WINDING TEMPERATURE INDICATORS FOR POWER TRANSFORMERS

The winding is the component with the highest temperature within the transformer and, above all, the one subjected to the fastest temperature increases as the load increases.

Thus, to have total control of the temperature parameter within the transformer, the temperature of the winding must also be measured. An indirect system is used to measure this latter since it is dangerous to place a sensor close to the winding due to the high voltage. The indirect measuring is done by means of a *thermal image.*

This instrument is designed to measure the temperature of the winding by means of a special bulb surrounded by a heating resistance through which passes a current proportional to the current passing through the transformer winding subject to a given load and immersed in insulating oil at temperature T_{oil}.
It's possible to adjust the heating system by means of a potentiometer whose knob is located on the winding temperature indicator's dial. In this way the value of the winding temperature indicated by the instrument will be equal to the ones planned by the trafo manufacturer for a given transformer load.
The winding temperature indicators can be fitted with one, two, three or four change-over microswitches suitable to control cooling equipments and protection circuits (alarm and trip) of the transformer.

Description and general specifications

TEMPERATURE SENSING SYSTEM : expansion type compensated for ambient temperature changes by means of a built-in compensating device.

CAPILLARY TUBE PROTECTION :

- copper tubing
- RILSAN tubing
- flex galvanized steel + PVC armouring
- flexible AISI 304 stainless steel armouring

BULB: bronze or stainless steel

CASING : aluminium alloy powder painted (RAL 7035) suitable to withstand to any climate and to heavy polluted atmosphere in as well tropical or arctical climates (-40/+70°C). All components are made of corrosion resistant or surface treated materials. The case is provided with a breather device to avoid dew on the lens. To make cable layout quick and easy, the case is equipped with a large junction- box completely separate from instrument's sensing system.

MECHANICAL PROTECTION DEGREE: IP 65.

LENS : special glass or polycarbonate

LOCKING RING : chrome plated brass

MEASURING RANGES : 0/150°C - 0/160°C

MEASURING TOLERANCE : 1,5% of fsv.

COMMUTATION TOLERANCE : 2% of fsv.

COMMUTATION DIFFERENTIAL : 4% of full scale value (this differential can be increased).

INSULATION: 2000V 50Hz between terminals and earth

MICROSWITCHES MAKING AND BREAKING CAPACITY :

	STANDARD MICROSWITCHES				HIGH-PERFORMANCE MICROSWITCHES			
VOLTAGE	RESISTIVE LOAD		INDUCTIVE LOAD		RESISTIVE LOAD		INDUCTIVE LOAD	
125 VAC	5	A	5	A	10	A	10	A
250 VAC	5	A	5	A	10	A	10	A
30 VDC	5	A	3	A	10	A	10	A
50 VDC	1	A	1	A	3	A	2,5	A
75 VDC	0,75	A	0,25	A	1	A	0,5	A
125 VDC	0,5	A	0,1	A	0,5	A	0,1	A
250 VDC	0,25	A	0,1	A	0,25	A	0,1	A

THERMAL IMAGE CURRENT : the heating resistance wound around the temperature indicator bulb is powered by the current transformer fitted to the power transformer. Both the heating resistance and the potentiometer that regulates it are sized with a given current coming from the CT. Standard values are: 1A, 1,5A, 2A, 5A. This value must be clearly specified at the time of the order. *No matching unit is required.*

MAX. TEMPERATURE POINTER: a red pointer, with reset knob located on the lens, indicates the max. temperature measured by the instrument.

BACK FLANGE: for wall mounting. Four holes ø=7mm on ø=175mm diameter allow the mounting of the instrument on the transformer tank.

ELASTIC SUSPENSION: it's a vibration damping system able to minimize the effects of a machine vibrations on the instrument .

EARTHQUAKE PROOF VERSION: equipping the instrument with the elastic suspension and suitable internal components.

PT 100 SENSOR: the winding temperature indicator can be equipped with a PT 100 sensor to transmit measured value to a receiver or to a monitoring system.

RECEIVER: it's possible to supply a 48x96mm digital receiver to display the temperature signal received from the PT 100 sensor