DESCRIPTION INSTALLATION

# INSTRUCTIONS

## TWO SWITCH TEMPERATURE INDICATOR

### Dial Type

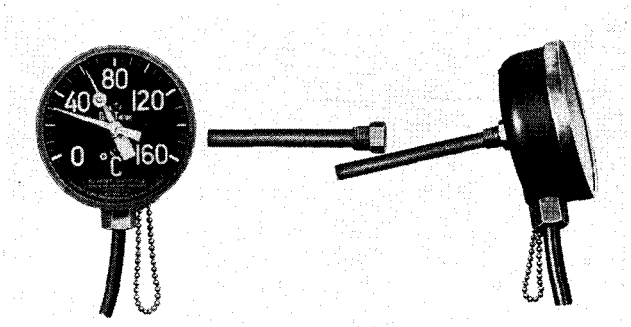


FIG. 1. Front and Side View of Indicator.

**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 type of indicator which depends on the hot oil temperature. It is a dial type instrument operated by a bimetallic element, and is made weatherproof and submersible.

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 temperature comes 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 AC and DC may be used.

The indicator is usually shipped mounted on the transformer case, requires no maintenance, and is suitable for use in oil or Inerteen.

## 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:

**1.** Four protruding terminals molded in the case

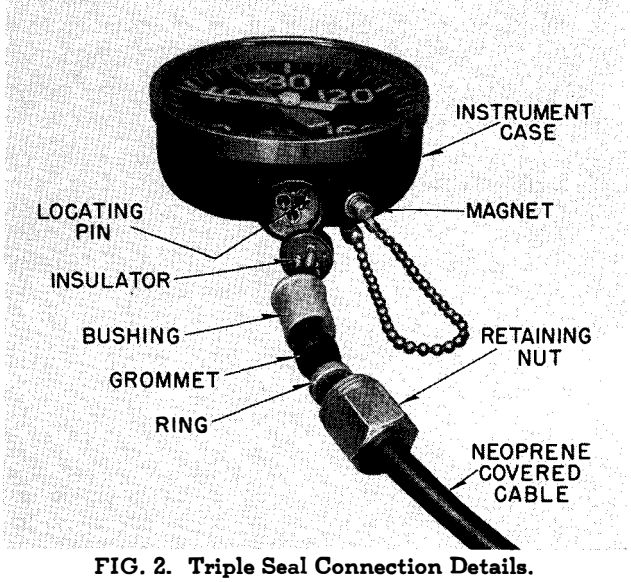


FIG. 2. Triple Seal Connection Details.

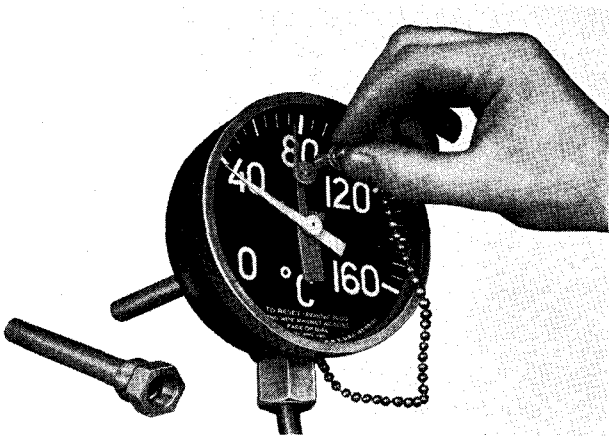


FIG. 3. Method of Resetting Maximum Indicating Pointer.

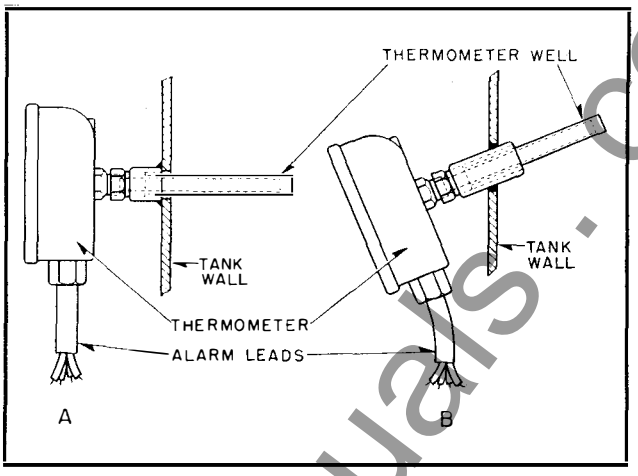


FIG. 4. Indicator Mounted Vertical (A) and Tilted Downward (B).

