

Operating and mounting manual automatic 3/2-way valve solenoid valve EVDF..(R)

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1.0 General remarks

This operating manual includes instructions to assemble and operate the valve in the prescribed and safe way. **Additionally, the adequate operation instructions of each special solenoid drive must be considered.**

| | |
|-----------------|-------------|
| Series MG... | 220.100.038 |
| Series MG...X | 220.100.040 |
| Series MG...Xme | 220.100.039 |

If any difficulties appear that can not be solved by means of the operating manual, further information may be demanded from the manufacturer.

This operating manual is in accordance with the relevant valid EN safety standards and the valid prescriptions and rules of the Federal Republic of Germany.

If the solenoids are used abroad of the FRG, the operator and/or the person who is responsible for the plant concept must take care that the valid national rules are met.

The manufacturer reserves the right of any technical change and improvement.

The use of these operating instructions suppose the qualification of the user according to paragraph 2.3 "qualified staff".

The operating staff must be trained in accordance with the operating instructions. The operating manual must always be available at the location where used.

1.1 Valve Data

Manufacturer:

UNI Geräte E. Mangelmann
Elektrotechnische Fabrik GmbH
Holtumsweg 13
D-47652 Weeze
Telefon: +49 (0) 2837/9134-0
Fax: +49 (0) 2837/1444
E-Mail: info@uni-geraete.de
Homepage: www.uni-geraete.de

Designation

Direct-acting, spring-loaded automatic 3/2-way valve with solenoid actuator.

Working pressure:
10- EVDF..R.. 0 – 10bar
12- EVDF..R.. 0 – 12bar

Medium: Air, water and other neutral thin fluid media

Medium temperature: -20°C to + 200°C

Ambient temperature: -20°C to + 60°C

Fitting position: vertical drive (preferred) and horizontal drive.

Switching cycles: see operating instructions solenoid drive

Threaded connection dimension at DIN ISO 228-1 / NPT

| Connection G | 1/4 (2) | 3/8 (3) | 1/2 (5) | 3/4 (7) | 1 (10) | 1 1/4 (12) | 1 1/2 (15) | 2 (20) | Test pressure (*) PT |
|---------------|------------|------------|------------|------------|-----------|---------------|---------------|-----------|-------------------------|
| 10- EVDF..R.. | X | - | - | - | - | - | - | - | PT 15 |
| 12- EVDF..R.. | X | X | X | - | - | - | - | - | PT 18 |

(*) Test pressure to perform leakage test "NO FUNCTION TEST"

Voltage: VDC 12 – 440 (-15% bis +10%)

VAC 24 – 500 (-15% bis +10%)

Protection type: IP54 or IP65

Frequency 40 – 60 Hz

Power 10 – 4000W

Details to the electrical data can be found on the type sign and the adequate operation instruction of the solenoid drives.

1.2 Application

The solenoid valves EVDF..(R). are used as automatic 3/2-way valves for protection, limitation, shut-off and release of gas and air supply at main stops or in front of gas burners.

If used in other cases, the operator must carefully check if construction/design of valve, accessories and materials are suitable for the new application. The range of application is subject to the responsibility of the plant planner. The service life of the valve is 20 years.

2.0 Danger Notices

2.1 Safety Terms

The signal terms DANGER, CAUTION und NOTICE are used in this operating manual in case of notices concerning special dangers, or for unusual information, requiring a special marking.



DANGER! means that in case of non-observance there is danger to life and/or considerable damage.



CAUTION! means that in case of non-observance there is danger of injury and/or damage.



NOTICE! means that attention is drawn to technical correlations/connections.

Observance of other, not especially marked notices concerning transport, assembly, operation and maintenance and other data (in the operating manual, product documentation and at the unit itself) is also essential, in order to avoid disturbances that might affect direct or indirect damage to property or injury to persons.

2.2 Safety Notice

Non observance of safety instructions can lead to loss of any claim for damages.

