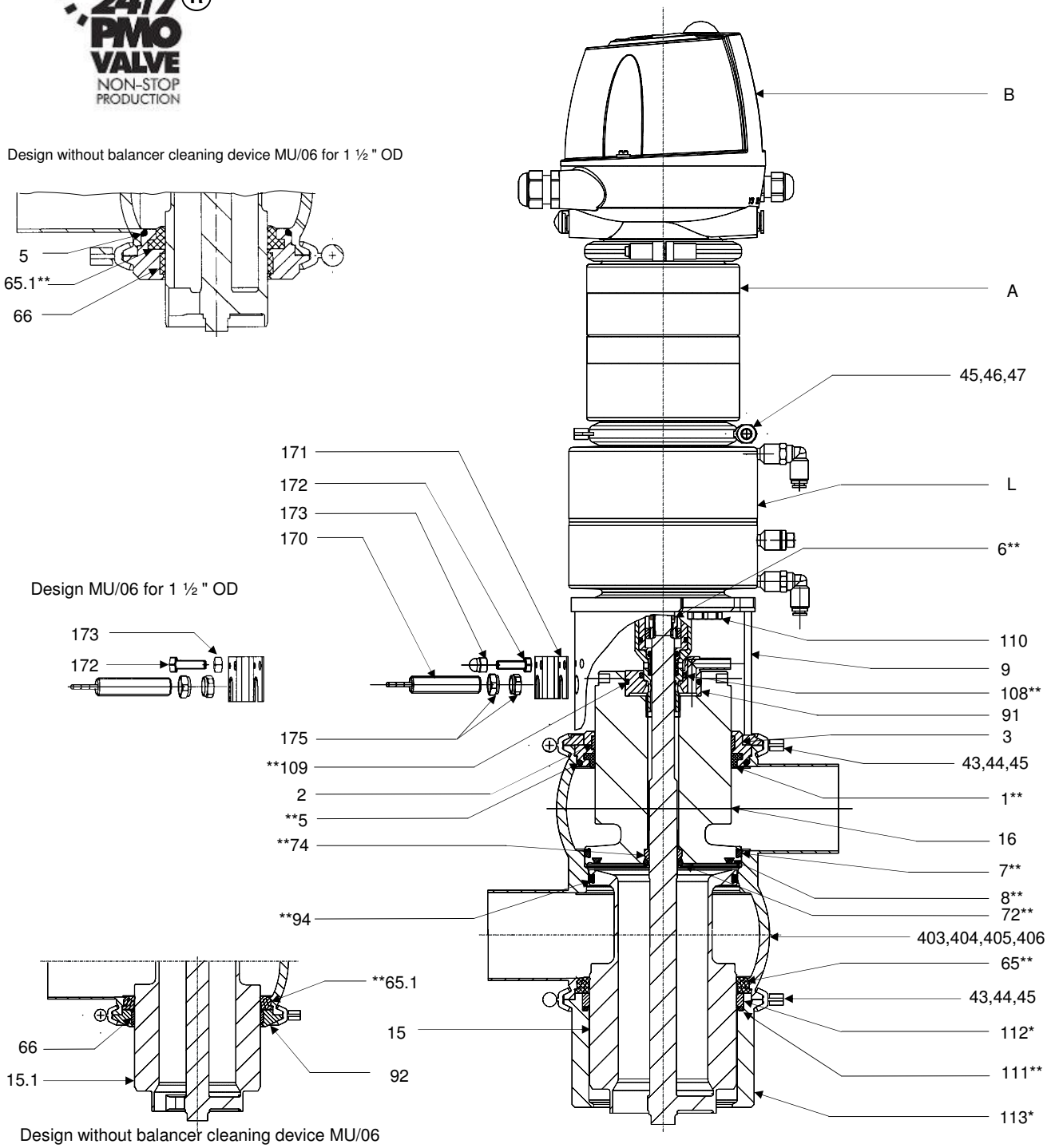
The resistance of the sealing material depends on the type and temperature of the medium conveyed.

