OPERATING AND MAINTENANCE INSTRUCTIONS

V12/sro	2005-02-14	V12/lf	V12/di	2005-02-16		Revision 01 / FINAL ISSUE
V12/sro	2005-01-05	V12/lf	V12/di	2005-01-10	IFR	FIRST ISSUE
Name	Date	Name	Name	Date	Status	
Prepared, revised		Checked	Approved			Remark, kind of revision

Table of Contents

1 OPERATING AND MAINTENANCE INSTRUCTIONS **Pages**

Globe Valve
Type 3241

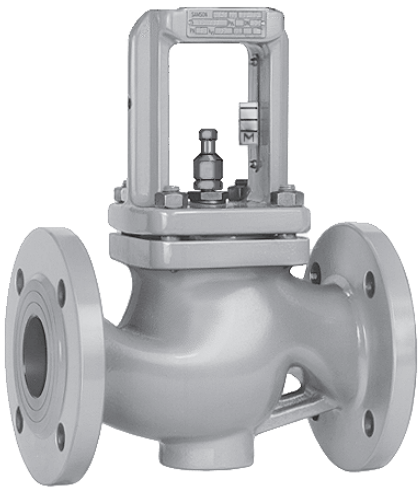


Fig. 1 · Type 3241 Globe Valve

Mounting and Operating Instructions

EB 8015-1 EN

Edition June 2004

Contents Page

Note!

Non-electrical control valves which do not have a valve body lined with an insulating material coating do not have their own potential ignition source according to the risk assessment in the rare incident of an operating fault, corresponding to EN 13463-1: 2001 paragraph 5.2, and therefore do ***not*** *fall within the scope of the European Directive 94/9/EC.*
Refer to paragraph 6.3 of EN 60079-14:1977 VDE 0165 Part 1 concerning connection to equipotential bonding system.

General safety instructions

- *The control valve may only be mounted, started up or serviced by fully trained and qualified personnel, observing the accepted industry codes and practices. Make sure employees or third persons are not exposed to any danger. All safety instructions and warnings in these mounting and operating instructions, particularly those concerning assembly, start-up and maintenance, must be observed.*
- *The control valves fulfill the requirements of the European Pressure Equipment Directive 97/23/EC. Valves with a CE marking have a declaration of conformity that includes information about the applied conformity assessment procedure. The corresponding declaration of conformity can be viewed and downloaded on the Internet at http://www.samson.de.*
- *For appropriate operation, make sure that the control valve is only used in areas where the operating pressure and temperatures do not exceed the operating values which are based on the valve sizing data submitted in the order. The manufacturer does not assume any responsibility for damage caused by external forces or any other external influence! Any hazards which could be caused in the control valve by the process medium, operating pressure, signal pressure or by moving parts are to be prevented by means of the appropriate measures.*
- *Proper shipping and appropriate storage of the control valve are assumed.*

Caution!

- *For installation and maintenance work on the valve, make sure the relevant section of the pipeline is depressurized and, depending on the process medium, drained as well. If necessary, allow the control valve to cool down or warm up to reach ambient temperature prior to starting any work on the valve.*
- *Prior to performing any work on the valve, make sure the lines for the electrical or supply air as well as the control signal are disconnected or blocked to prevent any hazards that could be caused by moving parts.*

1 Design and principle of operation

The single-seated Type 3241 Globe Valve can be combined with different actuators to form either a pneumatic control valve or an electric control valve. Additionally, the valve can be fitted with a hand-operated actuator. Thanks to the modular design, the actuators can be exchanged, and the standard version of the valve can be supplemented to form a version with insulating section or metal bellows seal.

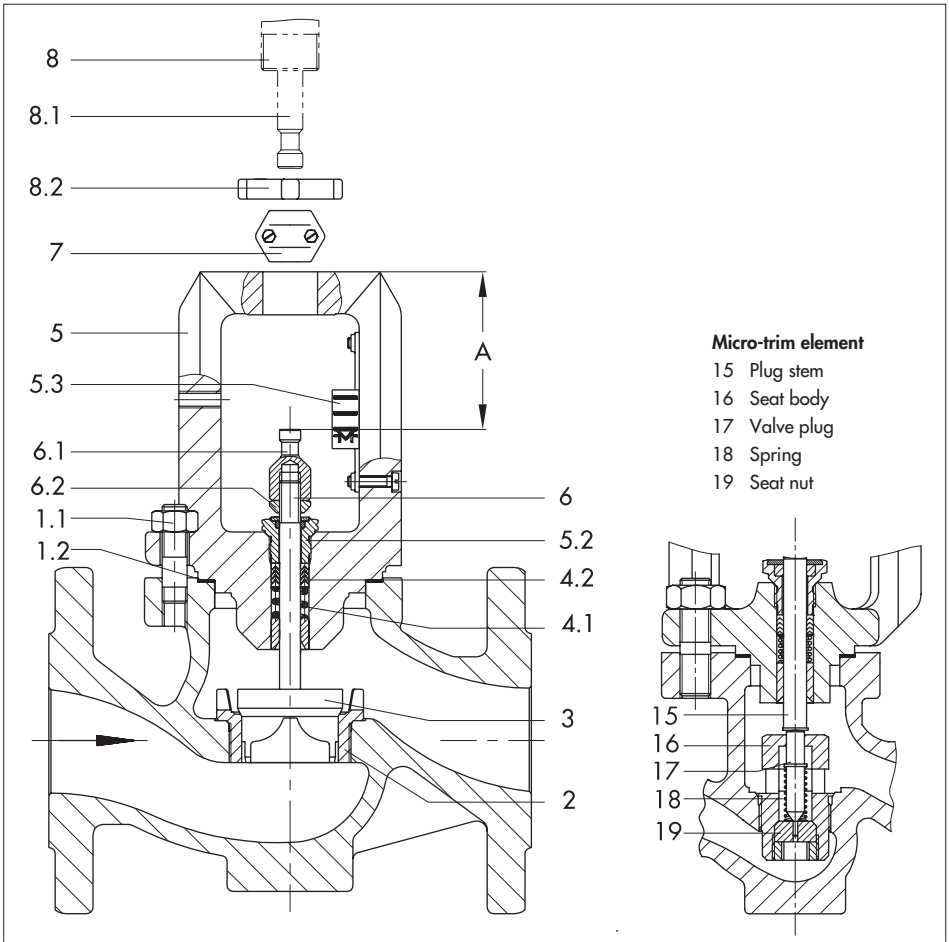


Fig. 2 · Sectional drawing of Type 3241 in nominal sizes DN 15 to 150

In the **micro-flow valve** version, a micro-trim element is installed in the valve body instead of the usual seat-plug assembly.
The process medium flows through the valve in the direction indicated by the arrow. The position of the plug (3) determines the flow through the valve seat (2). The position of the plug (3) is changed by the signal pressure acting on the diaphragm of the actuator (bench range). Plug (3) and actuator stem (8.1) are connected via the stem connector (7) and sealed by the spring-loaded ring packing (4.2).

Travel adjustment (with a valve closed)	
DN	Dimension A
15 to 80	75 ± 0.1
100 to 150	90 ± 0.1
200 and 250	165 (225)

1. Valve body
1.1 Nuts
1.2 Gasket
2 Seat
3 Plug
4.1 Spring
4.2 Packing
5 Valve bonnet
5.2 Threaded bushing
5.3 Travel indicator scale
6 Plug stem
6.1 Stem connector nut
6.2 Lock nut
6.3 Yoke (DN 200 and 250)
7 Stem connector
8 Actuator
8.1 Actuator stem
8.2 Nut

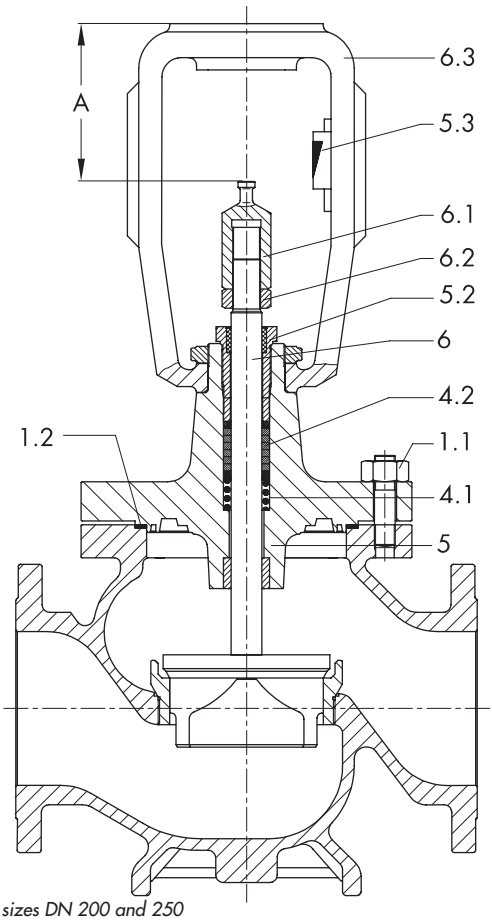


Fig. 3 · Sectional drawing of Type 3241 in nominal sizes DN 200 and 250

2 Assembling valve and actuator

Note!
Refer to the Mounting and Operating Instructions of the corresponding actuator for assembly.

2.1 Travel adjustment

When valve and actuator are shipped separately, dimension A, which extends from the top of the stem connector nut (6.1) to the top of the valve bonnet (yoke), is adjusted according to the table in Fig. 3.

Check this dimension on assembly and, if necessary, readjust it by turning the stem connector nut.

3 Installation

3.1 Mounting position

The valve can be mounted in any desired position. However, vertical installation with the actuator pointing upwards is preferable for valves in nominal size DN 100 or larger. Otherwise, difficulties during maintenance work can occur.
For valves with insulating section or metal bellows seal, or for actuators weighing more than 50 kg, mount a suitable support or suspension for the actuator.

Note!
The valve must be installed with as little vibration as possible and free of stress.
Flush the pipeline thoroughly before installation.

Note!
Do not insulate control valves which must conform to ***NACE MR 0175****.*

3.2 Strainer, bypass

We recommend you to install a SAMSON Type 2 Strainer upstream of the valve body. We also recommend to install a shut-off valve both upstream of the strainer and downstream of the valve, as well as a bypass, so that you do not need to shut down the plant for maintenance.

3.3 Test connection

If there is a test connection (G 1/8) at the upper flange of a valve version with metal bellows seal (Fig. 6), you can check the tightness of the bellows there.
Particularly for liquids and vapors, we recommend you to install a suitable leak indicator at the test connection, such as a contact pressure gauge, an outlet into an open vessel or an inspection window.

4 Operation

As the operating instructions only apply when the valve is used in conjunction with an actuator, refer to the associated Mounting and Operating Instructions of the actuator mounted on the valve.

5 Maintenance – Replacing parts

The control valve is subject to natural wear, especially at the seat, plug and packing. Depending on the application, the valve needs to be checked regularly to prevent against possible failures.
If leakage occurs, this could be caused by a damaged packing or a defective metal bellows.

If the valve does not seal properly, the tight shut-off may be impeded by dirt or other impurities caught between the seat and plug, or by damaged seat joints.
Remove the parts, clean them thoroughly and replace them, if necessary.

Note!
Suitable seat and special tools as well as the appropriate tightening torques required for installation are listed in EB 029 EN (formerly WA 029 EN) which can be viewed on the Internet at http://www.samson.de/pdf_en/e00290en.pdf.

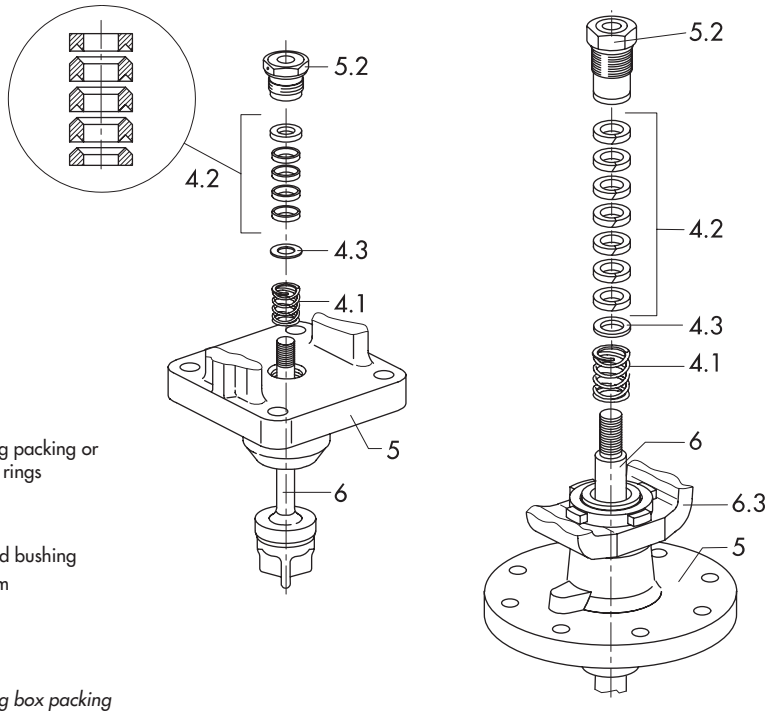
Note!
Before servicing or disassembling the control valve, depressurize the concerned section of the plant and drain it, if necessary, depending on the medium used.
Wait until the medium has cooled down, if necessary.
As valves are not free of cavities, there might still be residual medium in the valve.
This applies, in particular, for valve versions with insulating section and metal bellows seal.
We recommend removing the valve from the pipeline.

Caution!
On performing any work on the valve body, first shut off the electric or pneumatic auxiliary energy supply and block it as well as interrupt the control signals to prevent any hazards caused by moving parts. Remove the actuator from the valve before carrying out any work on the valve body.

5.1 Standard valve version

5.1.1 Stuffing box packing

1. Remove the body nuts (1.1) as well as the valve bonnet (5) together with the plug stem and plug from the body.
2. Unscrew the stem connector nut and lock nut (6.1 and 6.2) from the plug stem.
3. Unscrew the threaded bushing (5.2) out of the stuffing box. Pull the plug stem together with the plug out of the valve bonnet.
4. Pull all stuffing box parts out of the packing chamber using a suitable tool. Replace damaged parts.
   Clean packing chamber thoroughly.
5. Remove the gasket (1.2) and carefully clean sealing surfaces in the valve body and on the bonnet.
6. Apply lubricant (order no. 8150-0111) to all the packing parts and the plug stem (6).
7. Slide the plug stem with plug into the valve bonnet.



4 Packing
4.1 Spring
4.2 PTFE ring packing or packing rings
4.3 Washer
5 Bonnet
5.2 Threaded bushing
6 Plug stem
6.3 Yoke

Fig. 4 · Stuffing box packing

8. Insert a new gasket (1.2) into the body. Carefully place the valve bonnet onto the valve body and secure with nuts (1.1).
9. Carefully slide the stuffing box parts over the plug stem into the packing chamber. Make sure to keep the proper order.
   Screw in the threaded bushing (5.2) and tighten.
10. Loosely screw the lock nut (6.2) and stem connector nut (6.1) onto the plug stem.
11. Adjust the travel as described in section 2.1 and mount the actuator.

5.1.2 Seat and/or plug

We recommend you to also replace the packing (4.2) when exchanging the seat and plug.
To exchange the packing, proceed as described in section 5.1.1.

Plug:

- Remove the old plug and replace it with a new plug with plug stem. It is possible to use the old plug again, provided it has been reworked properly. Apply lubricant (order no. 8150-0111) to the plug stem before installation.

Reworking the plug

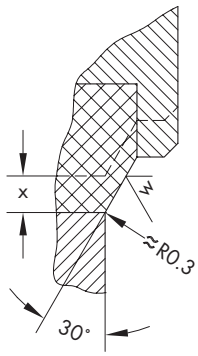
- Slight damage at the sealing edges of the plug can be eliminated by re-turning it on a lathe. Soft-sealing plugs can only be reworked until dimension x (Fig. 5) is reached, and if the seat bore exceeds 12 mm. For seat bores of 63 mm and larger, the entire sealing ring can be exchanged, if necessary (the plug parts are screwed together).

Seat:

- Unscrew the seat (2) using the appropriate seat wrench (see EB 029 EN). Apply lubricant (order no. 8150-0119) to the thread and sealing cone of the new seat (or possibly the old seat when it has been reworked or thoroughly cleaned) and screw it in.

Micro-flow valve version

In this version, the complete micro-trim element (Fig. 2) can be unscrewed from the valve body using a socket wrench (width across flats 27) and disassembled for cleaning.
If any parts are damaged, exchange the entire micro-trim element.



Seat bore	x [mm]
12	0.5
24...48	1.0
6...80	2.0
100...200	2.5

Fig. 5 · Plug with soft sealing

5.2 Valve with insulating section or metal bellows seal

5.2.1 Stuffing box packing

1. Remove the stem connector nut and lock nut (6.1 and 6.2) from the plug stem extension (6.3). Unscrew the threaded bushing (5.2) out of the stuffing box.
2. Remove nuts (5.4) and carefully lift the bonnet (5) over the plug stem extension.
3. Pull all stuffing box parts out of the packing chamber using a suitable tool. Replace damaged parts. Clean packing chamber thoroughly.
4. Remove the gasket (5.5) in the intermediate piece (12) and carefully clean the sealing faces.
5. Apply lubricant (order no. 8150-0111) to all the packing parts and the plug stem (6).
6. Insert a new gasket (5.5) in the intermediate piece. Carefully place the bonnet over the plug stem extension onto the bonnet and secure with nuts (5.4).
7. Carefully slide the stuffing box parts over the plug stem extension into the packing chamber. Make sure to keep the proper order. Screw in the threaded bushing (5.2) and tighten.
8. Loosely screw the lock nut (6.2) and stem connector nut (6.1) onto the plug stem.
9. Adjust the travel as described in section 2.1 and mount the actuator.

5.2.2 Plug

When exchanging the plug, check the packing (4.2) or, preferably, replace it as described in section 5.1.

DN 15 to DN 150: To unscrew the plug (6) from the plug stem extension (6.3), screw two nuts onto the protruding thread of the extension to hold the plug stem extension in place.

Caution!
To prevent damage to the version with the bellows seal (no bellows in the version with insulating section), make sure no torque is transmitted to the bellows, which is connected to the intermediate piece. We recommend you to use a clamping tool (see EB 029 EN).

1. Remove the nuts (1.1).
2. Remove the intermediate piece (12) together with the plug stem extension, plug stem and plug from the valve body.
3. Remove gasket (1.2) and carefully clean the sealing faces in the valve body and on the intermediate piece.
4. Use an appropriate wrench to hold the nuts stationary, which are screwed onto the plug stem extension. Clamp the plug stem using a suitable tool and screw it out of the plug stem extension.
   Caution! Do not twist the plug stem extension with the welded-on bellows!
5. Apply lubricant (order no. 8150-0111) to the end of the plug stem (6) of the new or old, reworked plug (3).

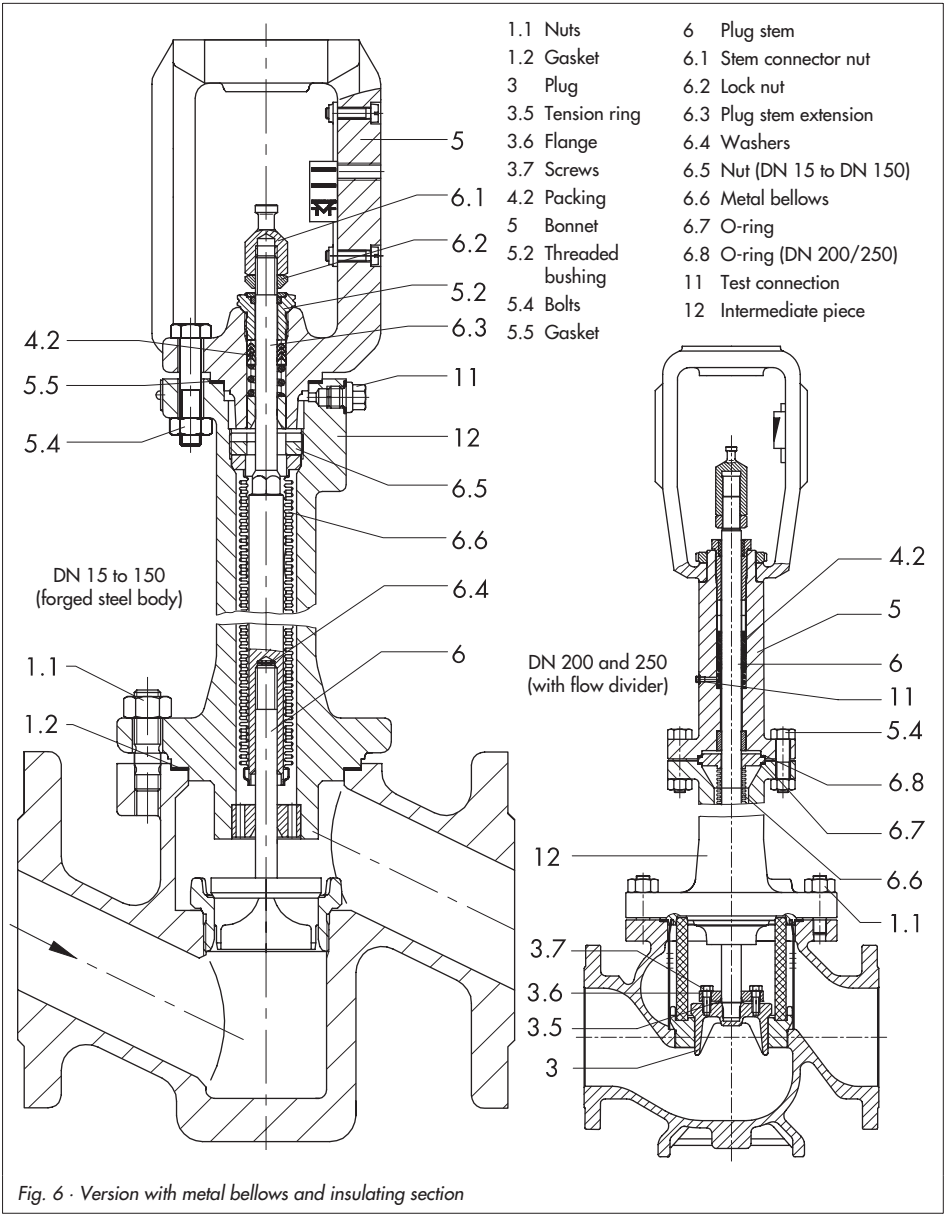


Fig. 6 · Version with metal bellows and insulating section

Check whether the two washers (6.4) are still in the plug stem extension (6.3). Screw the plug stem firmly into the plug stem extension (6.3); tightening torque is 50 Nm for Ø 10 mm and 80 Nm for Ø 16 mm.

▷ To complete assembly, refer to section 5.2.5.

DN 200 and DN 250:

1. Remove the nuts (1.1).
2. Remove the intermediate piece (12) together with the plug stem extension, plug stem and plug from the valve body.
3. Remove gasket (1.2) and carefully clean the sealing faces in the valve body and on the intermediate piece.
4. Remove the hexagon head screws (3.7), tension ring (3.5) and flange (3.6).
5. Unscrew the plug from the plug stem. To do so, use a suitable tool to hold the plug stem in place, so that the metal bellows, which is welded onto the plug stem, cannot be twisted.
6. Screw a new plug with tension ring and flange to the plug stem.

▷ To complete assembly, refer to section 5.2.5.

In the version with insulating section, there are no parts 3.5, 3.6 and 3.7. Plug (3) and plug stem(6) form one piece.

5.2.3 Seat

Replace the seat (2) as described in section 5.1.2.

5.2.4 Metal bellows

DN 15 to DN 150:

1. Unscrew the plug (3) together with the plug stem (6) from the plug stem extension (6.3) as described for replacing the seat in section 5.2.2.
2. Unscrew the nut (6.5) using a SAMSON socket wrench (see EB 029 EN).
3. Pull the plug stem extension with the welded-on metal bellows (6.6) out of the intermediate section (12).
4. Clean the sealing faces on the intermediate piece.
5. Insert a new plug into the intermediate piece and screw down the nut (6.5).

Caution!
Do not twist the metal bellows!

6. Check whether both washers (6.4) are still in the plug stem extension (6.3). Apply lubricant (order no. 8150-0111) to the thread of the plug stem and firmly screw the plug stem into the plug stem extension (6.3) with a tightening torque of 50 Nm for a plug stem diameter of 10 mm and 80 Nm for a diameter of 16 mm.

DN 200 and DN 250:

1. Unscrew the plug (3) from the plug stem as described in section 5.2.2. Pull the plug stem (6) together with the metal bellows (6.6) upwards, out of the intermediate piece (12).

2. Replace the O-ring (6.7) and insert a new plug stem with metal bellows (6.6).
3. Screw on the plug and secure with the tension ring (3.5), flange (3.6) and screws (3.7).

5.2.5 Reassembly

1. Insert a new gasket (1.2) into the valve body. Place the intermediate piece (12) onto the valve body (1) and secure with nuts (1.1).
2. Insert a new gasket (5.5) into the intermediate piece. Place the valve bonnet (5) onto the intermediate piece and secure with nuts and bolts (5.4). Observe the tightening torques specified in EB 029 EN.
3. Tighten the threaded bushing (5.2).
4. Loosely screw the lock nut (6.2) and stem connector nut (6.1) onto the plug stem extension (6.3) or plug stem.
5. Adjust the travel as described in section 2.1 and mount the actuator.

5.3 Replacing the collar or seal

For version with pressure-balanced plug:

1. Unscrew the stem connector nut and lock nut (6.1 and 6.2) from the plug stem.
2. Remove the body nuts (1.1) and carefully lift off the valve bonnet (5) with plug stem (6).
3. Screw the threaded bushing (5.2) out of the stuffing box. Pull plug stem and plug (3) out of the bonnet.
4. Remove gasket (1.2) and carefully clean the sealing faces in the valve body and on the bonnet.

DN 40:

5. Pull the packing (4.2), washer (4.3) and spring (4.1) out of the packing chamber using an appropriate tool. Replace damaged parts.
6. Push out the bushing (3.2) and replace the collar (3.1).
   Clean the packing chamber thoroughly.
7. Apply lubricant (order no. 8150-0111) to the bushing (3.2) and push it in again.
8. Also apply lubricant to the packing parts, plug stem (6) and the contact faces of the collar (3.1).
9. Insert the plug stem and plug into the valve bonnet.

Completion of reassembly:

10. Insert a new gasket (1.2) into the valve body. Carefully place the valve bonnet on the valve body and secure with nuts (1.1). Observe the tightening torques specified in EB 029 EN.
11. Slide the stuffing box parts over the plug stem into the packing chamber. Make sure to keep the proper order.
12. Screw in the threaded bushing (5.2) and tighten.
13. Loosely screw the lock nut (6.2) and stem connector nut (6.1) onto the plug stem.
14. Adjust the travel as described in section 2.1 and mount the actuator.

DN 50 to DN 150:

5. Remove screw (3.4) with its locking device and washer (3.3). Replace collar (3.1) with a new one.
6. Insert washer (3.3). Thread down the screw (3.4) with its locking device.
7. Apply lubricant (order no. 8150-0111) to the packing parts, plug stem (6) and contact faces of collar (3.1).
8. Insert the plug stem and plug into the valve bonnet.

▷ Complete reassembly as described for DN 40, steps 10 to 14.

DN 200 and DN 250:

5. Remove the screw (3.4) with its locking device.
6. Lift off the ring (3.3) and replace collar or seal (3.1).
7. Insert ring (3.3).
   Thread down screw (3.4) and its locking device.
8. Apply lubricant (order no. 8150-0111) to the packing parts, plug stem (6) and contact faces of the collar (3.1).
9. Insert the plug stem and plug into the valve bonnet.

▶ Complete reassembly as described for DN 40, steps 10 to 14.

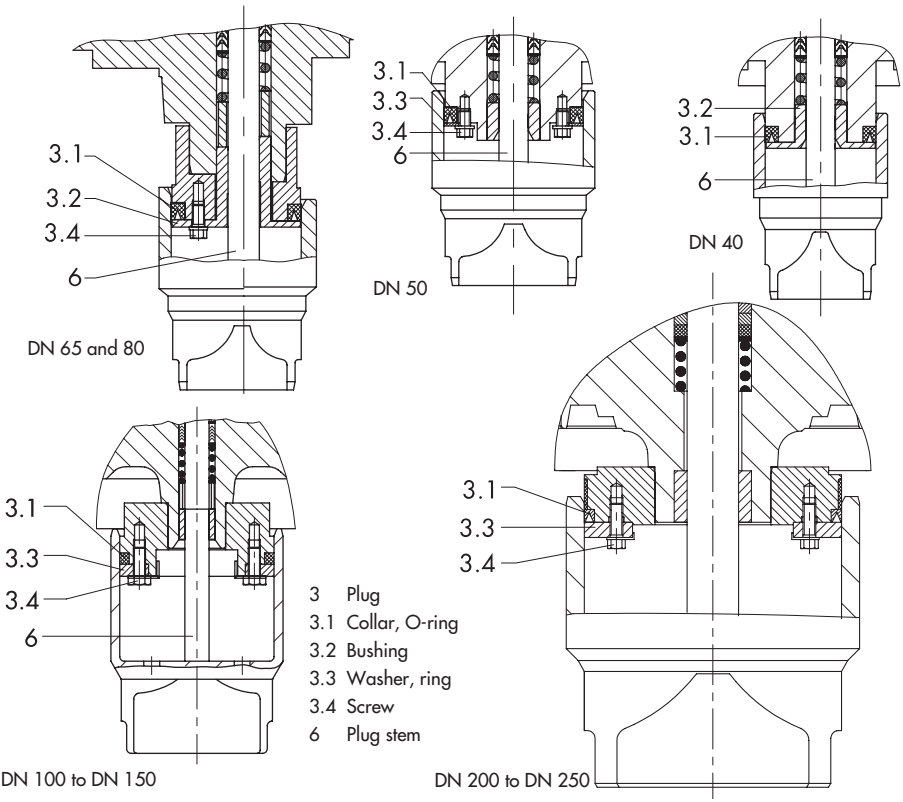


Fig. 7 · Version with metal bellows and insulating section

6 Material identifying marks

Guide bushing, seat and plug have the following identifying marks:

Guide bushing (groove on plane face)

- No groove: 1.4305
- Sharp recessed groove: 1.4571
- Flat recessed groove: Hastelloy

Seat
The material number according to DIN is either stamped or engraved on the seat.

- Stellited seats are marked by a stamped-on "st".

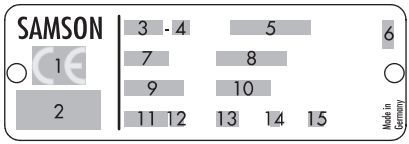
Plug
Groove below the plug stem thread:

- No groove: 1.4006
- Sharp recessed groove: 1.4571
- Two sharp recessed grooves: 1.4301
- Flat recessed groove: Hastelloy
- When other materials are used, either the material number or its designation is engraved on the plug.

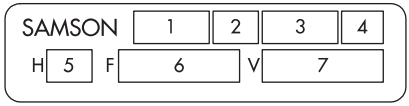
The **Kvs value and characteristic** are engraved on the plug.

- Stellited plugs are marked by an engraved "st".

7 Description of nameplates



1 CE marking or "Art. 3, Abs.3" (see article 3, § 3 of PED), where applicable
2 Identification no. of notified body, fluid group and category, where applicable
3 Type designation
4 Modification index of valve
5 Material
6 Year of manufacture
7 Nominal size: DIN: DN, ANSI: Size
8 Permissible excess pressure at room temperature DIN: PN, ANSI: CL
9 Order number with modification index
10 Position of item in order
11 Flow coefficient: DIN: $\mathbf{K_{VS}}$, ANSI: $\mathbf{C_v}$
12 Characteristic: % equal percentage, Lin linear, DIN: **A/Z** quick opening, ANSI: **O/C**
13 Sealing: **ME** metal, **ST** stellited, **Ni** nickel-plated **PT** soft sealing with PTFE, **PK** soft sealing with PEEK
14 Pressure-balanced: DIN: **D**, ANSI: **B**
15 **I** or **III** flow divider



1 Type designation
2 Modification index
3 Effective diaphragm area
4 Fail-safe action: FA Actuator stem extends FE Actuator stem retracts
5 Travel
6 Bench range (spring range)
7 Bench range with pretensioned springs

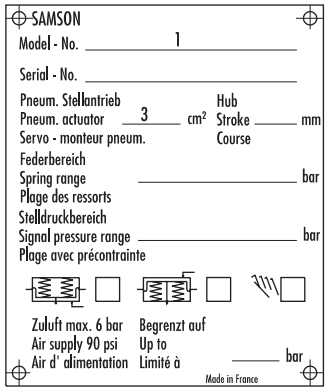


Fig. 8 · Valve nameplate (left) and actuator nameplates (right)

8 Customer inquiries

If you encounter any problems, please submit the following details:

- Order number
- Type, product number, nominal size and version of the valve
- Pressure and temperature of the process medium
- Flow rate in m^3/h
- Has a strainer been installed?
- Installation drawing

Dimensions and weights *of the valve versions can be found in Data Sheet T 8015 EN.*

SAMSON AG · MESS- UND REGELTECHNIK
Weismüllerstraße 3 · 60314 Frankfurt am Main · Germany
Phone +49 69 4009-0 · Fax +49 69 4009-1507
Internet: http://www.samson.de

EB 8015-1 EN

S/Z 2004-06

Pneumatic Control Valves
Type 3251-1 and Type 3251-7

Fig. 1 · Type 3251-1 Control Valve

Mounting and Operating Instructions

EB 8051 EN

Edition October 2003

Contents Page

Note!

Non-electrical control valves which do not have a valve body lined with an ***insulating material coating*** *do not have their own potential ignition source according to the risk assessment in the rare incident of an operating fault, corresponding to EN 13463-1: 2001 paragraph 5.2, and therefore do not fall within the scope of the European Directive 94/9/EC.*

General safety instructions

- *The control valve may only be mounted, started up or serviced by fully trained and qualified personnel, observing the accepted industry codes and practices. Make sure employees or third persons are not exposed to any danger.*
  All safety instructions and warnings in these instructions, particularly those concerning installation, start-up and maintenance, must be observed.
- *The control valve fulfills the requirements of the European Pressure Equipment Directive 97/23/EC. Valves with a CE marking have a declaration of conformity that includes information on the applied conformity assessment procedure. The declaration can be viewed and downloaded on the Internet at http://www.samson.de.*
- *For appropriate operation, make sure that the control valve is only used in areas where the operating pressure and temperatures do not exceed the operating values based on the valve sizing data submitted in the order. The manufacturer does not assume any responsibility for damage caused by external forces or any other external influence!*
  Any hazards which could be caused in the control valve by the process medium, operating pressure, signal pressure or by moving parts are to be prevented by means of the appropriate measures.
- *Proper shipping and appropriate storage are assumed.*

Caution!

- *For installation and maintenance work on the valve, make sure the relevant section of the pipeline is depressurized and, depending on the process medium used, drained as well. If necessary, allow the control valve to cool down or warm up to reach ambient temperature prior to starting any work on the valve.*
- *When working on the valve, make sure that the supply lines for the air supply as well as the control signal are disconnected to prevent any hazards that could be caused by moving parts.*
- *Special care is needed when the actuator springs are pretensioned. These actuators are labeled correspondingly and can also be identified by three long bolts at the bottom of the actuator. Prior to starting any work on the valve, you must relieve the compression from these pretensioned springs.*

1 Design and principle of operation

The Type 3251-1 and Type 3251-7 Pneumatic Control Valves consist of a single-seated Type 3251 Globe Valve and either the Type 3271 or Type 3277 Pneumatic Actuator.
The process medium flows through the valve in the direction indicated by the arrow. The position of the plug (3) determines the flow rate through the valve seat (2).
The plug (3) is moved by changing the signal pressure acting on the diaphragm of the actuator (8).
The plug stem (6) with the plug is connected to the actuator stem (8.1) over a stem connector (7) and sealed with spring-loaded PTFE V-ring packing (4.2) or adjustable HT packing.

Fail-safe position:

Depending on how the compressed springs (8.4) are arranged in the actuator, there are two different fail-safe positions:

Actuator stem extends:
When the signal pressure is reduced or the supply air fails, the springs move the actuator stem downwards, closing the valve.
The valve opens as the signal pressure increases and overcomes the force exerted by the actuator springs.

Actuator stem retracts:
When the signal pressure is reduced or the supply air fails, the springs move the actuator stem upwards, opening the valve.
The valve closes as the signal pressure increases and overcomes the force exerted by the actuator springs.

2 Assembling valve and actuator

A pneumatic actuator with an additional handwheel or an electric actuator can be mounted to the valve in place of the simple pneumatic actuator.
The standard pneumatic actuator can be replaced by a larger or smaller actuator, regardless of the nominal valve size.
If the travel range of the actuator is larger than that of the valve in a valve/actuator combination, the spring assembly in the actuator is preloaded by the manufacturer to make the travels match.

Each valve is equipped with the parts required for mounting its standard actuator. If you intend using a different actuator, the matching mounting parts need to be ordered together with the actuator.
The necessary parts with their order numbers can be found in the overview sheet **1600-0501...0550** available on request. These additionally delivered parts are then used instead of the original parts.

2.1 Assembly and adjustment

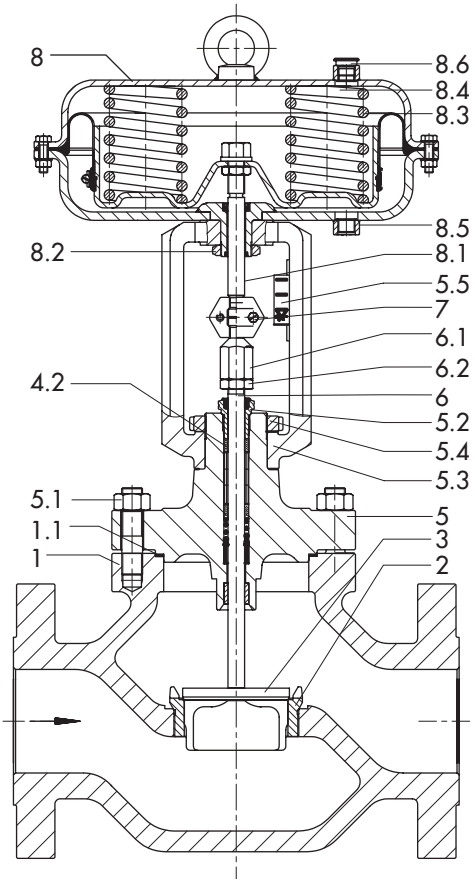
If the actuator has not already been mounted by the manufacturer on the valve or you intend replacing the original actuator with an actuator of a different sort or size, proceed as follows:

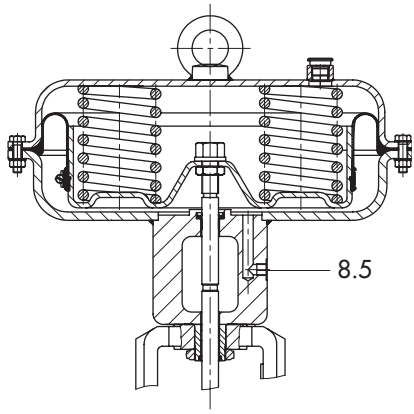
1. Loosen the lock nut (6.2) and stem connector nut (6.1) at the valve.
   Firmly press the plug and plug stem into the seat ring, then thread the stem connector nut and lock nut downwards.
2. Unscrew the coupling parts (7) of the stem connector and the ring nut (8.2) from the actuator.

Slide the ring nut over the plug stem of the valve.

3. Place the actuator on the yoke (5.3) and screw tight using the ring nut (8.2).
4. Read the bench range (or bench range with pretensioned springs) and the actuator's fail-safe action indicated on the nameplate of the actuator (e.g. 0.2 to 1 bar and "Actuator stem extends".

The lower bench range value (0.2 bar) corresponds to the lower range value of the signal pressure to be adjusted, the upper bench range value (1 bar) to the upper range value of signal pressure.





1	Valve body	6	Plug stem
1.1	Gasket	6.1	Stem connector nut
2	Seat	6.2	Lock nut
3	Plug	7	Stem connector
4.2	PTFE V-ring packing	8	Actuator
		8.1	Actuator stem
5	Valve bonnet	8.2	Nut for actuator
5.1	Nuts	8.3	Diaphragm
5.2	Guided bushing	8.4	Spring
5.3	Yoke	8.5	Loading pressure connection
5.4	Nut for yoke		
5.5	Travel indicator scale	8.6	Venting

Fig. 2 · Sectional drawings of Type 3251-1 and Type 3251-7 (right)

The fail-safe action "Actuator stem extends" or "Actuator stem retracts" is indicated by the abbreviation FA or FE on the nameplate of the Type 3271 Actuator and by a symbol on the Type 3277 Actuator.

5. For actuators with **"Actuator stem extends"**, apply a loading pressure corresponding to the lower signal pressure range (e.g. 0.2 bar) to the connection on the bottom diaphragm chamber.
   For actuators with "**Actuator stem retracts",** apply a loading pressure corresponding to the upper signal pressure range (e.g. 1 bar) to the connection on the top diaphragm chamber.
6. Turn the stem connector nut (6.1) by hand until it touches the actuator stem (8.1), then turn it another 1/4 turn and secure this position using the lock nut (6.2).
7. Attach the coupling parts (7) of the stem connector and screw them tight.
   Align the travel indicator scale (5.5) with the tip on the side of the stem connector.

Note about disassembling actuators
On removing an actuator mounted on a valve, and in particular, in a version with pretensioned springs, a loading pressure slightly higher than the lower bench range (see nameplate on the actuator) must be applied to the loading pressure connection before the ring nut (8.2) can be unscrewed.

2.2 Option of pretensioning for "Actuator stem extends"

To achieve a more powerful positioning force, the springs in the actuators can be pretensioned by up to 25 % of its travel or bench range during the valve adjustment procedure.
For example, the springs should be pretensioned by 0.1 bar for a bench range of 0.2 to 1 bar. This means the bench range is shifted by 0.1 bar to achieve a range from 0.3 to 1.1 bar (0.1 bar corresponds to pretensioning the springs by 12.5 %). On adjusting the valve, a signal pressure of 0.3 bar must now be set as the lower signal pressure range.
It is essential that the new bench range (e.g. 0.3 to 1.1 bar) is recorded on the nameplate as bench range with pretensioned springs.

2.3 Different rated travels of valve and actuator

Actuator version "Actuator stem extends"

Note!
Valves that have a smaller rated travel than that of the actuators must always use pretensioned spring ranges.

Example:
Valve DN 100 with a rated travel of 30 mm is to be mounted to an actuator 1400 cm^2 with a rated travel of 60 mm and a bench range from 0.4 to 2 bar.

1. Set the signal pressure required to preload the springs to 1.6 bar. This signal pressure value is above the signal press-

ure of 1.2 bar (range 1.2 to 2 bar) that corresponds to the mid-travel of the actuator (30 mm).

2. Thread the stem connector nut (6.1) until it touches the actuator stem.
3. Secure this position using the lock nut. Attach the stem connector as described in section 2.1.
4. Record the bench range (e.g. 1.6 to 2.4 bar) valid for the mounted valve on the nameplate of the actuator.

Actuator version "Actuator stem retracts"

Note!
The actuator springs in the version "Actuator stem retracts" cannot be pretensioned.

When a valve is mounted to a larger actuator (rated travel of the actuator is larger than that of the valve), only the first half of the actuator's bench range can be used.

Example:
Valve DN 100 with a rated travel of 30 mm and an actuator 1400 cm^2 with a rated travel of 60 mm and a bench range from 0.2 to 1 bar:

For mid-travel of the valve, a bench range from 0.2 to 0.6 bar can be used.

Note!
Actuators which have already been pretensioned by the manufacturer are labeled correspondingly. Additionally, they can also be identified by three long bolts on the bottom diaphragm case.

3 Installation

3.1 Mounting position

The control valve can be mounted in any position. However, valves in nominal sizes DN 100 and larger should preferably be mounted upright with the actuator pointing upwards. This makes maintenance work easier. Valves with an insulating section or bellows seal or actuators that weigh more than 50 kg should be fitted with suitable supports or, in the case of the actuator, suspended.

Important!
The valve must be installed with the least amount of vibrations possible and without any tension.
Clean out the pipeline thoroughly prior to installing the valve.
Note!
Control valves with insulating section or bellows seal may only be insulated up to the cover flange of the valve body for medium temperatures below 0 °C as well as temperatures above 220 °C.
Valves that should meet the requirements of ***NACE MR 0175*** *standard should not be insulated.*

3.2 Signal pressure line

For valves mounted to actuator versions "Actuator stem extends", connect the signal pressure to the loading pressure connection on the bottom diaphragm case and for valves mounted to actuator versions "Actuator stem retracts", connect the signal pressure to the connection on the top diaphragm case.

The lower loading pressure connection is located at the side of the yoke underneath the bottom diaphragm case in the Type 3277 Actuator.

3.3 Strainer, bypass

We recommend installing a strainer upstream of the valve.
If the plant should continue to operate during valve maintenance, install a shut-off valve both upstream of the strainer and downstream of the control valve as well a bypass.

3.4 Test connection

Versions with a metal bellows seal (Fig. 5) include a test connection (11.1) located on the top flange to check the bellows for any leakage. We recommend connecting a suitable leakage indicator (e.g. contact pressure gauge, drainage into an open vessel or sight glass).

4 Operation

(e.g. reversing the operating direction etc.)

Refer to the mounting and operating instructions of the pneumatic actuators

EB 8310 EN for Type 3271 and
EB 8311 EN for Type 3277.

5. Maintenance – Replacing parts

The control valve is subject to natural wear especially at the seat, plug and packing. Depending on the application conditions that prevail, the valve must be inspected at appropriately scheduled intervals to prevent any problems before they occur.
If any leaks occur to the atmosphere, the packing may be leaking.
If the valve does not seal properly, this may be because tight shut-off is prevented by dirt between the seat and plug or because the seating surface is damaged.
We recommend removing the parts, thoroughly cleaning them and replacing them, if necessary.

Important!
If you intend carrying out maintenance work on the valve, first relieve the corresponding plant section of pressure and, depending on the process medium, drain it as well.
Let the plant section cool down to reach ambient temperature, if necessary.
As the process medium cannot drain completely out of the valve, be aware that some of the process medium could still be in the valve. This is particularly the case for valve versions with bellows seals and insulating sections.
We recommend that you remove the valve from the pipeline.
On carrying out any work on the valve, first disconnect the signal pressure, remove the signal pressure line and remove the actuator from the valve.

Important!
Control valves fitted with a ceramic seat and plug must be handled with extreme care as they can easily break. The valve in this version cannot be remachined as described in section 5.1.2.

Note on SAMSON special tools
Suitable seat wrenches and special tools as well as the appropriate tightening torques can be found in EB 029 EN (formerly WA 29 EN). The instructions can be viewed on the Internet at http://www.samson.de/pdf_en/e00290en.pdf.

Removing the actuator:

1. Unscrew the ring nut (8.2) and take off the stem connector (7).
   For the version "Actuator stem extends", and in particular, in a version with pretensioned springs, apply a loading pressure slightly higher than the lower bench range (see nameplate on the actuator) to the loading pressure connection to allow the ring nut (8.2) to be unscrewed.
   After you have loosened the nut, disconnect the supply pressure again.
2. Remove the actuator from the valve yoke.

5.1 Replacing parts of standard valves

5.1.1 Packing

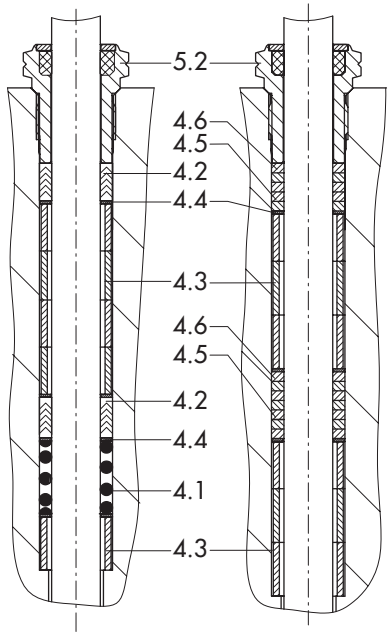
If the valve leaks at the packing, the packing (4.2) and seal elements (4.5 and 4.6) must be replaced as follows:

Disassembly

1. Unscrew the nuts (5.1) and lift the valve bonnet (5) together with the plug stem and plug off from the valve body.
2. Unscrew the stem connector nut (6.1) and lock nut (6.2) off the plug stem. Unthread the guided bushing (5.2) out of the packing.
3. Pull the plug together with the plug stem out of the valve bonnet.
4. Pull all the packing parts using a suitable tool out of the packing space. Replace any damaged parts with new ones.
   Carefully clean the packing space.

Assembly

1. Apply lubricant (order no. 8150-0111) to all parts as well as the plug stem (6). Do not use any lubricant for graphite packing!
2. Place the plug into the valve body and insert a new flat gasket (1.1).
3. Place the valve bonnet carefully over the plug stem onto the valve body and screw the nuts (5.1) tight.
4. Carefully slide the packing parts over the plug stem into the packing space. Make sure the packing parts are replaced in the right order. Note that the number of spacers (4.3) varies depending on the nominal size.
5. Thread in the guided bushing (5.2) and tighten. For high-temperature packing, tighten the guided bushing only slightly, even if it starts to leak, it should only be tightened slightly.



4.1 Spring
4.2 V-ring packing
4.3 Spacer(s)
4.4 Washer(s)
4.5 Carbon bushing(s)
4.6 Graphite, compressed
5.2 Guided bushing

Fig. 3 · Packing, standard (left) high-temperature (right)

6. Screw the lock nut (6.2) and stem connector nut (6.1) onto the plug stem without tightening them.
7. Attach the actuator as described in section 2.1 and set the lower and upper bench range.

5.1.2 Seats and/or plug

When replacing the seat or plug, we recommend replacing the packing (4.2 or 4.5 and 4.6) as well.

Seat:

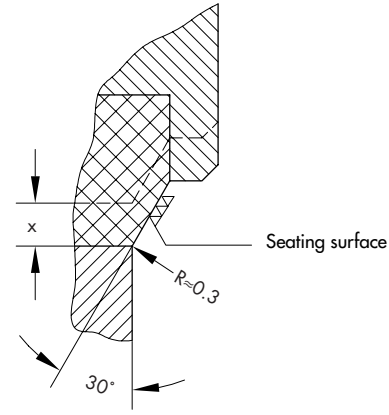
1. Unscrew the nuts (5.1) and lift the valve bonnet (5) together with the plug stem and plug off the valve body.
2. Unscrew the seat (2) using the appropriate seat wrench (see EB 029 EN).
3. Apply lubricant (order no. 8150-0119) to the thread and sealing cone of the new seat (or the old seat after it has been remachined or thoroughly cleaned) and screw it back in.
   The tightening torques for the seat are likewise listed in EB 029 EN.

Plug:

1. Unscrew the nuts (5.1) and lift the valve bonnet (5) together with the plug stem (6) and plug off the valve body (1).
2. Unscrew nuts (6.1, 6.2) and guided bushing (5.2).
3. Pull the plug out of the valve bonnet.
4. Change the plug and insert the new plug and plug stem (6).
   It may be possible to use the old plug again after it has been remachined.
   Apply lubricant (order no. 8150-0119) to the plug stem (6) before fitting it back into the valve.

Remachining the plug

The plug can be machined when the plug's seating surface is slightly damaged. Plugs with a soft sealing can only be machined up to the dimension x (Fig. 4).



Seat bore Ø	x (mm)
31 to 50	1
63 to 150	2

Fig. 4 · Remachining a plug with soft sealing

5.2 Replacing parts of valves with metal bellows seal

Caution!
To prevent damage in the valve with bellows seal (a valve with insulating section does not contain a bellows), make sure that no torque is transferred to the bellows.

5.2.1 Packing

Replace parts as described in section 5.1.1 for the standard valve. However, unthread the guided bushing (5.2), unscrew nuts (11.2) and separate the bonnet (11) from the intermediate piece (9).
Replace gasket (9.1) with a new one.

5.2.2 Metal bellows

The metal bellows (10) can only be replaced as an entire unit together with the plug stem. To do this, proceed as described in section 5.1.2 (Fig. 5).

5.2.3 Seats and/or plug

Replace parts as described in section 5.1.2 for the standard valve.
The plug stem can only be exchanged together with the metal bellows seal.
The plug can be removed from the plug stem: in valve size DN 15 to 40, the plug is attached by a nut and from valve size DN 50 and above, it is attached with a clamping disk.

- Prior to attaching the plug, apply lubricant (order no. 8150-0111) to the thread of the plug stem.

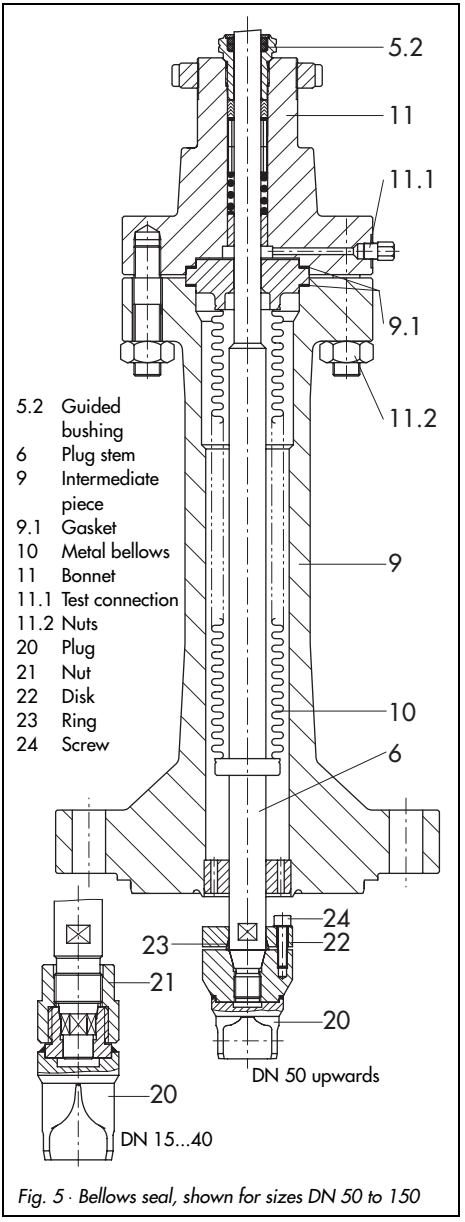


Fig. 5 · Bellows seal, shown for sizes DN 50 to 150

- In the version with the plug attached by a nut, screw on the nut (21) by hand on to the plug stem as far as it will go.
  Place the plug on the hexagonal neck of the plug stem.
  Place an open-end wrench on the flattened area of the plug stem and screw the nut onto the plug with a tightening torque of 40 Nm.

5.3 Replacing parts of valves with insulating section

Replace the packing as described in section 5.1.1 for the standard valve.

Replace the seat and plug as described in section 5.1.2 for the standard valve.

5.4 Disassembling the flow divider

For valves with flow dividers, the gasket (1.1) and shims (1.2) must be replaced with new ones every time the flow divider is removed.

The number of shims required and the dimension x must be determined when a new gasket (1.1) is used:

First measure dimension A, then dimension B.

Dimension x is calculated from A – B and must be filled out with shims (0.5 or 2 mm thick).
The maximum compression should be approximately 0.5 mm.

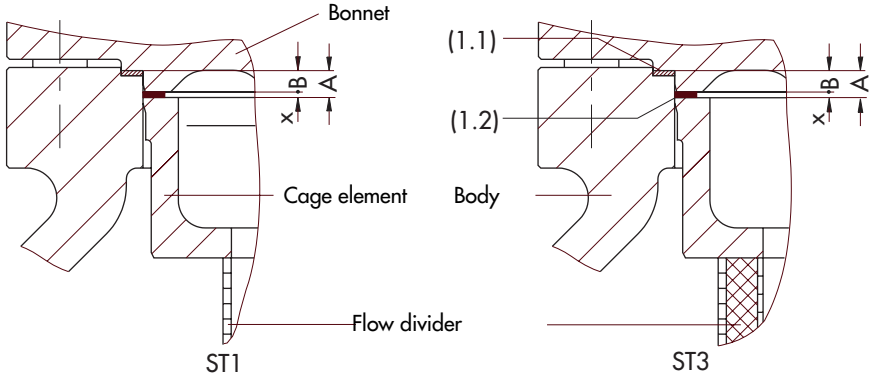
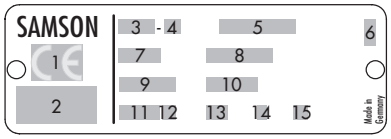


Fig. 6 · Installing a flow divider

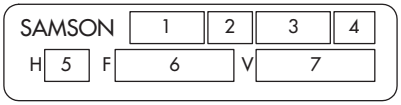
6 Description of nameplates

Valve nameplate



1 CE marking or "Art. 3, Abs. 3" (see article 3, § 3 of PED), where applicable
2 Ident. number of notified body, fluid group and category, where, applicable
3 Type designation
4 Modification index of valve
5 Material
6 Year of manufacture
7 Nominal size: DIN: DN, ANSI: Size
8 Perm. operating pressure at room temperature DIN: PN, ANSI: CL
9 Order number with modification index
10 Item position on order
11 Flow coefficient:
DIN: **K**$_{VS}$ value , ANSI: **Cv** value
12 Characteristic:
% equal percentage, **Lin** linear,
DIN: **A/Z**, ANSI: **O/C** for quick opening
13 Sealing:
ME metal, **ST** stellited, **Ni** nickel plated
PT soft sealing with PTFE,
PK soft sealing with PEEK
14 Pressure balancing: DIN: **D**, ANSI: **B**
15 **I** or **III** flow divider

Type 3271 Actuator nameplate



1 Type designation
2 Modification index
3 Effective diaphragm area
4 Fail-safe action:
FA Actuator stem extends
FE Actuator stem retracts
5 Travel
6 Bench range (spring range)
7 Bench range with pretensioned springs

Type 3277 Actuator nameplate

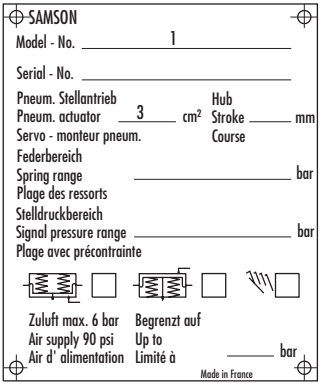


Fig. 7 · Nameplates

7 Customer inquiries

Please submit the following details:

- Order number
- Type, model number, nominal size and version of the valve
- Pressure and temperature of the process medium
- Flow rate in m^3/h
- Bench range (e.g. 0.2 to 1 bar) of the mounted actuator
- Has a strainer been installed?
- Installation drawing

Dimensions and weights
Refer to the Data Sheet T 8051 EN for dimensions and weights of the valve versions.

SAMSON AG · MESS- UND REGELTECHNIK
Weismüllerstraße 3 · 60314 Frankfurt am Main · Germany
Phone: +49 69 4009-0 · Fax: +49 69 4009-1507
Internet: http://www.samson.de

EB 8051 EN

Pneumatic Actuator
Type 3271

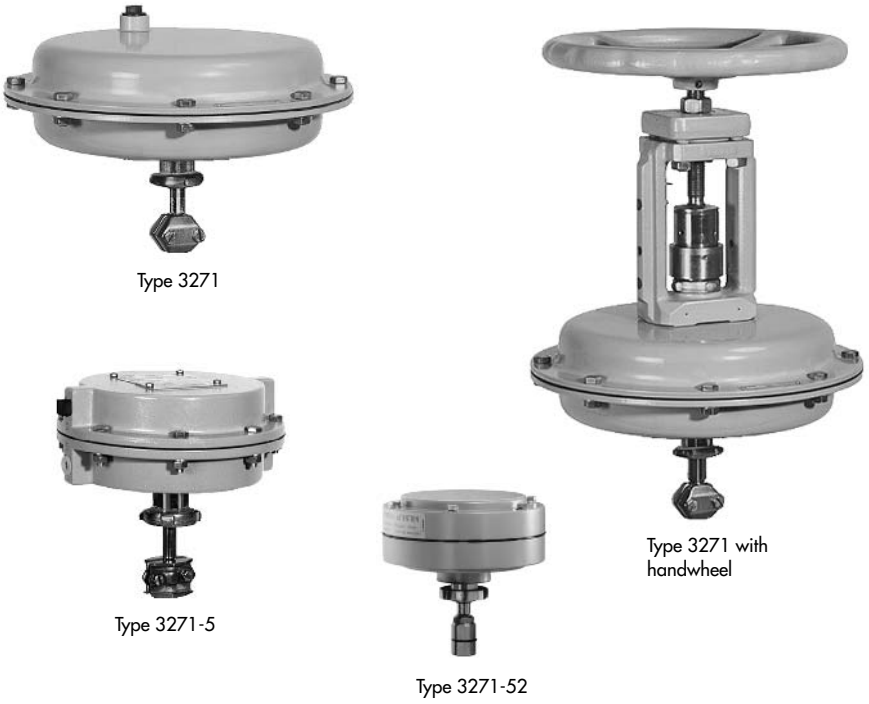


Fig. 1 · Type 3271 Actuator versions

Mounting and operating instructions

EB 8310 EN

Edition May 2002

- *Assembly, start-up and operation of the device may only be performed by trained and experienced personnel familiar with this product.*
  According to these mounting and operating instructions, trained personnel is referred to individuals who are able to judge the work they are assigned to and recognize possible hazards due to their specialized training, their knowledge and experience as well as their knowledge of the relevant standards.
- *Any hazards which could be caused by the signal pressure and moving parts of the actuator are to be prevented by means of appropriate measures.*
- *Proper shipping and appropriate storage are assumed.*

1. Design and principle of operation

Type 3271 Actuators are primarily used for attachment to control valves of the Series 240, 250, 260 and 280.

Type 3271-5 with a die-cast aluminum case and effective diaphragm areas of 60 and 120 cm², is mounted to Type 3510 and Series 240 Control Valves.

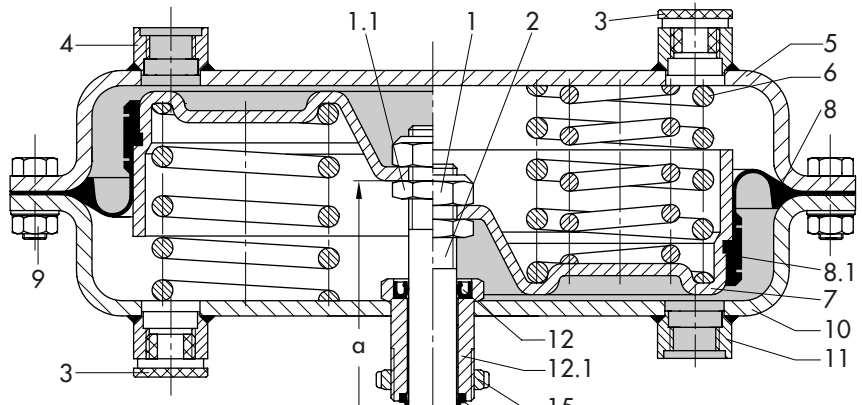
The Type 3271 Actuator is made up of two diaphragm cases, a rolling diaphragm and springs.

Actuators with **manual override** (Fig. 5) additionally have a handwheel mounted on the diaphragm case or mounted on the side of the valve yoke. The handwheel moves the actuator stem over a spindle.

The Type 3271 Actuator can be equipped in a special version with a mechanically adjustable travel stop (Fig. 6).

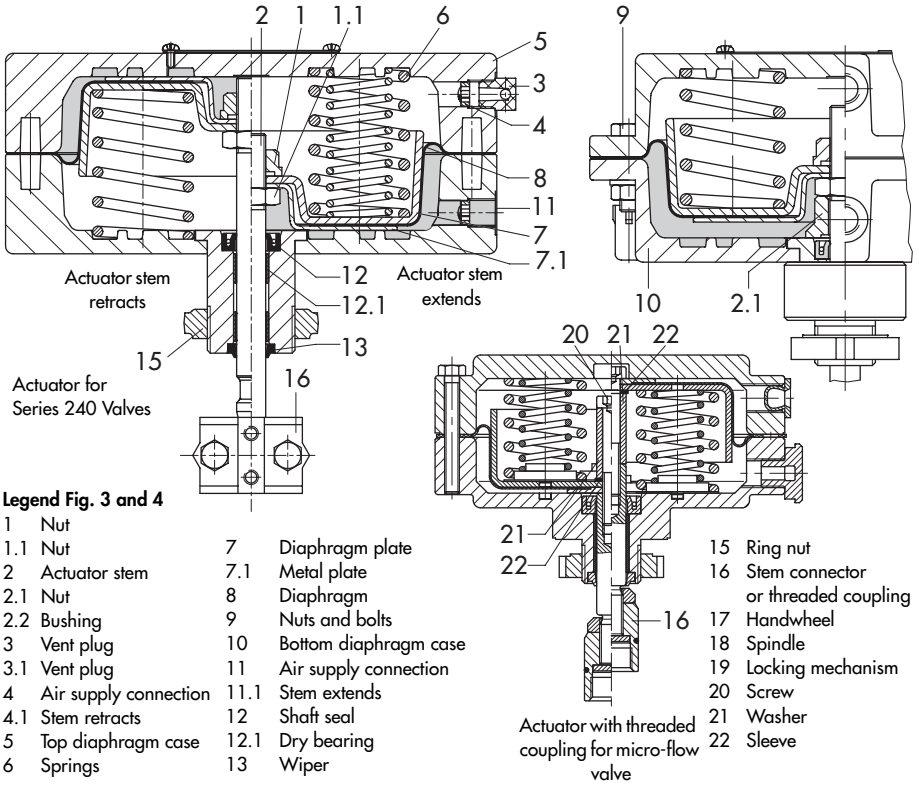
The signal pressure creates a force at the diaphragm surface which is balanced by the springs (6) arranged in the actuator. The number of springs and their compression determine the bench range (signal pressure range) while taking the rated travel into account which is directly proportional to the signal pressure.

A maximum of 30 springs can be installed, partly fitted inside one another.



1	Nut	6	Springs	11	Loading pressure connection
1.1	Nut	7	Diaphragm plate	12	Stem seal
2	Actuator stem	8	Diaphragm	12.1	Dry bearing
3	Vent plug	8.1	Hose clamp	13	Wiper
4	Loading pressure connection	9	Nuts and bolts	15	Ring nut
5	Top diaphragm case	10	Bottom diaphragm case	16	Stem connector

Fig. 2 · Type 3271 Actuator



Legend Fig. 3 and 4

1	Nut	7	Diaphragm plate	15	Ring nut
1.1	Nut	7.1	Metal plate	16	Stem connector or threaded coupling
2	Actuator stem	8	Diaphragm	17	Handwheel
2.1	Nut	9	Nuts and bolts	18	Spindle
2.2	Bushing	10	Bottom diaphragm case	19	Locking mechanism
3	Vent plug	11	Air supply connection	20	Screw
3.1	Vent plug	11.1	Stem extends	21	Washer
4	Air supply connection	12	Shaft seal	22	Sleeve
4.1	Stem retracts	12.1	Dry bearing		
5	Top diaphragm case	13	Wiper		
6	Springs				

Fig. 3 · Type 3271-5 Actuator with 120 cm² (top) and Type 3271-52 Actuator with 60 cm² (bottom)

In an actuator with the fail-safe action "actuator stem extends FA", the loading pressure is connected to the loading pressure connection (11) to fill the bottom diaphragm chamber which causes the actuator stem to move upwards.
In an actuator with the fail-safe action "actuator stem retracts FE", the loading pressure is connected the loading pressure connection (4) to fill the top diaphragm chamber which causes the actuator stem to move downwards.
The stem connector or threaded coupling (16) connects the actuator stem (2) to the plug stem of the valve.

Fail-safe action

When the signal pressure fails, the fail-safe action of the actuator depends on whether the springs are installed in the top or bottom diaphragm chamber.

Actuator stem extends

When the signal pressure is reduced or its supply fails, the springs move the actuator stem downwards and close the attached valve. The valve opens when the signal pressure is increased enough to overcome the force exerted by the springs.

Actuator stem retracts

When the signal pressure is reduced or its supply fails, the springs move the actuator stem upwards and open the attached valve. The valve closes when the signal pressure is increased enough to overcome the force exerted by the springs.

The **tandem actuator** (Fig. 4) has two diaphragms connected to each other. The signal pressure produces an actuating force double to that of an actuator with just one diaphragm.

Actuators with an **additional manual override** (Fig. 5) have a handwheel that moves the actuator stem over a spindle after the locking mechanism (lock nut) has been disengaged.
A side-mounted handwheel moves the stem over a bevel or worm gear.

Note!
The pneumatic actuators are designed for a maximum supply pressure of 6 bar.
To prevent the actuator from being damaged, do not let the supply pressure exceed the upper spring range value by more than 3 bar when the actuator is used for ***flow-switching service*** *(on-off valve) with the fail-safe position "****actuator stem retracts****".*
Label actuators that have a reduced supply pressure with a sticker "max. supply pressure limited to ... bar".

Note!
Refer to the operating instructions of the corresponding valve for instructions about how to attach and remove the actuator from the valve.

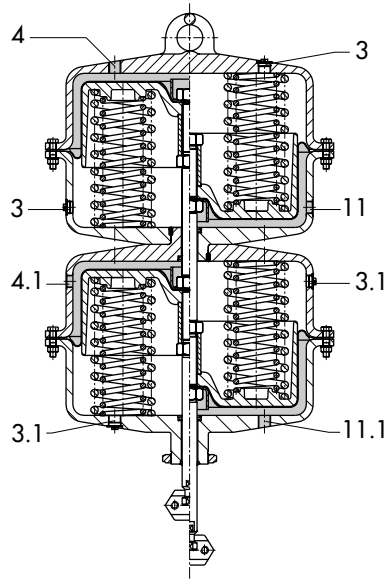


Fig. 4 · Tandem actuator

2. Operation

Note!
Only apply loading pressure to the diaphragm chamber that does not contain the springs.
It is important for a troublefree operation of the actuator that the vent plug (3) is not blocked.
Make sure in versions with a handwheel that the plug stem can move freely when the valve is being positioned by the pneumatic actuator by moving the handwheel into a neutral position (Fig. 5).

2.1 Reversing the operating direction (fail-safe action)

The operating direction, i.e. fail-safe action in pneumatic actuators can be changed. Prior to proceeding, you must remove the actuator from the valve.

The fail-safe action "actuator stem extends" or "actuator stem retracts" is specified on the nameplate with the initials **FA** and **FE** on Type 3271 and by a symbol on Type 3271-5.

Warning!
To disassemble an actuator with preloaded actuator springs (recognizable by the long bolts on the diaphragm chambers), always undo the short bolts first and then unthread the long bolts slowly and evenly until the actuator springs are fully decompressed.

2.1.1 Type 3271

Reversing the fail-safe action "actuator stem extends" to "actuator stem retracts" (Fig. 2)

1. Unthread the nuts and remove the bolts (9) from the diaphragm cases.
2. Lift off the top diaphragm case and remove the springs (6).
3. Pull the actuator stem (2) with diaphragm plate (7) and diaphragm (8) out of the bottom diaphragm case (10).
4. Unscrew nut (1), while holding the nut (1.1) stationary with a suitable tool.
   Caution: Proceed carefully to avoid damaging the seals of the actuator stem.

Caution!
Do not loosen the nut (1.1) on the actuator stem. It is painted over to protect it.
*If, however, it does become loose, it is essential that the dimension "**a**" from the top of the nut to the bottom of the actuator stem is kept as shown in Fig. 2 and table on the next page.*

5. Lift off the diaphragm plate with diaphragm and replace them in reverse order. Tighten nut (1).
6. Apply lubricant/sealant (order no. 8152-0043) to the actuator stem.
7. Place the diaphragm plate with diaphragm in the top diaphragm case. Insert the springs (6) and slide the lower diaphragm case over the actuator stem.
8. Screw tight the nuts and bolts of the diaphragm cases.
9. Remove vent plug (3) from top diaphragm case and screw into the loading pressure connection on the bottom diaphragm case.

The springs now press against the diaphragm plate from below and cause the actuator stem to retract.
The loading pressure is connected over the connection (4) to the top diaphragm chamber. The actuator stem starts to extend when the signal pressure overcomes the force of the springs.

10. Record the changed fail-safe action on the nameplate!

Actuator cm^2	Dimension "a" (Fig. 2)
120	100.5 mm, with threaded end 89 mm
240	98.25 mm
350	107.25 mm
700	125 mm for rated travel 15 (0.4 to1.2 bar), 144 mm for rated travel 30 and 40
1400	230 mm
2800	430 mm

Proceed in the same manner for the **Type 3271-5 Actuator**, but additionally install the metal plate (7.1). For the version intended for attachment to micro-flow valves, additionally install the bushing (2.1) for the mechanical travel stop.
In Type 3271-52 Actuator with 60 cm^2 unthread the screw (20) and then remove the washer (21) and sleeve (22).

Reversing the fail-safe action "actuator stem retracts" to "actuator stem extends" (Fig. 2)

1. Unthread the nuts and remove the bolts (9) and lift off the top diaphragm case (5).
2. Pull the diaphragm plate (7) and diaphragm with the actuator stem (2) out of the bottom diaphragm case (10). Remove the springs (6).
3. Unscrew nut (1), while holding the nut (1.1) stationary with a suitable tool. **Caution:** Proceed carefully to avoid damaging the seals of the actuator stem.
4. Remove the diaphragm plate with diaphragm and replace them in reverse order. Screw tight nut (1).
5. Coat the actuator stem with sealant/lubricant (order no. 8152-0043) and insert it into the bottom diaphragm chamber along with the diaphragm plate and diaphragm.
6. Insert springs (6) and place the top diaphragm case back on.
7. Screw tight the nuts and bolts of the diaphragm cases.
8. Remove the vent plug (3) from the bottom loading pressure connection and place it in the top connection.

The springs which are now pressed from the top against the diaphragm plate cause the actuator stem to extend. The signal pressure is connected via the connection (11) to the bottom diaphragm chamber. The actuator stem starts to retract when the signal pressure overcomes the force of the springs.

9. Record the changed fail-safe action on the nameplate!

Proceed in the same manner for the **Type 3271-5** Actuator, but additionally install the metal plate (7.1).
For an actuator intended for a micro-flow valve, install the bushing (2.1) for the travel stop.

For Type 3271-52 Actuator with 60 cm^2 undo the screw (20) and then remove the washer (21) and sleeve (22).

2.1.2 Actuator with handwheel

240, 350 and 700 cm^2 only (Fig. 5)

1. Undo lock nut (20) and relieve the springs (6) by turning the handwheel (17).
2. Loosen threaded pin (26) and unscrew coupling nut (25) from the coupling (22).
3. Knock out the clamping sleeve (23) and remove the ring (24).
4. Unthread the ring nut (28) and lift off the flange part (21).

Reversing the fail-safe action "actuator stem extends" to "actuator stem retracts"

▶ Proceed as described in chapter 2.1.1. However, use the word "spindle with nut (27)" in place of "nut (1)".

After reversing the operating direction:

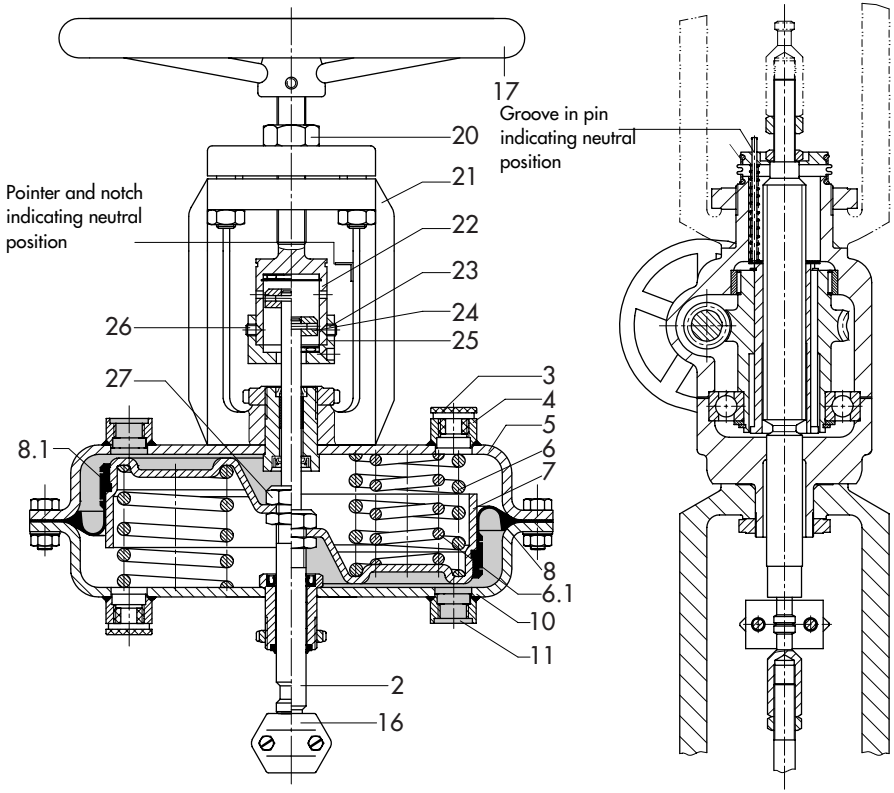
1. Place the flange part (21) and coupling nut (25). Then fasten the flange part (21) with the ring nut (28).
2. Attach the ring (24) with clamping sleeve (23).
3. Screw coupling nut (25) as far as it will go onto the coupling (22) and secure with threaded pins (26).

Reversing the fail-safe action "actuator stem retracts" to "actuator stem extends"

▶ Proceed as described in chapter 2.1.1. However, use the word "spindle with nut (27)" in place of "nut (1)".

After reversing the operating direction:

1. Place the flange part (21) and the coupling nut (25) and then secure flange part (21) with ring nut (28).
2. Attach the ring (24) with clamping sleeve (23).
3. Screw coupling nut (25) as far as it will go onto the coupling (22) and secure with threaded pins (26).



2 Actuator stem
3 Vent plug
4 Loading pressure connection
5 Top diaphragm case
6 Springs
6.1 Additional springs
7 Diaphragm plate
8 Diaphragm
8.1 Hose clamp
10 Bottom diaphragm case
11 Loading pressure connection
16 Stem connector
17 Handwheel
20 Lock nut
21 Flange part
22 Coupling
23 Clamping sleeve
24 Ring
25 Coupling nut
26 Threaded pin
27 Spindle with nut
28 Ring nut

Fig. 5 · Actuator with handwheel

2.2 Replacing the diaphragm and actuator stem seal

Diaphragm (Fig. 2)

1. Proceed as described in chapter 2.1 to take the diaphragm plate (7) with diaphragm (8) and actuator stem (2) out of the diaphragm case.
2. Remove the hose clamp (8.1) and pull it together with the diaphragm (8) off the diaphragm plate (7) (not necessary with Type 3271-5 as the diaphragm is held in place by the metal plate (7.1)).
3. Stretch the new diaphragm onto the diaphragm plate. Fit the hose clamp (8.1) evenly into the groove intended for it and tighten.
4. Reassemble actuator as described in chapter 2.1.

Actuator stem seal (Fig. 6)

1. Take the diaphragm plate (7) with the actuator stem (2) out of the diaphragm case as described in chapter 2.1.
2. Coat the new stem seal (12) with lubricant/sealant (order no. 8152-0043) and insert it.
3. If necessary, replace the dry bearing (12.1) and wiper (13) with new ones as well.
4. Reassemble the actuator as described in chapter 2.1.

2.3 Adjusting the travel stop

(Fig. 5, with Type 3271 in special version only)

The travel stop can be adjusted upwards or downwards to 50% of the travel.

Downward travel stop
(actuator stem extends)

1. Undo the lock nut (34) and unscrew the cap (33).
2. Undo the lock nut (31) and adjust the nut (32) to set required travel stop.
3. Tighten the lock nut (31) again.

Upward travel stop
(actuator stem retracts)

1. Undo the lock nut (34) and adjust the cap (33) to set the required travel stop.
2. Tighten the lock nut (34) again.

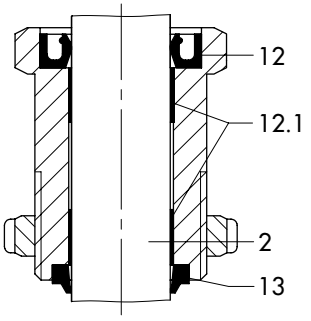


Fig. 6 · Actuator stem seal

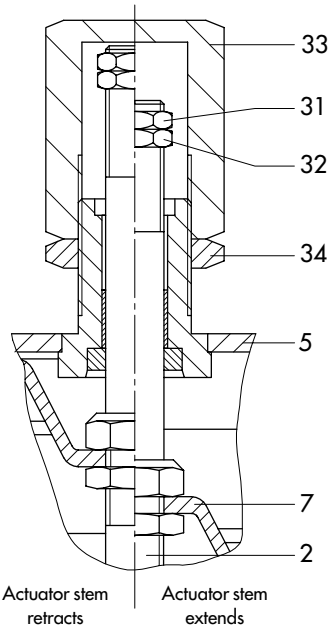
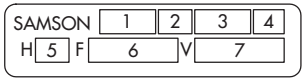


Fig. 7 · Travel stop

3. Description of nameplate



1 Type designation
2 Modification index
3 Effective diaphragm area
4 Fail-safe action:
FA Actuator stem extends
FE Actuator stem retracts
5 Travel
6 Bench range (spring range)
7 Bench range with preloaded springs

Fig. 8 · Nameplate of Type 3271 Actuator

4. Customer inquiries

Should you have any inquiries regarding the actuator, please submit the following details:

- Type and product number
- Effective diaphragm area
- Bench range (spring range) in bar
- Actuator version - fail-safe action

Dimensions
Refer to the Data Sheet T 8310 EN for dimensions and weights of the actuator versions.

SAMSON AG · MESS- UND REGELTECHNIK
Weismüllerstraße 3 · 60314 Frankfurt am Main · Germany
Phone: +49 69 4009-0 · Fax: +49 69 4009-1507
Internet: http://www.samson.de

EB 8310 EN

S/Z 2002-05

Pneumatic Actuator
Type 3277

Fig. 1 · Type 3277 Actuator

Fig. 2 · Type 3277-5 Actuator

Mounting and Operating Instructions

EB 8311 EN

Edition April 2002

1 Design and principle of operation

Type 3277 Pneumatic Actuators with an effective diaphragm area of 240, 350 or 700 cm^2 are primarily mounted to control valves from the Series 240, 250 and 280.

Type 3277-5 with a die-cast aluminum case and an effective diaphragm area of 120 cm^2, is mounted to Type 3510 and Series 240 Control Valves.

The actuator is made up of two diaphragm cases, a rolling diaphragm and springs. The lower diaphragm case is permanently fixed to the yoke which allows the direct attachment of either a pneumatic or electropneumatic positioner or a limit switch.

Actuators with **manual override** (Fig. 5) additionally have a handwheel mounted on the diaphragm case. The handwheel moves the actuator stem over a spindle after the locking mechanism (lock nut) has been disengaged. In addition, the actuator can be equipped in a special version with a mechanically adjustable travel stop.

The signal pressure creates a force at the diaphragm surface which is balanced by the springs (6) arranged in the actuator. The number of springs and their compression determine the bench range (signal pressure range) while taking the rated travel into account which is directly proportional to the signal pressure. A maximum of 30 springs can be installed, partly fitted inside one another.

The stem connector (16) connects the actuator stem (2) with the plug stem of the control valve.

- *Assembly, start-up and operation of the device may only be performed by trained and experienced personnel familiar with this product. According to these mounting and operating instructions, trained personnel is referred to individuals who are able to judge the work they are assigned to and recognize possible hazards due to their specialized training, their knowledge and experience as well as their knowledge of the relevant standards.*
- *Any hazards which could be caused by the signal pressure and moving parts of the actuator are to be prevented by means of appropriate measures.*
- *Proper shipping and appropriate storage are assumed.*

Fail-safe action

When the signal pressure fails, the fail-safe action of the actuator depends on whether the springs are installed in the top or bottom diaphragm chamber.

Actuator stem extends

When the signal pressure is reduced or its supply fails, the springs move the actuator stem downwards and close the attached valve. The valve opens when the signal pressure is increased enough to overcome the force exerted by the springs.

Actuator stem retracts

When the signal pressure is reduced or its supply fails, the springs move the actuator stem upwards and open the attached valve. The valve closes when the signal pressure is increased enough to overcome the force exerted by the springs.

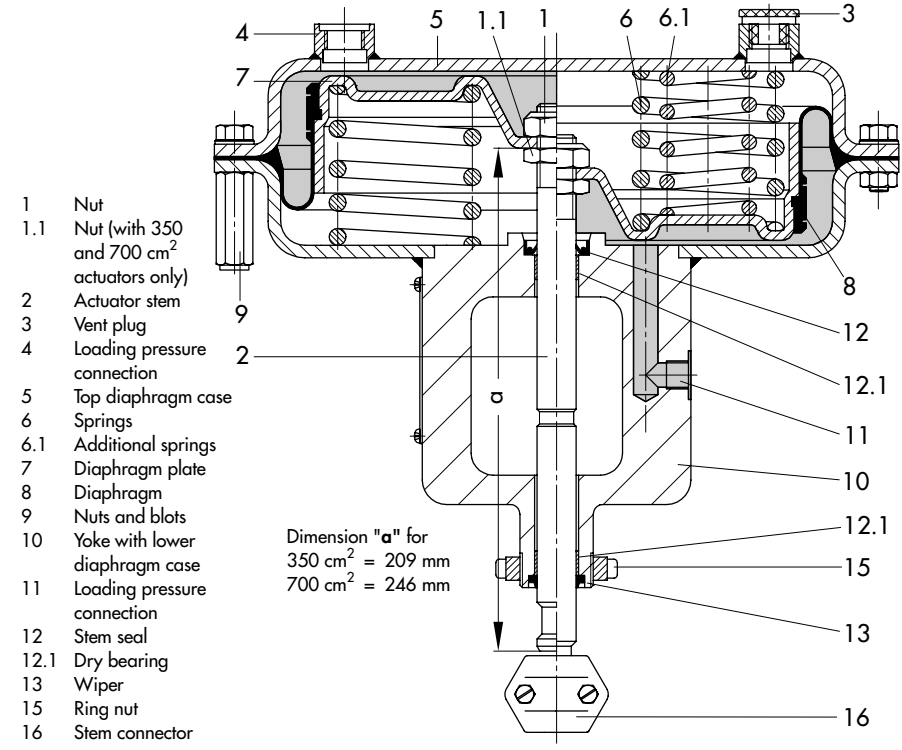


Fig. 3 · Type 3277 Actuator with 240, 350 and 700 cm² effective diaphragm areas

Loading pressure connection

Type 3277 Actuator (Fig. 3)
In the Type 3277 Actuator with the fail-safe action "actuator stem extends", the loading pressure is connected to the loading pressure connection (11) at the side of the yoke to fill the bottom diaphragm chamber which causes the actuator stem (2) to move upwards.
In an actuator with the fail-safe action "actuator stem retracts", the loading pressure is connected the loading pressure connection (4) to fill the top diaphragm chamber which causes the actuator stem to move downwards.

Type 3277-5 Actuator (Fig. 4)
In the Type 3277-5 Actuator, the loading pressure is connected to a borehole either at the left or right of the yoke. A **switchover plate** (14, accessories) directs the air to one of the diaphragm chambers, depending on the fail-safe action of the actuator ("actuator stem extends" or actuator stem retracts"), which is determined by how the plate is aligned with the mark (14.4).

- Turn the switchover plate to align the symbol (14.3) for the appropriate fail-safe action with the mark (14.4). See Fig. 4, bottom left. The operating direction (>>) or (<>) of the positioner determines whether the left or right attachment is to be used.

A **connecting plate** (accessories) is required instead of the switchover plate if the actuator is operated **without a positioner**. The loading pressure is directly connected to the loading pressure connection (14.8) of the connecting plate to fill the diaphragm chamber.

- Turn the connecting plate to align the symbol (14.3) for the appropriate fail-safe action "actuator stem extends" or "actuator stem retracts" with the mark (14.4). See Fig. 4, bottom right.
- Make sure that the flat gasket of the connecting plate is correctly inserted.
- The connecting plate has both NPT and G threaded bores. Seal the bore not required with a rubber gasket and square plug.

Accessories: The switchover plate or connecting plate must be ordered separately. Please note that actuators with modification index **01** e.g. 3277-531xxx20.**01** (old = **.00**) are equipped with new plates.
Old and new plates are not interchangeable.

		With index	Order no.
Switchover plate	**New**	**01**	**1400-6822**
	Old	00	1400-6819
Connecting plate	**New**	01	**1400-6823**
	Old G thread	00	1400-1620
	Old NPT thread	00	1400-6821

Note! *The pneumatic actuators are designed for a maximum supply pressure of 6 bar. To prevent the actuator from being damaged, do not let the supply pressure exceed the upper spring range value by more than 3 bar when the actuator is used for* ***flow-switching service*** *(on-off valve) with the fail-safe position "**actuator stem retracts**". Label actuators that have a reduced supply pressure with a sticker "max. supply pressure limited to ... bar".*
Note! *Refer to the operating instructions of the corresponding valve for instructions about how to attach and remove the actuator from the valve.*

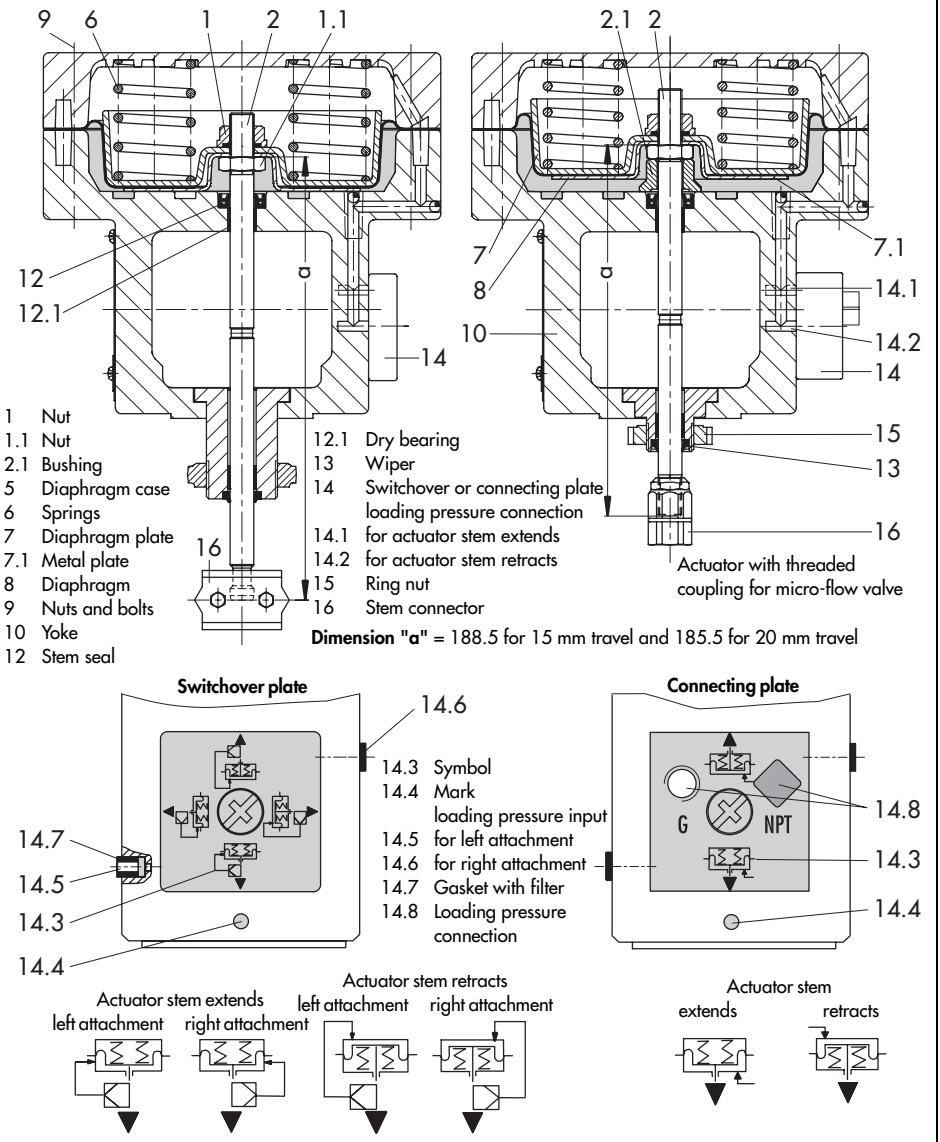


Fig. 4 · Type 3277-5 Actuator (120 cm²)

2 Operation

Note!
It is important for a troublefree operation of the actuator that the vent plug (3) is not blocked in the Type 3277 Actuator.
Make sure in versions with a handwheel that the plug stem can move freely when the valve is being positioned by the pneumatic actuator by moving the handwheel into a neutral position.

2.1 Reversing the operating direction (fail-safe action)

The operating direction and the fail-safe action in pneumatic actuators can be changed. Prior to proceeding, you must remove the actuator from the valve.
The fail-safe action is designated by a symbol on the nameplate.

 Actuator stem extends or

 Actuator stem retracts

Warning!
To disassemble an actuator with preloaded springs (recognizable by the long bolts on the diaphragm chambers), always undo the short bolts first and then unthread the long bolts slowly and evenly until the actuator springs are fully decompressed.

2.1.1 Standard actuator

Reversing the fail-safe action "actuator stem extends" to "actuator stem retracts"

Note!
The operating direction of actuators with 700 cm² (travel = 30 mm) and spring ranges - 0.2 to 1 bar, 0.4 to 2 bar and 0.6 to 3 bar - that are mounted to valves with 15 mm travel, can be only changed when the standard actuator stem is replaced by an actuator stem (order no. 0290-5266) that is 20 mm shorter.
These actuators are preloaded by approx. 50 % on mounting them to the valve due to the varying travels.
This means the bench range (spring range) of 0.2 to 1 bar results in a signal pressure range of 0.6 to 1 bar; 0.4 to 2 results in 1.2 to 2 bar and 0.6 to 3 results in 1.8 to 3 bar.
The signal pressure range is recorded on the nameplate when the actuators have been preloaded on mounting them to the valve.

1. Unthread the nuts and remove the bolts (9) from the diaphragm cases.
2. Lift off the top diaphragm case and remove the springs (6).
3. Pull the actuator stem (2) with diaphragm plate (7) and diaphragm (8) out of the yoke (10).
4. Unscrew nut (1), while holding the nut (1.1) stationary with a suitable tool or clamp the actuator stem.
   Caution: Proceed carefully to avoid damaging the seals of the actuator stem.

Caution!
*Do not loosen the nut (1.1) on the actuator stem of 350 and 700 cm² actuators. It is painted over to protect it. If, however, it does become loose, it is essential that the dimension "**a**" (Fig. 3 and 4) from the top of the nut to the bottom of the actuator stem is kept.*

5. Apply lubricant/sealant (order no. 8152-0043) to the sealing part of the actuator stem.
6. Turn the top diaphragm case (5) upside down and place in to it the actuator stem with diaphragm plate, diaphragm and metal plate (7.1 in Fig. 4), if one exists.
7. Insert the springs (6) and slide the yoke with the lower diaphragm case over the actuator stem.
8. Screw diaphragm cases back together. Remove vent plug (3) on Type 3277 Actuator.

Proceed in the same manner for the **Type 3277-5** Actuator intended for the microvalve, but additionally attach the bushing (2.1) for the mechanical travel stop.

The springs now press from below against the diaphragm plate and cause the actuator stem to retract (fail-safe action).
The actuator stem only starts to extend when the signal pressure overcomes the force of the springs.

9. Record the changed fail-safe action on the nameplate!

Reversing the fail-safe action "actuator stem retracts" to "actuator stem extends"

Note!
The operating direction of actuators with 700 cm² (travel = 30 mm) that are mounted to valves with 15 mm travel can only be changed when the actuator stem installed (length = 245 mm) is replaced by an actuator stem (order no. 0290-4727) that is 20 mm longer.

1. Unthread the nuts and remove the bolts (9) from the diaphragm cases. Lift off the top diaphragm case (5).
2. Pull the actuator stem with diaphragm plate, diaphragm and metal plate (7.1), if one exists, out of the yoke and the bottom diaphragm case (10).
3. Unscrew nut (1), while holding the nut (1.1) stationary with a suitable tool or clamp the actuator stem.
   Caution: Proceed carefully to avoid damaging the seals of the actuator stem.
4. Turn over diaphragm plate with diaphragm and screw back on the nut (1).
5. Apply lubricant/sealant (order no. 8152-0043) to the sealing part of the actuator stem.
6. Insert actuator stem with diaphragm plate, diaphragm and metal plate (7.1), if one exists, into the bottom diaphragm case with the yoke.
7. Insert springs (6) and place back on the top diaphragm chamber. Tighten using nuts, bolts and washers.
8. Screw a vent plug (3) in the top loading pressure connection in Type 3277 Actuator.

Proceed in the same manner for the **Type 3277-5** Actuator intended for the micro-valve, but additionally attach the bushing (2.1) for mechanical travel stop.

The springs now press from the top against the diaphragm plate and cause the actuator stem to extend (fail-safe action).
The actuator stem only starts to retract when the signal pressure overcomes the force of the springs.

9. Record the changed fail-safe action on the nameplate!

2.1.2 Actuator with handwheel

(Type 3277 only, see Fig. 5)

1. Undo lock nut (20) and relieve the springs (6) by turning the handwheel (17).
2. Loosen threaded pin (26) and unscrew coupling nut (25) from the coupling (22).
3. Knock out the clamping sleeve (23) and remove the ring (24).
4. Unthread the ring nut (15) and lift off the flange part (21) with coupling nut (25).

Reversing the fail-safe action "actuator stem extends" to "actuator stem retracts"

- Proceed as described in section 2.1.1. However, use the word "spindle with nut (27)" in place of "nut (1)".