Non observance can lead to the following mentioned dangers:

- Failure of important functions of the valve/plant
- Endangering of persons by electrical or mechanical influences.
- Protection against accidental contact for moving parts may not be removed as long as the valve is in operation.
- Leakage of dangerous media (e.g. explosive, toxic, hot) must be removed in the way that there is no danger for persons or environment. Laws and regulations must be observed.

2.3 Qualified staff

These are persons who are familiar with erection, assembly, starting, operation and maintenance of the product and who have special qualifications acc. to their activities and functions, e.g.:

- Instruction and obligation to carry out and meet all regional and in-house orders and requirements.
- Education or instruction according to the safety engineering standards in use and maintenance of adequate safety and working protection equipment.
- Training in first aid.

2.4 Unauthorized Modification and Spare Part Production

Modification or changes of the valve are only allowed after agreement of the manufacturer. Original drawings and accessories authorized by the manufacturer are for safety purposes. The use of other parts or unauthorized changes at the valve by third persons may cancel and abolish the manufacturer's liability for resulting consequences.

2.5 Unauthorized Operation

Operational reliability of the delivered valve is only guaranteed in case of determined use in accordance to paragraph 1 of the operating manual. **The application limits mentioned on the type sign may on no account be exceeded.**

2.6 Safety information for the use in explosion-prone areas guideline 2014/34/EU

- The temperature of the medium must not exceed the respective temperature class, and respectively, the respective maximum permitted medium temperature as per operation guideline.
- If the valve is heated (e.g. heating jacket), care must be taken, that the specified temperature class is kept in the time.
- The valve must be connected to the ground.
In the case most simple this can be realized via pipe screws by means of tooth disc.
Otherwise the connection to the ground must be implemented by other measures e.g. cable links.
- Control valves, electrical and electrical/mechanical drives as well as sensors must undergo a separate conformity check as per ATEX. In doing so the respective safety and explosion protection information in the operation instructions are to taken into special consideration.
- Any modifications whatsoever to the valve are not allowed. The ATEX approval is void with immediate effect if the valve is modified without prior authorisation (even including painting).
- UNI-Geräte GmbH must be consulted before any modifications are made.

Furthermore we point out the guideline 1999/192/EC, which include the minimum regulations for the improvement of the health-related situation and the safety of the employees, who might be jeopardized by an explosive atmosphere.

2.7 Safety information regarding guideline 2014/68/EU attachment I



Danger!

UNI valves are not an accessory with a safety function as defined in the PED 2014/68/EU Article 2 (4) and Article 4 (1) (d) by category IV
Use or classify!

3.0 Handling

3.1 Transport

For any transport works, the generally recognised technical rules and standards as well as rules for prevention of accidents must be observed.

During transport, storage and decommissioning, protective caps must be attached to the sides of the valve.

The goods to be transported must be carefully treated. During transport, the valve must be protected against strokes, impacts or vibration. The coat of lacquer may not be damaged. Transport temperature is -20°C up to $+60^{\circ}\text{C}$.

Never transport the valve at screwed cable glands, appliance plugs or add-on units. The valve can be transported at ring nuts, flange borings or by means of a belt under the solenoid drive.

Transport the valve in a case or on a pallet with smooth base and put it softly on plain floor. **Never put the valve on attachment parts.**

The goods must be checked on completeness and transport damage. See also section 9.0

3.2 Storage

If the valve is not installed immediately after delivery, it must be stored properly.

- Storage temperature -20°C up to +60°C, dry and clean.
- The lacquer protects against corrosion in neutral dry atmosphere. Do not damage colour.
- In humid rooms, a drying agent or a heating resp. is necessary because of condensation of water.

Requirements according to DIN 7716 (products made of caoutchouc and rubber) must be met.

3.3 Handling before Mounting

- In case of valve with protection caps, they must be removed before being mounted!
- Protect against atmospheric influences such as humidity.
- Appropriate treatment protects against damage.