Medium	Sealing material EPDM (standard)	FKM (optional)
product	–40... +135 °C	–10...+200 °C
caustics at 2...5%	up to 80 °C	up to 40 °C
strong caustics	sufficiently resistant	not resistant
acids at 2...5%	up to 80 °C	up to 100 °C
strong acids	not resistant	not resistant
saturated steam up to 135 °C	resistant	conditionally resistant
fuels/hydrocarbons	not resistant	conditionally resistant
oils/fats	not resistant	very good resistance

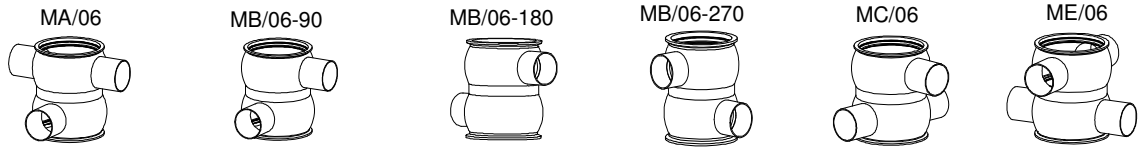
Tools / Lubricant

Tool	Part no.
Hose cutter	407-065
V-ring insertion tool	229-109.88
Open spanner, ends ground, SW / size 17-19	229-119.01
Open spanner, ends ground, SW / size 21-23	229-119.05
Open spanner, ends ground, SW / size 22-24	229-119.03
Open spanner SW / size 30-32	408-041
Hook spanner for holding the drive sleeve Ø30/Ø4 for 2", 2 1/2"	
Hook spanner for holding the drive sleeve Ø34/Ø4 for 3", 4"	
Mandrel 6 mm	
Mandrel	221-105.76 221-105.77
Mandrel used for installing the bushing into the drive sleeve/	221-105.94 (2", 2 1/2") 221-105.95 (3", 4")
Tubular hex. box spanner size 36	
Screwed-in eye bolt T.VIS M14	221-104.98
Snap ring pliers for bores up to DN 100 Ø 60; DN 125/6"IPS Ø 72	
Mounting device	
to DN 50	229-109.89
to DN 100	229-109.90
to DN 162	229-109.91
Pin punch for undoing the double disk Ø 6	
Adjustable head face spanner for adapter neckØ 3	
Tapered plug for double disk 2" OD	922-327
Tapered plug for double disk 2 1/2"OD	922-093
Tapered plug for double disk 3" OD	922-323
Tapered plug for double disk 4" OD	922-325
Lubricant	
Rivolta F.L.G. MD-2 PARALIQ GTE 703	413-071 413-064

