GENERAL MONITORS

MODEL 610

Four Channel
Combustible Gas Monitor

INSTRUCTION MANUAL 9/89

Part No. MAN610
Revision 9/89

GENERAL MONITORS

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To All Model 610/2280 Users:

The Model 610 (revision 09/89) and the Model 2280 (revision 09/91) Instruction Manuals do not adequately reflect the current revision of these units. These manuals are in the process of being updated, and in order to continue servicing you on these products, please make note of the following changes:

- The Common Alarm Relays with Discrete Alarm Setpoints option is not available.
- The Discrete Alarm Relays with Common Alarm Setpoints option is not available.

References to these options are made on the following pages in the Model 610 and 2280 instruction manuals:

Description	Model 610 Page #s	Model 2280 Page #s
Configuration Drawing	23	27
Circuit Card Assembly Drawing, Control Electronics	34 & 35	28 & 29
Final Assembly Drawing	49 & 58	49 & 62
Parts Lists	38, 40, 44, 51, 52, 55, 56, 60, 61, 64 & 65	32, 34, 38, 40, 43, 45, 51, 52, 55, 56, 59, 60, 64, 65, 68, 69, 72 & 73

If you have any questions, please contact your General Monitors' Sales Representative or the factory direct. Thank you.

Respectfully,

Charles Simek
Technical Writer
General Monitors, Inc.

GENERAL MONITORS

MODEL 610

QUAD CHANNEL COMBUSTIBLE GAS MONITOR

I. INTRODUCTION

A. NOTICE

All information contained in this instruction manual may be used only to install and operate the Model 610 System provided by GENERAL MONITORS, INC. (GMI). The sale of the instrument does not license the user to reproduce GMI drawings, or to utilize any information in this manual without prior written permission.

The Model 610 System is easy to install and operate. However, this manual should be read in full, and the information contained herein understood, before attempting to place the system in service.

B. GENERAL

The Model 610 is a four channel system designed to continuously monitor for potentially explosive concentrations of most combustible gases/vapors. Normally only a periodic calibration check is needed to assure dependable performance. The system operates in the range 0-100% LEL (Lower Explosive Limit) and is calibrated to a particular gas or vapor. There are relatively few combustible gases which should not be monitored; however, as a precaution GMI should always be consulted to verify the feasibility of monitoring any gas or vapor other than those specified at the time of purchase.

The Model 610 consists of a controller plus four sensor assemblies. The controller is fully solid state. It should be mounted in a weather protected, non-hazardous area. Several GMI mounting accessories are available for panel, wall, or 19 inch rack installation. For hazardous areas an explosion-proof housing is available for Class I, Division 1, Groups C & D.

Any GMI low temperature catalytic bead combustible gas sensor assembly may be used with the system. Sensor assemblies may be mounted outdoors in hazardous areas (National Electrical Code Class I, Div. 1, Groups B, C, and D). They must be connected to the controller in accordance with the instructions in this manual.

C. SENSOR OPERATING PRINCIPLE

A high efficiency source supplies constant direct current to a Wheatstone Bridge circuit. One leg of the bridge is formed by two bead elements in series, contained within the sensor. These beads are heated by the direct current. The other leg, located on the printed circuit board in the controller, is a resistive divider. With the sensor exposed to clean air, any initial bridge imbalance is

C. SENSOR OPERATING PRINCIPLE (cont'd.)

trimmed out with a zero pot. When a combustible gas/air mixture diffuses into the sensor, it oxidizes on one of the beads (the "active" bead, which has been catalytically treated). The second (reference) bead, inert to combustible gases, compensates for ambient temperature, humidity, and pressure variations. The oxidation at the active bead causes a temperature increase which produces an electrical resistance change and unbalances the Wheatstone Bridge. The difference in resistance between the two beads is proportional to the concentration of the combustible gas. The signal from the bridge imbalance is amplified and conditioned by the circuitry. The conditioned signal is then displayed in % LEL by the individual digital readouts.

This sensor relies on catalytic oxidation to sense and respond to combustible gases and vapors. As the term implies, oxygen plays a very crucial part in the operation. If there is a depletion of oxygen there will be a loss of response from the sensor. If the combustible gas is in mixture with nitrogen or some other inert gas, there may be no response at all, depending on the level of oxygen present.

Conversely, if the atmosphere is enriched with oxygen, the response will be enhanced and may even damage the sensor. Frequent checks should be made to determine sensor response and accuracy.

These sensors are intended for area monitoring, in the work environment and if used in process control or other special situations, the factory should be consulted.

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II. SYSTEM COMPONENTS

A. SENSOR ASSEMBLIES

Four SENSOR ASSEMBLIES (see Figure 2) are normally supplied with the system. They are comprised of the sensor, P/N 10001-1, plus the sensor housing, P/N 10252. This sensor assembly is CSA approved for Class I, Division 1, Groups B, C, and D hazardous areas. On some occasions a different P/N sensor and/or sensor housing will have been supplied (see Section IX). The appropriate P/N sensor will have been provided if GMI was made aware of the gas or vapor which will be monitored. Most combustible gases may be monitored, including most hydrocarbons, hydrogen, and carbon monoxide.

> CAUTION
>
> Sensors have a different sensitivity to each gas. GMI should be consulted if a sensor is expected to detect more than one gas. GMI can then recommend the best calibration gas.

A variety of sensor covers may be purchased. They provide extra protection from wind, weather, and dust. See Section X for information to aid in selecting the best sensor cover for various conditions. Note: These sensor covers are not included in the Factory Mutual approval of this equipment.

In the event the system is to have less than four active channels, P/N 10102 dummy sensor should be substituted for each of the unused sensors. Otherwise the MALF (malfunction) LED indicator for the unused channel will remain lit.

B. THE CONTROLLER

The Model 610 is a quad channel system in which the controller continuously monitors the inputs from four sensors. The sensors are monitored independently (i.e., they are not scanned, nor are the signals summed).

Each channel has its own:

- Constant current sensor drive circuit.
- LED indicators (front panel) for HIGH, LOW and MALF alarm circuits.
- Selector switch for CAL (calibrate) or OPER (operate) mode of system operation.
- Digital display of % LEL.
- ZERO and SPAN adjustments.
- High, Low and Malf relays (optional feature).
  Note: Standard configuration is common alarm relays.

Digital Displays on the front panel display the % LEL reading for each channel. The readout range is 0-99% LEL. For concentrations above 99%, the display becomes a flashing "99".

B. THE CONTROLLER (Cont'd)

Discrete front panel gas alarm indicators are flashing LED's - amber for LOW and red for HIGH. Alarm set points for these two gas alarm circuits are adjustable from 0 to 99% LEL. It is recommended that the low alarm be set under 25% LEL and the high alarm be set no higher than 60% LEL. The alarm set point adjustments are located on each channel control card. Access to these set point adjustments is gained by sliding the controller forward from its mounting. Access holes through the top plate of the controller are now visible and accessible for adjusting alarm set points.

NOTE

A "service loop" is necessary between the Model 610 controller's rear panel terminals and field/power wiring. This service loop should permit the controller to be removed or slid forward for various adjustments and/or servicing. This service loop is a definite advantage when replacing or exchanging a controller.

Standard Model 610 Controller

One alarm relay is provided for each of the three alarm circuits - HIGH, LOW and MALF. The standard Model 610 controller has one set of alarm relays which are common to all four channels. Discrete alarm relays (3 each per channel) are available as an optional feature. All alarm relays are rated 3 amps @ 117 VAC/ 30 VDC, resistive load. HIGH and LOW relays are DPDT; MALF relays are SPDT.

CAUTION

Do not utilize an inductive load without reading Section III, Paragraph H.

The standard Model 610 provides latching operation (requiring manual reset) of the high alarm circuit, and non-latching operation (automatic reset) of the low alarm and malfunction circuits. On special order the Model 610 can be provided with any combination of latching or non-latching low and high alarms. The malfunction alarm is always non-latching. The standard gas alarm relays are normally de-energized (with power applied) but they can be supplied normally energized on special order. The malfunction relay is always normally energized.

OPTIONAL MODEL 610 CONTROLLER FOR ZONE CONTROL (VOTING)

The Model 610 controller can be supplied with a special voting option when specified on the original order for the equipment. A system supplied for voting use must be the common alarm version and will require that two channels reach the HIGH alarm set point before the HIGH alarm relay will actuate. All other functions of the Model 610 system will be the same as for the non-voting system.

If eight (8) channels are to be employed to monitor one zone, a second Model 610 controller can be interconnected to the first unit and any two (2) out of the eight (8) channels that reach a high alarm condition will cause the HIGH alarm relay to actuate. When an eight (8) channel system is ordered, the HIGH alarm relays in both Model 610 systems will not actuate until two channels reach the alarm set point. The LOW and MALFunction relays will function the same as they do in non-voting systems.

A maximum of four (4) Model 610 controllers (16 channels) can be employed in this voting option. (See figure 10 for typical interconections).

NOTE: When more than one Model 610 controller is used in a zone, all of the controllers must be mounted adjacent to one another to keep the interconnecting leads as short as possible.

The reset button for cancelling latched alarm circuits is located on the front panel. The circuits will only reset if the gas concentration has fallen below the set point level.

The front panel Digital Display can be used for malfunction diagnosis. When a channel malfunctions, the front panel "MALF" LED will start flashing. That channel's Digital Display will go to 00% LEL. Switch that channel's front panel rocker switch (recessed) from the "OPER" mode to the "CAL" mode. The MALF LED will continue flashing. The digital readout will change from 00% LEL to one of the following readouts:

AO - indicates analog output malfunction
HI - indicates High Line Voltage
LO - indicates Low Line Voltage
SE - indicates Sensor circuit malfunction

Refer to the trouble-shooting section of this manual for corrective action for above noted malfunction modes.

The front panel recessed rocker switches have two positions - "OPER" and "CAL". The OPER (operating) position is for normal use/operation. The CAL position is used for system calibration and setting alarm set points. In this position, the alarm relays are by-passed to prevent false alarms. The flashing MALF LED indicates "out of normal operating mode".

ZERO and SPAN calibration potentiometers for each channel are located behind the front panel. They are accessible from the front panel by using a small screwdriver.

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III. INSTALLATION INSTRUCTIONS

A. LOCATION OF THE CONTROLLER

The Model 610 Controller should be installed in a weather protected, non-hazardous area. The following mounting hardware is available to facilitate installation:

98mm (4") panel mount frame	P/N 10199-1
483mm (19") rack frame (4 controllers)	P/N 10200-1
Blank panel (one for each unused position in 19" frame)	P/N 10191
98mm (4") wall mount bracket	P/N 10202-1
Weatherproof Enclosure	P/N 10259-1
NEMA 7 Explosion Proof Enclosure	P/N 10099
Desk Top Cabinet (up to 4 controllers)	P/N 914-006

Mounting should be as free from shock and vibration as possible in a grounded enclosure that requires a tool for instrument removal so as to minimize the possibility of electrical shock. Caution should be taken not to mount the controller in close proximity to radio transmitters or similar equipment, even though though the controller is RFI resistant. It is recommended that a wiring service loop be utilized to facilitate gaining access to the alarm set points. Care should be taken to assure adequate ventilation. Do not mount the controller in a manner which will restrict the natural convection air flow from normal ambient air. The controller operating temperature range is 0°C to 60°C (32°F to 140°F).

B. POWER CONNECTIONS

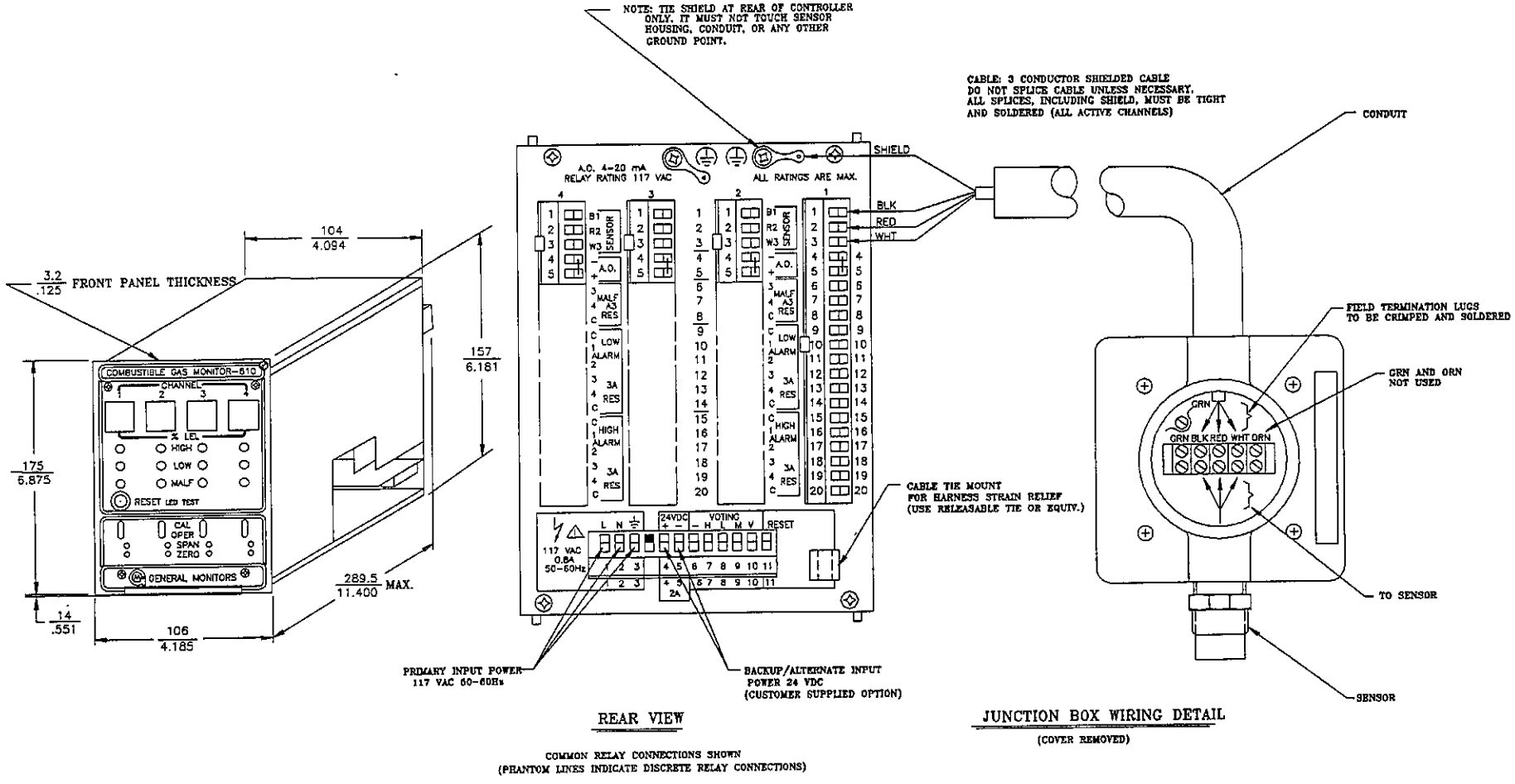
The system operates on nominal line power of 117 VAC, 50/60Hz. Power must remain disconnected until all other wiring connections are made. (NOTE: To eliminate accidental system shutdown, GMI does not provide a power on-off switch.)

If AC is to power the system, connect the line power supply to the terminals L, N, and ⏚ located on the rear of the controller. Refer to Figure 1. Use accepted commercial wiring practices.

Primary DC power may be utilized instead. Use any 24V nominal direct current supply with a minimum rating of 2 amperes. No. 14 wire should be used to prevent excessive voltage drop, and the run should be as short as possible. Connect the positive supply to 24 VDC (+) and the negative supply to 24 VDC (-) on the terminal block. An internal diode protects the system in the event of inadvertent supply reversal.

C. BATTERY BACKUP

An emergency battery backup may be employed on a system normally powered by AC. The customer furnished battery may be connected as shown. No manual or relay switching is required. Note that there is no provision for battery charging. A customer furnished battery charger should be used to keep the battery charged to the battery manufacturer's recommended level. The cable length (battery to controller) should be as short as possible. Should an AC power failure occur, the 24 Volt battery supplies current through the diode to the controller circuitry. DO NOT USE MORE THAN A 24 VOLT BATTERY.



REAR VIEW

COMMON RELAY CONNECTIONS SHOWN
(PHANTOM LINES INDICATE DISCRETE RELAY CONNECTIONS)

JUNCTION BOX WIRING DETAIL

(COVER REMOVED)

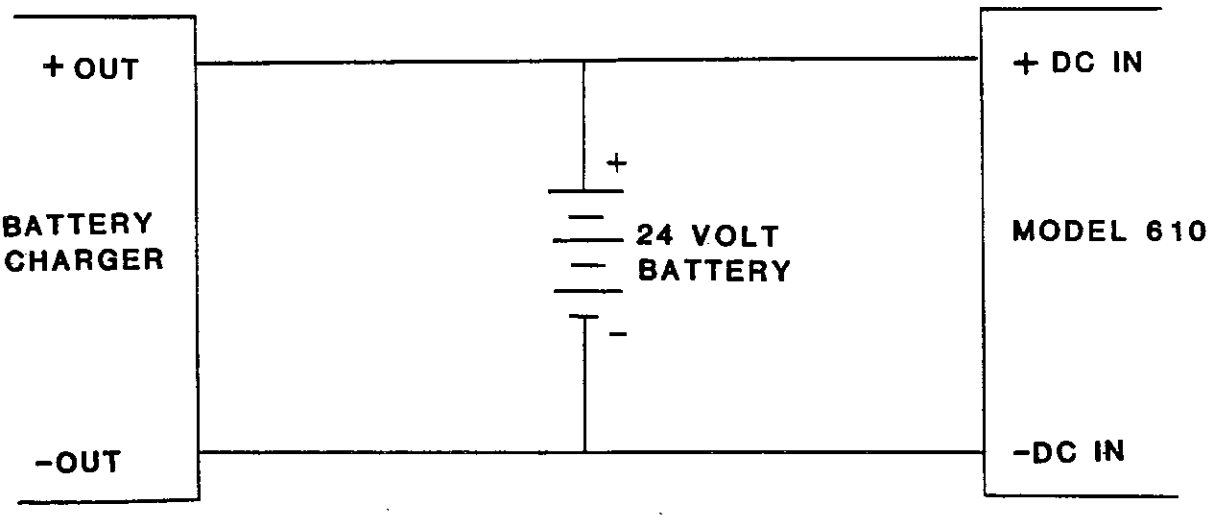
OUTLINE DRAWING & REAR TERMINAL CONNECTIONS

(REF 20659)

FIG. 1

C. BATTERY BACKUP (Cont'd)

The battery rating (ampere-hour capacity) is dictated by the length of time you expect power outages to last. A Model 610 requires approximately 2 ampere (peak) at 24 VDC. General Monitors recommends that a Lead-Acid type battery be used. This type battery can be expected to last for several years with minimum maintenance.



Schematic: Battery Back-up System

D. ANALOG OUTPUT CONNECTION

The analog output must either be used or jumpered, or the system will not operate. The two analog output terminals, (AO+ and AO-), are located on the rear panel. The analog output is 4-20ma into a maximum 300 ohm load.

E. REMOTE RESET CONNECTION

Remote Reset (of alarm circuits) connections are made to rear panel Terminal Board connections RESET and the 24VDC (-) terminal. If a remote reset switch is used, it must be a "normally open, momentary action" type.

NOTE

If the system is to be powered from a primary DC power supply or if battery backup is provided, the 24VDC(-) terminal will have two wires when remote reset is used. The diameter of the two wires cannot be larger than a No. 14 wire.

F. CHOOSING SENSOR LOCATIONS

Several variables are involved in selecting locations to install sensors to assure the detection of combustible gases. There are no hard and fast rules defining the optimum location. However, the following general suggestions should be considered in regard to particular conditions at the site a Model 610 is being installed.

(1) Vapor Density

Whether the gas/vapor to be monitored is lighter or heavier than air will affect sensor placement. For lighter-than-air gases, sensors should generally be placed close to the roof or ceiling in indoor installations. For gases much heavier than air, sensors should generally be located near the floor or ground when there is no air currents in the area. Gases with a density equal to air, or slightly greater than air, will tend to rise, particularly when air currents are present.

(2) Air Currents

If there are winds, fans, or other sources of air movement, combustible gases might tend to rise or to accumulate in certain sections of a facility. Local air currents should be studied to aid in selection of sensor locations.

(3) Likely Sources of Gas Emission

In general, at least one sensor should be located in close proximity to each point where a leak of a combustible gas is likely to occur. This is particularly important when a liquid having a low volatility is to be monitored.

(4) Environmental Factors

Avoid installing sensors where they will be unnecessarily exposed to wind, dust, water, shock, or vibration. Observe the temperature range limitations of sensors, covered in the Specification section of this manual.

(5) Catalytic "Poisons"

Sensors will be adversely affected by prolonged exposure to certain materials. Loss of sensitivity (i.e. reduced response to combustible gases), or corrosion, may be gradual if such materials are present in low concentrations, or it may be rapid at high concentrations. The more important materials adversely affecting sensors are:

- Halides (compounds containing chlorine, fluorine, bromine, or iodine).
- Sulfur compounds such as SO_2, H_2S, CS_2.

F. CHOOSING SENSOR LOCATIONS (Cont'd)

- Heavy metals such as tetraethyl lead.
- Silicones (often contained in greases and aerosols). Silicones do not chemically attack the sensor. They instead coat the beads and therefore reduce or stop the oxidation of the combustible gas at the catalytically active bead.
- Acid vapors.
- Caustic liquids or vapors.

The presence of such materials in an area does not necessarily preclude the use of a catalytic bead sensor. The feasibility of using a sensor in such areas must be determined by an analysis of the specific factors in each application. However, sensors used in such areas usually require calibration checks on a more frequent basis than normal, and typically have a shorter life than normal. In many such applications the normal two year warranty would not apply.

CAUTION

GMI discourages the painting of sensor assemblies for two reasons. First, if the sensor head is painted over, gas will not be able to diffuse into the sensor. Secondly, many paints contain lead which can poison a sensor.

G. SENSOR INSTALLATION

Various types (P/N's) of sensors can be provided with the Model 610. However, the installation method is identical in all cases. See Section IX for further information.

The SENSOR ASSEMBLY, as shown in Figure 2, is used most often. It consists of P/N 10001-1 sensor plus GMI P/N 10252 sensor housing. This assembly is CSA approved for NEC Class I, Division 1, Groups B, C, and D hazardous areas.

Although sensors are interchangeable between channels, it is recommended that each sensor be used with the channel it was matched with at the factory. The controller is tagged with this information.

Each sensor assembly is connected to the controller using 3-conductor stranded cable, and must be installed with conduit in hazardous areas. Total loop resistance excluding the sensor must not exceed 40 ohms. A separate cable is required for each sensor.

G. SENSOR INSTALLATION (Cont'd)

GMI recommends the use of shielded cable as a general rule, though in some cases it is not an absolute necessity. Due to the low levels of sensor signal voltages, shielded cable will be required in some installations to guard against extraneous electrical noise. The shield must be enclosed in a suitable insulating outer jacket, and must be grounded only at the rear panel sensor shield ground terminal (see Figure 1). Care must be taken to assure that the shield does not come into contact with the sensor housing or metal conduit.

