

NEW

ESKOM SPEC BUCHHOLZ BS25

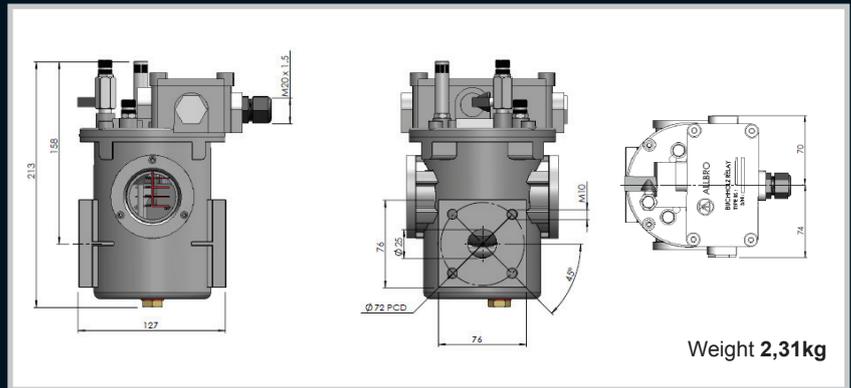
FIRST BUCHHOLZ RELAY

to comply to the Rev 2 Eskom Spec

- Tested and verified compliance to Eskom's latest specification: 240-56063908 Rev 2
- Anodised and hard baked C5M coated enamel - for high corrosive environments.
- Stainless steel fasteners throughout with thread lubrication.
- Accurate low tolerance gas accumulation functionality for alarm, trip and surge flow.
- Serialized test calibration certificate included.
- Protective double layered packaging for shipment protection.
- IP65 (Buchholz Relay is sealed)
- **MADE IN SA BY ALLBRO**

Enclosures
Hinges
Locks
Handles
Accessories
Rotary Operating Handles
Insulators
Transformer Equipment
Index

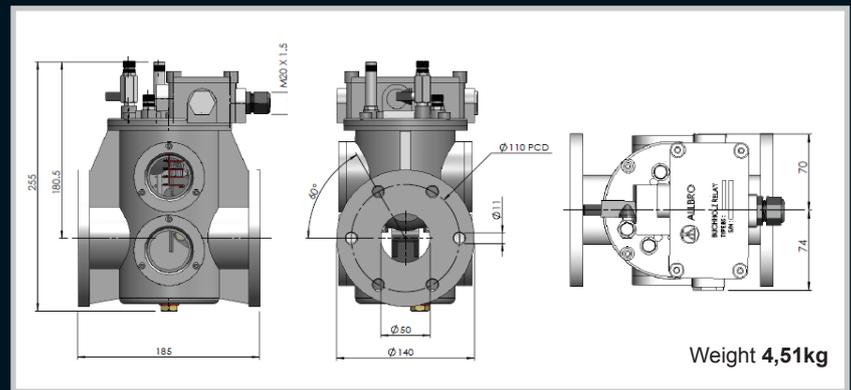
BS 25



Part Number	Description
021-115	Buchholz Relay Model BS25MA
021-115/E	Buchholz Relay BS25MA / E Eskom Spec 240-56063908 Rev 2
021-400	Buchholz Valve 25mm
021-426	Buchholz Valve 25mm (60mm FTF) with lockable handle

Remarks:
• MA = Magnetic - normally open contacts

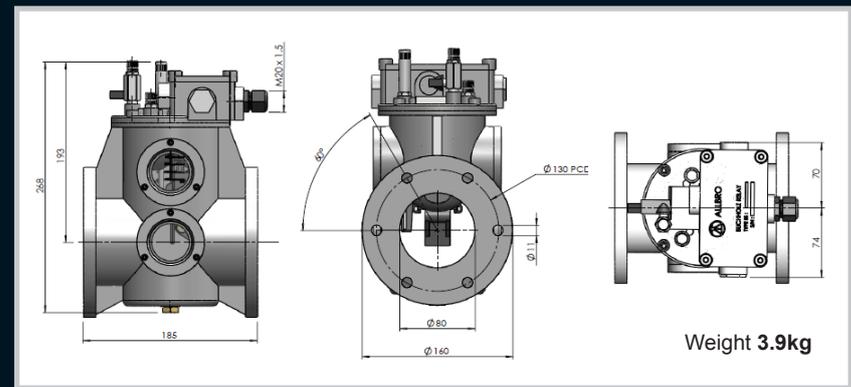
BS 50



Part Number	Description
021-117	Buchholz Relay Model BS50MA
021-117/E	Buchholz Relay BS50MA / E
021-401	Buchholz Valve 50mm
021-427	Buchholz Valve 50mm (60mm FTF) with lockable handle

