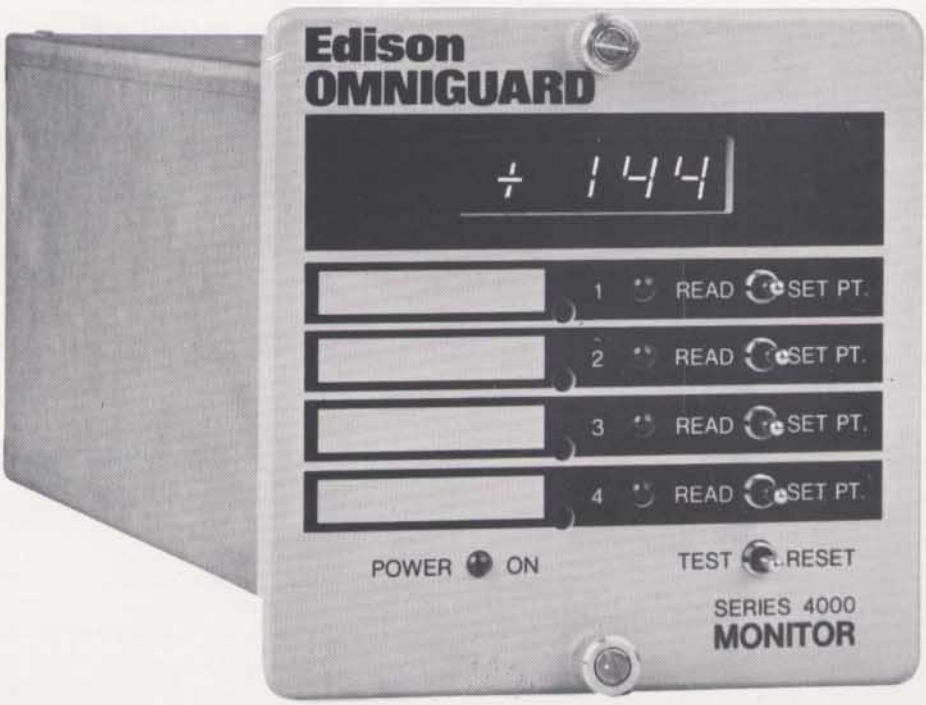
Omniguard

Temperature Monitors

OPERATING AND SERVICE MANUAL



OMNIGUARD® Series 4400

RTD Temperature Monitor

4-Channel, Digital Display

MEGGITT AEROSPACE

ARMTEC INDUSTRIES INC

FEATURES

Quality protection provided by—
- **Four channels** of continuous coverage
- **Shutdown inhibit** on sensor failure

Reliability provided by—
- **Fault latch locked** until problem cleared
- Complete electronic **self-test**
- Quality workmanship backed by a **two year warranty**

Ease of operation provided by—
- Set points **read** and **adjusted** from **front panel**
- Diagnostics with **digital display**

System flexibility provided by—
- RTD inputs - **platinum, nickel, copper**
- Field options using **plug-in modules**
- One display serving **many monitors**

OPTIONS

- 4-20 mA add on option
- Hysteresis Control
- NEMA 4 cabinet to mount six units
- Harsh environment protection

SPECIFICATIONS

Electrical

Operating Voltages Available
115/230 VAC ±10% @ 50/60 Hz or
24/28 VDC

Power Drain (Typ.)
Alarm ..... 6 Watts
Standby ..... 3 Watts

Operating Ranges (Set Point Range)
T/R #7 (Nickel) ..... −80°C to +320°C
T/R #15 (Copper) ..... −50°C to +240°C
T/R #8 or 11 (Platinum) ..... −80°C to +320°C

Set Point Specifications
Resolution ..... 0.2% of range
Environmental (Temp. −20°C to +65°C) ..... ±0.5%

RTD Temperature to Output Signal Conversion Accuracy
Platinum & Copper ..... ±0.15%
Nickel ..... ±0.5%
Ambient Temp. Sensitivity (−20°C to +65°C) ..... ±0.5%

Relay Contact Rating (4 output relays, 1 trouble/test relay)
28 VDC, resistive, 5 amp; inductive, 1.5 amp
120 VAC, resistive, 5 amp; inductive, 1.5 amp

Mechanical

Dimensions (maximum)
5.0" x 5.0" x 12.5" w/o 4-20 mA
Weight
5 lbs. max. (2.3 kg)
Tilt angle (max.)
±90 degrees about horizontal

Environmental

Operating Temperature Range
−20°C to +65°C (−4°F to +149°F)

Digital Indicator

Accuracy
±.05% RDG (±1 count)
Temperature Coefficient
50 ppm/°C max.

Specifications subject to change without notice.

Contents

I. INTRODUCTION

MONITOR DESCRIPTION

The OMNIGUARD Series 4400 Temperature Monitor (Figure 1-1) is a compact, solid-state supervisory control unit incorporating state-of-the-art components and circuitry. The monitor provides simultaneous, continuous surveillance of up to four 2- or 3-wire nickel, platinum or copper resistance temperature detectors (RTDs). The latter may be installed in locations remote from the supervisory station (e.g., at critical points inside operating machinery, in inaccessible or hostile environments, etc.). When preset temperature limits are exceeded, the monitor actuates an alarm circuit and, if desired, shuts down the process or equipment under surveillance.

Figure 1-1. Series 4400 Temperature Monitor

The Series 4400 provides a unique combination of operating features, including:

- Front-panel set point adjustment
- Digital front panel display of individual set points on demand
- Digital front panel temperature indication for each channel on demand
- Individual channel linearization
- Test function, with automatic inhibit of shutdown relays
- Integral, electromechanical relays
- Activation on either rising or falling temperatures
- Monitors may be interconnected to use a single display of temperatures and set points

In standard models, temperature set points are established by the operator for each channel in use. When the set point is exceeded on any channel, the appropriate shutdown lamp and relay are actuated. The actual temperature at the RTD can be displayed on the monitor panel digital indicator by actuating the appropriate channel READ/SET POINT switch.

All temperature set points are established and adjusted from the monitor's front panel. A built-in digital indicator allows quick, convenient setting and checking of shutdown set point values. Meter accuracy is .05 percent of reading (±1 count). In multimonitor systems, the master monitor indicator is used to display the set point levels and instantaneous temperature of any channel within the supervisory system. Depending upon the type of RTDs used, the system can monitor temperatures from −80°C to 760°C (−112°F to 1400°F).

The monitor is designed for easy mounting in a cabinet, rack or control panel. Two or more monitors may be connected in parallel.

Each monitor has its own built-in test circuit, activated by a front panel switch, enabling the operator to check the entire system.

A failsafe feature is a standard option which assures shutdown of external devices in the event of power failure to the monitor. This prevents the operation of unmonitored equipment.

II. THEORY OF OPERATION

The OMNIGUARD SERIES 4400 Supervisory System uses resistance temperature detectors (RTDs) for sensing temperatures of the devices they are to monitor.

