# Omniguard

## Temperature Monitors

OPERATING
AND
SERVICE
MANUAL


# OMNIGUARD® Series 6100

## RTD Temperature Monitor

*6-Channel, Dual-Level*

MEGGITT AEROSPACE

ARMTEC
INDUSTRIES INC

## FEATURES

- Standardize your instrumentation with **field selectable plug-in modules.**
- Maximum hazard protection with **six channels** of continuous coverage.
- High reliability due to quality workmanship backed by a **two year warranty.**
- Maximum system confidence with complete electronic **self-test.**
- Minimum space and installation cost due to **rack mount modular construction.**
- Easy set-up provided by **front panel set point read and adjust.**
- Minimum heat damage and repair costs because **dual set points** provide two level indication.
- Easy to read **high intensity digital display.**

## OPTIONS

- Versatility is virtually unlimited with 29 field and 10 factory options.

## SPECIFICATIONS

### Electrical

Operating Voltage
115/230 VAC ±10% @ 50/60 Hz
24/28 VDC, 48 VDC

Power Drain (maximum)
Alarm ..... 25 watts
Standby ..... 15 watts

Electrical Transients
600 V for 10 μsec ..... No effect
40 V drop for 40 msec ..... No effect

Sensor (RTD) Description
T/R #7 (Nickel) ..... 120 ohms @ 0 C
T/R #8 (Platinum) ..... 100 ohms @ 0 C (1.3850)*
T/R #11 (Platinum) ..... 100 ohms @ 0 C (1.3920)
T/R #15 (Copper) ..... 10 ohms @ 25 C

RTD Operating Ranges
T/R #7 ..... −70 C to +300 C (−94 F to +572 F)
T/R #8 ..... −130 C to +840 C (−202 F to +1500 F)*
T/R #11 ..... −130 C to +740 C (−202 F to +1364 F)
T/R #15 ..... −50 C to +250 C (−58 F to 482 F)
*European standard resistance curve

Set-Point Specifications (For Standard 300 F Span)
Front Panel Adjustable for Alarm and Shutdown
Resolution ..... 0.2% of Full Scale
Environmental (Temperature −20 C to 65 C) ..... ±0.5%
Sensitivity to ±10% line voltage variations ..... ±0.1%

Monitor Output Signal Specifications
Digital Meter Signal
(9K ohm output impedance) ..... 1 millivolt/ C or F
RTD Temperature-to-Output Signal Conversion Accuracy
Platinum and Copper ..... ±0.15%
Nickel ..... ±0.5%
Ambient Temperature Sensitivity (−20 C to 65 C) ... ±0.5%
Response Time ..... 0.36 seconds

Relay Contact Rating (six output relays, one alarm relay, one test relay)
28 VDC, resistive, 5 amp; inductive, 1.5 amp
120 VAC, resistive, 5 amp; inductive, 1.5 amp

### Mechanical

Dimensions (maximum)
8.75" x 4.25" x 14.5" (allow 3.25" for rear panel swing)
Weight
7.5 lbs. max. (3.4 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
±0.5% of full scale (±1 count)
Linearity
±0.005% of full scale
Temperature Coefficient
±50 ppm of full scale/ C max.
Display
3½ digit, red LED

Specifications Subject to Change Without Notice

# Contents

# I. INTRODUCTION

## MONITOR DESCRIPTION

The OMNIGUARD Series 6100 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 six 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.

The Series 6100 provides a unique combination of operating features, including:

- Dual-level set points (alarm and shutdown) for each channel (optional single-level models available, if desired)
- 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 shutdown relays and alarm relay
- Activation on either rising or falling temperatures
- Monitors may be interconnected to use a single display of temperatures and set points
- Over 1500 'custom' options available off-the-shelf through precalibrated plug-in modules

In standard, dual-level models, two temperature set points are established by the operator for each channel in use. When the first set point is exceeded on any channel, a single common alarm relay is actuated and an alarm lamp is lighted on the panel, identifying the affected channel. When the second set point is reached, 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 switch.


Figure 1-1. Series 6100 Temperature Monitor

In optional single-level models, when the preset temperature level is exceeded, the appropriate shutdown relay and lamp are actuated, along with the common alarm relay.

In both single- and dual-level units, each channel may be selected to activate on either rising or falling temperature.

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 both alarm and shutdown set point values. Meter accuracy is 0.5 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 −130 C to 840 C (−202 F to 1500 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 control, 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 6100 Supervisory System uses resistance temperature detectors (RTDs) for sensing temperatures of the device they are to monitor.

With reference to the block diagram, 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 to the ground return for 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 and the output of the amplifier is a linearized voltage proportional to the temperature of the RTD. This signal is fed through the READ switches to the degrees C to degrees F converter board and then to the digital display.

The output of the RTD bridge amplifier is also fed to four comparators; open RTD, shorted RTD, alarm and shutdown. The Alarm and Shutdown Setpoints are set by front panel potentiometers and can be read on the digital display by selecting the desired channel with the READ SET POINT switch and selecting alarm or shutdown with the ALARM/SHUTDOWN switch. The voltage set by the front panel potentiometers is fed through the normally closed contacts of the READ switches to the degrees C to degrees F converter board and on 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 alarm comparator, this will set the alarm latch and light the ALARM lamp on the front panel. The output of the alarm latch is capacitively coupled to a six-input OR gate and sets the alarm annunciator latch which in turn drives the alarm relay. The operator can acknowledge the alarm, and silence an external alarm device connected to the alarm relay contacts by depressing the

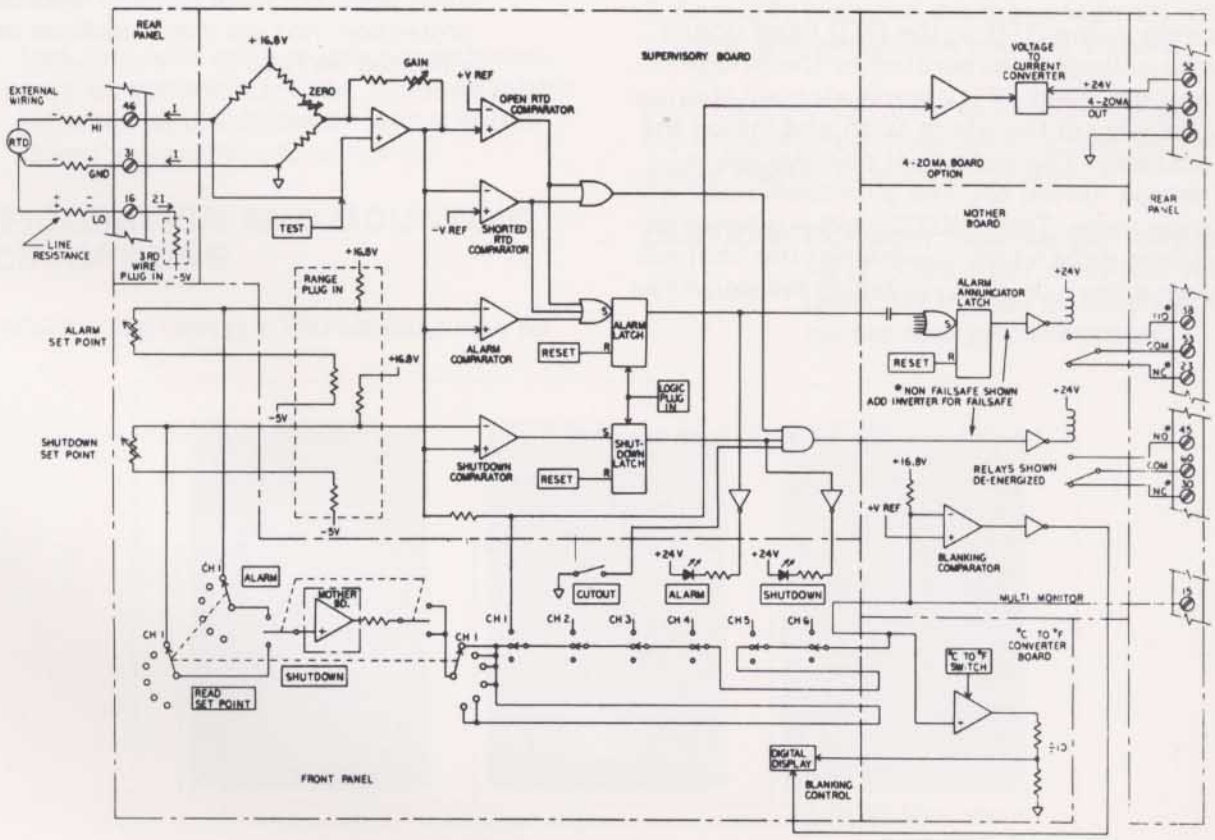



Figure 2-1. Series 6100 Block Diagram

RESET switch. The alarm annunciator latch will be reset and will turn off the alarm relay. The input to the alarm annunciator latch being capacitively coupled is now free to respond to an alarm signal from another channel should it occur. The reset signal will not reset the alarm latch or turn off the alarm lamp unless the alarm condition has gone away. When the RTD temperature returns to a safe condition, the alarm comparator output will return to normal, and allow the alarm latch to be reset by the RESET switch. If the alarm latch is programmed to be non-latching, it will reset automatically as soon as the alarm condition goes away.

