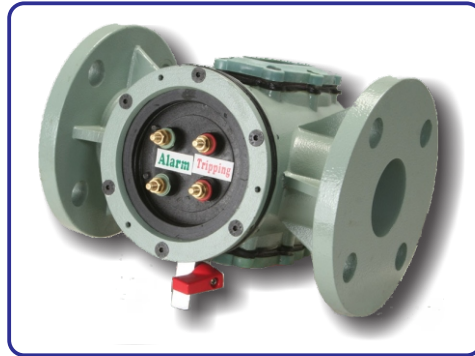




IMPROVED TECHNOLOGY FOR TRANSFORMER PROTECTION BUCHHOLZ RELAY



Transformers are considered to be the most expensive of electrical equipment in electrical systems. To ensure the reliable operation of this equipment protective devices are required so that the catastrophic failure/large scale damage can be avoided. In the event of system faults/short circuit conditions/unusual operating conditions any such protective device. One such device is the Buchholz Relay.

What is Buchholz Relay ?

A Buchholz relay is an alarm cum trip device configured to respond to a fault in current or Oil/gas surge/pressure in the Transformer. These relays are intended for installation between the transformer pipe and conservator tank/vessel.

Conventional Buchholz Relay

Presently relays are being manufactured by ferrous castings which are intrinsically heavy and are prone to corrosion. The internal mechanism of these relays are kinematics mechanical linkages installed inside the casing Many a time, these relays have been found not to operate during faults in the transformer resulting in catastrophic damage

Technology

The Non ferrous material based & light weight Gas & Oil surge Relay “GOR” technology developed by ERD & M/s, Ashish Engineering Comprises of an oil tight body (Casting) with a cooler. The casting is made by die casting using an advance a Aluminum alloy

The alarm and trip mechanisms in this relay comprise of two mercury switches provided in two respective, fully sealed polymer based floats. One of these floats, which is mounted at a higher elevation, responds to increase in the collected gas volume in the relay. The second lower float respond to transient oil surges. More specially, the upper float responds to the following potential fault condition in the transformer

1. Low Oil Level.
2. Gas Accumulation
3. Core lamination fault
4. Insulation damages

While the lower float triggers during the following conditions :

1. Major insulation damages



- 2. Short circuit between phases and phase & earth
- 3. Short circuit between turns
- 4. Oil level falling below the float (Due to oil Loss/leakage)

These GOR s are intended for installation in the connecting passage between the main tank of an oil immersed electrical apparatus (Transformer) and its oil conservator vessel The relay housing is weather resistant and free from mechanical defects. Two inspection windows of tough transparent material are provided on each side of the relay for checking the oil level. The volume in the relay (cm³) can be measured on a calibrated scale provided on the relay.

The connecting leads from the switch are made of tinned copper flexible wire insulated with insulated beads. These wires terminate on the outlet bushings by compressed terminal lugs.

The Newly Developed Buchholz Relay Qualify the Following Tests Testing Qualification as per IS :-3637-1966.`

The GOR relay was tested for following type tests.

- 1. Porosity test.
- 2. High Voltage test.
- 3. Element test.
- 4. Gas Volume Test.
- 5. Loss of oil & surge test.
- 6. Mechanical strength test.
- 7. Velocity calibration test.
- 8. Loss of Oil and Surge Test

Technical Details

Sr. No.	Parameters	Range
1	Nominal Voltage	230V, 50Hz AC / DC
2	Nominal Current	2 Amps AC/DC
3	High Voltage Capacity	200 V AC/minut.
4	Insulation Resistance	> 10 MΩ
5	Temperature Range	Up to 125oC
6	Pressure Withstand Strength	3 kg/cm2
7	Mechanical Strength – Casting	9 kg/Cm2
8	Resistance of Terminal	0.1Ω
9	Cross Sectional Diameter of Current Leads	0.5 mm
10	Operating Time	5 ms



Comparative Chart of Conventional and Newly Developed Relay. Salient Features

Sr No.	Features	Conventional Relay	Newly Developed
1	Internal Design	Conventionally Bigger	Miniature Design
2	Weight (Approx.)	C.I.-11.1Kgs, & M.S.-9.2Kgs.	3.9Kgs.(G.O.R.2)
3	Size	Square Flange Side Fitting-Difficult	Cylindrical Flange Side Fitting-Easy
4	Mercury Switch	Traditional Mercury Switch Inside glass tube Chances of damage/bursting	No Mercury or Reed Switch Mercury Float No chance of damage
5	Terminal Connections	On Side of the body Chance of rain water entering	Bottom side No chance of rain water Entering
6	Body Material	Mild Steel/Cast Iron	Aluminum alloy
7	Internal Material	M.S., Brass, Al..	S.S. & A.B.S.
8	Welding	Required	Not Required
9	Corrosion Resistance	Poor	High
10	Third Test Valve	Provided Due To Cup Type Float	Not required Due to Cylindrical Float
11	Performance	Acceptable	Superior
12	Reliability	Low	Very High
13	Cost Effectiveness	Average (100%)	Cheaper (< 50%)
14	Consumer Advantage	Average	Maximal
15	Transport lock	Required as per cl No 4.9 of Is.3637.Flot itsekf us mercury switch hence not reqd.	Not provided.

Reed Switch: A switch that has contacts mounted on ferromagnetic reeds sealed in a glass tube, designed for actuation by an external magnetic field. Also known as magnetic reed switch.