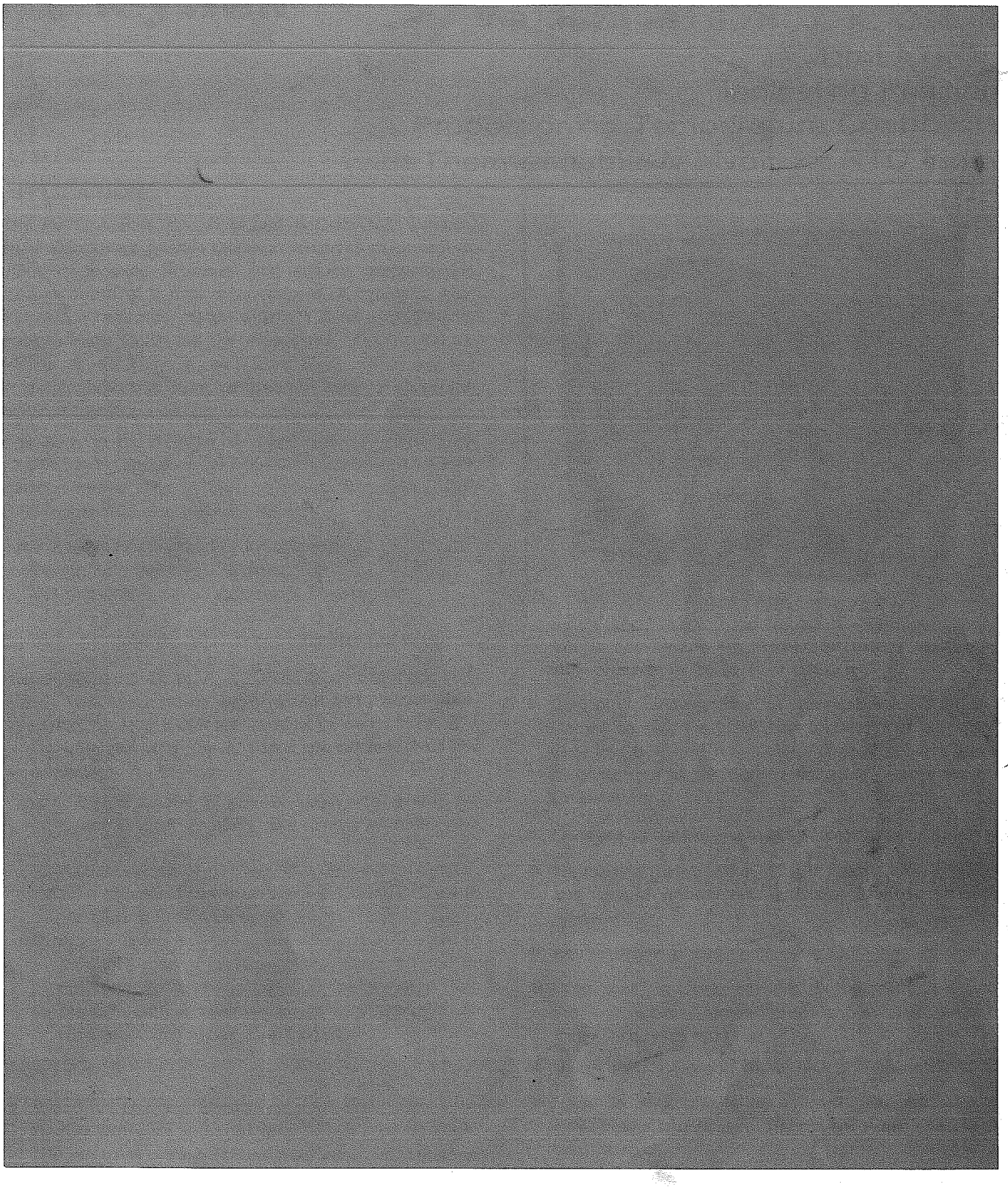


INSTRUCTIONS

R7352A, B, G, H, J, K, Q & R DIALATROL

95-8150-3

Rev. 1/77

Honeywell

Honeywell

INSTRUCTIONS
R7352A, B, G, H, J, K, Q & R
DIALATROL
Indicating Position
Proportioning Temperature Controllers
with Thermocouple, Millivolt, or RTD Input

APPLICATION

The R7352A, B, G, H, J, K, Q and R DialaTrol* Temperature Controllers provide precision temperature control of industrial heating processes that require proportioning motor control of a final drive element. A typical system includes a reversible motor with a 135-ohm rebalancing potentiometer, such as the Honeywell M940A and B, M944B, E, G, H, J, K, and L, or 831E. Green and red operating lights give visual indication of which direction the motor is turning.

The input to the R7352A, G, J and Q is a dc millivoltage supplied by an applicable thermocouple, transducer or associated amplifier. The R7352B, H, K and R models accept RTD inputs (100 ohm platinum bulb).

Typical applications would be for operating:

Rotary Stem Valve	Rheostat
Slip Stem Valve	Adjustable Transformer
Butterfly Valve	Mechanical Speed Changer
Damper or Louver	Burner Firing Rate Controls

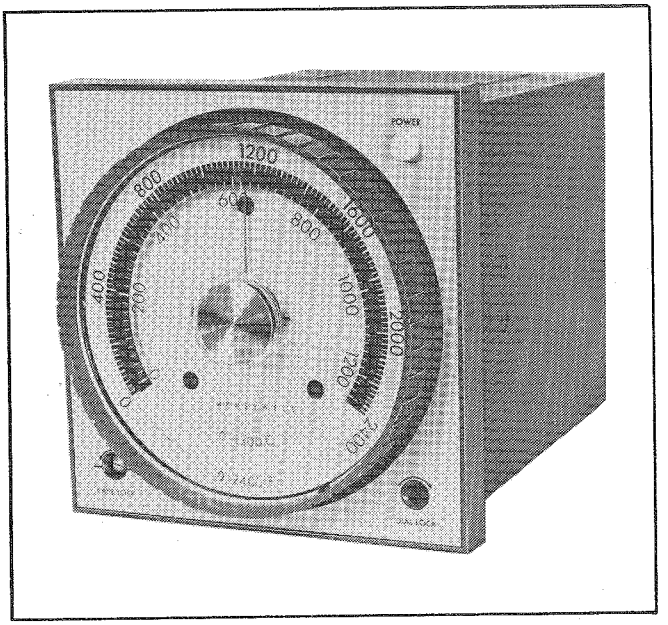
The R7352A, B, G, H, J, K, Q and R are one-mode controllers with proportional (gain) action and manual reset. The R7352G, H, Q and R are identical to the R7352A, B, J and K, with the exception of added adjustable high or low alarm circuit.

The R7352J, K, Q and R may be used with remote set point as well as local set point. The remote set point may be:

1. A programmed or manual 1000 ohm potentiometer.
2. Thru the use of converter board #138861B, C a 4 to 20 mA or 0 to 10 Vdc signal.
3. A zero based millivolt signal whose span is equal to the input span of the controller. Also, a ±1 volt dc deviation signal, proportional to the deviation from the set point, is available for external deviation recording, digital display, data logging, etc.

