Elektromotoren und
Gerätebau Barleben GmbH

# OPERATING INSTRUCTIONS
# Buchholz Gas Sampler BGS

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# 1 Safety instructions

Make sure that any persons installing, taking into operation and operating the Buchholz relay

- 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.

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. Disregarding the warning can lead to serious or even fatal injury.**

# 2 Introduction

**WARNING**

**In case of a failure in mineral oil or ester filled transformers the gases which are accumulated in the Buchholz relay are combustible and can form explosive mixtures with air.**

**Smoking and handling of spark emitting or spark causing tools is forbidden.**

**CAUTION**

**Reference shall also be made to safety instructions for the take-off of Buchholz gases from the operating authority of the transformer.**

The Buchholz gas sampler is used for taking gas samples from the Buchholz relay of transformers. After gas has accumulated in the Buchholz relay, the transformer must be switched off and secured against reconnection before sampling is performed.
The sampler is also required for performing the air calibration for the Buchholz gas tester BGT in on-site measurements.
The sampler can be used analogously to take-off gas out of the Buchholz gas reservoir of the Transformer Gas Monitor TGM.

## 3 Scope of supply

See figure 1:

- Buchholz gas sampler type BGS
- Sealing plug
- Oil trap with opening plug
- Septum plug
- Replacement seals 3 pcs.
- Replacement septa 5 pcs.
- Transport case

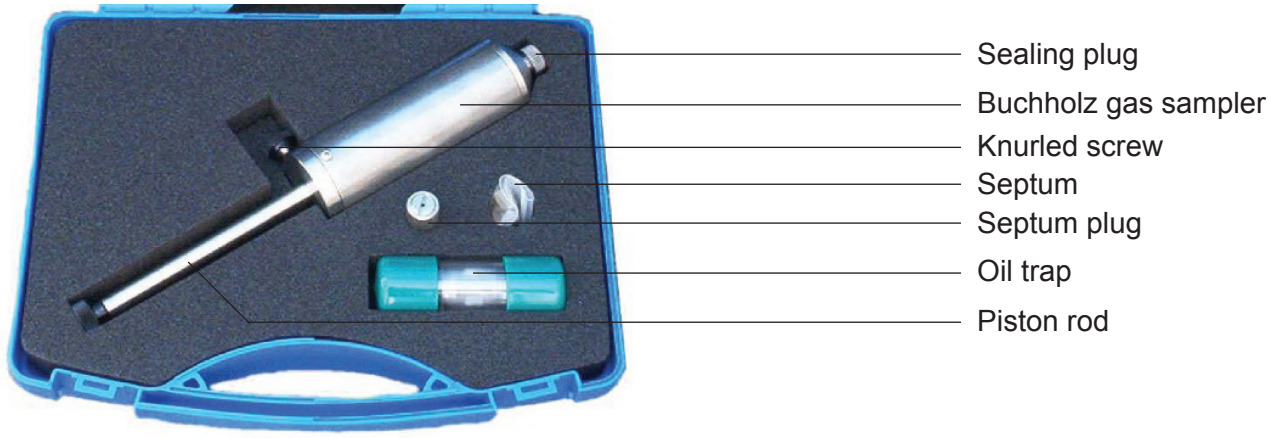


Figure 1 - Case contents of the BGS

## 4 Description of device

The sampler consists of a cylinder with piston and piston rod. To prevent residual oil from getting into the sampler, an oil trap is provided on the connecting branch of the sampler. The oil trap also serves as opening connection of the check valve in the sampler. At first the oil trap is screwed onto the test valve of the Buchholz relay and after that the sampler is screwed onto the oil trap. When the test valve is opened, the piston is automatically pressed outward by the pressure of the oil column in the transformer or pulled by hand. As a result of this motion, gas from the Buchholz relay is drawn via the check valve into the cylinder. When the sampler is unscrewed from the oil trap, the check valve closes so that the drawn-in gas cannot escape from the hermetically sealed sampler. After opening the test valve the sampler will be filled with Buchholz gas. After closing the test valve at first the sampler must be unscrewed from the oil trap and only thereafter it is allowed to unscrew the oil trap from the test valve of the Buchholz relay. The piston and piston rod can be fixed with the knurled screw. The gas can be kept for up to 5 days in the sampler without exhibiting any impermissible changes in its composition. The sampler with the Buchholz gas is taken to a Buchholz gas tester BGT for the onsite measurement or sent to a laboratory where the gas is analysed.
The sampler has a useful volume of 100 ml. Markings on the piston rod divide this volume into 6 x 15 ml and a residual quantity of 10 ml. 30 to 45 ml gas are consumed in the in-situ measurement. The remaining volume is available for gas analyses in the laboratory. The sampler is transported in the supplied case.