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 60°C for the fan circuit and 80°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. 5.

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.

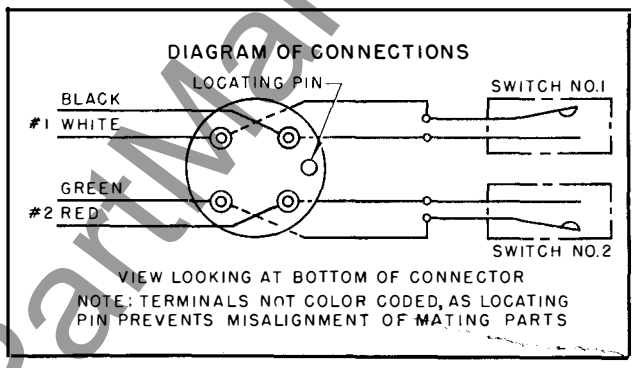


FIG. 5. Connection Diagram for Alarm Contact Leads.

**TABLE I**

| 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.

## INSTALLATION

The instrument is shipped fixed to 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 ground level (See Fig. 4).

## RENEWAL PARTS

If it becomes necessary to repair the instrument, contact the nearest Westinghouse Office.

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DESCRIPTION • INSTALLATION

# INSTRUCTIONS

## TEMPERATURE INDICATOR

### Two Switch—Dial Type

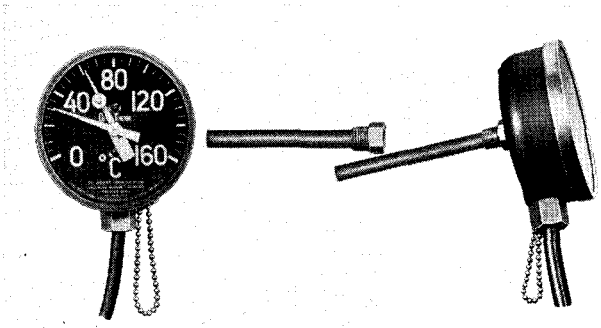


FIG. 1. Front and Side View of Indicator.

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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 temperature comes 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 AC and DC may be used.

The indicator is usually shipped mounted on the transformer case, requires no maintenance, and is suitable for use in oil or Inerteen.

## 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 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 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.

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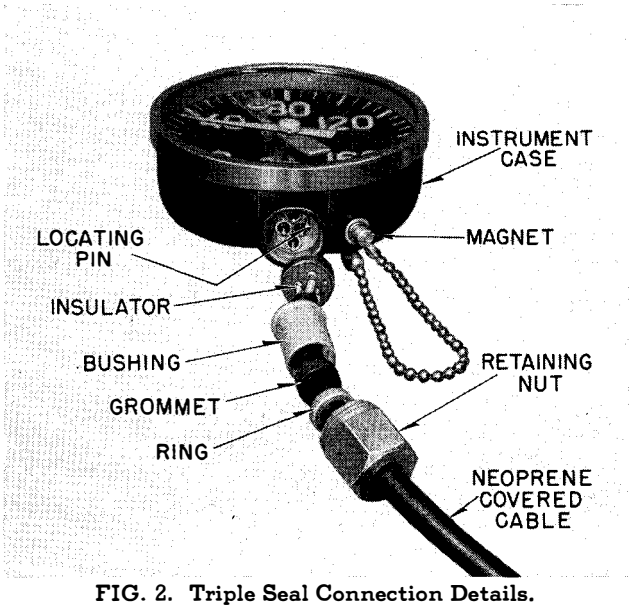


FIG. 2. Triple Seal Connection Details.