FEATURES

- Setability—The large circular set point dial is connected directly to the set point pot wiper, eliminating backlash. The set point pot has **infinite resolution.** Set point can be set over an 8-inch scale length.
- Readability—The 8-inch scale, plus one inch of overlap at each end, provide an effective scale length of 10 inches.
- Reliability—Completely solid-state—latest state of the art circuitry—no mechanical choppers—can be mounted in any plane—designed for industrial environments.
- Dependable potentiometric null balance circuitry—Control is not limited by mechanical inertia as it is in millivoltmeter or servo type devices.



- Control is independent of temperature indication—Unique concept combines the advantages of an analog scale and deviation null balance control, providing precision control in addition to indicating process variable temperature.
- Outstanding control and stability specifications.
- All modular construction—Plug-in chassis, plug-in relays, and plug-in printed circuit boards simplify field replacement.
- Economically priced.
- Easy start up—Rear terminal wiring, combined with easily accessible, tamper proof adjustments, simplify installation and start up.
- Visual light indication shows direction of motor travel.
- Versatile—Wide choice of millivolt, thermocouple, or RTD inputs and ranges. Ranges are easily changed at user location.
- Rugged—Shock and vibration resistant. Controller can be mounted directly on the machine.
- High input impedance—Calibration for thermocouple lead length is unnecessary (thermocouple and millivolt models). RTD models have leadwire resistance compensation when 3-wire sensor is used.
- Deviation alarm option can be set for either high or low alarm condition.

* Trademark

SPECIFICATIONS

GENERAL

MODEL–

R7352A and J DialaTrol Single-Mode (proportional plus manual reset) Position Proportioning Controller, millivolt or thermocouple input.

R7352B and K DialaTrol Single-Mode (proportional plus manual reset) Position Proportioning Controller, RTD input.

R7352G and Q DialaTrol Single-Mode (proportional plus manual reset) Position Proportioning Controller with high or low alarm, millivolt or thermocouple input.

R7352H and R DialaTrol Single-Mode (proportional plus manual reset) Position Proportioning Controller with high or low alarm, RTD input.

R7352J, K, Q and R are programmable single mode controllers.

INPUT RANGES–
R7352 models are available for a variety of commonly used temperature ranges for types B, E, J, K, R, S, T or tungsten-rhenium thermocouples; also millivolt and RTD ranges. Consult a Honeywell representative for specific range information. RTD models use a 100-ohm @ 0°C platinum sensor (span limits 20 to 250 ohms).

MINIMUM SPAN–
5 millivolts (millivolt or thermocouple models). 20 ohms (RTD models).

OPERATING VOLTAGE AND FREQUENCY–
120 volt 50/60 Hz, or 240 volt 50/60 Hz optional. Satisfactory operation is provided between 85% and 110% of rated voltage.

RELAY CONTACT RATINGS–
Inductive Load–
50 VA with 10 times inrush at 120 Vac.
Resistive Load–
10 amps at 120 Vac.
Actionator Motor Load–
200 mA at 120 Vac.

RELAY DIFFERENTIAL–
.25 ± .1% of span. (Defined as difference between pull-in and dropout of one relay.)

RELAY DEAD ZONE–
.6 ± .3% of span. Field adjustable from .5% to 1.4% of span. (Dead zone is defined as area between one relay dropping out and other relay pulling in.)

RELAY SWITCHING ACTION–
Two SPST relays. Multipoint electrical interlocking of the output relays prevents any possibility of both relays closing at once and damaging the motor.

LIGHT ACTION–
Green light indicates that relay K2 is energized. This will drive the motor to a position that supplies more heat or less cooling to the system. Red light indicates that relay K1 is energized. This will drive the motor to a position that supplies less heat or more cooling to the system.

ALARM RELAY CONTACT RATINGS–
Inductive Load–
50 VA with 10 times inrush rating at 120 Vac.
Resistive Load–
10 amperes at 120 Vac.

ALARM (R7352G, H, Q AND R)–
High or low, field convertible relay action. Adjustable from 10% below set point to 10% above set point. Wider spans can be obtained by field modification per instructions in the Service and Repair Manual, Form 72-4015.

POWER CONSUMPTION–
10 watts maximum at 60 Hz.

SLIDEWIRE RESISTANCE–
100 to 135 ohm. Resistance can be as high as 1,000 ohms provided the slidewire is shunted so that the equivalent resistance is 135 ohms. Example: A 1,000-ohm slidewire would require approximately 150 ohms in parallel.

GAIN (PROPORTIONAL BAND)–
Adjustable 3 to 25% of span. For wider proportional band, refer to Form 72-4015, Service and Repair Manual.

MANUAL RESET–
Adjustable approximately same range as proportional band.

SENSOR BREAK PROTECTION–
Standard upscale. Field convertible to downscale or none (by changing jumper on preamplifier board) on thermocouple models. Upscale protection only on RTD models.

SOURCE RESISTANCE RATING–
0 to 1,000 ohms. For resistance values greater than 1,000 ohms, recalibration is necessary. Maximum source resistance is 10,000 ohms.

LEADWIRE RESISTANCE COMPENSATION (RTD models)–
3-Wire Sensor: Maximum error ± .20% of span per ohm of leadwire resistance for leadwire resistance 0 to .4 ohm (98 ft. of 16 AWG copper wire has about .4 ohm resistance).

LEADWIRE RESISTANCE (TO REMOTE SET POINT)–
Maximum resistance of 10 ohms for each line. This is equal to 980 feet of 20 gauge copper wire, or 370 feet of 24 gauge copper wire.

COMMON MODE REJECTION–
120 db to line frequency.

NORMAL MODE REJECTION–
60 db at 2 times span at line frequency.

REMOTE SET POINT R7352J, K, Q & R–
1000 ohm potentiometer with maximum tolerance of ± 10%
4 to 20 mA from converter board #138861B, (see 95-8235) 0 to 10 Vdc from converter board #138861C.

LOCAL/REMOTE SWITCH–
The Local/Remote switch is located on the left side panel of the chassis. Turn the Case Lock screw and slide the chassis out approximately 3 1/2 inches for access.

MOUNTING–
Flush by two brackets. Surface mounting with the use of an optional junction box (Part Number 137108A). Maximum operating vibration level 0.5g @ 3600 RPM.

SHIPPING WEIGHT–
3.6 kg (8 pounds)

DIMENSIONS–
See Figure 1.

OPERATING CHARACTERISTICS

SET POINT ACCURACY–
Better than ± .5% of full span (nominal).

INDICATION–
± 50% of span.

INDICATION ACCURACY–
Same as set point accuracy at null (control point). Accuracy away from set point is ± 1% of span (nominal).

CONTROL STABILITY–
Maximum 24-hour drift under static voltage and ambient conditions equals ± .15% of span, thermocouple or millivolt models. RTD models equals ± .28°C (± .5°F).

EXTREME AMBIENT TEMPERATURE RANGE–
27°C ± 22°C (80°F ± 40°F) equals ± .75% of span maximum (typical figure ± .4% of span).

RATED AMBIENT TEMPERATURE EFFECTS–
80°F ± 40°F (27°C) equals ± .75% of span maximum (typical figure ± .4% of span).

RATED LINE VOLTAGE EFFECTS–
85% to 110% rated line voltage equals ± .4% of span maximum (typical figure ± .2% of span).