After reversing the operating direction:

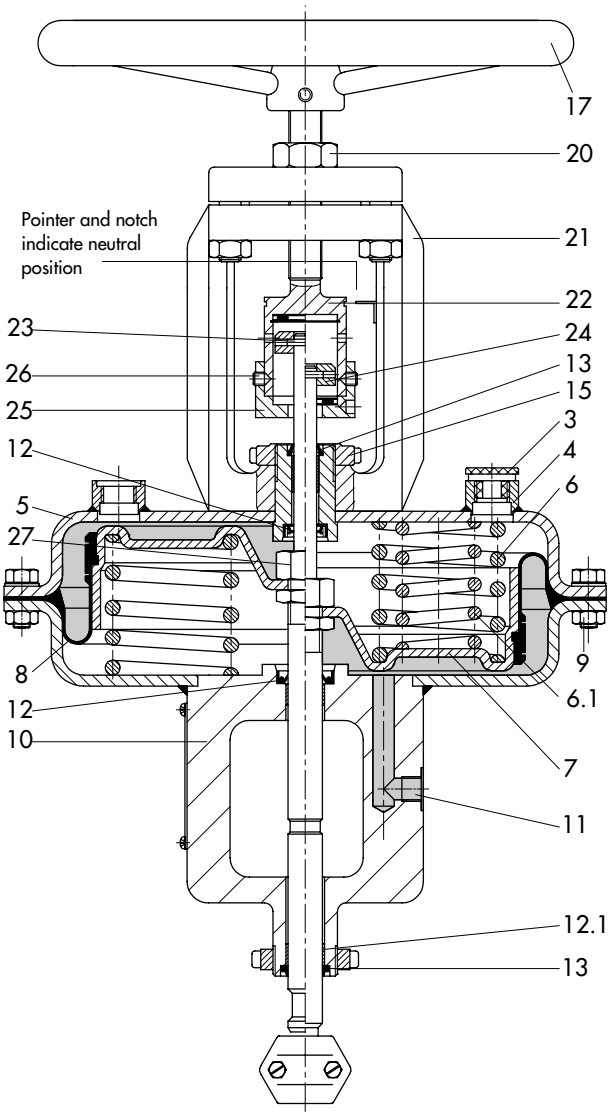
1. Replace the flange part (21) with ring nut (15) and coupling nut (25).
2. Tighten ring nut (15), then attach ring (24) with clamping sleeve.
3. Screw coupling nut (25) as far as it will go onto the coupling (22) and secure with threaded pins (26).

Reversing the fail-safe action "actuator stem retracts" to "actuator stem extends"

- Proceed as described in section 2.1.1. However, use the word "spindle with nut (27)" in place of "nut (1)".

After reversing the operating direction:

1. Place the flange part (21) with ring nut (15) and coupling nut (25) back again.
2. Tighten ring nut (15), then attach ring (24) with clamping sleeve.
3. Screw coupling nut (25) as far as it will go onto the coupling (22) and secure with threaded pins (26).



2	Actuator stem
3	Venting plug
4	Loading pressure connection
5	Top diaphragm case
6	Springs
6.1	Additional springs
7	Diaphragm plate
8	Diaphragm
9	Nuts, bolts
10	Bottom diaphragm case
11	Loading pressure connection
12	Stem seal
12.1	Dry bearing
13	Wiper
17	Handwheel
20	Lock nut
21	Flange part
22	Coupling
23	Clamping sleeve
24	Ring
25	Coupling nut
26	Threaded pin
27	Spindle with nut

Fig. 5 · Type 3277 Actuator with additional handwheel

2.2 Adjusting the travel stop

(with Type 3277 in special version only)

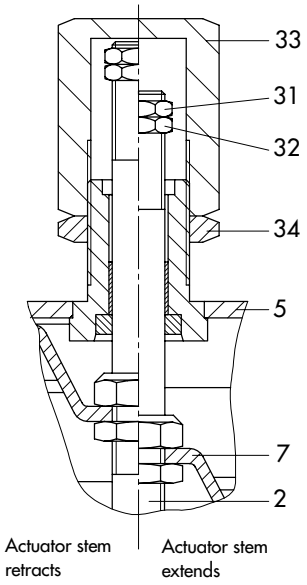
The travel stop can be adjusted upwards or downwards to 50% of the travel.

Downward travel stop
(actuator stem extends)

1. Undo the lock nut (34) and unscrew the cap (33).
2. Undo the lock nut (31) and adjust the nut (32) to set required travel stop.
3. Tighten the lock nut (31) again.

Upward travel stop
(actuator stem retracts)

1. Undo the lock nut (34) and adjust the cap (33) to set the required travel stop.
2. Tighten the lock nut (34) again.



2 Actuator stem
5 Top diaphragm case
7 Diaphragm plate
31 Lock nut
32 Nut
33 Cap
34 Lock nut

Fig. 6 · Travel stop

3 Replacing the diaphragm and actuator stem seal

3.1 Diaphragm

(Fig. 3)

1. Proceed as described in section 2.1 to take the diaphragm plate (7) with diaphragm (8) and actuator stem (2) out of the diaphragm case.
2. Remove the hose clamp and pull it together with the diaphragm (8) off the diaphragm plate (7) (not necessary with Type 3277-5 as the diaphragm is held in place by the metal plate (7.1)).
3. Stretch the new diaphragm onto the diaphragm plate. Insert the hose clamp evenly into the groove intended for it and tighten.
4. Reassemble actuator as described in section 2.1.

3.2 Replacing the seal

1. Take the diaphragm plate (7) with the actuator stem (2) out of the diaphragm case as described in section 3.1.
2. Coat the new shaft seal with lubricant/sealant (order no. 8152-0043) and insert it.
3. If necessary, replace the dry bearing (12.1) and wiper (13) with new ones as well.
4. Reassemble the actuator as described in section 2.1.

4 Customer inquiries

Please indicate the following:

- Type and product number
- Effective diaphragm area
- Bench range (signal pressure range) (in bar)
- Actuator version – operating direction

Dimensions

Refer to the Data Sheet T 8311 EN for dimensions and weights of the actuator versions.

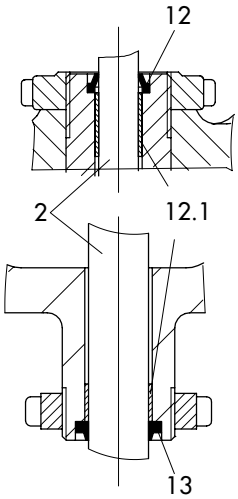


Fig. 7 · Actuator stem seal

SAMSON AG · MESS- UND REGELTECHNIK
Weismüllerstraße 3 · 60314 Frankfurt am Main · Germany
Phone: +49 69 4009-0 · Fax: +49 69 4009-1507
Internet: http://www.samson.de

EB 8311 EN

S/Z 2004-05

Pfeiffer
Chemie-Armaturenbau GmbH

Installation, Maintenance & Repair Procedures
Series 10z

I. Introduction

A. Historical Experience

Based on over thirty years experience in the butterfly industry, Bray can state without question the majority of all field problems for butterfly valves are directly related to poor installation procedures. For this reason, it is very important all distributor salespeople educate their customers regarding proper installation of butterfly valves. In this case, a small amount of education in the beginning can make most butterfly valve installation trouble-free and an easy and enjoyable experience for the piping personnel.

B. Butterfly Valve Seat / Disc Function

Before reviewing the proper installation, maintenance, and repair procedures for butterfly valves, let's discuss the seat-disc function of a butterfly valve. The seat in a resilient-seated butterfly valve, whether like Bray's or hardback in design, generally has molded o-rings on the flange face of the seat. **As a result, no gaskets are required as these o-rings serve the function of a gasket.** Before installation, the flange face and molded o-rings of the seat extend beyond the body face-to-face to ensure sealing at the flange faces. The seat material which extends past the face is compressed in installation and flows toward the center of the valve seat I.D. In essence, the elastomer seat acts as a liquid, and the displaced elastomer moves toward the point of least resistance. As one may recall, the seat I.D. of all resilient-seated butterfly valves is smaller than the disc O.D. This difference, the disc-seat interference, plus the increased interference due to the elastomer movement toward the seat center after installation, has been engineered by all reputable manufacturers so as to be the basis for pressure rating capability and the related seating/unseating torques. **Any change in this interference due to improper installation directly affects the pressure rating and seating/unseating torques.**

Finally, unlike many valve types, the butterfly valve's disc actually extends beyond the face of the valve body at given angles of opening (say, 30° or more) when installed between flanges. **Therefore, it is very important before installation to ensure the critical chord dimension of the disc at the full open position is less than the adjacent pipe flange I.D.**

Given this brief discussion on the butterfly valve seat and disc, the following is a discussion of recommended procedures to ensure proper installation and maintenance of Bray butterfly valves.

II. Shipment & Storage

A. The seat, disc, stem, and bushing of the butterfly valve should be coated with silicone lubricant as recommended by Bray Technical Bulletin 1028.

B. The disc should be positioned at 10° open.

C. The faces of each valve should be covered with cardboard, plywood, plastic plates, etc. to prevent damage to the seat face, disc edge, or butterfly valve interior.

D. Valves should be stored indoors with face protectors intact. Temperature should preferably be 40°F to 85°F.

E. When valves are stored for a long time, open and close the valves once every 3 months.

F. Ship and store valves so that no heavy loads are applied to the bodies.

III. Installation Considerations - Piping and Valve Orientation and Placement

A. Piping and Flange Compatibilities

The Series 20, 21, 30, 31, and 34 butterfly valves have been designed to be suitable for all types of ANSI 125/150 flanges, whether flat-faced, raised face, slip-on, weld-neck, etc. (Type C stub-end flanges conform to no standard for the flange face and are not recommended for use with resilient-seated butterfly valves.) These valves have been engineered so that the critical disc chord dimension at the full open position will clear the adjacent inside diameter of most types of piping, including Schedule 40, lined pipe, heavy wall, etc. If in question, one should compare the minimum pipe I.D. with the published disc chord dimension at full open.

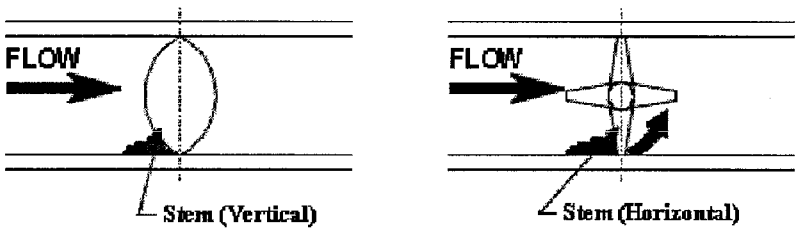
B. Valve Location and Orientation in Piping

1. Valve Location

a. Butterfly valves should be installed if possible a minimum of 6 pipe diameters from other line elements, i.e., elbows, pumps, valves, etc. Of course, 6 pipe diameters are not always practical, but it is important to achieve as much distance as possible.
b. Where the butterfly valve is connected to a check valve or pump, use an expansion joint between them to ensure the disc does not interfere with the adjacent equipment.

2. Valve Orientation

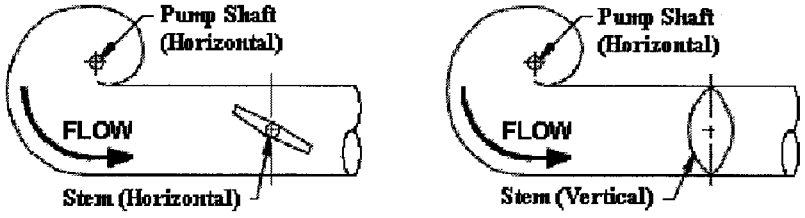
a. In general, Bray recommends the valve be installed with the stem in the vertical position and the actuator mounted vertically directly above the valve; however, there are those applications as discussed below where the stem should be horizontal. Valves should not be installed upside down.
b. **For slurries, sludge, mine tailing, pulp stock, dry cement, and any media with sediment or particles, Bray recommends the valve be installed with the stem in the horizontal position with the lower disc edge opening in the downstream direction.**



INCORRECT INSTALLATION CORRECT INSTALLATION

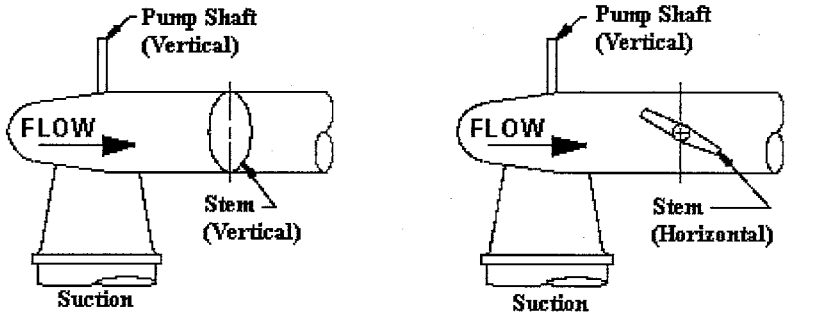
c. Butterfly valve located at the discharge of a pump should be oriented as follows:

i.) For Centrifugal Pump - Pump shaft horizontal and stem vertical



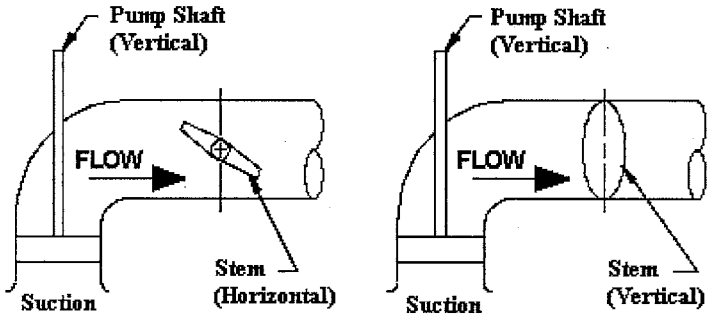
INCORRECT INSTALLATION CORRECT INSTALLATION

ii.) Centrifugal Pump - Pump shaft vertical & stem horizontal



INCORRECT INSTALLATION CORRECT INSTALLATION

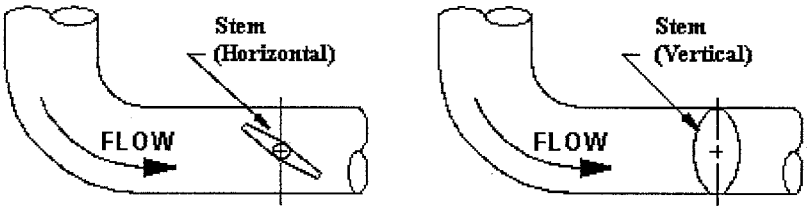
iii.) Axial Pump - Pump shaft vertical & stem vertical



INCORRECT INSTALLATION CORRECT INSTALLATION

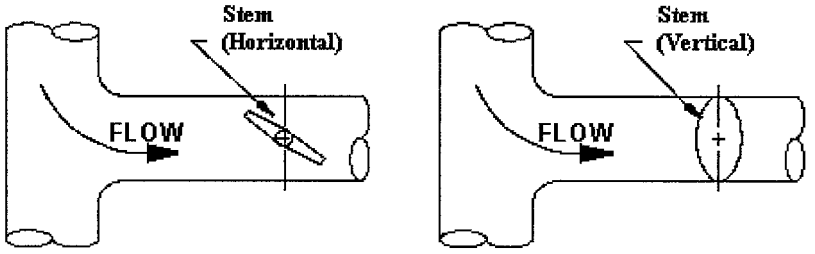
d. Butterfly valves located downstream of a bend or pipe reducer should be oriented as follows:

i.) Bend



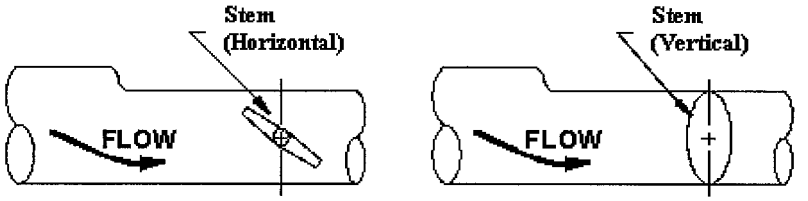
INCORRECT INSTALLATION CORRECT INSTALLATION

ii.) Tee



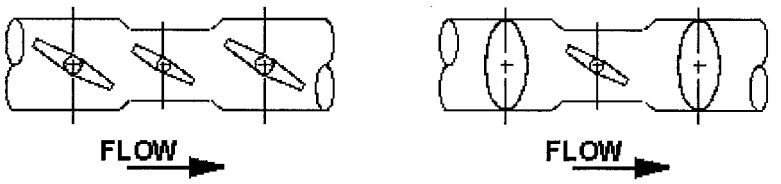
INCORRECT INSTALLATION CORRECT INSTALLATION

iii.) Pipe Reducer



INCORRECT INSTALLATION CORRECT INSTALLATION

e. Butterfly valves in combination for control/isolation applications should be installed as follows:



INCORRECT INSTALLATION CORRECT INSTALLATION

Combination with all valve stems in the same direction accelerates possible noise, vibration, & erosion problems.

Combination with the stem of the control valve at right angle to those of other valves tends to cancel the drift of the fluid, and reduces noises, vibration, and erosion

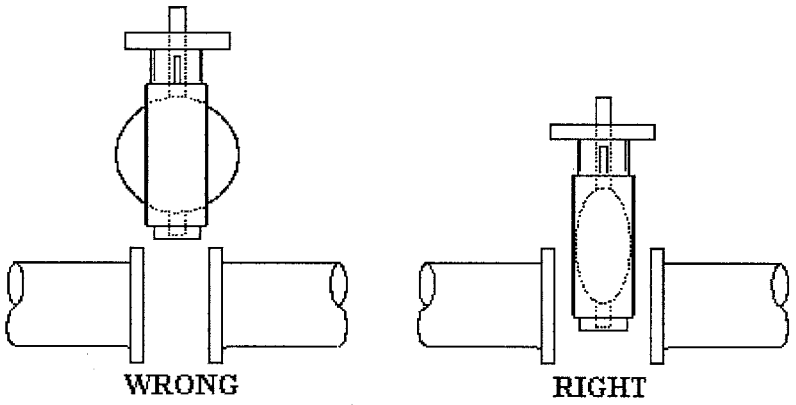
IV. Installation Procedure

A. General Installation

1. Make sure the pipeline and pipe flange faces are clean. Any foreign material such as pipe scale, metal chips, welding slag, welding rods, etc., can obstruct disc movement or damage the disc or seat.
2. The Bray elastomer seat has molded o-rings on the face of the seat. **As a result, no gaskets are required as these o-rings serve the function of a gasket.**

3. Align the piping and then spread the pipe flanges a distance apart so as to permit the valve body to be easily dropped between the flanges without contacting the pipe flanges *(see figure 1 below)*
4. Check to see that the valve disc has been positioned to a partially open position, with the disc edge about 1/4" to 3/8" from the face of the seat, approximately 10° open *(see figure 1 below)*
5. Insert the valve between the flanges as shown below, taking care not to damage the seat faces. Always pick the valve up by the locating holes or by using a nylon sling on the neck of the body. Never pick up the valve by the actuator or operator mounted on top of the valve.

Figure 1 - Insert Butterfly Valve Between Flanges



Pipe not spread, disc opened beyond valve body face; Results; Disc edge damaged when it hits pipe flange.

Pipe spread and aligned, disc rotated; Results; no undesirable beginning seating/unseating torque, disc edge protected.

6. Place the valve between the flanges, center it, and then span the valve body with all flange bolts, but do not tighten the bolts. Carefully open the disc to the full open position, making sure the disc does not hit the adjacent pipe I.D. Now systematically remove jack bolts or other flange spreaders, and hand-tighten the flange bolts as shown in Figure 2. Very slowly close the valve disc to ensure disc edge clearance from the adjacent pipe flange I.D. Now open the disc to full open and tighten all flange bolts per specification as shown in Figure 2. Finally, repeat a full close to full open rotation of the disc to ensure proper clearances *(See figures 3 & 4 below)*.

Figure 2 - Recommended Bolt Tightening Sequence

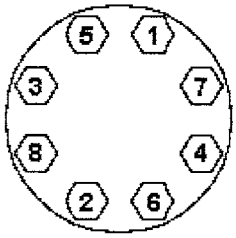
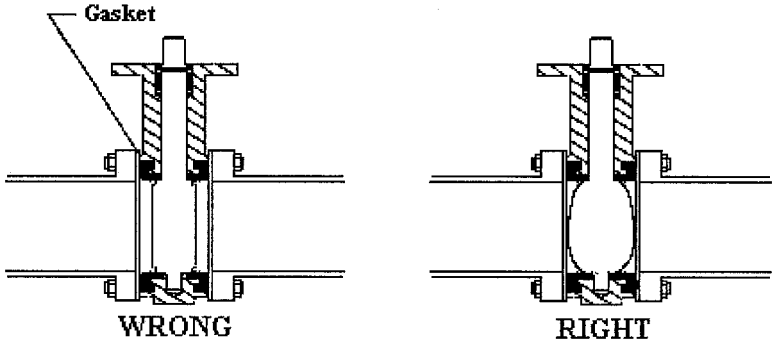


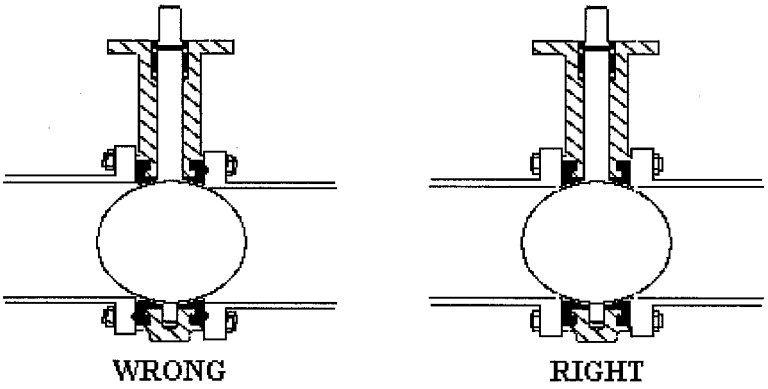
Figure 3 - Initial Centering & Flanging of Valve



Disc in closed position; gaskets used; Results - Seat distorted and over-compressed causing high initial unseating torque problems.

Bolts spanned, disc edge within body face-to-face, no flange gaskets; Results - No disc edge damage, proper sealing allowed.

Figure 4 - Final Aligning & Tightening of Flange Bolts



Piping misaligned; Results Disc O.D. strikes pipe I.D. causing disc edge damage, increased torque & leakage. Seat face o-rings seal improperly without engagement.

Piping aligned properly when bolts tightened, disc in full open position; Results - disc clears adjacent pipe I.D., seat face seals properly, no excessive initial torque.

B. Installation with Flange Welding

When butterfly valves are to be installed between ANSI welding type flanges, care should be taken to abide by the following procedure to ensure no damage will occur to the seat:

1. Place the valve between the flanges with the flange bores and valve body aligned properly. The disc should be in the 10° open position.
2. Span the body with the bolts.
3. Take this assembly of flange-body-flange and align it properly to the pipe.
4. Tack weld the flanges to the pipe

5. When tack welding is complete, remove the bolts and the valve from the pipe flanges and complete the welding of the flanges. Be sure to let the pipe and flanges cool before installing the valve.

NOTE: Never complete the welding process (after tacking) with the valve between pipe flanges. This causes severe seat damage due to heat transfer.

V. Maintenance and Repair

The many Bray features minimize wear and maintenance requirements. No routine lubrication is required. **All components - stem, disc, seat, bushing, stem seal, etc., are field replaceable, no adjustment is required.** If components require replacement, the valve may be removed from the line by placing the disc in the near closed position, then supporting the valve and removing the flange bolts.

VI. Disassembly and Assembly

A. Disassembly

1. **Series 20/21** - Remove handle, manual gear box or actuator form actuator mounting flange. Remove the body bolts and pull the lower body half away from the seat. Pull the seat and disc stem from the upper body half. Remove bushing and seal from the upper body. Push the seat into an oval shape and remove the disc stem by withdrawing the short stem end first.
2. **Series 30/31/34** - Remove the handle, gear operator, or actuator from actuator mounting flange. Remove the "Spirolox"® retaining ring and the two C-ring stem retainers from the stem hole, then remove the stem, bushing and seal. Remove the disc from the seat, protecting disc edge at all times. Push the seat into an oval shape , then remove the seat from the body.

B. Assembly

1. **Series 20/21** - Push the long stem end of the disc stem into the seat, then push the seat over the disc stem short stem. Place the disc stem and seat into the upper body half. Align the lower body bolt lugs with the upper body lugs and position lower body in the seat. Replace the body bolts and tighten. Install the stem seal, then the stem bushing. Replace handle, manual gear box or actuator on the actuator mounting flange. Note: The body halves have a matching casting node on one side only to ensure correct assembly of body halves.
2. **Series 30/31/34** - Push the valve seat into an oval and push it into the body with seat stem holes aligned to body stem holes. Insert stem seal and bushing. Push stem into the stem hole of body until the bottom of the stem is flush with the inner top edge of the seat. Install a light coating of silicone or grease on the I.D. of seat. Insert the disc into the seat by lining up the disc hole with the stem hole of the seat. Note: The broached double "D" flats in the disc must be toward the bottom of the valve body. With a downward pressure and rotating the stem back and forth, push the stem until the stem touches the bottom of the body stem hole. Make certain that when pushing stem through disc bottom, the broached flats of stem and disc are aligned. Replace the stem bushing and two stem retainers, then replace the "Spirolox"® retaining ring back into position.

For your special requirements please contact our technical sales department.

Pfeiffer Chemie-Armaturenbau GmbH

Hooghe Weg 41 • 47906 Kempen
Telefon: +49 21 52 20 05 - 0 • Telefax: +49 21 52 15 80
E-Mail: vertrieb@pfeiffer-armaturen.com • Internet: www.pfeiffer-armaturen.com

Values subject to change

PDF=472

Pfeiffer
Chemie-Armaturenbau GmbH

Operating, assembly and maintenance instructions for ball valve in stainless steel

Series 76a

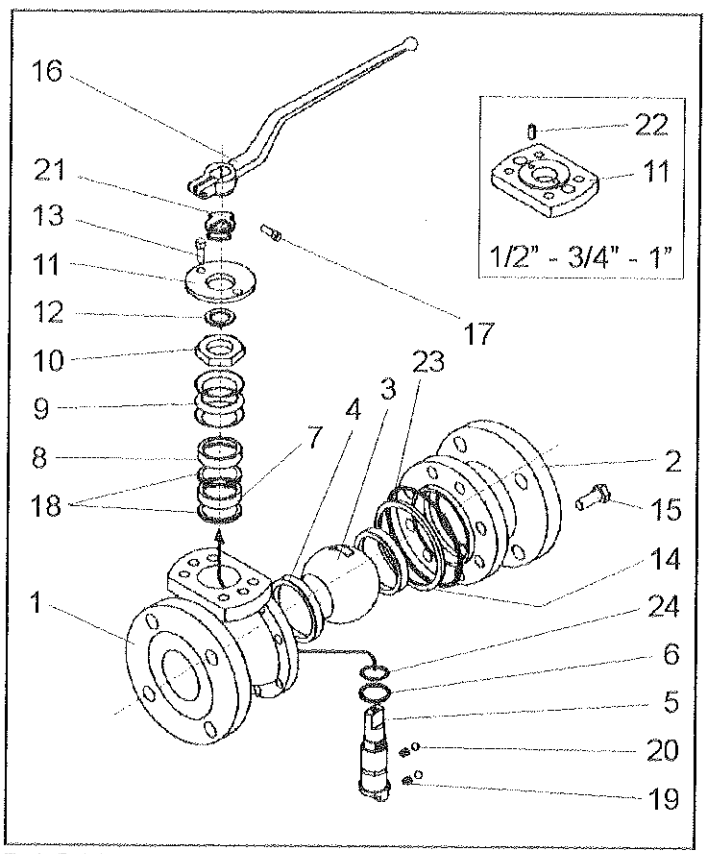


Fig. 1 - Exploded view of the ball valve

Pos.	Description	Materials Steel-Version	Materials Precious Steel Version
1	Body	A 216 WCC	A 351 CF8M
2	Adaptor	A 216 WCC	A 351 CF8M
3	Ball	A351 CF8M	
4	Seat	PTFE	
5	Stem	AISI 316	
6	Thrust washer	PTFE with Glass	
7	Packing ring	Graphit	
8	Gland packing	AISI 316	
9	Spring washer	AISI 301	
10	Stem nut	AISI 303	
11	Cover	A 619	AISI 316
12	Cover ring	PTFE	
13	Cover bolt	8.8	A4-70
14	Body seal 1	Graphit	
15	Body bolt	B7M	
16	Handle	A 619	
17	Handle bolt	8.8	
18	Packing washer	PTFE with Carbon	
19	Spring washer	AISI 302	
20	Ball	AISI 316	
21	Stop plate	1045	
22	Stop pin	Stahl / Acero	
23	Body seal 2	Buna	
24	O-ring-stem	Buna	

Table 1 - List of parts

Assembly instructions

Preparation for assembling the ball valve

To assemble the ball valve, all parts must be treated beforehand, e.g. thoroughly clean all parts and lay them on soft padding (rubber mat etc.). Take into account that parts made of plastic are almost always soft and very sensitive and that especially the sealing surfaces should not be damaged.

Assembling the ball valves

Caution: The position and arrangement of the individual parts shown in the exploded view diagram (Fig.1) must be strictly adhered to on assembling the valve.

Clean the Adaptor (2) and main body (1) with compressed air.
Insert the sealing ring (4) in the main body (1).

Insert the PTFE bearing bushing (6) and the O-ring (24) into the main body at the shaft entry. Push the control shaft (5) into the slot on the ball (3) to check whether it fits. Then push it as far as it will go onto the bearing bushing (6) and put the ball into the main body. Center the ball by lightly rocking the shaft. Put the PTFE rings of the body sealing (14 + 23) into the main body.

Place the second sealing ring (4) of the sealing unit into the side body (2). Then place the preassembled side body onto the main body and position it using hexagon screws (15) which have been lightly greased. Tighten the screws evenly in a criss-cross pattern.
Push the Packing (7 + 8 + 18) over the shaft into the body hole and press them in with a assembly sleeve.

Place likewise the set of spring washers (9) according to the diagram over the control shaft onto the packing.

Preloaded packing by the Stem nut (10).

Insert the bearing bushing (12) into the cover (11).

Place the preassembled cover (11) carefully on the body and position correctly using the fillister head screws (13).

Tighten the screws evenly in a criss-cross pattern.

Pfeiffer
Chemie-Armaturenbau GmbH

Operating, assembly and maintenance instructions for AT – Quarter-Turn Actuator Type SRP and DAP
Series 31a

Fig. 1 - AT-quarter-turn actuator

1. Fail safe position

Fail safe to close:
Spring to close (only SRP), (clockwise)

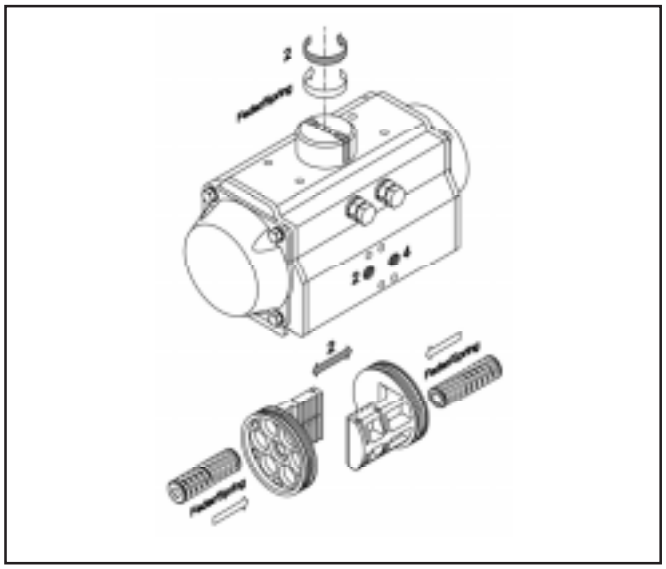


Fig. 2 - Spring to close

The standard model of the AT-actuators will be mounted in direction of the media flow from the valve.

Way of turning: By pressure an port ”2” the drive shaft turns from start position ”close” into the end position ”open” anticlockwise. In case of pressure fall on port ”2” the drive shaft turns clockwise into the start position ”close” (only SRP). The delivery will be in start position.

Important: By mounting diagonal to the flow from the valve, pay attention for the correct position of the indicator (Must be turned about 90°, see manual)!

Fail safe to open:
Spring to open (only SRP), (anticlockwise)

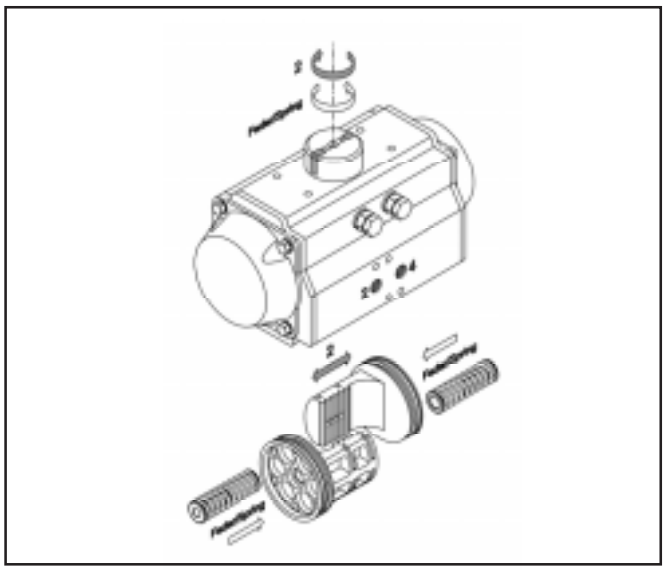


Fig. 3 - Spring to open

If the drive shaft has to turn during the opening of the valve clockwise, the pistons have to be mounted as shown in figure 3.

Way of turning: The drive shaft turns from start position ”open” info the end Position ”close” clockwise. The delivery will be in start position.

Change of operation / fail position:

Detailed instructions in chapter 5.

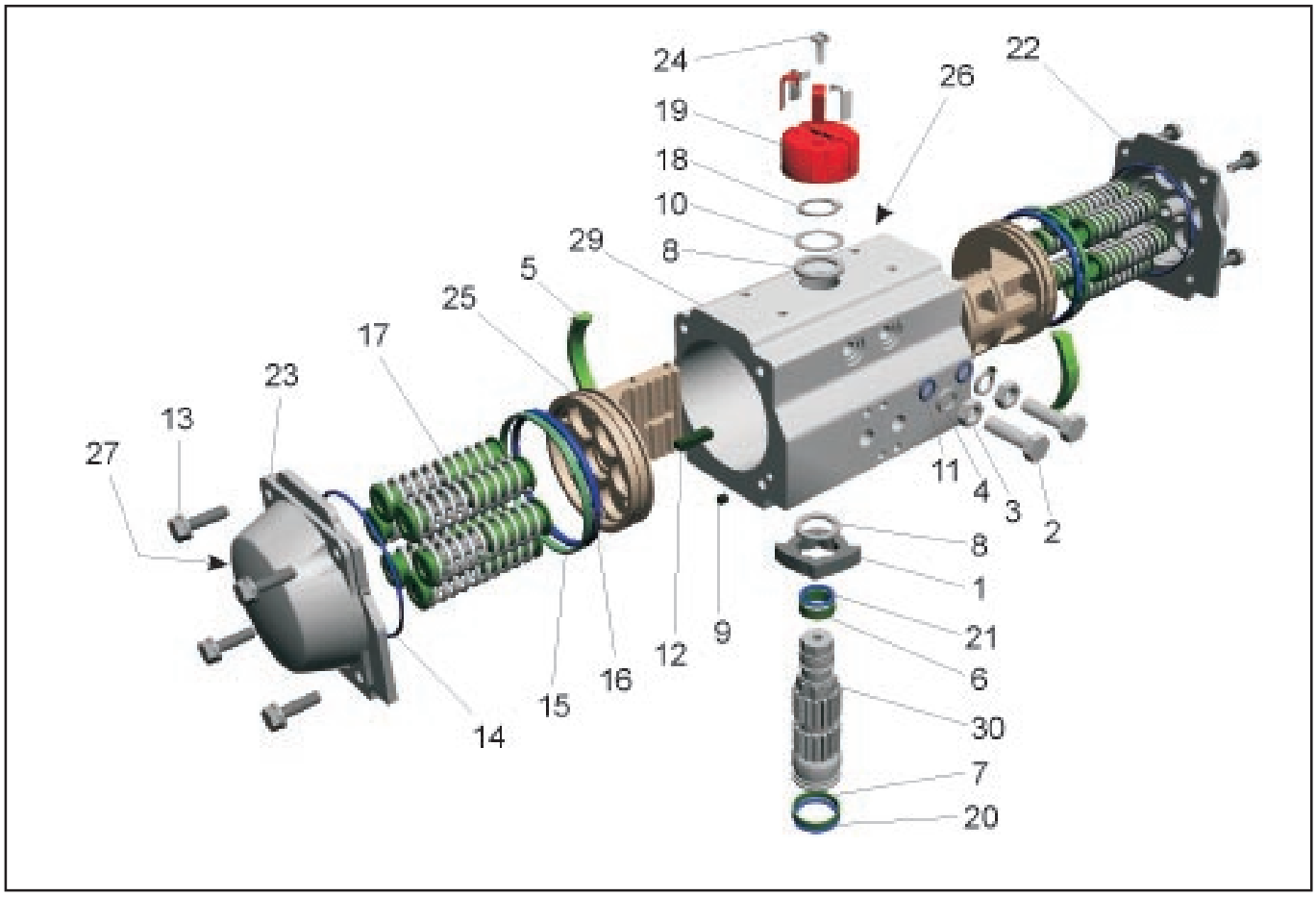


Fig. 4 - Cross-sectional drawing

Pos.	Pcs.		Material
1	1	Octi-cam (Stop arrangement)	1.4021 / GS400-15
2	2	Stop cap screw	B8 Cl.2
3	2	Nut	A2
4	2	Washer	A2-70
5*	2	Bearing (Piston back)	PPA
6*	1	Bearing (Pinion top)	PA 46
7*	1	Bearing (Pinion bottom)	PA 46
8*	2	Thrust bearing	PPA
9*	2	Plug	NBR
10	1	Thrust washer	1.4301
11*	2	O-Ring (Stop cap screw seal)	NBR
12	2	Piston guide	PPA+45%GF
13	8 / 12 / 16	Cap srew	A2-70
14*	2	O-Ring (End cap)	NBR
15*	2	Bearing (Piston Head)	PPA
16*	2	O-Ring (Piston)	NBR
17	4 - 12	Spring cartridge	SiCr Spring alloy steel
18	1	Spring clip	C 75
19	1	Position indicator	PP+30%GF
20*	1	O-ring (Pinion top)	NBR
21*	1	O-ring (Pinion bottom)	NBR
22	1	Right end cap	GD-AlSi8.5Cu3.5Fe
23	1	Left end cap	GD-AlSi8.5Cu3.5Fe
24	1	Cap screw (Indicator)	A2-70
25	2	Pistons	GD-AlSi8.5Cu3.5Fe
26	1	Identification Label	Polyester Aluminium
27	2	Label (End cap)	Polyester Aluminium
28	1	Spigot	Alloy 6082
29	1	Body	Alloy 6083
30	1	Drive shaft	A 105

Table 1 - Parts list

* = Spare part

2. Working Conditions and technival data

General:

This instruction manual contains important Information regarding the Installation, operation, maintenance and storage for AT rack and pinion pneumatic actuators. Please read these instructions carefully and save them for future reference. It Is important that only properly trained personnei disassemble / assemble the actuator.

The equipment may only be assembled and started-up by qualified personnel who are familiar with the assembly, start-up and operation of this product. Qualified personnel in the sense of these installation and operation instructions are persons who, as a result of their technical training, knowledge and experience plus their knowledge of the relevant standards, are able to assess their designated tasks and to recognize potential dangers.

Dangers which can occur at the control valve from the flow medium, the pressure drop and from moving parts, are to be avoided through appropriate measures. Additionally, it has to be ensured that the control valve is only employed where the operating pressures and temperatures do not exceed the design criteria upon which the order was placed. Appropriate transportation and proper storage of the equipment are a prerequisite.

Safety Notice:

- It is important that the actuator should only be used within pressure limits Indicated in our technical specifications.
- Operating the actuator over pressure limits will damage internal parts as well as cause damage to the housing.
- Operating the actuator over temperature limits will damage internal and external components (disassembly of spring return actuator may become dangerous).
- Operating the actuator in corrosive environments with incorrect protection may damage the internal and external parts.
- Do not disassemble individual spring cartridges. Disassembly may result In personal injury. For further Information contact Pfeiffer.
- Isolate all air lines and make sure that actuator air connection is vented before Installation or servicing of the actuator.
- Do not remove end caps or disassemble the actuator while the actuator is pressurised.
- Before Installing onto a valve make sure that the rotation of the valve and the actuator are the same and that the position indicator orientation is also correct.
- If the actuator is incorporated in a system or used within safety devices or circuits, the customer shall ensure that the national and local safety laws and regulations are observed.

Operating media:

Dry or lubricated air or inert / non-corrosive gases provided they are compatible with internal actuator parts and lubricant. The operating media must have a dew point equal to –20°C (-4°F) or at least 10°C below the ambient temperature. The maximum particle size must not exceed 30 µm.

• Supply pressure:

The maximum supply pressure is 8 bar (116 PSI).
Generally for Double Acting and Spring Return actuator the supply pressure is: from 2,5 bar (36 PSI) minimum to 8 bar (116 PSI) maximum.

• Operating Temperature:

Standard product: from -20°C (-4°F) to 80°C (+176°F).
Low temperature LT actuator with silicon O-rings from -40°C (-40°F) to 80°C (+176°F).
High temperature HT actuator with FPM O-rings from –15°C (+5°F) to +150°C (+300°F)

Caution: For low and high temperature service, special grease is required. Please contact Pfeiffer for each application. High and low temperature will vary the output torque of the actuator.

Operating Time:

See Technical Data Sheet.

Caution: The operating speeds depend an several factors such as: supply pressure / supply capacity (i.e. pipe diameter / flow capacity or pneumatic accessory), valve type. valve torque and characteristics, what safety factor is to be applied, frequency of operation and temperature.

Stroke:

The stroke for Pfeiffer actuators are as follows (See technical data):

Standard construction:	90° rotation with stroke adjustment at 0° and 90° + or - 4°
Type 120° stroke:	120° rotation with stroke adjustment at 0° and 120° + or – 4°
Type 180° stroke:	180° rotation with stroke adjustment at 0° and 180° + or – 4°

Lubrication:

The actuators are factory lubricated for the life of the actuator in normal working conditions. The standard lubricant is suitable for use from –20°C (-4°F) to +80°C (+176°F). For low (LT) and high (HI) temperature service, where special grease is required please contact Pfeiffer.
Recommended Pfeiffer actuator lubricants for standard working conditions:
- Kluber Unigear LAO2
- Esso (Exxon) Beacon EP2
- Fino Marson EP 12
- Shell Alvania EP2
- Mobilux EP2

Construction:

Rock and pinion actuator design suitable for both indoor or outdoor installations.

Protection and Corrosion resistance:

Ensure actuators are supplied with corrosion protections for normal environments. For severe duties select the protection required for corrosion protection. See technical data sheet before installing actuators.

Actuator designation and Marking:

The actuator type, size, operating pressure, output torque, direction of rotation, orientation of failure mode, operating temperature and drive type are determined by actuator designation. Pfeiffer actuators are supplied with a label showing all of this Information: type, model (Including protection and if applicable the LT or HT for operating temperature), stroke, maximum permissible supply pressure, direction of rotation, output torque, ancillary attachment, pressure connection, valve actuator attachment and serial number.

Operating Funktion and Direction of Rotation:

The actuator is a pneumatic operator for remote actuation of valves. The operation (90°, 120° or 180° rotation) may be connected by different methods:

- Direct mounting of solenoid valves (5/2 for double acting, 3/2 for spring return) to pressure connections ”2” and ”4”.
- Screwed connection (to pressure connections ”2” and ”4”) with air lines from separate control cabinet.
- The standard rotation is clockwise to close, counter-clockwise rotation is obtained when part ”2” is pressurised.
- For actuator marked LF the rotation is counter-clockwise to close, clockwise rotation is obtained when port ”2” is pressurised.

3 Actuator Installation Instructions

The AT actuator is a pneumatic device for the remote operation of industrial valves. The AT-actuator will operate through 90°, the option is available for 120° or 180° of rotation permitting the opening and closing of many types of 1/4 turn valves.

All the necessary technical Information to install the actuator correctly and safely onto a valve i.e. Dimensions, Output torque, Air volume, Stroke Adjustment, Operating time, Operating temperature, Direction of rotation and Weight is stated clearly an the Actuator label, In the catalogue and technical data sheets, Please read this technical Information carefully before proceeding with the actuator Installation.

Double Acting Operation function (standard rotation) Top View:

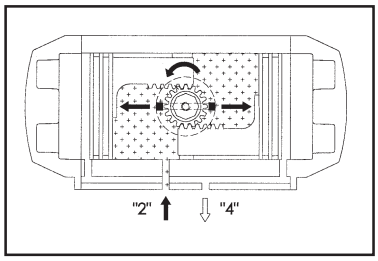


Fig. 5

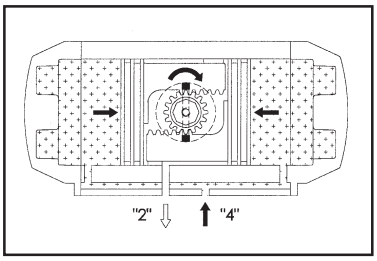


Fig. 6

Air supplied to port ”2” (Fig. 5) forces the pistons apart and toward end positions, with exhaust air exiting at port ”4”, a counter-clockwise is obtained.

Air supplied to port ”4” (Fig. 6) forces the pistons together with exhaust air exiting at port ”2”, a clockwise rotation is obtained.

Single Acting operation function (standard rotation)Top View:

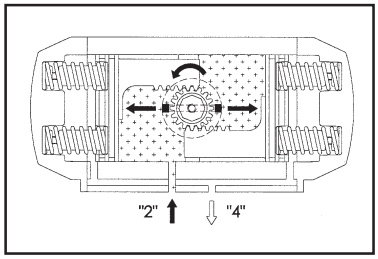


Fig. 7

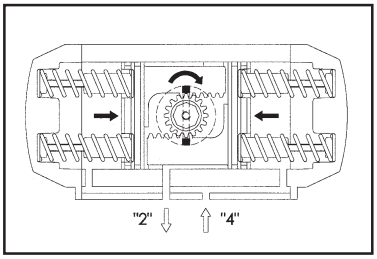


Fig. 8

Air supplied to port ”2” (Fig. 7) forces the pistons apart and toward end positions. compressing the springs with exhaust air existing at port ”4”,a counter clockwise rotation is obtained.

On loss of air pressure (air or electric failure) at port ”2” (Fig. 8) allow the springs to force the pistons to the centre position with exhaust air exiting at port ”2” clockwise rotation is obtained.

Important safety Notice:

- The actuator must not be pressurized at any time during Installation as injury may result.
- The utmost cleanliness is required during air supply connection to the actuator i.e. the connecting pipe thread, fittings and seals must be clean and dirt-free.
- When fitting accessories onto the actuator assemble them in such a way that the top of the drive shaft is easily accessible should manual Operation of the actuator be required.
- Before fitting onto the valve make sure that the actuator / valve are correctly orientated, depending upon which direction of rotation is required.

Controls and connections:

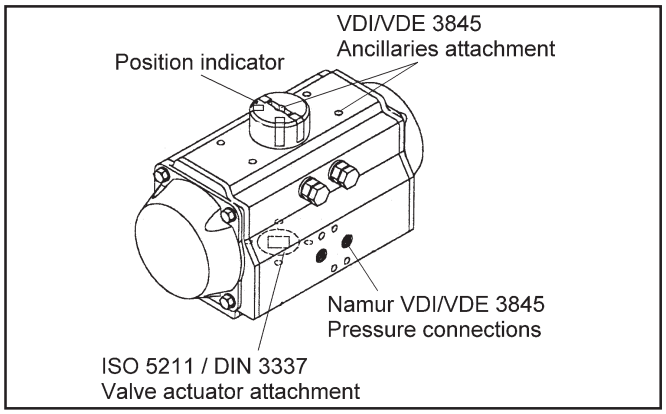


Fig. 9 - Connections

Assembly of accessories:

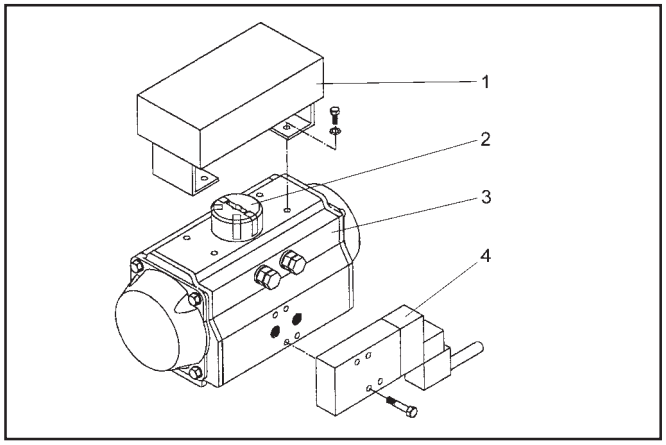


Fig. 10 - Assembly of accessories

- Solenoid valve mounting:
  Before mounting a Solenoid valve ensure that the actuator is in its normal position (closed Position) pistons together: For Standard assembly and rotation (Clockwise to close): the groove an the Indicator (2) must be diagonal to the longitudinal axis of the actuator in the closed position. Fit the solenoid valve (4) onto the actuator (3) using the screws provided (max. tightening torque see the table below).

- Switchbox mounting:
  Fit the switchbox and bracket (1) torque see the onto the actuator (3), using four screws provided (max. tightening see the table below).

Screw	M5	M6	M8	M10	M12	M14	M16	M20	M24
Tightening torque table in Nm	5 up to 6	10 up to 11	23 up to 25	48 up to 52	82 up to 86	132 up to 138	200 up to 210	390 up to 410	675 up to 705

Table 2 - Tightening torque table:

Assembly of Valve:

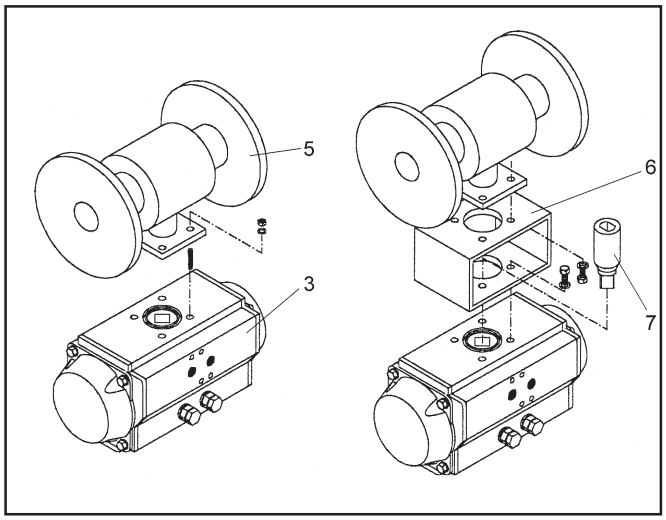


Fig 11 - Assembly of Valve

Before proceeding with the assembly of a valve onto an actuator be sure that the actuator operates in the desired direction of rotation and both actuator / valve are correctly orientated.

Important: When using a spring return actuator for a fall safe operation, ensure that when air or electricity failure occurs the direction of rotation is correct for your application.

Fit the valve (5) onto the actuator (3). Ensure that the actuator is in normal position (closed Position).

There are two types of valve assembly onto the actuator:

- Direct-mount:
  Fit the square of the valve (5) directly into the square of the actuator (3) and bolt together through the valve ISO pad (max. tightening torque see table 2).

- Bracket-mount:
  Mounting with a bracket (6) and coupling (7), the bracket is bolted to the actuator / valve to bin them together and the coupling is used to connect the actuator output drive to the valve stem (max. tightening torque see table 2).

Mounting alternatives:

- Valve mounting with Actuator Type Standard (Clockwise to close)

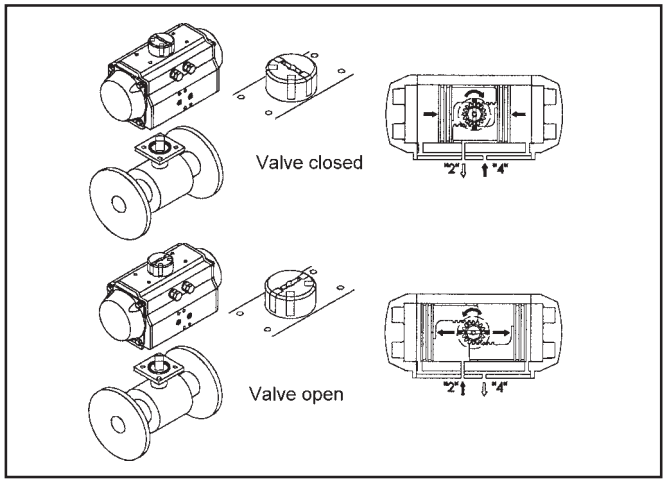


Fig. 12 - Clockwise to close

- Valve mounting with Actuator Type LF (Clockwise to open)

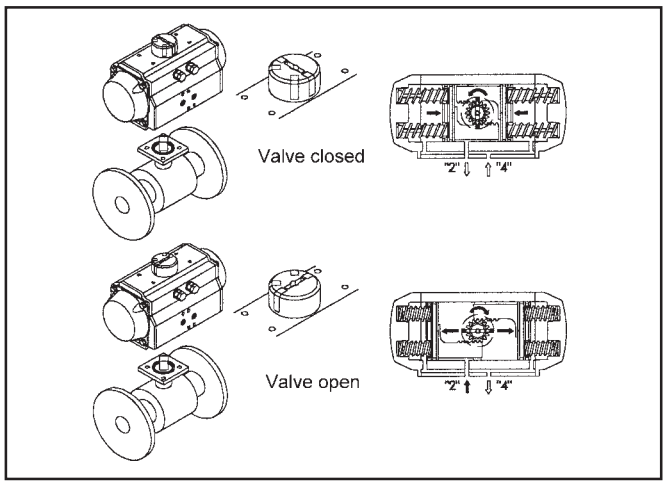


Fig. 13 - Clockwise to open

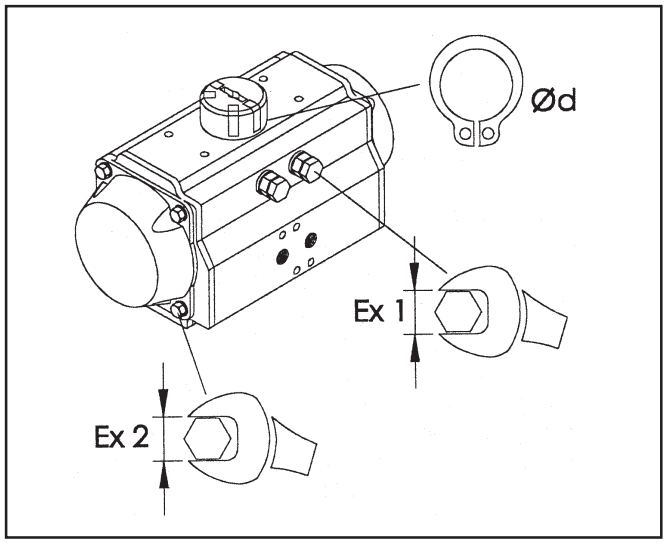


Fig. 14 - Dimensions

Actuator	Ex 1 in mm	Ex 2 in mm	d in mm
DAP / SRP 15	10	8	14
DAP / SRP 30	10	10	16
DAP / SRP 60	13	10	22
DAP / SRP 100	13	10	25
DAP / SRP 150	17	13	26
DAP / SRP 220	19	13	36
DAP / SRP 300	19	17	38
DAP / SRP 450	22	17	45
DAP / SRP 600	22	19	48
DAP / SRP 900	24	19	52
DAP / SRP 1200	30	22	58
DAP / SRP 2000	30	24	68
DAP / SRP 3000	36	22	80
DAP / SRP 5000			

Table 3 - Dimensions

4. Maintenance Instruction

With the Information given below, Pfeiffer provides the end user with all the required Information necessary for maintenance. Under normal operating conditions the actuator requires only periodic observation to ensure proper adjustment.
Rebuilding of the AT-actuators is allowed only to the personnel of Pfeiffer or to personnel which are properly instructed. By contravention the guarantees expires! Spare kits for maintenance are available to replace all seals and bearings (Soft components listed in table) that may be necessary between 500.000 and 1.000.000 cycles depending on operating and / or environmental conditions.

Disassembly:

When disassembly of actuator is required for maintenance, firstly remove the actuator from the valve.

Before performing any disassembly operations it is important to verify that the actuator is not pressurised. Always use caution and double check that the ports ”2” and ”4” are vented and are free from any accessory and / or device. When the actuator is a spring return unit, make sure that the actuator is in the failed position before disassembling.

Removal of position indicator (19):
(Figure 15)
- Remove cap screw (24) if fitted
- Lift position indicator (19) off shaft, it may be necessary to pry gently with a screwdriver.

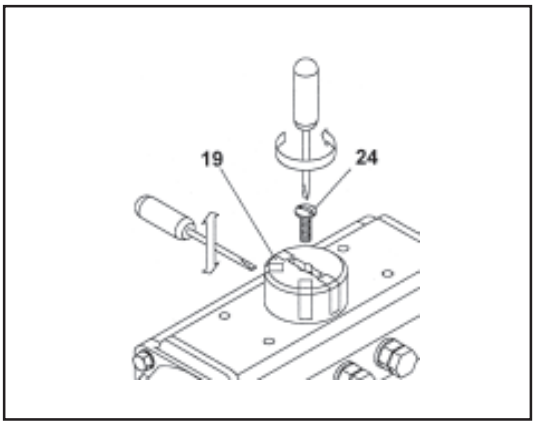


Fig. 15

Removal of stop cap screws (2):
(Figure 16)
- Remove both stop cap screws (2) together with. nut (4) and washer (3)
- Remove stop screw O-rings (11) and discard if replacing all soft parts.

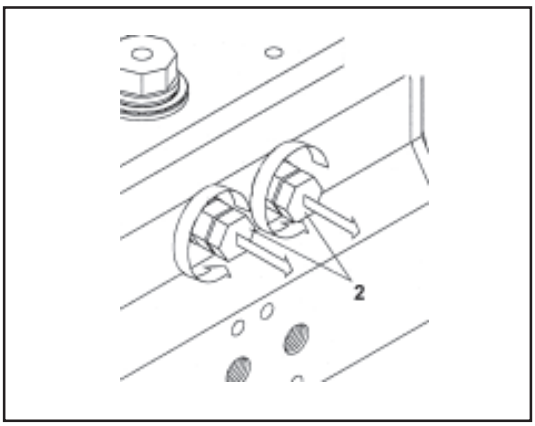


Fig. 16

End Caps disassembly (22 and 23):
(Figure 17)
For model DAP/SRP 900 to DAP/SRP 3000 the 2 end caps (22) are symmetric.
- Remove cap screw (13) in the sequence shown in the figure 17.

Caution: when disassembling a spring return actuator, the end cap (22 and 23) should be loose after unscrewing end cap bolts (13) 4-5turns. If there is still force an the end cap after 4-5 turns of the end cap bolts, this may indicate a damaged spring cartridge and any further disassembly should be discontinued. Further disassembly of the end caps may result in injury. Return actuator to Pfeiffer for further maintenance.

- For spring return actuators, always remove spring cartridge (17).
- Remove end cap O-rings (14) and discard if replacing all soft components.

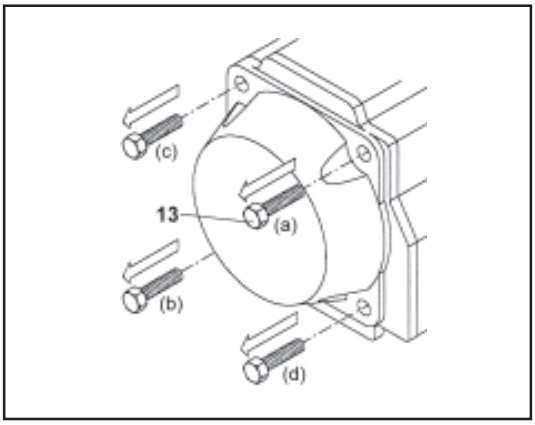


Fig. 17

Pistons disassembly (25):
(Figure 18)
- Holding the body (29) in a vice or similar device, rotate the drive shaft (30) until the pistons (25) are released.

Caution: Air pressure should not be used to remove the pistons from the body.

- Remove piston O-rings (16) using a small screwdriver; remove the piston back (5) and piston head (15) bearings. Discard bearings when replacing all soft components.

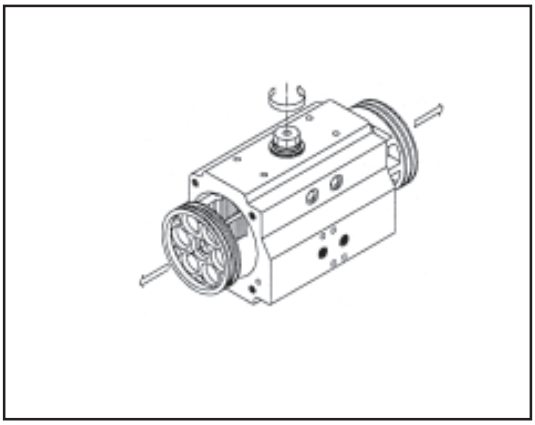


Fig. 18

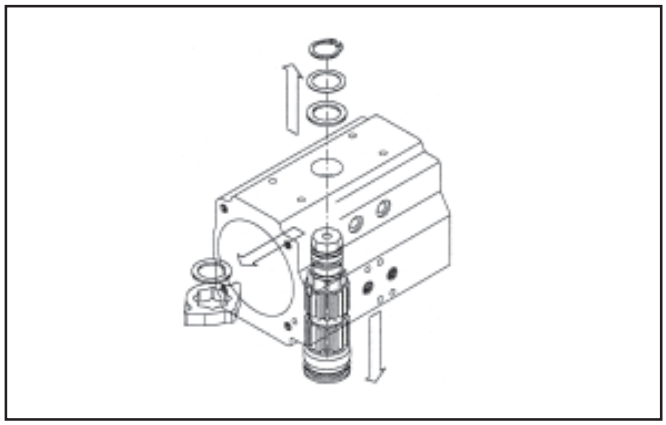


Fig. 19

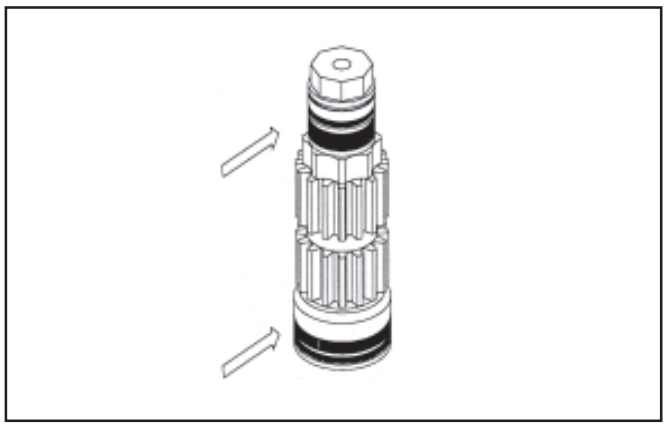


Fig. 20

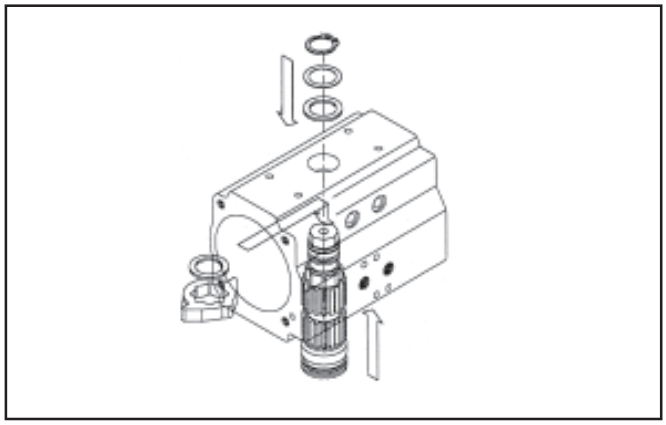


Fig. 21a

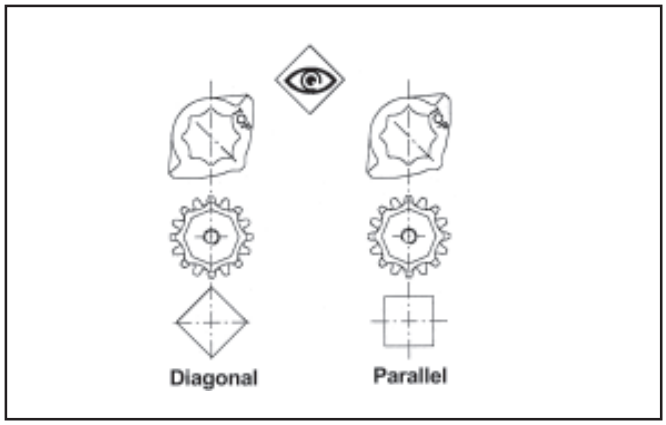


Fig. 21b

Pinion shaft disassembling (30):
(Figure 19)

- Remove spring clip (18) carefully, using nap-ring pliers, remove external thrust bearing (8) and thrust washer (10).
- Apply downward force to top of drive shaft (30) until it is partially out of the bottom of the body when it is possible to remove the octi-cam (1) and internal thrust bearing (8), then push the pinion (30) completely out of the bottom of the body. If pinion does not remove freely gently tap the top of the shaft with a plastic mallet.
- Remove top and bottom pinion bearings (6 and 7) and top and bottom pinion O-rings (21 and 22).
- Discard bearings (6 and 7), internal and external thrust washer (8) and O-rings (21 and 22) if replacing all soft components.

When all component are disassembled, those not being replaced should be properly cleaned and inspected for wear prior to being greased and re-assembled.

Assembly:

Prior to assembly, ensure all components are perfectly clean and free from damage. Please see point 3 for recommended lubricants.

Drive shaft assembly (30):
(Figures 20, 21a and 21b)

- Install top and bottom pinion bearings (6 and 7) and top and bottom pinion O-rings (21 and 22) onto the shaft.
- Grease the outside surface of the drive shaft on top and bottom as shown in figure 20.
- Insert partially the drive shaft (30) in the body (29).
- install octi - cam (1) in the correct position as shown in figure 21 related to the bottom and top of the drive shaft and the rotation of the actuator when energised and install internal thrust bearing (8). Insert completely the drive shaft in the body.
- Fit external thrust bearing (8), thrust washer (10) and then external circlip (18) using snap ring pliers.

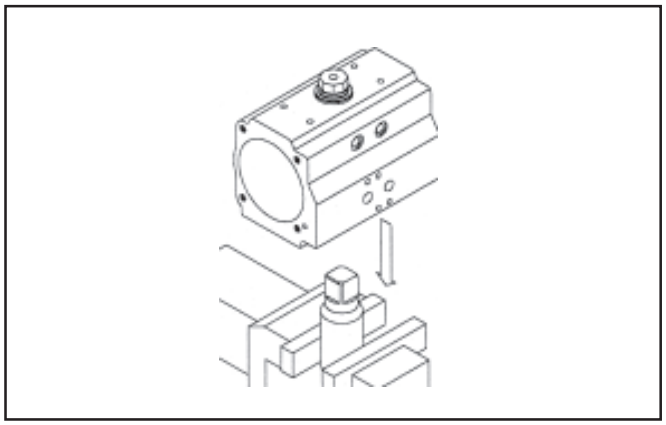


Fig. 22

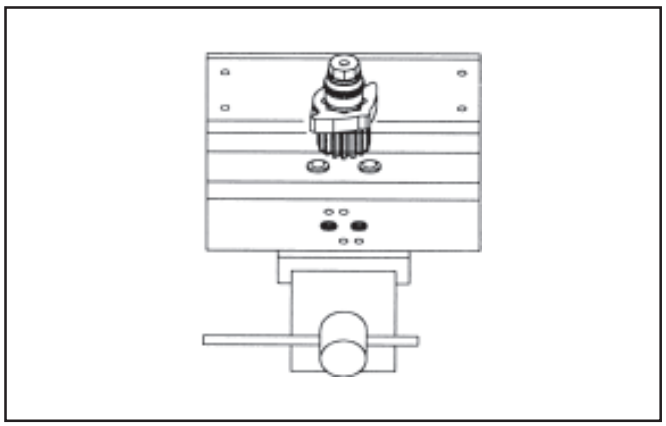


Fig. 23

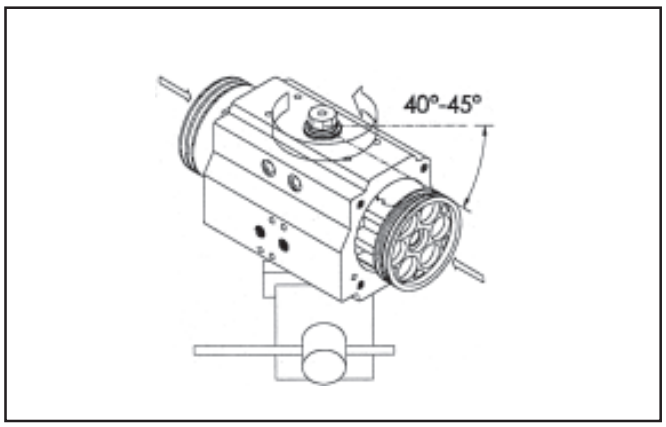


Fig. 24a

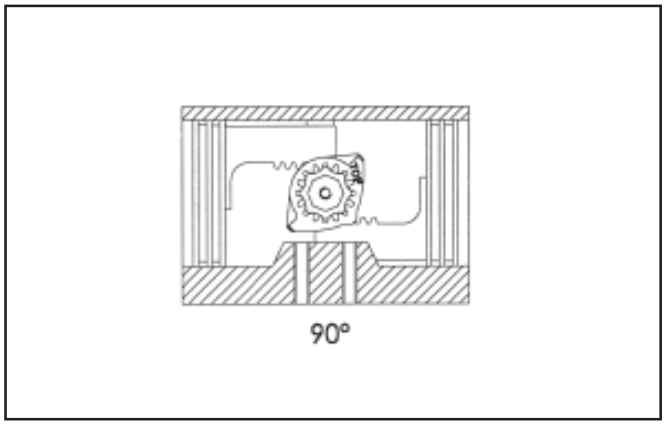


Fig. 24b

Pistons assembly (25):
(Figures 22, 23, 24a, 24b and 25)

- Install piston O-rings (16), the Piston skirt (5) and piston head (15) bearings.
- Grease the internal surface of the body (29) and the piston (25) rack teeth.
- Hold the body (29) in a horizontal position by inserting the top of the shaft into a vice or the bottom of the shaft connection into a male drive fitted in a vice as shown in figure 22.
- Ensure that the octi-cam (1) is in the right position as shown in figure 23.
- For standard rotation assembly (clockwise to close) rotate the body (29) about 40° - 45° counter-clockwise from bottom view or clockwise from top view depending an which way the shaft has been linked as shown in figure 24a and 24b.
- Press the two pistons (25) simultaneously inside the body (29) until the pistons are engaged and rotate the body clockwise from bottom view or counter clockwise from top view until the stroke is completed.
- Ensure that when the pistons are inserted that they both mesh at the same time.
  Check fullyclosed and open positions as shown in figure 25.

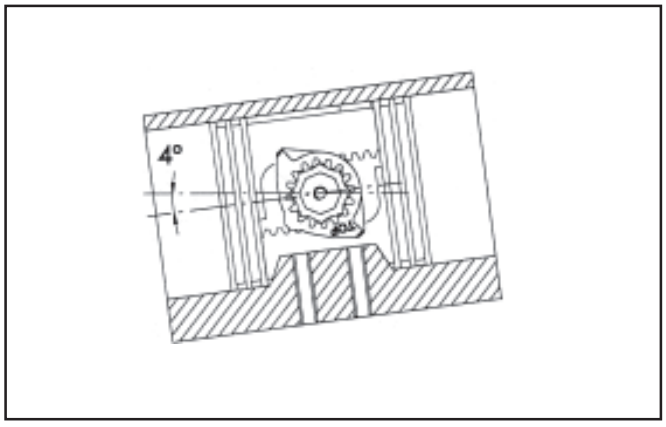


Fig. 25

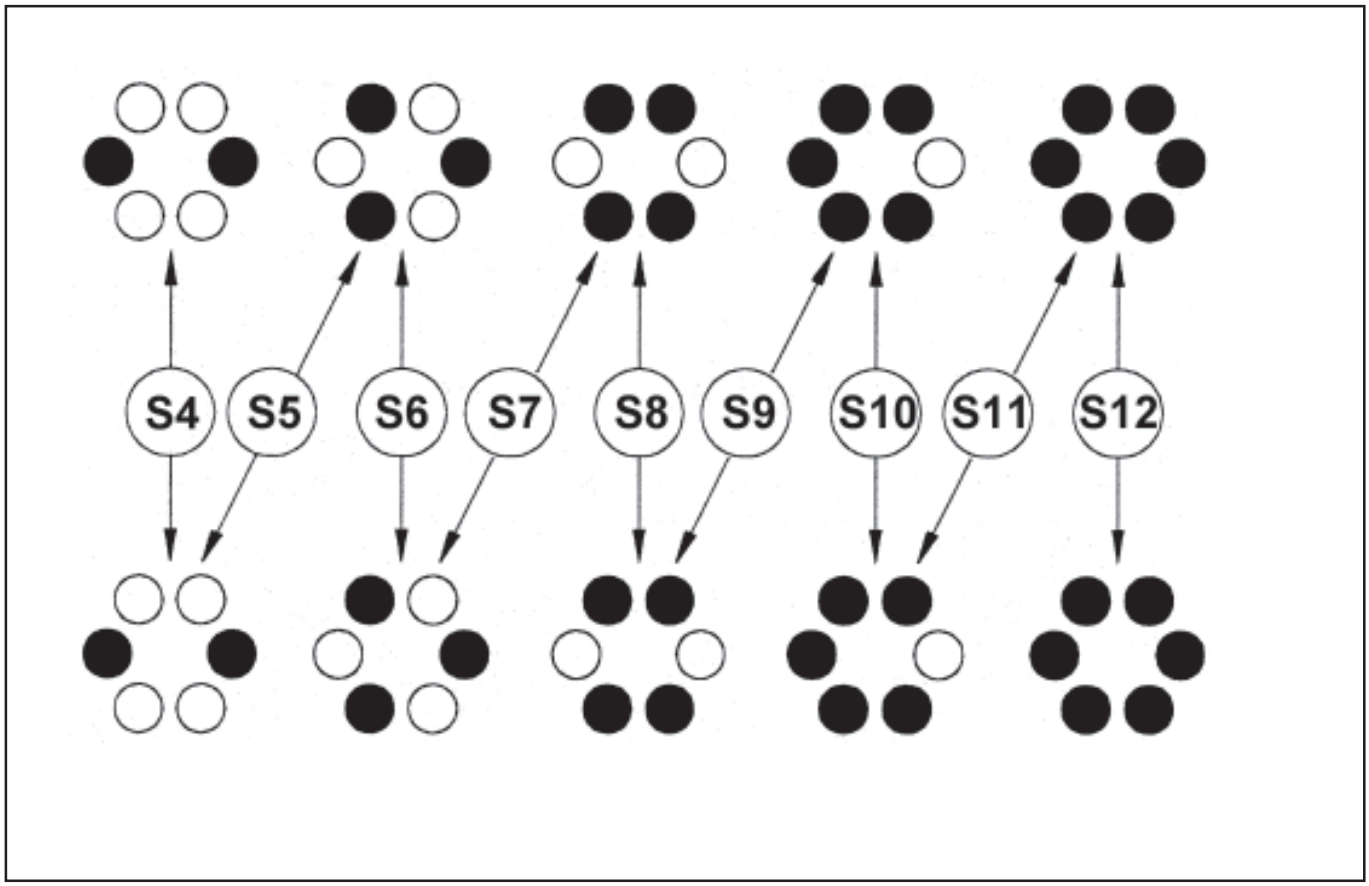


Fig. 26

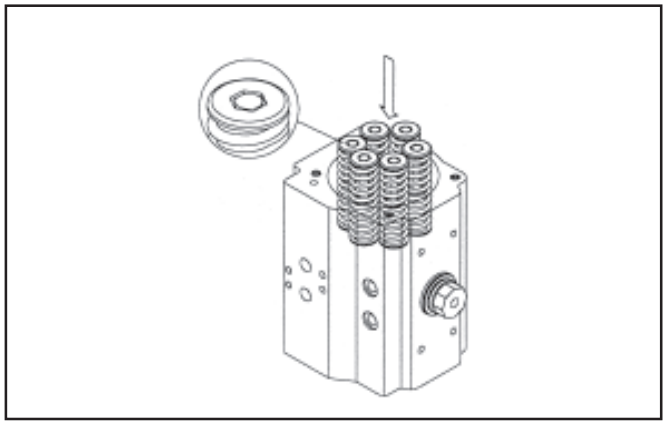


Fig. 27

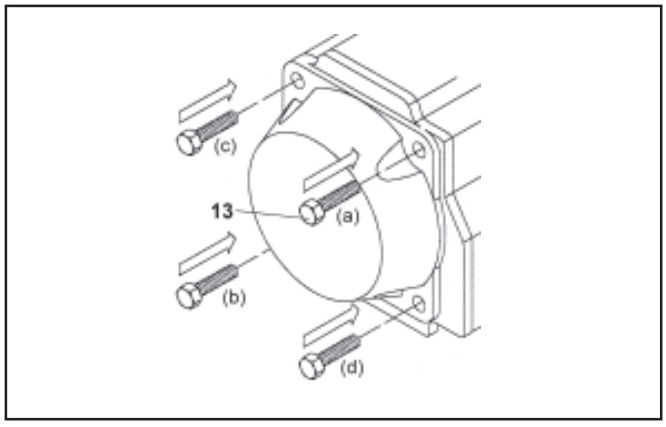


Fig. 28

End cap (22 right and 23 left) and spring cartridge (17) assembly:
(Figures 26, 27 and 28)

For model DAP / SRP 2000 to DAP / SRP 3000 the 2 end caps (22) are symmetric

- Lubricate the body.
- For spring return actuator insert the proper quantity of spring cartridge according to the pattern shown in figure 26 (referring to the total number of springs). Insert spring cartridge (17) as shown in figure 27.
- Fit end cap O-ring seal (14) into the groove in the end cap, an both end caps.
- Fit end caps onto the body (29), verifying that the O-ring remains in the groove.
- Insert all the cap screws (13) and tighten each only partially. Complete tightening by following the sequence indicated in figure 28.

Assembly of stop cap screws (2) and stroke adjustment:
(Figure 29)

- Insert on both the stop cap screw (2), the nut (4), the washer (3), and the O-ring (11) in.
- Fit the stop cap screw (2) in the body.

Stroke adjustment for standard rotation actuator (Clockwise to close):

- 0° (Close) position stroke adjustment with actuator in close position, screw or unscrew the right (from top view) stop cap screw (2) until the desired stop position is achieved. Then tighten the stop adjustment nut (4) to lock it in place.
- 90° (open) position stroke adjustment with actuator in open position, screw or unscrew the left (from top view) stop cap screw (2) until the desired stop position is achieved, then tighten the stop adjustment nut (4) and lock it in place.

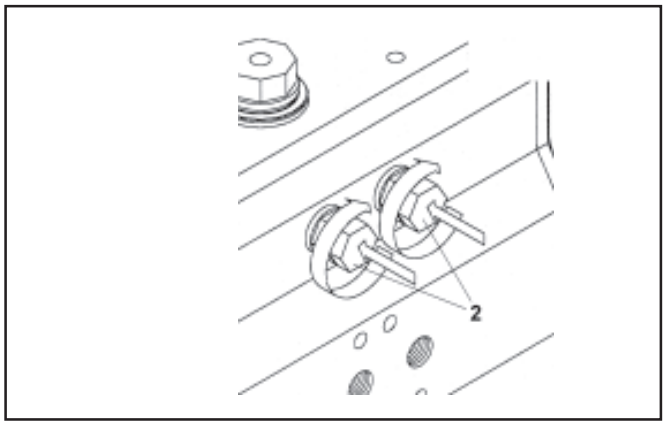


Fig. 29

Assembly of position indicator (19 and 24):
(Figure 30)

- Fit position indicator (19) an the shaft verifying that it indicates the correct actuator position.
- Then fit cap screw (24) where fitted.

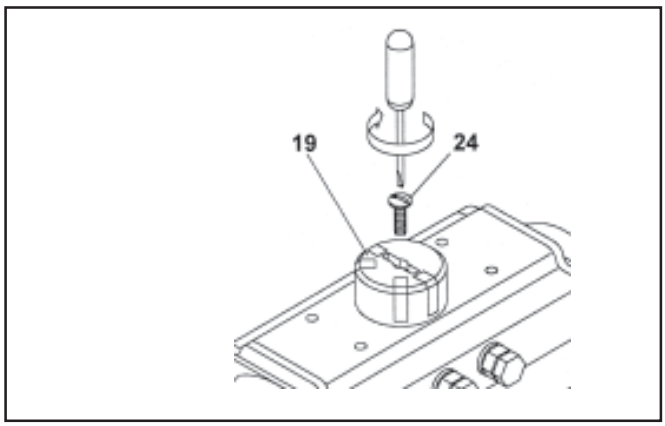


Fig. 30

5. Change of operation / fail position

Detailed information for assembling and disassembling see previous chapter.

- Actuator to be switched in fail position with expanded springs.
- Remove bolt (24) (Fig. 15).
- Remove position indicator (19) from stem.
- Remove both position bolts (2) with spacer (4) and nut (3).
- Remove seal rings (11).
- Remove bolts (13) from end caps.
- Remove end caps (22 and 23) from basic body.
- Remove spring sets (17) (only for spring return actuators).
- Remove end cap seal rings (14).
- Fit act. body (29) in a vice or simular, turn stem (30) until pistons (25) have left the act. body (Fig. 18)
- Turn both pistons (25) 180° around axial assle
- Press both pistons (25) in basic body (29) at the same time until piston have reached there end position
- Check that stem has turned 4° over center position (0°) (Fig. 25)
- Place spring sets (17) at pistons
- Place cap seal ring (14) on end caps (22 and 23)
- Mount end caps (22 and 23) at basic body (29)
- Mount bolts (13) at end caps (22 and 23)
- Mount both position bolts (2) with spacer (4), nut (3) and seal ring (11)
- Check both end position and adjust position bolts (2)
- Mount pos. indicator (19) in correct position (Fig. 30)
- Mount bolt (24) at stem

6. Actuator designation and type plate

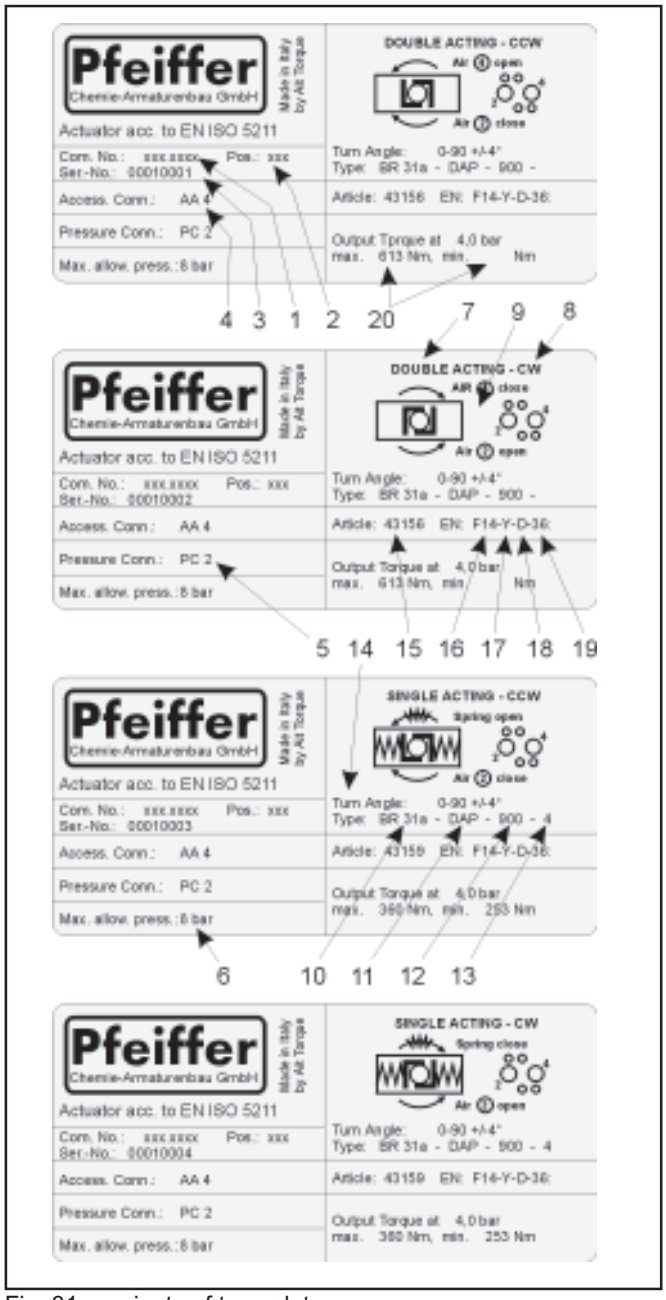


Fig. 31 - variants of type plates

- ***Unmistakable Marking:*** variable
- 1 Commission No.
- 2 Positon No.
- 3 Serial No. (continuously)
- ***Acc. connection interface:*** fix acc. to actuator size
- 4 AA1 to AA4 (acc.to VDI/VDE size 1 to 4)
- ***Pressure connection:*** fix acc. to actuator size
- 5 PC1 = G 1/8“
  PC2 = G 1/4“
  PC3 = G 3/8“
  PC4 = G 1/2“
- ***Max. allow pressure:*** fix
- 6 Series 31a allways 8 bars
- ***Mode of operation:*** variable
- 7 kind of operation: single / double acting
- 8 direction of operation: CW=clockwise (spring closing)
  CCW = counter clockwise (sprind opening)
- 9 Figure of act. operation with spring and air action, scheme of Namur air connection port incl. numbering of air connection 2 and 4.
- ***Exact type code:*** variable
- 10 Series: BR 31a
- 11 Type: SRP / DAP
- 12 Actuator size: 15 to 5000
- 13 Spring No.: 2,5 to 6 (bar)
- ***Turn angle:*** fix acc. to actuator
- 14 0-90°+/-4°; 0-120°+/-4°; 0-180°+/-4°
- ***Article No.:*** variable
- 15 Article No. - Pfeiffer
- ***Type acc. to EN:*** fix acc. to actuator size
- 16 Act. flange (F07)
- 17 Spigot (Y)
- 18 Square pos. diagonal (D)
- 19 Square size (SW 17)
- ***Torques:*** variable
- 20 Output torque for air and spring stroke

7. Storage Instructions

If the actuators are not for immediate use, the following precaution must be taken for storage:

- Store in a dry environment at ambient temperature.
- It is recommended that the actuator be stared in its original box,
- Do not remove the plastic plugs an air supply parts.

For your special requirements please contact our technical sales department

Pfeiffer Chemie-Armaturenbau GmbH
Hooghe Weg 41 • 47906 Kempen
Telefon: 02152 / 2005-0 • Telefax: 02152 / 1580
E-Mail: vertrieb@pfeiffer-armaturen.com • Internet: www.pfeiffer-armaturen.com

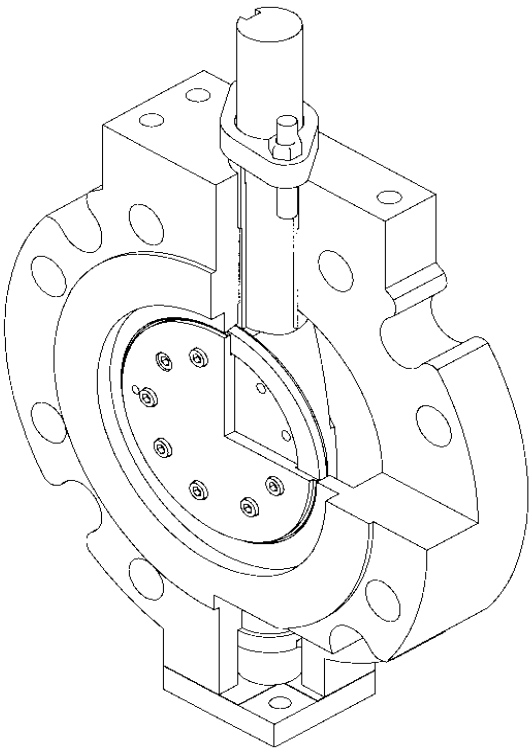
Specifications subject to change without notice

PDF=199

Operating Instructions

Butterfly Valves Series TRI-CON
(with actuator)

Type 14t



Declaration of Conformance acc. to Directive 97/23 EC

and Manufacturer's Declaration acc.to Directive 98/37 EC

The manufacturer	**ZWICK GmbH, D-58256 Ennepetal**
declares, that (for) the valves	**ZWICK butterfly valves Series TRI-CON** • **supplied with pneumatic/hydraulic actuator,** • **supplied with electric actuator** • **prepared to connect a 90°-part-turn actuator,**

1. are a pressure equipment within the meaning of the European Directive 97/23 EC (PED) and conform to this directive,
2. are not a complete machine within the meaning of the European Directive 98/37 EC (Machinery Directive) but conform to this directive,
3. the operation instruction no. Zw-TriCon-2002-A1 shall be observed.

It is forbidden to put the valve into operation as long as the valve is not yet installed into the pipeline to prevent injury of the user**.**

Technical Standards used

EN 593	**Product standard for butterfly valves**
DIN 3840	**Design of the valve shell**
EN 292	**Safety of machines, Part 2: Technical specifications**

Technical Specifications

ZWICK-catalogue <Butterfly Valves series TRI-CON>

Used method of conformity:

Annex II of the Pressure Equipment Directive 97/23 EG, category III, module H

Name of Independent Expert:	*Identification-no. of the Independent Expert*
Lloyd's Register	**0525**

Any modification of the valve and/or the valve actuator unit, which changes the design and/or the valve application other than specified in clause 1 <valve destination>, invalidates this declaration.

Ennepetal / February 2002

Hans Zwick, General Manager

0 Introduction

This instruction may support the user to store, install, start-up, use and maintain ZWICK-butterfly valves series TRI-CON.

⚠ **Attention**	**It will be dangerous for the user if the following „attention"-, „warning"- and „danger"-notices are not observed,** and the liability of the manufacturer may become ineffective. In case of any question to the manufacturer, see addresses in clause 8 <information>.

1 Valve destination

These butterfly valves **series TRI-CON** are exclusively destined – after installation at or between flanges or butt welded into a pipe system and after connection of the actuator to the plant control system – to let pass or shut off media in the allowable pressure and temperature range, or to control the flow.
For fluids with more than very small content of solid particulates – especially hard and/or sharp ones – this series should not be used.

Note:
The ZWICK catalogue layout-sheets <Butterfly Valves TRI-CON> specify the admissible range of p/t-rating.

Clause 2.2 < Important information for the user> shall be observed.

⚠ **Warning**	If a valve is used for permanent flow control at differential pressure more than about 0,15 bar (liquid fluids) the flow parameters shall be accepted by the manufacturer. Avoid cavitation in any case.

2 Safety information

2.1 General Safety Information

The safety requirements apply for valve units same as for the pipe system into which the valve is installed and same as for the plant control system, to which the actuator is connected. This instruction gives such advices only, which **shall be observed additionally**.

More safety information may be included in the relevant manual of the actuator.

2.2 Important information for the user

It is not the valve manufacturer's liability, and therefore it shall be observed by the user, that

⇒ the valve is only used as specified in clause 1 <valve destination>,

⚠ **Danger**	No valve shall be used, that's certified pressure/temperature range (= "rating") is not sufficient for the operating conditions: The relevant diagrams in the ZWICK catalogue <Butterfly Valves TRI-CON> specify this admissible range. See clause 8 <information>. If other materials are used or at service conditions not included in the above mentioned diagrams, the manufacturer shall be asked for release. **Ignoring these requirements could mean danger for the life or health of the user and/or cause damage in the piping system.**
⚠ **Danger**	The user shall check and ensure, that the choice of the valve's materials is suitable for the fluids used. The valve manufacturer is not liable for damage resulting from corrosion. **Ignoring these requirements could mean the danger of injury of the user and/or cause damage in the piping system.**

⇒ an actuator installed at a valve supplied bare shaft has been sized and assembled according to the manufacturer's recommendations, and has been adjusted correctly for both valve end positions. Specifically in the CLOSED end position the **body seat** shall stop the stroke,

not the actuator end stop. Any limitation of the stroke to full closure shall be made ineffective.

⇒ the pipe system has been installed by experts and that these systems are regularly inspected. The stiffness of the body is designed to support the usual additional pipe forces F_z equal to $\pi/4 \cdot DN^2 \cdot PS$. Wafer type butterfly valves may support higher values of additional pipe forces F_z.
(PS = design pressure at ambient temperature)

⇒ the valve has been connected to these systems by experts, especially a valve with butt-weld ends,

⇒ the operating time of a pneumatic/hydraulic actuator has been adjusted to the pipe system characteristics,

⇒ the flow velocity in the pipe system is limited to usual values (i.e. 4 m/s for liquid fluids) and that abnormal conditions such as vibration, waterhammer, erosion (i.e. by wet steam), cavitation and a relevant content of solid – especially abrasive – particulates in the fluid are agreed by the manufacturer,

⇒ at service temperature between >+50°C and <–20°C the valve and the valve connection surfaces are protected from contact by the user,

⇒ only experts for pressurized pipe systems operate und maintain the valve unit.

2.3 Special dangers

Danger	The valve shaft is tightened by a stuffing box. Before the bolting of this stuffing box is loosened be sure, that the pipe system is **completely depressurised.**
Danger	Before a valve is disassembled from the pipe or before the plug (or cover) from the valve body is loosened, be sure, that the pipe system **is completely depressurised**, to prevent leakage from the pipe system. Be sure that **the valve is 5°-10° opened** and remains in this position to equalize the pressure at both sides. If the actuator shall be disassembled for stuffing box repair, first open the disc to depressurise the valve completely **and leave it in this position**.
Danger	*Valves in end-of-line-position:* For normal service, specifically at gaseous, hot or dangerous fluids, a butterfly valve shall be used only, if **a blind flange or cover is assembled downstream** or – for short-term only – if the valve is duly locked in the CLOSED position. Attention when closing such a valve: Avoid getting one's hand between body and disc.
Warning	If a valve is used in end-of-line-service and shall be opened under pressure, open the valve very carefully: The **fluid splashes out with high velocity**! Attention when closing: Avoid getting one's hand between body and disc.
Warning	*If a valve shall be disassembled from the pipe:* Take care, that the adjacent pipe system **is completely drained**, before the valve is disassembled from the pipe. Take special care to residual amounts of the fluid that **remain trapped in the valve and/or in the adjacent pipe.**

2.4 Valve marking

Each butterfly valve is marked as follows (see label, left column):

for	marking	remark
manufacturer	**Zwick GmbH**	Address see clause 8 <Information>
Model No.	For ex.: **C10125C-AA-11CP**	Explanation see ZWICK-catalogue <TRI-CON>
S.- No.	For ex.: **02-03-7806**	Corresponding to: year – month – order-n°
Size	**DN (**and **value)**	Value mm, for ex. DN200 or inch, for ex. 8“
PN / class	**Value** for PN or class	PN / class = dimensional standard for the flanged connection
CWP / PS	**Value** in bar or PSI	= pressure, upper limit of application at 20°C
max. T / TS	**Value** in °C or °F	= temperature, upper limit of application
Date	**year / month**	

and markings for materials of the valve parts in contact with the fluid (see label, right column):

for	marking	Remark
Body	**Markings according to the relevant material standard**	material of the body
Disc.		material of disc and seat ring retainer
Shaft		material of shaft
Seat		material of the stainless seat surface in the body
Lamella		material of the exchangeable laminated ring in the disc
Key		material of the key for connection shaft-disc
Bolting		material of the bolting of the seat ring retainer
Bush		material of the bushes
Standards	**API 609B/ B16.34**	Standards for design and testing

To allow the valve identification the label shall not be damaged.

3 Shipment and Storage

The valve shall be handled, shipped and stored with care.

- ⇒ The valve shall be stored in the protective packaging or caps at the flanged or butt weld ends. Store and transport it at a pallet or similar even to the place of installation.
- ⇒ If the valve shall be stored before installation, store it in a closed building and protect the valve from harsh environmental conditions, such as dirt, debris and humidity.
- ⇒ Take special care to protect the metallic seat, the flange or butt weld end faces and the actuator from damage at transport.
- ⇒ Butterfly valves shall be stored in the position of the actuator (=disc) as supplied, do not operate the actuator.

 **Danger**	*Valves supplied without actuator:* Handle the valve very carefully at transport: The disc is not fixed and may open by influence from outside (i.e. by shaking or vibration).
 **Attention**	*Valves with actuator type fail-safe to „OPEN“:* At supply, the disc may protrude from the valve body at both sides. **The actuator shall be disassembled and the disc shall be closed for transport.**

4 Installation

4.1 General

The requirements for the installation apply for valve units same as for the piping system into which the valve is installed and as for the plant control system, to which the actuator is connected. This instruction gives such advices only, which **shall be observed additionally**.

Attention	Butterfly valves – especially wafer type valves – shall be transported and installed **disc closed only.** Otherwise the disc could be damaged and the valve will no more be tight.
Danger	*When the valve is not yet installed: Prevent to get one's hand between body and disc:* The actuator unit shall not be connected to the plan control system not before the valve has been installed into the pipe system. If a butterfly valve is used in end-of-line-service, take special care to assemble a blind flange or a cover behind or to lock the valve safely in the CLOSED position.
Attention	*The valve unit has been adjusted for tight shut-off by the manufacturer:* Do not change **the end stop adjustment** of the unit valve/actuator in the CLOSED position. In this position the body seat shall stop the disc stroke. Any actuator end stop has been adjusted appropriately. **This adjustment shall not be changed**.
Danger	*When a butterfly valve is supplied bare shaft (without actuator):* You may install the valve**, but don't pressurise it!** When the actuator is installed later, the nominal size and torque, the sense and range of rotation and the limit stops in the OPEN and CLOSED positions of the actuator unit shall be exactly adjusted to the butterfly valve and to the service conditions. **Ignoring these requirements could mean the danger of injury of the user and cause damage in the piping system.**
Attention	*Valve with electric actuator only:* Check and be sure that **the signal of the torque switch stops the valve in the CLOSED end-position** and the signal of the limit switch stops the valve in the OPEN end-position. *More instruction is given in the actuator manual.*

4.2 Installation

⇒ Bring the valve in its protective packaging to the place of installation and do not unpack it earlier.

⇒ Check and be sure, that the valve and the gear unit are free from damage. Valves or gear units with visible damage shall not be installed.

⇒ Check and be sure, that the valve pressure class and the connecting type and dimensions and the actuator data correspond to the plant data. See markings in the valve's label.

Danger	No valve shall be installed, that's certified pressure/temperature range (= "rating") is not sufficient for the operating conditions: This range is defined in the catalogue <butterfly valves TRI-CON>. See section 8 < information >. If other materials are used or at service conditions not included in the above mentioned diagrams, the manufacturer shall be asked for release. **Ignoring these requirements could mean danger for the life or health of the user and/or cause damage in the piping system.** At any doubt, contact the manufacturer.

