



*Elektromotoren und
Gerätebau Barleben GmbH*



TECHNICAL DOCUMENTATION

Gas Relay for Transformers

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1 Safety instructions

Make sure that any persons installing, taking into operation and operating gas relays of type 80 are:

- qualified and competent, and
- fully comply with these operating instructions.

Improper operation or misuse might cause danger to:

- life and limb,
- the relay and other property of the operator, and
- the relay's proper function.

Opening of the device will void your warranty.

Safety instructions in this manual are presented in three different forms to emphasize important information:



NOTE

This symbol refers to important information on a specific subject.



CAUTION

This symbol indicates particular risks for the device or any other property of the operator. Danger to life and limb cannot be excluded.



WARNING

This symbol indicates serious danger to life and limb. Non-compliance with this warning may cause most serious injuries or even be fatal.

2 Mode of operation

The gas relay can be used both on hermetically sealed transformers and on open-type transformers.

Due to its specific design, the gas relay is suitable especially for hermetically sealed transformers without nitrogen cushion. Mounted on the transformer tank it can be filled completely through an oil filler so that reliable monitoring of the oil level is ensured.

An integral pressure switch (optional) and a temperature sensor offer significant additional monitoring options for the transformer.

With open-type transformers with conservator the gas relay, on the one hand, serves as an air cell failure relay monitoring the hydro-type compensator (rubber sack) in the conservator and, on the other hand, the gas relay can also be used on the transformer cover.

During normal operation the gas relay must be filled completely with oil. Due to its buoyant force the float is in the upper limit position.

As soon as gases are generated, these are collected in the gas relay and cause the float to descend. This actuates the switching contact (magnetic contact tube) and trips a signal.

Gas collection is indicated by the sightglass.

3 Types

| Type Manufacturer's designation | Type of connection | Pipe diameter DN (mm) | Flange dimensions (mm) | | | | Device dimensions (mm) | Weight without packaging (kg) |
|---------------------------------------|-----------------------|-----------------------------|---------------------------|-----|----|----|---------------------------|----------------------------------|
| | | | d1 | d2 | d3 | d4 | | |
| 80 (CF 38) | Flange 4-hole | 38 | 75 | 100 | 11 | 10 | 223 | 3,5 |

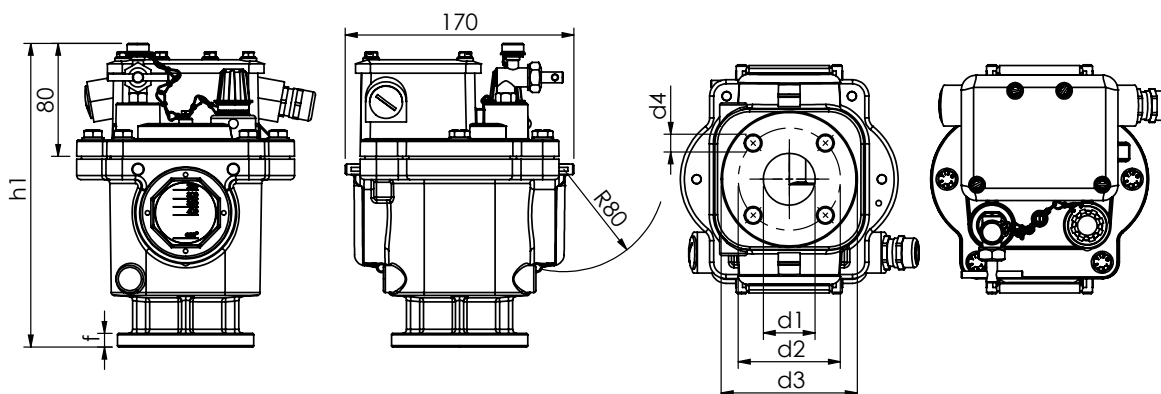


Fig. 1 - Dimensional drawing

4 Technical data

| Parameter | Value | Notes |
|--|---|--|
| Temperature range: - Ambient temperature - Operating range * Temperature of insulating liquid * Viscosity of insulating liquid | - 40 °C to + 55 °C - 40 °F to + 131 °F - 40 °C to + 115 °C - 40 °F to + 239 °F Up to + 135 °C design 21 required 1 mm ² /s to 1100 mm ² /s | Climatic test acc. to DIN EN 60068-2-78: 2002-09 Others on request |
| Insulating liquid | Mineral oil | Others on request |
| Resistance to vibration | Vibration: 2-200 Hz, 2 g Shock: 25 g, 6 ms | Class 4M6 acc. to DIN EN 60721-3-4 |
| Resistance to pressure | 0,25 MPa | |
| Resistance to vacuum | < 2,5 kPa | |
| Insensitivity to magnetic fields | 25 mT | Static magnetic field of any direction and polarity |
| Response of switching system to: - Gas accumulation | 200 cm ³ / 300 cm ³ / 400 cm ³ / Tolerance ± 15% | Others on request, see under section 11 |
| Cable gland | M20x1,5; M25x1,5 | Others on request |
| IP code | IP 56 | Others on request |
| Casing colour | Two-component texture paint | On polyurethane basis |

Other special designs are specified under section 9. Their codes are given under Ordering data/type codes.

Other options available on request.

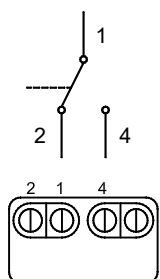
5 Switching system design options

Magnet contact tubes are used as switching elements. These are normally-open (NO), normally-closed (NC) or change-over (CO) contacts. The design of the switching system of the gas relay can be derived from the last digit of the type code. For coding, see Ordering data/type codes under section 10.

| ...1 | ...2 | ...3 | ...4 | ...5 |
|---------------|---------------|-------------------------------|-------------------------------|-------------------------------|
| 1 NO contact | 1 NC contact | 2 NO contacts | 2 NC contacts | 1 NO contact and 1 NC contact |
| | | | | |
| | | | | |
| ...6 | ...7 | ...8 | ...9 | |
| 1 CO contact | 2 CO contacts | 1 NO contact and 1 CO contact | 1 NC contact and 1 CO contact | |
| | | | | |
| | | | | |
| ...A | ...B | | | |
| 3 NO contacts | 3 NC contacts | | | |
| | | | | |
| | | | | |

Explanation of symbols:

Example: Coding „...6“
Design of magnet contact tube(s)



1 CO Contact → Switching symbol with terminal marking

→ Pin assignment in terminal box

The switching system is shown in its neutral position. The neutral position is the operating condition when the gas relay is filled completely with insulating liquid.

6 Use on open-type transformers

The following description of the installation process is non-binding. Exclusive responsibility is with the fitter.

6.1 Installation as air cell failure relay for hydro-type compensators

The gas relay (Fig. 2/ no. 1) is mounted on top of the conservator (Fig. 2/ no. 2) or laterally at top using four M10 fastening elements.



CAUTION

Proper operation requires that the gas relay is filled completely with oil.



NOTE

The fastening elements and a suitable sealing ring (not included in the scope of supply) ensure tight seat.