4.0 Product description

The solenoid valves in the EVDF..(R).. series are direct-acting, normally closed (NC), resp. normally opened (NO), spring-loaded automatic 3/2-way valves with solenoid actuator.

Sectional drawing 11.1 Fig. 1 to Fig. 2 shows the valve construction.

4.1 Function

Opening operation:

On applying the operating voltage the solenoid core (207) picks up the valve pin (214/2) with the two valve disks (200).

Normal design (NC):

Passage pressure source (1) – working line (2) will be free.

Passage working line (2) – vent line (3) will be closed.

“R” – design (NO):

Passage working line (2) – vent line (1) will be free.

Passage pressure source (3) – working line (2) will be closed.

Closing operation:

After operating voltage disconnection the solenoid core (207) will drop with the valve pin (214/2) and the two valve disks (200) due to its net weight and the close force of the pressure springs (503/2).

Normal design (NC):

Passage pressure source (1) – working line (2) will be closed.

Passage working line (2) – vent line (3) will be free.

“R” – design (NO):

Passage working line (2) – vent line (1) will be closed.

Passage pressure source (3) – working line (2) will be free.

4.2 Technical Data

Opening times: 0,3 – 1s

Closing times: < 1s

Solenoid –drive types MG...

| Connection G | 1/4 (2) | 3/8 (3) | 1/2 (5) | 3/4 (7) | 1 (10) | 1 1/4 (12) | 1 1/2 (15) | 2 (20) |
|----------------|------------|------------|------------|------------|-----------|---------------|---------------|-----------|
| 10-EVDF 2R.Ü.. | 016 | 016 | 018 | - | - | - | - | - |
| 12-EVDF..R.. | | | | | | | | |

Max. valve loading by pipe power

The indicated moments may not work longer than 10s.

| DN | 8 | 10 | 15 | 20 | 25 | 32 | 40 | 50 | 65 | 80 | 100 | 125 | ≥150 |
|-------------------|----|----|-----|-----|-----|-----|-----|-------------------|-------------------|-------------------|------|------|------|
| Torsion Nm | 20 | 35 | 50 | 85 | 125 | 160 | 200 | 250 ¹⁾ | 325 ¹⁾ | 400 ¹⁾ | - | - | - |
| Bending Nm | 35 | 70 | 105 | 225 | 340 | 475 | 610 | 1100 | 1600 | 2400 | 5000 | 6000 | 7600 |

¹⁾ Not valid in case of valves with flanges

Starting torque, pipe screws greased

| DN | 8 | 10 | 15 | 20 | 25 | 32 | 40 | 50 | 65 | 80 | 100 | 125 | ≥150 |
|-----------|----|----|----|----|----|----|----|----|----|----|-----|-----|------|
| Torque Nm | 20 | 30 | 30 | 30 | 30 | 50 | 50 | 50 | 50 | 50 | 80 | 160 | 160 |

Starting torque, product screws and nuts greased

| Screw | M6 | M8 | M10 | M12 | M16 | M20 | M24 |
|-----------|----|----|-----|-----|-----|-----|-----|
| Torque Nm | 5 | 11 | 22 | 39 | 70 | 110 | 150 |

4.3 Marking

The type sign on the solenoid drive has the following information:

- Fabricator
- Valve type, nominal width, pressure and temperature indication, fitting position
- Year of construction/ production no.
- Valve class and valve group acc.
- CE-sign and no. of relevant location
- Fluid group and test pressure PT
- Solenoid drive type
- Electr. performance
- Voltage
- Frequency
- Protection type

When using solenoid drives for ex-protection zone 1 refer to information in the valid operation instruction.

Refer also to section 10.0.

5.0 Installation

5.1 Warning of Dangers during Installation, Operation and Maintenance



DANGER!