⇒ *Wafer type Butterfly valves:*
To protect damage of the valve disc at operation, be sure, that the clearance of the adjacent pipe flanges is sufficient for the disc in full open position.

⇒ Inspect and be sure, that the valve waterway and both adjacent pipe insides are free from dirt, rust, pipe scale, welding slag and any other foreign material.

	*Valves with pneumatic actuator type **"fail safe to open":*** Steps to install this special type of valve:

Danger	- connect the actuator to a (temporary) pilot pressure supply, - close the disc by the pilot pressure and make sure, that the disc remains 100% closed under the full pilot pressure until the valve is properly fixed in the pipework, - finally disconnect the pneumatic actuator from the (temporary) pilot pressure supply with care for smooth opening. **Ignoring these requirements could mean danger for the health of the personnel and/or cause damage in the piping system.**

⇒ *TRI-CON butterfly valves are suitable for both flow directions. But respect the "arrow"-marking of the valve body:*
The valve should be installed with this "arrow"-direction same as the direction of the pressure against the closed disc. This direction may be different from the flow direction of the opened valve!

⇒ Butterfly valves should be installed preferably in the optimal position with the valve shafts horizontal. Avoid putting the actuator directly under the valve: Stuffing box leakage may damage the actuator unit.

 **Danger**	An actuator assembled to a valve installed bare shaft shall be supported, if the mass of the actuator and/or if the actuator position causes a too high bending torque to the valve body.

⇒ At installation into an existing pipe system be sure, that the gap between the pipe ends has sufficient clearance to protect all connecting surfaces (and gaskets) from damage.
But the gap shall not be larger than necessary to limit additional pipe load.

Flanged butterfly valves only:

⇒ The flanged pipe ends shall be installed in line with the faces being parallel.

 **Attention**	*Butterfly valves with flanged ends:* The mating flange surfaces shall be conform to EN 1092-1 or "stock-finish" conform to ANSI B16.5, with flat mating faces (i.e. form C or form D or form E). The manufacturer ZWICK shall release flanges of other standards or other kinds of mating faces.
 **Attention**	Install a wafer type butterfly valve into the clearance between the adjacent pipe flanges with the disk in full closed position. Otherwise the valve disc is damaged and the valve will not be tight.

⇒ When fastening the flange bolting, be sure, that the bolts centre the valve body correctly.

 **Attention**	Wafer type butterfly valves series TRI-CON may need flange bolts and studs with different length for connection to the pipe flanges. For bolting dimensions refer to ZWICK-document < Zw-TriCon-Scr-2002-A1>.

Butt-welded butterfly valves only:

⇒ The pipe ends shall have been installed in line with the faces being parallel.

⇒ The butt-weld ends of the valve – see valve marking – shall fit to the pipe material. The valve and pipe welding ends shall have the same diameter and the same welding die.

⇒ Connect the welding cable not at the valve body, but at the pipe only.

⇒ The seam shall be welded by experts to reduce stresses produced by the welding process in the valve body and in the adjacent pipe. The body wall temperature shall be limited to <300°C.

⇒ *Valves >DN400:*

Attention	Be careful at the welding process: The temperature in the valve body shall be restricted to protect it from local deformation. The seam shall be welded with interruption, alternating crossover, to limit the temperature in the seam area. Ignoring these requirements could mean a permanent deformation in the valve body. Even by 1/10 mm permanent deformation of the body seat (around the body necks) the valve may become useless.

All butterfly valves:

⇒ To connect the actuator to the plant control system, follow the manual of the actuator.

⇒ Last step of the installation: Make a functional test with the signals of the plant control system: Open and close the valve to the tight position and check the correct function and signalisation of the limit switches (if any).
At any trouble see clause 7 <Trouble shooting guide>.

Danger	Defaults of signals and signalisation could mean **danger of injury of the user and/or cause damage in the piping system**

5 Pressure test of the pipe system

The valve manufacturer before supply has made the pressure test of the valve. When testing a pipe section with valves installed, take care to observe:

⇒ Flush new installed pipe systems carefully before the pressure test to be sure, that all hard particulates have been flushed out,

⇒ **Valve in OPEN position:** The test pressure shall be limited to **1,5 x PS** (see valve marking) (*PS = maximal admissible pressure at 20°C).*

⇒ **Valve in CLOSED position:** The test pressure shall be limited to **1,5 x PS** (see valve marking) (*PS = maximal admissible pressure at 20°C).*

In case of leakage at the valve connections section 7 <troubleshooting> shall be observed.

6 Normal service and inspection

Actuated valves shall be operated by the plant control system. The adjustment of an actuator supplied together with the valve shall not be changed as long as the valve operates correctly.

To operate an emergency manual actuation at the actuator unit – if any –, normal manual force is sufficient. It is not permitted to use extension levers to increase the torque.

Regular maintenance is not required for valves. When at examination of the line section a leakage is detected at a valve section 7 <troubleshooting> shall be observed.

For valves remaining permanently in the same position, it is recommended, to operate it 1x to 2x each year to check their function.

Danger	*A butterfly valve is not self-locking:* The actuator shall not be disassembled, **as long as the valve is pressurised.**
Danger	*A butterfly valve is not self-locking:* Piston actuators need a permanent supply of control pressure in all those positions, for which control pressure is needed.

7 Troubleshooting Guide

At any troubleshooting, respect the requirements of clause 2 <Safety instructions>.

Possible Defect	Remedy	Remark
If an actuator type "fail safe to open" shall be disassembled	 **Attention: Danger of injury of the user:** Disconnect the actuator from the pilot pressure supply before the actuator is disassembled from the valve.	***Note 1:*** *To order spare parts, transmit all markings from the valve tag. Only original ZWICK-parts shall be used.* ***Note 2:*** *If a disassembled valve is corroded at body or trim surfaces, choose wear and spare parts of a more resistant material quality.*
Leakage at the pipe flange or at a cover flange connection	Tighten the gasket by the flange bolting. *If this is in vain:* Replace the flange or cover gasket. Observe clause 2.3 <Special danger> and order cover gaskets and repair instruction from ZWICK.	
Leakage in the seat	Check and be sure, that the actuator closes the valve completely. *If valve is in closed position:* Check, if the actuator closes the valve under full torque. *If the actuator closes the valve under full torque:* Open and close the valve several times under differential pressure. *If the seat continues to leak:* Increase the actuator torque at 1,1x nominal torque. *If the seat continues to leak:* The valve shall be repaired: Replace the seat ring in the disc. Observe clause 2.3 <Special danger> and order spare parts and repair instruction from ZWICK.	
Leakage at the stuffing box	Tighten the stuffing box by the stuffing box bolting in little steps of ¼ turn clockwise alternating at both nuts. *If the stuffing box continues to leak:* The shaft seal shall be replaced. Observe clause 2.3 <Special danger> and order spare parts and repair instruction from ZWICK. *If the nuts at the stuffing box shall be loosened or disassembled (anti-clockwise):*  **Attention: Danger for the life or health of the user:** Make sure, that the pipe at both sides of the valve is completely depressurised before the actuator is disassembled from the valve disconnect the pilot pressure supply.	

Defect of the valve functional parts	Check the actuator and the signals of the plant control system to be correct. *If both are OK:* Disassemble the valve from the pipe system and inspect it. Observe clause 2.3 <Special danger> *If the valve is damaged:* The valve shall be repaired: Order spare parts and repair instruction from ZWICK and replace it.	

More troubleshooting guide may be included in the relevant manual of the actuator.

8 More information

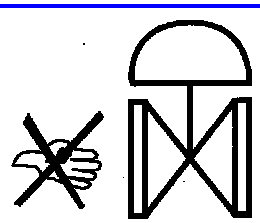
This manual, ZWICK-catalogue-sheets and other information – even in other languages – are also available at:

ZWICK GmbH
Egerstraße 25
D-58526 Ennepetal
Tel: +49 (0) 2333 98565
Fax +49 (0) 2333 98566
www.zwick-gmbh.de
E-Mail: info@zwick-gmbh.de

Operating and service instruction
Butterfly valves type LTR 43

LEUSCH GmbH
Industriearmaturen

Size 3" to 80" / DN 80 to DN 2000
Pressure ANSI Class 150 - 1500 / PN 10 - PN 250



Safety Information

Make absolutely sure that nobody can be injured when operating a valve, equipped with an actuator (pneumatic, electric or hydraulic), outside the pipe system. Don´t put any fingers, hands or arms inside the valve or at the sealing surfaces when the supply energy is connected to the actuator.

Contents

Storing and handling

Check that the valve has not been damaged during transport and handling. Protection plates should not be removed until the valve
is subject to installation.

The valve must not be stored directly on the ground and should in other respects be protected against impurities during storage and in connection with the assembly. A suitable storage area is ordinarily dry, cool and clean.

Lifting

Never lift the valve directly in the actuator. Lift large valves with
the aid of a strap as shown in Fig. 1.

Installation

Avoid mounting the valve immediately before or after a pipe bend, when used in control applications. If the valve must be mounted after a pipe bend, point the valve shaft towards the diametrical centre of the bend (see Fig. 2) to reduce the dynamic imbalance forces on the disc.

The main flow direction must always be towards the flat side of the disc. Flow direction is marked with arrows on one side of the valve body.

When mounting on the pressure side of a centrifugal pump, mount the valve perpendicular to the pump shaft (see Fig. 3).

1. Check that the valve is clean and not damaged.
2. Check that the screws for the cover plate are tight.
3. Make sure that the piping is flushed clean and that there will be no further installations after the valve has been mounted.
4. Open the valve by approx. 5° immediately before mounting.
5. Make sure that the sealing surfaces on the counter flanges are flat and clean. Make certain that the valve and gaskets are properly centered and that the correct gasket quality is used. The shut-off function of the valve is dependent upon the gasket on the inlet side of the valve transmitting the pressure from the flange connection to the cover plate (see Fig. 4). See also additional information, page 8.
6. Before final tightening of the flange bolts, manoeuvre the valve between fully open and fully closed. Observe that the valve, when used in control applications shall open approx. 60 - 80° and in on/off installations approx. 80°. For properly functioning joints, use washers and tighten the bolts in rotating order with a torque wrench. Suitable torque varies as follows according to the size of the bolt:

Bolt	M16	M20	M24	M27	M30	M33
Torque (Nm)	90	140	250	380	480	580

7. A valve that is to be put into operation within the not too distant future should be left in closed position after mounting

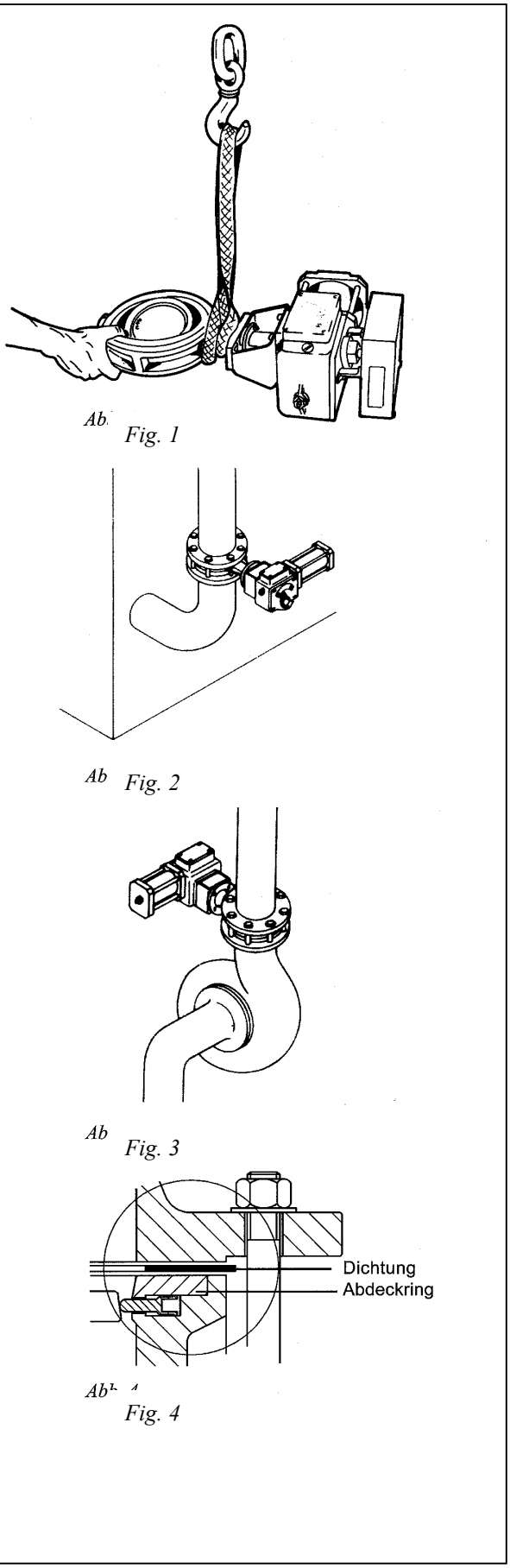


Fig. 1

Fig. 2

Fig. 3

Fig. 4

Start up

Always start up the system with the valve closed.

Make sure that the system is well cleaned before start-up. Remaining impurities can quickly damage seat and make the valve loose. For a final flushing, try to operate the system with the valve fully opened during start-up.

Check the stuffing box of the valve. Tighten the gland nuts if the stuffing box is leaking.

Function

The LEUSCH LTR 43-valve is tight in both directions and has normally a Itt laminated (316SS/graphite) seat. The tightness class in the main direction of flow is as standard Class VI for a valve with Itt laminated seat and Class V for a valve with solid metal seat.

The main flow direction is marked with one arrow on the side of the valve.

The valve is adjustable. Quite simply, this means that the more the valve is closed the tighter it becomes. (see Fig. 5 - 6). The disc is pressed against the seat thanks to the uniqe disc geometry design.

The tricentric mounted disc release the seat when the begin to open and is turned outwards from the seat. The wear on disc and seat is hereby minimized.
Generally, liquids require less torque than steam and gases.

Maintenance and adjustment

The LTR 43-valve is in principle maintenance-free.
None the less, should joints be tightened according to recommendations by the gasket supplier, check and adjust, if necessary, the stuffing box after a couple of months in operation.

Testing of tightness must always be done with the valve clamped between flanges.

The surface pressure between seat and disc can be adjusted with the travel stop on the actuator. In case of leakage, open the valve to flush out obstructions on the sealing surfaces. Close the valve again, but first check that it can be closed, i.e. that there are no obstructions between seat and disc. If it continues to leak, open the valve slightly. Loosen the lock nut on the travel stop and turn the screw counter clockwise a quarter turn. Test the valve again for tightness. When the valve is tight, tighten the lock nut.

If the valve still leaks, repeat these measures until it is tight. the seat is probably damaged if the travel stop screw is screwed out more than three turns and the valve still leaks, .

For more information about adjustment of travel stops see the instructions for the actuators.

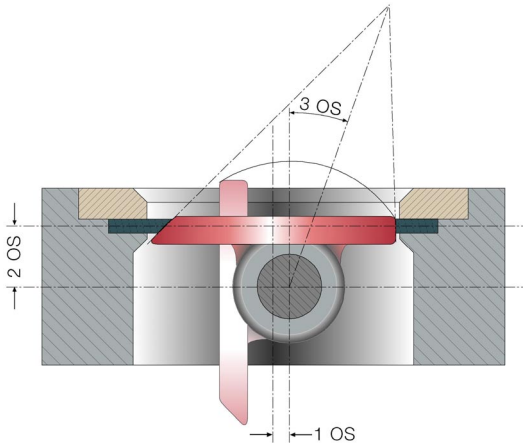


Fig. 5

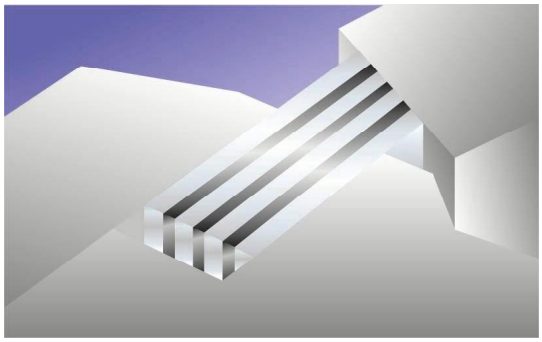


Fig. 6

Location of keyway *(Fig. 7)*

The key way is turned 3° from the centerline of the disc to ensure that the valve, in combination with an actuator, can reach closed position without overtravel.

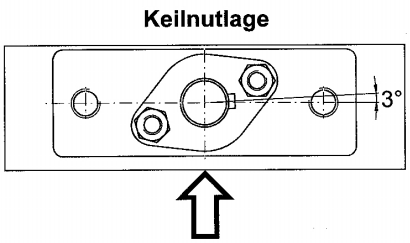


Fig. 7

Mark on shaft end *(Fig. 8)*

A line on the shaft end marks the position of the disc in the valve. The line should be parallel to the valve body when the valve is closed.

The valve tightness is a function of the closing torque. See the chapter “Function”.

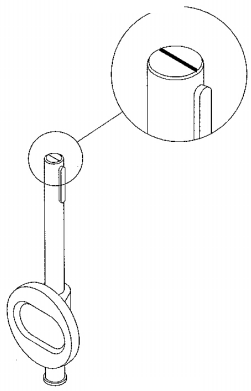


Fig. 8

Filling of stuffing box *(Fig. 9)*

1. Remove key (D) and loosen gland nuts(A).
2. Remove gland (B) and add graphite rings (C).
3. Put back gland and gland nuts.
4. Tighten the nuts alternately, but not too hard. Retighten when needed.ie
5. Replace the key.

Note!
Should the valve be equipped with an actuator that is not removable, proceed as follows: Cut the graphite ring diagonally, thread the ring carefully onto the shaft, and down into the stuffing box.

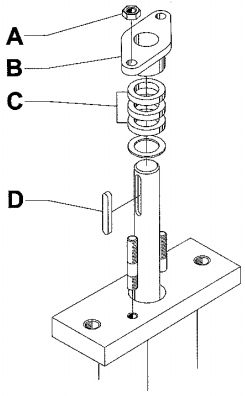


Fig. 9

Fig. 9a

Assembly of actuator

See also the instruction for the respective actuator.

1. Turn the disc 90° from closed position to avoid damage on the seat.
2. Mount the actuator in the desired position on the shaft. Note the position of the key.
3. Fix the actuator in the correct position on the valve by means of the screws.

The disc shall be turned 90° from closed position also at dismounting.

Change of metal seat *(Fig. 10)*

Dismounting

1. Place the valve with the inlet side pointing upwards and open the valve approx. 5° (from closed position).
2. Loosen the screws (9) and remove the cover plate (5). Note the position of the cover plate.
3. Lift out the seat (3).

Cleaning, lubricating and mounting

4. Clean seat area and cover plate and make sure that the disc is undamaged. Any damage can quickly destroy a new seat. Small scratches can be removed by light polishing with fine emery-cloth.
5. Lubricate the screws (9) with paste type polybdenum disulfide.
6. Mount the new seat (3).
7. Fit the cover plate (5) to the original position.
8. Fasten the screws and tighten the screws firmly in rotating order.
9. Perform a test run.

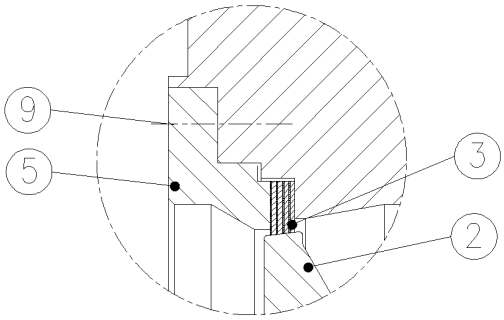


Fig. 10

Change of PTFE seat *(Fig. 11)*

Dismounting

1. Place the valve with the inlet side pointing upwards and open the valve approx. 5° (from closed position).
2. Loosen the screws (9) and remove the cover plate (5). Note the position of the cover plate.
3. Lift out the seat (3) and backing ring (3a).

Cleaning, lubricating and mounting

4. Clean seat area and cover plate and make sure that the disc is undamaged. Any damage can quickly destroy a new seat. Small scratches can be removed by light polishing with fine emery-cloth.
5. Lubricate the screws (9) with paste type polybdenum disulfide.
6. Mount the new seat and a new support ring. The bevel at the inside of the seat should be placed downwards to the disc.
7. Fit the cover plate to the original position.
8. Fasten the screws and tighten the screws firmly in rotating order.
9. Perform a test run.

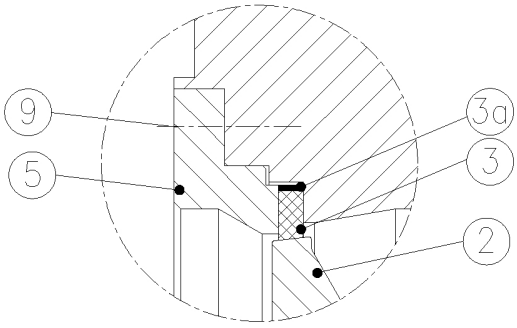


Fig. 11

Type LTR 43-2 (Disc with screwed on ring)

Disassembly

Same procedure as above, but remove srewed on ring and gasket additionally

Assembly

Put in new gasket and screw ring. Afterwards mount seat the same way as above.

Service

The LTR 43 valve does not need any regular service.

The stuffing box consists as standard of compression-moulded, expanding graphite rings. In case of leakage at the stuffing box, tighten the gland nuts alternately until the leakage stops. If the stuffing box cannot be tightened because of the gland reaching the bottom, add more graphite rings according to the instruction in “Filling of stuffing box”.

Retighten the bolts of the counter flanges if the flange joints are made of PTFE or if the temperature exceeds 150°C.

Complete sealing kits for maintenance of the valves can be ordered from Leusch or Leusch representative.

Note! Check the type sign (see Fig. 12) and note down all data before calling our representative

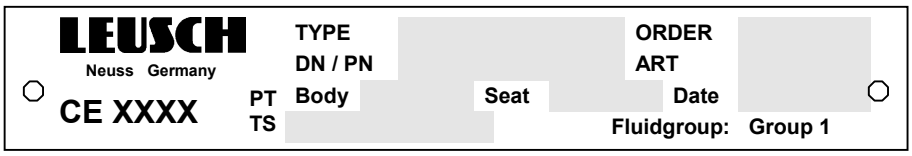


Fig. 12

Spare parts

Pos.	Detail	Incl. In the seal kit
1	Body	
2	Disc	
3	Seat	X
4	Shaft	
5	Cover plate	
6	Bushing	
7	Gland	
8	Cover	
9	Screw	
10	Gasket	X
11	Packing	X

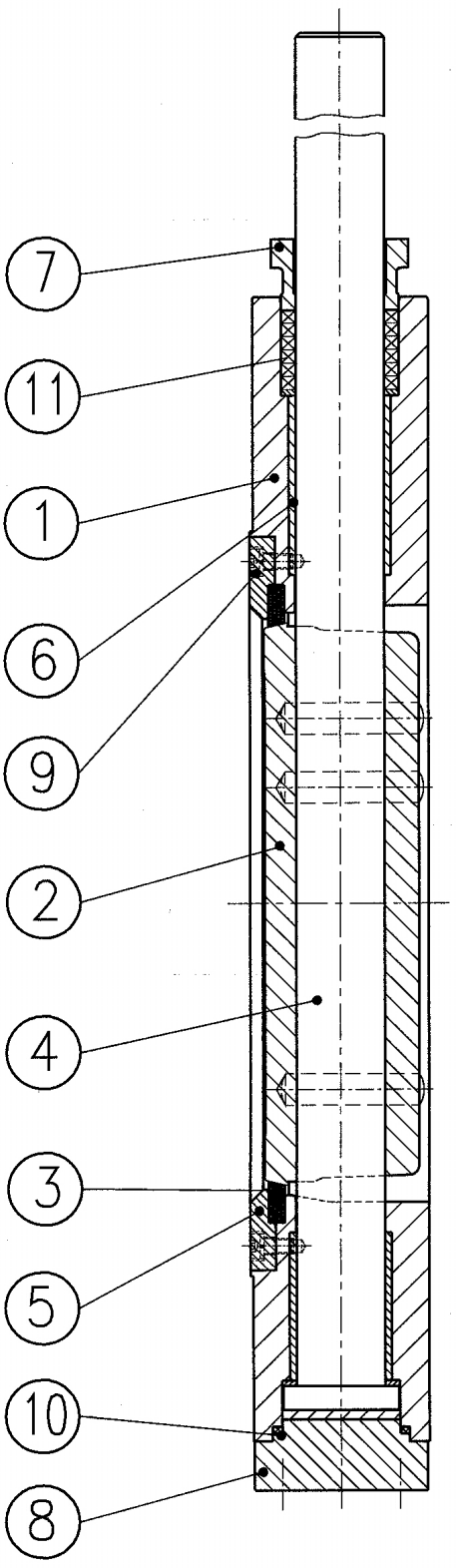


Fig. 13

Additional information

It is very important to use gaskets with correct insidediameters in order to have a pressure on the coverplate.Inside gasket diameter should not be larger than those specified according to standard DIN-EN 1514-1 where thefollowing dimensions are valid:

Valve DN	Inside Ø Di *(mm)*	Outside Ø, dy *(mm)* PN 10	PN 16	PN 25	PN 40
80	89	142	142	142	142
100	115	162	162	168	168
125	141	192	192	194	194
150	169	218	218	224	224
200	220	273	273	284	290
250	273	328	329	340	352
300	324	378	384	400	417
350	356	438	444	457	474
400	407	489	495	514	546
450	458	539	555	564	571
500	508	594	617	624	628
600	610	695	734	731	747
700	712	810	804	833	-
800	813	917	911	942	-
900	915	1017	1011	1042	-
1000	1016	1124	1128	1154	-
1200	1220	1341	1342	1364	-

For mounting between flanges according to ANSI 150 & ANSI 300 is dimensions valid according to the standard ANSI B 16.21 RF where the following dimensions are valid:
.

Valve DN	Inside Ø Di *(mm)*	Outside Ø, dy *(mm)* ANSI 150	ANSI 300
80	89	136	149
100	114	174	181
125	141	196	215
150	168	222	250
200	219	279	308
250	273	340	362
300	324	410	422
350	356	451	486
400	406	515	540
450	457	550	595
500	508	606	654
600	610	720	775
750	762	857	-

Example

Valve Type LTR 43 -1 (1) - W (2) - 1 (3) 2 (4) 1 (5) - 1 (6) 1 (7) 1 (8) - DN... (9) - PN... (10)

Valve specification system

1 Valve type
- LTR 43-1 = solid disc
- LTR 43-2 = bolted seatring on disc

2 Valve body design
- W = Wafer type
- L = Lug type
- F = Flanged design

3 Material - valve body
- 1 = A 216 WCB / 1.0619*
- 2 = A 351 CF8M / 1.4408*

4 Material - disc
- 1 = A 216 WCB / 1.0619 (by LTR 43-2 = seatring 1.4541)*
- 2 = A 351 CF8M / 1.4408*

5 Material - seat
- 1 = Itt Laminated Metall/Graphite
- 2 = stellited
- 3 = PTFE

6 Material - shaft
- 1 = 17-4PH*
- 2 = 1.4571 *
- 3 = 1.4571 hard chromed*
- 4 = 1.4571 stellited*

7 Bearing - valve body/shaft
- 1 = Bronze
- 2 = 316 SS coated
- 3 = Stellite

8 Packing
- 1 = Graphite
- 2 = PTFE
- 3 = Graphite/Graphite (spring loaded with purge connection)
- 4 = PTFE/PTFE (spring loaded with purge connection)

9 Valve Size, DN or Inch

10 Nominal pressure, PN or ANSI (counter flange)

*or equivalent

Leusch reserve the right to make improvements without prior notice.

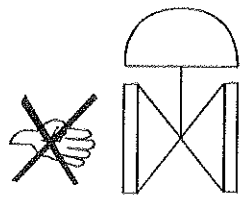
Edition: 2002-05

LEUSCH GMBH INDUSTRIEARMATUREN • Ziegeleistraße 10 • D-41472 Neuss
Telefon +49 2131 7699-0 • Fax 7699-29 • e-mail: sales@leusch.de / www.leusch.de

Service and operating instructions Mi-203 GB

Butterfly valves, type VSS

Preliminary Edition 1999-09



Safety Information

To make absolutely sure that no one can be injured when operating a valve equipped with an actuator (pneumatic, electric or hydraulic), outside the pipe system, fingers, hands or arms should not be placed inside the valve or at the sealing surface when the supply energy is connected to the actuator.

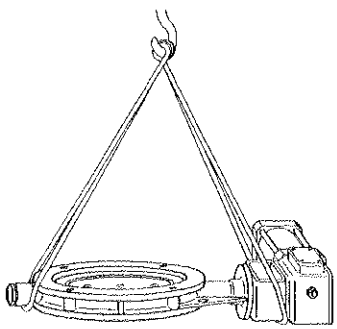


Fig. 1

Storing and handling

Check that the valve has not been damaged during transport and handling. A suitable storage area is ordinarily dry, cool and clean. Never lay the valve directly on the ground, so that sand or other abrasive particles can come into contact with it. Protection plate should not be removed until the valve is subject to installation.

Lifting

Never lift the valve directly in the actuator. Lift large valves with the aid of a strap as shown in Fig. 1.

Mounting

Check that the valve is clean and not damaged. Check that the screws for the cover plate are tight. Make sure that the piping is flushed clean and that there will be no further installations after the valve has been mounted. Open the valve by approx. 5° immediately before mounting.

The valve is tight in both directions of flow. The main direction of flow must always be towards the flat side of the disc. Avoid mounting the valve immediately before or after a pipe bend, when used in control applications. If the valve must be mounted after a pipe bend, point the valve shaft towards the diametrical centre of the bend. See Fig. 2.

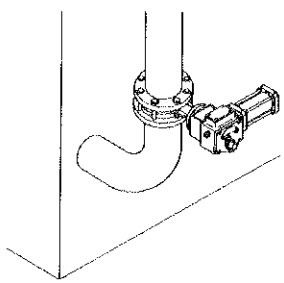


Fig. 2

When mounting on the pressure side of a centrifugal pump, mount the valve perpendicular to the pump shaft. See Fig. 3. Make sure that the sealing surfaces on the counter flanges are flat and clean.

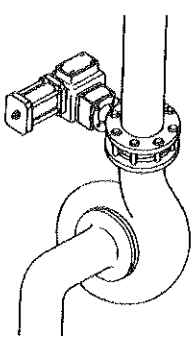


Fig. 3

Make certain that the valve and gaskets are properly centred and that the correct gasket quality is used. The shut-off function of the valve is dependent on, that the gasket on the inlet side of the valve transmits the pressure from the flange connection to the cover plate (see Fig. 4). See also additional information, page 4.

If the valve is of a lugged type, it is important that the medium pressure is toward the flat side of the disc.

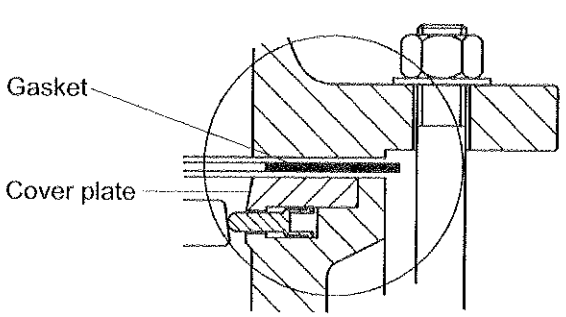


Fig. 4

Before final tightening of the flange bolts, manoeuvre the valve between fully open and fully closed. Observe that the valve, when used in control applications shall open approx. 60 - 80° and in on/off installations approx. 80°.

For properly functioning joints, use washers and tighten the bolts in rotating order with a torque wrench. Suitable torque varies as follows according to the size of the bolt:

Bolt	M16	M20	M24	M27	M30	M33
Torque (Nm)	90	140	250	380	480	580

A valve that is to be put into operation within the not too distant future should be left in closed position after mounting.

Start-up

Always start up the system with the valve closed. For a final flushing, try to operate the system with the valve fully opened during start-up.

Maintenance

The VSS-valve is in principle maintenance-free. Nonetheless, should joints be tightened according to recommendations by the gasket supplier, check and adjust, if necessary, the stuffing box after a couple of months in operation.

Function and adjustment

The SOMAS VSS-valve normally has a metallic seat. The valve is adjustable. Quite simply, this means that the more the valve is closed the tighter it becomes.

Generally, liquids require less torque than steam and gases. The surface pressure between seat and disc can be adjusted with the travel stop on the actuator.

In case of leakage, open the valve to flush out obstructions on the sealing surfaces. Close the valve again, but first check that it can be closed, i.e. that there are no obstructions between seat and disc.

If it continues to leak, open the valve slightly. Loosen the lock nut on the travel stop and turn the screw counter clockwise a quarter turn. Test the valve again for tightness. When the valve is tight, tighten the lock nut. If the valve still leaks, repeat these measures until it is tight. If the travel stop screw is screwed out more than three turns and the valve still leaks, the seat is probably damaged. Testing of tightness must always be done clamped between flanges. For more information about adjustment of travel stops see the instructions for the actuators.

Location of keyway

The keyway is turned 3° from the centerline of the disc to ensure that the valve, in combination with an actuator, can reach closed position without overtravel. See Fig. 5.

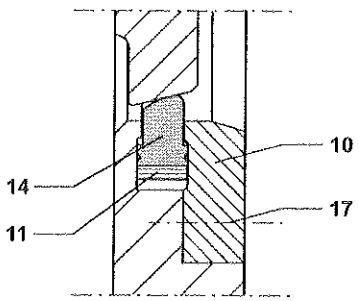
Changing the seat

Open the valve approx. 5°. Loosen the screws holding the cover plate. *Note the position of the cover plate.* Lift out the seat. Check the surface on the periphery of the disc for damage. Small scratches can be removed by light polishing with fine emery-cloth. Change the seat, if damaged, as well as the gaskets and reassemble. Put back the cover plate to the original position. Tighten the screws firmly in rotating order.

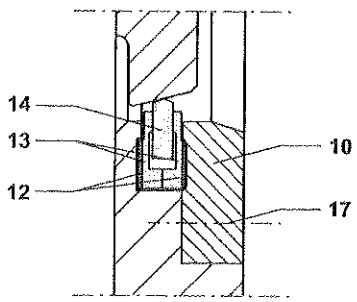
Spare parts- and Material specification

Item	Description	VSS code -AAA- DN 80 -	VSS code -AAC- DN 80 - 800	MTV code -AAD- DN 900 -	Included in the sealing kit
1	Key	Steel	Steel	Steel	X
2	Shaft	EN 1.4460	EN 1.4460	EN 1.4460	
	Shaft	——	EN 1.4460 Hard chromed	EN 1.4460 Hard chromed	
3	Pin bolt	A4	A4	A4	
4	Nut	A4	A4	A4	
6	Gland	SS 2343	SS 2343	SS 2343	
7	Valve body	SS 2343	SS 2343	SS 2343	
8	Stuffing box kit	Graphite/PTFE	Graphite/PTFE	Graphite/PTFE	X
10	Cover plate	SS 2324	SS 2324	SS 2324	
11	Backing ring	SS 2343	———	———	X
12	Gaskets, kit	———	Graphite	Graphite	X
13	Spring washers, kit	———	SS 2377	SS 2377	X
14	Seat	PTFE	SS 2377	SS 2377	X
15	Disc	SS 2343	SS 2343	SS 2343	
16	Rivet	SS 2343	SS 2343	SS 2343	
17	Screw	A4	A4	A4	
18	Gasket* *(only for DN600 and upwards)*	Graphite	Graphite	Graphite	X
19	Cover	SS 2343	SS 2343	SS 2343	

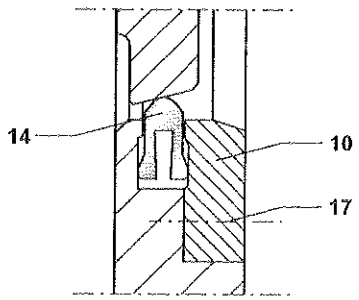
VSS - Seat code A
(PTFE-seat)
DN 80 -



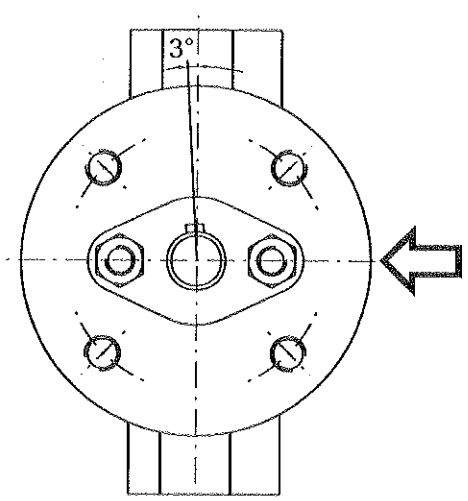
VSS - Seat code C
(metal seat, 3 pcs.)
DN 80 - 800



VSS - Seat code D
(metal seat, type Y)
DN 800 -

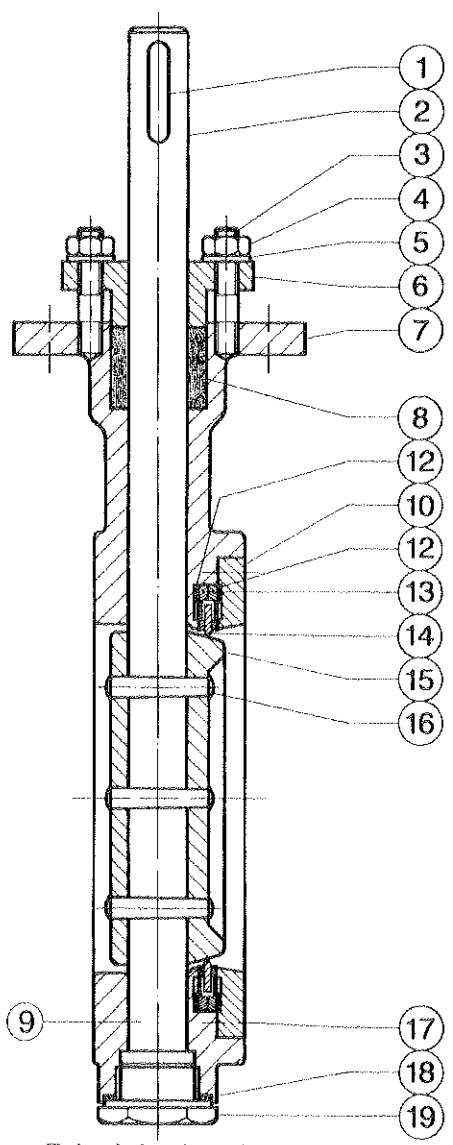


Keyway location



Principle drawing

Fig. 5



Principle drawing

Additional information

To ensure the correct tightness it is necessary for the gasket to apply pressure on the cover plate.
The inside gasket diameter **should not exceed** the dimensions specified in the DIN-EN 1514-1 (see below).

Valve DN	Gasket dia. Internal *(mm)*	Gasket dia. external *(mm)* PN 10	PN 16	PN 25
80	89	142	142	142
100	115	162	162	168
125	141	192	192	194
150	169	218	218	224
200	220	273	273	284
250	273	328	329	340
300	324	378	384	400
350	356	438	444	457
400	407	489	495	514
450	458	539	555	564
500	508	594	617	624
600	610	695	734	731

For ANSI related flanges we refer to ANSI B16.21 RF. See table below

Valve DN	Gasket dia. Internal *(mm)*	Gasket dia. external *(in mm)* ANSI 150	ANSI 300
80	89	136	149
100	114	174	181
125	141	196	210
150	168	222	250
200	219	279	308
250	273	340	362
300	324	410	422
350	356	451	486
400	406	515	540
450	457	550	595
500	508	606	654
600	610	720	775

Valve specification system

VSS - B5 - AAD - A11 - DN... - PN...
1 — 2 3 — 4 5 6 — 7 8 9 — 10 — 11

1 Valve type
2 Valve body design
- A = Wafer design acc. to EN 558-1, Series 20
- F = lugs according to DIN

3 Nominal pressure
- 1 = PN 6
- 2 = PN 10
- 5 = PN 25
- 6 = PN 50

4 Material — valve body
- A = SS 2343
- D = W1.4408
- E = SS 2378

5 Material - disc
- A = SS 2343
- B = SS 2343 Hard chromed
- C = SS 2343 Stellite coated
- S = SS 2378 (Avesta 254 SMO)

6 Material - seat
- A = PTFE
- C = SS 2377 (metal seat, 3 pcs)
- D = SS 2377 (metal seat, type Y)
- E = SS 2378 (Avesta 254 SMO)
- G = SS 2562 (904L)
- T = Stellite

7 Material - shaft
- A = EN 1.4460 (max. t = 150°C)
- B = EN 1.4460 Hard chromed
- C = EN 1.4460 Stellite coated
- H = SS 2375

8 Bearing
- 1 = Without bearing
- 3 = Stellite
- 6 = SS 2378 (Avesta 254 SMO)
- 7 = SS 2562 (905L)

9 Stuffing box
- 1 = Graphite
- 2 = PTFE

10 Nominal size DN
11 Nominal pressure, PN

Artikel nr: 26 012

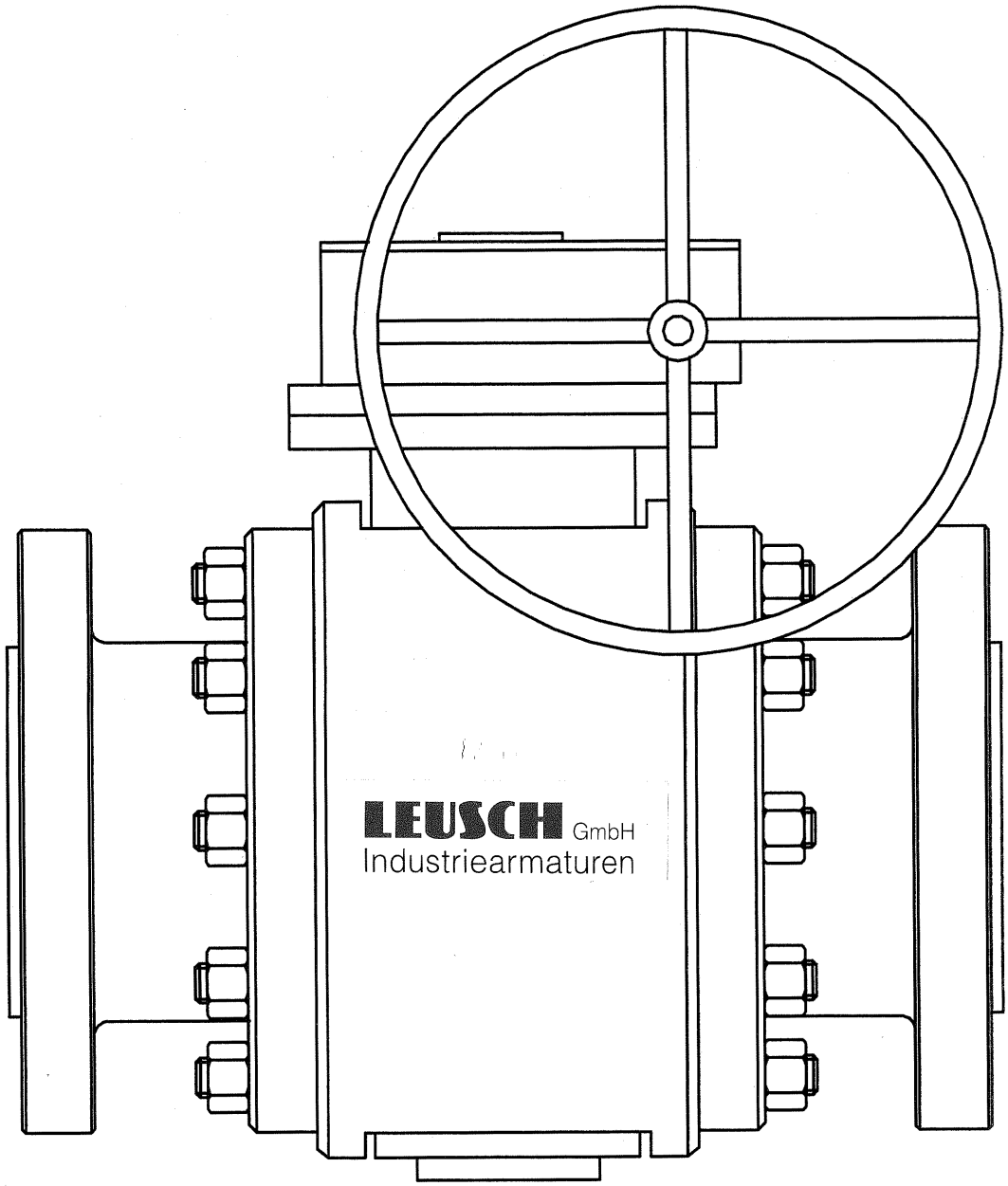
SOMAS® Representative
P. O. Box 107, SE-661 23 SÄFFLE, SWEDEN
PHONE: +46 533 167 00
FAX: +46 533 141 36
E-mail: sales@somas.se / www.somas.se

ITALIANO

MANUALE DI USO E MANUTENZIONE

ENGLISH

OPERATING AND MAINTENANCE MANUAL



00	20.06.03	LP	FF	AV	O&MM-SE.STD
REV	DATE	BY	CHKD.	APPR.	MANUAL No.

ITA ENG

INDICE

! **IMPORTANT:** *istruzioni molto importanti o suggerimenti*
✓ **SAFETY:** *istruzioni molto importanti per la sicurezza del personale*
ENVIRONMENT: *istruzioni molto importanti per l'ambiente*

INDEX

! **IMPORTANT:** *very important instruction to be followed or tips*
✓ **SAFETY:** *very important instruction for the safety of personnel*
ENVIRONMENT: *very important instruction for the environment*

ITA
ENG

1.0 SCOPO

1.1 Le seguenti istruzioni sono molto importanti per la manutenzione, lo smontaggio ed il montaggio delle valvole a sfera PIBIVIESSE tipo side entry.
Le istruzioni si riferiscono a valvole con ingrassatori ed anelli anti-estrusione per alta pressione. Essendo questi componenti non standard, in alcuni casi le parti potrebbero parzialmente mancare durante lo smontaggio.
Per i componenti applicabili, il loro nome e numero vedere i disegni in paragrafo 10.0.
Le istruzioni di questo manuale sono applicabili alle valvole listate in paragrafo 12.0.

1.2 I prodotti coperti da questo manuale possono essere stati costruiti in accordo alla Direttiva Componenti in Pressione 97/23/CE. Questo manuale include raccomandazione per evitare possibili pericoli oppure informazione riguardanti pericoli residui (come da PED 97/23/CE Allegato I, punto 1.2 e 1.3).

⁝ ***Le valvole in accordo alla PED 97/23/CE hanno il marchio CE sulla targhetta.***
Il marchio CE certifica che il design e la fabbricazione è stata verificata e certificata da organismo notificato in accordo ai requisiti PED 97/23/CE.
Lo smontaggio di un componente in pressione con marchio CE annulla la marcatura originale. Contattare Pibiviesse S.p.a per ulteriori informazioni.

1.3 I prodotti coperti da questo manuale possono essere stati costruiti in accordo alla Direttiva ATEX 94/9/CE. Questo manuale include raccomandazione per evitare possibili pericoli oppure informazione riguardanti pericoli residui (come da ATEX 94/9/CE Allegato II, punto 1.0.6).

⁝ ***Le valvole in accordo alla ATEX 94/9/CE hanno sia il marchio CE sia il marchio €x sulla targhetta.***
Il marchio CE certifica sia quanto definito al punto 1.2 sia che il design e la fabbricazione è stata verificata in accordo ai requisiti ATEX 94/9/CE. Il marchio ex certifica il gruppo e la categoria ATEX.
Lo smontaggio di un componente in pressione con marchio CE ed €x renderà nulla la marcatura originale. Contattare Pibiviesse S.p.a per ulteriori informazioni.

2.0 INSTALLAZIONE

2.1 Procedura di Imballo e Spedizione
Vedi Appendice M.

2.2 Stoccaggio, Movimentazione ed Installazione
Vedi Appendice I.

2.3 Tutte le valvole Pibiviesse sono progettate per sopportare una combinazione di pressione interna e carichi esterni. I massimi carichi esterni applicabili sono riassunti in Appendice G. Eseguire una verifica di carico esterno. Casi particolari possono essere discussi con Pibiviesse.

2.4 Le valvole sono dotate di targhette molto importanti che permettono di identificare l'apparecchio in pressione ed i rischi residui. Non rimuoverle o coprirle (es. verniciature, coperture ecc).

✓ *Le targhette previste sono progettate per avvisare l'operatore di eventuali rischi residui o fornire informazioni riguardanti l'apparecchio in pressione. Nascondere o rimuovere tali informazioni può essere molto pericoloso per il personale addetto all'utilizzo o la manutenzione dell'apparecchio in pressione.*

2.5 Alcune valvole possono avere temperature di esercizio pericolose per gli esseri viventi.Per evitare pericoli di questo genere è necessario proteggere opportunamente dal contatto accidentale le superfici delle valvole che possono raggiungere tali temperature.
In aggiunta le valvole con temperature di design superiori a 200°C devono essere efficientemente isolate per fare in modo che non si creino differenze di temperatura (Δt) tra il corpo ed i componenti interni della valvola. Tali Δt, se non evitati, possono indurre carichi indesiderati su sfera e seggi che possono portare a difficoltà operative.

✓ *Raccomandiamo gli operatori di installare protezioni/isolamenti efficienti ove superfici che possono essere toccate da esseri viventi superano i limiti umanamente tollerabili (da -20°C a +60°C).*

1.0 SCOPE

1.1 The following instruction are very important for the maintenance, disassembling and assembling of PIBIVIESSE side entry type ball valves.
The instructions make reference to valves with emergency sealant injectors and with back-up rings for high pressure service. As the above mentioned features are not standard, in some cases these parts may not be found, or may be found only partially during the disassembling of the valves.
For parts number and name please refer to drawings listed in paragraph 10.0.
For applicability of the instructions contained in this manual refer to related equipment in paragraph 12.0.

1.2 The products covered by the following instructions may be designed and manufactured in accordance with the Pressure Equipment Directory 97/23/EC. This manual includes recommendation to avoid any foreseeable hazard or information regarding residual hazards (as per PED 97/23/EC Annex I, point 1.2 & 1.3).

⁝ ***Compliance with PED 97/23/EC can be found on the product by means of the CE marking on the tag.***
The CE marking is a certification that the design and manufacturing process has been assessed and found in compliance with the requirement of the PED 97/23/EC by a Notified Body.
Disassembling of the pressure equipment will invalidate the original CE marking. Please contact Pibiviesse S.p.a for further information.

1.3 The products covered by the following instructions may be designed and manufactured in accordance with the Directory ATEX 94/9/CE. This manual includes recommendation to avoid any foreseeable hazard or information regarding residual hazards (as per ATEX 94/9/CE Annex II, point 1.0.6).

⁝ ***Compliance with ATEX 96/9/CE can be found on the product by means of both the CE and the €x marking on the tag.***
The CE marking certifies both compliance with PED 97/23/EC (as per point 1.2 above) and ATEX 94/9/CE. The ex marking gives the ATEX group and category.
Disassembling of the pressure equipment will invalidate the original CE and €x marking. Please contact Pibiviesse S.p.a for further information.

2.0 INSTALLATION

2.1 Packing & Shipping Procedure
Refer to Appendix M.

2.2 Storage, Handling & Installation Instruction
Refer to Appendix I.

2.3 All of the Pibiviesse S.p.a valves are designed to withstand a combination of internal pressure and external loads. Maximum external loads are summarised in Appendix G. Make sure not to exceed such loads. Particular cases may be discussed with Pibiviesse S.p.a.

2.4 Valves are provided with very important tags to allow identification of the pressure equipment and identification residual hazards. Do not remove or cover (e.g. masking or painting etc) such tags.

✓ *Tags provided on the products are designed to either advise operators of residual hazard or provide information regarding the pressure equipment. Hide or remove such information can be very dangerous to personnel operating or maintaining the pressure equipment.*

2.5 Some valves do have operating temperatures that can be very dangerous to human being or animals. To avoid this kind of injuries operators must ensure that valve surfaces that reach such temperatures are suitably protected against accidental contact.
In addition valves for high temperature service (i.e. valves with design temperature above 200°C) must be efficiently insulated (lagged) to make sure that there is no differential temperature (Δt) between the body and the internals of the valve.
Such Δt , if not avoided, can induce undesired loads on internal components that will lead to operational problems.

✓ *Operators are recommended to always provide an efficient protection/insulation of the valve surfaces that may be touched by personnel and/or animals and that exceed, in lower or in higher, the human tolerable limits (as a suggestion use -20°C through +60°C).*

ITA

3.0 OPERAZIONE

3.1 AVVIAMENTO / COMMISSIONING

Una volta installata, la valvola deve rimanere o tutta aperta o tutta chiusa, a seconda delle esigenze operative.

⁑ ***Non lasciare la valvola in parziale apertura per lunghi periodi. Assicurarsi che il tubo sia libero da sabbia, terra, avanzi di saldatura e apparecchiature varie. Queste cose potrebbero danneggiare la sfera ed i seggi durante le operazioni di avviamento impianto.***

3.2 NORMALI OPERAZIONI

La valvola deve essere usata solo per servizio on/off.
I limiti di P/T sono indicati sulla targhetta.
Non utilizzare la valvola come regolante o per throttling a meno che questo servizio sia chiaramente indicato sull' ordine.
La valvola può essere operata da aperta a chiusa agendo sulla leva/volantino (senso orario chiude).
Tutte le valvole sono dotate di indicatore di posizione. Per valvole con attuatore vedere istruzioni dell' attuatore.

3.3 UTILITY REQUIREMENTS

E' richiesto un organo di sollevamento. Gru o paranchi devono essere dimensionati per sollevare valvola + attuatore. Il peso totale è indicato sul disegno dimensionale relativo in paragrafo 9.0.
I requisiti per gli attuatori sono indicati nelle istruzioni operative ad essi relative e/o sulla targhetta.

4.0 MANUTENZIONE

✓ *Il personale di manutenzione tenuto ad eseguire queste operazioni deve essere qualificato ad intervenire su componenti in pressione. Smontare un contenitore di pressione senza aver scaricato la pressione ed isolato la tubature ove la valvola è installata può causare gravi lesioni o morte degli operatori. NON PROCEDERE IN CASO DI DUBBI. VERIFICATE SEMPRE LE VOSTRE CONOSCENZE.*

❀ & ✓ *Alcune tubature possono contenere fluidi pericolosi o letali per gli esseri umani, gli animali e l'ambiente. Verificare sempre con la ASL competente prima di rilasciare alcun fluido in atmosfera.*

4.1 MANUTENZIONE IN ESERCIZIO

4.1.1 PERDITE DALLA STELO

In presenza di ingrassatore stelo (49) eventuali perdite possono essere temporaneamente eliminate o ridotte iniettando grasso sigillante.
E' anche possibile sostituire la guarnizione stelo superiore (73) senza smontare il premitreccia (10).

Per sostituire tutte le tenute stelo è necessario depressurizzare la linea e smontare il gruppo stelo come indicato in paragrafo 4.2.

⁑ ***L'ingrassatore stelo non è una caratteristica standard su queste valvole, quindi sarà fornito solo se richiesto.***

4.1.2 PERDITE ATTRAVERSO I SEGGI

In presenza di ingrassatore seggi (50) eventuali perdite possono essere temporaneamente eliminate o ridotte iniettando grasso sigillante.con la valvola chiusa. Gli ingrassatori seggio sono posizionati nel corpo valvola per istallazioni fuori terra o in cima all'estensione di manovra per valvole interrate. Per eliminare le perdite dai seggi prevedere uno smontaggio completo.

⁑ ***L'ingrassatore seggio non è una caratteristica standard su queste valvole, quindi sarà fornito solo se richiesto.***

4.2 ISTRUZIONI PER LO SMONTAGGIO

⁑ ***Prima di iniziare lo smontaggio assicurarsi che i ricambi come da paragrafo 6.0 siano disponibili***

4.2.1 Se la valvola è in esercizio, per prima cosa depressurizzare la linea. Per uno smontaggio completo la valvola deve essere rimossa dalla linea.

4.2.2 Aprire la valvola di drenaggio (54) per scaricare la pressione residua a centro corpo e aprire la valvola completamente.

✓ *Utilizzare sempre la valvola di scarico prevista al drenaggio o allo sfiato. MAI ALLENTARE UNA CONNESSIONE A CENTRO CORPO, CHE SIA FILETTATA O FLANGIATA, CON PRESSIONE RESIDUA NELLA CAVITA'.*

4.2.3 Rimuovere la valvola dalla linea.

ENG

3.0 OPERATION

3.1 INITIAL START-UP / COMMISSIONING

Once installed on the line the valve shall be left either in the fully open or fully closed position, depending on start-up / commissioning operation.

⁑ ***Do not leave the valve in half / partially open position for a long period of time. Ensure that the pipeline is free of any debris such as sand, tools, welding slag or weld splatter and rod ends. This will damage the valve ball and seats during start-up/commissioning operations.***

3.2 NORMAL OPERATING ACTIVITY

The valve shall be used for on/off service only.
Pressure temperature limits are stated on the valve tag. Do not use it for flow control neither in the partially open position not for throttling service unless this requirements was clearly stated on the purchase order for the valve concerned. The valve can be operated from the fully open to the fully closed position by acting on the handwheel/lever (clockwise to close).
All valves are provided with a position indicator.
For actuator operated valves refer to actuator operating instructions.

3.3 UTILITY REQUIREMENTS

A lifting facility is required to handle the valve (as available). Any crane or gear chain block used shall be sufficiently heavy to handle valve operator assembly. Total weight is stated on applicable dimensional drawings (refer to para 9.0). Actuator utility requirements are stated on the relevant operator operating instruction and/or actuator tags.

4.0 MAINTENANCE

✓ *Maintenance personnel performing this operation shall be fully trained to handle pressure containing equipment. Opening pressure containing equipment without having released all of the internal pressure and having safely isolated the pipeline where the valve is assembled can lead to serious injury or even death of the personnel involved. DO NOT PROCEDE IF IN DOUBT. ALWAYS DOUBLE CHECK.*

❀ & ✓ *Some pipelines may contain fluid that are dangerous or lethal to human being, animals and to the environment. Always check with the local HS&E manager before relieving any fluid to the atmosphere.*

4.1 VALVE MAINTENANCE IN OPERATION

4.1.1 STEM LEAKAGE

In case the valve has been provided with stem grease sealant injectors, stem leakage can be temporarily stopped by injecting sealing grease into the stem grease fitting (49). It is also possible to replace the upper stem fire safe (73) without disassembling the gland flange (10).

To replace all the stem o-rings it is necessary to depressurise the line and to disassemble the stem-gland flange group as per instructions at para 4.2.

⁑ ***Stem grease injectors are not a standard feature for this type of valves. They will be provided if required only.***

4.1.2 SEAT LEAKAGES IN OPERATION

If valve has been provided with emergency seat sealant injection fittings (50), the leakage can be temporarily eliminated or, at least, considerably reduced injecting sealant when the valve is in fully closed position. Seat sealant fittings (50) are located either in the body for above ground valves or on top of the stem extension, for buried valves. Disassembling the valve and replacing the seat seal can eliminate seat leakages.

⁑ ***Seat sealant injectors are not a standard feature for this type of valves. They will be provided if required only.***

4.2 DISASSEMBLY INSTRUCTIONS

⁑ ***Before disassembling ensure that all spare parts as detailed in para 6.0***

4.2.1 In case the valve is on operation, first of all, release the pressure from the line. For a complete disassembling the valve must be removed from the line.

4.2.2 Open the drain valve (54) to discharge the residual pressure and operate the valve to the fully open position

✓ *Always use the safety plug provided either at the drain connection or at the vent connection to release the body cavity pressure. NEVER UNSCREW SCREWED OR FLANGED CONNECTIONS WITH RESIDUAL PRESSURE IN THE BODY CAVITY*

4.2.3 Remove the valve from the line.

ITA
ENG

! *Prima di smontare la valvola marcare tutti I componenti in modo indelebile in modo da poter eseguire un corretto montaggio.*

4.2.4 Posizionare la valvola con asse flusso orizzontale in modo che la parte superiore sia facilmente accessibile.

4.2.5 Rimuovere l'organo di manovra. Nel caso di attuatore, una volta allentati i tiranti di fissaggio alla flangia motore sollevarlo con cura fino alla completa fuoriuscita dello stelo (5).

! *Durante questa operazione prestare attenzione a non danneggiare stelo (5) e chiavetta (20).*

✓ *Utilizzare sempre le dotazioni di sicurezza personale previste. Indossare sempre guanti protettivi, ed utilizzare distanziali in legno.*

4.2.6 Allentare i dadi corpo (40), lasciandone 4, 6 o 8 su ogni chiusura (a seconda del size) per facilitarne la movimentazione da eseguire.

4.2.7 Ruotare la valvola adagiandola su una flangia di linea in modo da avere l'asse flusso verticale.

! *Fare attenzione a non danneggiare la superficie di tenuta della flangia di linea.*

4.2.8 Rimuovere la chiavetta (20).

4.2.9 Allentare le brugole flangia motore (44) e rimuovere le spine di centraggio (18B) utilizzando opportuni estrattori.

4.2.10 Rimuovere la flangia motore (12).

4.2.11 Allentare le brugole flangia premi treccia (43).

4.2.12 Rimuovere le spine di centraggio (18) dalla flangia premi treccia utilizzando opportuni estrattori.

4.2.13 Rimuovere la flangia premi treccia (10)

4.2.14 Estrarre il gruppo stelo (5) e premi treccia (10) dal corpo.

✓ *Attenzione alla sicurezza del personale. Indossare sempre guanti e scarpe protettive.*

4.2.15 Estrarre lo stelo (5) dal premi treccia (10).

4.2.16 Rimuovere la guarnizione FS (73), i back-up stelo (37), gli o-ring stelo (34), l'o-ring premi treccia (35), la guarnizione FS premi treccia (72), e la rondella stelo (25).

4.2.17 E' possible rimuovere l'ingrassatore stelo (49) per pulirlo.

4.2.18 Rimuovere le brugole perno (45).

4.2.19 Estrarre il perno (9) dal corpo (1) e rimuovere l'o-ring (30) e la guarnizione FS (70).

! *Gli step 4.2.18 & 19 sono applicabili solo a valvole tipo E0 ed E1.*

4.2.20 Svitare e rimuovere il drenaggio (54) ed lo sfiato (52). Le connessioni saldate non devono essere rimosse.

4.2.21 Rimuovere i dadi corpo (40) lasciati sulla chiusura superiore (2).

4.2.22 Sollevare la chiusura (2) facendo attenzione a non danneggiare l'o-ring corpo (32) che può seguire la chiusura o rimanere nel corpo. Per le valvole tipo E3 fare attenzione alle spine (21).

✓ *Indossare sempre guanti e scarpe protettive.*

4.2.23 Rimuovere i dadi corpo (40) lasciati sulla chiusura inferiore (2) e sollevare il corpo (1). Nel caso di valvole pesanti usare due golfari avvitati sui tiranti corpo.

✓ *Attenzione alla sicurezza del personale. Indossare sempre guanti e scarpe protettive.*

4.2.24 Rimuovere la sfera (4) ed i supporti (9) dalla chiusura inferiore (2) e adagiarli su cunei di legno. Per valvole tipo E0/E1 i supporti (9) non sono applicabili.

! *Per movimentare la sfera senza danneggiarla usare corde di nylon.*

✓ *Indossare sempre guanti e scarpe protettive.*

4.2.25 Rimuovere i supporti (9) e la rondella sfera (22) ove prevista. Solo se danneggiati i cuscinetti sfera (28) possono essere rimossi usando un estrattore. Per valvole tipo E0/E1 i supporti (9) non sono applicabili.

4.2.26 Estrarre i seggi (7) dalle chiusure (2). La tenuta seggio-sfera può essere un o-ring (8) oppure un inserto. Nel caso di o-ring di tenuta (8) è possibile la sua sostituzione rimuovendo l'anellino elastico (6).

✓ *Per valvole di grosse dimensioni i seggi sono muniti di dispositivo anti-caduta Rimuovere questi dispositivo prima di estrarre il seggio.*

! *Per le valvole fornite con inserto seggio (8) non è possibile rimuovere l'inserto dal seggio (7). Se l'inserto fosse danneggiato occorre un nuovo seggio completo di inserto per il montaggio.*

! *Before disassembling the valve it is important to mark, in a lasting way, all the parts, in order to make a correct reassembling*

4.2.4 The valve shall be settled to have the flow axis in the horizontal position and the upper part shall be easily accessible.

4.2.5 Remove the valve operator. If it is an actuator, after having removed the studs which are connected with the valve, lift the actuator carefully until it is completely disconnected from the stem (5).

! *During this operation, particular care shall be paid not to damage both the stem (5) and the key (20).*

✓ *Be careful not to injury personnel performing this operation. Always wear safety gloves and use wood to protect fingers.*

4.2.6 Unscrew the body nuts (40), leaving 4 or more (depending on valve size) on each closure for an easier handling.

4.2.7 Turn the valve and rest it on one line flange. In this way the valve bore will be in vertical position.

! *Pay attention not to damage the surface of the flanged end.*

4.2.8 Remove the stem key (20).

4.2.9 Unscrew the adapter plate capscrew (44) and remove the adapter plate pins (18B) from the adapter plate using suitable extractors.

4.2.10 Remove the adapter plate (12).

4.2.11 Unscrew the gland plate capscrew (43).

4.2.12 Remove the stop pins (18) from the gland plate using eyebolts fitted in the threaded hole in the pins.

4.2.13 Remove the gland plate (10)

4.2.14 Extract the stem (5) and the gland flange (10) group from the body.

✓ *Be careful not to injury personnel performing this operation. Always wear safety gloves and shoes.*

4.2.15 Extract the stem (5) from the gland flange (10).

4.2.16 Remove the stem FS gasket (73), the stem back-up rings (37), the stem o-rings 34), the gland plate o-ring (35), the gland plate fire safe (72), and the stem washer (25).

4.2.17 It is possible to remove the stem grease fitting (49) for cleaning.

4.2.18 Unscrew the trunnion cap screws (45).

4.2.19 Extract trunnion (9) from the body (1) and remove trunnion o-ring (30) and trunnion FS gasket (70).

! *Step 4.2.18 & 19 are applicable to valve type tipo E0 ed E1 only.*

4.2.20 Unscrew and remove the drain plug (54) and the vent plug (52). Welded connections shall not be removed.

4.2.21 Remove the body stud nuts (40) left on the upper closure (2).

4.2.22 Lift carefully the closure (2) paying attention not to damage the body o-rings (32) which can follow the closure or stay in the body cavity. For valves type E3 pay attention to the closure pins (21).

✓ *Always wear safety gloves and shoes.*

4.2.23 Unscrew the body nuts (40) left on the lower closure (2) and lift the body (1). In case of large size valves, use lifting eyebolts fitted instead of two stud nuts.

✓ *Be careful not to injury personnel performing this operation. Always wear safety gloves and shoes.*

4.2.24 Remove the ball (4) and the bearing retainers (9) from the lower closure (2) and place them on wooden block. For valves type E0/E1 bearing retainers (9) are not applicable.

! *To lift the ball without any damage, use nylon ropes or strap.*

✓ *Always wear safety gloves and shoes.*

4.2.25 Remove bearing retainers (9) and ball thrust washer (22), where provided. If damaged only, ball bearings (28) may be removed using an extractor. For valves type E0/E1 bearing retainers (9) are not applicable.

4.2.26 Extract the seat (7) from the closure (2). Seat seal can be either an o-ring (8) or an insert. In case of o-ring (8) it is possible to replace it by removing the locking ring (6).

✓ *For large size valves seats are provided with anti-falling devices that shall be removed before seat extraction.*

! *For valves provided with the seat insert (8) instead of the seal o-ring it is not possible to remove it, and if it is found damaged new seat rings complete with inserts shall be used during reassembling.*

4.2.27 Rimuovere gli o-ring seggio (33), i back-up (38) e le guarnizioni FS (74). Per valvole tipo E0/E1 rimuovere anche l'anello (75) ed il distanziale (76) dalla chiusura.

4.2.28 Rimuovere le molle seggio (31) dalla loro sede nella chiusura (2).

4.3 ESAME DEI COMPONENTI

4.3.1 I componenti metallici possono essere puliti con un panno pulito e un detergente a base petrolio.

4.3.2 Per la pulizia di o-ring e guarnizioni usare panno pulito e asciutto. Ove possibile si consiglia di lavare le tenute in acqua e sapone e risciacquarle in acqua pulita.

4.3.3 Dopo la pulizia dei componenti verificare che non ci siano parti danneggiate, in particolare verificare che non ci siano danni a componenti metalli in movimento e/o sulle superfici di tenuta. Verificare inoltre che o-ring e dei back-up non siano danneggiati.

4.3.4 Sostituire le parti danneggiate.

4.3.5 Lubrificare con grasso di qualità le guarnizioni e le parti metalliche interessate dal movimento della sfera. I cuscinetti sfera (28) sono lubrificati a vita e non richiedono lubrificazione addizionale.

❀ ***Guarnizioni e tenute da sostituire devono essere smaltite in accordo alle leggi locali in materia di gestione dei rifiuti. NON SMALTIRE MAI TENUTE O GUARNIZIONI USATE NELL'AMBIENTE***

4.4 ISTRUZIONI PER IL MONTAGGIO

4.4.1 Per inserire il gruppo seggio nella chiusura procedere come segue:

a) Montare la guarnizione FS corpo (71) e l'o-ring corpo (32) nelle loro cave sulla chiusura (2).

⁑ ***Gli o-ring corpo (32), seggio (33) e premi treccia (35) devono essere montati tirandoli leggermente. Ogni danno a questi o-ring può causare rotture durante il montaggio.***

⁑ ***Durante il montaggio fare riferimento ai segni applicati prima dello smontaggio. Nota che i due seggi potrebbero essere diversi (es. un seggio potrebbe essere doppi effetto pistone e l'altro self-relieving) Assicuratevi di montare le guarnizioni giuste ad ogni tipo di seggio.***

b) Inserire le molle (31) nella chiusura (2).

c) Per valvole tipo E0/E1inserire l'anello (75) ed il distanziale (76) nella chiusura.

d) Per valvole tipo E/E3/EP con tenuta seggio-sfera tipo o-ring rimontare il seggio come da Fig. 1. Orientare il taglio dell'anellino (6) a 90° rispetto e forellini di vent sul lato del seggio.

e) Inserire l'o-ring seggio (33), il back-up rings (38) e la guarnizione FS seggio (74) , ove prevista, nelle rispettive cave (vedi Fig. 1).

f) Inserire il gruppo seggio così ottenuto nella chiusura (2). Per valvole tipo E/E3/EP con tenuta seggio-sfera tipo o-ring orientare il seggio in modo che il taglio dell'anellino (6) sia in linea non lo stelo e quindi i forellini di vent siano a 90° rispetto all' asse stelo.

⁑ ***Nell'inserire il seggio fare attenzione che si muova correttamente, parallelo alla superficie della chiusura. Per questa operazione utilizzare morsetti ed un martello di gomma.***

⁑ ***Per valvole con inserto di tenuta non è possibile sostituire solo l'inserto.***

4.2.27 Remove the seat o-ring (33) and the back-up ring (38), the seat fire safe gasket (74). For valve type E0/E1also remove the thrust ring (75) and the spacer (76) from the closure.

4.2.28 Remove the seat springs (31) from their housing in the closure (2)

4.3 REVISION OF COMPONENTS

4.3.1 The metallic parts can be cleaned using cloths wet with petrol.

4.3.2 To clean the o-rings and gaskets use dry and clean cloths. If possible it is recommended to wash the o-rings with soap and water, rinsing with clean water.

4.3.3 After cleaning components be sure that there are no damaged parts and, particularly, that there are no scores on metallic surfaces in movement or on any sealing areas. Also check the condition of the o-rings and back-up rings, making sure that they have not been damaged.

4.3.4 Replace any damaged parts.

4.3.5 Lubricate with high quality grease o-rings and metallic surfaces which come into contact during the ball movement. The ball bearings (28) are self-lubricated and do not required any additional lubrication.

❀ ***Seals and gaskets that require replacement shall be disposed in accordance with local regulation in terms of waste management. Never dispose used gasket in the environment.***

4.4 REASSEMBLING INSTRUCTION

4.4.1 To reassemble the seat group in the closure (2) proceed as follows:

a) Put the body fire safe gasket (71) and o-ring (32) into their housing in the closure (2).

⁑ ***The body o-rings (32), seat o-rings (33) and the gland flange o-rings (35) must be fitted stretching them slightly. Any damage on these o-rings can cause breakages during the valve assembly.***

⁑ ***During reassembling make reference to markings applied before disassembling. Note that the two seats can be different (i.e. one of the two seat may be of the double piston effect design whilst the other self relieving). Please make sure to use the correct gaskets for each seat.***

b) Insert the springs (31) into the closure (2).

c) For valves E0/E1 type insert the thrust ring (75) and the spacer (76) into the closure.

d) For valves E/E3/EP type with o-ring type seat seal (8) reassemble the seat seal as per Fig. 1. Make sure to position the cut in the split ring (6) 90° off the little vent holes on the side of the seat.

e) Insert the seat o-rings (33), the back-up rings (38) and the seat fire safe gasket (74), where provided, into their cavities as per Fig. 1.

f) Press the obtained seat unit into the closure (2). For valves E/E3/EP type with o-ring type seat seal (8) position the seatto have the cut of the split ring (6) in line with the stem and the little vent holes 90° off the stem axis.

⁑ ***When pressing the seat into the closure pay attention that the seat moves correctly, parallel to the closure surfaces. For this operation we recommend using clamps and a soft hammer.***

⁑ ***For valves, with insert seat seal it is not possible to replace the insert only.***

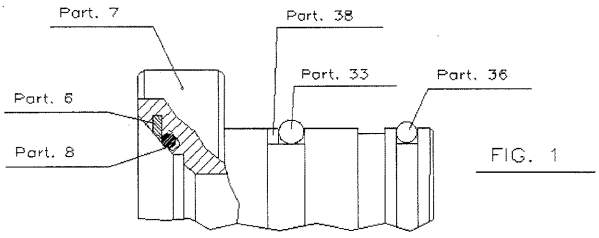


FIG. 1

4.4.2 Poggiare una chiusura (2) su una superficie capace di sopportare il peso di tutta la valvola.

4.4.3 Montare il gruppo stelo/premi treccia come segue:

a) Inserire la rondella stelo (25) nella parte superiore dello stelo.

b) Montare l'o-ring premitreccia (35), la guarnizione (72), gli o-ring stelo (34) ed i back-up (37) alla flangia premitreccia (10).

c) Inserire le spine (18) nel corpo (1).

d) Inserire lo stelo (5) nella flangia premi treccia (10).

e) Inserire la guarnizione FS stelo (73).

4.4.2 Lay one closure (2) on a plane surface, which can bear the weight of the whole valve.

4.4.3 Assemble the stem/gland plate group as follows:

a) Insert in the upper part of the stem (5) the stem washer (25).

b) Assemble to the gland flange (10) the gland flange o-ring (35) and f.s.gasket (72), the stem o-rings (34) and back-up rings (37).

c) Insert the stop pins (18) in the body (01).

d) Insert the stem (5) into the gland flange (10).

e) Insert the stem f.s. gasket (73).

ITA
ENG

4.4.4 Per valvole tipo E0/E1:

4.4.4.1 montare la guarnizione FS perno (70) e l'o-ring perno (30) al perno (9).

4.4.4.2 Inserire la sfera (4) nel corpo in modo da avere il cuscinetto sfera (28) in corrispondenza con il foro nel corpo (1) ove verrà inserito il perno (9).

4.4.4.3 Inserire il perno (9) e il gruppo stelo/flangia premi treccia nei fori a loro corrispondenti del corpo (1).

4.4.4.4 Sollevare il corpo (1) e posizionarlo su una chiusura completa di seggio, verificando sempre le marcature eseguite prima dello smontaggio.

4.4.4.5 Applicare 4 dadi (40) e serrarli in modo da fissare il corpo alla chiusura.

4.4.4.6 Sollevare l'altro gruppo chiusura/seggio e posizionarlo sul corpo (1) fissandolo con 4 dadi (40).

4.4.5 Per valvole tipo E/E3/EP:

4.4.5.1 Mettere i supporti (9) sulla sfera (4) dopo avere sistemato il distanziale (22).

4.4.5.2 Posizionare il gruppo sfera/supporti sul seggio nella chiusura (2) assicurandosi che le spine (21) ritornino nelle loro sedi.

4.4.5.3 Posizionare il corpo(1) completo di tiranti (39) sopra la chiusura facendo riferimento ai segni fatti prima dello smontaggio.

4.4.5.4 Assemblare i dadi corpo effettuando un serraggio preliminare.

4.4.5.5 Posizionare la seconda chiusura sul corpo seguendo i segni effettuati prima dello smontaggio ed verificando che la spina (21) entri nella sua sede nella chiusura.

4.4.5.6 Assemblare i dadi corpo effettuando un serraggio preliminare.

4.4.6 Ruotare la valvola in modo da avere l'asse stelo in verticale.

4.4.7 Inserire il gruppo stelo nel corpo seguendo I segni fatti prima dello smontaggio. Se tutte le parti sono correttamente allineate il rimontaggio risulterà facile.

4.4.8 Serrare completamente tutti i dadi (40) da ambo I lati e le brugole perno e premi treccia. (vedi Appendice C) per le coppie di serraggio.

4.4.9 Montare la flangia motore (12) e le relative spine (18B), serrare quindi le relative brugole (44).

✓ ***Attenzione, una coppia di serraggio tiranti, dadi e brugole eccessiva provoca danni alle filettature. Tali danni possono causare la rottura sotto pressione del giunto flangiato con conseguenti lesioni alle persone.***

4.4.10 Montare la chiavetta stelo (20) sullo stelo (5).

4.4.11 Montare l'ingrassatore stelo (49), l'ingrassatore seggio (50), ove previsto, il drenaggio (54) e lo sfiato (52).

4.4.12 Montare l'organo di manovra verificando sempre le marcature apposte prima dello smontaggio. Fissarlo con un paio di tiranti ed eseguire qualche operazione di apertura e chiusura per verificare il perfetto funzionamento della valvola.

‼ ***Per valvole azionate da riduttore o attuatore assicurarsi che I fermi meccanici degli stessi siano tarati sia in apertura sia in chiusura.***

‼ ***Eseguire sempre un collaudo secondo API 6D per verificare che le operazioni di manutenzione siano state eseguite correttamente e per certificare la capacità di contenimento della pressione prima di re-installare la valvola in.linea***

✓ *L'istallazione in linea di valvole prive di certificato di collaudo soddisfacente può essere causa di perdite di fluido con potenziali pericoli per persone ed animali.che vivono in quell'area e con conseguenti perdite di produzione.*

❀ *L'istallazione in linea di valvole prive di certificato di collaudo soddisfacente può essere causa di perdite di fluido con potenziali pericoli per l'ambiente.*

4.5 MANUTENZIONE PERIODICA

Le valvole sono progettate per operare senza manutenzione durante un periodo che varia dai 5 ai 25 anni (a seconda del tipo di tenute). I ricambi dettagliati nel capitolo 6.0 devono comunque essere disponibili durante le fasi di avviamento, commisioning e normale funzionamento.

5.0 ESTENSIONE DI MANOVRA

Per valvole interrate con estensione di manovra fare riferimento all' Appendice B.

4.4.4 For valves type E0/E1:

4.4.4.1 Fit the trunnion f. s. gasket (70) and the trunnion o-ring (30) on the trunnion (9).

4.4.4.2 Lift the ball (4) and insert it into the body (1) until the ball bearing are correspondence of the trunnion hole in the body.

4.4.4.3 Insert the trunnion (9) and assembled gland flange group in their housing into the body following the references.

4.4.4.4 Lift the body (1) and then lower it carefully on one closure assembly, checking the correct position of the marks made during disassembling.

4.4.4.5 Fit 4 nuts (40) and tighten them to secure closure to the body.

4.4.4.6 Lift the other closure assembly (2) and lay it on the body (1) and secure it by means of 4 nuts (40)..

4.4.5 For valves type E/E3/EP:

4.4.5.1 Place the ball (4) on wood blocks in order to replace bearing retainers (9) and washer (22).

4.4.5.2 Lower ball c/w bearing retainers on seat ring in the closure and and fit closure pins (21) into matching holes.

4.4.5.3 Lower body (1) into closure (2) until studs (39) are in final position making reference to markings made before disassembling.

4.4.5.4 Fit the body nuts (40) and carry out a preliminary manual tightening using the appropriate wrench.

4.4.5.5 Lower the second assembled closure (2) over the body, checking the references and making sure that closure pins engage the appropriate holes into the closure.

4.4.5.6 Fit the body nuts (40) and carry out a preliminary manual tightening using the appropriate wrench.

4.4.6 Turn the valve bringing the stem axis in the vertical position.

4.4.7 Fit the stem/gland plate group following the marking made before disassembling. If parts are correctly aligned reassembly shall be easy.

4.4.8 Completely tighten the body stud nuts (40) on both sides of the valve, gland flange and trunnion cap screws. (Refer to Appendix C).

4.4.9 Fit the adapter plate (12) by the adapter plate pins (18B), and then lock it with the adapter plate capscrews (44).

✓ ***Be careful not to over-torque the studs, nuts and cap-screws. Damages to the threads can cause the flanged joint to fail under pressure and injury personnel performing test operation.***

4.4.10 Insert the stem key (20) on the stem (5).

4.4.11 Reassemble seat grease fitting (50), when provided, stem grease fitting (49) and the drain valve (54).

4.4.12 Reassemble the gear box operator, ensuring that all the marks previously made correspond and using only part of the fixing bolts. Carry out some opening and closing operations, verifying the perfect functioning of the operator and the valve.

‼ ***For either gear operated valves or actuated valves, make sure that travel ends act both when the valve is totally open and totally closed.***

‼ ***Always perform an API 6D pressure test before re-installing the valve into the line to verify that the maintenance operation have been satisfactorily performed and to re-certify pressure containment capability of the valve.***

✓ *Fitting the valve to the line without a previous satisfactory pressure test can cause leakage of production fluid with potential hazardous situations for human being and animals in the area and with consequent production loss.*

❀ *Fitting the valve to the line without a previous satisfactory pressure test can cause leakage of production fluid with potential hazardous situations for the environment.*

4.5 SCHEDULE OF ROUTINE MAINTENANCE

Valves are designed for a maintenance free life of 5 - 25 years (depending on seals type). Spares as detailed in 6.0 shall be available during start-up, commissioning and normal operating.

5.0 STEM EXTENSION

For buried valves having stem extension refer to Appendix B.

ITA ENG

6.0 PARTI DI RICAMBIO E CONSIDERAZIONI GENERALI

6.1 START-UP AND COMMISSIONING SPARES
Prima dello start-up/commissionino consigliamo di avere 1 set di parti di ricambio ogni 5 valvole (o frazioni).

6.2 OPERATING SPARES
Per il normale utilizzo consigliamo di avere 1 set di parti di ricambio ogni 3 valvole (o frazioni).:

6.3 LISTA RICAMBI
Vedi paragrafo 10.0.

7.0 PROCEDURA DI INIEZIONE DI GRASSO SIGILLANTE
Vedi Appendice L

8.0 ATTREZZI SPECIALI
Per lo smontaggio di valvole side entry non occorrono attrezzi speciali. E' richiesta una chiave dinamometria manuale o idraulica durante il montaggio.Per le coppie di serraggio vedi l'Appendice C.

9.0 CERTIFICATI DI PESO FINALE

Il peso della valvola è mostrato sui disegni dimensionali. Ove richiesto vengono forniti certificati di peso o "Weight Data Sheet"

10.0 DOCUMENTAZIONE DI RIFERIMENTO

10.1 SELLER DOCUMENT INDEX (solo se richiesto)

10.2 LISTA DOCUMENTI (solo se richiesto)

10.3 DISEGNI
- Disegno dimensionale
- Disegno in sezione
- Elenco particolari/materiali

10.4 In mancanza di disegni specifici vedi l' Appendice A per l'elenco dei disegni applicabili.

11.0 ANOMALIA / INDIVIDUAZIONE / RETTIFICA
Vedi Appendice D per identificazione guasti ed azioni correttive.

12.0 LISTA DELLE VALVOLE
Fare riferimento all' Appendice E.

13.0 INFORMAZIONI SUL SISTEMA DI RILASCIO PRESSIONE A CENTRO CORPO

13.1 Le valvole a sfera imperniata hanno una cavità a centro corpo dove la pressione può essere intrappolata in un volume chiuso. In queste circostanze un incremento di temperatura oppure una degradazione del fluido può risultare in un aumento incontrollato della pressione del fluido intrappolato fino a superare la pressione di progetto del contenitore della pressione.

Per evitare questa situazione tutte le valvole a sfera imperniata PIBIVIESSE hanno uno dei seguenti sistemi di rilascio pressione dalla cavità (a seconda del tipo di seggio):

Self Relieving Seats: il design dei seggi a rilascio automatico fa sì che quando la pressione della cavità corpo supera quella della linea di circa 200 - 700 kPa (2 - 7 barg) il seggio si sconnetta automaticamente dalla sfera consentendo un'equalizzazione della pressione tra cavità corpo e tubatura.

Quando uno oppure entrambe I seggi sono del tipo self relieving non c'è bisogno di alcun altro sistema di rilascio pressione dalla cavità corpo.

Pressure Relief Valve: quando entrambe i seggio non sono del tipo self relieving (ovvero sono del tipo a Doppio Effetto Pistone) la cavità corpo deve essere protetta da una Valvola di Sicurezza (PRV) tarata ad una pressione che consenta il rilascio a livelli di sicurezza.

Le valvole PRV fornite da Pibiviesse rilasciano la sovra-pressione della cavità quando eccede 1,1 volte la pressione di progetto del contenitore di pressione a cui è montata.

13.2 Istruzioni operative, collaudi periodici e manutenzione periodica dei sistemi di rilascio pressione a centro corpo sono in Appendice H.

✓ *E' obbligatorio mantenere efficiente il funzionamento del sistema di rilascio pressione a centro corpo. Il malfunzionamento dello stesso può portare alla rottura del componente in pressione con conseguente perdita di fluido e possibili lesioni alle persone, danni all'ambiente e perdita di produzione.*
Questo requisito è chiaramente evidenziato sulla maggior parte delle normative riguardanti le valvole (es. API 6D para 2.10, ANSI B16.34 para 2.3.3, ISO 14313 para 6.8 etc.).

6.0 SPARE PARTS AND GENERAL CONSIDERATION

6.1 START-UP AND COMMISSIONING SPARES
Before of the start-up/commissioning operation we suggest 1 set of spares for each 5 valves (or fraction) should be available on site.

6.2 OPERATING SPARES
For normal operating/2 years operating we suggest 1 set of spares for each 3 valves (or fraction) should be available on site.

6.3 PARTS LISTS
Refer to paragraph 10.0.

7.0 LUBRICATION PROCEDURE
Refer to Appendix L

8.0 SPECIAL TOOLS
To disassemble side entry ball valves no special tools are needed. A torque wrench or bolt tightening tool is required to tighten nuts during reassembling. For tightening torque please refer to Appendix C.

9.0 FINAL WEIGHT CERTIFICATE

Valve weights are shown on general arrangements drawings. If required weight data sheets and weight certificates can be supplied.

10.0 REFERENCE DOCUMENTATION

10.1 SELLER DOCUMENT INDEX (If required only)

10.2 LIST OF COMPANY DOCUMENTS (If required only)

10.3 REFERENCE DRAWINGS
- General arrangement
- Cross sectional drawing
- Part list

10.4 If no specific drawings are available please refer to Appendix A for the list of applicable drawings.

11.0 FAULT / FINDING / CORRECTION
Refer to Appendix D for fault identification and corrective actions.

12.0 LIST OF RELATED EQUIPMENT
Refer to Appendix E.

13.0 INFORMATION REGARDING BODY CAVITY RELIEVING SYSTEMS

13.1 Trunnion mounted ball valves do have a body cavity where pressure can be trapped into a closed volume. Under this circumstance any increase of the contained fluid temperature or any degradation of the contained fluid can result in an uncontrolled pressure increase of the trapped fluid to figures that are above the design pressures of the pressure equipment.

To avoid the above scenario, all of the Pibiviesse trunnion mounted ball valves are provided with one of the following body cavity relieving systems (depending on the design of the seats):

Self Relieving Seats : the design of self relieving seat is such that when the pressure in the body cavity excees the pressure in the line by 200 to 700 kPa (2 to 7 barg) the seat will automatically disconnect from the ball and allow pressure equalisation between the body cavity and the pipeline.

When one or both the seats are of the Self Relieving type there is no need of any other type of body cavity relieving systems.

Pressure Relief Valve : when both of the seats are not of the self relieving type (i.e. both the seats are of the Double Piston Effect type) the body cavity must be protected from overpressure by means of a Pressure Relieving Valve (PRV) set to relieve exceedes pressure.

The standard PRV provided by Pibiviesse does relieve body cavity overpressure to the atmosphere once it exceed 1,1 times the design pressure of the pressure equipment it is assembled.

13.2 Instructions on operation, scheduled testing and routine maintenance of body cavity pressure relieving systems can be found in Appendix H.

✓ *It is a mandatory requirement to keep body cavity pressure relieving system functioning correctly. Failure of the body cavity pressure relieving system can lead to failure of the pressure equipment pressure containment capability with consequent injuries to personnel, demage to the environment and los of production.*
This requirement is clearly stated on most of the valve standards (e.g. API 6D para 2.10, ANSI B16.34 para 2.3.3, ISO 14313 para 6.8 etc.).

DISEGNI DI RIFERIMENTO

I disegni listati nella seguente tabella sono forniti al fine di seguire le istruzioni di uso e manutenzione descritte in questo manuale.

Ove sono stati forniti disegni in sezioni, liste materiali etc. specifici per una particolare commessa si raccomanda di seguire le indicazioni di questo manuale sui quei documenti.

I disegni allegati a questo manuale mostrano varie tipologie sia di tenuta, in particolare tenute tipo o-ring e tenute tipo guarnizioni a labbro, sia di seggi, in particolare tenuta soffice e metallica . Le parti del disegno da considerare sono quelle applicabili alle varie forniture.

REFERENCE DRAWINGS

Drawings listed in the following table are provided to easier follow the instruction contained in this manual.

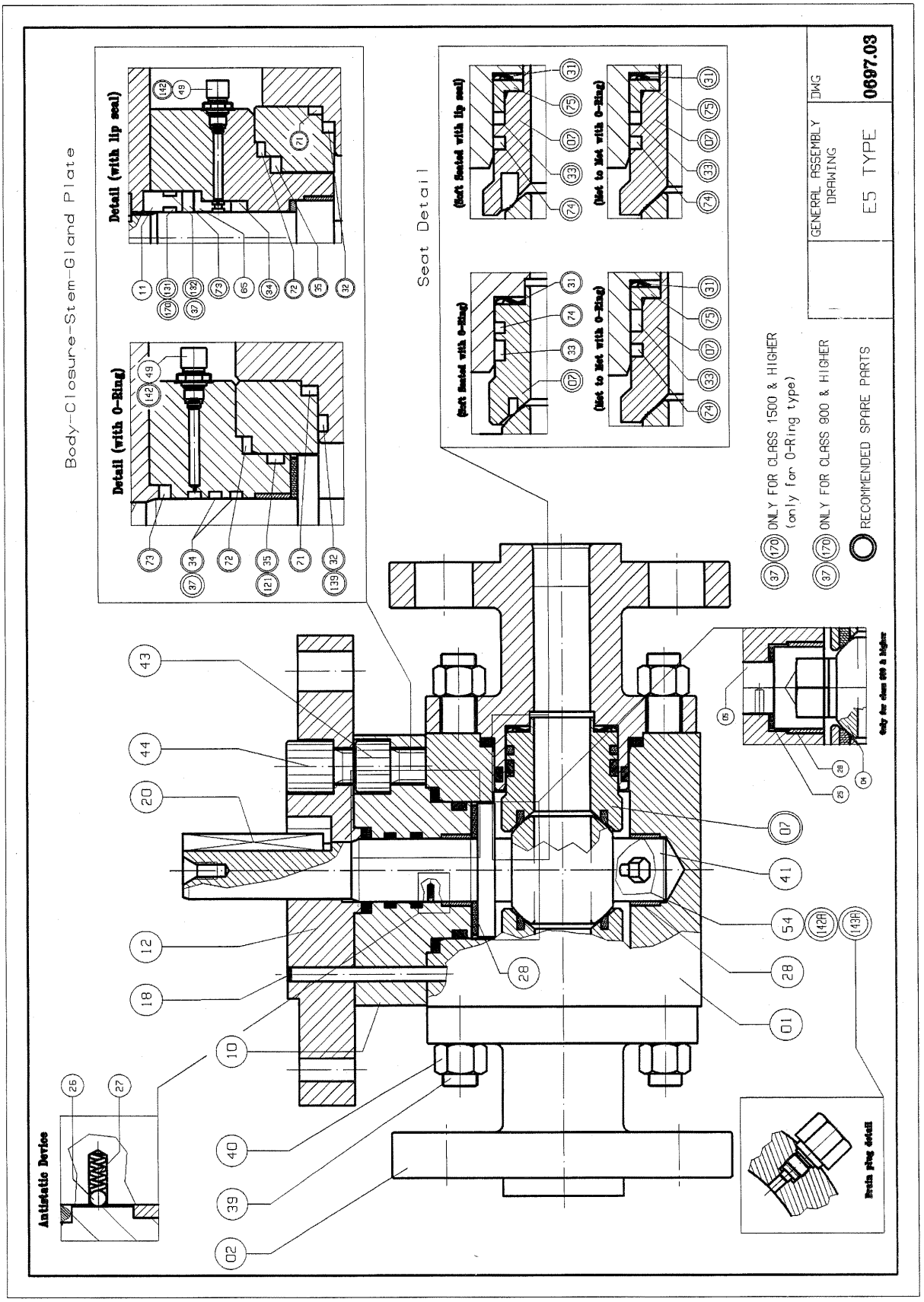
Where specific drawings, part lists etc. have been provided for a particular job we recommend to follow the instruction contained in this manual using such documents.

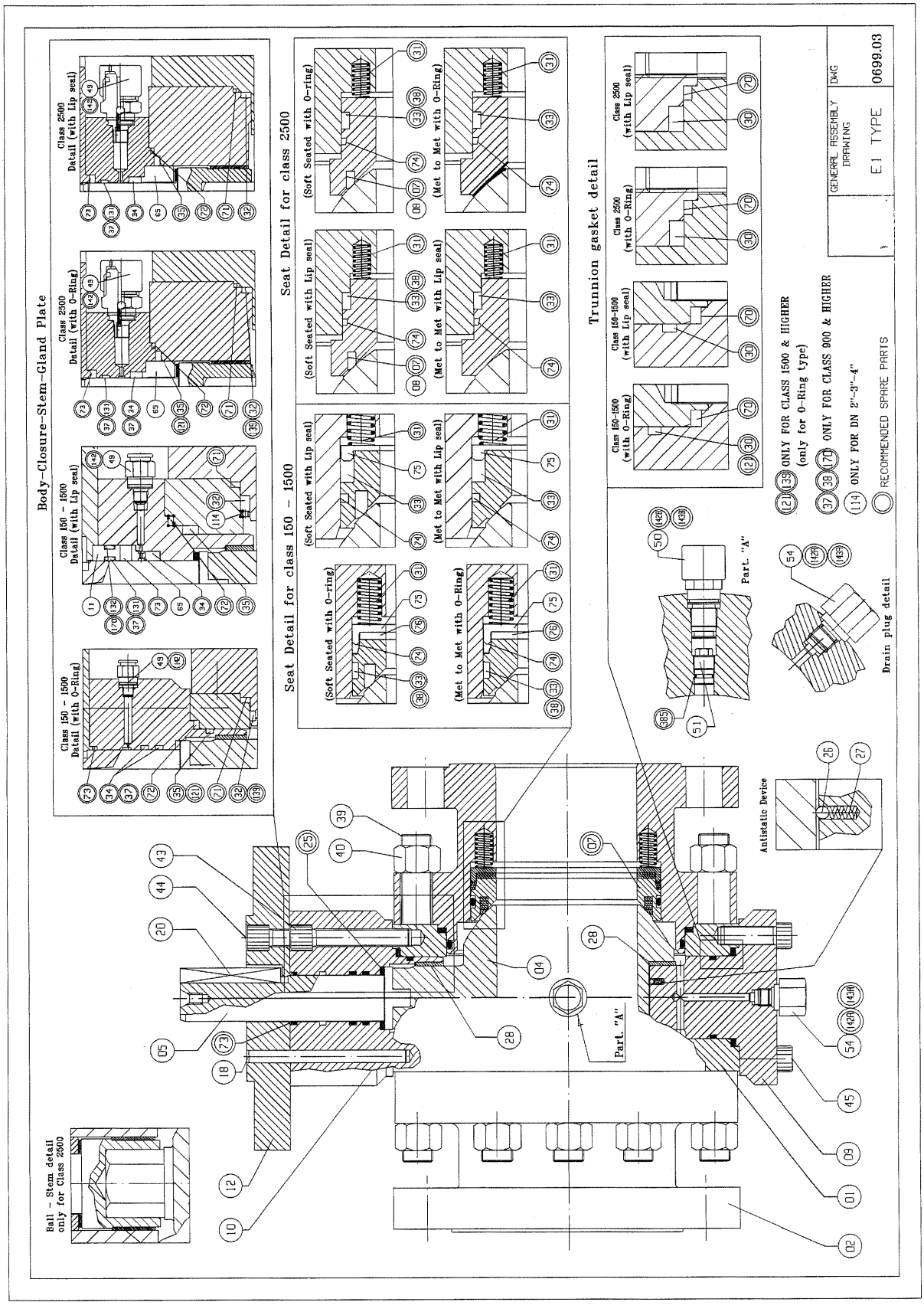
Drawings attached to this manual show various design alternatives in terms of seals (i.e. o-ring type and lip seal type) and seats (i.e. soft and metal to metal). The views to be considered on the various drawings are the ones applicable to the particular supply.

