



For Transformers with Conservator

Für Transformatoren mit Konservator

APPLICATION

Buchholz Relay is a protection device for monitoring the gas and oil movements in oil immersed transformers.

It is designed to detect the faults and minimize the propagation of any damage which might occur within oil circuit, induction coils etc.

The examples of the faults which could cause gas accumulation or strong oil flows in the oil circuit are as follows:

- short-circuited core laminations
- broken-down core insulation
- overheating of windings
- bad contacts
- short-circuit between phases
- earth faults
- puncture of bushing insulators inside tank
- falling of oil level due to leaks
- ingress of air as a result of defective oil circulation system

CONSTRUCTION

The relays structurally consist of two main sections, i.e. main housing and upper housing which are both made of corrosion-resistant aluminum alloy and covered with electrostatic powder paint. These sections are also resin treated to seal possible micropores.

Main Housing

Depending on the model, screw or flange type connections are available. On each side there are graduated inspection glass windows which enable the volume of gas to be read off and the contact system to be examined. The inspection windows have also additional metal protection covers against external hazards.

Upper Housing

Upper housing holds all the inside mechanisms and is also fitted with a cable terminal box, a breather cock and a test button for the mechanical release of the floats to test the alarm circuits.

Cable terminal box incorporates the base mounted electrical connection parts and earth terminal and has a cover for

external hazard protection.

Breather cock is generally used to exhaust the air in the relay and to take gas samples.

The inside mechanism comprises upper and lower contact systems for alarm and tripping positions.

Both contact systems include:

- a float made of oil resistant, closed cellular type special plastic foam
- a magnet and a mechanical or mercury contact

Additionally, the lower contact system is also fitted with a deflector plate for oil flow sensing.

Single float Buchholz relays have only one contact system together with the deflector plate.

OPERATION PRINCIPLE

During normal operation the relay is completely filled with oil keeping the floats in their top limit or rest position.

The contact mechanisms in the relays respond to:

- slight faults causing a slow evolution of gas in the transformer,
- serious faults creating immediate oil surge,
- oil leakages.

Slight Faults

When a slight or incipient fault occurs in the transformer, the small bubbles of gas, which pass upwards towards the oil conservator tank, are trapped in relay housing, thus causing its oil level to fall.

As a result the upper float rotates on its hinge and operates the alarm switch, thus operating an external alarm device.

Serious Faults

When a serious fault, core insulation break-down, short circuits etc., occurs in the transformer, the gas generation is violent and causes the oil to rush through the Buchholz Relay to the oil conservator tank.

In the relay, this oil surge impinges on the deflector plate fitted on the lower float and causes the rotation of the float itself,

thus operating the tripping contact and disconnecting the transformer.

Oil Leakage

An oil leak in the transformer causes the oil level in the relay to fall, thus operating first the alarm (upper) float and then the tripping (lower) float.

The ingress of air into the transformer, arising from the defects in the oil circulation system, operates the alarm float.

TECHNICAL SPECIFICATIONS

Electrical

- Nominal Voltage: AC / DC 230V
- Nominal Current: AC / DC 2 A
- Insulation Voltage: AC 2000 V

Oil

- Type: Transformer oil
- Permissible temperature range: -25°C to 115°C
- Viscosity: 1 mm²/s – 1100 mm²/s

Response conditions of the contact systems

- Gas accumulation: 200 cm³ – 300 cm³
- Oil flow velocity: 0.65 m/s, (± 15%)
1.00 m/s, (Default)
1.50 m/s.
- Deflector plate reaction time: max. 0.5 s.

Ambient

- Temperature range: -40°C to +60°C
- Protection Class: IP 65 IEC 60529

Shock resistance

- Earthquake: max. 2 g
(at 5 to 15Hz seismic wave frequency)
- Vibration: max. 1 g
(at vibrations of the sinusoidal wave form with 16 to 720 Hz frequency)
- Impacts: max. 10 g
(at shocks of the half-sinusoidal wave form with a duration of 10 ms)

FINAL TESTS

The following tests are applied to the relays (100%) at the end of the production line;

Leakage test

The relays are filled with oil at the temperature of 90°C and at the pressure of 1 bar and checked for leakage after min. 30 minutes.

Electrical test

Earthing insulation of the connections is checked at the voltage of 2000 V, 50 Hz for 1 minute.

Functional test

All the relays are tested on specially designed PLC controlled testing units and all the response conditions of the contact systems are checked.

ASSEMBLY INSTRUCTIONS

The following conditions should be verified for the best results:

- On the relay, there is an arrow showing the direction of the assembly (from the transformer to the oil conservator tank)
- The relay should always be full of oil. Therefore the minimum oil level in the conservator should always be above the breather cock of the relay.
- The relay should be assembled horizontally to ensure correct operation of the floats. A maximum inclination of 4° with respect to the horizontal axis towards the conservator tank is allowed.
- The pipe which connects the transformer to the relay should come out from the uppermost part of the transformer cover.

Änderungen können ohne Benachrichtigung vorgenommen werden. Wir behalten uns vor, Produkte abzuändern oder ganz aus dem Lieferprogramm zu streichen. Die Angaben in diesem Katalog sind ohne Gewähr.

Der Nachdruck bzw. die Kopie auch von Teilen dieser Dokumentation, sowohl auf elektronischem wie auch mechanischem Weg, bedürfen unserer ausdrücklichen schriftlichen Genehmigung.

© Copyright – Alle Rechte vorbehalten

Changes may be made without further notice. We reserve the right to change products or omit them from our program. The information given in this catalog is subject to change.

No part of this publication may be reproduced by any means, electronic or mechanical, including photocopying and microfilming, or utilized in any other form without permission in writing from the publisher.

© Copyright – All rights reserved

Flister Group GmbH & Co KG
Dorfäcker 4
D-91086 Aurachtal
Tel.: +49 (0) 91 32-30 01
Fax: +49 (0) 91 32-65 02
eMail: info@flister-elektrotechnik.de
web: www.flister-elektrotechnik.de



FLISTER
Elektrotechnik