RECEIVING • CONSTRUCTION • INSTALLATION

INSTRUCTIONS

TEMPERATURE INDICATOR
Non-Submersible

Dial Type **Remote Indicating**

FIG. 1. Thermometer with Alarm Contacts and Flexible Tube for Distant Mounting.

WESTINGHOUSE NON-SUBMERSIBLE TYPE THERMOMETERS are designed for outdoor application on transformers, to indicate hot oil or hottest spot temperatures. They are a self-contained weatherproof unit made with alarm contacts and are of the dial type operated by Bourdon gauge connected to a thermometer bulb located in the region of the hottest oil. These thermometers are suitable for use in oil or Inerteen.

RECEIVING

Shipment. These thermometers are usually shipped mounted on the transformer.

Unpacking. When thermometers are shipped as a separate item, to be installed in the field, they should be carefully unpacked and installed as shown on the transformer outline drawing.

Note: Particular care should be used not to bend the capillary tube at sharp angles or flex it unnecessarily and to be sure the thermometer bulb is in the top oil when placed in the transformer.

CONSTRUCTION

The Westinghouse non-submersible thermometers are dial type instruments calibrated in degrees centigrade. Each consists of a Bourdon gauge connected through a capillary tube to a thermometer bulb. The portion of capillary tube within the transformer tank is long enough to locate the bulb in the region of the hottest oil. The portion of the capillary tube outside of the transformer, that is, from the gauge on the side of the tank to where the capillary tube enters the tank, is protected by a flexible covering. The long flexible capillary tube of the distant type thermometer permits mounting the gauge on the side of the tank on a level with the eye. This capillary tube should be installed so that long bends or spans are not free to vibrate, as this may result in failure of the tube.

The cover mounted thermometers are provided with a fitting to permit making an oil tight joint between the transformer cover and the capillary tube. A special bushing screws into a tapped hole in the transformer case. The inside of the bushing has a tapered seat which matches a similar taper on a collar attached to the capillary tube and the two surfaces are clamped together by a gland nut which screws into the special bushing. See sketch of adapter, Fig. 2. It is unnecessary to twist or turn the capillary tube to get an oil tight seal.

The wall mounted thermometer has its bulb and inside capillary tube enclosed in a well which will permit installation or removal of the thermometer without lowering the oil or opening the gas space. The well is sealed from the outside atmosphere by the same construction as described for the cover mounted thermometer.