Remarks:
• MA = Magnetic - normally open contacts

BS 80



Part Number	Description
021-119/E	Buchholz Relay BS80MA / E

WHAT IS A BUCHHOLZ RELAY?

Buchholz Relays are essentially a gas detection relay. They are placed on transformers, that are equipped with a conservator tank. The vast majority of the failure / fault conditions in transformers are associated with “gassing” which is detected by the Buchholz Relay which will provide early indication by means of an alarm and subsequently a trip contact to protect the transformer from catastrophic failure.

Allbro’s Buchholz Relay complies with the latest CENELEC EN 50216-2 and EN 50216-2 standards.

HOW DOES A BUCHHOLZ RELAY WORK?

The Buchholz Relay is fitted in the pipework between the transformer itself and the conservator at a 2.5 to 5 degree angle. During normal transformer operation the relay allows oil flow between the conservator and the main tank and it is filled with oil. However, a fault within the transformer will result in gas being generated within the transformer. Gas being lighter in density than oil, the gas rises towards the conservator and collects in the upper chamber of the relay. The result is an oil level drop within the relay. The top float drops and triggers an alarm switch. Should no effective remedial action take place after the alarm, and should the transformer continue gassing the build-up of gas within the Buchholz relay will result in a trip.

The Relay is designed to trip immediately on a sudden oil surge. A large sudden fault, like a short circuit, will instantly raise the temperature of the oil and force oil up the piping through the relay at a high velocity. This sudden surge is detected by the Buchholz Relay.

CONSTRUCTION

Made from aluminium the main body of the relay is fitted with tempered glass windows to allow for visual indication of the oil level. The oil drain plug is located at the bottom of the main body for drainage when required.

The mechanism of the Relay consists of two floats, the magnetic reed switches, a surge flow valve and two permanent magnets.

Positioned on the lid of the Buchholz Relay are the following;

- Gas discharge valve with “G/8” in male thread with a protective cap
- Manual valve for pneumatically testing the alarm and insulation circuits also with a protective cap
- Push rod for mechanically tripping the alarm and the insulation circuits, also with a protective cap,
- Terminal box, containing 4 numbered M6 terminals and one earth terminal.