Safe operation of the valve can only be guaranteed if it is installed, commissioned and maintained by qualified personnel (see point 2.3 “Qualified staff”) correctly and in observance of the warnings in this operating manual. Apart from that, the operation safety order and the qualified use of tools and protection equipment must be guaranteed. The operating instructions for the valve must be observed during all work on or with the valve. Failure to observe these instructions may result in injury or in damage to the valve or other installations.

When the valve is used as a final sealing element, a safety precaution e.g. blanking disc, blind flange, etc., in accordance with the code of practice of the German Technical and Scientific Association for Gas and Water (DVGW) is recommended during all repair work.

5.2 Installation

Apart from the general installation guidelines, the following points should be observed:



NOTICE!

- Remove protective caps.
- The inside of the valve and the pipeline must be free from foreign particles.
- Observe the installation position in relation to the flow direction, see markings on the valve.
- Ensure that none of the components is strained during installation.
- The valve must not be used as a fixed point; it is supported by the pipework system.
- Protect valves from soiling, particularly during construction work.
- Thermal expansion of the pipework must be equalized using compensators.

The valve can be installed with upright but not suspended solenoid drive.



NOTICE!

Please observe the solenoid drive operating instructions.

5.3 Installation position

The connection for the 3/2 way valve is to be made as follows:

Normal design (NC) currentless closed

- Connection 1 Pressure source
- Connection 2 Working line
- Connection 3 Vent line

“R” - design (NO) currentless opened

- Connection 1 Vent line
- Connection 2 Working line
- Connection 3 Pressure source

6.0 Operation



DANGER!

Before commissioning a new installation or before starting up an installation again after repairs or modifications, ensure:

- The proper completion of all installation and assembly work!
- Commissioning only by “qualified staff” (see point 2.3).
- Installation or repair of existing guards and protection equipment.

6.1 Commissioning

- Before commissioning, check the data on material, pressure, temperature and flow direction with the layout plan of the pipework system.
- Depending on the field of application, the local regulations have to be observed, e.g. the operation safety order.
- Residues in the pipework and the valve (dirt, weld beads, etc.) will inevitably result in leaks.
- Leakage inspection of the installed valve.

6.2 Shutting Down

- Depending on the field of application, the local regulations have to be observed, e.g. the operation safety order.

6.3 Maintenance

Solenoid valves have to be checked at regular intervals for proper function and internal leak tightness. The intervals for regular inspections have to be defined by the operator according to the operating conditions. UNI-Geräte recommends an internal visual inspection once a year and an overhaul of the valve after 2 years or after the following number of switching cycles at the latest:

| Application temperature | DN ≤ 25 | ≤ DN 80 | ≤ DN 150 | > DN 150 |
|-------------------------|---------|---------|----------|----------|
| ≤ 25°C | 150 000 | 75 000 | 25 000 | 20 000 |
| > 25°C | 50 000 | 25 000 | 25 000 | 5 000 |

6.4 Putting Back into Operation

When putting a valve back into operation, ensure that all the necessary steps described in section 5.2 (Installation) and section 6.1 (Commissioning) are repeated.

Repair or maintenance works at the manufacturing company (UNI- Geräte)



DANGER!

Valves and fittings must be delivered clean and free from substances which are harmful to health or to the environment.

7.0 Troubleshooting

7.1 Detection of defects



DANGER!

Be sure to observe the safety instructions during troubleshooting.

If the malfunctions cannot be remedied using the following “**Troubleshooting plan (7.2)**” please contact the manufacturer.

In the event of faults in the function or operating behaviour of the valve, check whether the installation work was carried out and completed as described in this operating manual.

Depending on the field of application, the operation safety order must be observed.

Check the data on material, pressure, temperature, voltage and flow direction with the layout plan of the pipework system. In addition, check whether the operating conditions correspond to the technical data in the data sheet or on the rating plate.

