DESCRIPTION • INSTALLATION

INSTRUCTIONS

TEMPERATURE INDICATOR
Hottest Spot Dial Type
Direct Mounted

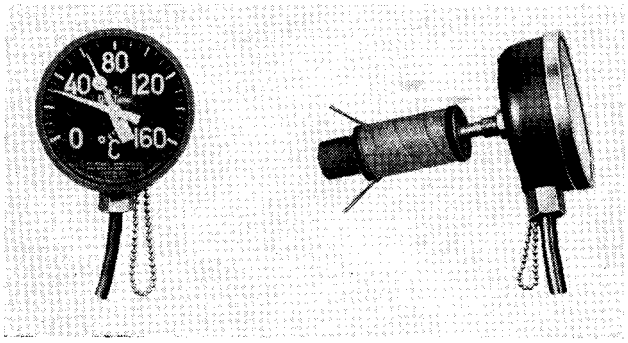

FIG. 1. Front and Side View of Indicator.

THE TWO SWITCH TEMPERATURE INDICATOR designed for application on Westinghouse transformers or related apparatus, is used where both fan control and alarm circuits are required. This leaflet covers the Hot Spot type of indicator. The indicator is a dial type instrument operated by a bimetallic element, and is made weatherproof and submersible. The heating coil is designed to heat the bimetallic element to the temperature of the hottest spot in a transformer winding, when receiving a current proportional to that in the transformer winding.

The two switches of the indicator are set at different temperature levels; the lower level switch controls the fan circuit, and the higher level switch controls the alarm circuit. The fan circuit serves to give added cooling when the transformer winding temperature falls within the range of the switch. The alarm circuit operates at a higher temperature range to give warning in case the fans, for any reason, do not limit the temperature to a proper range. The circuits are separate so that both a-c and d-c may be used.

DESCRIPTION

The indicator (Fig. 1) is a dial type precision instrument whose needle is directly coupled to a bimetallic spiral actuating element in the stem which fits closely into a well. The well is of thin-walled construction and screws into the tank wall making an oil tight connection. The instrument can be removed from the well in the tank wall without the loss of liquid and without lowering the oil level.

Note: Do not fill the well with a solid or liquid before inserting the stem of the indicator since this may damage the instrument without appreciably helping in the transfer of heat from the heating coil to the sensitive element. The indicator should not be tightened in the well any more than is necessary to place the dial in an upright position.

The instrument is weatherproof and submersible. The dial is calibrated in degrees centigrade and is easily read because of the contrasting black face with yellow characters, graduations and indicating pointer.

A maximum indicating pointer, red in color, is used to indicate the maximum temperature reached between readings. This hand is easily reset by wiping a magnet across the face of the dial pro-

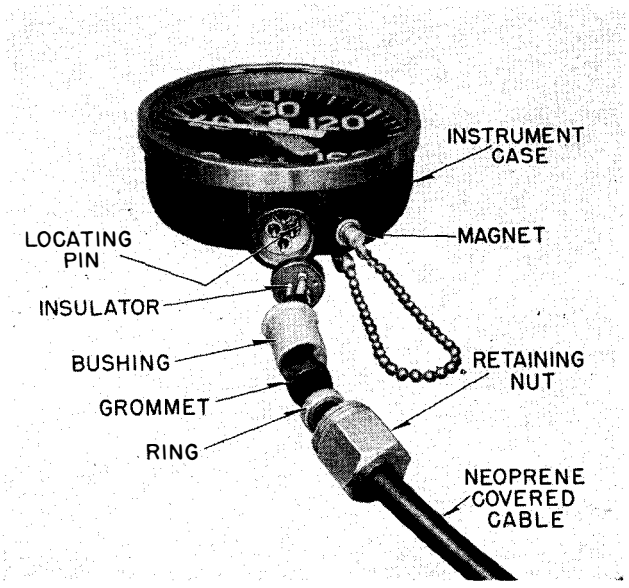

FIG. 2. Triple Seal Connection.