If the temperature continues to go out of bounds, the shutdown comparator will change state setting the shutdown latch. This lights the SHUTDOWN light and operates the shutdown relay for the particular channel. The external device is shut down (or depending on installation wiring, turned on) through N.C. (or N.O.) contacts on the shutdown relay. The shutdown latch maintains the shutdown condition until the fault condition is corrected, and acknowledged (by depressing RESET switch). (If the non-latching option is selected, the shutdown condition will automatically be reset when the temperature returns to a safe value.)

If the wiring to the RTD or the RTD itself opens up, a large voltage is generated by the bridge circuit and the open RTD comparator will change state. This will set the alarm latch and inhibit the shutdown relay. The individual channel alarm device will be turned on. The shutdown relay will not change state. The SHUTDOWN light may or may not light depending on whether the channel is set to shutdown on rising or falling temperatures. A rising channel will light on open RTD, and a falling channel will light on a shorted RTD. A shorted RTD or wiring will cause the same sequence except that it is triggered by a low voltage into the shorted RTD comparator.

When the TEST switch is pushed, a simulated out of tolerance voltage is impressed on the RTD bridge amplifier input. The voltage is large enough to trigger the open or shorted RTD comparator and will light both the ALARM and SHUTDOWN lights and activate the external alarm device. The shutdown relay is automatically inhibited from changing state, and shutting down the monitored device during test. If a test is made by simulating an out of tolerance temperature at the RTD, the shutdown relay must be inhibited by putting the appropriate READ switch in the CUTOUT position, if shutdown of the monitored equipment is not desired.

For those systems employing 'failsafe' protection, the monitored external devices are shut down through the shutdown latch in such a way that upon powering down or a power failure to the series 6100 monitor, a shutdown condition is imposed for each channel.

Note: The single set point option (shutdown only) does not have open or shorted RTD protection, nor are the shutdown relays inhibited on test.

# III. INSTALLATION

## PREPARATION FOR USE

The Series 6100 6-Channel Monitor can be installed by the user, with common tools and equipment. After simple pre-operative set-up procedure (see page 12), 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 Armtec Distributor or represenative.

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, single or dual set points, indicator type, 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 Armtec Distributor or 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 SPECIFICATIONS

MONITORS - The Series 6100 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 3-2. The weight of a single monitor is 3.4 kg (7.5 lbs.).

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

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 (or connected to the remote indicator(s)) is considered the master monitor. Location of the master monitor should be given location priority for operator convenience.

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

1. Loosen the four knurled screws and carefully withdraw the monitor assembly from the mounting case.
2. Position and secure the mounting case inside the cabinet.
3. Carefully slide the monitor assembly into the case, and secure the knurled screws.

MULTIMONITOR INSTALLATION - Additional monitors may be mounted in a manner similar to single master monitor installation.

**CAUTION: Consider total weight load fo 3.4 kg (7.5 lbs.) per monitor. Allow at least 3¼ inches behind each monitor for rear panel access.**

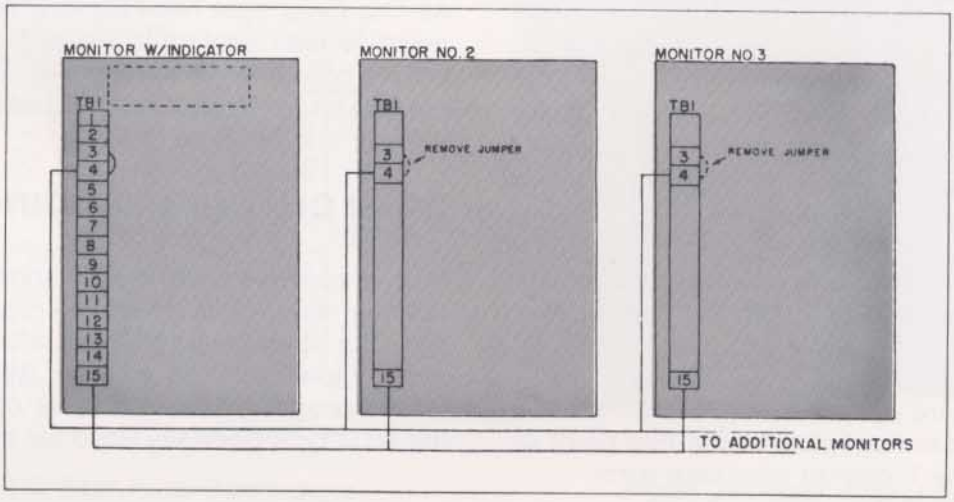



Figure 3-1. Multimonitor system interconnects — master monitor with indicator.

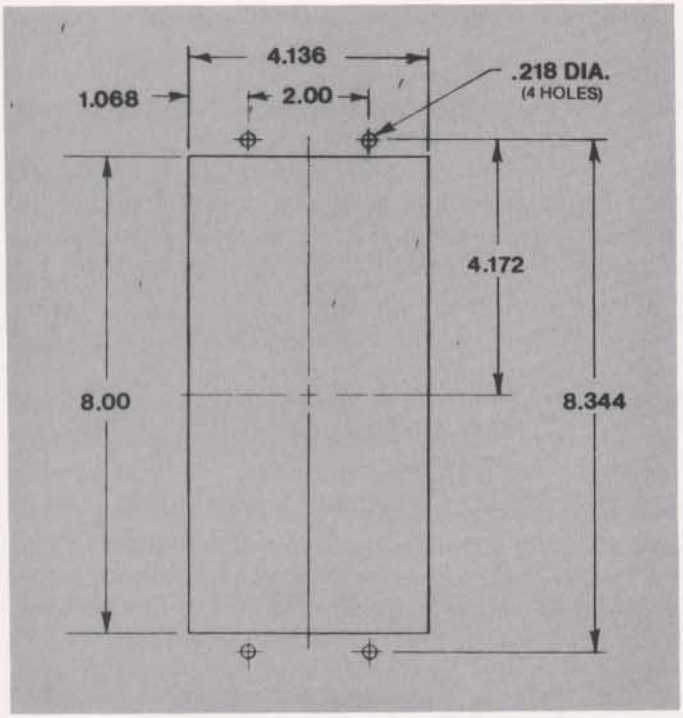



Figure 3-2. Panel Cutout Dimensions

MONITOR INTERCONNECTIONS - Interconnections are made by means of screw terminals on terminal boards at the rear of each monitor. Interconnections between satellite monitors and a master monitor having an internal indicator are shown in Figure 3-1.

**CAUTION: Monitors are normally supplied with a jumper between TB1-3 and TB1-4. This jumper must be removed from all monitors except the master.**

## RTD INSTALLATION

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, and 2.0 F for platinum, 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 scale, it cannot eliminate error entirely, and the error factor increases slightly at the extreme ends of the scale. For this reason, it is important to consider the range of the indicator.

Table 3-2 shows the indication error with a 0-300 F scale. Distances are between RTD and instrument, and the wire used is 14 AWG, copper.

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

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

Three wire RTDs are supplied with two leads the same color and one of a different color. The two leads of the same color are connected to the RTD LO and RTD GRD pins for the desired channel. The third lead is connected to the RTD HI pin.

*Example* - If channel 1 is selected, the leads with the same color are connected to pins 16 and 31. The lead dissimilar in color is connected to pin 46.

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

*Example* - If channel 1 is selected, one RTD lead is connected to pin 46, the other is connected to pin 16 and a jumper is installed between pins 16 and 31.

**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.

## OPEN CHANNEL LOADING

Before operation of the 6-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 3-3 for the proper resistance value corresponding to the RTD type normally used for that channel.

# 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 alarm condition. In the failsafe mode, a power failure to the 6100 Monitor will give the same shutdown relay closure as an alarm condition. The non-failsafe configuration gives no alarm indication in the event of a power failure.

| | Apply Power On Alarm | Remove Power On Alarm |
|---|---|---|
| Non-Failsafe | Figure 3-5a | Figure 3-5b |
| Failsafe | Figure 3-5c | Figure 3-5d |

Consult the factory if other configurations are necessary. The locations of all external connections of the Series 6100 Monitor are shown in Figure 3-3. The terminal strips are on the rear of the monitor.

