GENERAL MONITORS

MODEL DC100

COMBUSTIBLE GAS

SMART SENSOR

READOUT/RELAY MODULE

0288

GENERAL MONITORS

PLEASE NOTE
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MODEL DC100

COMBUSTIBLE GAS SMART SENSOR READOUT/RELAY UNIT

I. INTRODUCTION

A. NOTICE

All information contained in this instruction manual may be used only to install and operate the Model DC100 System provided by GENERAL MONITORS, INC. (GMI). The sale of the instrument does not license the user to reproduce GENERAL MONITORS' drawings or to utilize proprietary circuitry or information without prior written permission.

The Model DC100 System is as easy to install and operate as any combustible gas monitor available. However, this manual should be read in full, and the information contained herein understood, before attempting to install or operate the system.

B. GENERAL

The Model DC100 is a single channel Readout/Relay module and must be used with the Model SC100 Smart Sensor. This system is designed to continuously monitor most combustible gases and vapors in the 0-100% Lower Explosive Limit (LEL) range. Normally only a periodic system calibration check is needed to assure dependable performance. There are relatively few combustible gases which should not be monitored by the system; 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 microprocessor based DC100 may be rack, panel, or wall mounted in a non-hazardous area. Weatherproof enclosures are available for outdoor installations, and Explosion Proof enclosures for hazardous installations.

NOTE: Weatherproof and explosion proof enclosures are not included in the Factory Mutual performance approval of these systems.

The DC100 has a digital display (0-99% LEL) and visual status indicators for normal operation (READY), gas alarms (ALARM and WARN), calibration (CALIB) and malfunction (MALF) and reset (RESET). Three relay alarm circuits are provided: (two for the gas alarm circuits, ALARM and WARN, and one for the MALFunction alarm circuits).

C. OPERATION

The Model DC100 furnishes the 24 VDC power to the SC100 Smart Sensor as well as receiving the 4 to 20 mA output signal from the SC100. The digital display of the DC100 shows the gas concentration level up to 99% LEL. Higher concentration levels will cause the display to blink the 99 reading.

C. OPERATION (cont'd)

Should a malfunction occur in the SC100 Smart Sensor, the DC100 will display an "Er" and the letters "MALF" will be illuminated on the front panel. During calibration, the DC100 will display a "CA" and the word "CALIB" will be illuminated on the front panel.

In normal operation the word READY appears on the front panel. When latching alarm relays are used and the gas concentration has dropped below the preset alarm level, the word RESET is illuminated. An alarm RESET switch is located adjacent to the illuminated "RESET". The relays may be remotely reset by momentarily connecting the RESET terminal on the rear panel to the DC common.

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II. INSTALLATION INSTRUCTIONS

A. LOCATION OF THE READOUT/RELAY MODULE

The Model DC100 Readout/Relay unit should be mounted in a non-hazardous area. It should also be mounted in a weather-protected location unless installed in a weatherproof enclosure. Mounting hardware is available from GMI for indoor wall, rack, or panel mounting, as well as weatherproof and explosion proof housings.

NOTE: The mounting hardware is not included in the Factory Mutual performance approval.

The mounting should be as free from shock and vibration as possible. Caution must also be taken to allow convection air cooling. Although the readout/relay unit is RFI resistant, it should not be mounted in close proximity to radio transmitters or similar equipment. GMI recommends a wiring service loop be provided to facilitate front panel hook-up or removal.

B. POWER CONNECTIONS

The DC100 will operate on nominal line power of 117 VAC, 50/60Hz, or 24 VDC. There is no power on-off switch, so power must remain disconnected until all other wiring connections are made. A power on-off switch is not included to prevent accidental system shut down, since the system is designed for continuous use to maximize protection from combustible gases.

If AC is to power the system, connect the AC power to terminals LINE, NEUTRAL, and GROUND (L, N. and ⏚) on the rear of the controller. (See Figure 2).