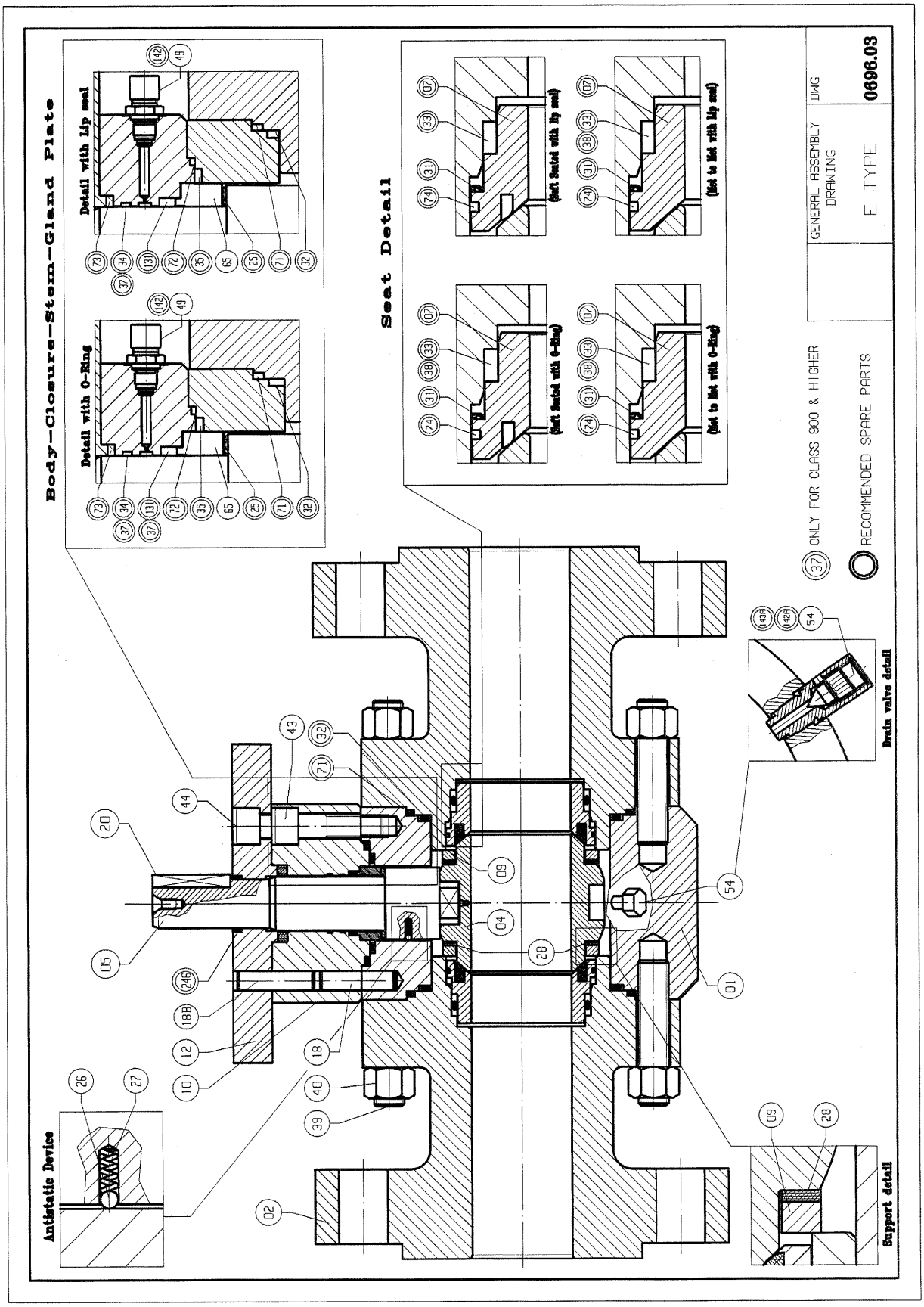
MODELLO VALVOLA ***VALVE MODEL NUMBER***	**DISEGNO IN SEZIONE** ***CROSS SECTIONAL DRAWING***
E5	**0697.03**
E0 & E1	**0699.03**
E DN40 to DN100 FB DN50 to DN150 RB	**0696.03**
E DN150 to DN300 FB DN200 to DN350 RB including DN400xDN300	**0698.03**
E3	**0700.03**
EP	**0701.03**

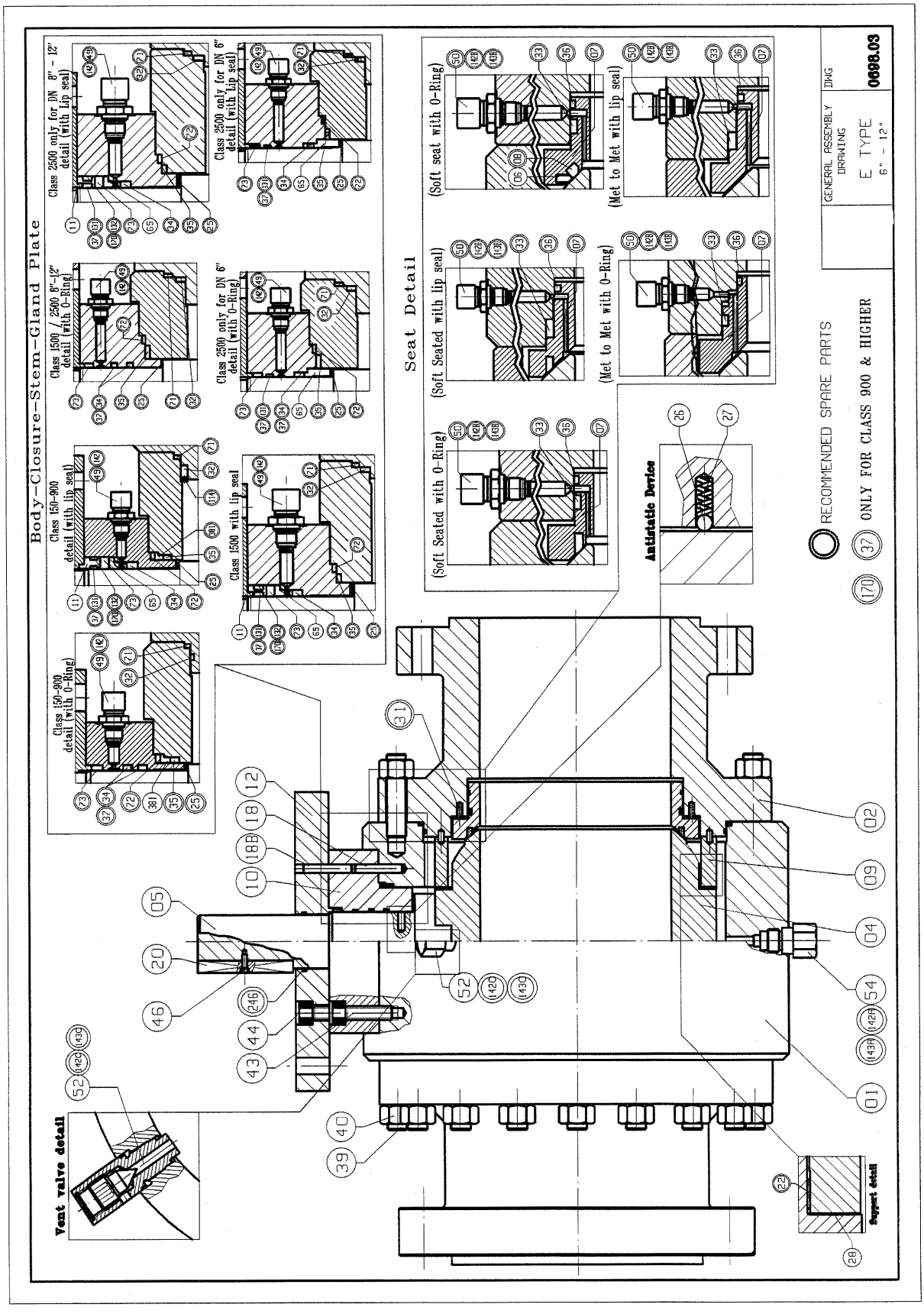
ESTENSIONE DI MANOVRA ***STEM EXTENSION***	**DISEGNO IN SEZIONE** ***CROSS SECTIONAL DRAWING***
ALL VALVES	**0709.03**

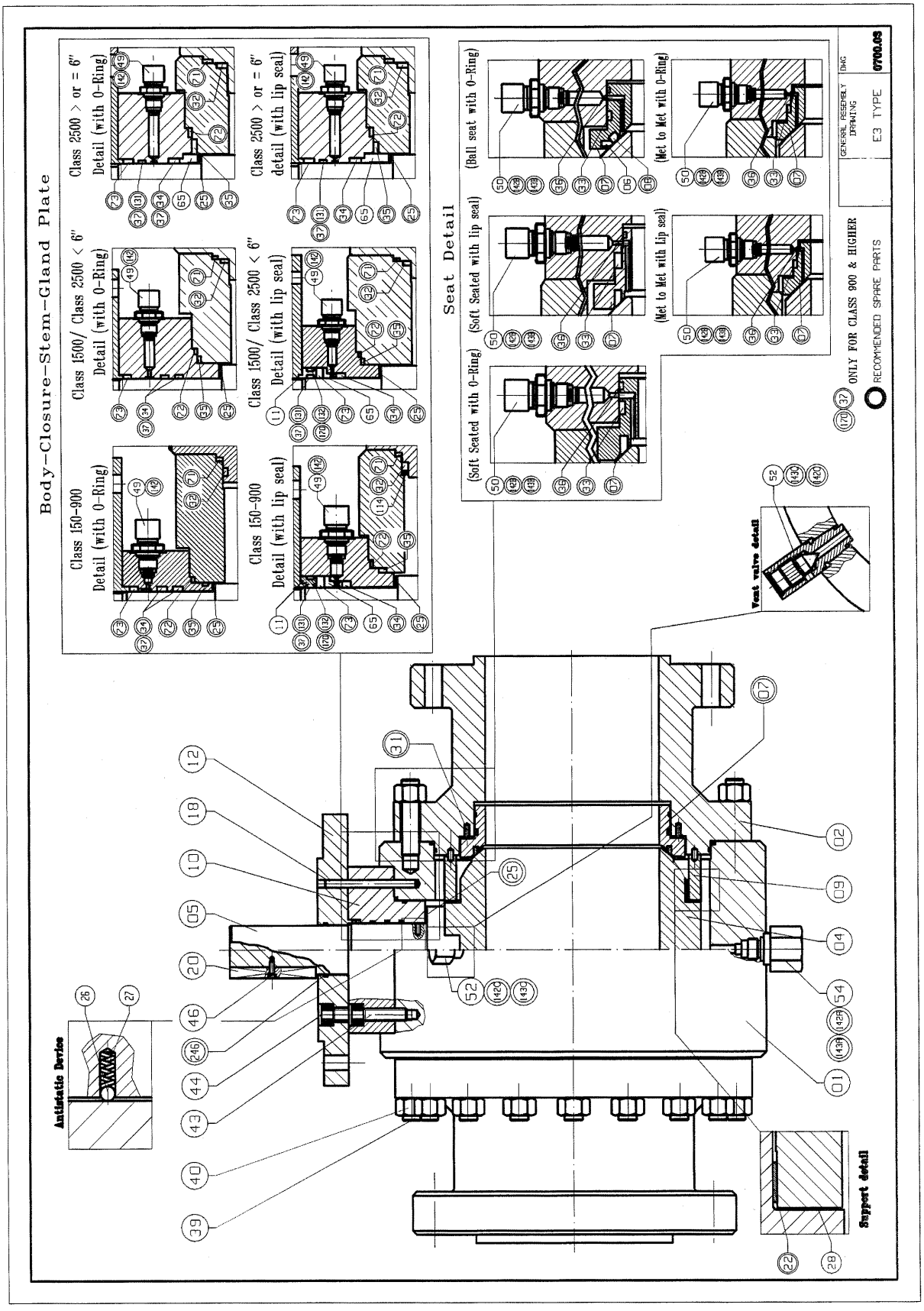
ITA
ENG

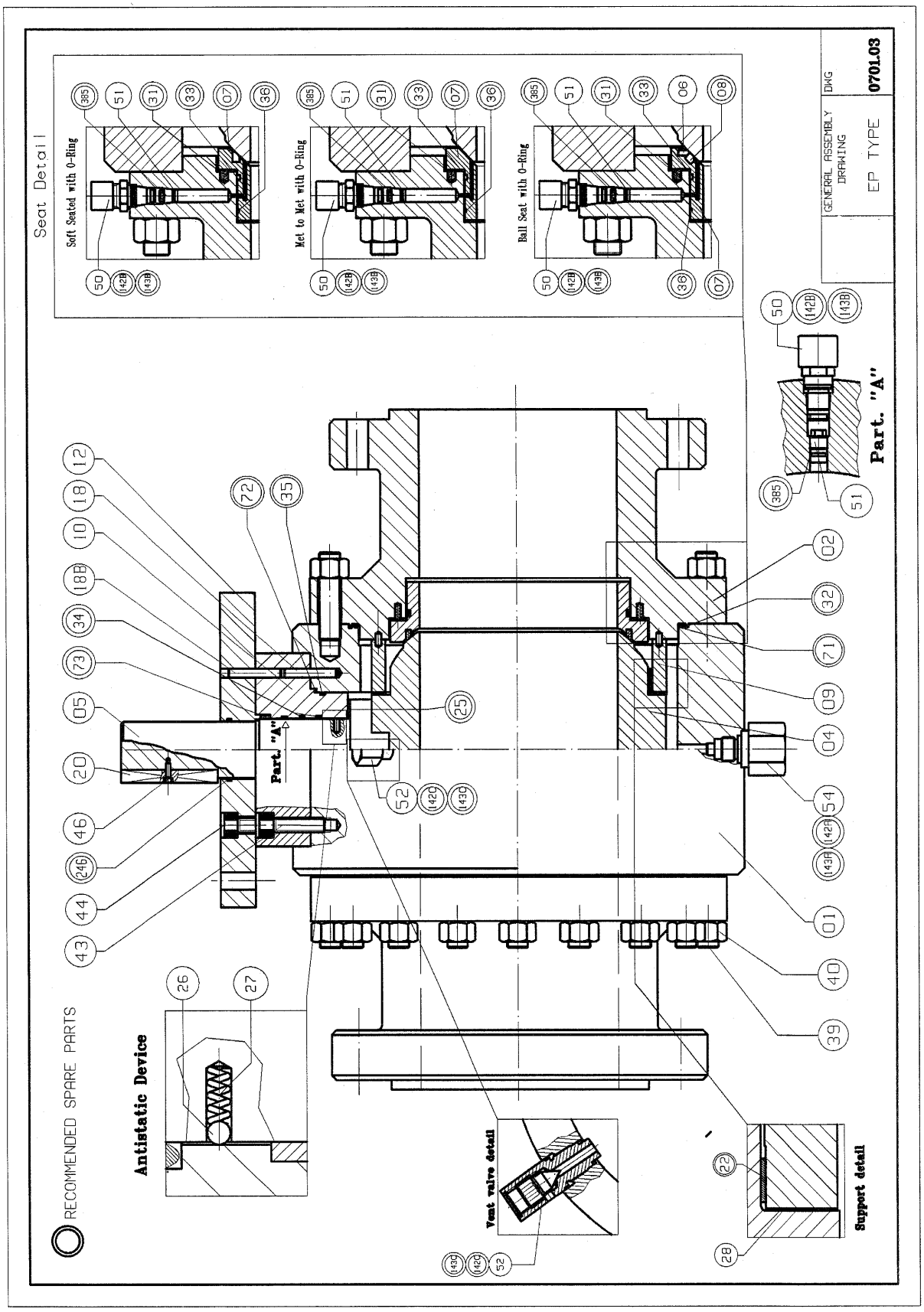

Body-Closure-Stem-Gland Plate
Detail (with lip seal)
Detail (with O-Ring)
Seat Detail
(Soft Seated with lip seal)
(Soft Seated with O-Ring)
(Met to Met with O-Ring)
(Met to Met with O-Ring)
ONLY FOR CLASS 1500 & HIGHER
(only for O-Ring type)
ONLY FOR CLASS 900 & HIGHER
RECOMMENDED SPARE PARTS
GENERAL ASSEMBLY DRAWING
E5 TYPE
DWG
0697.03
Antistatic Device
Drain plug detail

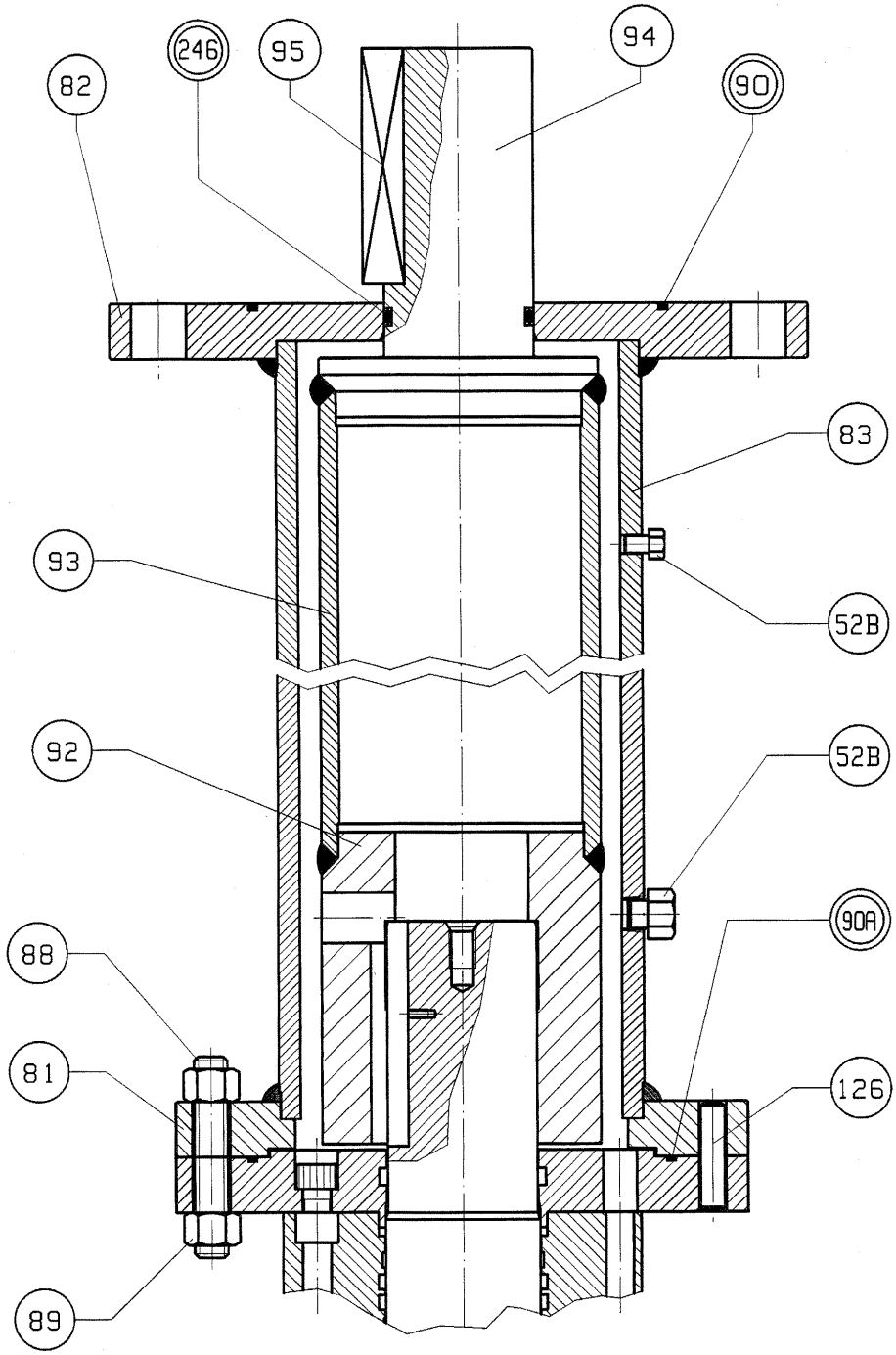

Body-Closure-Stem-Gland Plate
Class 2500 Detail (with Lip seal)
Class 2500 Detail (with O-Ring)
Class 150 - 1500 Detail (with Lip seal)
Class 150 - 1500 Detail (with O-Ring)
Seat Detail for class 150 - 1500
Seat Detail for class 2500
(Soft Seated with Lip seal)
(Met to Met with Lip seal)
(Soft Seated with O-ring)
(Met to Met with O-Ring)
Trunnion gasket detail
Class 150-1500 (with O-Ring)
Class 150-1500 (with Lip seal)
Class 2500 (with O-Ring)
Class 2500 (with Lip seal)
(2) (139) ONLY FOR CLASS 1500 & HIGHER (only for O-Ring type)
(37) (38) (170) ONLY FOR CLASS 900 & HIGHER
(114) ONLY FOR DN 2"-3"-4"
RECOMMENDED SPARE PARTS
GENERAL ASSEMBLY DRAWING
E1 TYPE
DWG
0699.03
Part. "A"
Drain plug detail
Antistatic Device
Ball - Stem detail only for Class 2500


Body-Closure-Stem-Gland Plate
Detail with Lip seal
Detail with O-Ring
Seat Detail
(Not Sealed with Lip seal)
(Not to Mat with Lip seal)
(Not Sealed with O-Ring)
(Not to Mat with O-Ring)
GENERAL ASSEMBLY DRAWING
E TYPE
DWG
0696.03
37 ONLY FOR CLASS 900 & HIGHER
RECOMMENDED SPARE PARTS
Drain valve detail
Support detail
Antistatic Device


Body–Closure–Stem–Gland Plate
Class 2500 only for DN 8" - 12" detail (with Lip seal)
Class 2500 only for DN 6" detail (with lip seal)
Class 1500 / 2500 6"-12" detail (with O-Ring)
Class 2500 only for DN 6" detail (with O-Ring)
Class 150-900 detail (with lip seal)
Class 1500 with lip seal
Class 150-900 detail (with O-Ring)
Seat Detail
(Soft seat with O-Ring)
(Met to Met with lip seal)
(Soft Seated with lip seal)
(Met to Met with O-Ring)
(Soft Seated with O-Ring)
Antistatic Device
Vent valve detail
Support detail
GENERAL ASSEMBLY DRAWING
E TYPE
6" - 12"
DWG
0698.03
RECOMMENDED SPARE PARTS
ONLY FOR CLASS 900 & HIGHER


Body–Closure–Stem–Gland Plate
Class 2500 > or = 6" Detail (with O-Ring)
Class 2500 > or = 6" detail (with lip seal)
Class 1500/ Class 2500 < 6" Detail (with O-Ring)
Class 1500/ Class 2500 < 6" Detail (with lip seal)
Class 150-900 Detail (with O-Ring)
Class 150-900 Detail (with lip seal)
Seat Detail
(Ball seat with O-Ring)
(Met to Met with O-Ring)
(Soft Seated with lip seal)
(Met to Met with Lip seal)
(Soft Seated with O-Ring)
GENERAL ASSEMBLY DRAWING
E3 TYPE
DWG
0700.03
ONLY FOR CLASS 900 & HIGHER
RECOMMENDED SPARE PARTS
Vent valve detail
Antistatic Device
Support detail


Seat Detail
Soft Seated with O-Ring
Met to Met with O-Ring
Ball Seat with O-Ring
GENERAL ASSEMBLY DRAWING
EP TYPE
DWG
0701.03
Part. "A"
Part. "A"
Antistatic Device
Vent valve detail
Support detail
RECOMMENDED SPARE PARTS



RECOMMENDED SPARE PARTS

	GENERAL ASSEMBLY DRAWING	DWG
	STEM EXTENSION	0709.03

ITA
ENG

ISTRUZIONI PER VALVOLE INTERRATE

B1.0 SCOPE

Questa appendice fornisce le istruzioni addizionali per la manutenzione di valvole con estensione di manovra per valvole interrate. Le seguenti istruzioni devono essere lette in combinazione con I paragrafi da 4.1 a 4.4 del manuale (tra parentesi sono indicati quelli applicabili). Il disegno di riferimento per l'estensione di manovra si trova in Appendice A.

B2.0 MANUTENZIONE (4.0)

B2.1 MANUTENZIONE IN ESERCIZIO (4.1)

B2.1.1 PERDITE DALLO STELO (4.1.1)

In presenza di ingrassatore stelo eventuali perdite possono essere temporaneamente eliminate o ridotte iniettando grasso sigillante nell' ingrassatore stelo (49) posizionato in cima all'estensione di manovra. Per sostituire la guarnizione stelo superiore come descritto nel manuale principale per prima cosa rimuovele l'estensione di manovra come da punto **B2.2.**

B2.1.2 PERDITE SEGGIO (4.1.2)

In presenza di ingrassatori seggio eventuali perdite possono essere temporaneamente eliminate o ridotte iniettando, con la valvola chiusa, grasso sigillante nell' ingrassatore seggio (50) posizionato in cima all'estensione di manovra.

⚠ ***Prima di smontare l'estensione marcare tutti le parti in modo indelebile in modo da poter eseguire un corretto montaggio.***

B2.2 ISTRUZIONI PER LO SMONTAGGIO (4.2)

Una volta rimosso l'organo di manovra, smontare l'estensione stelo come segue:

B2.2.1 Svitare tutte le connessioni filettate (*) sia sulle linee di drenaggio (A), ingrassatore stelo (B) ingrassatori seggio (C).
La linea di estensione dello sfiato viene fornita solo su richiesta. Se prevista occorre allentare le sue connessioni filettate.

B2.2.2 Rimuovere le fascette di fissaggio dei tubi (84) agendo sulla relativa tiranteria (86).

B2.2.3 Svitare I dati (89) e rimuovere I tiranti (88). Rimuovere la chiavetta (95).

B2.2.4 Sollevare con cautela l'estensione esterna (81+82+83) facendo attenzione a non danneggiare l'estensione interna (92+93+94) o lo stelo della valvola. Rimuovere l' o-ring (90A) dalla flangia inferiore.

B2.2.5 Sollevare con cautela l'estensione di manovra interna (92+93+94) facendo attenzione a non danneggiare lo stelo della valvola.

B2.3 VERIFICA DEI COMPONENTI (4.3)

Vedi paragrafo 4.3 del manuale principale.

B2.4 ISTRUZIONI PER IL RIMONTAGGIO (4.4)

A valvola principale rimontata e collaudata proseguire come segue:

B2.4.1 Riposizionare l'estensione di manovra interna (92+93+94).

⚠ ***Quando si posiziona l'estensione interna sullo stelo prestare particolare attenzione a non danneggiare nè lo stelo (5) ne la chiavetta (20). l'estensione interna deve essere posata seguendo un linea verticale, se dovesse tendere a bloccarsi muoverla leggermente attorno al suo asse fino allo sblocco.***

B2.4.2 Riposizionare l'estensione di manovra esterna (81+82+83) completa dell' o-ring (90A) e serrare la tiranteria (88) & (89) come da Appendice C.

B2.4.3 Rimontare la chiavetta (96).

B2.4.4 Rimontare tutti I tubi estensione serrando le connessioni filettate (*).

B2.4.5 Fissare tutti I tubi tramite le fascette (84) & (86) previste.

B2.5 COLLAUDO

Eseguire le operazioni previste al punto 4.4.12 del manuale.

NOTE (*) Le linee di estensione possono essere collegate in vari modi (a seconda delle richieste del cliente): saldate; filettate e flangiate.
Le istruzioni fornite fanno riferimento a connessioni filettate e/o flangiate. Nel caso di connessioni saldate ignorare le istruzioni contrassegnate con (*). Nel caso di connessioni flangiate assicurarsi di avere le guarnizioni di ricambio.

INSTRUCTIONS FOR BURIED VALVES

B1.0 SCOPE

This appendix describes the additional maintenance operation for valves with stem extension for buried service. The following instructions shall be read in conjunction with paragraphs 4.1 thru 4.4 of the main manual. The corresponding paragraphs, as applicable, are quoted in brackets. Typical General Assembly Drawing of the stem extension for part references can be found in Appendix A

B2.0 MAINTENANCE (4.0)

B2.1 VALVE MAINTENANCE IN OPERATION (4.1)

B3.1.1 STEM LEAKAGE (4.1.1)

In case the valve has been provided with emergency stem grease sealant injectors, stem leakage can be temporarily stopped by injecting sealing grease into the stem grease fitting (49) located at the top of the stem extension. To replace the upper stem gasket, as detailed on the main manual, first remove the stem extension as per point **B2.2.**

B3.1.2 SEAT LEAKAGE (4.1.2)

Where emergency seat grease injectors are provided, leakage through the seats can be temporarily eliminated or, at least, considerably reduced by injecting sealing grease into the seat grease fittings (50) at the top of the stem extension with the ball in the fully closed position.

⚠ ***Before disassembling the extentione it is important to mark, in a lasting way, all the parts, in order to make a correct reassembling***

B2.2 DISASSEMBLING INSTRUCTIONS (4.2)

Once the operator is removed disassemble the stem extension as follows:

B2.2.1 Unscrew all the threaded connections (*) on either the drain (A), the stem grease fitting (B) and the seat grease fitting (C) lines.
Line extending the vent connection to the surface is supplied only on request. If provided its threaded connection shall be unscrewed too.

B2.2.2 Release the pipe holding clamps (84) unscrewing screws (86).

B2.2.3 Unscrew the nuts (89) and remove the extension mounting studs (88). Remove the stem key (95).

B2.2.4 Carefully lift the outer extension (81+82+83) paying attention not to damage the inner stem extension (92+93+94) or the valve stem. Remove the seal o-ring (90A) on the lower flange (81).

B2.2.5 Carefully lift the inner stem extension (92+93+94) paying attention not to damage the valve stem.

B2.3 REVISION OF COMPONENTS (4.3)

Refer to para. 4.3 of the main manual.

B2.4 REASSEMBLING INSTRUCTIONS (4.4)

Once the valve has been reassembled up to the adapter flange (12) operate as follows:

B2.4.1 Reassemble the inner stem extension (92+93+94).

⚠ ***When laying the inner stem extension on the stem be careful not to damage both the stem (5) and the stem key (20). The inner stem extension shall be laid following a straight vertical line, if it tends to block, move it around its axis until it freely enters the stem completely.***

B2.4.2 Relocate the outer stem extension (81+82+83) complete with lower seal o-ring (90A) and tighten the locking studs (88) and nuts (89).

B2.4.3 Reassemble the stem key (96).

B2.4.4 Reassemble pipe works tightening all the threaded connections (*).

B2.4.5 Secure pipe works to the relevant clamps (84) & (86).

B2.5 TESTING

Perform activity described at point 4.4.12 of this manual.

NOTE (*) Pipe works can be connected by different methods (upon customer specification): welded; threaded connections; flanged connections.
Instruction given above make reference to the threaded connection configuration. For welded connection please ignore all the sentences containing an asterisk (*). For flanged connection suitable face gaskets shall be available for reassembling.

COPPIE DI SERRAGGIO TIRANTI
BOLT TIGHTENING TORQUE

DIMESIONE *BOLT SIZE* (metric)	CHIAVE *FLAT TO FLAT* (mm)	COPPIA DI SERRAGGIO *TIGHTENING TORQUE* (Nm)	
		(1)	(2)
M12	19	56	28
M14	22	89	45
M16	24	138	70
M18	27	190	97
M20	30	270	137
M22	32	366	186
M24	36	466	237
M27	41	680	347
M30	46	925	470
M33	50	1260	640
M36	55	1700	870
M39	60	2209	1225
M42	65	2795	1420
M45	70	3465	1765
M48	75	4224	2150
M52	80	5434	2765
M56	85	6590	3355
M60	90	8184	4165
M64	95	10032	5105
M68	100	12117	6170
M72	105	14494	7375
M76	110	17138	8725
M80	115	20108	10235
M85	120	24216	12330
M95	135	34171	17400
M100	145	40040	20385
M105	150	44814	22810

NOTE :
COLUMN **(1)** APPLIES TO : B7, L7, B7M, L7M, Gr. 660, DUPLEX.
COLUMN **(2)** APPLIES TO : B8, B8M.
The above figures apply to dry bolts and nuts. For lubricated or PTFE coated studs and nuts multiply the above figures by 0,8.
I valori sopradescritti si intendono per tiranti montati a secco. Per tiranti lubrificati oppure teflonati moltiplicare i valori per 0,8.

ITA
ENG

ANOMALIA *FAULT*	INDIVIDUAZIONE *FINDING*	RETTIFICA *CORRECTION*
Perdite Seggio *Seat leakage*	In sospetto di perdite seggio • Chiudere la valvola. • Scaricare la pressione da centro corpo tramite valvola di sfiato/drenaggio (ove prevista). • Consentire al sistema di stabilizzarsi per circa mezz'ora. • Se la valvola tiene nessun fluido dovrebbe fuoriuscire dalla cavità. *When in suspect of seat leakage* • *Stroke the valve to the fully closed position.* • *Discharge the residual pressure left inside the body cavity through the drain valve and the vent plug (when provided).* • *Allow the system to stabilize for half an hour minimum.* • *If the valve is tight no water should drip out the drain valve.*	Piccole perdite possono essere fermate o ridotte iniettando grasso sigillante tramite gli ingrassatori (vedi paragrafo 4.1.2). Grosse perdite richiedono lo smontaggio della valvola (vedi paragrafo 4.2) *Small leaks can be stopped by injecting sealant into grease nipples (refer to paragraph 4.1.2).* *Bad ones require replacement of seat seals (refer to paragraph 4.2).*
Perdite verso l'esterno *Body leakage*	Quando i collegamenti flangiati perdono fluido verificare che le coppie di serraggio dei tiranti del giunto flangiato sono in accordo con l'Appendice C. *When any of the body flanged connections drips verify that the bolt tightening torque of the joint concerned is in accordance with Appendix C.*	Le perdite verso l'esterno possono essere fermate sostituendo le guarnizioni del corpo (vedi paragrafo 4.2) *External leaks can be stopped replacing body gaskets.* *(Refer to paragraph 4.2).*
Aumenti della coppia di manovra *Increase in torque requirements*	Un lieve aumento della coppia di manovra è naturale durante la vita operativa della valvola ed è stato considerato nel dimensionamento dell'organo di manovra. Questi aumenti di coppia tendono a stabilizzarsi nel tempo. Aumenti di coppia che non tendono a stabilizzarsi possono essere causati da elementi esterni come sabbia/terra intrappolata tra stelo e flangia motore/premi treccia o da oggetti, lasciati nella tubatura, che si intrappolano tra seggio e sfera. *A slight increase in the valve torque requirement is natural during the valve life and has been taken in account when designing the operator device.* *This torque increment trends to stabilize with time.* *Torque increasing rate that does not trend to stabilize can be caused by external effects such as sand/debris trapped between stem and adapter flange or foreign objects, left into the pipeline, that gets trapped between seats and ball.*	Iniettare fluido di pulizia e/o grasso lubrificante tramite l'ingrassatore stelo (49) oppure tramite gli ingrassatori seggio (50), come applicabile (vedi Appendice L). Se questa operazione non porta alcun miglioramento smontare il gruppo stelo/premi treccia e verificare lo stato dei componenti (vedi paragrafo 4.1.1). *Inject lubricant grease through the stem grease fitting (49).* *If this operation does not bring any benefit dismantle the stem/gland flange group and verify no galling, scores or damages has occurred.* *(Refer to paragraph 4.1.1).*

Applicabilità del presente manuale / Applicability of this manual

Il presente manuale è applicabile alle seguenti valvole:

This O&MM is applicable to the following valves:

Dimensioni Size	Class	Model	Drawing
DN15 – DN25 FB e DN40 RB ½" to 1" FB and 1½" RB	150 300 400 600 900 1500 2500 4500	E5	0697.03
DN40 – DN100 FB e DN150 RB 1½" to 4" FB and 6" RB	150 300 400 600 900 1500 2500 4500	E0 E1 E	0699.03 0699.03 0696.03
DN150 – DN300 FB DN350xDN300 e DN400xDN300 6" to 12" FB 14"x12" and 16"x12"	150 300 400 600 900 1500 2500 4500	E	0698.03
DN350 – DN1500 FB DN400xDN350 e DN450-DN1500 RB 14" to 60" FB 16"x14" and 18" to 60" RB	150 300 400 600 900 1500 2500 4500	E3 EP	0700.03 0701.03

ITA
ENG

MASSIMI CARICHI ESTERNI AMMISSIBILI
MAXIMUM DESIGN EXTERNAL LOADS

DN	CLASS	P [Mpa]	Maximum Bending Moment [Nm]	Maximum Axial Thrust [N]
1-1/2	150 - 600	9,93	1470	11337
1-1/2	900 - 1500	24,82	1230	28343
1-1/2	2500	41,37	1890	25423
2	150 - 600	9,93	2250	20066
2	900 - 1500	41,37	1750	83607
2	2500	41,37	2730	59543
3	150 - 600	9,93	6560	45254
3	900	14,89	6010	67882
3	1500	24,82	4900	113136
3	2500	41,37	10200	110831
4	150 - 600	9,93	10800	80452
4	900	14,89	9600	120678
4	1500	24,82	7100	201131
4	2500	41,37	14900	247610
6	150 - 600	9,93	28800	181160
6	900	14,89	24800	271740
6	1500	24,82	29300	417384
6	2500	41,37	42600	563948
8	150 - 600	9,93	77600	321999
8	900	14,89	68400	482999
8	1500	24,82	101000	731056
8	2500	41,37	145000	1027298
10	150 - 600	9,93	140000	504650
10	900	14,89	122000	756975
10	1500	24,82	196000	1133939
10	2500	41,37	277000	1603349
12	150 - 600	9,93	197000	723881
12	900	14,89	166000	1085821
12	1500	24,82	298000	1625570
12	2500	41,37	435000	2308822
14	150 - 600	9,93	232000	882828
14	900	14,89	379000	1226036
14	1500	24,82	391000	1964168
16	150 - 600	9,93	291000	1169447
16	900	14,89	482000	1640857
16	1500	24,82	599000	2552773
18	150 - 600	9,93	351000	1496293
18	900	14,89	590000	2116016
18	1500	24,82	727000	3319604
20	150 - 600	9,93	412000	1863364
20	900	14,89	799000	2616002
20	1500	24,82	1040000	4072898
22	150 - 600	9,93	470000	2270662
22	900	14,89	930000	3208039
24	150 - 600	9,93	530000	2718186
24	900	14,89	1210000	3818342
26	150 - 600	9,93	940000	3142668
26	900	14,89	1540000	4481755
28	150 - 600	9,93	1050000	3665608
28	900	14,89	1920000	5197344
30	150 - 600	9,93	1150000	4228775
30	900	14,89	2370000	5965575
34	150 - 600	9,93	1970000	5393004
34	900	14,89	3440000	7663863
36	150 - 600	9,93	2810000	5984898
36	900	14,89	4090000	8591069
40	150 - 600	9,93	3300000	7453152
40	900	14,89	5610000	10606506
42	150 - 600	9,93	5490000	8146270
48	150 - 600	9,93	8200000	10639818

ITA
ENG

Scarico Pressione dalla Cavità Corpo Istruzioni per la Manutenzione

Tutte le valvole a sfera imperniata PIBIVIESSE sono dotate di un sistema di rilascio sovra-pressione a centro corpo (vedi sezione 13 di questo manuale).

Questo sistema di rilascio pressione è molto importante per evitare sovra-pressioni e conseguentemente danni al contenitore della pressione.

Si raccomanda fortemente di tenere il sistema di rilascio pressione a centro corpo sotto controllo eseguendo, come minimo, le seguenti verifiche periodiche :

Self Relieving Seats

I seggi Self Relieving sono progettati per intervalli di manutenzione compatibili con quelli della valvola (vedi para 4.5). Nel caso di danni al seggio lo stesso tende a rilasciare in sicurezza (cioè a pressioni più basse), e quindi offre una protezione intrinseca al contenitore di pressione. Raccomandiamo di verificare la funzione di self relieving and ogni intervento di manutenzione .

Per verificare la funzione di self relieving chiudere completamente la valvola con entrambe i lati a pressione atmosferica, indi aumentare la pressione a centro corpo in step e verificare costantemente ambo i lati della valvola (i seggi self relieving devono rilasciare a pressioni differenziali tra centro corpo e linea comprese tra 0,5 e 1,0 Mpa).

Nel caso di fluidi particolarmente sporchi o dove sorgano dubbi sul funzionamento della funzione self relieving, la stessa si può verificare anche in esercizio.

Safety Relief Valve

Ove viene fornita una valvola di sicurezza, la stessa è stata calibrata e collaudata da Pibiviesse S.p.a per rilasciare ad una pressione pari a circa 1,33 la MOPR della valvola .

Tutte le SRV fornite da PIBIVIESSE non richiedono manutenzione periodica.

Le SRV devono comunque essere sostituite ogni volta che scaricano pressione (ovvero ad ogni pop-off).

Si raccomanda inoltre la sostituzione delle SRV ad ogni manutenzione della valvola principale.

Usare sempre e solo SRV originali della PIBIVIESSE.

Body Cavity Relieving Systems Operating & Maintenance Instructions

All of the Pibiviesse S.p.a trunnion mounted ball valves are provided with a device to relieve excess body cavity pressure (please refer to section 13 of this manual).

This pressure relieving system is very important to avoid over-pressurisation and consequential damages of the pressure containing components.

We strongly recommend to keep the body cavity pressure relieving system provided on your valves under control by performing, as a minimum, the following periodical checks:

Self Relieving Seats

Self relieving seats are designed for a maintenance free life similar to the valve (please refer to para 4.5 of this manual). In case of seat failure the same are designed to fail safe (i.e. relieve at lower pressure) and therefor to intrinsically protect the pressure equipment. We anyway recommend that the self relieving capability of the seats is checked every time the valve is disassembled and reassembled for maintenance.

To assess pressure relieving performance of the seats operate the valve to the fully closed position, with both sides of the valve at atmospheric pressure pressurise the body cavity in steps and constantly check either side for the valve for pressure relieve (self relieving seats shall relieve at pressures between 0,5 to 1,0 Mpa in excess of the line pressure).

With particularly dirty fluids or where in doubt the same check can be performed with the valve in operation.

Safety Relief Valve

When a safety relief valve is connected to the body cavity, the same has been pre-setted and tested in the factory to relieve at approx. 1,33 times the MOPR of the valve.

All of the Pibiviesse's provided SRV are designed for a maintenance free life and therefor do not require any routine maintenance.

SRV do require to be changed every time they pop-off (i.e. every time they relieve overpressure).

We also recommend to change the PRV every time the valve is disassembled and reassembled for routine maintenance. We recommend to use only genuine spare PRV from Pibiviesse S.p.a.

ITA
ENG

ISTRUZIONI PER LA MOVIMENTAZIONE, LO STOCCAGGIO E L'ISTALLAZIONE

1. GENERALITA'

1.1. Tutte la valvole a sfera PIBIVIESSE sia manuali che motorizzate (di seguito indicate come valvole) sono consegnate verniciate, imballate e protette secondo i requisiti concordati con il cliente in fase d'ordine, identificate secondo le richieste del cliente (es. Tag n°, MESC n°, data sheet n° ecc.) ed hanno un numero di serie univoco assegnato dal PIBIVIESSE (Serial Number).
Il numero di serie PIBIVIESSE è stampigliato sul corpo valvola e deve sempre essere citato per ogni richiesta riguardante la valvola stessa.

1.2. Le valvole, incluso quelle a ritorno a molla tipo fail open, sono normalmente spedite in apertura con protezioni di plastica o legno per evitare l'ingresso di materiale contaminante nel passaggio.
Le valvole a ritorno a molla tipo fail close, sono spedite in posizione di chiusura.

2. STOCCAGGIO VALVOLE

Per l'immagazzinamento delle casse contenenti le valvole prestare particolare attenzione sia alle marcatura esterne alla cassa sia ai limiti di impilamento. Se non diversamente concordato le casse fornite da PIBIVIESSE non sono adatte ad essere immagazzinate una sopra l'altra. La non osservanza delle raccomandazioni per la movimentazione potrebbe portare a seri infortuni al personale e danneggiamento dei prodotti in esse contenuto.

2.1. Al ricevimento a destinazione verificare accuratamente che le casse non siano state danneggiate durante il trasporto. Quando ritenuto necessario le casse possono essere aperte per verificare la condizione del contenuto. Dopo l'ispezione richiudere e/o riparare le casse nel caso servano per la conservazione delle valvole.

2.2. Quando possibile le valvole devono essere conservate in un capannone, che siano nelle loro casse o no. In nessun caso rimuovere le protezioni del passaggio (se rimosse per ispezione periodica, queste ultime devono essere re-istallate come da fornitura originale). Nel caso di conservazione fuori dalle casse prestare attenzione a non mettere in contatto acciai inossidabili con acciai al carbonio per evitarne la contaminazione. E' vietata la molatura di acciaio al carbonio nelle vicinanze di valvole in acciaio inossidabile.

2.3. Per la conservazione all'aperto occorre prendere tutte le precauzioni necessarie al fine di evitare danni sia alla cassa, sia al suo contenuto a causa delle condizioni climatiche applicabili e/o prevedibili. Le casse di legno devono come minimo essere protette con fogli di plastica o materiale simile, assicurandosi che non ci siano rotture e/o fori e che siano saldamente fissate alle casse. Le casse devono essere staccate dal suolo e la loro condizione deve essere controllata almeno ogni due mesi.

2.4. Se non preventivamente stipulato sull'ordine d'acquisto, PIBIVIESSE non accetta alcuna responsabilità per danni derivanti dalla conservazione all'aperto per periodi superiori a due mesi.

2.5 Per lunghi periodi di conservazione seguire le istruzioni date in 2.1 & 2.2. Eseguire le ispezioni richiesta almento ogni sei mesi dalla data di ricevimento. La frequenza e lo scopo di queste ispezioni deve essere valutata dall'ispettore considerando lo stato del materiale ispezionato e le condizioni ambientali specifiche. Ove possibile la no conservare le valvole all'aperto.

2.6 Si sconsigli l'uso di lubrificanti e/o sigillanti durante la conservazione.

2.7 L'utilizzo di rivestimenti protettivi non è generalmente necessario. Limitarne l'uso alle aree ove compaiano eventuali tracce di ruggine.

2.8 STOCCAGGIO DELLE PARTI DI RICAMBIO

2.8.1 Al ricevimento a destinazione verificare accuratamente che le casse non siano state danneggiate durante il trasporto. Quando ritenuto necessario le casse possono essere aperte per verificare la condizione del contenuto. Dopo l'ispezione richiudere e/o riparare le casse nel caso servano per la conservazione delle valvole.

2.8.2 I ricambi devono sempre essere stoccati in magazzini chiusi. Per i componenti metallici si raccomanda la conservazione nelle confezioni originali. I componenti non metallici possono essere stoccati anche in altri contenitori, a seconda delle loro dimensioni, protetti dalla luce solare, dal calore (temperatura <= 49°C), dal contatto con liquidi e da danni derivanti da ozono e fonti radioattive.

INSTRUCTIONS FOR STORAGE, HANDLING AND INSTALLATION

1. GENERAL

1.1. All PIBIVIESSE manual and actuated ball valves (in this specification, identify as valve) are delivered painted, packed and protected to customer requirements (as per purchase order), fully identified with customer identification numbers (e.g. tag n°, MESC n°, data sheet n° etc.) and in addition with a PIBIVIESSE unique manufacturing number (i.e. Serial Number).
The PIBIVIESSE serial number is hard stamped onto the body of the valve and shall always be quoted for any enquiry related to a particular valve.

1.2. Valve, including fail open actuated valves, are normally shipped in the fully open position with wooden or plastic covers to protect the ends from ingress of foreign matters.
Valves shipped complete with fail to close spring return actuators are shipped in the fully closed position.

2. VALVE STORAGE

Special care to the marking applied on the crates, and particularly to piling instructions, must be taken during storage / stowage of the box containing the valves. Unless otherwise agreed, PIBIVIESSE wooden boxes are not suitable for storage / stowage one on top of the other. Non observance of crates handling marking could lead to serious injuries to people and damages to the goods.

2.1. On arrival at site an accurate checking of the boxes must be carried out in order to verify if any damage have been occurred during transportation. When deemed necessary the box can be opened to verify the condition of the content. After inspection if valves are to be stored into the wooden box it shall be repaired/restored as originally.

2.2. When is possible valves shall be stored in a warehouse both into the wooden boxes or without it. Valves shall never be stored without ends protection to prevent from ingress of foreign matters. If removed for periodical inspection purposes protections shall be re-installed as originally. When stored without wooden box, care shall be paid not to put stainless steel valves and/or components in contact with any carbon steel component and/or structure to avoid contamination. Also grinding of carbon steel components near stainless steel valve shall be avoided.

2.3. For storage in open air, special precautions should be taken to avoid both package and valve get damaged by environmental condition. Wooden boxes shall be as a minimum protected using cellophane or similar sheets without tears and/or holes adequately fixed and boxes lifted from the ground. Boxes condition shall be checked maximum every two months.

2.4. For storage periods over two months in un-covered areas PIBIVIESSE do not take any responsibility unless this requirement has been agreed on purchase order.

2.5. For long period storage, instruction given in 2.1 & 2.2 shall be followed and inspection of the goods therein indicated, repeated maximum after six month from the receiving. Frequency and extension of the following inspections shall be evaluated by the inspectors, taking in consideration the condition of the material detected during the previous checks and the general environmental condition. Storage in open space if possible shall be avoided.

2.6. Lubrication during storage is not recommended.

2.7. Protective coating application is generallly not necessary. Interventions will be limited to the areas where eventual sings of rust are detected.

2.8. SPARE PARTS STORAGE

2.8.1 On arrival at site an accurate checking of the boxes must be carried out in order to verify if any damage have occurred during transportation. When deemed necessary the box can be opened to verify the condition of the content. After inspection, if used for storage, wooden box shall be repaired/restored as originally.

2.8.2 Spares shall always be stored in a warehouse. For metallic components, storage into the original boxes is preferred; non metallic components can be stored in other suitable containers, depending on their dimensions, providing they are protected from direct natural light, heat (max temp. 49°C), contact with liquids and from ozone and radiographic damage.

2.8.3 Gli elastomeri devono essere conservati al buio. Se conservati per lungo tempo considerare una scadenza pari a 5 anni.

2.8.4 I ricambi devono essere conservati protetti contro eventuali danni e/o contaminazioni. Se le protezioni vengono rimosse per eseguire delle ispezioni, le stesse devono essere re-istallate come in origine.

3. MOVIMENTAZIONE

3.1 Gli imballi sono forniti con indicazioni riguardanti la movimentazione e la sovrapposizione che devono sempre essere seguite.

3.2 Le valvole DN 150 e superiori sono fornite con orecchiette di sollevamento.
Gli organi di manovra possono avere i loro punti di sollevamento che sono da intendersi dimensionati solo per il loro peso.
I punti di sollevamento degli organi di manovra non devono essere utilizzati per la movimentazione dell'assieme valvola/attuatore.

3.3 La procedura di movimentazione raccomandata per il sollevamento con funi è mostrata in Fig. 1.
Si possono utilizzare altri organi di sollevamento muniti di ganci.
Non utilizzare catene al posto di funi per sollevamenti come da fig.1
Verificare sempre il SWL e lo stato di conservazione degli apparecchi di sollevamento prima di ogni movimentazione.

3.4 Durante la movimentazione mantenere tutte le protezioni del passaggio.

3.5 Prestare attenzione a non danneggiare la verniciatura durante le operazioni di movimentazione.

4. ISTALLAZIONE

4.1 Le valvole, come fornite, sono pronte per l'istallazione una volta rimosse sia le protezioni del passaggio sia i rivestimenti anticorrosivi dalle superfici di tenuta delle flangie.

⁝ Per rimuovere i rivestimenti anticorrosivi non usare attrezzi appuntiti che possano danneggiare le superfici di tenuta, usare sono solventi poco aggressivi del metallo base.

❀ I residui delle sostanze rimosse ed i materiali di imballaggio e protezione devono essere smaltiti in accordo con le leggi locali in materia di salvaguardia ambientale ed in accordo con le raccomandazioni del fabbricante. Non disperdere tali sostanze nell'ambiente.

4.2 Le tubazioni ove la valvola verrà istallata devono essere pulite, prive di sabbia, avanzi di saldatura, rifiuti, pezzi di legno e/o qualsiasi altro oggetto che possa danneggiare la valvola durante l'utilizzo.

4.3 Per le valvole che sono state immagazzinate per un lungo periodo è buona norma e fortemente raccomandato eseguire un collaudo funzionale dei seggi ad alta pressione al fine di verificare le capacità operative e di tenuta della valvola.

4.4 Le valvole PIBIVIESSE, anche se previste di ingrassatori di emergenza, non richiedono alcun tipo di lubrificazione prima dell'istallazione. Gli ingrassatori di emergenza sono forniti solo per poter eliminare/ridurre eventuali perdite attraverso i seggi e/o lo stelo, qualora si verificassero. La procedura da seguire per l'eliminazione di eventuali perdite è descritta in questo manuale all'Appendice L.

4.5 Nonostante vengano considerati carchi esterni nella progettazione delle nostre valvole, è buona norma posizionare le valvole in zone della tubazione ove carichi assiali, azioni di taglio e momenti sia flettenti, sia torcenti siano al minimo.

⁝ Prestare particolare attenzione al posizionamento delle valvole top entry. Non ci devono essere carichi esterni durante le operazioni di manutenzione delle stesse.

4.6 Istallazione di valvole frangiate (vedi Fig. 2)

4.6.1 Verificare allineamento, parallelismo ed angolazione delle flangie di linea prima dell'istallazione della valvola. In caso di problemi o non conformità no istallare la valvola prima della loro risoluzione.

4.6.2 Non istallare la valvola se le flangie di linea sono fuori tolleranza. Questo produrrà stress indesiderati sulla giunzione e potenziali situazioni di pericolo. Le tolleranze, prima del serraggio dei tiranti, sono: allineamento superfici di tenuta entro 0,5 mm ogni 200 mm (1/32 in./ft) misurate su ogni diametro; allineamento fori tiranti entro 1 mm (1/8 in.) massimo. (come da punto 335.1.1 (c) della B31.3-1999)

2.8.3 Elastomers to be hold for long period need to be held in the dark. Shall be noted that use of elastomers kept in stock for over five years is not advisable.

2.8.4 Spares shall never be stored without protection to prevent damages and contamination.. If removed for periodical inspection purposes protection shall be re-installed as originally.

3. HANDLING

3.1 Pallets, boxes, crates are provided with lifting/piling indications that shall be followed at all times.

3.2 PIBIVIESSE ball valves 6" full bore and larger are provided with lifting lugs.
Operators like gearboxes or actuators may have their own lifting points that are intended and designed to bear the load of the operator only.
Operators lifting points shall not be used to lift the valve/operator assembly.

3.3 Recommended handling procedure when lifting with slings is shown in fig.1.
Other lifting equipment provided with hooks can be used instead.
Chains shall not be used instead of slings using procedures in fig.1
Lifting equipment SWL shall always be double check prior to any lift.

3.4 During lifting/handling always keep valve protection in place to avoid foreign matter from entering the valve bore.

3.5 Attention shall be paid not to damage the valve painting during lifting/handling operations.

4. INSTALLATION

4.1 Valves, as delivered, are ready for installation once valve bore protections and rust-preventive compounds from flanges gasket surfaces are removed.

⁝ To remove rust preventive compounds do not use sharp tools, that may damage the flange sealing surfaces, but only a light solvent.

❀ Residuals of removed compounds and materials used for packing and protection shall not be disposed in the environment. They shall be disposed in accordance with the local regulations and with the relevant manufacturers recommendations.

4.2 The pipeline where the valve is installed shall be clean, free from sand, welding slag's, debris, pieces of wood and/or any other foreign matter that can damage the valve seats during valve operation.

4.3 Is a general good practice and strongly recommended for valves which have been kept in stock for a long period, to perform, before installation, an hydraulic high pressure seats and stroke test, to verify the seats sealing and operability of the valves.

4.4 PIBIVIESSE valves, even if provided with emergency sealant injectors, do not need to be lubricated prior to installation. Sealant injection points are provided to eliminate/reduce seat and stem leaks only when same occurs. Procedure for emergency sealant injection is available on request or can be found in the Maintenance Manual Appendix L.

4.5 Despite some external loads are considered in the design of our valves, it is always good practice to locate the valves where they are subjected to the minimum bending moment and axial loads imposed by the pipeline.

⁝ Special care shall be taken when locating top entry ball valves. There should be no external loads imposed to the valve by the pipeline during maintenance operations.

4.6 Installation of flanged ends valves (see fig. 2)

4.6.1 Check alignment, parallelism and squareness of pipeline flanges prior to installation of valve. Should any misalignment and/or other non conformity on the pipeline flanges be detected do not fit the valve prior to rectify the problem.

4.6.2 Do not fit the valve if pipeline flanges are out of tolerances. This will result in the valve being over-stressed and thus generating a potential dangerous situation. Tolerance: before bolting up, flange faces shall be aligned to the design plane within 0,5 mm in 200 mm (1/32 in./ft) measured across any diameter; flange bolt holes shall be aligned within 1 mm (1/8 in.) maximum offset. (as per 335.1.1 point (c) of B31.3-1999 Edition)

4.6.3 Le valvole non sono progettate per correggere eventuali errori di posizioni delle flangie di linea.

4.7 Istallazione di valvole con finale a saldare (vedi Fig. 2)

4.7.1 Verificare allineamento, parallelismo ed angolazione del tubo adiacente prima di eseguire la saldatura della valvola. In caso di problemi o non conformità non istallare la valvola prima della loro risoluzione.

4.7.2 Utlizzare sempre WPS formalizzate, supportate da WPQR valide ed approvate ed eseguite da saldatori qualificati per il giunto da saldare.

4.7.3 La temperatura esterna della valvola nella zona seggi deve essere monitorata sia durante la saldatura che durante il PWHT. La temperature in quella zona non deve mai superare i 120°C.

4.7.4 Ove è richiesto il PWHT si raccomanda l'utilizzo di tronchetti di transizione da applicare in PIBIVIESSE prima della consegna.

4.8 Una volta terminate le operazioni di istallazione si raccomanda l'esecuzione di un collaudo funzionale per assicurarsi il corretto funzionamento della valvola.

4.9 Verificare sempre il serraggio delle connessioni al corpo prima delle operazioni di commisiioning/start-up e del collaudo in linea. Le connessioni al corpo non devono mai essere rimosse quando la valvola è in pressione. L'allentamento delle connessioni al corpo deve essere eseguito dopo aver depressurizzato almeno la cavità del corpo. La non osservanza di questa raccomandazione può creare situazioni di grave pericolo per la salute del personale.

4.10 La valvola è ora pronta per le operazioni di commissioning, avviamento e servizio.

4.11 Le valvole in servizio a temperature superiori ai 120°C dovrebbero essere isolate. L'isolamento è necessario per temperature di esercizio superiori ai 200°C al fine di garantire un'uniformità di temperatura tra le superfici interne ed esterne della valvola. Tale differenza di temperatura genererà malfunzionamenti e/o danneggiamenti ai componenti interni del trim.

✓ 5. HEALTH & SAFETY

5.1 Fa parte della politica PIBIVIESSE assistere gli utilizzatori dei suoi prodotti in material di sicurezza e salute. Le raccomandazioni fornite in questo manuale hanno lo scopo di avvisare l'utilizzatore di alcuni potenziali problemi, ma non devono ritenersi come complete ed esaustive e soprattutto non devono sostituirsi ai regolamenti locali in material si sicurezza e salute.
Pesi e pressioni con cui operare quando si usano questi prodotti possono essere molto pericolosi e possono ferire gravemente od addirittura uccidere le persone che eseguono operazioni di movimentazione, istallazione, commissioning e/o avviamento e manutenzione se I criteri di base in materia di sicurezza e salute non vengono seguiti.
Queste istruzioni sono da intendersi come raccomandazioni generali e non devono essere considerate come le sole regole di sicurezza e salute.
PIBIVIESSE non si assume alcuna responsabilità in caso di cattiva movimentazione e/o erroneo utilizzo dei suoi prodotti.

4.6.3 Valves are not intended and designed to correct pipeline flanges mis-positions.

4.7 Installation of welded ends valves (see fig. 2)

4.7.1 Check alignment, parallelism and perpendicularity of the pipeline prior to welding valve in position. Should any misalignment and/or other non conformity on the pipeline butt welding ends be detected do not weld the valve in position until alignment is correct.

4.7.2 Always use established and qualified Welding Procedure Specifications, supported by suitable WPQR and performed by qualified welders.

4.7.3 The valve external temperature near the seats shall always be controlled during both welding and Post Weld Heat Treatment operation. Temperature shall never exceed 120°C in this area.

4.7.4 For valves to be installed using WPS that do require PWHT PIBIVIESSE recommends the use of pipe pups to be welded to the valve in the PIBIVIESSE factory.

4.8 Once installation activities are finished we recommend a functional test to be performed to make sure the valve is free to operate.

4.9 Always check tightening of all body connections prior to commissioning / start-up operations and testing. Body connections shall never be removed when the valve is under pressure. Un-tightening of body connections shall always be done after body cavity and pipeline has been depressurised. Not double checking that there is no pressure both in the pipeline and into the body cavity may result in situation hazardous to health of personnel.

4.10 Valve is now ready for commissioning, start-up and service operations.

4.11 Shall be noted that all valves in high temperature service (>120°C) shall be totally insulated to guaranty a uniform temperature. Presence of a differential temperature between internal and outside surface of the valve can be cause of malfunction end/or damage of the valve.

✓ 5. HEALTH & SAFETY

5.1 It is PIBIVIESSE policy to keep a close eye on health & safety of users of its products. The above recommendation are intended to advise users of some potential problems but shall not be considered as being complete or superseding local health and safety regulation.
Pressures and weight handled to use these products can be dangerous and can seriously injury or even kill personnel performing handling, commissioning and/or start-up operations if basic health and safety rules are not followed.
The above instructions shall only be intended as general recommendations only and shall not be considered as the health and safety rules.
PIBIVIESSE takes no responsibility for mis-handling and or mis-use of its products.

Fig. 1

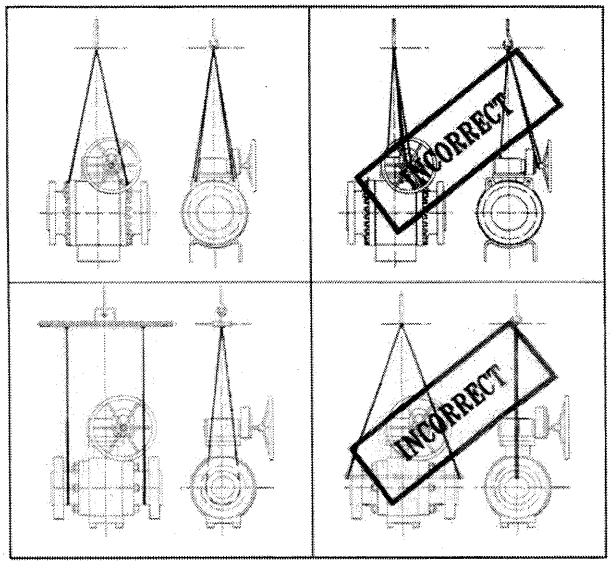
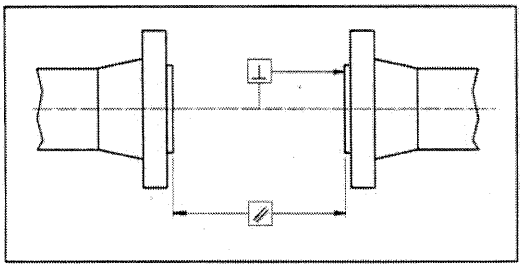


Fig. 2



ITA
ENG

PROCEDURA DI INIEZIONE GRASSO SIGILLANTE NELLE TENUTE SEGGIO E STELO

1.0 GENERALITA'

1.0.1 Le valvole sono provviste di ingrassatori di emergenza delle tenute stelo e seggio solo quando richiesto.

1.0.2 Tutte le valvole PIBIVIESSE sono progettate per operare senza l'uso di alcun tipo di **lubricante**.
Se per qualsiasi motivo l'utilizzatore desiderasse iniettare lubrificante nello stelo e/o nei seggi non ci sono controindicazioni, ma la selezione dei lubrificanti e l'eventuale verifica di compatibilità con i materiali della valvola rimarrebbe di esclusiva responsabilità del cliente a cui le valvole sono state vendute.

1.0.3 Gli iniettori di **Sigillante** possono essere usati per ridurre o eliminare perdite attraverso le tenute stelo e seggi in situazioni di emergenza e come misura temporanea. Inoltre non esiste alcuna garanzia che dopo tali operazioni le tenute della valvola saranno perfette

1.0.4 Il Sigillante deve essere iniettato solo in caso di perdita.

1.0.5 Prima di iniettare il sigillante suggeriamo di pulire i seggi iniettando un liquido di lavaggio.

1.1 SICUREZZA ✓

1.1.1 La pressione del fluido sigillante, lubrificante o di lavaggio **NON DEVE MAI ESSERE SUPERIORE DI 1000 PSIG /70 BARG DELLA PRESSIONE DI LINEA.**

1.1.2 Le operazioni e le pressioni correlate a questa procedura possono essere pericolose per le persone.
Prima di rimuovere il tappo di sicurezza degli ingrassatori svitarlo ½ giro per sfiatare eventuale presenza di pressione in sicurezza (**fare attenzione a non allentare l'ingrassatore dal corpo ma solo il tappo di sicurezza**). Verificare che non ci siano perdite dall'ingrassatore prima di rimuovere completamente il tappo di sicurezza.

1.1.3 Leggere attentamente le istruzioni e le raccomandazioni di sicurezza fornite dal costruttore e relative alle pompe ed alle pistole di ingrassaggio.

1.1.4 E' responsabilità dell'utilizzatore di questa procedura di stabilire appropriate istruzioni in material di sicurezza e salute, in linea con le leggi ed I regolamenti locali per la protezione del personale e dell'ambiente.

1.2 PROCEDURA DI INIEZIONE

1.2.1 Procedure di lavaggio

- Identificare il seggio che perde e misurare la perdita.
- Il lavaggio dei seggi può essere eseguito in tutte le condizioni, ma, ove possibile, è preferibile fermare il flusso attraverso la valvola. In questa condizione la maggior parte del fluido di lavaggio può essere drenata dalla cavità corpo. In caso di flusso una parte del fluido di lavaggio contaminerà il fluido di produzione.
- Ridurre la pressione di linea il più possibile. Questo accorgimento ridurrà la pressione di pompaggio aumentando la velocità e la sicurezza di questa operazione.
- Iniettare il fluido di lavaggio e contemporaneamente operare la valvola da aperto a chiuso e vice versa. Alcune valvole sono dotate di due iniettori per seggio, se non fosse possibili usarli contemporaneamente, alternarli.
- Quando la quantità di fluido di lavaggio è stat iniettata chiudere la valvola.
- Scaricare la pressione dal centro corpo.
- Aprire il dregaggio per scaricare le rimanenze del fluido di lavaggio.
- Verificare il livello di perdita dei seggi prima di procedere all'iniezione di sigillante. Se la perdita è accettabile evitare l'uso del sigillante.
- Come indicazione generale la quantità di fluido di lavaggio da utilizzare su ciascun seggio si calcola come 0,125 cc per pollice di dimensione nominale.

VALVES SEATS AND STEM SEALANT INJECTION PROCEDURE

1.0 GENERAL

1.0.1 Valves are provided with seats and/or stem emergency sealant/lubricant injectors only when required.

1.0.2 All Pibiviesse valves are designed to operate without **lubrication**.
If for any reason Users need to inject **lubricants** on stem and/or seats, this is not contraindicated, but selection of the grease as the eventual problems due to incompatibility of the soft components of the valve with the products injected, will remain under the only Customer responsibility.

1.0.3 **Sealant** injection can be used to stop/reduce leakage across the seats and or through the stem seals as an emergency and temporary solution. Furthermore there is no guaranty that after injection of the sealant the valve seats or stem seal will seal perfectly.

1.0.4 **Sealant** must be injected only when leakage occurs.

1.0.5 Prior to inject sealant it is suggested to flush the seats with flushing fluid

1.1 SICUREZZA ✓

1.1.1 Sealant/flushing fluid injection pressure shall **NEVER BE MORE THAN 1000 PSIG /70 BARG ABOVE THE LINE PRESSURE.**

1.1.2 Operation and pressure related to this procedure might be hazardous to personnel.
Prior to removal of the safety sealant injector cap, unscrew it half a turn to allow any pressure to bleed off in a safe manner (**make sure not to unscrew the body of the sealant injector but the cap only**). Check for leakage from the injector prior to complete removal of the safety cap.

1.1.3 For safety recommendation related to the use of sealant gun or pumps refer to manufacturer manuals and/or instructions.

1.1.4 It is responsibility of the user of this procedure to establish appropriate health and safety practices in line with local regulation and limitation to protect involved personnel and the environment.

1.2 INJECION PROCEDURE

1.2.1 Flushing procedure

- Identify the passing seat and if possible measure the leak rate.
- Flushing can be performed under any condition but if possible is better to stop the flow through the valve. In this condition the majority of the "flushing fluid" injected can be drained from the valve body drain port. Presence of flow will take the "flushing fluid" into the line.
- Reduce the line pressure as much as possible. This will allow the use of a lower injection pressure, making the same quicker and safer
- Inject flushing fluid while operating the valve few times from fully close to open to close. Most of the valves are fitted with two injector per seat. If is not possible to inject flushing on both simultaneously connect the injectors alternately.
- When the required quantity of fluid has been injected, set the valve in fully close position.
- Open the body vent to relive the pressure present in the body cavity (if any).
- Open the body drain to drain out the flushing fluid.
- After flushing before to proceed with sealant injection it is suggested to check again the seat leak rate. If the flushing operation achieve a reduction of the leak rate to an acceptable level, injection of sealant can be avoided.
- As a general indication the suggested quantity of flushing fluid to inject on **each seat** can be calculated as 0.125 cc per inch of valve nominal diameter.

1.2.2 Iniezione di Grasso Sigillante

- Chiudere la valvola e, se possible, lasciare lo sfiato e/o il drenagio aperti.
- L'iniezione del sigillante può essere eseguito in tutte le condizioni, ma, ove possibile, è preferibile mantenere un minimo delta P sulla valvola.
- Iniettare il sigillante verificando eventuali riduzioni della perdita.
- Alcune valvole sono dotate di due iniettori per seggio, se non fosse possibili usarli contemporaneamente, alternarli.
- Appena si raggiunge un livello di perdita accettabile interrompere l'operazione. Non è richiesta alcuna ulteriore iniezione.
- Se si ottengono delle riduzioni della perdita, ma non ad un livello accettabile, operare la valvola alcune volte e ripere le operazioni di iniezioni di sigillante.
- Se malgrado tutto non si riesce a ridurre ulteriormente la perdita sospendere la procedura in quando non è consigliato insistere.
- Come regola generale la quantità di grasso sigillante da iniettare per ogni seggio è di 13 grammi per police di diametro nominale. Quando si procede ad iniettare grasso per la prima volta tale quantità va triplicata.

1.3 PRODOTTI ED APPARECCHIATURE CONSIGLIATI

1.3.1 Prodotti

- La seguente tabella fornisce indicazioni sui prodotti consigliati sia per il lavaggio, sia per le operazioni di iniezione di sigillante.

1.2.2 Sealant injection

- Close the valve and if possible leave the body vent or drain open.
- While injecting sealant, any line pressure condition is acceptable but if possible should be better to maintain a Delta P across the seat.
- Inject sealant checking and monitoring for leak reduction or stop.
- For valves fitted with two injectors per seat if possible inject sealant simultaneously; if not possible connect the injectors alternately.
- As soon as leakage reduce to an acceptable level or disappear stop injection. No further actions are required.
- If a leak reduction is obtained but not considered acceptable stroke valve and inject a further quantity of sealant following the same procedure.
- If there is no further improvement in leak reduction, to insist on the injection is not recommended.
- As a general indication the suggested quantity of sealant to inject on each seat can be calculated as 13 grams per inch of valve nominal diameter. When sealant is injected in a new valve or when the valve has been previously flushed, the above quantities must be multiplied by three.

1.3 SUGGESTED PRODUCTS AND EQUIPMENT

1.3.2 Products

- The following table give indication of same products that can be used for flush and seal the valves. Depending on Customer experience and local disposal other product can be evaluated.

PRODUTTORE MANUFACTURER	TIPO DI PRODOTTO TYPE OF PRODUCT	MARCHIO E MODELLO TRADE NAME
Suff Marine International	FLUSHIN FLUID	SMI Valve King Liquid Valve Flush
Val-Tex	FLUSHIN FLUID	Valve Flush
Apex Industrial Chemicals	FLUSHIN FLUID	Eco-Solv
Sealweld	FLUSHIN FLUID	Valve Cleaner
Suff Marine International	SEALANT	SMI Valve Master Synthetic Sealant
Val-Tex	SEALANT	202-5
Val-Tex	SEALANT	302-5
Nordstrom Valves Inc.	SEALANT	555
Sealweld	SEALANT	Sealant 5050

1.3.2 Apparecchiature

Per eseguire le operazioni sopra descritte sono necessarie apparecchiature standard (pompe, tubi flessibili, connettori ecc.).
Il reparto di Assistenza Tecnica della PIBIVIESSE è tuttavia disponibile a fornire ulteriori indicazioni su prodotti ed apparecchiature da utilizzare e, ove richiesto, a fornirle direttamente oppure tramite un centro di assistenza tecnica autorizzato.

1.3.2 Equipment

Only standard equipment (pumps, hoses, connectors etc.) are necessary for performing the above described operations.
Pibiviesse After Sales Service is however at Customer full disposal for further specific information on products and equipment and if required to supply the same.

IMBALLO E SPEDIZIONE / PACKING AND SHIPPING

1 – SCOPO / SCOPE

Lo scopo di questa procedura è quello di garantire che tutte le valvole lascino la Società in perfette condizioni ed adeguatamente protette, in modo da non aver reclami da parte dei clienti e danneggiamenti durante il trasporto.

The purpose of this procedure is to ensure that every valve leaves the Company , in perfect condition and adequately protected, in order to avoid possible damage during transport and as consequence relevant client claims.

2 – PROTEZIONI / PROTECTIONS

Tutte le valvole se non specificamente richiesto dal cliente e tranne quelle corredate di attuatori "Fail close" vengono imballate in posizione di completa apertura. Se non altrimenti specificato nell'ordine, le parti terminali della valvola devono essere protette mediante coperture di plastica o dischi di legno completi di foglio di plastica, che devono essere saldamente fissate e sigillate per evitare qualsiasi movimento e che qualsiasi corpo estraneo possa entrare all'interno della valvola. A tale fine, per coperture non auto-bloccanti, utilizzare reggia di nylon o nastro adesivo ad alta resistenza oppure un prodotto equivalente.

If not otherwise specified by the customer and with the exception of those fitted with "Fail close" actuators, valves are boxed in the fully open position. In absence of specific instructions, valves' ends shall be protected with plastic cup or wooden discs complete with plastic seal. These protections must be securely fastened and sealed to avoid displacement and thus allow foreign matter to enter the valve bore. For this purpose loose protections shall be secured by means of nylon strips or heavy duty adhesive tape or equivalent product.

Prima dell'applicazione delle protezioni, ogni area non verniciata deve essere protetta con uno dei seguenti prodotti:

- Valvoline TECTYL 506 EH (allegati 1 e 2) deve essere utilizzato su RF, BW. RTJ, flangie motore delle valvole spedite "bare stem"
- Shell Ensis (allegato 4) per tutte le parti interne rimanenti
- LPS 3 (allegato 3) che può essere utilizzato al posto di Shell Ensis se previsto un lungo periodo di stoccaggio.

Before the application of the protection discs unpainted areas shall be protected using the followings products;

- Valvoline Tectyl 506 EH (attachment 01-02) shall be used on RF, BW, RTJ & adapter plate of bare stem valves;
- Shell Ensis for all the remain internal areas (attachment 04);
- LPS3 (attachment 03) can be used instated of Shell Ensis if a long storage period is advised.

3 – CASSE / CASES

Le valvole possono essere imballate in casse totalmente chiuse, gabbie o pallets. Le casse o le gabbie possono su richiesta avere il coperchio apribile per ispezione a seconda delle richieste del cliente o doganali.
Le casse, le gabbie o i pallets devono essere di dimensioni adeguate alle misure della valvola.
Nessuna parte della valvola o del riduttore / attuatore deve fuoriuscire dalla cassa/gabbia o dalla superficie del pallet.
Le valvole devono essere adeguatamente fissate e separate al fine di minimizzare possibili danni dovuti a incorretta movimentazione durate la spedizione. Se necessario a mantenere la stabilità del contenuto dovranno essere inserite all'interno della cassa/gabbia travi di adeguate dimensioni a ulteriore supporto.
Nel caso di commesse che comprendono richieste particolari (esempio: spessori speciali, rivestimenti di materiale idrorepellente, inserimento di sacchetti idrofobi a base di silicio) le deviazioni dalla presente dovranno essere indicate nel PCQ o su apposite "Work instructions".
In tal caso le casse dovranno essere acquistate, ispezionate e identificate in accordo.
Il legno utilizzato per la costruzione delle casse deve essere di buona qualità, sufficientemente stagionato e resistente per sopportare il peso del contenuto.
Se non diversamente specificato dal cliente, tutte le casse devono essere costruite in accordo alle norme UNI 9151 "Imballaggi in legno per contenuto superiore ai 300 Kg".
I requisiti minimi richiesti sono i seguenti:

Valves can be shipped in wooden crates, cages or pallets. Crates or cages can, upon request, have removable cover to allow for content inspection depending on customer or custom requirements.
Crates/pallets must be of adequate dimensions to the valve sizes.
No part of the valve or its handling appurtenance shall protrude beyond the edge of the crate/pallet.
The contained valves must be sufficiently supported and separated within the case in order to minimise damage in the event of poor handling during shipment. If necessary for the stability of the content, wooden beams of adequate size will be installed inside the box.

For job with specific package requirements (i.e. special wood thickness, internals lined with moisture proof material, application of silica gel bags etc.) deviation from this procedure shall be indicated on the job Q.C.P. or on specific "Work instruction".

Cases shall be purchased inspected and identified according.
The wood used for the cases shall be of good quality, adequately seasoned firm and must be sufficiently thick to support the weight of the valves.
Unless otherwise specified, all the boxes shall be manufactured according to UNI 9151 "Wood packages for bulk capacity over 300 Kg".

4– RICAMBI SPARE PARTS

Ogni pezzo deve essere etichettato per permetterne l'identificazione.
L'etichetta deve riportare:
- Il n° di commessa
- Il Tag della valvola per la quale il ricambio è fornito
- Il part number
- La descrizione
- Il codice del prodotto

I componenti metallici devono essere imballato possibilmente singolarmente e posto nella cassa avvolto con materiale antiurto per prevenire possibili danneggiamenti durante il trasporto.
I componenti metallici non verniciati dovranno in oltre essere protetti contro la corrosione mediante Valvoline Tectyl 506 EH.
Le guarnizioni metalliche ad anello (Ring Gaskets), quando spedite sciolte, devono essere spedite in scatole oppure avvolte in materiale protettivo.

Every piece or bag containing more them one identical pieces, shall carry labels for identification.
Label will indicate:
- *Job number*
- *Tag/tags of the valve/s for which the spares are supplied*
- *The part number*
- *The description of the component*
- *The Pibiviesse code number.*

Metallic components shall be possibly single packed and boxed with appropriate anti-stroke material. Care must be paied in order to prevent damages during transport.
Un-painted metallic components shall be protected with anticorrosion Valvoline Tectyl 506EH.

Loose Ring Gaskets shall be boxed or wrapped in protective material suitable to prevent them from transportation damages.

5 – MARCATURA E CONTROLLI / MARKING AND CHECKING

Ogni cassa deve essere come minimo marcata con le seguenti scritte/indicazioni:
- Fragile
- Lato superiore
- Punti di sollevamento
- Il peso
- Eventuale indicazione della presenza nella cassa del set di certificati.
- Il paese di origine
- N° di commessa, n° item o Tag

Sono inoltre applicate su richiesta scritte o marchi aggiuntivi per informazioni e/o identificazione quali:
- L'indirizzo del destinatario
- Il N° di ordine
- Nome del costruttore
- etc.

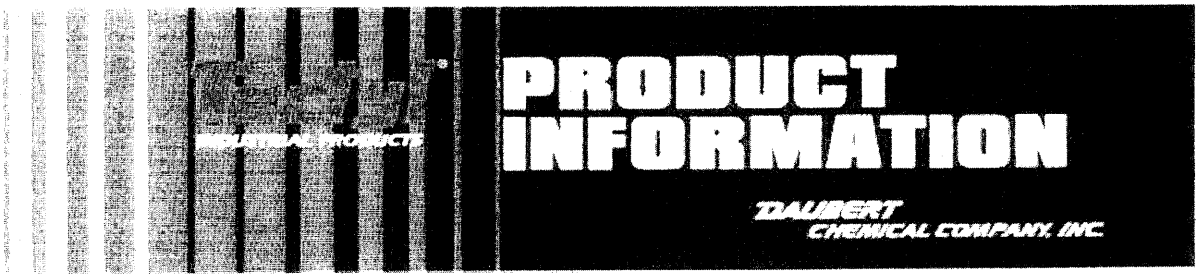
Prima della spedizione tutte le casse devono essere ispezionate per verificare la corretta e completa marcatura.
Il contenuto delle casse deve essere verificato rispetto alle indicazioni riportate sul Packing list, copia del quale, inserito in una busta impermeabile viene fissata all'esterno della cassa e deve accompagnare il materiale.

The outside of every single crate shall bear as a minimum the followings marks/indication:
- Fragile
- This way up
- Lifting points
- *weight.*
- Indication of the presence of materials certificates inside the box
- *Country of origin*
- *Job n°, item or tag number*

Additional indications / identification marks are applied upon request as follows:
- *destination address*
- *P.O. number*
- *Name of manufacturer*
- *etc.*

Before despatch all crates shall be inspected in order to verify the correctness and completeness of the marking.
Content of the box shall be verified against the information indicated on the Packing list, copy of which, placed in a waterproof bag fixed to the outside of the box, shall accompany the goods.

ATTACHMENTS 01 Pag. 1/2



TECTYL® 506EH

Description

TECTYL® 506EH is a high solids, solvent cutback, general purpose corrosion preventive compound suitable for the widest range of application requirements for vehicle rustproofing and protection of machinery and parts in storage. TECTYL® 506EH protects parts in indoor or outdoor storage, as well as during domestic and international shipments.

Laboratory Data

Typical Properties

	English	Metric
Flash, PMCC*, Minimum	106°F	41.1°C
Density, Weight/Gallon @ 77°F (25°C)	7.5 ± 0.1 lbs./gallon	899 grams/L
Specific Gravity @ 60°F (15.6°C)	0.90	
Recommended Dry Film Thickness over Metal Profile	2.5 mils	62.5 microns
Theoretical Coverage @ Recommended DFT	347 sq. ft./gallon	8.5 sq. meters/L
Non-Volatile % by Weight	60 ± 2	
Non-Volatile % by Volume	54 ± 2	
Volatile Organic Content (VOC), Maximum	3.15 lbs./gallon	377 grams/L
Approximate Dry to Touch Time @ 77°F (25°C)	1 - 2 hours	
Cure Time	24 hours	
High Temperature Flow Point, Minimum	320°F	160°C
Accelerated Corrosion Tests:		
5% Salt Spray (Hours) ASTM** B-117 @ Recommended DFT (2x4x1/8 in. Polished Steel Panels)	1500	
100% Relative Humidity (Hours) ASTM D-1748 @ Recommended DFT (2x4x1/8 in. Polished Steel Panels)	2000	

*PMCC (Penske Martin Closed Cup)
**ASTM (American Society for Testing and Materials)

Surface Preparation

The maximum performance of TECTYL® 506EH can be achieved only when the metal surfaces to be protected are clean, dry and free of rust, oil and mill scale. Daubert Chemical Company recommends that the metal substrate temperature be 50-95°F (10-35°C) at the time of product application.

Application

TECTYL® 506EH is formulated to be used as supplied. Ensure uniform consistency prior to use. Continued stirring is generally not required. If the product thickens due to cold storage or loss of solvent during use, contact Daubert Chemical Company. DO NOT THIN TECTYL® 506EH. Incorrect thinning will affect film build, dry time and product performance. Daubert Chemical Company recommends that the ambient and product temperature be 50 - 95°F (10 - 35°C) at time of application. TECTYL® 506EH can be spray or dip applied. DO NOT FREEZE TECTYL® 506EH.

Removal

TECTYL® 506EH can be removed with TECTYL® HPS solventborne thinner, vapor degreasing, hot alkaline wash, or low pressure steam. TECTYL® 506EH can be removed from fabrics by normal dry cleaning procedures. Avoid the use of chlorinated or highly aromatic **solvents when removing from painted surfaces, as these solvents may adversely affect paint.**

Storage

Store TECTYL® 506EH at temperatures between 50-95°F (10-35°C). Mild agitation is recommended prior to use.

Caution

Adequate ventilation is required for cure and to ensure against formation of a combustible liquid. THE PARTIALLY CURED FILM SHOULD NOT BE EXPOSED TO IGNITION SOURCES SUCH AS FLARES, FLAMES, SPARKS, EXCESSIVE HEAT, OR TORCHES. Refer to Daubert's Material Safety Data Sheet for additional handling and first aid information.

Note:

The addition of any product over or under this coating is not recommended. The use of additional coatings could result in chemical incompatibility, thus adversely affecting the performance of this coating as stated in the lab data section. If a product other than Daubert Chemical Company's recommended product is required, written authorization must be obtained from Daubert Chemical Company.

10/18/01:KP

ATTACHMENTS 02

Pag 1/6

The Valvoline Company

Date Prepared: 04/19/96
Date Printed: 10/19/99
MSDS No: 506.0312377-001.001I

TECTYL 506 EH (SPL)

---

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Material Identity
Product Name: TECTYL 506 EH (SPL)
General or Generic ID: PETROLEUM BASED RUST PREVENTATIVE

Company
The Valvoline Company
P.O. Box 14000
Lexington, KY 40512

Telephone Numbers
Emergency: 1-800-274-5263
Information: 1-606-357-7847

---

2. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredient(s)	CAS Number	% (by weight)
ALIPHATIC HYDROCARBONS (STODDARD TYPE)	8052-41-3	20.0- 30.0
ALIPHATIC PETROLEUM DISTILLATES	64742-47-8	9.0- 19.0

---

3. HAZARDS IDENTIFICATION

Potential Health Effects

Eye
Can cause eye irritation. Symptoms include stinging, tearing, redness, and swelling of eyes.

Skin
Can cause skin irritation. Prolonged or repeated contact may dry the skin. Symptoms may include redness, burning, and drying and cracking of skin, burns and other skin damage. Passage of this material into the body through the skin is possible, and may add to toxic effects from breathing or swallowing.

Swallowing
Swallowing small amounts of this material during normal handling is not likely to cause harmful effects. Swallowing large amounts may be harmful. This material can enter the lungs during swallowing or vomiting and cause lung inflammation and/or damage.

Inhalation
Breathing of vapor or mist is possible. Breathing small amounts of this material during normal handling is not likely to cause harmful effects. Breathing large amounts may be harmful.

ATTACHMENTS 02

Pag 2/6

Symptoms of Exposure
stomach or intestinal upset (nausea, vomiting, diarrhea), irritation (nose, throat, airways), central nervous system depression (dizziness, drowsiness, weakness, fatigue, nausea, headache, unconsciousness), and death.

Target Organ Effects
Overexposure to this material (or its components) has been suggested as a cause of the following effects in laboratory animals, and may aggravate preexisting disorders of these organs in humans: blood abnormalities, liver abnormalities, anemia, spleen damage, testis damage, kidney damage, lung damage, Overexposure to this material (or its components) has been suggested as a cause of the following effects in humans, and may aggravate preexisting disorders of these organs: central nervous system effects.

Developmental Information
This material (or a component) has been shown to cause harm to the fetus in laboratory animal studies. Harm to the fetus occurs only at exposure levels that harm the pregnant animal. The relevance of these findings to humans is uncertain.

Cancer Information
No data

Other Health Effects
No data

Primary Route(s) of Entry
Inhalation, Skin absorption, Skin contact.

---

4. FIRST AID MEASURES

Eyes
If symptoms develop, immediately move individual away from exposure and into fresh air. Flush eyes gently with water for at least 15 minutes while holding eyelids apart; seek immediate medical attention.

Skin
Remove contaminated clothing. Wash exposed area with soap and water. If symptoms persist, seek medical attention. Launder clothing before reuse.

ITA
ENG

ISTRUZIONI AGGIUNTIVE PER APPARECCHI E SISTEMI DI PROTEZIONE DESTINATI AD ESSERE UTILIZZATI IN ATMOSFERA POTENZIALMENTE ESPLOSIVA IN ACCORDO ALLA DIRETTIVA EUROPEA 94/9/CE DEL 23/03/1994 (ATEX)

N1.0 SCOPO

Lo scopo di questa appendice è quello di fornire all'utilizzatore tutte le informazioni necessarie ad un uso corretto e sicuro delle valvole al fine di prevenire sia la formazione di atmosfere potenzialmente esplosive, sia di non innescare un'esplosione, nel caso la valvola si venga a trovare in un atmosfera esplosiva.

N2.0 MARCATURA

Le valvole in accordo con questa direttiva sono marcate come segue:

- Nome ed indirizzo della PIBIVIESSE Spa sulla targhetta
- Marchio CE sulla targhetta (nota che tale marchio indica la conformità del prodotto sia alla direttiva ATEX 94/9/CE sia alla direttiva PED 97/23/CE)
- Designazione del diametro nominale e della serie sia sulla targhetta sia stampigliato sul corpo valvola
- Numero di serie sia sulla targhetta sia stampigliato sul corpo valvola
- Anno di costruzione sulla targhetta
- Marcatura specifica di protezione dalle esplosioni ⟨Ex⟩ seguita dal simbolo del Gruppo di appartenenza, dalla Categoria e per il gruppo II dalla lettera G e/o D, come applicabile, su una targhetta addizionale.
- Ulteriori indicazioni, ove necessario, per l'utilizzo in condizioni di sicurezza vengono fornite tramite specifiche targhette addizionali.

N3.0 ISTRUZIONI PER L'USO E LA MANUTENZIONE

Il presente manuale, completo di tutte le sue Appendice, fornisce informazioni per effettuare senza rischi le seguenti operazioni:

- Istallazione e messa in servizio: vedi Sezione 2.0.
- Impiego e regolazione: vedi Sezione 3.0.
- Montaggio e Smontaggio: vedi Sezioni 4.2 e 4.4.
- Manutenzione: vedi sezione 4.0 ed Appendice H.
- Punti di scarico pressione: vedi Sezione 3.0.
- Formazione in loco ed utilizzo di centri di assistenza tecnica autorizzati: vedi Appendice F.
- Dati relativi alle condizioni di progetto ed al tipo di fluidi utilizzabile sono contenuti nella certificazione finale fornita con la valvola.
- I parametri di progetto ed i limiti di funzionamento sono indicati sulla targhetta.
- Condizioni particolari che si possono verificare sono indicate, unitamente alle soluzioni possibili, in Appendice D.
- Le caratteristiche degli apparecchi e/o strumenti che possono essere montati sulla valvola sono contenute in questa Appendice paragrafo N5.0.

N4.0 INFORMAZIONI ADDIZIONALI SULL'USO IN SICUREZZA IN ATMOSFERA POTENZIALMENTE ESPLOSIVA.

N4.1 Prevenzione di potenziali fonti di innesco

Superfici calde:

La temperatura superficiale della valvola può raggiungere la massima temperatura di design del processo. L'utilizzatore deve assicurarsi che tale temperatura non possa innescare atmosfere potenzialmente esplosive che si possono essere formate all'esterno della valvola stessa.

La temperatura superficiale della valvola può raggiungere la massima temperatura di design del processo. L'utilizzatore deve assicurarsi che tale temperatura non possa incendiare polveri di qualsiasi genere, presenti nella zona di utilizzo della valvola, che si possono depositare sulla sua superficie esterna. L'incendio di tali polveri può innescare atmosfere potenzialmente esplosive che si possono essere formate all'esterno della valvola stessa.

A causa dell'irraggiamento solare la superficie esterna della valvola può raggiungere temperature a cui si possono incendiare polveri di qualsiasi genere, presenti nella zona di utilizzo della valvola, che si possono depositare sulla sua superficie esterna. L'incendio di tali polveri può innescare atmosfere potenzialmente esplosive che si possono essere formate all'esterno della valvola stessa.

ADDITIONAL INSTRUCTION FOR EQUIPMENT AND PROTECTION SYSTEMS TO BE USED IN POTENTIALLY EXPLOSIVE ATMOSPHERES IN ACCORDANCE WITH EUROPEAN DIRECTIVE 94/9/CE DATED 23/03/1994 (ATEX)

N1.0 SCOPE

The scope of this appendix is to suppli the user with all of the information .

N2.0 MARKING

Valves in accordance with this directive shall be marked as follows:

- PIBIVIESSE Spa name and address can be found on the nameplate
- CE marking on the nameplate (note that CE marking indicates product conformity to both ATEX 94/9/CE and PED 97/23/CE)
- Nominal diameter and class both on the nameplate and hard stamped on the valve body
- Serial number both on the nameplate and hard stamped on the valve body
- Year of manufacturing on the nameplate
- Specific marking for explosion protection ⟨Ex⟩ followed by the Group and the Category identification and for group II by the letter G and/or D, as applicable, on an additional tag.
- Additional indication, where necessary, to allow a safeuse of the product in form of additional tag plates.

N3.0 USE & MAINTENANCE INSTRUCTION

This manual, complete with all of the appendices, provides information to safely perform the following activities:

- Installation and start-up: refer to Section 2.0.
- Use and set-up: refer to Section 3.0.
- Assembly and Disassembly: refer to Sections 4.2 and 4.4.
- Maintenance: refer to Section 4.0 and Appendix H.
- Body connections: refer to Section 3.0.
- Local training and use of Authorised Service and repair Centers: refer to Appendix F.
- Data regarding design parameters and fluid compatibility are container in the final certification package supplied with the valve.
- Design parameters and pressare/temperature limits are described on the nameplate.
- Fault, Findings and Corrections are described in Appendix D.
- Characteristics of the equipment that can be assembled to our valves are described at paragraph N5.0.

N4.0 ADDITIONAL INFORMATION FOR A SAFE USE IN POTENTIALLY EXPLOSIVE ATMOSPHERE.

N4.1 Source of ignition prevention

Hot surfaces

Valve superficial temperature can reach the design maximum temperature of the process. The valve user shall ensure that such temperature cannot ignite potentially explosive atmospheres that may have formed around the valve.

Valve superficial temperature can reach the design maximum temperature of the process. The valve user shall ensure that such temperature cannot set on fire any flammable dusts, eventually available in the vicinity of the valve and that can lay on the valve outer surface. The fire generated by these dusts would ignite potentially explosive atmospheres that may have formed around the valve.

Solar radiation can increase the valve outer superficial temperature to levels that can set on fire any flammable dusts, eventually available in the vicinity of the valve and that can lay on the valve outer surface. The fire generated by these dusts would ignite potentially explosive atmospheres that may have formed around the valve.

Le valvole sono progettate per resistere all'aumento della temperatura superficiale dovuta ad incendio esterno secondo i limiti delle normative API 6FA, BS 6755 Pt.2 o API 607 (come indicato sulla targhetta). Si consiglia l'utilizzatore di familiarizzare con i limiti di resistenza specificati sulla normativa Fire Safe applicabile.

Fiamme e gas caldi

E' vietato utilizzare sorgenti di fiamma e/o scintille (es. molature) e/o archi elettrici (es. saldature di ogni tipo) in prossimità della valvola durante l'esercizio. Nel caso di utilizzo di tali sorgenti con valvola non in utilizzo assicurarsi di avere eliminato qualsiasi atmosfera potenzialmente esplosiva sia all'interno sia all'esterno della valvola.
Le valvole sono progettate per resistere all'aumento della temperatura sup della valvola dovuta ad incendio esterno secondo i limiti del le normative API 6FA, BS 6755 Pt.2 o API 607 (come indicato sulla targhetta). Si consiglia l'utilizzatore di familiarizzare che i limiti di resistenza specificati sulla normativa Fire Safe applicabile.

Materiale elettrico

La valvola non contiene alcun componente elettrico. Gli unici componenti elettrici,ove presenti, fanno parte dell'organo di manovra. Tutti i componenti elettrici assembleti alla valvola sono acquistati con marcatura ATEX compatibile con le richieste del cliente e/o la marcatura della valvola stessa. Fare riferimento al manuale d'uso e manutenzione di tali componenti per le indicazioni specifiche al riguardo.

Correnti elettriche vaganti e protezione contro la corrosione catodica

Le valvole PIBIVIESSE sono dotate di dispositivo antistatico che evita la formazione di differenze di potenziale tra i vari componenti conduttori.
E' richiesto che l'utilizzatore assicuri tramite opportuni accorgimenti l'equi-potenzialità di tutte le parti conduttrici dell'impianto connesse alla valvola.

Elettricità statica

Le valvole PIBIVIESSE sono dotate di dispositivo antistatico che evita la formazione di differenze di potenziale tra i vari componenti conduttori.
La prevenzione di scintillli su superfici non conduttrici è assicurata per il gruppo IIG in utilizzo con gas e vapori del gruppo IIA e IIB. Nel caso di utilizzi nel gruppo IIC verificare che lo spessore del rivestimento non conduttore sia inferiore a 0,2 mm.

Fulmine

L'utilizzatore deve proteggere gli impianti ove vengono istallate le valvole per mezzo di misure appropriate di protezione contro i fulmini.
Le misure di protezione contro i fulmini non devono compromettere le misure di protezione contro la corrosione catodica.

Onde elettromagnetiche

L'utilizzatore deve verificare che non ci siano sorgenti di onde elettromagnetiche in prossimità della valvola come stabilito dalla EN 1127-1 paragrafi 5.3.9, 5.3.10, 6.4.9 & 6.4.10.

Radiazioni ionizzanti

L'utilizzatore deve verificare che non ci siano sorgenti di radiazioni ionizzanti in prossimità della valvola come stabilito dalla EN 1127-1 paragrafi 5.3.11 & 6.4.11.

Ultrasuoni

L'utilizzatore deve verificare che le valvole non vengano esposte ad ultrasuoni con frequenza maggiore di 10 MHz e densità di potenza nel campo acustico generato maggiore di 1 mW/mm^2 come stabilito dalla EN 1127-1 paragrafo 6.4.12.

Compressione adiabatica ed onde d'urto

L'utilizzatore deve evitare che, in normali condizioni di esercizio o in presenza di disfunzioni previste, ci siano processi che possono causare compressione adiabatica o onde d'urto che potrebbero produrre inneschi efficaci, come stabilito dalla EN 1127-1 paragrafo 6.4.13.

Valves are designed to maintain their working performance also in presence of fire in the plant. The international specifications used for this purpose are either API 6FA, BS 6755 Part 2 and API 607 (as indicated on the valve nameplate). We recommend the valve users to familiarise with the operational limits set into the applicable fire safe specification.

Flames and hot gases

It is forbidden to use flame and/or sparkles souces (e.g. grinding tools) and/or electric arcs (e.g. any welding equipment) in the vicinity of the valve when in service. Should any of these sources be required when the valve is off service, user is required to ensure that any potentially explosive atmosphere has been removed both internally and externally of the valve.
Valves are designed to maintain their working performance also in presence of fire in the plant. The international specifications used for this purpose are either API 6FA, BS 6755 Part 2 and API 607 (as indicated on the valve nameplate). We recommend the valve users to familiarise with the operational limits set into the applicable fire safe specification.