Avoid running sensor cables close to high power cables, radio transmission lines, or cables subject to pulses of high current.

Sensor cable connections must be crimped and SOLDERED for stable operation. Use only continuous, unjointed cable runs if possible. Improperly spliced cable can result in corrosion, resistance changes and drift.

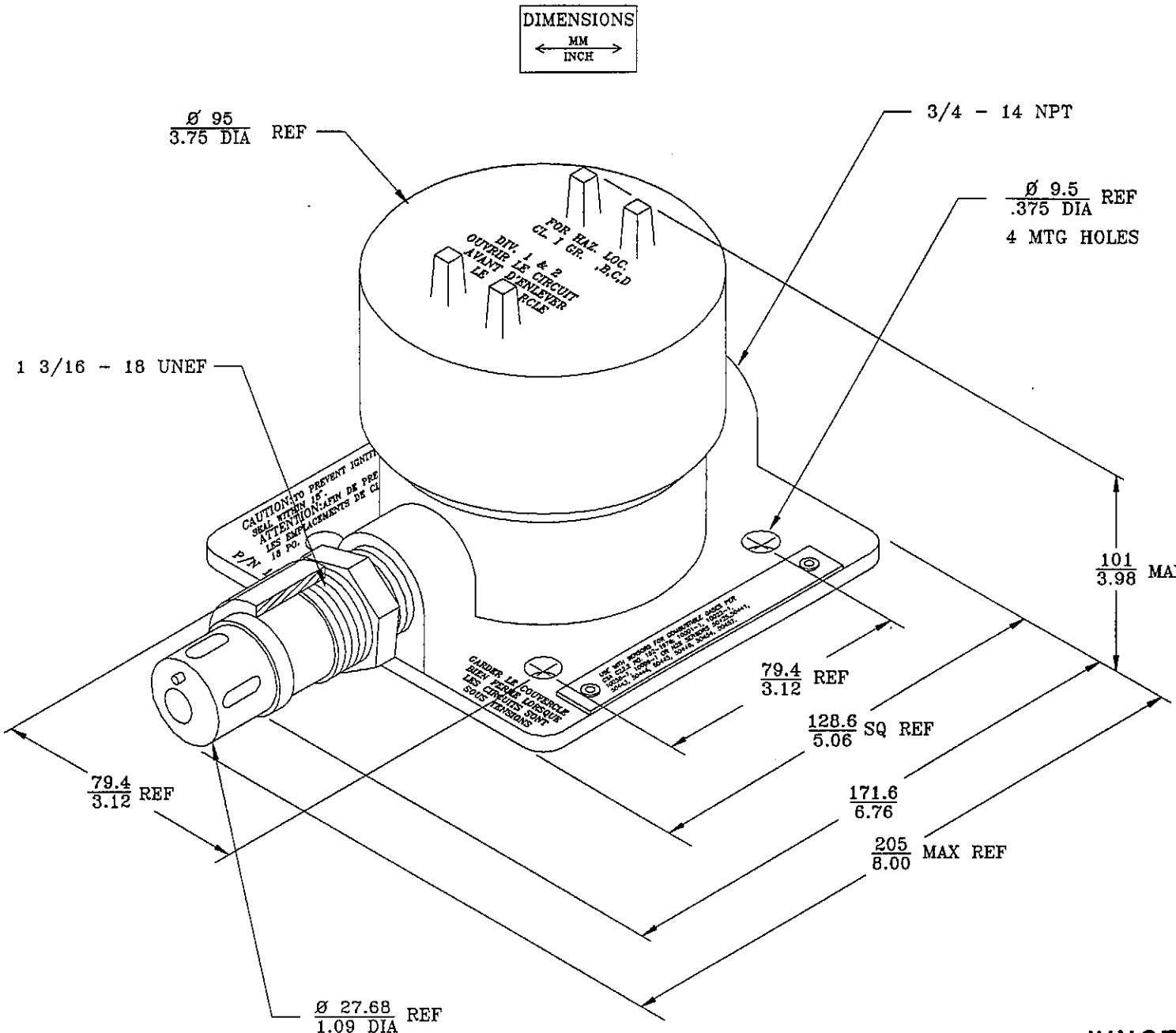
To connect the cable at the sensor, remove the P/N 10252 housing lid to reveal the terminal strip. The sensor is connected in the housing according to the color designations shown in Figure 2. (The green and orange positions are not used).

Sensor cables are connected at the controller to the terminal blocks located along the top of the rear of the controller. The channel numbers (1,2,3 & 4) read from right to left on these sets of terminals. Connect the cable so that the terminal color at the sensor housing matches the terminal color at the controller as follows (see Figure 1):

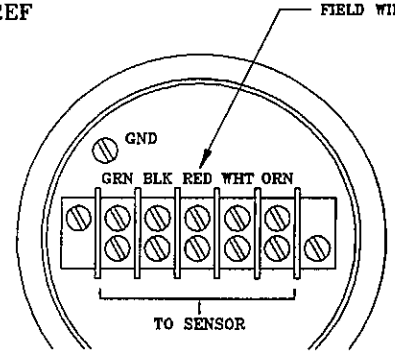
Wire Color	Terminal Number			
	CH 1	CH2	CH3	CH4
Black	BLK	BLK	BLK	BLK
Red	RED	RED	RED	RED
White	WHT	WHT	WHT	WHT

Cable runs should not exceed the following distances (maximum loop resistance of 40 ohms).

AWG	METERS	FEET
20	580	1900
18	910	3000
16	1460	4800
14	2320	7600



SENSOR GUARDS	
PART NUMBER	DESCRIPTION
1800822	DUST GUARD
10395	SPLASH GUARD
10110	DUST GUARD WITH DISPOSABLE SCREEN



WIRING DETAIL
(COVER REMOVED)

FIG.2

JUNCTION BOX ASSY-SENSOR

G. SENSOR INSTALLATION (Cont'd)

> CAUTION
>
> Sensors should always be mounted pointing downward so that water will not accumulate on the sensor head. Mounting should be as free from shock and vibration as possible, and should be convenient for calibration checks in place. The sensor housing must never be opened when power is on, otherwise the explosion-proof integrity of the sensor assembly is violated. The threads on the housing lid must be fully engaged.

H. ALARM WIRING CONNECTIONS

The low and high alarm contacts for customer use are DPDT, and are rated 3 amps at 117 VAC, resistive. The malfunction alarm contact is SPDT, 3 amps at 117 VAC, resistive. These contacts are brought out to terminals on the rear of the controller as follows (see Figure 1):

ALARM RELAY	CONTACT CONDITION		
	OPEN	COM	CLOSED
Malfunction			
Low Alarm	2,3	C	1,4
High Alarm	2,3	C	1,4

The above chart shows the high and low alarm contacts in the standard de-energized state (with power applied). These two alarm relays are normally de-energized unless specially ordered for normally energized operation. The malfunction relay is always supplied normally energized.

If normally energized, the terminations are:

ALARM RELAY	CONTACT CONDITION		
	OPEN	COM	CLOSED
Malfunction	4	C	3
Low Alarm	1,4	C	2,3
High Alarm	1,4	C	2,3

H. ALARM WIRING CONNECTIONS (Cont'd)

CAUTION

Inductive loads (bells, buzzers, relays, contactors, solenoid valves, etc.) connected to the high alarm, low alarm and malfunction alarm relays must be clamped down as shown in the diagrams below. Unclamped inductive loads can generate voltage spikes in excess of 1000 Volts. Spikes of this magnitude will cause false alarms and possible damage.

I. ZONE CONTROL OPTION (VOTING)

If the special voting option has been ordered for eight channels or more, special interconnections must be made between the Model 610 controllers. Terminals for these interconnections are on terminal block TB2 which is the set of terminal blocks located horizontally along the bottom of the controller. (See Figure 1).

The terminals to be interconnected are identified as follows and are located within the area labeled "VOTING":

" - "
" H "
" L "
" M "
" V "

Use 18 to 20 AWG cable and connect these terminals to the like terminals on the second Model 610 controller.

If 12 or 16 channels are to be in the zone, continue the same interconnection between the second and third controller and between the third and fourth.

NOTE: The terminal blocks will accept up to No. 14 AWG wire so that it is recommended that 18 or 20 AWG be used where two leads are to be connected to the same terminal.

When a voting system is in operation, all LED's and Digital Readouts on the front of each channel will function normally. That is to say that when one channel reaches a HIGH alarm condition, LOW and HIGH LED's for that channel will illuminate and the digital readout will show the gas concentration. The HIGH alarm relay will not actuate however, until a second channel reaches the high alarm set point.

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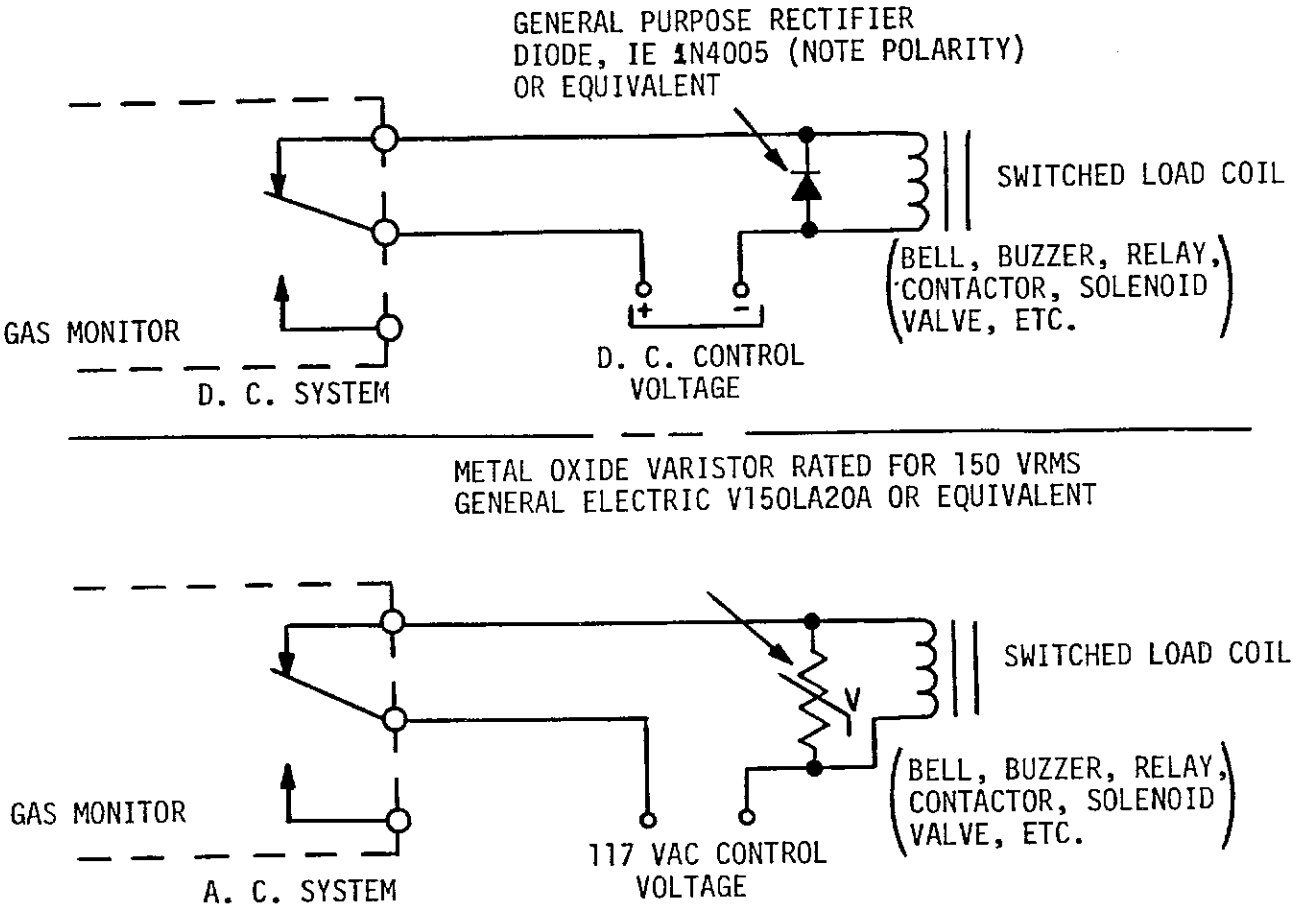


IV. START-UP AND OPERATION

A. INITIAL APPLICATION OF POWER

Before applying power for the first time double-check all wiring components.

The system has a time delay feature. The HIGH and LOW alarm circuits are disabled for approximately 45 seconds after power is applied. This feature prevents false alarms while the sensor circuits are stabilizing.

When power is first applied, all of the % LEL displays will flash "digits". This indicates "Power on". The displays will continue flashing digits during the 45 second time delay. After the 45 second delay, the displays should read "0". Should a channel malfunction, the display will read "00" and the MALF LED for that channel will start flashing. This malfunction indication is independent of the time delay feature noted above.

> NOTE
>
> A defect in one sensor circuit will not affect the operation of other channels.

B. ALARM SET POINT ADJUSTMENTS

Switch the front panel rocker switch (recessed) from the "OPER" position to the "CAL" position.

Alarm set points are electronic, and are set by adjustment of the HIGH and LOW ALARM pots located/accessible through the controller's top plate (see Figure 1). These pots are R28 (HIGH) and R25 (LOW). To change the setpoints, advance the ZERO pot (a front panel adjustment) until the % LEL display reads the concentration you wish to use as the LOW setpoint - usually about 25% LEL. Then adjust the LOW alarm pot until the amber LOW alarm LED begins to flash. Further advance the ZERO pot until the HIGH setpoint value is reached on the % LEL display - usually about 60% LEL. Then adjust the HIGH alarm pot until the red HIGH alarm LED begins to flash. Turn the ZERO pot counterclockwise until the display again reads zero. For Model 610's with discrete alarm circuits, repeat the above procedure for each discrete channel.

These alarm circuits may be of the latching or non-latching (manual or automatic) reset type, depending upon how the instrument was initially ordered. A reset push button switch is provided on the instrument panel to reset the alarm circuits as required.

B. ALARM SET POINT ADJUSTMENTS (cont'd.)

Check both set points by moving the % LEL display upscale once again with the ZERO pot and observing the reading where the LED's illuminate. When the set points have been checked, re-set the display to zero with the ZERO pot. Return the front panel rocker switch to the "OPER" position.

> NOTE
>
> Up to 3% hysteresis is normal around alarm set points. This is required to prevent relay chatter. If the relays are latching, the RESET will have to be depressed to deactivate alarm circuits.

C. CALIBRATION

Calibration to customer specified gas is initially done at the factory. We recommend that the Model 610 system be recalibrated upon start-up, and that calibration be checked at least every 90 days thereafter.

The calibration procedure is as follows:

1. If the gas alarm relays are not to be activated during calibration (since they might be connected to external devices), move the recessed front panel rocker switch to the "CAL" position. The MALF light will flash and the relays will be held in standby. The % LEL display and gas alarm LED's will function normally.

2. Locate the ZERO and SPAN potentiometer screwdriver access openings for each channel on the front panel.

3. Select one channel to calibrate. Assure that the sensing assembly for that channel is in "clean" air.

4. Adjust the appropriate (20 turn) ZERO pot for that channel until the % LEL display reads zero, using a small thin-blade screwdriver. Make sure that you are adjusting the proper channel zero setting by observing the channel % LEL display.

5. Expose the sensor for the channel being calibrated to calibration gas, using the GMI Portable Purge Calibrator (for methane, hydrogen, etc.), P/N 1400150, or Calibration Chamber, P/N 1400200 (for solvents).

6. Adjust the channel's SPAN pot to bring the % LEL display to the concentration matching the calibration gas being used. (NOTE: Gas cylinders are normally labeled either in % LEL or % by volume of the gas. Refer to NFPA Standards No. 325M or other authority for conversions if required. For methane, 50% LEL = 2.5% gas by volume; for hydrogen, 50% LEL = 2.0% gas by volume).

C. CALIBRATION (cont'd.)

7. Remove the calibration gas, allowing the sensor to return to clean air. Allow sufficient time for the display reading to stabilize. It should stabilize at or near 0% LEL. If a minor adjustment is required to reach zero, the calibration is acceptable. Adjust the display to zero with the ZERO potentiometer. If a significant adjustment is necessary to return to zero, repeat the entire calibration procedure.

8. Repeat the previous steps (1-7) for the other channels.

D. VERIFICATION OF ZONE CONTROL OPERATION (VOTING)

To verify the correct operation of a voting system will require the actuation of the alarm relays. If the relay contacts are connected to an external alarm or to an automatic shutdown system, they should either be disconnected or the external systems should be disabled prior to check out of the operation.

With the front panel rocker switch (recessed) in the "OPER" position, adjust the ZERO pot of one channel of one of the Model 610 controllers until the LOW alarm LED begins to flash. As the low alarm set point is reached, listen for the audible low alarm relay contact actuation. If the system is located in a high noise area where the relay actuation cannot be heard, it will be necessary to connect an ohmmeter or test light across the relay contacts at the rear terminal block to verify the operation.

Continue adjusting the ZERO pot until the HIGH alarm LED begins to flash. At this point, there should be no actuation of the HIGH alarm relays. Leave this channel in the alarm condition and adjust the ZERO pot of a second channel to the HIGH alarm condition. As the HIGH alarm set point is reached on the second channel, its Red HIGH alarm LED will begin to flash and listen for the HIGH alarm relays to actuate or check the contact operation with an ohmmeter or test light.

Other combinations of two channels should be checked to ensure that all controllers interconnected in the voting mode will cause the LOW and HIGH alarms to actuate the same as described above.

E. CHECK POINTS FOR CALIBRATION AND OPERATION

(1) Frequency of Calibration

As a rule of thumb GMI recommends that the calibration be checked on each sensor at least every 90 days. If a sensor is installed where it may be subjected to splashing water, mud or dirt accumulation, or adverse gases as described in Section III D.(5), more frequent calibration is recommended. The exact frequency can vary with the severity of conditions and must be established in the field.

(2) Observations During Calibration

(a) A horizontal, one digit display (-), when the sensor is exposed to calibration gas, indicates the white and black sensor leads are reversed. This same display will appear if the ZERO pot is adjusted below the 0% LEL setting (no gas at the sensor).

(b) The SPAN potentiometer is a 20-turn pot. The number of clockwise turns required to obtain the correct meter reading during calibration varies from one gas to another. For a particular gas at a specific concentration, a steady increase over a short period of time in the number of turns required to obtain the correct meter reading indicates that the sensor is losing sensitivity and/or has been contaminated. Operators should periodically check how many turns remain in the span pot. GMI highly recommends replacing the sensor while a few turns still remain, since it is probably approaching the end of its useful life.

See Section V for additional important information.

E. CHECK POINTS FOR CALIBRATION AND OPERATION (cont'd.)

(3) Background of Combustible Gases

In some applications there will be an occasional or continuous presence of "background" combustible gases. Generally this will be a very small % LEL. Usually it is advisable to zero out the background gas concentration during caibration. To do so, isolate the sensor from the surrounding air using a plastic bag (or by placing your hand tightly over the sensor). Observe the reading on the % LEL display. A gradual drop in reading indicates the presence of background or combustible gases. With the bag in place, set the display to read 0% LEL using the ZERO potentiometer. Remove the bag and proceed with normal calibration.

CAUTION - Extended Exposure to Combustible Gases

Extended exposure of a sensor to a high concentration of combustible gases can introduce stress in the sensing element which may seriously affect performance. Re-calibration should therefore be performed after an alarm due to a high concentration of gas, and the sensor should be replaced if necessary. A display reading of 99% LEL, or high offscale, may mean an explosive concentration of gas is present.

NOTE

The foregoing warning is applicable to all catalytic bead sensors, regardless of manufacturer.

GENERAL MONITORS

V. SYSTEM PROBLEMS AND TROUBLE-SHOOTING

A. GENERAL

It is highly recommended that a spare sensor be on hand at all times. GMI sensors are the most reliable, longest life catalytic bead sensors available. Sensor failure tends to be one of the potential causes of real downtime. A full complement of other GMI recommended spare parts should also be on hand. It is recommended that defective controllers be returned to the factory for repair even if the warranty has expired.

B. MAINTENANCE

Once installed, the Model 610 system requires little or no routine maintenance other than periodic calibration checks. GMI recommends that a calibration schedule be established and adhered to. GMI also recommends that a log book be kept showing calibration dates and dates of sensor replacement.

The removal of particulate matter from accessory sensor covers may be facilitated by the use of an appropriate halogen-free solvent. Water or ethanol are examples of suitable solvents. The sensor cover should be thoroughly dried with compressed air if necessary, before refitting to the sensor body. A calibration check should be made after the cleaned cover has been re-installed because the cleaning process may increase response due to removal of dirt, etc.

C. TROUBLE-SHOOTING TABLE

The information presented in the following table is designed to correct the more common problems which appear during system startup and operation. Should the various actions suggested in the table fail to restore normal operation, we recommend that the factory be consulted and, if necessary, that the system be returned to the factory for repair.

V. MODEL 610 TROUBLE-SHOOTING

INTRODUCTION:

This section is intended to be a guide in correcting problems which may arise in the field. This section is not all-inclusive, and General Monitors should be contacted for assistance if the corrective actions listed do not eliminate the problem. If equipment or qualified personnel required for various tests is not available it is recommended that the defective unit be returned to General Monitors for repair. A complete written description of the problem should be included.

Be sure to place instrument in CAL mode or disconnect external alarm wiring before making any check which might send the unit into alarm, if an alarm condition will create problems.

NOTE: If the equipment is under warranty, any repairs performed by persons other than General Monitors' authorized personnel may void the warranty. Please read the warranty statement carefully.

PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
1. % LEL display does not turn on after application of power (AC or DC).	1. No input power. 2. 0.8 amp AC fuse (F1) is defective. 3. 2 amp DC fuse (F2) is defective.	1. Insure proper power supply to controller. 2. Replace F1. 3. Replace F2.
2. The controller does not "time out" within 45 seconds after application of power. MALF LED is flashing.	1. Low input power. 2. OPER-CAL switch is in "CAL" Mode.	1. Insure proper power supply to controller. 2. Place switch in OPER position.
3. MALF LED is flashing and digital display reads 00:	One or more channels are in Malfunction.	Switch to calibrate mode for diagnostic message.
4. MALF LED is flashing and digital display reads: HI- - - - - - - - - - - -High line voltage - - - - - - - - - -check input power LO- - - - - - - - - - - -Low line voltage - - - - - - - - - - check input power AO- - - - - ---- - - - - Analog output malfunction - - - - - -check analog output SE- - - - - - - - - - - -Sensor Malfunction: Sensor leads open- - - - - - - - - replace cable Low zero adjust- - - - - - - - - - re-zero Sensor is defective- - - - - - - - replace sensor Constant current shutdown- - - - - return to factory		
5. LOW and/or HIGH alarm LED'S do not turn "ON" when % LEL readout exceeds alarm set point.	1. Alarm pots not properly adjusted. 2. LED defective.	1. Perform high and low alarm set point adjustment. 2. Replace LED.

