

SERIES 35 TEMPERATURE MONITOR

Using 10 Ohm Resistance Detectors

Model No. 2076A36H01 with Trip Only  
Model No. 2076A36H02 with Alarm and Trip

Using 100 Ohm Platinum Temperature Detectors

Model No. 2076A36H03 with Trip Only  
Model No. 2076A36H04 with Alarm and Trip

Using 120 Ohm Nickel Temperature Detectors

Model No. 2076A36H05 with Trip Only  
Model No. 2076A36H06 with Alarm and Trip

# SERIES 35 TEMP MONITOR

## INSTALLATION INSTRUCTIONS

1. CONNECT AC TO TERMINALS.
2. CONNECT ALL PROBES TO THE INSTRUMENT AND DETERMINE WHICH PROBE RUNS HOTTEST. THEN CONNECT THIS PROBE TO TERMINALS MARKED PT.
3. TEMP. MONITOR WILL ALARM IF THIS PROBE TEMPERATURE EXCEEDS THE ALARM CARD SET POINT.
4. CONNECT LOAD TO OUTPUT RELAY.

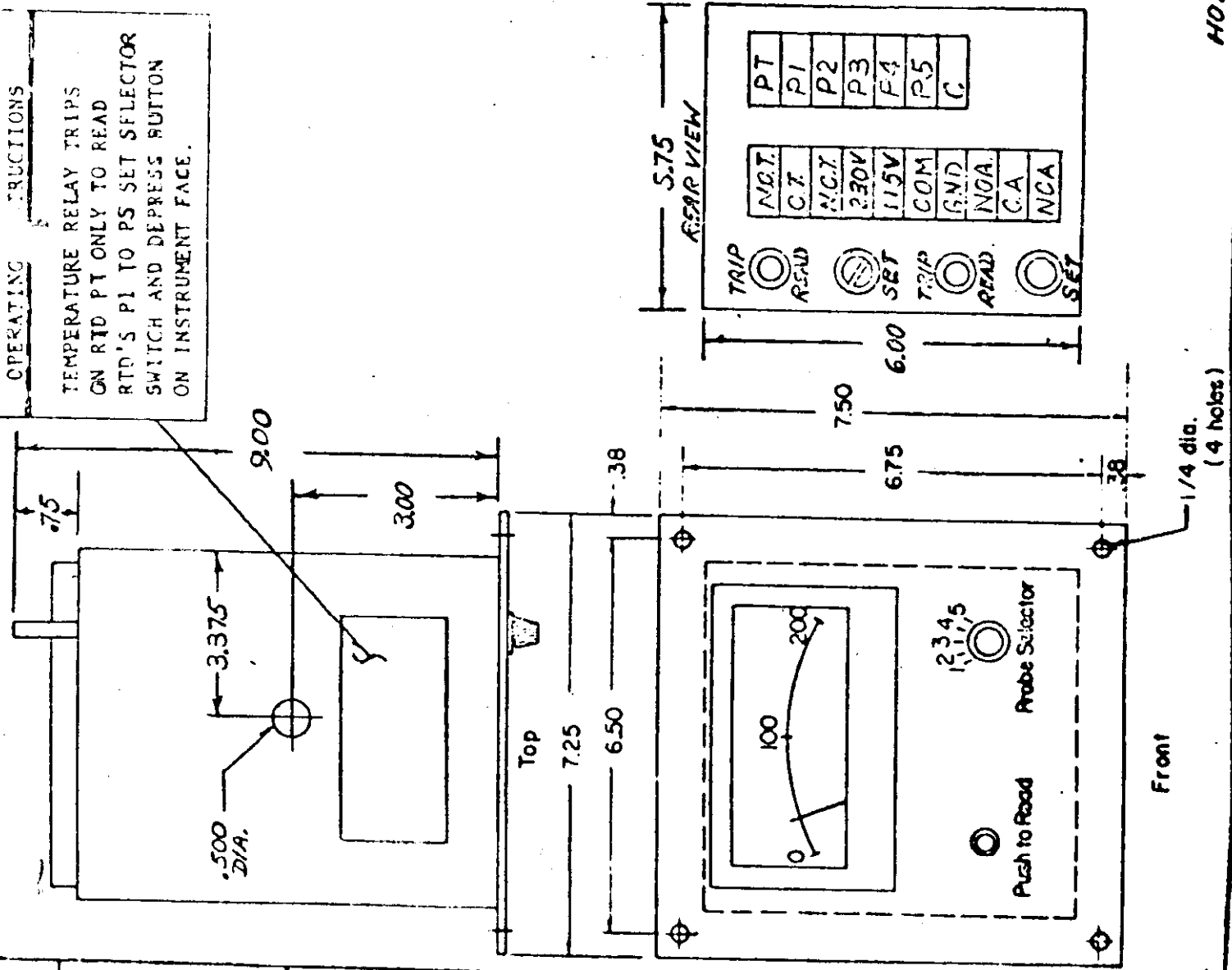
## OPERATING INSTRUCTIONS

TEMPERATURE RELAY TRIPS ON RTD PT ONLY TO READ RTD'S P1 TO P5 SET SELECTOR SWITCH AND DEPRESS BUTTON ON INSTRUMENT FACE.