7.2 Troubleshooting Plan

| Malfunction | Possible causes | Remedy |
|--|--|--|
| No flow | Valve does not open | Switch on solenoid drive (800) Check operating voltage |
| | Working pressure too high | Compare working pressure with the data on the rating plate |
| | Protective caps were not removed | Remove protective caps |
| Low flow rate | Clogging in the pipework system | Check pipework system |
| Valve leaking at seat, no internal tightness | Valve disk sealing (400) or valve seat (100) damaged by external particles | See section 8 or replace valve |
| No external tightness | Gaskets damaged | See section 8 or replace valve |
| Valve does not close | Connected voltage too high | Check whether there is residual voltage, see section 4.1 |



NOTICE!

Observe section 9.0 before all installation and repair work!

Observe section 6.4 when putting the valve back into operation!

8.0 Dismantling of the Valve

In addition to the general installation guidelines and the operation safety order, the following points must also be observed:



DANGER!

- Depressurised pipework system
- Cooled medium
- Emptied installation
- Vent pipework systems containing corrosive, inflammable, aggressive or toxic media
- Have dismantling work carried out only by qualified staff (see point 2.3)

8.1 Replacement of Wear Parts

Shut down the valve as described in section 6.2.

Fig.1 12-EVDF 2/3/5R.(Xn)...

Switch off and dismantle the solenoid drive as described in the operating manual of the solenoid drive.



DANGER!
After continuous operation, the solenoid drive may be hot! Danger of burns!

Replace the 3/2-way valve.

Fig.2 10-EVDF 2R.Ü.Xde...; 12-EVDF 3/5RÜ.Xde...

Replace the complete 3/2-way solenoid valve.

9.0 Warranty

Scope and period of the warranty is specified in the edition of the "General Terms of Business of the UNI-Geräte E. Mangelmann Elektrotechnische Fabrik GmbH" valid at the time of delivery or else in the purchase agreement.

We warranty that the valve is free from faults in line with the state of the art and for the confirmed field of application.

No warranty claims will be accepted for damage resulting from improper use or failure to observe these operating and installation instructions, the statutory accident prevention regulations, the EN, DIN and VDE standards and other codes and regulations.

Warranty claims will also not be accepted for damage occurring during operation due to operating conditions deviating from those specified in the data sheet or in other agreements.

Justified complaints will be remedied by reworking by us or specialist companies authorised by us.

Claims going beyond the scope of the warranty will not be accepted. The customer shall have no right to the supply of a replacement valve.

Maintenance work, installation of parts from other manufacturers, any modifications to the design and natural wear are not covered by the warranty.

Transport damage must be reported not to us but **without delay** to your responsible goods handling company, the railway company or the shipping agent as otherwise all claims for damages against these companies will be voided.

10.0 Explanations on Codes and Directives

The Commission of the European Union has laid down common directives resp. regulations for the free trading of goods within the Union specifying minimum requirements for safety and health protection. The CE symbol confirms that products comply with the EU directives resp. regulations, i.e. in conformity with the relevant, in particular harmonised standards. Directive 2014/68/EU applies to the valve (mechanical part).

Notes on Directive 2014/68/EU (Pressure Equipment Directive, DGRL):