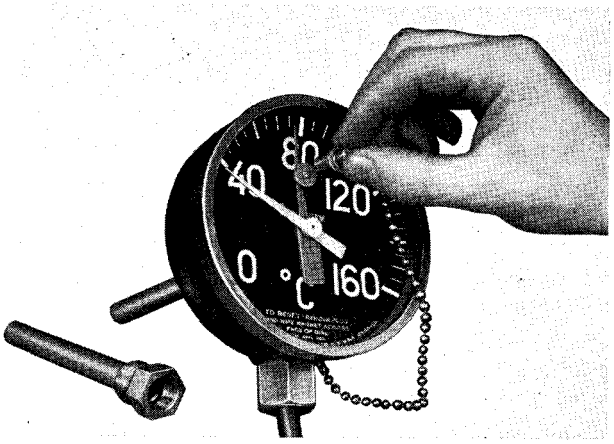


FIG. 3. Method of Resetting Maximum Indicating Pointer.

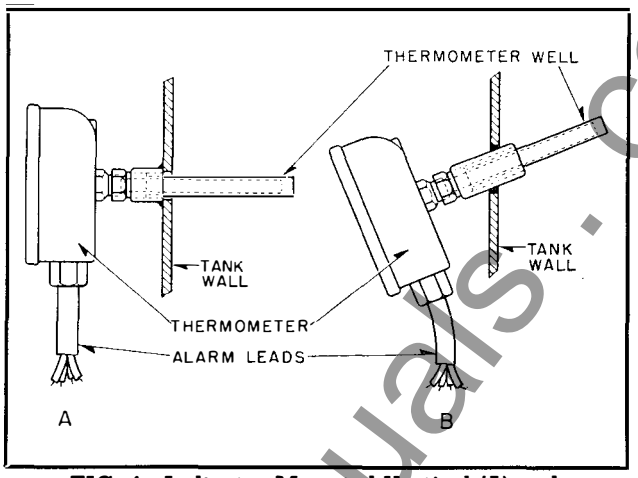


FIG. 4. Indicator Mounted Vertical (A) and Tilted Downward (B).

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 60°C for the fan circuit and 80°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. 5.

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.

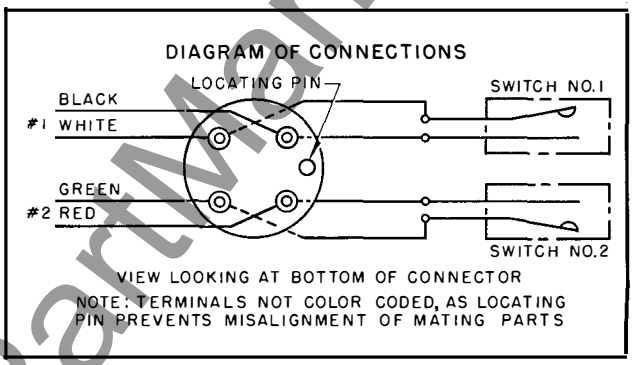


FIG. 5. Connection Diagram for Alarm Contact Leads.

**TABLE I**

| 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.

## INSTALLATION

The instrument is shipped fixed to 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 ground level (See Fig. 4).

**Important: When checking circuits through this instrument it is necessary to follow Table 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.**

## RENEWAL PARTS

If it becomes necessary to repair the instrument, contact the nearest Westinghouse Office.

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DESCRIPTION • INSTALLATION

# INSTRUCTIONS

## TEMPERATURE INDICATOR

### Two Switch—Dial Type

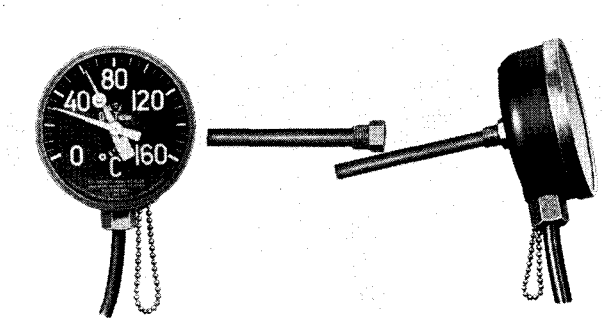


FIG. 1. Front and Side View of Indicator.