**Table 3-1. Maximum Separation (MON-RTD) for TR#7 RTDs**

| Wire Gauge | Ohms/1000 Feet* | Maximum Recommended Lead Length in Feet | |
|---|---|---|---|
| 12 | 1.58 | 500 | |
| 13 | 2.00 | 400 | |
| 14 | 2.62 | 315 | |
| 15 | 3.18 | 250 | maximum of 4.0°F indication error |
| 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. Indication Error on a 0-300 F Scale Indicator**

| MON-RTD SEPARATION | 2000 feet | 1000 feet |
|---|---|---|
| Low end of scale at 0°F | 2°F error | 1 F error |
| Middle of scale at 150°F | 0°F error | 0 F error |
| High end of scale at 300°F | 2°F error | 1°F error |

**Table 3-3. Proper Loading of Open Monitor Channels**

| RTD Type | Alarm on Temperature Rise | Alarm on Temperature Fall |
|---|---|---|
| Platinum | 100 ohm, ½ watt, carbon | 470 ohm, ½ watt, carbon |
| Nickel | 100 ohm, ½ watt, carbon | 470 ohm, ½ watt, carbon |
| Copper | 10 ohm, ½ watt, carbon | 22 ohm, ½ watt, carbon |

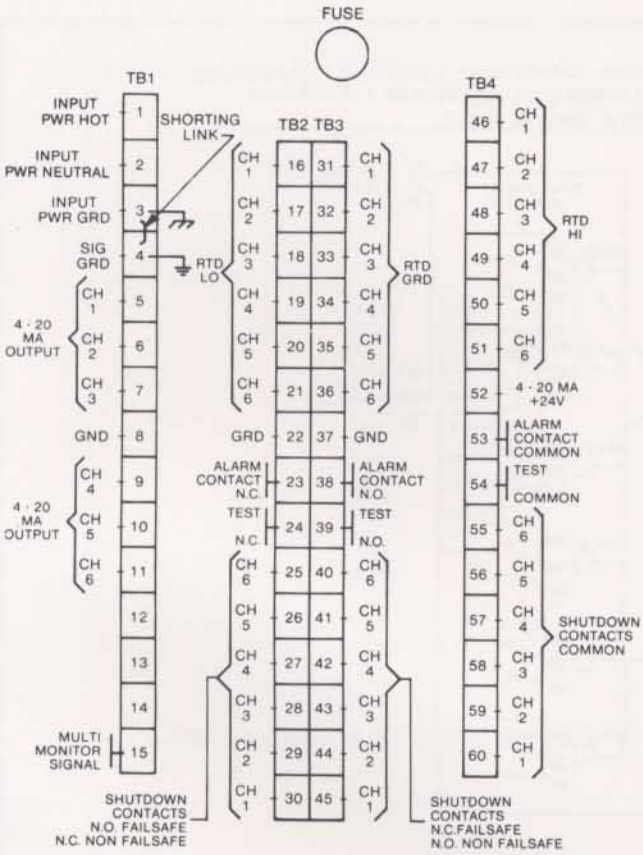



Figure 3-3. Rear Panel Connections

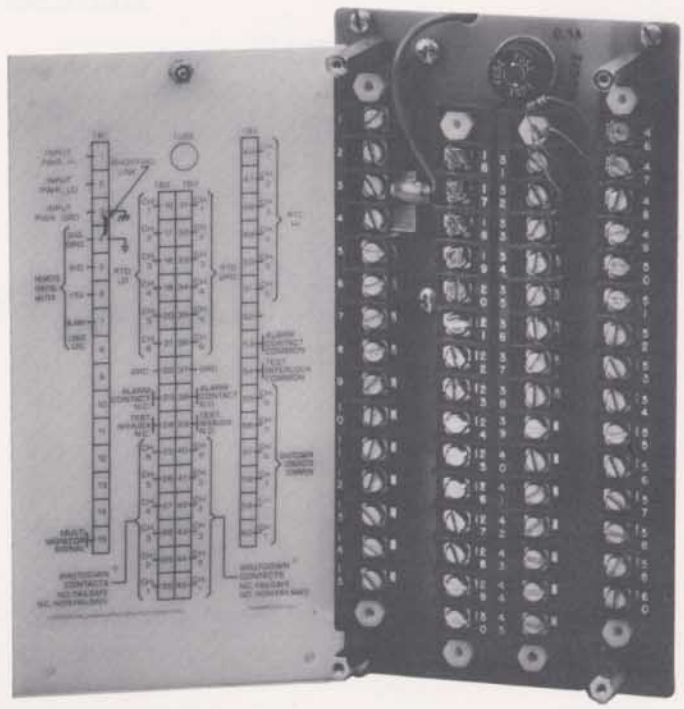


Figure 3-4. Rear View of Control Panel

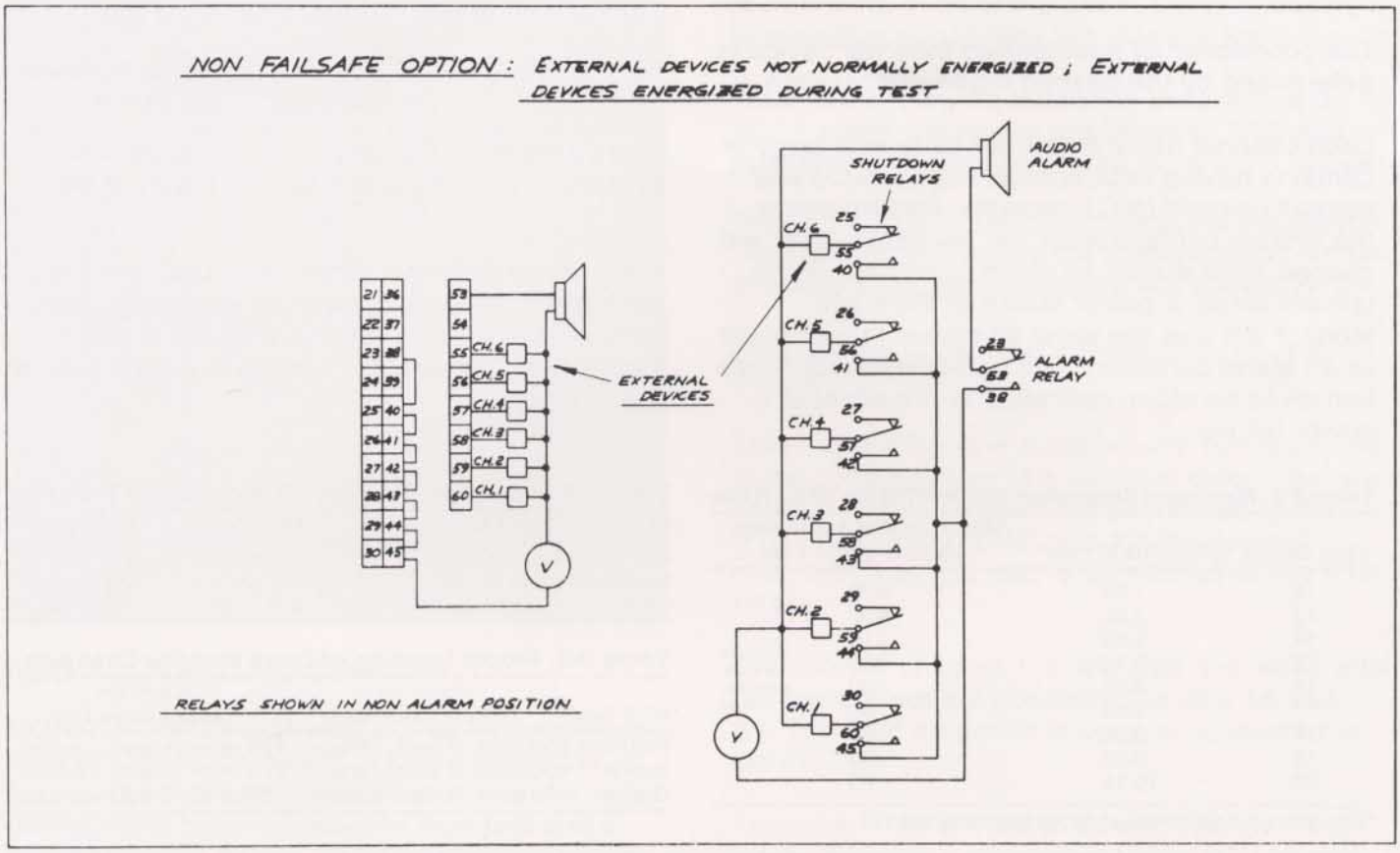



Figure 3-5a. Non Failsafe Option: External Devices not Normally Energized

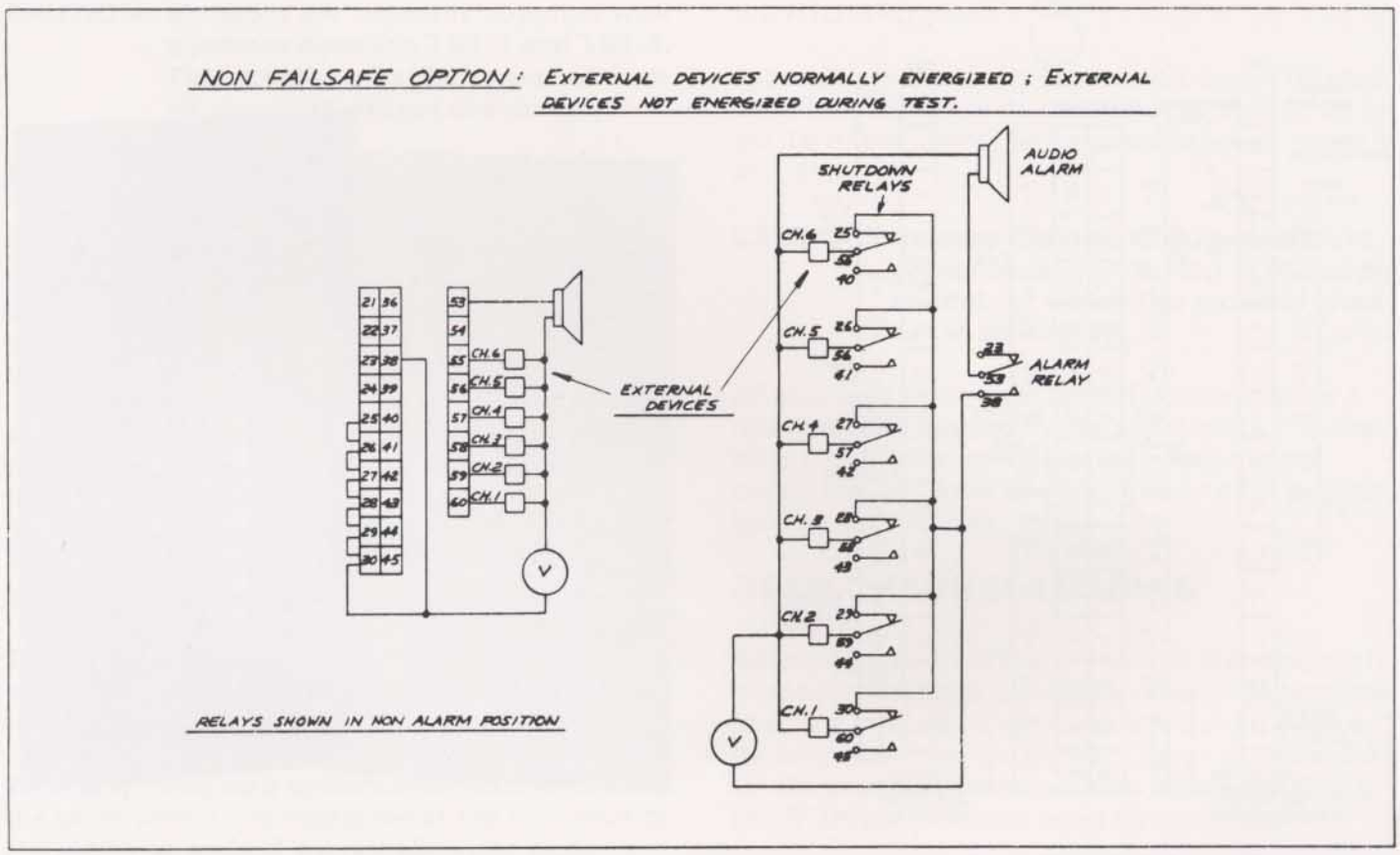



Figure 3-5b. Non Failsafe Option: External Devices Normally Energized

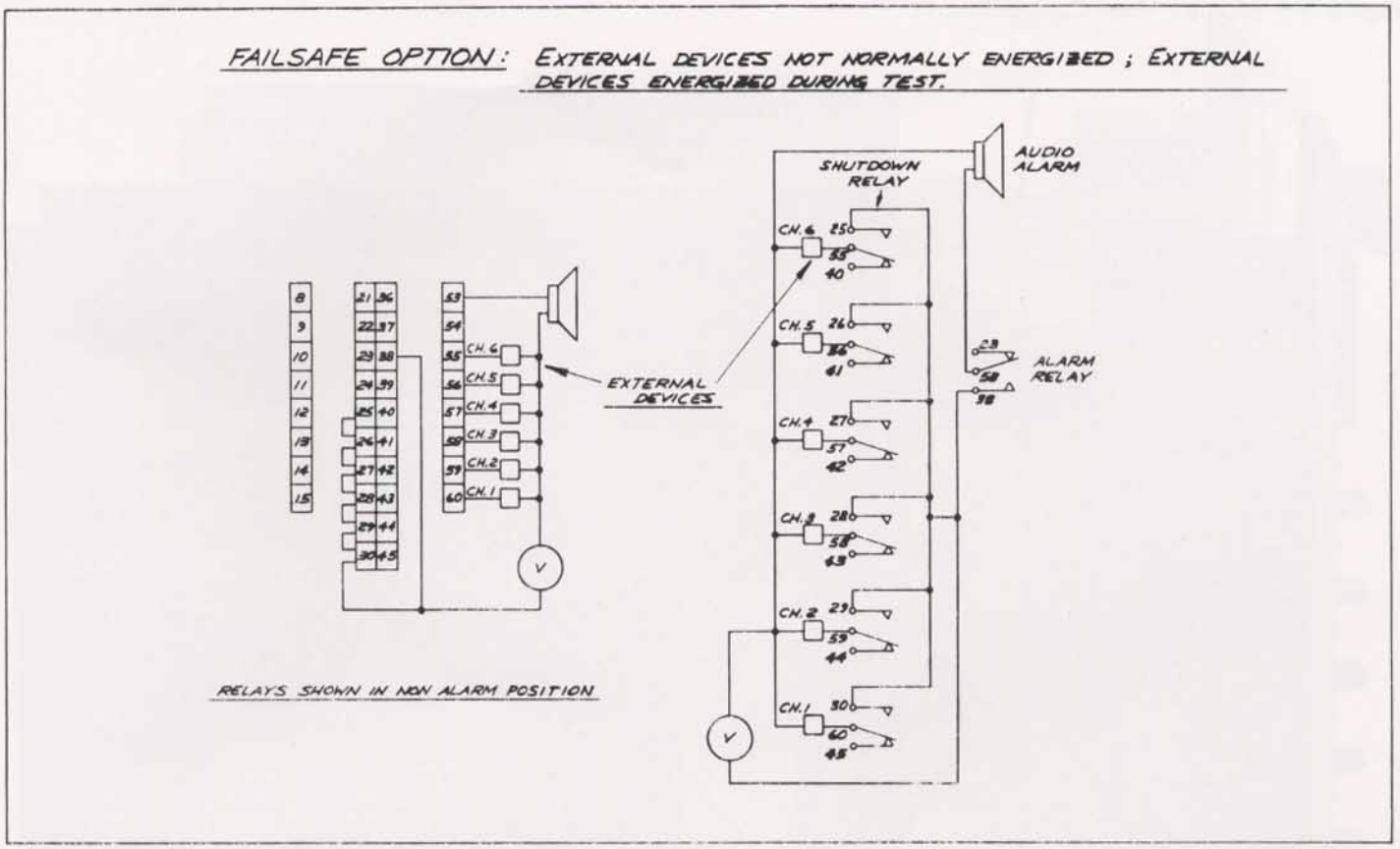



Figure 3-5c. Failsafe Option: External Devices not Normally Energized

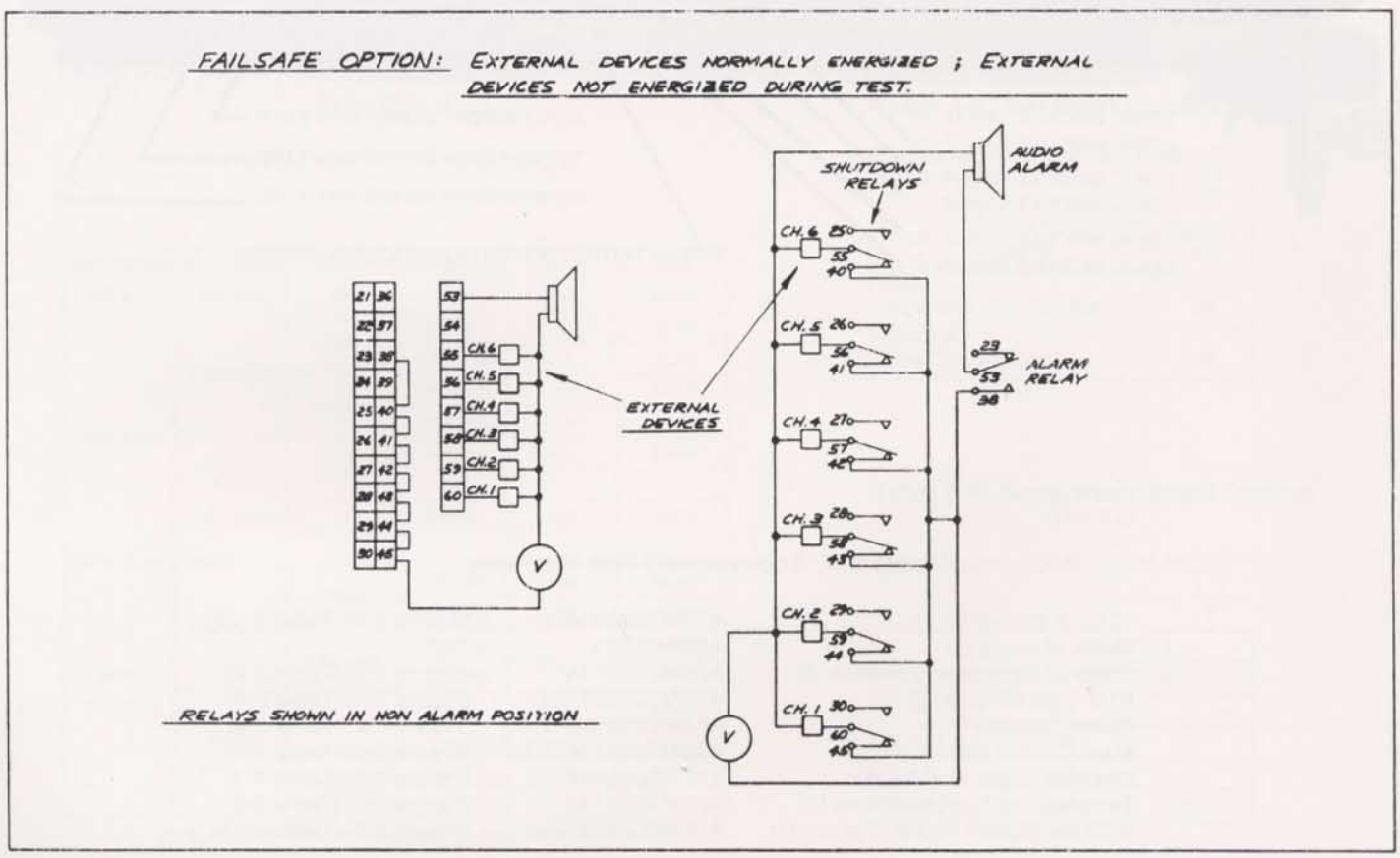



Figure 3-5d. Failsafe Option: External Devices Normally Energized