With reference to the block diagram, Figure 2-1, a voltage is developed across the RTD by a current "I" from the bridge. A small voltage is also developed across the line resistance of the external wiring used to connect the RTD to the monitor. An equal current "I" is forced out through the ground return of the RTD by causing "2I" to flow into the "LO" terminal. This causes a compensating drop in the RTD ground return line which cancels the error voltage developed in the "HI" line resistance when used with a three-wire RTD.

The bridge and amplifier resistances are chosen to correct for the non-linearity of the particular RTD type. The output of the amplifier is a linearized voltage proportional to the temperature of the RTD.

The output of the RTD bridge amplifier is fed to three comparators - open RTD, shorted RTD, and shutdown. This signal can also be fed through the READ/SETPOINT switches to the digital display. The shutdown comparator setpoints are set by front panel potentiometers and can be read on the digital display by selecting the desired channel with the READ/SETPOINT switch. The voltage set by the front panel potentiometers is fed through the READ switches to the digital display.

Whenever the RTD bridge amplifier output voltage exceeds a comparator reference voltage, that comparator output changes state. In the case of the open RTD comparator, this will set the fault latch and light the front panel LED. The output of the fault latch is capacitively coupled to a 4-input OR gate and sets the trouble relay latch which in turn drives the trouble relay. The operator can acknowledge the alarm and silence any external alarm device connected to the trouble relay contacts by depressing the RESET switch. The trouble relay latch will be reset and will turn off the trouble relay. The input to the trouble relay

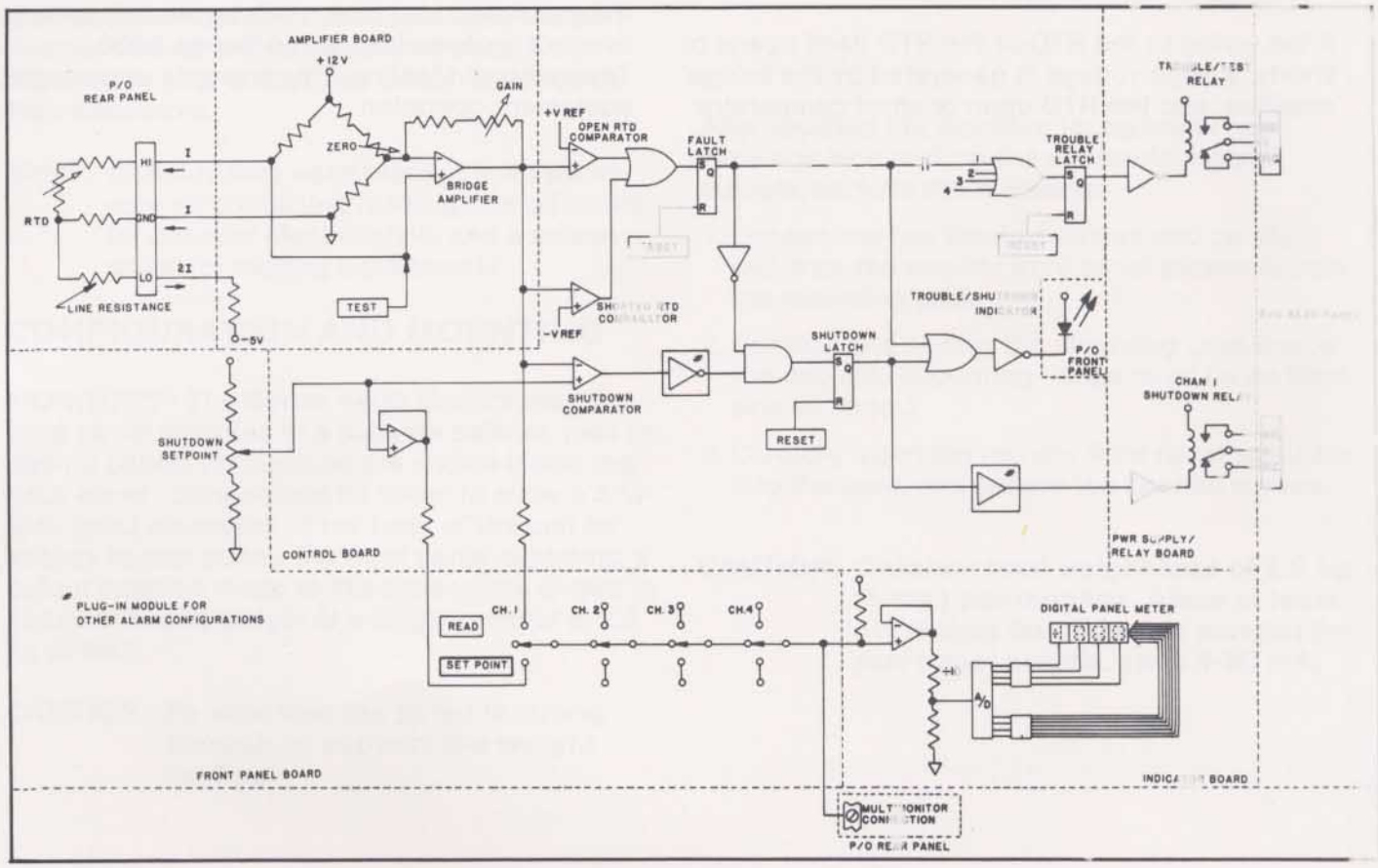


Figure 2-1. Series 4400 Block Diagram

being capacitively coupled is now free to respond to a trouble signal from another channel should it occur. However, the reset signal will not reset the fault latch or turn off the front panel LED unless the fault condition has gone away. When the RTD temperature sensor returns to a safe condition, the comparator outputs will return to normal and allow the latches to be reset by the front panel RESET switch. If the latches are programmed to be non-latching, they will reset automatically once the fault condition is removed.

If the RTD temperature of any channel goes beyond the chosen set point (adjustable at the front panel) the shutdown comparator will change state setting the shutdown latch. This lights the appropriate front panel LED and operates the shutdown relay. The external device is shut down (or turned on) through normally closed or normally open contacts on the relay. The shutdown latch maintains the shutdown condition until the RTD temperature returns to safe limits and is acknowledged by depressing the RESET switch. If the non-latching option is selected, the shutdown condition will reset automatically.

If the wiring to the RTD or the RTD itself opens or shorts, a large voltage is generated by the bridge amplifier, and the RTD open or short comparator will change state. This will set the fault latch, inhibit the shutdown relay and actuate the trouble relay. The appropriate front panel LED will light. Reading the affected channel RTD temperature will give an indication of the type of fault. A shorted RTD display will display a temperature less than -100 degrees. If the RTD is open, the display will be blanked when the affected channel is displayed.

When the TEST switch is pushed, a simulated out-of-limit voltage is impressed on the RTD bridge amplifier input. The voltage is large enough to trigger the open or short RTD comparator (units that alarm on falling temperature will activate the shorted RTD comparator). This will light the front panel LEDs and activate the trouble alarm. The fault latch automatically inhibits the shutdown relays so that external devices are unaffected during test. If the test is made using an out of tolerance temperature condition at the RTD, means must be provided to inhibit external devices.

For those systems employing 'failsafe' protection, the monitored equipment will be shut down in the event of a power loss to the Series 4400 Temperature Monitor. This prevents unprotected equipment operation.

