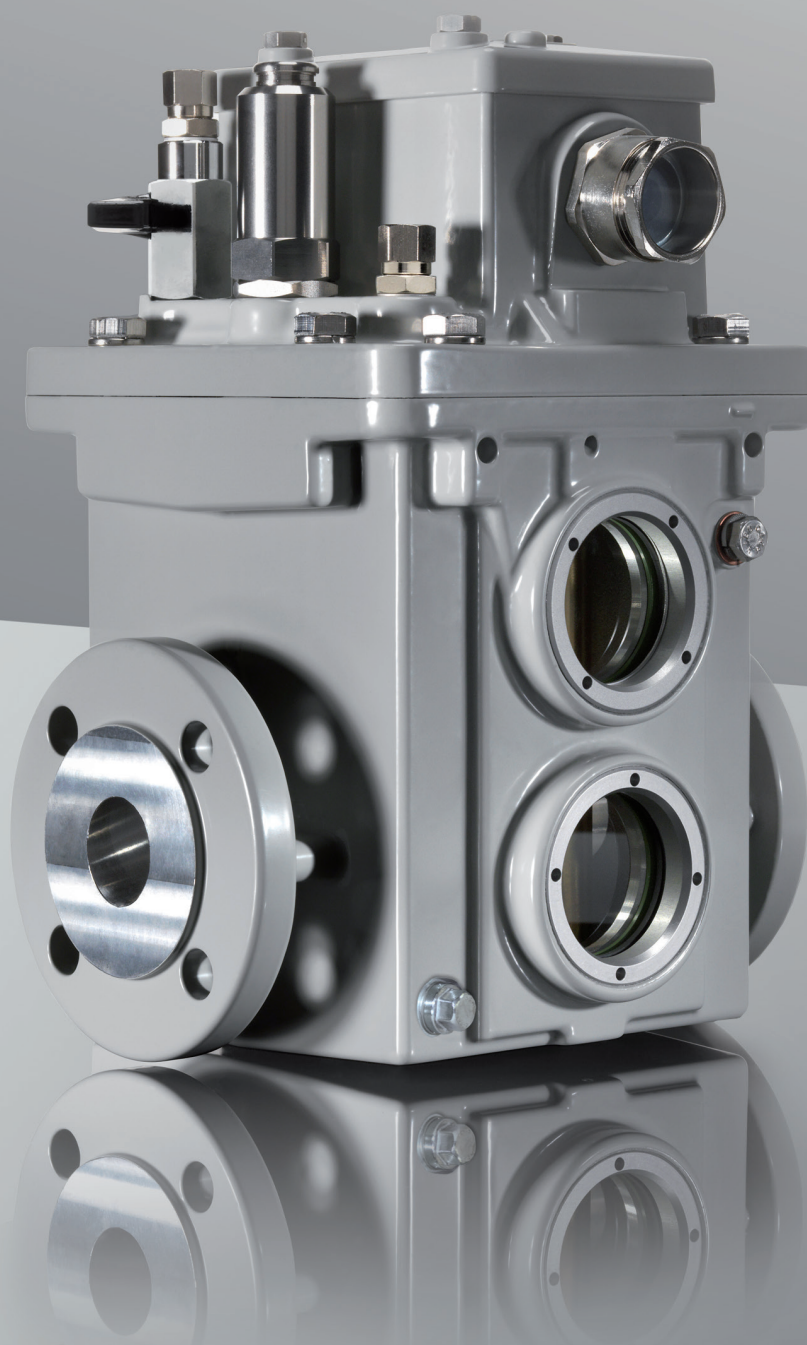




MESSKO® MSAFE®
100 YEARS OF EXPERIENCE AND
PRECISION – THE BUCHHOLZ
RELAY FROM MESSKO.

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MESSKO® MSAFE® MAXIMUM SAFETY – DUE TO RELIABLE MONITORING.

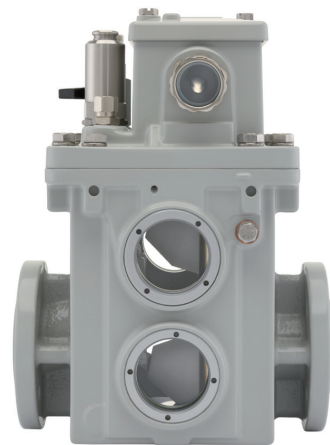
Power transformers are one of the most important pieces of equipment in a power supply network and, at the same time, one of the most expensive. When transformers are reliably serviced, they can remain in operation for 30 years or longer. But transformers can also suffer damage despite the very low failure quota. Weak energy partial discharges and leakage currents, local and temporary overheating as well as other error sources cause the liquid and solid insulating materials to accelerated decomposition and create gases in the process. These gases can develop rapidly to turbulently when arcing discharges or highcurrent flashovers occur. These faults can lead in cases of late detection to malfunctions or even the destruction of the transformer.