Figure 3-6. Monitor Main Control Board

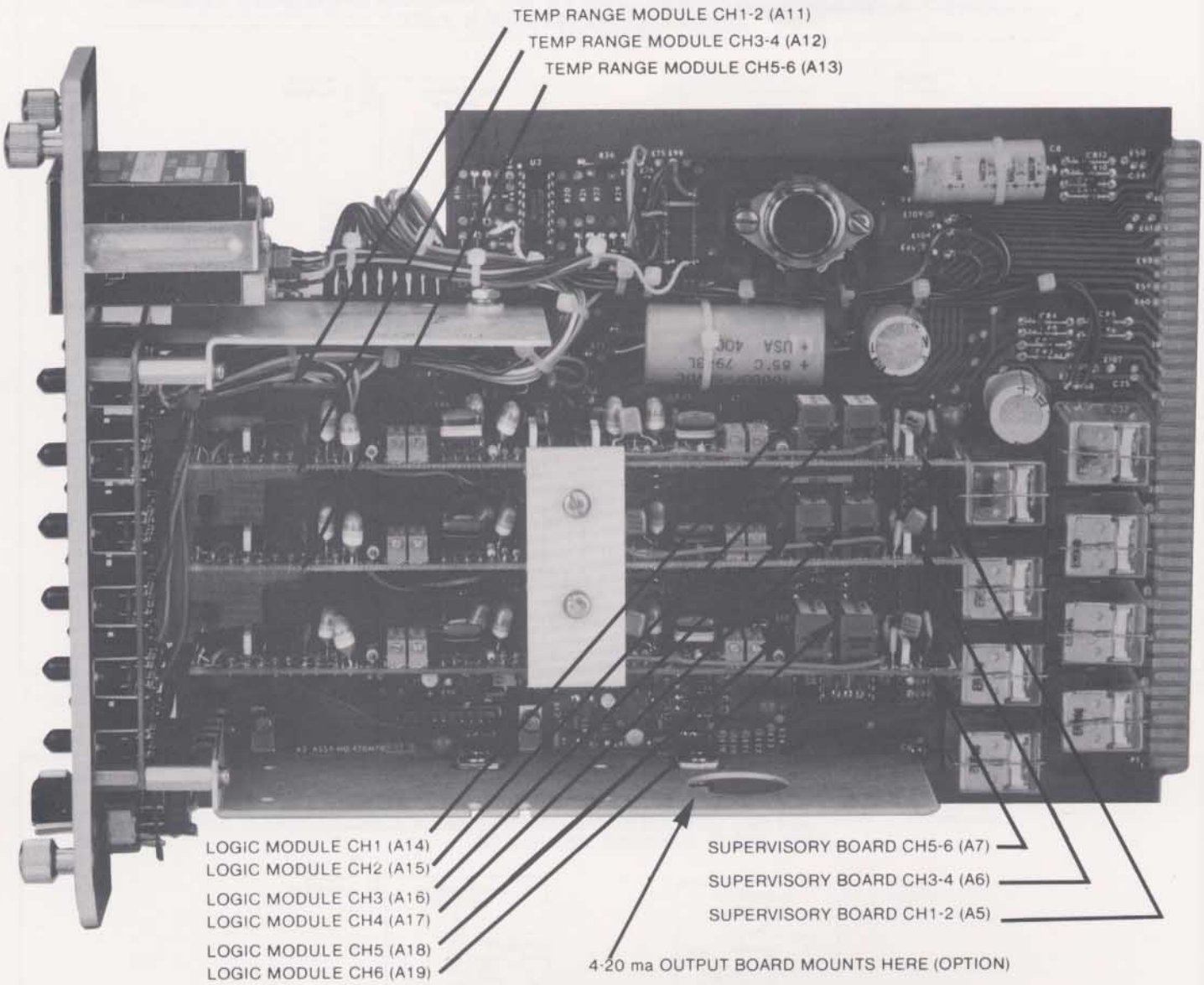



**Table 3-4. Subassembly Part Numbers**

| | | |
|---|---|---|
| °C to °F Converter (1) | 470M70324M01 | (Figure 3-7) (Table 3-10) |
| Meter (if used) (1) | 470M70323 | |
| Channel Supervisory Boards (3) | 470M70335M□□ | (Figure 3-6) (Table 3-7) |
| RTD Type Module (3) | 470M70333M□□ | (Figure 5-2) (Table 3-8) |
| Power Supply (1) | 470M7032□M□□ | (Figure 5-2) (Table 3-9) |
| Main Control Board (1) | 470M70317M □□ | (Figure 3-6) (Table 3-6) |
| Channel Logic Module (6) | 470M70336M□□ | (Figure 3-6) (Table 3-5) |
| Temperature Range Module (3) | 470M70311M□□ | (Figure 3-6) (Table 3-8) |
| 4-20 ma Output Board (Option) (1) | 470M70350M□□ | (Figure 3-6) (Table 3-11) |

