INSTALLATION • OPERATION • MAINTENANCE

INSTRUCTIONS

ELECTRICAL RESISTANCE THERMOMETERS

GENERAL

Electrical resistance thermometers are used to indicate the temperature of motors, generators, transformers and other equipment during operation or while they are undergoing tests.

These instructions cover the description and installation of the temperature indicating systems. Other instruction leaflets provide additional information on the particular type of instrument used. The types available are X-221, X-231, X-241, X-251, and X-261.

DESCRIPTION AND APPLICATION

A complete resistance thermometer system is made up of the detector coils, the detector coil selector switch, the indicating instrument, and the connecting leads.

The detector coils are made of copper wire to an exact resistance of 10 ohms at 25° centrigrade and are located at the points where the temperature is to be measured. The detector coils are mounted in the equipment by the manufacturer of the generator, motor transformer etc. and are not supplied with the instrument. Usually several detector coils are used with each indicator. The indicator may be connected to any desired detector coil by means of the selector switch.

When connected to the indicator, the detector coil becomes one leg of a wheatstone bridge (See Fig. 1). As the detector coil resistance changes due to changes in its temperature, the balance of the bridge is upset and a voltage is produced across the instrument movement causing an indication. This indication is proportional to the amount of unbalance and hence indicative of the temperature of the apparatus at the detector coil.

INSTALLATION

Drill panels and connect instruments according to the diagram in this leaflet and the applicable instrument instruction leaflet, or according to switchboard drawings if instruments are supplied as part of a complete switchboard.

The leads to the detector coils may be of any length but their total resistance should be kept within values shown on the wiring diagram, Fig. (2).

The selector switch must have enough points to connect to the required number of detector coils plus one point for the test resistor and one point for the off position. Switch contacts must make before break and must be clean and tight. All connections must be tight and clean to keep the contact resistance to a minimum.

A nominal 120 volt 60 cycle a.c. supply should be used. The resistance thermometer is self-regulating and will tolerate voltage variations of as much as ± 10%. The line frequency should be maintained between 59.5 and 60.5 cycles.

Grounding of the instrument case should be the same as indicated in the separate instruction leaflet for the instrument.

After all connections have been made, apply voltage and put the selector switch on the test position. The pointer should deflect to the test point, which is marked with a green line on the dial. If it does not, errors proportional to the amount it is off will be present. To correct for this, the zero adjuster should be turned with a screw driver until the pointer deflects to the green line. If the deviation is beyond the range of this adjustment either the instrument will need recalibration or some error in the connections has been made and should be checked out and corrected. THE TEST POINT IS NOT THE MECHANICAL ZERO OR DE-ENERGIZED POSITION OF THE INSTRUMENT.

MAINTENANCE

The bridge circuit consists of fixed resistors and no adjustments should be necessary. Calibration of the instrument proper is covered in the separate instructions for the basic instrument, the same as for a d-c milli-ammeter or ammeter.

The following table gives the resistance of the exploring coils for which this instrument is calibrated, for various temperatures:

Temperature In Degrees C	Resistance In Ohms
0	9.037
25	10.000
50	10.962
100	12.887
150	14.812
200	16.737
300	20.587

REPAIR AND RENEWAL PARTS

Repair work can be done most satisfactorily at the factory. When returning an instrument for repairs, obtain a return material tag from your dealer or your nearest Westinghouse Sales Office, to insure proper identification at the factory.

Orders for renewal parts should include the name of the part and the style and serial number of the apparatus appearing on the dial or nameplate.