VI. SPECIAL WARNING

Through engineering design, testing, manufacturing techniques, and rigid quality control, General Monitors supplies the finest gas detection systems available. The user must recognize his responsibility for maintaining the gas detection system in operational condition.

(1) GENERAL MONITORS recommends a calibration check on a regular schedule. The calibration check should be conducted at least every ninety (90) days. This is the only method of insuring proper system operation and response to combustible gases. More frequent calibration checks are encouraged to spot problems such as mud collecting on the sensor heads, accidental painting over of sensors, etc. A calibration check is defined as the procedure of applying a known concentration of gas to the system sensors while observing the controller. The visual display will indicate the gas concentration, and alarm indicators/circuits will activate in direct relationship to gas concentration. Calibration adjustments must be made if results are at variance (see CALIBRATION section of this manual).

(2) GENERAL MONITORS cautions, as with all equipment of this type, that high levels or long exposure to certain atmospheres will "poison" the sensor catalyst and eventually affect sensitivity. See Section III F. (5) for specific information. Use in such atmospheres requires calibration checks on a more frequent schedule than normal. General Monitors should be consulted for application feasibility determination before installing a system in such atmospheres.

(3) GENERAL MONITORS' sensors and sensor housings are designed and tested for use in certain classes of hazardous atmospheres. Explosion-proof integrity cannot be maintained if sensors and sensor housings are operated in other than the "as designed" condition. Terminal access covers of sensor housings must be on. Sensor housing must be installed in accordance with National Electrical Code acceptable practices for the class of hazardous atmosphere.

(4) Sensors are designed with sintered metal or screen covers which act as flame arrestors. Do not operate sensors without screen or sintered metal parts in place.

(5) GENERAL MONITORS' gas detection systems are primarily SAFETY devices for the protection of personnel and facilities, and must be "always ready". With proper installation, calibration, and maintenance, the system will provide continuous monitoring of hazardous areas. The user must assume all liability for misuse of GENERAL MONITORS' gas detection systems.

(6) The system's full two year warranty will be voided if customer personnel or third parties damage the system during repair attempts.

GENERAL MONITORS

VII. WARRANTY

GMI warrants all of its products to be free from defects in workmanship or material under normal use and service within two (2) years (Hydrocarbon, H_2S and CO gas) and (1) year (Flame Detection) from date of shipment. The CO sensor carries a 6 month warranty. GMI will repair or replace without charge, any equipment found to be defective during the warranty period. Final determination of the nature and responsibility for defective or damaged equipment will be made by GMI personnel. Gas detection elements which have been poisoned by contaminants are not included in this warranty. In all cases this warranty warranty is limited to the cost of the equipment. All warranties hereunder are contingent upon proper use in the application for which the product was intended and do not cover products which have been modified or repaired without GMI approval or which have been subjected to neglect, accident, improper installation or application, or on which the original identification marks have been removed or altered. GMI's responsibility under the above warranty shall be limited to the repair or replacement at GMI's option at no cost to the purchaser for parts or labor, of any component which fails during the warranty period provided that the purchaser has promptly reported such failure to GMI in writing and GMI, upon inspection, found such component to be defective. The purchaser must obtain shipping instructions for the return of any item under this warranty provision and compliance with such instruction shall be a condition of this warranty.

EXCEPT FOR THE EXPRESS WARRANTY STATED ABOVE, GMI DISCLAIMS ALL WARRANTIES WITH REGARD TO THE PRODUCTS SOLD HEREUNDER INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS AND THE EXPRESS WARRANTIES STATED HEREIN ARE IN LIEU OF ALL OB LIGATIONS OR LIABILITIES ON THE PART OF GMI FOR DAMAGES INCLUDING, BUT NOT LIMITED TO, CONSEQUENTIAL DAMAGES ARISING OUT OF/OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THE PRODUCT.

GENERAL MONITORS

VIII. GENERAL SPECIFICATIONS

CONTROLLER

Dimensions:	Approx.102mm x 178mm x 292mm (4.0"W x 7.0"H x 11.5"D)
Weight:	Approx. 2.86kg (6.2 lb.)
Mounting Configurations:	Rack, panel, wall, weatherproof enclosure
Temperature Range:	32°F to 140°F (0°C to 60°C)
Storage Temperature:	-28°F to + 130°F
Humidity:	15 to 95% Non-Condensing,
Power:	105-130 VAC/50-60 Hz 205-255 VAC/50-60 Hz 22-30VDC. 9 Watts nominal per channel (117 VAC)
Digital Readout:	Range 0-99% Lower Explosive Limit (% LEL)
Accuracy:	± 3% LEL or ± 10% of applied gas, whichever is greater.
Alarm Circuits:	Independent HIGH, LOW and MALFunction circuits common to all channels. HIGH and LOW DPDT 3 Amp relays @ 117 VAC, resistive. MALFunction relay SPDT, 3 Amps @ 117 VAC, resistive. MALFunction relay is normally energized, non-latching. HIGH (latching) and LOW (non-latching) alarm relays are normally de-energized. All above specifications are standard. Options are available.
Status Indicators:	Flashing amber for LOW alarm; flashing red for HIGH alarm; flashing amber for MALFunction. % LEL digial display flashing digits during 45 second time out.
Output Signal:	Discrete 4-20 ma, 300 ohm maximum load.
Electrical Classification:	General purpose (non-hazardous, indoors)
Warranty:	Two years

SENSOR

Type:	Diffusion, low temperature catalytic bead Standard Industrial Types: Combustible Gas; High Temperature Combustible Gas.
Temperature Range: (operating and storage)	-55°C to +93°C (-65°F to +200°F) standard; high temperature special to 200°C (400°F).
Humidity:	15 to 95% R.H.
Response Time:	Typically 6 second time constant when exposed to 50% LEL of Methane gas.
Zero Drift:	Less than 5% per year
Typical Life:	3 years in normal service
Electrical Classification:	NEC Class I, Division 1, Groups B, C, and D
Warranty:	Two years

VIII. GENERAL SPECIFICATIONS cont.

Cable: 3 wire maximum cable length allowable between controller and sensor assembly with one way resistance of 20 ohms (total 40 ohms loop):

AWG	METERS	FEET
20	580	1900
18	910	3000
16	1460	4800
14	2320	7600

GENERAL MONITORS

IX. SENSORS

The following is a list of GMI sensors available for use with the Model 610 System:

P/N	
10001-1	Standard Industrial Combustible Gas Sensor. Used for most hydrocarbons and hydrogen. Temperature range -55°C to 93°C (-65°F to +200°F).
10001-1R	Same as P/N 10001-1 except greatly improved resistance to poisons such as HMDS (Hexamethyldisiloxane) and H_2S.
10014-1	High Temperature Standard Industrial Combustible Gas Sensor. Same as P/N 10001-1 except it may be used at temperatures up to 200°C (400°F).
10058-1	Same as P/N 10001-1 except sensor body is stainless steel.
10058-1R	Same as P/N 10058-1 except greatly improved resistance to poisons such as HMDS (Hexamethyldisiloxane) and H_2S.
10022-1	Similar to P/N 10001-1 except PTB approved.
10059-1	Same as P/N 10022-1 except body is constructed of stainless steel.
10015-1	High temperature equivalent of P/N 10022-1. It may be used in temperatures up to 200°C (400°F).

P/N 10001-1, 10058-1, 10022-1, and 10059-1 sensors are CSA C22.2 No. 152-1976 certified.

P/N 10252 sensor housing is normally used in the Western Hemisphere. Special PTB approved housings are normally used in Europe.

X. ACCESSORIES

A. CALIBRATION EQUIPMENT

Calibration accessories may be purchased from GMI. Contact the factory or your local representative for technical or ordering information.

The P/N 1400200 Portable Calibration Chamber is used to calibrate sensors for any specific combustible vapor which has a flash point below ambient temperature. The customer must provide his own sample of the liquid to use with the chamber. GMI provides a microliter syringe for exact measurement of volumes to be used. Instructions for use are provided with the chamber.

GMI P/N 1400150 portable purge calibrators are available for several common gases, including hydrogen, methane, ethane, propane and butane. The portable purge calibrator is a ready-for-use assembly including a lecture bottle containing approximately 50% LEL of the gas ordered, plus regulator and an adaptor which fits over the sensor. Replacement cylinders are also available.

B. SENSOR COVERS

The information below is of a general nature. GMI or your local representative should be contacted for specific recommendations.

> NOTE:
>
> If sensor covers are used they should remain in place during calibration. If they are going to be cleaned, the sensor should be recalibrated after the sensor cover is re-installed. Although several of the available covers do not effect sensitivity or response time themselves, accumulations of dust, dirt, water, etc., may do so.

(1) Dust Guard Assembly (P/N 10110)

The dust guard assembly is a simple, threaded stainless steel (type 303) cylinder with a disposable wire screen at one end. It is easily unscrewed for cleaning and/or replacement of the screen. The screen material is stainless steel (type 316) with a nominal 40 micron mesh. This accessory is specially designed to prevent dust and particulate matter from reaching the sensor flame arrestor. Such debris can plug the screen and limit the amount of gas reaching the active surface of the sensor. When the dust guard is installed, this problem is minimized and sensor response is virtually unchanged. The dust guard is also available in a kit (P/N 10044 with twelve replaceable screens. It can be used as an effective windscreen, and is recommended for corrosive, windy or high temperature environments. A typical application would be in the area surrounding a drying oven.

B. SENSOR COVERS (Cont'd.)

(2) Sintered Stainless Steel Dust Guard (P/N 1800822)

The construction of this accessory is similar to P/N 10110 above, but it has a 3mm (1/8") thick sintered stainless steel disc at one end. The body material is stainless steel. It has an internal thread for installation on the sensor body. This dust guard provides protection from fine particulates and windy environments. It should be used only in dry locations because of the tendency of the sintered disc to absorb water, which would then act as a gas diffusion barrier until the disc dried out again. This dust guard reduces sensor response, so it must never be removed for calibration.

(3) Splash Guard (P/N 10395-1)

The Splash Guard is a rugged VALOX plastic cylinder which screws into place over the sensor body. It contains a series of internal baffles and a stainless steel mesh which are designed to deflect water away from the sensor flame arrestor. The Splash Guard is recommended for areas where heavy rain or frequent equipment hosedowns occur.

Note: Sensor covers are not included in the Factory Mutual approval for this equipment.

(4) Sensor Flow Chamber (P/N 10066)

The General Monitors' Sensor Flow Chamber is constructed of aluminum (optional stainless steel construction available). The chamber has an internal thread into which a sensor may be screwed, and two threaded ports which accept 1/4 inch tube fittings. The chamber is designed for insertion into a sampling system.

XI. RECOMMENDED SPARE PARTS

One Model 610

For up to Two Years Operation

ITEM	DESCRIPTION	PART NUMBER	QTY.
1.	LENS - Amber	939-054	1
2.	LENS - Red	939-052	1
3.	LENS - Yellow	939-055	1
4.	FUSE, .8 amp, 250 VAC	951-012	2
5.	FUSE, 2 amps, 250 VAC	951-015	2
6.	Sensor	10001-1*	1

* Standard.
See Section IX for alternate types.

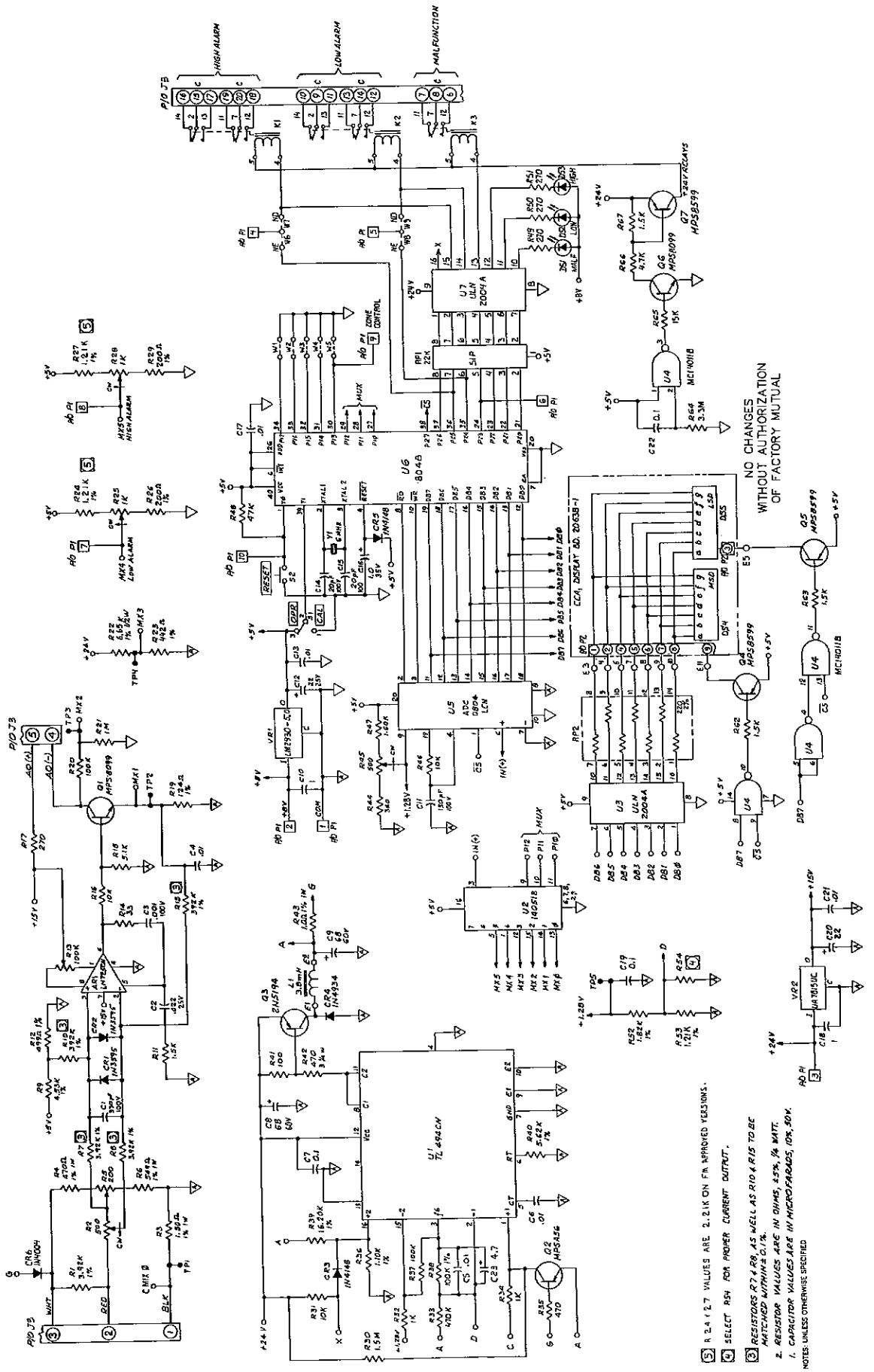
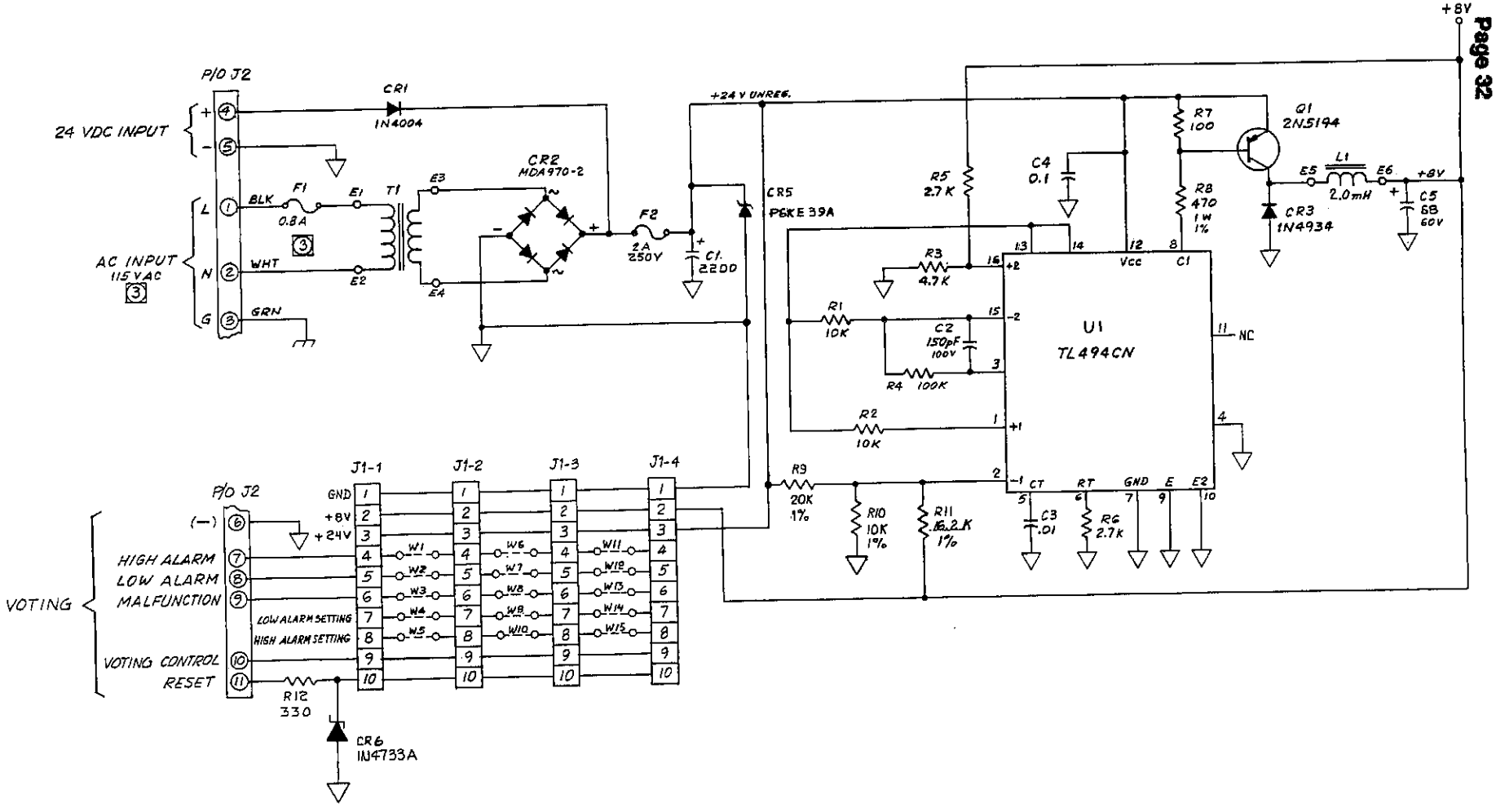


FIG 3

SCHEMATIC DIAGRAM

(REF 20631)

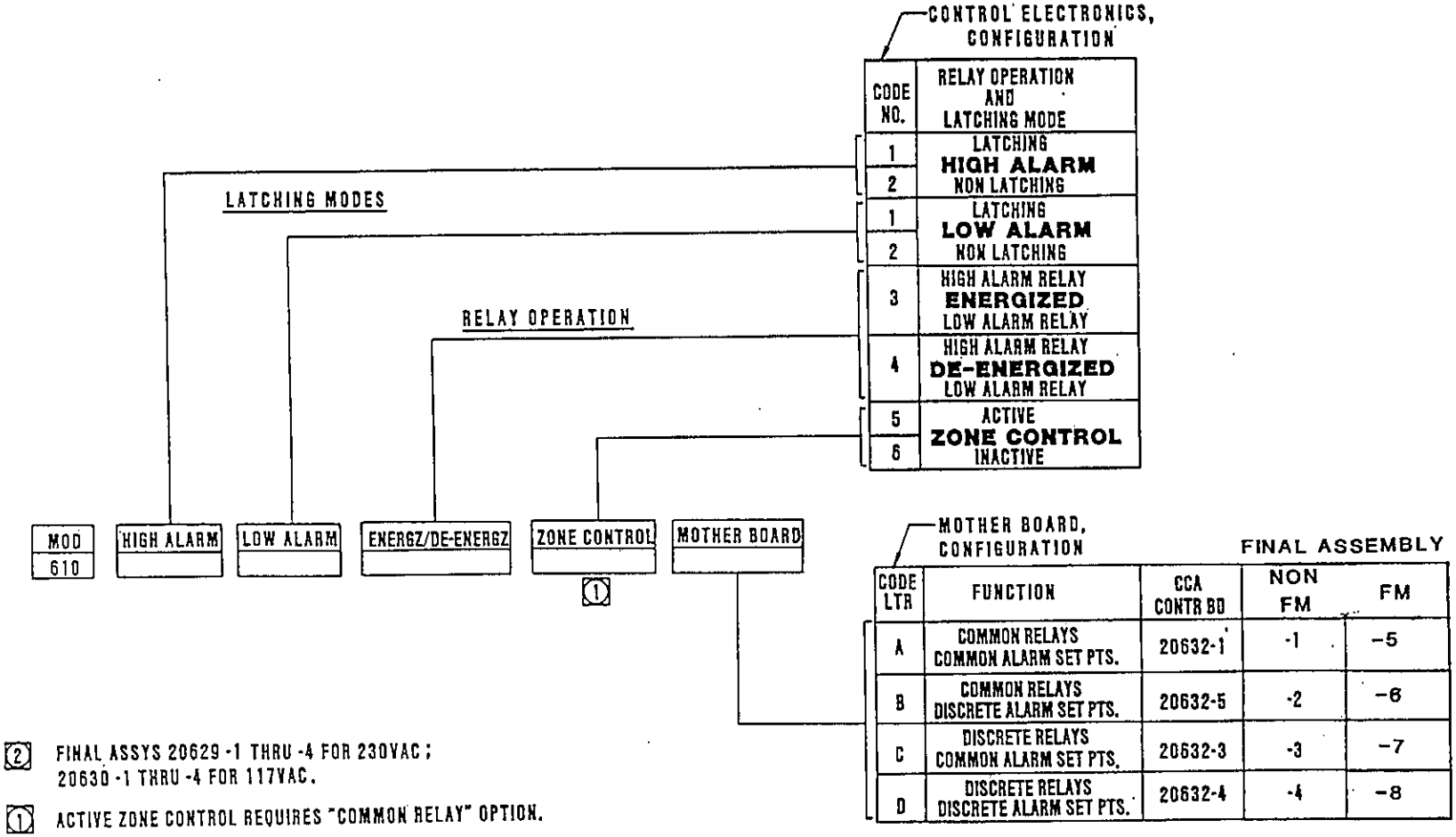


3. FOR 230 VAC OPERATION REDUCE LINE FUSE (F1) TO 0.4 A.
2. RESISTOR VALUES ARE IN OHMS, ±5%, ¼ WATT.
1. CAPACITOR VALUES ARE IN MICROFARADS, 10%, 50 V.