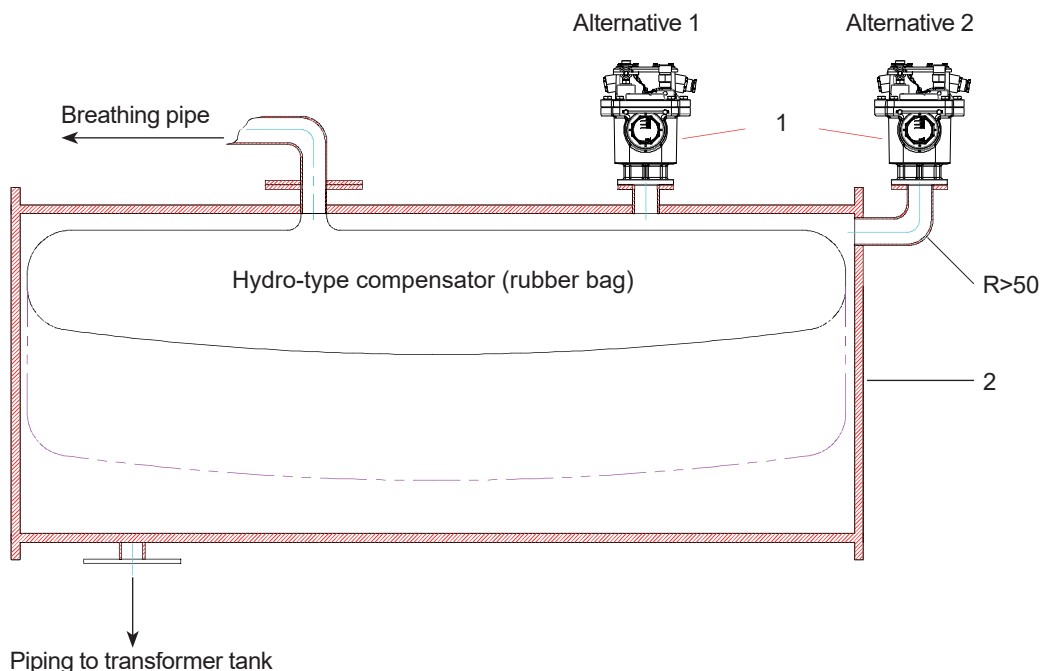


Fig. 2 - Sketch, mounting on conservator

After mounting and before taking into operation, open the bleeder valve to drain gas / air from the interior of the casing (see section 6.3).

Now the circuit can be tested with the help of the test key (see section 6.6).

During installation make sure that:

- gases produced can flow unimpeded into the gas relay,
- the flange is stressed evenly when tightening the screws,
- the gas relay is mounted on or above the conservator,
- the pipe has no elbows and bends are designed preferably with an inside radius $R > 50$ mm.



CAUTION

Make sure during installation that no dirt, moisture or foreign matter get into the gas relay. The insulating liquid of the transformer must not contain any conductive substances.

6.2 Installation as gas relay

The gas relay (Fig. 3/ no. 1) is mounted on the cover (Fig. 3/ no. 2) of the transformer using four M10 fastening elements.



CAUTION

Proper operation requires that the gas relay is filled completely with oil.
Make sure that the gas/air produced in the transformer can be collected initially in the gas dome of the gas relay.



NOTE

The fastening elements and a suitable sealing ring (not included in the scope of supply) ensure tight seat.

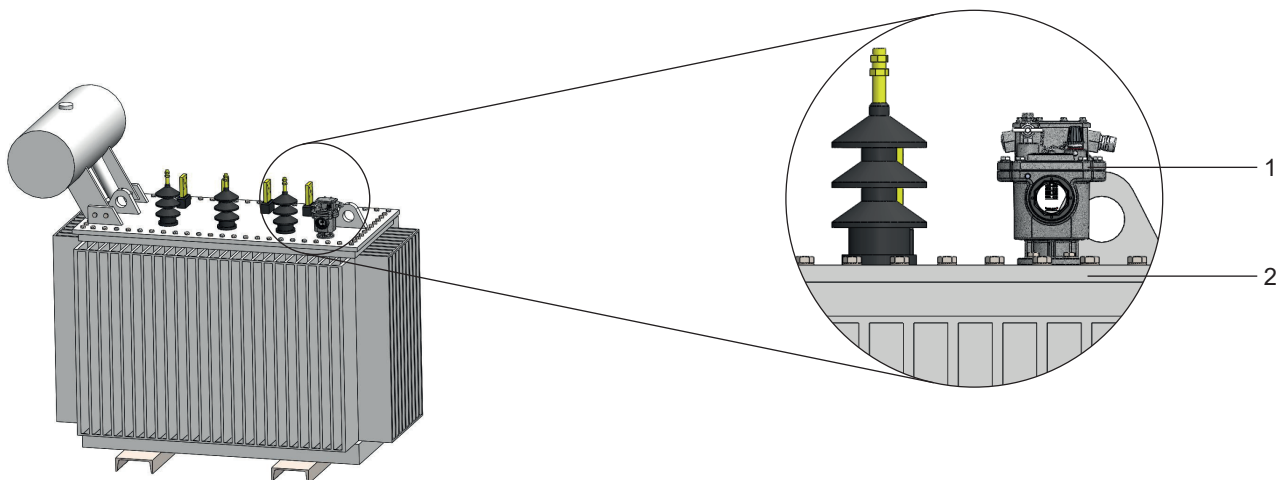


Fig. 3 – Mounting on transformer cover

After mounting and before taking into operation, drain the gas / air from the interior of the casing (see section 6.3).

Now the circuit can be tested with the help of the test key (see section 6.6)

During installation make sure that

- gases produced can flow unimpeded into the gas relay,
- the flange is stressed evenly when tightening the screws.



CAUTION

Make sure during installation that no dirt, moisture or foreign matter get into the relay. The insulating liquid of the transformer must not contain any conductive substances.

6.3 Filling and bleeding of gas relay

Once the device to be protected is ready for operation and the conservator filled with insulating liquid, bleed the gas relay completely.

Proceed as follows:

- Remove the small cap nut (Fig. 4/ no. 1) from the bleeding valve (Fig. 4/ no. 2).
- Open the bleeder valve (turn anticlockwise) and let the gas/air escape from the gas relay.
- Close the bleeder valve as soon as insulating liquid comes out (turn clockwise).
- Fit the small cap nut on the bleeder valve and tighten.

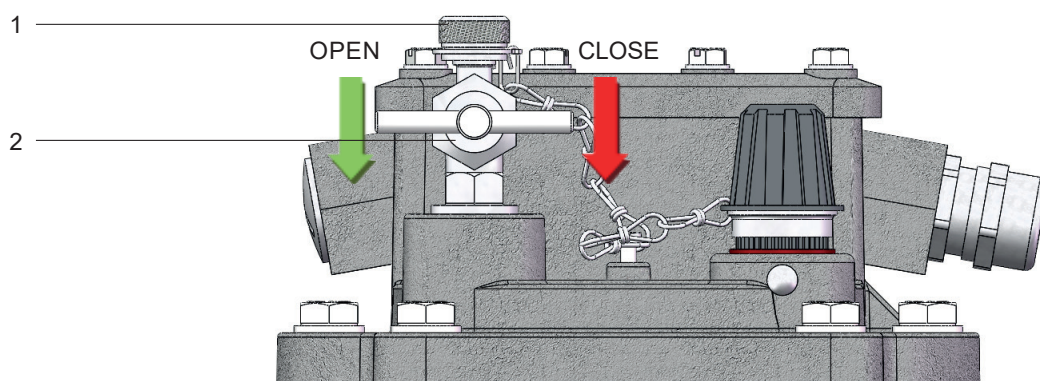


Fig. 4 - Bleeding valve

6.4 Removal of transport lock

Proceed as follows:

- Remove the large cap nut (Fig. 5/ no. 1) from the test key (Fig. 5/ no. 3).
- Remove the transport lock (Fig. 5/ no. 2) from the cap nut.
- Fit the large cap nut **without** the transport lock and tighten.