Electric Material

The valve does not contain any electric material. The only electric components, when available, are part of the actuator. All of the electric components used are anyway in accordance with the ATEX directive and are compatible with the requirements for the main valve.
Please refer to the actuator O&MM for specific instruction or indication regarding such components.

Free electrical currents and protection against galvanic corrosion

Valves are provided with an antistatic device that avoids formation of ΔV between the various conducting components.
The user shall ensure that all of the piping components connected to the valve are at the same potential.

Static Electricity

Valves are provided with an antistatic device that avoids formation of ΔV between the various conducting components.
Sparkle prevention on non conductive surfaces is assured for use with gases and vapours in groups IIA and IIB. When used with gases and vapours in group IIC please ensure that the thickness of the valve coating / painting does not exceed 0,2 mm

Lightning

User shall protect the piping system where the valve is installed against the strike of lightning.
Protection against lightning shall not interfere or compromise protection against galvanic corrosion.

Electro-magnetic waves

User shall verify that the valve is not exposed to electromagnetic waves as defined in EN 1127-1 paragraphs 5.3.9, 5.3.10, 6.4.9 & 6.4.10.

Ionisation

User shall verify that the valve is not exposed to ionisation as defined in EN 1127-1 paragraphs 5.3.11 & 6.4.11.

Ultrasounds

User shall verify that the valve is not exposed to ultrasounds having a frequency higher than 10 MHz and density in the generated acoustic field greater than 1 mW/mm^2 as defined in EN 1127-1 paragraph 6.4.12.

Adiabatic compression and sonic waves

User shall avoid both, in normal operating conditions or during any misuse which can reasonably be anticipated, any process that can generate adiabatic compression or sonic waves than can result in an efficient source of ignition, as defined in EN 1127-1 paragraph 6.4.13.

Reazioni esotermiche inclusa accensione delle polveri

I materiali di costruzione delle valvole sono in accordo con i requisiti del cliente e vengono di massima verificati in base ai dati i nostro possesso. Qualora l'utilizzatore necessiti di usare la valvola per impieghi con fluidi non originalmente previsti deve verificarne la compatibilità dei materiali forniti.

N4.2 Prevenzione della creazione di atmosfere potenzialmente esplosive

Esposizione al fuoco

Le valvole sono progettate per resistere all'aumento della temperatura sup della valvola dovuta ad incendio esterno secondo i limiti del le normative API 6FA, BS 6755 Pt.2 o API 607 (come indicato sulla targhetta). Si consiglia l'utilizzatore di familiarizzare con i limiti di resistenza specificati sulla normativa Fire Safe applicabile.

Al termine dell'incendio è vietato l'utilizzo della valvola prima di una verifica globale delle condizioni e delle caratteristiche sia dei materiali metallici, sia dei materiali soffici.

Esposizione al gelo

L'esposizione alle basse temperature in particolari condizioni di collaudo e/o di esercizio può provocare la solidificazione del fluido contenuto nella valvola. L'eventuale aumento di volume conseguente alla solidificazione può generare distorsioni all'involucro di contenimento della pressione che ne compromettano irreparabilmente la tenuta. Una pressurizzazione con fluidi potenzialmente esplosivi in tali condizione genererà quindi fuoriuscita di fluido e formazione di atmosfere potenzialmente esplosive all'esterno della valvola, con possibili pericoli di estendere la propagazione dell''esplosione all'interno della stessa.

L'utilizzatore deve evitare che il fluido contenuto nella valvola sia in fase di collaudo, sia in condizione di normale utilizzo che di disfunzione prevista, possa solidificare a causa di un abbassamento della temperatura.

Per le valvola a sfera trunnion mounted prestare particolare attenzione alla cavità di centro corpo che può rimanere piena di fluido anche una volta drenata la linea. Verificare sempre che la cavità di centro corpo sia drenata mediante l'utilizzo delle connessioni vi sfiato/drenaggio previste.

Esposizione a pressioni superiori alle pressioni di rating

Sulla targhetta sono chiaramente indicati i limiti di pressione/temperatura da non superare per un utilizzo della valvola corretto ed in sicurezza.
Nonostante i coefficienti di sicurezza previsti nella progettazione l'esposizione della valvola a pressioni superiori alla pressione di rating può provocare danni all'involucro di contenimento della pressione che ne compromettano irreparabilmente la tenuta.

Sollecitazioni meccaniche esterne

Le valvole sono progettate per sopportare oltre alla pressione interna ed alle coppe di manovra, anche carichi esterni derivanti dalla tubatura, tipicamente momenti flettenti, torcenti, azioni di taglio ed assiali.
Fare riferimento all'Appendice G per i limiti massimi dei carichi esterni ammissibili.

Selezione dei materiali di costruzione e di tenuta

I materiali di costruzione delle valvole sono in accordo con i requisiti del cliente e vengono di massima verificati in base ai dati i nostro possesso. Qualora l'utilizzatore necessiti di usare la valvola per impieghi con fluidi non originalmente previsti deve verificarne la compatibilità dei materiali forniti.

Adiabatic compression and sonic waves

Materials of construction are in accordance with customer requirement and are verified for their compatibility with the produced fluid based on fluid data in our hands. Should user require to use the valve for other fluids not originally specified , the same user is responsible to establish their compatibility with the supplied materials.

N4.2 Potentially explosive atmospheres prevention

Exposure to fire

Valves are designed to maintain their working performance also in presence of fire in the plant. The international specifications used for this purpose are either API 6FA, BS 6755 Part 2 and API 607 (as indicated on the valve nameplate). We recommend the valve users to familiarise with the operational limits set into the applicable fire safe specification.
Once exposed to fire a valve shall not be used until a full re-assessment of both metallic and non metallic materials conditions.

Exposure to chill

Exposure to low temperatures may, in certain testing or operation conditions generate solidification of the fluid contained into the valve. The increase of volume consequent to the fluid solidification can generate distortion of the pressure containing components thus compromising their sealing capability. The flow of potentially explosive fluids in such conditions will therefore generate a leakage of the same into the atmosphere and formation of potentially explosive atmosphere around the valve with possible extention of the explosion to the inside of the same.
User shall therefore avoid any solidification of the fluid contained into the valves either during testing, commissioning, start-up, normal operation or during any misuse which can reasonably be anticipated.
For trunnion mounted ball valves special care shall be paid to the body cavity that can remain full of fluid also after draining of the pipeline. User is requested to always verify that the body cavity is fully drained by means of the vent/drain body connections provided.

Exposure to pressure greater than the valve rating

Pressure and temperature limits are clearly shown on the valve nameplate. These limits shall never be exceeded for a safe and correct use of the valve.
Despite the safety coefficients used in the valve design exposure to pressures above the rating can damage the pressure containing components thus compromising their sealing capability.

External loads

The valves are designed to take some external loads in addition to the internal pressure and the operating torque.
Please refer to Appendix G of this manual for the maximum allowed external load.

Metallic and non metallic material selection

Metallic and non metallic materials are selected in accordance with customer requirements and are normally verified for their compatibility with the produced fluid based on data in our hands. Should user require to use the valve for fluids not originally specified , the same user is responsible to establish their compatibility with the supplied materials.

Connessioni al corpo valvola

Se non diversamente concordato le valvole vengono fornite con connessioni di sfiato e drenaggio a centro corpo. Tali connessioni, necessarie per un corretto collaudo della valvola, possono però diventare fonte di perdita verso l'esterno se allentate prima o durante il normale utilizzo della valvola.
Il serraggio e la tenuta delle connessioni a centro corpo deve sempre essere verificato prima della messa in esercizio della valvola. Tale verifica può essere eseguita in concomitanza con il collaudo della valvola dopo l'istallazione in linea.
Si raccomanda quindi l'utilizzatore di non aprire tali connessioni dopo il collaudo o durante l'esercizio.

Body connections

Unless otherwise agreed, valves are supplied with vent and drain body connection. Such connections, required for a correct valve testing, can generate a fluid leak if unscrewed before or during the valve use.
Tightening and sealing capacity of the body connections shall always be verified before the valve is put in service. Such verification can be performed together with the pipeline testing after valve installation in the line.
User are requested not to operate such connections after final testing or during normal operation.

Minime Coppie di Serraggio per Connessioni Corpo tipo NPT/Minimum tightening torque figures for NPT type body connections

Coppia di serraggio [Nm] Tightening torque [Nm]	Dimensione / Size 1/4" NPT	Dimensione / Size 3/8" NPT	Dimensione / Size 1/2" NPT	Dimensione / Size 1" NPT
Con nastro o pasta in PTFE sui filetti NPT With PTFE tape or paste on the NPT threads	30	40	60	120
Senza nastro o pasta in PTFE sui filetti NPT With PTFE tape or paste on the NPT threads	100 (*)	150 (*)	200 (*)	250 (*)

(*) Quando non viene utilizzato un prodotto a base PTFE sui filetti si richiede comunque l'utilizzo di un prodotto sigillante per filetti (tipo Loctite 686 or equivalente) in quanto la tenuta perfetta con un solo contatto metallo-metallo risulta spesso difficile da ottenere.
When a PTFE derived product is not used on the NPT threads it is anyway requested to use a thread sealing compound (type Loctite 686 or equivalent) since it is often difficult to achieve a bubble tight seal with only a metal to metal contact between the treads

Rilascio automatico della pressione a centro corpo

Alcune valvole sono fornite con sistema di rilascio automatico della pressione di centro corpo in forma di valvola di sicurezza con rilascio verso l'esterno.
In condizioni di rilascio la valvola di sicurezza scarica all'esterno della valvola una parte del fluido contenuto nella cavità fino al raggiungimento della pressione di sicurezza.
Il fluido rilasciato provocherà quindi un'atmosfera potenzialmente esplosiva.
Al fine di renderla innocua occorre prevedere un'adeguata ventilazione della zona.
Evitare ogni presenza di fonti di innesco in prossimità delle valvole dotate di SRV.
Per ulteriori informazioni riguardanti il funzionamento e la manutenzione delle SRV fare riferimento al paragrafo 13.0 ad all'Appendice H.

Body cavity pressure relieving

Some valves are supplied with a body cavity pressure relieving system in form of a safety relief valve (SRV) that relief to the environment.
When SRV operates it relieves some fluid to the environment around the valve until the pressure in the body cavity reaches the safety values pre-set.
The fluid relieved will therefore generate a potentially explosive atmosphere.
To avoid any danger user is required to allow a good ventilation of the area around the valves having SRV.
Also avoid any source of ignition in the vicinity of the valves with SRV.
Additional information regarding the use and maintenance of SRV can be found both at paragraph 13 and in Appendix H.

N4.3 Manutenzione del dispositivo Antistatico

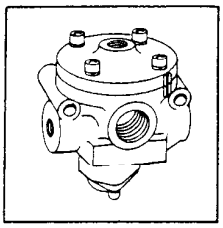
Durante lo smontaggio della valvola tra stelo e corpo si troverà un dispositivo che consente il contatto elettrico tra i vari componenti della valvola in qualunque situazione. Tale dispositivo è mostrato sui disegni allegati in Appendice A ed è formato da una molla e da una pallina entrambe conduttori.
Tale dispositivo può essere rimosso durante lo smontaggio, facendo attenzione a non perdere e/o danneggiare i componenti che lo compongono in quanto sono molto piccoli e delicati.
Molla, pallina, foro e superficie su cui lavora la pallina devono essere accuratamente puliti e, se ossidati, lucidati.
Nel caso di danni riscontrati a qualunque di questi componenti sostituirlo con uno nuovo ,di fornitura PIBIVIESSE.
Assicurarsi di re istallare il dispositivo antistatico al fine di prevenire la formazione di cariche elettrostatiche, possibili fonti di innesco di atmosfere esplosive.

E' vietata la rimozione del dispositivo antistatico dalle valvole,

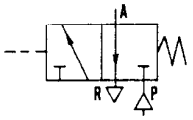
N4.3 Maintenance of the Antistatic device

During disassembling pay attention to identify the antistatic device that provides electrical continuity under any circumstance. This device is shown on the drawings attached in Appendix A and is composed by a conductive spring and ball.
This device can be remove during disassembling, paying attention not to loose any of the parts and not to damage either the spring and the ball that are very fragile.
Spring, ball, hole and mating surfaces shall be accurately cleaned.
Should any of the component found damaged use a new genuine spare part during reassembling.
Make sure to reassemble the antistatic device to avoid electrostatic sparkles, that can possibly ignite explosive atmospheres.

Removal of the antistatic device is forbidden.



HL SERIES
WITH
BLU OPERATOR



3/2 DIRECTIONAL CONTROL VALVE – NORMALLY CLOSED PRESSURE OPERATED – INLINE MOUNTED

PLATE NO.
D27A003
ISSUED 3-73

DESIGN

Poppet valve: Resilient seal on metal seat.

Pipe threads: Female, Whitworth Parallel (DIN 259, BSP Pl).

Mounting: Any orientation, but preferably with actuator on top.

Housing material: Aluminium alloy.

ACTUATION

Maintained pressure signal to valve head, spring returned. Signal pressure should be equal to main valve inlet pressure but not less than 1 kp/cm².

OPERATION

Signal exhausted: P closed, A exhausted via R.
Signal present: P open to A, R closed.

FLOW MEDIA

Compressed air: Filtered.

Media temperature: Min. +4° C; Max. +80° C.

Ambient temperature: Min. +4° C; Max. +80° C.

Pressure range: 0,3–10 kp/cm².

OPTIONAL MODELS

"PB" adaptor: Permits main valve operation with lower signal pressure.

Sequence adaptor: Upon applying or exhausting pilot signal valve reverses, after a variable but preset delay.

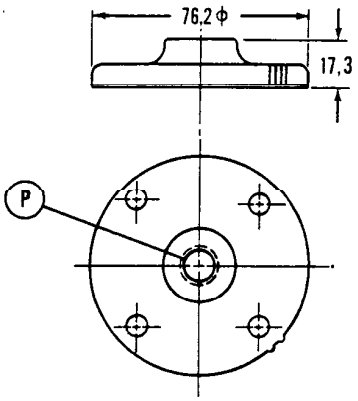
Air Index adaptor: Main valve reversal upon each impulse signal.

"Y" modification: For maintaining trapped pilot signal via main valve output.

Adaptable for other uses and conditionally suitable for other flow media. Consult your Ross representative or Ross Europa.

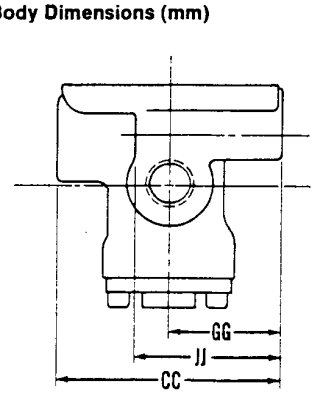
Pipe Size	Orifice Dia. (NW) mm	Model Numbers	kg	Pipe Size	Orifice Dia. (NW) mm	Model Numbers	kg	Pipe Size	Orifice Dia. (NW) mm	Model Numbers	kg
¼"	13	D2753A2001	0,6	½"	21	D2753A4001	0,9	1"	38	D2753A6001	2,7
⅜"		D2753A3001		¾"		D2753A5001		1¼"		D2753A7001	
½"		D2753A4011		1"		D2753A6011		1½"		D2753A8011	

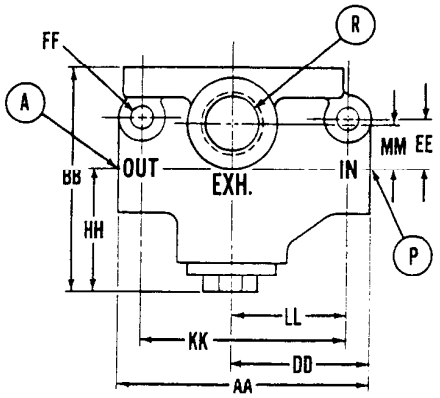
Head Dimensions (mm)



(P)	¼" Signal Port

Body Dimensions (mm)



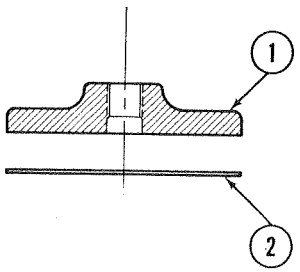


Pipe Size	¼"	⅜"	½"	½"	¾"	1"	1"	1¼"	1½"
(A) (P)	¼"	⅜"	½"	½"	¾"	1"	1"	1¼"	1½"
(R)	½"			1"			1½"		
AA	88			113			166		
BB	79			98			167		
CC	78,6			91,3			123		
DD	48			59			86		
EE	17,5			24			36		
FF	8,7			8,7			13,5		
GG	39			39			46		
HH	43,7			54			78		
JJ	51,6			54			70,6		
KK	71,4			82,6			118,3		
LL	39,7			43,7			66,7		
MM	16			21,4			30,2		

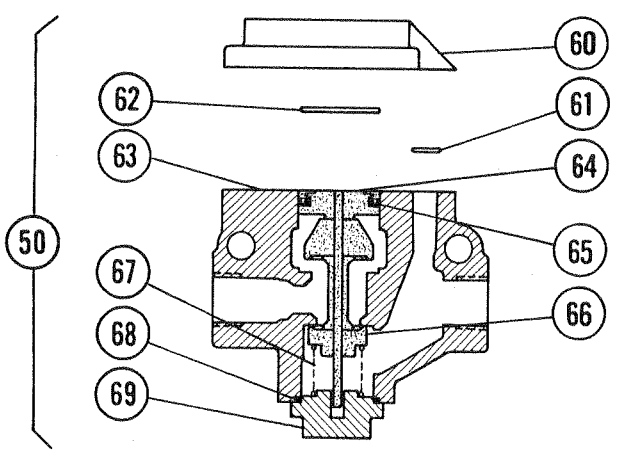
ROSS EUROPA GMBH • ROBERT-BOSCH-STRASSE 2 • D-63225 LANGEN

PLATE NO.
D27A003
ISSUED 3-73

3/2 DIRECTIONAL CONTROL VALVE – NORMALLY CLOSED PRESSURE OPERATED – INLINE MOUNTED



Item No.	No. Req'd.	Description	Basic Pipe Size $^3/_8$" – $^3/_4$" – $1^1/_4$"
1	1	Head	D102A03
[1] [2] 2	1	Gasket	200A11



50

Basic Pipe Size	Pipe Size	Valve Body Assembly
$^3/_8$"	$^1/_4$"	D928B81
	$^3/_8$"	D929B81
	$^1/_2$"	D930B81
$^3/_4$"	$^1/_2$"	D931B81
	$^3/_4$"	D932B81
	1"	D933B81
$1^1/_4$"	1"	D934C81
	$1^1/_4$"	D935C81
	$1^1/_2$"	D936C81

Item No.	No. Req'd.	Items	Pipe Size	$^1/_4$"	$^3/_8$"	$^1/_2$"	$^1/_2$"	$^3/_4$"	1"	1"	$1^1/_4$"	$1^1/_2$"
			Basic Pipe Size	$^3/_8$"			$^3/_4$"			$1^1/_4$"		
50	1	Valve Body Assembly		see chart								
60	1	Adaptor		–			–			D244B25		
[1] [2] 61	1	"O" Ring		–			–			201J15		
[1] [2] 62	1	"O" Ring		–			–			312J15		
63	1	Body		not sold separately								
[2] 64	1	Piston and Rod Assembly (incl. 65)		259B99			260B99			261B99		
[1] 65	1	Seal		304A32			305A32			306A32		
[2] 66	1	Poppet		263B08			267B08			270B08		
[2] 67	1	Spring		330A13			202A13			336A13		
[1] [2] 68	1	"O" Ring		209J15			216J15			241J15		
[2] 69	1	End Plug Assembly		190B85			191B85			192B85		
[1] Valve Gasket and Seal Kit				510K87			511K87			512K87		
[2] Valve Body Service Kit				495K87			496K87			497K87		

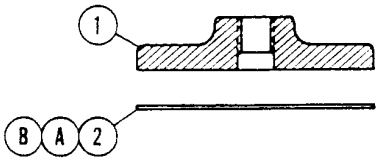
Printed in Germany

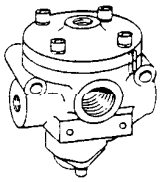
3/2 — Normalement Fermée
3/2 — Normalmente Cerrada
3/2 — Normal Geschlossen
3/2 — Normally Closed

ROSS

27PA05

FSGE 2.83





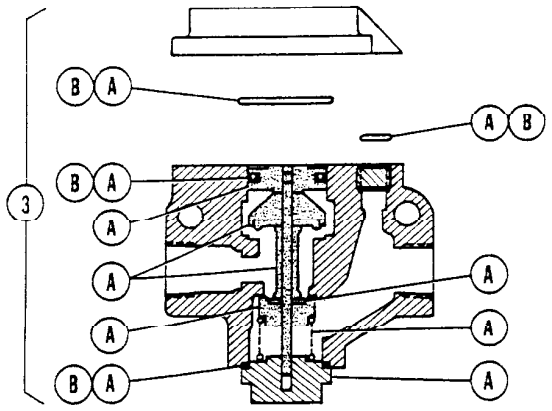
¼ ⅜ ½	★ 2753A2001 ★ 2753A3001 ★ 2753A4011	X
½ ¾ 1	★ 2753A4001 ★ 2753A5001 ★ 2753A6011	Y
1 1¼ 1½	★ 2753A6001 ★ 2753A7001 ★ 2753A8011	Z

★ Certaines références d'appareils sont précédées de la lettre D ou J. De ce fait pour la commande d'un corps complet destiné à ces appareils, la référence du corps complet doit être précédée de la lettre D. Exemple: un corps complet (voir ci-dessous) pour vannes D2753A2001 ou J2753A2001 doit être commandé sous la désignation: corps complet REF. D282K78.

★ Algunos modelos están precedidos por la letra D ó J. Cuando se pide un cuerpo completo para tales modelos la letra D debe preceder al número del cuerpo completo. Por ejemplo un cuerpo completo (ver abajo) para válvula modelo D2753A2001 ó J2753A2001 debe ser pedido como cuerpo completo número D282K78.

★ Einigen Bestellnummern sind die Buchstaben D oder J vorangestellt. Falls eine Ventilkörper-Baugruppe bestellt wird, so muss der Buchstabe D vor der Bestellnummer der Ventikörper-Baugruppe erscheinen. Beispiel. Eine Ventilkörper-Baugruppe (siehe unten) für Ventil D2753A2001 oder J2753A2001 muss unter der Nummer D282K78 bestellt werden.

★ Some model numbers are preceded by the letter D or J. When ordering a body assembly for such models the letter D must precede the body assembly number. For example, a body assembly (see below) for valve model D2753A2001 or J2753A2001 must be ordered as body assembly number D282K78.



	Description	Descripción	Beschreibung	Description	X	Y	Z
1	Tête	Cabeza	Betätiger	Head	W102A03	W102A03	W102A03
2	Joint Plat	Junta	Dichtung	Gasket	200A11	200A11	200A11
3	Corps Complet	Conjunto Cuerpo	Ventilkörper-Baugruppe	Body Assy.	(¼)★282K78 (⅜)★283K78 (½)★284K78	(½)★285K78 (¾)★286K78 (1) ★287K78	(1) ★288K78 (1¼)★289K78 (1½)★290K78
A	Kit Corps	Repuestos del Cuerpo	Ventilkörper-Reparatursatz	Body Kit	495K87	496K87	497K87
B	Kit de Joints	Juego Juntas	Dichtungssatz	Seal Kit	510K87	511K87	512K87

ROSS EUROPA GmbH • Robert-Bosch-Straße 2 • D-63225 Langen

ROSS

INSTALLATION &
MAINTENANCE MANUAL

MM-GP-E

SINGLE & DOUBLE ACTING
PNEUMATIC ACTUATORS

GP/S – GP/D SERIES

rotork
fluid system

MM-GP-E

INDEX

I. INSTALLATION INSTRUCTIONS

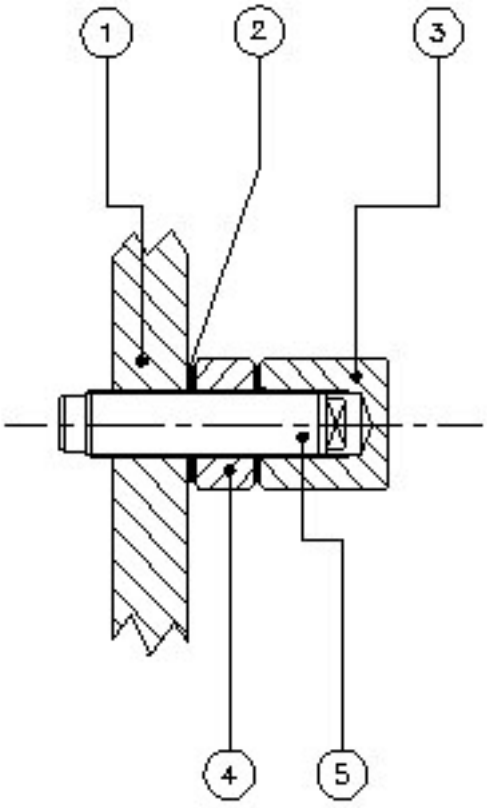
1.1 It is recommended that before lifting an actuator onto a valve, great care is taken to ascertain the position of the valve and orientate the actuator accordingly.

1.2 Rotork actuators can be mounted on valves in almost any desired position. It is usual however to align the centreline of the cylinder to the centreline of the associated pipe work.

1.3 When the actuator has been bolted to the flange or adapter and the keys inserted, the position of the stop bolts should be checked to ensure full opening and closing of the valve.
If these end positions are not suitable, the stop bolts may be adjusted by first loosening the fixing nut (item 4) and screwing the bolts in or out until desired position is obtained. Stroke the yoke away from the stop bolt when adjusting, then return it to check position. When the correct positioning is obtained, retighten the fixing nut (item 4) and reassemble the cap nut (item 3).

1.4 Certain valves incorporate their own stops. Such, it is recommended that the actuator stop bolt positions coincide with the valve stop positions.

1.5 Once in position, the actuator should operate the valve with a smooth continuous action.
If jerky operation occurs, the Hydraulic/gas supply should be checked for correct pressure and volume flow. Flow may be restricted by undersize pipe or fittings - these could throttle the flow thus reducing the air pressure at the actuator and causing intermittent motion. All Rotork actuators are tested prior to dispatch and copies of the test certificates are available on request.



Pos.	Q.ty	Description
1	1	Flange
2	2	Seal Washer
3	1	Cap nut
4	1	Fixing Nut
5	1	Stop screw

II. PERIODIC MAINTENANCE

As the actuators have been designed to work for long periods in the most severe conditions, they do not need any specific maintenance.
However, we recommend the following periodic checks:

- The actuators operate the valve correctly and with the required operating time.
  Carry out some opening and closing operations with all the existing controls (such as remote control - local control - emergency control). If the working conditions of the plant allow to do this and if the actuator is not frequently operated.
- The signalings to the control board are correct.
- The fluid supply pressure value is within the required range.
- The external components of the actuator are in good condition.
  This control can be carried out visually.
- The hydraulic/pneumatic connections do not show any leakage.
  If necessary, tighten the nuts of the pipe fittings.
- The painting work of the actuator has not been damaged. It is possible that some areas may need a touch-up according to the applicable painting specifications.

III. REPLACEMENT OF CYLINDER SEALS

When the cylinder seals must be replaced, either because of a leakage or a preventive scheduled maintenance, proceed as described below (see drawing) :
- Unscrew the nuts (item 33) from the tie rod (item 21).
- Remove the bottom flange (item 20).
- Remove the cylinder tube (item 18).
- Unscrew the screws and the cover of the mechanism (nb for a double acting actuator only)
- Slide the rod (item 19) together with the piston of the head flange (item 17).
- Stops from the inside of the housing the stem, by using a fork wrench (nb for a double acting actuator only).
- Unscrew the nut (item 34).
- Remove the piston (item 22) together with the shoulder washer (item 29).
- Unscrew the screw (item 13).
- Remove the head flange (item 17).
- Unscrew the screws (item 37).
- Remove the gasket retaining flange (item 36).
- Remove the o-rings (items 24-25-28-35), the gaskets (items 16-36) and the guide sliding ring (item 23).
  Carefully clean the relative grooves.
  Replace all the above mentioned seals and lubricate them with a grease film.

Taking care not to damage the seals, proceed with the reassembling as follows:
- Reassemble the gasket retaining flange (item 36) and screw the screws (item 37).
- Reassemble the head flange (item 17) and screw the screws (item 13).
- Reassemble the piston (item 22) and the shoulder washer (item 29).
- Stop from the inside of the container the stem by using a fork wrench (nb for a double acting actuator only).
- Screw the nut (item 34).
- Insert the rod (item19) into the head flange (item 17).
- Reassemble the cylinder tube (item 18) and the bottom flange (item 20).
- Uniform screw the nuts (item 33) on the tie rod (item 21).
- Replace the gasket of the mechanism cover (item 14) and reassemble the cover of the mechanism (nb
for a double acting actuator only)
- Carry out a few operations with the actuator, in order to check that the movement is regular and that the seals show no leakages.

Check that the painted parts have not been damaged during the operations of disassembly and of reassembly. If necessary repaint them in according to the applicable painting specification.

IV. LUBRICATION & HYDRAULIC OIL FEATURES

Usually the actuator will not require additional lubrication, because its mechanism is lubricated for life.
However, the following grease is used by Rotork Fluid System to lubricate the mechanical components and is recommended for any necessary lubrication:

MANUFACTURER:	MOBIL
TRADE NAME:	MOBILTEMP 78
COLOR:	GRAY/BLACK
SOAP TYPE:	INORGANIC
OIL TYPE:	MINERAL
CONSISTENCY (NLGI GRADE)-ASTM D217:	1
WORKED PENETRATION AT 25°C-ASTM D217:	295/325 dmm
DROPPING POINT–ASTM D2265	260°C
VISCOSITY OF BASE OIL AT 40°C-ASTM D445:	485 cSt
VISCOSITY OF BASE OIL AT 100°C-ASTM D445:	32 cSt

Note:
The above described grease type is the Rotork Fluid System standard for lubrication of scotch yoke actuators. In case a different grease type has been requested, see the description in the instruction manual.

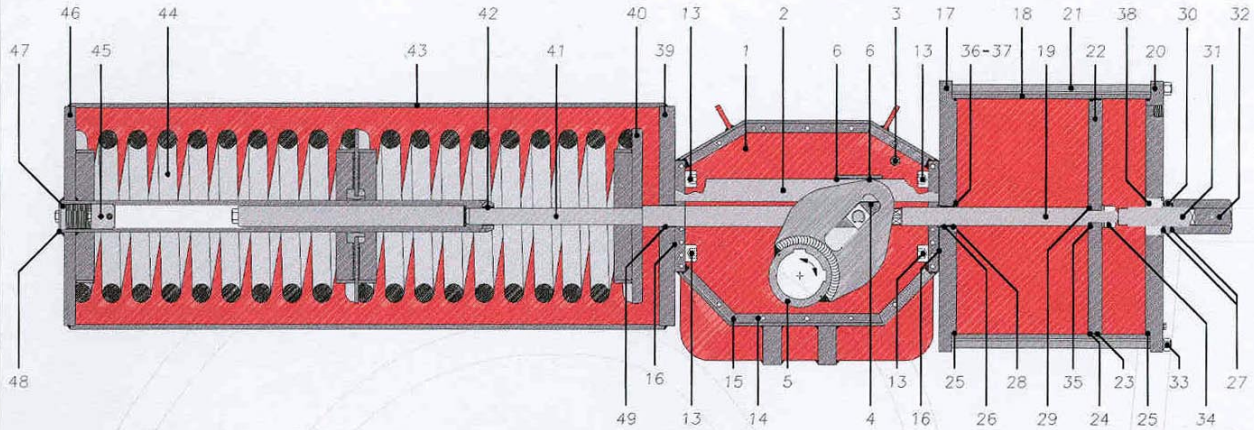
MANUFACTURER:	MOBIL
TRADE NAME:	DTE 11
VISCOSITY AT 40°C:	16,5 cSt
VISCOSITY AT 100°C:	4,2 cSt
VISCOSITY INDEX ASTM:	168
ISO GRADE:	16
POUR POINT:	-42 °C
SPECIFIC WEIGHT AT 15°C:	0,85 kg/dm^3
EQUIVALENT TO:	STATOIL - HYDRAWAY HVX-A15

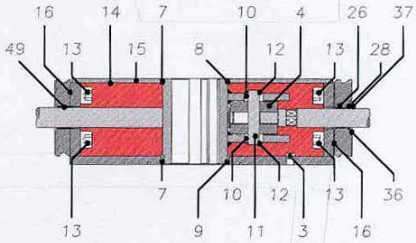
Note:
The above described oil type is the Rotork Fluid System standard. In case a different oil type has been requested, see the description in the instruction manual.

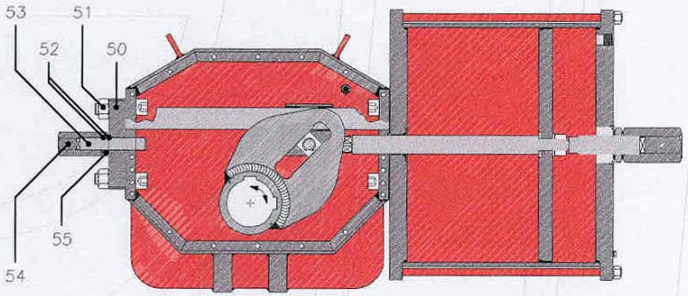
V. FAULT LOCATION

In the unlikely event of a fault developing, the following Fault Location table is provided to assist the maintenance technician.
This Fault Location Table is designed to cover as wide a range of Rotork Fluid System actuators as possible. Reference to equipment not supplied should be ignored.

SYMPTOM	CAUSE	REMEDY
1.Erratic movement	1.1 Irregular supply of operating medium.	1.1.1 Check operating medium supply and correct as necessary.
	1.2 Poor lubrication.	1.2.1 Dismantle, relubricate and reassemble.
	1.3 Worn parts / scuffing ect.	1.3.1 Dismantle, remove any roughness, lubricate and reassemble.
	1.4 Defective valve.	1.4.1 Consult the valve manufacturer's documentation.
2. Short stroke	2.1 Incorrectly set stops (valve and /or actuator).	2.1.1 Check the position of the stops and readjust as necessary.
	2.2 Worn parts / scuffing ect.	2.2.1 Dismantle, remove any roughness, lubricate and reassemble.
		2.2.2 Dismantle, replace worn parts, lubricate and reassemble.
	2.3 Hard grease.	2.3.1 Dismantle, remove old hard grease, relubricate and reassemble.
	2.4 Debris left in the cylinder or housing during overhaul.	2.4.1 Disassemble cylinder assembly to remove debris. Reassemble cylinder assemble as necessary.
	2.5 Defective valve.	2.5.1 Consult the valve manufacturer's documentation.
	2.6 Valve seized.	2.6.1 Remove the actuator from the valve, paying particular attention to procedure if the actuator is in a spring compressed position.
3.Apparent lack of power.	3.1 Low supply pressure.	3.1.1. Check the supply pressure and restore to the normal operating pressure.
	3.2 Incorrect speed control settings.	3.2.1 Adjust the speed controls to give the correct speed.
	3.3 Exhaust ports choked.	3.3.1 Remove and clean the exhaust port silencers and replace.
		3.3.2 Remove the exhaust port silencers and replace with new.
	3.4 Pipe work blocked, crushed or leaking.	3.4.1 Examine the pipe work for blockage, crushed pipe work and leakage. Clear and / or make good as necessary.
	3.5 Defective controls.	3.5.1 Examine the controls, refurbish or renew as necessary. Refer to manufacturer's documentation.
	3.6 Defective piston seal.	3.6.1 Dismantle the cylinder assembly, remove the defective piston seal and fit new, reassemble the cylinder assembly.
	3.7 Defective rod seal.	3.7.1 Dismantle the cylinder assembly, remove the defective rod seal and fit new, reassemble the cylinder assembly.
	3.8 High valve torque or valve seized.	3.8.1 Consult the valve manufacturers documentation.
		3.8.2 Remove the actuator from the valve (see 2.6.1 above).







HOUSING	DESCRIPTION	Q.ty	MATERIAL
1	Housing	1	Carbon steel
2	Guide bar	1	Alloy Steel+Chrom. plating
3	Safety valve	1	Brass+Stainless steel
4	Guide block	1	Carbon steel
5	Yoke	1	Carbon steel
6	Bushing	2	Steel+Bronze+PTFE
7	O-ring	2	Buna-n
8	Upper bushing	1	Bronze
9	Lower bushing	1	Bronze
10	Sliding block	2	Bronze
11	Bar pin	1	Alloy steel
12	Snap ring	2	Spring steel
13	Screw	8	Carbon steel
14	Gasket	1	Vaporflex/SA
15	Cover	1	Carbon steel

CYLINDER	DESCRIPTION	Q.ty	MATERIAL
16	Gasket	2	Buna-n+PTFE+Graphite
17	Head flange	1	Carbon steel
18	Cylinder tube	1	Carbon steel+Nickel plating
19	Piston rod	1	Carbon steel+Chrom. plating
20	Bottom flange	1	Carbon steel
21	Tie rod	–	Alloy steel
22	Piston	1	Carbon steel
23	Sliding ring	–	PTFE+Graphite
24	O-ring	–	Buna-n
25	O-ring	2	Buna-n
26	Bushing	1	Steel+Bronze+PTFE
27	Gasket	2	Buna-N+PTFE+Graphite
28	O-ring	1	Buna-n
29	Shulder washer	1	Alloy steel
30	Fixing nut	1	Carbon steel
31	Stop screw	1	Alloy steel
32	Cap nut	1	Carbon steel
33	Nut	–	Carbon steel
34	Nut	1	Carbon steel
35	O-ring	1	Buna-n
36	Gasket flange	1	Stainless steel
37	Screw	2	Stainless steel
38	Flange	1	Carbon steel

SPRING	DESCRIPTION	Q.ty	MATERIAL
39	Head flange	1	Carbon steel
40	Driving flange	1	Carbon steel
41	Rod	1	Carbon steel+Chrom. plating
42	Bushing	1	Steel+Bronze+PTFE
43	Enclosure	1	Carbon steel
44	Spring	–	Steel for spring
45	Stop screw	2	Carbon steel
46	Bottom flange	1	Carbon steel
47	Protection plug	1	Carbon steel
48	O-ring	1	Buna-n
49	Bushing	1	Steel+Bronze+PTFE

CLOSURE	DESCRIPTION	Q.ty	MATERIAL
50	Flange	1	Carbon steel
51	Nut	4	Carbon steel
52	Gasket	2	Buna-n
53	Stop screw	1	Alloy Steel
54	Cap nut	1	Carbon steel
55	Nut	1	Carbon steel

NOTE:
The quantities which are not indicated on the drawing, depend on the type of actuator.

rotork fluid system

GENERAL SECTIONAL DRAWING OF GP

rev.	date	drawn	check
00	27.09.02		

MSG1001

RC200

Pneumatic Actuators

INSTRUCTION No 836

TYPE AND DESIGN

DA = Double Acting. Actuator with pneumatic operation in both directions.
SR = Spring Return. Actuator with spring return.
RC 210, 230, 250 and 270 have 1 piston.
RC 220, 240, 260 and 280 have 2 pistons.

OPERATING MEDIUM

The air or inert gas to be used must be filtered to 30 µm particle size or less. If the operating temperature is below +5 °C, the air dew point must be below the application temperature. The exhaust air must pass through a filter silencer before it is let out into a workshop.

THE APPLICATION OF THE SCOTCH YOKE CONSTRUCTION

The Scotch Yoke of the RC 200 actuators has angled slots. Thus the output torque can be given different values depending on how the pistons are mounted in the actuator.

As standard, the DA actuators are mounted as shown on picture 1, page 2. This design allows for highest torque at "closed" valve position. The pistons are then in their outermost position and can be fine adjusted ±3°.

The SR actuators have the pistons turned (rotated) 180° in relation to the DA actuators according to picture 3 on page 3. This gives an increase of the torque towards the end of the rotary motion, although the spring force is diminished.

When the pistons in an SR actuator are mounted according to picture 1 on page 2, the function is changed from "spring closes" to "spring opens". The adjustment of the end position will then take place in "closed position".

If the pistons in a DA actuator are mounted according to picture 3, on page 3 the fine adjustment will take place in "open" valve position. The actuators can be supplied with adjustment in both end positions on request. The possibility to turn the pistons can be used in several ways in order to suit the actuators to the customer's requirements. For further information on this, please consult factory.

HAND OPERATION

WARNING!

It is very risky to try to operate the actuator manually by using the key grip on the driving shaft. The accumulated energy inside the actuator may instantaneously be set free.

The actuator can be equipped with handwheel for manual operation, RC-M1.
Other methods are available on request.

WARNING!

All manual operations must be carried out with a vented actuator.

INSTALLATION AND ADJUSTMENT

All types of actuators can be mounted in various positions, e.y. vertical or horizontal. When mounting on a valve, ensure that the actuator shaft and the valve stem are centered, and that a play of 0,5–1 mm exists between shaft and driving bush depending on actuator size. Ensure especially that actuator and driving bush are mounted correctly in relation to eachother, considering that the actuator shaft has an octagonal hole and that a faulty mounting of 45° degrees is possible. This naturally also applies to direct mounting on a valve. After mounting, it may be necessary to adjust the turning angle of the actuator.
Tightening torques for lock nuts on page 6.

As mentioned previously, the DA actuators can, as standard, be adjusted in "closed" valve position and the SR actuators in "open" position. The adjustment occurs by loosening the lock nut on the end plate, after which the set screw is turned clockwise for reduced and anticlockwise for increased rotary motion. The adjustment degree is ±3 °C.

RC 220, 240, 260 and 280 have two adjustment screws. ***It is important that <u>both</u> screws are in contact with the piston in question.***

The actuator is supplied with an indicator on the driving shaft. The indicator can be mounted in 2 optional positions for different valve functions, mounting directions, etc.

WARNING!

RC actuators must only be used as actuators on valves. Levers, racks and similar cannot be used to transmit movement without protective equipment.
Pinch risk in the valve opening when test trimming non-installed valves.

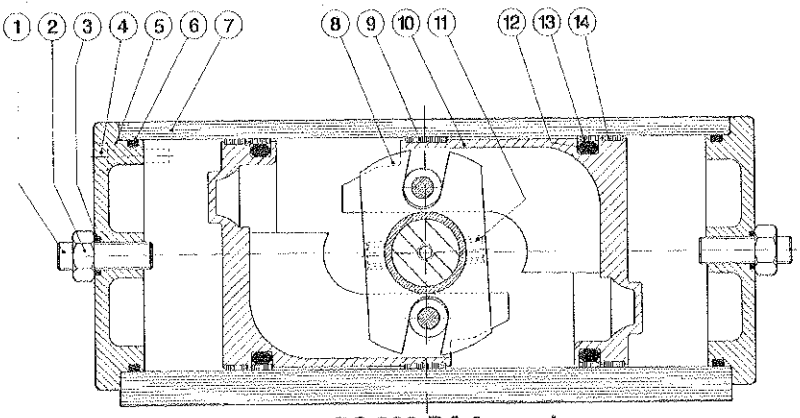


Fig. 1 RC 200-DA from above

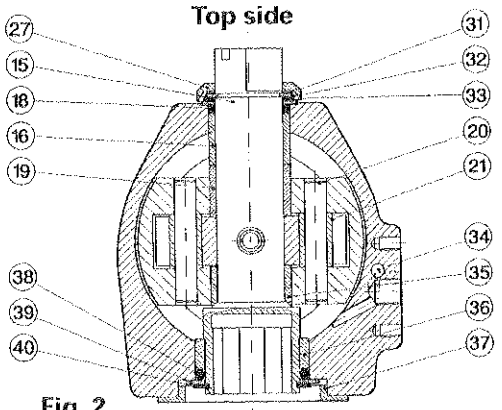


Fig. 2

LUBRICATION

RC actuators are permanently lubricated and additional lubrication is normally not required. However, for actuators performing 100.000 operation cycles or more under very heavy load, an oil mist lubrication is recommended.

Oil mist lubrication requires a mineral oil type ISO VG32 according to DIN 51524HLP for usage in temperature range -10 to +70 °C. Oil mist lubricator must be set at lowest possible value. Commenced oil mist lubrication must continue. If the actuator is equipped with pneumatic or electro-pneumatic positioner, oil mist must not be used.

RECOMMENDED LUBRICATION GREASE

Cylinder bore and drive shaft with shaft saealings and bearings	Grease
RC 200 standard and high temp	Cargo White Grease, Klüber Isoflex Topas NCA 52.
RC 200 low temp	Klüber Isoflex Topas NCA 52

Piston roller (21)	Grease
All RC 200	Cargo Red Grease, Klüber Unimoly GL 82.

SERVICE OF RC 210-280

WARNING!

Before dismantling, check that the compressed air and possible power supply are disconnected. Dismantling of SR unit, see instruction on page 5. Dismantling of SR unit with manual operation unit type M1, see instruction on page 4.

Exchange of piston sealings and support elements

1. *Please read the warning above!*
2. Dismantle the actuator from the console.
3. Dismantle the end plates (5) or the spring houses (25).
4. Fasten the actuator shaft between soft jaws in a vice and turn the actuator until the pistons reach the cylinder end. Then place a few rods in the holes on the outside of one piston. By pressing together and pulling these rods simultaneously, the piston is dismantled from the cylinder.
5. If the sealing ring (13) and the piston O-ring (12) are worn, they must be replaced. (RC 270 and 280 have no sealing rings).
6. Replace the support ring (14) if it is worn.
7. Replace the support element (9) if it is worn.
8. Grease the cylinder surface with a grease according to the lubrication list above.
9. When mounting the pistons, we recommend the use of some kind of piston ring compressor. RC 270 and 280 which do not have sealing rings, can be mounted without appliances.
10. Mount the end plates and adjust the shaft turning angle.

Exchange of shaft sealings and support washers

The shaft bearings (18) and (38) and the support washers (33) and (39) can easily be replaced as below.

1. *Please read the warning on the left!*
2. Dismantle the actuator from the console.
3. Dismantle the circlips (31) and (40) around the shaft.
4. Dismantle the worn details.
5. Fit the new O-rings (18) and (38).
6. Fit new washers under the circlips.
7. Use a grease according to the lubrication list when mounting.
8. ***Fit the new circlips with the rounded inner edge towards the centre of the actuator. Do not stretch them more than necessary.***
9. ***Check that the circlips are tightly fitted without play in their grooves.***

Exchange of shaft bearings

The bearings (16) and (36) and also the support ring (19) on RC 210-240 can easily be replaced when the pistons and shaft sealings are dismantled as above.

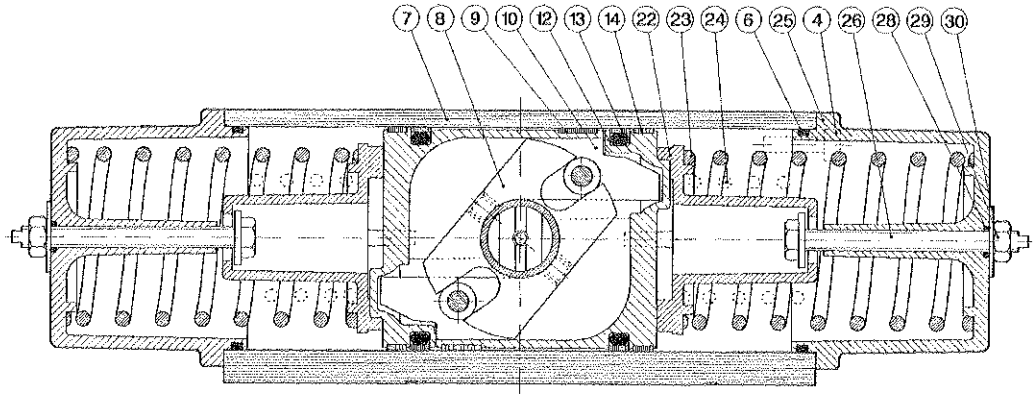


Fig. 3 RC 200-SR from above

Material table for RC 210–280

Part No	Description	Number RC 200-DA	Number RC 200-SR	Material	Surface treatment
1	Adjusting screw[1]	1	—	Sizes 210–260: Stainless steel Others: Steel	Zinc plated
2	Lock nut[1]	1	—	Sizes 210–260: Stainless steel Others: Steel	Zinc plated
3	O-ring[1]	1	—	Nitrile	
4	Screw	8–16	8–16	Sizes 210–260: Stainless steel Others: Steel	Zinc plated
5	End plate with centre hole[1]	1	—	Aluminium	Anodized
6	O-ring	2	2	Nitrile	
7	Cylinder	1	1	Aluminium	Anodized
8	Scotch Yoke	1	1	Steel	
9	Support element[1]	1	1	POM/PTFE	
10	Piston[1]	1	1	Aluminium	
11	Roll pin, double [2,3]	1	1	Spring steel	
12	O-ring[1]	1	1	Nitrile	
13	Sealing ring[1,4]	1	1	PTFE, filled	
14	Support band[1]	1	1	PTFE, filled	
15	Driving shaft	1	1	Sizes 210–260: Stainless steel Others: Steel	Zinc plated, yellow chromated
16	Bearing, upper	1	1	Polymer material	
17	End plate without centre hole[5]	1	1	Aluminium	Anodized
18	O-ring, upper	1	1	Nitrile	
19	Support ring, upper	1	1	Polymer material	
20	Piston pin[1]	1	1	Steel	
21	Piston roller[1]	1	1	Steel	
22	Spring guide[1]	—	1	Aluminium	
23	Spring, external[1]	—	1	Sizes 210–260: Alloyed spring steel Others: Spring steel	Corrosion protected Corrosion protected
24	Spring internal[1,6]	—	1	Alloyed spring steel	Corrosion protected
25	Spring housing[1]	—	1	Aluminium	Anodized
26	Pre-tensioning screw[1]	—	1	Sizes 210–260: Stainless steel Others: Steel	Zinc plated
27	Indicator	1	1	Polymer material	
28	O-ring[1]	—	1	Nitrile	
29	Lock nut[1]	—	1	Sizes 210–260: Stainless steel Others: Steel	Zinc plated
30	Marking washer[1]	—	1	Aluminium	Anodized
31	Circlip, upper	1	1	Sizes 210–260: Stainless spring steel Others: Spring steel	Corrosion protected
32	Middle washer	1	1	Sizes 210–260: Stainless spring steel Others: Steel	Corrosion protected
33	Support washer, upper	1	1	Polymer material, chemically resistant	
34	Sealing[1]	1	1	Sizes 210–260: Stainless steel Others: Nitrile	
35	Support ring, lower	1	1	Polymer material	
36	Bearing, lower	1	1	Polymer material	
37	Guide ring	1	1	Polymer material	
38	O-ring, lower	1	1	Nitrile	
39	Support washer, lower	1	1	Polymer material, chemically resistant	
40	Circlip, lower	1	1	Sizes 210–260: Stainless spring steel Others: spring steel	Corrosion protected

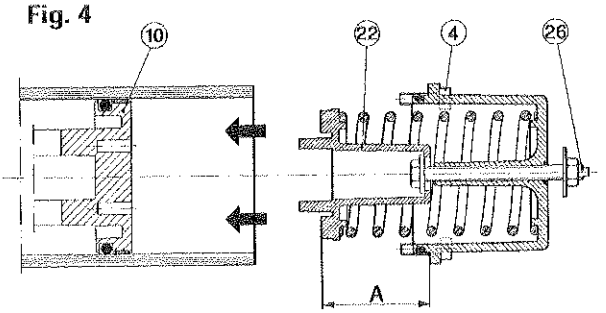
1) For actuator sizes 220, 240, 260 and 280: The double amount of details. 2) RC 240 has treble roll pins.
3) RC 270–280 have a slotted pin in steel. 4) Do not exist for sizes 270 and 280.
5) Not in the picture! Do not exist for sizes 220, 240, 260 and 280. 6) Only for sizes 270 and 280.

Converting to SR actuators

All DA actuators can be changed into SR actuators by adding spring conversion kits according to the following instructions:

1. *Please read the warning on page 2!*
2. Dismantle the end plates. (The description is for RC 220, 240, 260 and 280 which have two pistons).
3. Dismantle the pistons. See the text under "Exchange of piston sealings and support elements".
4. Mount the pistons according to picture 3 on page 3.
5. Check that the spring is correctly pre-tensioned according to table 1 and picture 4.
6. The spring guide ㉒ is centered towards the piston with the aid of 2 pins.
7. The SR units on sizes 230–280 must be turned so that one of the three support points lies between the bosses on the piston ⑩.
8. Mount the SR unit when the pistons are in their innermost position.
9. Put the screws ④ in place. When tightening the screws, the spring force is transmitted from the tensioning screw ㉖ to these screws. ***Tightening torques according to table on page 6.***
10. The turning angle of the actuator is adjusted with the tensioning screw ㉖.

Fig. 4



Adjustment is made with screw ㉖.

Table 1

RC 200–SR actuator	A
210–220	41
230–240	62
250–260	87
270–280	137

INSTRUCTIONS FOR DISMANTLING OF RC 200-SR ACTUATORS WITH MANUAL OPERATION UNIT TYPE M1

WARNING!

Do not remove the protective tube ㊿ and handwheel from the spring housing as long as the springs are tensioned. This procedure must be followed for safe dismantling of pretensioned spring housings.

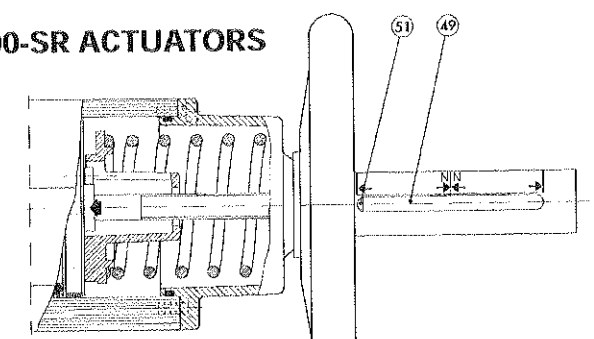
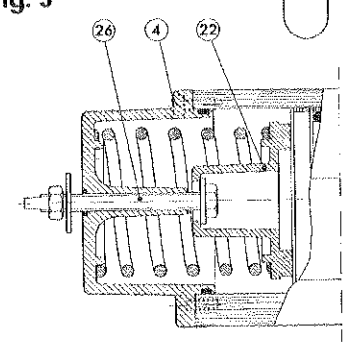
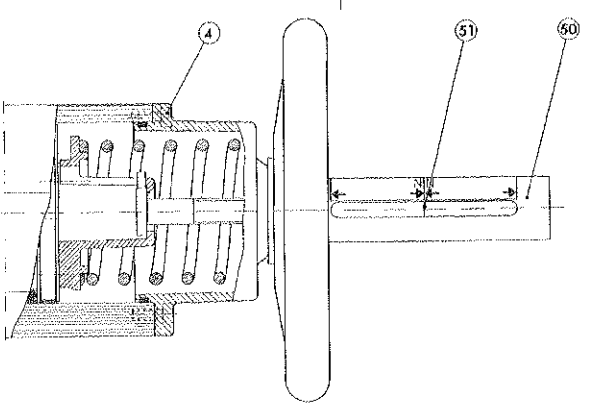


Fig. 5



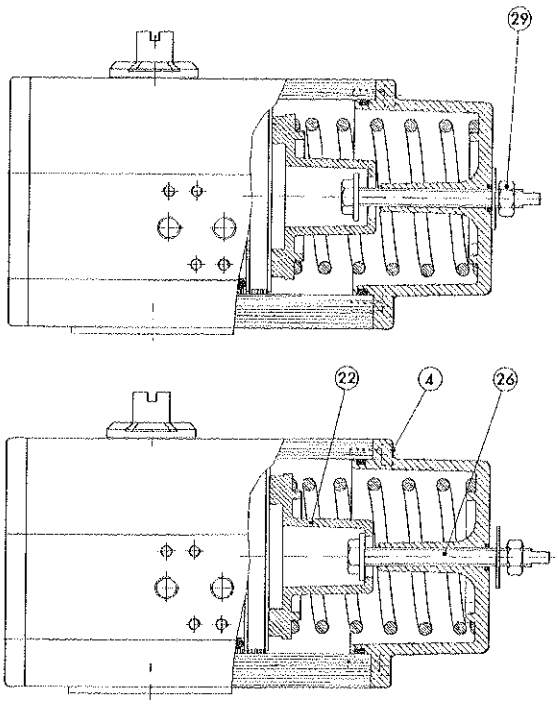


1. The actuator must be pressureless.
2. Check that the springs can press the piston back into its starting position according to picture 5. The upper shaft journal must not be oblique.
3. Disconnect possible power supply.
4. Turn the handwheel so that the threaded stem ㊾ moves toward the actuator until it stops and the stem can just barely be seen in the plastic tube ㊾.
5. For sizes RC 220, 240, 260 and 280 (i.e. actuators with two pistons): adjust the tensioning screw ㉖ in the opposite spring housing anti-clockwise until it lies against the spring guide ㉒. Dismantle the spring housing by loosening the screws ④.
6. For all sizes: then turn the handwheel until there is resistance and the threaded stem ㊾ can be seen somewhat to the right of neutral position "N".
7. Dismantle the spring housing of the manual override by loosening the retaining screws ④ and turning the handwheel several turns in the direction which gives the least resistance.

Dismantling must be carried out in the above order with the utmost care. In the case of the slightest uncertainty – contact the supplier.

INSTRUCTIONS FOR DISMANTLING OF RC 200-SR ACTUATORS

RC 210, 230, 250 and 270

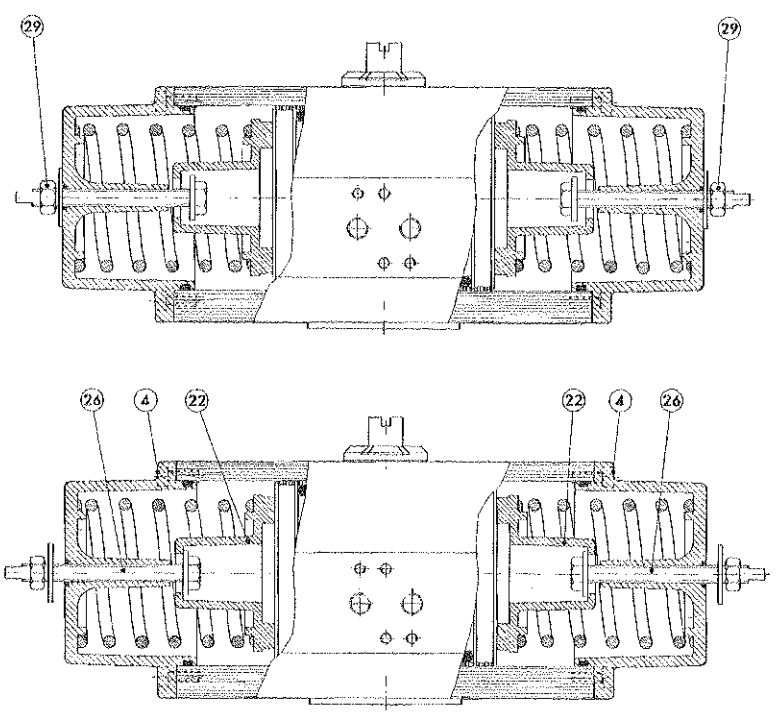


WARNING!

The procedure below must be followed for safe dismantling of pre-tensioned spring housings.

1. The actuator must be pressureless.
2. Check that the springs can press the piston into starting position according to picture on the left.
3. Disconnect all possible power supply.
4. Loosen the lock nut (29).
5. Turn the tensioning screw (26) anti-clockwise until it lies lightly against the spring guide (22).
6. Dismantle the spring housing by loosening the screws (4).
7. Dismantling must be carried out with the utmost care. In the case of the slightest uncertainty – contact the supplier.

RC 220, 240, 260 and 280



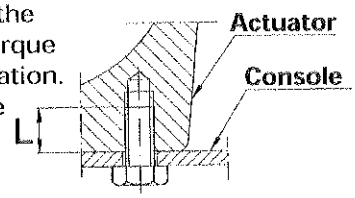
WARNING!

The procedure below must be followed for safe dismantling of pre-tensioned spring housings.

1. The actuator must be pressureless.
2. Check that the springs can press the piston into starting position according to picture on the left.
3. Disconnect all possible power supply.
4. Loosen the lock nuts (29).
5. Turn both spring tensioning screws (26) clockwise until they can be turned with minimum force.
6. Turn the left spring tensioning screw (26) anti-clockwise until it lies lightly against the spring guide (22) and dismantle the left spring housing by loosening the screws (4).
7. Dismantle the right spring housing in the same manner as the left one.
8. Dismantling must be carried out with the utmost care. In the case of the slightest uncertainty – contact the supplier.

TIGHTENING TORQUES FOR SCREWS AND LOCK NUTS

The actuators must be screwed onto the console with the correct tightening torque in order to remain stable during operation. Please use as long screws as possible without the threads grounding. "L" is the screw length according to drawing.



Actuator	End plate screw	Lock nut	
		DA	SR
	④	②	㉙
RC 210-220	5,5	20	9
RC 230-240	5,5	40	18
RC 250-260	23	90	35
RC 270-280	76	120	80

Tightening torques in Nm:

Resistance class min. 8.8. Lightly oiled screws.

Actuator	DIN flange	Thread	L max (mm)	Screw length (mm)									
				8	10	12	14	16	18	20	24	28	32
RC 210	F05	M6	11	8,8	9,2								
RC 220	F05	M6	11	8,8	9,2								
RC 230-240	F07	M8	14		21	23	23						
	F10	M10	17			40	45	45					
RC250-260	F10	M10	17			40	45	45					
	F12	M12	21				60	70	75	75			
RC 270	F14	M16	25					125	140	155	185		
	170 x 110	M16	25					125	140	155	185		
RC 280	F12	M12	25					70	75	75	75		
	F16	M20	32								280	330	360
	F25	M16	25					125	140	155	185		

Electric or Pneumatic Limit Switch Type 4746

Fig. 1 · Type 4746 Limit Switch

Mounting and Operating Instructions

EB 8365 EN

Edition March 2004

Contents

- *Assembly, start-up and operation of the device may only be performed by trained and experienced personnel familiar with this product.*
  According to these mounting and operating instructions, trained personnel is referred to as individuals who are able to judge the work they are assigned to and recognize possible dangers due to their specialized training, their knowledge and experience as well as their knowledge of the applicable standards.
- *Explosion-protected versions of this device may only be operated by personnel who have undergone special training or instructions or who are authorized to work on explosion-protected devices in hazardous areas (also see section 5 "Servicing explosion-protected versions").*
- *Any hazards which could be caused by the process medium, the signal pressure and moving parts of the control valve are to be prevented by means of the appropriate measures.*
  If inadmissible motions or forces are produced in the pneumatic actuator as a result of the supply air pressure, it must be restricted by means of a suitable pressure reducing station.
- *Proper shipping and appropriate storage are assumed.*

- ***Note!** The device with a CE marking fulfils the requirements of the Directives 94/9/EC (ATEX) and 89/336/EEC (EMC).*
  The declaration of conformity can be viewed and downloaded on the Internet at http://www.samson.de.

Technical data

Inductive limit switch	**Type 4746-x2**		Type 4746-0281
Control circuit	Values correspond to downstream switch amplifier		Operating voltage 10 to 30 V
Proximity switch	SJ 3.5 N	SJ 3.5 SN	SB 3.5 -E2
Perm. ambient temperature	–20 (–25)[1] to +70 °C[2]	–20 (–40)[1] to +100 °C[2]	–20 (–25)[1] to +70 °C
Deg. of protection	IP 65, also see section 2.2		
Weight	Approx. 0.7 kg		
Type 4746-x3 Electric Limit Switch			
Switching element	Electric limit switch (double-throw type)		
Load	AC voltage: 220 V, 6.9 A DC voltage: 220 V, 0.25 A / 20 V, 6.9 A		
Perm. ambient temperature	–20 (–40)[1] to +85 °C[2]		
Deg. of protection	IP 65, also see section 2.2		
Weight	Approx. 0.7 kg		
Type 4746-04 Pneumatic Limit Switch			
Switching element	Pneumatic limit switch with downstream pneumatic microswitch		
Air supply	Supply air 1.4 bar (20 psi), briefly overloadable up to 4 bar (60 psi)		
Air consumption	0.04 m_n^3/h		
Output	0 or 1.4 bar (20 psi)		
Air output	1 switch closed: 0.7 m_n^3/h 2 switches closed: 1.0 m_n^3/h		
Perm. ambient temperature	–20 to +60 °C		
Deg. of protection	IP 54, also see section 2.3		
Weight	Approx. 0.75 kg		
Materials	Housing and cover made of powder-coated aluminum, lever and shaft made of 1.4571		

[1] With cable gland, metal
[2] Observe restrictions concerning the permissible ambient temperatures specified in the Type Examination Certificate

Switching differential (reverse span)			
Type	**4746-x2**	**4746-x3**	**4746-04**
Lever length L	Switching hysteresis in mm		
50 mm	0.15	0.6	0.75
120 mm	0.35	1.0	1.5

Versions of the limit switch (for devices with model index .07 and higher)

Type		**4746-**	X	X	X	X	**2**	X	X
Explosion protection	Without		0						
	II 2 G EEx ia IIC T6 acc. to ATEX		1						
	CSA/FM		3	2					
	II 3 G EEx nA IIC T6 acc. to ATEX		8						
Design	Inductive			2					
	Electric			3					
	Pneumatic		0	4					
2 contacts	SJ 3.5 N			2	0	0		1	0
	SJ 3.5 SN			2	1	0		1	0
	Microswitch			3	2	0		1	0
	Microswitch (gold-plated contacts)			3	2	1		1	0
	Pneumatic microswitch		0	4	4	0		0	
	SB 3.5 - E2 (three-wire switch)		0	2	8	1		1	0
Electrical connection	Without		0	4	4	0		0	
	M 20 x 1.5							1	0
Pneumatic connection	Without								0
	ISO 228/1- G 1/8		0	4	4	0		0	1
	1/8 -27 NPT		0	4	4	0		0	2

1 Design and principle of operation

The limit switches are attached to pneumatic control valves as well as to Type 4765 and Type 4763 Positioners.
These limit switches are provided with either inductive, electric or pneumatic switching elements and issue a limit signal when a set limit value is exceeded or not reached, especially when a control valve has reached its final position. This signal is transmitted, e.g. to an alarm or indicating system.

1.1 Principle of operation

The valve travel is transmitted either directly to the lever (1) of the limit switch via the plate (10) and pin (1.1), or via a coupling pin when attached to a positioner. The linear travel is converted into a rotary motion via the shaft (2).

1.1.1 Type 4746-x2 Inductive Limit Switch

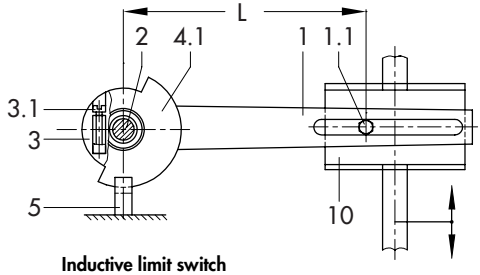
In these instruments, the shaft (2) carries two switch cases (3) with adjustable metal tags (4.1) for frictionless activation of the integrated proximity switches (5). For the operation of inductive limit switches (except for Type 4746-0281), appropriate switch amplifiers have to be integrated into the output circuit.
The switching function and switching point are continuously adjustable using the adjustment screw (3.1).

1.1.2 Type 4746-x3 Electric Limit Switch

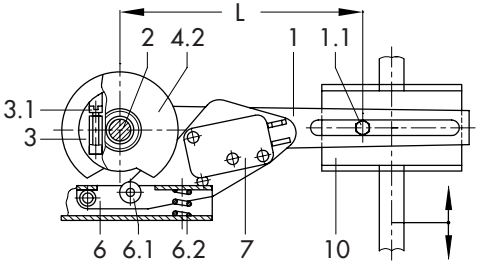
In these instruments, the shaft (2) carries two switch cases (3) with adjustable cam discs (4.2). Each cam disc activates an electric double-throw switch (7) via the roller (6.1), which is attached to the switch lever (6). The switching function and switching point are continuously adjustable using the adjustment screw (3.1).

1.1.3 Type 4746-04 Pneumatic Limit Switch

In these instruments, the shaft (2) carries two switch cases (3) with adjustable cam discs (4.2). Each cam disc activates a nozzle flapper system in the pneumatic switching element (8).
Whenever the cam disc (4.2) activates the switch lever (6) via the roller (6.1), the nozzle in the pneumatic switching element (8) is opened and the supply air is switched through to port A_1 or A_2 by the microswitch (9).
It is not until the cam disc has released the switch lever (6) that the nozzle is closed in the pneumatic switching element (8) and the supply air applied to the microswitch is cut off. As a result, pressure is no longer applied to ports A_1 or A_2.
The switching function and switching point are continuously adjustable using the adjustment screw (3.1).

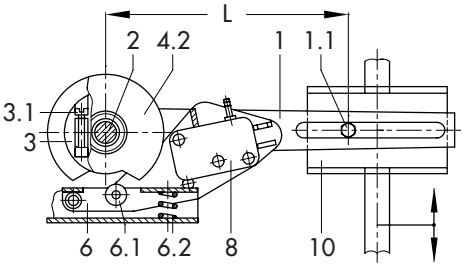


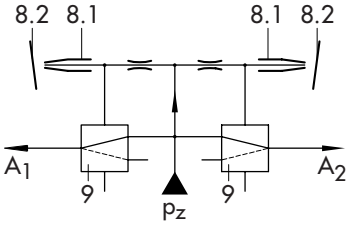
Inductive limit switch



Electric limit switch

1 Lever for valve travel
1.1 Pin
2 Shaft
3 Switch case
3.1 Adjustment screw
4.1 Metal tag
4.2 Cam disc
5 Proximity switch
6 Switch lever
6.1 Roller
6.2 Spring
7 Electric switching element (double-throw switch)
8 Pneumatic switching element
8.1 Nozzle with switch
8.2 Flapper
9 Pneumatic microswitch
10 Plate for attachment to actuator stem or plug stem





Pneumatic limit switch with switching function

Fig. 2 · Functional diagrams

2 Attachment to control valve

For attachment of the limit switch to a control valve, the accessories listed in the table below are required.

The lever (I or II) should be installed before the limit switch is attached to the control valve. To do so, slide the lever clamping plate (1.1) over the lever (1) and slip them onto the shaft (2) together. Tighten the fastening screw (1.2).

2.1 Attachment to casted yoke valve

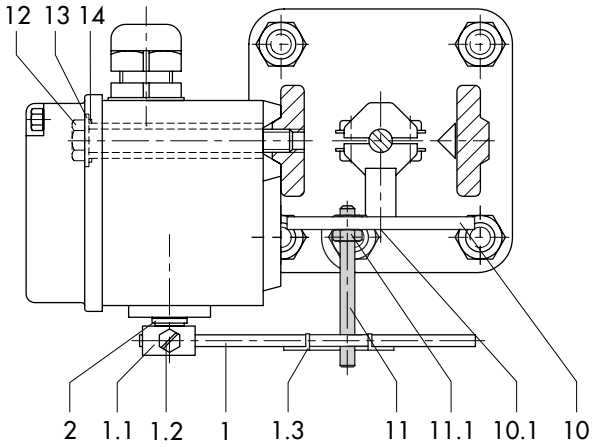
1. Attach the plate (10) to the valve's stem connector using two screws (10.1).
2. Attach the pin (11) to the plate (10) using two nuts (11.1).
3. Unscrew the cover of the limit switch. Attach the limit switch to the valve yoke using the mounting screw (12), washer (13) and O-ring (14). Make sure that the pin (11) is inserted through the wire strap (1.3) of the lever (1).

2.2 Attachment to valve with rod-type yoke

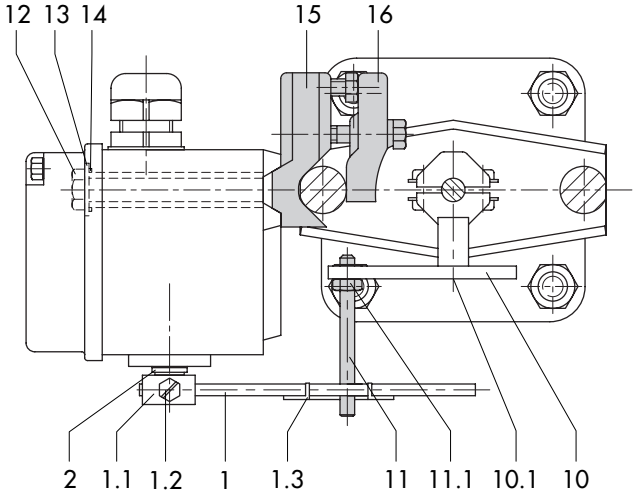
1. Attach the plate (10) to the valve's stem connector using two screws (10.1).
2. Attach the pin (11) to the plate (10) using two nuts (11.1).
3. Attach the support (15) and the rod clamping plate (16) to the rod. Screw them together loosely.
   With the valve travel being in halfway position, move the support until the center of the plate (10) and the support (15) are aligned.
4. Tightly screw the rod clamping plate to the support.
5. Attach the limit switch to the support using the mounting screw (12), washer (13) and O-ring (14). Make sure that the pin (11) is inserted through the wire strap (1.3) of the lever (1).

Caution!
After the attachment of the limit switch is completed, make sure that the vent plug of the housing cover faces downward when the valve is installed.

Accessories for attachment in accordance with IEC 60584-6				
Valve	With casted yoke (NAMUR rib)		With rod-type yoke (rods Ø 18 to 32 mm)	
Travel	Up to 60 mm	Up to 120 mm	Up to 60 mm	Up to 120 mm
Attachment kit Order no.	1400-6713 (lever **I**)	1400-6714 (lever **II**)	1400-6713 (lever **I**) plus 1400-5342	1400-6714 (lever **II**) plus 1400-5342
Accessories for attachment to Types 4763 and 4765 Positioners				
Attachment kit		Order no. 1400-6710		



Attachment to valve with casted yoke (NAMUR rib)



Attachment to valve with rod-type yoke

1	Lever
1.1	Lever clamping plate
1.2	Fastening screw
1.3	Wire strap
2	Shaft
10	Plate
10.1	Screws
11	Pin
11.1	Nuts
12	Mounting screw
13	Washer
14	O-ring
15	Support
16	Rod clamping plate

Fig. 3 · Attachment to valve

2.3 Attachment to positioner

For attachment of the limit switch to the Types 4763 or 4765 Positioners according to Fig. 4, a short lever (1) and an intermediate piece (31) are required as accessories (order no. 1400-6710).

1. Insert one O-ring (30) each into the left and the right side of the intermediate piece (31).
2. Push the two fillister head screws (33) through the limit switch and intermediate piece, and insert them into the positioner.
3. Fasten the two fillister head screws (33) in the positioner housing using the nuts (32). Make sure that the short lever (1) slides over the pin (16) of the positioner.
4. Replace the vent plug (17) in the positioner housing with the screw plug included in the accessories (order no.1400-6710).
   In exchange, insert the vent plug into the housing of the limit switch. Thus, the IP degree of protection of the limit switch corresponds to that of the positioner.

▶ To achieve degree of protection IP 65, a check valve (order no. 1790-7408) needs to be installed in the housing of the limit switch.

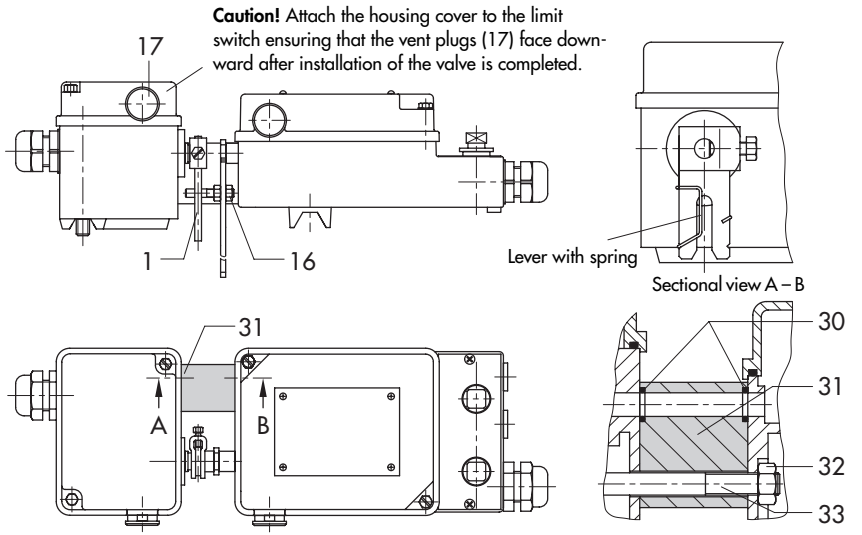


Fig. 4 · Attachment using an intermediate piece, e.g. to a Type 4765 or Type 4763 Positioner

3 Connections

3.1 Electrical connection

For electrical installation, you are required to observe the relevant electrotechnical regulations and the accident prevention regulations that apply in the country of use.
In Germany, these are the VDE regulations and the accident prevention regulations of the employers' liability insurance.
The following regulations apply for installation in hazardous areas:
EN 60079-14: 1997; VDE 0165 Part 1/8.98 "Electrical apparatus for explosive gas atmospheres" and EN 50281-1-2: VDE 0165 Part 2/11.99 "Electrical apparatus for use in the presence of combustible dust".
For intrinsically safe electrical equipment approved in accordance with Directive 79/196/EEC, the data specified in the certificate of conformity apply for the connection of intrinsically safe circuits.
For intrinsically safe electrical equipment approved in accordance with Directive 94/9/EC, the data specified in the EC Type Examination Certificate apply for the connection of intrinsically safe circuits.
***Caution!** The terminal assignment specified in the certificate must be adhered to! Switching the assignment of the electrical terminals may cause the explosion protection to become ineffective!*

The lines for the electric control signal must be laid via the screw joint on the housing and connected to the input terminals marked + and – as illustrated in Fig. 5 or the adhesive labels on the inside of the cover.

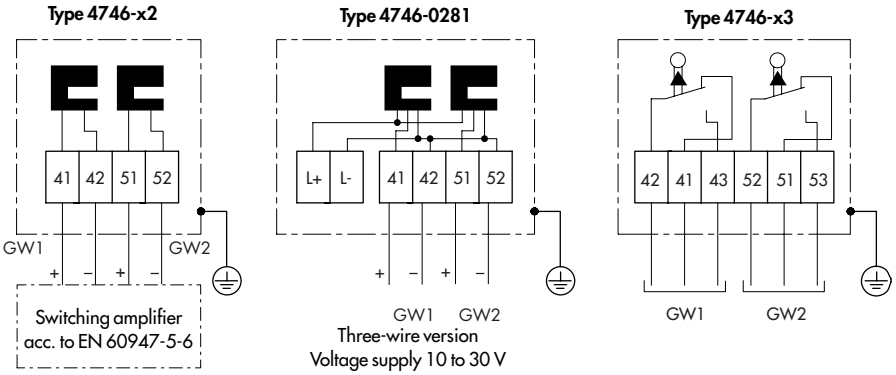


Fig. 5 · Electrical connection

The following accessories are available.
Cable gland M20 x 1.5:

Plastic, black order no. 1400-6985

Plastic, blue order no. 1400-6986

Brass, nickel-plated order no. 1890-4875

Adapter M20 x 1.5 to 1/2 NPT:
Aluminum, powder-coated
order no. 0310-2149

3.1.1 Switching amplifier for Type 4746-x2

For operation of the inductive limit switches, switching amplifiers in accordance with EN 60947-5-6 have to be integrated into the output circuit (not for Type 4746-0281). For installation in hazardous areas, the relevant regulations must be observed.

3.2 Pneumatic connection for Type 4746-04

The air connections are tapped holes with G 1/8 ISO 228 or 1/8 - 27 NPT thread. Standard screw joints for metal pipes or plastic hoses can be used.

4 Operation

4.1 Adjusting the switching point

The limit switches attached to the control valves are usually adjusted in such a way that a signal is issued when the final travel positions are reached. Optionally, the switching point can also be adjusted to any position within the travel range, e.g. if an intermediate position is to be signalized.

The adjusted switch positions can be recorded on the supplied adhesive labels marked A, B and C, and thus, be assigned to the corresponding switching elements.

4.1.1 Type 4746-x2

Move the valve to the switching position and turn the adjustment screw (3.1) until the metal tag (4.1) reaches the switching point. Always move to the final travel positions from an intermediate position to adjust or check the switching point!

Note!
The switching elements and the levers required to activate them react to temperature fluctuations. To ensure safe switching, the switching hysteresis between the mechanical stop (e.g. plug in the seat) and the switching point of the limit switch must be larger than the displacement of the switching point caused by the temperature change.

Distance between switching points for 100 mm lever:
Contact SJ 3.5 N = ≥ 2 mm
Contact SJ 3.5 SN = ≥ 0.75 mm,
With other lever lengths, adjust the switching point to the changed lever length.
For example, if the lever length changes from 100 mm to 160 mm, the distance between the switching points is increased from 2.0 mm to 3.2 mm correspondingly.

Simplified adjustment of the inductive limit switches:

Valve CLOSED: control valve closes until the plug reaches the seat

Valve OPEN: control valve can be moved to the desired travel position, e.g. final position.

- Turn the adjustment screw (3.1) to slowly move the metal tag (4.1) towards the contact until the switching point is reached.
- Turn the adjustment screw in the opposite direction to achieve that the switching point reaches the stop after contact SJ 3.5 N = ≥ 1/6 turn and contact SJ 3.5 SN = ≥ 1/16 to 1/10 turn.

If the adjustment is performed carefully, the distances between the switching points specified above apply.

4.1.2 Type 4746-x3 and Type 4746-04

For adjustment, the cam disc (4.2) has to be positioned in such a way that its cam moves towards the roller (6.1, Fig. 2) in accordance with the direction of travel.
Move the control valve to the desired switching position (e.g. final travel position "valve OPEN" or "valve CLOSED").
Adjust the switch which is assigned to the upper or lower switching point.

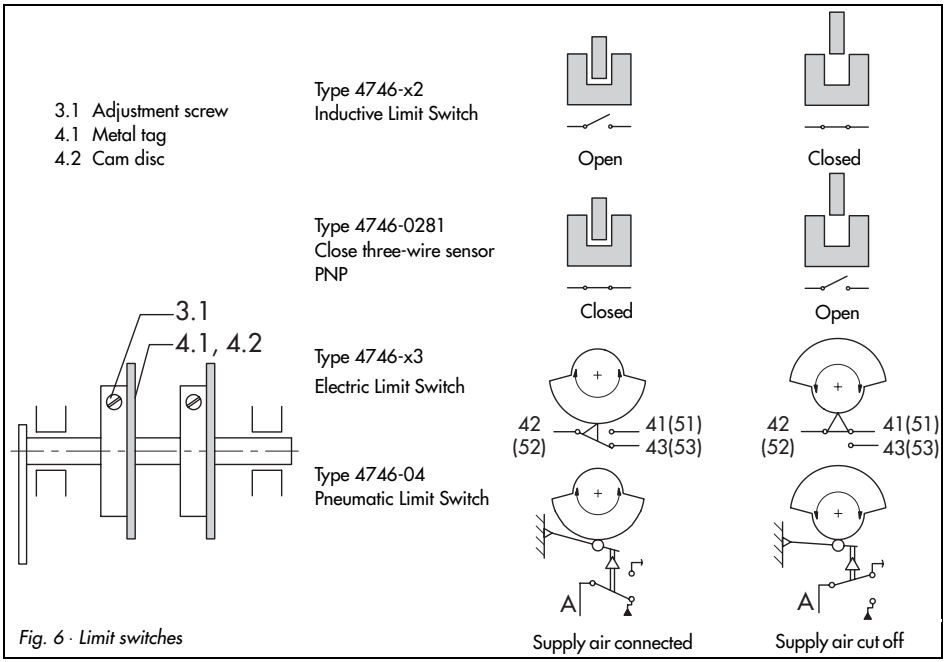


Fig. 6 · Limit switches

Turn the adjustment screw (3.1) until the cam of the cam disc (4.2) reaches the roller (6.1, Fig. 2) and the switch changes over. To accurately check the switching point, move the valve slightly backward and move it to the switching position again.

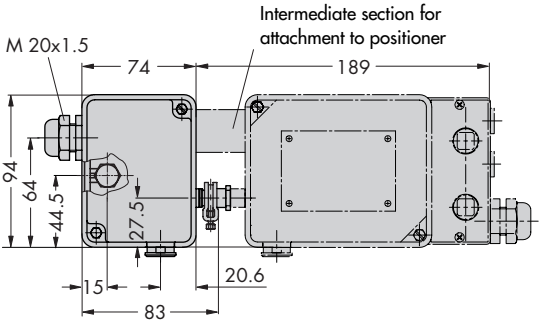
5 Servicing explosion-protected versions

If a part of the limit switch on which the explosion protection is based must be serviced, the limit switch must not be put back into operation until an expert has inspected the device according to explosion protection requirements, has issued a certificate stating this or given the device a mark of conformity.

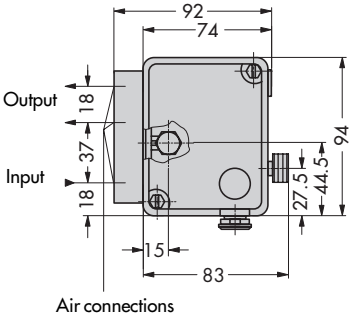
Inspection by an expert is not required if the manufacturer performs a routine check on the device prior to putting it back into operation. The passing of the routine check must be documented by attaching a mark of conformity to the device.

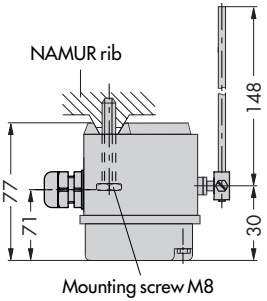
Explosion-protected components may only be replaced by original, checked components from the manufacturer.

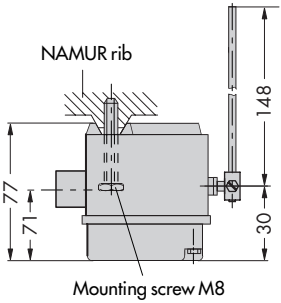
Types 4746-x2, -x3
Air connection for separate air supply, tapped hole G 1/8



Type 4746-04
Air connections, tapped hole G 1/8
1/8 NPT on request







NOTE!

The type designations of the Types 4746-2 and 4746-3 Limit Switches have been changed. The certificates of conformity remain valid. See fax message (German only) for details.

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

Telefax

Bitte sofort weiterleiten! Please pass on immediately!

an / to

Fa. SAMSON AG Mess- und Regeltechnik
E 71
Herrn Pflug

Weismüllerstr. 3
60314 Frankfurt

Telefax: 069 4009 1785

Postfach 33 45, 38023 Braunschweig, Germany
Hausadresse / Lieferanschrift
Postal address (for deliveries)
Bundesallee 100, 38116 Braunschweig, Germany

Telefon (0531) 592 0 Zentrale / Operator)
Telefon International +49 531 592 0
Telefax (0531) 592 92 92 Zentrale / Operator)
Telefax International +49 531 592 92 92

von / from

Org.-Einh. / Org.Unit:	Name:	Telefon:	Datum / Date:
3.42	Hartmut Bienmüller	592 - 35 40	13.08.02

Telefax Org.-Einh. / Org.Unit: 592 - 34 05 Seiten / Pages: 1 (insges. / total)

e-mail: hartmut.bienmueller@ptb.de

Bemerkungen / Remarks: EG- Baumusterprüfbescheinigung PTB 98 ATEX 2114 für Grenzsignalgeber Typen 4746-...

Sehr geehrter Herr Pflug,

bezogen auf unser heutiges Telefonat bestätige ich Ihnen die folgenden Änderungen:

Der Typenschlüssel für die Grenzsignalgeber 4746-... hat sich geändert.

Die Gegenüberstellung der Typen ist der folgenden Tabelle zu entnehmen:

Ausführung / Typ	alt	neu
Grenzsignalgeber induktiv	4746-2..	4746-12.
Grenzsignalgeber elektrisch	4746-3..	4746-13.

Bezogen auf die Zündschutzart Eigensicherheit „i" von elektrischen Betriebsmitteln bestehen keine Bedenken, den Typenschlüssel in der vorgeschlagenen Weise zu modifizieren.

Die Änderungsmitteilung verbleibt bei den Unterlagen der EG-Baumusterprüfbescheinigung.

Ein Antrag auf Ergänzung ist nicht erforderlich.

Mit freundlichen Grüßen
Im Auftrag

Rückfragen bei fehlerhafter Übermittlung / In the case of faulty reproduction, please call: (0531) 592 34 01

TRANSLATION

Physikalisch-Technische Bundesanstalt **PTB**
Braunschweig und Berlin

(Symbol)

(1) **EC TYPE EXAMINATION CERTIFICATE**
(2)

(2) Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres – **Directive 94/9/EC**

(3) EC Type Examination Certificate Number

PTB 98 ATEX 2114

(4) Equipment: Model 4746-2 and 4746-3 Limit Switches

(5) Manufacturer: Samson AG

(6) Address: Weismüllerstr. 3, D-60314 Frankfurt

(7) This equipment and any acceptable variations thereof is specified in the schedule to this certificate and the documents referred to therein.

(8) The Physikalisch-Technische Bundesanstalt, certified body number 0102 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres specified in Annex II to the Directive.

The examination and test results are recorded in confidential report No. PTB Ex 98-28184.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with

EN 50014: 1997 **EN 50020: 1994**

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

(11) According to the Directive 94/9/EC, this EC TYPE EXAMINATION CERTIFICATE relates only to the design and construciton of the specified equipment. If applicable, further requirements of this Directive apply to the manufacture and suply of this equipment.

(12) The marking of the equipment shall include the following:

(Ex) II 2 G EEx ia IIC T6

Zertifizierungsstelle Explosionsschutz Braunschweig, 03.09.1998
By order

(Signature) (Seal)

EC Type Examination Certificates without signature and seal are invalid.

This EC Type Examination Certificate may only be reproduced in its entirety and without any changes, schedule included.

Extracts or changes shall require the prior approval of the Physikalisch-Technische Bundesanstalt.

Physikalisch-Technische Bundesanstalt.
Bundesallee 100
D-38116 Braunschweig

TRANSL\15Ptb.doc

(13) **Schedule**

(14) **EC TYPE EXAMINATION CERTIFICATE No. PTB 98 ATEX 2114**

(15) **Description of Equipment**

The Model 4746-2 and 4746-3... Limit Switches serve for converting mechanical manipulated variables into electrical signals. Depending on the version, they are equipped with various types of limit contacts. They are intended for attachment to pneumatic, electrical or hydraulic actuators installed inside and outside of hazardous areas.

The Model 4746-2... and 4746-3... Limit Switches are passive two-terminal networks that may be connected to all certified intrinsically safe circuits, provided the permissible maximum values of U_i, I_i and P_i are not exceeded.

Electrical connection is made by means of plugs and sockets or cable entries.

The relation between temperature classification and the permissible maximum ambient temperature range is specified in the table below:

Temperature class	Ambient temperatue range
T5 -	-45 °C ... +70 °C
T6	-45 °C ... +60 °C
T4	-45 °C ... +80 °C

Electrical data

Contact circuits

Type of protection: Intrinsic safety EEx ia IIC only for connection to a certified intrinsically safe circuit

(Terminals 41/42

Models 4746-2.0., Model 4746-2.1., Model 4746-2.5. with inductive promimity switch.

Maximum values:
U_i = 16 V
I_i = 52 mA
P_i = 169 mW

Effective internal capacitance: C_i = 60 nF
Effective internal inductance: L_i = 250 μH

(Terminals 41/42/43 and 51/52/53

Model 4746-3.2, Model 4746-3.6 with electric microswitch

Maximum values:

U_i = 45 V
P_i = 2 W

The effective internal capacitances and inductances are negligible.

(16) **Report PTB Ex 98-28184**

(17) **Sepcial conditions for safe use**

Not applicable

(18) **Essential Health and Safety Requirements**

In compliance with standards

Zertifizierungsstelle Explosionsschutz Braunschweig, 03.09.98
By order

(Signature) (seal)

Dr. Ing. U. Johannsmeyer
Regierungsdirektor

1. ERGÄNZUNG

gemäß Richtlinie 94/9/EG Anhang III Ziffer 6

zur EG-Baumusterprüfbescheinigung PTB 98 ATEX 2114

Gerät: Grenzsignalgeber Typen 4746-12.. und 4746-13..

Kennzeichnung: ⟨Ex⟩ **II 2 G EEx ia IIC T6**

Hersteller: SAMSON AG Mess- und Regeltechnik

Anschrift: Weismüllerstraße 3
60314 Frankfurt am Main, Deutschland

Beschreibung der Ergänzungen und Änderungen

Die Typenbezeichnungen haben sich geändert. Die Zuordnung zwischen bisheriger und neuer Bezeichnung ist der folgenden Tabelle zu entnehmen:

bisher	neu
4746-2..	4746-12..
4746-3..	4746-13..

Künftig dürfen auch die mit EG-Baumusterprüfbescheinigung PTB 99 ATEX 2219 X bescheinigten Schlitzinitiatoren Typ SJ-3,5.. der Firma Pepperl + Fuchs eingesetzt werden.

Die mit Konformitätsbescheinigung PTB Nr. Ex-95.D.2195 X bescheinigten gleichnamigen Vorgängertypen dürfen noch bis zum 30.06.2003 eingesetzt werden.

Elektrische Daten

Typen 4746-12..1 / ..2 mit induktivem Grenzkontakt

Induktiver Grenzkontakt ..... in Zündschutzart Eigensicherheit EEx ia IIC
(Klemmen 41/42 u. 51/52) nur zum Anschluss an einen bescheinigten eigensicheren Stromkreis

Höchstwerte:

U_i = 16 V
I_i = 52 mA
P_i = 169 mW

bzw.

U_i = 16 V
I_i = 25 mA
P_i = 64 mW

C_i = 50 nF
L_i = 250 µH

Der Zusammenhang zwischen der Temperaturklasse, den zulässigen Umgebungstemperaturbereichen, sowie den maximalen Kurzschlussströmen und Leistungen für Auswertegeräte, ist der folgenden Tabelle zu entnehmen:

Temperaturklasse	zulässiger Umgebungstemperaturbereich	I_o / P_o
T6	-45 °C ... 45 °C	52 mA / 169 mW
T5	-45 °C ... 60 °C	
T4	-45 °C ... 89 °C	
T6	-45 °C ... 66 °C	25 mA / 64 mW
T5	-45 °C ... 81 °C	
T4	-45 °C ... 100 °C	

Alle übrigen elektrischen Daten und sonstigen Angaben gelten auch für diese 1. Ergänzung.

Prüfbericht: PTB Ex 03-23049

Zertifizierungsstelle Explosionsschutz
Im Auftrag

Braunschweig, 7. März 2003

Dr.-Ing. U. Johannsmeyer
Regierungsdirektor

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

(1) # Konformitätsaussage

(2) Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen - **Richtlinie 94/9/EG**

(3) Prüfbescheinigungsnummer

PTB 02 ATEX 2012 X

(4) Gerät: Grenzsignalgeber Typ 4746-8..

(5) Hersteller: SAMSON AG Mess- und Regeltechnik

(6) Anschrift: Weismüllerstr. 3, 60314 Frankfurt am Main, Deutschland

(7) Die Bauart dieses Gerätes sowie die verschiedenen zulässigen Ausführungen sind in der Anlage und den darin aufgeführten Unterlagen zu dieser Prüfbescheinigung festgelegt.

(8) Die Physikalisch-Technische Bundesanstalt bescheinigt als benannte Stelle Nr. 0102 nach Artikel 9 der Richtlinie des Rates der Europäischen Gemeinschaften vom 23. März 1994 (94/9/EG) die Erfüllung der grundlegenden Sicherheits- und Gesundheitsanforderungen für die Konzeption und den Bau von Geräten und Schutzsystemen zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen gemäß Anhang II der Richtlinie.

Die Ergebnisse der Prüfung sind in dem vertraulichen Prüfbericht PTB Ex 02-21299 festgehalten.

(9) Die grundlegenden Sicherheits- und Gesundheitsanforderungen werden erfüllt durch Übereinstimmung mit

EN 50021:1999

(10) Falls das Zeichen „X" hinter der Bescheinigungsnummer steht, wird auf besondere Bedingungen für die sichere Anwendung des Gerätes in der Anlage zu dieser Bescheinigung hingewiesen.

(11) Diese Konformitätsaussage bezieht sich nur auf Konzeption und Bau des festgelegten Gerätes gemäß Richtlinie 94/9/EG. Weitere Anforderungen dieser Richtlinie gelten für die Herstellung und das Inverkehrbringen dieses Gerätes.

(12) Die Kennzeichnung des Gerätes muß die folgenden Angaben enthalten:

Ex II 3 G EEx nA II T6

Zertifizierungsstelle Explosionsschutz
Im Auftrag
Dr.-Ing. U. Klausmeyer
Regierungsdirektor

Braunschweig, 05. April 2002

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

(13) # Anlage

(14) **Konformitätsaussage PTB 02 ATEX 2012 X**

(15) Beschreibung des Gerätes

Der Grenzsignalgeber Typ 4746-8.. dient der Umwandlung mechanischer Stellgrößen in elektrische Signale. Der Anbau erfolgt an pneumatische, elektrische oder hydraulische Stellgeräte.

Der Einsatz erfolgt innerhalb oder außerhalb explosionsgefährdeter Bereiche der Kategorie 3.

Der Zusammenhang zwischen der Temperaturklasse und den zulässigen Umgebungstemperaturbereichen ist der nachfolgenden Tabelle zu entnehmen:

Temperaturklasse	Zulässiger Umgebungstemperaturbereich
T6	... +60 °C
T5	-45 °C ... +70 °C
T4	... +80 °C

Elektrische Daten

Ausführungen:

a) mit induktivem Grenzkontakt:

Kontaktstromkreis ..... in Zündschutzart EEx nA II
(Klemmen 41/42, 51/52)

b) mit elektrischem Grenzkontakt:

Kontaktstromkreis ..... in Zündschutzart EEx nA II
(Klemmen 41/42/43, 44/45/46; 51/52/53)

(16) Prüfbericht PTB Ex 02-21299

(17) Besondere Bedingungen

Der Grenzsignalgeber Typ 4746-8.. muss in ein Gehäuse eingebaut werden, welches mindestens den Schutzgrad IP 54 gemäß IEC-Publikation 60529:1989 gewährleistet.

Der Anschluss der Leitungen muss so erfolgen, daß die Anschlussverbindung frei von Zug- und Verdrehbeanspruchung ist.