**SERIES 35 GENERAL CONTROL**  
 MODEL - 2076A36-H02  
 SUPPLY - 115/230 VAC.  
 INPUT - 10 OHM RTD.  
 OUTPUT - 10A/115/230 VAC.  
 TEMP, INC.

**SERIES 35 GENERAL CONTROL**  
 MODEL - 2076A36-H04  
 SUPPLY - 115/230 VAC.  
 INPUT - 100 OHM RTD.  
 OUTPUT - 10A/115/230 VAC.  
 TEMP, INC.

**SERIES 35 GENERAL CONTROL**  
 MODEL - 2076A36-H06  
 SUPPLY - 115/230 VAC  
 INPUT - 120OHM RTD.  
 OUTPUT - 10A/115/230 VAC  
 TEMP, INC.



H02-H04-H06 = DUAL ALARM

WRITTEN BY \_\_\_\_\_ DATE \_\_\_\_\_

CHECKED BY \_\_\_\_\_

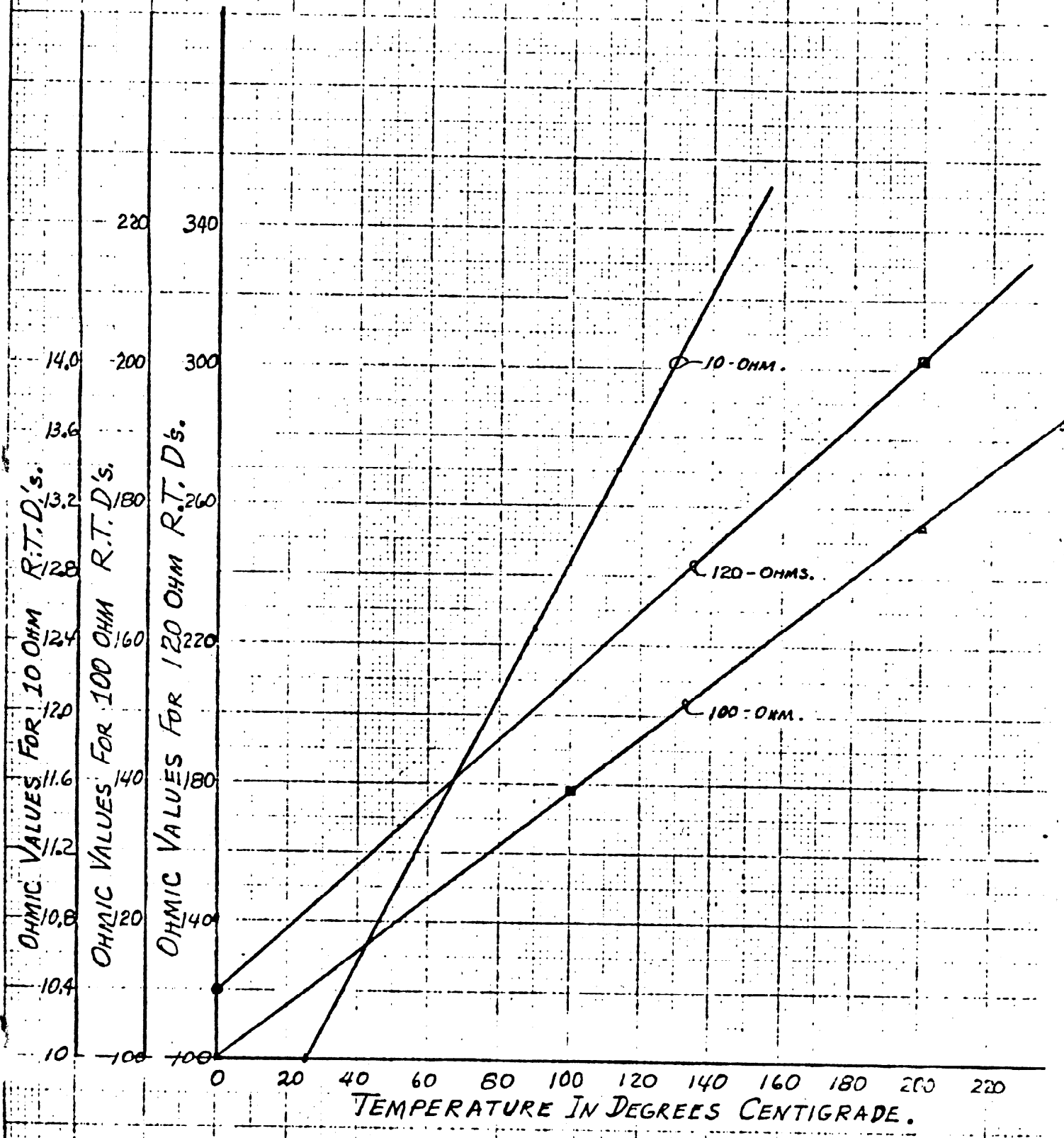
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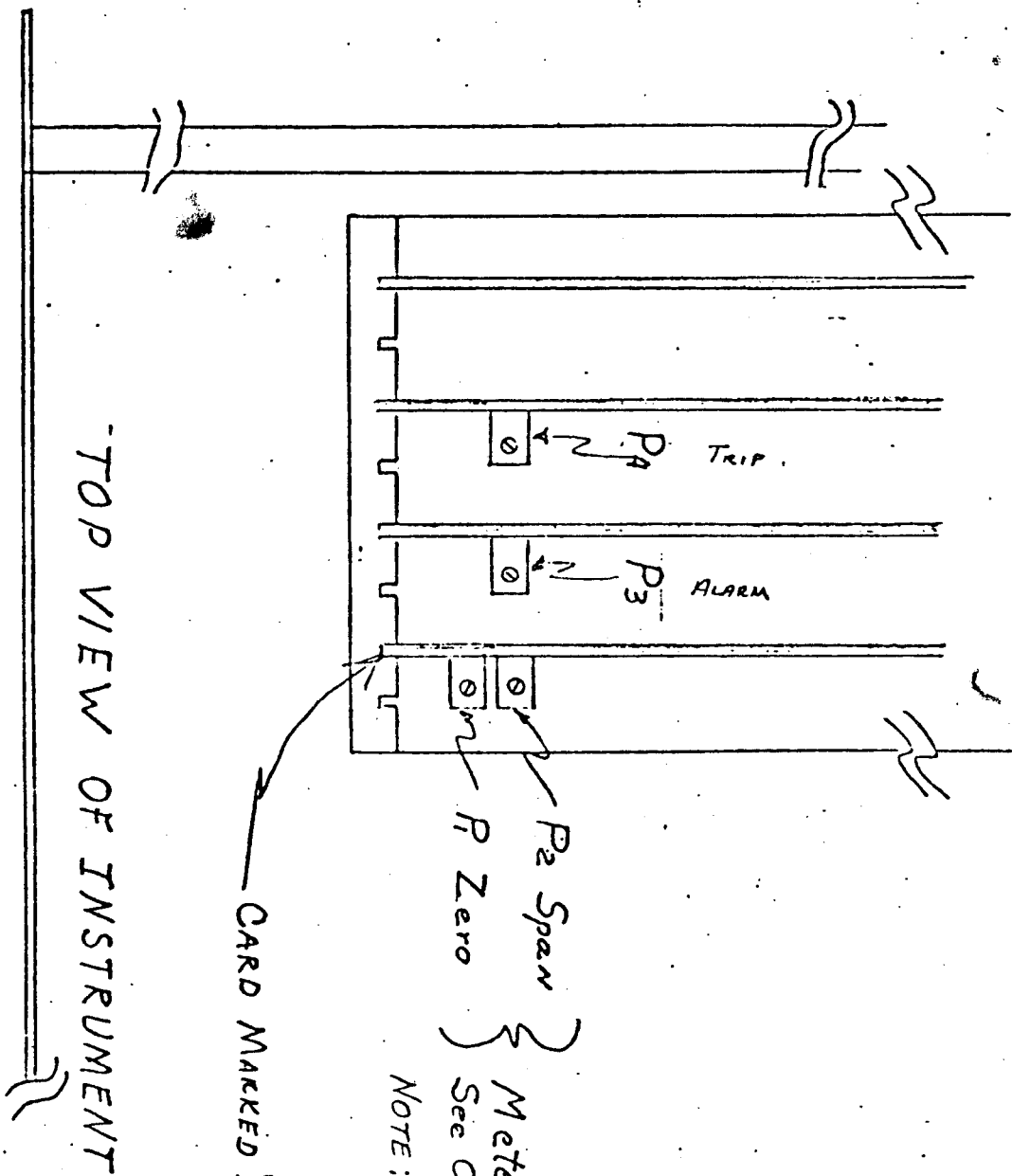
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# RESISTANCE-TEMPERATURE CURVES FOR DIFFERENT RESISTANCE-TEMPERATURE DETECTORS