Primary DC power may be provided by any nominal 24V direct current supply. Heavy duty cables should be used to prevent excessive voltage drop, and the cable run should be as short as possible. Connect the positive supply to 24VDC (+) and the negative supply to DC COM (-). An internal diode protects the system in the event of inadvertent supply reversal.

C. BATTERY BACKUP

Battery backup of an AC powered unit may be employed if desired. The customer furnished battery may be connected as shown. No manual or relay switching is required. 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 DC100) should be as short as possible. Should an AC power failure occur, the 24 Volt battery supplies current through the diode to the DC100 circuitry. DO NOT USE MORE THAN A 24 VOLT BATTERY.

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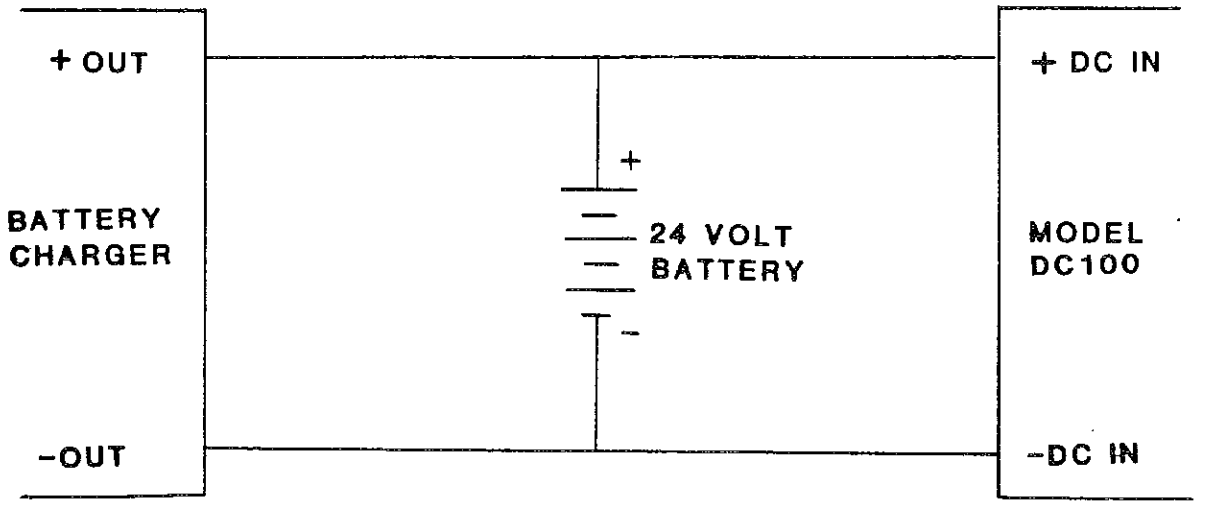
C. BATTERY BACKUP (cont'd)

The battery rating (ampere-hour capacity) is dictated by the length of time you expect power outages to last. A Model DC100 requires approximately 1/2 ampere (peak) at 24 Volts DC. 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. POWER CONNECTIONS TO THE MODEL SC100 SMART SENSOR

The Model DC100 is designed to supply the 24VDC power required by the General Monitors' Model SC100 Smart Sensor. To power the SC100, the DC 100 must be located within a maximum distance of 1000 meters (3000 feet) from the Model SC100 Smart Sensor and the maximum permissible loop resistance is 20 ohms at 24 VDC using #16 AWG cable. The interconnection is made from the rear terminal block connections of the Model DC100 identified as "DC OUT" and "DC COM". The "DC OUT" terminal should be connected with a red wire to the TB1 connection point 7 identified as +24 VDC RED in the Model SC 100. See Figure 1 for the Terminal Block identification of the Model SC100. The "DC COM" terminal point is connected with a black wire to the TB1 connection point 6 in the Model SC100 identified as "COM-BLK" (TB1-6).