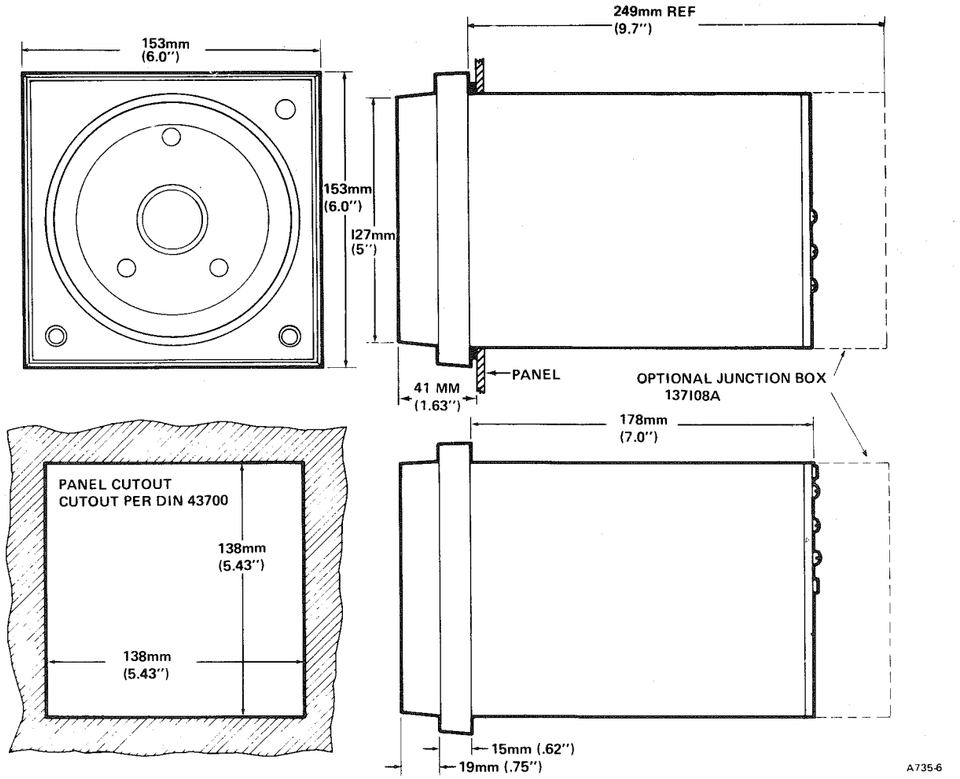


Figure 1–Mounting Dimensions.

REMOTE SET POINT POSITION—
The internal point potentiometer of the DialaTrol is switched out of the circuit, and the remote set point is switched into the circuit to the internal amplifier. Remote light on front panel is on. Read Percent Deviation from the remote set point on the meter (inner scale).

LOCAL SET POINT POSITION—
Normal local operation. Remote light is off, and the meter reads actual input temperature.

INSTALLATION

1. Select Location
   A. Orientation—The R7352 may be mounted in any position or angle.
   B. Limitations
      1. Ambient: The controller should be operated in ambient temperatures between –7° to 66°C (20° and 150°F).
      2. Input Impedance (Thermocouple or Millivolt Models): Maximum source resistance for the R7352 is 1,000 ohms. For higher source resistances, up to 10,000 ohms, recalibrate using the calibration procedure with the source as described in the CALIBRATION section of this form.
      3. Sensor Leadwire Resistance (RTD Models): 2-Wire Sensor—Minimize leadwire resistance as it adds directly to sensor resistance.
      3-Wire Sensor—Minimize leadwire resistance and make resistance of 3 leadwires equal for optimum compensation.

2. Mounting
   See Figure 1 for panel cutout dimensions. Mounting clamps and bolts are supplied with the controller for flush mounting. For surface mounting, order kit 137108A. The kit also serves as a terminal cover in flush mounting applications.

3. Wiring

NOTE: ***All wiring must comply with local codes, regulations, and ordinances.***

Hookup—Connect the wires to the appropriate screws on the rear terminal board. See Figures 2, 3, 4, and 5. For maximum safety, connect the instrument ground (terminal marked GND) separately and directly to a good earth ground.

Sensor Leadwires (Thermocouple and RTD)—Special precautions should be taken to see that sensor leadwires and motor slidewire feedback leadwires do not closely parallel line voltage wiring. DO NOT RUN THE SENSOR LEADWIRES OR MOTOR SLIDEWIRE FEEDBACK LEADWIRES WITH THE LINE WIRING IN THE SAME CONDUIT.

Thermocouple leadwire has a definite polarity, one wire is negative and the other is positive. ***Thermocouple leadwire supplied by Honeywell is always identified for polarity by red insulation on the negative (–) wire.*** Be sure the proper thermocouple extension wire is used for the right type of thermocouple and instrument calibration, and that the polarity of wire is properly identified.

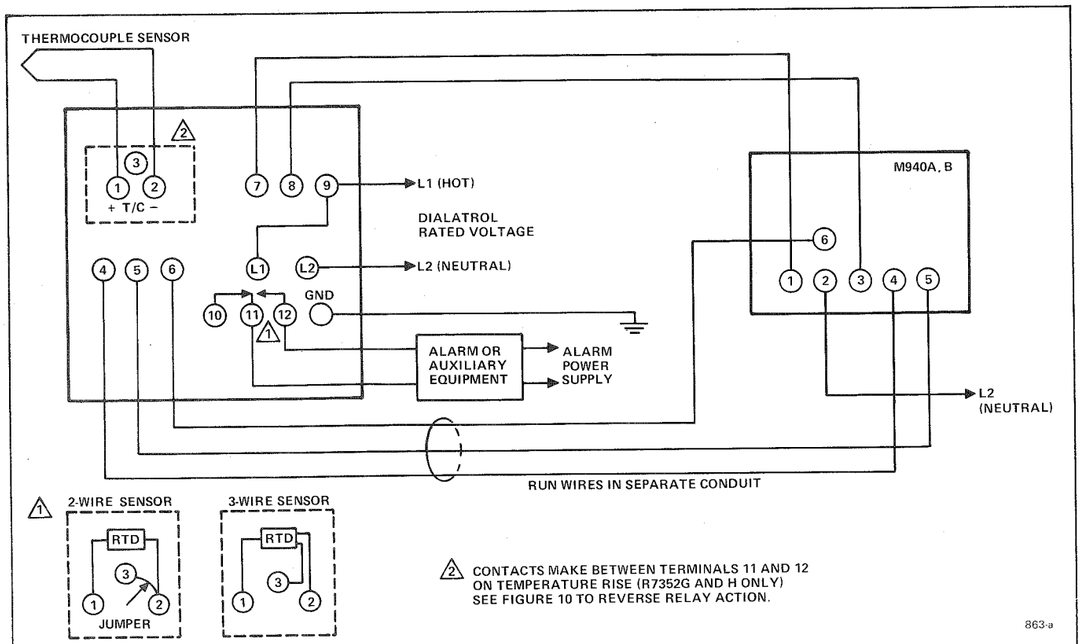


Figure 2—External Wiring Diagram with M940A or B Actionator Motor.