Figure 3-7. °C to °F Converter Board

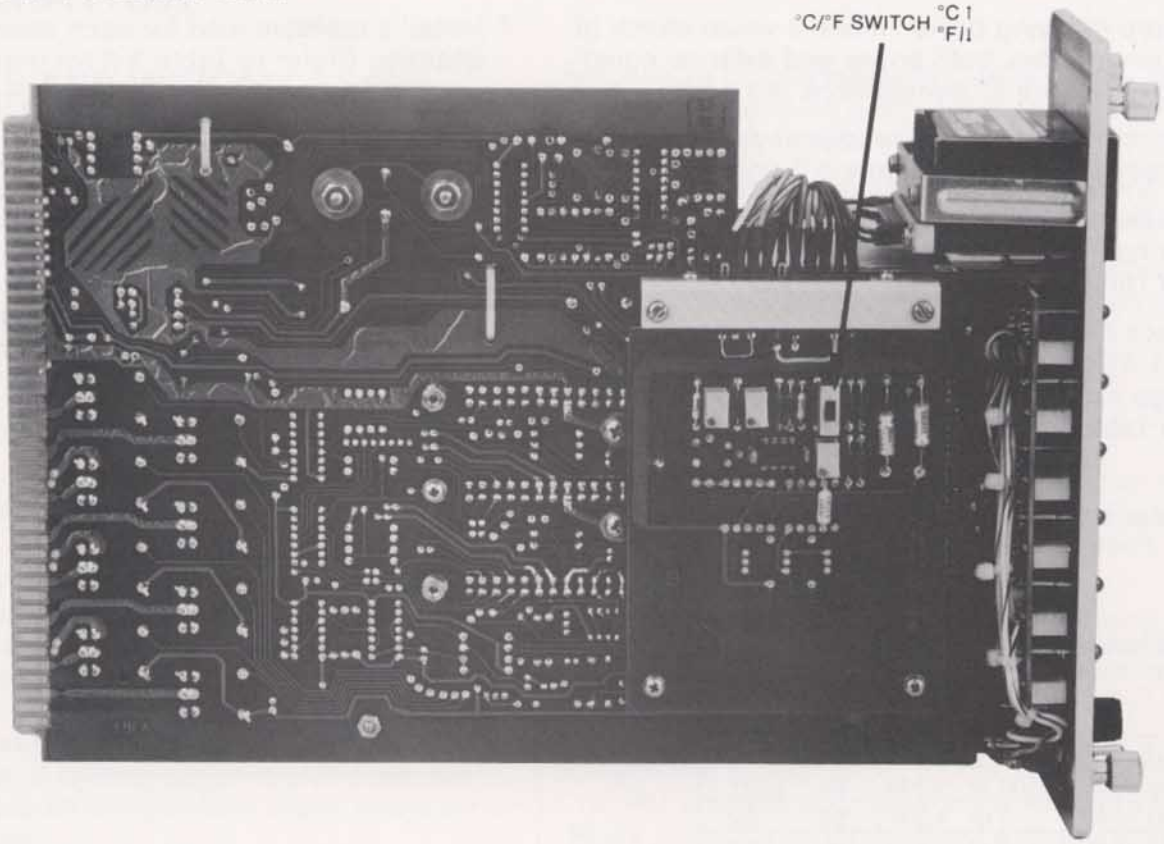



**Table 3-5. Logic Module Options**
(A14 thru A19)

Part Number 470M70336M□□

| SHUTDOWN RELAYS | SHUTDOWN RELAYS | ALARM ON | SHUTDOWN ON | DASH NO. | USE CODE |
|---|---|---|---|---|---|
| FAILSAFE | LATCHING | RISING | RISING | 01 | FLRR |
| | | | FALLING | 02 | FLRF |
| | | FALLING | RISING | 03 | FLFR |
| | | | FALLING | 04 | FLFF |
| | NON-LATCHING | RISING | RISING | 05 | FNRR |
| | | | | | |
| | | FALLING | RISING | 07 | FNFR |
| | | | | | |
| NON-FAILSAFE | LATCHING | RISING | RISING | 09 | NLRR |
| | | | FALLING | 10 | NLRF |
| | | FALLING | RISING | 11 | NLFR |
| | | | FALLING | 12 | NLFF |
| | NON-LATCHING | RISING | RISING | 13 | NNRR |
| | | | | | |
| | | FALLING | RISING | 15 | NNFR |
| | | | | | |

Note: Standard units are designated by bold DASH NUMBERS.

**Table 3-6. Set Point Options**

Part Number 470M70317M□□

| SET POINTS | DASH NO. |
|---|---|
| DUAL (ALARM & SHUTDOWN) | **01** |
| SINGLE (SHUTDOWN ONLY) | **02** |

**Table 3-7. Supervisory Board Options**
(A5-A7)

Part Number 470M70335M□□

| RTD TYPE | DASH NO. | |
|---|---|---|
| | DUAL SET | SINGLE SET |
| Pt #8 | 02 | 12 |
| Pt #11 | 06 | 16 |
| Ni #7 | 03 | 13 |
| Cu #15 | 04 | 14 |

# 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 the power supply module is the correct voltage. (See Figure 5-2 and Table 3-9.)
3. Check that the supervisory boards are the correct type to match each RTD. (See Figure 3-6 and Table 3-7.)
4. Check that the temperature range modules (A11-A13) are correct for the temperature range expected on each RTD. (See Figure 3-6 and Table 3-8).

**Table 3-8. RTD Type & Temperature Range Options**

RTD Type (A8-A10)
Part Number 470M70333M□□

Temperature Range (A11-A13)
Part Number 470M70311M□□

| RANGE (°C) | RANGE (°F) | DASH # | DASH # | | |
|---|---|---|---|---|---|
| | | | Ni | Pl | Cu |
| −80 to +90 | −100 to +200 | 01 | 01 | 07 | 06 |
| −20 to +150 | 0 to +300 | 02 | 02 | | |
| +40 to +210 | +100 to +400 | 03 | 03 | | |
| +90 to +260 | +200 to +500 | 04 | 04 | | |
| +150 to +320 | +300 to +600 | 05 | 05 | | |
| −80 to +760 | −100 to +1400 | 06 | | | |
| Thermocouple | | 07 | None | | |
| Deviations | | 08-99 | | | |

5. Check that the plug-in modules A14 through A19 are the correct type for the logic options wanted on Channels 1 through 6. (See Figure 3-6 and Table 3-5.)
6. Check that the RTD type modules are correct for the RTD type being used (and range if using nickel RTDs). (See Figure 5-2 and Table 3-8.)

**Table 3-9. Power Supply Options**
(A3)

Part Number 470M7032□M□□

| VOLTAGE | DASH # |
|---|---|
| 115V 50/60Hz | 1M01 |
| 230V 50/60Hz | 1M02 |
| 24/48 VDC | 2M01 |
| 48 VDC | 2M02 |
| SPECIAL | ---- |

7. Install a resistive load for each open (unused) channel. (Refer to Table 3-3 for proper value.)
8. Apply external power and observe the POWER lamp lighted.
9. Momentarily depress the TEST/RESET switch to RESET position to clear all ALARM and SHUTDOWN lamps and the respective auxiliary relays. If the RESET switch fails to clear an ALARM or SHUTDOWN lamp, check the set points for the channel as directed in the system test procedure on page 13.

**Table 3-10. °C to °F Converter Board**

Part Number 470M70324M□□

| CIRCUIT BOARD | DASH # |
|---|---|
| C to F CONVERTER (with meter) | 01 |
| JUMPER BOARD (no meter option) | 02 |

**Table 3-11. 4-20 ma Output Board Options**
(Used only if 4-20 ma option is selected)

For Monitor P/N 61(2 or 3)XMXXXXXM□□□X

| | | 0 | 1 | 2 | 3 |
|---|---|---|---|---|---|
| 0 | 0 | 01 | 02 | 03 | 04 |
| | 1 | 06 | 07 | 08 | 09 |
| | 2 | 11 | 12 | 13 | 14 |
| | 3 | 16 | 17 | 18 | 19 |
| 1 | 0 | 21 | 22 | 23 | 24 |
| | 1 | 26 | 27 | 28 | 29 |
| | 2 | 31 | 32 | 33 | 34 |
| | 3 | 36 | 37 | 38 | 39 |
| 2 | 0 | 41 | 42 | 43 | 44 |
| | 1 | 46 | 47 | 48 | 49 |
| | 2 | 51 | 52 | 53 | 54 |
| | 3 | 56 | 57 | 58 | 59 |
| 3 | 0 | 61 | 62 | 63 | 64 |
| | 1 | 66 | 67 | 68 | 69 |
| | 2 | 71 | 72 | 73 | 74 |
| | 3 | 76 | 77 | 78 | 79 |

Use Module 470M70350M□□

Example: A 12XMXXXXXM123X monitor would use a 470M70350M34 4-20 ma output board.

# IV. OPERATION

## CONTROLS AND INDICATORS

Controls and indicators for the OMNIGUARD Series 6100 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.

The controls and indicators used for operating, testing and adjusting the monitor are given in Table 4-1 with the functions of each.

## OTHER SYSTEM FEATURES

ALARM RELAY - The alarm relay is actuated for an alarm condition on any channel and is normally common to all channels. It may be used to control external warning devices such as a howler, lamp, etc. As a factory option, the alarm relay is available in a non-latching mode, and/or a failsafe mode. A factory option is also available which provides six independent alarm relays for process control.

SHUTDOWN RELAYS - Each channel has a shutdown relay which is actuated during shutdown of the channel except when that channel is in the CUTOUT position. This relay has isolated SPDT contacts brought out to the terminal board on the rear of the monitor.