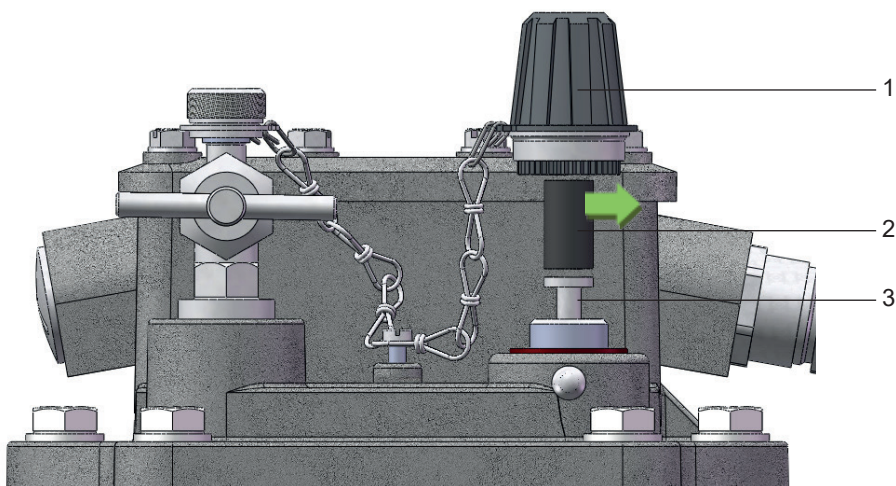


Fig. 5 – Removal of transport lock



CAUTION

Make sure that the transport lock is removed before taking the gas relay into operation. If the gas relay has to be transported separately, reinstall the transport lock.

6.5 Connection of signal lead

Not more than 2 multicore signal leads can be fitted in the gas relay through cable glands. A conductor cross section of 1.5 mm² (copper) is recommended. The maximum cross section that can be clamped is 4 mm².

Proceed as follows:

- Remove the screws (Fig. 6/ no. 1).
- Remove the cap (Fig. 6/ no. 2).
- Insert the lead through the cable gland (Fig. 6/ no. 3).
- Connect the lead to the terminal studs (Fig. 6/ no. 4) (max. tightening torque: 3 Nm).
- Tighten the cable gland.
- Fit the cap.
- Tighten the screws (Fig. 6/ no. 1) (max. tightening torque: 3 Nm).

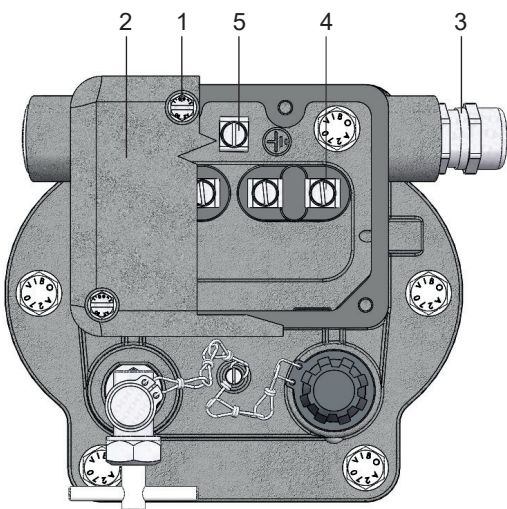


Fig. 6 – Electrical connection

Connected load of the switching systems:

Voltage: AC 5 V – max. 250 V
DC 5 V – max. 250 V

Current: AC 0.01 A – max. 6 A $\cos \varphi \geq 0.5$
DC 0.01 A – max. 6 A $L/R \leq 40\text{ms}$

Switching capacity: AC max. 1500 VA
DC max. 1250 W



NOTE

The inner side of the cap accommodates a plate with the connection diagram and the pin assignment (Fig. 7). The switching systems are shown in their neutral position. The neutral position is the operating condition when the gas relay is filled completely with insulating liquid and the device to be monitored operates without any fault.

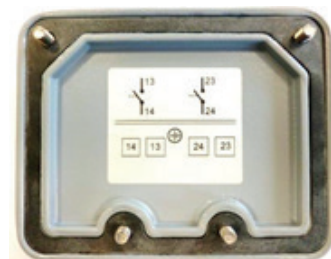


Fig. 7 – Inner side of cap (example)



WARNING

Connect the protective conductor (green-yellow insulation) to the earth terminal (Fig. 5/ no. 6) (max. tightening torque: 3 Nm).

6.6 Functional test

The functional test can be carried out using both the test key (mechanically) and a special test pump (pneumatically). Make sure that the gas relay is filled completely with insulating liquid.

Functional test by means of the test key:

Proceed as follows:

- Remove the large cap nut (Fig. 8/ no. 1).
- Press the test key (Fig. 8/ no. 2) down to stop position and keep it depressed.
- Obtain verification of correct function from the control room.
- Release the test key.
- Fit and tighten the large cap nut.

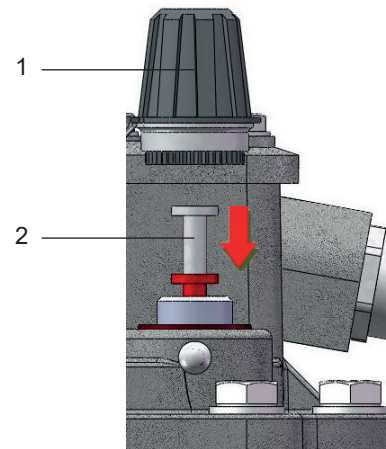


Fig. 8 - Test key

Functional test by means of the test pump:

Proceed as follows:

- Remove the small cap nut (Fig. 9/ no. 1) from the bleeder valve (Fig. 9/ no. 2).
- Fit the adapter (Fig. 9/ no. 3) of the hose providing the connection to the test pump (Fig. 9/ no. 4) on the valve nozzle (Fig. 9/ no. 5).
- Open the bleeder valve (turn anticlockwise).
- Pump air into the gas relay until lowering of the float causes the magnet contact tube to operate.
- Obtain verification of correct function from the control room.
- Close the bleeder valve (turn clockwise).
- Remove the adapter from the valve nozzle.
- Open the bleeder valve and let the air escape (see section 6.3).
- Close the bleeder valve as soon as insulating liquid comes out.
- Fit the small cap nut on the bleeder valve and tighten.

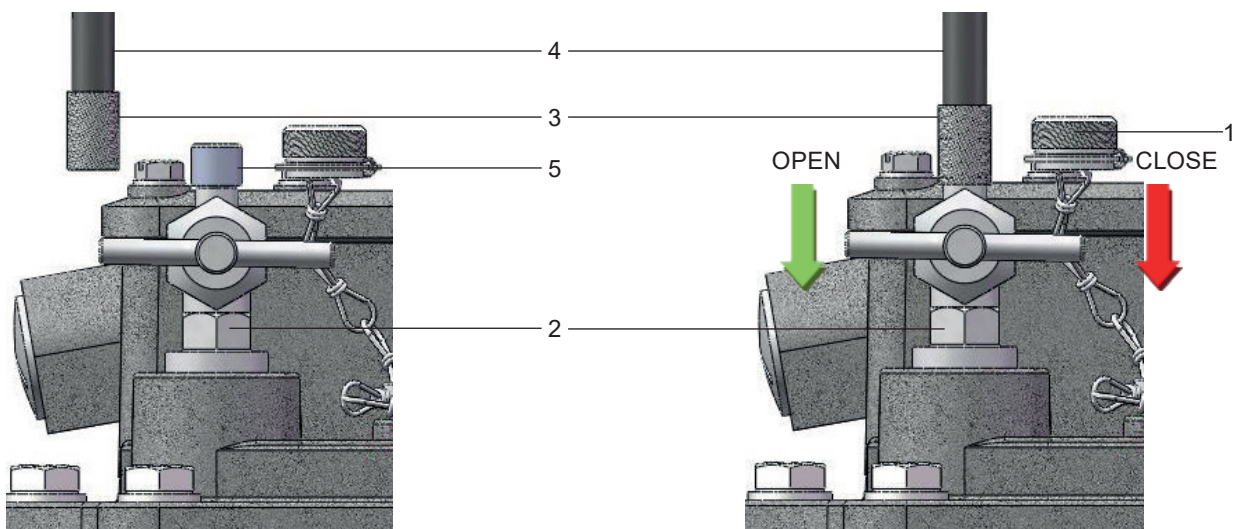


Fig. 9 – Functional test by means of test pump



NOTE

Use only test pumps with adapter (ball valve) from EMB (ZG 5.1. or ZG 5.2.).