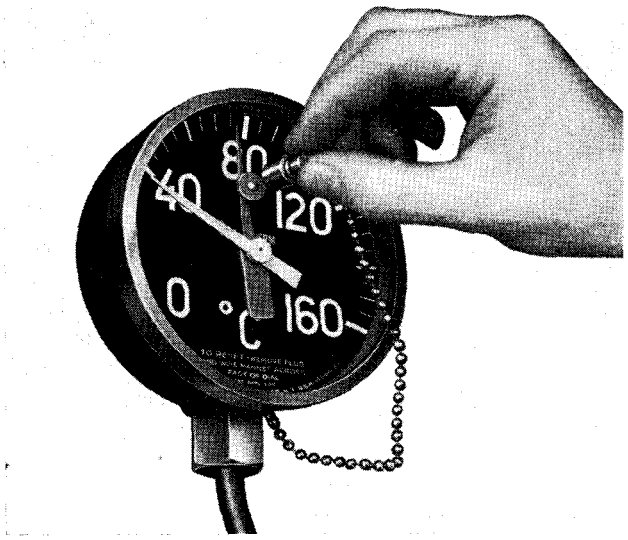

FIG. 3. Method of Resetting Maximum Indicating Pointer.

viding the magnet is held with the poles in the proper position so as to attract the maximum indicating pointer. The magnet is attached to a small chain in the instrument case to prevent misplacing after using and is self-supporting in a metallic socket near the underside of the case. The method of resetting the maximum indicating pointer is shown in Fig. 3.

The alarm leads are brought through the underside of the case by means of a triple seal connector, the details of which are shown in Fig. 2. This connector consists of the following:

1. Four protruding terminals moulded in the case and a locating pin to prevent making incorrect connections.

2. A rubber insulator which has four terminals to mate with the terminals in the case, and a hole to match the locating pin. The ends of the leads are tinned and crimped into the terminals of the insulator.

3. A bushing to compress the insulator against the instrument case.

4. A grommet to make a seal between the rubber covered cable and the bushings.

5. A ring to compress the grommet against the cable.

6. A retaining nut, to hold the component parts of connector tight in the case. This retaining nut is screwed into place.

There are two micro-switches in this type temperature indicator. Switch No. 1 is set to close at 75°C for the fan circuit, and switch No. 2 is set to close at 105°C for the alarm circuit. These are nominal values, and will be supplied unless otherwise ordered. Both switches open at 5°C less than the closing temperature. The ratings for the switches are given in Table No. 1, and the connection diagram is shown in figure 5.

TABLE NO. 1

VOLTAGE	NON-INDUCTIVE NON—AMPS.	INDUCTIVE LOAD AMPS. L/R. = 026*
125 AC	10	10
250 AC	5	5
125DC	0.5	0.05
250 DC	0.25	0.025

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

The switches are adjustable over a range of ±10°C in relation to the above mentioned values. To adjust switches to a different value, remove corresponding set screw at top of the case. Make proper adjustment through the indicator case and seal the case again with set screws.