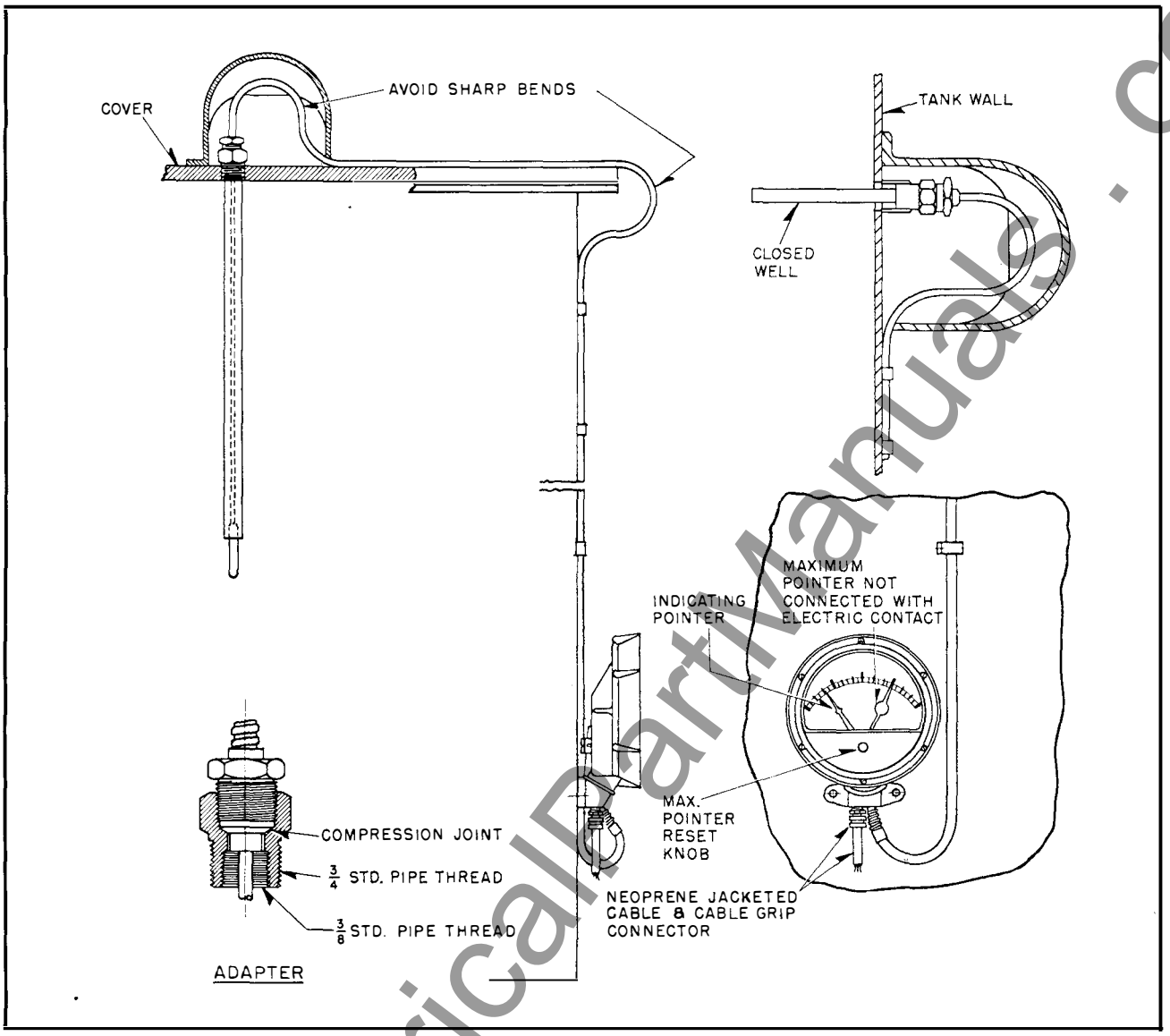

FIG. 2. Sectional View of Transformer Showing Mounting of Thermometer with Flexible Tube and Alarm Contacts.

Note: Do not fill the well with a solid or liquid before inserting the bulb of the thermometer since this may ruin the calibration of the instrument without appreciably helping in the transfer of heat from the heating coil to the sensitive element.

TABLE NO. 1

VOLTAGE	NON-INDUCTIVE LOAD—AMPS.	INDUCTIVE LOAD AMPS. L/R = .026*
125 AC	5	5
250 AC	2.5	2.5
125 DC	0.5	0.05
250 DC	0.25	0.025

* Equal to or less than .026. If greater, refer to factory for adjusted rating.

Indications of temperature are given by the movement of an indicating hand over the dial of the gauge. The dials have large figures which are easily read at a distance. A red hand, actuated by the movement of the indicating hand, records the maximum temperature reached between readings, and may be easily reset by a knurled knob on the front of the case.

The alarm circuit is closed by a micro-switch enclosed within the thermometer case. The standard closing for the alarm is 80°C with the switch opening at 5°C less. The ratings for the switch are given in Table No. 1 and the connection diagram is shown in Fig. 3. Adjustment of the alarm can be made only by removing the front of the gauge to get at the micro-switch.

The alarm contacts on thermometers may be used for providing a signal or through relays for controlling additional cooling, when the transformer reaches a maximum safe temperature. Flexible neoprene jacketed cable is brought out through the mounting bracket to which a cable grip connector is attached.

INSTALLATION

When installing, make certain that the threads on the outside of the special bushing are coated with Westinghouse gasket cement (S# 1150 419, 1 pt. size; or S# 471 880, 1 qt. size can) which is oil and Inerteen proof.

Important: Do not put cement on the tapered joint on the cover bushing as it is unnecessary and may make removal of the thermometer at some future date sufficiently difficult as to damage the capillary tube. See sketch of adapter, Fig. 2.

When the alarm circuit is used, external connections are made through the neoprene jacketed cable. A cable grip, which screws up into the mounting bracket, serves to grip the alarm lead cable and seals the gauge from the atmosphere. If the contacts are not to be connected into an alarm circuit, the external neoprene jacketed cable is coiled and taped in place for possible future use.