## 5 Leakage test

Before the Buchholz gas sample is taken, the sampler has to be checked for leakage:

- Remove sealing plug from sampler, and loosen the knurled screw.
- Check visually that the O-ring seals in the threads of the sampler and the oil trap are undamaged. If necessary, they have to be replaced.
- Screw the oil trap into the sampler (this motion opens the check valve).
- Pull piston rod out of the cylinder up to the stop.
- Unscrew the oil trap.
- Push piston rod by hand against the pressure of the entrapped air into the cylinder up to the second marking on the piston rod.
- Let the air pressure in the cylinder force the piston rod slowly back to its initial position.
- If the piston rod does not return to its initial position, the sampler is not tight and may not be used in this condition.

## 6 Taking a Buchholz gas sample

Proceed as follows

- Screw oil trap handtight into the sampler, and push piston rod completely into the cylinder and after that unscrew the oil trap again.

- Screw off the cap nut from the test valve of the Buchholz relay, and wipe off the test valve with a cloth.
- Screw the oil trap handtight onto the test valve of the Buchholz relay.
- Open test valve of the Buchholz relay shortly for rinsing the test valve and
- the oil trap with Buchholz gas.
- Hold the loose end of the oil trap by the one hand and screw the sampler handtight onto this loose end of the oil trap rapidly. The check valve insite
- the sampler is opened now.
- Open the test valve of the Buchholz relay.
- The pressure of the oil column in the conservator of the transformer automatically forces out the piston with piston rod up to the stop of the cylinder. During this operation, the gas from the Buchholz relay flows into the sampler.

**NOTE**

**If the oil column pressure is too low, assist this operation by slightly pulling the piston rod by hand.**

**CAUTION**

**Observe the oil trap during the gas take-off in view of oil entry. Stop the gas sampling immediately by closing the test valve of the Buchholz relay if oil flows into the oil trap.**

- Close the test valve of the Buchholz relay or of the Buchholz gas reservoir of the TGM.

**CAUTION**

**At first screw the sampler filled with the gas off *from the oil trap*. As a result, the check valve in the sampler closes and the gas insite is protected.**

- Push the piston rod with your hand into the cylinder against the pressure of the entrapped gas up to the first marking on the piston rod, and fix the piston rod with the knurled screw in position.
- Only now the oil trap has to be screwed off from the test valve of the Buchholz relay.
- Close the test valve of the Buchholz relay with the cap nut.
- Subject the gas-filled sampler to the on-site measurement with a Buchholz gas tester or/and send it to a laboratory to have the gas analysed. When transporting the sampler to the laboratory, close it additionally with the sealing plug.

After each sampling of Buchholz gas it is necessary to make the oil trap free of oil. Let the oil drop out and wipe off the oil trap by a cloth. To support the cleaning it is possible to use only non-polar solvents. (**Do not use acetone!**)

**NOTE**

**Keep the residual gas in the Buchholz relay for taking any further gas samples which may be required, and discharge it only after successfully completing all gas analyses.**

## 7 Using the sampler in on-site measurements

When using the sampler for on-site measurements with the Buchholz gas tester, use it first for rinsing and calibrating the unit with air. Only thereafter should it be used for taking the Buchholz gas sample on the transformer.

For further directions on the operation of the sampler in on-site measurements, refer to the **operating instructions for the Buchholz gas tester type BGT 3**.

## 8 Using the sampler in a laboratory gas analyses

- Remove the sampler filled with the Buchholz gas from the transport case.
- Make sure the overpressure is maintained in the sampler. To this end, loosen the knurled screw and, exerting a slight pressure, push the piston rod into the cylinder (by not more than one marking spacing on the piston rod). Then, fix the piston rod in position with the knurled screw.
- Replace sealing plug on the connecting branch of the sampler by the septum plug (after checking the septa).

**CAUTION**

**Rinse the septum plug repeatedly befor the gas take-off by repeated pushing/pulling of the piston rod into/out of the cylinder (after loosing the knurled screw).**

- Note, that in case of gas take-off for analyses by a gas tight syringe with cannula through the septum the overpressure in the sampler can be not strong enough to push out a sluggish syringe piston. In that case, pull the piston of the gas tight syringe slowly by hand.

After removing a gas volume of about 15 ml each, maintain the overpressure in the sampler by pushing the piston rod inward to the required extent as described above.