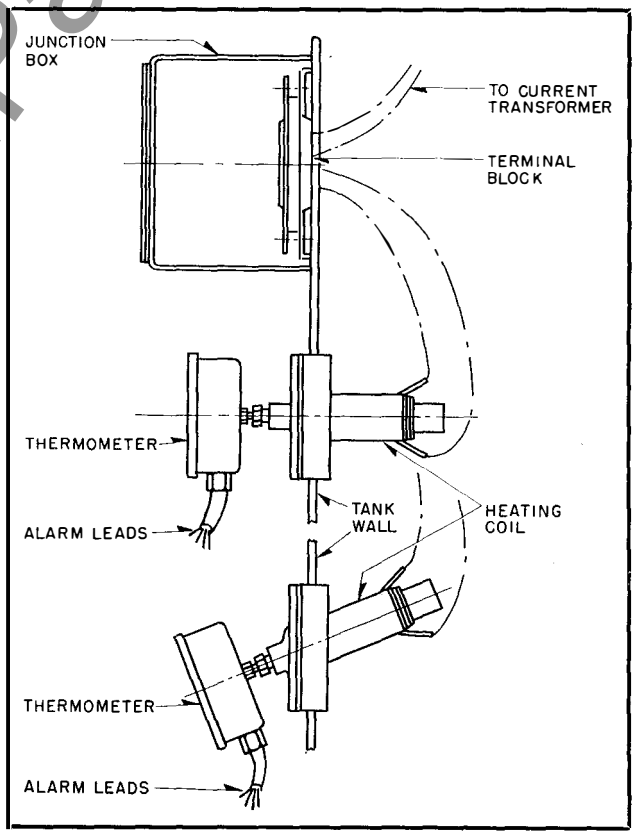

FIG. 4. Indicator Mounted Vertically and Inclined, with Junction Box.

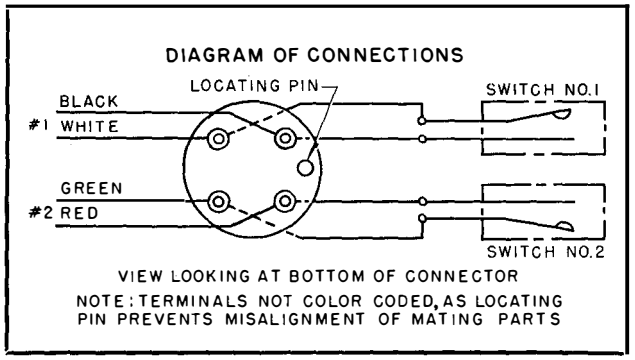

FIG. 5. Connection Diagram for Alarm Contact Leads.

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 micro-switches of similar capacities.

SHIPPING AND RECEIVING

The current transformer is generally shipped as part of the main transformer. It is usually of the through type which is slipped over the lower end of the bushing, and mounted on the under side of the cover. Sometimes it will be mounted on the top of the terminal board, bridges, or end frames. In this case, a micarta tube will probably be used to conduct the current transformer leads to the terminal box. This tube will be installed in place on the current transformer. If the main transformer is not shipped in its tank, the tube is slid down or removed and tied to the current transformer.

The external terminal block will always be in place, and will be covered by a weatherproof conduit box. It may be a block as shown in Fig. 4 or a large block to take care of a number of leads including some not for the hot spot indicator. The heating coil is fastened in place on the well of the temperature indicator.

The temperature indicator is shipped mounted on the tank wall, so that no installation is necessary.

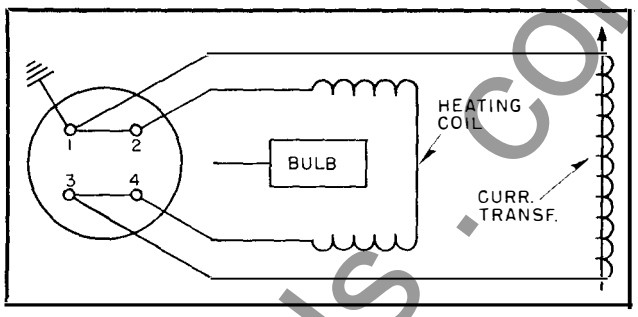

FIG. 6. Connection Diagram for Current Transformer and Heating Coil.

When mounted at a high point, the indicator may be tilted so that it can be read easily from the ground level (See Fig. 4).

OPERATION

The current transformer is mounted inside the case of the power transformer, usually on a bushing. Its primary winding carries the main current of one of the transformer's windings and its secondary winding delivers to the heating coil a reduced current which is at all times proportional to the load current. The insulation of the current transformer serves to protect the heating coil and temperature indicating equipment from the high voltage of the main transformer windings.

The heating coil is placed in the hot surface oil and its windings are worked at the same current density as the main transformer. In addition, the insulation of the heating coil windings has the same elevation in temperature above the oil as the windings of the main transformer. By these methods the temperatures inside the transformer windings are duplicated in the area surrounding the bimetallic element of the indicator.

RENEWAL PARTS

If it becomes necessary to repair the instrument, contact the nearest Westinghouse Office. Include a complete description of the part wanted along with the data on the nameplate attached to the transformer tank wall.