7 Use on hermetically sealed transformers

The following description of the installation process is non-binding. Exclusive responsibility is with the fitter.

7.1 Installation as gas relay

The gas relay (Fig. 10/ no. 1) is mounted on the cover (Fig. 10/ no. 2) of the hermetically sealed transformer without nitrogen cushion using four M10 fastening elements.



CAUTION

Proper operation requires that the gas relay is filled completely with oil. However, to ensure complete bleeding, the transformer oil level in the filler neck (Fig. 10/ no. 3) must be above the maximum oil level in the gas relay.



NOTE

The fastening element and a suitable sealing ring (not included in the scope of supply) ensure tight seat.

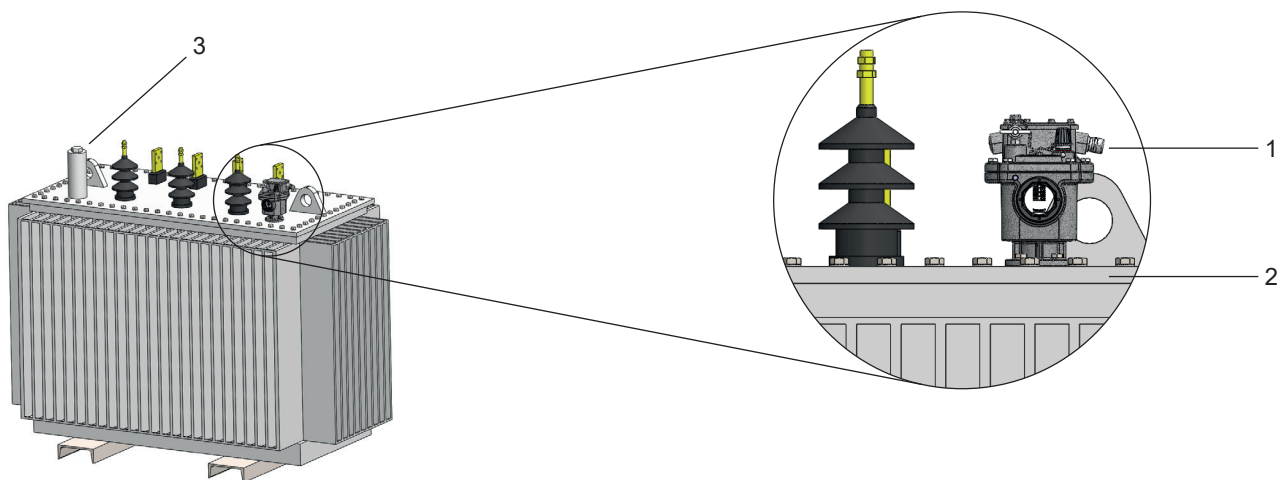


Fig. 10 – Mounting on the hermetically sealed transformer

After installation and before taking into operation, drain the gas / air from the interior of the casing (see section 7.2).

Now the circuit can be tested with the help of the test key (see section 7.5).

During installation make sure that

- Gases produced can flow unimpeded into the gas relay,
- The flange is stressed evenly when tightening the screws.



CAUTION

Make sure during installation that no dirt, moisture or foreign matter gets into the relay. The insulating liquid of the transformer must not contain any conductive substances.

7.2 Filling and bleeding of gas relay

Once the device to be protected is ready for operation and the transformer has been filled with insulating liquid, bleed the gas relay completely.

Proceed as follows:

- Remove the small cap nut (Fig. 11/ no. 1) from the bleeder valve (Fig. 11/ no. 2) and open the bleeder valve (turn anticlockwise).
- Fill in insulating liquid through the filler neck of the transformer.
- Close the bleeder valve as soon as insulating liquid comes out (turn clockwise).
- Fit the small cap nut on the bleeder valve and tighten.
- Close the filler neck of the transformer.

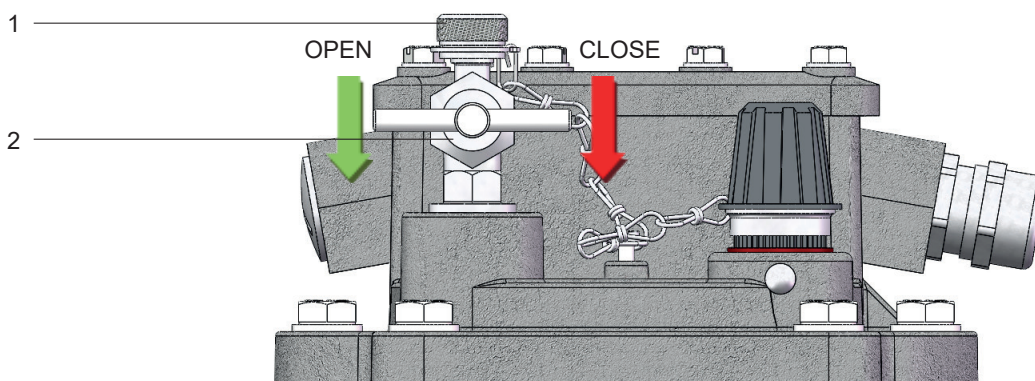


Fig. 11 - Cover of the gas relay



NOTE

Make sure that the maximum oil level in the filler neck of the transformer is above that of the gas relay. To prevent overflow of oil from the bleeder valve, the EMB reflux lock ZG 4.1 (see section 12) can be screwed onto the valve.

For gas relays with oil filler neck (code 29D) proceed as follows:

- Remove the small cap nut (Fig. 12/ no. 1) from the bleeder valve (Fig. 12/ no. 2) and open the bleeder valve (turn anticlockwise).
- Remove the locking screw (Fig. 12/ no. 4) from the oil filler neck (Fig. 12/ no. 3)
- Fill-up the insulating liquid through the oil filler neck of the gas relay
- As soon as insulating liquid comes out, screw the locking screw (Fig. 12/ no. 4) firmly onto the oil filler neck
- Close the bleeder valve and fit the small cap nut (Fig. 12/ no. 1) on the bleeder valve and tighten.

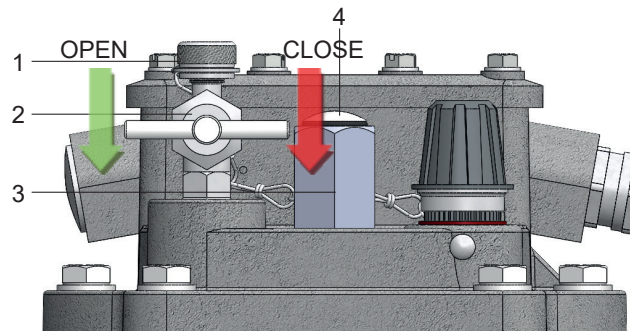


Fig. 12 - Cover of the gas relay with oil filler neck (code 29D)

7.3 Removal of transport lock

Proceed as follows:

- Remove the large cap nut (Fig. 13/1) from the test key (Fig. 13/3).
- Remove the transport lock (Fig. 13/2) from the cap nut.
- Fit the large cap nut **without** transport lock and tighten.