FIG.4

SCHEMATIC DIAGRAM-POWER SUPPLY

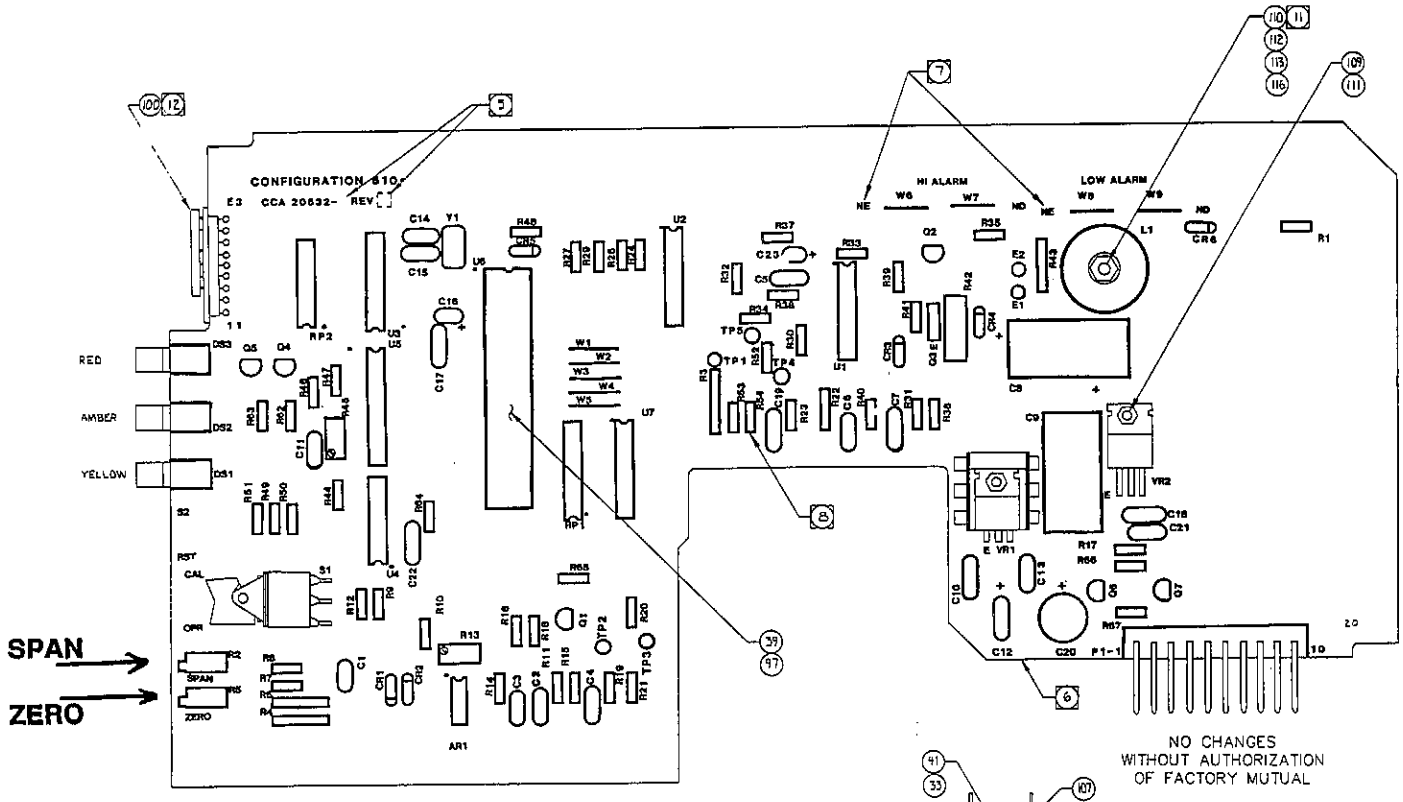
(REF 20648)



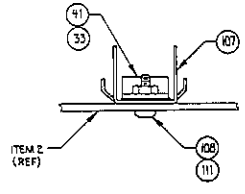
(REF 20657)

FIG 5

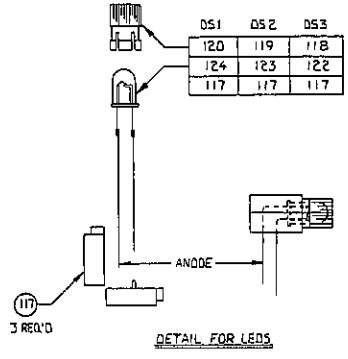
CONFIGURATION DRAWING
MODEL 610



-6 ASSY SHOWN (COMMON COMPONENTS)



DETAIL VR1



DETAIL FOR LEDS

FOR PART LIST SEE COMPUTER BOM 20632-

SHEET 1OF 2.

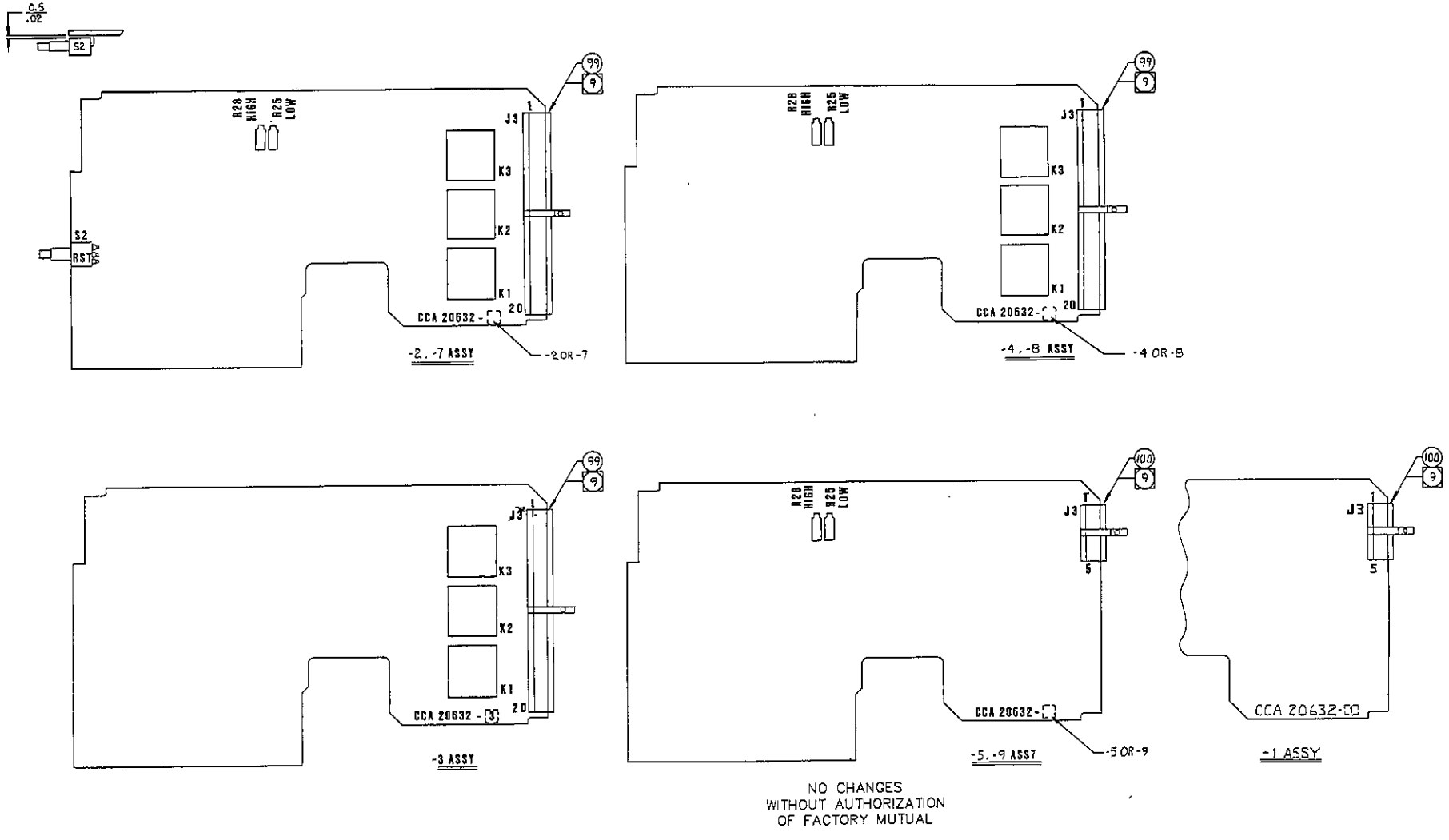
-9	-8	-7	-5	-4	-3	-2	-1	QTY.	PART NO.	DESCRIPTION
								-	-10	CCA, CONTROL CARD, COMMON COMPONENTS(FM APHD ALM)
								-	-9	CCA, CONTROL CARD, COMMON RELAY-DISCRETE ALM SET PTS(FM APHD ALM)
								-	-8	CCA, CONTROL CARD, DISCRETE RELAY-DISCRETE ALM SET PTS(FM APHD ALM)
								-	-7	CCA, MASTER CONTROL CARD (FM APHD ALM)
								1	-6	CCA, CONTROL CARD, COMMON COMPONENTS
								1	-5	CCA, CONTROL CARD, COMMON RLYS - DISCRETE ALARM SET PTS
								1	-4	CCA, CONTROL CARD, DISCRETE RLYS - DISCRETE ALARM SET PTS
								1	-3	CCA, CONTROL CARD, DISCRETE RLYS - COMMON ALARM SET PTS
								1	-2	CCA, MASTER CONTROL CARD
								1	-1	CCA, CONTROL CARD, COMMON RLYS-COMMON ALARM SET PTS

1. (•) INDICATES PIN ONE (1) ON I C'S.

(REF 20632)

FIG.6
SHT 1

CCA, CONTROL ELECTRONICS



(REF 20632)

FIG.6 SHT 2

CCA, CONTROL ELECTRONICS

PART#.....	QTY	MFG-PART#.....	DESC.....	REV	REV-DATE	ITM	REFDES .....
20632	INFO		CIRCUIT CARD ASSY CONTROL BOARD	K	05-10-89		
921-378	1	1738180	TERM BLK PLUG-IN HDR 5 POS GRN				J3
20632-6	1		CCA CONTROL CARD COMMON COMPONENTS	K	05-10-89		

20632-1(K)

FIG 6 SHT 2

PARTS LIST

CONTROL ELECTRONICS

COMMON RELAYS -

COMMON ALARM SET POINTS

PART#.....	QTY	MFG-PART#.....	DESC.....	REV	REV-DATE	ITM	REFDES .....
20632	INFO		CIRCUIT CARD ASSY CONTROL BOARD	K	05-10-89		
951-415	1	8121SHAGE	SWITCH PB SPDT				S2
947-533	2	66XR1K	POT 1K 20 TURNS				R25,28
945-030	3	NC2ED-JP-24VDC	RELAY DPDT COIL 24V 3 AMP				K1,2,3
921-382	1	1738339	TERM BLK PLUG-IN HDR 20 POS CLE GRN				J3
20632-6	1		CCA CONTROL CARD COMMON COMPONENTS	K	05-10-89		

20632-2(K)

FIG 6 SHT 3

PARTS LIST
CONTROL ELECTRONICS
MASTER CONTROL CARD

PART#.....	QTY	MFG-PART#.....	DESC.....	REV	REV-DATE	ITM	REFDES .....
20632	INFO		CIRCUIT CARD ASSY CONTROL BOARD	K	05-10-89		
945-030	3	NC2ED-JP-24VDC	RELAY DPDT COIL 24V 3 AMP				K1,2,3
921-382	1	1738339	TERM BLK PLUG-IN HDR 20 POS CLE GRN				J3
20632-6	1		CCA CONTROL CARD COMMON COMPONENTS	K	05-10-89		

20632-3(K)

FIG 6 SHT 4

PARTS LIST
CONTROL ELECTRONICS
DISCRETE RELAYS -
COMMON ALARM SET POINTS

PART#.....	QTY	MFG-PART#.....	DESC.....	REV	REV-DATE	ITM	REFDES .....
20632	INFO		CIRCUIT CARD ASSY CONTROL BOARD	K	05-10-89		
947-533	2	66XR1K	POT 1K 20 TURNS				R25,28
945-030	3	NC2ED-JP-24VDC	RELAY DPDT COIL 24V 3 AMP				K1,2,3
921-382	1	1738339	TERM BLK PLUG-IN HDR 20 POS CLE GRN				J3
20632-6	1		CCA CONTROL CARD COMMON COMPONENTS	K	05-10-89		

20632-4(K)

FIG 6 SHT 5

PARTS LIST
CONTROL ELECTRONICS
DISCRETE RELAYS -
DISCRETE ALARM SET POINTS

PART#	QTY	MFG-PART#	DESC	REV	REV-DATE	ITM	REFDES
20632	INFO		CIRCUIT CARD ASSY CONTROL BOARD	K	05-10-89		
947-533	2	66XR1K	POT 1K 20 TURNS				R25,28
921-378	1	1738180	TERM BLK PLUG-IN HDR 5 POS GRN				J3
20632-6	1		CCA CONTROL CARD COMMON COMPONENTS	K	05-10-89		

20632-5(K)

FIG 6 SHT 6

PARTS LIST
CONTROL ELECTRONICS
COMMON RELAYS -
DISCRETE ALARM SET POINTS

PART#	QTY	MFG-PART#	DESC	REV	REV-DATE	ITM	REFDES
20632	INFO		CIRCUIT CARD ASSY CONTROL BOARD	K	05-10-89		
20631	INFO		SCHEMATIC DIAGRAM 610	H	05-11-89		
931-366	1	TL494CN	IC SWITCHING REG 16 PIN				U1
931-426	1	MC14051B	IC ANA MUX/DEMUX SGL 8 CHANNEL				U2
931-425	2	ULN2004A	IC DARLINGTON XISTOR ARRAY HI/VOLT				U3,7
931-427	1	ADC0804LCN	IC ADC 8-BIT 20 PIN				U5
931-426	1	MC14011B	IC QUAD 2-INPUT "NAND" GATE 14 PIN				U4
948-245	2	MPS 8099	TRANS MPS 8099 NPN				Q1,6
948-248	3	MPS8599	TRANSISTOR MPS 8599				Q4,5,7
948-238	1	2N5194	TRANS 2N5194 PNP 4A 60V				Q3
948-240	1	MPSA56	TRANS MPSA56				Q2
931-370	1	LM2930T-5.0	IC VOLT REG 5V TO-220 PACKAGE			41	VR1
931-310	1	UA7815UC	IC REG VOLT 15V TO 220 PKG				VR2
915-030	1	CM20A331K	CAP 330PF 100V CER NP				C1
915-052	1	UK25-223	CAP .022UF 25V NP				C2
915-037	1	CM20A102K	CAP .001 100V CER NP				C3
915-017	6	UK 50-103	CAP .01UF 50V CER NP				C4,5,6,13,17,21
915-027	1	CM05FD151J03	CAP 150PF 100V DIPPED MICA				C11
915-033	3	CM20C104K-244	CAP .1UF 50V CER				C7,19,22
915-168	2	6720686M060DM5J	CAP 68UF 60V ALUM				C8,9
915-167	1	6720226M050CD5C	CAP 22UF 50V ALUM				C20
915-171	1	1996226X9025DB1	CAP 22UF 25V 20% TANT				C12
915-026	2	CM04CD200J03	CAP 20PF 100V DIPPED MICA				C14,15
915-102	1	T330A105K035AS	CAP 1UF 35V TANT				C16
915-036	2	CY30C105M	CAP 1UF 50V CER				C10,18
915-170	1	1996475X0050DB1	CAP 4.7UF 50 VDC SOLID TANT				C23
921-707	1	26-48-2102	CONN WFR RTANG 10 PIN GLD PLD				P1
948-125	2	1N3595	DIODE 1N3595/FDH300 150V 200MA				CR1,2
948-104	2	1N4148	DIODE 1N4148 SIGNAL				CR3,5
948-124	1	1N4934	DIODE RECT 1N4934 1A 100V FACVRY				CR4
948-123	1	1N4004	DIODE 1N4004 400V 1A RECTIFIER				CR6
931-036	1	7403-09FR-58	INSULATOR SIL-PAD .75 X .5 IN.			33	
931-355	1	LM725CN	IC AMP PRCN INSTR				AR1
923-000	1	HC-18/U 6MHZ	CRYSTAL 6 MHZ				Y1
947-530	1	66WR500	POT 500 OHM 20 TURNS				R2
947-527	1	66WR200	POT 200 OHM 20 TURNS				R5

PART#	QTY	MFG-PART#	DESC	REV	REV-DATE	ITM	REFDES
947-543	1	66WR100K	POT 100K 20 TURNS				R13
947-529	1	66WR500	POT 500 OHM 20 TURNS				R65
947-304	1		RES 3.92K 1% RN55D METAL FILM				R1
947-374	1		RES 5.11K 1% RN55D METAL FILM				R54,DC-SELECT
947-428	1	RS-A1/RS-1B	RES 1.50 OHM 1W 1%				R3
947-429	2	RS-1A	RES 470 OHM 1W 1%				R4,R6
947-026	4		RES 1.5K 1/4W 5% CARBON				R11,62,63,67
947-397	1		RES 499 OHMS 1% RN55D				R12
947-006	1		RES 33 OHM 1/4W 5% CARBON				R14
947-036	5		RES 10K 1/4W 5% CARBON				R16,31,46
947-416	1	RS-1B	RES 1.0 OHM 1W 1%				R43
947-017	4		RES 270 OHM 1/4W 5% CARBON				R17,49,50,51
947-065	1		RES 5.1K 1/4W 5% CARBON				R18
947-048	2		RES 100K 1/4W 5% CARBON				R20,37
947-076	1		RES 1M 1/4W 5% CARBON				R21
947-309	3		RES 1.21K 1% RN55D METAL FILM				R24,27,53
947-078	1		RES 1.5M 1/4W 5% CARBON				R30
947-024	2		RES 1K 1/4W 5% CARBON				R32,34
947-020	1		RES 470 OHM 1/4W 5% CARBON				R35
947-310	1		RES 1.10K 1% RN55D METAL FILM				R36
947-356	1		RES 16.2K 1% RN55 METAL FILM				R39
947-016	1		RES 360 OHM 1/4W 5% CARBON				R44
947-043	1		RES 47K 1/4W 5% CARBON				R45
947-411	1	4410	RES 470 OHM 3 1/4W 5%				R42
947-012	1		RES 100 OHM 1/4W 5% CARBON				R41
947-032	1		RES 4.7K 1/4W 5% CARBON				R66
947-091	1		RES 3.3M 1/4W 5% CARBON				R64
947-395	1		RES 1.62K 1% RN55D				R47
947-389	1		RES 5.62K 1% RN55D METAL FILM				R40
947-393	2		RES 200 OHMS 1% RN55D				R26,29
947-392	1		RES 124 OHMS 1% RN55D				R19
947-396	1		RES 4.53K 1% RN55D				R9
947-198	1		MATCHED PAIR MAKE FROM 947-304				R7,8
947-194	1		MATCHED PAIR MAKE FROM 947-391				R10,15
947-606	1		RES 6.65K 1% RN60D METAL FILM				R22
947-394	1		RES 442 OHMS 1% RN55D				R23

PART#	QTY	MFG-PART#	DESC	REV	REV-DATE	ITM	REFDES
947-907	1	1084225	RES NETWORK 22K 8 PIN SIP 7 RES				RP1
947-908	1	899-38220	RES NETWORK 220 OHM 14 PIN 7 RES				RP2
947-398	1		RES 1.82K 1% RN55D				R52
947-036	1		RES 15K 1/4W 5% CARBON				R65
948-410	1	MOD 361	HEATSINK			107	
951-321	1	7101-21-ACE	SWITCH ROCKER SPDT PC MT				S1
20633-1	1		CCD CONTROL CARD MODEL 610	H	06-07-89		
948-332	1	MV851D	LED LIGHT YELLOW T 1 3/4 DIFFUSED				DS1
948-331	1	MOB51D	LED LIGHT ORN T 1 3/4 DIFFUSED				DS2
948-333	1	MSB51D	LED LIGHT RED T 1 3/4 DIFFUSED				DS3
939-053	3	PCR740	LENS HLDR LED T1 3/4 PC MT			117	DS1,2,3
939-052	1	CLF280RTP	LENS LED RED TRANS T 1 3/4 SIZE				DS3
939-055	1	CLF280YTP	LENS LED YEL TRANS T 1 3/4 SIZE				DS1
939-054	1	CLF280ATP	LENS LED AMBER TRANS T 1 3/4 SIZE				DS2
947-056	1		RES 470K 1/4W 5% CARBON				R33
947-316	1		RES 100K 1% RN55D METAL FILM				R58
921-711	1	ICA-406-S-GG	SOCKET IC 40 PIN GOLD PLT SOLID			97	XU6
921-520	4	TP-103-02	TEST POINT PC MOUNT TP103 SERIES				TP2,3,4,5
931-040	1	7403-09-FR-28	INSULATOR PAD 1" ROUND			116	
12517	1		NUT M3X0.5 NYLON HEX			112	
9115	1		WASH #6 FLT FBR			113	
12516	2		NUT M3X0.5 NY INSERT-S-C LOCK			111	
12553	1		SCR M3X0.5X20 SLOT PAN HD NYL			110	
12507	1		SCR M3X0.5X8 PHIL PAN HD SST			109	
12571	4		SCR M3X0.5X10 PHIL PAN HD SST			108	
932-002	AR	5780	COATING CONFORMAL				
9425	7		JUMPER WIRE 0.5 TEFLON INSULATED				W1-5,7,9
20505	1		INDUCTOR 3.8 MH	B	12-28-82		L1
10284-5	1		MICROCOMPUTER PROGRAMMED 610	D	03-10-87	39	U6
20638-1	1		CCA DISPLAY BOARD	C	06-05-87	100	

20632-6(K)

FIG 6 SHT 7

PARTS LIST
CONTROL ELECTRONICS
COMMON COMPONENTS

PART#.....	QTY	MFG-PART#.....	DESC.....	REV	REV-DATE	ITM	REFDES .....
20632	INFO		CIRCUIT CARD ASSY CONTROL BOARD	K	05-10-89		
951-415	1	8121SHAGE	SWITCH PB SPDT				S2
947-533	2	66XR1K	POT 1K 20 TURNS				R25,28
945-030	3	NC2ED-JP-24VDC	RELAY DPDT COIL 24V 3 AMP				K1,2,3
921-382	1	1738339	TERM BLK PLUG-IN HDR 20 POS CLE GRN				J3
20632-10	1		CCA CONTROL CARD COMMON COMPONENTS	B	05-10-89		

20632-7(B)

FIG 6 SHT 8

PARTS LIST
CONTROL ELECTRONICS
MASTER CONTROL CARD
FM APPROVED ALARMS

PART#.....	QTY	MFG-PART#.....	DESC.....	REV	REV-DATE	ITM	REFDES .....
20632	INFO		CIRCUIT CARD ASSY CONTROL BOARD	K	05-10-89		
947-533	2	66XR1K	POT 1K 20 TURNS				R25,28
945-030	3	NC2ED-JP-24VDC	RELAY DPDT COIL 24V 3 AMP				K1,2,3
921-382	1	1738339	TERM BLK PLUG-IN HDR 20 POS CLE GRN				J3
20632-10	1		CCA CONTROL CARD COMMON COMPONENTS	B	05-10-89		