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DESCRIPTION • INSTALLATION

INSTRUCTIONS

TWO SWITCH HOT SPOT INDICATOR

Dial Type

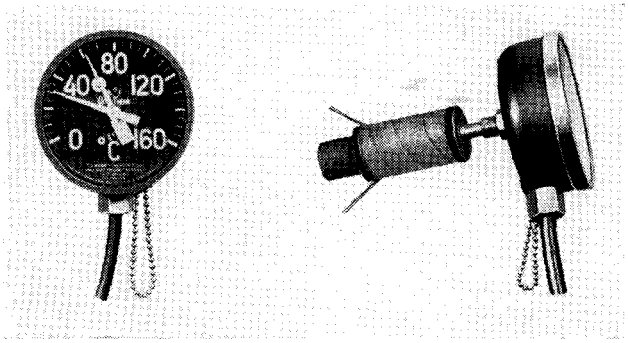

FIG. 1. Front and Side View of Indicator.

The Two Switch Temperature Indicator designed for application on Westinghouse Transformers or related apparatus, is used where both fan control and alarm circuits are required. This leaflet covers the Hot Spot type of indicator. The indicator is a dial type instrument operated by a bimetallic element, and is made weatherproof and submersible. The heating coil is designed to heat the bimetallic element to the temperature of the hottest spot in a transformer winding, when receiving a current proportional to that in the transformer winding.

The two switches of the indicator are set at different temperature levels; the lower level switch controls the fan circuit, and the higher level switch controls the alarm circuit. The fan circuit serves to give added cooling when the transformer winding temperature falls within the range of the switch. The alarm circuit operates at a higher temperature range to give warning in case the fans, for any reason, do not limit the temperature to a proper range. The circuits are separate so that both a-c and d-c may be used.

DESCRIPTION

The indicator (Fig. 1) is a dial type precision instrument whose needle is directly coupled to a bimetallic spiral actuating element in the stem which fits closely into a well. The well is of thin-walled construction and screws into the tank wall making an oil tight connection. The instrument can be removed from the well in the tank wall without the loss of liquid and without lowering the oil level. The instrument is weatherproof and submersible. The dial is calibrated in degrees centigrade and is easily read because of the contrasting purple face with yellow characters, graduations and indicating pointer.

A maximum indicating pointer, red in color, is used to indicate the maximum temperature reached between readings. This hand is easily reset by wiping a magnet across the face of the dial providing the magnet is held with the poles in the proper position so as to attract the maximum indicating pointer. The magnet is attached to a small chain in the instrument case to prevent misplacing after using and is self-supporting in a metallic socket near the underside of the case. The method of resetting the maximum indicating pointer is shown in Fig. 3.

The alarm leads are brought through the underside of the case by means of a triple seal connector, the details of which are shown in Fig. 2. This connector consists of the following:

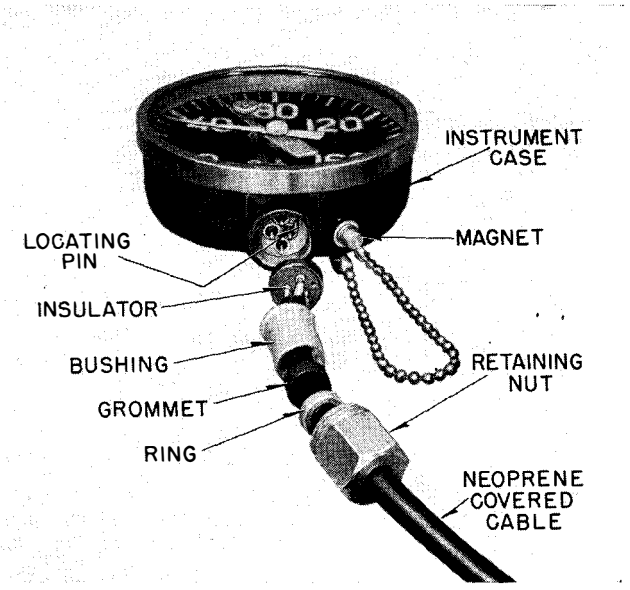

FIG. 2. Triple Seal Connection.