Meter  
See OPENING IN TOP.  
NOTE: - Do Not Adjust P3 AND P4.

FIG. 3. - CALIBRATION ADJUSTMENT POTENTIOMETERS FOR LINEARITY AND LEAD LENGTHS.

INSTALLATION INSTRUCTIONS

for  
Digital Panel Meter  
Series 35 RTD  
Temperature Monitor

- Step #1
- A. Remove Analog Panel Meter from Instrument by detaching positive (Red) and negative (Black) meter leads on rear of meter.
  - B. Remove clamps from rear of meter.
  - C. Remove 2 screws from front of meter (Retain for use in installation of digital meter).

- Step #2
- A. Place Digital Panel Meter in panel cutout which formerly held analog meter.
  - B. Insert upper two screws in panel to hold meter in place.
  - C. Drill bottom two holes at digital panel meter hole locations.
  - D. Install bottom two screws.

- E. Solder two gray wires to 120 VAC terminals on inside, rear of instrument.
- F. Attach white/Red wire on digital panel meter to (Red +) wire formerly attached to analog meter (+).
- G. Attach White/Black lead to Black wire formerly attached to analog meter (-).



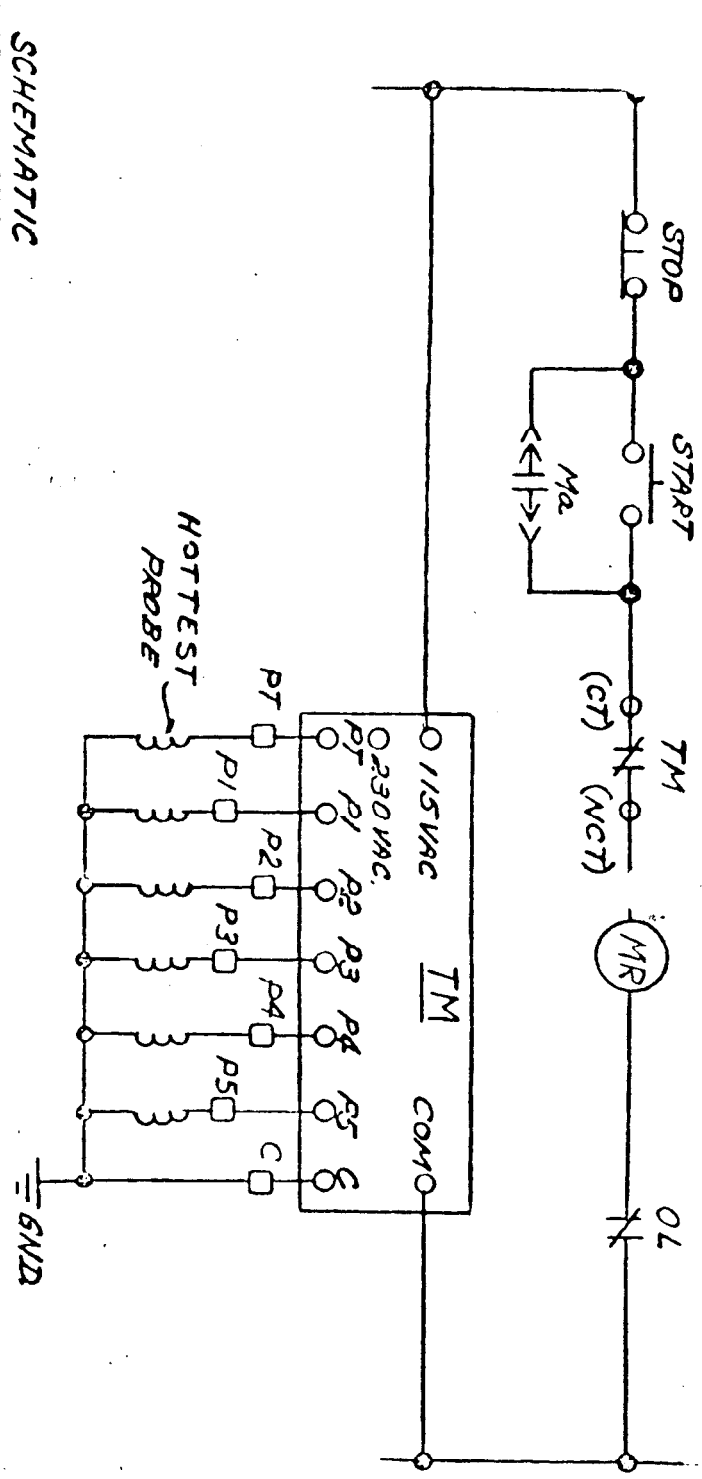
**TEMP, INC.**

INSTALLATION INSTRUCTIONS  
for  
DIGITAL PANEL METER  
Series 35 RTD Temperature  
Monitor

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**WIRING DIAGRAM**

NOT.	TM	PT
CT		P1
NCT		P2
230V		P3
115V		P4
COM		P5
GND		C
NQA.		
CA.		
11GA		

SERIES 35 TEMP MONITOR

**OPERATING INSTRUCTIONS**

TEMPERATURE RELAY TRIPS ON RTD PT ONLY TO REAR RTD'S P1 TO P5 SET SELECTOR SWITCH AND DEPRESS BUTTON ON INSTRUMENT FACE.