Valve code ending …B/06



Housing Configurations



Date: 2009-07-23

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Spare parts list

Double-Seat Mixproof Valve M_OB (06) with Lifting Actuator MN

Item	Designation	Material	1 ½" OD	2" OD	2 ½" OD	3" OD	4" OD	6" OD
			Sach-Nr. / Part no.					
*	Valve insert MS.O cpl.	--	221-179.86	221-179.87	221-179.88	221-179.89	221-179.90	--
*	Valve insert M.O cpl.	--	221-179.85	221-179.69	221-179.70	221-179.71	221-179.72	--
**	Sealing set MS cpl.	EPDM FKM	221-003277 221-003278	221-003279 221-003280	221-003281 221-003282	221-003283 221-003284	221-003285 221-003286	-- --
**	Sealing set M cpl.	EPDM FKM	221-002981 221-002983	221-002231 221-002235	221-002232 221-002236	221-002233 221-002237	221-002234 221-002238	-- --
***	Housing configurations Typ/type MA Typ/type MB-90 Typ/type MB-180 Typ/type MB-270 Typ/type MC Typ/type ME	--	221-202.48 221-202.47 221-202.46 221-202.45 221-202.44 221-202.43	221-202.49 221-202.50 221-202.51 221-202.52 221-202.53 221-202.54	221-202.55 221-202.56 221-202.57 221-202.58 221-202.59 221-202.60	221-202.61 221-202.62 221-202.63 221-202.64 221-202.65 221-202.66	221-202.67 221-202.68 221-202.69 221-202.70 221-202.71 221-202.72	-- -- -- -- -- --
1**	Sealing ring	EPDM FKM	924-305 924-307	924-296 924-308	924-254 924-309	924-262 924-319	924-261 924-320	924-261 924-320
2	Rod guide ring	Turcite	935-056	935-042	935-043	935-044	935-045	935-045
3	Seal disk	1.4404	221-476.05	221-476.03	221-476.01	221-476.04	221-476.02	221-141.28
5**	O-ring	EPDM FKM	930-144 930-171	930-150 930-176	930-156 930-178	930-372 930-409	930-260 930-259	930-845 ---
6**	O-ring	NBR	930-004	930-004	930-004	930-007	930-007	930-007
7**	V-ring RA	EPDM FKM	221-365.07 221-365.10	221-365.08 221-365.11	221-365.09 221-365.12	221-365.14 221-365.15	221-365.16 221-365.17	221-365.25 --
8**	V-ring	EPDM FKM	932-019 932-032	932-023 932-034	932-027 932-038	932-059 932-063	932-045 932-044	221-365.25 ---
9	Lantern	1.4301	221-533.19	221-533.09	221-533.10	221-533.11	221-533.12	221-533.20
15	Valve disk MS/06	1.4404	221-691.05	221-691.01	221-691.02	221-691.03	221-691.04	221-691.06
15.1	Valve disk M/06	1.4404	221-662.06	221-662.01	221-662.02	221-662.03	221-662.04	221-662.07
16	Double valve disk M/06	1.4404	221-661.05	221-661.01	221-661.02	221-661.03	221-661.04	221-661.06
43	Hinged clamp Cast clamp	1.4401 1.4408	701-075 ---	701-076 ---	701-077 ---	--- 701-011	--- 701-010	--- 701-080
44	Hex. screw	A2-70	---	---	---	901-296	901-296	901-296
45	Hex. nut	1.4305 A2	912-035 ---	912-036 ---	912-036 ---	--- 910-025	--- 910-025	--- 910-025
46	Hinged clamp	1.4401	701-073	701-073	701-073	701-073	701-073	701-073
47	Hex. nut	1.4305	912-036	912-036	912-036	912-036	912-036	912-036
65**	Sealing ring RA	EPDM FKM	221-367.02 221-367.12	221-367.03 221-367.08	221-367.04 221-367.09	221-367.05 221-367.10	221-367.06 221-367.11	221-367.16 ---
65.1**	Sealing ring RA	EPDM FKM	924-305 924-307	221-367.03 221-367.08	221-367.04 221-367.09	221-367.05 221-367.10	221-367.06 221-367.11	221-367.16 ---
66	Rod guide ring	Turcite	935-056	935-078	935-076	935-079	935-072	935-090
72**	O-ring	EPDM FKM	930-610 930-662	930-611 930-663	930-611 930-663	930-612 930-664	930-612 930-664	930-612 930-664
74**	Snap sealing	PVDF	221-000522	221-000523	221-000523	221-000524	221-000524	221-000524
91	CIP connection	1.4404	221-428.02	221-428.03	221-428.03	221-428.05	221-428.05	221-428.05
92	Balancer locking	1.4404	221-348.03	221-538.01	221-538.02	221-538.03	221-538.04	221-538.07
94**	V-ring RA	EPDM FKM	221-365.07 221-365.10	221-365.08 221-365.11	221-365.09 221-365.12	221-365.14 221-365.15	221-365.16 221-365.17	221-365.25 ---
108**	O-ring	EPDM FKM	930-243 930-244	930-243 930-244	930-243 930-244	930-356 930-357	930-356 930-357	930-356 930-357
109**	O-ring	EPDM FKM	930-246 930-247	930-701 930-606	930-701 930-606	930-266 930-265	930-266 930-265	930-266 930-265
110	Hex. screw	A2	---	901-043	901-043	901-089	901-089	901-089
111**	O-ring	EPDM	930-266	930-148	930-923	930-924	930-925	930-937
112	Guide MU/06	PTFE	221-696.05	221-696.04	221-696.01	221-696.02	221-696.03	221-696.06
113	Balancer cleaning device MU/06	1.4305	221-695.05	221-695.04	221-695.01	221-695.02	221-695.03	221-695.06
403	Welded housing Typ/type MA/06	1.4404	221-666.05	221-666.01	221-666.02	221-666.03	221-666.04	---
404.1	Typ/type MB/06-90	1.4404	221-667.13	221-667.01	221-667.02	221-667.07	221-667.08	---
404.2	Typ/type MB/06-180	1.4404	221-667.14	221-667.03	221-667.04	221-667.09	221-667.10	---
404.3	Typ/type MB/06-270	1.4404	221-667.15	221-667.05	221-667.06	221-667.11	221-667.12	---
405	Typ/type MC/06	1.4404	221-668.05	221-668.01	221-668.02	221-668.03	221-668.04	---
406	Typ/type ME/06	1.4404	221-669.05	221-669.01	221-669.02	221-669.03	221-669.04	221-669.06
A	Actuator	--	**BD**	**BD**	**BD**	**DF 5**	**DF 5**	**EK 6Z**
			221-119.02	221-119.02	221-119.02	221-184.01	221-184.01	221-585.10
B	Control module T.VIS® A-7	siehe Ersatzteilliste für Anschlusskopf T.VIS / see spare parts list for control module T.VIS						
L	Lifting actuator MN	--	221-609.39	221-609.20	221-609.21	221-609.19	221-609.19	221-609.42
		See spare parts list Lifting actuator (221ELI001815G)						
170	Proximity switch	CuZn verchromt	505-095	505-095	505-095	505-095	505-095	505-095
171	Switch locking plate	1.4404	221-478.08	221-478.02	221-478.02	221-478.02	221-478.02	221-478.02
172	Hex. screw	A2-70	901-350	901-020	901-020	901-023	901-023	901-023
173	Cap nuT Hex. nut	1.4301 A2	-- 910-009	912-002 --	912-002 --	912-002 --	912-002 --	912-002 --
175	Nut NI/M/06	1.4305	221-478.07	221-478.07	221-478.07	221-478.07	221-478.07	221-478.07