20632-8(B)

FIG 6 SHT 9

PARTS LIST
CONTROL ELECTRONICS
DISCRETE RELAYS -
DISCRETE ALARM SET POINTS
FM APPROVED ALARMS

PART#.....	QTY	MFG-PART#.....	DESC.....	REV	REV-DATE	ITM	REFDES .....
20632	INFO		CIRCUIT CARD ASSY CONTROL BOARD	K	05-10-89		
947-533	2	66XR1K	POT 1K 20 TURNS				R25,28
921-378	1	1738180	TERM BLK PLUG-IN HDR 5 POS GRN				J3
20632-10	1		CCA CONTROL CARD COMMON COMPONENTS	B	05-10-89		

20632-9(B)

FIG 6 SHT 10

PARTS LIST
CONTROL ELECTRONICS
COMMON RELAYS -
DISCRETE ALARM SET POINTS
FM APPROVED ALARMS

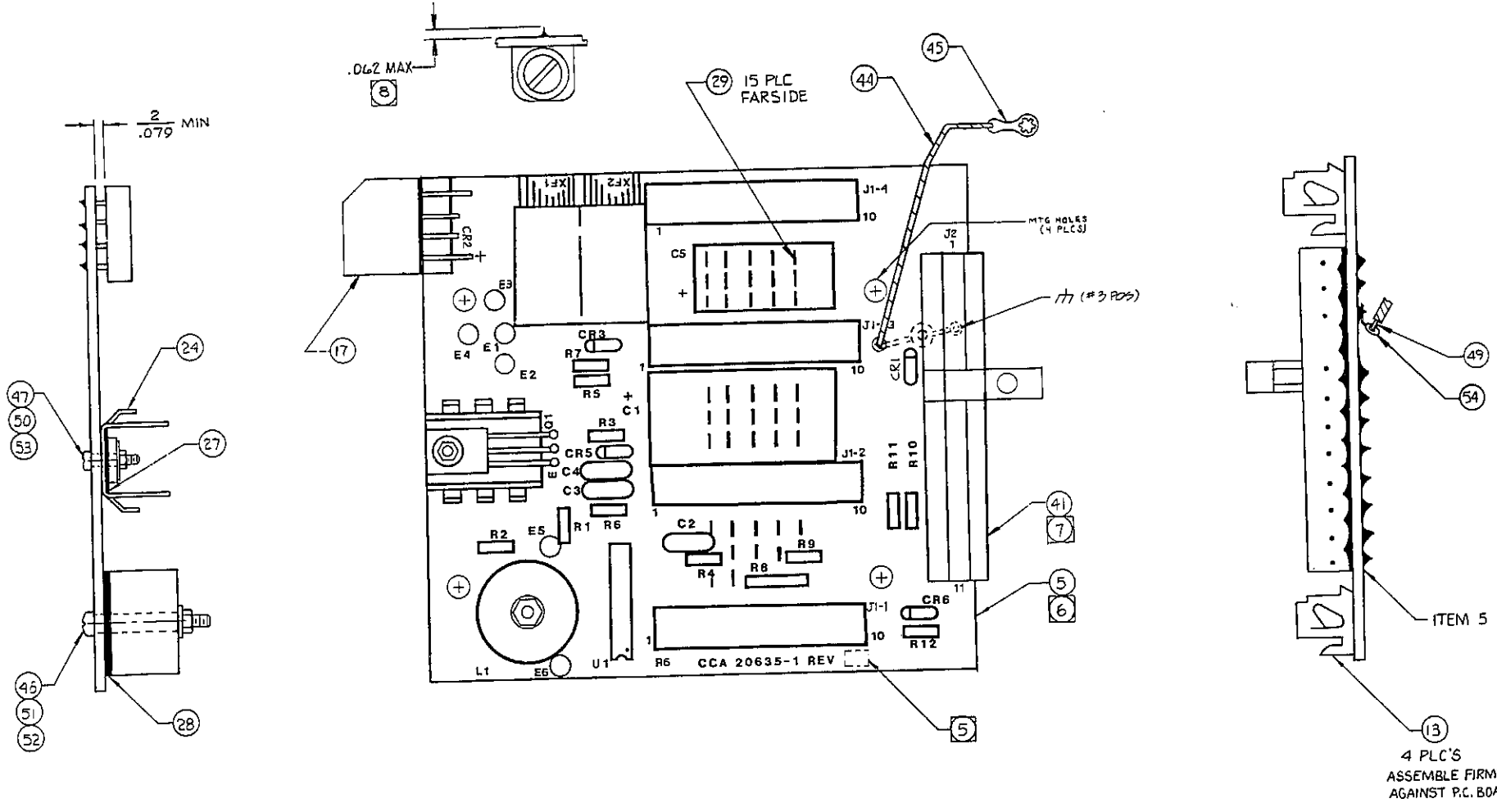
PART#	QTY	MFG-PART#	DESC	REV	REV-DATE	ITM	REFDES
20632	INFO		CIRCUIT CARD ASSY CONTROL BOARD	K	05-10-89		
20631	INFO		SCHEMATIC DIAGRAM 610	K	05-11-89		
931-366	1	TL494CN	IC SWITCHING REG 16 PIN				U1
931-428	1	MC14051B	IC ANA MUX/DEMUX SGL 8 CHANNEL				U2
931-425	2	ULN2004A	IC DARLINGTON XISTOR ARRAY HI/VOLT				U3,7
931-427	1	ADC0804LCN	IC ADC 8-BIT 20 PIN				U5
931-426	1	MC14011B	IC QUAD 2-INPUT "NAND" GATE 14 PIN				U4
948-245	2	MPS 8099	TRANS MPS 8099 NPN				Q1,6
948-248	3	MPS8599	TRANSISTOR MPS 8599				Q4,5,7
948-238	1	2N5194	TRANS 2N5194 PNP 4A 60V				Q3
948-240	1	MPSA56	TRANS MPSA56				Q2
931-370	1	LM2930T-5.0	IC VOLT REG 5V TO-220 PACKAGE			41	VR1
931-310	1	UA7815UC	IC REG VOLT 15V TO 220 PKG				VR2
915-030	1	CN20A331K	CAP 330PF 100V CER NP				C1
915-052	1	UK25-223	CAP .022UF 25V MP				C2
915-037	1	CN20A102K	CAP .001 100V CER NP				C3
915-017	6	UK 50-103	CAP .01UF 50V CER NP				C4,5,6,13,17,21
915-027	1	CM05FD151J03	CAP 150PF 100V DIPPED MICA				C11
915-033	3	CW20C104K-244	CAP .1UF 50V CER				C7,19,22
915-168	2	672D686H060M5J	CAP 68UF 60V ALUM				C8,9
915-167	1	672D226H050CD5C	CAP 22UF 50V ALUM				C20
915-171	1	199D226X9025DB1	CAP 22UF 25V 20% TANT				C12
915-026	2	CM06ED200J03	CAP 20PF 100V DIPPED MICA				C14,15
915-102	1	T330A105K035AS	CAP 1UF 35V TANT				C16
915-036	2	CY30C105M	CAP 1UF 50V CER				C10,18
915-170	1	199D475X0050DB1	CAP 4.7UF 50 VDC SOLID TANT				C23
921-707	1	26-48-2102	CONN WFR RTANG 10 PIN GLD PLD				P1
948-125	2	1N3595	DIODE 1N3595/FDH300 150V 200MA				CR1,2
948-104	2	1N4148	DIODE 1N4148 SIGNAL				CR3,5
948-124	1	1N4934	DIODE RECT 1N4934 1A 100V FRCVRY				CR4
948-123	1	1N4004	DIODE 1N4004 400V 1A RECTIFIER				CR6
931-036	1	7403-09FR-SB	INSULATOR SIL-PAD .75 X .5 IN.			33	
931-355	1	LM725CN	IC AMP PRCN INSTR				AR1
923-000	1	HC-18/U 6MHZ	CRYSTAL 6 MHZ				Y1
947-530	1	66XR500	POT 500 OHM 20 TURNS				R2
947-527	1	66XR200	POT 200 OHM 20 TURNS				R5
947-543	1	66MR100K	POT 100K 20 TURNS				R13
947-529	1	66MR500	POT 500 OHM 20 TURNS				R45
947-304	1		RES 3.92K 1% RN55D METAL FILM				R1

PART#	QTY	MFG-PART#	DESC	REV	REV-DATE	ITM	REFDES
947-374	1		RES 5.11K 1% RN55D METAL FILM				R54,DC-SELECT
947-428	1	RS-A1/RS-1B	RES 1.5Ω OHM 1W 1%				R3
947-429	2	RS-1A	RES 470 OHM 1W 1%				R4,86
947-026	4		RES 1.5K 1/4W 5% CARBON				R11,62,63,67
947-397	1		RES 499 OHMS 1% RN55D				R12
947-006	1		RES 33 OHM 1/4W 5% CARBON				R14
947-036	3		RES 10K 1/4W 5% CARBON				R16,31,46
947-416	1	RS-1B	RES 1.0 OHM 1W 1%				R43
947-017	4		RES 270 OHM 1/4W 5% CARBON				R17,49,50,51
947-065	1		RES 5.1K 1/4W 5% CARBON				R18
947-048	2		RES 100K 1/4W 5% CARBON				R20,37
947-076	1		RES 1M 1/4W 5% CARBON				R21
947-309	1		RES 1.21K 1% RN55D METAL FILM				R53
947-315	2		RES 2.21K 1% RN55D METAL FILM				R24,27
947-078	1		RES 1.5M 1/4W 5% CARBON				R30
947-024	2		RES 1K 1/4W 5% CARBON				R32,34
947-020	1		RES 470 OHM 1/4W 5% CARBON				R35
947-310	1		RES 1.10K 1% RN55D METAL FILM				R36
947-356	1		RES 16.2K 1% RN55 METAL FILM				R39
947-016	1		RES 360 OHM 1/4W 5% CARBON				R44
947-043	1		RES 47K 1/4W 5% CARBON				R48
947-411	1	4410	RES 470 OHM 3 1/4W 5%				R42
947-012	1		RES 100 OHM 1/4W 5% CARBON				R41
947-032	1		RES 4.7K 1/4W 5% CARBON				R66
947-091	1		RES 3.3M 1/4W 5% CARBON				R64
947-395	1		RES 1.62K 1% RN55D				R47
947-389	1		RES 5.62K 1% RN55D METAL FILM				R40
947-393	2		RES 200 OHMS 1% RN55D				R26,29
947-392	1		RES 1Z4 OHMS 1% RN55D				R19
947-396	1		RES 4.53K 1% RN55D				R9
947-198	1		MATCHED PAIR MADE FROM 947-304				R7,8
947-194	1		MATCHED PAIR MADE FROM 947-391				R10,15
947-606	1		RES 6.65K 1% RN60D METAL FILM				R22
947-394	1		RES 442 OHMS 1% RN55D				R23
947-907	1	108A223	RES NETWORK 22K 8 PIN SIP 7 RES				RP1
947-908	1	899-38220	RES NETWORK 220 OHM 16 PIN 7 RES				RP2
947-398	1		RES 1.82K 1% RN55D				R52
947-038	1		RES 15K 1/4W 5% CARBON				R65
948-410	1	MCD 361	HEATSINK			107	

PART#	QTY	MFG-PART#	DESC	REV	REV-DATE	ITM	REFDES
951-321	1	7101-A1-AGE	SWITCH ROCKER SPDT PC MT				S1
20633-1	1		CCD CONTROL CARD MODEL 610	H	06-07-89		
948-332	1	MV8510	LED LIGHT YELLOW T 1 3/4 DIFFUSED				DS1
948-331	1	MCB510	LED LIGHT ORN T 1 3/4 DIFFUSED				DS2
948-333	1	MS8510	LED LIGHT RED T 1 3/4 DIFFUSED				DS3
939-053	3	PCR740	LENS HLDR LED T1 3/4 PC MT			117	DS1,2,3
939-052	1	CLF280RTP	LENS LED RED TRANS T 1 3/4 SIZE				DS3
939-055	1	CLF280YTP	LENS LED YEL TRANS T 1 3/4 SIZE				DS1
939-054	1	CLF280ATP	LENS LED AMBER TRANS T 1 3/4 SIZE				DS2
947-056	1		RES 470K 1/4W 5% CARBON				R33
947-316	1		RES 100K 1% RN55D METAL FILM				R38
921-711	1	ICA-606-S-GG	SOCKET IC 40 PIN GOLD PLT SOLID			97	XU6
921-520	4	TP-103-02	TEST POINT PC MOUNT TP103 SERIES				TP2,3,4,5
931-040	1	7403-09-FR-2B	INSULATOR PAD 1" ROUND			116	
12517	1		NUT M3X0.5 NYLON HEX			112	
9115	1		WASH #6 FLT FBR			113	
12516	2		NUT M3X0.5 NY INSERT-S-C LOCK			111	
12553	1		SCR M3X0.5X20 SLOT PAN HD NYL			110	
12507	1		SCR M3X0.5X8 PHIL PAN HD SST			109	
12571	1		SCR M3X0.5X10 PHIL PAN HD SST			108	
932-002	AR	5720	COATING CONFORMAL				
9429	7		JUMPER WIRE 0.5 TEFLON INSULATED				W1-5,7,9
20505	1		INDUCTOR 3.8 MH	B	12-28-82		L1
10284-5	1		MICROCOMPUTER PROGRAMMED 610	D	03-10-87	39	U6
20634-1	1		CCA DISPLAY BOARD	C	06-05-87	100	

FIG 6 SHT 11

PARTS LIST
CONTROL ELECTRONICS
COMMON COMPONENTS
FM APPROVED ALARMS



1. (•) INDICATES PIN ONE (1) ON I C'S.

(REF 20635)

FIG.7
SHT 1

CCA, MOTHER BOARD

REF	PART#.....	QTY.	DESC.....	REV	REV-DATE	ITM	REFDES
1	20648	INFO	SCHEMATIC DIAGRAM	D	01-10-86		
2	921-607	2	HOLDER FUSE PC MTD W/CAP				XF1,XF2
3	951-015	1	FUSE MINI 5 X 20MM 2A 250V				F2
4	948-123	1	DIODE 1N4004 400V 1A RECTIFIER				CR1
5	948-124	1	DIODE 1N4934 100V 1A RECTIFIER				CR3
6	948-112	1	DIODE BRIDGE 100V 4A			17	CR2
7	948-035	1	DIODE ZENER 39V 5% TRANSIENT SUP				CR5
8	931-366	1	IC SWITCHING REG 16 PIN				U1
9	915-169	1	CAP 2200UF 50V +/- 20% ALUMN				C1
10	915-168	1	CAP 68UF 60V ALUM				C5
11	915-027	1	CAP 150PF 100V DIPPED MICA				C2
12	915-017	1	CAP .01UF 50V CER NP				C3
13	915-033	1	CAP .1UF 50V CER				C4
14	948-238	1	TRANS 2N5194 PNP 4A 60V				Q1
15	947-036	2	RES 10K 1/4W 5% CARBON				R1,R2
16	947-032	1	RES 4.7K 1/4W 5% CARBON				R3
17	947-048	1	RES 100K 1/4W 5% CARBON				R4
18	947-009	2	RES 2.7K 1/4W 5% CARBON				R5,6
19	947-012	1	RES 100 OHM 1/4W 5% CARBON				R7
20	947-429	1	RES 470 OHM 1W 1%				R8
21	947-325	1	RES 20K 1% RN55D METAL FILM				R9
22	947-301	1	RES 10K 1% RN55D METAL FILM				R10
23	948-410	1	HEATSINK			24	
24	931-036	1	INSULATOR SIL-PAD			27	
25	921-703	4	CONN BOT ENTRY 10 POS GOLD PL			13	J1-1,J1-2,J1-3,J1-4
26	20636-1	1	CCD MOTHER BD MODEL 610	E	03-13-87	5	
27	921-511	1	LUG CONNECTOR			54	
28	921-505	1	TERM LOCKWASHER #6/M3-M3.5			45	
29	931-040	1	INSULATOR PAD			28	
30	947-356	1	RES 16.2K 1% RN55 METAL FILM				R11
31	948-030	1	DIODE 1N4733A 5.1V 1W 5%				CR6
32	947-018	1	RES 330 OHM 1/4W 5% CARBON				R12
33	932-002	AR	COATING CONFORMAL				
34	931-010	AR	TUBING SHRINK 3/16 DIA.			49	
35	12517	1	NUT M3X0.5 NYLON HEX			51	
36	9419	1	WASH CUPPED ALUM W/TO126			53	
37	9115	1	WASH #6 FLT FBR			52	
38	12516	1	NUT M3X0.5 NY INSERT-S-C LOCK			50	
39	12553	1	SCR M3X0.5X20 SLOT PAN HD NYL			48	
40	12557	1	SCR M3X0.5X12 PHIL PAN HD SST			47	
41	9347	.6	WIRE YELLOW/GREEN STRIP 20 AWG			44	
42	20667-1	1	TERM BLK PLUG-IN HEADER MODIFIED	A	01-09-86	41	J2
43	9425	15	JUMPER WIRE 0.5 TEFLON INSULATED			29	W1-W15
44	30011-1	1	INDUCTOR 2 mH	A	09-16-83		L1

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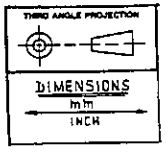
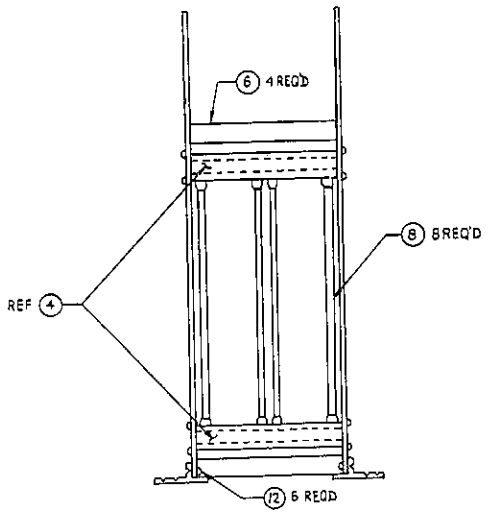
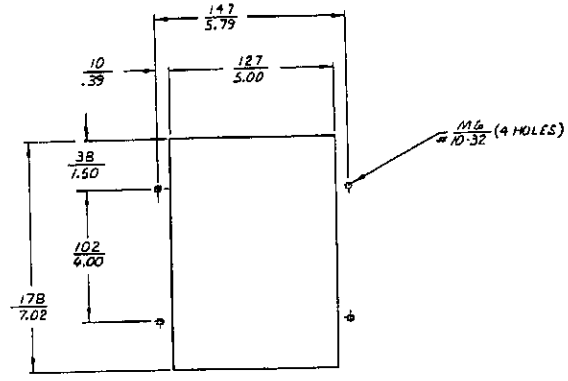
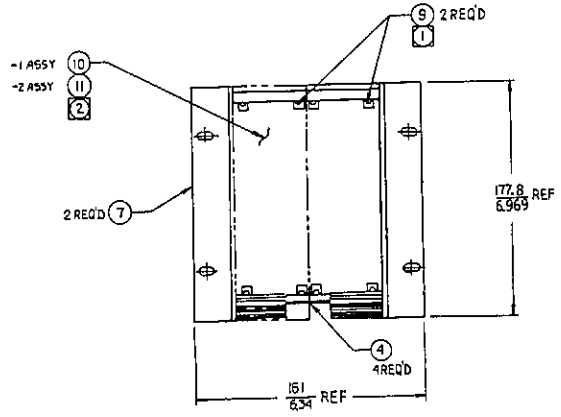
(REF 20635) **FIG.7 SHT 2** **CCA, MOTHER BOARD MATERIAL LIST**

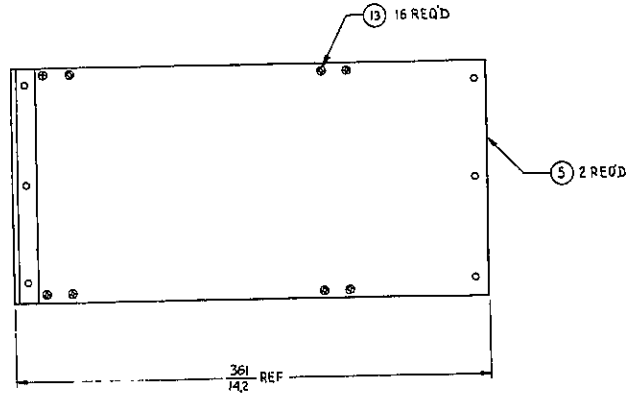






CUSTOMER PANEL CUTOUT DIMENSIONS





16	16		SCREW, THD FORMING, M3×12 P-PH-ST-Z1	13
6	6	DIN 7985	SCREW, MACH M3×6 P-PHIL-SST	12
REF	—	10197-2	PANEL ASSY, BLANK-49, YELLOW	11
—	REF	10187-1	PANEL ASSY, BLANK-49, BLACK	10
2	2	(1)	NUT, SQUARE M4x0.7 STL-CAD-PLT	9
8	8	921-209	GUIDE, SNAP-IN	8
2	2	10196	MOUNTING BRACKET, FRONT VERTICAL	7
4	4	10198-2	HORIZONTAL MEMBER	6
2	2	10197	SIDE PANEL	5
4	4	10185-2	STRIP, LOCATING	4
				3
1	—	-2	RACK ASSEMBLY, PANEL MOUNT-98 (YELLOW)	2
—	1	-1	RACK ASSEMBLY, PANEL MOUNT-98 (BLACK)	1
QTY-2	QTY-1	PART NO	DESCRIPTION	ITEM

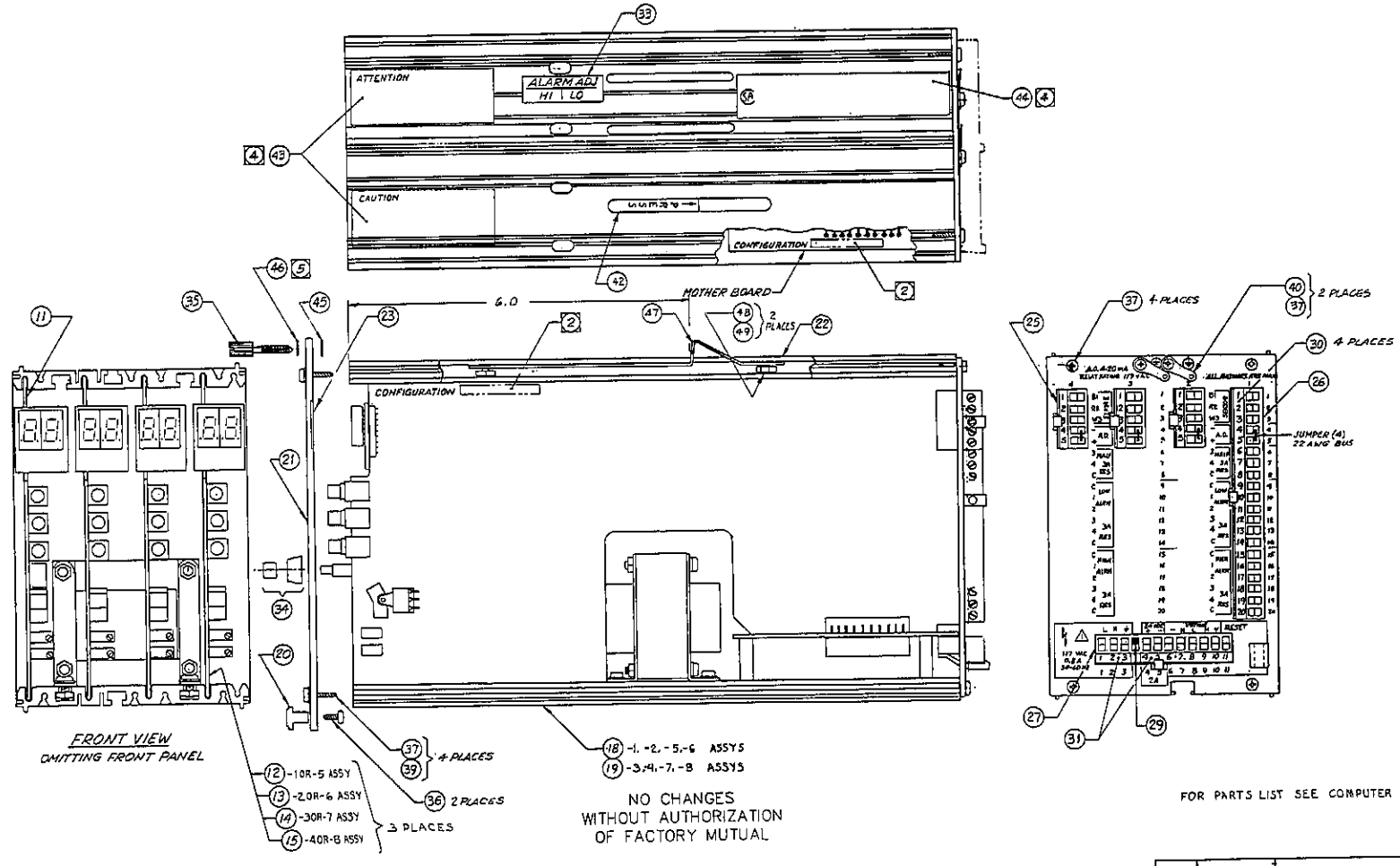
(2) BLANK PANEL ASSY (ITEM 10 OR 11) SUPPLIED PER CUSTOMER REQUIREMENT.