The solution: MSAFE® – the Buchholz Relay from MESSKO

The MESSKO® MSAFE® acts as a central protection system for liquid-filled transformers and reactors with oil conservator. Installed in the pipeline between tank and oil conservator, it reacts to faults which occur inside the transformer. Damages which are not visible can be detected early by the Buchholz relay.

Gases moving in the direction of the oil conservator or shock waves created by the rapid gas development trigger the signaling system of the Buchholz relay. The Buchholz relay also takes over the function of an oil level indicator when there is not enough oil in the conservator or when there is an oil leak.

Two-float Buchholz relays are used to protect larger transformers. They have separate switching elements for warning and switch-off. Two-float Buchholz relays have different nominal widths and pipe threads or flange connections so that they will fit the different pipeline cross-sections from the transformer to the oil conservator. The Buchholz relay can also be used on a transformer oil conservator with rubber bag to indicate a breakage in the bag.



MESSKO® MSAFE® – BUCHHOLZ RELAY. ARGUMENTS FOR LONG-TERM COST SAVINGS.

Long life span

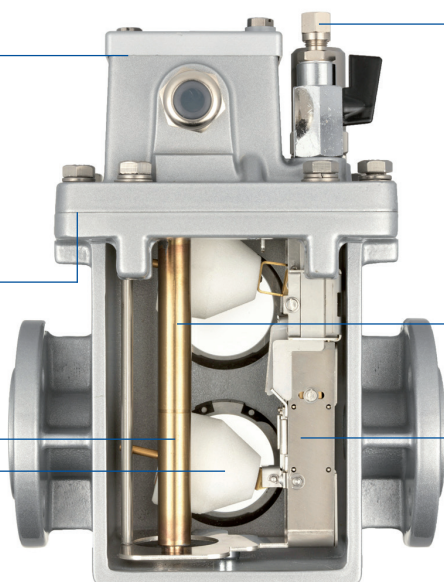
- Top-quality, reliable materials
- 95% of the mechanical components made of stainless steel

High operating reliability

- Helium leak test

No false alarms

- Protected Reed switch
- Solid-body float
- 100% test



Easy maintenance and service

- Test line connection for remote inspection
- Gas withdrawal
- Switch replacement is possible without any interference to the oil circulating system

Extensive accessories

- MESSKO® Gas Sampler
- MESSKO® Gas Quick Test

The MESSKO® MSAFE® Buchholz relay impresses with its robust construction in which more than 100 years of experience in measurement, regulation and safety technology have been invested. Top-quality materials, high manufacturing quality and the latest testing devices all guarantee the reliability of Messko's Buchholz relay.

Extra function reliability due to the use of solid-body floats

In contrast to frequently used hollow floats, the solid-body floats used by the MESSKO® MSAFE® cannot fill up with oil and lose their buoyancy. Messko has had long years of positive experience with this material using it for the MTO series oil level indicators.

Helium leak test as guarantee of oil and gas leak proofness

Before being delivered, every single Buchholz relay is checked for leak proofness in addition to a function test. For this test Messko uses helium at its state-of-the-art test stand. This helium leak test guarantees maximum oil and gas leak proofness.

Two or four switching contacts

If desired, the device can be equipped with normally closed, normally open and / or changeover contacts.

Protected Reed switches

The reed switches of the MESSKO® MSAFE® are separated by immersion pipes from the oil. An oil ingress into the reed switch is therefore impossible. These switches are freely accessible from the terminal-box. Replacement is possible without any interference to the oil circulating system.

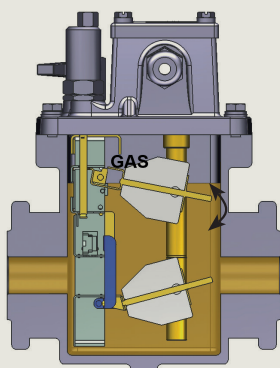
Remote testing possibility

At any time the MESSKO® MSAFE® can be triggered via a compressed air line to test its readiness of operation.

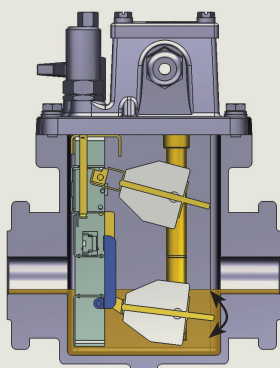
Top-quality, reliable material

95% of the mechanical components are made of stainless steel. An offshore-quality MESSKO® MSAFE® is also available as an option.