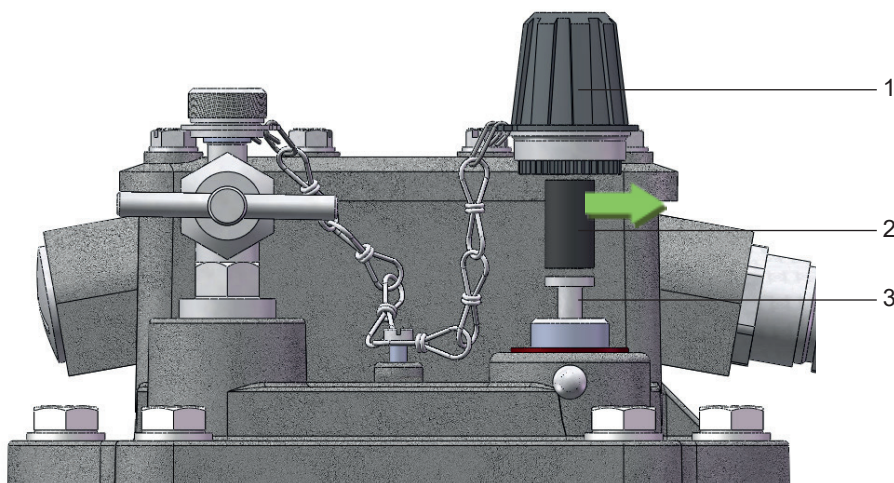


Fig. 13 – Removal of transport lock



CAUTION

Remove the transport lock before taking the gas relay into operation. If the gas relay has to be transported separately, reinstall the transport lock.

7.4 Connection of signal lead

Not more than 2 multicore signal leads can be fitted in the gas relay through cable glands. A conductor cross section of 1.5 mm² (copper) is recommended. The maximum cross section that can be clamped is 4 mm².

Proceed as follows:

- Remove the screws (Fig. 14/ no. 1).
- Remove the cap (Fig. 14/ no. 2).
- Insert the lead through the cable gland (Fig. 14/ no. 3).
- Connect the lead to the terminal studs (Fig. 14/ no. 4) (max. tightening torque: 3 Nm).
- Tighten the cable gland.
- Fit the cap.
- Tighten the screws (Fig. 14/ no. 1) (max. tightening torque: 3 Nm).

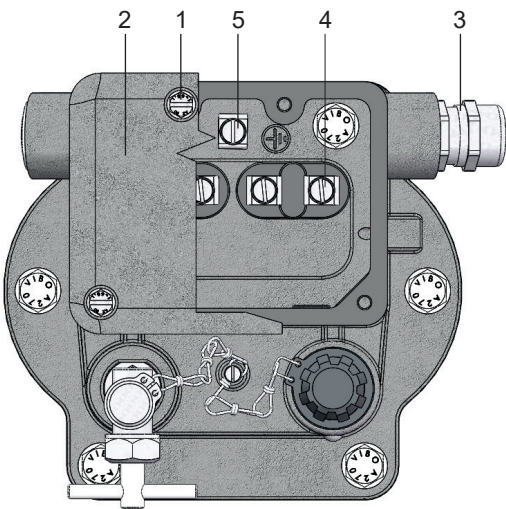


Fig. 14 – Electrical connection

Connected load of the switching systems:

Voltage: AC 5 V – max. 250 V
DC 5 V – max. 250 V

Current: AC 0.01 A – max. 6 A $\cos \varphi \geq 0.5$
DC 0.01 A – max. 6 A $L/R \leq 40\text{ms}$

Switching capacity: AC max. 1500 VA
DC max. 1250 W



NOTE

The inner side of the cap accommodates a plate with the connection diagram and the pin assignment (Figure 15). The switching systems are shown in their neutral position. The neutral position is the operating condition when the gas relay is filled completely with insulating liquid and the device to be monitored operates without any fault.

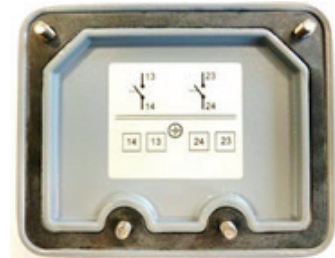


Fig. 15 – Inner side of cap (example)



WARNING

Connect the protective conductor (green-yellow insulation) to the earth terminal (Fig. 14/5) (max. tightening torque: 3 Nm).

7.5 Functional test

The functional test is carried out with the help of the test key (mechanically). Make sure that the gas relay is filled completely with insulating liquid.

Testing by means of test key:

Proceed as follows:

- Remove the large cap nut (Fig. 16/ no. 1).
- Press the test key (Fig. 16/ no. 2) down to stop position and keep it depressed.
- Obtain verification of correct function from the control room.
- Release the test key.
- Fit and tighten the large cap nut.

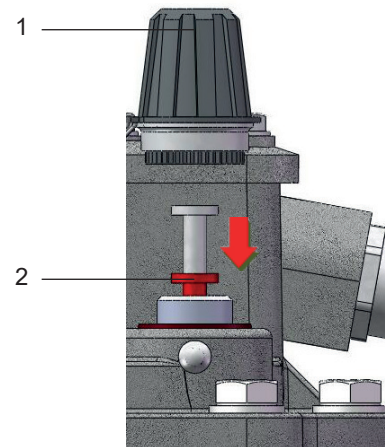


Fig. 16 – Test key



NOTE

Functional testing by means of test pumps on hermetically sealed transformers is not recommended.

8 Maintenance

Gas relays are insensitive to ambient conditions. Therefore, no special maintenance is required during operation.

Gas relays should be inspected and tested at specified intervals as described in the maintenance instructions of the plant operator. Make sure that the functional tests described are carried out.

Unless otherwise specified by the operator, EMB recommends to operate the test key as described for functional testing during the scheduled maintenance operations.



NOTE

When dismantling the gas relay, make sure that there is no insulating liquid in the device. On customer's request EMB GmbH will ensure proper disposal of your old relays.



WARNING

During operation explosive gases are accumulated in the gas relay. When opening the device make sure that there are no sparks or open flames in the direct vicinity as they would cause an explosion risk. Wait for some 10 minutes before starting any other work on the relay to allow the gases to evaporate.

9 Options/Special designs

Cable gland *

| Explanation | Code |
|--|------|
| M20x1.5: 1 Cable gland and 1 dummy plug | 1 |
| M25x1.5: 1 Cable gland and 1 dummy plug | 2 |
| M20x1.5: 2 Cable glands | 3 |
| M20x1.5: 2 Cable glands and 1 dummy plug (added loosely) | 3B |
| M25x1,5: 2 Cable glands | 4 |
| M25x1.5: 2 Cable glands and 1 dummy plug (added loosely) | 4B |
| M20x1.5: 1 Harting connector and 1 dummy plug | 5 |
| 1/2" NPT: 1 Cable gland and 1 dummy plug | 6 |
| 1/2" NPT: 2 Cable glands | 7 |
| Cable gland: On customer's request | 9 |

Casing colour *

| | |
|--|----|
| Casing colour RAL 9006 (white-aluminium) | 40 |
| Casing colour RAL 7001 (silver-grey) | 41 |
| Casing colour RAL 7012 (basalt-grey) | 42 |
| Casing colour RAL 7022 (umber-grey) | 43 |
| Casing colour RAL 7033 (cement-grey) | 44 |
| Casing colour RAL 7038 (agate-grey) | 45 |
| Casing colour RAL 7035 (light-grey) | 46 |
| Casing colour RAL 7016 (anthracite-grey) | 47 |
| Casing colour RAL 9002 (grey-white) | 48 |
| Casing colour RAL 7032 (siliceous-grey) | 49 |

Climate-proof version/IP code

| | |
|--|-----|
| Climate-proof version for extreme frigid open-air conditions below - 40 °C | 34 |
| Climate-proof version for Offshore | 36 |
| Climate-proof version for aggressive industrial atmosphere | 36B |
| IP code 66 | 39 |
| IP code 67 | 39B |

Insulating liquid

| | |
|----------------------------------|----|
| Insulating liquid silicone oil | 20 |
| Insulating liquid based on ester | 21 |

Casing

| | |
|--|----|
| Sealing of bleeding valve (Note: Explanations to code 14) | 14 |
| Metal plate | 15 |

* Mandatory order data, for other mandatory data see section 11.