III. INSTALLATION

PREPARATION FOR USE

The Series 4400 4-Channel Monitor can be installed by the user with common tools and equipment. After simple pre-operative set-up procedure (see page 11), the system is ready for continuous, reliable operation.

UNPACKING - Prior to unpacking the monitor and related equipment, visually check all cartons for external damage from handling or water. Check all part numbers on the outside of each carton against the part numbers listed on the packing slip. Any discrepancies should be reported to the carrier, or to your authorized Edison Electronics Representative.

INSPECTION - Carefully open all containers and visually inspect all components for obvious physical damage. Again check all part numbers against both the packing slip and the part number coding on the back cover of this manual. The part number coding provides complete information relative to RTD types and ranges for each channel, input power and operating features which are unique to your system installation. Any discrepancies between your order and the part number coding on the equipment should be reported to your authorized Edison Electronics Representative.

Note: Included with each monitor is an accessory kit containing fuses, gummed labels for channel identification, and a screwdriver for making adjustments.

CONFIGURATION AND MOUNTING

MONITORS - The Series 4400 Monitor may be front panel mounted in a suitable cabinet, rack or control panel. Dimensions are shown inside the back cover. Care should be taken to allow a 3 ¼-inch (min.) clearance at the back of the unit for access to rear panel. For front panel mounting, a cutout must be made to the dimensions shown in Figure 3-1. The weight of a single monitor is 2.3 kg (5 lbs.).

CAUTION: Be sure that the panel is strong enough to support the weight loading.

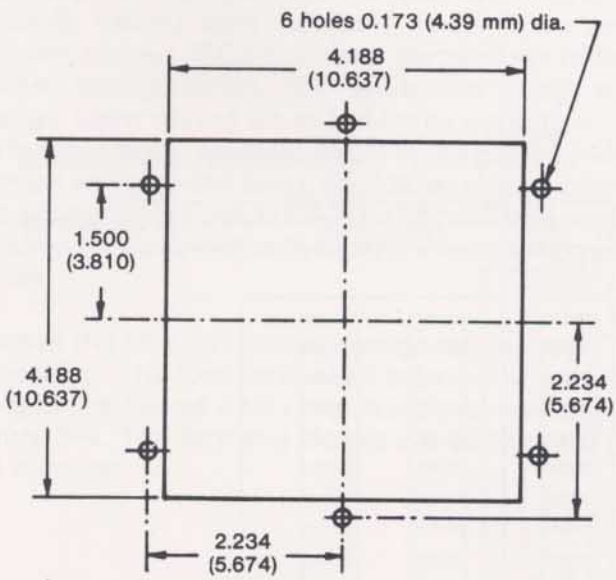


Figure 3-1. Panel Cutout Dimensions

After locating the monitors for optimum convenience, and making the appropriate panel cutouts, perform the following:

1. Loosen the two knurled screws and carefully withdraw the monitor front panel assembly from the mounting case.
2. Position and secure the mounting case inside the cabinet. (Mounting flange must be on front side of panel.)
3. Carefully insert the monitor front panel assembly into the case, and secure the knurled screws.

CAUTION: Consider total weight load of 2.3 kg (5 lbs.) per monitor. Allow at least 3¼ inches behind each monitor for rear panel access. (w/o 4-20 mA)

POWER WIRING

Check the monitor label for the input voltage and power requirements. The power wiring connections are shown in Figure 3-2.

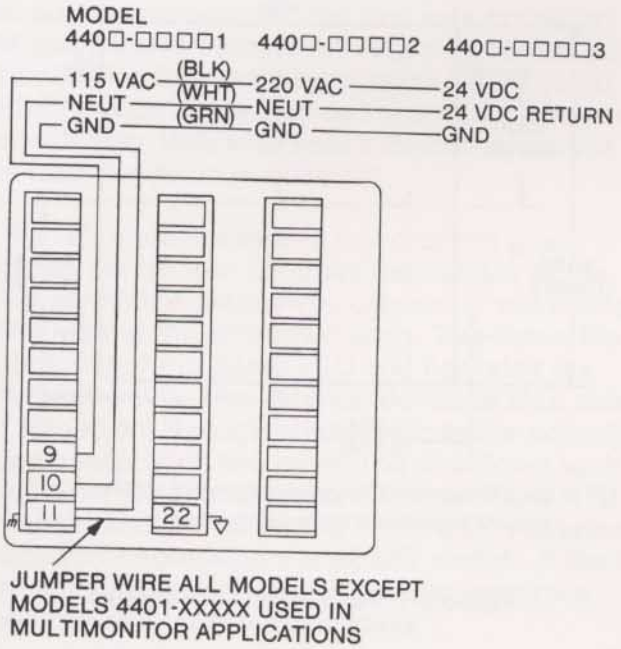


Figure 3-2. Power Wiring Diagram

RTD CONNECTIONS

Two-wire systems are less expensive to interconnect than three-wire systems, and should be adequate for the average industrial application when the distance between the RTD and associated instrumentation is not great.

An indication error of about 1.0°F for nickel wire detectors, 2.0°F for platinum, and 19.0°F for copper, will result from the addition of 0.4 ohms to the RTD circuit. Table 3-1 uses a T/R Characteristic No. 7 (120 ohm) RTD and gives recommended maximum lead wire distances for various wire gauges.

Three-wire systems are used where indication accuracy is critical, and/or the distance between the RTD and associated instrumentation is great.

While the three-wire system minimizes error to the point where it is negligible at the mid-point of the indicator range, it cannot eliminate error entirely, and the error factor increases slightly at the extreme ends of the range.

Table 3-1.
Maximum Separation (MON-RTD) for Two-Wire RTDs

Wire Gauge	Ohms/1000 Feet*	Maximum Recommended Lead Length in Feet	
12	1.58	500	
13	2.00	400	
14	2.62	315	maximum of 4.0°F indication error
15	3.18	250	
16	4.01	200	
17	5.06	160	
18	6.08	125	
19	8.05	100	
20	10.15	75	

*Resistance calculated at room temperature.

Table 3-2 shows the indication error with a −100°F to 600°F range. Distances are between RTD and instrument, and the wire used is 14 AWG copper.

Table 3-2. Indication Error on a Three-Wire RTD

MON-RTD SEPARATION	2000 feet	1000 feet
Low end of range at −100°F	4°F error	2°F error
Middle of range at 250°F	0°F error	0°F error
High end of range at 600°F	4°F error	2°F error

Install the RTD in accordance with the installation instructions provided by the manufacturer. Edison provides a full line of standard and special RTDs.

For location of the RTD connections, refer to Figure 3-3.