Konformitätsaussagen ohne Unterschrift und ohne Siegel haben keine Gültigkeit.
Diese Konformitätsaussage darf nur unverändert weiterverbreitet werden.
Auszüge oder Änderungen bedürfen der Genehmigung der Physikalisch-Technischen Bundesanstalt.
Physikalisch-Technische Bundesanstalt • Bundesallee 100 • D-38116 Braunschweig

(18) Grundlegende Sicherheits- und Gesundheitsanforderungen
werden durch die genannte Norm erfüllt

Zertifizierungsstelle Explosionsschutz
Im Auftrag

Dr.-Ing. U. Klausmeyer
Regierungsdirektor

Braunschweig, 05. April 2002

Installation Manual for apparatus certified by CSA for use in hazardous locations.

Electrical rating of intrinsically safe apparatus and apparatus for installation in hazardous locations.

Table 1: Maximum values

	U_i or V_{max}	I_i or I_{max}	P_i or P_{max}	C_i	L_i
Limit switches (inductive)	16V	25/52 mA	64/169mW	60 nF	250 µH
Limit switches (electrical)	28V	115 mA	2 W	0 nF	0 µH

Notes: U_o or V_{OC} or $V_t \leq U_i$ or V_{max} / I_o or I_{OC} or $I_t \leq I_i$ or I_{max}
P_o or $P_{max} \leq P_i$ or P_{max}

Table 2: CSA - certified barrier parameters of electrical limit switch circuits

Barrier	Supply barrier				Evaluation barrier		
	V_{OC}	R_{min}	I_{OC}	P_{max}	V_{OC}	R_{min}	I_{OC}
Limit switches (electrical)	≤ 28V	≥ 98Ω	≤ 115mA	≤ 2W	≤ 28V	#	0mA

Table 3: The correlation between temperature classification and permissible ambient temperature ranges is shown in the table below:

Temperature class	Permissble ambient temperature range
T6	- 45°C ... 60°C
T5	- 45°C ... 70°C
T4	- 45°C ... 80°C

Table 4: For the Model 4746 – 3 Limit Switch the correlation between temperature classification, permissible ambient temperature ranges and maximum short- circuit current is shown in the table below:

Temperature class	Permissible ambient temperature range	Maximum short-circuit current
T6	- 45°C ... 45°C	52mA
T5	- 45°C ... 60°C	
T4	- 45°C ... 75°C	
T6	- 45°C ... 60°C	25mA
T5	- 45°C ... 80°C	
T4	- 45°C ... 80°C	

Intrinsically safe if installed as specified in manufacturer's installation manual.

CSA - certified for hazardous locations

Ex ia IIC T6, Class I, Zone 0
Class I, Division 1, Groups A, B, C, D
Class II, Division 1, Groups E, F + G
Class III

Type 4 Enclosure

Notes:

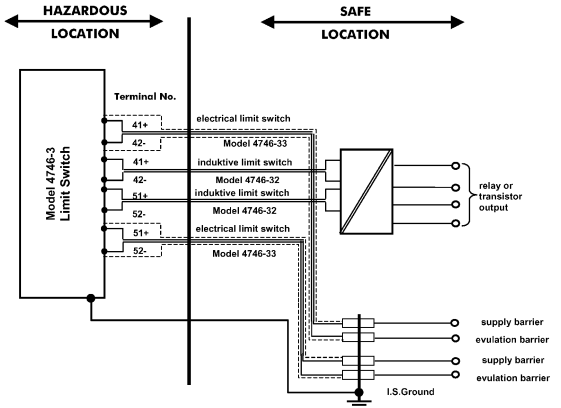
1.) The apparatus may be installed in intrinsically safe circuits only when used in conjunction with the CSA certified apparatus.
For maximum values of U_i or V_{max} ; I_i or I_{max}; P_i or P_{max} ; C_i and L_i of the various apparatus see Table 1.

2.) The apparatus may be installed in intrinsically safe circuits only when used in conjunction with the CSA certified intrinsically safe barrier.
For barrier selection see Table 2.

3.) The installation shall be in accordance with the C. E. C. Part 1.

4.) For CSA Certification, Safety Barrier must be CSA Certified and installed in accordance with C.E.C. Part. 1. Each pair of I.S. wires shall be protected by a shield that is grounded at the I.S. Ground. The shield shall extend as close to the terminals as possible.

5.) Use only supply wires suitable for 5°C above ambient temperature.

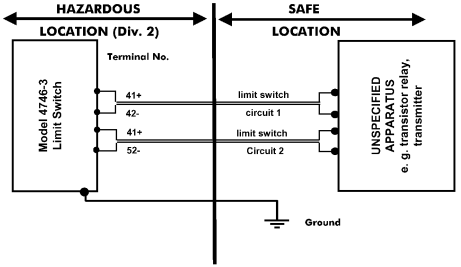


Version: Model 4746-33 Electrical Limit Switch. Supply and evulation barrier FM/CSA- certified.

CSA- certified for hazardous locations

Class I, Division 2, Groups A, B, C, D
Class II Division 2, Groups E, F + G
Class III

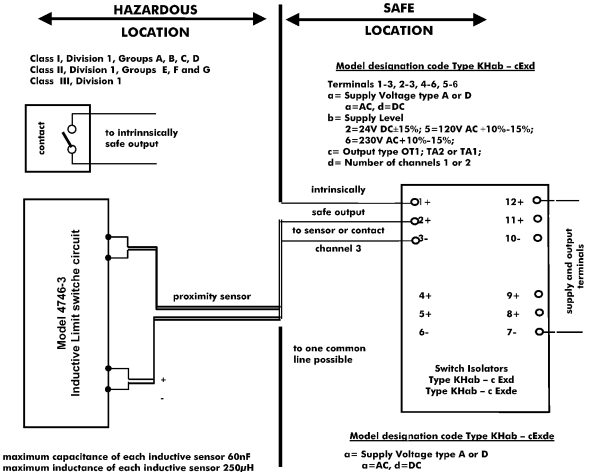
Type 4 Enclosure



Notes:
1.) For the maximum values for the individual circuits see Table 1 and 2.

2.) Cable entry M 20 x 1.5 metal conduit according to drawing No. 1050-0539 T and 1050-0540 T

Installation drawing: Control Relay Hab – cEx de with Model SJ-b-N Proximitty Sensors



The total series inductance and shunt capacitance of shield wiring shall be restricted to the following maximum values

Control Relay Terminal No.	Groups	L [mH]	C [µF]	V_{OC} [V]	I_{SC} [mA]
1-3; 2-3 4-6; 5-6	A + B	84,8	1,27	12,9	19,8
	C + E	299	3,82		
	D, F, G	744	10,2		

Installation Manual for apparatus approved by FM for use in hazardous locations.

Electrical rating of intrinsically safe apparatus and apparatus for installation in hazardous locations.

Table 1: Maximum values

	U_i or V_{max}	I_i or I_{max}	P_i or P_{max}	C_i	L_i
Limit switches (inductive)	16V	25/52 mA	64/169mW	60 nF	250 µH
Limit switches (electrical)	28V	115 mA	2 W	0 nF	0 µH

Notes: U_o or V_{OC} or $V_t \leq U_i$ or V_{max} / I_o or I_{OC} or $I_t \leq I_i$ or I_{max}
P_o or $P_{max} \leq P_i$ or P_{max}

Table 2: FM - approved barrier parameters of electrical limit switch circuits

Barrier	Supply barrier				Evaluation barrier		
	V_{OC}	R_{min}	I_{OC}	P_{max}	V_{OC}	R_{min}	I_{OC}
Limit switches (electrical)	≤ 28V	≥ 98Ω	≤ 115mA	≤ 2W	≤ 28V	#	0mA

Table 3: The correlation between temperature classification and permissible ambient temperature ranges is shown in the table below:

Temperature class	Permissble ambient temperature range
T6	- 45°C ... 60°C
T5	- 45°C ... 70°C
T4	- 45°C ... 80°C

Table 4: For the Model 4746 – 3 Limit Switch the correlation between temperature classification, permissible ambient temperature ranges and maximum short- circuit current is shown in the table below:

Temperature class	Permissible ambient temperature range	Maximum short-circuit current
T6	- 45°C ... 45°C	52mA
T5	- 45°C ... 60°C	
T4	- 45°C ... 75°C	
T6	- 45°C ... 60°C	25mA
T5	- 45°C ... 80°C	
T4	- 45°C ... 80°C	

Intrinsically safe if installed as specified in manufacturer's installation manual.
FM - approved for hazardous locations

Class I, Zone 0 A Ex ia IIC T6,
Class I, II, III, Division 1, Groups A, B, C, D, E, F + G

NEMA 4

Notes:

1.) The apparatus may be installed in intrinsically safe circuits only when used in conjunction with the FM approved apparatus.
For maximum values of U_i or V_{max} ; I_i or I_{max}; P_i or P_{max} ; C_i and L_i of the various apparatus see Table 1.

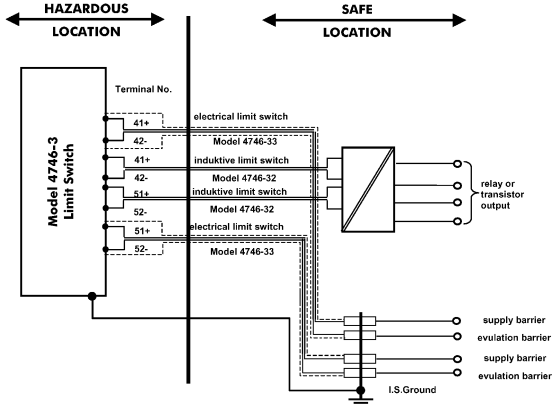
2.) The apparatus may be installed in intrinsically safe circuits only when used in conjunction with the FM approved intrinsically safe barrier.
For barrier selection see Table 2.

3.) The installation shall be in accordance with the National Electrical Code ANSI/NFPA 70 and ANSI/ISA RP 12.06.01.

4.) Safety Barrier shall be FM-Approved. Each pair of I.S. wires shall be protected by a shield that is grounded at the I.S. Ground. The shield shall extend as close to the terminals as possible.

5.) Use only supply wires suitable for 5°C above ambient temperature.

.

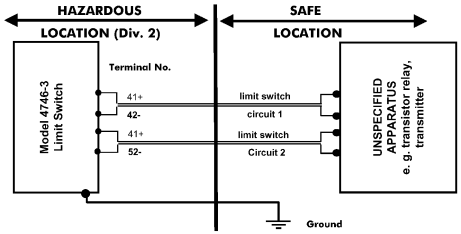


Version: Model 4746-33 Electrical Limit Switch. Supply and evulation barrier FM approved.

Cable entry M 20 x 1.5 or metal conduit according to drawing
No. 1050 – 0539 T or 1050 – 0540 T

FM- approved for hazardous locations

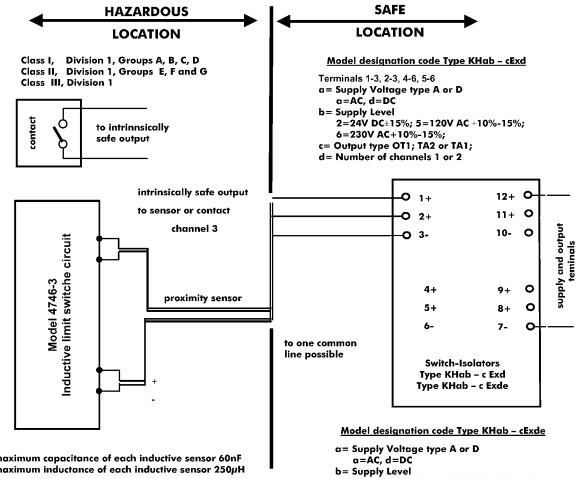
Class I, Division 2, Groups A, B, C, D **NEMA 4**
Class II Division 2, Groups F + G, Class III



Notes:
1.) For the maximum values for the individual circuits see Table 1 and 2.
2.) Cable entry M 20 x 1.5 metal conduit according to drawing
No. 1050-0539 T and 1050-0540 T
3.) The installation shall be in accordance with the National Electrical Code ANSI/NFPA 70

Installation drawing Control Relay Hab – cEx de with Model SJ-b-N

Proximity Sensors



maximum capacitance of each inductive sensor 60nF
maximum inductance of each inductive sensor 250µH

The total series inductance and shunt capacitance of shield wiring shall be restricted to the following maximum values

Control Relay Terminal No.	Groups	L [mH]	C [µF]	V_{OC} [V]	I_{SC} [mA]
1-3; 2-3 4-6; 5-6	A + B	84,8	1,27	12,9	19,8
	C + E	299	3,82		
	D, F, G	744	10,2		

Model designation code Type KHab – cExde

a= Supply Voltage type A or D
a=AC, d=DC
b= Supply Level
2=24V DC+15%; 5=120V AC +10%-15%;
6=230V AC+10%-15%;
c= Output type RTA/; RW1/; SS1/; SS2/; RS1/; SR/; ST-or SOT
d= Number of channels 1 or 2
e= Power rail designation, P, 2S.P or GS.P (includes Model KHD2-EB-PB Power Feed Module) or Blank

SAMSON AG · MESS- UND REGELTECHNIK
Weismüllerstraße 3 · 60314 Frankfurt am Main · Germany
Phone: +49 69 4009-0 · Fax: +49 69 4009-1507
Internet: http://www.samson.de

EB 8365 EN S/Z 2004-04

Mounting and Operating Instructions

Limit Switch Type 3776

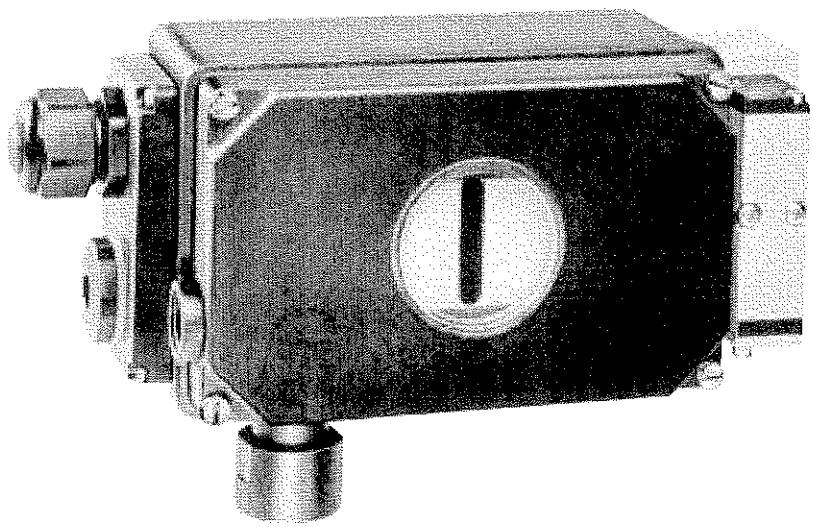


Fig. 1

Contents

Edition: July 1999

EB 8368 EN

General notes

The device may only be assembled, started up, and operated by experienced personnel familiar with this product. Proper shipping and appropriate storage of the device are assumed.

In these Mounting and Operating Instructions, the term "experienced personnel" refers to persons, who are able to evaluate the responsibilities assigned to them as well as recognize potential hazards due to their specialized training, knowledge, and experience as well as their special knowledge of the relevant standards.

Staff handling/operating ex-proof devices in hazardous areas must be specially trained or instructed, i. e. authorized to handle/operate ex-proof devices.

For technical data, ordering data, spare parts and accessories, see Data Sheet T 8368 EN.

Mounting

Before mounting to actuators, all relevant parts of the plant must be depressurized.
In view of the high surface resistance, the device shall be mounted and serviced in hazardous areas, so that no electrostatic charging is to be expected.
The coated screws in the enclosure must not be tampered with.

Using mounting kits, the devices can be mounted to SAMSON Type 3278 Rotary Actuators, to rotary actuators according to VDI/VDE 3845 and to SAMSON Types 3277 and 3277-5 Linear Actuators. Then the relevant mounting instructions must be observed (see page 3 ff.).

The devices can be mounted in any desired position to SAMSON Type 3277 Linear Actuators. The devices must not be mounted to rotary actuators or valves with NAMUR rib with the bottom of the enclosure upwards, to prevent water entering the enclosure. The exhaust air filter in the enclosure cover and the cable gland must be installed vertically downwards or, if this is not possible, horizontally.

On mounting, it is important that a clearance of 300 mm minimum above the enclosure cover be observed.

Mounting to SAMSON Type 3278 Rotary Actuators

For mounting to SAMSON Type 3278 Rotary Actuators (see Data Sheet T 8321 EN and Mounting and Operating Instructions EB 8321 EN), a mounting kit is required (see Fig. 2).

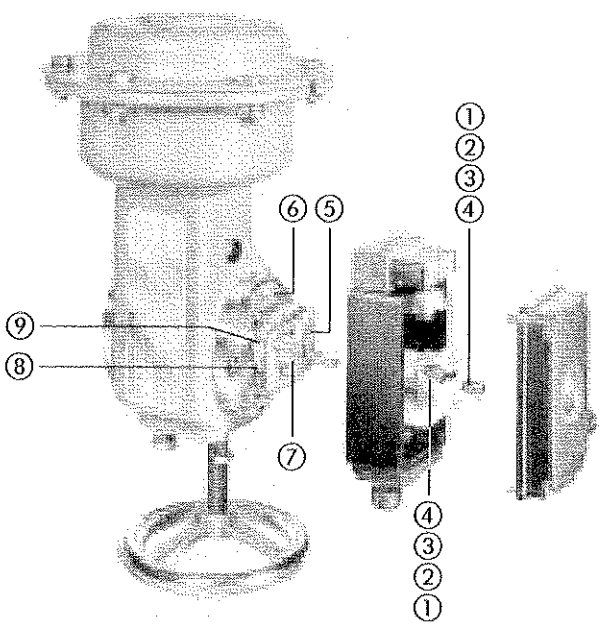
▶ Devices with Type 3777-X030 Booster Valve
Insert plug according to the "external" function into the output bore at the flange of the booster valve (as-delivered condition).

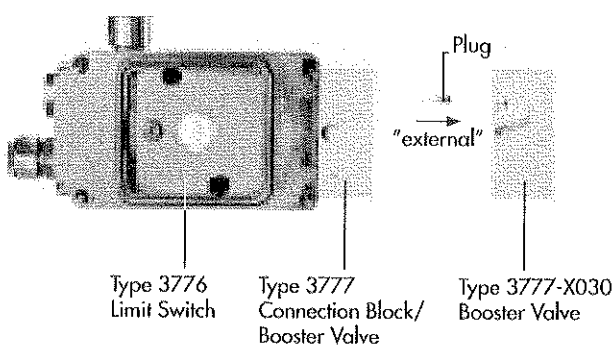
▶ Exhaust air return for devices with Types 3777-X030/-X63X Booster Valves
Close connection 4 of the booster valve with a threaded plug, if no exhaust air return from the rotary actuator ensues.

▶ Mounting instructions

1 Attach plate ⑧ with two hexagon socket head screws ⑨ to the flange of the rotary actuator.
2 Attach flange plate ⑤ with four hexagon screws ⑥ to the flange of the rotary actuator.
3 Place driver ⑦ through the plate ⑧ onto the stub of the rotary actuator.
4 Unscrew enclosure cover.
5 Place enclosure onto the threaded bolts of the flange plate ⑤. Then adjust the stub at the device so that it engages in the slit at the driver ⑦.
6 Attach enclosure with two hexagon socket head screws ①, two split washers ②, two washers ③ and two O-rings ④.
7 Attach enclosure cover.

Mounting to SAMSON Type 3278 Rotary Actuators





Mounting kit for SAMSON Type 3278 Rotary Actuators		
Order no.	**1400-7216**	**1400-7217**
① 2 × Hexagon socket head screw M 6 × 12 DIN 912	Diaphragm area 160 cm²	Diaphragm area 320 cm²
② 2 × Split washer DIN 127 – form B 6		
③ 2 × Washer DIN 125 – 6.4		
④ 2 × O-ring 7.5 × 1.5		
⑤ 1 × Flange plate		
⑥ 4 × Hexagon screw M 5 × 12 DIN EN 24017		
⑦ 1 × Driver		
⑧ 1 × Plate		
⑨ 2 × Hexagon socket head screw M 4 × 10 DIN 912		

Fig. 2

Mounting to rotary actuators according to VDI/VDE 3845 – fixing level 1

For mounting to rotary actuators according to VDI/VDE 3845 – fixing level 1, a mounting kit is required (see Fig. 3).

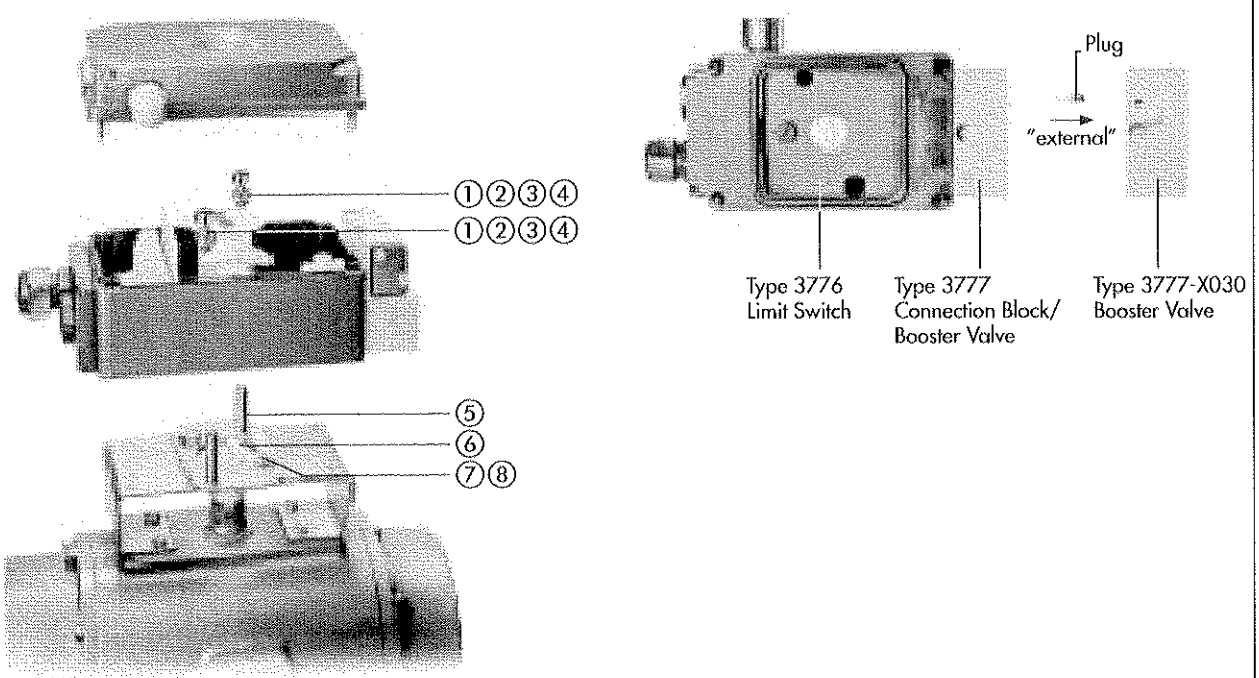
▶ Devices with Type 3777-X030 Booster Valve
Insert plug according to the "external" function into the output bore at the flange of the booster valve (as-delivered condition).

▶ Exhaust air return for devices with Types 3777-X030/-X63X Booster Valves
Close connection 4 of the booster valve with a threaded plug, if no exhaust air return from the rotary actuator ensues.

▶ Mounting instructions

1 Attach flange plate ⑤ with two hexagon screws ⑦ and two hexagon nuts ⑧ onto the bracket of the rotary actuator.
2 Place driver ⑥ onto the stub of the rotary actuator.
3 Unscrew enclosure cover.
4 Place enclosure onto the threaded bolts of the flange plate ⑤. Then adjust the stub at the device so that it engages in the slit at the driver ⑥.
5 Attach enclosure with two hexagon socket head screws ①, two split washers ②, two washers ③ and two O-rings ④.
6 Attach enclosure cover.

Mounting to rotary actuators according to VDI/VDE 3845 – fixing level 1



Mounting kit for rotary actuators according to VDI/VDE 3845 – fixing level 1	
Order no.	**1400-7041**
① 2 × Hexagon socket head screw M 6 × 12 DIN 912 ② 2 × Split washer DIN 127 – form B 6 ③ 2 × Washer DIN 125 – 6.4 ④ 2 × O-ring 7.5 × 1.5 ⑤ 1 × Flange plate ⑥ 1 × Driver ⑦ 2 × Hexagon screw M 6 × 12 DIN EN 24017 ⑧ 2 × Hexagon nut M 6 DIN EN 24032	

Fig. 3

Mounting to rotary actuators according to VDI/VDE 3845 – fixing level 2

For mounting to rotary actuators according to VDI/VDE 3845 – fixing level 2, a mounting kit is required (see Fig. 4).

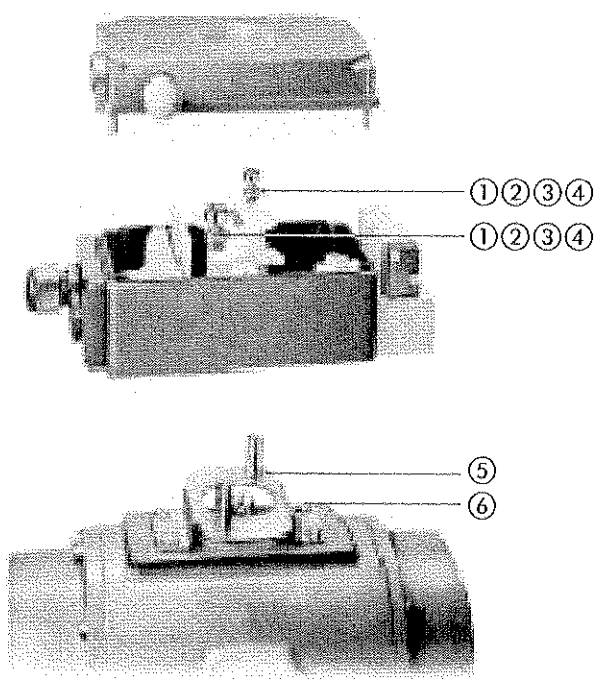
▶ Devices with Type 3777-X030 Booster Valve
Insert plug according to the "external" function into the output bore at the flange of the booster valve (as-delivered condition).

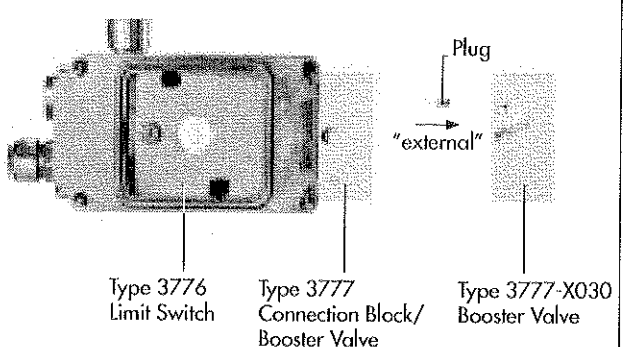
▶ Exhaust air return for devices with Types 3777-X030/-X63X Booster Valves
Close connection 4 of the booster valve with a threaded plug, if no exhaust air return from the rotary actuator ensues.

▶ Mounting instructions

1 Attach flange plate ⑤ with four hexagon screws ⑥ to the flange of the rotary actuator.
2 Unscrew enclosure cover.
3 Place enclosure onto the threaded bolts of the flange plate ⑤. Then adjust the stub at the device so that it engages in the slit at the stub of the rotary actuator.
4 Attach enclosure with two hexagon socket head screws ①, two split washers ②, two washers ③ and two O-rings ④.
5 Attach enclosure cover.

Mounting to rotary actuators according to VDI/VDE 3845 – fixing level 2





Mounting kit for rotary actuators according to VDI/VDE 3845 – fixing level 2				
Order no.	**1400-7043**	**1400-7186**	**1400-7212**	**1400-7210**
① 2 × Hexagon socket head screw M 6 × 12 DIN 912	Size 1	Size 2	Size 3	Size 4
② 2 × Split washer DIN 127 – form B 6	Hole spacing A			
③ 2 × Washer DIN 125 – 6.4	80 mm	80 mm	130 mm	130 mm
④ 2 × O-ring 7.5 × 1.5	Shaft stub length B			
⑤ 1 × Flange plate				
⑥ 4 × Hexagon screw M 5 × 12 DIN EN 24017	20 mm	30 mm	30 mm	50 mm

Fig. 4

Mounting to SAMSON Type 3277 Linear Actuators without positioner

For mounting to SAMSON Type 3277 Linear Actuators (see Data Sheet T 8311 EN and Mounting and Operating Instructions EB 8311 EN), a mounting kit is required (see Fig. 5).

▶ Devices without pilot valve
Replace exhaust air filter in the enclosure cover with a threaded plug ⑭, because aeration ensues via cover ⑬ at the linear actuator. Screw exhaust air filter into cover ⑬.

▶ Devices with pilot valve
Replace exhaust air filter in the enclosure cover with a threaded plug ⑭, because aeration ensues via cover ⑬ at the linear actuator. Screw exhaust air filter into cover ⑬.
With devices with two exhaust air filters (see "Exhaust air filter/degree of protection", page 13), one exhaust air filter remains in the enclosure cover.

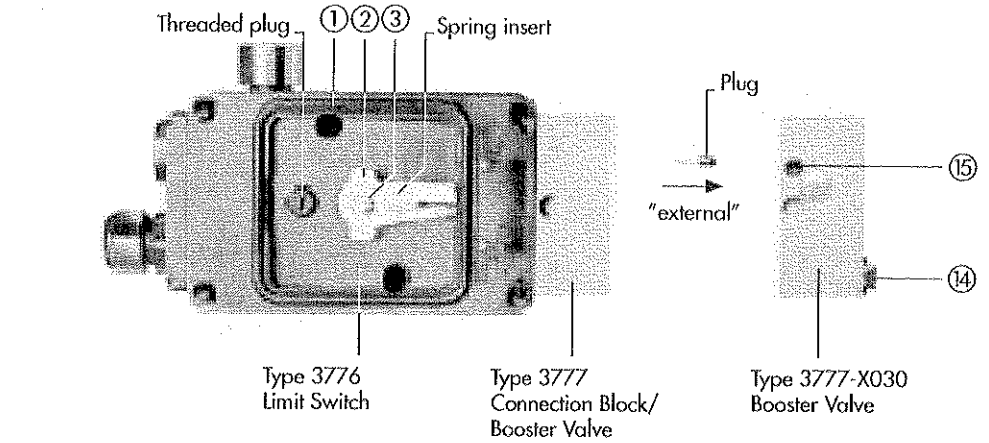
▶ Devices with Type 3777-X030 Booster Valve
Insert plug according to the "external" function into the output bore at the flange of the booster valve (as-delivered condition).
Insert O-ring ⑮ into the output bore on the bottom side of the booster valve.

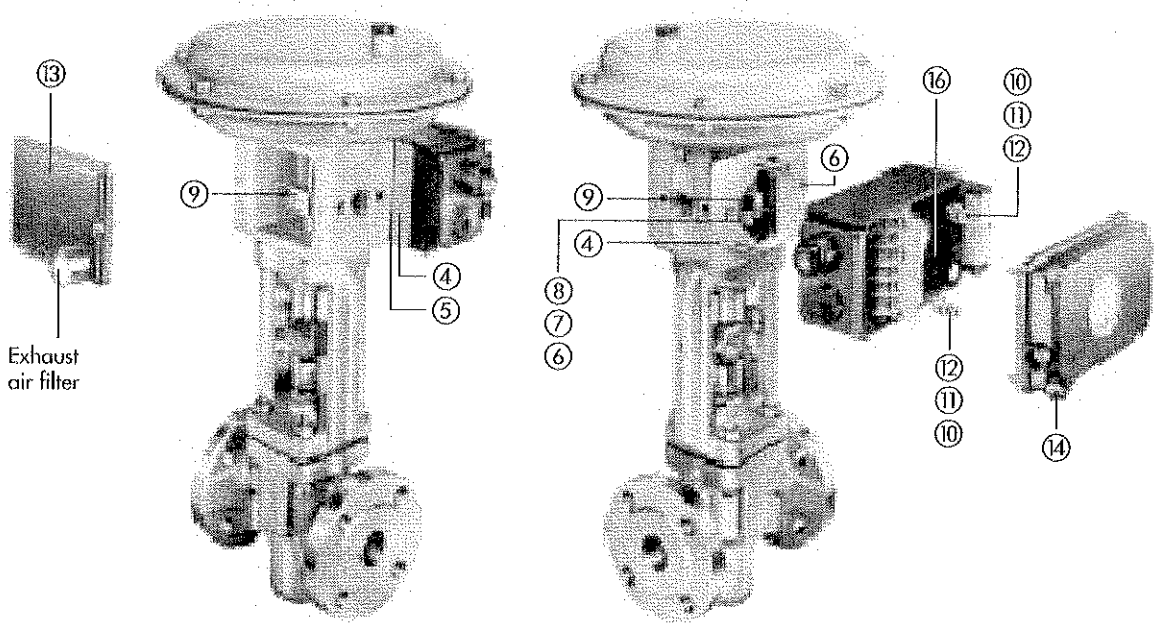
▶ Exhaust air return for devices with Types 3777-X030/-X63X Booster Valves
Close connection 4 of the booster valve with a threaded plug, if no exhaust air return from the linear actuator ensues.

▶ Mounting instructions

1 Break out the threaded plug from the bottom of the enclosure by turning respectively with a screw driver.
2 Insert molded gasket ① into the groove at the bottom of the enclosure.
3 Attach driver ② with the spring insert on the outside onto the stub and lock it with the snap ring ③.
4 Stick flat gasket ⑤ onto the bottom side of the flange plate ④.
5 Attach flange plate ④ with two hexagon screws ⑥ rightside at the yoke of the linear actuator. Put the washer ⑦ and the O-ring ⑧ under the left hexagon screw ⑥.
6 Attach clamping lever ⑨ to the actuator stem of the linear actuator.
7 Unscrew enclosure cover.
8 Place enclosure onto the threaded bolts of the flange plate ④. Then adjust the stub so that the pin at the clamping lever ⑨ engages in the slit at the driver ②.
9 Attach enclosure with two hexagon socket head screws ⑩, two split washers ⑪ and two washers ⑫.
10 Replace the indicating cap with the black covering cap ⑯, because the valve position indication ensues at the actuator stem of the linear actuator. Attach and turn covering cap ⑯ onto the cam holder until it engages.
11 Attach enclosure cover.
12 Attach cover ⑬ rearside at the yoke of the linear actuator.

Mounting to SAMSON Type 3277 Linear Actuators without positioner





Mounting kit for SAMSON Type 3277 Linear Actuators		
Order no.	**1400-7220**	**1400-7221**
	Diaphragm area 240/350 cm²	Diaphragm area 700 cm²
① 1 × Molded gasket		
② 1 × Driver		
③ 1 × Snap ring ∅ 5 × 0.8		
④ 1 × Flange plate		
⑤ 1 × Flat gasket		
⑥ 2 × Hexagon screw M 5 × 12 DIN EN 24017		
⑦ 1 × Washer DIN 125 – 5.3		
⑧ 1 × O-ring 5 × 1.2		
⑨ 1 × Clamping lever		
⑩ 2 × Hexagon socket head screw M 6 × 12 DIN 912		
⑪ 2 × Split washer DIN 127 – form B 6		
⑫ 2 × Washer DIN 125 – 6.4		
⑬ 1 × Cover		
⑭ 2 × Threaded plug 1/4"		
⑮ 1 × O-ring 4 × 2		
⑯ 1 × Covering cap		

Fig. 5

Mounting to SAMSON Type 3277-5 Linear Actuators (external) without positioner

For mounting to SAMSON Type 3277-5 Linear Actuators with external routing of the loading pressure (see Data Sheet T 8311 EN and Mounting and Operating Instructions EB 8311 EN), a mounting kit is required (see Fig. 6).

▶ Devices without pilot valve
Replace ventilation plug/exhaust air filter in the enclosure cover with a threaded plug ⑭, because aeration ensues via cover ⑬ at the linear actuator.
Screw ventilation plug/exhaust air filter into cover ⑬.

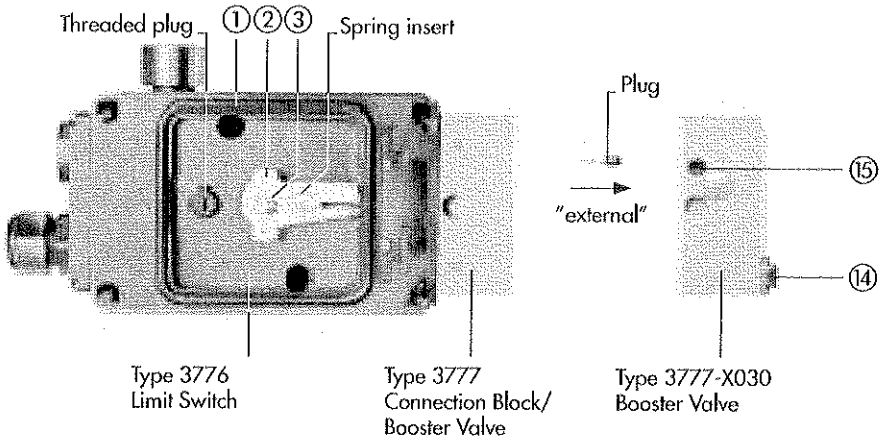
▶ Devices with pilot valve
Replace exhaust air filter in the enclosure cover with a threaded plug ⑭, because aeration ensues via cover ⑬ at the linear actuator.
Screw exhaust air filter into cover ⑬.
With devices with two exhaust air filters (see "Exhaust air filter/degree of protection", page 13), one exhaust air filter remains in the enclosure cover.

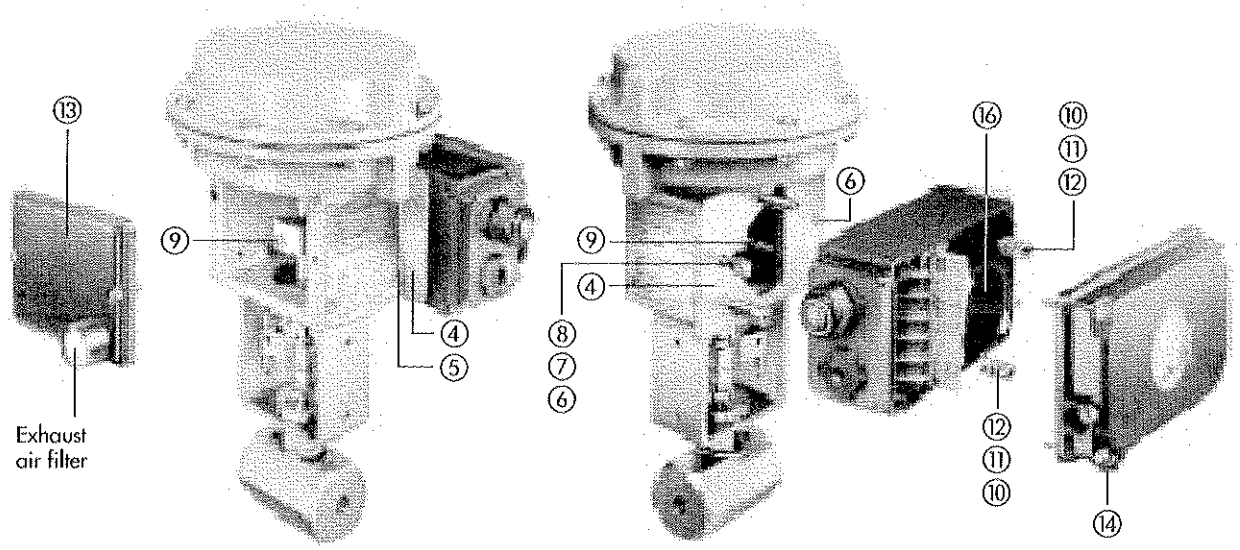
▶ Devices with Type 3777-X030 Booster Valve
Insert plug according to the "external" function into the output bore at the flange of the booster valve (as-delivered condition).
Insert O-ring ⑮ into the output bore on the bottom side of the booster valve.

▶ Mounting instructions

1 Break out the threaded plug from the bottom of the enclosure by turning respectively with a screw driver.
2 Insert molded gasket ① into the groove at the bottom of the enclosure.
3 Attach driver ② with the spring insert on the outside onto the stub and lock it with the snap ring ③.
4 Stick flat gasket ⑤ onto the bottom side of the flange plate ④.
5 Attach flange plate ④ with two hexagon screws ⑥ rightside at the yoke of the linear actuator. Put the washer ⑦ and the O-ring ⑧ under the left hexagon screw ⑥.
6 Attach clamping lever ⑨ onto the actuator stem of the linear actuator.
7 Unscrew enclosure cover.
8 Place enclosure onto the threaded bolts of the flange plate ④. Then adjust the stub so that the pin at the clamping lever ⑨ engages in the slit at the driver ②.
9 Attach enclosure with two hexagon socket head screws ⑩, two split washers ⑪ and two washers ⑫.
10 Replace the indicating cap with the black covering cap ⑯, because the valve position indication ensues at the actuator stem of the linear actuator. Attach and turn covering cap ⑯ onto the cam holder until it engages.
11 Attach enclosure cover.
12 Attach cover ⑬ rearside at the yoke of the linear actuator.

Mounting to SAMSON Type 3277-5 Linear Actuators (external) without positioner





Mounting kit for SAMSON Type 3277-5 Linear Actuators (external)	
Order no.	**1400-7219**
① 1 × Molded gasket ② 1 × Driver ③ 1 × Snap ring ∅ 5 × 0.8 ④ 1 × Flange plate ⑤ 1 × Flat gasket ⑥ 2 × Hexagon screw M 5 × 12 DIN EN 24017 ⑦ 1 × Washer DIN 125 – 5.3 ⑧ 1 × O-ring 5 × 1.2 ⑨ 1 × Clamping lever ⑩ 2 × Hexagon socket head screw M 6 × 12 DIN 912 ⑪ 2 × Split washer DIN 127 – Form B 6 ⑫ 2 × Washer DIN 125 – 6.4 ⑬ 1 × Cover ⑭ 2 × Threaded plug 1/4" ⑮ 1 × O-ring 4 × 2 ⑯ 1 × Covering cap	

Fig. 6

Mounting to SAMSON Type 3277-5 Linear Actuators (internal) without positioner

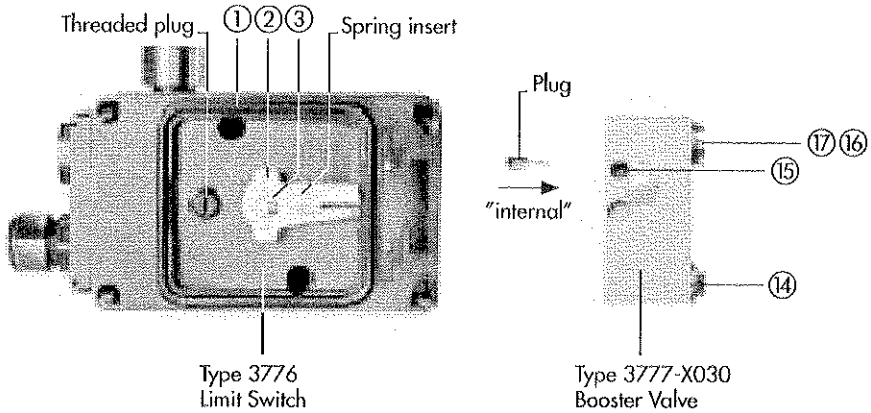
For mounting to SAMSON Type 3277-5 Linear Actuators with internal routing of the loading pressure (see Data Sheet T 8311 EN and Mounting and Operating Instructions EB 8311 EN), a mounting kit is required (see Fig. 7).

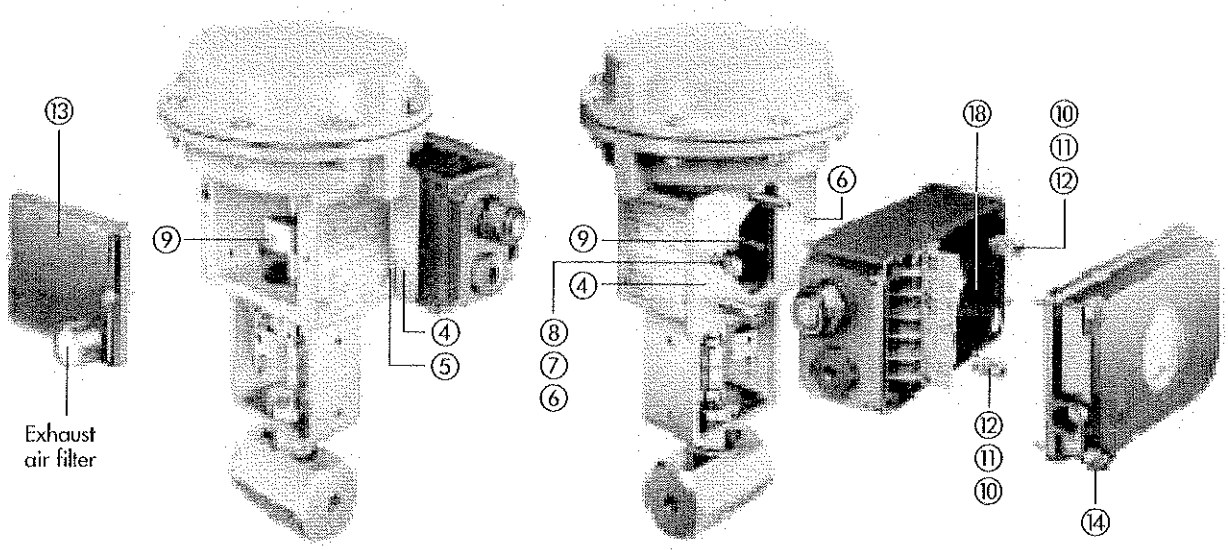
▶ Devices with Type 3777-X030 Booster Valve
Only devices with Type 3777-X030 Booster Valve can be mounted to SAMSON Type 3277-5 Linear Actuators with internal routing of the loading pressure. Then the loading pressure is connected optionally to the bottom or the top diaphragm chamber via the holes in the yoke and via a switch-over plate.

▶ Mounting instructions

1 Unscrew booster valve from enclosure (see "Air connection", page 12).
2 Insert plug according to the "internal" function into the output bore at the flange of the booster valve.
3 Attach booster valve to the enclosure.
4 Close connection 2 with the threaded plug ⑯ and the sealing ring ⑰.
5 Close connection 4 with a threaded plug ⑭.
6 Insert O-ring ⑮ into the output bore on the bottom side of the booster valve.
7 Break out the threaded plug from the bottom of the enclosure by turning respectively with a screw driver.
8 Insert molded gasket ① into the groove on the bottom of the enclosure.
9 Attach driver ② with the spring insert on the outside onto the stub and lock it with the snap ring ③.
10 Stick flat gasket ⑤ onto the bottom side of the flange plate ④.
11 Attach flange plate ④ with two hexagon screws ⑥ rightside at the yoke of the linear actuator. Put the washer ⑦ and the O-ring ⑧ under the left hexagon screw ⑥.
12 Attach clamping lever ⑨ to the actuator stem of the linear actuator.
13 Unscrew enclosure cover.
14 Place enclosure onto the threaded bolts of the flange plate ④. Then adjust the stub so that the pin at the clamping lever ⑨ engages in the slit at the driver ②.
15 Attach enclosure with two hexagon socket head screws ⑩, two split washers ⑪ and two washers ⑫.
16 Replace the indicating cap with the black covering cap ⑯, because the valve position indication ensues at the actuator stem of the linear actuator. Attach and turn covering cap ⑯ onto the cam holder until it engages.
17 Attach enclosure cover.
18 Attach cover ⑬ rearside at the yoke of the linear actuator.
19 Replace exhaust air filter in the enclosure cover with a threaded plug ⑭, because aeration ensues via cover ⑬ at the linear actuator.
20 Screw exhaust air filter into cover ⑬.

Mounting to SAMSON Type 3277-5 Linear Actuators (internal) without positioner





Mounting kit for SAMSON Type 3277-5 Linear Actuators (internal)		
Order no.	**1400-7222**	**1400-7223**
	Connection G 1/4	Connection NPT 1/4
① 1 × Molded gasket		
② 1 × Driver		
③ 1 × Snap ring ∅ 5 × 0.8		
④ 1 × Flange plate		
⑤ 1 × Flat gasket		
⑥ 2 × Hexagon screw M 5 × 12 DIN EN 24017		
⑦ 1 × Washer DIN 125 – 5.3		
⑧ 1 × O-ring 5 × 1.2		
⑨ 1 × Clamping lever		
⑩ 2 × Hexagon socket head screw M 6 × 12 DIN 912		
⑪ 2 × Split washer DIN 127 – Form B 6		
⑫ 2 × Washer DIN 125 – 6.4		
⑬ 1 × Cover		
⑭ 2 × Threaded plug 1/4"		
⑮ 1 × O-ring 4 × 2		
⑯ 1 × Hexagon head socket pipe plug DIN 908 – 1/4"		
⑰ 1 × Sealing ring 13.5 × 17 × 1.5 (only for G 1/4)		
⑱ 1 × Covering cap		

Fig. 7

Air connection

For devices with pilot valve, the air supply pipes and screw joints may only be laid and assembled by experienced personnel. They must be regularly checked for leaks and damage and, if necessary, repaired. Before starting any repair work, all supply pipes which are to be opened must be depressurized.
The air supply must not exceed the maximum permissible pressure.

The air connections on the Type 3777 Connection Block/Booster Valve are G (NPT) $^1/_4$ tapped holes.
Preferably angle connectors for pipe 6 × 2 or hose 4 × 1 shall be used.

Air supply			
Instrument air 2.2 ... 10 bar			
Ambient temperature (°C)	Dew point (°C)	Particle size (µm)	Oily residues (mg/m³)
+15 ... +35	+10	≤5	≤0.1
−15	−20		
−32	−40		
−60	−70		

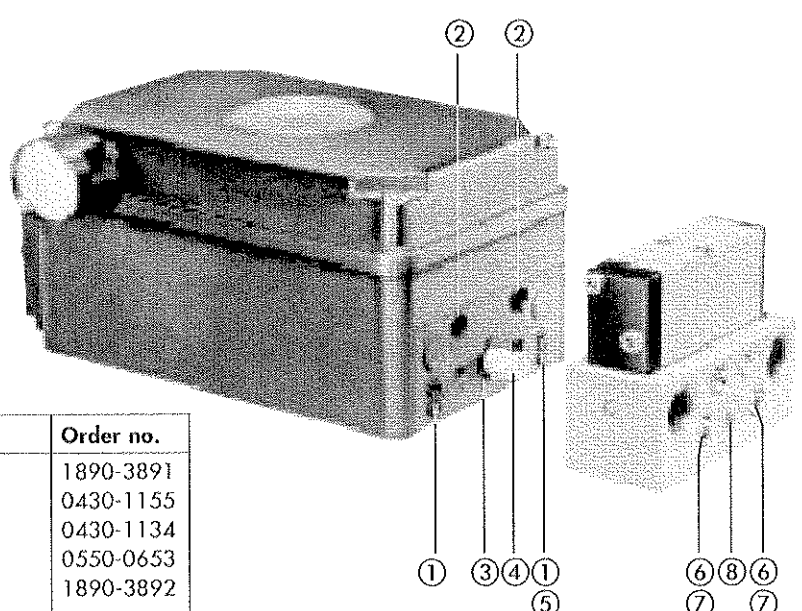
Filter elements for air supply

To protect the pilot valve against dirt particles, connection 9 for air supply is equipped with a sieve, mesh size 100 µm, and a filter, pore size 30 µm.
The filter elements must be cleaned or replaced when contaminated (see Fig. 8).

▶ Cleaning/replacing the filter elements

1 Screw out sieve ⑧ from connection 9 with a screw driver (screw driver point 7 to 9 mm). Clean/replace and screw into connection 9.
2 Remove connection block/booster valve from the enclosure after removal of two hexagon socket head screws ⑥ and two split washers ⑦.
3 Pull out filter ④ from the enclosure. Clean/replace and reinsert into the enclosure. Be sure to check that the seal ring ③ is positioned correctly.
4 Attach connection block/booster valve with two hexagon socket head screws ⑥ and two split washers ⑦ to the enclosure. Before mounting, be sure to check that the seals ① or ⑤ and the two O-rings ② are positioned correctly.

Air connection



Spare parts	Order no.
① Seal with restrictor	1890-3891
② O-ring 6 × 1	0430-1155
③ Seal ring 12 × 2	0430-1134
④ Filter	0550-0653
⑤ Seal with ball (only if one pilot valve is used)	1890-3892
⑥ Hexagon socket head screw M 4 × 30 DIN 912	8333-1191
⑦ Split washer DIN 127 – form B 4	8392-0654
⑧ Sieve	0550-0213

Fig. 8

Exhaust air filter/degree of protection

▶ Devices without pilot valve

These devices are equipped either with a ventilation plug (IP 54), a filter (IP 54), or a filter check-valve (IP 65) in the enclosure cover.
For mounting to SAMSON Types 3277 and 3277-5 Linear Actuators, the ventilation plug must be replaced with an exhaust air filter.

▶ Devices with pilot valve

These devices are equipped either with one or two filters (IP 54), or one or two filter check-valves (IP 65) in the enclosure cover.
The quantity of exhaust air filters depends on the K_{VS} value of the booster valve/connection block (see table).

Connection block/Booster valve		**Exhaust air filter**
Type	K_{VS} value	
3777-X010	0.01	1 ×
3777-X020	0.01	1 ×
3777-X030	0.20	1 ×
3777-X630	0.30	2 ×
3777-X632	0.18	1 ×
3777-XX50	0.30	2 ×
3777-XX53	0.23	2 ×

Restrictors

▶ Devices with Types 3777-X632/-XX53 Booster Valve

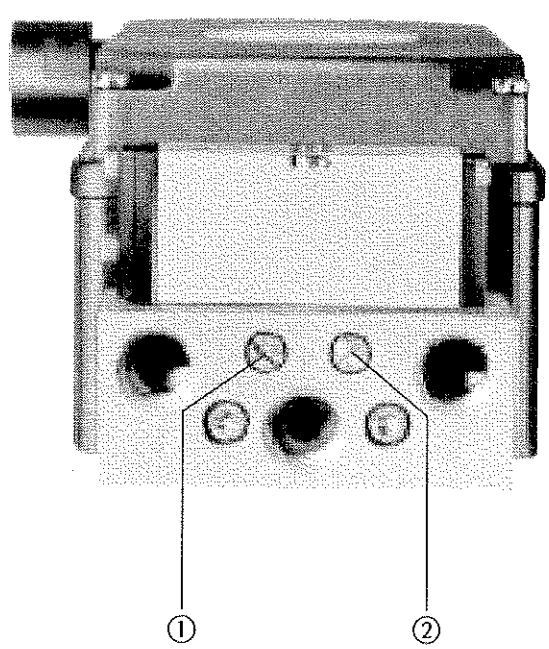
These devices are equipped with supply air restrictors/exhaust air restrictors (see Fig. 9).
Different closing and opening times can be adjusted by turning the restricting screws ① and ② to the right (opening) or to the left (closing) using a screw driver (e. g. for rotary actuators at a ratio of 1:15).
With closed restricting screws, a minimum of flow is guaranteed.

Important note for devices with Types 3777-XXXX index -01 Booster valve

▶ Devices with Types 3777 -X030-**01**/-X630-**01**/-X650-**01**/-X250-**01**/ -X350-**01**/-X450-**01**/-X550-**01** Booster Valve

These devices include baffle plates with a diameter of 3 mm in the output connections. **Do not remove the baffle plates, otherwise the reliable functioning cannot be guaranteed.**

Restrictors



Booster valve		**Restrictors**	
Type	Connection	Function	K_{VS} value
3777-X632	2 2	① Exhaust air ② Supply air	0.01 ... 0.18
3777-XX53	4 2	① Exhaust air ② Exhaust air	0.01 ... 0.23

Fig. 9

Electrical connection

As far as the electrical installation of the device is concerned, the relevant electrotechnical regulations and the accident prevention regulations of the country in which the device is used must be observed. In Germany these are the VDE regulations and the accident prevention regulations of the emloyers' liability insurance association.
For mounting in hazardous areas, the respective national regulations of the country in which the device is used applies. In Germany this is VDE 0165.
For connection to certified intrinsically safe electric circuits, the Certificate of Conformity PTB No. Ex-97.D.2107 applies (see page 23).
When connected to DC voltage signals, correct polarity must be ensured.
The coated screws in the enclosure must not be tampered with.

Connecting cables

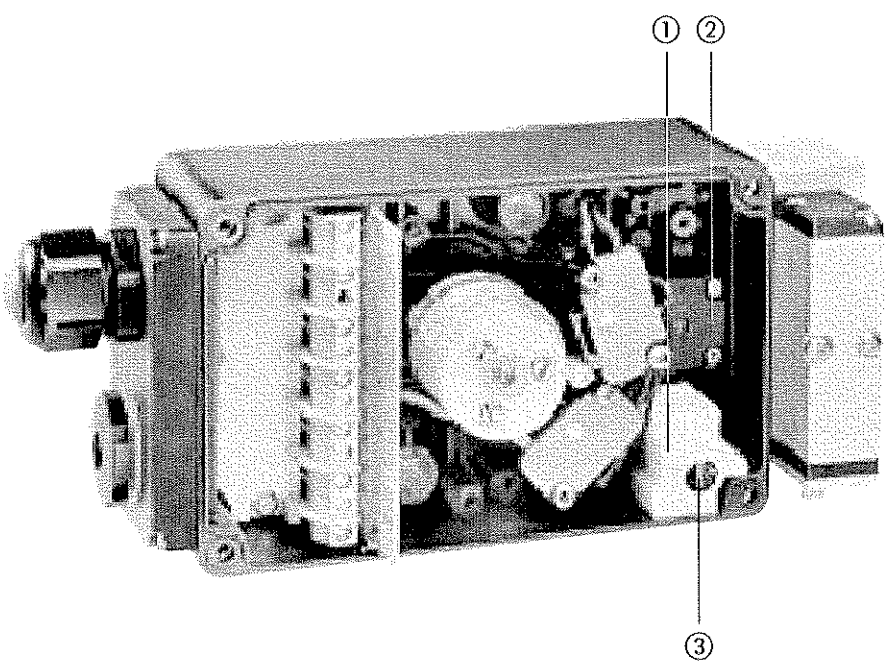
The power supply is connected either through cable glands M 20 × 1,5 to a terminal in the enclosure, with plug-type connectors according to DIN 43 650, with plug-type connectors (manufactured by Harting) or with round connectors (manufactured by Binder).
It is recommended that connecting cables with a conductor cross-section of 0.5 mm^2 and an external diameter of 6 to 9 mm are used.

Pilot valve/manual operation function

For safety circuits, only pilot valves without manual operation function should be used.

▶ Devices with pilot valve
The pilot valve, which conists of an E/P binary converter ① and a pressure reducer ②, is optionally provided with a manual operation function ③ (see Fig. 10).
When a nominal signal is not available, the pilot valve can be operated by a pushbutton or a pushbutton switch using a screw driver (screw driver point 4.5 mm).

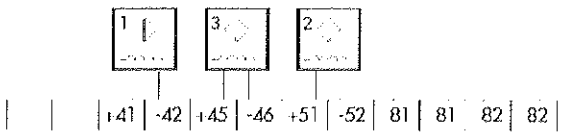
Pilot valve/manual operation function



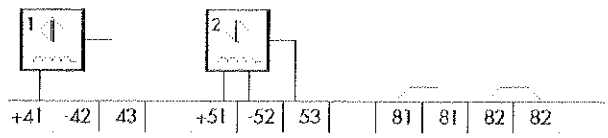
① E/P binary converter
② Pressure reducer
③ Manual operation function

Fig. 10

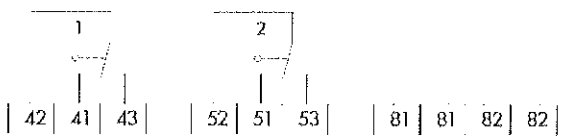
Connection diagrams for terminal



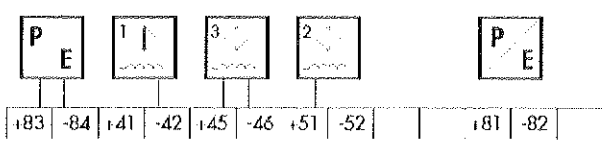
3 inductive contacts (2-wire)



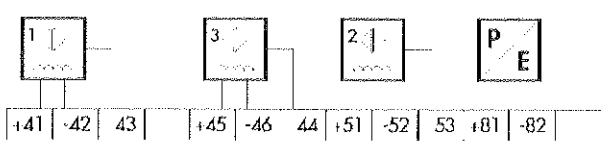
2 inductive contacts (3-wire)



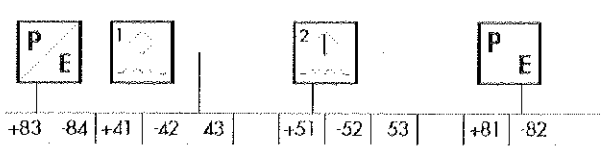
2 electric contacts (change-over contacts)



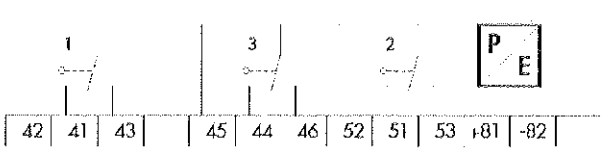
2 pilot valves
3 inductive contacts (2-wire)



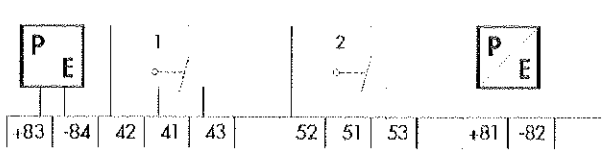
1 pilot valve
3 inductive contacts (3-wire)



2 pilot valves
2 inductive contacts (3-wire)



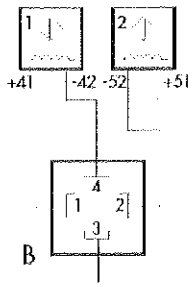
1 pilot valve
3 electric contacts (change-over contacts)



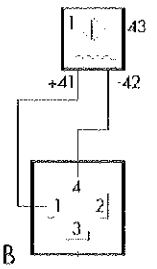
2 pilot valves
2 electric contacts (change-over contacts)

Fig. 11

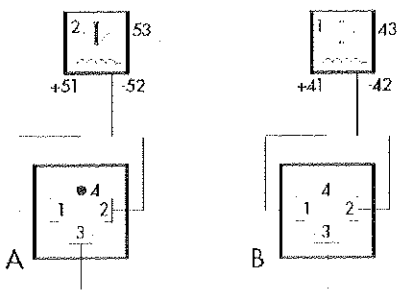
Connection diagrams for plug-type connectors according to DIN 43 650



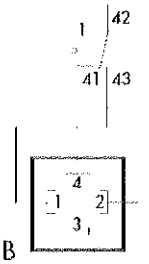
2 inductive contacts (2-wire)



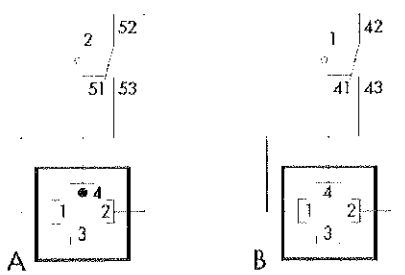
1 inductive contact (3-wire)



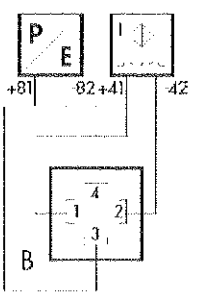
2 inductice contacts (3-wire)



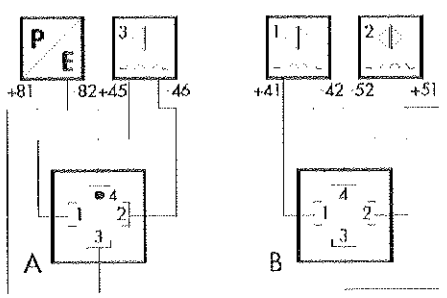
1 electric contact (change-over contact)



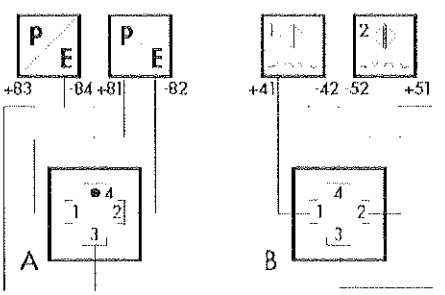
2 electric contacts (change-over contacts)



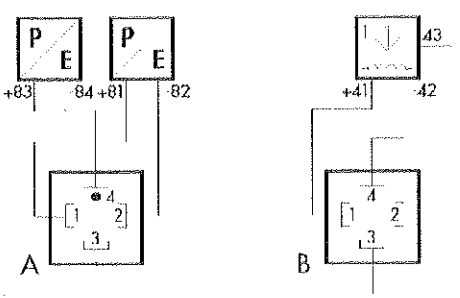
1 pilot valve
1 inductive contact (2-wire)



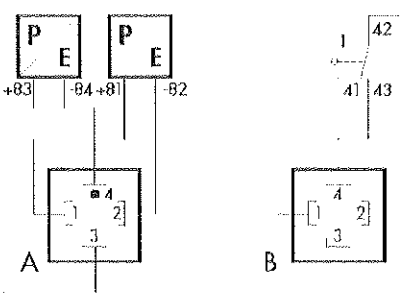
1 pilot valve
3 inductive contacts (2-wire)



2 pilot valves
2 inductive contacts (2-wire)



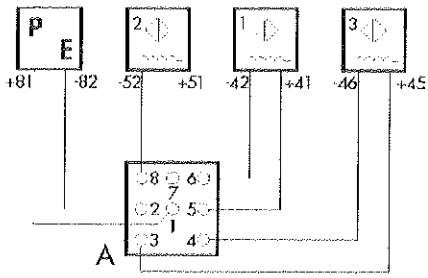
2 pilot valves
1 inductive contact (3-wire)



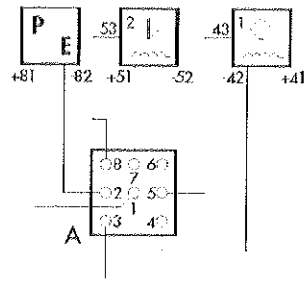
2 pilot valves
1 electric contact (change-over contact)

Fig. 12 · ● = Coding (only if 2 plug-type connectors are used)

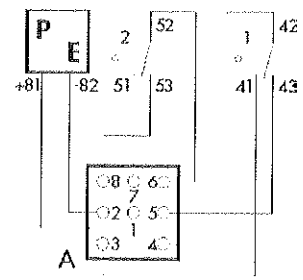
Connection diagrams for plug-type connectors (manufatured by Harting)



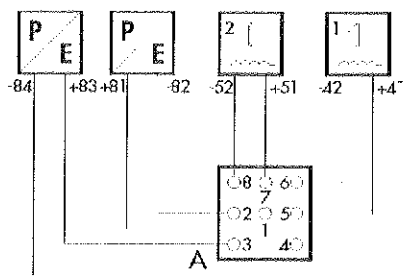
1 pilot valve
3 inductive contacts (2-wire)



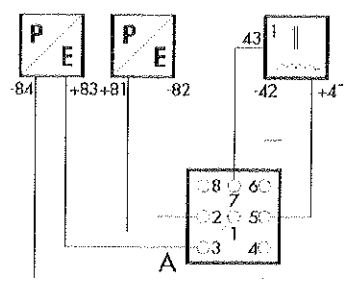
1 pilot valve
2 inductive contacts (3-wire)



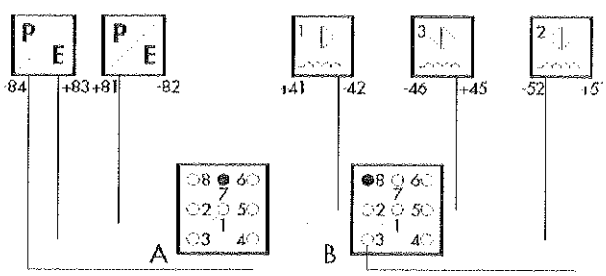
1 pilot valve
2 electric contacts (change-over contacts)



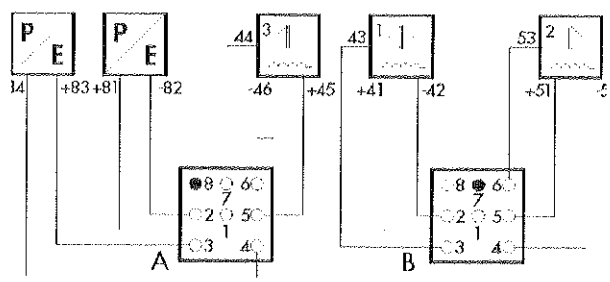
2 pilot valves
2 inductive contacts (2-wire)



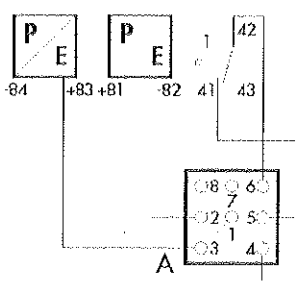
2 pilot valves
1 inductive contacts (3-wire)



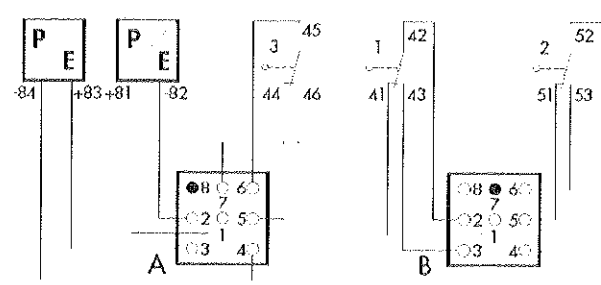
2 pilot valves
3 inductive contacts (2-wire)



2 pilot valves
3 inductive contacts (3-wire)



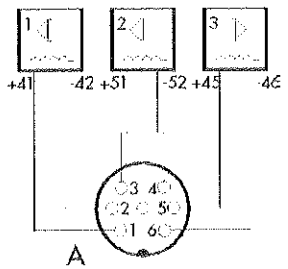
1 pilot valve
1 electric contact (change-over contact)



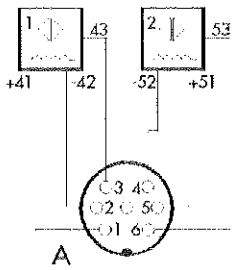
2 pilot valves
3 electric contacts (change-over contacts)

Fig. 13 · ● = Coding (only if 2 plug-type connectors are used)

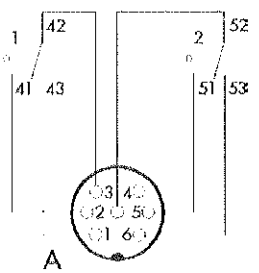
Connection diagrams for round connectors (manufactured by Binder)



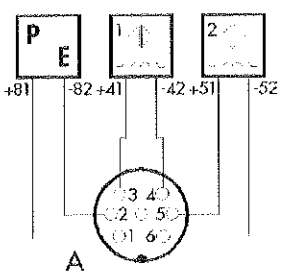
3 inductive contacts (2-wire)



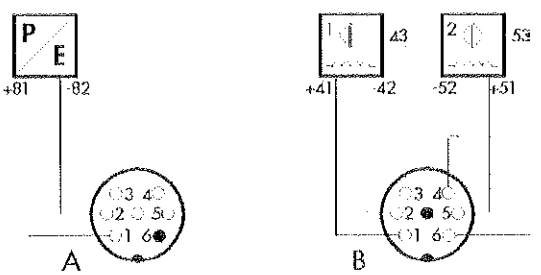
2 inductive contacts (3-wire)



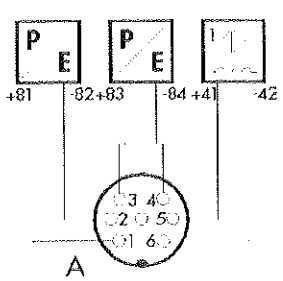
2 electric contacts (change-over contacts)



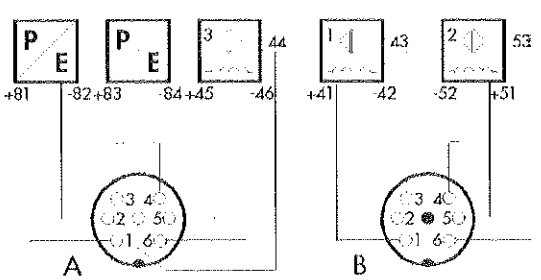
1 pilot valve
2 inductive contacts (2-wire)



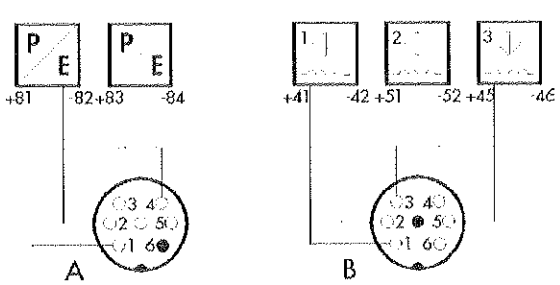
1 pilot valve
2 inductive contacts (3-wire)



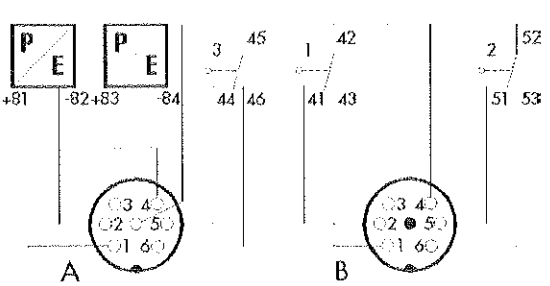
2 pilot valves
1 inductive contact (3-wire)



2 pilot valves
3 inductive contacts (3-wire)



2 pilot valves
3 inductive contacts (2-wire)



2 pilot valves
3 electric contacts (change-over contacts)

Fig. 14 · ● = Coding (only if 2 round connectors are used)

Contacts

The devices are either equipped with inductive pick-ups, inductive double proximity switch or electric microswitches (see page 20 ff.).
For most applications, the contacts are adjusted to provide a signal when the actuator has reached one of its end positions. The switching point can also be adjusted to any position within the rotary range or travel range to signalize an intermediate position.

Displacement of the switching point due to changes in temperature

The contacts and their actuating appliances are sensitive to changes in temperature.
In order to ensure safe switching, the switching hysteresis between the switching position of the actuator and the switching point of the contact must be larger than the displacement of the switching point due to changes in temperature. For this reason, when adjusting the contacts, the displacement of the switching point must be compensated for with x rotation of the adjusting screw (see table "Adjustment data").

Adjustment data	
Displacement of the switching point $\Delta T = 50$ K	
Angle of rotation	Travel
$\leq 2°$	≤ 0.8 mm
Rotation of the adjusting screw	
$x = 1/16$	$x = 1/16$

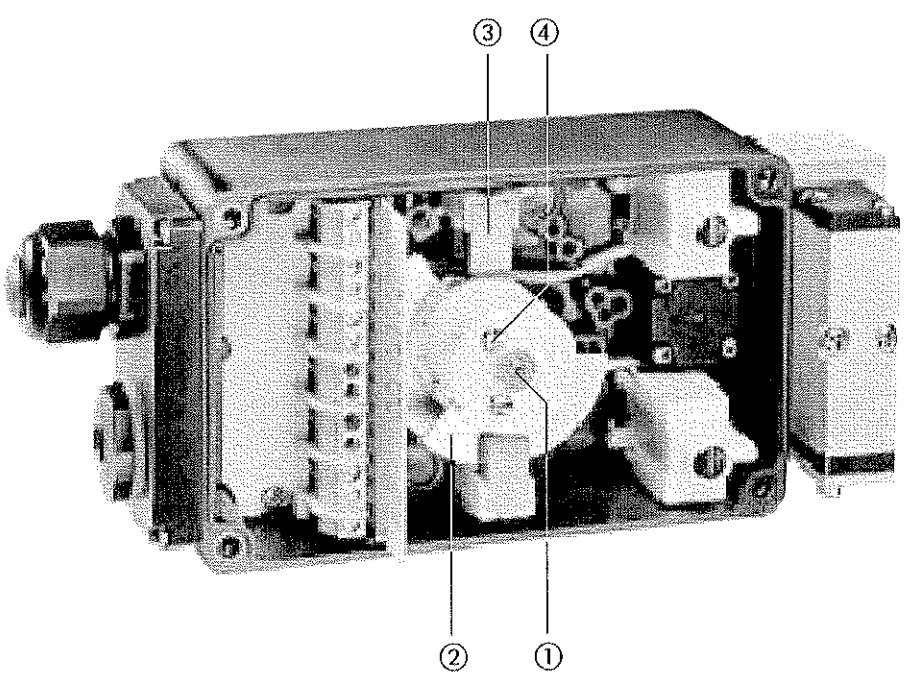
Inductive pick-ups

For devices with inductive pick-ups ③, the shaft ① is equipped with up to three adjustable metal tags ② (see Fig. 15).
When the metal tag is within the magnetic field of the pick-up, the initiator becomes attenuated and the output high-resistant (switching function "contact open"). When the metal tag is no more within the magnetic field, the pick-up is unattenuated and the output low-resistant (switching function "contact closed").
If the devices have been attached by the manufacturer, the metal tags are adjusted, so that the pick-ups are unattenuated in the switching positions of the control valve (switching function "contact closed").

▶ Adjusting the switching points

1 Unscrew enclosure cover.
2 Pull off indicating cap/black covering cap from the cam holder.
3 Move control valve to the desired switching position.
4 Turn adjusting screw ④ with a screw driver, until the metal tag ② moves out of the magnetic field of the pick-up ③ and the output signal changes from "0" to "1".
5 To compensate for the displacement of the switching point due to changes in temperature, turn adjusting screw ④ with x rotation in the opposite direction (see table "Adjustment data", page 19).
6 Move control valve out of the switching position and check whether the output signal changes from "1" to "0".
7 Move control valve to the switching position again and check the switching point.
8 Attach and turn indicating cap/black covering cap onto the cam holder until it engages.
9 Attach enclosure cover.

Adjusting the switching points for inductive pick-ups



① Shaft
② Metal tag
③ Inductive pick-up
④ Adjusting screw

Fig. 15 · Device without enclosure cover and indicating cap/black covering cap

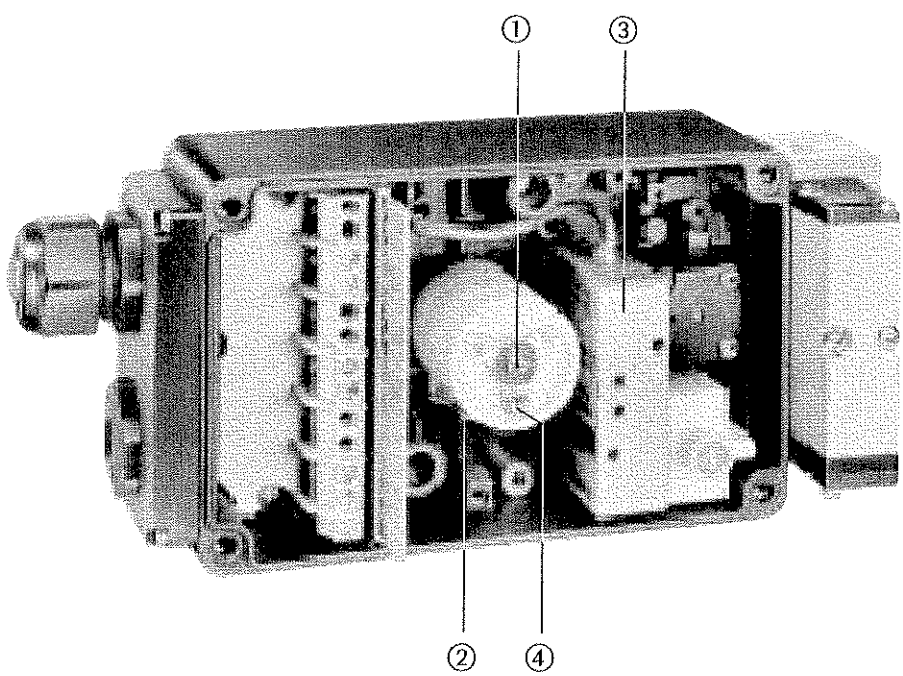
Inductive double proximity switch

For devices with inductive double proximity switch ③, the shaft ① is equipped with an adjustable metal tag ② with an angle of rotation of 70° or 90° (see Fig. 16).
When the metal tag is within the magnetic field of the proximity switch, the initiator becomes attenuated and the output high-resistant (switching function "contact open"). When the metal tag is no more within the magnetic field, the proximity switch is unattenuated and the output low-resistant (switching function "contact closed").
The metal tag is designed, so that in the switching positions of the control valve the proximity switches are unattenuated (switching function "contact closed").
When the device is mounted to a rotary actuator turned by 90°, the connecting cables of the proximity switches must be changed to signalize the switching positions "closed" and "open" correctly.

▶ Adjusting the switching points

1 Unscrew enclosure cover.
2 Pull off indicating cap/black covering cap from the cam holder.
3 Move control valve to the switching position „closed".
4 Turn adjusting screw ④ with a screw driver, until the metal tag ② moves out of the magnetic field of the proximity switch „closed" and the output signal changes from "0" to "1".
5 To compensate for the displacement of the switching point due to changes in temperature, turn adjusting screw ④ with x rotation in the opposite direction (see table "Adjustment data", page 19).
6 Move control valve to the switching position "open" and check whether the output signal of proximity switch "open" changes from "0" to "1".
7 Move control valve to the switching position "closed" again and check the switching point.
8 Attach and turn indicating cap/black covering cap onto the cam holder until it engages.
9 Attach enclosure cover.

Adjusting the switching points for inductive double proximity switch



① Shaft
② Metal tag
③ Inductive double proximity switch
④ Adjusting screw

Fig. 16 · Device without enclosure cover and indicating cap/black covering cap

Electric microswitches

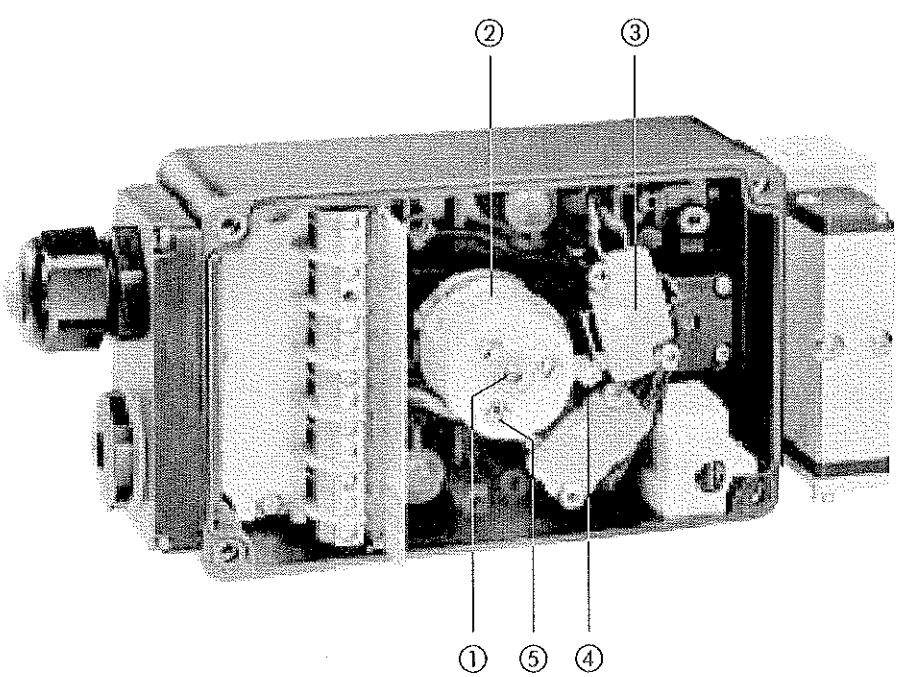
The covering plate under the enclosure cover must not be removed.

For devices with electric microswitches, the shaft ① is equipped with up to three adjustable cam disks ②. Each cam disk ② actuates an electric microswitch ③ by means of the roller mounted to the switch lever ④ (see Fig. 17).
The electric microswitches have a change-over contact which can be used as normally open contact or normally closed contact.

▶ Adjusting the switching points

1 Unscrew enclosure cover.
2 Pull off indicating cap/black covering cap from the cam holder.
3 Move control valve to the desired switching position.
4 Turn adjusting screw ⑤ with a screw driver, until the cam disk ② actuates the microswitch ③ and the output signal changes.
5 To compensate for the displacement of the switching point due to changes in temperature, turn adjusting screw ④ with x rotation in the opposite direction (see table "Adjustment data", page 19).
6 Move control valve out of the switching position and check whether the output signal changes.
7 Move control valve to the switching position again and check the switching point.
8 Attach and turn indicating cap/black covering cap onto the cam holder until it engages.
9 Attach enclosure cover.

Adjusting the switching points for electric microswitches



① Shaft
② Cam disk
③ Electric microswitch
④ Switch lever
⑤ Adjusting screw

Fig. 17 · Device without enclosure cover, indicating cap/black covering cap and covering plate

Certifications

Certificate of Conformity
PTB No. Ex-97.D.2107

 **EEx ia IIC T6**

The following table shows the permissible ambient temperature within the temperature classes:

Temperature class		T 6	T 5	T 4
Ambient temperature	maximum	+60 °C	+70 °C	+80 °C
	minimum	−45 °C		

For connection to a certified intrinsically safe electric circuit, the maximum permissible values for input voltage U_i, input current I_i, input power P_i, internal inductance L_i and internal capacitance C_i are shown in the following table:

Pilot valve (Screw terminals +81, −82, +83, −84 or plug-type connector)					
U_i	25 V	27 V	28 V	30 V	32 V
I_i	150 mA	125 mA	115 mA	100 mA	90 mA
P_i	no power limit				
L_i	negligible				
C_i	negligible				
Initiator (Screw terminals +41, −42, +45, −46, +51, −52 or plug-type connector)					
U_i	16 V				
I_i	52 mA				
P_i	169 mW				
L_i	250 µH				
C_i	60 nF				

Note: The Certificate of Conformity is available on request.

(Specifications subject to change without notice)

SAMSOMATIC
AUTOMATIONSSYSTEME
GMBH

– A subsidiary of SAMSON AG

Weismüllerstrasse 20–22
D-60314 Frankfurt am Main
P. O. Box 101901
D-60019 Frankfurt am Main
Telephone +49-69-40090
Telefax +49-69-4009644

Mounting and Operating Instructions

Solenoid Valves Type 3963

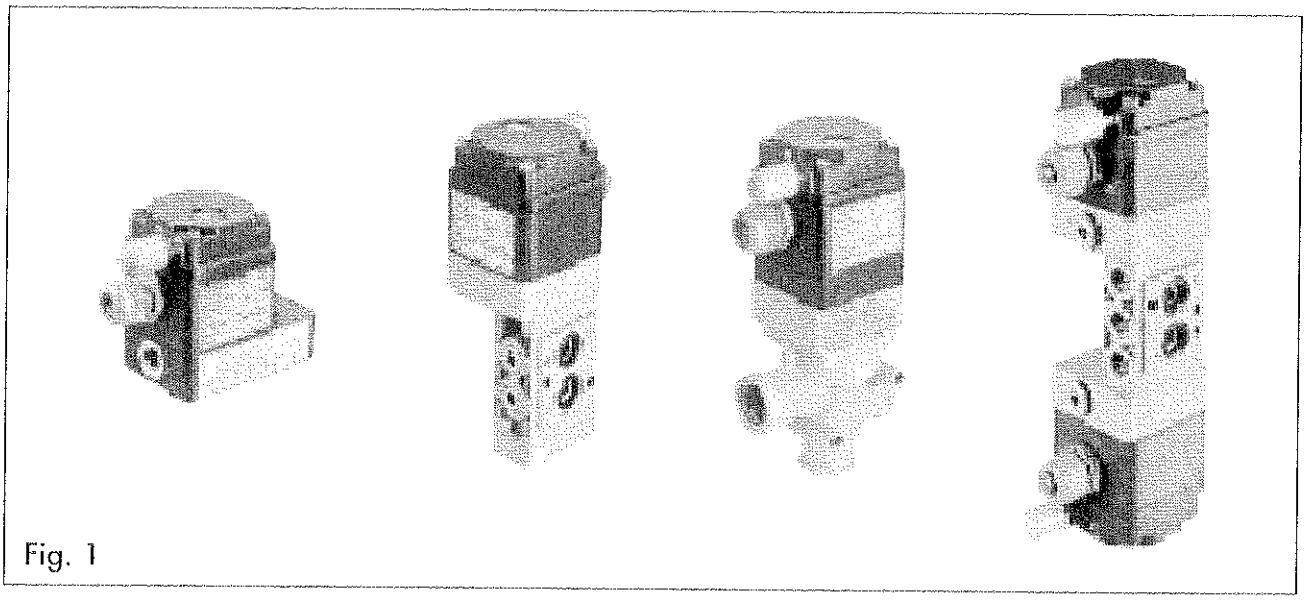


Fig. 1

General

Assembly, commissioning and operation of these devices may only be performed by experienced personnel. Proper shipping and appropriate storage are assumed.
The air supply may not exceed the maximum permissible pressure and, if necessary, it must be limited by a pressure reducer.

The devices can be mounted in any desired position. The filter in the enclosure cover and the cable gland Pg 13.5 must be installed hanging downwards, or if this is not possible, horizontally.
On mounting, it is important that a clearance of ≥ 300 mm above the enclosure cover is kept.
If the device is mounted to a rotary actuator or linear actuator with positioner, it is necessary to change over the air supply to an external supply at connection 9 (see page 7 ff.).
The minimum permissible ambient temperature is −25 °C (for Type 3963-....0/-....2 and 3756-1203/-6203) and −40 °C (for Type 3963-....1/-....3 and 3756-1213/-6213/-3.../-8...).

The maximum permissible ambient temperature of +80 °C is lowered for intrinsically safe devices in accordance with the Certificate of Conformity PTB No. Ex-90.C.2100 (see page 10).
Technical data, ordering data, spare parts and accessories see Data Sheet T 963 EN.

Contents

Mounting

Mounting rails

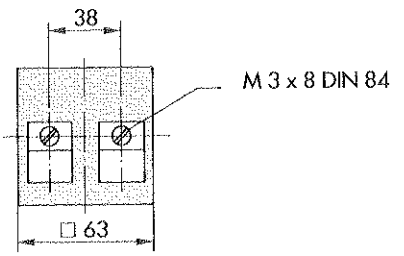
▶ Type 3963-..14/-..27/-..28/-..54/-..64
These devices can be attached with two mounting bases for G-profile 32 according to EN 50035 or top hat rail 35 according to EN 50022 (Fig. 2).

Wall mounting

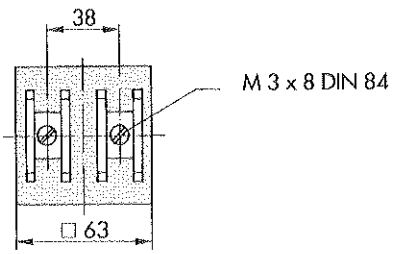
▶ Type 3963-..14/-..27/-..28/-..54/-..64
These devices can be attached to a wall mounting plate (Fig. 2).

▶ Type 3963-..25, combined with
Type 3756-1203/-6203/-1213/-6213
▶ Type 3963-..76, combined with
Type 3756-3205/-8205/-3206/-8206/
-3325/-8325/-3335/-8335/
-3345/-8345/-3355/-8355
These devices can be attached with screws through bore holes (Fig. 3).

Mounting base for G-profile 32 (Order No. 1400-5930)



Mounting base for top hat rail 35 (Order No. 1400-5931)



Wall mounting plate (Order No. 1400-6726)

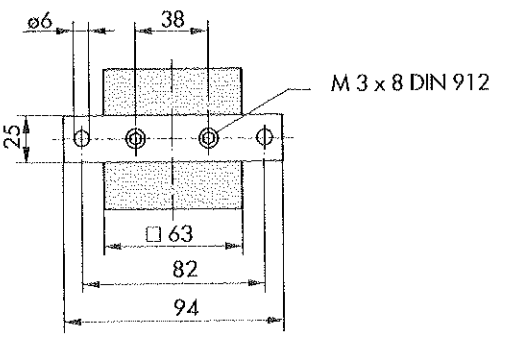
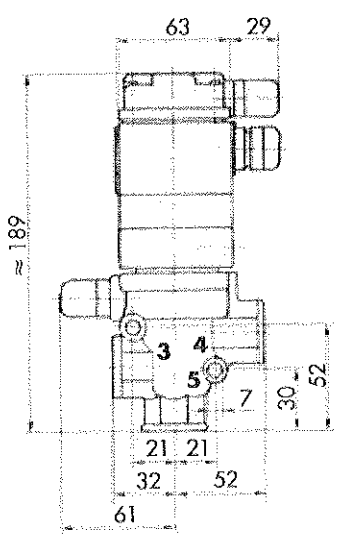


Fig. 2 · Dimensions in mm

Type 3963-..25, combined with Type 3756-1203/-6203/-1213/-6213



Type 3963-..76, combined with Type 3756-3205/-8205/-3206/-8206/ -3325/-8325/-3335/-8335/ -3345/-8345/-3355/-8355

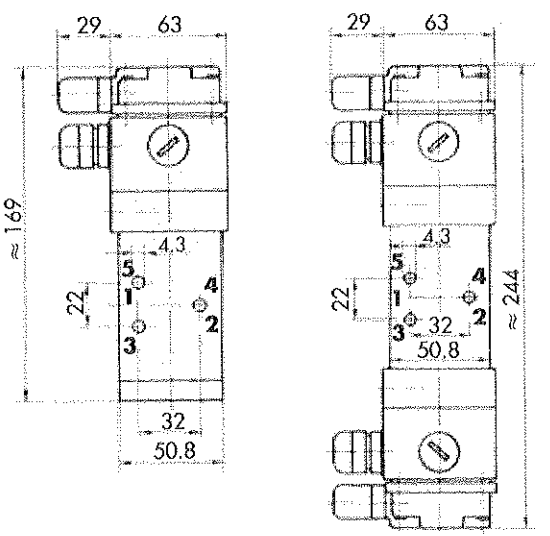


Fig. 3 · Dimensions in mm

Mounting to rotary actuators with NAMUR interface according to VDI/VDE 3845

- Type 3963-..11/-..12/-..21/-..22/-..23/ -..52/-..62
- Type 3963-..76, combined with Type 3756-3207/-8207/-3208/-8208/ -3327/-3827/-3337/-3837/ -3347/-3847/-3357/-3857

These devices can be directly attached to rotary actuators with NAMUR interface (Fig. 4). Before mounting, check that the two O rings are positioned correctly. The operation direction is determined by a threaded coding pin M 5×10 DIN 916 on the mounting flange of the rotary actuator. The device is attached with two screws M 5×35 DIN 912. The mounting accessories are delivered together with the device.

Mounting to restrictor block for rotary actuators with NAMUR interface according to VDI/VDE 3845

- Type 3963-..76, combined with Type 3756-3207/-8207/-3208/-8208

These devices can be attached to a restrictor block for rotary actuators with NAMUR interface (Fig. 5). The restricting function can be identified from the symbol indicated on the device. Different closing and opening times can be adjusted in a ratio of 1:15 by turning the restricting screws to the left or to the right respectively with a screw driver.

NAMUR interface according to VDI/VDE 3845

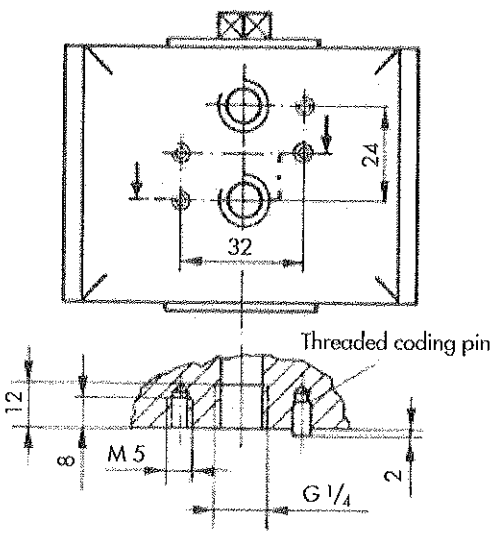


Fig. 4 · Dimensions in mm

Mounting to restrictor block for single-acting rotary actuators (Order No. 1400-6763)

Mounting to restrictor block for double-acting rotary actuators (Order No. 1400-6764)

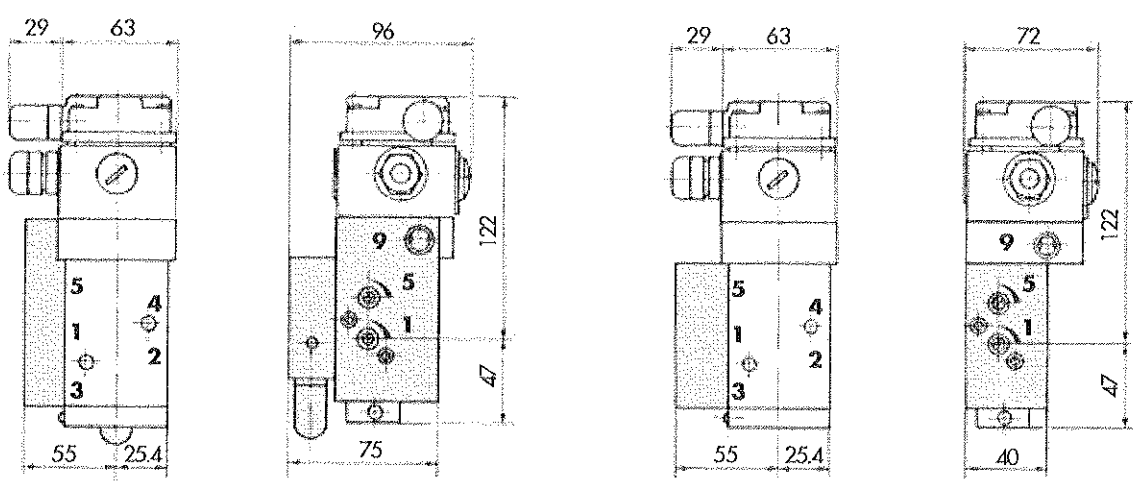


Fig. 5 · Dimensions in mm

Mounting with adapter plate to linear actuators with NAMUR rib according to DIN IEC 534

- Type 3963-..11/-..12/-..21/-..22/-..23/ -..52/-..62
- Type 3963-..76, combined with Type 3756-3207/-3208

These devices can be mounted with an adapter plate (Fig. 6) to linear actuators with NAMUR rib. When positioners or limit switches with long lever are to be mounted on linear actuators ≤DN 50 at the same time a bracket (Order No. 0320-1416) is required.