Enclosures

Hinges

Locks

Handles

Accessories

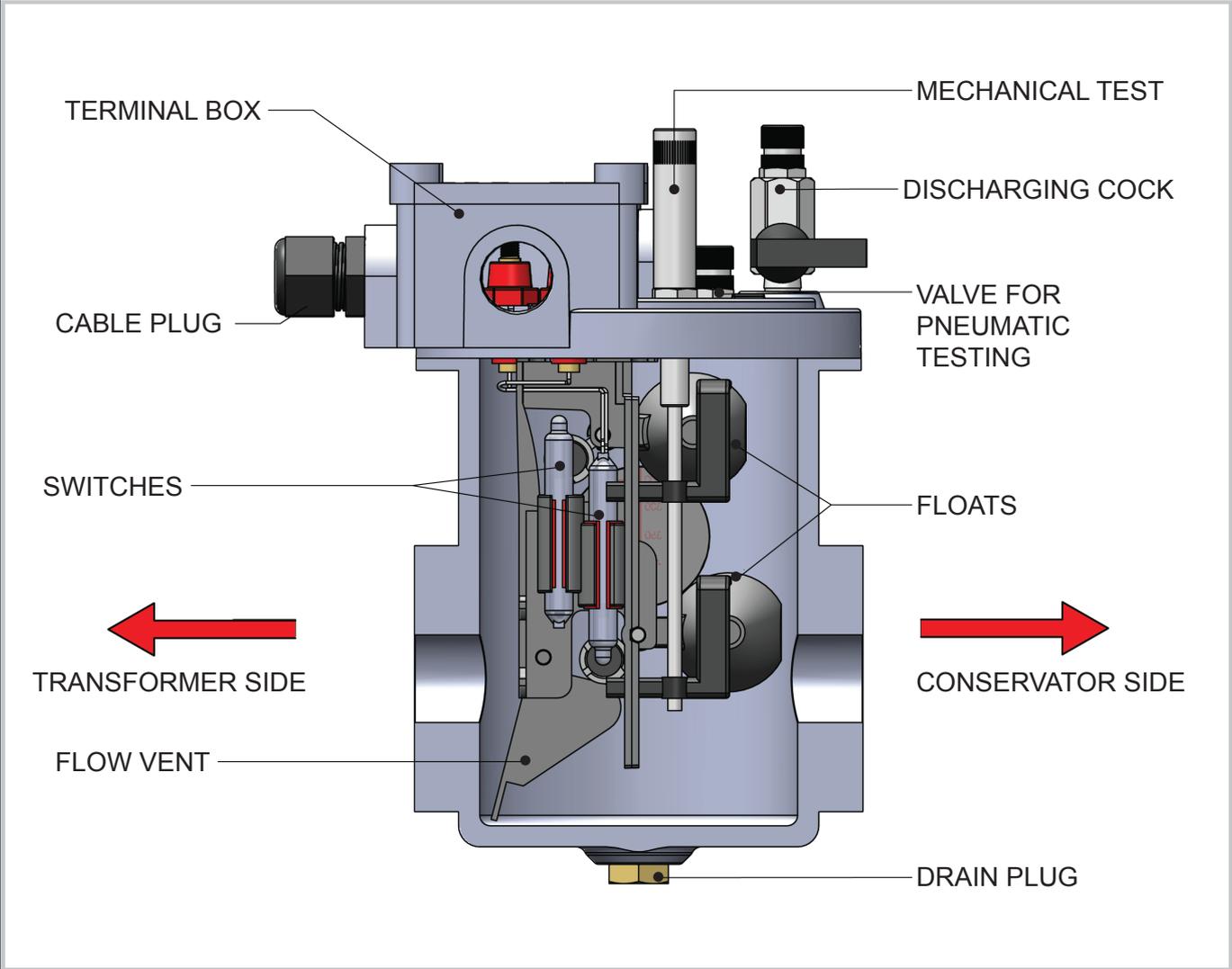
Rotary Operating
Handles

Insulators

Transformer
Equipment

Index

- Enclosures
- Hinges
- Locks
- Handles
- Accessories
- Rotary Operating Handles
- Insulators
- Transformer Equipment
- Index



EXTERNAL COATING AND PROTECTION

The external housing of the Buchholz Relay is made from aluminium alloy. A phosphate treatment is used to clean the housing before application of a vinyl enamel. 72 hour salt spray tests have shown that this coating provides a protection layer from corrosion and resistance against most atmospheric conditions. All external fittings are brass plated and nuts are made from stainless steel. For extremely corrosive conditions due to extreme high salt spray or high acidic atmospheres, Allbro have treated our Buchholz relay units with anodized C5M coating, with stainless fittings. This model conforms to the latest Eskom requirements.

RELAY SELECTION

The size and type of relay to be used will depend on the transformer rating and oil volume. Suggestions are given in the following table but the final choice is often as a result of the transformer manufacturers experience.

MVA Transformer Power	Nominal Diameter
Up to 5	25
From 5 up to 20	50
From 20 to 50	80

TECHNICAL DATA

- **Recommended angles for Buchholz Relay pipework between main tank and conservator**
- The relay pipework is typically mounted at 2,5 degrees to the horizontal. A positive inclination of up to 5 degrees to the horizontal axis is admissible.
- Operating pressure - 1 bar, tested to 2,5 bar for 2 minutes at 100 deg C.
- Gas volume to trip alarm:

Buchholz Relay Type	Gas Volume Necessary to Activate Switch	Tolerance	Trip	Tolerance
BS 25	150 ± 50 cm ³	Min 100 Max 200	300 ± 50	Min 250 Max 350
BS 50	300 ± 50 cm ³	Min 250 Max 350	700 ± 100	Min 600 Max 800
BS 80	400 ± 100 cm ³	Min 300 Max 500	800 ± 100	Min 700 Max 900

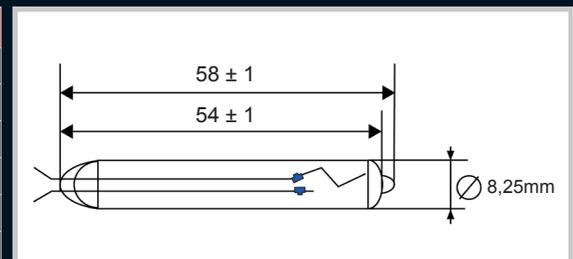
- Rate of oil flow in m/s to trip insulation. In the following table standard values are highlighted with an 'O' available, on request with an 'X' and not available with a '/'. +/- 15% tolerance at 20°C with oil viscosity according to IEC296.

Inside Pipe Diameter	1,0 m/s	1,5 m/s	2,0 m/s
25	o	x	x
50	o	x	x
80	o	x	x

- The relay operates within 0,5 seconds.
- Oil temperature between -25 and +115 deg C.
- Ambient temperature between -25 and +60 deg C.
- Degree of Protection IP65 to EN 60529.

SWITCH ELECTRICAL DATA

Specification	Values
Max. switching current DC	3A
Max. switching current AC	5A
DC load min. 5 - max. 250 V min. 100 000 operations	250 VA
AC load min. 5 - max. 250 V min. 100 000 operations	400 W
DC load min. 5 - max. 250 V min. 10 000 operations	1.250 VA
AC load min. 5 - max. 250 V min. 10 000 operations	1.500 W
Min. switching current	5 mA
Dielectric withstand circuits-earth	Short Duration min. 2,5kV
Dielectric withstand open contracts	Short Duration min. 1,5kV
Working temperature	-40°C - +135°C



Enclosures

Hinges

Locks

Handles

Accessories

Rotary Operating Handles

Insulators

Transformer Equipment

Index

Enclosures

The following Type Tests have been performed on the relay.

- 72 hour salt spray
- Electromagnetic Field Test. Relay does not trip in field strength up to 25mT (ref EN 50216-2)
- Stationary sinusoidal mechanical vibrations. Tests according to EN 60721-3-4 standards have been performed.
 - (a) Class 4M4 (4M6 on request) vibration test applied in sites where vibrations are transmitted from machinery and vehicles. Three-axis movement was impressed to the relay using special equipment with stationary sinusoidal vibrations from 2 to 200 Hz.
 - (b) A seismic test has also been performed on each unit according to the EN 50216-1 standards that refers to EN 60068-3-3 class 0, level 2 standards. The test consists of application of a 9m/s² horizontal acceleration and a 4.5m/s² vertical acceleration, increasing frequency one octave per minute. No activation of alarm or release switches was encountered.
- Pressure withstands Tests 2.5 bar for 2 minutes with oil at 100°C.
- Vacuum Withstand Test of 2500Pa for 24 hrs.
- Test to show the relay is insensitive to oil flow from conservator to transformer.

Hinges

Locks

FUNCTIONAL TESTS

The following Functional Tests are applied to all relays.

- High Pressure Leak test @ 2.5 Bar
- Oil Flow Test (meters/sec trip Value).
- Gas Accumulation Alarm Value (volume in cm³).
- Gas Accumulation Trip Value (volume in cm³).
- Press-To-Test Function Test
- Temperature Rise Test over 48 hours
- Efficacy of seal verified with transformer oil (at 80°C) at a pressure of 1.0 bar. This test ensures that the relay meets the required EN Standards.

Handles

Accessories

Rotary Operating Handles

Insulators

Transformer Equipment

Index



* Allbro's Buchholz Relay Mechanical & Electrical verification of float and switch functionality



* Allbro's Buchholz Relay -Main functional test.