(1) INSERT SQ NUT INTO TOP GUIDES AS INDICATED. (SUPPLIED WITH KIT PPL 928-13).

(REF 10199C)

FIG.8

RACK ASSEMBLY, PANEL MOUNT - 98



FOR PARTS LIST SEE COMPUTER BOM 20630-

REF	-8	FINAL ASSY, DISCRETE RELAYS-DISCRETE ALM SET PTS(FM APM0 ALM)
REF	-7	FINAL ASSY, DISCRETE RELAYS-COMM ALM SET PTS(FM APM0 ALM)
REF	-6	FINAL ASSY, COMMON RELAYS-DISCRETE ALM SET PTS(FM APM0 ALM)
REF	-5	FINAL ASSY, COMMON RELAYS-COMM ALM SET PTS(FM APM0 ALM)
REF	-4	FINAL ASSY, DISCRETE RELAYS – DISCRT ALARM SET POINTS
REF	-3	FINAL ASSY, DISCRETE RELAYS – COMM ALARM SET POINTS
REF	-2	FINAL ASSY, COMMON RELAYS – DISCRT ALARM SET POINTS
REF	-1	FINAL ASSY, COMMON RELAYS – COMM. ALARM SET POINTS
QTY.	PART NO.	DESCRIPTION

(20630)

FIG 9 SHT 1

FINAL ASSEMBLY - FOUR CHANNEL
H.C. MONITOR, MODEL 610
117V AC

PART#	QTY	MFG-PART#	DESC	REV	REV-DATE	ITM	REFDES
20630	INFO		MOD 610 4 CHAN HC MONITOR 117VAC	J	07-03-89		
20659	INFO		OUTLINE DWG & REAR TERM CONN	J	05-11-89		
20648	INFO		SCHEMATIC DIAGRAM	E	09-24-87		
20631	INFO		SCHEMATIC DIAGRAM 610	H	05-11-89		
20663-1	1		PANEL REAR SSLK COMM RLY 117V	B	09-01-87	16	
20655-1	1		PLATE MOUNTING 104 MOD 610 TOP	E	08-27-87	22	
10249-1	1		HANDLE UNIVERSAL -76	A	03-13-87	20	
20641-1	1		PANEL FRONT PAINT & SSCRN 610	B	09-11-84	21	
20668-1	1		DISPLAY WINDOW	C	01-13-88	23	
10283-2	1		SCREW CAPTIVE M4 .125 THK MET PANEL	B	04-06-86	35	
960-327	1	PM2H25	CABLE TIE PUSH-IN MT .30X.38X.18 NY			24	
10209	1		CAUTION LABEL CSA	B	04-22-85	43	
10108	1		INSTRUMENT LABEL CSA	D	09-14-87	44	
921-517	2	501-H-#4	TERM LOCKWASHER #4 .018 BRASS			40	
928-735	1	8025 WITH WHITE	DRESS NUT WITH WHITE CAP			34	
10385-1	1		MARKER STRIP HORIZONTAL 1-11	B	10-30-86	31	
10381-1	4		MARKER STRIP 1-26	B	10-30-86	30	
921-384	1	1759994	KEY PIN TYPE CS-MSTB NYLON			29	
921-381	1	1757116	TERM BLK PLUG-IN 12 POS GRN			27	
921-383	1	1757190	TERM BLK PLUG-IN 20 POS GRN			26	
921-379	3	1757048	TERM BLK PLUG-IN 5 POS GRN			25	
20660-1	1		LABEL ALARM ADJUSTMENT	A	08-12-83	33	
10165-1	1		SAFETY LATCH RACK MTG CONTR INSTR	B	01-05-87	47	
10166-1	1		LABEL SAFETY LATCH RACK MOUNTING	A	06-07-84	42	
1042	2		SCR 6-20X3/8 PH PAN TY 25 ST ZN			36	
1043	1	5610-55-20	WASH NYLON .128 I.D. X .245 O.D.			46	
1044	1	1200-12-ST-ZD	GRIP RING, EXTERNAL .100DIA SHAFT			45	
1040	2		SCR 6-32X3/16 SKT CP PT SST HXSO			48	
9110	4		WASH #4 FLT FBR BLK			39	
9420	10		SCR 4 X 1/2 PAN HD SELF TAP ZINC			37	
9096	2		NUT 6-32 STL CAD PLT HEX			49	
928-725	1	8-T005	TRIM ADJ TOOL				
1003	2		CLAMSHELL, ANTI-STATIC CONTROLLER				
10450-1	1	A35S/M-1450	SCREWDRIVER MAGNET TIP	B	04-09-87		
20632-2	1		CCA MSTER RESET MODEL 610	K	07-12-89	11	
20632-1	3		CCA COM RLYS & SET PNT 610	K	07-12-89	12	
20650-1	1		CHASSIS SUB ASSY MOD 610 117V	F	07-05-89	18	

FIG 9 SHT 2

20630-1(J)

PARTS LIST
FINAL ASSEMBLY
COMMON RELAYS -
COMMON ALARM SET POINTS
117V AC

PART#	QTY	MFG-PART#	DESC	REV	REV-DATE	ITM	REFDES
20630	INFO		MOD 610 4 CHAN HC MONITOR 117VAC	J	07-03-89		
20659	INFO		OUTLINE DWG & REAR TERM CONN	J	05-11-89		
20648	INFO		SCHEMATIC DIAGRAM	E	09-24-87		
20631	INFO		SCHEMATIC DIAGRAM 610	H	05-11-89		
20663-1	1		PANEL REAR SSLK COMM RLY 117V	B	09-01-87	16	
20655-1	1		PLATE MOUNTING 104 MOD 610 TOP	E	08-27-87	22	
10249-1	1		HANDLE UNIVERSAL -76	A	03-13-87	20	
20641-1	1		PANEL FRONT PAINT & SSCRN 610	B	09-11-84	21	
20668-1	1		DISPLAY WINDOW	C	01-13-88	23	
10283-2	1		SCREW CAPTIVE M4 .125 THK MET PANEL	B	04-06-86	35	
960-327	1	PM2H25	CABLE TIE PUSH-IN MT .30X.38X.18 NY			24	
10209	1		CAUTION LABEL CSA	B	04-22-85	43	
10108	1		INSTRUMENT LABEL CSA	D	09-14-87	44	
921-517	2	501-H-#4	TERM LOCKWASHER #4 .018 BRASS			40	
928-735	1	8025 WITH WHITE	DRESS NUT WITH WHITE CAP			34	
10385-1	1		MARKER STRIP HORIZONTAL 1-11	B	10-30-86	31	
10381-1	4		MARKER STRIP 1-26	B	10-30-86	30	
921-384	1	1759994	KEY PIN TYPE CS-MSTB NYLON			29	
921-381	1	1757116	TERM BLK PLUG-IN 12 POS GRN			27	

FIG 9 SHT 3

20630-2(J)

PART#	QTY	MFG-PART#	DESC	REV	REV-DATE	ITM	REFDES
921-383	1	1757190	TERM BLK PLUG-IN 20 POS GRN			26	
921-379	3	1757048	TERM BLK PLUG-IN 5 POS GRN			25	
20660-1	1		LABEL ALARM ADJUSTMENT	A	08-12-83	33	
10165-1	1		SAFETY LATCH RACK MTG CONTR INSTR	B	01-05-87	47	
10166-1	1		LABEL SAFETY LATCH RACK MOUNTING	A	06-07-84	42	
1042	2		SCR 6-20X3/8 PH PAN TY 25 ST ZN			36	
1043	1	5610-55-20	WASH NYLON .128 I.D. X .245 O.D.			46	
1044	1	1200-12-ST-20	GRIP RING, EXTERNAL .100DIA SHAFT			45	
1040	2		SCR 6-32X3/16 SKT CP PT SST HXSO			48	
9110	4		WASH #4 FLT FBR BLK			39	
9420	10		SCR 4 X 1/2 PAN HD SELF TAP ZINC			37	
9096	2		NUT 6-32 STL CAD PLT HEX			49	
928-725	1	8-T005	TRIM ADJ TOOL				
1003	2		CLAMSHELL, ANTI-STATIC CONTROLLER				
10450-1	1	A35S/M-145D	SCREWDRIVER MAGNET TIP	B	04-09-87		
20632-5	3		CCA COM RLYS DISCR ALM SET PTS 610	K	07-12-89	12	
20632-2	1		CCA MSTER RESET MODEL 610	K	07-12-89	11	
20650-1	1		CHASSIS SUB ASSY MOD 610 117V	F	07-05-89	18	

PARTS LIST
FINAL ASSEMBLY
COMMON RELAYS -
DISCRETE ALARM SET POINTS
117V AC

PART#	QTY	MFG-PART#	DESC	REV	REV-DATE	ITM	REFDES
20630	INFO		MOD 610 4 CHAN HC MONITOR 117VAC	J	07-03-89		
20659	INFO		OUTLINE DWG & REAR TERM CONN	J	05-11-89		
20648	INFO		SCHEMATIC DIAGRAM	E	09-24-87		
20631	INFO		SCHEMATIC DIAGRAM 610	H	05-11-89		
20663-2	1		PANEL REAR SSLK DISCRETE RLYS 117V	B	09-01-87	9	
20655-1	1		PLATE MOUNTING 104 MOD 610 TOP	E	08-27-87	22	
10249-1	1		HANDLE UNIVERSAL -76	A	03-13-87	20	
20641-1	1		PANEL FRONT PAINT & SSCRN 610	B	09-11-84	21	
20668-1	1		DISPLAY WINDOW	C	01-13-88	23	
10283-2	1		SCREW CAPTIVE M4 .125 THK MET PANEL	B	04-06-86	35	
960-327	1	PM2H2S	CABLE TIE PUSH-IN MT .30X.38X.18 NY			24	
10209	1		CAUTION LABEL CSA	B	04-22-85	43	
10108	1		INSTRUMENT LABEL CSA	D	09-14-87	44	
921-517	2	501-H-#4	TERM LOCKWASHER #4 .018 BRASS			40	
928-735	1	8025 WITH WHITE	DRESS NUT WITH WHITE CAP			34	
10385-1	1		MARKER STRIP HORIZONTAL 1-11	B	10-30-86	31	
10381-1	4		MARKER STRIP 1-26	B	10-30-86	30	
921-384	1	1759994	KEY PIN TYPE CS-MSTB NYLON			29	

20630-3(J)

FIG 9 SHT 4

PART#	QTY	MFG-PART#	DESC	REV	REV-DATE	ITM	REFDES
921-381	1	1757116	TERM BLK PLUG-IN 12 POS GRN			27	
921-383	4	1757190	TERM BLK PLUG-IN 20 POS GRN			26	
20660-1	1		LABEL ALARM ADJUSTMENT	A	08-12-83	33	
10165-1	1		SAFETY LATCH RACK MTG CONTR INSTR	B	01-05-87	47	
10166-1	1		LABEL SAFETY LATCH RACK MOUNTING	A	06-07-84	42	
1042	2		SCR 6-20X3/8 PH PAN TY 25 ST ZN			36	
1043	1	5610-55-20	WASH NYLON .128 I.D. X .245 O.D.			46	
1044	1	1200-12-ST-ZD	GRIP RING, EXTERNAL .100DIA SHAFT			45	
1040	2		SCR 6-32X3/16 SKT CP PT SST HXSO			48	
9110	4		WASH #4 FLT FBR BLK			39	
9420	10		SCR 4 X 1/2 PAN HD SELF TAP ZINC			37	
9096	2		NUT 6-32 STL CAD PLT HEX			49	
928-725	1	8-T005	TRIM ADJ TOOL				
1003	2		CLAMSHELL, ANTI-STATIC CONTROLLER				
10450-1	1	A35S/M-1450	SCREWDRIVER MAGNET TIP	B	04-09-87		
20632-2	1		CCA MSTER RESET MODEL 610	K	07-12-89	11	
20632-3	3		CCA DISCRETE RLYS & COM SET PTS 610	K	07-12-89	12	
20650-1	1		CHASSIS SUB ASSY MOD 610 117V	F	07-05-89	18	

PARTS LIST
FINAL ASSEMBLY
DISCRETE RELAYS -
COMMON ALARM SET POINTS
117V AC

PART#	QTY	MFG-PART#	DESC	REV	REV-DATE	ITM	REFDES
20630	INFO		MOD 610 4 CHAN HC MONITOR 117VAC	J	07-03-89		
20659	INFO		OUTLINE DWG & REAR TERM CONN	J	05-11-89		
20648	INFO		SCHEMATIC DIAGRAM	E	09-24-87		
20631	INFO		SCHEMATIC DIAGRAM 610	H	05-11-89		
20663-2	1		PANEL REAR SSLK DISCRETE RLYS 117V	B	09-01-87	9	
20655-1	1		PLATE MOUNTING 104 MOD 610 TOP	E	08-27-87	22	
10249-1	1		HANDLE UNIVERSAL -76	A	03-13-87	20	
20641-1	1		PANEL FRONT PAINT & SSCRN 610	B	09-11-84	21	
20668-1	1		DISPLAY WINDOW	C	01-13-88	23	
10283-2	1		SCREW CAPTIVE M4 .125 THK MET PANEL	B	04-06-86	35	
960-327	1	PM2H25	CABLE TIE PUSH-IN MT .30X.38X.18 NY			24	
10209	1		CAUTION LABEL CSA	B	04-22-85	43	
10108	1		INSTRUMENT LABEL CSA	D	09-14-87	44	
921-517	2	501-M-#4	TERM LOCKWASHER #4 .018 BRASS			40	
928-735	1	8025 WITH WHITE	DRESS NUT WITH WHITE CAP			34	
10385-1	1		MARKER STRIP HORIZONTAL 1-11	B	10-30-86	31	
10381-1	4		MARKER STRIP 1-26	B	10-30-86	30	
921-384	1	1759994	KEY PIN TYPE CS-MSTB NYLON			29	

20630-4(J)

FIG 9 SHT 5

PART#	QTY	MFG-PART#	DESC	REV	REV-DATE	ITM	REFDES
921-381	1	1757116	TERM BLK PLUG-IN 12 POS GRN			27	
921-383	4	1757190	TERM BLK PLUG-IN 20 POS GRN			26	
20660-1	1		LABEL ALARM ADJUSTMENT	A	08-12-83	33	
10165-1	1		SAFETY LATCH RACK MTG CONTR INSTR	B	01-05-87	47	
10166-1	1		LABEL SAFETY LATCH RACK MOUNTING	A	06-07-84	42	
1042	2		SCR 6-20X3/8 PH PAN TY 25 ST ZN			36	
1043	1	5610-55-20	WASH NYLON .128 I.D. X .245 O.D.			46	
1044	1	1200-12-ST-ZD	GRIP RING, EXTERNAL .100DIA SHAFT			45	
1040	2		SCR 6-32X3/16 SKT CP PT SST HXSO			48	
9110	4		WASH #4 FLT FBR BLK			39	
9420	10		SCR 4 X 1/2 PAN HD SELF TAP ZINC			37	
9096	2		NUT 6-32 STL CAD PLT HEX			49	
928-725	1	8-T005	TRIM ADJ TOOL				
1003	2		CLAMSHELL, ANTI-STATIC CONTROLLER				
10450-1	1	A35S/M-1450	SCREWDRIVER MAGNET TIP	B	04-09-87		
20632-2	1		CCA MSTER RESET MODEL 610	K	07-12-89	11	
20632-4	3		CCA DISCRETE RLYS & ALM SER PTS 610	K	07-12-89	12	
20650-1	1		CHASSIS SUB ASSY MOD 610 117V	F	07-05-89	18	

PARTS LIST
FINAL ASSEMBLY
DISCRETE RELAYS -
DISCRETE ALARM SET POINTS
117V AC

PART#	QTY	MFG-PART#	DESC	REV	REV-DATE	ITM	REFDES
20630	INFO		MOD 610 4 CHAN HC MONITOR 117VAC	J	07-03-89		
20659	INFO		OUTLINE DWG & REAR TERM CONN	J	05-11-89		
20648	INFO		SCHEMATIC DIAGRAM	E	09-24-87		
20631	INFO		SCHEMATIC DIAGRAM 610	H	05-11-89		
20663-1	1		PANEL REAR SSLK COMM RLY 117V	B	09-01-87	16	
20655-1	1		PLATE MOUNTING 104 MOD 610 TOP	E	08-27-87	22	
10249-1	1		HANDLE UNIVERSAL -76	A	03-13-87	20	
20641-1	1		PANEL FRONT PAINT & SSCRN 610	B	09-11-84	21	
20668-1	1		DISPLAY WINDOW	C	01-13-88	23	
10283-2	1		SCREW CAPTIVE M4 .125 THK MET PANEL	B	04-06-86	35	
960-327	1	PM2H25	CABLE TIE PUSH-IN MT .30X.38X.18 NY			24	
10209	1		CAUTION LABEL CSA	B	04-22-85	43	
10108	1		INSTRUMENT LABEL CSA	D	09-14-87	44	
921-517	2	501-H-#4	TERM LOCKWASHER #4 .018 BRASS			40	
928-735	1	8025 WITH WHITE	DRESS NUT WITH WHITE CAP			34	
10385-1	1		MARKER STRIP HORIZONTAL 1-11	B	10-30-86	31	
10381-1	4		MARKER STRIP 1-26	B	10-30-86	30	
921-384	1	1759994	KEY PIN TYPE CS-MSTB NYLON			29	
921-381	1	1757116	TERM BLK PLUG-IN 12 POS GRN			27	

20630-5(B)

FIG 9 SHT 6

PART#	QTY	MFG-PART#	DESC	REV	REV-DATE	ITM	REFDES
921-383	1	1757190	TERM BLK PLUG-IN 20 POS GRN			26	
921-379	3	1757048	TERM BLK PLUG-IN 5 POS GRN			25	
20660-1	1		LABEL ALARM ADJUSTMENT	A	08-12-83	33	
10165-1	1		SAFETY LATCH RACK MTG CONTR INSTR	B	01-05-87	47	
10166-1	1		LABEL SAFETY LATCH RACK MOUNTING	A	06-07-84	42	
1042	2		SCR 6-20X3/8 PH PAN TY 25 ST ZN			36	
1043	1	5610-55-20	WASH NYLON .128 I.D. X .245 O.D.			46	
1044	1	1200-12-ST-ZD	GRIP RING, EXTERNAL .100DIA SHAFT			45	
1040	2		SCR 6-32X3/16 SKT CP PT SST HXSO			48	
9110	4		WASH #4 FLT FBR BLK			39	
9420	10		SCR 4 X 1/2 PAN HD SELF TAP ZINC			37	
9096	2		NUT 6-32 STL CAD PLT HEX			49	
928-725	1	8-T005	TRIM ADJ TOOL				
1003	2		CLAMSHELL, ANTI-STATIC CONTROLLER				
10450-1	1	A35S/M-1450	SCREWDRIVER MAGNET TIP	B	04-09-87		
20632-1	3		CCA COM RLYS & SET PNT 610	K	07-12-89	12	
20632-7	1		CCA MASTER RESET MODEL 610 FM	B	07-12-89	11	
20650-1	1		CHASSIS SUB ASSY MOD 610 117V	F	07-05-89	18	

PARTS LIST
FINAL ASSEMBLY
COMMON RELAYS -
COMMON ALARM SET POINTS
FM APPROVED ALARMS
117V AC

PART#	QTY	MFG-PART#	DESC	REV	REV-DATE	ITM	REFDES
20630	INFO		MOD 610 4 CHAN HC MONITOR 117VAC	J	07-03-89		
20659	INFO		OUTLINE DWG & REAR TERM CONN	J	05-11-89		
20648	INFO		SCHEMATIC DIAGRAM	E	09-24-87		
20631	INFO		SCHEMATIC DIAGRAM 610	H	05-11-89		
20663-1	1		PANEL REAR SSLK COMM RLY 117V	B	09-01-87	16	
20655-1	1		PLATE MOUNTING 104 MOD 610 TOP	E	08-27-87	22	
10249-1	1		HANDLE UNIVERSAL -76	A	03-13-87	20	
20641-1	1		PANEL FRONT PAINT & SSCRN 610	B	09-11-84	21	
20668-1	1		DISPLAY WINDOW	C	01-13-88	23	
10283-2	1		SCREW CAPTIVE M4 .125 THK MET PANEL	B	04-06-86	35	
960-327	1	PM2H25	CABLE TIE PUSH-IN MT .30X.38X.18 NY			24	
10209	1		CAUTION LABEL CSA	B	04-22-85	43	
10108	1		INSTRUMENT LABEL CSA	D	09-14-87	44	
921-517	2	501-H-#4	TERM LOCKWASHER #4 .018 BRASS			40	
928-735	1	8025 WITH WHITE	DRESS NUT WITH WHITE CAP			34	
10385-1	1		MARKER STRIP HORIZONTAL 1-11	B	10-30-86	31	
10381-1	4		MARKER STRIP 1-26	B	10-30-86	30	
921-384	1	1759994	KEY PIN TYPE CS-MSTB NYLON			29	
921-381	1	1757114	TERM BLK PLUG-IN 12 POS GRN			27	