Mounting with screwed pipe connection of CrNiMo to linear actuators

- Type 3963-..27/-..28/-..54
- Type 3963-..25, combined with Type 3756-1203/-1213
- Type 3963-..76, combined with Type 3756-3205/-3206

These devices can be mounted with a screwed pipe connection to linear actuators, e. g. SAMSON Type 271 or 3277 (Fig. 7). Mounting instructions for SAMSON devices see Mounting and Operating Instructions EB 8310 EN and EB 8311 EN.

Adapter plate NAMUR rib/NAMUR interface (Order No. 1400-6751)

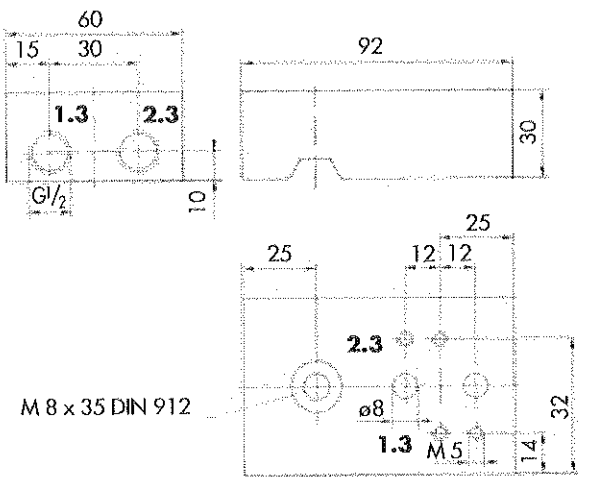
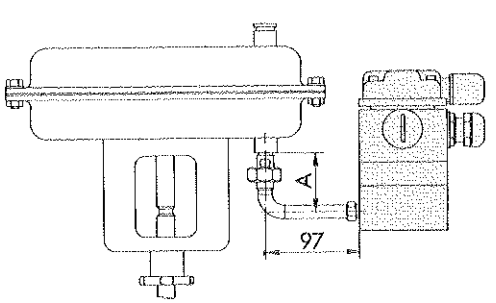
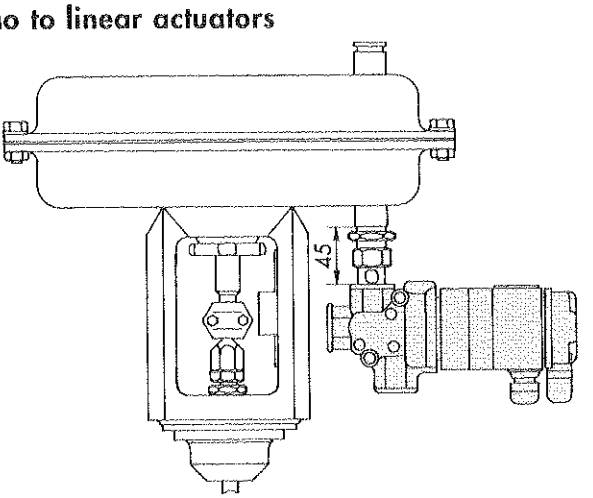


Fig. 6 · Dimensions in mm

Mounting with screwed pipe connection of CrNiMo to linear actuators





Actuator size	Connection	A	Order No.
80/240 cm²	G 1/4 / 1/4	64	**1400-6759**
350/700 cm²	G 3/8 / 1/4	75	**1400-6761**
	G 3/8 / 1/2	64	**1400-6735**

Actuator size	Connection	Order No.
1400 cm²	G 3/4 / 1/2	**1400-6736**
2100 cm²	G 1 / 1/2	**1400-6737**
2800 cm²		

Fig. 7 · Dimensions in mm

Mounting to connection block for Linear Actuator SAMSON Type 3277

▶ Type 3963-..29/-..55

These devices can be mounted to connection block for Linear Actuator SAMSON Type 3277 with Positioner SAMSON Type 3766, 3767 or 3780 (Fig. 8). Before mounting, check that the four O-rings are positioned correctly on the mounting flange. The device is attached with two screws M 5 ×60 DIN 912. The mounting accessories are delivered together with the device. Mounting instructions for SAMSON devices see Mounting and Operating Instructions EB 8311 EN, EB 8355 EN and EB 8380 EN.

Mounting to linear actuators with NAMUR rib according to DIN IEC 534

▶ Type 3963-..53

These device can be directly mounted to a linear actuator with NAMUR rib. The device is attached with one screw M 8 ×45 DIN 912 which is delivered with the device.

Mounting to connection block for Linear Actuator SAMSON Type 3277

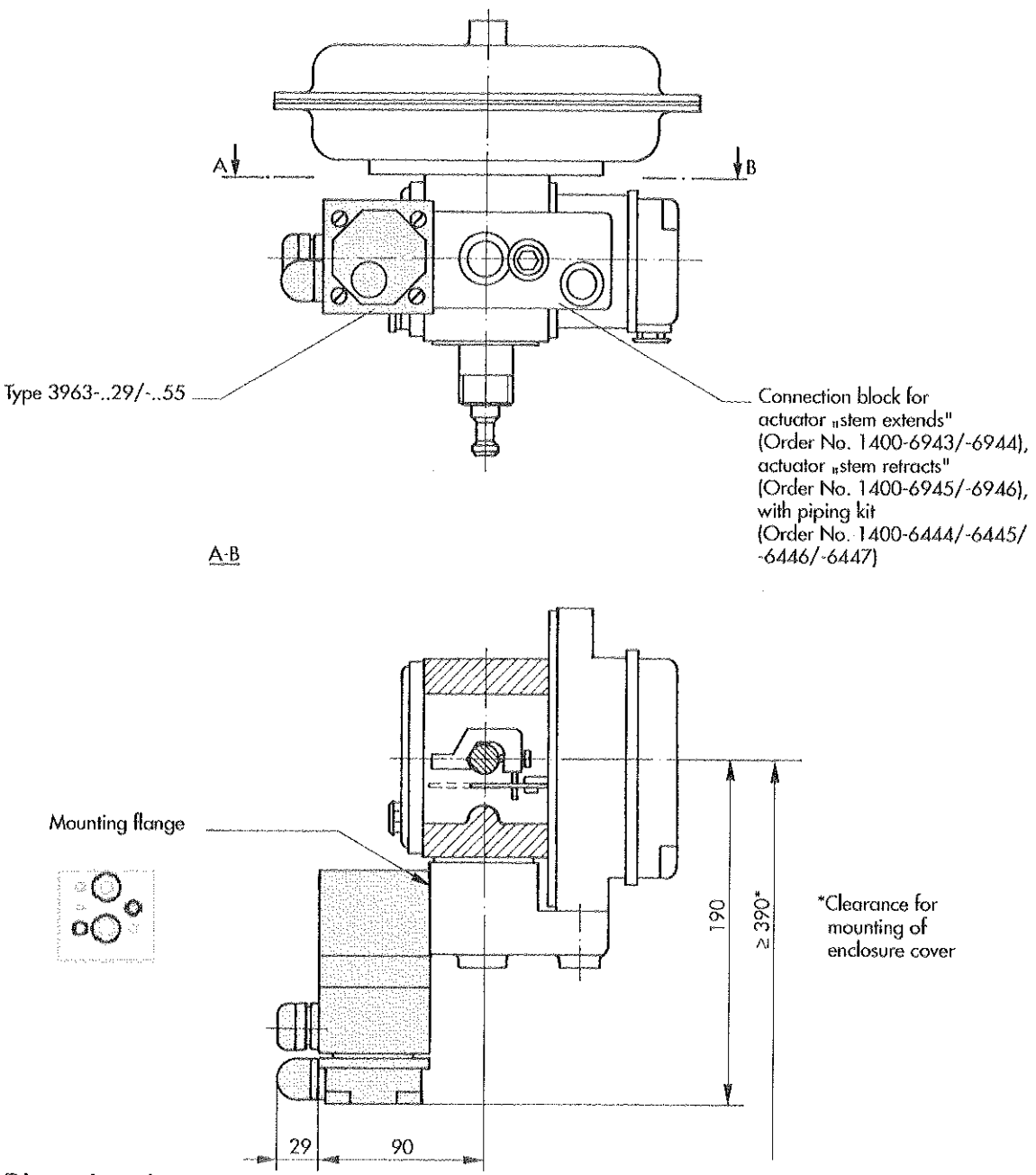


Fig. 8 · Dimensions in mm

Air connection

The air supply pipes and screw joints may only be laid and assembled by experienced personnel. They must be regularly checked for leaks and damage, and if necessary, repaired. Before starting any repair work, all supply pipes which are to be opened must be depressurized.

The air connections are G (NPT) $^1/_4$ or G (NPT) $^1/_2$ tapped holes depending on the version.
Note: The K_{vs} value of a pressure reducer connected upstream must be at least 1.6 times larger than the K_{vs} value of the device.

Supply pipe

Nominal size (Supply pipe length ≤ 2 m)				
Pressure (bar)	K_{vs} value			
	0.16 0.32	1.4	4.3	–
	Connection			
	4	1 and 3	4	9
≥1.4	≥DN 6	≥DN 8	≥DN 10	≥DN 4
≥2.5	≥DN 4	≥DN 6	≥DN 8	
≥6		≥DN 4	≥DN 6	

Note: For supply pipes length ≥2 m larger nominal sizes must be provided.

▶ Type 3963-..25, combined with
Type 3756-1203/-6203/-1213/-6213
With the above listed devices, it is possible to check whether the nominal size of the supply pipe is sufficient as follows:
1. Unscrew the screw plug covering connection 9 and connect a pressure gauge.
2. The nominal size of the supply pipe proves to be sufficient when there is a pressure of ≥1.3 bar during the switching process.

Air supply instrument air 1.4 ... 6 bar			
Ambient temperature (°C)	Particle size (µm)	Dew point (°C)	Oily residues (mg/m³)
+15 ... +35	≤5	+10	≤0.1
–15		–20	
–32		–40	
–60		–70	

Working medium

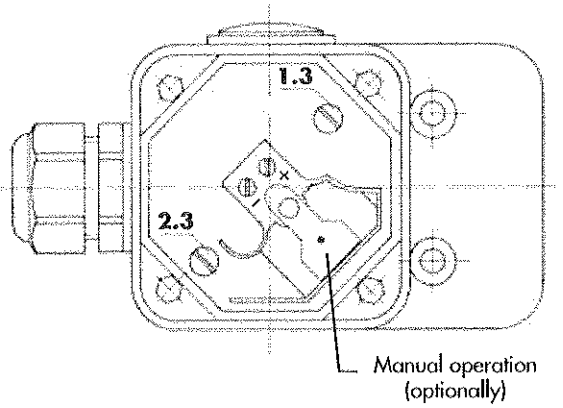
Instrument air 1.4 ... 6 bar for internal air supply (as-delivered condition).

Instrument air, oil-containing air or non-aggressive gases of 0 ... 6 bar (10 bar with Type 3756) for external air supply across connection 9 (see page 7 ff.).

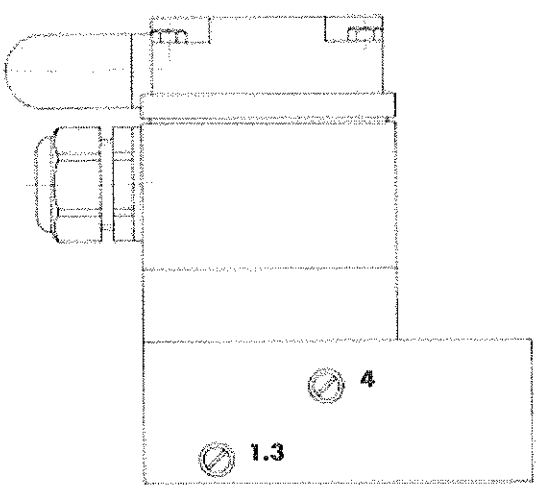
Exhaust air restrictors

▶ Type 3963-..12/-..22/-..23/-..28/-..29
These devices have one or two exhaust air restrictors. The restricting function can be identified from the symbol indicated on the device. Different closing and opening times can be adjusted in a ratio of 1:15 by turning restricting screws to the right or to the left respectively with a screw driver. The restricting screws can be found underneath the enclosure cover or at the adapter plate (Fig. 9).

Setting of the exhaust air restrictors



Type 3963-..12/-..22/-..28/-..29



Type 3963-..23

Fig. 9

Conversion to external air supply across connection 9

▶ Type 3963-..25, combined with
Type 3756-1203/-6203/-1213/-6213

To these devices air supply in the as-delivered condition is to be connected internal via connection 4. Conversion to external air supply via connection 9 is effected as follows:

1. Remove pilot valve enclosure cover after removal of four filister head screws.
2. Remove pilot valve from booster valve after removal of three hexagon socket head screws.
3. Remove plate with flat gasket [1] after removal of a filister head screw (Fig. 10).
4. Turn flat gasket [1] by 90°. After assembly, the **tab** of the gasket [1] is **not visible from the outside.**
5. Conversion to external air supply is determined only by turning the flat gasket [1]. Prior to assembly, install flat gasket [3] between pilot valve and booster valve as follows (Fig. 12):
   Type 3963 with index -01, -02, -04 and -06
   The **white mark in the slots** of the flat gasket [3] is **not visible.**
   Type 3963 with index -03, -05 and -10
   The **tab** of the flat gasket [3] is placed **in cutout "Int" of the enclosure.**

▶ Type 3963-..76, combined with
Type 3756-3205/-8205/-3206/-8206/
-3207/-8207/-3208/-8208/
-3325/-8325/-3327/-8327/
-3335/-8335/-3337/-8337/
-3345/-8345/-3347/-8347/
-3355/-8355/-3357/-8357

To these devices air supply in the as-delivered condition is to be connected internal via connection 1 or 3. Conversion to external air supply via connection 9 is effected as follows:

1. Remove plate with flat gasket [2] from the connecting plate after removal of a filister head screw.
2. Turn flat gasket [2] by 180°. The **tab** of flat gasket [2] is then placed **in cutout "9" of the connecting plate** (Fig. 11).

Note: In the case of bilaterally actuated booster valves, both pilot valves must be converted.

Installation of flat gasket [1]

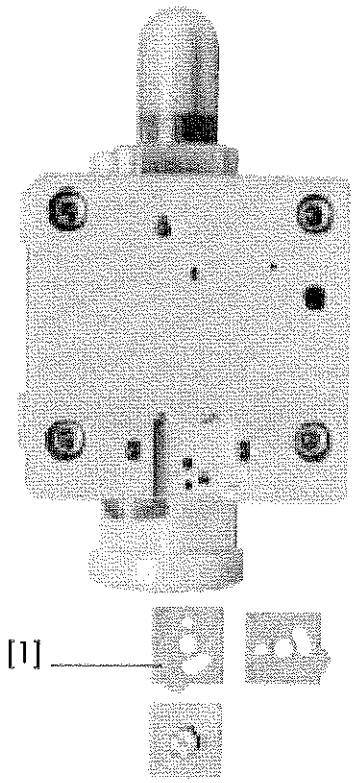


Fig. 10

Installation of flat gasket [2]

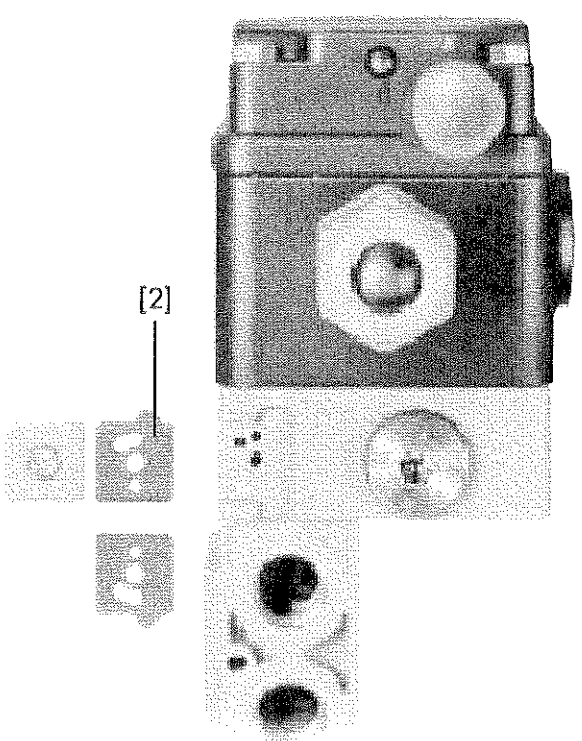


Fig. 11

▶ Type 3963-..14/-..52/-..53/-..54

To these devices air supply in the as-delivered condition is to be connected internal via connection 4. Conversion to external air supply via connection 9 is effected as follows:

1. Remove enclosure cover after removal of four filister head screws.
2. Remove solenoid valve from adapter plate after removal of three hexagon socket head screws.
   Type 3963 with index -01, -02, -04 and -06
3. Turn flat gasket [3] by 180°. The **white mark** is then **visible in the slots** (Fig. 12).
   Type 3963 with index -03, -05 and -10
   Turn flat gasket [3] by 180°. The **tab** of the flat gasket [3] is then placed **in cutout "9" of the enclosure** (Fig. 12).

▶ Type 3963-..11/-..12/-..21/-..22/-..27/ -..28/-..29/-..55/-..62

To these devices the air supply cannot be changed. The flat gasket [3], if provided, must be installed in accordance with the as-delivered condition (Fig. 12).

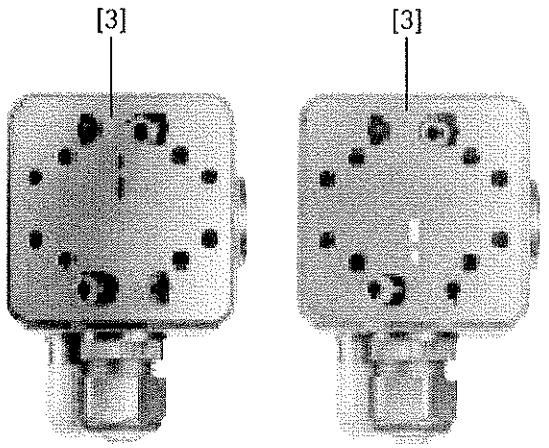
Exhaust air return

▶ Type 3963-..76, combined with Type 3756-3206/-8206

To these devices, in the as-delivered condition connection 4 is closed with a threaded plug. If the exhaust air return is used for spring-loaded actuators, the threaded plug must be removed and connection 4 must be connected to the spring chamber of the actuator by a hose with nominal size DN 4 to 10 (depending on the actuator size).

Installation of flat gasket [3]

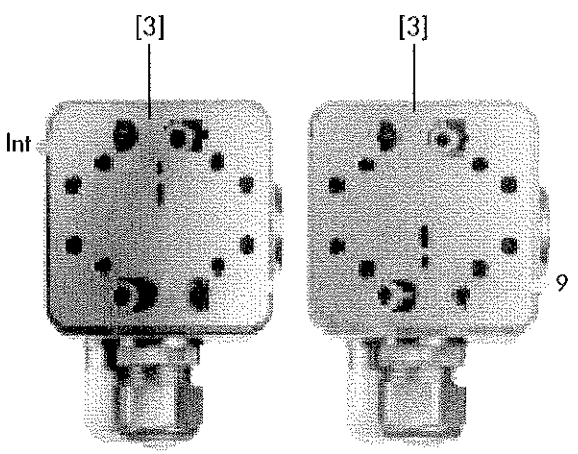
Type 3963 with index -01, -02, -04 and -06



Internal air supply via connection 4 (as-delivered condition)

External air supply via connection 9

Type 3963 with index -03, -05 and -10



Internal air supply via connection 4 (as-delivered condition)

External air supply via connection 9

Fig. 12

Electrical connection

As far as the electrical installation of the device is concerned, the relevant VDE regulations and the accident prevention regulations of the employers' liability insurance association must be observed.
For installation in hazardous areas, the respective national regulations of the country in which the device is to be used must be observed. In Germany this is VDE 0165.
When connected to DC voltage signals, correct polarity must be ensured.
For connection of intrinsically safe circuits, the Certificate of Conformity PTB No. Ex-90.C.2100 applies (see page 10).
The coated screws in the enclosure may not be tampered with.

The power supply is connected, depending on version, either through a cable gland Pg 13.5 to the terminals in the enclosure, with a Harting connector, a socket in accordance to DIN 43650 or a cable socket M 12×1 (Fig. 13).

Cable

It is recommended that connecting cables with a conductor cross-section of ≥0.5 mm² are used. Connecting cables with an external diameter of 6 ... 12 mm are suitable for the cable gland Pg 13.5.

Degree of protection

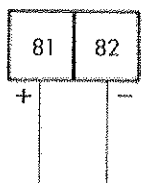
The devices can be changed from degree of protection IP 54 (Order No. 8504-0066) to degree of protection IP 65 (Order No. 1099-1103) by exchanging the filter in the enclosure cover.

Manual operation

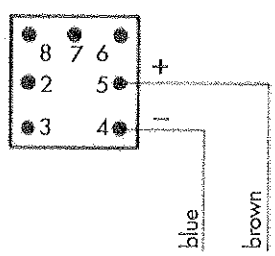
The devices have a manual operation as an alternative to allow the device to be manually operated when a nominal signal is not available:
- Switch outside of the enclosure
- Push button outside of the enclosure
- Switch in the enclosure cover
- Pushbutton underneath enclosure cover (see page 6, fig. 9)

Note: For **safety circuits**, only devices **without manual operation** should be used.

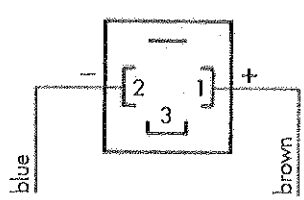
Connection diagrams



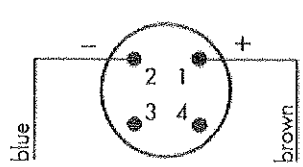
Terminals in the enclosure



Harting connector



Socket in accordance to DIN 43650



Cable socket M 12×1

Fig. 13

Certificate of Conformity PTB No. Ex-90.C.2100 (Extract)

for the electric apparatus Solenoid Valve Type 3963-1... index -02 and -03

Class EEx ia IIC T6

dated 06.09.1990
1. Addendum dated 28.06.1991
2. Addendum dated 11.04.1994
3. Addendum dated 10.10.1995

The following table shows the maximum permissible ambient temperature within the temperature classes:

Nominal signal	Type	Permissible maximum ambient temperature		
		T 6	T 5	T 4
6 V	3963-11	+60 °C	+70 °C	+80 °C
12 V	3963-12			
24 V	3963-13			
22 mA	3963-14			
7.5 V	3963-17	+65 °C	+80 °C	

Note: Minimum permissible ambient temperature −45 °C. This is limited to −25 °C (for Type 3963-1...0/-1...2) and −40 °C (for Type 3963-1...1/-1...3) due to the materials used.

To connect to a certified intrinsically safe electric circuit, refer to the maximum permissible values for voltage U_0, current I_k and power P in the following table:

Type	3963-11		3963-12		3963-13			3963-14		3963-17	
U_0 (V)	13	27	25	28	32	32	28	8	15	28	32
I_k (mA)	150	125	150	115	70	90	115	150	200	115	90
P (mW)	*)	400	*)	400	*)	250	*)	*)	400	*)	350

*) No power limit

Note: Internal capacitance and internal inductance are negligible.

Certificate of Conformity PTB No. Ex-90.C.2100 (Extract)

for the electric apparatus Solenoid Valve Type 3963-1... index -04 and up

Class EEx ia IIC

4. Addendum dated 11.07.1997

The following table shows the maximum permissible ambient temperature within the temperature classes:

Temperature class		T6	T5	T4
Ambient temperature	maximum	+60 °C	+70 °C	+80 °C
	minimum	−45 °C *)		

*) Limited to −25 °C (for Type 3963-1...0/-1...2) and −40 °C (for Type 3963-1...1/-1...3) due to the materials used.

To connect to a certified intrinsically safe circuit, refer to the maximum permissible values for voltage U_0, current I_0 and power P in the following table:

U_0 (V)	25 V	27 V	28 V	30 V	32 V
I_0 (mA)	150 mA	125 mA	115 mA	100 mA	90 mA
P	no power limit				

Note: Internal capacitance and internal inductance are negligible.

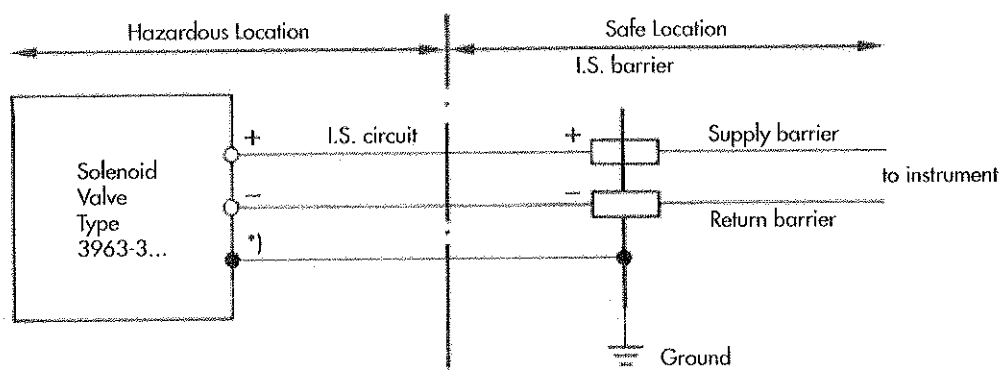
Installation Directions for Devices for Use in Hazardous Locations in Compliance with CSA Approval

The devices may be installed in intrinsically safe circuits when connected with CSA approved intrinsically safe barriers (Fig. 14). In case of doubt as regards barrier selection, contact the manufacturer. For maximum values of V_{max}, R_{min} and I_{max} of the various devices see the following table:

Type	V_{max} [V DC]	R_{min} [Ω]	I_{max} [mA]
3963-31	13	94	150
3963-32	25	168	150
3963-33	28	256	110
3963-34	9	60	150
3963-37	28	256	110

Connection diagrams

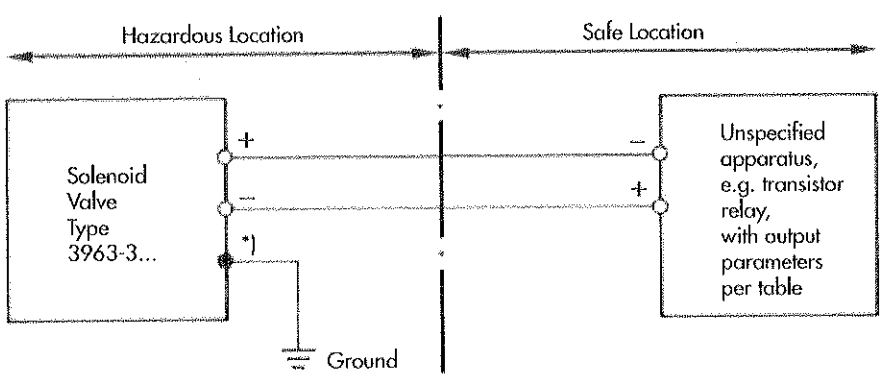
CSA certified for Hazardous Locations: Class I; Division 1; Groups A, B, C, D



*) Only for metal enclosure

Cable entry Pg 13,5 or metal conduit
according to assembly drawing No. 3963-3...
and drawing No. 1150-6016 T-3

CSA certified for Hazardous Locations: Class I; Division 2; Groups A, B, C, D



*) Only for metal enclosure

Cable entry only rigid metal conduit
according to drawing No. 1150-6016 T-3

Fig. 14

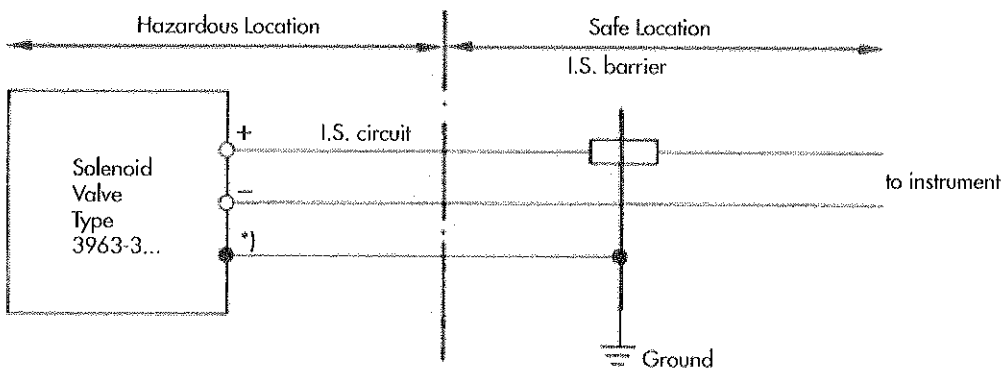
Installation Directions for Devices for Use in Hazardous Locations in Compliance with FM Approval

The devices may be installed in intrinsically safe circuits when connected with FM approved intrinsically safe barriers (Fig. 15). In case of doubt as regards barrier selection, contact the manufacturer. For maximum values of V_{max} and I_{max} of the various devices see the following table:

Type	V_{max} [V DC]	I_{max} [mA]
3963-31	13	150
3963-32	25	150
3963-33	28	110
3963-34	9	150
3963-37	28	110

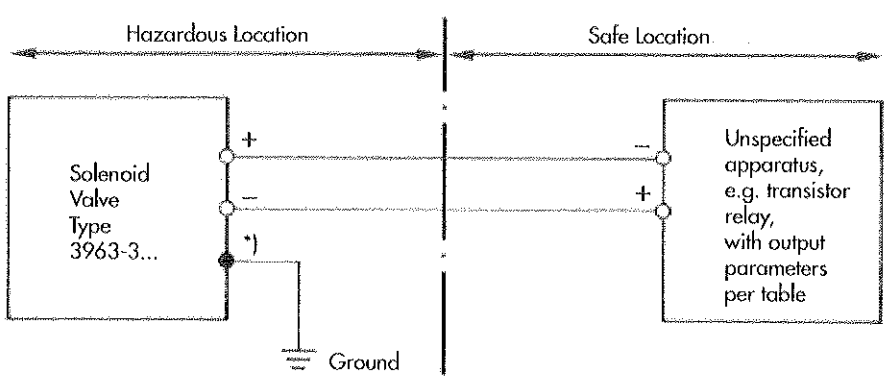
Connection diagrams

FM certified for Hazardous Locations: Class I, II, III; Division 2; Groups A, B, C, D, E, F, G



*) Only for metal enclosure

FM certified for Hazardous Locations: Class I, II, III; Division 1; Groups A, B, C, D, E, F, G



*) Only for metal enclosure

Fig. 15

(Specifications subject to change without notice)

SAMSOMATIC
AUTOMATIONSSYSTEME
GMBH

– A subsidiary of SAMSON AG

Weismüllerstrasse 20–22
D-60314 Frankfurt am Main
P. O. Box 101901
D-60019 Frankfurt am Main
Telephone +49-69-40090
Telefax +49-69-4009644

FAIRCHILD MODEL 4500A
PNEUMATIC VOLUME BOOSTER
Installation, Operation and Maintenance Instructions

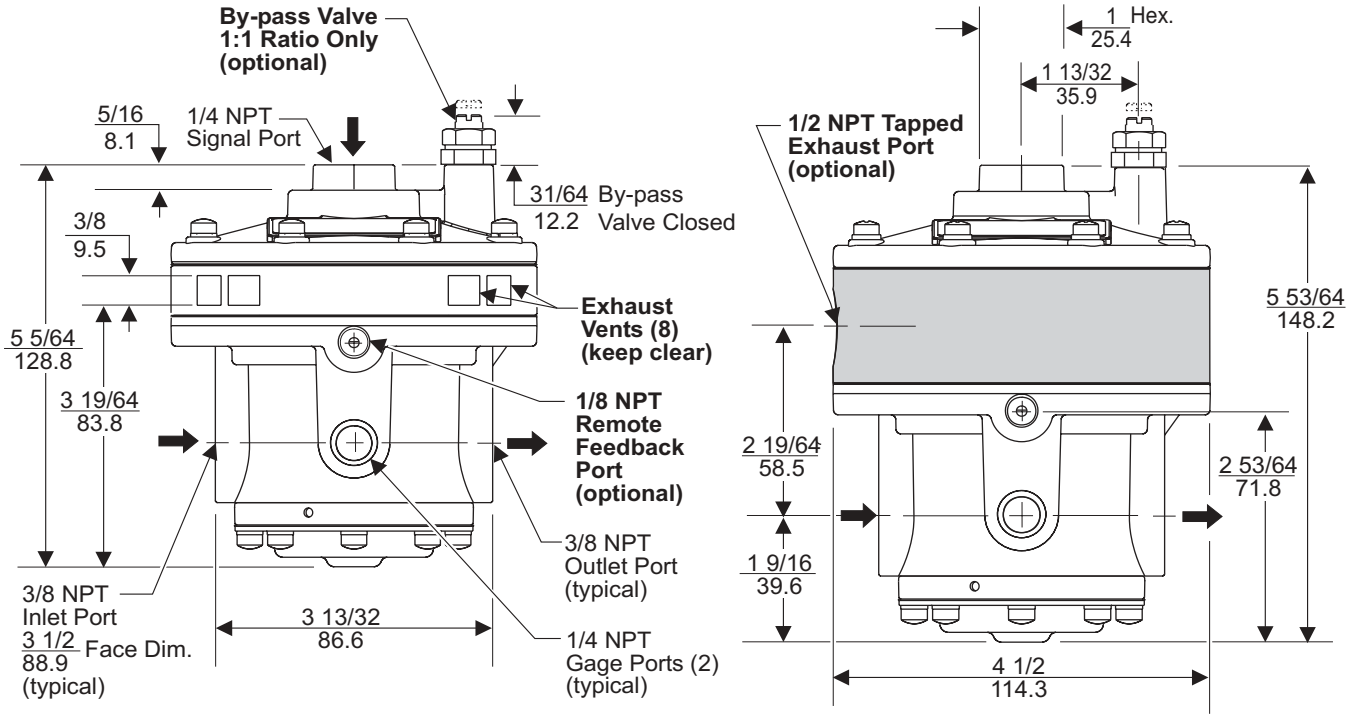


Figure 1. Model 4500A Outline Dimensions

INSTALLATION

You can mount the booster in any position without affecting its operation.

Clean all pipelines to remove dirt and scale before installation.

Apply a minimum amount of pipe compound to the male threads of the fitting only. **Do Not use teflon tape as a sealant.** Start with the third thread back and work away from the end of the fitting to avoid contaminating the booster. Install the booster in the air line.

The Inlet and Outlet ports are labeled “In” and “Out”. Tighten all connections securely. Avoid undersized fittings that will limit the flow through the booster. For more information, see Figure 1.

OPERATION

The Model 4500A reproduces a pneumatic signal in a 1:1 ratio or in multiplying or dividing ratios. (Po = Ps x R); where Po is output pressure, Ps is signal pressure, R is ratio.

NOTES: Oil free air must be applied to the booster. Use a filter to remove dirt and entrained liquid in the air line ahead of the booster. If an air line lubricator is used, it MUST be located downstream of the booster to avoid interference with performance.

To clean the Model 4500A, use the following steps:

1. Shut off system pressure to the booster to prevent air from escaping. It is not necessary to remove the booster from the air line.

2. Remove the four Screws and Washers (between ports) from the bottom of the unit. For more information, see Figure 2.

3. Remove the Inner Valve Assembly. For more information, see Figure 2.

4. Wash the Inner Valve Assembly with a solvent. Exercise care to prevent damage to diaphragms and valve facings. **Avoid solvents such as acetone, carbon tetrachloride and trichlorethylene.**

5. Replace the assembly carefully. Ensure that the Vent in the exterior part of the Inner Valve Assembly and the Exhaust vents in the Spacer Ring are clear. For more information, see Figure 2.

Troubleshooting

Problem	Source	Solution
Leakage	Bonnet Screws	Tighten the Bonnet Screws.
High Bleed	• Relief Valve • Supply Valve • Supply Seat	• If contaminated, clean the source and Body.
	• Diaphragm Assembly	• If damaged, install the service kit.

NOTE: If the standard maintenance procedure does not correct the problem, install the appropriate service kit.

Standard	Tapped Exhaust	Ratio
• EA-19549-1	• EA-19549-1E	• 1:1 & By-pass Option (I)
• EA-19549-2	• EA-19549-2E	• 1:2
• EA-19549-3	• EA-19549-3E	• 1:3
• EA-19549-4	• EA-19549-4E	• 2:1
• EA-19549-5	• EA-19549-5E	• 3:1

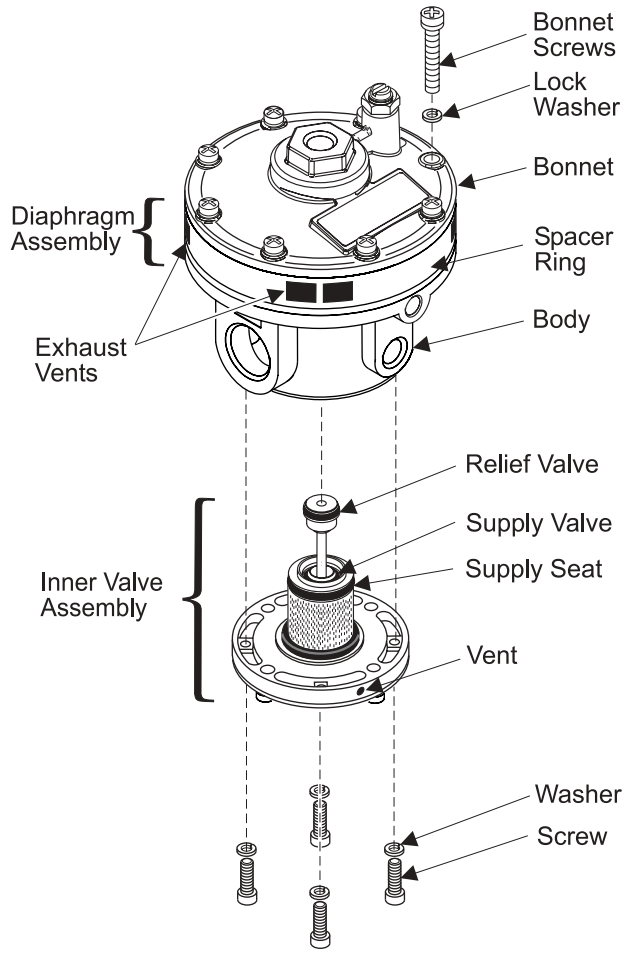


Figure 2. Model 4500A Exploded Drawing

LEGAL NOTICE:

The information set forth in the foregoing Installation, Operation and Maintenance Instructions shall not be modified or amended in any respect without prior written consent of Fairchild Industrial Products Company. In addition, the information set forth herein shall be furnished with each product sold incorporating Fairchild's unit as a component thereof.

ISO 9002 Certified

FAIRCHILD
INDUSTRIAL PRODUCTS COMPANY

3920 WEST POINT BLVD. WINSTON-SALEM, NC 27103-6708
TEL 336-659-3400 FAX 336-659-9323
www.fairchildproducts.com

FM NO. 25571

IS-2004500A
Litho in USA
Rev. E 11/02

NORGREN

B74G

Installation & Maintenance Instructions

Filter/Regulator

B74G - ★★★ - ★★★ - ★★★

Port	Thread Form	Adjustment	Drain	Bowl	Element	Diaphragm	Spring (Outlet Pressure Range) *	Gauge
3....3/8"	A....PTF	K....Knob	A....Automatic	D....Metal with liquid level indicator	1....5 µm	N....Non-relieving	F....0,3 to 4 bar (5 to 60 psig)	G....With
4....1/2"	B....ISO Rc taper	T....T-bar	Q....Manual, 1/4 turn	P....Transparent with guard	2....25 µm	R....Relieving	M...0,3 to 10 bar (5 to 150 psig)	N....Without
6....3/4"	G....ISO G parallel				3....40 µm		S....0,7 to 17 bar (10 to 250 psig)	

* Outlet pressure can be adjusted to pressures in excess of, and less than, those specified. Do not use these units to control pressures outside of the specified ranges.

TECHNICAL DATA

Fluid: Compressed air
Maximum pressure:
  Transparent bowl: 10 bar (150 psig)
  Metal bowl: 17 bar (250 psig)
Operating temperature*:
  Transparent bowl: -20° to +50°C (0° to +125°F)
  Metal bowl: -20° to +80°C (0° to +175°F)
* Air supply must be dry enough to avoid ice formation at temperatures below +2°C (+35°F).
Particle removal: 5 µm, 25 µm, or 40 µm filter element
Air quality: Within ISO 8573-1, Class 3 and Class 5 (particulates)
Typical flow with 10 bar (150 psig) inlet pressure, 6,3 bar (90 psig) set pressure and 1 bar (15 psig) droop from set: 100 dm^3/s (212 scfm)
Nominal bowl size: 0,2 litre (7 fluid ounce)
Manual drain connection: 1/8"
Automatic drain connection: 1/8"
Automatic drain operating conditions (float operated):
  Bowl pressure required to close drain: Greater than 0,3 bar (5 psig)
  Bowl pressure required to open drain: Less than 0,2 bar (3 psig)
  Minimum air flow required to close drain: 1 dm^3/s (2 scfm)
  Manual operation: Depress pin inside drain outlet to drain bowl
Gauge ports:
  1/4 PTF with PTF main ports
  Rc1/4 with ISO Rc main ports
  Rc1/8 with ISO G main ports
Materials:
  Body: Aluminum
  Bonnet: Aluminum
  Valve: Brass
  Bowl:
    Transparent with guard: Polycarbonate, steel guard
    Metal: Aluminum
    Metal bowl liquid level indicator lens: Transparent nylon
  Element: Sintered polypropylene
  Elastomers: Neoprene and nitrile

REPLACEMENT ITEMS

Service Kit (includes items circled on exploded view):
  Relieving.....4383-700
  Nonrelieving.....4383-701
Liquid level lens kit (34, 36, 37, 38).....4380-050
Filter element, 5µm, red speckles (52).....4338-04
Filter element, 25µm, blue speckles (52).....4338-07
Filter element, 40µm, no speckles (52).....4338-05
Manual drain (18, 19, 20) (28, 29, 30).....619-50
Automatic drain (21, 22, 23) (31, 32, 33)
  1/8 NPT outlet.....3000-10
  G 1/8 outlet.....3000-97
Tamper resistant cover (knob adjustment only).....4355-51

PANEL MOUNTING DIMENSIONS

Panel mounting hole diameter: 52 mm (2.06")
Panel thickness: 2 to 6 mm (0.06" to 0.25")

INSTALLATION

1. Shut off air pressure. Install filter/regulator in air line -
   - vertically (bowl down),
   - with air flow in direction of arrow on body,
   - upstream of lubricators and cycling valves,
   - as close as possible to the device being serviced.
2. Connect piping to proper ports using pipe thread sealant on male threads only. Do not allow sealant to enter interior of unit.
3. Push bowl, or bowl with guard, into body and turn fully clockwise before pressurizing.
4. Flexible tube with 3mm (0.125") minimum I.D. can be connected to the automatic drain. Avoid restrictions in the tube.
5. Install a pressure gauge or plug the gauge ports. Gauge ports can also be used as additional outlets for regulated air.

ADJUSTMENT

1. Before applying inlet pressure to filter/regulator, turn adjustment (1 or 7) counterclockwise to remove all force on regulating spring.
2. Apply inlet pressure, then turn adjustment (1 or 7) clockwise to increase and counterclockwise to decrease pressure setting.
3. Always approach the desired pressure from a lower pressure. When reducing from a higher to a lower setting, first reduce to some pressure less than that desired, then bring up to the desired pressure.

NOTE

With non-relieving filter/regulators, make pressure reductions with some air flow in the system. If made under no flow (dead-end) conditions, the filter/regulator will trap the over-pressure in the downstream line.

4. KNOB ADJUSTMENT. Push knob down to lock pressure setting. Pull knob up to release. Install tamper resistant cover (see ***Replacement Items***) to make setting tamper resistant.
5. T-BAR ADJUSTMENT. Tighten lock nut (8) to lock pressure setting.

SERVICING

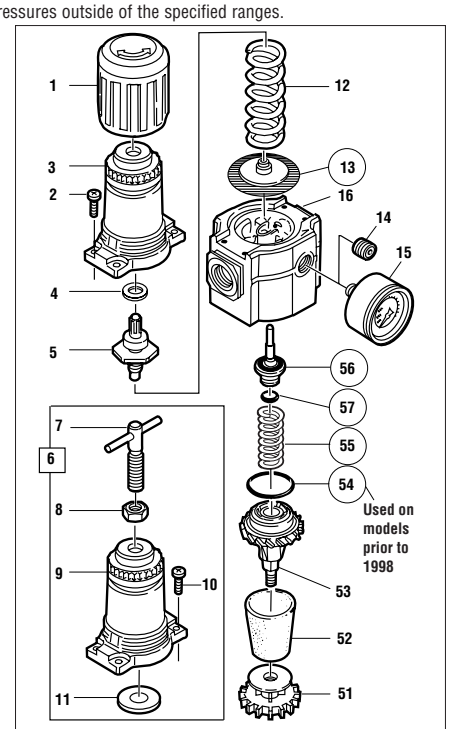
1. Open manual drain to expel accumulated liquids. Keep liquids below baffle (51).
2. Clean or replace filter element when dirty.

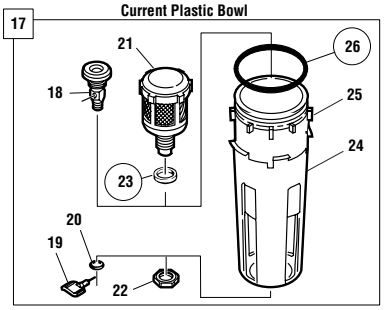
DISASSEMBLY

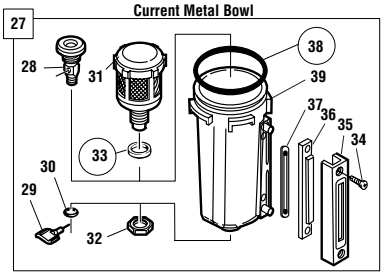
1. Filter/regulator can be disassembled without removal from air line.
2. Shut off inlet pressure. Reduce pressure in inlet and outlet lines to zero.
3. Turn adjustment (1 or 7) fully counterclockwise.
4. Remove bowl - push into body and turn counterclockwise.
5. Disassemble in general accordance with the item numbers on exploded view. Do not remove the drains unless replacement is necessary. Remove and replace only if they malfunction.

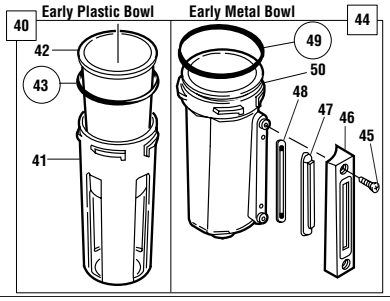
CLEANING

1. Clean plastic bowl (25, 42) with warm water only. Clean other parts with warm water and soap.
2. Rinse and dry parts. Blow out internal passages in body (16) with clean, dry compressed air. Blow air through filter element (52) from inside to outside to remove surface contaminants.
3. Inspect parts. Replace those found to be damaged. Replace plastic bowl with a metal bowl if plastic bowl shows signs of cracking or cloudiness.









NORGREN

B74G

Installation & Maintenance Instructions

ASSEMBLY

1. Lubricate the following items with o-ring grease.
   4 (Thrust washer) - outer circumference and both sides.
   5, 7 (Adjusting screw) - threads and tip.
   18, 28 (Manual drain body) - the portion of the body that contacts the bowl, and the hole that accommodates the stem of drain valve (19, 29).
   56 (Valve) - stem.
   26, 38, 43, 49, 54, 57 (O-rings)
2. Assemble the unit as shown on the exploded view. Push bowl, or bowl with guard, into body and turn fully clockwise.
3. Torque Table

Item	Torque in Nm (Inch-Pounds)
2, 10 (Screw)	2,3 to 3,9 (20 to 35)
22, 32 (Nut)	2,3 to 2,8 (20 to 25)
34, 45 (Screw)	1,7 to 2,3 (15 to 20)
53 (Center-post)	2,0 to 2,7 (18 to 24)

CAUTION

Water vapor will pass through these units and could condense into liquid form downstream as air temperature drops. Install an air dryer if water condensation could have a detrimental effect on the application.

WARNING

These products are intended for use in industrial compressed air systems only. Do not use these products where pressures and temperatures can exceed those listed under ***Technical Data***.

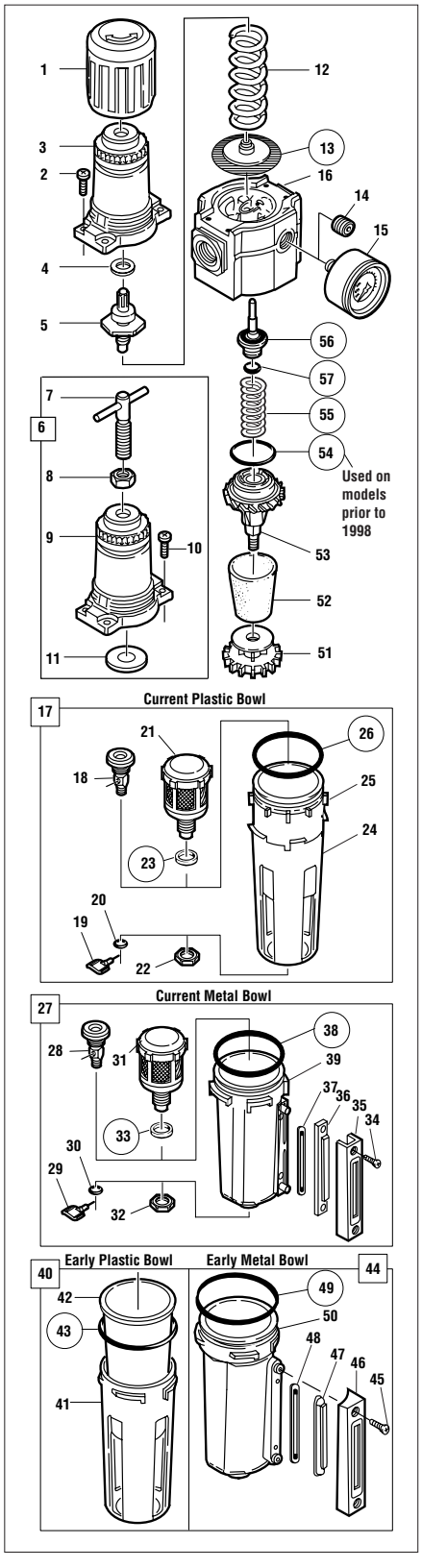
Polycarbonate plastic bowls can be damaged and possibly burst if exposed to such substances as certain solvents, strong alkalies, compressor oils containing ester-based additives or synthetic oils. Fumes of these substances in contact with the polycarbonate bowl, externally or internally, can also result in damage. Clean with warm water only.

Use metal bowl in applications where a plastic bowl might be exposed to substances that are incompatible with polycarbonate.

If outlet pressure in excess of the filter/regulator pressure setting could cause downstream equipment to rupture or malfunction, install a pressure relief device downstream of the filter/regulator. The relief pressure and flow capacity of the relief device must satisfy system requirements.

The accuracy of the indication of pressure gauges can change, both during shipment (despite care in packaging) and during the service life. If a pressure gauge is to be used with these products and if inaccurate indications may be hazardous to personnel or property, the gauge should be calibrated before initial installation and at regular intervals during use.

Before using these products with fluids other than air, for non industrial applications, or for life-support systems consult Norgren.



Necessary safety requirements when using Norgren products

1 Gerneral Information

- Pneumatics has a variety of advantages over other control and driving systems. When being used however, general design guidelines and specific regulations for machines and equipment relating to with pneumatics, (e.g. those complying to DIN 24558, pneumatic equipment) as well as general safety regulations must be complied with.
- When using Norgren products the specifications applicable in each case must be observed, as for example:
  - all necessary Accident Prevention Regulations
  - all the relevant VDI guidelines (in particular VDI 2853 and VDI 3229)
  - all the guidelines, safety regulations and istruction leaflets concerned
  - the relevant DIN standards (e.g. DIN 31000 and DIN 31001)
  - instructions for installation and maintenance for Norgren pneumatic equipment and controls (which are obtainable from Norgren)
  - EG “Machines“ guidelines (particulary in the area of fluid technology)
  - “General Safety Requirements of Fluid Technology Systems and Components“ (CEN Document)
- The products may not be used outside the specified “Technical Parameters“ (e.g. pressure and temperature).
- The consequences of a breakdown of a product, e.g., through incorrect operating procedures, ageing or malfunction, should be taken into consideration.
- System designers and the subsequent operators must follow the existing operating guidelines and strictly adhere to the installation and operating instructions.
- System designers must make the end-users aware in the User Instructions that adequate safety measures are to be taken in order to protect people and equipment.
- Norgren must be consulted before using the product with fluids other than those specified, for non-industrial applications, life support systems and other applications outside the published specification list.
- In order to avoid unrestricted movements of equipment components where no displacement limiters are provided, supplementary means must be made available and used.
- Unclean and incorrectly oiled compressed air will shorten the life-span of the pneumatic components.
- Variations in compressed air can lead to irregular functioning of the pneumatic components and hence of the production equipment.
- Improper fitting and improper handling of compressed air appliances can lead to premature failure and can be dangerous.

2 Cylinders

- The displacement range of the cylinders, pistons and all the other associated actuations must be safeguarded against to protect and equipment. (Recommended guidelines VDI 2853 or DIN 31001)

2.1 Single acting cylinders with spring return

- Dismantling of the cylinders should be carried out with the utmost care as the cylinder is pre-stressed by means of the mechanical spring.

2.2 Bellow cylinders

- Pneumatic bellow cylinders must not be used outside specified operating parameters.
- To avoid overstretching or excessive movement of the belows, external stops must be provided.
- A contact-free stroke movement of the bellows with respect to neighbouring components is essential.
- The pneumatic bellow cylinders must not be supplied with compressed air if the edge of the bellows is not completely encapsulated by the end-plates.
- If only two of the four fastening bolts are used, the end-plates must be additionally supported.

2.3 Impact cylinders

- Due to the high kinetic energy content in the impact cylinder, precautionary measures must be taken.
- Impact cylinders may only be operated when adequately safeguarded.

3 Air valves

- Air valves can have an undefined switching position when switching on equipment.Therefore it is possible that the equipment makes an uncontrolled sudden movement. Care should therefore be taken when switching on equipment.

3.1 5/3 wax valves and non-return valves

- When using 5/3-way valves with closed centre position or not-return valves in pneumatic control systems and plants it is to be noted that certain areas of such systems and plants may remain under pressure after they have been shut off and vented. The utmost care should therefore be exercised when carrying out repair work.
- The areas of the system which remain under pressure after being shut off and vented are to be provided with special markings (e.g.“pressure line“) in circuit diagrams. It is also highly advisable to provide these circuit diagrams with a special text, e.g.: “WARNING! Due care is to be exercised during repair work to areas marked “pressure line“ in this system.“

4 Air line equipment

- When designing and installing the airfilter appliances make sure that filters are always installed before regulators and lubricators.
- The lubricators of the Olympian series are not suitable for use in “Mistcool“ mist coolant systems or lubricating systems for machines (bearings, gears etc.). They are neither suitable as mist lubricatiors on the output side, nor for operation at full power in reversed flow direction.
- A list of recommended lubricants is available. For certain applications it is, however, more advisable to use only those lubricants which the paricular manufacturer produces and specifies for the machines, equipment etc.. Lubricants containing soap or bulk adding agents are not recommended.
- Do not use non-inflammable phosphate-ester-based compressor oils as this causes damage to O-rings, seals and other parts of the Norgren equipment and pneumatics installations.
- Clean the plastic containers of the filters, filter regulators and lubricators with soapy water only. On no account should solvents be used as these destroy the containers.
- Filters designed for manual drainage must be drained regulary, before the fluid reaches the membrane.

  To remove the filter element, shut off the compressed air supply (decrease the pressure level in the device - not necessary when a drainage shut-off valve is installed).
- Shut off the compressed air supply prior to replenishing the oil of a micro-mist oiler. It is advisable to install a vent valve up-line of the filter, to enable venting prior to replenishing the oil.

NORGREN

Installation and maintenance instructions for Norgren pneumatic products

Care should always be taken during installation of pneumatic cylinders and valves to ensure that they are fitted in such a manner that they are protected against dirt, water or other contamination as well against mechanical damage. The environmental temperature for normal cylinders should not exceed 80° C, and the same applies to normal valves. Cylinders fitted with heatresistant seals may be used for temperatures up about 150° C.

Installation of the cylinders

In order to prevent premature wear of the seals and piston rod bearings, the cylinders must be carefully aligned during installation. It is absolutely imperative that should be no forces acting at right angles to the cylinders axis. A wiper is fitted in the bearing to prevent dirt penetrating into the cylinder. If a cylinder is employed in a dirty environment (cement dust, residues from flame-cutting operations etc.) it is advisable to provide special protection for the piston rod (a bellows sleeve may be used).
Every cylinder is authorized for a certain maximum working pressure which may be exceeded.
Adjustable cushions are fitted in both ends of the cylinders. When installing a cylinder care should be taken to ensure that the cushions adjusting screws remain easily accessible, so that the cushions can be adjusted at any time to suit the working conditions.

Installation of valves

Main control valves, i.e. valves which control reversal of cylinders, should be installed as close to the cylinders as possible in order to eliminate unnecessary air consumption. Under no circumstances valves serving as limit switches may be used as stops.

Routing of pipework

Pipework in the main supply network in the plant should be installed at a slightly inclined angle. Long runs should be alternately inclined downwards and upwards. Any condensate water then collects at the lowest points in the pipework. At such points a pipe should be fitted leading vertically downwards to a small condensate receiver. The latter should be emptied from time to time. An automatic drain valve will do this automatically if fitted in place of a condensate receiver. Branches leading from the main line to consumption points should be installed pointing vertically upwards and then curving downwards. Do not use bends of too small radius. Carefully blow out all pipes before installing them, so as to remove any dirt and chips. Do not hemp for making seals! Liquid sealing agents or, still better, sealing tape (Fluflex or Diring) ensure that contamination, such as fibres when hemp is used, does not get into the pipework.

Maintenance

As a rule Norgren cylinders and valves require nardly any maintenance. All seals (o-rings and packing-rings) are made of synthetic, oil-resistant rubber. However, the condition of the compressed air determines the life of the installation. For this reason the air used should be treated so that it is suitable for the purpose in the interests of long life. Clean air, free of water and containing oil fog, ensures long service life for the equipment. A filter with water separator incorporated in the line removes small particles from the air and separates out water. The condensate collects in a receiver mounted on the filter and should be drained off from time to time. If an automatic drain valves is mounted on the filter it is absolutely certain that it will not be forgotten to drain off the condensate. The cleaned air now has to have oil added to it. Every engineer knows that sliding parts have to be lubricated and therefore provides lubrication for bearings and other moving parts. In a cylinder, too, the piston and piston rod slide, and the slides in the valve also move. It is very often not considered necessary to lubricate such parts- and then the penalty is paid in the form of premature wear of packings and bearing. In order to lubricate a pneumatic control system properly a lubricator is installed in the air line; this lubricator saturates the compressed air with a fine fog of oil droplets. These droplets remain suspended in the air and are carried to the lubricating points in the cylinders and valves. The size of lubricator selected depends on the volume of air flowing through the line and NOT on the consumption. One must differentiate between consumption per unit time and rate of flow per unit of time.

And now an example

Lubricators have a wide flow range, but care must still be taken to match the size of lubricator to air flow, and it s important to distinguish between consumption and air flow. Thus if a circuit consumes 5 cubic feet of air per cycle and this cycle occupies 10 seconds and occurs once every two minutes, the average consumption is 2 ½ cfm but the rate of flow is 30 cfm when calculating the capacity of lubricator required. We recommend the following grades of oil for use in the oilers:

Shell Oil	Tellus C32	Fa. Shell
Aral Oil	Vitam DE32	Fa. Aral
BP Oil	Energol HLP32	Fa. BP
Esso Oil	Nuto H32	Fa. Esso
Mobil Oil	D.T.E. Oil Light	Fa. Mobil Oil

or corresponding oils of other makes.
The micro-lubricators are suitable for oils with a viscosity from 20 to 200 cSt at an operating temperature of 20° C. Lighter oils should not be used, as in most cases an excess of lubrication.

ROSE

A Phoenix Mecano Company

Betriebsanleitung
Aluminium/Polyester/Edelstahl- und Sonder-Ex-Klemmengehäuse

Operation Manual
Aluminium/Polyester/Stainless steel - and special Ex terminal enclosures

Mode d'emploi
Carter de bornes en aluminium/polyester/acier fin et spécial explosion

Brugsvejledning
Aluminium/polyester/rustfrit stål- og special-Ex-klemmehuse

Manual de servicio
Caja de bones para ambientes explosivos de Aluminio/Poliéster/Acero Inoxidable

Käyttöohje
Alumiini-/polyesteri-/teräs- ja erikoisliitinkotelot

Οδηγίες χρήσης
Αλουμίνιο/Πολυεστέρας/Ειδικό αντιεκρηκτικό κουτί σύνδεσης ανοξ. χάλυβα

Istruzioni per l'uso
Morsettiera in alluminio/poliestere/lamiera acciaio e materiale speciale

Gebruiksaanwijzing
Aluminium/Polyester/Roestvast staal en klantspecifieke Ex-Behuizingen

Instruções de serviço
Caixas de bornes de alumínio/poliéster/chapa de aço e de protecção antideflagrante especial

Driftsanvisningar
Aluminium/polyester/stålplåt- och Special-Ex-kapsling

Mat.-Nr.: 92301

1. Programm / Programme

Aluminium Tabelle / Table 1

Typ / Type		Maße in mm (B x L x H)
Ex-e	Ex-i	Dimensions in mm (W x L x H)
05.06 06 03	**15.06 06 03**	64 x 58 x 34
05.06 10 03	**15.06 10 03**	64 x 98 x 34
05.06 15 03	**15.06 15 03**	64 x 150 x 34
05.08 08 06	**15.08 08 06**	80 x 75 x 57
05.08 13 06	**15.08 13 06**	80 x 125 x 57
05.08 18 06	**15.08 18 06**	80 x 175 x 57
05.08 25 05	**15.08 25 05**	80 x 250 x 52
05.10 10 08	**15.10 10 08**	100 x 100 x 80
05.10 16 08	**15.10 16 08**	100 x 160 x 80
05.10 20 08	**15.10 20 08**	100 x 200 x 80
05.23 10 11	**15.23 10 11**	100 x 230 x 110
05.12 12 08	**15.12 12 08**	120 x 120 x 80
05.12 12 09	**15.12 12 09**	120 x 120 x 90
05.12 22 08	**15.12 22 08**	120 x 220 x 80
05.12 22 09	**15.12 22 09**	120 x 220 x 90
05.12 36 08	**15.12 36 08**	120 x 360 x 80
05.14 14 09	**15.14 14 09**	140 x 140 x 90
05.14 20 09	**15.14 20 09**	140 x 200 x 90
05.16 16 09	**15.16 16 09**	160 x 160 x 90
05.16 26 09	**15.16 26 09**	160 x 260 x 90
05.16 36 09	**15.16 36 09**	160 x 360 x 90
05.16 56 09	**15.16 56 09**	160 x 560 x 90
05.18 18 10	**15.18 18 10**	180 x 180 x 100
05.18 28 10	**15.18 28 10**	180 x 280 x 100
05.23 20 11	**15.23 20 11**	230 x 200 x 110
05.23 20 18	**15.23 20 18**	230 x 200 x 180
05.23 28 11	**15.23 28 11**	230 x 280 x 110
05.23 33 11	**15.23 33 11**	230 x 330 x 110
05.23 33 18	**15.23 33 18**	230 x 330 x 180
05.23 40 11	**15.23 40 11**	230 x 400 x 110
05.23 40 23	**15.23 40 23**	230 x 400 x 224
05.23 60 11	**15.23 60 11**	230 x 600 x 110
05.31 40 11	**15.31 40 11**	310 x 400 x 110
05.31 40 14	**15.31 40 14**	310 x 400 x 140
05.31 40 18	**15.31 40 18**	310 x 400 x 180
05.31 40 23	**15.31 40 23**	310 x 400 x 230
05.31 60 11	**15.31 60 11**	310 x 600 x 110
05.31 60 18	**15.31 60 18**	310 x 600 x 180
05.60 60 20	**15.60 60 20**	600 x 600 x 200

Polyester Tabelle / Table 2

Typ / Type		Maße in mm (B x L x H)
Ex-e	Ex-i	Dimensions in mm (W x L x H)
06.08 08 06	**16.08 08 06**	75 x 80 x 55
06.08 08 08	**16.08 08 08**	75 x 80 x 75
06.08 11 06	**16.08 11 06**	75 x 110 x 55
06.08 11 08	**16.08 11 08**	75 x 110 x 75
06.08 16 06	**16.08 16 06**	75 x 160 x 55
06.08 16 08	**16.08 16 08**	75 x 160 x 75
06.08 19 06	**16.08 19 06**	75 x 190 x 55
06.08 19 08	**16.08 19 08**	75 x 190 x 75
06.08 23 06	**16.08 23 06**	75 x 230 x 55
06.08 23 08	**16.08 23 08**	75 x 230 x 75
06.12 12 09	**16.12 12 09**	120 x 120 x 90
06.12 22 09	**16.12 22 09**	120 x 220 x 90
06.16 16 09	**16.16 16 09**	160 x 160 x 90
06.16 26 09	**16.16 26 09**	160 x 260 x 90
06.16 36 09	**16.16 36 09**	160 x 360 x 90
06.16 56 09	**16.16 56 09**	160 x 560 x 90
06.25 26 12	**16.25 26 12**	250 x 255 x 120
06.25 26 16	**16.25 26 16**	250 x 255 x 160
06.25 40 12	**16.25 40 12**	250 x 400 x 120
06.25 40 16	**16.25 40 16**	250 x 400 x 160
06.25 60 12	**16.25 60 12**	50 x 600 x 120
06.36 36 09	**16.36 36 09**	360 x 360 x 90
06.41 40 12	**16.41 40 12**	405 x 400 x 120
06.88 01 00	**16.88 01 00**	80 x 80 x 75
06.88 02 00	**16.88 02 00**	120 x 120 x 75
06.88 03 00	**16.88 03 00**	160 x 160 x 93
06.14 01 00	**16.14 01 00**	170 x 270 x 135
06.14 02 00	**16.14 02 00**	270 x 270 x 135
06.14 03 00	**16.14 03 00**	270 x 540 x 135

Edelstahl / Stainless steel Tabelle / Table 3

Typ / Type		Maße in mm (B x L x H)
Ex-e	Ex-i	Dimensions in mm (W x L x H)
35.10 10 06	**36.10 10 06**	100 x 100 x 58
35.15 10 06	**36.15.10.06**	150 x 100 x 58
35.15 15 08	**36.15 15 08**	150 x 150 x 78
35.20 10 06	**36.20 10 06**	200 x 100 x 58
35.20 20 08	**36.20 20 08**	200 x 200 x 78
35.20 20 12	**36.20 20 12**	200 x 200 x 118
35.30 15 08	**36.30 15 08**	300 x 150 x 78
35.30 20 08	**36.30 20 08**	300 x 200 x 78
35.30 20 12	**36.30 20 12**	300 x 200 x 121
35.30 30 12	**36.30 30 12**	300 x 300 x 121
35.30 30 16	**36.30 30 16**	300 x 300 x 161
35.38 38 16	**36.38 38 16**	380 x 380 x 151
35.40 15 08	**36.40 15 08**	400 x 150 x 81
35.40 20 12	**36.40 20 12**	400 x 200 x 121
35.40 30 16	**36.40 30 16**	400 x 300 x 161
35.50 30 16	**36.50 30 16**	500 x 300 x 161
35.50 40 16	**36.50 40 16**	500 x 400 x 161
35.60 20 12	**36.60 20 12**	600 x 200 x 121
35.30 15 13	**36.30.15.13**	229 x 152 x 131
35.30 30 15	**36.30 30 15**	306 x 306 x 151
35.45 38 15	**36.45 38 15**	458 x 382 x 151
35.16 50 15	**36.16 50 15**	162 x 508 x 151
35.40 20 16	**36.40 20 16**	400 x 200 x 161
35.60 30 16	**36.60 30 16**	600 x 300 x 161
35.40 40 16	**36.40 40 16**	400 x 400 x 161
35.38 30 21	**36.38 30 21**	380 x 300 x 211
35.30 38 21	**36.30 38 21**	300 x 380 x 211
35.38 38 21	**36.38 38 21**	380 x 380 x 211
35.60 38 21	**36.60 38 21**	600 x 380 x 211
35.60 60 21	**36.60 60 21**	600 x 600 x 211
35.76 76 21	**36.76 76 21**	760 x 760 x 211
35.30 30 19	**36.30 30 19**	300 x 300 x 195
35.30 38 19	**36.30 38 19**	300 x 380 x 195
35.38 38 19	**36.38 38 19**	380 x 380 x 195
35.40 65 19	**36.40 65 19**	400 x 650 x 195
35.60 70 19	**36.60 70 19**	600 x 700 x 195
35.60 90 19	**36.60 90 19**	600 x 900 x 195
35.12 12 09	**36.12 12 09**	120 x 120 x 90
35.16 16 09	**36.16 16 09**	160 x 160 x 90
35.13 18 13	**36.13 18 13**	180 x 130 x 130

Edelstahl / Stainless steel Tabelle / Table 3

Typ / Type		Maße in mm (B x L x H)
Ex-e	Ex-i	Dimensions in mm (W x L x H)
35.31 31 15	**36.31 31 15**	306 x 306 x 150
35.46 38 15	**35.46 38 15**	460 x 380 x 150
35.76 50 15	**36.76 50 15**	760 x 500 x 150
35.92 61 20	**36.92 61 20**	920 x 610 x 200
35.76 50 21	**36.76 50 21**	760 x 500 x 210
35.76 50 25	**36.76 50 25**	760 x 500 x 250
35.92 61 25	**36.92 61 25**	920 x 610 x 250
35.92 61 30	**36.92 61 30**	920 x 610 x 300
35.92 61 35	**35.92 61 35**	920 x 610 x 350
35.00 22 09	**36.00 22 09**	250 x 200 x 97
35.00 22 15	**36.00 22 15**	250 x 200 x 157
35.00 32 09	**36.00 32 09**	250 x 350 x 97
35.00 33 16	**36.00 33 16**	300 x 300 x 167
35.00 44 16	**36.00 44 16**	380 x 380 x 167
35.00 44 21	**36.00 44 21**	380 x 380 x 217
35.00 53 16	**36.00 53 16**	300 x 500 x 167
35.00 63 16	**36.00 63 16**	300 x 600 x 167
35.00 64 21	**36.00 64 21**	380 x 600 x 217

Die EG-Baumusterprüfung schließt Sondergrößen mit ein.
The EC-model test certification includes special sizes also.

Inhalt

D

2. Sicherheitshinweis

Zielgruppe: Erfahrene, Ex-geschulte Elektrofachkräfte
Die Klemmenkästen sind nicht für Zone 0 geeignet.
Die auf den Klemmenkästen angegebene Temperaturklasse und Explosionsgruppe ist zu beachten. Umbauten oder Veränderungen an den Klemmenkästen sind nicht gestattet. Ausgenommen ist das Anbringen von zusätzlichen Kabel- u. Leitungseinführungen und das Montieren von Anschlussklemmen im Rahmen der Zulassung des Betriebsmittels, siehe Kapitel 11 und 12. Sie sind bestimmungsgemäß in unbeschädigtem und einwandfreiem Zustand zu betreiben. Als Ersatz und zur Reparatur dürfen nur Originalteile von ROSE verwendet werden. Reparaturen, die den Explosionsschutz betreffen, dürfen nur von einer qualifizierten Elektrofachkraft in Übereinstimmung mit national geltenden Regeln durchgeführt werden. Alle Fremdkörper ohne EG-Baumusterprüfbescheinigung müssen vor Inbetriebnahme aus den Klemmenkästen entfernt werden.

Beachten Sie die nationalen Sicherheits- und Unfallverhütungsvorschriften und die nachfolgenden Sicherheitshinweise in dieser Betriebsanleitung, die wie dieser Text in Kursivschrift gefasst sind.

3. Normenkonformität

Diese Betriebsmittel sind für explosionsgefährdete Bereiche nach EN 50014, 50019, 50020 und EN 50281-1-1:1998 geprüft und bescheinigt worden. Bei Errichtung und Betrieb explosionsgeschützter elektrischer Betriebsmittel müssen die anerkannten VDE-Bestimmungen und die Verordnung über elektrische Anlagen in explosionsgefährdeten Räumen (Elex V) eingehalten werden.

4. Technische Daten

Hersteller:	ROSE Systemtechnik GmbH + Co. KG Erbeweg 13-15 D-32457 Porta Westfalica
Explosionsschutz:	EEx e II EEx ed II C EEx em II C EEx e (ia) II C EEx ia II C EEx ed (ia) II C EEx em (ia) II C
Sonderkennzeichnung	EEx II 2D IP 66
Staubschutz:	EEx II 2D IP 66 T 85°C
Temperaturklasse:	Standard: T6 Optional: T4, T5
Baumusterprüfbescheinigung:	PTB 00 ATEX.....
Gehäusematerial:	Aluminium, Polyester bzw. Stahlblech, Edelstahl
Bemessungsspannung:	max. 690 V (s. Typenschild)
max. Leiterquerschnitt:	z.B. 240 mm² (s. Typenschild)
Schutzleiterquerschnitt:	max. 120 mm²
Schutzart:	IP66 nach EN 60529, IEC 529
Einsatztemperaturbereich:	Aluminium / Edelstahl: -55°C bis +155°C Polyester: -55°C bis +125°C
Zulässige Umgebungstemperaturen:	-20° C bis +40° C (dies entspricht T6=85°C) oder -55° C bis +40° C mit besonderer Kennzeichnung und geeigneten Ein- und Anbauteilen
Kennzeichnung:	CE 0123 Ex II 2G / 2 D

5. Bestückungsmöglichkeiten

Die maximale Anzahl der Klemmen ist abhängig vom Querschnitt und dem zulässigen Dauerstrom (s. Beiblatt), z.B. für Gehäuse 05.165609 und 06.165609 (s. Tabelle 4)

Tabelle 4

Anschlussquerschnitt (mm²)		1,5	2,5	4	6	10	16	25
max. Klemmenanzahl**		119	96	81	61	49	41	
max. Anzahl Tragschienen		1	1	1	1	1	1	
max. Bestückungslänge (mm)		508	508	508	508	508	508	
Leiteranzahl in Abhängigkeit von Strom/A	6				In diesem Bereich kann man unter Beachtung der Hinweise und der festgelegten Einbaumaße im Gehäuse zusätzlich beliebig bestückt werden.			
	10	53						
	16	18	35	138				
	20	7	20	40				
	25		9	22	43			
	35			6	17	42		
	50				2	14	35	
	63					4	16	
	80						6	
	100							
	125							
	160							
	200							
	225							
	250							
	315							
	400							
	500							

Leiteranzahl/2 = Klemmenanzahl
Anmerkung: Schutzleiterklemmen werden nicht gezählt

Beispiel für Aluminium- und Polyestergehäuse 160 x 560 x 90 mm

Querschnitt / mm²	Strom A	Anzahl	Auslastung
2,5	20	(6 von 20)	30 %
16	63	(5 von 16)	31 %
16	80	(2 von 6)	33 %
		Summe	94 % < 100 %

6. Installation

Für das Errichten/Betreiben sind die relevanten EN-Normen und nationale Vorschriften für Gerätesicherheitsgesetze sowie die allgemein anerkannten Regeln der Technik bindend.

7. Instandhaltung

Die für die Instandhaltung von elektrischen Betriebsmitteln in explosionsgefährdeten Bereichen geltenden EN-Normen und nationalen Bestimmungen sind einzuhalten. Vor Öffnen des Gehäuses Spannungsfreiheit sicherstellen. Bei eigensicheren Stromkreisen ist das Arbeiten unter Spannung zulässig.

8. Inbetriebnahme von Klemmen

Bei Inbetriebnahme ist bei der Klemme folgendes zu beachten:
- Nur EG-Baumuster geprüfte und bescheinigte Klemmen
- max. Nennquerschnitt
- max. Strom
- max. Spannung

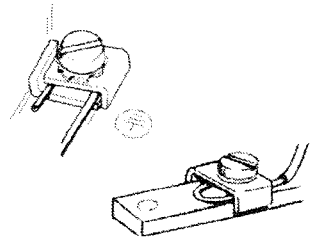
Beim Austauschen oder Hinzufügen von Klemmen sollte ein technisch gleichwertiger Klemmentyp eingesetzt werden. Bei Reparaturarbeiten am Gehäuse, wie z.B. das Auswechseln der Dichtung, sind gleiche Komponenten bei ROSE zu bestellen, da die Betriebserlaubnis sonst erlischt.

9. Kabel- und Leitungseinführung

Nach EN 50014 Anhang B nur EG-Baumuster geprüfte und bescheinigte Kabel- und Leitungseinführungen. Es dürfen nur fest verlegte Kabel und Leitungen eingeführt werden. Der Betreiber muss eine entsprechende Zugentlastung gewährleisten. Bei Verwendung im Bereich mit brennbarem Staub dürfen nur ATEX-geprüfte Kabel- und Leitungseinführungen mit einer Mindestschutzart IP 6X verwendet werden. Der Abstand der Bohrungen ist nach Kapitel 12 einzuhalten.

10. Schutzleiteranschluss

Jeder der Klemmbügel darf 2 Leiter bis 6 mm² aufnehmen. Wird nur 1 Leiter angeschlossen, muss dieser zur Schlaufe gebogen werden, damit ein gleichmäßiger Anpressdruck durch den Bügel erfolgt.



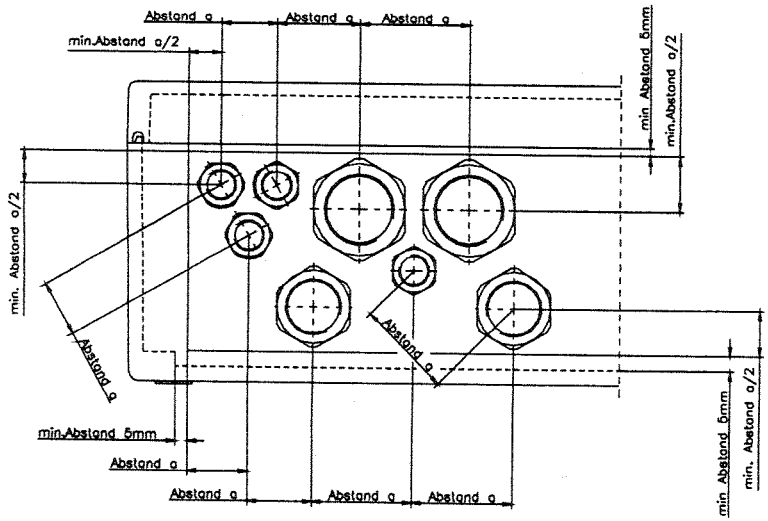
11. Nicht vollständig bestücktes Ex-Klemmengehäuse

Da Sie als Kunde der Firma ROSE ein unvollständiges Betriebsmittel erhalten, das nach EN 50014, 50019, 50020 und 50281-1-1 bescheinigt und geprüft ist, verpflichten Sie sich, die Stückprüfung nach vorgegebenen PTB-geprüften Herstellerunterlagen durchzuführen.
- max. Querschnitt
- max. Spannung
- EG-Baumuster geprüfte und bescheinigte Kabel- und Leitungseinführungen sowie Verschlussstopfen
- Schutzleiteranschluss sowie Potentialausgleich nach EN 50014, Punkt 15.4
- Luft- und Kriechstrecke nach EN 50019, Tabelle 1 und 3
- EG-Baumuster geprüfte und bescheinigte Klemmen, wobei die Bestückung und der Dauerstrom nach beiliegendem Beiblatt eingehalten werden müssen.
- Anschlussteile, Verbindungen und Anschlussklemmen in der Zündschutzart Eigensicherheit „i" müssen die Bestimmungen nach EN 50020, Abschnitt 6.3.1 erfüllen.

Da die Herstellerverantwortung und die Stückprüfung bei Fa. ROSE liegen, sind unbedingt die Punkte nach EN 50014 unter Abschnitt 24, 25 und 26 zu beachten, da sonst die zugelassene EG - Baumusterprüfbescheinigung keine Gültigkeit hat.

12. Bohrungsabstand für Kabelverschraubungen

M	PG	Abstand	M	PG	Abstand	M	PG	Abstand
12	7	20 mm	12 + 16	7 + 9	21 mm	16 + 20	9 + 11	24 mm
16	9	22 mm	12 + 20	7 + 11	23 mm	16 + 20	9 + 13.5	25 mm
20	11	26 mm	12 + 20	7 + 13.5	24 mm	16 + 25	9 + 16	27 mm
20	13,5	27 mm	12 + 25	7 + 16	26 mm	16 + 32	9 + 21	32 mm
25	16	32 mm	12 + 32	7 + 21	31 mm	16 + 40	9 + 29	37 mm
32	21	42 mm	12 + 40	7 + 29	37 mm	16 + 50	9 + 36	43 mm
40	29	53 mm	12 + 50	7 + 36	42 mm	16 + 63	9 + 42	46 mm
50	36	63 mm	12 + 63	7 + 42	46 mm	16 + 63	9 + 48	49 mm
63	42	70 mm	12 + 63	7 + 48	48 mm			
63	48	75 mm						
M	PG	Abstand	M	PG	Abstand	M	PG	Abstand
20 + 20	11 + 13.5	27 mm	20 + 25	13.5 + 16	30 mm	25 + 32	16 + 21	37 mm
20 + 25	11 + 16	29 mm	20 + 32	13.5 + 21	35 mm	25 + 40	16 + 29	43 mm
20 + 32	11 + 21	34 mm	20 + 40	13.5 + 29	41 mm	25 + 50	16 + 36	48 mm
20 + 40	11 + 29	40 mm	20 + 50	13.5 + 36	46 mm	25 + 63	16 + 42	51 mm
20 + 50	11 + 36	45 mm	20 + 63	13.5 + 42	49 mm	25 + 63	16 + 48	54 mm
20 + 63	11 + 42	48 mm	20 + 63	13.5 + 48	52 mm			
20 + 63	11 + 48	51 mm						
M	PG	Abstand	M	PG	Abstand	M	PG	Abstand
32 + 40	21 + 29	50 mm	40 + 50	29 + 36	61 mm	50 + 63	36 + 42	69 mm
32 + 50	21 + 36	55 mm	40 + 63	29 + 42	64 mm	50 + 63	35 + 48	72 mm
25 + 63	21 + 42	58 mm	40 + 63	29 + 48	67 mm			
25 + 63	21 + 48	61 mm						
M	PG	Abstand						
63 + 63	42 + 48	73 mm						



Content

GB

2. Safety instructions

Target group: Experienced electrical engineers trained in explosion zones
The terminal boxes are not suitable for Zone 0.
The temperature class and explosion group given on the terminal box must be observed. Conversions or alterations to the terminal boxes are not permitted. Attaching additional cable and line entries or installation of terminals in context of the equipment authorisation are excepted, see chapter 11 and 12. They must be operated in undamaged and perfect working order in accordance with the regulations. Only original parts supplied by ROSE are permissible for spares and repair work. Repairs affecting explosion protection may only be carried out by a qualified electrical engineer in conformity with the nationally applicable regulations. All foreign bodies without EC prototype test certification must be removed from the terminal box before usage.

Oberserve the national safety and accident prevention regulations and the following safety information in this operating manual, which are written in italics like this text.

3. Standard conformity

This equipment is tested and approved for explosion-hazard areas to EN 50014, 50019, 50020 and EN 50281-1-1:1998. When installing and operating explosion-proof electrical equipment the recognised VDE conditions and stipulations concerning electrical equipment in explosion-hazard rooms (Elex V) must be observed.

4. Technical data

Manufacturer:	ROSE Systemtechnik GmbH + Co. KG Erbeweg 13-15 D-32457 Porta Westfalica
Explosion protection:	EEx e II T6 EEx ed II C T6 EEx e (ia) II C T6 EEx ia II C T6 EEx ed (ia) II C T6
Special dust prevention:	EEx II 2D IP 66
Labelling:	EEx II 2D IP 66 T 85°C
EC Model test certificate:	PTB 00 ATEX.....
Enclosure material:	Aluminium, Polyester and/or Sheet steel, stainless steel
Rated voltage:	max. 750 V (s. typelabel)
max. conductor cross-section:	z.B. 240 mm² (s. typelabel)
Protective earth conductor cross-section:	max. 120 mm²
Contact, foreign body and ingress protection:	IP66 to EN 60529: 191 /IEC 529
Application temperature range:	max. +100° C; mind. –55° C
Permissible surrounding temperature:	-20° C to +40° C (this is equivalent to T6=85°C) or -55° C to +40° C with special labelling and suitable build-in and add-on components
Labelling:	CE 0123 Ex II 2G / 2 D

5. Possibility of assembling

The maximum number of terminals is dependent on the cross-section and permissible continuous current (see insert) e.g. for enclosure 05.165609 and 06.165609 (s. table 4).

Table 4

Diameter of connection (mm²)		1,5	2,5	4	6	10	16	25
max. number of terminals**		119	96	81	61	49	41	
max. number of rails		1	1	1	1	1	1	
max. fitting length (mm)		508	508	508	508	508	508	
Possible number of internal cables in dependence of the current/A	6				In this range you may additionally mount by regarding the notice of the fixed mounting dimensions inside the enclosure.			
	10	53						
	16	18	35	138				
	20	7	20	40				
	25		9	22	43			
	35			6	17	42		
	50				2	14	35	
	63					4	16	
	80						6	
	100							
	125							
	160							
	200							
	225							
	250							
	315							
	400							
	500							

Number of internal cables/2 = number of terminals
Note: safety earth terminals are not counted!

Example for aluminium and polyester enclosure 160 x 560 x 90 mm

Diameter / mm²	Current A	Number	Utilisation
2,5	20	(6 from 20)	30 %
16	63	(5 from 16)	31 %
16	80	(2 from 6)	33 %
		Total	94 % < 100 %

6. Installation

Relevant EN standards and national regulations for equipment safety laws are binding for setting up and operation in addition to generally recognised technological regulations.

7. Repair

The EN standards and national regulations applicable to the maintenance of electrical equipment in explosion hazard areas must be observed. Ensure that the equipment is isolated before opening the enclosure. In the case of intrinsically safe circuits, working under voltage is permissible.

8. Commissioning terminals

The following must be observed when commissioning the terminals:
- only EC model checked and approved terminals
- max. nominal cross-section
- max. current
- max. voltage

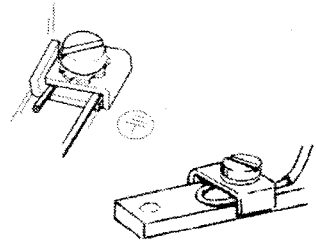
If terminals are replaced or added, terminal types of equivalent technical standard should be used. If repair works is carried out on the enclosure, such as replacing the seals, the same components must be ordered from ROSE, otherwise the operational is invalid.

9. Cable and line entry

Only cable and wiring lead-ins tested and certified to EC prototype tests in accordance with EN 50014 appendix B. Only fixed shifted cables may be imported. Operator has to guarantee an appropriate strain relief. If used in areas with flammable dust, only ATEX-tested cable and wiring lead-ins with a minimum ingress protection of IP 6X may be used. Distance between drill holes must be oberved in accordiance with chapter 12.

10. Protective earth connection for one cable

Each terminal clamp may accept two cables of up to 6 mm². If only one cable is connected, this must be bent into a loop so that the terminal clamp exerts an even contact pressure.



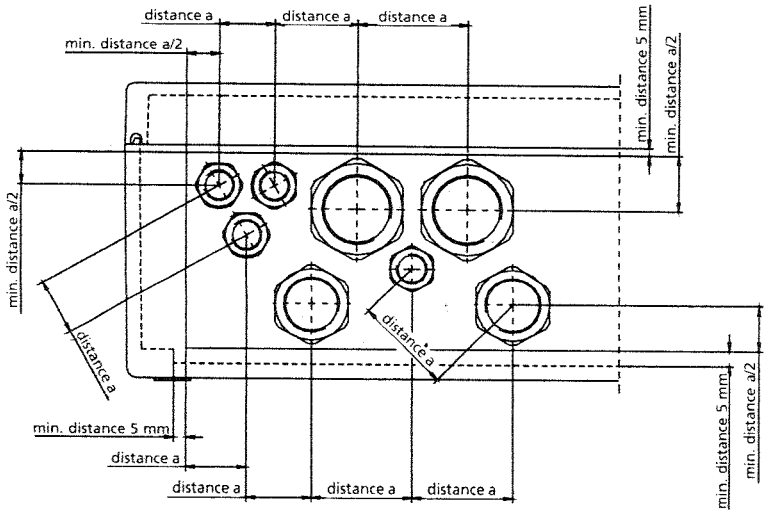
11. Empty explosion zone terminal enclosure

As you are a ROSE customer and have received an incomplete item of equipment which has been checked and certified to EN 50014, 50019, 50020 and 50281-1-1, you undertake to carry out part inspection in accordance with the predeterminded manufacturer documentation.
- max. cross-section
- max. voltage
- EC model checked and certified cable and cable lead-ins in addition to blind plugs
- Protective earth connection in addition to equipotential bonding to EN 50014, point 15.4
- Air and leakage path to EN 50019, tables 1 and 3
- EC Model checked and certified terminals, whereby the fittings and continuous current must be observed in accordance with the atteched insert
- Connection components, connections and connection terminals in protection type intrinsic safety „i" must comply with conditions to EN 50020, section 6.3.1.

Since the manufacturing responsibility and part inspection are ROSE's responsibility, points to EN 50014 under section 24, 25 and 26 must be unconditionally observed, otherwise the approved EC model test certificate is invalid.

12. Drilling spacing for cable unions

M	PG	Distance	M	PG	Distance	M	PG	Distance
12	7	20 mm	12 + 16	7 + 9	21 mm	16 + 20	9 + 11	24 mm
16	9	22 mm	12 + 20	7 + 11	23 mm	16 + 20	9 + 13.5	25 mm
20	11	26 mm	12 + 20	7 + 13.5	24 mm	16 + 25	9 + 16	27 mm
20	13,5	27 mm	12 + 25	7 + 16	26 mm	16 + 32	9 + 21	32 mm
25	16	32 mm	12 + 32	7 + 21	31 mm	16 + 40	9 + 29	37 mm
32	21	42 mm	12 + 40	7 + 29	37 mm	16 + 50	9 + 36	43 mm
40	29	53 mm	12 + 50	7 + 36	42 mm	16 + 63	9 + 42	46 mm
50	36	63 mm	12 + 63	7 + 42	46 mm	16 + 63	9 + 48	49 mm
63	42	70 mm	12 + 63	7 + 48	48 mm			
63	48	75 mm						
M	**PG**	**Distance**	**M**	**PG**	**Distance**	**M**	**PG**	**Distance**
20 + 20	11 + 13.5	27 mm	20 + 25	13.5 + 16	30 mm	25 + 32	16 + 21	37 mm
20 + 25	11 + 16	29 mm	20 + 32	13.5 + 21	35 mm	25 + 40	16 + 29	43 mm
20 + 32	11 + 21	34 mm	20 + 40	13.5 + 29	41 mm	25 + 50	16 + 36	48 mm
20 + 40	11 + 29	40 mm	20 + 50	13.5 + 36	46 mm	25 + 63	16 + 42	51 mm
20 + 50	11 + 36	45 mm	20 + 63	13.5 + 42	49 mm	25 + 63	16 + 48	54 mm
20 + 63	11 + 42	48 mm	20 + 63	13.5 + 48	52 mm			
20 + 63	11 + 48	51 mm						
M	**PG**	**Distance**	**M**	**PG**	**Distance**	**M**	**PG**	**Distance**
32 + 40	21 + 29	50 mm	40 + 50	29 + 36	61 mm	50 + 63	36 + 42	69 mm
32 + 50	21 + 36	55 mm	40 + 63	29 + 42	64 mm	50 + 63	35 + 48	72 mm
25 + 63	21 + 42	58 mm	40 + 63	29 + 48	67 mm			
25 + 63	21 + 48	61 mm						
M	**PG**	**Distance**						
63 + 63	42 + 48	73 mm						



Sommaire:

F

2. Consignes de sécurité

Cible : Electriciens expérimentés et formés aux risques d'explosion
Les boîtiers à bornes ne sont pas adaptés pour la zone 0.
La classe de température et le groupe d'explosion indiqués sur les boîtiers à bornes doivent être respectés. Aucune transformation ou modification des boîtiers à bornes n'est autorisée, à l'exception de l'installation d'entrées de câbles et de lignes supplémentaires et du montage de pinces de courant dans le cadre des moyens d'exploitation autorisés, voir chapitres 11 et 12. Elles doivent être utilisées dans les règles de l'art et en parfait état. Seules des pièces originales de ROSE doivent être utilisées pour des remplacements ou réparations. Les réparations concernant la protection contre les explosions ne doivent être réalisées que par un électricien qualifié conformément aux règles en vigueur dans le pays. Tous les corps étrangers non homologués CE doivent être retirés des boîtes de connexion avant mise en service.

Respectez les dispositions nationales en matière de sécurité et de prévention contre les accidents ainsi que les consignes de sécurité figurant dans ce mode d'emploi, eux-mêmes rédigés en italique.

3. Conformité aux normes

Ces moyens d'exploitation ont été vérifiés et certifiés conformes pour les zones à risque d'explosion selon les normes EN 50014, 50019, 50020 et EN 50281-1-1:1998. Lors de l'installation et de l'exploitation de moyens électriques protégés contre les explosions, les prescriptions VDE et les réglementations concernant les installations électriques dans les zones à risque d'explosion (Elex V) doivent être respectées.

4. Données techniques

Fabricant:	ROSE Systemtechnik GmbH + Co. KG Erbeweg 13 - 15 D-32457 Porta Westfalica
Protection contre les explosions:	EEx e II T6 EEx ed II C T6 EEx e [ia] II C T6 EEx ia II C T6 EEx ed [ia] II C T6
Marquage spécial protection anti-poussière:	EEx II 2D IP 66 EEX II 2D IP 66 T 85°C
Attestation d'examen CE de type:	PTB 00 ATEX.....
Matériau boîtiers:	Aluminium, Polyester ou tôle forte
Tension:	max. 750V (cf. plaque signalétique)
Section de conducteur max.:	par ex. 240 mm² (cf. plaque signalétique)
Section terre:	max. 120 mm²
Types de protection contre les contacts accidentels et les corps étrangers:	IP 66 selon EN 60529: 1991 /IEC 529
Températures d'utilisation:	max. + 100°C; min. - 55°C
Température ambiante admissible:	-20°C à +40°C ou (ceci correspond à T6=85°C) -55°C à +40°C avec marquage spécial et pièces nécessaires au montage
Identification:	CE 0123 Ex II 2G / 2 D

5. Possibilités d'équipements supplémentaires

Le nombre maximal de bornes dépend de la section et du courant permanent autorisé (voir feuille annexe), par ex. pour les boîtiers 05.16 56 09 et 06.16 56 09. (tableau 4)

Tableau 4

Aire de l'orifice (mm²)		1,5	2,5	4	6	10	16	25
Nombre de bornes max.**		119	96	81	61	49	41	
Nombre supports max.		1	1	1	1	1	1	
Longueur composants suppl. max. (mm)		508	508	508	508	508	508	
Nombre de conducteurs possible en fonction du courant A	6				Dans cette zone, des composants peuvent être ajoutés à souhait, sous réserve du respect des consignes et des cotes de montages établies.			
	10	53						
	16	18	35	138				
	20	7	20	40				
	25		9	22	43			
	35			6	17	42		
	50				2	14	35	
	63					4	16	
	80						6	
	100							
	125							
	160							
	200							
	225							
	250							
	315							
	400							
	500							

Nombre de conducteurs/2 = nombre de bornes
Remarque: Les bornes terre ne sont pas comptées

Exemple pour boîtiers aluminium et polyester 160 x 560 x 90 mm

Section / mm²	Courant A	Nombre	Utilisation
2,5	20	(6 sur 20)	30 %
16	63	(5 sur 16)	31 %
16	80	(2 sur 6)	33 %
		Somme	94 % < 100 %

6. Installation

Pour l'installation /le fonctionnement, les Normes NE correspondantes et les réglementations nationales en matière de sécurité des appareils, de même que règles généralement admises dans le domaine technique doivent être impérativement respectées.

7. Maintenance

Les normes NE en vigueur en matière d'entretien de moyens d'exploitation électriques en zone à risque d'explosion et les dispositions nationales doivent être respectées. Avant d'ouvrir le boîtier, s'assurer qu'il n'y a pas de tension. Pour les circuits à sécurité intrinsèque, une intervention sous tension est admise.

8. Mise en service de bornes

Les points suivants doivent être respectés lors de la mise en service:
- Uniquement bornes vérifiées et certifiées examen CE de type
- Section nominale maximale
- Courant maximal
- Tension maximale

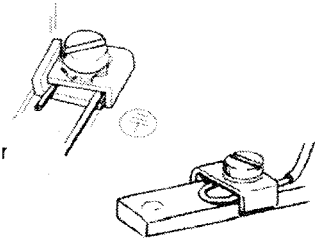
En cas de remplacement ou d'ajout de bornes, utiliser un modèle de bornes techniquement identique. Pour les réparations sur le boîtier comme par ex. le changement de garnitures commander les mêmes composants chez ROSE, à défaut de quoi l'autorisation d'exploitation expire.

9. Entrées de câbles et de lignes

Selon la norme NE 50014 annexe B uniquement entrées de câbles et de lignes homologuées CE. Uniquement câbles et conduites fixes. L'utilisateur doit assurer la décharge de traction correspondante. Dans le cas d'une utilisation dans le secteur avec poussière combustible, seules les entrées de câbles et de lignes munies d'une protection au moins égale à IP 6X peuvent être utilisées. Pour l'espacement des perforations se conformer à l' chapitre 12

10. Branchement terre

Chacun des serre-câble peut recevoir 2 conducteurs allant jusqu'à 6 mm². Si un seul conducteur est branché, celui-ci doit être recourbé en arc afin que le serre-câble exerce une pressior homogène.



11. Carter de bornes Ex non équipé complètement

En tant que client de la société ROSE, vous recevez un moyen d'exploitation incomplet attesté et vérifié selon la norme EN 50014, 50019, 50020 et 50281-1-1 et vous vous engagez à réaliser les essais individuels de série selon les documents du fabricant vérifiés par le PTB (Institut Fédéral de Physique et de Métrologie)
- Section max.
- Tension max.
- Entrée de câbles et de lignes ainsi que bouchons de fermeture vérifiés et attestés examen CE de type
- Branchement terre ainsi que équipotentialité selon norme EN 50014, point 15.4.
- Entrefer et ligne de fuite selon norme EN 50019, tableau 1 et 3.
- Bornes homologuées CE, sous le respect d'équipement supplémentaire et courant permanent selon feuille annexe.
- Manchons, raccords et bornes de connexion dans la protection sécurité intrinsèque „i" doivent remplir les conditions de la norme EN 50020, paragraphe 6.3.1

La responsabilité fabricant et les essais individuels de série se situant côté ROSE, les points de la norme EN 50014 figurant aux paragraphes 24, 25 et 26 doivent être impérativement respectés, l'attestation d'examen CE de type n'ayant sinon aucune validité.