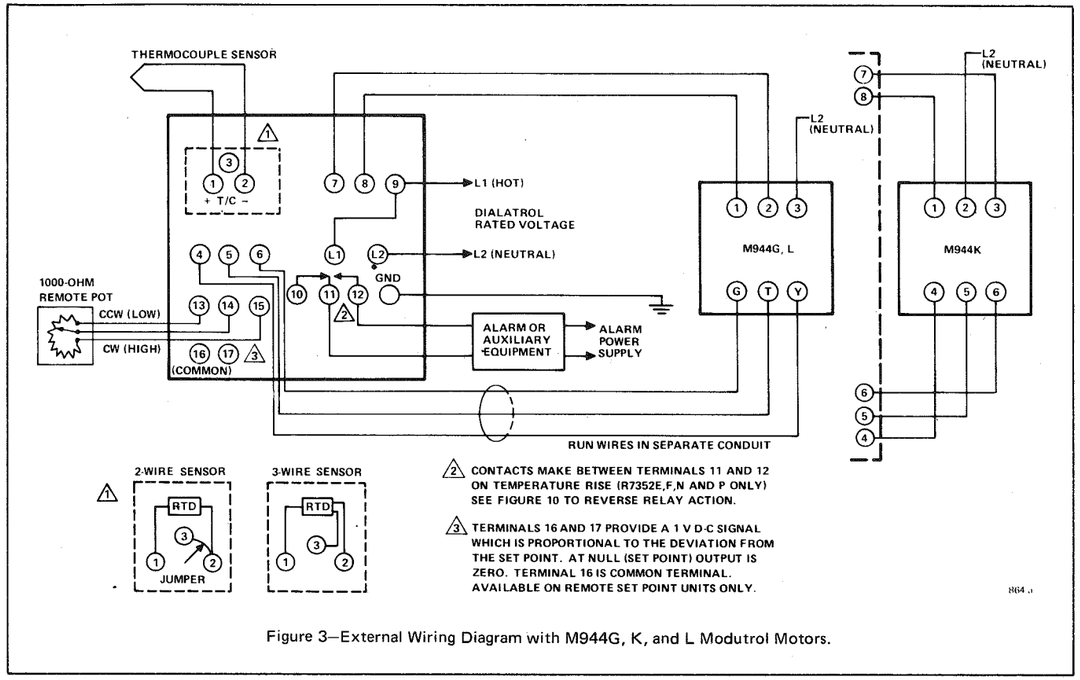


Figure 3—External Wiring Diagram with M944G, K, and L Modutrol Motors.

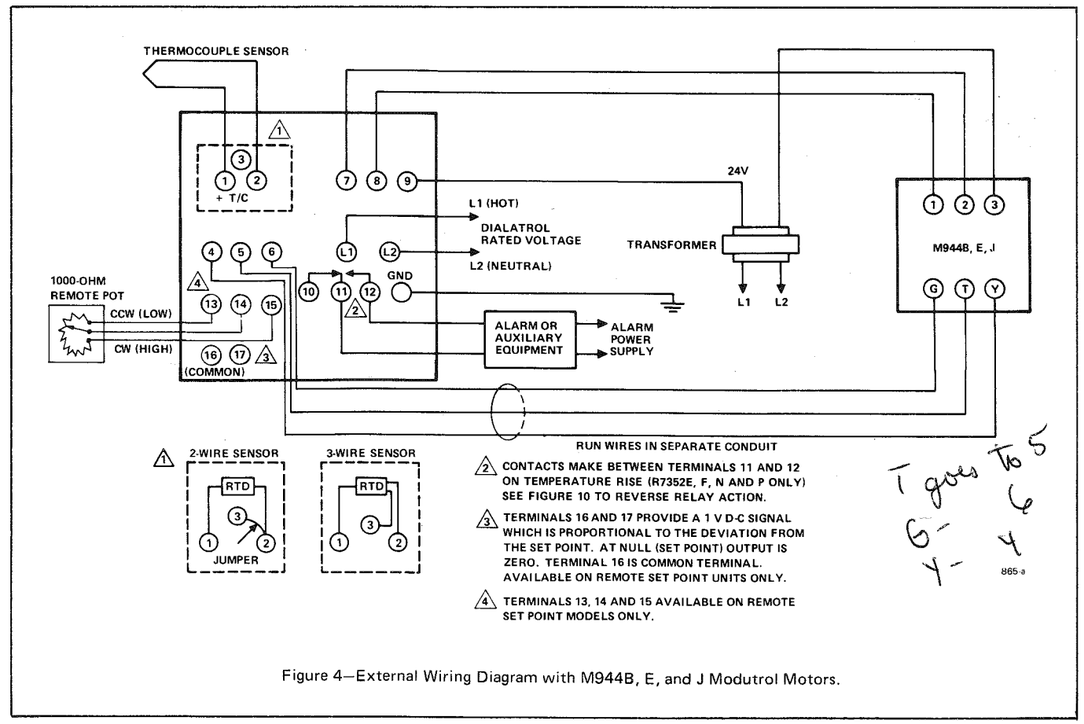


Figure 4—External Wiring Diagram with M944B, E, and J Modutrol Motors.

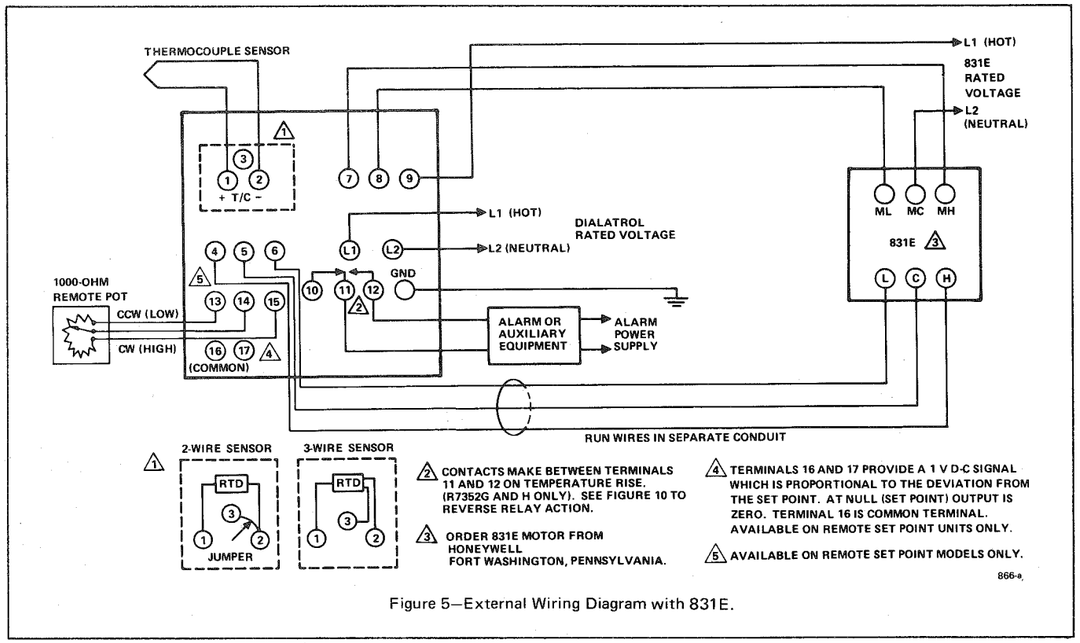


Figure 5—External Wiring Diagram with 831E.