20630-6(B)

FIG 9 SHT 7

PART#	QTY	MFG-PART#	DESC	REV	REV-DATE	ITM	REFDES
921-383	1	1757190	TERM BLK PLUG-IN 20 POS GRN			26	
921-379	3	1757048	TERM BLK PLUG-IN 5 POS GRN			25	
20660-1	1		LABEL ALARM ADJUSTMENT	A	08-12-83	33	
10165-1	1		SAFETY LATCH RACK MTG CONTR INSTR	B	01-05-87	47	
10166-1	1		LABEL SAFETY LATCH RACK MOUNTING	A	06-07-84	42	
1042	2		SCR 6-20X3/8 PH PAN TY 25 ST ZN			36	
1043	1	5610-55-20	WASH NYLON .128 I.D. X .245 O.D.			46	
1044	1	1200-12-ST-ZD	GRIP RING, EXTERNAL .100DIA SHAFT			45	
1040	2		SCR 6-32X3/16 SKT CP PT SST HXSO			48	
9110	4		WASH #4 FLT FBR BLK			39	
9420	10		SCR 4 X 1/2 PAN HD SELF TAP ZINC			37	
9096	2		NUT 6-32 STL CAD PLT HEX			49	
928-725	1	8-T005	TRIM ADJ TOOL				
1003	2		CLAMSHELL, ANTI-STATIC CONTROLLER				
10450-1	1	A35S/M-1450	SCREWDRIVER MAGNET TIP	B	04-09-87		
20632-9	3		CCA COM RLYS D/ALM SET PTS 610 FM	B	07-12-89	12	
20632-7	1		CCA MASTER RESET MODEL 610 FM	B	07-12-89	11	
20650-1	1		CHASSIS SUB ASSY MOD 610 117V	F	07-05-89	18	

PARTS LIST
FINAL ASSEMBLY
COMMON RELAYS -
DISCRETE ALARM SET POINTS
FM APPROVED ALARMS
117V AC

PART#	QTY	MFG-PART#	DESC	REV	REV-DATE	ITM	REFDES
20630	INFO		MOD 610 4 CHAN HC MONITOR 117VAC	J	07-03-89		
20659	INFO		OUTLINE DWG & REAR TERM CONN	J	05-11-89		
20648	INFO		SCHEMATIC DIAGRAM	E	09-24-87		
20631	INFO		SCHEMATIC DIAGRAM 610	H	05-11-89		
20663-2	1		PANEL REAR SSLK DISCRETE RLYS 117V	B	09-01-87	9	
20655-1	1		PLATE MOUNTING 104 MOD 610 TOP	E	08-27-87	22	
10249-1	1		HANDLE UNIVERSAL -76	A	03-13-87	20	
20641-1	1		PANEL FRONT PAINT & SSCRN 610	B	09-11-84	21	
20668-1	1		DISPLAY WINDOW	C	01-13-88	23	
10283-2	1		SCREW CAPTIVE M4 .125 THK MET PANEL	B	04-06-86	35	
960-327	1	PM2H25	CABLE TIE PUSH-IN MT .30X.38X.18 NY			24	
10209	1		CAUTION LABEL CSA	B	04-22-85	43	
10108	1		INSTRUMENT LABEL CSA	D	09-14-87	44	
921-517	2	501-H-#4	TERM LOCKWASHER #4 .018 BRASS			40	
928-735	1	8025 WITH WHITE	DRESS NUT WITH WHITE CAP			34	
10385-1	1		MARKER STRIP HORIZONTAL 1-11	B	10-30-86	31	
10381-1	4		MARKER STRIP 1-26	B	10-30-86	30	
921-384	1	1759994	KEY PIN TYPE CS-MSTB NYLON			29	

20630-7(B)

FIG 9 SHT 8

PART#	QTY	MFG-PART#	DESC	REV	REV-DATE	ITM	REFDES
921-381	1	1757116	TERM BLK PLUG-IN 12 POS GRN			27	
921-383	4	1757190	TERM BLK PLUG-IN 20 POS GRN			26	
20660-1	1		LABEL ALARM ADJUSTMENT	A	08-12-83	33	
10165-1	1		SAFETY LATCH RACK MTG CONTR INSTR	B	01-05-87	47	
10166-1	1		LABEL SAFETY LATCH RACK MOUNTING	A	06-07-84	42	
1042	2		SCR 6-20X3/8 PH PAN TY 25 ST ZN			36	
1043	1	5610-55-20	WASH NYLON .128 I.D. X .245 O.D.			46	
1044	1	1200-12-ST-ZD	GRIP RING, EXTERNAL .100DIA SHAFT			45	
1040	2		SCR 6-32X3/16 SKT CP PT SST HXSO			48	
9110	4		WASH #4 FLT FBR BLK			39	
9420	10		SCR 4 X 1/2 PAN HD SELF TAP ZINC			37	
9096	2		NUT 6-32 STL CAD PLT HEX			49	
928-725	1	8-T005	TRIM ADJ TOOL				
1003	2		CLAMSHELL, ANTI-STATIC CONTROLLER				
10450-1	1	A35S/M-1450	SCREWDRIVER MAGNET TIP	B	04-09-87		
20632-3	3		CCA DISCRETE RLYS & COM SET PTS 610	K	07-12-89	12	
20632-7	1		CCA MASTER RESET MODEL 610 FM	B	07-12-89	11	
20650-1	1		CHASSIS SUB ASSY MOD 610 117V	F	07-05-89	18	

PARTS LIST
FINAL ASSEMBLY
DISCRETE RELAYS -
COMMON ALARM SET POINTS
FM APPROVED ALARMS
117V AC

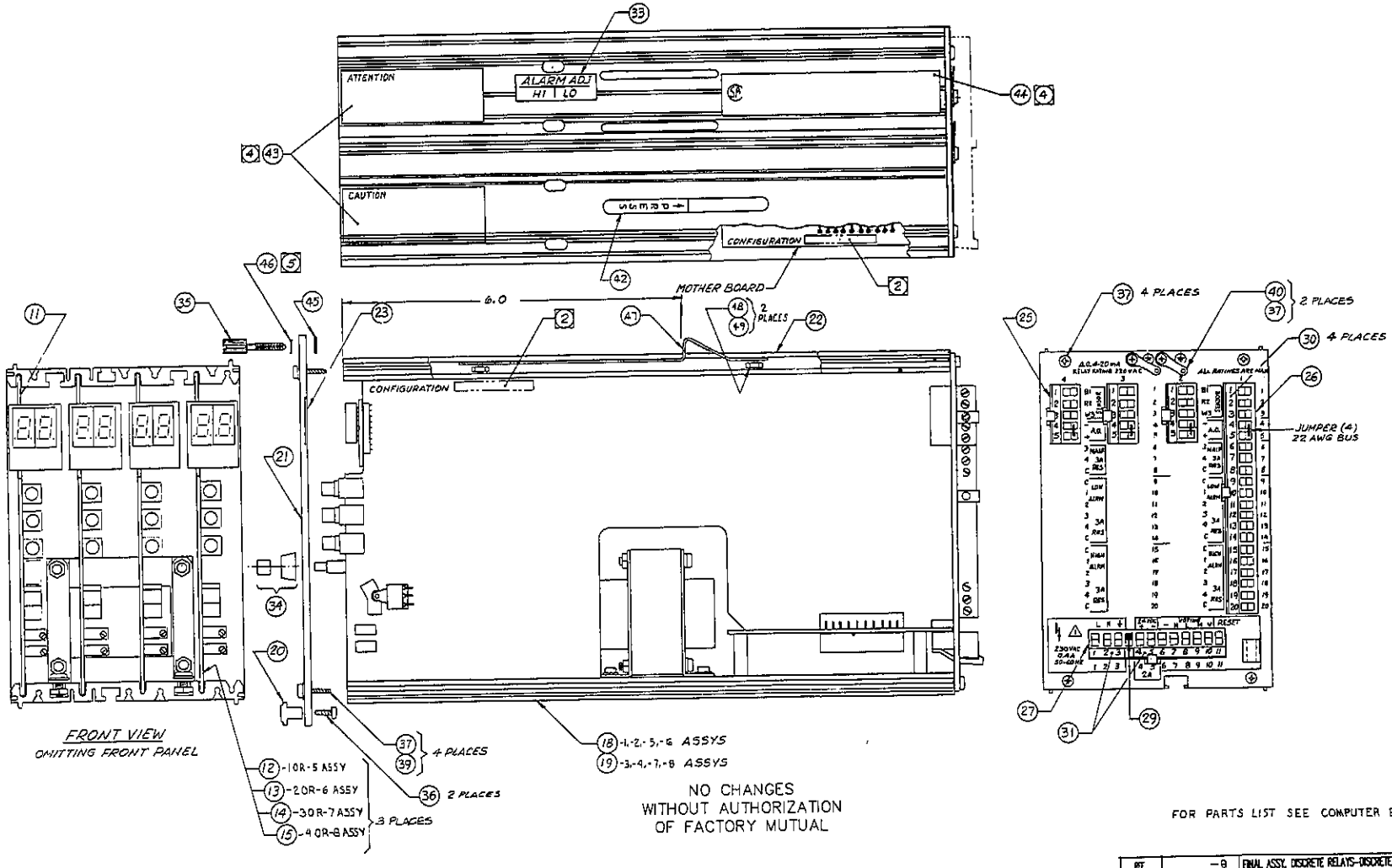
PART#	QTY	MFG-PART#	DESC	REV	REV-DATE	ITM	REFDES
20630	INFO		MOD 610 4 CHAN HC MONITOR 117VAC	J	07-03-89		
20659	INFO		OUTLINE DWG & REAR TERM CONN	J	05-11-89		
20648	INFO		SCHEMATIC DIAGRAM	E	09-24-87		
20631	INFO		SCHEMATIC DIAGRAM 610	H	05-11-89		
20663-2	1		PANEL REAR SSLK DISCRETE RLYS 117V	B	09-01-87	9	
20655-1	1		PLATE MOUNTING 104 MOD 610 TOP	E	08-27-87	22	
10249-1	1		HANDLE UNIVERSAL -76	A	03-13-87	20	
20641-1	1		PANEL FRONT PAINT & SSCRN 610	B	09-11-84	21	
20668-1	1		DISPLAY WINDOW	C	01-13-88	23	
10283-2	1		SCREW CAPTIVE M4 .125 THK MET PANEL	B	04-06-86	35	
960-327	1	PM2H25	CABLE TIE PUSH-IN MT .30X.38X.18 NY			24	
10209	1		CAUTION LABEL CSA	B	04-22-85	43	
10108	1		INSTRUMENT LABEL CSA	D	09-14-87	44	
921-517	2	501-H-#4	TERM LOCKWASHER #4 .018 BRASS			40	
928-735	1	8025 WITH WHITE	DRESS NUT WITH WHITE CAP			34	
10385-1	1		MARKER STRIP HORIZONTAL 1-11	B	10-30-86	31	
10381-1	4		MARKER STRIP 1-26	B	10-30-86	30	
921-384	1	1759994	KEY PIN TYPE CS-MSTB NYLON			29	

20630-8(B)

FIG 9 SHT 9

PART#	QTY	MFG-PART#	DESC	REV	REV-DATE	ITM	REFDES
921-381	1	1757116	TERM BLK PLUG-IN 12 POS GRN			27	
921-383	4	1757190	TERM BLK PLUG-IN 20 POS GRN			26	
20660-1	1		LABEL ALARM ADJUSTMENT	A	08-12-83	33	
10165-1	1		SAFETY LATCH RACK MTG CONTR INSTR	B	01-05-87	47	
10166-1	1		LABEL SAFETY LATCH RACK MOUNTING	A	06-07-84	42	
1042	2		SCR 6-20X3/8 PH PAN TY 25 ST ZN			36	
1043	1	5610-55-20	WASH NYLON .128 I.D. X .245 O.D.			46	
1044	1	1200-12-ST-20	GRIP RING, EXTERNAL .100DIA SHAFT			45	
1040	2		SCR 6-32X3/16 SKT CP PT SST HXSD			48	
9110	4		WASH #4 FLT FBR BLK			39	
9420	10		SCR 4 X 1/2 PAN HD SELF TAP ZINC			37	
9096	2		NUT 6-32 STL CAD PLT HEX			49	
928-725	1	8-T005	TRIM ADJ TOOL				
1003	2		CLAMSHELL, ANTI-STATIC CONTROLLER				
10450-1	1	A35S/M-1450	SCREWDRIVER MAGNET TIP	B	04-09-87		
20632-7	1		CCA MASTER RESET MODEL 610 FM	B	07-12-89	11	
20632-8	3		CCA DISC RLY & ALM SER PTS 610 FM	B	07-12-89	12	
20650-1	1		CHASSIS SUB ASSY MOD 610 117V	F	07-05-89	18	

PARTS LIST
FINAL ASSEMBLY
DISCRETE RELAYS -
DISCRETE ALARM SET POINTS
FM APPROVED ALARMS
117V AC



NO CHANGES
WITHOUT AUTHORIZATION
OF FACTORY MUTUAL

FOR PARTS LIST SEE COMPUTER BOM 20629-

REF	-8	FINAL ASSY, DISCRETE RELAYS-DISCRETE ALM SET PTS(FM APVD ALM)
REF	-7	FINAL ASSY, DISCRETE RELAYS-COMM ALM SET PTS(FM APVD ALM)
REF	-6	FINAL ASSY, COMMON RELAYS-DISCRETE ALM SET PTS(FM APVD ALM)
REF	-5	FINAL ASSY, COMMON RELAYS-COMM ALM SET PTS(FM APVD ALM)
REF	-4	FINAL ASSY, DISCRETE RELAYS - DISCRT ALARM SET POINTS
REF	-3	FINAL ASSY, DISCRETE RELAYS - COMM ALARM SET POINTS
REF	-2	FINAL ASSY, COMMON RELAYS - DISCRT ALARM SET POINTS
REF	-1	FINAL ASSY, COMMON RELAYS - COMM. ALARM SET POINTS
QTY.	PART NO.	DESCRIPTION

(20629)

FIG 10 SHT 1

FINAL ASSEMBLY - FOUR CHANNEL H.C. MONITOR, MODEL 610

230V AC

PART#	QTY	MFG-PART#	DESC	REV	REV-DATE	ITM	REFDES
20629	INFO		MOD 610 4 CHAN HC MONITOR 230VAC	J	07-03-89		
20659	INFO		OUTLINE DWG & REAR TERM CONN	J	05-11-89		
20648	INFO		SCHEMATIC DIAGRAM	E	09-24-87		
20631	INFO		SCHEMATIC DIAGRAM 610	H	05-11-89		
20664-1	1		PANEL REAR SSLK COMMON RLY 230 VAC	B	09-01-87	17	
20655-1	1		PLATE MOUNTING 104 MOD 610 TOP	E	08-27-87	22	
10249-1	1		HANDLE UNIVERSAL -76	A	03-13-87	20	
20641-1	1		PANEL FRONT PAINT & SSCRN 610	B	09-11-84	21	
20668-1	1		DISPLAY WINDOW	C	01-13-88	23	
10283-2	1		SCREW CAPTIVE M4 .125 THK MET PANEL	B	04-06-86	35	
960-327	1	PMZH25	CABLE TIE PUSH-IN MT .30X.38X.18 NY			24	
921-517	2	501-H-#4	TERM LOCKWASHER #4 .018 BRASS			40	
20660-1	1		LABEL ALARM ADJUSTMENT	A	08-12-83	33	
10209	1		CAUTION LABEL CSA	B	04-22-85	43	
10072	1		NAMEPLATE INSTRUMENT CSA	G	09-15-88	44	
921-383	1	1757190	TERM BLK PLUG-IN 20 POS GRN			26	
921-379	3	1757048	TERM BLK PLUG-IN 5 POS GRN			25	
921-381	1	1757116	TERM BLK PLUG-IN 12 POS GRN			27	
921-384	1	1759994	KEY PIN TYPE CS-MSTB NYLON			29	

PART#	QTY	MFG-PART#	DESC	REV	REV-DATE	ITM	REFDES
10381-1	4		MARKER STRIP 1-26	B	10-30-86	30	
10385-1	1		MARKER STRIP HORIZONTAL 1-11	B	10-30-86	31	
928-735	1	8025 WITH WHITE	DRESS NUT WITH WHITE CAP			34	
10165-1	1		SAFETY LATCH RACK MTG CONTR INSTR	B	01-05-87	47	
10166-1	1		LABEL SAFETY LATCH RACK MOUNTING	A	06-07-84	42	
9420	10		SCR 4 X 1/2 PAN HD SELF TAP ZINC			37	
9096	2		NUT 6-32 STL CAD PLT HEX			49	
9110	4		WASH #4 FLT FBR BLK			39	
1042	2		SCR 6-20X3/8 PH PAN TY 25 ST ZN			36	
1043	1	5610-55-20	WASH NYLON .128 I.D. X .245 O.D.			46	
1044	1	1200-12-ST-ZD	GRIP RING, EXTERNAL .1000IA SHAFT			45	
1040	1		SCR 6-32X3/16 SKT CP PT SST HXSO			48	
1003	2		CLAMSHELL, ANTI-STATIC CONTROLLER				
928-725	1	8-T005	TRIM ADJ TOOL				
10450-1	1	A35S/M-1450	SCREWDRIVER MAGNET TIP	B	04-09-87		
20632-1	3		CCA COM RLYS & SET PNT 610	K	07-12-89	12	
20632-2	1		CCA MSTER RESET MODEL 610	K	07-12-89	11	
20650-2	1		CHASSIS SUB ASSY MOD 610 230V	F	07-06-89	18	

20629-1(J)

FIG 10 SHT 2

PARTS LIST
FINAL ASSEMBLY
COMMON RELAYS -
COMMON ALARM SET POINTS
230V AC

PART#	QTY	MFG-PART#	DESC	REV	REV-DATE	ITM	REFDES
20629	INFO		MOD 610 4 CHAN HC MONITOR 230VAC	J	07-03-89		
20659	INFO		OUTLINE DWG & REAR TERM CONN	J	05-11-89		
20648	INFO		SCHEMATIC DIAGRAM	E	09-24-87		
20631	INFO		SCHEMATIC DIAGRAM 610	H	05-11-89		
20664-1	1		PANEL REAR SSLK COMMON RLY 230 VAC	B	09-01-87	17	
20655-1	1		PLATE MOUNTING 104 MOD 610 TOP	E	08-27-87	22	
10249-1	1		HANDLE UNIVERSAL -76	A	03-13-87	20	
20641-1	1		PANEL FRONT PAINT & SSCRN 610	B	09-11-84	21	
20668-1	1		DISPLAY WINDOW	C	01-13-88	23	
10283-2	1		SCREW CAPTIVE M4 .125 THK MET PANEL	B	04-06-86	35	
960-327	1	PM2H25	CABLE TIE PUSH-IN MT .30X.38X.18 NY			24	
921-517	2	501-M-#4	TERM LOCKWASHER #4 .018 BRASS			40	
20660-1	1		LABEL ALARM ADJUSTMENT	A	08-12-83	33	
10209	1		CAUTION LABEL CSA	B	04-22-85	43	
10072	1		NAMEPLATE INSTRUMENT CSA	G	09-15-88	44	
921-383	1	1757190	TERM BLK PLUG-IN 20 POS GRN			26	
921-379	3	1757048	TERM BLK PLUG-IN 5 POS GRN			25	
921-381	1	1757116	TERM BLK PLUG-IN 12 POS GRN			27	
921-384	1	1759994	KEY PIN TYPE CS-MSTB NYLON			29	

20629-2(J)

FIG 10 SHT 3

PART#	QTY	MFG-PART#	DESC	REV	REV-DATE	ITM	REFDES
10381-1	4		MARKER STRIP 1-26	B	10-30-86	30	
10385-1	1		MARKER STRIP HORIZONTAL 1-11	B	10-30-86	31	
928-735	1	8025 WITH WHITE	DRESS NUT WITH WHITE CAP			34	
10165-1	1		SAFETY LATCH RACK MTG CONTR INSTR	B	01-05-87	47	
10166-1	1		LABEL SAFETY LATCH RACK MOUNTING	A	06-07-84	42	
9420	10		SCR 4 X 1/2 PAN HD SELF TAP ZINC			37	
9096	2		NUT 6-32 STL CAD PLT HEX			49	
9110	4		WASH #4 FLT FBR BLK			39	
1042	2		SCR 6-20X3/8 PH PAN TY 25 ST ZN			36	
1043	1	5610-55-20	WASH NYLON .128 I.D. X .245 O.D.			46	
1044	1	1200-12-ST-ZD	GRIP RING, EXTERNAL .100DIA SHAFT			45	
1040	1		SCR 6-32X3/16 SKT CP PT SST HXSO			48	
928-725	1	8-T005	TRIM ADJ TOOL				
1003	2		CLAMSHELL, ANTI-STATIC CONTROLLER				
10450-1	1	A35S/M-1450	SCREWDRIVER MAGNET TIP	B	04-09-87		
20632-2	1		CCA MSTER RESET MODEL 610	K	07-12-89	11	
20632-5	3		CCA COM RLYS DISCR ALM SET PTS 610	K	07-12-89	12	
20650-2	1		CHASSIS SUB ASSY MOD 610 230V	F	07-06-89	18	

PARTS LIST
FINAL ASSEMBLY
COMMON RELAYS -
DISCRETE ALARM SET POINTS
230V AC

PART#.....	QTY	MFG-PART#.....	DESC.....	REV	REV-DATE	ITM	REFDES .....
20629	INFO		MOD 610 4 CHAN HC MONITOR 230VAC	J	07-03-89		
20659	INFO		OUTLINE DWG & REAR TERM CONN	J	05-11-89		
20648	INFO		SCHEMATIC DIAGRAM	E	09-24-87		
20631	INFO		SCHEMATIC DIAGRAM 610	H	05-11-89		
20664-2	1		PANEL REAR SSLK DISCRETE RLYS 230V	B	09-01-87	10	
20655-1	1		PLATE MOUNTING 104 MOD 610 TOP	E	08-27-87	22	
10249-1	1		HANDLE UNIVERSAL -76	A	03-13-87	20	
20641-1	1		PANEL FRONT PAINT & SSCRN 610	B	09-11-84	21	
20668-1	1		DISPLAY WINDOW	C	01-13-88	23	
10283-2	1		SCREW CAPTIVE M4 .125 THK MET PANEL	B	04-06-86	35	
960-327	1	PM2X25	CABLE TIE PUSH-IN MT .30X.38X.18 NY			24	
921-517	2	501-H-#4	TERM LOCKWASHER #4 .018 BRASS			40	
20660-1	1		LABEL ALARM ADJUSTMENT	A	08-12-83	33	
10209	1		CAUTION LABEL CSA	B	04-22-85	43	
10072	1		NAMEPLATE INSTRUMENT CSA	G	09-15-88	44	
921-383	4	1757190	TERM BLK PLUG-IN 20 POS GRN			26	
921-381	1	1757116	TERM BLK PLUG-IN 12 POS GRN			27	
921-384	1	1759994	KEY PIN TYPE CS-MSTB NYLON			29	