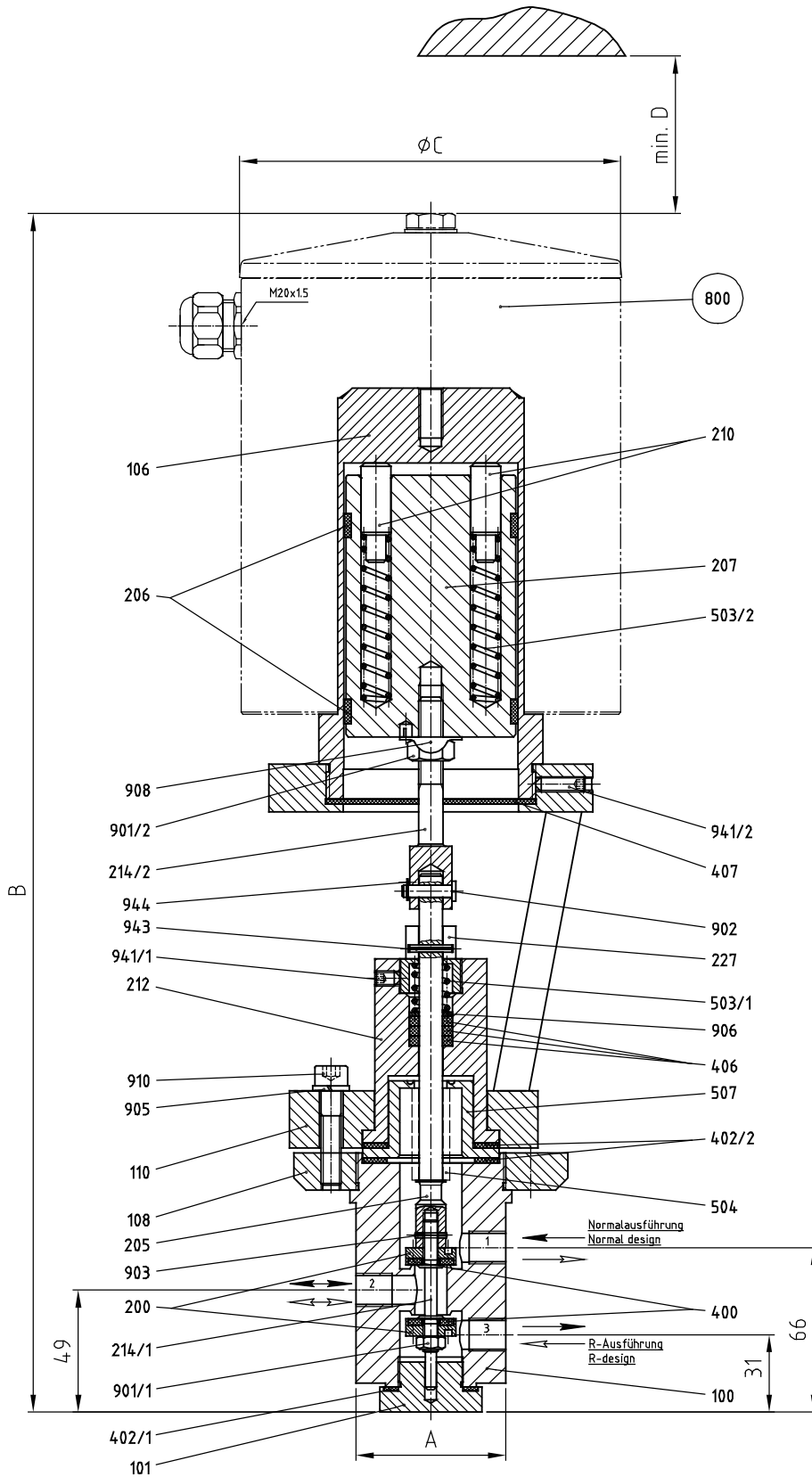
It has been confirmed that the quality assurance in design control, manufacture and final acceptance of the manufacturer, UNI-Geräte E. Mangelmann Elektrotechnische Fabrik GmbH, satisfy the requirements of 2014/68/EU Article 14 Module H. The valves comply with the fundamental requirements of Directive 2014/68/EU. Valves in according to Article 1 Paragraph 2,f,v or Article 4 paragraph 3 are not allowed to have the CE Mark in according to Article 18.

Note concerning ex-guideline 2014/34/EU (explosion guideline ATEX):

The product is not subject to guideline 2014/34/EU, since due to the loads occurring during practical operation, there is no effective source of ignition even in case of an error case to be assumed. This also applies to spring-loaded components in the medium-conveying space. In case of electric drives, sensors or other electric components the application as per 2014/34/EU is to be checked separately.