When checking circuits through this instrument it is necessary to observe the switch limitations of Table No. 1. This means that a low voltage bell ringer cannot be used unless switched through a high impedance relay. An indicating light type device is generally recognized as best for checking circuits through instruments containing microswitches of similar capacities.

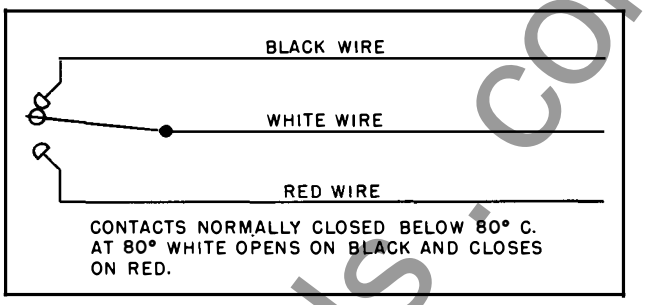

FIG. 3. Alarm Contact Connections.

FIELD TEST

These instruments may be field tested for accuracy of calibration by means of the following procedure. Remove the bulb of the thermometer from the transformer tank and submerge (to the depth of the extension of the bulb inside the tank) into a closely temperature controlled, well agitated oil bath. Check the temperature by placing a thermocouple or other accurate temperature measuring device on the center of the bulb. The thermometer should be accurate within $\pm 2°C$, allowing a minimum of 15 minutes for the thermometer to come up to temperature. The thermometer will hold its accuracy unless the bulb or capillary tube is damaged or there is a loss of fluid pressure.

REPLACEMENT

In the event it becomes necessary to repair the thermometers, contact the Westinghouse Engineering and Service Department through the nearest Westinghouse Office giving serial number or stock number of transformer from which it was taken.

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TEMPERATURE INDICATOR

Non-Submersible

Dial Type **Remote Indicating**

FIG. 1. Thermometer with Alarm Contacts and Flexible Tube for Distant Mounting.

WESTINGHOUSE NON-SUBMERSIBLE TYPE THERMOMETERS are designed for outdoor application on transformers, to indicate hot oil temperatures. They are a self-contained weatherproof unit made with alarm contacts and are of the dial type operated by Bourdon gauge connected to a thermometer bulb located in the region of the hottest oil. These thermometers are suitable for use in oil or Inerteen.

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CONSTRUCTION

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The cover mounted thermometers are provided with a fitting to permit making an oil tight joint between the transformer cover and the capillary tube. A special bushing screws into a tapped hole in the transformer case. The inside of the bushing has a tapered seat which matches a similar taper on a collar attached to the capillary tube and the two surfaces are clamped together by a gland nut which screws into the special bushing. See sketch of adapter, Fig. 2. It is unnecessary to twist or turn the capillary tube to get an oil tight seal.