Switching system

| | |
|--|----|
| Switching system with two magnet contact tubes | 25 |
| Switching system with three magnet contact tubes | 99 |

Additional functions

| | |
|--|---------|
| Temperature Sensor (Note: Explanations to code 61) | 61 |
| Pressure switch, factory-set (Note: Explanations to code 63B) | 63B ... |
| Switching pressure from 20 kPa = 0,20 bar | 63B20 |
| Switching pressure from 25 kPa = 0,25 bar | 63B25 |
| Switching pressure from 30 kPa = 0,30 bar | 63B30 |
| Switching pressure from 35 kPa = 0,35 bar | 63B35 |
| Switching pressure from 40 kPa = 0,40 bar | 63B40 |
| Switching pressure from 45 kPa = 0,45 bar | 63B45 |
| Switching pressure from 50 kPa = 0,50 bar | 63B50 |

Special request

| | |
|--|-------|
| Special request (on special agreement with customer) | 29... |
| Bleeding valve as mini ball valve | ...A |
| Large cap nut of test key, metal | ...B |
| Without hinged lids for sightglasses | ...C |
| With oil filler neck | ...D |

9.1 Explanation of code 14 - Gas relay with safety seal

To prevent unauthorized access to the gas relay, a special version provided with a safety seal can be supplied on customer's request. The seal is fastened on the bleeder valve.

Proceed as follows:

- Check if the relay is filled completely with oil and bleed, if necessary (see section 7.2).
- Close the valve handtight.
- Fit and tighten the small cap nut.
- Insert the safety cable as shown in Fig. 17 through the holes in the valve handle (Fig. 17/ no. 1) and the casing (Fig. 17/ no. 2).
- Then pull tight both ends of the cable through the seal body (Fig. 17/ no. 3).
- Tighten the locking screw of the seal using the attached tool (Fig. 17/ no. 4) to secure the tight cable.
- Then break off the tool.
- Write down the seal number in the documentation.

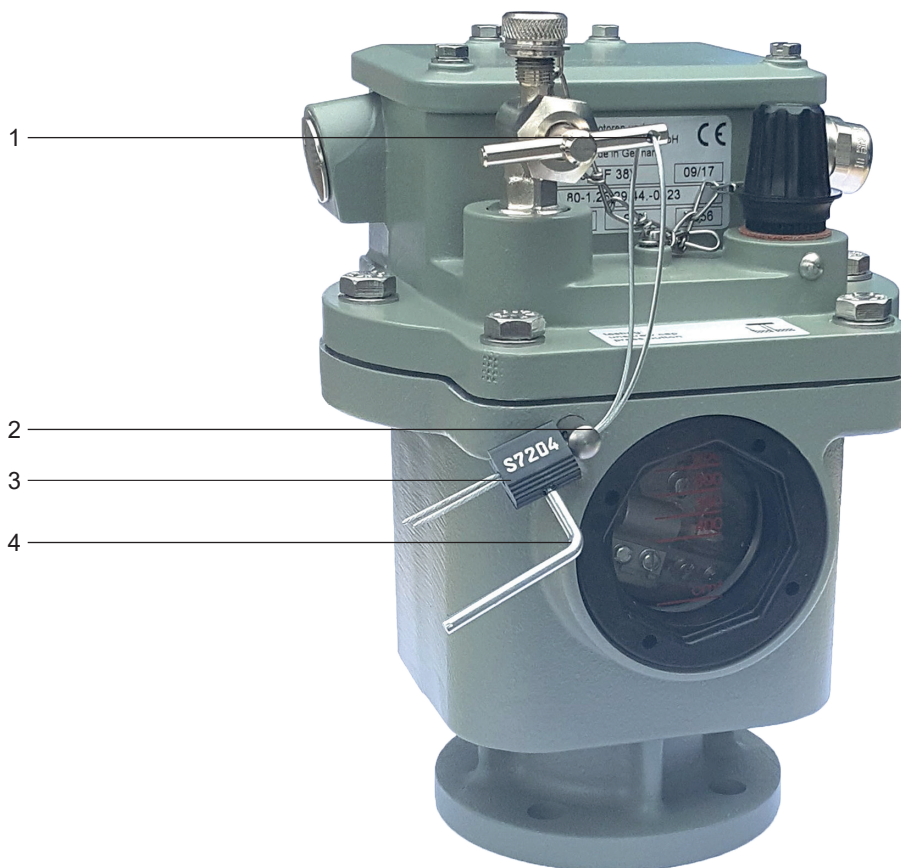


Fig. 17 – Gas relay with seal



NOTE

The gas relay with safety lock – as shown in Fig. 17 – is delivered without hinged lids for sightglasses.

9.2 Explanation to code 61 - Temperature sensor

The gas relay CF 38 provided with a temperature sensor is identified by code 61. The sensor is a temperature-dependent Pt1000 resistor in a stainless steel casing. The temperature sensor is fitted in the lower casing section next to the sightglass. Connection is by a shielded cable with plug connector.

Figure 18 shows the arrangement of the temperature sensor.

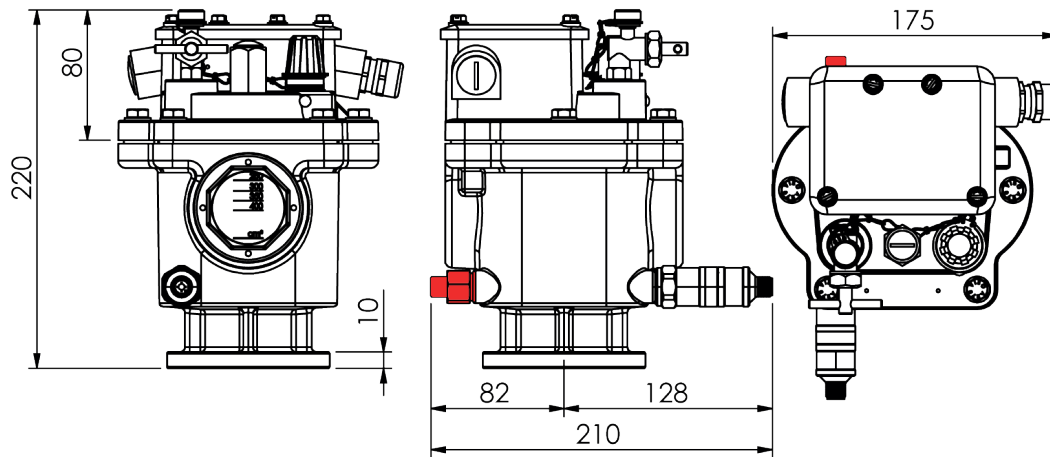


Figure 18 - Dimensional drawing gas relay with temperature sensor

The temperature sensor is used to continuously monitor the insulating liquid temperature in the gas relay. The widely used Pt1000 resistance sensor type allows easy integration into the monitoring system of the transformer. Two-wire connection of the temperature sensor to the user's signal transducer is through a shielded connecting cable.