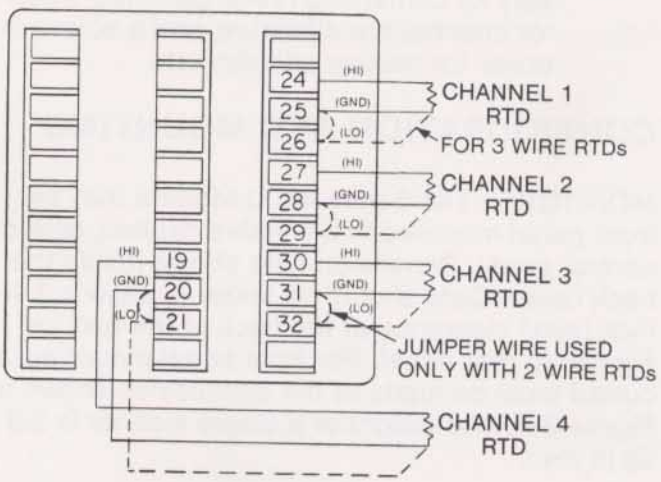


Figure 3-3. RTD Connections

Three wire RTDs are supplied with two leads of the same color and one of a different color. The two

leads of the same color are connected to the RTD LO and RTD GND pins for the desired channel. The third lead is connected to the RTD HI pin. Refer to Figure 3-3.

Example - If channel 1 is selected, the leads with the same color are connected to pins 26 and 25. The lead dissimilar in color is connected to pin 24.

Two-wire RTDs are supplied with two identical leads. These are connected to the RTD HI and RTD LO pins for the channel selected and a jumper must then be installed between the RTD LO and the RTD GND pins.

Example - If channel 1 is selected, one RTD lead is connected to pin 24, the other is connected to pin 25 and a jumper is installed between pins 25 and 26.

CAUTION: Be sure that the RTD temperature characteristic (T/R No.) is the same as that for which the monitor channel is calibrated.

All channels must have an RTD connected or a resistive load applied to the appropriate channel before operation of the system. Refer to the paragraph on Open Channel Loading for proper loading instructions.

CONNECTION OF EXTERNAL DEVICES

The connection of a monitored external device is determined by the desired mode of operation.

Each channel has a shutdown relay with transfer contacts having both normally open (N.O.) and normally closed (N.C.) contacts. Regardless of the system configuration, the shutdown relay will change state during an out-of-limits condition. In the failsafe mode, a power failure to the Series 4400 Monitor will give the same shutdown relay closure as an out-of-limits condition. The non-failsafe configuration gives no indication in the event of a power failure.

Consult the factory if other configurations are necessary. The locations of all external connections of the Series 4400 Monitor are shown in Figure 3-4. The terminal blocks are on the rear of the monitor.

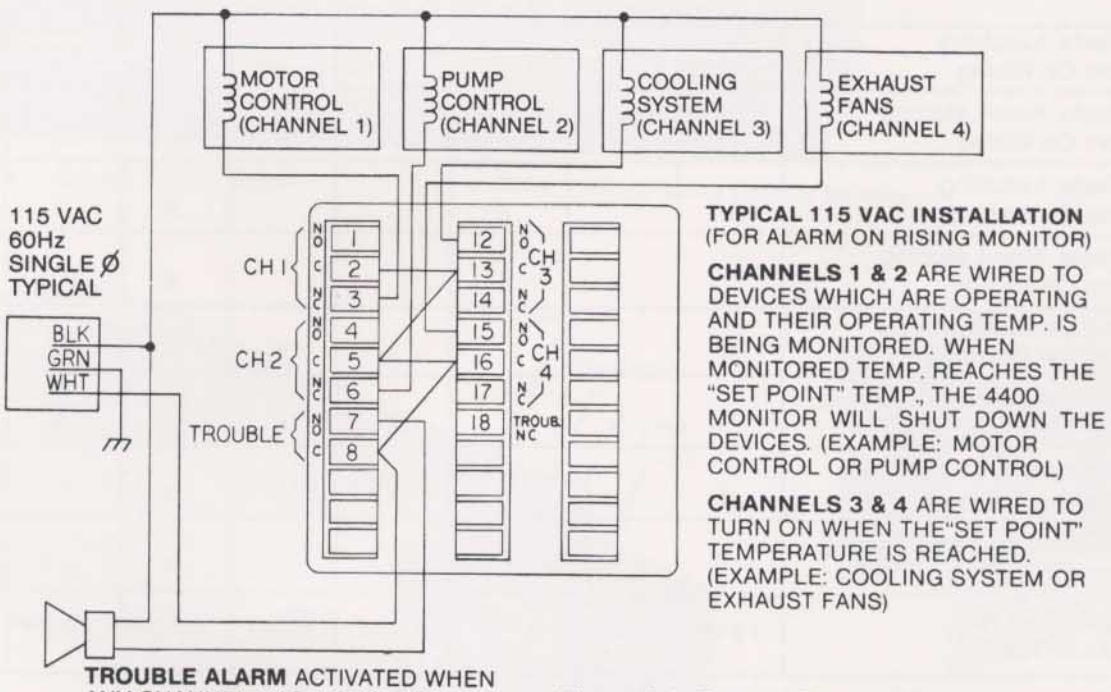


Figure 3-4. External Devices Wiring Diagram

Table 3-3. Subassembly Part Numbers

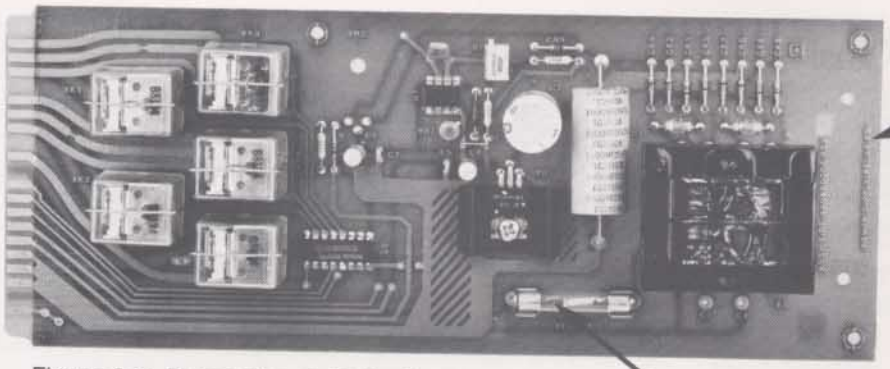
Control P.C. Board Assembly	440000004-01	(Figure 3-7)
Power Supply P. C. Board Assembly, 115 VAC	440000006-01	(Figure 3-5)
Power Supply P. C. Board Assembly, 230 VAC	440000006-02	(Figure 3-5)
Power Supply P. C. Board Assembly, 24/28 VDC	440000006-03	
Front Panel Assembly, °F	440000003-01	(Figure 3-8)
Front Panel Assembly, °C	440000003-02	(Figure 3-8)
Front Panel Assembly, w/o Indicator	440000003-04	(Figure 3-8)
Case Assembly	440000001-01	(Figure 3-9)
Rear Panel Assembly, w/o 4-20 mA Option	440000014-01	
Amplifier P. C. Board Assembly, Pt #8	440000005-01	(Figure 3-6)
Amplifier P. C. Board Assembly, Pt #11	440000005-02	(Figure 3-6)
Amplifier P. C. Board Assembly, Ni #7	440000005-03	(Figure 3-6)
Amplifier P. C. Board Assembly, Cu #15	440000005-04	(Figure 3-6)