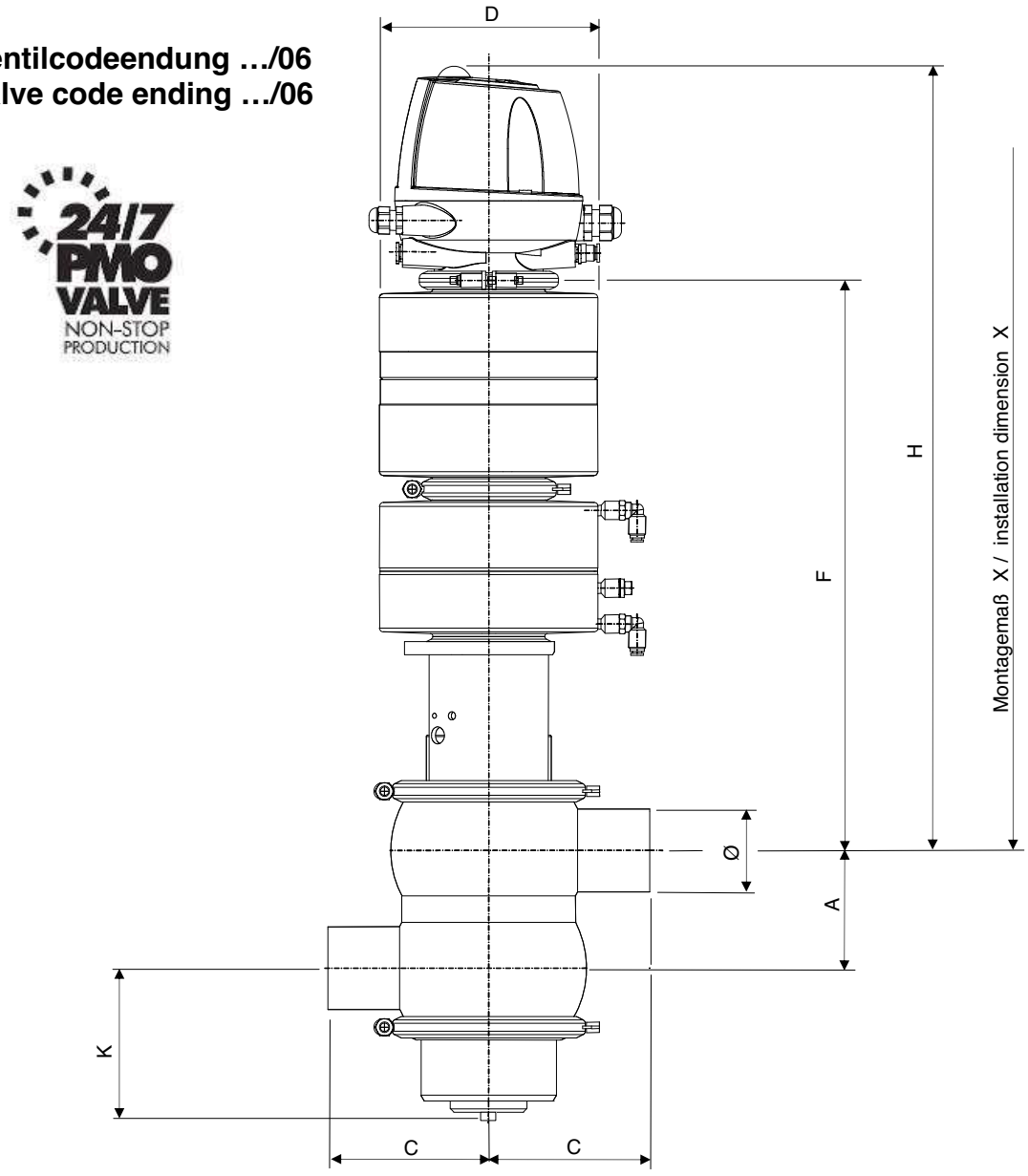
* In valve insert are according items 2; 3, 15, 16, (66), 72, 74, 91 (92), 112, 113.