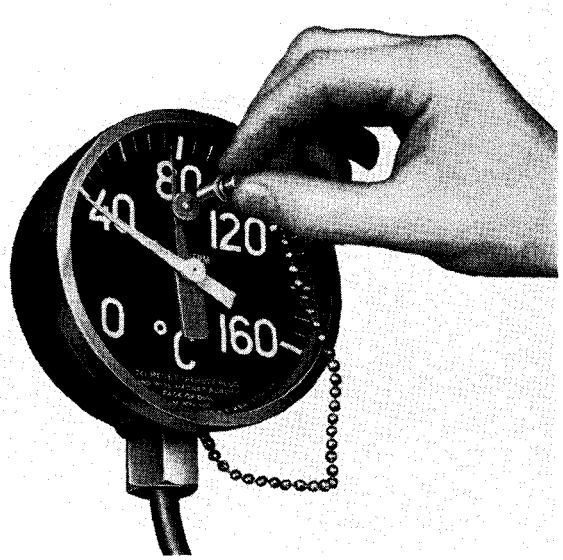

FIG. 3. Method of Resetting Maximum Indicating Pointer.

1. Four protruding terminals moulded in the case and a locating pin to prevent making incorrect connections.

2. A rubber insulator which has four terminals to mate with the terminals in the case, and a hole to match the locating pin. The ends of the leads are tinned and crimped into the terminals of the insulator.

3. A bushing to compress the insulator against the instrument case.

4. A grommet to make a seal between the rubber covered cable and the bushings.

5. A ring to compress the grommet against the cable.

6. A retaining nut, to hold the component parts of connector tight in the case. This retaining nut is screwed into place.

There are two micro-switches in this type temperature indicator. The switches are set to close at 75°C for the fan circuit and 105°C for the alarm circuit. The switches open at 5°C less than the closing temperature. The ratings for the switches are given in Table 1, and the connection diagram is shown in Fig. 6.

The switches are adjustable over a range of ±10°C in relation to the above mentioned values. To adjust switches to a different value, remove corresponding set screw at top of the case. Make proper adjustment through the indicator case and seal the case again with set screws.

SHIPPING AND RECEIVING

The current transformer is generally shipped as part of the main transformer. It is usually of the through type which is slipped over the lower end of the bushing, and mounted on the under side of the cover. Sometimes it will be mounted on the top of the terminal board, bridges, or end frames. In this case, a micarta tube will probably be used to conduct the current transformer leads to the terminal box. This tube will be installed in place on the current transformer. If the main transformer is not shipped in its tank, the tube is slid down or removed and tied to the current transformer.

The external terminal block will always be in place, and will be covered by a weatherproof conduit box. It may be a block as shown in Fig. 4 or a large block to take care of a number of leads including some not for the hot spot indicator. The heating coil is fastened in place on the well of the temperature indicator.

The temperature indicator is shipped mounted on the tank wall, so that no installation is necessary. When mounted at a high point, the indicator may be tilted so that it can be read easily from the ground level (See Fig. 4).