E. ANALOG INTERCONNECTION TO MODEL SC100 SMART SENSOR

The 4-20 mA output signal from the Model SC100 Smart Sensor is interconnected with the Model DC100 Readout/Relay Module to provide 1) local indication in a control room or other location remote to the Model SC100 of the operation and alarm conditions of the Model SC100, and 2) to provide alarm relays for audible or visual indications or other relay type of functions desired by the user.

To interconnect the DC100 with the SC100, make the following interconnections:

DC100		SC100
ANALOG IN	to	CURRENT OUT (WHT)
ANALOG COM	to	COM (BLK)

NOTE: If the Model DC100 is supplying the 24VDC power for the Model SC100, the only analog interconnection required is between ANALOG IN on the DC100 and CURRENT OUT on the SC100. This single interconnection is possible through an internal jumper which connects DC COM and ANALOG COM terminals within the Model DC100.

F. ALARM WIRING CONNECTIONS

Alarm wiring connections are made at designated terminals located on the rear panel of the DC100. The ALARM and WARN gas alarm relay contacts (dry) are DPDT and rated 4 amps at 117 VAC, resistive. They may have been ordered as latching (manual reset) or non-latching (automatic reset), and as normally energized or normally de-energized (with power applied to the controller). Latching ALARM alarm non-latching WARN alarm is standard. The MALFunction alarm relay contacts (dry) are SPDT and rated 4 Amps at 117 VAC, resistive. MALFunction relay is always provided as non-latching normally energized (with power applied to the controller).

The number designations on the alarm connection terminals (rear panel) are in accordance with the following:

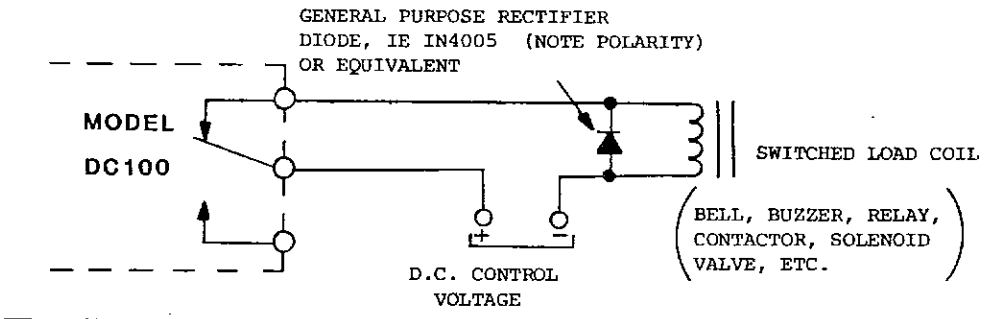
MALFunction alarm (with power applied)	COM = Common 1 = Open 2 = Closed
ALARM, WARN alarms normally energized (with power applied)	COM = Common 1,4 = Open 2,3 = Closed
ALARM, WARN alarms normally de-energized (with power applied)	COM = Common 2,3 = Open 1,4 = Closed

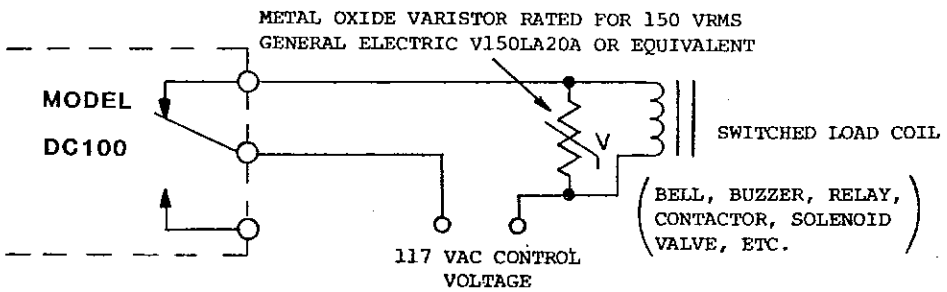
F. ALARM WIRING CONNECTIONS (Cont'd)

NOTE: Factory Mutual requires that any combustible gas controller alarm be of the latching type and not capable of being set above 60% LEL. If the Model DC100 has been ordered with non-latching relays it should be connected to an auxiliary system that accomplishes the latching function.