## 9 Important comments

- The gas tightness of the sampler is not be guaranteed if the user has installed or deinstalled the piston. Buchholz gas sampler BGS should be returned after every 5 years to the manufacturer for an inspection.
- If there was any oil in the sampler it should be undergone a maintainance at the manufacturer.
- It is advisable to keep two samplers for one Buchholz gas tester – one sampler for taking Buchholz gas samples and one sampler for calibrating the Buchholz gas tester with air. This ensures that Buchholz gas sampling and measurement preparations can be performed independently of one another.
- To avoid confusion, Buchholz gas samplers are

## 10 Technical data

| | |
|---|---|
| • Filling volume: | 100 ml |
| • Max. storage period of gas: | 5 days |
| • Length, in extended condition: | 250 mm |
| • Diameter: | 42 mm |
| • Protective system: | IP 40 |
| • Material: | High-grade steel |
| • Operating temperature: | - 25 ... 60 °C |
| • Weight: incl. transport case: | 1.4 kg |
| • Dimensions of transport case: | 275 mm x 230 mm x 85 mm (L x W x H) |
| • | |

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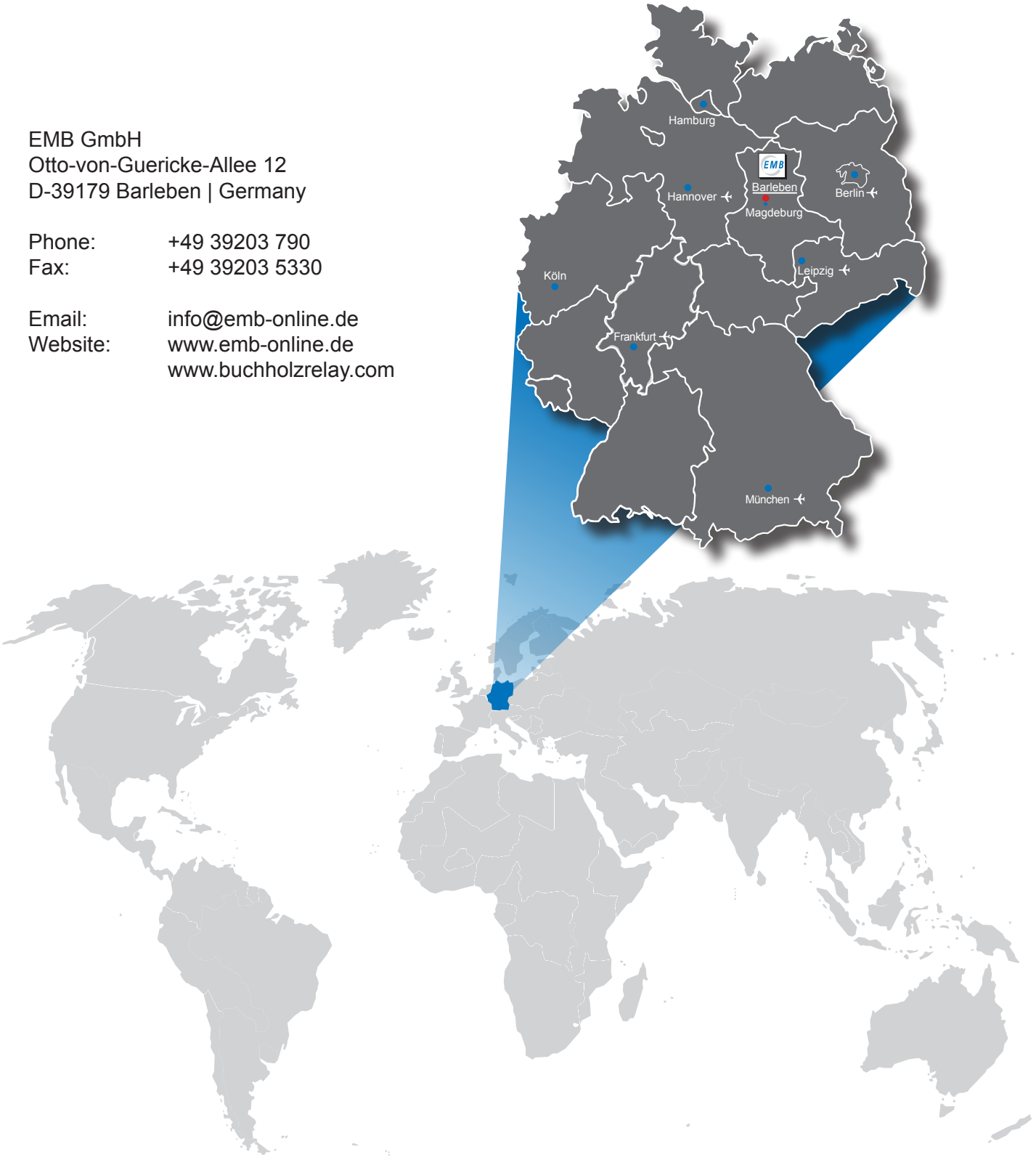




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