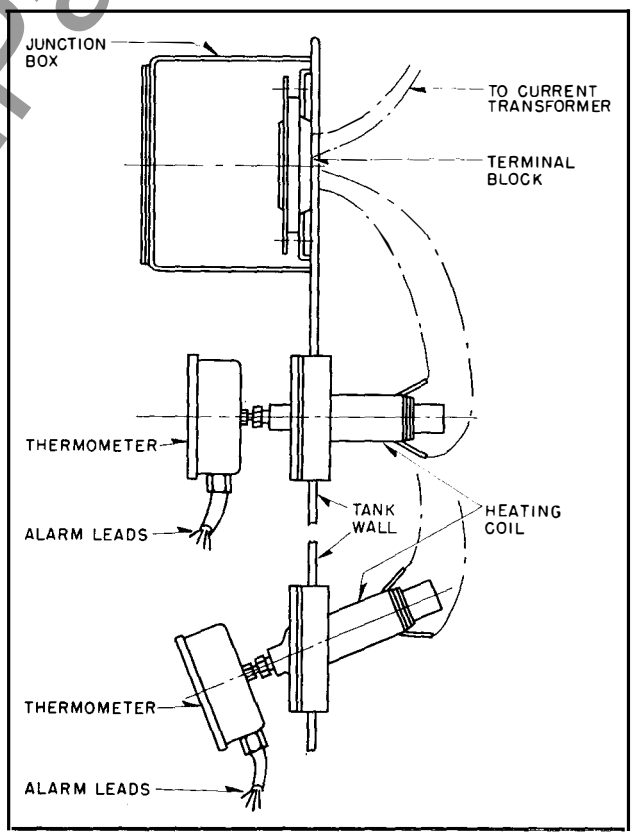

FIG. 4. Indicator Mounted Vertically and Inclined, with Junction Box.

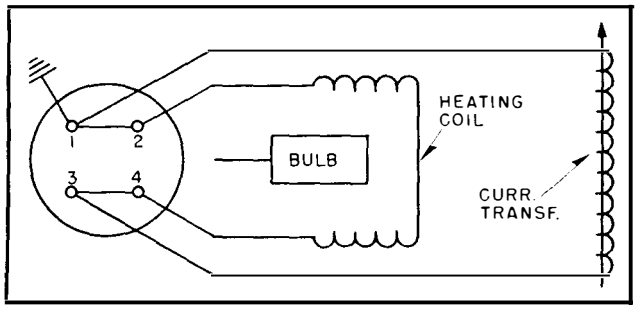

FIG. 5. Connection Diagram for Current Transformer and Heating Coil.

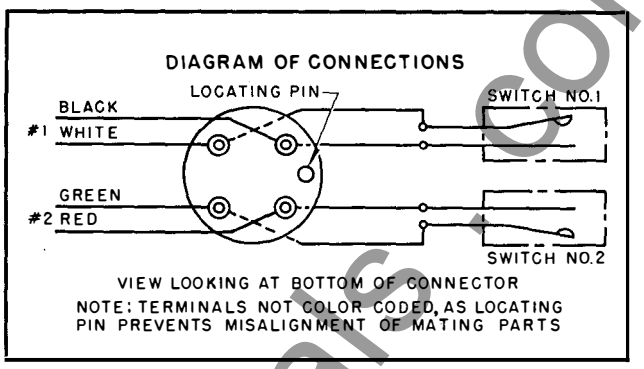

FIG. 6. Connection Diagram for Alarm Contact Leads.

OPERATION

The current transformer is mounted inside the case of the power transformer, usually on a bushing. Its primary winding carries the main current of one of the transformer's windings and its secondary winding delivers to the heating coil a reduced current which is at all times proportional to the load current. The insulation of the current transformer serves to protect the heating coil and temperature indicating equipment from the high voltage of the main transformer windings.

The heating coil is placed in the hot surface oil and its windings are worked at the same current density as the main transformer. In addition, the insulation of the heating coil windings has the same elevation in temperature above the oil as the windings of the main transformer. By these methods the temperatures inside the transformer windings are duplicated in the area surrounding the bimetallic element of the indicator.

TABLE NO. 1

VOLTAGE	NON-INDUCTIVE NON—AMPS.	INDUCTIVE LOAD AMPS. L/R. = 026*
125 AC	10	10
250 AC	5	5
125DC	0.5	0.05
250 DC	0.25	0.025

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

RENEWAL PARTS

If it becomes necessary to repair the instrument, contact the nearest Westinghouse Office. Include a complete description of the part wanted along with the data on the nameplate attached to the transformer tank wall.

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DESCRIPTION • INSTALLATION

INSTRUCTIONS

TEMPERATURE INDICATOR

Hottest Spot Dial Type
Direct Mounted

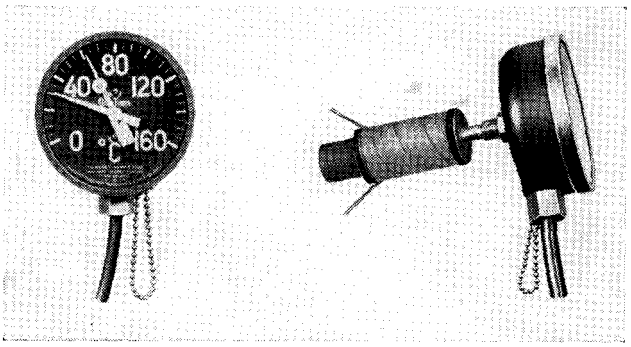

FIG. 1. Front and Side View of Indicator.