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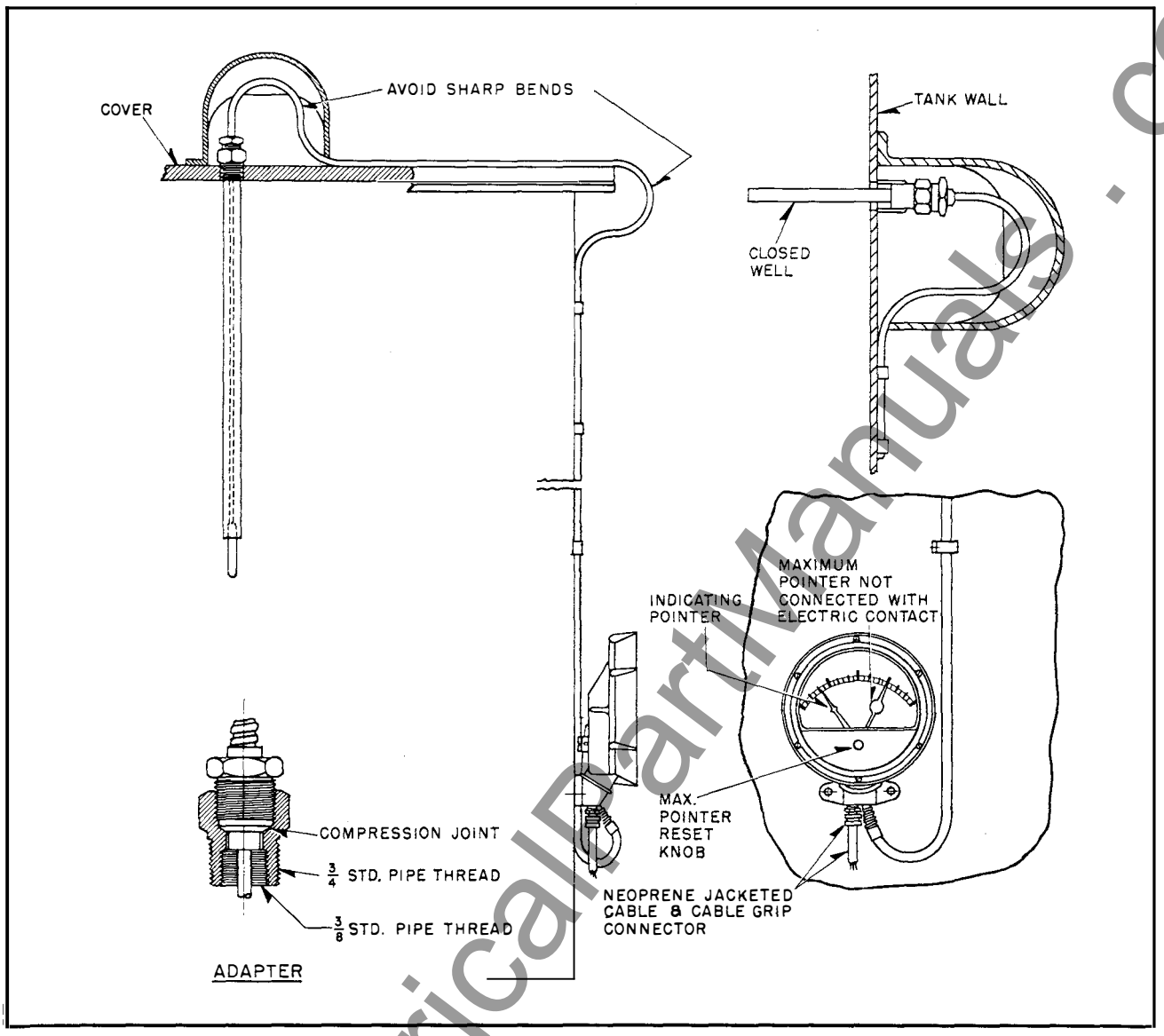

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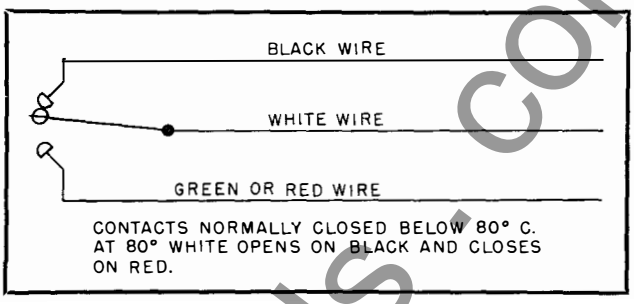

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DIAL TYPE INDICATING THERMOMETERS

