BUCHHOLZ RELAY (Gas & Oil Operated)

With Magnetic (Reed) Switches

Size 25 mm, 50 mm & 80 mm ● Optional: Plug and Socket
India relevant models only ● GOR series

1" relay

3" relay

2" relay

OSR (Al type)

OSR (CI type)

FEATURES

- Reliable, time tested magnetic reed switch switches
- Magnetic switch allows high AC and DC switch rating and functioning at mA current
- Anti-vibration mounting pads give high stability against mechanical shocks and vibrations.
- Options of Aluminium alloy or cast-iron body construction cater to varying market requirements.
- Unique internal design of housing prevents false air traps on top of the relay.
- Bucket type float design with inherent ability to withstand vacuum treatment of transformers.
- High flow versions for force cooled transformers available on request
- Plug and socket connection available with models approved for PGCIL 420/765KV applications
- Each relay tested for all parameters including gas volume, oil surge and loss of oil. Individual test certificates.
- ATVUS relays are approved by most consultants, Power Projects and Electricity Boards in India.

VIAT INSTRUMENTS

ATVUS®

GENERAL

Power transformers are considered to be a highly reliable type of equipment, yet, in order to ensure the continuity of service that modern conditions demand, protective devices are required. The purpose of such devices is to disconnect faulty apparatus before large-scale damage is caused by a fault to the apparatus or to other connected apparatus. Such devices generally respond to a change in the current or pressure arising from the faults and are used for either signaling or tripping circuits.

Protective devices in the ideal case must be sensitive to all faults, simple in operation, robust for service and economically feasible. Considering liquid immersed transformers, a near ideal 'protective device' is available in the form of Gas and oil relay described here. The relay operates on the well known fact that almost every type of electrical fault in a 'liquid immersed transformers' gives rise to gas. This gas is collected in the body of the relay and is used in some way or other to cause the alarm or the tripping circuit to operate.

The principle of the gas and oil relay was first successfully demonstrated and utilized by "Buchholz" many years back. In a series of experiments carried out extensively in Germany it was provided that the relay is capable of bringing to light incipient fault thereby preventing further spreading of the fault and extensive damage and thus saving expensive and protracted repairs. So successful is the principle of this relay that despite the continued search for better protective devices in other electrical field the Gas and Oil relay is still on its own in providing protection against a variety of faults.

WORKING

The function of a double element relay will be described here. During normal operation of a transformer the buchholz relay is completely filled with oil. Buoyancy and the moment due to counterweights keep the floats in their original top positions. In the event of some fault in the interior of the transformer tank, gas bubbles are produced which accumulate in the buchholz relay on the way to the conservator. In consequence, the oil level in the relay enclosure drops which in turn lowers the upper bucket.

This causes the magnetic switch to operate an alarm signal.

The lower bucket does not change its position, because when the gas reaches the upper inside wall of the pipe it can escape into the conservator. Hence, minor fault in the transformer tank will not trigger the lower switching assembly and will not trip the transformer.

In case the liquid continues to drop due to loss of oil, the lower bucket also goes down. In consequence, the lower switching system operates if the level of oil goes below the bottom level of the pipe connected to the relay. Alternately in the event the liquid flow exceeds a specific value the lower bucket is forced down, thus triggering the lower switching system to operate.

As the liquid flow rate decreases, or the level of the liquid rises, the bucket returns to its original position. The single element relay has only trip element. and it responds to only oil surges. The method of operation is similar to that described for double element relay. Single element relays are suitable for potential transformers and on load lap changers.

The single element oil surge relay has been specifically designed for use with on load tap change equipment and it will by pass normal amounts of gas which are generated by tap change operations and will only respond to oil surges and loss of oil.

APPLICATIONS

Double element relays can be used in detecting minor or major faults in a transformer. The alarm element will operate, after a specified volume of gas has collected to give an alarm indication. Examples of incipient faults are :

a) Broken down core bolt insulation.
b) Shorted laminations.
c) Bad contacts.
d) Over-heating of part of windings.

The alarm element will also be operated in the event of oil leakage, or if air gets into the oil system.