Table 3-4. Plug-In Module Assembly Options

		A1		A2		A3			
Features		Control Module		Control Module		Control Module		Amplifier Module	
Code*	Option	Latch	Non-Latch	Failsafe	Non-Failsafe	Rising	Falling	Rising	Falling
01	Failsafe, Latching Alarm On Rising	X		X		X		X	
02	Failsafe, Non-Latching Alarm On Rising		X	X		X		X	
03	Failsafe, Latching Alarm On Falling	X		X			X		X
04	Failsafe, Non-Latching Alarm On Falling		X	X			X		X
05	Non-Failsafe, Latching Alarm On Rising	X			X	X		X	
06	Non-Failsafe, Non-Latching Alarm On Rising		X		X	X		X	
07	Non-Failsafe, Latching Alarm On Falling	X			X		X		X
08	Non-Failsafe, Non-Latching Alarm On Falling		X		X		X		X
	Plug-In Part No. 440000□□-□□	13-01	13-02	11-01	11-02	12-01	12-02	10-01	10-02

*Note: See Part No. Code

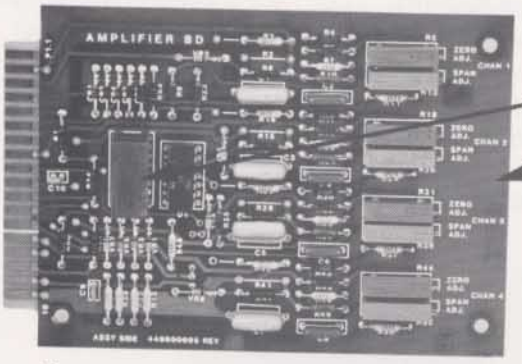
Other combinations possible; check with authorized Edison Electronics Representative.



Power Supply
Circuit Board
440000006-01 115 VAC
440000006-02 230 VAC

Figure 3-5. Power Supply/Relay Board

F1 Replace only with same value fuse.
440000006-01 120M112M0003 (.2A SLOBLO)
440000006-02 120M112M0002 (.1A SLOBLO)



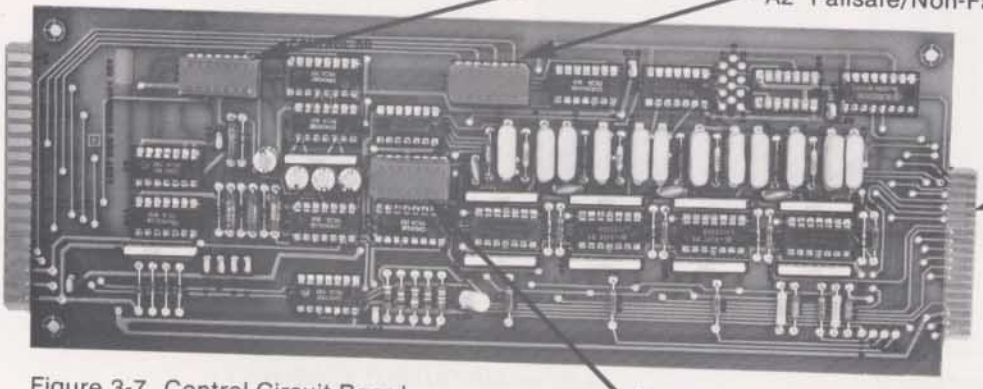
Amplifier Module

Amplifier
Circuit Board
440000005-□□

Figure 3-6. Bridge Amplifier Board

A1 Latch/Non-Latch Control Module

A2 Failsafe/Non-Failsafe Control Module



Control Circuit Board
440000004-□□

Figure 3-7. Control Circuit Board

A3 Rising/Falling Control Module

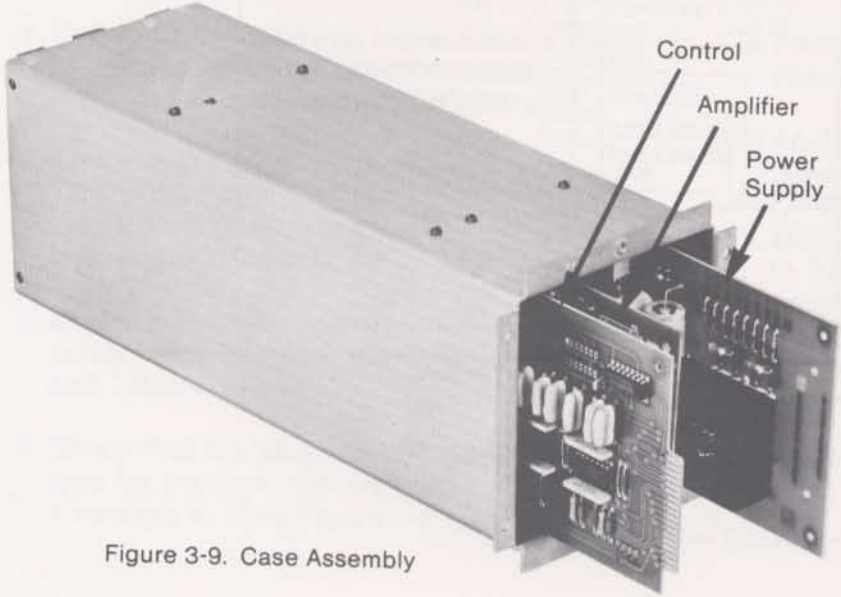


Figure 3-9. Case Assembly

Figure 3-8. Front Panel Assembly
440000003-□□

OPTIONAL 4-20 mA OUTPUT MODULE

The 4-20 mA Output Module converts the temperature monitor's linearized bridge amplifier output to a 4-20 mA current which in turn is transmitted to a remote monitoring station.

Upscale and downscale burnout protection is provided by limiting the output current when the RTD is unconnected or in the event of RTD failure.

Table 3-5. 4-20 mA Subassembly Part Numbers

Rear Panel Assembly w/4-20 mA Option	440000014-02
4-20 mA Output Module (Pt & Ni models)	440000015-01
4-20 mA Output Module (Cu models)	440000015-02

SPECIFICATIONS

4-20 mA Output Module
(440000015-□□)

Power Input	24VDC ±20%
Output (4 channel)	4-20 mA
Operating Temp. Range	−20°C to +65°C
Ambient Temp. Sensitivity	.5% of span
Signal Conversion Accuracy	Same As Monitor
Temperature Ranges	Same As Monitor
Maximum Loop Resistance	350 ohms