- RTD Models—2-Wire Sensor: Connect sensor leads to terminals 1 and 2. Jumper terminal 3 to terminal 2.

NOTE: *Model R7352J, K, Q and R DialaTrol controllers are shipped with a 1000-ohm resistor across terminals 13 and 15. This resistor must be removed when a remote set point (programmer or manual) is used. When a remote set point is not electrically connected, or when the remote set point is a millivolt signal, the 1000-ohm resistor must be left in place. See Figure 3 for hookup.*

3-Wire Sensor: Connect single lead end of sensor to terminal 1. Connect one of dual leads of sensor to terminals 2 and 3, respectively.

4. Slidewire (feedback potentiometer) with resistance greater than 135 ohms.
   Slidewire resistance may be as high as 1,000 ohms, provided it is shunted so that the equivalent resistance is 135 ohms. For example, a 1,000-ohm slidewire would require approximately 150 ohms in parallel. Connect the shunt resistor across terminals 4 and 6 on the rear terminal board of the R7352.

START UP PROCEDURE

NOTE: *The factory ships the R7352 completely calibrated for the range and sensor specified.* **CAUTION:** *Do not attempt to adjust any adjustable potentiometers except according to instructions.*

If the device is to be used with a motor which has a timing of 15 seconds or less, then a jumper must be moved from NDZ to WDZ. This jumper is located on the output board (see Figure 6 for location).

The only other adjustments that should be necessary on an initial start up are the potentiometer adjustments on the side of the chassis (see Figure 8). In order to gain access to these adjustments, turn the case lock screw to free the chassis from the case, and slide the chassis out approximately three and one-half inches. The chassis connector plug, connecting the chassis to the rear wiring terminals, slides on two rods attached to the back of the case. By pulling the chassis out until resistance from the connector cable is felt, access to the potentiometer adjustments is possible without interrupting power to the unit.

ADJUSTMENTS FOR STRAIGHT LINE TEMPERATURE CONTROL

The following guideline explains the function of each adjustment, and the effect it has on the process. It is provided to insure that you are getting the most out of your temperature controller.

See Figure 7 for graphic representation of meter indication pointer.

PROPORTIONAL BAND ADJUSTMENT (PROP BAND)—
TURNING PROP BAND TO OFF makes the controller an on-off controller.
INCREASING the prop band reduces instability (slow temperature oscillations).
INCREASING the prop band reduces temperature overshoot on start up.

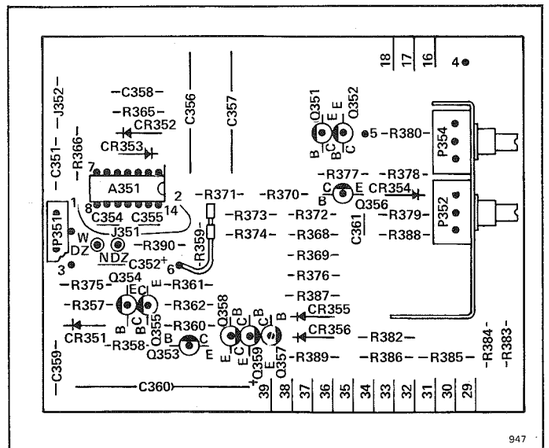


Figure 6—View of Output Board.

DECREASING the prop band increases the ability of the controller to respond to load temperature changes.

FOR OPTIMUM CONTROL, the prop band should be decreased until just before the point where the control becomes unstable. The exception to this general rule is that if overshoot is a problem, it may be desirable to increase the prop band.

MANUAL RESET—

Once the controller is tuned for stable control, the deviation meter may indicate a constant above or below null condition. A deviation of this type is called offset or droop.

TURNING THE MANUAL RESET to + will eliminate a below null offset.

TURNING THE MANUAL RESET to — will eliminate an above null offset.

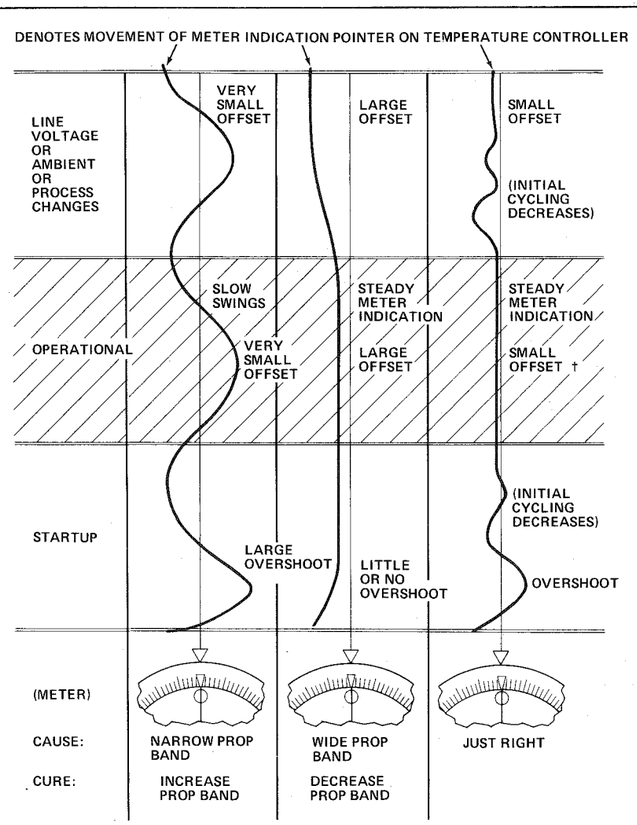


Figure 7—Graphic Representation of Meter Indication.

ADJUSTMENT PROCEDURE

1. Energize power to the controller.

2. Adjust set point for the desired control point with the large circular dial on the front of the device. Rotate dial until set point temperature desired is aligned with black mark in red triangle.

3. Set the manual reset potentiometer to midposition (see Figure 8).

4. Adjust the proportional band potentiometer to the minimum position.

5. Put entire system into operation.

6. On start up with the sensor ambient below set point, relay K2 pulls in (green light on). When the temperature reaches the proportioning band limit, K2 drops out, and as the temperature continues to increase, K1 (red light on) will pull in to reverse direction. As the temperature decreases, K1 will drop out and K2 will pull in.

7. Start widening the proportioning band by increasing the setting gradually. Cycling can be observed with the meter pointer. Continue to widen the proportioning band until a setting is reached which just eliminates the cycling (stable meter pointer, not necessarily at set point). ***Be sure to give the system enough time to stabilize and react to the new proportional band setting.*** For slow responding processes, this may mean one or two hours between adjustments.

8. If the system is now stable but slightly off set point, adjust the manual reset potentiometer to bring the system to the desired control point. Increase the manual reset setting if temperature is below set point, decrease if the system is above set point.