The trip element will be operated by an oil surge in the event of more serious faults such as :

a) Earth faults.
b) Winding short circuits.
c) Puncture of bushings.
d) Short circuit between phases.

The trip element will also be operated if a rapid loss of oil occurs. Single element relays can be used to detect either incipient or major faults in oil filled potential transformers, rectors, capacitors etc. A special single element relay is available for the protection of on load tap change equipment.

BASIC CHARACTERISTICS

The gas and oil relay provides protection against a number of internal faults and is also able to indicate in several cases the type of fault. This is possible because the gas collected in relay can, from its colour, odour and composition, indicate where the fault may be and what its nature is. By examining the gases collected it is possible to infer the nature of fault. Thus:

a) If the gas is colourless and odourless or with only a faint odour of oil, the gas is air trapped in the oil or the insulation.

b) If the gas is greyish white with sharp and penetrating odour and non inflammable it is due to overheated or faulty insulation.

c) If the gas is yellowish in colour and inflammable it may be due to surface leakage on material like wood.

d) If the gas is dark grey and inflammable it may be due to a flashover in oil or due to excessive overheating of the oil caused by a fault in the winding or the core.

On the operation of the alarm if investigation of the collected gas does not indicate a serious fault it is possible to leave the transformer in service till it is convenient to carry out a thorough inspection. This occurrence is possible on the newly commissioned transformer due to air trapped in the oil or the insulation. On repeated and frequent alarm signals the transformer should be taken out of service for thorough checkup.

VARIETY AVAILABLE

Pipe size	25mm, 50mm or 80mm			
Trip/Surge Velocity	As per drawing			
Flange to flange distance (GOR 2M)	184 and 215mm			
Switch configurations	**Nomenclature**	**Switch configuration**	**Nomenclature**	**Switch configuration**
	Standard	Alarm NO, Trip NO	1NC	Alarm NO, Trip NC
	3NO	Alarm 1NO, Trip 2NO	2NC	Alarm NC, Trip NC
	3NO-A	Alarm 2NO, Trip 1NO	1CO	Alarm NO, Trip 1CO
	4NO	Alarm 2NO, Trip 2NO	2CO	Alarm 1CO, Trip 1CO
Cable termination	-¾ BSC conduit on terminal box -Plug and socket connection with armoured cable or unarmoured cable available			

Why you should never use 'Micro switch type' Buchholz relay (with switch in housing)

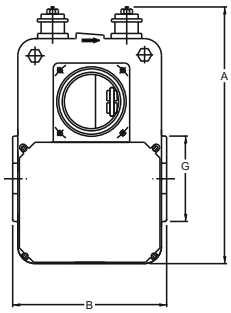
One of Viat's core values is to provide reliable, dependable products that work. Hence, we make a strong stand against a relatively new type of relay in the market where micro switches are put inside the housing of the Buchholz relay- exposed to heat, pressure and immersed in liquid for the life of the transformer.

Although microswitches are used extensively in other transformer instruments like MOLG, flow indicator etc, in all cases this microswitch is in air in a protected enclosure. In these micro switch type Buchholz relays, however, the micro switch is inside the hot pressurized transformer fluid, a medium where it is not designed to operate- and hence the relay may stop functioning after some time. There have been extensive reports of this type of relay failing at sites.

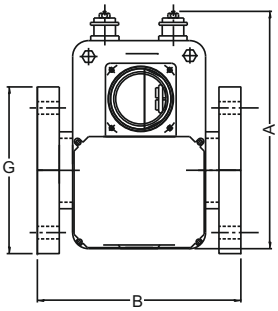
Hence, 100% of Viat Buchholz relays use Magnetic reed switches. These switches are glass encapsulated and designed to work in oil- the absolute gold standard in Buchholz contacting.