** The sealing set and wearing parts are the items 1; 5, 6, 7, 8, 65, 72, 74, 94, 108, 109, (111)

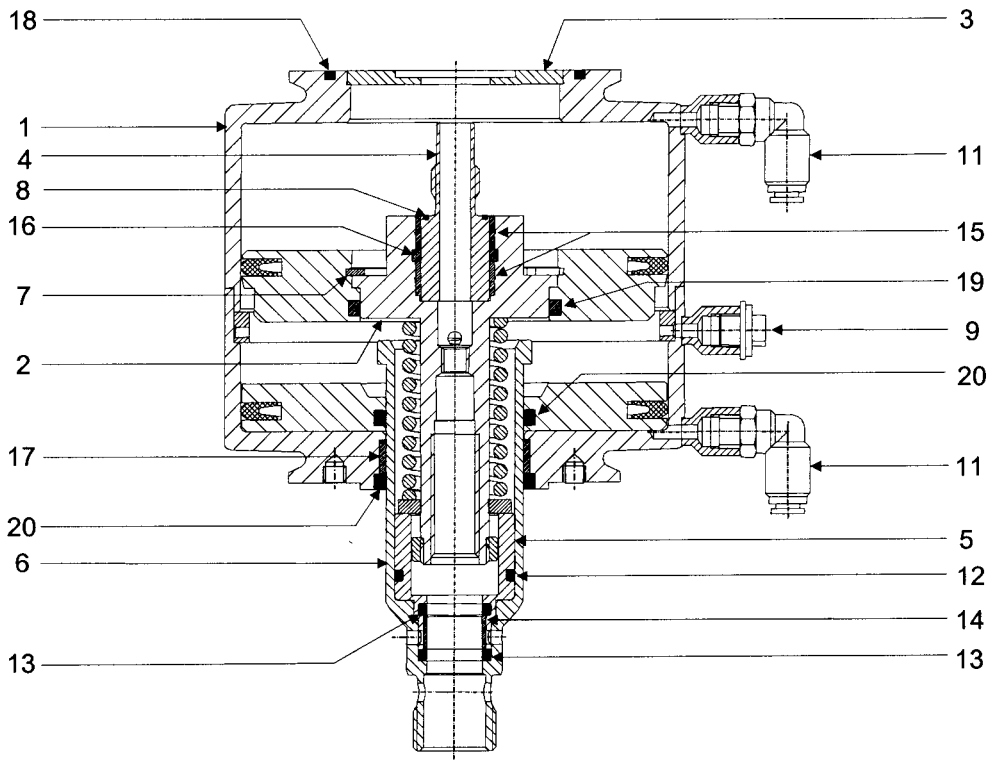
*** In housing configurations are according items 43, 44, 45, 403, (404,405,406)