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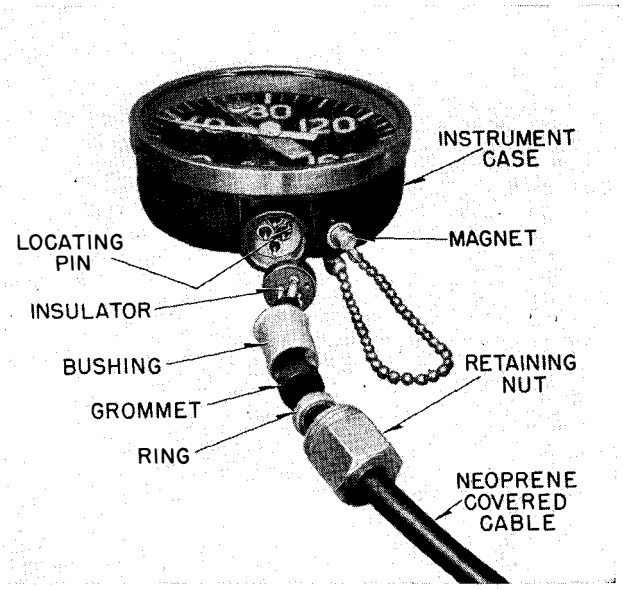

FIG. 2. Triple Seal Connection.

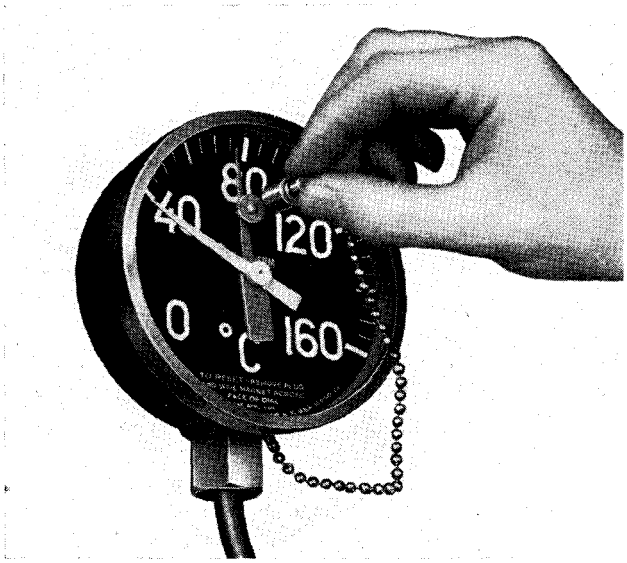

FIG. 3. Method of Resetting Maximum Indicating Pointer.

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TABLE NO. 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
250 DC	0.25	0.025

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

The switches are adjustable over a range of ±10°C in relation to the above mentioned values. To adjust switches to a different value, remove corresponding set screw at top of the case. Make proper adjustment through the indicator case and seal the case again with set screws.