9.3 Explanation for code 63B - Gas relay with factory-set pressure switch

For use on hermetically sealed transformers, the CF 38 gas relay is available with an optional pressure switch.

The principal construction of the gas relay with float and its electromechanical function are the same as those of the standard design. The position of the gas relay is shown in Fig. 19.

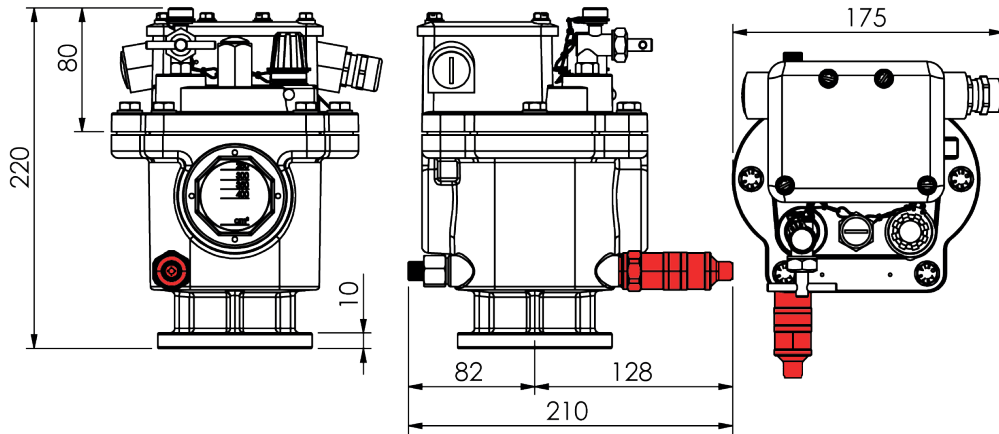


Fig. 19 – Dimensional drawing of CF 38 gas relay with factory-set pressure switch

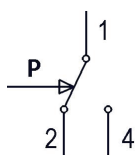
The pressure switch controls overpressure in the hermetically sealed transformer. If the pressure exceeds the factory-set pressure range, a change-over contact is operated that can be used as an alarm or shutdown signal.

The switching pressure is factory set and can be selected within the setting range of 0.2 to 0.5 bar. For the selection of switching pressure, see section 9 Options/special designs.

Technical data:

| Parameter | Value/data |
|--------------------|-------------------------------|
| Type | Diaphragm pressure switch |
| Setting range | 0.2 – 0.5 bar, factory set |
| Tolerance | ± 15 % |
| Switch | Change-over contact |
| Electrical ratings | AC 250 V, 4 A DC 48 V, 2 A |

Schaltbild des Druckschalters:



| Pin | Description |
|-----|-------------|
| 1 | COM |
| 2 | NC |
| 3 | n.c. |
| 4 | NO |

| Pin | Description |
|-----|-------------|
| 1 | NC |
| 2 | NO |
| 3 | CO |

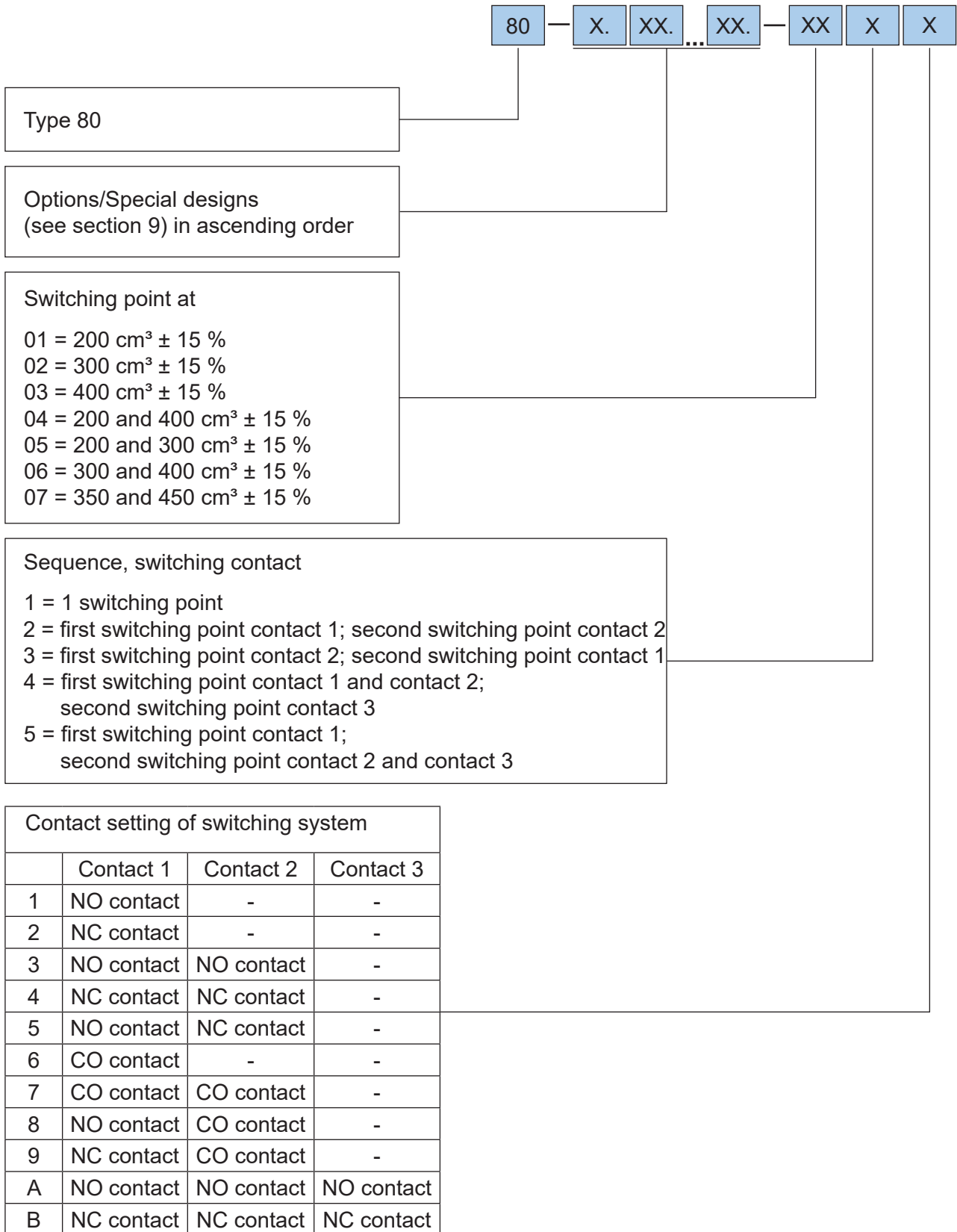


NOTE

Class of protection of gas relay with factory set pressure switch: IP 56.

10 Ordering data/type code

For placing orders, please use the following key:



Ordering example:

A customer needs a gas relay of type 80 (CF 38) with a cable gland M20 x 1.5. The switching system is to be provided with two switching elements (magnet contact tubes) designed as NO contacts. The protective device is to operate at two different switching points, namely gas volumes of 200 and 400 cm³. Furthermore, the device should be delivered in the color RAL 7033 as well as with a mini ball valve as bleeder valve, which should be secured with a seal. Additionally, the gas relay should be equipped with a factory-set pressure pressure switch and switch at an overpressure of 0.25 bar.