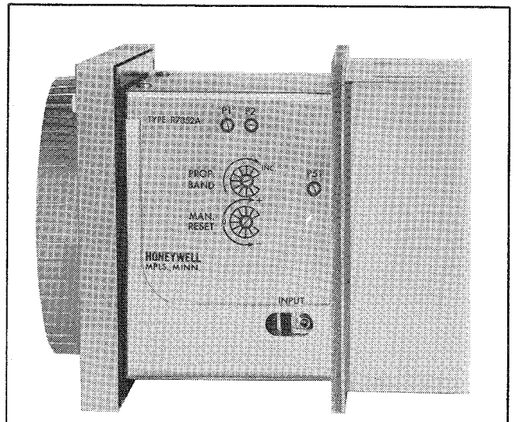


Figure 8—Adjustable Potentiometer Location.

9. Adjust the alarm (R7352G and H).
The R7352G and H are shipped with the alarm connected so that the relay pulls in (Normally Open contacts close) when the temperature increases to the alarm setpoint. The alarm is adjustable to ± 10% of span (see Figure 9).

Alarm action can be reversed so that the relay drops out when the temperature increases to the alarm setpoint. See Figure 11 to identify the alarm board, and Figure 10 to locate pins B and D for reverse alarm action. No soldering is necessary.

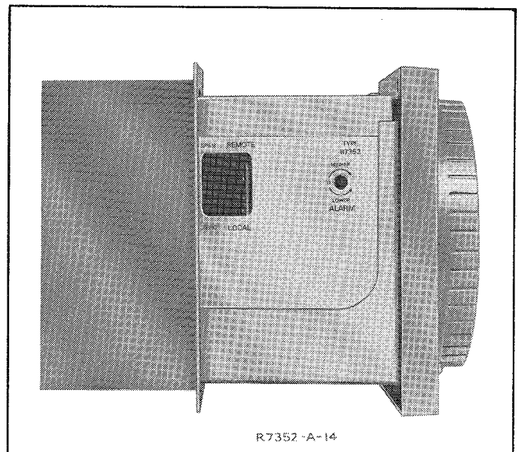


Figure 9—Alarm Adjustment (R7352G,H,Q and R). Local/Remote Switch location for R7352J, K, Q and R.

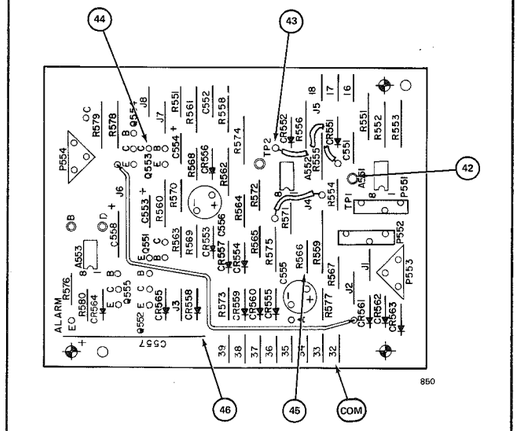


Figure 10—Alarm Board Components (R7352G, H, Q and R).

CALIBRATION (Non-Programmable Models)

R7352A AND G (THERMOCOUPLE INPUT)

NOTE: ***This procedure also applies to programmed units in the local set point position.***

Equipment Needed—

1. Millivolt potentiometer.
2. Test cable to input jack (Part Number 117053), or leads to rear thermocouple input terminals.
3. Table of millivolt equivalents (see Honeywell 892-1, 892-2 for IPTS 68 or other as available).
4. Small screwdriver.
5. Thermometer.

PROCEDURE—

1. Determine ambient temperature at the thermocouple input terminals on the rear terminal board after the device has warmed up (power on for at least 15 minutes). Using a table of millivolt equivalents, find the millivolt equivalent of the ambient temperature.
2. Zero Calibration—Connect millivolt source to test jack with 117053 test cable (red lug on cable to negative terminal of MV source) or directly to rear thermocouple terminal (negative to negative). Adjust the set point to zero or the lowest number printed on the scale.
   From the table of MV equivalents, obtain the MV value for zero or the lowest number on the scale.
   Subtract the MV equivalent for the ambient temperature.
   Set the resulting MV value on the MV source, then adjust P2 so the meter needle points to the set point index.
   (Gently tap meter housing to overcome friction for the most accurate reading.)
3. Span Calibration— Adjust the set point to the highest number printed on scale. From the table of MV equivalents, obtain the MV value for the highest number printed on scale. Subtract the MV equivalent for the ambient temperature, then set the resulting millivoltage on the MV source. Adjust P1 until the meter needle points to the set point (tap meter housing).
4. Meter Calibration—With the scale at the clockwise set point, as in step 3, apply a MV input to null the meter. Adjust the scale clockwise approximately 90 angular degrees. The meter should still point to the same point on the scale. If not, adjust P51.
5. Recheck all preceding steps in the same order.

CALCULATION OF CALIBRATION

MILLIVOLTAGE

Example #1

For an ambient temperature of 80°F and a desired calibration point of 0°F, subtract the millivolt equivalent of 80°F from the millivolt equivalent of 0°F. For a Type J thermovouple.

0°F = –0.885 MV 80°F = 1.363 MV

–0.885 – (1.363)= –2.248 MV (set on MV source)

Example #2

For an ambient temperature of 80°F and a desired calibration point of 1000°F with a Type J thermocouple:

1000°F = 29.515 MV 80°F = 1.363 MV

29.515 – (1.363) = 28.152 MV (set on MV source)

R7352B AND H (RESISTANCE BULB INPUT)

Equipment Needed—

1. Precision five-place decade resistance box for values from 0 to 500 ohms.
2. Small screwdriver.
3. Test cable to input jack (Part Number 117053), or leads to the rear sensor input terminals.

PROCEDURE

Tap the knurled set point ring gently to overcome meter bearing friction before taking meter readings.

1. Zero Calibration—Connect the precision five-place decade resistance to the jack with the test cable (Part Number 117053), or directly to terminals 1 and 2 on the rear terminal board. In either case, short terminal 2 to terminal 3. Turn the set point scale to zero, or the low end of the scale. Set the decade resistance box to the equivalent value obtained from Table 1. Adjust potentiometer P2 (see Figure 4) so the meter reads at the index line. (Gently tap the knurled set point ring to insure a true meter reading.)
2. Span Calibration—Turn the scale to a set point reading full scale. Set the decade resistance box to the equivalent value obtained from Table 1. Adjust potentiometer P1 so the meter reads at the index line. (Gently tap the knurled set point ring when making the adjustment to insure a true meter reading.)
3. Meter Calibration—With the scale at the counter-clockwise set point as in step 2, apply a MV input to null the meter. Adjust the scale clockwise approximately 90 angular degrees. The meter should still point to the same point on the scale. If not, adjust P51.
4. Recheck Steps 1 through 3, in the same order.

CALIBRATION (Programmed Controllers)

NOTE: ***This procedure applies only to programmed units in the remote set point position.***

The controller is factory calibrated for a remote 1000-ohm potentiometer. However, if any of the following conditions exist, recalibration is necessary.

1. The remote potentiometer tolerance is greater than ±2%.
2. The remote potentiometer end resistance is greater than 2 ohms.

3. The leadwire resistance between the remote potentiometer and the controller, added to the potentiometer end resistance, is greater than 2 ohms.

Recalibration should be performed with the potentiometer and leads installed and connected. When this cannot be done, the installation may be simulated.