**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 type of indicator which depends on the hot oil temperature. It is a dial type instrument operated by a bimetallic element, and is made weatherproof and submersible.

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 temperature comes 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.

The indicator is usually shipped mounted on the transformer case, requires no maintenance, and is suitable for use in oil or Inerteen.

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

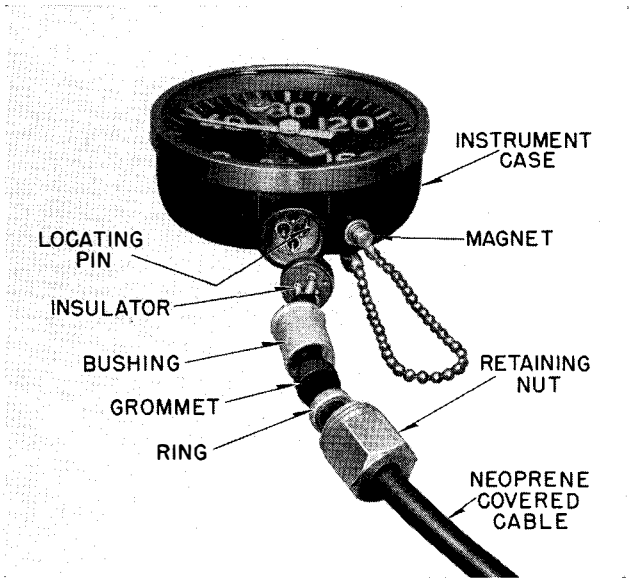


FIG. 2. Triple Seal Connection Details.

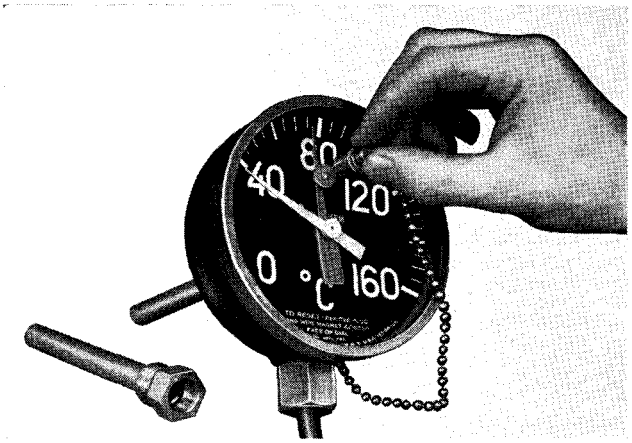


FIG. 3. Method of Resetting Maximum Indicating Pointer.

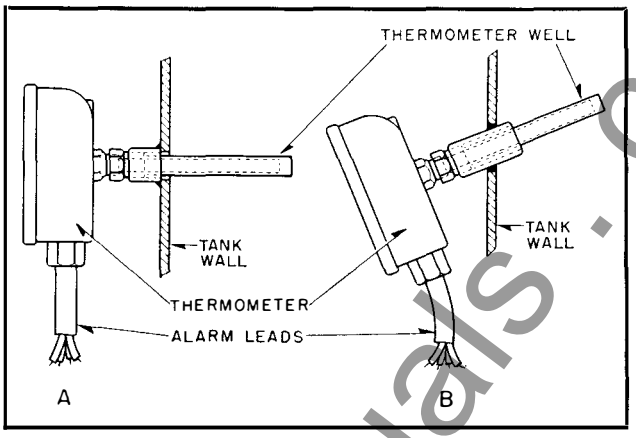


FIG. 4. Indicator Mounted Vertical (A) and Tilted Downward (B).

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 molded 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 60°C for the fan circuit and 80°C for the alarm circuit. The switches are adjustable over a range of ±10°C in relation to the above mentioned values. 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. 5.

**Field Test.** Remove the thermometer from its well and submerge the stem up to the brass fitting in a closely controlled temperature, well agitated, oil bath. Check the temperature by placing a thermo-couple or other accurate temperature measuring device on the stem about two inches from the end. The thermometer should be accurate within ±2°C (allowing 15 minutes for the thermometer to come up to temperature). To adjust the switches to a different value, remove the corresponding sealing plug at the top of the case. Make the proper adjustment of the switch through the opening in the case, and then reseal the case with the sealing plug.