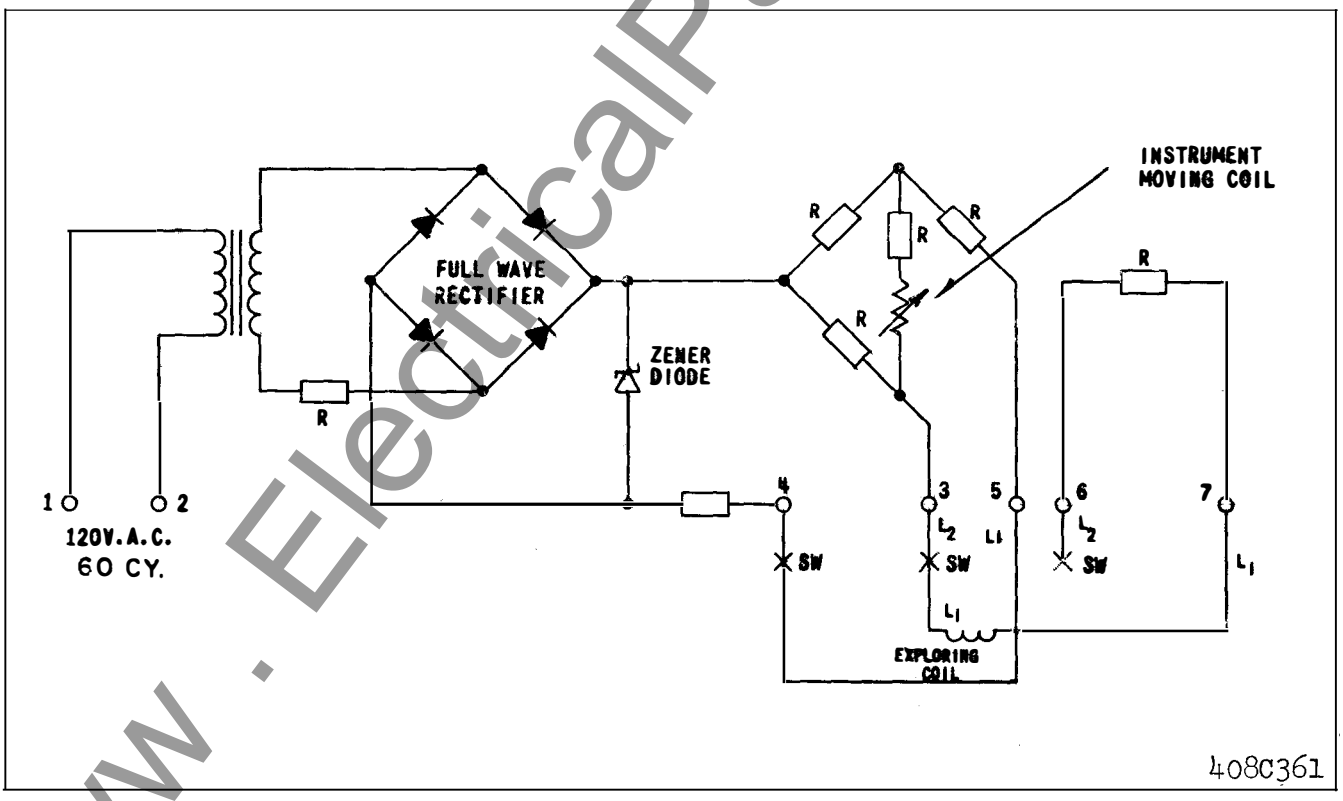
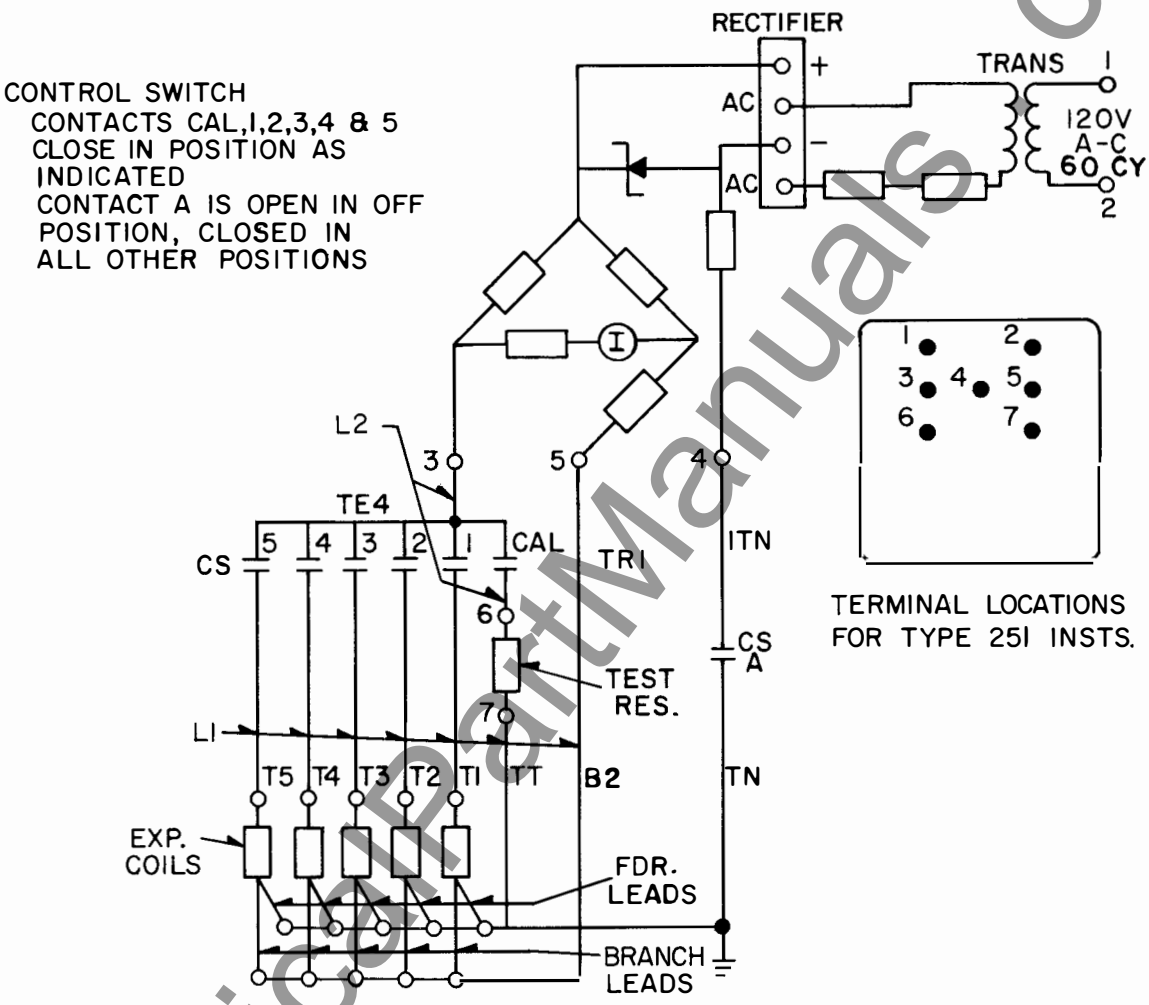