R7352J AND Q (THERMOCOUPLE MODELS)

Equipment Needed

1. Millivolt potentiometer.
2. Test cable to input jack (Part Number 117053), or leads to the rear thermocouple input terminals.
3. Table of millivolt equivalents.
4. Small screwdriver.
5. Thermometer.

PROCEDURE

1. Calibrate the controller for local set point operation, (see page 7).
2. Using a table of millivolt equivalents, determine the millivolt value for calibrating the low end of the scale (see page 7).
3. Connect the millivolt source to the test jack, or directly to the thermocouple terminals on the back of the unit.
4. Set the LOCAL/REMOTE switch to REMOTE, and adjust the ZERO adjustment screw (next to the LOCAL/REMOTE switch) for meter null.
5. Set the remote set point at the high end of the scale.
6. Apply the equivalent high-end input to the controller.
7. Adjust the SPAN adjustment screw (next to the LOCAL/REMOTE switch) until the meter nulls.
8. Because of interaction, repeat Steps 4 through 7.

R7352K AND R (RESISTANCE BULB MODELS)

Equipment Needed

1. Precision five-place decade resistance box for values from 0 to 500 ohms.
2. Small screwdriver.
3. Test cable to input jack (Part Number 117053), or leads to the rear sensor input terminals.

TABLE 1
RESISTANCE-TEMPERATURE EQUIVALENTS
(100-OHM PLATINUM SENSOR)

Temperature	Ohms (°F)	Ohms (°C)
–200	47.63	–
–125	64.86	49.17
–100	70.51	59.62
0	92.90	100.00
100	114.93	139.15
200	136.57	177.06
300	157.84	213.74
375	173.54	240.46
400	178.72	249.19
500	199.22	283.41
600	219.34	316.39
700	239.08	–
800	258.44	–
900	277.41	–
1000	296.01	–
1100	314.23	–
1200	332.06	–

PROCEDURE

1. Connect the precision five-place decade resistance box to the jack with the test cable (Part Number 117053), or directly to terminals 1 and 2 on the rear terminal board. Short terminal 2 to terminal 3, and calibrate controller for local set point operation.
2. Set the remote set point at the low end of the scale.
3. Set the LOCAL/REMOTE switch to REMOTE.
4. Set the decade resistance box the equivalent value obtained from Table 1, and adjust ZERO adjustment screw (next to the LOCAL/REMOTE switch) for meter null.
5. Set the remote set point at the high end of the scale.
6. Set the decade box resistance to the equivalent value for the high end of the scale (see Table 1 for resistance value) and adjust the SPAN adjustment screw (next to LOCAL/REMOTE switch) until the meter nulls.
7. Because of interaction, repeat Steps 2 through 6.

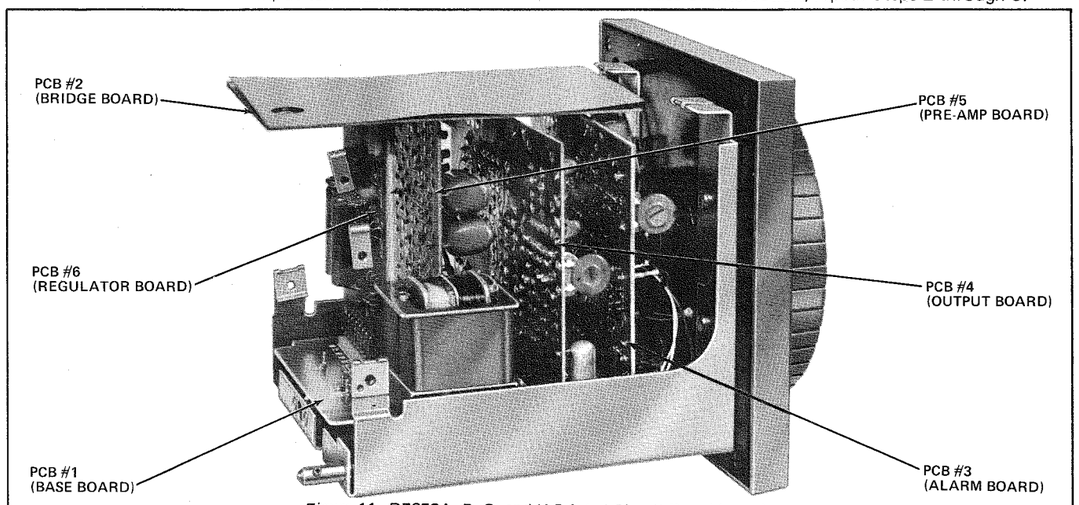


Figure 11—R7352A, B, G, and H Printed Circuit Board Locations.

TROUBLESHOOTING CHART

SYMPTOM	PROBABLE CAUSE
Meter upscale (upscale burnout models). †	Open thermocouple input—check by inserting millivolt signal in input jack. Use test cable Part No. 117053.
Meter upscale (upscale burnout models) (RTD or thermocouple).	Open input jack, circuit connector, printed circuit board path.
Meter upscale (RTD models).	Open sensor circuit—check by connecting resistance to input jack. Use test cable Part No. 117053.
Meter upscale (thermocouple models).	Open compensator on rear terminal board.
Meter upscale.	Controlled temperature too high due to defective load wiring; relay contacts welded; defective output circuit board.
Meter upscale.	Defective bridge or preamplifier circuit board.
Meter downscale (downscale burnout models). †	Open thermocouple circuit—check by inserting millivolt signal in input jack. Use test cable Part No. 117053.
Meter downscale (downscale burnout models). †	Open input jack, circuit connector, printed circuit board path.
Meter downscale.	Controlled temperature too low; open load circuit (check fuses, heater, wiring, and line supply); defective relay; defective output circuit card.
Meter downscale.	Defective bridge or preamplifier circuit board.
Meter downscale.	Shorted input circuit (sensor, sensor leads). This would result in the controlled temperature being too high.
Meter at or near zero at all times (models without burnout). †	Open input circuit—check by inserting a millivolt signal in input jack. Use test cable Part No. 117053.
Meter at or near zero at all times (models without burnout). †	Open input jack, connector, printed circuit board path.
Meter at or near zero at all times.	Meter or connections to meter open. This would not result in loss of control. NOTE: If meter kicks when power is applied, the meter connections are not open.
Meter at or near zero at all times.	Sticky meter, or no power to controller.
Meter at or near zero at all times.	Open input jack, circuit connector, printed circuit board path.
Meter at or near zero at all times.	Defective regulator or preamplifier circuit board.
Meter at or near zero at all times.	Open set point potentiometer wiper.
Meter oscillates.	Defective preamplifier or regulator board. NOTE: A slight oscillation may be expected on narrow span units.
Control point drifts.	Meter indicates null or near null, and control action appears to be normal, but controlled temperature still drifts. This would indicate trouble in the sensor, bridge, or preamplifier boards.
Control point drifts.	Meter indicates higher or lower than the set point. If the manual reset will not return the meter to the set point after allowing the system to stabilize, replace or check the output card, relays, motor, or load. **NOTE:** ***Another area to closely check is proper wiring between the motor and the R7352.***

† Thermocouple or millivolt models only.