Doppelsitzventil M_OB (06) mit Liftantrieb MN
Double-Seat Mixproof Valve M_OB (06) with Lifting Actuator MN

Ventilcodeendung …/06
Valve code ending …/06



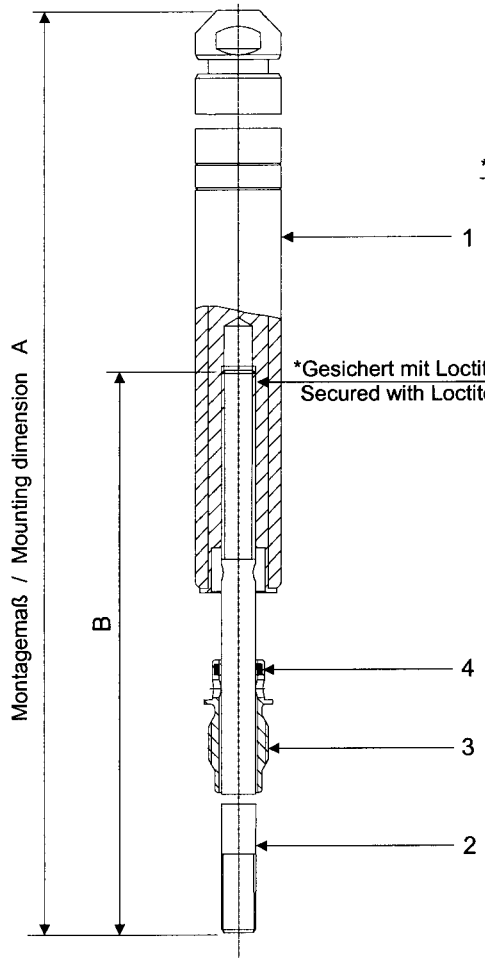
Maß / Dimension (mm)	1 ½" OD	2" OD	2 ½" OD	3" OD	4" OD	6" OD
A	59	71,5	90	103	127,5	177
C	90	90	125	125	150	175
	35	47,5	60	73	97,5	147
D	110	110	135	170	170	210
F	393	391	398	502	514	639
H mit/with T.VIS A-7	557	555	561	665	678	803
K	65	111	133	136	156	201
X	820	823	934	1020	1045	1275
Hub/stroke	22	31	35	45	45	65
Steuerluftdruck / control air pressure	4,8 bar (70 psi)					
Produktdruck federschließend / spring-closing valve	6 bar					
Produktdruck luftöffnend / air to open valve	6 bar					
Gewicht / weight (kg)	18	21	32	51,5	61	115



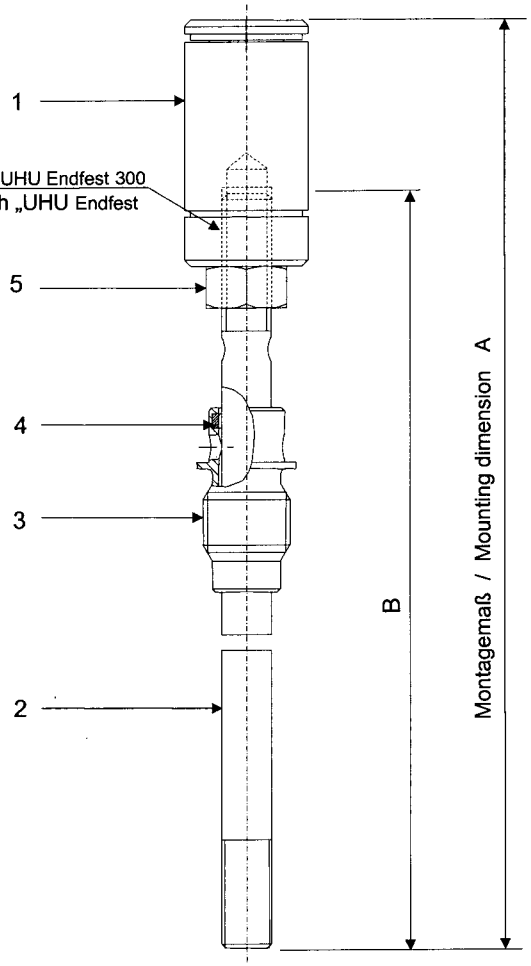
Items marked with * are wearing parts.