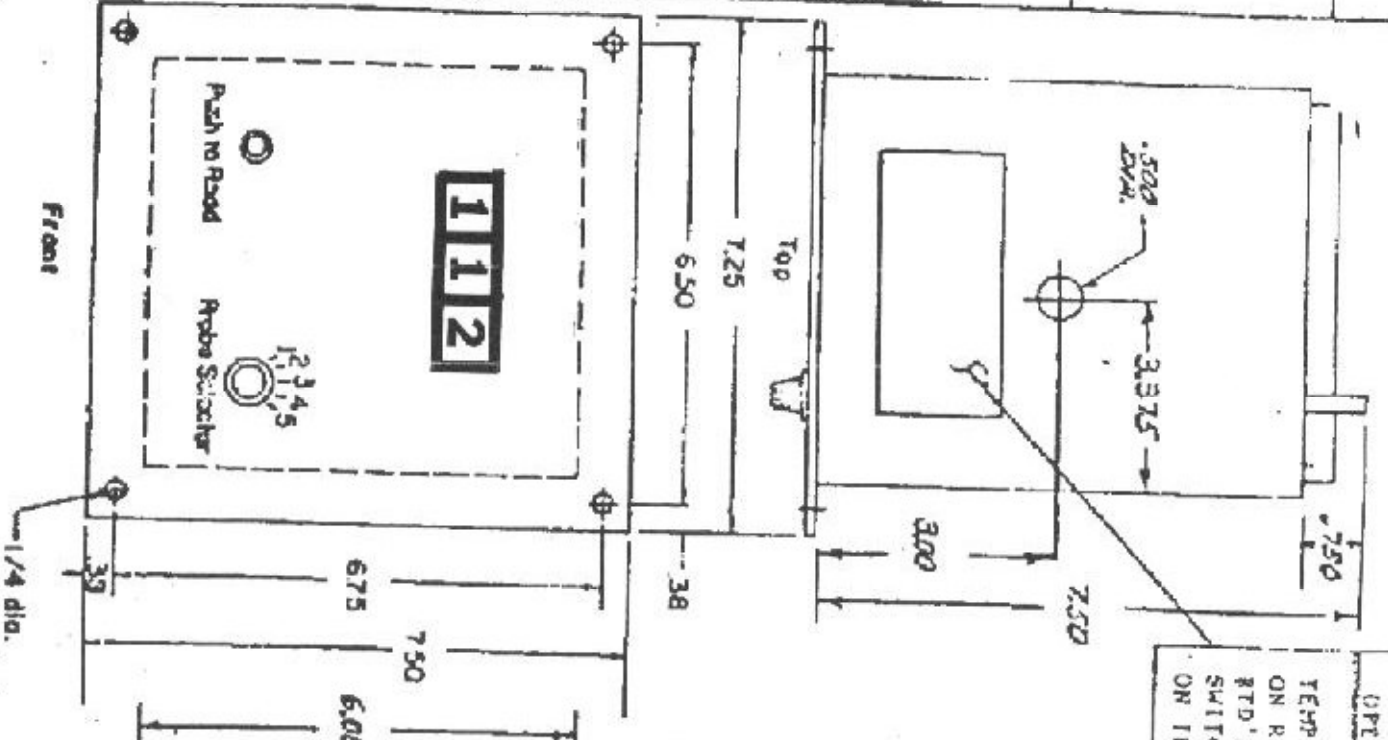
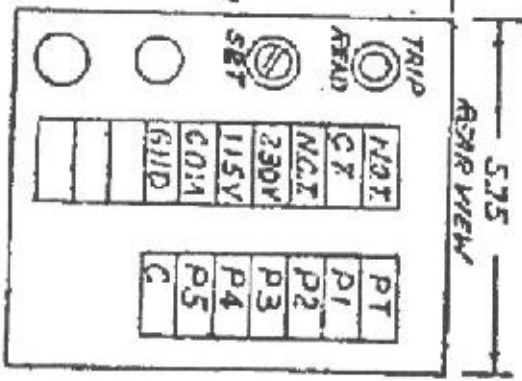
**INSTALLATION INSTRUCTIONS**

1. CONNECT AC TO TERMINALS.
2. CONNECT ALL PROBES TO THE INSTRUMENT AND DETERMINE WHICH PROBE RUNS HOTTEST. THEN CONNECT THIS PROBE TO TERMINALS MARKED P<sub>1</sub>.
3. TEMP. MONITOR WILL ALARM IF THIS PROBE TEMPERATURE EXCEEDS THE ALARM CARD SET POINT.
4. CONNECT LOAD TO OUTPUT RELAY.

**SERIES 35 GENERAL CONTROL**  
 MODEL - 2076A36-INC1  
 SUPPLY - 115/230 VAC.  
 INPUT - 10 OHM RTD.  
 OUTPUT - 10A/115/230 VAC.  
 TEMP., INC.

**SERIES 35 GENERAL CONTROL**  
 MODEL - 2076A36-INC3  
 SUPPLY - 115/230 VAC.  
 INPUT - 100 OHM RTD.  
 OUTPUT - 10A/115/230 VAC.  
 TEMP., INC.

**SERIES 35 GENERAL CONTROL**  
 MODEL - 2076A36-INC5  
 SUPPLY - 115/230 VAC.  
 INPUT - 120OHM RTD.  
 OUTPUT - 10A/115/230 VAC.  
 TEMP., INC.



H01-H03-H05 = SINGLE ALARM

TYPICAL CALIBRATION PROCEDURE

METER CALIBRATION RESISTORS (100 ohm RTD)

	<u>RESISTOR</u>	<u>METER READING</u>
Zero	100 ohms	0°C.
Span	169 ohms	178 C.

CALIBRATION PROCEDURE

- A. Connect (100 ohm) Zero Resistor, between two leads, at Motor end, for PT point. Adjust Zero screwdriver adjustment, until meter reads 0°C.
- B. Connect (169 ohm) Span Resistor, between two leads, at Motor end, for PT point. Adjust Span screwdriver adjustment, until meter reads 178 C.
- C. Repeat Steps A and B, until calibration is as close as desired.