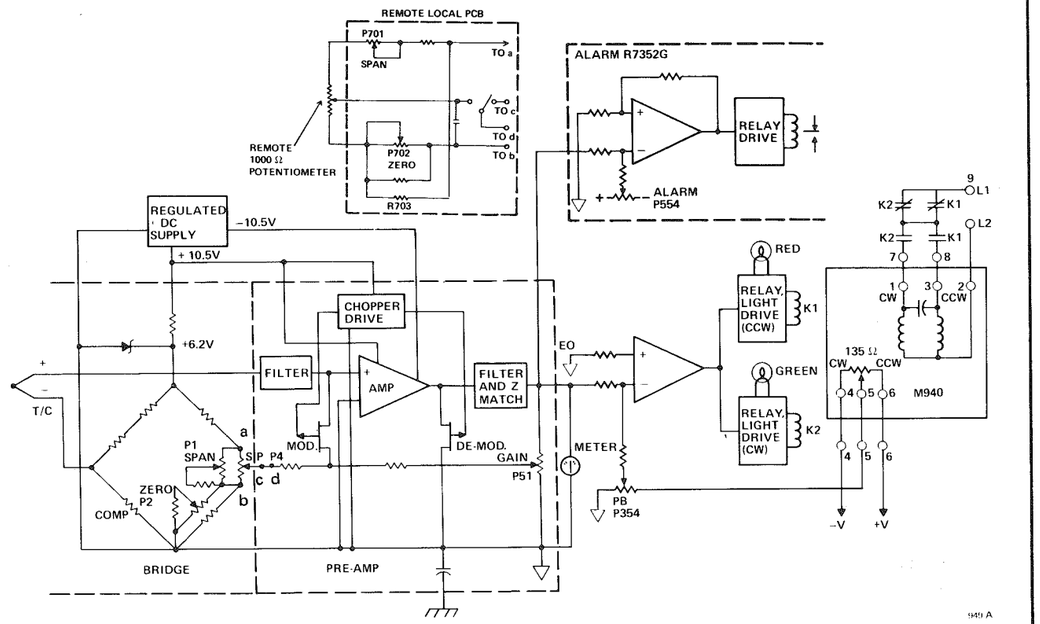


Figure 12 — Block Diagram for R7352A, J, G & Q.

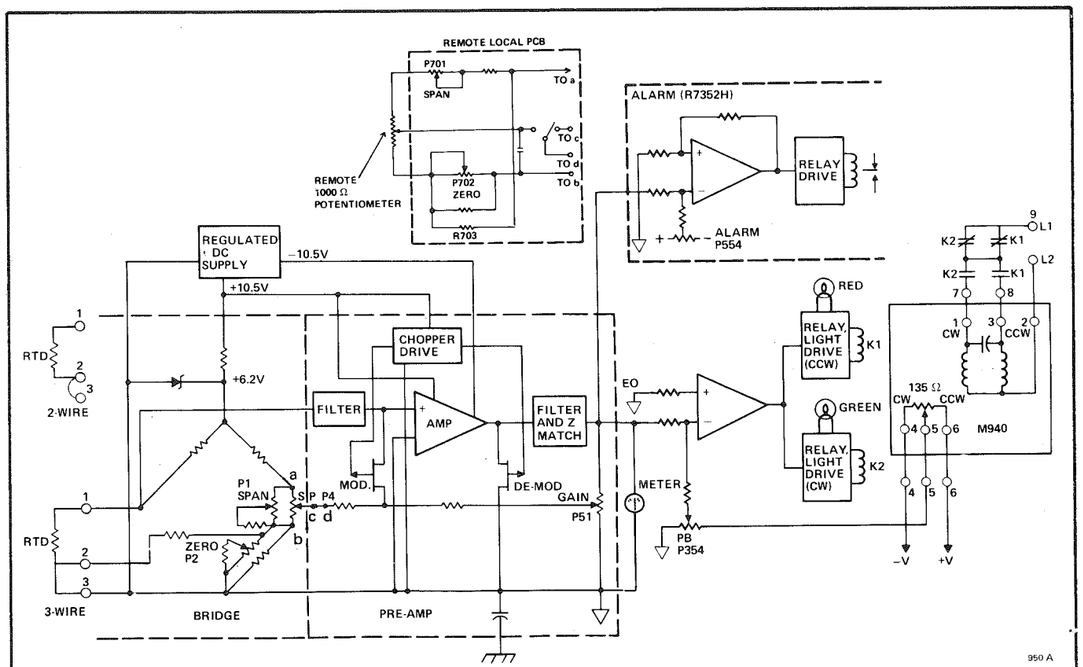


Figure 13 — Block Diagram, R7352B, K, H & R.

RECOMMENDED SPARE REPLACEMENT PARTS

The following parts have been selected as those most likely to be needed to support repair and maintenance of the R7352. It is recommended that these parts be ordered and maintained in your maintenance stock.

Any part listed below may be ordered.

Description	Part Number	Recommended Quantity †
Regulator Board	134199A	1
Preamplifier Board Assembly	134196A	1
Output Board Assembly	135582A	1
Alarm Board Assembly	137537C	1
Relay Board Assembly	135576A	1
Bridge Board Assembly	134193 ††	As needed
Scaleplate	134418 ††	As needed
Output Relay	134396	2
Alarm Relay	135481	1
Test Cable	117053	1
Test Jack (old style— white case)	135209	1
Test Jack (new style— black case)	137093	1
Front Potentiometer and Meter Assembly	134427AA	1
Light	134326A	5
n Light	134326A	5
Power Light	134327A	5
Compensator	135148	2
Options		
Bezel to fit over R7161 cutout	137771	As needed
Bezel to fit over Class 10 cutout	138480	As needed
Solid State Relay, in place of Mechanical Relay	138297	As needed
Test Cable (Input)	117053	1

† For each multiple of 10 or less devices.
†† Letter suffix is dependent on range. Refer to Service and Repair Manual, Form 72-4015, for part numbers and ranges not shown in this list, or contact a Honeywell representative.

ORDERING INFORMATION

SPECIFY—

1. Model number.
2. Voltage and frequency.
3. Range and sensor. †
4. Optional junction box Part No. 135628AA for panel installations, or Part No. 137108A for surface mounting.

ORDER FROM—

1. Local Honeywell branch office, distributor, or
2. **Honeywell**
   1885 Douglas Drive North
   Minneapolis, Minnesota 55422
   (In Canada,— Honeywell Limited
   740 Ellesmere Road
   Scarborough, Ontario M1P 2V9)

International Sales and Service Offices in all principal cities of the world.

† Order thermocouple from local Honeywell branch offices, or

Honeywell
1100 Virginia Drive
Fort Washington, Pennsylvania 19034.

DEVICE REPAIR

For devices in need of repair, contact your local Honeywell Serviceman or return to—

Honeywell
Return Goods Department
Columbia Heights Plant
550 39th Ave. N.E.
Minneapolis, Minnesota 55421

SERVICE PROCEDURES

For complete calibration and repair information, see Service and Repair Manual, Form 72-4015. This manual may be purchased from the local Honeywell branch office, or write to:

Honeywell, MS 436
1100 Virginia Drive
Fort Washington, Pa. 19034

For emergency field repairs, printed circuit board replacement may be made with the aid of the included trouble-shooting chart and the block diagrams that are shown on pages 11 and 12.