**Important.** When changing the alarm setting on those temperature indicators with adjustable contacts, be sure to use any non-setting sealing compound on the threads of the sealing plug. Plastic Lead Seal #8138-3 is recommended. Loose or improperly sealed plugs will allow moisture to collect in the indicators, and cause eventual shorting of electrical circuits or deterioration of dial markings.

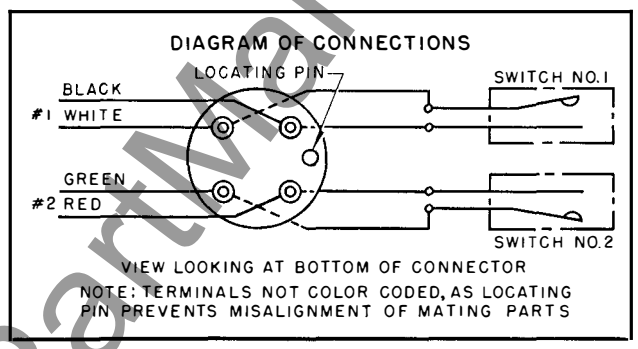


FIG. 5. Connection Diagram for Alarm Contact Leads.

**TABLE NO. I**

| VOLTAGE | NON-INDUCTIVE LOAD—AMPS. | INDUCTIVE LOAD AMPS. L/R = .026* |
|---|---|---|
| 125 A-C | 10 | 10 |
| 250 A-C | 5 | 5 |
| 125 D-C | 0.5 | 0.05 |
| 250 D-C | 0.25 | 0.025 |

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

## INSTALLATION

The instrument is shipped fixed to 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 ground level (See Fig. 4).

**Important: When checking circuits through this instrument it is necessary to follow 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.**

## RENEWAL PARTS

If it becomes necessary to repair the instrument, contact the nearest Westinghouse Office.

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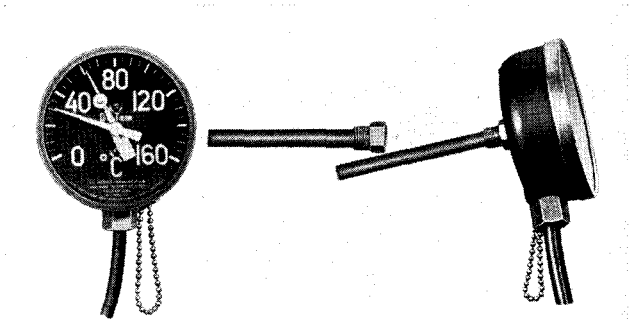
DESCRIPTION • INSTALLATION

# INSTRUCTIONS

## TEMPERATURE INDICATOR

### Two Switch—Dial Type

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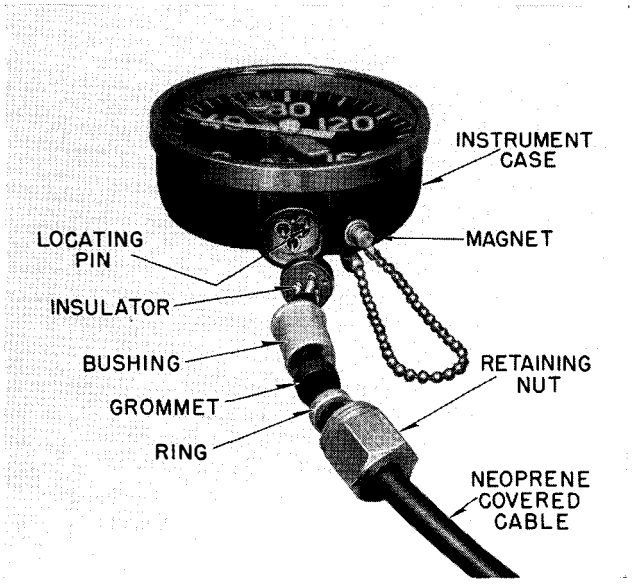



FIG. 2. Triple Seal Connection Details.