- NOTE: (1) Zero and Span screwdriver adjustments are located on Plug-in CMI Card, located behind hole plug (top of case). Front Adjustment - Zero. Rear Adjustment - Span.
- (2) CALIBRATION RESISTORS ARE SHIPPED IN ENVELOPE TAPED TO SIDE OF PC CARD HOLDER - DUST COVER MUST BE REMOVED.

## FIELD CALIBRATION

(Resistance values are for 10 ohm RTD)

When field calibrating the temperature Monitor, the following procedure should be followed:

The calibration can be checked by use of the two fixed resistors furnished. The resistors are the correct value of RTD probe resistance and can be substituted for the probe to simulate the probe temperature. The resistor should therefore be connected to the probe leads, by removing them from the point of connection, at the motor and substituting the resistor at that point.

- A. By observing the temperature, at each of the 6 probe positions, with the 25°C. resistor (10 ohms), on each of the probes, the point that reads the highest temperature will be used for the (PT - point) Meter Calibration.
- B. The Meter Calibration adjustments are located on the top cover of the instrument (looking from the rear). The snap-button covering these adjustments, must be removed.
  - (1) With the 25°C. resistor on the (PT) point, adjust the Zero adjustment (front trimpot), until the meter reads 25°C.
  - (2) With the 112°C. resistor placed on the (PT) probe leads, adjust the Span adjustment (rear trimpot), until the meter reads 112°C. (13.3 ohms).
  - (3) It would be necessary to repeat steps (1) and (2), until the calibration is as close as possible.
- C. The Meter is now calibrated for the point reading the highest temperature.

## CUSTOMER INSTALLATION

- A. Connect the six RTD probe lead wires, from the motor to the terminals labeled PT, P1, P2, P3, P4 and P5. The common side of the six RTD's are connected together and this single common wire connected to terminal labeled (C) PROBE COMMON at the bottom of the probe connection strips.
- B. Connect the Alarm and Trip control circuits to the relay contacts labeled NO, C, NC, for the trip and alarm functions, for the RTD sensor (PT probe position).
- C. Connect 230 or 115VAC power to the AC power terminals, on rear of case.

- NOTE: (1) Where possible #14AWG wire should be run, for the probe connecting from each of the 6 RTD probes at the motor, for best accuracy. This is particularly true, when long runs from the instrument to the motor are used. #14 AWG wire is 2.5 ohms per 1000 ft. and for the 100 and 120 ohm probes NO CALIBRATION for lead wire resistance would be necessary.
- (2) The Monitor wiring from the RTD sensor, located at the motor should not be run in close proximity to the Motor AC power wiring.

WIRE SIZE:

AWG

#20	1.0 ohms per 100 feet.
#18	0.65 ohms per 100 feet.
#16	0.40 ohms per 100 feet.
#14	0.25 ohms per 100 feet.

Double above figure, for two leads of probe i.e., for 100 ft. cable run to motor, total lead resistance will be for #14 wire 0.5 ohms or #20 wire 2.0 ohms.

FIG. 5 - LINEARITY AND LEAD RESISTANCE CALIBRATION

Style No.	Connect A Resistor on (PT) Terminals at Motor	Remove Cover Over (P1) Pot on Top of the Instrument	Connect a Resistor on (P1) Leads and Set Sel. Sw. to Position No. 1	Depress Pushbutton on Front of Inst. and Read Adjust (P2) Pot
2076A36H01 2076A36H02	* Use 10 Ohm Resistor in the Motor on (PT)	Adjust (P1) for Meter Reading 25°C.	Use 13.3 Ohm Resistor	Meter should Read 112°C.
2076A36H03 2076A36H04	* Use 121 Ohm Resistor in the Motor on (PT)	Adjust (P1) for Reading 52°C.	Use 169 Ohm Resistor	Meter should Read 178°C.
2076A36H05 2076A36H06	* Use 121 Ohm Resistor in the Motor on (PT)	Adjust (P1) for Reading 0°C.	Use 301 Ohm Resistor	Meter should Read 196°C.

By making the calibration adjustments, per the table, it eliminates the effect of lead resistance and provides for meter linearity. There is enough range in the potentiometer to take care of 2 ohms in lead resistance.

\* NOTE: If the RTD resistance with leads measures 1/4% high, it is advisable to substitute a resistor of this value instead of using the table value for "PT".

The indicating circuit consists of one side of the meter card being connected to the common side of the probes and the other side connected between (R3) and the (RTD) connected on (PT) terminals. One input goes through the normally closed side of pushbutton switches (PB-1), (PB-2) and (PB-3), before connecting to the meter indicator card.

If it is desired to read the temperature of an (RTD), other than the one connected to (PT) terminal, it is necessary to set the selector switch to the one desired, then press the read pushbutton, on the front of the instrument. When the read pushbutton is released, the indicator transfers and control is returned to the (RTD) connected to the (PT) terminals, regardless of the switch position.

The instrument will monitor correctly even though the meter has friction or is sticking. The monitoring is independent of the meter reading.

