Transformer components

Buchholz Relay

Protection against dielectric failures & sudden gas or oil changes

Transformers outages have considerable impact on the power grid. During their operation, certain phenomena contribute to the degradation of the insulation and generate dangerous gas and oil flow inside the tank.

The Buchholz relays are designed to monitor and rapidly react to internal gas accumulation and oil flow changes. It provides a prompt alarm or trip signal allowing the operator to shut down the transformer quickly and prevent further damage.

Features:

- Flexibility in product options
- Robust design and field-proven reliability
- Precision and tested quality
- Quick Quotes and Deliveries

Our Buchholz relays are designed to detect the faults and minimize the propagation of any damage by controlling the gas accumulation and oil flow inside the transformer. Examples of faults that can cause gas accumulation or strong oil flow are:

- 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

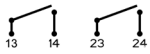
Flexibility

Tansformer Oil Capacity	Pipe Size (mm)	Type	Connection Flange	Switch	Connection Diagram*	Product Number
<1600 kg	25	BR25-F16 	Circular 4 holes (Ø11,5)	2xNO	C	1ZTE011001B0007
				2xCO	D	1ZTE011001B0008
		BR25-V16 	Threaded G 1½"	2xNO	C	1ZTE012001B0007
				2xCO	D	1ZTE012001B0008
		BR25-KF16 	Square 4 holes (M10)	2xNO	C	1ZTE018001B0007
				2xCO	D	1ZTE018001B0008
		BR25-F50 	Circular 4 holes (Ø14)	2xNO	C	1ZTE014001B0010
				2xCO	D	1ZTE014001B0011
				3xNO	E	1ZTE014001B0012
				3xNO	F	1ZTE014001B0013
				4xNO	G	1ZTE014001B0014
		BR25-V50 	Threaded G 1½"	2xNO	C	1ZTE013001B0010
				2xCO	D	1ZTE013001B0011
				3xNO	E	1ZTE013001B0012
				3xNO	F	1ZTE013001B0013
				4xNO	G	1ZTE013001B0014
≥1600 kg ≤10000 kg	50	BR50-F100 	Circular 4 holes (Ø18)	2xNO	C	1ZTE015001B0010
				2xCO	D	1ZTE015001B0011
				3xNO	E	1ZTE015001B0012
				3xNO	F	1ZTE015001B0013
				4xNO	G	1ZTE015001B0014
>10000 kg	80	BR80-F100 	Circular 8 holes (6x Ø18+ 2x M16)	2xNO	C	1ZTE016001B0010
				2xCO	D	1ZTE016001B0011
				3xNO	E	1ZTE016001B0012
				3xNO	F	1ZTE016001B0013
				4xNO	G	1ZTE016001B0014
		BR80-KF100 	Square 4 holes (Ø18)	2xNO	C	1ZTE017001B0010
				2xCO	D	1ZTE017001B0011
				3xNO	E	1ZTE017001B0012
				3xNO	F	1ZTE017001B0013
				4xNO	G	1ZTE017001B0014

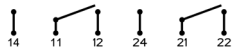
All models have inspection windows on each side allowing to view the oil level indication, the gas volume and examine the contact system. Custom options are available on request, including flow rate speeds, contact types and C5 Medium corrosion class.

***Connection Diagrams**

C 2xNO Connection (1xAlarm, 1xTrip)



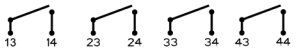
D 2xCO Connection (1xAlarm, 1xTrip)



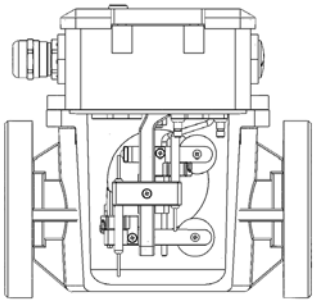
E 3xNO Connection (2xAlarm, 1xTrip)

F 3xNO Connection (1xAlarm, 2xTrip)

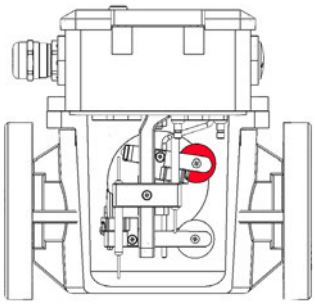
G 4xNO Connection (2xAlarm, 2xTrip)



Robust Design

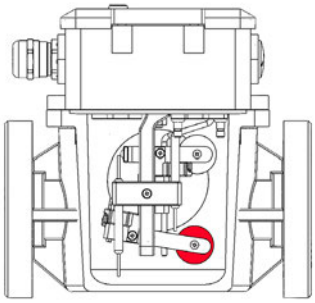


The Buchholz Relay is installed on the pipe between a transformer and its conservator. During normal operation, the relay is filled with oil keeping the floats in their top limit or rest position. The contact mechanisms in the relay responds to:



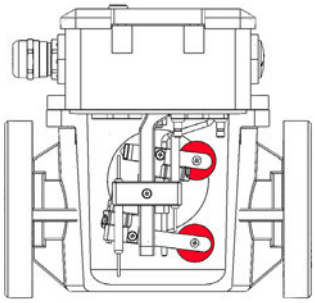
Incipient faults

When an incipient fault occurs in the transformer, small bubbles of gas will travel upward towards the oil conservator tank. They will be trapped inside the Buchholz Relay housing, reducing the oil inside. As a result, the upper float rotates on its hinge and operates the alarm switch, sending a signal to the operator.



Serious faults

When a serious fault occurs in the transformer, the gas generation is violent and causes an oil rush through the Buchholz Relay to the oil conservator tank.
Inside the Relay, the oil surge pushes the deflector plate fitted on the lower float and causes the rotation of the float itself. The latter will operate the tripping contact and send a signal to the operator to disconnect the transformer.



Oil leakage

An oil leak in the transformer will cause the oil level inside the relay to drop. It will operate first the alarm, through the upper float. Then the tripping signal, through the lower float.

The relays, consist of two sections, the main and upper housings which are both made of corrosion-resistant aluminum alloy and covered with electrostatic powder paint. Both sections are then treated to seal possible microcracks and each Buchholz Relay is tested to ensure no leakage of oil or gas inside and out. The upper housing of the product holds all the internal mechanisms and is fitted with a cable terminal box, a breather valve, and a test button to test the alarm circuits.

This gives the operator the ability to test the signals when the product is empty or filled with oil. Gas and oil can also be tested out of a sampling valve. Inside the main housing, the lower contact system is also fitted with a deflector plate for oil flow sensing and allows the relay to adjust the oil flow speed on request. Foam type floaters provide extra buoyancy and prevents the oil to leak inside the float resulting in malfunction.

Precision and Testing

Quality is a priority for us . We offer technology leadership, backed by a proven record of addressing diverse challenges and improving standard practices. Our product portfolio is the result of research, manufacturing, and servicing transformers, making us unique in the industry.

Every Buchholz Relay is tested for:

Leakage test
Units are placed in a water container and injected with pressured air for a short duration to witness possible leaks.

Electrical test
A short-duration power frequency withstand voltage test is applied between all circuits and earth.

Functional test
All mechanisms and contacts are tested for good operation.

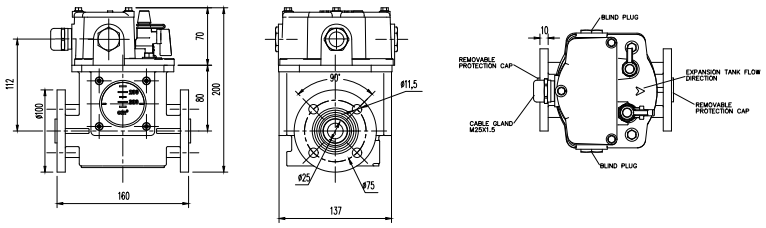
Quick quotes and deliveries

We offer standard pricelists and quick delivery times for our standard products listed herein. If required, our engineers can also offer customized solutions for your application.

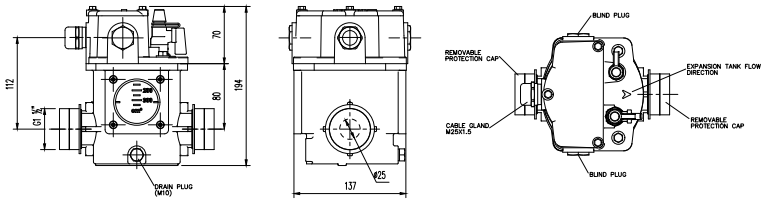
Technical Data	
Standard	DIN 42566, EN 50216-2, IEC 60076-22-1