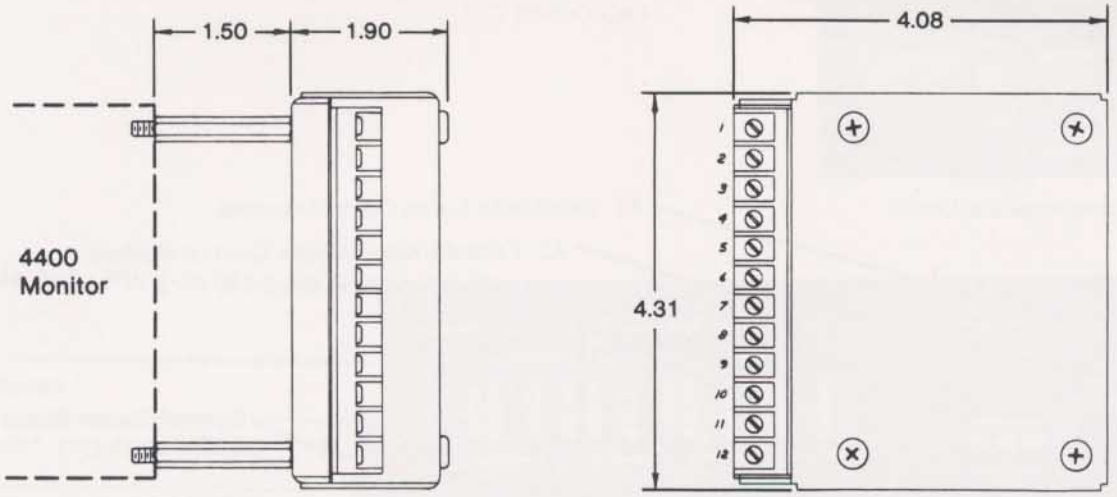


Figure 3-10. 4-20 mA Output Module*

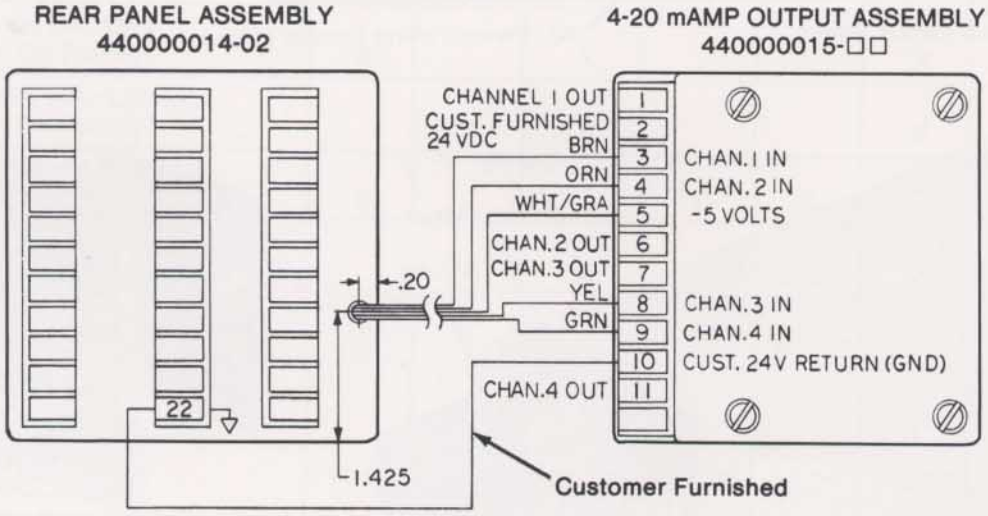


Figure 3-11. 4-20 mA Output Option Wiring Diagram*

*Note: For use on model 440□-□□□1□ only.

OPEN CHANNEL LOADING

Before operation of the 4-Channel Monitor, each channel must have a suitable resistance termination. If a channel is to be left without an RTD, a dummy load must be applied. Refer to Table 3-6 for the proper resistance value corresponding to the RTD type normally used for that channel.

Table 3-6. Proper Loading of Open Monitor Channels

RTD Type	Alarm on Temperature Rise	Alarm on Temperature Fall
Platinum	82 ohm, ½ watt, carbon	220 ohm, ½ watt, carbon
Nickel	82 ohm, ½ watt, carbon	470 ohm, ½ watt, carbon
Copper	6.8 ohm, ½ watt, carbon	18 ohm, ½ watt, carbon

MULTIMONITOR INSTALLATION

Two or more monitors may be mounted together and wired in parallel. Because one digital indicator is sufficient to serve all monitors, the monitor having the indicator is considered the master monitor. Location of the master monitor should be given location priority for operator convenience. Additional monitors may be mounted in a manner similar to single master monitor installation.

MONITOR INTERCONNECTIONS - Interconnections are made by means of screw terminals on terminal blocks at the rear of each monitor. Interconnections between satellite monitors and a master monitor having an internal indicator are shown in Figure 3-12.

CAUTION: Single monitors and master monitors must have TB-11 jumpered to TB-22. (Jumper not supplied) No jumper is used on satellite monitors.

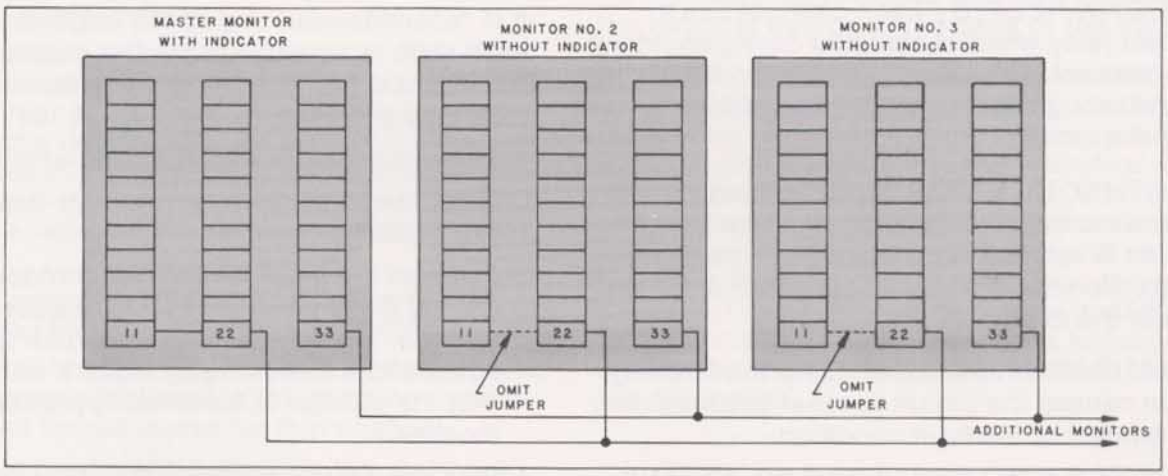


Figure 3-12. Multimonitor System Interconnects

PREOPERATIVE SETUP

1. Before applying power, make a visual check of all connections, both power and external equipment. Be sure all connections are tight.

2. Check that a jumper is installed between TB-11 and TB-22 on all master monitors and single monitor installations. Check to see that this jumper is omitted on all satellite monitors.

3. Check that the bridge amplifier board is the correct type to match the RTD. (See Figure 3-6 and Table 3-3.)

4. Check that the plug-in modules are the correct type for the logic options wanted on Channels 1 through 4. (See Figure 3-7 and Table 3-4.)

5. Install a resistive load for each open (unused) channel. (Refer to Table 3-6 for proper value.)

6. Apply external power and observe the POWER lamp lighted.

7. Momentarily depress the TEST/RESET switch to RESET position to clear all trouble alarm relays and shutdown lamps and relays. If the RESET switch fails to clear a shutdown lamp, check the set points for the channel as directed in the system test procedure on page 12.

IV. OPERATION

CONTROLS AND INDICATORS

Controls and indicators for the OMNIGUARD Series 4400 Monitor with a digital indicator are shown on the inside back cover. The controls and indicators for other monitors are identical except for the absence of the digital indicator across the top of the front control panel.