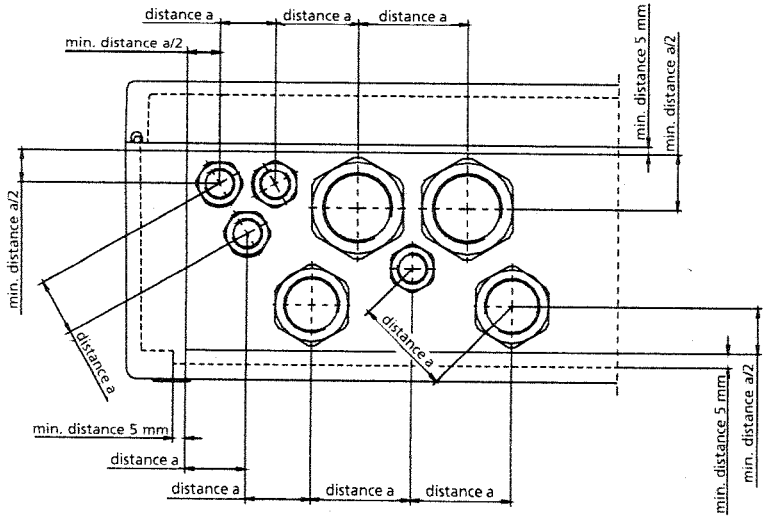
12. Espacement entre les alésages pour passe-câbles à vis

M	PG	Distance	M	PG	Distance	M	PG	Distance
12	7	20 mm	12 + 16	7 + 9	21 mm	16 + 20	9 + 11	24 mm
16	9	22 mm	12 + 20	7 + 11	23 mm	16 + 20	9 + 13.5	25 mm
20	11	26 mm	12 + 20	7 + 13.5	24 mm	16 + 25	9 + 16	27 mm
20	13,5	27 mm	12 + 25	7 + 16	26 mm	16 + 32	9 + 21	32 mm
25	16	32 mm	12 + 32	7 + 21	31 mm	16 + 40	9 + 29	37 mm
32	21	42 mm	12 + 40	7 + 29	37 mm	16 + 50	9 + 36	43 mm
40	29	53 mm	12 + 50	7 + 36	42 mm	16 + 63	9 + 42	46 mm
50	36	63 mm	12 + 63	7 + 42	46 mm	16 + 63	9 + 48	49 mm
63	42	70 mm	12 + 63	7 + 48	48 mm			
63	48	75 mm						

M	PG	Distance	M	PG	Distance	M	PG	Distance
20 + 20	11 + 13.5	27 mm	20 + 25	13.5 + 16	30 mm	25 + 32	16 + 21	37 mm
20 + 25	11 + 16	29 mm	20 + 32	13.5 + 21	35 mm	25 + 40	16 + 29	43 mm
20 + 32	11 + 21	34 mm	20 + 40	13.5 + 29	41 mm	25 + 50	16 + 36	48 mm
20 + 40	11 + 29	40 mm	20 + 50	13.5 + 36	46 mm	25 + 63	16 + 42	51 mm
20 + 50	11 + 36	45 mm	20 + 63	13.5 + 42	49 mm	25 + 63	16 + 48	54 mm
20 + 63	11 + 42	48 mm	20 + 63	13.5 + 48	52 mm			
20 + 63	11 + 48	51 mm						

M	PG	Distance	M	PG	Distance	M	PG	Distance
32 + 40	21 + 29	50 mm	40 + 50	29 + 36	61 mm	50 + 63	36 + 42	69 mm
32 + 50	21 + 36	55 mm	40 + 63	29 + 42	64 mm	50 + 63	35 + 48	72 mm
25 + 63	21 + 42	58 mm	40 + 63	29 + 48	67 mm			
25 + 63	21 + 48	61 mm						

M	PG	Distance
63 + 63	42 + 48	73 mm



Indhold:

DK

2. Sikkerhedshenvisninger

Målgruppe: Erfarne, Ex-uddannede elektrikere
Klemmekasserne er ikke egnede til zone 0.
Vær opmærksom på temperaturklasse og eksplosiongruppe, som er angivet på klemmekassen. Ombygninger eller ændringer på klemmekasserne er ikke tilladt. En undtagelse er placering af ekstra kabel- og ledningsindføringer og montering af tilslutningsklemmer inden for rammerne af godkendelsen af driftsmidlet, se Kapitel 11 + 12. Kasserne skal anvendes i henhold til deres bestemmelse i ubeskadiget og fejlfri tilstand. Som reservedele og til reparation må der kun bruges originaldele fra ROSE. Reparationer, som har med eksplosionsbeskyttelsen at gøre, må kun udføres af en kvalificeret elektriker i overensstemmelse med nationalt gældende regler. Alle fremmedlegemer uden EU-typegodkendelse skal tages ud af klemmekasserne inden idrifttagning.

Overhold de nationale sikkerheds- og ulykkesforebyggende forskrifter og de følgende sikkerhedshenvisninger i denne driftsvejledning, der ligesom denne tekst er skrevet i kursiv.

3. Overensstemmelse med standarder

Disse driftsmidler er testet og godkendt til eksplosionsudsatte områder iht. EN 50014, 50019, 50020 og. EN 50281-1:1998. Ved indretning og drift af eksplosionsbeskyttede elektriske driftsmidler skal de anerkendte VDE-bestemmelser og den tyske forordning om elektriske anlæg i eksplosionsudsatte rum (Elex V) overholdes.

4. Tekniske data

Producent:	ROSE Systemtechnik GmbH + Co. KG Erbeweg 13 - 15 D-32457 Porta Westfalica
Eksplosionsbeskyttelse:	EEx e II T6 EEx ed II C T6 EEx e [ia] II C T6 EEx ia II C T6 EEx ed [ia] II C T6
Særlig mærkning for Støvbeskyttelse:	EEx II 2D IP 66 EEx II 2D IP 66 T 85°C
EF-typegodkendelse:	PTB 00 ATEX.....
Kassemateriale:	Aluminium, polyester, stålplade
Tilladt spænding:	Maks. 750V (se typeskilt)
Maks. ledertværsnit:	F.eks. 240 mm² (se typeskilt)
Beskyttelsesledertværsnit:	Maks. 120 mm²
Kapslingsklasse:	IP66 iht. EN 60529:1991 /IEC 60529
Anvendelsestemperaturområde:	Maks. + 100°C; min. - 55°C
Till. omgivelsestemperaturer:	- 20°C til + 40°C eller (dette svarer til T6=85°C) - 55°C til + 40°C med særlig mærkning og egnede ind- og påbygningsdele
Mærkning:	CE 0123 Ex II 2G / 2 D

5. Bestykningsmuligheder

Det maksimale antal klemmer afhænger af tværsnittet og den tilladte kontinuerlige strøm (se tillæg) f.eks. for kassetyper 05.16 56 09 og 06.16 56 09 (tabel 4)

Tabel 4

Tilslutningstværsnit (mm²)		1,5	2,5	4	6	10	16	25
Maks. klemmeantal**		119	96	81	61	49	41	
Maks. antal bæreskinner		1	1	1	1	1	1	
Maks. bestykningslængde (mm)		508	508	508	508	508	508	
Muligt antal interne ledere afhængigt af strøm A	6				Inden for dette område kan man ekstrabestykke så meget man vil, under hensyntagen til henvisningerne og de fastlagte indbygningsmål i kassen.			
	10	53						
	16	18	35	138				
	20	7	20	40				
	25		9	22	43			
	35			6	17	42		
	50				2	14	35	
	63					4	16	
	80						6	
	100							
	125							
	160							
	200							
	225							
	250							
	315							
	400							
	500							

Antal ledere/2 = antal klemmer
Anmærkning: Beskyttelseslederklemmer tælles ikke med

Eksempel på aluminium- og polyesterkasser 160 x 560 x 90 mm

Tværsnit / mm²	Strøm A	Antal	Udnyttelse
2,5	20	(6 af 20)	30 %
16	63	(5 af 16)	31 %
16	80	(2 af 6)	33 %
		I alt	94 % < 100 %

6. Installation

De relevante EN-standarder og de nationale forskrifter for apparatsikkerhed samt de alment anerkendte regler for teknik er bindende for klargøringen / driften.

7. Vedligeholdelse

De gældende nationale EN-standarder og nationale bestemmelser for vedligeholdelse af elektriske driftsmidler i eksplosionsudsatte områder skal overholdes. Vær sikker på, at der ingen spænding er, før kassen åbnes. Ved egensikre strømkredse er det tilladt at arbejde under spænding.

8. Montering af klemmer

Ved monteringen skal følgende overholdes, hvad angår klemmen:
- Kun EF-typekontrollerede og -godkendte klemmer
- Maksimalt mærketværsnit
- Maksimal strøm

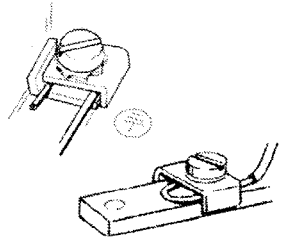
Ved udskiftning eller tilføjelse af klemmer bør der benyttes en klemmetype af samme tekniske niveau. Ved reparationsarbejder på kassen som f.eks. udskiftning af pakningen skal der bestilles tilsvarende komponenter hos ROSE, da driftstilladelsen ellers bortfalder.

9. Kabel- og ledningsindføringer

Iht. EN 50014 tillæg B kun EU-typekontrollerede og –godkendte kabel- og ledningsindføringer. Der må kun indføres fast oplagte kabler og ledninger. Brugeren skal sikre en passende trækaflastning. Ved anvendelse i områder med brændbart støv, må der kun anvendes ATEX-godkendte kabel- og ledningsindføringer med en min. kapslingsklasse IP 6X. Afstanden mellem gevindhullerne skal overholdes iht. Kapitel 12.

10. Tilslutning til beskyttelsesleder

Hver klemmebøjle må holde 2 ledere indtil 6 mm². Hvis der kun tilsluttes 1 leder, skal den bøjes til en sløjfe, så der bibeholdes et ensartet tryk fra bøjlen.



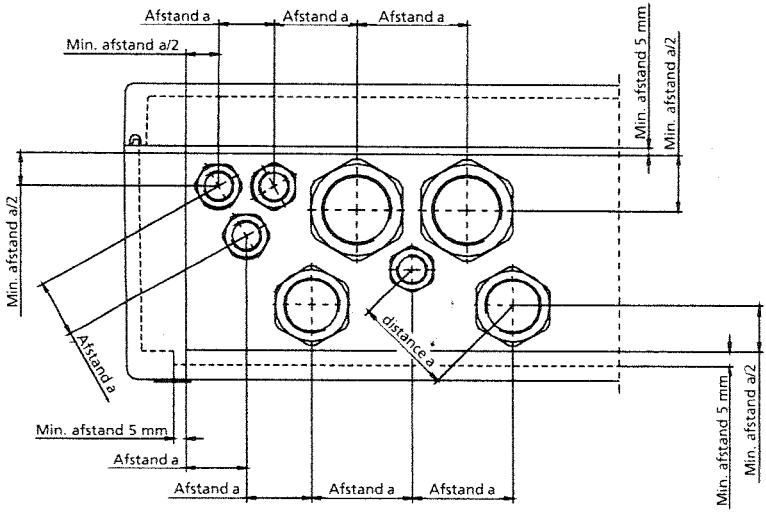
11. Ikke fuldt bestykket Ex-klemmehus

Da De som kunde hos firmaet ROSE modtager et ufuldstændigt driftsmiddel, som er godkendt og kontrolleret iht. EN 50014, 50019, 50020 og. 50281-1-1 forpligter De Dem til at foretage en stykafprøvning iht. den PTB-kontrollerede producentdokumentation. (PTB: Physikalisch-Technische Bundesanstalt, teknisk overmyndighed i Tyskland for måling (metrologi) og fysikalisk sikkerhedsteknik)
- Maks. tværsnit
- Maks. spænding
- EF-typekontrollerede og -godkendte kabel- og ledningsindføringer samt blændpropper.
- Beskyttelsesledertilslutning samt potentialudligning iht. EN 50014, punkt 15.4.
- Luft- og krybeafstande iht. EN 50019, tabel 1 og 3.
- EF-typekontrollerede og -godkendte klemmer, idet bestykningen og den kontinuerlige strøm skal overholdes i henhold til vedlagte tillæg.
- Tilslutningsdele, forbindelser og tilslutningsklemmer i eksplosionsbeskyttelsesklassen egensikkerhed „i" skal opfylde bestemmelserne iht. EN 50020, afsnit 6.3.1.

Da producentansvaret og produktionskontrollen ligger hos fabrikanten ROSE, skal punkterne iht. EN 50014 under afsnit 24, 25 og 26 under alle omstændigheder overholdes, da EF-typegodkendelsen ellers mister sin gyldighed.

12. Afstanden mellem de borede huller til kabelforskruningerne

M	PG	Afstand	M	PG	Afstand	M	PG	Afstand
12	7	20 mm	12 + 16	7 + 9	21 mm	16 + 20	9 + 11	24 mm
16	9	22 mm	12 + 20	7 + 11	23 mm	16 + 20	9 + 13.5	25 mm
20	11	26 mm	12 + 20	7 + 13.5	24 mm	16 + 25	9 + 16	27 mm
20	13,5	27 mm	12 + 25	7 + 16	26 mm	16 + 32	9 + 21	32 mm
25	16	32 mm	12 + 32	7 + 21	31 mm	16 + 40	9 + 29	37 mm
32	21	42 mm	12 + 40	7 + 29	37 mm	16 + 50	9 + 36	43 mm
40	29	53 mm	12 + 50	7 + 36	42 mm	16 + 63	9 + 42	46 mm
50	36	63 mm	12 + 63	7 + 42	46 mm	16 + 63	9 + 48	49 mm
63	42	70 mm	12 + 63	7 + 48	48 mm			
63	48	75 mm						
M	**PG**	**Afstand**	**M**	**PG**	**Afstand**	**M**	**PG**	**Afstand**
20 + 20	11 + 13.5	27 mm	20 + 25	13.5 + 16	30 mm	25 + 32	16 + 21	37 mm
20 + 25	11 + 16	29 mm	20 + 32	13.5 + 21	35 mm	25 + 40	16 + 29	43 mm
20 + 32	11 + 21	34 mm	20 + 40	13.5 + 29	41 mm	25 + 50	16 + 36	48 mm
20 + 40	11 + 29	40 mm	20 + 50	13.5 + 36	46 mm	25 + 63	16 + 42	51 mm
20 + 50	11 + 36	45 mm	20 + 63	13.5 + 42	49 mm	25 + 63	16 + 48	54 mm
20 + 63	11 + 42	48 mm	20 + 63	13.5 + 48	52 mm			
20 + 63	11 + 48	51 mm						
M	**PG**	**Afstand**	**M**	**PG**	**Afstand**	**M**	**PG**	**Afstand**
32 + 40	21 + 29	50 mm	40 + 50	29 + 36	61 mm	50 + 63	36 + 42	69 mm
32 + 50	21 + 36	55 mm	40 + 63	29 + 42	64 mm	50 + 63	35 + 48	72 mm
25 + 63	21 + 42	58 mm	40 + 63	29 + 48	67 mm			
25 + 63	21 + 48	61 mm						
M	**PG**	**Afstand**						
63 + 63	42 + 48	73 mm						



Contenido:

E

2. Avisos de seguridad

Grupo de destinatarios: electricistas expertos instruidos en materia de anti-explosión.
Las cajas de bornes no son apropiadas para la zona 0.
Se debe respetar la clase de temperatura y el grupo de explosión indicados en las cajas de bornes. No se permiten los cambios o modificaciones en las cajas de bornes. Excepción: la instalación adicional de pasacables y entrada de líneas y el montaje de bornes de conexión dentro del marco de la autorización de equipamiento, véase capítulo 11 + 12. Se deben poner en servicio en perfecto estado y conforme al uso reglamentado. Solamente deben utilizarse piezas originales de ROSE como repuesto y para la reparación. Sólo un electricista cualificado puede realizar las reparaciones que afecten a la protección de explosiones en consonancia con las reglas vigentes nacionales. Todos los cuerpos extraños sin certificado de comprobación de muestra o prototipo de pruebas CE deben retirarse de las cajas de bornes antes de llevarse a cabo la puesta en servicio.

Respete las prescripciones nacionales de seguridad y prevención de accidentes así como los avisos de seguridad que aparecen en cursiva en este manual.

3. Conformidad de normas

Estos equipos han sido verificados y certificados para zonas sujetas a peligro de explosión según EN 50014, 50019, 50020 e EN 50281-1-1:1998. Al instalar y poner en servicio útiles eléctricos protegidos contra explosión deben respetarse las disposiciones VDE reconocidas y la directriz sobre instalaciones eléctricas en locales sujetos a peligro de explosión (Elex V).

4. Datos técnicos

Fabricante:	ROSE Systemtechnik GmbH + Co. KG Erbeweg 13 - 15 D-32457 Porta Westfalica
Protección de explosiones:	EEx e II T6 EEx ed II C T6 EEx e [ia] II C T6 EEx ia II C T6 EEx ed [ia] II C T6
Señalización especial de protección contra el polvo:	EEx 2D IP 66 EEx II 2D IP 66 T 85°C
Certif. Modelo aprobado CE:	PTB 00 ATEX..
Material del cuerpo:	Aluminio, poliéster o acero inoxidable
Rango de tensión:	máx. 750V (v. placa caracter)
Sección máx. de cable:	p.ej. 240 mm² (v. placa caracter)
Sección de cable protección:	máx. 120 mm²
Grado de protección:	IP 66 según EN 60529: 1991 / IEC 529
Gama de temperatura de uso:	máx. + 100°C; mín. - 55°C
Temperatura ambiente permitida:	-20°C a +40°C o (esto se corresponde a T6=85°C) -55°C a +40°C con etiquetado especial y piezas adecuadas de montaje
Etiquetado:	CE 0123 Ex II 2G / 2 D

5. Posibilidades de equipamiento

El número máximo de bornes depende de la sección transversal y de la corriente permanente permitida (véase hoja adjunta), p.ej. para cuerpos 05.16 56 09 e 06.16 56 09 (tabla 4).

Tabel 4

Secc. transv. connex. (mm²)		1,5	2,5	4	6	10	16	25
N° máx. bornes**		119	96	81	61	49	41	
N° máx. de perfiles		1	1	1	1	1	1	
Long. máx. equipamiento (mm)		508	508	508	508	508	508	
Número posible de cables dependiendo de la corriente A	6				En esta zona puede equiparse adicionalmente según necesidad, observando los avisos y las distancias de montaje fijadas en la envolvente.			
	10	53						
	16	18	35	138				
	20	7	20	40				
	25		9	22	43			
	35			6	17	42		
	50				2	14	35	
	63					4	16	
	80						6	
	100							
	125							
	160							
	200							
	225							
	250							
	315							
	400							
	500							

N° cables/2 = N° bornes
Nota: No se cuentan los bornes de tierra

Ejemplo para cuerpos de aluminio y poliéster 160 x 560 x 90 mm

Secc. transv. / mm²	Corriente A	Núm.	Aprovecham.
2,5	20	(6 de 20)	30 %
16	63	(5 de 16)	31 %
16	80	(2 de 6)	33 %
		Suma	94 % < 100 %

6. Instalación

Para la instalación / funcionamiento es obligatorio observar las normas EN pertinentes y las prescripciones nacionales relativas a la seguridad de los aparatos así como las reglas y tecnología generalmente reconocidas.

7. Mantenimiento

En relación al mantenimiento de medios de equipos eléctricos, en zonas expuestas a peligro de explosión son vinculantes las normas EN y las directivas nacionales. Garantizar la seguridad de tensión antes de abrir la envolvente. Se permite trabajar bajo tensión en circuitos eléctricos de seguridad intrínseca.

8. Puesta en servicio de bornes

Al poner en servicio los bornes se debe respetar lo siguiente:
- Sólo bornes certificados y aprobados según modelo CEE
- Sección transversal nominal máxima
- Corriente máxima
- Tensión máxima

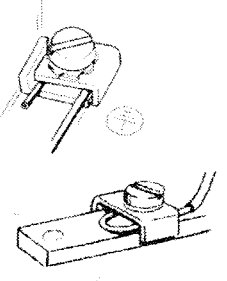
Al substituir o añadir bornes debe emplearse un tipo técnicamente semejante. En los trabajos de reparación en el cuerpo tales como p. ej. cambiar la junta, se deben pedir los mismos componentes a ROSE, pues de lo contrario se pierde la autorización de servicio.

9. Prensaestopas y entradas de cables

Según la EN 50014 anexo B sólo se pueden usar prensaestopas y conductos con certificado y comprobación de muestra o prototipo CE. Sólo deben introducirse cables y líneas tendidos fijamente. El operario debe asegurar una descarga de tracción suficiente. En todas las aplicaciones en zonas con polvo inflamable solamente deben emplearse prensaestopas y conductos con comprobación ATEX con un tipo de protección mínimo IP 6X. Se debe mantener la separación de agujeros indicada en el capítulo 12.

10. Conexión de línea de protección

Cada uno de los estribos de sujeción debe sujetar dos líneas de hasta 6 mm². Caso que solamente se conecte una línea, debe hacerse con ésta un bucle, de modo que la presión de comprensión por medio del estribo sea regular.



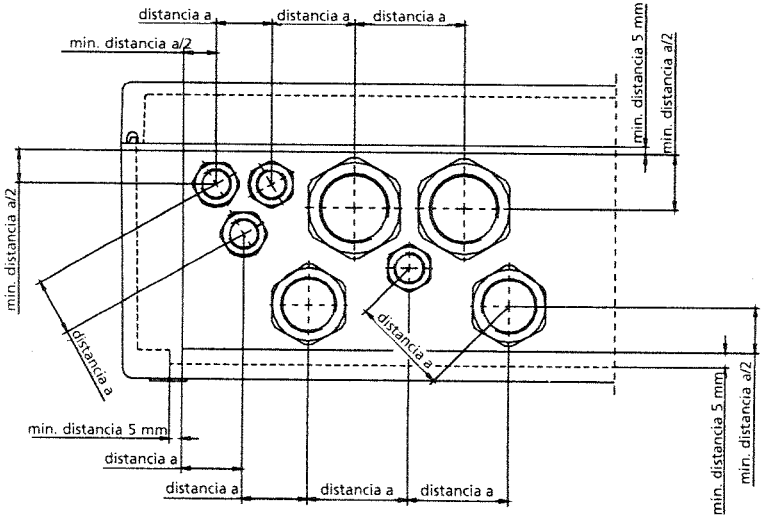
11. Envolventes Ex sin montar

Dado que usted como cliente de la firma ROSE recibe un útil de servicio sin montar, que está certificado y verificado según EN 50014, 50019, 50020 y 50281-1-1, se compromete a realizar el control de la pieza según los datos del fabricante prescritos controlados según el Instituto fisiotécnico federal (PTB).
- Sección transv. máx.
- Tensión máx.
- Prensaestopas y entradas de líneas certificados y aprobados según modelo CEE así como tapones de cierre.
- Conexión de tierra y compensación de potenctial según EN 500 14, punto 15.4.
- Tramo de aire y de escape según EN 50019, tabla 1 y 3.
- Bornes certificados y aprobados según modelo CEE, teniéndose que observar el equipamiento y la corriente permanente según hoja adjunta.
- Las piezas de conexión, empalmes y bores de conexión en la clase de protección Seguridad intrínseca "i" deben cumplir las normas según EN 50020, párrafo 6.3.1.

Dado que la responsabilidad del fabricante y el control de piezas residen en la Fa. ROSE, se deben respetar necesariamente los puntos según EN 50014, en los párrafos 24, 25 y 26, pues de lo contrario pierde su validez el certificado de modelo aprobado según pruebas CEE.

12. Distancia entre prensaestopas

M	PG	Distancia	M	PG	Distancia	M	PG	Distancia
12	7	20 mm	12 + 16	7 + 9	21 mm	16 + 20	9 + 11	24 mm
16	9	22 mm	12 + 20	7 + 11	23 mm	16 + 20	9 + 13.5	25 mm
20	11	26 mm	12 + 20	7 + 13.5	24 mm	16 + 25	9 + 16	27 mm
20	13,5	27 mm	12 + 25	7 + 16	26 mm	16 + 32	9 + 21	32 mm
25	16	32 mm	12 + 32	7 + 21	31 mm	16 + 40	9 + 29	37 mm
32	21	42 mm	12 + 40	7 + 29	37 mm	16 + 50	9 + 36	43 mm
40	29	53 mm	12 + 50	7 + 36	42 mm	16 + 63	9 + 42	46 mm
50	36	63 mm	12 + 63	7 + 42	46 mm	16 + 63	9 + 48	49 mm
63	42	70 mm	12 + 63	7 + 48	48 mm			
63	48	75 mm						
M	PG	Distancia	M	PG	Distancia	M	PG	Distancia
20 + 20	11 + 13.5	27 mm	20 + 25	13.5 + 16	30 mm	25 + 32	16 + 21	37 mm
20 + 25	11 + 16	29 mm	20 + 32	13.5 + 21	35 mm	25 + 40	16 + 29	43 mm
20 + 32	11 + 21	34 mm	20 + 40	13.5 + 29	41 mm	25 + 50	16 + 36	48 mm
20 + 40	11 + 29	40 mm	20 + 50	13.5 + 36	46 mm	25 + 63	16 + 42	51 mm
20 + 50	11 + 36	45 mm	20 + 63	13.5 + 42	49 mm	25 + 63	16 + 48	54 mm
20 + 63	11 + 42	48 mm	20 + 63	13.5 + 48	52 mm			
20 + 63	11 + 48	51 mm						
M	PG	Distancia	M	PG	Distancia	M	PG	Distancia
32 + 40	21 + 29	50 mm	40 + 50	29 + 36	61 mm	50 + 63	36 + 42	69 mm
32 + 50	21 + 36	55 mm	40 + 63	29 + 42	64 mm	50 + 63	35 + 48	72 mm
25 + 63	21 + 42	58 mm	40 + 63	29 + 48	67 mm			
25 + 63	21 + 48	61 mm						
M	PG	Distancia						
63 + 63	42 + 48	73 mm						



Sisältö:

FIN

2. Turvatekniset ohjeet

Kohderyhmä: Harjaantuneet, ex-koulutetut sähköasentajat
Liitäntäkotelot eivät sovellu käytettäviksi 0-vyöhykkeessä (vrt. EN 6079-14).
Katso sallitut lämpötilaluokat ja räjähdyssuojausryhmät liitäntäkotelon kuoresta.
Liitäntäkoteloiden rakennetta ei saa muuttaa. Poikkeus: ylimääräiset kaapeli- ja johdinläpiviennit sekä liitinnapojen asennus hyväksyttyihin sähkölaitteisiin ovat sallittuja, kappale 11 + 12. Liitäntäkoteloita saa käyttää ainoastaan niille tarkoitettuihin kohteisiin ja niiden on oltava ehjiä ja moitteettomassa kunnossa. Vara- ja korjausosina saa käyttää ainoastaan alkuperäisiä ROSE-osia. Räjähdyssuojaan vaikuttuvat korjaustyöt saa tehdä ainoastaan ammattitaitoinen sähköasentaja, samalla on noudatettava voimassa olevia lakimääräisiä sääntöjä ja asetuksia. Ennen liitinkotelon käyttöönottoa kaikki osat, jotka eivät ole EU-tyyppihyväksyttyjä, on poistettava kotelosta.

Maakohtaisia turvateknisiä ja työturvallisuusmääräyksiä sekä tässä käyttöohjeessa selostettuja turvaohjeita (painettu kursiivilla, kuten tämä teksti) on noudatettava!

3. Standardit

Nämä tuotteet on tarkastettu ja tyyppihyväksytty standardien EN 50014, 50019, 50020 ja EN 50281-1-1:1998 mukaan käytettäviksi räjähdysvaarallisissa tiloissa. Räjähdyssuojattuja sähkölaitteita asennettaessa ja käytettäessä on noudatettava lakisääteisiä ja standardien mukaisia määräyksiä (SLT: VDE-standardit sekä räjähdysvaarallisiin tiloihin asennettuja sähkölaitteita koskeva säädös, Elex V).

4. Tekniset tiedot

Valmistaja:	ROSE Systemtechnik GmbH + Co. KG Erbeweg 13 – 15 D-32457 Porta Westfalica
Ex-suojaus:	EEx e II T6 EEx ed II C T6 EEx e [ia] II C T6 EEx ia II C T6 EEx ed [ia] II C T6
Pölysuojattu –erikoistunnus	EEx II 2D IP 66 EEx II 2D IP 66 T 85°C
EU-tyyppihyväksyntä:	PTB 00 ATEX ....
Kotelon materiaali:	Alumiini, polyesteri tai teräspelti
Mittausjännite:	kork. 750 V (ks. tyyppikilpi)
Suurin johtimen poikkipinta:	esim. 240 mm^2 (ks. tyyppikilpi)
Suojajohtimen poikkipinta:	kork. 120 mm^2
Kotelointi- ja suojausluokat:	IP 66, EN 60529: 1991 /IEC 529
Lämpötila-alue:	kork. +100°C, väh. –55°C
Sall. ympäristön lämpötila:	-20°C - +40°C tai (vastaa: T6=85°C) -55°C - +40°C, mikäli varustettu erikoistunnuksella ja soveltuvilla asennusosilla
Erikoistunnus:	CE 0123 Ex II 2G / 2 D

5. Liitäntävaihtoehdot ja liitäntöjen lukumäärä

Liittimien maksimimäärä riippuu käytettyjen liittimien poikkipinnasta ja ko. tapauksessa pätevästä suurimmasta sallitusta jatkuvasta kuormitusvirrasta (ks. liite), esim. kotelo 05.16 56 09 ja 06.16 56 09 (taulukko 4).

Taulukko 4

Liittimien poikkipinnat (mm²)		1,5	2,5	4	6	10	16	25
Liittimien lukumäärä kork.**		119	96	81	61	49	41	
Aluskiskojen lukumäärä kork.		1	1	1	1	1	1	
Liitinrivin pituus (mm) kork.		508	508	508	508	508	508	
Johtimien lukumäärä virran (A) funktiona	6				Em. rajojen puitteissa sekä muut ohjeet ja asennusmitat huomioiden liittimien kokoonpanoa kotelossa voi vaihdella vapaasti.			
	10	53						
	16	18	35	138				
	20	7	20	40				
	25		9	22	43			
	35			6	17	42		
	50				2	14	35	
	63					4	16	
	80						6	
	100							
	125							
	160							
	200							
	225							
	250							
	315							
	400							
	500							

Johtimien lukumäärä/2 = liittimien lukumäärä
Huom.: Suojajohtimien liittimiä ei lasketa mukaan

Esimerkki: Alumiini- ja polyesterikotelo 160 x 560 x 90 mm

Poikkipinta / mm²	Virta A	Lukumäärä	Kuormitus
2,5	20	(6 / 20)	30 %
16	63	(5 / 16)	31 %
16	80	(2 / 6)	33 %
		Summa	94 % < 100 %

6. Asennus

Laitteiden asennusvaiheessa sekä käytössä on noudatettava ko. EN-standardeja, voimassa olevia maakohtaisia turvateknisiä asetuksia sekä yleisesti päteviä teknisiä sääntöjä.

7. Kunnossapito

Lisäksi on noudatettava EN-standardeja ja maakohtaisesti päteviä määräyksiä, jotka koskevat räjähdysvaarallisiin tiloihin suunniteltujen sähköteknisten osien ja laitteiden kunnossapitoa. Ennen kotelon avaamista on jännite kytkettävä pois päältä. Luonnostaan vaarattomissa (Exi-) virtapiireissä jännite voi olla päällä kunnostustöiden aikana.

8. Liitintyypit ja niiden käyttöönotto

Ennen liitäntöjen asennusta on otettava huomioon seuraavaa:
- vain EC-tyyppihyväksytyt liittimet ovat sallittuja
- liittimen suurin nimellispoikkipinta
- maksimivirta
- maksimijännite

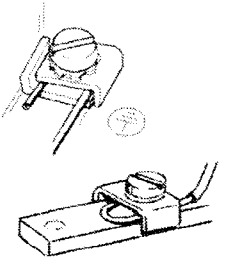
Liittimiä uusittaessa ja lisättäessä on katsottava, että uudet liittimet ovat teknisesti ja tyypiltään tasavertaisia jo käytössä olevien kanssa. Jos koteloa joudutaan korjaamaan (esim. tiivisteen uusiminen), varaosina on käytettävä alkuperäisiä ROSE-osia, muutoin ko. kotelon käyttölupa raukeaa.

9. Kaapeli- ja johdinläpiviennit

EN 50014 –standardi, liite B, sallii ainoastaan EU-tyyppihyväksyttyjen kaapeli- ja johdinläpivientien käytön. Koteloon liitettävien kaapeleiden ja johtimien on oltava kiinteästi asennettuja. Käyttäjän on itse huolehdittava tarvittavasta vedonpoistosta. Paloherkkää pölyä sisältävissä tiloissa saa käyttää ainoastaan ATEX-hyväksyttyjä kaapeli- ja johdinläpivientejä, joiden kotelointiluokan on oltava vähintään IP 6X. Sallitut läpivientiaukkojen etäisyydet on määrätty kappale 12.

10. Suojajohtimen liitäntä

Liitinsankaan saa asentaa 2 johdinta, poikkipinta kork. 6 mm²/ johdin. Jos johtimia asennetaan vain yksi, se on taivutettava välijohtimeksi, jotta siihen kohdistuva puristuspaine olisi riittävä.



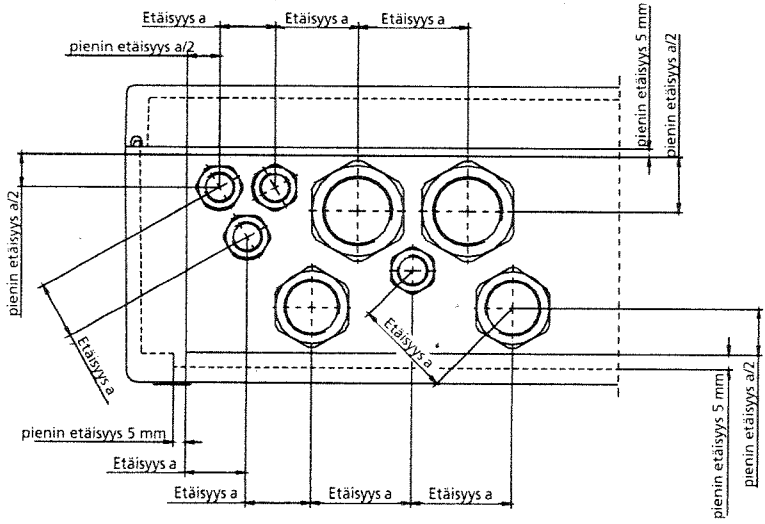
11. Ex-suojattu liitinkotelo, osa liitännöistä on vapaita

Koska hankkimanne ROSE-tuote, joka on tyyppihyväksytty ja vastaa EN 50014, 50019, 50020 ja 50281-1-1 standardeja, ei sellaisenaan ole käyttövalmis, olette käyttäjänä velvollinen tekemään tuotetarkastuksen PTB-hyväksyttyjä ja valmistajan laatimia dokumentteja noudattaen (PTB: SLT:n fysikaalis-tekninen tutkimusinstituutti):
- Suurin sallittu poikkipinta
- Suurin sallittu jännite
- EC-tyyppihyväksytyt kaapeli- ja johdinläpiviennit ja niiden sulkutulpat
- Suojajohtimen liitäntä sekä potentiaalin tasaus: EN 50014, kohta 15.4
- Ilma- ja pintaväli: EN 50019, taulukko 1 ja 3
- EC-tyyppihyväksytyt liittimet: sallitut liittimien lukumäärät ja jatkuva kuormituksvirta käyvät selville heisesta liitteestä
- Liitäntään tarvittavat lisätarvikkeet ja liittimet: syttymissuojausluokka i, täytettävä standardin EN 50020, kappale 6.3.1, vaatimukset

Koska ROSElla on valmistajan tuotevastuu ja -tarkastus, on ehdottomasti otettava huomioon EN 50014 -standardin kohdat 24, 25 ja 26, koska tuotteelle myönnetty EC-tyyppihyväksyntä raukeaa muutoin.

12. Kierreliitokset ja niiden aukkojen etäisyydet

M	PG	Etäisyys	M	PG	Etäisyys	M	PG	Etäisyys
12	7	20 mm	12 + 16	7 + 9	21 mm	16 + 20	9 + 11	24 mm
16	9	22 mm	12 + 20	7 + 11	23 mm	16 + 20	9 + 13.5	25 mm
20	11	26 mm	12 + 20	7 + 13.5	24 mm	16 + 25	9 + 16	27 mm
20	13,5	27 mm	12 + 25	7 + 16	26 mm	16 + 32	9 + 21	32 mm
25	16	32 mm	12 + 32	7 + 21	31 mm	16 + 40	9 + 29	37 mm
32	21	42 mm	12 + 40	7 + 29	37 mm	16 + 50	9 + 36	43 mm
40	29	53 mm	12 + 50	7 + 36	42 mm	16 + 63	9 + 42	46 mm
50	36	63 mm	12 + 63	7 + 42	46 mm	16 + 63	9 + 48	49 mm
63	42	70 mm	12 + 63	7 + 48	48 mm			
63	48	75 mm						
M	**PG**	**Etäisyys**	**M**	**PG**	**Etäisyys**	**M**	**PG**	**Etäisyys**
20 + 20	11 + 13.5	27 mm	20 + 25	13.5 + 16	30 mm	25 + 32	16 + 21	37 mm
20 + 25	11 + 16	29 mm	20 + 32	13.5 + 21	35 mm	25 + 40	16 + 29	43 mm
20 + 32	11 + 21	34 mm	20 + 40	13.5 + 29	41 mm	25 + 50	16 + 36	48 mm
20 + 40	11 + 29	40 mm	20 + 50	13.5 + 36	46 mm	25 + 63	16 + 42	51 mm
20 + 50	11 + 36	45 mm	20 + 63	13.5 + 42	49 mm	25 + 63	16 + 48	54 mm
20 + 63	11 + 42	48 mm	20 + 63	13.5 + 48	52 mm			
20 + 63	11 + 48	51 mm						
M	**PG**	**Etäisyys**	**M**	**PG**	**Etäisyys**	**M**	**PG**	**Etäisyys**
32 + 40	21 + 29	50 mm	40 + 50	29 + 36	61 mm	50 + 63	36 + 42	69 mm
32 + 50	21 + 36	55 mm	40 + 63	29 + 42	64 mm	50 + 63	35 + 48	72 mm
25 + 63	21 + 42	58 mm	40 + 63	29 + 48	67 mm			
25 + 63	21 + 48	61 mm						
M	**PG**	**Etäisyys**						
63 + 63	42 + 48	73 mm						



Περιεχόμενα:

GR

2. Υπόδειξη ασφαλείας

Ομάδα-στόχος: Έμπειροι ηλεκτρολόγοι με ειδίκευση στα αντιεκρηκτικά

Τα κιβώτια των ακροδεκτών είναι **ακατάλληλα** για την ζώνη 0.
Προσέξτε την κατηγορία της θερμοκρασίας και την ομάδα εκρηκτικότητας που αναγράφονται επάνω στα κιβώτια των ακροδεκτών.
Δεν επιτρέπονται μετατροπές ή άλλου είδους αλλαγές στα κιβώτια ακροδεκτών.
Εξαιρείται η τοποθέτηση επιπλεον ακροδεκτών και η συναρμολόγηση ακροδεκτών σύνδεσης στα πλαίσια της άδειας του εξοπλισμού, βλέπε Κεφάλαιο 11 + 12.
Πρέπει να τίθενται σε λειτουργία σύμφωνα με τους κανόνες και εφόσον είναι σε άψογη κατάσταση.
Για την αντικατάσταση ή επισκευή τους πρέπει να χρησιμοποιούνται μόνο αυθεντικά ανταλλακτικά της ROSE.
Επισκευές που επηρεάζουν την προστασία από έκρηξη επιτρέπεται να διεξάγονται μόνο από εξειδικευμένο ηλεκτροτεχνικό σύμφωνα με τους ισχύοντες κανονισμούς της εκάστοτε χώρας.
Κάθε ξένο σώμα χωρίς το πιστοποιητικό ελέγχου κατασκευής της ΕΕ πρέπει να απομακρύνονται από τα κουτιά σύνδεσης.

Προσέχετε τις εθνικές προδιαγραφές ασφάλειας και αποφυγής ατυχημάτων και τις παρακάτω υποδείξεις της παρούσας, που είναι σε πλάγια γράμματα όπως και το παρόν κείμενο!

3. Συμμόρφωση προς τους κανόνες

Ο εξοπλισμός αυτός έχει ελεγχθεί και πιστοποιηθεί για περιοχές με κίνδυνο έκρηξης σύμφωνα με τα EN 50014, 50019, 50020 και EN 50218-1-1:1998. Κατά την τοποθέτηση και τη λειτουργία ηλεκτρικού εξοπλισμού με προστασία έκρηξης πρέπει να τηρούνται οι διατάξεις της Ένωσης Ηλεκτροτεχνίας Ηλεκτρονικής (VDE) και οι κανονισμοί σχετικά με ηλεκτρικές εγκαταστάσεις σε χώρους με κίνδυνο έκρηξης (Elex V).

4. Τεχνικά δεδομένα

Κατασκευαστής:	ROSE Systemtechnik GmbH + Co. KG Erbeweg 13 - 15 D-32457 Porta Westfalica
Πρόληψη έκρηξης:	EEx e II T6 EEx ed II C T6 EEx e [ia] II C T6 EEx ia II C T6 EEx ed [ia] II C T6
Ειδική σήμανση αντισκονικής προστασίας:	EEx II 2D IP 66 EEx II 2D IP 66 T 85°C
Πιστοποιητικό εξέτασης τύπου ΕΚ:	PTB 00 ATEX.....
Υλικό περιβλήματος:	Αλουμίνιο, πολυεστερικές ίνες ή γαλβανισμένη λαμαρίνα
Επιτρεπόμενη τάση:	μεγ. 750V (βλ. πινακίδα στοιχείων)
Μεγ. διατομή αγωγών:	π.χ. 240 mm² (βλ. πινακ. στοιχείων)
Διατομή αγωγού προστασίας:	μεγ. 120 mm²
Είδη επαφών, ξένων σωμάτων και προστασίας:	IP 66 σύμφωνα με EN 60529: 1991 / IEC 529
Περιοχή θερμοκρασίας λειτουργίας:	μεγ. + 100°C; ελάχ. - 55°C
Επιτρ. θερμοκρασίες περιβάλλοντος:	-20°C έως +40°C ή (Αυτό αντιστοιχεί σε T6 = 85°C) -55°C έως +40°C με ειδική ετικέτα ασφαλείας και κατάλληλα εξαρτήματα
Ετικέτα ασφαλείας:	CE 0123 Ex II 2G / 2 D

5. Δυνατότητες εξοπλισμού

Ο μέγιστος αριθμός ακροδεκτών εξαρτάται από τη διατομή και το επιτρεπόμενο συνεχές ηλεκτρικό ρεύμα (βλέπε συνοδευτικό φυλλάδιο), π.χ. για το περίβλημα 05.16 56 09 και 06.16 56 09 (Πίνακας 4).

Πίνακας 4

Διατομή σύνδεσης (mm²)		1,5	2,5	4	6	10	16	25
μεγ. αριθ. ακροδεκτών		119	96	81	61	49	41	
μεγ. αριθμός. φερ. σιδηροτροχιών		1	1	1	1	1	1	
μεγ. μήκος εξοπλισμού (mm)		508	508	508	508	508	508	
Δυνατός αριθμός αγωγών σε σχέση με το ρεύμα **A**	6				Είναι δυνατή η συμπλήρωση της περιοχής αυτής λαμβάνοντας υπόψη τις υποδείξεις και τις σταθερές διαστάσεις του περιβλήματος.			
	10	53						
	16	18	35	138				
	20	7	20	40				
	25		9	22	43			
	35			6	17	42		
	50				2	14	35	
	63					4	16	
	80						6	
	100							
	125							
	160							
	200							
	225							
	250							
	315							
	400							
	500							

Αριθμός αγωγών/2 = Αριθμός ακροδεκτών

Υπενθύμιση: Δεν υπολογίζονται ακροδέκτες αγωγών προστασίας

Παράδειγμα για περίβλημα αλουμινίου και πολυεστερικών ινών 160 x 560 x 90 mm

Εγκ. τομή / mm²	Ρεύμα A	Αριθμός	Χρήση
2,5	20	(6 από 20)	30 %
16	63	(5 από 16)	31 %
16	80	(2 από 6)	33 %
		Σύνολο	94 % < 100 %

6. Εγκατάσταση

Η εγκατάσταση / λειτουργία υπόκειται στους εφαρμοστέους κανονισμούς EN και τις εθνικές προδιαγραφές για τους νόμους περί ασφάλειας συσκευών καθώς και στους γενικά αναγνωρισμένους κανόνες της τεχνολογίας.

7. Συντήρηση

Θα τηρούνται οι κανονισμοί της ΕΕ και οι εθνικές προδιαγραφές για τη συντήρηση ηλεκτρικών εγκαταστάσεων σε χώρους που κινδυνεύουν από εκρήξεις.
Πριν το άνοιγμα του περιβλήματος βεβαιωθείτε για την απουσία τάσης.
Σε εγγενώς ασφαλή ηλεκτρικά κυκλώματα επιτρέπεται η εργασία υπό τάση.

8. Έναρξη λειτουργίας των ακροδεκτών

Κατά την έναρξη λειτουργίας να δοθεί προσοχή στα ακόλουθα:
- Αποκλειστική χρήση ακροδεκτών με πιστοποιητικό εξέτασης τύπου ΕΚ
- Μέγιστη ονομαστική διατομή
- Μέγιστη ισχύς ρεύματος
- Μέγιστη τάση

Κατά την αντικατάσταση ή προσθήκη ακροφυσίων θα πρέπει να χρησιμοποιούνται τεχνικά ισότιμα ανταλλακτικά.
Σε περίπτωση επισκευής του περιβλήματος όπως π.χ. αντικατάσταση της μόνωσης να παραγγέλλονται τα ίδια εξαρτήματα από τη ROSE, αφού σε διαφορετική περίπτωση ακυρώνεται η άδεια λειτουργίας.

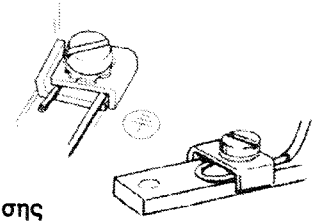
9. Διαβάσεις καλωδίων και αγωγών

Κατά EN 50014 Παράρτημα Β αποκλειστικά ελεγμένες και πιστοποιημένες με πιστοποιητικό ελέγχου κατασκευής διαβάσεις καλωδίων και αγωγών.

Επιτρέπεται να τοποθετούνται μόνο σταθερά καλώδια και αγωγοί.
Θα πρέπει να εξασφαλιστεί κατάλληλη ανακούφιση καταπόνησης.
Για χώρους με εύφλεκτη σκόνη θα χρησιμοποιούνται αποκλειστικά πιστοποιημένα κατά ATEX καλώδια και διαβάσεις αγωγών με ελάχιστη προστασία IP 6X.
Η απόσταση μεταξύ των οπών να τηρείται σύμφωνα με το Κεφάλαιο 12.

10. Σύνδεση γείωσης

Κάθε βραχίονας ακροφυσίου επιτρέπεται να πάρει 2 αγωγούς έως 6 mm² . Αν συνδεθεί μόνο ένας αγωγός, πρέπει να διπλωθεί ως βρόχος, για να επιτευχθεί η ομοιόμορφη προσπίεση από το βραχίονα του ακροφυσίου.



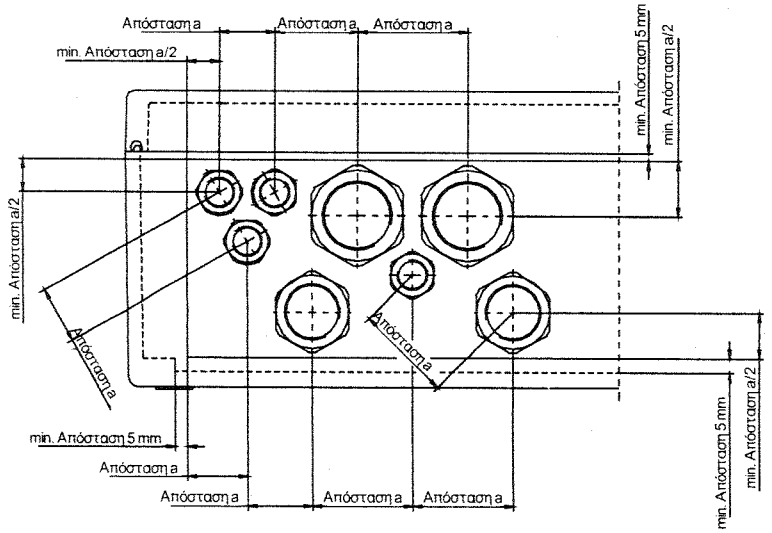
11. Μη πλήρως εξοπλισμένο αντιεκρηκτικό κουτί σύνδεσης

Επειδή ως πελάτης της εταιρίας ROSE θα λάβετε ένα μη ολοκληρωμένο εξάρτημα, το οποίο είναι πιστοποιημένο και ελεγμένο κατά EN 50014, 50019 και 50020, 50281-1-1 υποχρεούστε να διεξάγετε τον έλεγχο σύμφωνα με τα έγγραφα του κατασκευαστή.
- Μεγ. εγκάρσια διατομή
- Μεγ. τάση
- Χρήση καλωδίων και αγωγών καθώς και κλειστών συνδέσμων με πιστοποιητικό εξέτασης τύπου ΕΚ.
- Σύνδεση αγωγού προστασίας και ισοδυναμική σύνδεση σύμφωνα με EN 50014, σημείο 15.4.
- Διάκενο και μήκος ερπυσμού σύμφωνα με EN 50019, πίνακας 1 και 3.
- Ακροδέκτες με πιστοποιητικό εξέτασης τύπου ΕΚ, όπου θα πρέπει να τηρούνται ο εξοπλισμός και το συνεχές ρεύμα σύμφωνα με το συνοδευτικό φυλλάδιο.
- Τα εξαρτήματα σύνδεσης, οι συνδέσεις και οι ακροδέκτες σύνδεσης στον τρόπο προστασίας από ανάφλεξη Αυτοπροστασία „i" πρέπει να τηρούν τους κανονισμούς σύμφωνα με EN 50020, -παράγραφος 6.3.1. (βλέπε επίσης αρ Zg.: 05-4-000002-01-0)

Επειδή η ευθύνη του κατασκευαστή και ο έλεγχος των εξαρτημάτων βρίσκεται στην εταιρία ROSE, να ληφθούν οπωσδήποτε υπόψη τα σημεία κατά EN 50014 παράγραφος 24, 25 και 26, διαφορετικά παύει να ισχύει η πιστοποίηση εξέτασης τύπου ΕΚ.

12. Απόσταση οπών καλωδίων

M	PG	Απόσταση	M	PG	Απόσταση	M	PG	Απόσταση
12	7	20 mm	12 + 16	7 + 9	21 mm	16 + 20	9 + 11	24 mm
16	9	22 mm	12 + 20	7 + 11	23 mm	16 + 20	9 + 13.5	25 mm
20	11	26 mm	12 + 20	7 + 13.5	24 mm	16 + 25	9 + 16	27 mm
20	13,5	27 mm	12 + 25	7 + 16	26 mm	16 + 32	9 + 21	32 mm
25	16	32 mm	12 + 32	7 + 21	31 mm	16 + 40	9 + 29	37 mm
32	21	42 mm	12 + 40	7 + 29	37 mm	16 + 50	9 + 36	43 mm
40	29	53 mm	12 + 50	7 + 36	42 mm	16 + 63	9 + 42	46 mm
50	36	63 mm	12 + 63	7 + 42	46 mm	16 + 63	9 + 48	49 mm
63	42	70 mm	12 + 63	7 + 48	48 mm			
63	48	75 mm						
M	PG	Απόσταση	M	PG	Απόσταση	M	PG	Απόσταση
20 + 20	11 + 13.5	27 mm	20 + 25	13.5 + 16	30 mm	25 + 32	16 + 21	37 mm
20 + 25	11 + 16	29 mm	20 + 32	13.5 + 21	35 mm	25 + 40	16 + 29	43 mm
20 + 32	11 + 21	34 mm	20 + 40	13.5 + 29	41 mm	25 + 50	16 + 36	48 mm
20 + 40	11 + 29	40 mm	20 + 50	13.5 + 36	46 mm	25 + 63	16 + 42	51 mm
20 + 50	11 + 36	45 mm	20 + 63	13.5 + 42	49 mm	25 + 63	16 + 48	54 mm
20 + 63	11 + 42	48 mm	20 + 63	13.5 + 48	52 mm			
20 + 63	11 + 48	51 mm						
M	PG	Απόσταση	M	PG	Απόσταση	M	PG	Απόσταση
32 + 40	21 + 29	50 mm	40 + 50	29 + 36	61 mm	50 + 63	36 + 42	69 mm
32 + 50	21 + 36	55 mm	40 + 63	29 + 42	64 mm	50 + 63	35 + 48	72 mm
25 + 63	21 + 42	58 mm	40 + 63	29 + 48	67 mm			
25 + 63	21 + 48	61 mm						
M	PG	Απόσταση						
63 + 63	42 + 48	73 mm						



Indice:

2. Avvertenze generali per la sicurezza

Destinatari: esperti, elettricisti specializzati
I coperchi non sono adatti per la Zona 0.
Prestare attenzione alla classe di temperatura e al gruppo di esplosione indicati sulla morsettiera. Non sono ammesse trasformazioni o modifiche dei coperchi dei morsetti. Fa eccezione il collegamento di passacavi addizionali e il montaggio di morsetti di collegamento nell'ambito dell'omologazione dell'apparecchio elettrico, vedere capitolo 11 + 12. I coperchi in funzione devono essere integri e in condizioni perfette. Come parti di ricambio e per eventuali riparazioni possono essere utilizzati solo ricambi originali ROSE. Eventuali riparazioni che interessano la protezione antideflagrazione possono essere effettuate solo da elettrotecnici qualificati, conformemente alle regole vigenti. Tutti i corpi estranei privi di certificazione di collaudo CEI devono essere smontati dalla morsettiera prima della messa in funzione.

Osservare le norme nazionali di sicurezza e di prevenzione degli incidenti e le indicazioni di sicurezza contenute nelle presenti istruzioni per l'uso raccolte in questo testo in carattere corsivo!

3. Conformità alle norme

Questi apparecchi elettrici sono collaudati e certificati per l'uso in atmosfere potenzialmente esplosive secondo EN 50014, 50019, 50020 e EN 50281-1-1:1998. Nella costruzione e nel funzionamento di apparecchi elettrici provvisti di protezione antideflagrante osservare le norme CEI riconosciute e il decreto relativo agli impianti elettrici in atmosfere potenzialmente esplosive (Elex V).

4. Dati tecnici

Fabbricante:	ROSE Systemtechnik GmbH + Co. KG Erbeweg 13 - 15 D-32457 Porta Westfalica
Protezione antideflagrazione:	EEx e II T6 EEx ed II C T6 EEx e [ia] II C T6 EEx ia II C T6 EEx e [ia] II C T6
Marcatura speciale protezione da polvere:	EEx II 2D IP66 EEx II 2D IP 66 T 85°C
Attestato di certificazione CEE:	PTB 00 ATEX.....
Materiale coperchio:	Alluminio, poliestere e lamiera di acciaio
Tensione nominale:	max. 750 V (v. targhetta)
Sezione max. conduttore:	p.e. 240 mm2 (v. targhetta)
Sezione conduttore di protezione:	max. 120 mm²
Tipo di protezione contatto e corpi solidi:	IP 66 secondo EN 60529 1991 /IEC 529
Temperatura di utilizzo:	max. + 100°C; min. - 55°C
Temperature ambiente ammesse:	da -20°C fino a +40°C o (ciò corrisponde a T=85°C) da – 55°C fino a + 40° C con marcatura speciale e accessori per il montaggio idonei
Marcatura:	CE 0123 Ex II 2G / 2 D

5. Possibilità di montaggio

Il numero massimo di morsetti dipende dalla sezione e dalla corrente termica ammessa (vedere appendice), p.e. per i coperchi 05. 16 56 09 e 06.16 56 09 (tabella 4)

Tabella 4

Sezione collegamenti (mm²)		1,5	2,5	4	6	10	16	25
Numero morsetti max.**		119	96	81	61	49	41	
Numero max. barre		1	1	1	1	1	1	
Max. lunghezza montaggio (mm)		508	508	508	508	508	508	
Numero di conduttori possibile in funzione della corrente A	6				In questo campo, osservando le indicazioni e l'ingombro definito, è possibile procedere al montaggio nel coperchio di elementi addizionali a piacere.			
	10	53						
	16	18	35	138				
	20	7	20	40				
	25		9	22	43			
	35			6	17	42		
	50				2	14	35	
	63					4	16	
	80						6	
	100							
	125							
	160							
	200							
	225							
	250							
	315							
	400							
	500							

Numero di conduttori/2 = numero morsetti
Nota: i morsetti di protezione non sono contati.

Esempio per coperchi in alluminio e poliestere 160 x 560 x 90 mm

Sezione / mm²	Corrente A	Numero	Carico
2,5	20	(6 di 20)	30 %
16	63	(5 di 16)	31 %
16	80	(2 di 6)	33 %
		Somma	94 % < 100 %

6. Installazione

Per l'installazione / messa in funzione devono essere osservate le relative norme EN e le disposizioni nazionali vigenti per la sicurezza delle attrezzature nonché le regole della tecnica generalmente riconosciute.

7. Manutenzione

Attenersi alle normative EN e alle disposizioni nazionali applicabili per la manutenzione di apparecchiature a funzionamento elettrico in ambienti a rischio d'esplosione. Prima dell'apertura del coperchio assicurarsi che non ci sia tensione. Con circuiti a sicurezza intrinseca è ammesso lavorare con i circuiti sotto tensione.

8. Messa in funzione dei morsetti

Alla messa in funzione prestare attenzione a quanto segue:
- Utilizzare solo morsetti collaudati e provvisti di attestato di certificazione CEE
- Sezione nominale massima
- Corrente massima
- Tensione massima

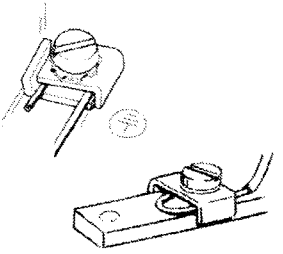
In caso di sostituzione o aggiunta di morsetti deve essere utilizzato un tipo di morsetto di pari valore tecnico. In caso di lavori di riparazione alla scatola come p.e. sostituzione della guarnizione ordinare a ROSE i relativi componenti, in caso contrario l'omologazione decadrà.

9. Passacavi per cavi e fili elettrici

Secondo EN 500014 all. B utilizzare solo pezzi approvati dalla CEI e passacavi omologati. Il gestore deve garantire un adeguato scarico della tensione mediante serracavi. In caso di utilizzo in ambiente con polvere infiammabile possono essere utilizzati solo cavi ATEX omologati e passacavi i con un grado di protezione minimo IP 6X. Rispettare la distanza dei fori specificata nell' capitolo 12.

10. Raccordo conduttore di protezione

Ogni staffa di morsetto può ricevere 2 conduttori fino a 6 mm². Qualora venga collegato un solo conduttore, questo deve essere piegato ad anello al fine di ottenere una pressione di appoggio regolare sulla staffa.



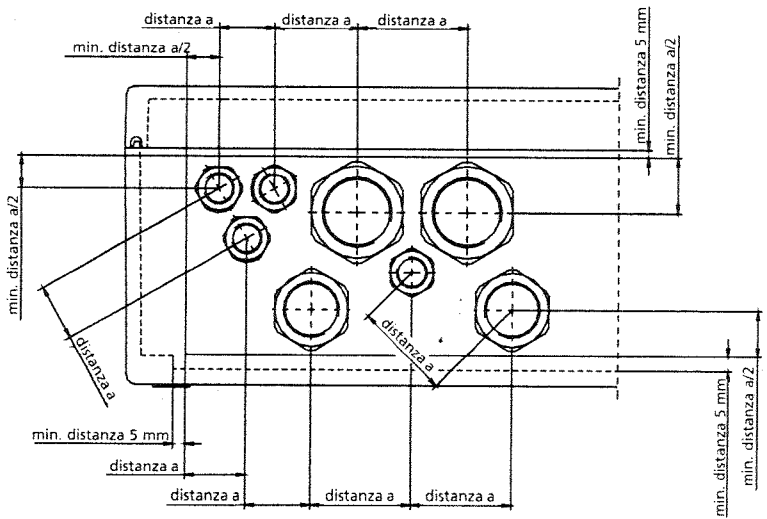
11. Coperchio morsettiera Ex non completamente montato

Coperchio Ex senza morsetti con targhetta
I clienti di ROSE ricevono un dispositivo elettrico incompleto, collaudato e provvisto di certificazione CEE secondo EN 50014, 50019, 50020 e 50281-1-1, pertanto si impegnano a eseguire le prove di serie secondo la documentazione del fabbricante verificata dal PTB.
- Sezione max.
- Tensione max.
- Passacavi e tappi di chiusura collaudati e provvisti di certificazione CEE e .
- Collegamento conduttore di protezione ed equipotenziale secondo EN 50014, Punto 15.4.
- Distanza in aria e di dispersione secondo EN 50019, Tabella 1 e 3.
- Morsetti collaudati e certificati CEE, montaggio e corrente termica secondo l'appendice.
- Particolari di collegamento, giunzioni e morsetti di collegamento nel grado di protezione Sicurezza intrinseca "i" devono soddisfare le disposizioni di cui a EN 50020, sezione 6.3.1

La ROSE in qualitá di produttore con responsabilitá nel produrre il prodotto e relativo collaudo, devono
pertanto essere necessariamente rispettati i punti secondo EN 50014 sezione 24, 25 e 26, in caso contrario la certificazione CEE perde qualsiasi validitá.

12. Distanza fori per collegamenti a vite per cavi

M	PG	Distanza	M	PG	Distanza	M	PG	Distanza
12	7	20 mm	12 + 16	7 + 9	21 mm	16 + 20	9 + 11	24 mm
16	9	22 mm	12 + 20	7 + 11	23 mm	16 + 20	9 + 13.5	25 mm
20	11	26 mm	12 + 20	7 + 13.5	24 mm	16 + 25	9 + 16	27 mm
20	13,5	27 mm	12 + 25	7 + 16	26 mm	16 + 32	9 + 21	32 mm
25	16	32 mm	12 + 32	7 + 21	31 mm	16 + 40	9 + 29	37 mm
32	21	42 mm	12 + 40	7 + 29	37 mm	16 + 50	9 + 36	43 mm
40	29	53 mm	12 + 50	7 + 36	42 mm	16 + 63	9 + 42	46 mm
50	36	63 mm	12 + 63	7 + 42	46 mm	16 + 63	9 + 48	49 mm
63	42	70 mm	12 + 63	7 + 48	48 mm			
63	48	75 mm						
M	PG	Distanza	M	PG	Distanza	M	PG	Distanza
20 + 20	11 + 13.5	27 mm	20 + 25	13.5 + 16	30 mm	25 + 32	16 + 21	37 mm
20 + 25	11 + 16	29 mm	20 + 32	13.5 + 21	35 mm	25 + 40	16 + 29	43 mm
20 + 32	11 + 21	34 mm	20 + 40	13.5 + 29	41 mm	25 + 50	16 + 36	48 mm
20 + 40	11 + 29	40 mm	20 + 50	13.5 + 36	46 mm	25 + 63	16 + 42	51 mm
20 + 50	11 + 36	45 mm	20 + 63	13.5 + 42	49 mm	25 + 63	16 + 48	54 mm
20 + 63	11 + 42	48 mm	20 + 63	13.5 + 48	52 mm			
20 + 63	11 + 48	51 mm						
M	PG	Distanza	M	PG	Distanza	M	PG	Distanza
32 + 40	21 + 29	50 mm	40 + 50	29 + 36	61 mm	50 + 63	36 + 42	69 mm
32 + 50	21 + 36	55 mm	40 + 63	29 + 42	64 mm	50 + 63	35 + 48	72 mm
25 + 63	21 + 42	58 mm	40 + 63	29 + 48	67 mm			
25 + 63	21 + 48	61 mm						
M	PG	Distanza						
63 + 63	42 + 48	73 mm						



Inhoud:

NL

2. Veiligheidsvoorschriften

Doelgroep: ervaren, Ex-geschoolde elektrovakkrachten
De behuizingen zijn niet geschikt voor zone 0.
Er dient rekening gehouden te worden met de op de behuizingen aangegeven temperatuurklasse en explosiegroep. Veranderingen of aanpassingen aan de behuizingen zijn niet geoorloofd. Een uitzondering hierop vormen het aanbrengen van extra kabelwartels en het monteren van aansluitklemmen in het kader van de toelating van het elektrisch apparaat, zie tabel 11 en 12. Zij dienen volgens de voorschriften en in niet-beschadigde en onberispelijke staat te worden toegepast. Ter vervanging en bij reparatie mogen uitsluitend originele onderdelen van ROSE worden toegepast. Reparaties die betrekking hebben op de explosieveiligheid, mogen uitsluitend door een gekwalificeerde elektrotechnische specialist uitgevoerd worden, overeenkomstig de nationaal geldende regels. Alle onderdelen die niet onder het ATEX certificaat vallen dienen voorafgaand aan het inbedrijfstellen uit de behuizing verwijderd te worden.

Houdt u zich aan de nationale voorschriften met betrekking tot veiligheid en ongevallen-preventie, alsmede aan de veiligheidsinstructies in deze gebruiksaanwijzing, die net als deze tekst vet zijn weergegeven.

3. Conformiteit met de normen

Deze apparatuur is getest en goedgekeurd voor een explosiegevaarlijke omgeving volgens NEN 50014, 50019 , 50020 en EN 50281-1-1:1998. Bij de opstelling en het gebruik van explosiebeveiligde elektrische apparatuur dienen de erkende NEN normen en de verordeningen met betrekking tot elektrische installaties in explosie gevaarlijke ruimtes NEN-EN-IEC 60079-14 opgevolgd te worden.

4. Technische gegevens

Producent:	ROSE Systemtechnik GmbH + Co. KG Erbeweg 13 - 15 D-32457 Porta Westfalica
Explosiebescherming:	EEx e II T6 EEx ed II C T6 EEx e [ia] II C T6 EEx ia II C T6 EEx ed [ia] II C T6
Bijzondere stof-bescherming:	EEx II 2D IP 66 EEx II 2D IP 66 T 85°C
EG-constructie-keuringscertificaat:	PTB 00 ATEX.....
Materiaal behuizing:	aluminium, polyester resp. roestvast staal
Max. toegestane spanning:	max. 750 V (zie typeplaatje)
Max. doorsnede geleider:	bijv. 240 mm² (zie typeplaatje)
Doorsnede aardgeleider:	max. 120 mm²
Vreemde voorwerpen met aanrakings en beschermingsklasse:	IP 66 volgens EN 60529: 1991 /IEC 529
Temperatuurbereik:	max. + 100°C; min. - 55°C
Toegestane omgevingstemperaturen:	-20°C tot +40°C of, met spec. aanduiding (T6=85°C) -55°C tot +40°C wanneer gebruik gemaakt wordt van goedgekeurde in- en aanbouwelementen
Aanduiding:	CE 0123 Ex II 2G / 2 D

5. Aansluitmogelijkheden

Het maximale aantal klemmen is afhankelijk van de kabeldoorsnede en de toegestane onafgebroken stroom (zie bijlage), bijv. voor behuizing type 05.16 56 09 en 06.16 56 09 (zie Tabel 4).

Tabel 4

Doorsnede aansluiting (mm²)		1,5	2,5	4	6	10	16	25
Maximaal aantal klemmen**		119	96	81	61	49	41	
Maximaal aantal rails		1	1	1	1	1	1	
Max. te benutten din rail lengte (mm)		508	508	508	508	508	508	
Max. toegestane aantal aders afhankelijk van de stroom A	6				In dit bereik kunnen extra klemmen worden geplaatst, met inachtneming van de voorschriften, de te benutten din rail lengte en het maximaal aantal klemmen.			
	10	53						
	16	18	35	138				
	20	7	20	40				
	25		9	22	43			
	35			6	17	42		
	50				2	14	35	
	63					4	16	
	80						6	
	100							
	125							
	160							
	200							
	225							
	250							
	315							
	400							
	500							

Aantal kabels/2 = aantal klemmen
Opmerking: aardklemmen worden niet meegeteld

Voorbeeld voor aluminium en polyester behuizingen 160 x 560 x 90 mm

Dwarsdoorsnede / mm²	Stroom A	Aantal	Belastingsfactor
2,5	20	(6 van 20)	30 %
16	63	(5 van 16)	31 %
16	80	(2 van 6)	33 %
		Totaal	94 % < 100 %

6. Installatie

Bij de installatie dient u zich te houden aan de nationale voorschriften en wetten, bijv. NEN-EN-IEC 60079-14, met betrekking tot de veiligheid van apparaten en de algemeen erkende technische regels.

7. Onderhoud

Voor onderhoud van elektrische apparatuur in explosie gevaarlijke omgevingen zijn nationale bepalingen van kracht. Deze dienen te worden opgevolgd. Voordat de behuizing ten behoeve van inspectie of onderhoud geopend wordt, dient u te controleren of deze spanningsloos is. Bij intrinsiek veilige stroomketens mag onder spanning gewerkt worden.

8. In bedrijf stellen van klemmen

Bij het in bedrijf stellen van klemmen dient er op het volgende te worden gelet:
- alleen klemmen met ATEX certificaat mogen toegepast worden
- maximale nominale aderdoorsnede
- maximale stroom
- maximale spanning

Bij het vervangen of toevoegen van klemmen altijd technisch gelijke klemmen gebruiken. Bij reparatiewerkzaamheden aan de behuizing, zoals het vervangen van de afdichting, moeten dezelfde componenten bij ROSE bestelt worden, daar anders het ATEX-certificaat vervalt.

9. Kabel- en aderinvoer

Volgens EN 50014 (zie tabel 5) mogen alleen kabelwartels met ATEX-keuringscertificaat toegepast worden. Er mogen uitsluitend vast geïnstalleerde kabels en leidingen worden ingevoerd. De gebruiker dient te zorgen voor een overeenkomstige trekontlasting. Bij toepassing in een omgeving met brandbaar stof mogen alleen ATEX-goedgekeurde kabelwartels met een minimale beschermingsfactor volgens IP6X toegepast worden. De minimale hart op hart afstanden van de boorgaten ten behoeve van de kabelwartels staan aangegeven in tabel 5.

10. Aardaansluitingen

Per zadel mogen 2 aders tot max. 6 mm² aangesloten worden. Indien er slechts 1 ader per schroef of zadel gebruikt wordt, moet deze zoals fig. 1 aangesloten worden, zodat de druk gelijkmatig verdeeld wordt.

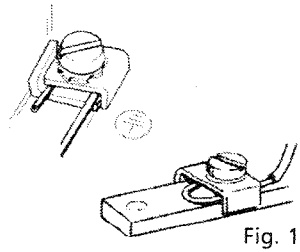


Fig. 1

11. Niet volledig geassambleerde EX-behuizingen

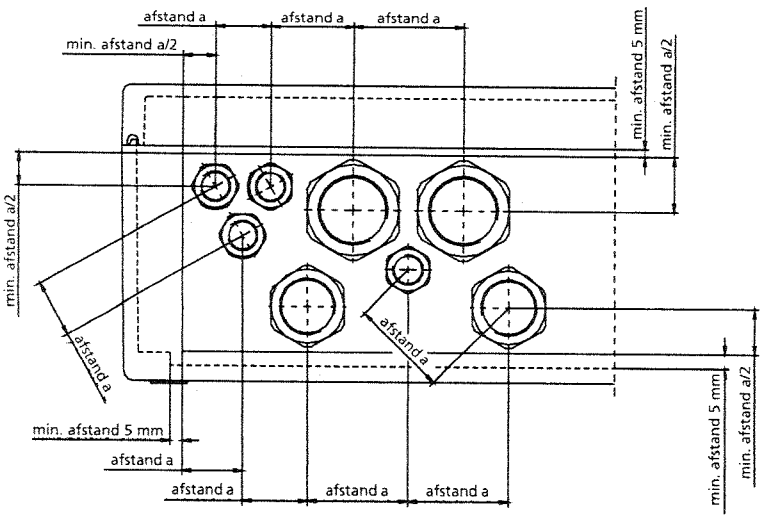
Aangezien u als klant van de firma ROSE een onvolledig product ontvangt, dat volgens EN 50014, 50019, 50020 en 50281-1-1 getest en goedgekeurd is, dient u stukscontrole volgens PTB-geteste productiedocumenten uit te voeren.
- Max. dwarsdoorsnede
- Max. spanning
- Goedgekeurde kabel- en aderinvoeren, evenals blindstoppen, volgens EG-Constructie-keuringscertificaat.
- Aardaansluitingen en potentiaalcompensatie volgens EN 50014, punt 15.4.
- Lucht- en kruipruimte volgens EN 50019, Tabel 1 en 3.
- Goedgekeurde klemmen, waarbij de montage en de duurstroom volgens de bijlage dienen te worden aangehouden, zoals aangegeven op het EG-constructie-keuringscertificaat.
- Aansluitdelen, verbindingen en aansluitklemmen in de ontstekingsbeveiliging met eigenzekerheid "i" dienen te voldoen aan de norm EN 50020, par. 6.3.1.

Aangezien de producentverantwoordelijkheid en de stukcontrole bij de firma ROSE liggen, dienen de punten uit EN50014 onder paragraaf 24, 25 en 26 absoluut te worden opgevolgd, omdat anders het toegestane EG-bouwmonster-certificaat niet geldig is.

12. Minimale hart op hart afstanden van boorgaten t.b.v. kabelwartels

M	PG	Afstand	M	PG	Afstand	M	PG	Afstand
12	7	20 mm	12 + 16	7 + 9	21 mm	16 + 20	9 + 11	24 mm
16	9	22 mm	12 + 20	7 + 11	23 mm	16 + 20	9 + 13.5	25 mm
20	11	26 mm	12 + 20	7 + 13.5	24 mm	16 + 25	9 + 16	27 mm
20	13,5	27 mm	12 + 25	7 + 16	26 mm	16 + 32	9 + 21	32 mm
25	16	32 mm	12 + 32	7 + 21	31 mm	16 + 40	9 + 29	37 mm
32	21	42 mm	12 + 40	7 + 29	37 mm	16 + 50	9 + 36	43 mm
40	29	53 mm	12 + 50	7 + 36	42 mm	16 + 63	9 + 42	46 mm
50	36	63 mm	12 + 63	7 + 42	46 mm	16 + 63	9 + 48	49 mm
63	42	70 mm	12 + 63	7 + 48	48 mm			
63	48	75 mm						
M	**PG**	**Afstand**	**M**	**PG**	**Afstand**	**M**	**PG**	**Afstand**
20 + 20	11 + 13.5	27 mm	20 + 25	13.5 + 16	30 mm	25 + 32	16 + 21	37 mm
20 + 25	11 + 16	29 mm	20 + 32	13.5 + 21	35 mm	25 + 40	16 + 29	43 mm
20 + 32	11 + 21	34 mm	20 + 40	13.5 + 29	41 mm	25 + 50	16 + 36	48 mm
20 + 40	11 + 29	40 mm	20 + 50	13.5 + 36	46 mm	25 + 63	16 + 42	51 mm
20 + 50	11 + 36	45 mm	20 + 63	13.5 + 42	49 mm	25 + 63	16 + 48	54 mm
20 + 63	11 + 42	48 mm	20 + 63	13.5 + 48	52 mm			
20 + 63	11 + 48	51 mm						
M	**PG**	**Afstand**	**M**	**PG**	**Afstand**	**M**	**PG**	**Afstand**
32 + 40	21 + 29	50 mm	40 + 50	29 + 36	61 mm	50 + 63	36 + 42	69 mm
32 + 50	21 + 36	55 mm	40 + 63	29 + 42	64 mm	50 + 63	35 + 48	72 mm
25 + 63	21 + 42	58 mm	40 + 63	29 + 48	67 mm			
25 + 63	21 + 48	61 mm						
M	**PG**	**Afstand**						
63 + 63	42 + 48	73 mm						

Tabel 5



Conteúdo:

P

2. Indicações de segurança

Grupo visado: Electricistas experientes, instruídos na protecção antideflagrante
As caixas de bornes não são adequadas para a zona 0.
Devem ser considerados a classe de temperatura e o grupo de protecção antideflagrante indicados sobre as caixas de bornes. Não são permitidas modificações ou alterações nas caixas de bornes, excepto a fixação de entradas adicionais de linhas e cabos bem como a montagem de bornes de ligação, no âmbito da autorização referente ao equipamento, vide capítulo 11 + 12. De acordo com as respectivas determinações, as caixas de bornes deverão ser manejadas num estado intacto e impecável. Para substituições e reparações só podem ser utilizadas peças originais da empresa ROSE. As reparações que se refiram à protecção antideflagrante só podem ser efectuadas por um electricista qualificado, de acordo com as normas válidas no país. Todos os corpos estranhos sem Certificado CE de tipo terão de ser removidos das caixas de bornes antes da colocação em funcionamento.

Cumpra as normas nacionais de segurança e prevenção de acidentes bem como as indicações de segurança seguintes, contidas nestas instruções de serviço que, como o presente texto, estão em itálico.

3. Conformidade com as normas

Este equipamento foi ensaiado e certificado para espaços potencialmente explosivos, segundo as normas europeias EN 50014, 50019, 50020 e EN 50281-1-1:1998. Na montagem e no serviço de equipamento eléctrico com protecção antideflagrante deverão ser cumpridas as normas reconhecidas da Associação dos Electrotécnicos Alemães VDE e o regulamento sobre instalações eléctricas em espaços potencialmente explosivos (Elex V).

4. Dados técnicos

Fabricante:	ROSE Systemtechnik GmbH + Co. KG Erbeweg 13 - 15 D-32457 Porta Westfalica
Protecção antideflagrante:	EEx e II T6 EEx ed II C T6 EEx e [ia] II C T6 EEx ia II C T6 EEx ed [ia] II C T6
Marcação especial protecção contra poeiras	EEx 2D IP 66 EEx II 2D IP 66 T 85°C
Certificado CE de tipo:	PTB (Instituto Federal Físico-Técnico) 00 ATEX..
Material da caixa:	Alumínio, poliéster ou chapa de aço
Tensão admissível:	máx. 750V (vide chapa de características)
Secção máxima do condutor:	p.ex. 240 mm² (vide chapa de características)
Secção do condutor de protecção:	máx. 120 mm²
Corpos estranhos de contacto e tipos de protecção:	IP 66 segundo EN 60529: 1991 / IEC 529
Amplitude de temperaturas:	máx. + 100°C; mín. - 55°C
Temperaturas ambiente admissíveis:	-20°C até +40°C ou (Isto corresponde T6=85°C) -55°C até +40°C com marcação especial e peças de montagem e adicionais adequadas
Marcação:	CE 0123 Ex II 2G / 2 D

5. Possibilidades para equipamento

O número máximo de bornes depende da secção e da corrente permanente admissível (vide folha anexa), p.ex. para caixas 05.16 56 09 e 06.16 56 09 (tabela 4).

Tabela 4

Secção da ligação (mm²)		1,5	2,5	4	6	10	16	25
Número máximo de bornes**		119	96	81	61	49	41	
Número máximo de calhas de suporte		1	1	1	1	1	1	
Comprimento máximo para o equiamento (mm)		508	508	508	508	508	508	
Número possível de condutores em dependência da corrente A	6				Nesta área e considerando as indicações e as dimensões de montagem fixadas dentro da caixa, é possível equipar à discrição .			
	10	53						
	16	18	35	138				
	20	7	20	40				
	25		9	22	43			
	35			6	17	42		
	50				2	14	35	
	63					4	16	
	80						6	
	100							
	125							
	160							
	200							
	225							
	250							
	315							
	400							
	500							

Número de condutores/2 = número de bornes

Nota: não são contados os bornes de condutores de protecção

Exemplo para caixas de alumínio e poliéster 160 x 560 x 90 mm

Secção / mm²	Corrente A	Número	Carga
2,5	20	(6 de 20)	30 %
16	63	(5 de 16)	31 %
16	80	(2 de 6)	33 %
		Soma	94 % < 100 %

6. Instalação

Para a instalação / o serviço são vinculativas as normas europeias EN relevantes e as disposições nacionais para leis de segurança de equipamentos, bem como as regras da técnica, reconhecidas na generalidade.

7. Manutenção

Deverão ser cumpridas as normas nacionais vigentes para a manutenção de materiais eléctricos em espaços potencialmente explosivos. Antes de abrir a caixa, deverá verificar-se que não haja tensão.No caso de circuitos com segurança intrínseca é admissível trabalhar sob tensão.

8. Colocação em funcionamento de bornes

Na colocação em funcionamento dos bornes deverá considerar-se o seguinte:
- utilizar apenas bornes ensaiados e certificados CE
- Secção nominal máxima
- Corrente máxima
- Tensão máxima

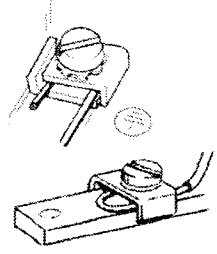
Na substituição ou adição de bornes deveria ser utilizado um tipo de borne tecnicamente idêntico. Em trabalhos de reparação na caixa, como p.ex. substituição do dispositivo vedante, deverão ser pedidos os mesmos componentes à empresa ROSE, caso contrário, expira a autorização de serviço.

9. Entrada de cabos e linhas

De acordo com a norma europeia EN 50014, anexo B, utilizar apenas tipos CE de entradas de cabos e linhas ensaiados e certificados. Só podem ser introduzidos cabos e linhas de instalação fixa. O operador tem de garantir um respectivo dispositivo anti-tracção. Na utilização com poeira inflamável, só podem ser utilizadas entradas de cabos e linhas ensaiadas conforme ATEX com um tipo de protecção mínima IP 6 X. A distância entre as perfurações deverá ser mantida segundo o capítulo 12.

10. Ligação do condutor de protecção

Cada braçadeira de aperto pode comportar 2 condutores de até 6 mm². Se for ligado apenas um condutor, este deverá ser dobrado em forma de gancho, para que resulte uma força de pressão uniforme mediante a braçadeira.



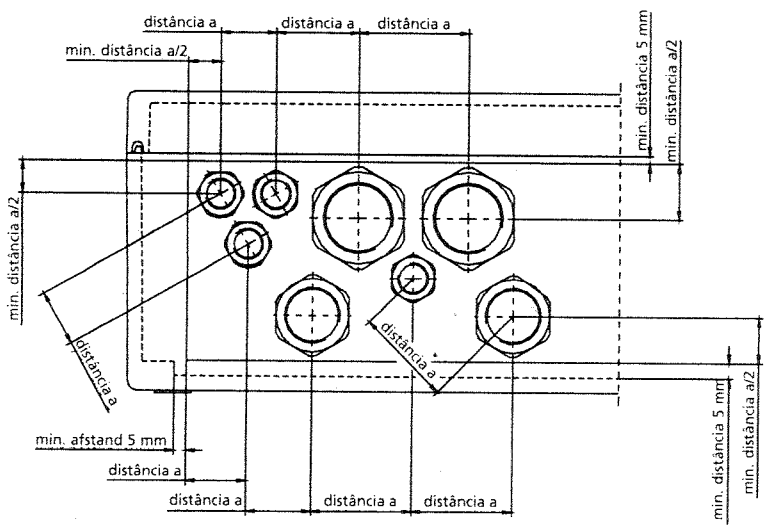
11. Caixas de bornes de protecção antideflagrante não totalmente equipadas

Como cliente da empresa ROSE, que recebe um material incompleto que foi certificado e ensaiado, de acordo com as normas europeias EN 50014, 50019, 50020 e 50281-1-1, compromete-se a efectuar o ensaio individual, segundo documentos do fabricante, ensaiados pelo Instituto Federal Físico-Técnico.
- Secção máxima
- Tensão máxima
- Entradas de cabos e linhas ensaiadas e certificadas CE bem como tampão de fecho.
- Ligação do condutor de protecção bem como ligação equipotencial, segundo a norma europeia EN 500 14, ponto 15.4.
- Distância de isolamento e linha de fuga, segundo a norma europeia EN 50019, tabela 1 e 3.
- Bornes ensaiados e certificados CE, sendo observados o respectivo equipamento e a corrente permanente, segundo folha anexa.
- As peças de união, as ligações e os bornes de ligação do tipo de protecção antideflagrante com segurança intrínseca „i" têm de cumprir as definições, segundo a norma europeia EN 50020, capítulo 6.3.1.

Dado que a responsabilidade de fabrico e o ensaio individual pertencem à empresa ROSE, devem ser considerados, sem restrição, os pontos, segundo a norma europeia EN 50014, dos capítulos 24, 25 e 26, caso contrário, o certificado CE de tipo admitido não tem validade.

12. Distância entre as perfurações para bucins para cabo

M	PG	Distância	M	PG	Distância	M	PG	Distância
12	7	20 mm	12 + 16	7 + 9	21 mm	16 + 20	9 + 11	24 mm
16	9	22 mm	12 + 20	7 + 11	23 mm	16 + 20	9 + 13.5	25 mm
20	11	26 mm	12 + 20	7 + 13.5	24 mm	16 + 25	9 + 16	27 mm
20	13,5	27 mm	12 + 25	7 + 16	26 mm	16 + 32	9 + 21	32 mm
25	16	32 mm	12 + 32	7 + 21	31 mm	16 + 40	9 + 29	37 mm
32	21	42 mm	12 + 40	7 + 29	37 mm	16 + 50	9 + 36	43 mm
40	29	53 mm	12 + 50	7 + 36	42 mm	16 + 63	9 + 42	46 mm
50	36	63 mm	12 + 63	7 + 42	46 mm	16 + 63	9 + 48	49 mm
63	42	70 mm	12 + 63	7 + 48	48 mm			
63	48	75 mm						
M	**PG**	**Distância**	**M**	**PG**	**Distância**	**M**	**PG**	**Distância**
20 + 20	11 + 13.5	27 mm	20 + 25	13.5 + 16	30 mm	25 + 32	16 + 21	37 mm
20 + 25	11 + 16	29 mm	20 + 32	13.5 + 21	35 mm	25 + 40	16 + 29	43 mm
20 + 32	11 + 21	34 mm	20 + 40	13.5 + 29	41 mm	25 + 50	16 + 36	48 mm
20 + 40	11 + 29	40 mm	20 + 50	13.5 + 36	46 mm	25 + 63	16 + 42	51 mm
20 + 50	11 + 36	45 mm	20 + 63	13.5 + 42	49 mm	25 + 63	16 + 48	54 mm
20 + 63	11 + 42	48 mm	20 + 63	13.5 + 48	52 mm			
20 + 63	11 + 48	51 mm						
M	**PG**	**Distância**	**M**	**PG**	**Distância**	**M**	**PG**	**Distância**
32 + 40	21 + 29	50 mm	40 + 50	29 + 36	61 mm	50 + 63	36 + 42	69 mm
32 + 50	21 + 36	55 mm	40 + 63	29 + 42	64 mm	50 + 63	35 + 48	72 mm
25 + 63	21 + 42	58 mm	40 + 63	29 + 48	67 mm			
25 + 63	21 + 48	61 mm						
M	**PG**	**Distância**						
63 + 63	42 + 48	73 mm						



Innehåll

S

2. Säkerhetsanvisningar

Målgrupp: Erfaren, Ex-utbildad behörig personal
Kapslingar är inte lämpade för zon 0.
Den temperaturklass och explosionsgrupp som finns angiven på kapslingar skall respekteras. Ombyggnader eller förändringar på kapslingar är ej tillåtet. Undantaget är montage av extra kabel- och ledningsinföringar och att montera anslutningsplint inom ramen av intyget för utrustningen, se kapitel 11 + 12. Kapslingarna får endast användas enligt avsett syfte i oskadat och felfritt skick. För utbyte eller reparation får endast originaldelar från ROSE användas. Reparationer som berör explosionsskyddet, får endast genomföras av kvalificerad behörig personal i överensstämmelse med gällande nationella regler. Alla främmande objekt utan EG-typintyg måste avlägsnas från kapslingar innan driftsättningen.

Beakta de nationella säkerhetsföreskrifterna och olycksfallsförebyggande föreskrifterna och de efterföljande säkerhetsanvisningarna i denna bruksanvisning, vilka liksom denna text är skrivna med kursivt!

3. Normkonformitet

Denna utrustning har provats och försetts med intyg för områden med explosionsfara enligt EN 50014, 50019, 50020 och EN 50281-1-1:1998. Vid iordningställande och drift av explosionsskyddad elektrisk utrustning måste erkända VDE-bestämmelser och förordningen om elektriska anläggningar i utrymmen med explosionsfara (Elex V) respekteras.

4. Tekniska data

Tillverkare:	ROSE Systemtechnik GmbH + Co. KG Erbeweg 13 - 15 D-32457 Porta Westfalica
Explosionsskydd:	EEx e II T6 EEx ed II C T6 EEx e [ia] II C T6 EEx ia II C T6 EEx ed [ia] II C T6
Specialmärkning dammskydd	EEx II 2D IP 66 EEx II 2D IP 66 T 85°C
EG-typintyg:	PTB 00 ATEX.....
Material i kapslingen:	Aluminium, polyester resp. stålplåt
Märkspänning:	max. 750V (se typskylt)
Max. kabelarea:	t.ex. 240 mm² (se typskylt)
Skyddsledararea:	max. 120 mm²
Beröring främmande objekt o. kapslingsklasser:	IP 66 enligt EN 60529: 1991 /IEC 529
Användningstemperaturområde:	max. + 100°C; minst - 55°C
Till. omgivningstemperaturer:	-20°C upp till +40°C eller (detta motsvarar.T6=85°C) -55°C upp till +40°C med särskild märkning och lämpade in- och påmonteringsdelar
Märkning:	CE 0123 Ex II 2G / 2 D

5. Anslutningsmöjligheter

Det maximala antalet kopplingsplintar beror på arean och den tillåtna kontinuerliga strömmen (se bilaga), t.ex. för kapsling 05.16 56 09 och 06.16 56 09 (tabell 4)

Tabell 4

Anslutningsdiameter (mm²)		1,5	2,5	4	6	10	16	25
Max. antal plint**		119	96	81	61	49	41	
Max. antal fästskenor		1	1	1	1	1	1	
Max. bestyckningslängd (mm)		508	508	508	508	508	508	
Möjligt ledarantal beroende på strömmen A	6					Inom detta område kan valfritt antal klämmor monteras under beaktande av anvisningarna och de fastställda monterings-dimensionerna.		
	10	53						
	16	18	35	138				
	20	7	20	40				
	25		9	22	43			
	35			6	17	42		
	50				2	14	35	
	63					4	16	
	80						6	
	100							
	125							
	160							
	200							
	225							
	250							
	315							
	400							
	500							

Ledarantal/2 = antal klämmor
Kommentar: Skyddsledarklämmor räknas inte

Exempel för aluminium- och polyesterkapsling 160 x 560 x 90 mm

area / mm²	ström A	antal	kapacitetsutnyttjande
2,5	20	(6 av 20)	30 %
16	63	(5 av 16)	31 %
16	80	(2 av 6)	33 %
		summa	94 % < 100 %

6. Installation

För inrättande / drift är relevanta EN-normer och nationella föreskrifter för apparatsäkerhetslagar, samt allmänt erkända tekniska regler bindande.

7. Underhåll

De gällande EN-normerna och nationella bestämmelserna för underhållet av elektrisk utrustning inom områden med explosionsrisk skall respekteras. Säkerställ att det är spänningsfritt innan kapslingen öppnas. Vid egensäkra strömkretsar är det tillåtet att arbeta under spänning.

8. Driftsättning av kopplingsplint

Vid driftsättning skall följande beaktas för kopplingsplinten:
- Endast EG-typprovad klämma med intyg
- Maximal märkarea
- Maximal ström
- Maximal spänning

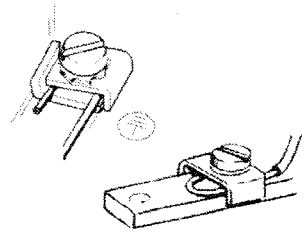
Vid utbyte eller tillägg av plint skall en tekniskt likvärdig kopplingsplint användas. Vid reparationsarbeten på kapslingen såsom t.ex. att byta ut tätningen skall likadana komponenter beställas hos ROSE eftersom driftstillståndet annars upphör.

9. Kabel- och ledningsinföringar

Enligt EN 50014 bilaga B endast kontrollerade kabel- och ledningsinföringar med EG-typintyg. Endast fast förlagda kablar och ledningar från föras in. Användaren måste garantera säker dragavlastning. Vid användning inom område med brännbart damm får endast ATEX-kontrollerade kabel- och ledningsinföringar med lägsta kapslingsklass IP 6X användas. Avstånden mellan hålen skall beaktas i enlighet med kapitel 12.

10. Skyddsledaranslutning

Var och en av klämbyglarna får ta upp 2 ledare upp till 6 mm². Ansluts endast 1 ledare, måste denna böjas till en ögla så att ett jämnt tryck sker genom bygeln.



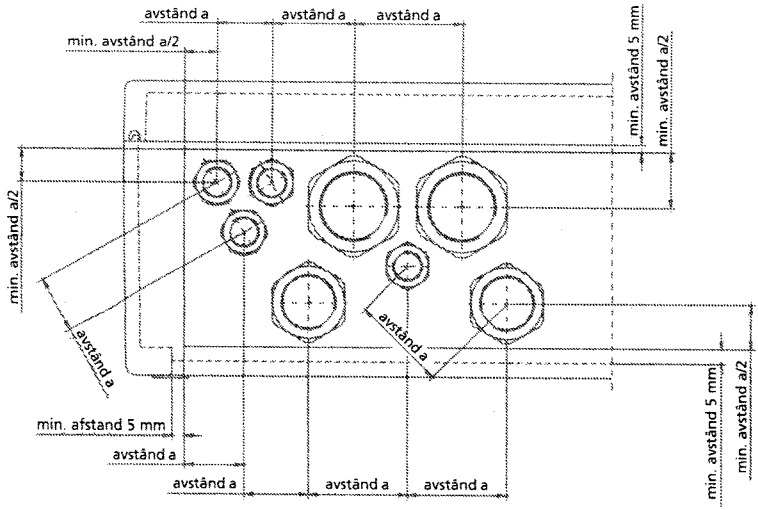
11. Ej fullständigt utrustad ex-kapsling

Eftersom du som kund hos företaget ROSE erhåller en ofullständig utrustning som är försedd med intyg och provad enligt EN 50014, 50019, 50020 och 50281-1-1, är du förpliktigad att genomföra styckprovningen enligt föregivna PTB-provade tillverkar-underlag.
- Max. area
- Max. spänning
- EG-typprovade och med intyg försedda kabel- och ledningsinföringar samt plugg.
- Skyddsledaranslutning samt potentialutjämning enligt EN 50014, punkt 15.4.
- Luft- och krypsträcka enligt EN 50019, tabell 1 och
- EG-typprovad och med intyg försedd kopplingsplint, varvid bestyckningen och den kontinuerliga strömmen måste beaktas i enlighet med bilagan.
- Anslutningsdelar, förbindningar och anslutningsplint inom tändskyddstypen egensäkerhet "i" måste uppfylla bestämmelserna enligt EN 50020, avsnitt 6.3.1.

Eftersom tillverkaransvaret och rutinprovningen åligger företaget ROSE skall ovillkorligen punkterna enligt EN 50014 under avsnitt 24, 25 och 26 beaktas, eftersom i annat fall det tillåtna EG-typintyget ej är giltigt.

12. Borravstånd för kabelförskruvning

M	PG	Avstånd	M	PG	Avstånd	M	PG	Avstånd
12	7	20 mm	12 + 16	7 + 9	21 mm	16 + 20	9 + 11	24 mm
16	9	22 mm	12 + 20	7 + 11	23 mm	16 + 20	9 + 13.5	25 mm
20	11	26 mm	12 + 20	7 + 13.5	24 mm	16 + 25	9 + 16	27 mm
20	13,5	27 mm	12 + 25	7 + 16	26 mm	16 + 32	9 + 21	32 mm
25	16	32 mm	12 + 32	7 + 21	31 mm	16 + 40	9 + 29	37 mm
32	21	42 mm	12 + 40	7 + 29	37 mm	16 + 50	9 + 36	43 mm
40	29	53 mm	12 + 50	7 + 36	42 mm	16 + 63	9 + 42	46 mm
50	36	63 mm	12 + 63	7 + 42	46 mm	16 + 63	9 + 48	49 mm
63	42	70 mm	12 + 63	7 + 48	48 mm			
63	48	75 mm						
M	PG	Avstånd	M	PG	Avstånd	M	PG	Avstånd
20 + 20	11 + 13.5	27 mm	20 + 25	13.5 + 16	30 mm	25 + 32	16 + 21	37 mm
20 + 25	11 + 16	29 mm	20 + 32	13.5 + 21	35 mm	25 + 40	16 + 29	43 mm
20 + 32	11 + 21	34 mm	20 + 40	13.5 + 29	41 mm	25 + 50	16 + 36	48 mm
20 + 40	11 + 29	40 mm	20 + 50	13.5 + 36	46 mm	25 + 63	16 + 42	51 mm
20 + 50	11 + 36	45 mm	20 + 63	13.5 + 42	49 mm	25 + 63	16 + 48	54 mm
20 + 63	11 + 42	48 mm	20 + 63	13.5 + 48	52 mm			
20 + 63	11 + 48	51 mm						
M	PG	Avstånd	M	PG	Avstånd	M	PG	Avstånd
32 + 40	21 + 29	50 mm	40 + 50	29 + 36	61 mm	50 + 63	36 + 42	69 mm
32 + 50	21 + 36	55 mm	40 + 63	29 + 42	64 mm	50 + 63	35 + 48	72 mm
25 + 63	21 + 42	58 mm	40 + 63	29 + 48	67 mm			
25 + 63	21 + 48	61 mm						
M	PG	Avstånd						
63 + 63	42 + 48	73 mm						



Index of Revisions

Rev.	Sheet	Prepared, revised		Checked	Approved			Remark, kind of revision
		Name	Date	Name	Name	Date	Status	
00	1 of 244	V12/sro	2004-09-01	V12/lf	V12/di	2004-09-10	IFR	First Issue
01	1 of 298	V12/sro	2005-02-14	V12/lf	V12/di	2005-02-16		FINAL ISSUE