11.0 Drawing

11.1 Fig. 1 sectional drawing 12- EVDF 2/3/5R.(Xn).. (G1/4, 3/8, 1/2)




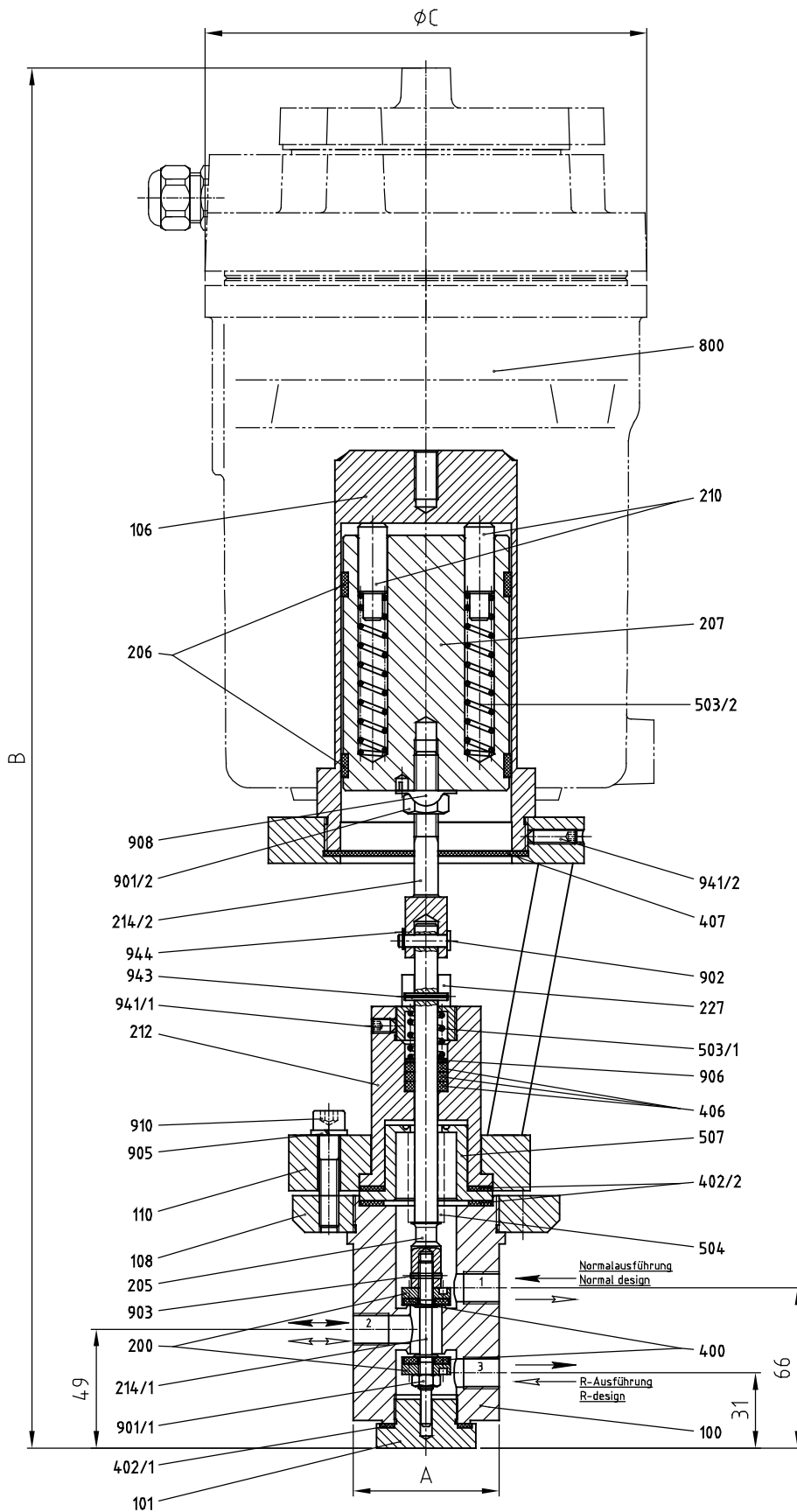
 = Spare parts

Fig. 2 sectional drawing 10-EVDF 2RÜ.Xde... (G1/4) ; 12-EVDF 2/3/5R...Xde.. (G1/4, 3/8, 1/2)