LATCH FUNCTION - The latch function causes the circuit to indicate the fault, either alarm or shutdown, 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 optionally.

Latching and failsafe options (for the shutdown relays only) are selected through the use of inexpensive plug-in modules. Alarm and/or shutdown on temperature rising or falling are selected by similar plug-in modules.

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

REMOTE RESET - A remote reset factory option is also available, to reset the 6100 Monitor from a remote location.

## ALARM AND SHUTDOWN SET POINT ADJUSTMENT

The alarm and shutdown set points for dual-level operation, or shutdown set point for single-level operation are 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 READ SET POINT rotary switch to the CHANNEL 1 position.
3. Place the ALRM/SHDN toggle switch in the ALRM position and, inserting a screwdriver (see accessories kit supplied with monitor) in the access opening located below No. 1 channel ALARM light, adjust the potentiometer until the indicator shows the desired alarm temperature (cw for increase; ccw for decrease).
4. Place the ALRM/SHDN switch in the SHDN position and adjust the shutdown set point for channel no. 1 in the same manner.
5. Using the same procedure, set the alarm and shutdown set points for the other active channels.
6. Mark the alarm and shutdown set points 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 alarm and shutdown lights should illuminate. Controlled devices will not actuate. Illumination of the monitor alarm and shutdown lights will indicate that the monitor is functioning properly.

4. Place any MON switch in the READ position and check the indicator for operation.
5. Check the alarm and shutdown set points for each channel against the values on the channel identification labels. Refer to Set Point Adjustment in Section III if adjustments are necessary.
6. Monitor is ready for continuous operation.

## ALARM CONDITION

If alarm condition is indicated, proceed as follows:
1. Place READ/MON/CUTOUT 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.**

### Table 4-1 Control and Indicator Functions

| Control/Indicator | Status | Function |
|---|---|---|
| ALARM indicator lamp (each channel) | Lighted | Alarm condition for that channel |
| | Off | Channel temperature within limits |
| SHUTDOWN indicator lamp (each channel) | Lighted | Shutdown condition for that channel |
| | Off | Channel temperature within limits |
| READ/MON/CUTOUT 3-position toggle switch (each channel) | READ | Causes current channel temperature to be displayed. |
| | MON | Normal operating mode. Alarm/shutdown conditions enabled. |
| | CUTOUT | Same as MON except that shutdown relays are not energized. |
| ALARM set point adjust potentiometer | Clockwise | Increases alarm set point level. |
| | Counter-clockwise | Decreases alarm set point level. |
| SHUTDOWN set point adjust potentiometer | Clockwise | Increases shutdown set point level. |
| | Counter-clockwise | Decreases shutdown set point level. |
| TEST/RESET toggle switch | TEST | Used with READ/MON/CUTOUT switch in MON causes all ALARM and SHUTDOWN lamps to light, but auxiliary devices controlled by shutdown relays are inhibited from shutting down. |
| TEST/RESET toggle switch (cont.) | RESET | Resets all alarm and shutdown conditions and annunciators only after all fault conditions are removed. |
| READ SET POINT CHANNEL select switch | Any position 1 through 6 | In conjunction with ALARM/Off/SHDN switch, permits reading of alarm or shutdown set point for the selected channel. |
| ALARM/Off/SHDN momentary toggle switch | ALRM | Selects alarm set point for channel selected on READ SET POINT switch. |
| | SHDN | Selects shutdown set point for channel selected on READ SET POINT switch. |
| POWER indicator lamp | Lighted | Indicates system powered up. |
| | Off | Indicates system powered down. |
| Digital display indicator (located on master monitor ) | Any value | Displays (3½ digit) current temperature, alarm or shutdown set points for any channel in °F or °C depending upon RTD values and calibration data. |

Note: See monitor controls and indicators inside back cover.

# V. MAINTENANCE

## PREVENTIVE MAINTENANCE

The OMNIGUARD Series 6100 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 3-4.) 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.

**CAUTION: On failsafe units, turning off the power will activate the shutdown relays. During this test, the test interlock circuitry is not active and if it is desired not to cycle any controlled equipment, that channel should be in the CUTOUT position. Be sure to restore all cutout switches to the monitor position when finished.**

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.

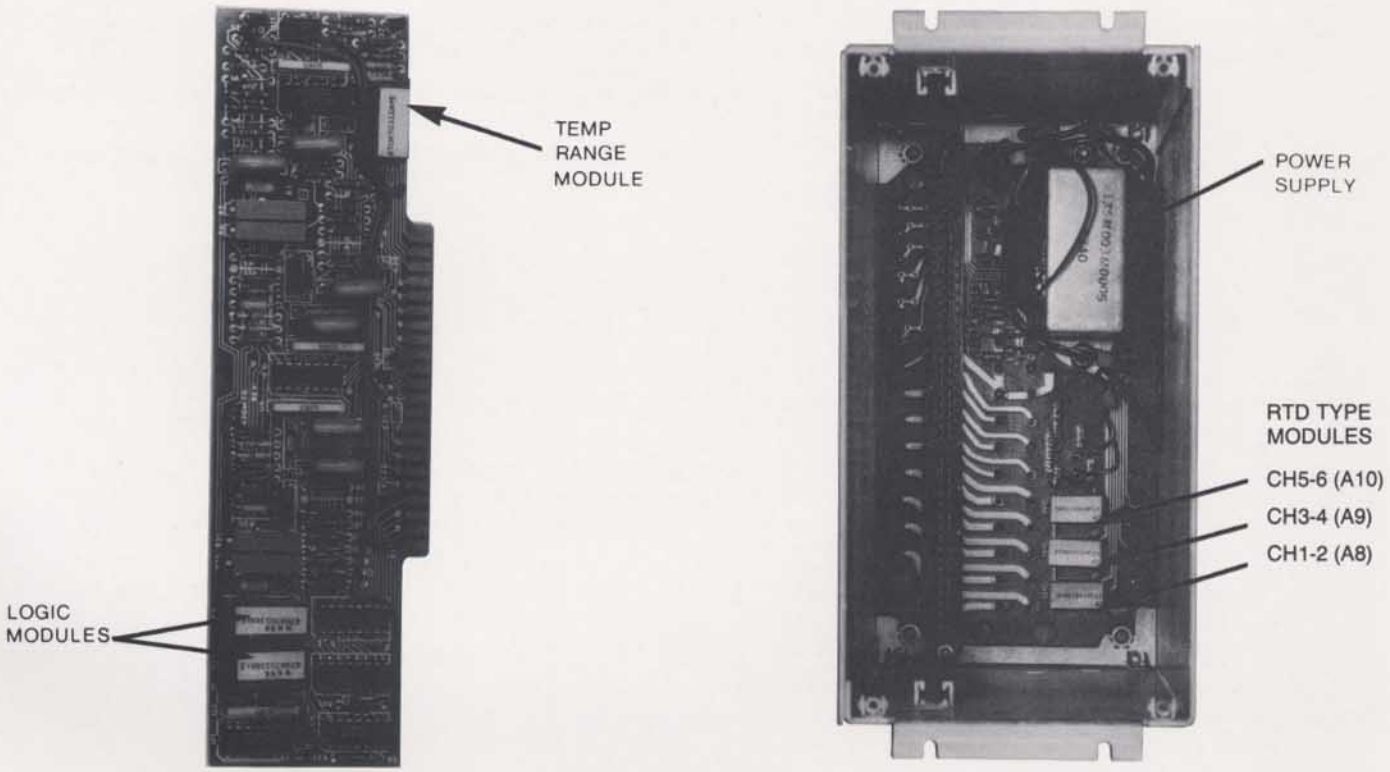



Figure 5-2. Inside View of Cabinet

## CORRECTIVE MAINTENANCE

**It is the manufacturer's recommendation that all monitors requiring repair be returned to Armtec 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 6100 Supervisory System has an extensive built-in test capability. Besides checking indicator lights, the TEST/RESET switch in TEST position and individual channel READ/-MON/CUTOUT switches in CUTOUT position allow 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 6100 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-module, be sure that they are the correct ones. When finished, carefully recheck all plug-ins and modules against the part number using Tables 3-4 through 3-9.**

## 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 P/N |
|---|---|
| Fuse 0.3A (115VAC only) | 120M112M0008 |
| Fuse 0.125A (230VAC only) | 120M112M0009 |
| Fuse 2.0A (24/28VDC only) | 120M112M0007 |
| Fuse 1.0A (48VDC only) | 120M112M0006 |
| Supervisory Board | 470M7335M□□ |
| Relay | 185M007M0001 |
| °C to °F Board | 470M70324M01 |
| Meter | 470M70323 |
| Main Control Board* | 470M70317M□□ |
| Temp. Range Module* | 470M70311M □□ |
| Logic Module* | 470M70336M □□ |
| RTD Type Module* | 470M70333M □□ |

*Blank digits are determined by particular configuration.