Refer to sheet (4) of Dwg. 2076A36, for typical connection diagram. The outline is shown on sheets (2) and (3), of the same drawing.

One lead of each (RTD's) should be connected together and grounded, at the motor. The other lead from the (RTD's) should run back to the monitor and they should be in a separate conduit. Keep parallel runs away from high power leads, as far as practical. When three lead (RTD's) are supplied, connect the common leads on the units together and ground at the motor, then run a ground lead back to the (C) terminal, on the monitor. Should less than six (RTD's) be connected to the monitor it is necessary to jumper the unused terminals to any one of the other units. This is to prevent open circuiting the instrument, resulting in pegging, when the pushbutton is depressed.

**NOTE:** The error due to current flow is small on solid state monitors and we do not use the third lead for accurate calibration. Simply connect the two common leads, on the (RTD's) and ground at the motor and bring the ground lead back to the (C) terminal.

This industrial type control is designed to be installed, operated and maintained by adequately trained workmen. These instructions do not cover all details, variations, or combinations of the equipment, its storage, delivery, installation, check-out, safe operation or maintenance. Care must be exercised to comply with local, state and national regulations, as well as safety practices, for this class of equipment.

**CAUTION:** DO NOT TRY TO "RING-OUT" LEADS WITH THEM CONNECTED TO THE INSTRUMENT. IT WILL BURN OUT OR DAMAGE THE LOW VOLTAGE COMPONENTS. ALSO, DO NOT "HI-POT" THE (RTD) CIRCUIT.

No routine maintenance is required and should the instrument appear to be defective, call the factory.

ments and it may be necessary to repeat a few times. Not necessary if error is less than  $\frac{1}{4}^{\circ}\text{C}$ .

**CAUTION: DO NOT ADJUST (P<sub>3</sub>) OR (P<sub>4</sub>) ON THE PRINTED CIRCUIT BOARDS.**

Once the instrument is corrected to compensate, for lead resistance, replace the cover and proceed to set the trip points, by depressing the Read pushbutton, on the rear of the instrument and vary the set potentiometer, for relay pick-up. Use an ohmmeter, to check the relay contact closure. Set the high limit tripping, to suit the machine safe operating temperature.

Model No. 2076A36H01 is a single Alarm Unit, for 10 ohm R.T.D.

Model No. 2076A36H02 is a dual Alarm Unit, for 10 ohm R.T.D.

Model No. 2076A36H03 is a single Alarm Unit, for 100 ohm R.T.D.

Model No. 2076A36H04 is a dual Alarm Unit, for 100 ohm R.T.D.

Model No. 2076A36H05 is a single Alarm Unit, for 120 ohm R.T.D.

Model No. 2076A36H06 is a dual Alarm Unit, for 120 ohm R.T.D.

The single or dual units have set points, individually adjustable. Once the instrument is aligned, re-connect the leads to the temperature detectors and check operation.

When it is desired to know where the alarm point is set, the (PB-2) pushbutton, on the rear of the instrument, is depressed and held, until the set point temperature is read on the meter. Likewise, when it is desired to know where the shutdown point is set, the (PB-3) pushbutton is depressed and read on the meter. NOTE: If the (PT) temperature detector is at something above ambient it introduces a small error and may read in error a few degrees. Normally the trip points adjustments are made on the initial start-up and only checked occasionally. If it is desirable to change a particular set point, it is only necessary to rotate the screw driver adjustment, on the respective set point potentiometer, until the set point reads the desired value, then release the pushbutton, when the (PT) temperature sensor is at ambient condition.

When neither pushbutton is depressed, the meter reads the temperature of the (RTD) connected to the (PT) terminals, therefore it is necessary to locate the highest temperature (RTD) and connect to this point, on the temperature monitor.

INSTRUCTIONS FOR SERIES 35  
TEMPERATURE MONITOR

The temperature monitor is a solid state device used for indication and alarm on (RTD) inputs. The unit consists basically of three or four plug-in printed circuit cards, dependent upon whether the unit is single or dual alarm:

1. Alarm Card #1 - For Single Alarm Units
2. Alarm Card #2 - Plus Card #1 for Dual Alarm Units
3. Meter Indicator Card
4. Power Supply Card

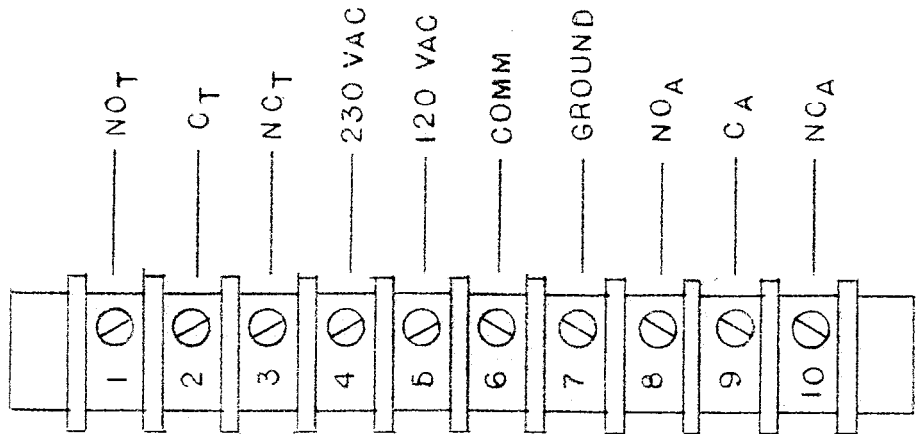
Plus a front panel mounted indicator, selector switch and pushbutton.