Item	Designation	Material	Part no.					
	Lifting Actuator MN		**1 ½ " OD BLRN**	**2" OD BLRN**	**2 ½ " OD CLRN**	**3"OD / 4"OD DLM5**	**4"OD/ 3"OD ELM6**	**6" OD ELRN6**
			221-609.39	221-609.20	221-609.21	221-609.19	221-609.37	221-609.15
1	Lifting actuator	--	221-605.01	221-605.12	221-605.13	221-605.18	221-605.07	221-605.07
2	Striker	--	221-622.10	221-622.03	221-622.04	221-622.11	221-622.06	221-622.06
3	Locking flange LFT-R	3.2315.T6	221-613.05	221-613.04	221-613.01	221-613.01	221-613.10	221-613.02
4	Adaptor	3.2315.T6	221-614.01	221-614.01	221-614.01	221-614.03	221-614.02	221-614.02
5	Bush LFT-B	1.4301	221-616.02	221-616.02	221-616.02	221-616.03	221-616.03	221-616.03
6	Drive sleeve	1.4301	221-617.02	221-617.02	221-617.02	221-617.05	221-617.04	221-617.04
7	Circlip	3.2315.T6	917-179	917-179	917-179	917-179	917-154	917-154
8	O-ring *	NBR	930-846	930-846	930-846	930-846	930-847	930-847
9	Locking screw	1.4571	922-316	922-316	922-316	922-316	922-316	922-316
11	Angular union 6 -1/8"	Ms/vern.	933-475	933-475	933-475	933-475	933-475	933-475
	Angular union 6,35-1/8"	Ms/nickled	933-979	933-979	933-979	933-979	933-979	933-979
12	O-ring *	NBR	930-041	930-041	930-041	930-052	930-052	930-052
13	O-ring *	EPDM FKM	930-235 930-162	930-235 930-162	930-235 930-162	930-268 930-164	930-268 930-164	930-268 930-164
14	Plain bearing	IGLIDUR-G	704-043	704-043	704-043	704-038	704-038	704-038
15	Plain bearing	IGLIDUR-G	704-041	704-041	704-041	704-042	704-042	704-042
16	O-ring *	NBR	930-026	930-026	930-026	930-035	930-035	930-035
17	Plain bearing Rrod guide ring	IGLIDUR-G TURCITE	704-057 --	704-057 --	704-057 --	-- 935-015	-- 935-015	-- 935-015
18	O-ring *	NBR	930-850	930-850	930-850	930-850	930-107	930-107
19	O-ring *	NBR	930-848	930-848	930-848	930-848	930-849	930-849
20	O-ring *	NBR	930-242	930-242	930-242	930-249	930-249	930-249

Schaltstange RM 7 / switch bar RM 7
(Sensortechnik / sensor technology)



Schaltstange T.VIS /
switch bar T.VIS



Maß / Dimension (mm)	Schaltstange RM 7 / switch bar RM 7 (Sensortechnik / sensor technology) für Antrieb _LR / for actuator _LR					Schaltstange T.VIS / switch bar T.VIS für Antrieb _LR / for actuator _LR				
	125	**200**	**205**	**166**	**256**	**125**	**200**	**205**	**166**	**256**
A	443 $^{+6}$	473 $^{+6}$	503 $^{+6}$	559 $^{+0,5}$	607 $^{+0,5}$	308 $^{+2}$	338 $^{+2}$	368 $^{+2}$	422 $^{+1}$	470 $^{+1}$
B	300	330	360	412	464	300	330	360	412	464
Verwendung mit Standardantrieb Use with standard actuator	100-125 **B - C**	160-200 **D - E (BD5)**	165-205 **D5 - E5**	166 **D6**	206-256 **E6 - S6**	100-125 **B - C**	160-200 **D - E (BD5)**	165-205 **D5 - E5**	166 **D 6**	206-256 **E6 - S6**