Non-Submersible

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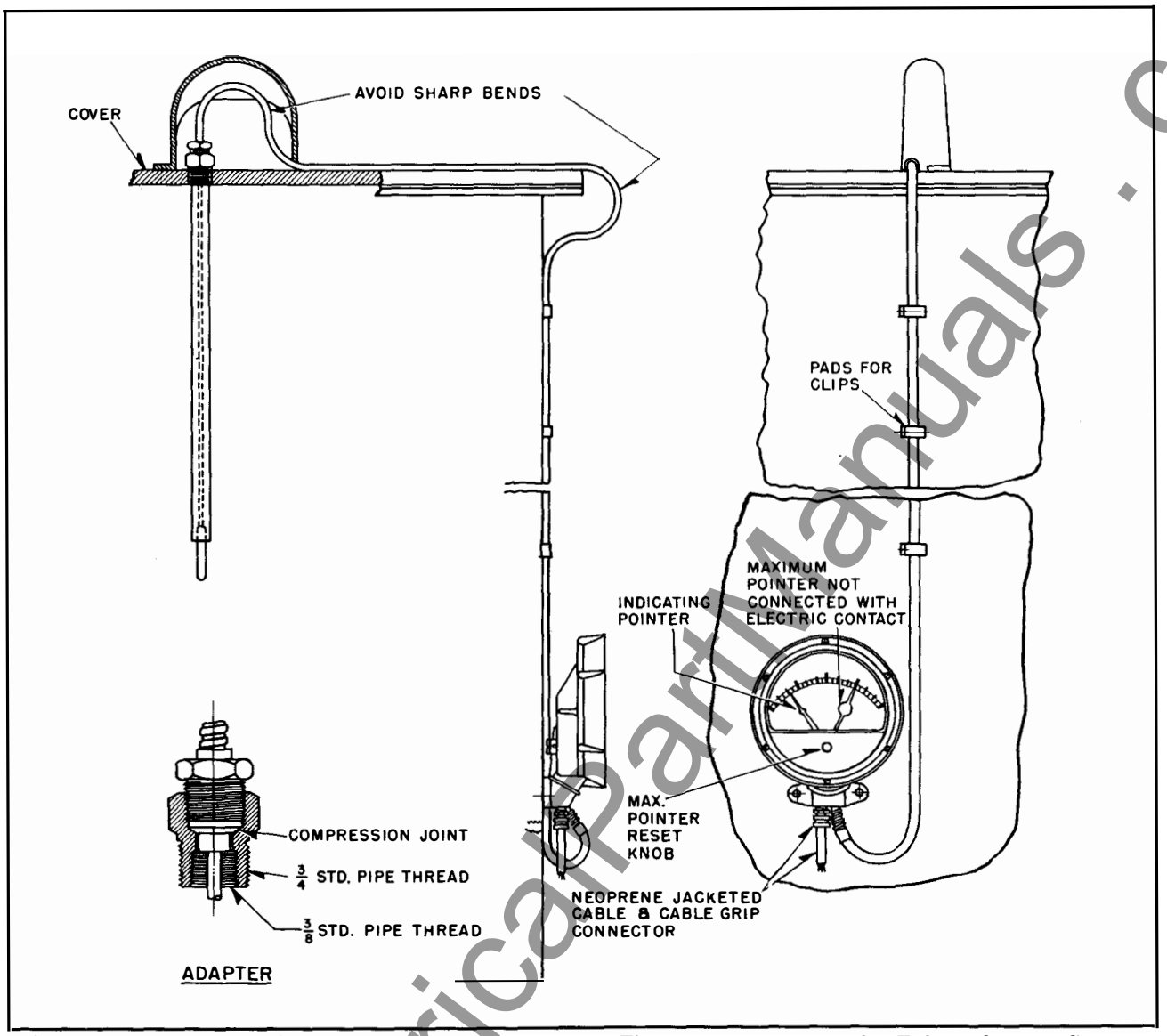

FIG. 2. Sectional View of Transformer Showing Mounting of Thermometer with Flexible Tube and Alarm Contacts.

The alarm circuit is closed by a Micro-switch enclosed within the thermometer case. The alarm closes at 80°C, and opens at 75°C. The ratings for the switches are given in Table 1 and the connection diagram is shown in Fig. 3.

TABLE 1

VOLTAGE	NON-INDUCTIVE LOAD—AMPS.	INDUCTIVE LOAD AMPS. L/R = .026*
125 AC	10	10
250 AC	5	5
125 DC	0.5	0.05
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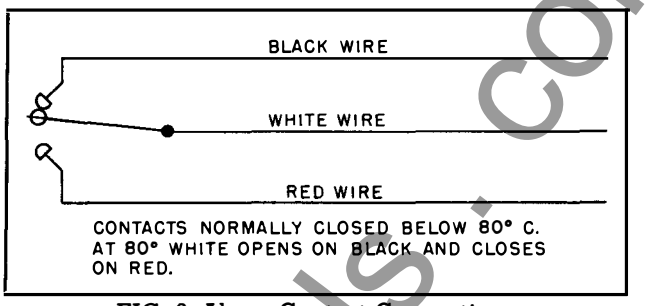

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