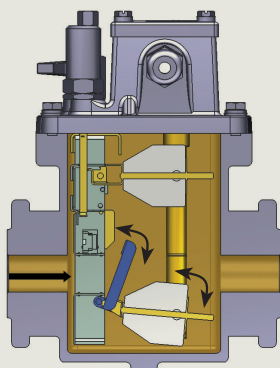
FUNCTIONAL PRINCIPLE OF THE MESSKO® MSAFE®.



Accumulation of gas



Loss of insulating fluid



Fast-moving insulating fluid current

At the accumulation of gas

The insulating fluid contains free gas

The gas in the fluid moves upwards, accumulates within the Buchholz relay and displaces the insulating fluid. When the level of liquid falls, the upper float sinks accordingly. The movement of the float activates a switching contact (Reed switch) which triggers a signal (warning). This does not affect the lower float since after a certain amount of gas is reached, the gas flows off through the pipe to the oil conservator.

At the loss of insulating fluid

Loss of insulating fluid due to leaks

First, the upper float sinks when the level of the fluid drops. A signal (warning) is triggered. If more fluid is lost, the oil conservator, pipe and the Buchholz relay become empty. The lower float sinks when the level of fluid falls. The movement of the float activates a switching contact which can be used to trip the transformer.

At fast-moving insulating fluid current

A spontaneous event creates a shock wave which moves in the direction of the oil conservator

The current caused by the shock wave strikes a flap valve positioned within its path. If the speed of the current exceeds the triggering sensitivity of the flap valve, the flap valve moves in the direction of the current. This motion activates a switching contact which can be used to trip the transformer.

Option/accessories

- I MESSKO® Gas Sampler
(with additional optional accessories, such as adapter plate, PTFE or copper pipe and pipe coupling)
- I MESSKO® Gas Quick Test
- I MSAFE® Test Accessories (hand pump, foot pump)
- I Inspection window cover
- I Connector for pneumatic test
- I Offshore version

AN OVERVIEW OF THE ADVANTAGES OF THE MESSKO® MSAFE®.

- Additional functional reliability due to the use of solid-body floats
- Helium leak test and oil test stand to guarantee 100% functional reliability and oil and gas tightness
- Up to 4 switching contacts: normally closed, normally open and / or changeover contacts can be combined
- Protected Reed switches (encapsulated and not in oil)
- Switch replacement is possible without any interference to the oil circulating system
- Top-quality, reliable material (corrosion proof)
- 100% inspection including test report

Technical Data MESSKO® MSAFE®:

MESSKO® MSAFE®	Technical Data
	Materials
Housing and upper part including terminal box	Aluminium casting, RAL 7033 or 7038 (similar to ANSI 70 light grey), powder coated; Offshore model on request
Inspection glass	Tempered glass with UV filter
	Characteristic data
Installation	Indoors and outdoors, tropical proof
Ambient temperature	-50... 80 °C
Isolation liquid temperature	-30... 120° C (mineral oil)
Protection mode	IP 66 as per DIN EN 60 529
Nominal tube diameter	DN25, DN50, DN80 or G 1 1/2" threaded connection
Flap triggering pressure	for DN25, DN50 and DN80 on customer request 0.65 m/s, 1 m/s, 1.5 m/s, 2 m/s or 2.5 m/s (each $\pm 15\%$); others on request
	Protected Reed switch
Number and type	Normally closed, normally open and / or changeover contacts on customer request; potential free; 2 pieces per function
Nominal voltage	24-250 V AC/DC
Max. nominal current	2 A AC/DC
Min. switching current	50 mA/24 V DC
Max. through current	3 A AC/DC
Max. switching capacity AC	1.2 VA-400 VA
Max. switching capacity DC	1.2 W-250 W
Rated insulation voltage	2.7 kV AC/2 sec. contacts against housing; 1 kV AC/2 sec. open contacts
Insulation resistance	1000 M Ω /500 V DC
	Connection via terminal-box
Connection terminals	min. 0.25 mm ² / max. 4 mm ²
Cable gland	M25x1.5 for cable \varnothing 13...20 mm or 1/2" NPT
	Mechanical tests
Vibration	5-35 Hz and 10-150 Hz at 2 g, 2 h (IEC 60068-2-6)
Earthquake	2-10 Hz, 22.5 mm, 1 h (IEC 60068-2-57)
Shock	10 g, 10 ms (IEC 60068-2-27)
Continuous oscillation test	100, 200, 300, 400 Hz, 1 g, 2 h

Maschinenfabrik Reinhausen GmbH
Falkensteinstraße 8
93059 Regensburg
Germany
+49 941 4090-0
info@reinhausen.com
reinhausen.com

Please note:

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THE POWER BEHIND POWER.