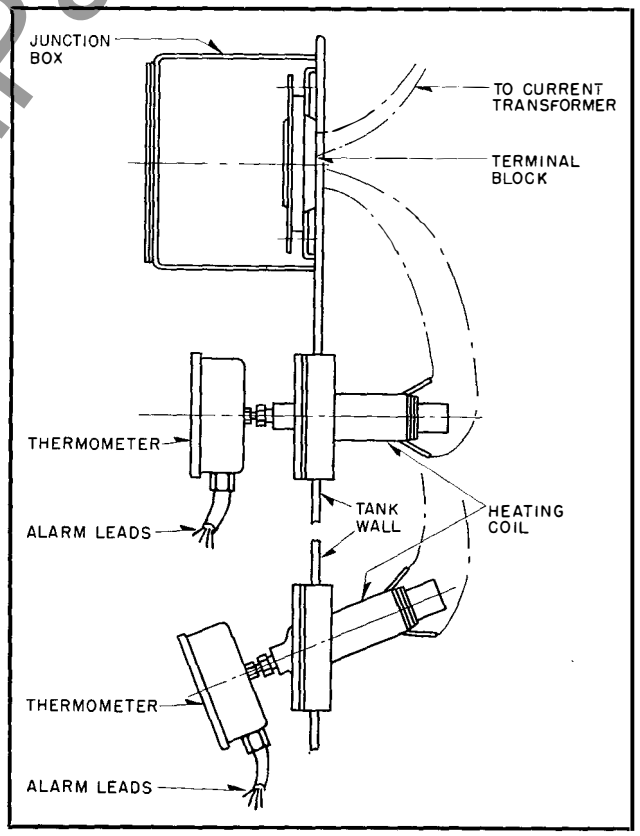
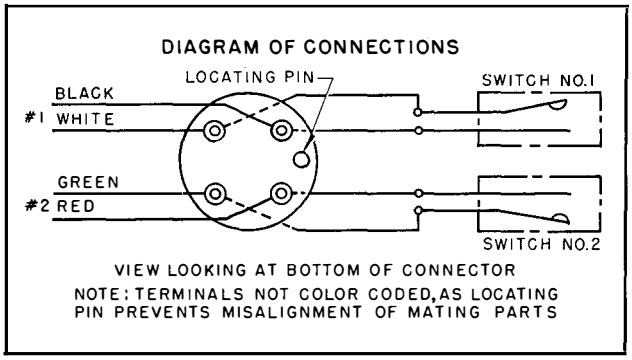


FIG. 4. Indicator Mounted Vertically and Inclined, with Junction Box.

TEMPERATURE INDICATOR



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SHIPPING AND RECEIVING

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The external terminal block will always be in place, and will be covered by a weatherproof conduit box. It may be a block as shown in Fig. 4 or a large block to take care of a number of leads including some not for the hot spot indicator. The heating coil is fastened in place on the well of the temperature indicator.

The temperature indicator is shipped mounted on the tank wall, so that no installation is necessary.

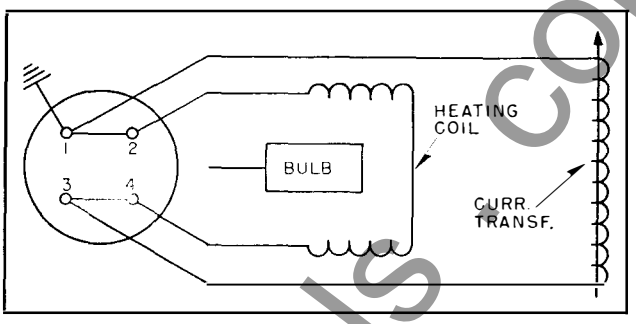

FIG. 6. Connection Diagram for Current Transformer and Heating Coil.

When mounted at a high point, the indicator may be tilted so that it can be read easily from the ground level (See Fig. 4).

OPERATION

The current transformer is mounted inside the case of the power transformer, usually on a bushing. Its primary winding carries the main current of one of the transformer's windings and its secondary winding delivers to the heating coil a reduced current which is at all times proportional to the load current. The insulation of the current transformer serves to protect the heating coil and temperature indicating equipment from the high voltage of the main transformer windings.

The heating coil is placed in the hot surface oil and its windings are worked at the same current density as the main transformer. In addition, the insulation of the heating coil windings has the same elevation in temperature above the oil as the windings of the main transformer. By these methods the temperatures inside the transformer windings are duplicated in the area surrounding the bimetallic element of the indicator. During operation or test, voltage across heating coil should not exceed 3 volts.

RENEWAL PARTS

If it becomes necessary to repair the instrument, contact the nearest Westinghouse Office. Include a complete description of the part wanted along with the data on the nameplate attached to the transformer tank wall.

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