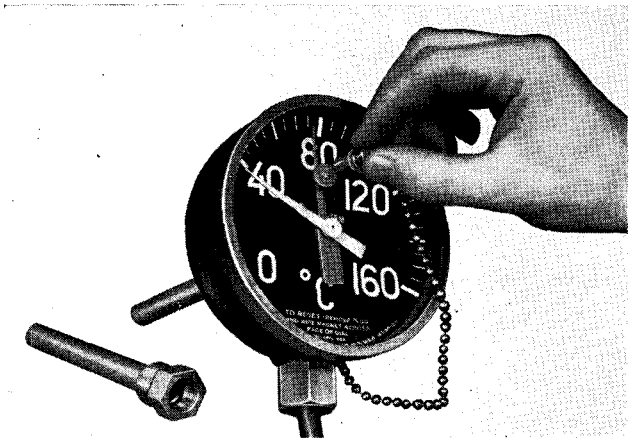
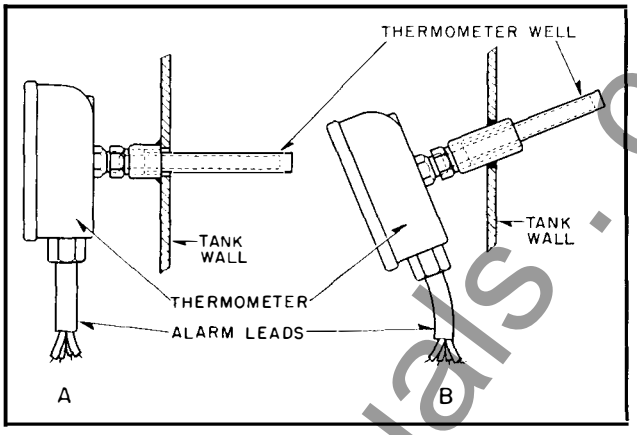



FIG. 3. Method of Resetting Maximum Indicating Pointer.

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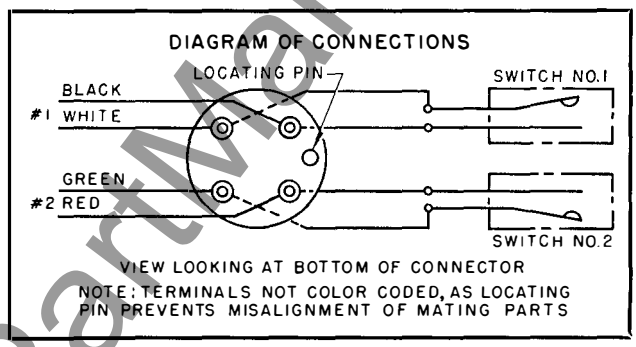


FIG. 5. Connection Diagram for Alarm Contact Leads.

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## INSTALLATION

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## RENEWAL PARTS

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DESCRIPTION • INSTALLATION

# INSTRUCTIONS

## TEMPERATURE INDICATOR

### Two Switch—Dial Type

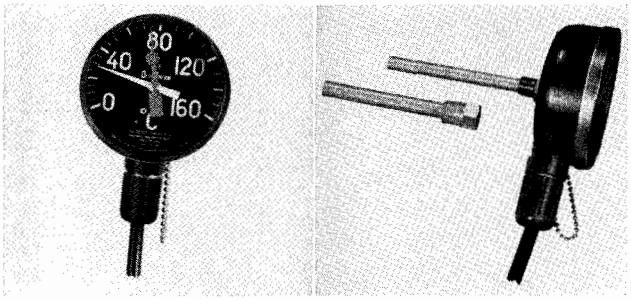


FIG. 1. Front and Side View of Indicator with Alarm Contacts

**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 oil temperature type of indicator. It is a dial type instrument operated by a bimetallic element, and is made weatherproof and submerisble.

The two switches of the indicator are set to operate at different temperature levels, the lower level switch controls the fan circuit, and the higher level switch controls the alarm circuit. The fan circuit is used to provide added cooling when the transformer temperature comes within the range of the switch. The alarm circuit operates at a higher temperature 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.