11.2 List of parts

| Pos./ Item | Stück/ Qty. | Benennung | Description |
|------------|-------------|----------------------|-----------------------|
| 100 | 1 | Ventilgehäuse | valve chamber |
| 101 | 1 | Gehäusemutter | housing nut |
| 106 | 1 | Gehäuseoberteil | upper part of housing |
| 108 | 1 | Gehäuseflansch | housing flange |
| 110 | 1 | Distanzstück | spacer |
| 200 | 2 | Ventilteller | valve disk |
| 205 | 1 | Ventilspindel | valve spindle |
| 206 | 2 | Führungsring | guide ring |
| 207 | 1 | Magnetkern | solenoid core |
| 210 | 4 | Federbolzen | spring bolt |
| 214/1 | 1 | Ventilstift | valve pin |
| 214/2 | 1 | Ventilstift | valve pin |
| 212 | 1 | Spindelführung | spindle guide |
| 227 | 1 | Verdrehschutz | distort protection |
| 400 | 2 | Ventiltellerdichtung | valve disk sealing |
| 402/1 | 1 | Flachdichtung | gasket |
| 402/2 | 2 | Flachdichtung | gasket |
| 406 | 3 | Packung | packing |
| 407 | 1 | Staubschutzmembrane | dust guard membrane |
| 503/1 | 1 | Druckfeder | pressure spring |
| 503/2 | 4 | Druckfeder | pressure spring |
| 504 | 1 | Faltenbalg | expansion bellows |
| 507 | 1 | Faltenbalgstück | bellow piece |
| 800 | 1 | Magnetantrieb | solenoid drive |
| 901/1 | 1 | Sechskantmutter | hexagon nut |
| 901/2 | 1 | Sechskantmutter | hexagon nut |
| 902 | 1 | Bolzen | bolt |
| 903 | 1 | Kerbstift | grooved dowel pin |
| 905 | 4 | Federring | lock washer |
| 906 | 1 | Scheibe | washer |
| 908 | 1 | Sicherungsblech | locking plate |
| 910 | 4 | Zylinderschraube | cylinder head screw |
| 941/1 | 1 | Gewindestift | setscrew |
| 941/2 | 1 | Gewindestift | setscrew |
| 943 | 1 | Spannstift | spring dowel sleeve |
| 944 | 1 | Sicherrungsring | safe ring |

Wearing parts

| Version | Fig. | Type | Spare parts |
|----------------|--------|-------------------------------|----------------------|
| Thread version | Fig. 1 | 12-EVDF 2/3/5R.Xn.W.Ü.P.09.29 | Solenoid drive (800) |
| | Fig. 2 | 10/12-EVDF 2/ 3/5 R.Ü.Xde... | - |

Dimension

| Connection G | Dimension | 1/4 (2) | 3/8 (3) | 1/2 (5) | 3/4 (7) | 1 (10) | 1 1/4 (12) | 1 1/2 (15) | 2 (20) |
|---------------------------------------|----------------|------------|------------|------------|------------|-----------|---------------|---------------|-----------|
| Installation length | A | 60 | 60 | 65 | - | - | - | - | - |
| | 12-EVDF...R... | B | 481 | 481 | 501 | - | - | - | - |
| | | ØC | 153 | 153 | 191 | - | - | - | - |
| | | D | 131 | 131 | 150 | - | - | - | - |
| | Weight kg | 23,8 | 23,8 | 37,0 | - | - | - | - | |
| 10-EVDF 2RÜ.Xde. 12-EVDF 3/5R.Xde. | B | 569 | 569 | 587 | - | - | - | - | |
| | ØC | 153 | 153 | 191 | - | - | - | - | |
| | Weight kg | 37,5 | 37,5 | 52,4 | - | - | - | - | |