## OMNIGUARD® PRODUCT WARRANTY

Armtec Industries, Inc. will, at its option, repair or replace 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.

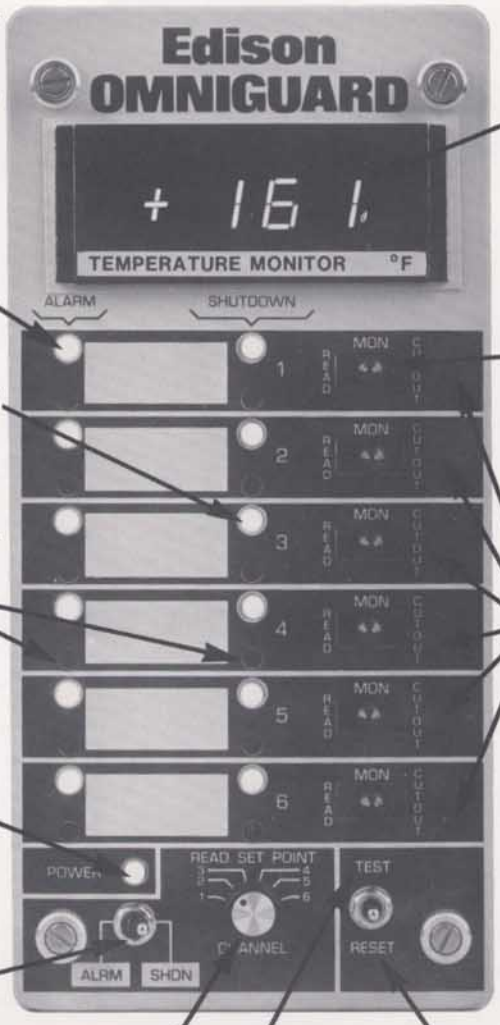
This warranty will be valid only if the product is returned to the factory at Manchester, NH properly packed and with all transportation charges prepaid within the applicable warranty period. All periods run from date product is shipped to end user providing this is within six (6) months of date product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




**ALARM LIGHT** signifies first set-point has been exceeded and annunciator relay activated.

**SHUTDOWN LIGHT** signifies the second temperature set-point has been exceeded, and annunciator and output relays activated.

**DUAL CHANNEL SETPOINTS** are fully accessible and independently adjustable — thru the mask.

**POWER LIGHT** indicates unit on, fuse o.k.

**READ SET POINT SWITCH** provides built-in readout of ALARM and SHUTDOWN temperature settings.

**DIGITAL INDICATOR** The brightest display on the market provide temperature point readings on demand.

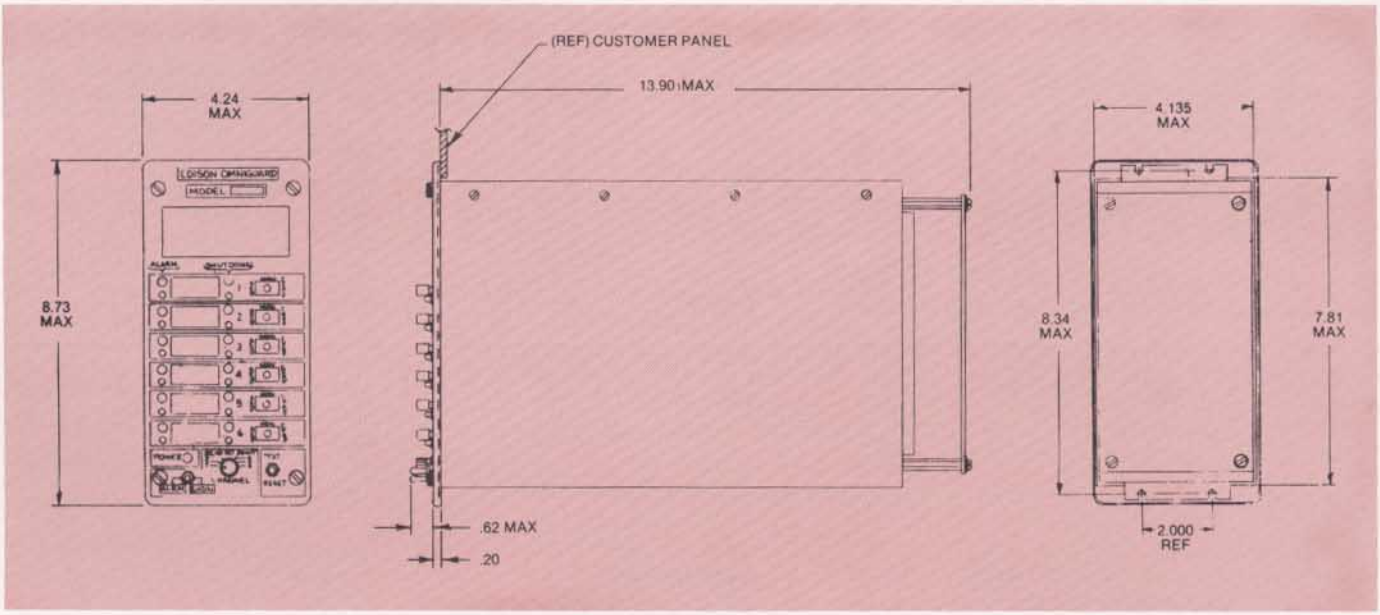
**3-POSITION SWITCH** for each channel selects operating mode: READ (must be held in), MONITOR (normal) or CUTOUT (prevents operation of output relays in all modes of operations including TEST).

**6-CHANNEL MONITOR** continuously monitors temperature at six locations.

**READ SET-POINT** selects channel for temperature alarm and shutdown settings.

**TEST** position simulates temperature fault conditions.

**RESET** position resets the circuit, lights, and relays after removal of the temperature fault condition, and acknowledges Alarm Annunciator.



# 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 | |

**Set Point Type**

| Code | 4-20 mA Output | Set Points |
|---|---|---|
| 0 | No | Dual (Alarm and Shutdown) |
| 1 | No | Single (Shutdown Only) |
| 2 | Yes | Dual (Alarm &Shutdown) |
| 3 | Yes | Single (Shutdown Only) |

**Temperature Range**

| Code | Temperature Range Celsius | or Fahrenheit |
|---|---|---|
| 0 | −80° to 760° | −100° to 1400° |
| 1 | −80° to 90° | −100° to 200° |
| 2 | −20° to 150° | 0° to 300° |
| 3 | 40° to 210° | 100° to 400° |
| 4 | 90° to 260° | 200° to 500° |
| 5 | 150° to 320° | 300° to 600° |
| 8 | None - (No Control Card) | |
| 9 | Special - See Specifications | |

CH1-2
CH3-4
CH5-6

**61 ■ ■ M ■ ■ ■ ■ ■ M ■ ■ ■ ■**

**Features**

| Code | Option |
|---|---|
| 00 | Failsafe, Latching Alarm on Rising |
| 01 | Non-Failsafe, Latching Alarm on Rising |
| 02 | Failsafe, Non-Latching Alarm on Rising |
| 03 | Non-Failsafe, Non-Latching Alarm on Rising |
| 04 | Failsafe, Latching Alarm On Falling |
| 05 | Non-Failsafe, Latching Alarm On Falling |
| 06* | Failsafe, Non-Latching Alarm On Falling |
| 07* | Non-Failsafe, Non-Latching Alarm On Falling |
| 10-89 | Deviation to be factory assigned |

*Factory Option Only

**Power Supply**

| Code | Power Supply |
|---|---|
| 0 | 115 VAC, 50/60 Hz |
| 1 | 230 VAC, 50/60 Hz |
| 2 | 24/28 VDC |
| 3 | 48 VDC |
| 9 | Special - See Specifications |

CH5-6
CH3-4
CH1-2

**RTD Type & Scale**

| Code | RTD Type | Scale Type |
|---|---|---|
| 0 | #8 Platinum | Fahrenheit |
| 1 | #11 Platinum | Fahrenheit |
| 2 | #7 Nickel | Fahrenheit |
| 3 | #15 Copper | Fahrenheit |
| 4 | #8 Platinum | Celsius |
| 5 | #11 Platinum | Celsius |
| 6 | #7 Nickel | Celsius |
| 7 | #15 Copper | Celsius |
| 8 | None - (No Control Card) | |
| 9 | Special - See Specifications | |

The maximum temperature range for each type of RTD is

| | °C | °F |
|---|---|---|
| Pl #8 | −130 to +840 | −202 to +1500 |
| Pl #11 | −130 to +740 | −202 to +1364 |
| Ni#7 | −70 to +300 | −94 to +572 |
| Cu#15 | −50 to +250 | −58 to +482 |

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