CAUTION:

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





G. APPLYING POWER

Before applying power to the system for the first time, all wiring connections should be double-checked for correctness.

The system has a time delay feature. For approximately 45 seconds after power is applied the alarm relays remain deactivated and front panel indicators except READY cannot light. The purpose of this feature is to eliminate false alarms which might otherwise result while the system is stabilizing. The time delay is also initiated when the SC100 Smart Sensor returns to normal operation from the MALFunction mode.

H. ALARM SET POINT ADJUSTMENTS

NOTE: Alarm circuits can be disabled to prevent activation of the relay contacts when testing the complete SC100 - DC100 system. To do so, slide the DC100 forward and activate the internal RELAY INHIBIT SWITCH (S3) located on the printed circuit board (See figure 2.) When in this mode the letters "AI" will appear on the digital display instead of 0 to advise the operator that the relays are not active (Alarm Inhibit).

Both alarm set potentiometers are located on the right hand side of the printed circuit board when facing the DC100.

(1) WARN setting

When the WARN pushbutton (S2) (see figure 2) is pressed the value of WARN level will appear on the digital display. The WARN level may be changed by adjusting the WARN potentiometer (R4) until the desired value appears on the digital display.

(2) ALARM setting

When the ALARM pushbutton (S1) (see figure 2) is pressed the value of ALARM level will appear on the digital display. The ALARM level may be changed by adjusting the ALARM (R8) potentiometer until the desired new value appears on the digital display.

IMPORTANT

When alarm adjustments are complete, be sure to return the RELAY INHIBIT SWITCH (S3) to its operating position.

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III. INDICATORS, SWITCHES AND FUNCTIONS

A. % LEL Display

The digital display is scaled from 0 to 99% LEL for the gas/vapor for which the system will be calibrated. Should a malfunction occur the meter will indicate an "Er" reading. CAUTION: readings of 99% LEL, or high offscale readings, indicate an explosive gas concentration is present.

B. Ready Indicator

This light-emitting diode (LED) glows a steady green and the word "READY" appears whenever the channel is operating normally (i.e., when power is on and there is no malfunction alarm condition).

C. Gas Alarm Indicators

The red HIGH alarm LED and amber WARN alarm LED indicators illuminate whenever the gas concentration at the sensor exceeds the concentration at which the respective alarm circuits were pre-set. The activating of the LED's will be accompanied by the activation of the gas alarm relay contacts.

D. Malfunction Indicator

Normally off, this amber indicator flashes any time there is a fault in the system. Gas alarm relays and indicators are bypassed during a malfunction, and the MALFUNCTION RELAY de-energizes. When the system is in "CAL" mode the CALIB indicator flashes to alert the user that the gas alarm relays are not operative. The MALF relay does activate in CAL mode, however.

E. Reset Switch

Any alarm relay which is wired for LATCHING operation, and its associated alarm indicator, will stay in alarm condition even if the gas concentration at the sensor drops below the set point. The alarm condition of the relay and indicator can be cancelled when the "RESET" indication appears on the Front panel of the DC100, by depressing the momentary-action RESET SWITCH located on the Front panel adjacent to the "RESET" indication. Depressing the switch has no effect if the gas concentration is still above the set point levels.

IV. OPERATIONAL ADJUSTMENTS AND PROCEDURES

A. INITIAL START-UP

Each Model DC100 is completely checked at the factory, including calibration with the gas specified at the time of purchase. However, a complete checkout is a necessity upon placing the system in operation to assure system integrity. This includes verifying the digital indicator zero, checking and adjusting alarm set points, and performing a complete calibration procedure.

B. MODEL SC100/DC100 CALIBRATION

Alarm circuits can be disabled to prevent activation of the relay contacts when preparing to calibrate. To do so, move switch S3 located on the P.C. Board to the "RELAY INHIBIT" position.