Accordingly, the relay ordered has the following

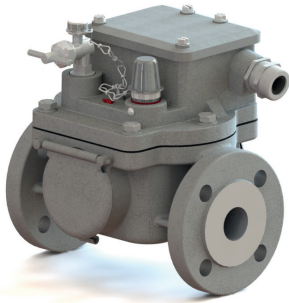
Type code: **80 – 1.14.25.29AC.44.63B25. – 0423**

Explanation:

| | |
|-------|---|
| 80 | = Gas relay of type 80 (CF 38) |
| 1 | = M20x1.5: 1 cable gland and 1 dummy plug |
| 14 | = With safety seal for the bleeder valve |
| 25 | = Switching system equipped with 2 magnet contact tubes |
| 29AC | = With mini ball valve as bleeding valve and without hinged lids for sightglasses |
| 44 | = Casing colour RAL 7033 (cement-grey) |
| 63B25 | = Pressure switch with factory-set switching pressure from 0,25 bar |
| 04 | = Switching point at gas volumes of 200 cm ³ and 400 cm ³ |
| 2 | = First switching point = 200 cm ³ contact 1 Second switching point = 400 cm ³ contact 2 |
| 3 | = Contact setting of switching system: Contact 1 = NO contact Contact 2 = NO contact |

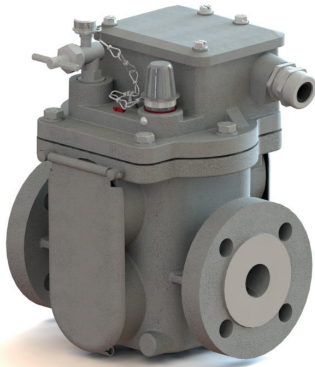
11 Other protective devices for conservators with hydro-type compensator

EMB Buchholz relays are also used as gas relays (air cell failure relay) for the conservator.



Single-float Buchholz relay with flanged connection

Type 03 (AF 25/10)



Double-float Buchholz relay with flanged connection

Type 05 (BF25/6)

Type 06 (BF 25/10)

Type 23 (BF 25/10 S)

For further information about these devices, please ask for the relevant documents.

12 EMB accessories

All below devices can be used both for the Buchholz relay and the gas relay:



Buchholzgas-Sampler BGS

The Buchholz gas sampler provides a safe method of taking and transporting gas samples from the Buchholz relay, gas relay or the gas extraction device. Its capacity is 100 ml.



Buchholz gas tester BGT 4.1 and BGT 4.2

The Buchholz gas tester is used to measure and analyse the free gases in the oil collected in the Buchholz relay.

The BGT 4.1 is used to measure the hydrogen concentration in the Buchholz gas.

The concentrations of hydrogen carbon dioxide, carbon monoxide as well as the sum of hydrocarbons and ethyne in the Buchholz gas can be determined with the help of BGT 4.2.

The scope of supply includes a BGS.



Gas testing device ZG 3.1.

The gas testing device ZG 3.1 is used to analyse the gas accumulated in the Buchholz relay. It can be installed directly on the bleeder valve of the Buchholz relay or on the gas outlet tap of the gas extraction device. The gas flows through two different chemical solutions, and the colour reactions indicate the nature of the fault.

An analysis using the gas testing device is no substitute for a gas chromatographic analysis.



Reflux lock ZG 4.1.

The reflux lock prevents insulating liquid from flowing into the gas testing device. It is installed between the Buchholz relay or the gas extraction device and the gas testing device.



Test pumps

The test pump serves to check the function of the upper switching system (alarm) of the Buchholz relay by pumping in air. The test can be performed directly on the Buchholz relay. For that purpose, the test pump is connected to the bleeder valve of the Buchholz relay. When the test is performed via the gas extraction device, the test pump is connected to the gas outlet tap of the gas extraction device.



- ZG 5.1. manually operated

- ZG 5.2. pedal operated



- ZG 5.3. manually operated



NOTE

Functional testing using test pumps on hermetically sealed transformers is not recommended.

For further information about accessories and other products of EMB GmbH, please ask for the relevant documents.

Notes:

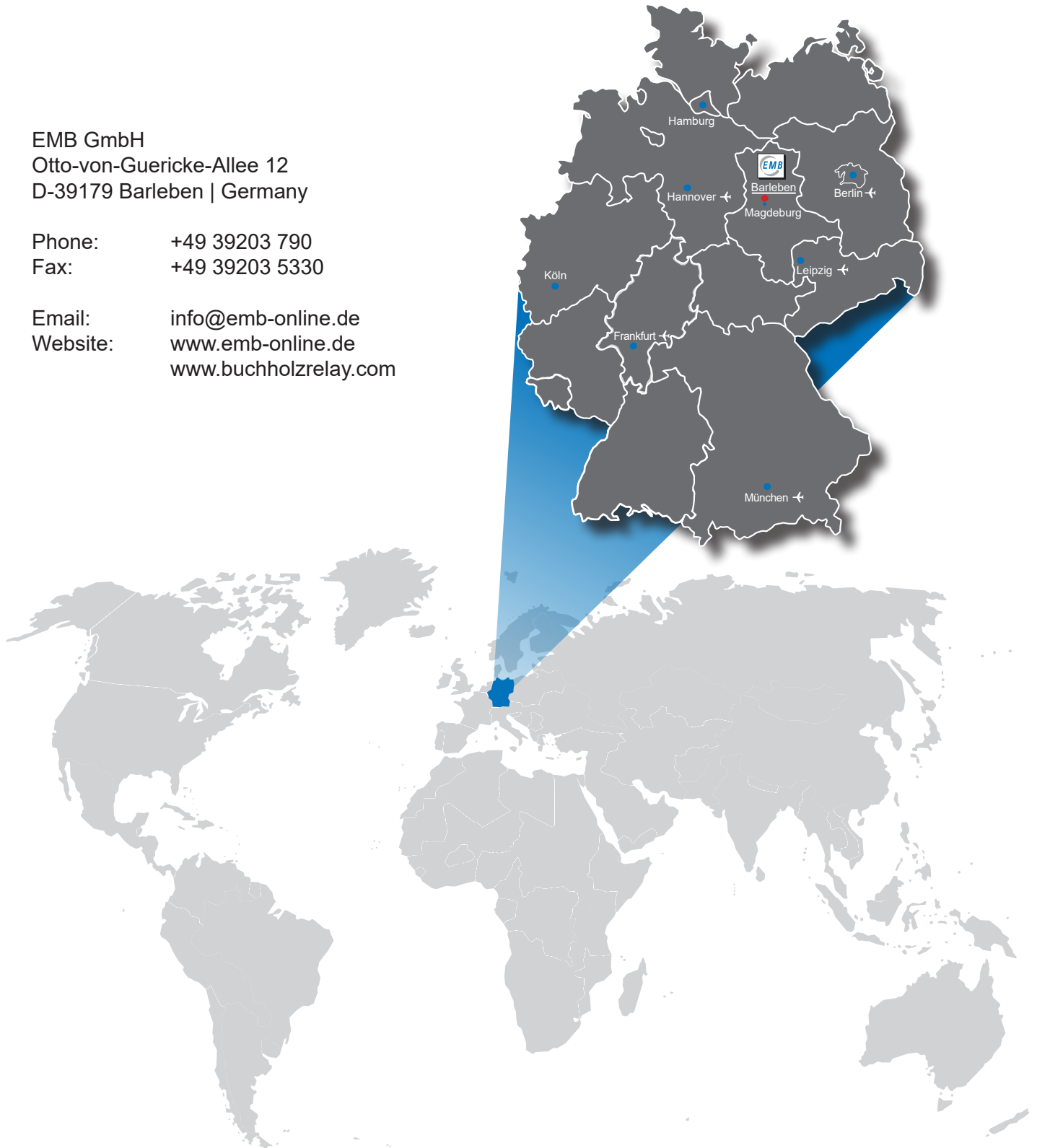


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