OTHER SYSTEM FEATURES

TROUBLE RELAY - The failsafe trouble relay is actuated for a shorted or open RTD or for RTD wiring faults on any channel and is common to all channels. It may be used to control external warning devices such as howler, lamp, etc. As an option, the alarm relay is available in a non-latching mode, and/or a non-failsafe mode.

SHUTDOWN RELAYS - Each channel has a shutdown relay which is actuated during shutdown of the channel. This relay has isolated SPDT contacts brought out to the terminal block on the rear of the monitor.

LATCH FUNCTION - The latch function causes the circuit to indicate the fault until the fault condition is removed and the RESET switch is pressed. Removing the fault condition *only*, will not reset the circuit.

NON-LATCHING FUNCTION - The non-latching function causes the circuit to reset automatically upon removal of the fault condition.

FAILSAFE FUNCTION - Loss of monitor power causes the shutdown relays to assume the same state as a temperature fault. Thus auxiliary devices wired for shutdown on a temperature fault will also shut down in a monitor power failure. Note that external devices are never powered except when protected by the monitor. In some installations, however, a non-failsafe function may be preferred and is available.

Latching and failsafe options are selected through the use of inexpensive plug-in modules. Shutdown on temperature rising or falling is selected by similar plug-in modules.

4-20 mA LOOP - As factory options, 4-20 mA loops are available for either input or output.

SHUTDOWN SETPOINT ADJUSTMENT

The shutdown set point is adjusted and verified for each channel as follows:

1. With the system powered up, momentarily set the TEST/RESET switch to RESET position.
2. Place the CH 1 READ/SET POINT toggle switch in the SETPOINT position and, inserting a screwdriver (see accessories kit supplied with monitor) in the access opening, adjust the potentiometer until the indicator shows the desired alarm temperature (cw for increase; ccw for decrease).
3. Using the same procedure, set the shutdown set points for the other active channels.
4. Mark the shutdown set point for each channel on the applicable channel identification label (see accessories kit).

SYSTEM TEST AND ROUTINE OPERATION

It is recommended that at the beginning of each work shift, or power up after the monitor has been shut down, the following system test procedure be performed:

1. Make sure the power indicator lamp is lighted.
2. Clear the system by momentarily depressing the RESET switch.
3. Depress the TEST switch. All shutdown lights should illuminate. Controlled devices will not actuate. Illumination of the monitor shutdown lights and a trouble relay closure will indicate that the monitor is functioning properly. Reset monitor.
4. Place any MON switch in the READ position and check the indicator for operation.
5. Check the shutdown set points for each channel against the values on the channel identification labels. Refer to Set Point Adjustment if adjustments are necessary.
6. Monitor is ready for continuous operation.

ALARM CONDITION

If alarm condition is indicated, proceed as follows:

1. Place READ/SETPOINT switch for affected channel in READ position and check temperature.
2. Correct cause of alarm condition.
3. Observe indicator until a satisfactory reading is obtained.
4. Depress RESET switch to clear system.

CAUTION: If alarm indications continue after the RESET switch is depressed, alarm condition still exists. Repeat above steps and thoroughly check system.

V. MAINTENANCE

PREVENTIVE MAINTENANCE

The OMNIGUARD Series 4400 Monitor utilizes reliable solid-state components, and under normal conditions should give long trouble-free service. To ensure confidence, however, it is recommended that the system be tested as directed in Section IV at the beginning of each work shift, and after a prolonged shutdown. Other preventive maintenance checks should be performed as follows:

INSPECTION - Check the following semiannually or more often if warranted by site conditions.

1. Check all wiring and terminal boards for evidence of damage, corrosion, or loose connections, particularly where subject to vibration.
2. Remove each tip-sensitive detector from its well and make sure that the well is clean and dry. Check for evidence of leakage, and be sure that the detector is firmly seated in the well on reinstallation.
3. With monitor power off, disconnect each RTD, one channel at a time from the terminal boards on the rear of the monitor. (See Figure 3-3.) Connect a decade resistor box across the terminals in place of the RTD. Check channel label on the front of the monitor for set point temperatures for the particular channel under test.
4. Turn monitor POWER on and momentarily depress TEST/RESET switch to RESET.
5. Gradually change the decade box resistance in the appropriate direction for alarm on rise/fall set point temperatures for that channel.
6. Observe temperature at which the alarm activates, and the temperature at which the shutdown activates. Compare with data on the channel label for that channel.
7. Repeat steps 3 through 6 for each channel making sure that proper connections are restored and are tight.

CLEANING - The front panel and channel labels may be cleaned using a lint-free cloth dampened with a mild detergent solution.

CAUTION: Do not use solvents such as lacquer thinner or alcohols as some solvents may attack some plastic surfaces such as meter faces, etc.

The internal parts of the monitor and RTD wells can be cleaned (all power off) by dry air under pressure. Avoid direct contact between the nozzle and components.

CORRECTIVE MAINTENANCE

It is the manufacturer's recommendation that all monitors requiring repair be returned to Edison facilities. Any field repair should be accomplished by personnel thoroughly familiar with the techniques involved, and in a shop having facilities for checking the work accomplished.

TROUBLESHOOTING AND FAULT DIAGNOSIS - The easiest method of fault isolation is to determine, deductively from the symptoms, whether the problem is in circuits common to all channels, or in the circuitry of an individual channel. The OMNIGUARD Series 4400 Supervisory System has an extensive built-in test capability. Besides checking indicator lights, the TEST/RESET switch in TEST position allows the operator to simulate alarms. The substitution of a resistor decade box for individual RTDs enables troubleshooting to the normally open/closed shutdown contacts on the terminal boards at the back of the monitor.

REPAIR AND REPLACEMENT - Since the 4400 Monitor is a modularized unit, it is possible to repair it by replacing just the defective module. Isolation of the problem to the individual module is best accomplished by deduction from the affected channels. Are both set points and RTD readings affected? Are both alarms and shutdown circuits affected?....etc. Reference to the block diagram (Figure 2-1) will give the signal flow through the unit. Substitution of a known good module for the suspected bad one will confirm the diagnosis.

CAUTION: Be sure to substitute a module of the same type (part number) or unreliable and/or unwanted cycling of the control equipment may result. If a module has sub-modules, be sure that they are the correct ones. When finished, carefully recheck all plug-ins and modules against the part number using Tables 3-3 through 3-5.

INSPECTION RECORD

Date	Comments	Initials

Unit Serial Number ______________

PARTS REPLACEMENT

Date	Part No.	Description	Initials

PARTS REPLACEMENT

The following list provides a brief description and the Edison part number of all replaceable parts in the monitor. For specific applicability to your model, check the monitor part number coding given on the back of the manual. Parts not listed are considered to be non-field replaceable. Consult your authorized Edison Electronics representative for inquiries regarding parts replacement.