The indicator is usually shipped mounted on the transformer case, requires no maintenance, and is suitable for use in oil or Inerteen.

## 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. *NOTE: Do not fill the well with a solid or liquid before inserting the stem of the thermometer since this may damage the instrument without appreciably helping in the transfer of heat from the oil to the sensitive element. The thermometer should not be tightened in the well any more than is necessary to place the dial in an upright position.* The instrument can be removed from the well in the tank wall without loss of liquid and with no need for lowering the oil level. The instrument is weatherproof and submersible. The dial is calibrated in degrees centigrade and may be easily read because of the contrasting black face with yellow characters, graduations and indicating pointer.

A red maximum indicating pointer indicates the maximum temperature reached since last reset. This hand may be easily reset by wiping a magnet across the face of the dial provided 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. 2.

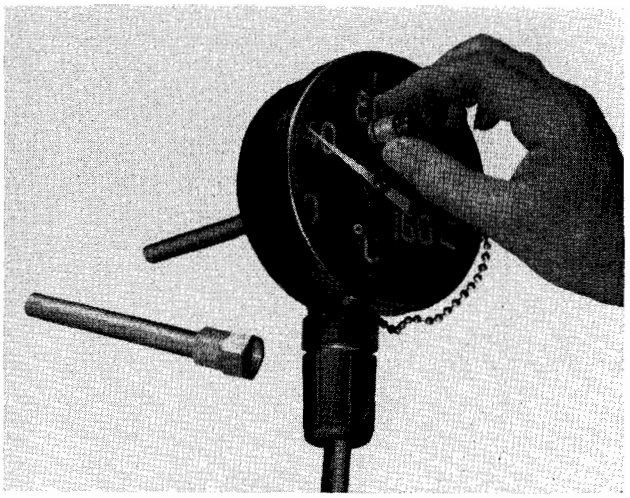

FIG. 2. Method of Resetting Maximum Indicating Pointer

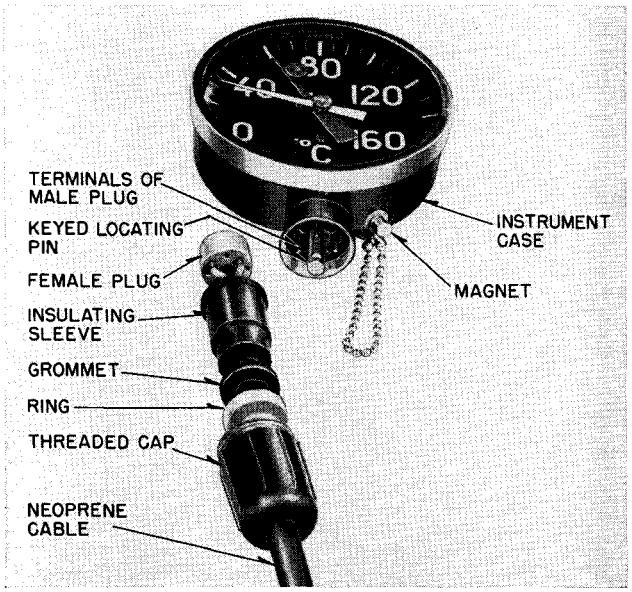


FIG. 3. Triple Seal Connection Details

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. 3. This connector consists of the following:

**1.** The male terminals are molded into the case together with a locating pin to prevent making incorrect connections.

**2.** The rubber female plug which has 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 male plug.

**3.** A bushing to compress the female plug against the male plug.

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

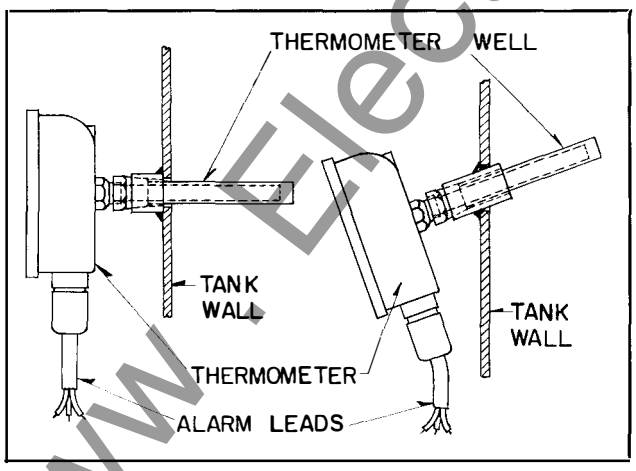


FIG. 4. Indicator Mounted Vertical (A) and Tilted Downward (B).