Mechanical

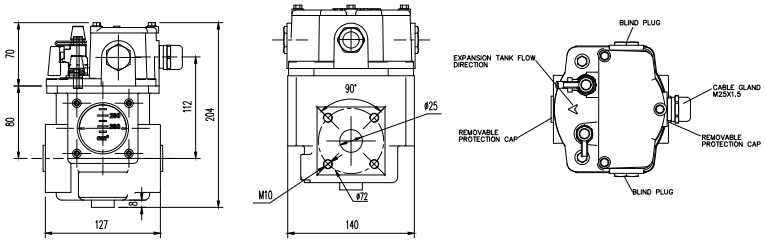
BR25-F16



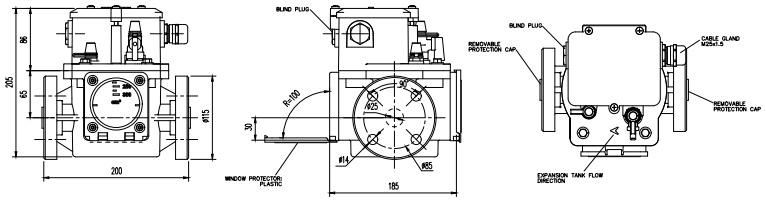
BR25-V16



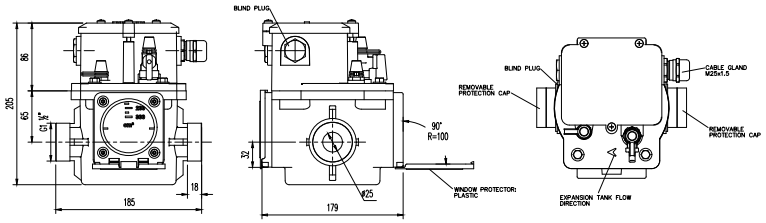
BR25-KF16



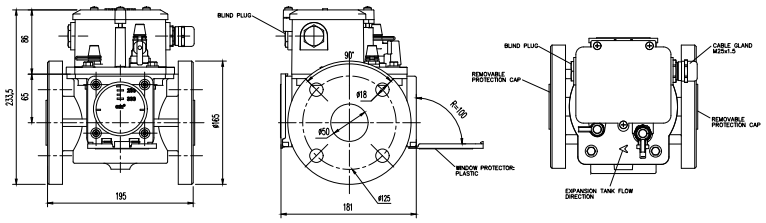
BR25-F50



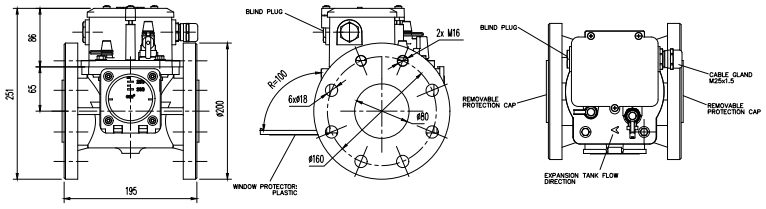
BR25-V50



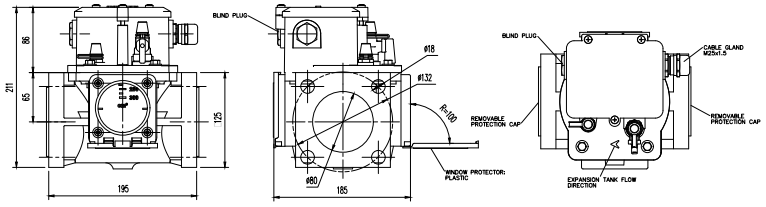
BR50-F100



BR80-F100



BR80-KF100



Housing		Aluminum casting
Color		RAL 7033
Nominal pipe diameter		DN25, DN50, DN80
Mounting position		Max 5° ascending towards conservator
Gas sampling valve connection		G1/8” male threaded
Gasket material		NBR (standard) for mineral oil, other options available
Weight	BR25-F16	3,2 kg
	BR25-V16	2,9 kg
	BR25-KF16	3,4 kg
	BR25-F50	4,3 kg
	BR25-V50	3,6 kg
	BR50-F100	5,9 kg
	BR80-F100	6,7 kg
	BR80-KF100	6,9 kg
Electrical		
Switches	BR25-F16 BR25-V16 BR25-KF16	2xNO or 2xCO
	others	2xNO, 2xCO, 3xNO or 4xNO
Making Capacity (AC)	NO	250 VA
	CO	100 VA
Making Capacity (DC)	NO	250 W
	CO	100 W
Cable gland		M25x1,5 (up to 3 pcs.)
Oil		
Oil type		Mineral oil
Operating oil temperature		-40°C to +110°C
Response conditions of the switches		
Gas accumulation		200 cm^3 - 300cm^3
Oil flow velocity (±15%)		1,00 m/s (standard), optional 0,65 m/s or 1,50 m/s
Environmental		
Ambient temperature		from -40°C up to +80°C
Degree of protection		IP65 in accordance with IEC 60529
Insensitivity to magnetic fields		in compliance with IEC 60076-22-1
Corrosion protection		C4 Medium
Vibration class		4M6 according to IEC 60721-3-4