Protect your transformer, avoid internal micro switch type relays

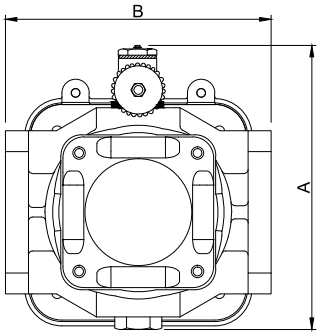
	Other manufacturer internal micro switch	**Magnetic Reed switch type relay**
Type of switch	Micro switch in oil (Zero ingress protection of switch)	Magnetic reed switch in molded glass. Contacts in sealed glass tube with complete ingress protection to 5 Kg/cm2
Position of switch	Exposed switch directly in hot, pressurised oil	Sealed switch inside oil
Method of operation of switch	Float directly presses micro switch in oil	Float brings magnet close to switch, which triggers contact inside the glass switch
Vibration resistance	No vibration resistance	Vibration resistance upto 4M4 class of EN60721-3-4: 1995
Expected lifetime	Switch could fail anytime under hot pressurized liquid	Transformer lifetime



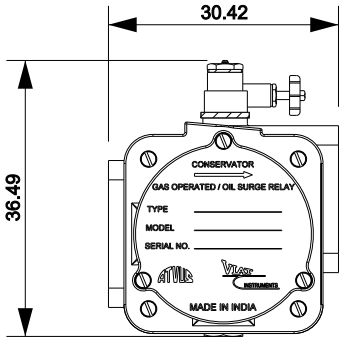
RELAY TYPE
1" GOR



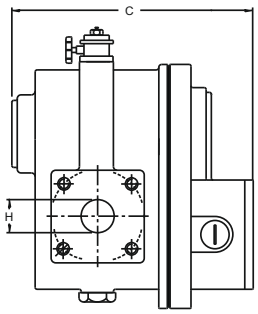
RELAY TYPE
2" and 3" GOR

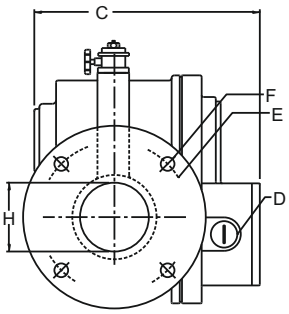


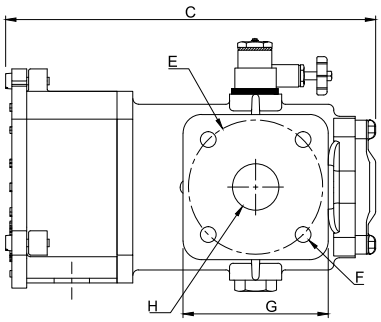
RELAY TYPE
OSR (AI)

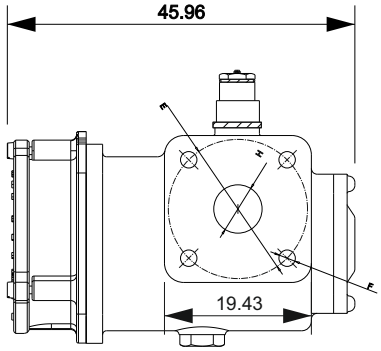


OSR (CI)









			1" GOR	2" GOR	3" GOR	OSR (AI)	OSR (CI)
Transformer Rating (MVA)			below 1	1 to 10	above 10	OLTC	OLTC
Main Dimensions (mm) Aprox		**A**	250	250	250	115	155
		B	128	184 or 215	215	128	120
		C	190	205	202	200	160
		D	1" BSC Conduit	1" BSC Conduit	1" BSC Conduit	3/4" BSC Conduit	3/4" BSC Conduit
Flange Dimensions (mm)	P.C.D. Holes / Thread Flange Dia.	**E**	72	115	145	72	72
		F	M 10	18	18	M 10	M 10
		G	76 square	150	185	78 square	76 square
Pipe Bore (mm)		**H**	25	50	80	25	25

Operating Temperature			Air: -40 C to 80 C | Oil : -25 C to 100 C
High Voltage Test	IS 3637		2000 VAC at 50 Hz for 1 minute
Insulation Resistance Test	IS 3637		Greater than 10 megaohms with 500 V meggar
Enclosure Protection	EN 60529		IP 67
Current Rating of Switch	IS 3637		250 VAC 5A, 250 VDC 2A or 3A (Depending on model)
Paint Shade			IS 5 - 631 Standard
Vibration Sensitivity			CLASS 4M4 OF EN 607211-3-4:1995

Due to our policy of continuous product improvement, dimensions and designs are subject to change.

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