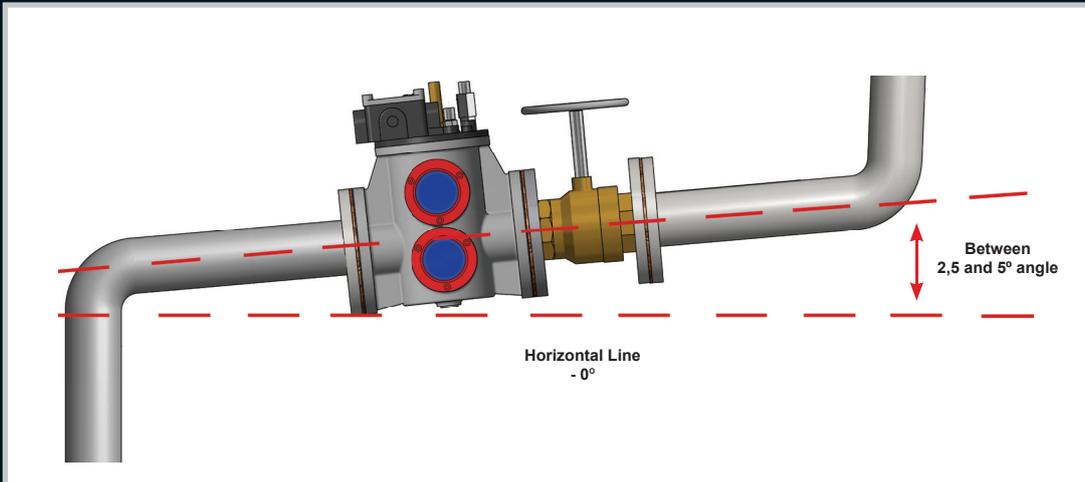
* Allbro's Buchholz Relay efficacy of seal test



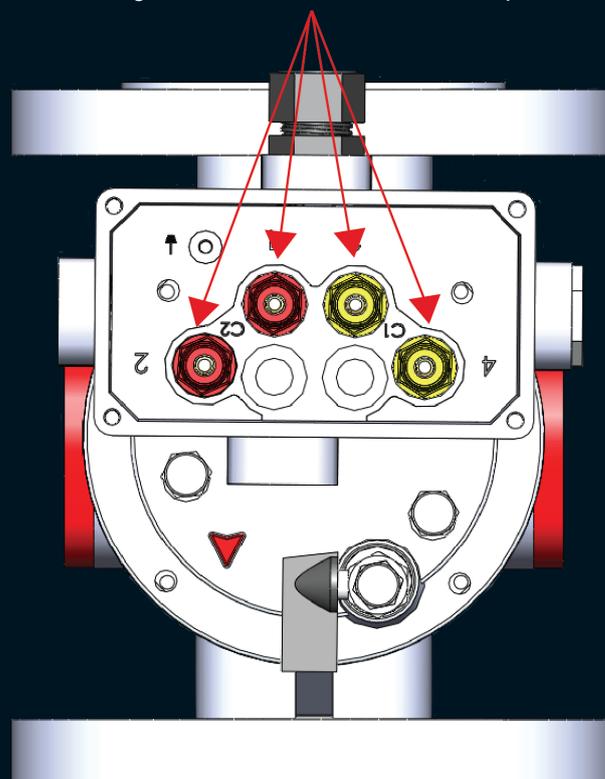
INSTALLATION INSTRUCTIONS

The following installation procedures must be observed for proper relay operation:

- The red arrow on the relay must point towards the conservator.
- The relay must always be full of oil, which means that the minimum oil level in the conservator must be higher than the relays breather valve.



- The recommended inclination of the relay pipework is 2.5 degrees from the horizontal.
- The pipe from the transformer to the relay must exit the transformer at the highest point.
- The pipeline upstream from the relay has to be straight and with a length equal to 5-10 times the pipeline diameter, at least.
- Down stream from the relay, pipeline length has to be 3 times the pipeline diameter, only. It must rise up towards the conservator.
- M5 connections in terminal box must be tightened to a maximum of 2NM torque.



Enclosures

Hinges

Locks

Handles

Accessories

Rotary Operating
Handles

Insulators

Transformer
Equipment

Index