Pos. item	Benennung / Designation	Werkstoff Material	Sach-Nr. / Part no.									
Schaltstange kpl. / switch bar kpl.			221-623.02	221-623.03	221-623.04	221-623.09	221-623.05	221-618.02	221-618.03	221-618.04	221-618.06	221-618.05
1	Schaltstange switch bar LFT-RM7	PA 12	221-623.01	221-623.01	221-623.01	221-623.08	221-623.01	221-618.01	221-618.01	221-618.01	221-618.01	221-618.01
2	Schaltstange LFT-R switch bar LFT-R	1.4301	221-615.01	221-615.02	221-615.03	221-615.05	221-615.04	221-615.01	221-615.02	221-615.03	221-615.05	221-615.04
3	Gleitstück / slide	3.2315.T6	221-619.01	221-619.01	221-619.01	221-619.01	221-619.01	221-619.01	221-619.01	221-619.01	221-619.01	221-619.01
4	Führungsring / rod guide ring	Turcite	935-085	935-085	935-085	935-085	935-085	935-085	935-085	935-085	935-085	935-085
5	Sechskantmutter / hex. nut	A2	--	--	--	--	--	910-018	910-018	910-018	910-018	910-018

Sicherheitshinweise siehe Datenblatt für Loctite 603 und "UHU Endfest 300" /
see safety specification in data sheet for Loctite 603 and „UHU Endfest 300".

Einbauerklärung
Declaration of Incorporation

im Sinne der EG-Maschinenrichtlinie 2006/42/EG
as defined by Machinery Directive 2006/42/EC

Hiermit erklären wir, dass es sich bei dieser Lieferung um die nachfolgend bezeichnete - jedoch unvollständige - Maschine handelt und dass ihre Inbetriebnahme solange untersagt ist, bis festgestellt wurde, dass die Maschine, in die diese Maschine eingebaut werden soll, den Bestimmungen der EG-Maschinenrichtlinie entspricht.

We herewith declare that this consignment contains the subsequently described - but incomplete - machine and that commissioning is suspended until it is established that the machine in which the machine concerned will be installed conforms to the regulations of the EC-Machine Directive

Wir erklären, dass die hier beschriebene unvollständige Maschine den "grundlegenden Sicherheits- und Gesundheitsschutzanforderungen" aus Anhang I, Abschnitt 1. und Abschnitt 2.1 erfüllt. Die technischen Unterlagen wurden gemäß Anhang VII, Teil 3 erstellt. Auf begründetes Verlangen werden die Unterlagen einzelstaatlichen Stellen zur Verfügung gestellt.

We declare that the subsequently described incomplete machine fulfills the "Essential Health and Safety Requirements" from Annex I part 1. and part 2.1. The technical documentation is compiled in accordance to part 3 of Annex VII. In response to reasoned request the relevant information will be transmitted to the national authorities.

Bei einer nicht mit uns abgestimmten Änderung an der Maschine verliert diese Erklärung ihre Gültigkeit.

This declaration becomes invalid in case of alterations at the machine which have not been agreed with us.

Bezeichnung der Maschine: Machine´s designation:	Ventil Valve
Maschinentyp/machine type:	VARIVENT®
Einschlägige EG-Richtlinien: Relevant EC-Directives:	2006/42/ EG 2006/42/ EC
Angewendete harmonisierte Normen: Applicable, harmonized standards:	DIN EN ISO 12100, Teil 1 + 2 DIN EN ISO 12100, part 1 + 2

Büchen, 06.02.2009

Franz Bürmann
Geschäftsführer/Managing Director

i.V. Peter Fahrenbach
Leiter Entwicklung & Konstruktion/
Head of Development & Design

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