Fig. 1— Electrical Resistance Thermometer Schematic Diagram.



1. L-2 LEADS AND BRANCH LEADS SHOULD NOT EXCEED 0.02 OHMS EACH.
2. SWITCH CONTACTS TO EXPLORING COILS MUST MAKE BEFORE BREAK. (SWITCH WESTINGHOUSE S#508A424G01 FOR 5 EXPLORING COILS.)
3. INDIVIDUAL L-1 LEADS SHOULD HAVE A RES. OF .3 OHMS FOR STANDARD INSTRUMENTS OTHER RESISTANCE VALUES ARE AVAILABLE ON SPECIAL ORDER UP TO 3 OHMS. IN EITHER CASE THE VARIATION IN RESISTANCE SHOULD NOT EXCEED ± 0.1 OHMS.
4. ALL L-1 LEADS MUST BE WITHIN 0.02 OHM OF THE SAME RESISTANCE
5. EACH RESISTANCE TOLERANCE OR LIMIT STATED WILL LIMIT ERRORS FROM THIS SOURCE TO LESS THAN ONE PERCENT. ANY INCREASE WILL CAUSE AN APPROXIMATELY PROPORTIONAL ERROR.
6. FEEDER LEADS MUST BE WITHIN 1 OHM OF THE SAME RESISTANCE

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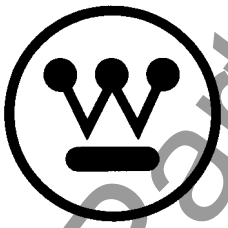
Fig. 2— Electrical Reisistance Thermometer External Wiring.



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