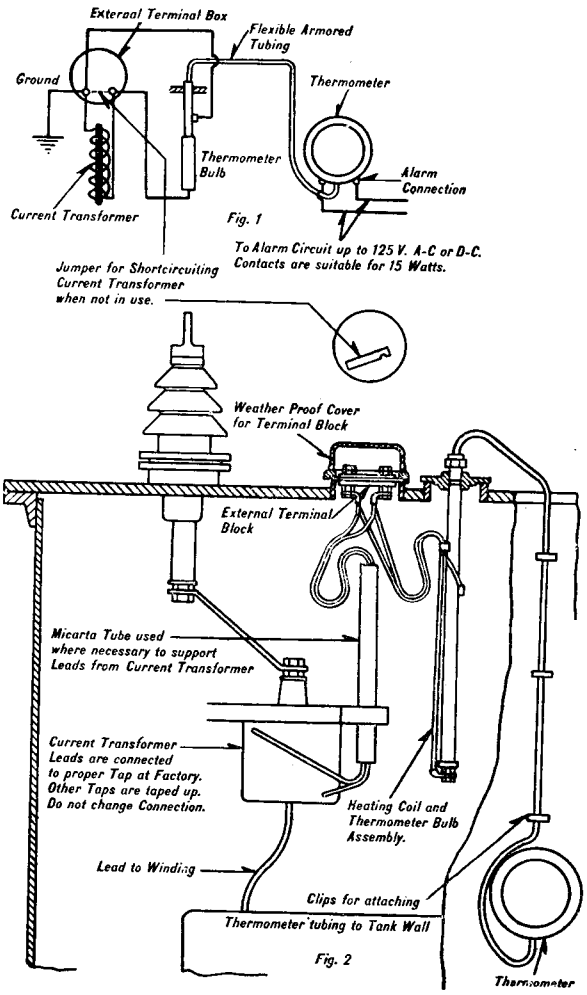
Westinghouse Hottest-Spot Dial Type Temperature Indicators for Transformers



GENERAL

The Thermometer Type Hottest Spot Indicator is an auxiliary piece of apparatus which can be applied to transformers to indicate the hottest spot temperature. It consists of an indicating dial type thermometer located externally and connected to a bulb immersed in the oil near the top of the transformer. The bulb is made of a high resistance metal and is connected across the secondary of a current transformer, the current in which is proportional to the load. The current transformer is shipped with the main transformer assembly and the bulb and indicator shipped as a separate item to be installed on the transformer cover and wall by the customer.

Once installed the indicator requires very little attention except the occasional inspection of the alarm contacts if these are used.

CONSTRUCTION AND OPERATION

The temperature of the hottest spot in the transformer windings is duplicated approximately at the bulb of a standard dial type thermometer and is read directly on the dial of the instrument. A graphic meter operating on the same principle can also be used.

The bulb is supported in the hottest part of the transformer oil. In addition a current proportional to the load current of the main transformer is passed through the bulb which is made of a high resistance metal. From these two sources of heat the bulb attains a temperature which reproduces the temperature of the transformer windings themselves, although it is not in contact with the windings. An insulating tube which surrounds the bulb is of such thickness that the difference in temperature between the bulb and oil is the same as the elevation in temperature of the windings in the main transformer above the oil. The adjustment of the current flowing through the bulb is checked at the time of the heat test of the transformer to see that the current flowing produces the additional increment of heat corresponding to a conventional 10° allowance for the hottest parts of the windings at full load. In this way the instrument reads the "Hottest-Spot" temperature of the transformer.

Fig. 1 shows schematically the arrangement of the apparatus. The current for heating the thermometer bulb comes from the secondary of a current transformer which is mounted inside the case of the power transformer. The insulation of the current transformer serves to protect the thermometer from the high voltage of the main transformer windings.

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The thermometer dial is mounted at a convenient height on the side of the tank or other nearby support.

An external terminal box is provided on the cover of the tank.

An adjustable alarm contact is provided which may be set to close an alarm circuit at any temperature on the dial.

The alarm contact is suitable for 15 watts, at 125 volts a-c. or d-c. The terminals are ungrounded.

SHIPMENT OF PARTS OF THE HOTTEST-SPOT INDICATOR

The current transformer is usually mounted on the transformer itself and will be found near the top on the terminal board, bridges or end frames. In some cases a current transformer of the type slipped over the lower end of one of the bushings is mounted on the underside of the cover. If a "Bushing Type" current transformer is used, it is sometimes shipped separately as "Details" and should be mounted in the place provided under the cover around one of the bushings.

A micarta tube which is usually used to conduct the current transformer leads to the terminal box will be installed in place on the transformer, unless the main transformer is not shipped in its tank, when the tube may be slipped down or removed and tied to the transformer.

The external terminal box will always be in place, and will be covered by a weather-proof conduit box. The thermometer is automatically grounded when the connection block is put in place. The thermometer with leads for the heating current, is shipped in a separate package marked "Details", to preclude the possibility of breakage in transit.

INSTALLATION OF HOTTEST-SPOT INDICATOR

1. Insert the bulb of the thermometer and the attached leads through the proper hole in the cover and fasten securely in place. The location of the hole is shown on the Outline Drawing for the transformer.

2. Connect the two leads from the thermometer bulb to the two studs on the under side of the external terminal block.

3. Connect the two leads from the current transformer to the same two studs on the under side of the external terminal block. Polarity is of no importance in making these connections. The leads of the current transformer itself are connected to the proper terminals at the factory and these connections should never be changed.

4. Mount the dial of the thermometer at the place provided on the side of the tank as shown on the Outline Drawing for the transformer. Avoid sharp bends in the armored tubing.

5. To adjust the setting of the alarm contacts, remove the glass front from the thermometer and move the contact to the desired position.

6. **CAUTION**—If, for any reason, it is necessary to open the heating coil circuit, short circuit the current transformer at the external terminal box by means of the jumper provided for the purpose.

INSPECTION AND MAINTENANCE

Inspect the alarm contacts occasionally to see that they are in good condition.

RENEWAL PARTS

If any renewal parts are required order from the nearest Westinghouse Electric and Manufacturing Co. office giving description of part wanted and serial and stock order number of transformer as given on the nameplate attached to the tank wall.

Westinghouse Electric & Manufacturing Company
Sharon, Pa.

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