DESCRIPTION	EDISON PART NUMBER
Fuse 0.2A (115VAC only)	120M112M0003
Fuse 0.1A (230VAC only)	120M112M0002
Fuse 0.75A (24/28VDC only)	120M112M0005
Relay	1851003
Control Board	440000004
Power Supply Assy.*	440000006-□□
Front Panel Assy.*	440000003-□□
Amplifier Assy.*	440000005-□□

***Blank digits are determined by particular configuration.**

OMNIGUARD® PRODUCT WARRANTY

Armtec Industries, Inc. will, at its option, repair and return without charge (freight prepaid) any Edison® OMNIGUARD product used in accordance with Armtec's rating and instructions and found by us to be defective in workmanship or materials.

This warranty will be valid only if the product is returned to the factory at Manchester, NH properly packed and with all transportation charges prepaid within the applicable warranty period. All periods run from date product is shipped to end user providing this is within six (6) months of date product was originally shipped from factory.

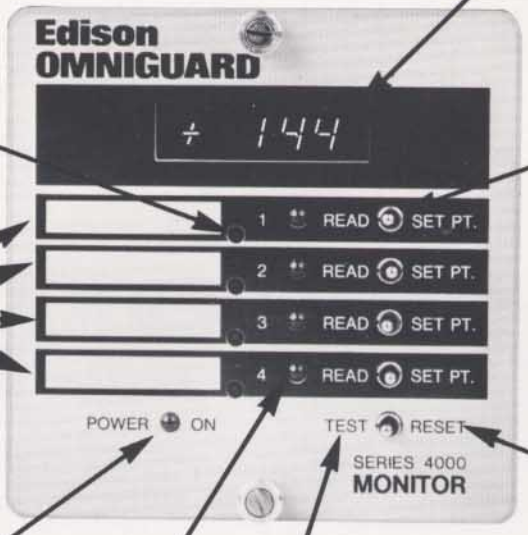
There are no implied warranties of merchantability, fitness or other implied warranties or representations for any of Armtec's products except the warranty specified herein. In no event shall Armtec be liable for any consequential, special or other damages attributable to our product except as specified herein.

Special Caution: Attempts to service OMNIGUARD products (beyond simple replacement of plug-in modules) at other than the factory authorized location will void this warranty.

MONITOR CONTROLS AND INDICATORS

COMPACT SIZE– smaller than other full-function monitors – conserves panel space.

DIGITAL INDICATOR provides temperature point readings and diagnostics display on demand.



CHANNEL SET POINTS are fully accessible and independently adjustable – thru the mask.

4-CHANNELS continuously monitor temperature at four locations.

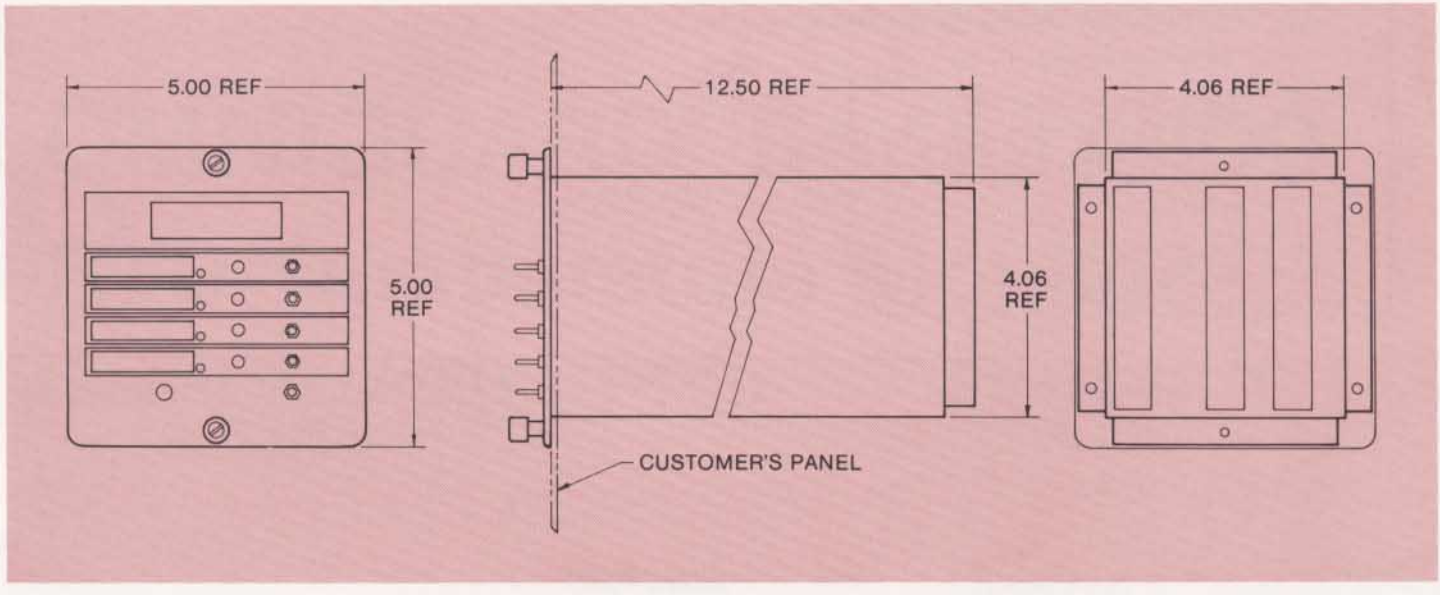
3-POSITION SPRING RETURN SWITCH READ - to read actual temperature (must be held); MONITOR - to automatically monitor channel (normal); SET POINT - to read shutdown setting (must be held)

RESET position resets the circuit, lights, and relays after removal of fault condition.

POWER LIGHT indicates unit on, fuse o.k.

SHUTDOWN LIGHT signifies the temperature set point has been exceeded.

TEST position simulates temperature fault conditions.



PART NUMBER CODING

Indicator Type

Code	Indicator Type	Notes
1	No Indicator	(Used in multimonitor installations only. Only one indicator is required for any number of monitors.)
6	Digital	

Power Supply

Code	Power Supply
1	115 VAC, 50/60 Hz
2	230 VAC, 50/60 Hz
3	24/28 VDC

4-20 mA Options

Code	Option
0	Standard
1	4-20 mA Output

4 4 0 ■ – ■ ■ ■ ■ ■

Shutdown Relay Options

Code	Option
01	Failsafe, Latching Alarm On Rising
02	Failsafe, Non-Latching Alarm on Rising
03	Failsafe, Latching Alarm On Falling
04	Failsafe, Non-Latching Alarm On Falling
05	Non-Failsafe, Latching Alarm On Rising
06	Non-Failsafe, Non-Latching Alarm On Rising
07	Non-Failsafe, Latching Alarm On Falling
08	Non-Failsafe, Non-Latching Alarm On Falling
09-99	Deviation - to be factory assigned

RTD Type & Range

Code	RTD Type	Temperature Range
1	#8 Platinum	−80° to 320°C
2	#8 Platinum	−112° to 600°F
3	#11 Platinum	−80° to 320°C
4	#11 Platinum	−112° to 600°F
5	#7 Nickel	−80° to 320°C
6	#7 Nickel	−112° to 600°F
7	#15 Copper	−50° to 240°C
8	#15 Copper	−58° to 460°F
9	4-20 mA Input	

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