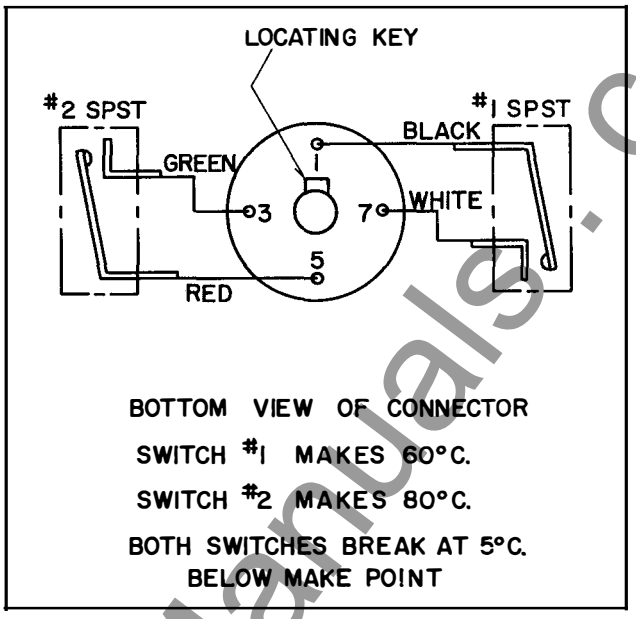


FIG. 5. Oil Temperature Relay Wiring Diagram

**TABLE NO. 1**

| VOLTAGE | NON-INDUCTIVE LOAD—AMPS. | INDUCTIVE LOAD AMPS. |
|---|---|---|
| 125 A-C | 10 | 10 |
| 250 A-C | 5 | 5 |
| 125 D-C | 0.5 | 0.05 |
| 250 D-C | 0.25 | 0.025 |

*L/R equal or less than 0.026 where
L = Inductance in henrys
R = Resistance in ohms

**Important: Relays, solenoids and motors are inductive loads. When an inductive circuit is opened, a voltage is induced which tends to maintain current flow. The resultant arcing may result in failure of the contacts to interrupt current.**

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

**6.** A threaded cap to hold the component parts of the connector tight in the case. This threaded cap is screwed into place.

There are two micro-switches in this type temperature indicator. Switch #1 is set to close at 60°C. for the fan circuit, and Switch #2 closes at 80°C. for the alarm circuit. The switches are adjustable over a range of ±10°C. in relation to the above mentioned values. The 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 Fig. 5.

**Field Test.** Remove the thermometer from its well and submerge the stem up to the brass fitting in a closely controlled temperature, well agitated, oil bath. Check the temperature by placing a thermo-couple or other accurate temperature measuring device on the stem about two inches from the end. The thermometer should be accurate within $\pm$ 2°C. (allowing 15 minutes for the thermometer to come up to temperature). To adjust a switch to a different value, remove the corresponding numbered sealing plug at the top of the case. Make the proper adjustment of the switch through the opening in the case, and then reseal the case with the sealing plug.

**Important.** When changing the alarm setting on those temperature indicators with adjustable contacts, be sure to use a non-setting sealing compound on the threads of the sealing plug. Plastic Lead Seal #8138-3 is recommended. Loose or improperly sealed plugs will allow moisture to collect in the indicators, and cause eventual shorting of electrical circuits or deterioration of dial markings.

## INSTALLATION

The instrument is shipped fixed to 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 ground level (See Fig. 4).

**Important: When checking circuits through this instrument it is necessary to follow 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.**

## RENEWAL PARTS

If it becomes necessary to repair the instrument, contact the nearest Westinghouse Office.

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