

SAFETY VALVES FOR OIL FILLED ELECTRIC TRANSFORMERS

Aim of the safety valves on electric transformers:

The transformer tank filled with cooling liquid is a container subject to internal pressure and then has to be provided with one or more safety valves suitably calibrated for the maximum allowed pressure, so that overpressure caused by internal faults else can be instantaneously relieved through the valves, thus avoiding greater damages such as the deformation or even the burst of the tank and the spraying of oil with subsequent fire risks.

It is necessary to protect the transformer tank with a suitable equipment capable of almost instantaneously discharging overpressure already at the development, before the structure integrity is damaged and *safety valves* has just this function

General features

The safety valves consist schematically of:

- a **valve base** comprising the valve opening with its specially profiled gasket and a seat for an O-ring gasket on the flanged end towards the transformer's tank;
- a **valve cap** pressed against the profiled gasket by

calibrated helical spring, thus making the valve completely tight up to the rated pressure;

- a **splash diverter** to avoid damages caused by hot oil sprinkles (on request);
- a single or a double **electrical contacts** (on request).

MECHANICAL PROTECTION DEGREE : IP 65

INSULATION : 2000V 50Hz between terminals and earth for a 60 secs. time

CABLE GLAND : PG 13,5

MICROSWITCH BREAKING CAPACITY :

10A 250V AC

1A 125V DC

Safety valves - types

The safety valves are built with different Major Diameters and rated pressure to satisfy the requirements of the various applications.

TYPE	MAJOR DIAMETER	RATED PRESSURE	PREVAILING USE
T 200	200mm.	0,3 ÷ 0,7 bar	big power transformers
T 125 - VS 150	125mm.	0,3 ÷ 1 bar	big power transformers
VS 100	100mm.	0,3 ÷ 1 bar	medium power transformers
T80 - VS 80	80mm.	0,3 ÷ 1 bar	small power transformers
T 50	50mm.	0,3 ÷ 1 bar	cable boxes - small tanks

SAFETY VALVES SERIES VS : the advantage of safety valves serie VS consists in the total absence of projecting parts in the transformers tank making the mounting point choose easier. These valves can be mounted, with regards to their base plane, both horizontally on the cover and vertically on the transformer walls at the points where their safety action is presumed to be more necessary.

SAFETY VALVES SERIES T : the advantage of safety valves series T is that, showing the same effectiveness and reliability of valves serie VS, their simplicity consent to obtain very competitive prices.

Instruction for mounting safety valves

The data about the transformer point where a short circuit is most likely to occur, the preferential direction the resulting shock wave may have, the intensity this one can reach, all depend on the transformer power, its transformation ratio, its construction characteristic and the behaviour of the other installed protection equipment.

Therefore, is not possible to give strict rules about safety valves application. It is the manufacturer who must decide each time and on his own experience the valve type and its position.

It is important to take these general suggestions into due consideration for a correct choice:

- *the safety valves must be mounted near the points where a failure is most likely to occur. When a single valve is mounted the barycentric position with regards to these points shall be chosen;*
- *the exhaust rated diameter shall be connected with the transformer oil quantity and with the number of mounted valves;*

- *the presence of gas or air-bubbles under the valve cap may negatively affect valve opening speed.*

Therefore, before operating the transformer, it is important to let possibly accumulated air come out through the suitable breather screw and above all to mount the valve so that the possible gas-bubbles developed during operation can not accumulate on the valve;

- *the operating pressure must be definitely lower than the maximum allowed pressure in the tank, but higher than possible pressure peak reached during operation.*

Mounting and maintenance

The safety valves mounting is carried out by means of the suitable fastening holes of the flange, after the splash diverter removal and after the insertion of the O-ring gasket supplied with the valve.

After the transformer filling, the air developed under the valve must be breather by unscrewing the suitable breathing screw. This breathing screw shall be tightened again as soon as the oil starts to come out.

During operation the safety valves do need a particular maintenance. Nevertheless, it is convenient to regularly check the electric contact good operation and to verify if there is no gas accumulation.

Instruction for ordering safety valves

The exhaust rated diameter shall be connected with the transformer oil quantity and with the number of mounted valves. When a single valve is mounted the barycentric position, with regards to the points where a failure is most likely to occur, must be chosen.

To help the Technical Department to state types and number of valves to be mounted on a transformer, is possible to study the following indicative table:

VALVE TYPE	OIL QUANTITY
T 50	up to 1.000 dm ³ (900Kgs.)
T 80	up to 4.000 dm ³ (3.600Kgs.)
VS 80	up to 6.000 dm ³ (5.400Kgs.)
VS 100	up to 20.000 dm ³ (18.000Kgs.)
T 125	up to 20.000 dm ³ (18.000Kgs.)
VS 150	up to 35.000 dm ³ (31.500Kgs.)
T 200	up to 40.000 dm ³ (36.000Kgs.)

In case of tanks containing larger quantities of oil must be mounted 2 or more valves of suitable dimensions (i.e.: if oil quantity is 95.000dm³ must be mounted 3 valves type VS 150 or 2 valves T 200 + 1 valve T 125).