The temperature is sensed by means of (RTD's) Resistance Temperature Detectors, one of which (PT) is used in a bridge circuit consisting of resistor (R3) and (PT) in one leg of the bridge, and resistors (R2), (R6) and (P1) rheostat in the other leg of the bridge. The output of this bridge feeds alarm card (#1). The Alarm Card (#1) operates the Trip Temperature Relay providing a single pole double throw contact for customer's use. This is shown on Figure 1 schematic, for temperature monitor. Figure 2 schematic shows the Dual Alarm Unit.

The temperature set points, for the alarm and shutdown circuits, are (P1) and (P2) potentiometers, if dual units are located on the rear of the instrument. The set point potentiometers are uncalibrated and it is necessary to connect a known resistance at the motor, in order to correct for the error introduced by the lead resistance.

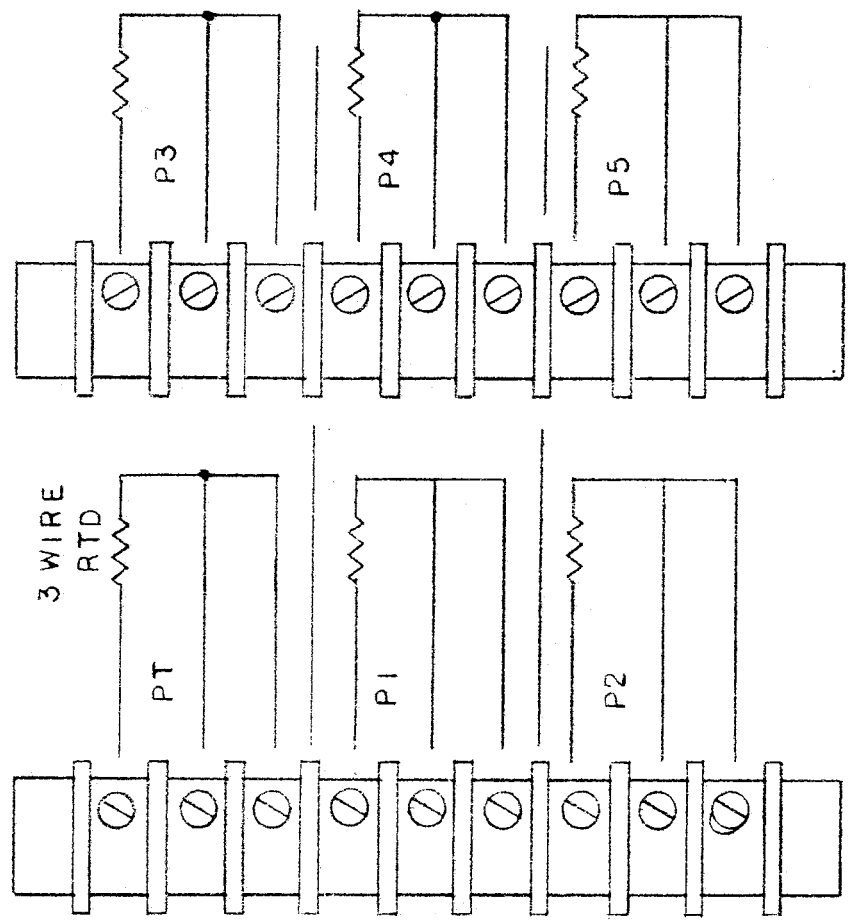
NOTE: 10 ohms corresponds to 25°C. 13.3 ohms corresponds to 112°C. (readings are linear between these points). For other range detectors refer to Table, Figure 5 attached, and follow instructions, for linearity calibration

The instrument is calibrated for short leads and in order to make the instrument match the application, connect the motor (RTD) resistor, per the table, at the motor on the leads connected to (PT) terminals, of the instrument. Use Zero resistor, for 25°C. point and Span resistor (13.3 ohm), for 112°C. point. Remove top hole cover, on the instrument and adjust the (P1) Zero and (P2) Span potentiometers, to get linearity on the indicator dial. The motor resistance (RTD) is normally connected to (PT) terminals. The RTD should be removed and either the Zero or Span resistor substituted, for calibration. The meter should read 25°C. or the ambient temperature, with the motor cold. If not, adjust (P1), on the "M" card. With the 13.3 ohm Span resistor, on the terminals PT and Common, it should read 112°C. If not, adjust (P2) Span potentiometer. These are trial and error adjust-



240VAC Operation---Connect  
 Power to 4 and 5

120VAC Operation---Connect  
 Power to 5 and 6



PT HOTTEST PROBE

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