20629-3(J)

FIG 10 SHT 4

PART#.....	QTY	MFG-PART#.....	DESC.....	REV	REV-DATE	ITM	REFDES .....
10381-1	4		MARKER STRIP 1-26	B	10-30-86	30	
10385-1	1		MARKER STRIP HORIZONTAL 1-11	B	10-30-86	31	
928-735	1	8025 WITH WHITE	DRESS NUT WITH WHITE CAP			34	
10165-1	1		SAFETY LATCH RACK MTG CONTR INSTR	B	01-05-87	47	
10166-1	1		LABEL SAFETY LATCH RACK MOUNTING	A	06-07-84	42	
9420	10		SCR 4 X 1/2 PAN HD SELF TAP ZINC			37	
9096	2		NUT 6-32 STL CAD PLT HEX			49	
9110	4		WASH #4 FLT FBR BLK			39	
1042	2		SCR 6-20X3/8 PH PAN TY 25 ST ZN			36	
1043	1	5610-55-20	WASH NYLON .128 I.D. X .245 O.D.			46	
1044	1	1200-12-ST-ZD	GRIP RING, EXTERNAL .100DIA SHAFT			45	
1040	1		SCR 6-32X3/16 SKT CP PT SST HXSO			48	
928-725	1	8-T005	TRIM ADJ TOOL				
1003	2		CLAMSHELL, ANTI-STATIC CONTROLLER				
10450-1	1	A35S/M-1450	SCREWDRIVER MAGNET TIP	B	04-09-87		
20632-2	1		CCA MSTER RESET MODEL 610	K	07-12-89	11	
20632-3	3		CCA DISCRETE RLYS & COM SET PTS 610	K	07-12-89	12	
20650-2	1		CHASSIS SUB ASSY MOD 610 230V	F	07-06-89	18	

PARTS LIST
FINAL ASSEMBLY
DISCRETE RELAYS -
COMMON ALARM SET POINTS
230V AC

PART#.....	QTY	MFG-PART#.....	DESC.....	REV	REV-DATE	ITM	REFDES .....
20629	INFO		MOD 610 4 CHAN HC MONITOR 230VAC	J	07-03-89		
20659	INFO		OUTLINE DWG & REAR TERM CONN	J	05-11-89		
20648	INFO		SCHEMATIC DIAGRAM	E	09-24-87		
20631	INFO		SCHEMATIC DIAGRAM 610	H	05-11-89		
20664-2	1		PANEL REAR SSLK DISCRETE RLYS 230V	B	09-01-87	10	
20655-1	1		PLATE MOUNTING 104 MOD 610 TOP	E	08-27-87	22	
10249-1	1		HANDLE UNIVERSAL -76	A	03-13-87	20	
20641-1	1		PANEL FRONT PAINT & SSCRN 610	B	09-11-84	21	
20668-1	1		DISPLAY WINDOW	C	01-13-88	23	
10283-2	1		SCREW CAPTIVE M4 .125 THK MET PANEL	B	04-06-86	35	
960-327	1	PM2H25	CABLE TIE PUSH-IN MT .30X.38X.18 NY				24
921-517	2	501-H-#4	TERM LOCKWASHER #4 .018 BRASS				40
20660-1	1		LABEL ALARM ADJUSTMENT	A	08-12-83	33	
10209	1		CAUTION LABEL CSA	B	04-22-85	43	
10072	1		NAMEPLATE INSTRUMENT CSA	G	09-15-88	44	
921-383	4	1757190	TERM BLK PLUG-IN 20 POS GRN				26
921-381	1	1757116	TERM BLK PLUG-IN 12 POS GRN				27
921-384	1	1759994	KEY PIN TYPE CS-MSTB NYLON				29

20629-4(J)

FIG 10 SHT 5

PART#.....	QTY	MFG-PART#.....	DESC.....	REV	REV-DATE	ITM	REFDES .....
10381-1	4		MARKER STRIP 1-26	B	10-30-86	30	
10385-1	1		MARKER STRIP HORIZONTAL 1-11	B	10-30-86	31	
928-735	1	8025 WITH WHITE	DRESS NUT WITH WHITE CAP				34
10165-1	1		SAFETY LATCH RACK MTG CONTR INSTR	B	01-05-87	47	
10166-1	1		LABEL SAFETY LATCH RACK MOUNTING	A	06-07-84	42	
9420	10		SCR 4 X 1/2 PAN HD SELF TAP ZINC				37
9096	2		NUT 6-32 STL CAD PLT HEX				49
9110	4		WASH #4 FLT FBR BLK				39
1042	2		SCR 6-20X3/8 PH PAN TY 25 ST ZN				36
1043	1	5610-55-20	WASH NYLON .128 I.D. X .245 O.D.				46
1044	1	1200-12-ST-ZD	GRIP RING, EXTERNAL .100DIA SHAFT				45
1040	1		SCR 6-32X3/16 SKT CP PT SST HXSO				48
928-725	1	8-T005	TRIM ADJ TOOL				
1003	2		CLAMSHELL, ANTI-STATIC CONTROLLER				
10450-1	1	A35S/M-1450	SCREWDRIVER MAGNET TIP	B	04-09-87		
20632-2	1		CCA MSTER RESET MODEL 610	K	07-12-89	11	
20632-4	3		CCA DISCRETE RLYS & ALM SER PTS 610	K	07-12-89	12	
20650-2	1		CHASSIS SUB ASSY MOD 610 230V	F	07-06-89	18	

PARTS LIST
FINAL ASSEMBLY
DISCRETE RELAYS -
DISCRETE ALARM SET POINTS
230V AC

PART#	QTY	MFG-PART#	DESC	REV	REV-DATE	ITM	REFDES
20629	INFO		MOD 610 4 CHAN HC MONITOR 230VAC	J	07-03-89		
20659	INFO		OUTLINE DWG & REAR TERM CONN	J	05-11-89		
20648	INFO		SCHEMATIC DIAGRAM	E	09-24-87		
20631	INFO		SCHEMATIC DIAGRAM 610	H	05-11-89		
20664-1	1		PANEL REAR SSLK COMMON RLY 230 VAC	B	09-01-87	17	
20655-1	1		PLATE MOUNTING 104 MOD 610 TOP	E	08-27-87	22	
10249-1	1		HANDLE UNIVERSAL -76	A	03-13-87	20	
20641-1	1		PANEL FRONT PAINT & SSCRN 610	B	09-11-84	21	
20668-1	1		DISPLAY WINDOW	C	01-13-88	23	
10283-2	1		SCREW CAPTIVE M4 .125 THK MET PANEL	B	04-06-86	35	
960-327	1	PM2H25	CABLE TIE PUSH-IN MT .30X.38X.18 NY			24	
921-517	2	501-H-#4	TERM LOCKWASHER #4 .018 BRASS			40	
20660-1	1		LABEL ALARM ADJUSTMENT	A	08-12-83	33	
10209	1		CAUTION LABEL CSA	B	04-22-85	43	
10072	1		NAMEPLATE INSTRUMENT CSA	G	09-15-88	44	
921-383	1	1757190	TERM BLK PLUG-IN 20 POS GRN			26	
921-379	3	1757048	TERM BLK PLUG-IN 5 POS GRN			25	
921-381	1	1757116	TERM BLK PLUG-IN 12 POS GRN			27	
921-384	1	1759994	KEY PIN TYPE CS-MSTB NYLON			29	

20629-5(B)

FIG 10 SHT 6

PART#	QTY	MFG-PART#	DESC	REV	REV-DATE	ITM	REFDES
10381-1	4		MARKER STRIP 1-26	B	10-30-86	30	
10385-1	1		MARKER STRIP HORIZONTAL 1-11	B	10-30-86	31	
928-735	1	8025 WITH WHITE	DRESS NUT WITH WHITE CAP			34	
10165-1	1		SAFETY LATCH RACK MTG CONTR INSTR	B	01-05-87	47	
10166-1	1		LABEL SAFETY LATCH RACK MOUNTING	A	06-07-84	42	
9420	10		SCR 4 X 1/2 PAN HD SELF TAP ZINC			37	
9096	2		NUT 6-32 STL CAD PLT HEX			49	
9110	4		WASH #4 FLT FBR BLK			39	
1042	2		SCR 6-20X3/8 PH PAN TY 25 ST ZN			36	
1043	1	5610-55-20	WASH NYLON .128 I.D. X .245 O.D.			46	
1044	1	1200-12-ST-ZD	GRIP RING, EXTERNAL .100DIA SHAFT			45	
1040	1		SCR 6-32X3/16 SKT CP PT SST HXSO			48	
928-725	1	8-T005	TRIM ADJ TOOL				
1003	2		CLAMSHELL, ANTI-STATIC CONTROLLER				
10450-1	1	A35S/M-1450	SCREWDRIVER MAGNET TIP	B	04-09-87		
20632-1	3		CCA COM RLYS & SET PNT 610	K	07-12-89	12	
20632-7	1		CCA MASTER RESET MODEL 610 FM	B	07-12-89	11	
20650-2	1		CHASSIS SUB ASSY MOD 610 230V	F	07-06-89	18	

PARTS LIST
FINAL ASSEMBLY
COMMON RELAYS -
COMMON ALARM SET POINTS
FM APPROVED ALARMS
230V AC

PART#	QTY	MFG-PART#	DESC	REV	REV-DATE	ITM	REFDES
20629	INFO		MOD 610 4 CHAN HC MONITOR 230VAC	J	07-03-89		
20659	INFO		OUTLINE DWG & REAR TERM CONN	J	05-11-89		
20648	INFO		SCHEMATIC DIAGRAM	E	09-24-87		
20631	INFO		SCHEMATIC DIAGRAM 610	H	05-11-89		
20664-1	1		PANEL REAR SSLK COMMON RLY 230 VAC	B	09-01-87	17	
20655-1	1		PLATE MOUNTING 104 MOD 610 TOP	E	08-27-87	22	
10249-1	1		HANDLE UNIVERSAL -76	A	03-13-87	20	
20641-1	1		PANEL FRONT PAINT & SSCRN 610	B	09-11-84	21	
20668-1	1		DISPLAY WINDOW	C	01-13-88	23	
10283-2	1		SCREW CAPTIVE M4 .125 THK MET PANEL	B	04-06-86	35	
960-327	1	PM2H25	CABLE TIE PUSH-IN MT .30X.38X.18 NY			24	
921-517	2	501-H-#4	TERM LOCKWASHER #4 .018 BRASS			40	
20660-1	1		LABEL ALARM ADJUSTMENT	A	08-12-83	33	
10209	1		CAUTION LABEL CSA	B	04-22-85	43	
10072	1		NAMEPLATE INSTRUMENT CSA	G	09-15-88	44	
921-383	1	1757190	TERM BLK PLUG-IN 20 POS GRN			26	
921-379	3	1757048	TERM BLK PLUG-IN 5 POS GRN			25	
921-381	1	1757116	TERM BLK PLUG-IN 12 POS GRN			27	
921-384	1	1759994	KEY PIN TYPE CS-MSTB NYLON			29	

20629-6(B)

FIG 10 SHT 7

PART#	QTY	MFG-PART#	DESC	REV	REV-DATE	ITM	REFDES
10381-1	4		MARKER STRIP 1-26	B	10-30-86	30	
10385-1	1		MARKER STRIP HORIZONTAL 1-11	B	10-30-86	31	
928-735	1	8025 WITH WHITE	DRESS NUT WITH WHITE CAP			34	
10165-1	1		SAFETY LATCH RACK MTG CONTR INSTR	B	01-05-87	47	
10166-1	1		LABEL SAFETY LATCH RACK MOUNTING	A	06-07-84	42	
9420	10		SCR 4 X 1/2 PAN HD SELF TAP ZINC			37	
9096	2		NUT 6-32 STL CAD PLT HEX			49	
9110	4		WASH #4 FLT FBR BLK			39	
1042	2		SCR 6-20X3/8 PH PAN TY 25 ST ZN			36	
1043	1	5610-55-20	WASH NYLON .128 I.D. X .245 O.D.			46	
1044	1	1200-12-ST-ZD	GRIP RING, EXTERNAL .100DIA SHAFT			45	
1040	1		SCR 6-32X3/16 SKT CP PT SST MXSO			48	
928-725	1	8-T005	TRIM ADJ TOOL				
1003	2		CLAMSHELL, ANTI-STATIC CONTROLLER				
10450-1	1	A35S/M-1450	SCREWDRIVER MAGNET TIP	B	04-09-87		
20632-7	1		CCA MASTER RESET MODEL 610 FM	B	07-12-89	11	
20632-9	3		CCA COM RLYS D/ALM SET PTS 610 FM	B	07-12-89	12	
20650-2	1		CHASSIS SUB ASSY MOD 610 230V	F	07-06-89	18	

PARTS LIST
FINAL ASSEMBLY
COMMON RELAYS -
DISCRETE ALARM SET POINTS
FM APPROVED ALARMS
230V AC

PART#	QTY	MFG-PART#	DESC	REV	REV-DATE	ITM	REFDES
20629	INFO		MOD 610 4 CHAN HC MONITOR 230VAC	J	07-03-89		
20659	INFO		OUTLINE DWG & REAR TERM CONN	J	05-11-89		
20648	INFO		SCHEMATIC DIAGRAM	E	09-24-87		
20631	INFO		SCHEMATIC DIAGRAM 610	H	05-11-89		
20664-2	1		PANEL REAR SSLK DISCRETE RLYS 230V	B	09-01-87	10	
20655-1	1		PLATE MOUNTING 104 MOD 610 TOP	E	08-27-87	22	
10249-1	1		HANDLE UNIVERSAL -76	A	03-13-87	20	
20641-1	1		PANEL FRONT PAINT & SSCRN 610	B	09-11-84	21	
20668-1	1		DISPLAY WINDOW	C	01-13-88	23	
10283-2	1		SCREW CAPTIVE M4 .125 THK MET PANEL	B	04-06-86	35	
960-327	1	PM2H25	CABLE TIE PUSH-IN MT .30X.38X.18 NY			24	
921-517	2	501-N-#4	TERM LOCKWASHER #4 .018 BRASS			40	
20660-1	1		LABEL ALARM ADJUSTMENT	A	08-12-83	33	
10209	1		CAUTION LABEL CSA	B	04-22-85	43	
10072	1		NAMEPLATE INSTRUMENT CSA	G	09-15-88	44	
921-383	4	1757190	TERM BLK PLUG-IN 20 POS GRN			26	
921-381	1	1757116	TERM BLK PLUG-IN 12 POS GRN			27	
921-384	1	1759994	KEY PIN TYPE CS-MSTB NYLON			29	

PART#	QTY	MFG-PART#	DESC	REV	REV-DATE	ITM	REFDES
10381-1	4		MARKER STRIP 1-26	B	10-30-86	30	
10385-1	1		MARKER STRIP HORIZONTAL 1-11	B	10-30-86	31	
928-735	1	8025 WITH WHITE	DRESS NUT WITH WHITE CAP			34	
10165-1	1		SAFETY LATCH RACK MTG CONTR INSTR	B	01-05-87	47	
10166-1	1		LABEL SAFETY LATCH RACK MOUNTING	A	06-07-84	42	
9420	10		SCR 4 X 1/2 PAN HD SELF TAP ZINC			37	
9096	2		NUT 6-32 STL CAD PLT HEX			49	
9110	4		WASH #4 FLT FBR BLK			39	
1042	2		SCR 6-20X3/8 PH PAN TY 25 ST ZN			36	
1043	1	5610-55-20	WASH NYLON .128 I.D. X .245 O.D.			46	
1044	1	1200-12-ST-ZD	GRIP RING, EXTERNAL .1000IA SHAFT			45	
1040	1		SCR 6-32X3/16 SKT CP PT SST HXSO			48	
928-725	1	8-T005	TRIM ADJ TOOL				
1003	2		CLAMSHELL, ANTI-STATIC CONTROLLER				
10450-1	1	A35S/M-1450	SCREWDRIVER MAGNET TIP	B	04-09-87		
20632-7	1		CCA MASTER RESET MODEL 610 FM	B	07-12-89	11	
20632-3	3		CCA DISCRETE RLYS & COM SET PTS 610	K	07-12-89	12	
20650-2	1		CHASSIS SUB ASSY MOD 610 230V	F	07-06-89	18	

FIG 10 SHT 8

PARTS LIST
FINAL ASSEMBLY
DISCRETE RELAYS -
COMMON ALARM SET POINTS
FM APPROVED ALARMS
230V AC

PART#	QTY	MFG-PART#	DESC	REV	REV-DATE	ITM	REFDES
20629	INFO		MOD 610 4 CHAN HC MONITOR 230VAC	J	07-03-89		
20659	INFO		OUTLINE DWG & REAR TERM CONN	J	05-11-89		
20648	INFO		SCHEMATIC DIAGRAM	E	09-24-87		
20631	INFO		SCHEMATIC DIAGRAM 610	H	05-11-89		
20664-2	1		PANEL REAR SSLK DISCRETE RLYS 230V	B	09-01-87	10	
20655-1	1		PLATE MOUNTING 104 MOD 610 TOP	E	08-27-87	22	
10249-1	1		HANDLE UNIVERSAL -76	A	03-13-87	20	
20641-1	1		PANEL FRONT PAINT & SSCRN 610	B	09-11-84	21	
20668-1	1		DISPLAY WINDOW	C	01-13-88	23	
10283-2	1		SCREW CAPTIVE M4 .125 THK MET PANEL	B	04-06-86	35	
960-327	1	PM2H2S	CABLE TIE PUSH-IN MT .30X.38X.18 NY			24	
921-517	2	501-H-#4	TERM LOCKWASHER #4 .018 BRASS			40	
20660-1	1		LABEL ALARM ADJUSTMENT	A	08-12-83	33	
10209	1		CAUTION LABEL CSA	B	04-22-85	43	
10072	1		NAMEPLATE INSTRUMENT CSA	G	09-15-88	44	
921-383	4	1757190	TERM BLK PLUG-IN 20 POS GRN			26	
921-381	1	1757116	TERM BLK PLUG-IN 12 POS GRN			27	
921-384	1	1759994	KEY PIN TYPE CS-MSTB NYLON			29	

20629-8(B)

FIG 10 SHT 9

PART#	QTY	MFG-PART#	DESC	REV	REV-DATE	ITM	REFDES
10381-1	4		MARKER STRIP 1-26	B	10-30-86	30	
10385-1	1		MARKER STRIP HORIZONTAL 1-11	B	10-30-86	31	
928-735	1	8025 WITH WHITE	DRESS NUT WITH WHITE CAP			34	
10165-1	1		SAFETY LATCH RACK MTG CONTR INSTR	B	01-05-87	47	
10166-1	1		LABEL SAFETY LATCH RACK MOUNTING	A	06-07-84	42	
9420	10		SCR 4 X 1/2 PAN HD SELF TAP ZINC			37	
9096	2		NUT 6-32 STL CAD PLT HEX			49	
9110	4		WASH #4 FLT FBR BLK			39	
1042	2		SCR 6-20X3/8 PH PAN TY 25 ST ZN			36	
1043	1	5610-55-20	WASH NYLON .128 I.D. X .245 O.D.			46	
1044	1	1200-12-ST-ZD	GRIP RING, EXTERNAL .1000IA SHAFT			45	
1040	1		SCR 6-32X3/16 SKT CP PT SST HXSO			48	
928-725	1	8-TOOS	TRIM ADJ TOOL				
1003	2		CLAMSHELL, ANTI-STATIC CONTROLLER				
10450-1	1	A35S/M-1450	SCREWDRIVER MAGNET TIP	B	04-09-87		
20632-7	1		CCA MASTER RESET MODEL 610 FM	B	07-12-89	11	
20632-8	3		CCA DISC RLY & ALM SER PTS 610 FM	B	07-12-89	12	
20650-2	1		CHASSIS SUB ASSY MOD 610 230V	F	07-06-89	18	

PARTS LIST
FINAL ASSEMBLY
DISCRETE RELAYS -
DISCRETE ALARM SET POINTS
FM APPROVED ALARMS
230V AC

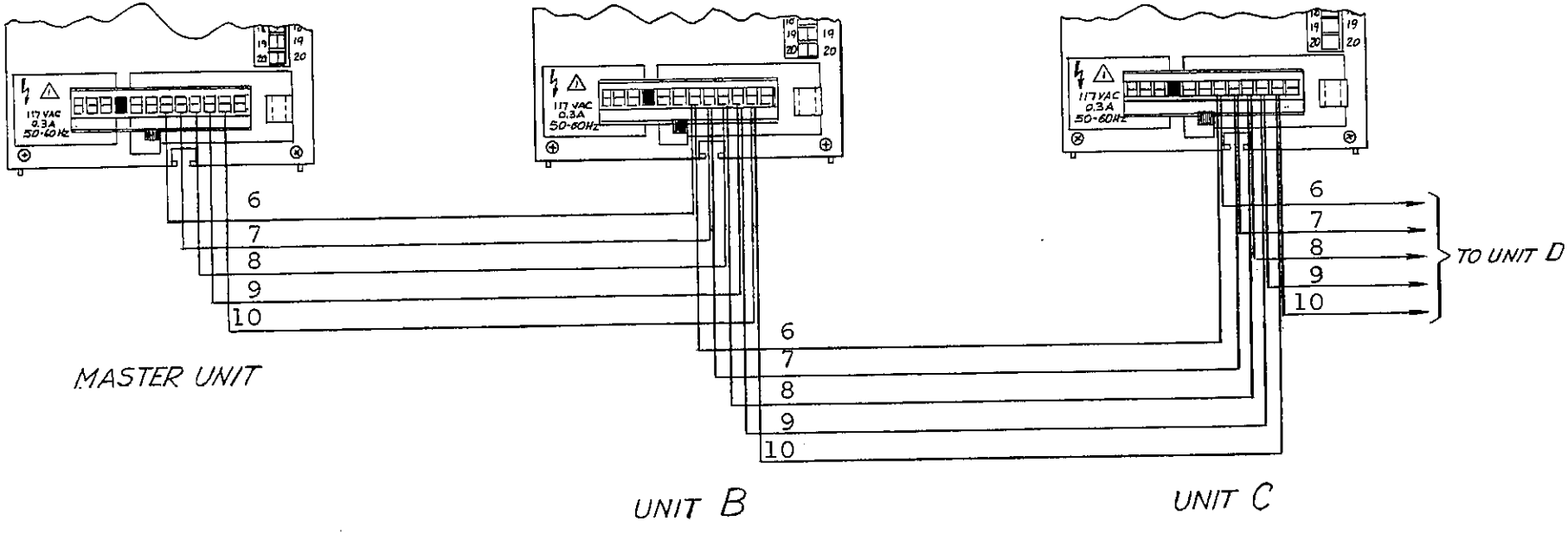


FIG. 10

INTERCONNECTION DRAWING
ZONE CONTROL
MODEL 610