C. ALARM SET POINT CHECK

To check the alarm set points, depress switch S2 for WARN or Switch S1 for ALARM and observe the corresponding readings on the digital display.

NOTE: Up to 5% 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. After alarm points have been set or checked, return the RELAY INHIBIT SWITCH S3 to the off position to restore normal operation.

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V. SYSTEM PROBLEMS AND TROUBLESHOOTING

A. GENERAL

It is highly recommended that a spare sensor be on hand at all times. While GMI sensors are the most reliable, longest life catalytic bead sensors available, sensor failure tends to be the largest potential cause of real downtime. A full complement of other GMI recommended spare parts should also be on hand. GMI's warranty will be voided if damage results from repair efforts involving replacement of P.C. boards or their components other than routine replacement of recommended spare parts. 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 SC100/DC100 systems require 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 reinstalled because the cleaning process may have increased sensor response.

C. TROUBLESHOOTING 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 DC100 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 Alarm Inhibit 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. 0.5 amp AC fuse (F1) is defective. 3. 1 amp DC fuse (F2) is defective.	1. Insure proper power supply to controller. 2. Replace F1. 3. Replace F2.
2. Module, the MALF LED is flashing.	1. Low input power. 2. The SC100 is in the malfunction mode.	1. Insure proper power supply to controller. 2. Check the SC100 unit for proper operation.
3. WARN and/or ALARM LED's do not turn "ON" when % LEL readout exceeds alarm set point.	1. Alarm pots not properly adjusted.	1. Perform ALARM and WARN alarm set point adjustment.

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VI. SPECIAL WARNING

Through engineering design, testing, manufactuuring techniques, and rigid quality control, General Monitors supplies the finest gas detection systems avialable. 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 activate alarm indicators/circuits 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' 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.

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

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 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 and labor, of any component which fails during the two (2) year 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 OBLIGATIONS 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.

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VI. GENERAL SPECIFICATIONS

Dimensions:	Approx. 2.1"W x 6.9"H x 11.5"D (53mm x 175mm x 294mm)
Weight:	Approx. 3.8 lbs. (1.8kg.)
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
Power:	105-130 VAC/50-60 Hz 22-30 VDC, 14 Watts Maximum
Humidity:	15 to 95% Non-condensing
Display Range:	0 to 99% Lower Explosive Level (% LEL) Blinking '99' for Over-range Indication
Accuracy:	± 3% LEL or ± 10% of applied gas, whichever is greater
Status Indicators:	READY, MALFunction, ALARM, WARNing, CALIBration RESET
Front Panel Switch:	RESET
Alarm Circuits:	Independent ALARM, WARNing, & MALFunction circuits. ALARM and WARN are DPDT 4 Amp relays @ 117 VAC, Resistive. MALF relay is SPDT, 4 Amp @ 117 VAC Resistive. MALF relay is always supplied normally energized and non-latching. ALARM (latching) and WARN (non-latching) alarm relays are normally de-energized. These specifications are standard. Options are available.
Remote Reset:	Yes
Calibration Reset:	One momentary pushbutton switch--PC board mounted

NOTE: Factory Mutual requires that any combustible gas controller alarm be of the latching type and not capable of being set above 60% LEL. If the Model DC100 has been ordered with non latching relays it should be connected to an auxiliary system that accomplishes the latching function.

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VI. GENERAL SPECIFICATIONS (con't)

Electrical Classification: General purpose for mounting in a non-hazardous area.

Output: 24VDC nominal at 0.25 Amp to the SC100 Smart Sensor

Input: 0-20 mA from the SC100 Smart Sensor

Warranty: Two years.

Cable: 3 wire shielded maximum cable length allowable between Readout/Relay Module and Sensor Assembly with one way resistance of 10 ohms (total 20 ohm loop). Power for sensor supplied by module.

AWG	METERS	FEET
18	600	1800
16	1000	3000
14	1500	4500

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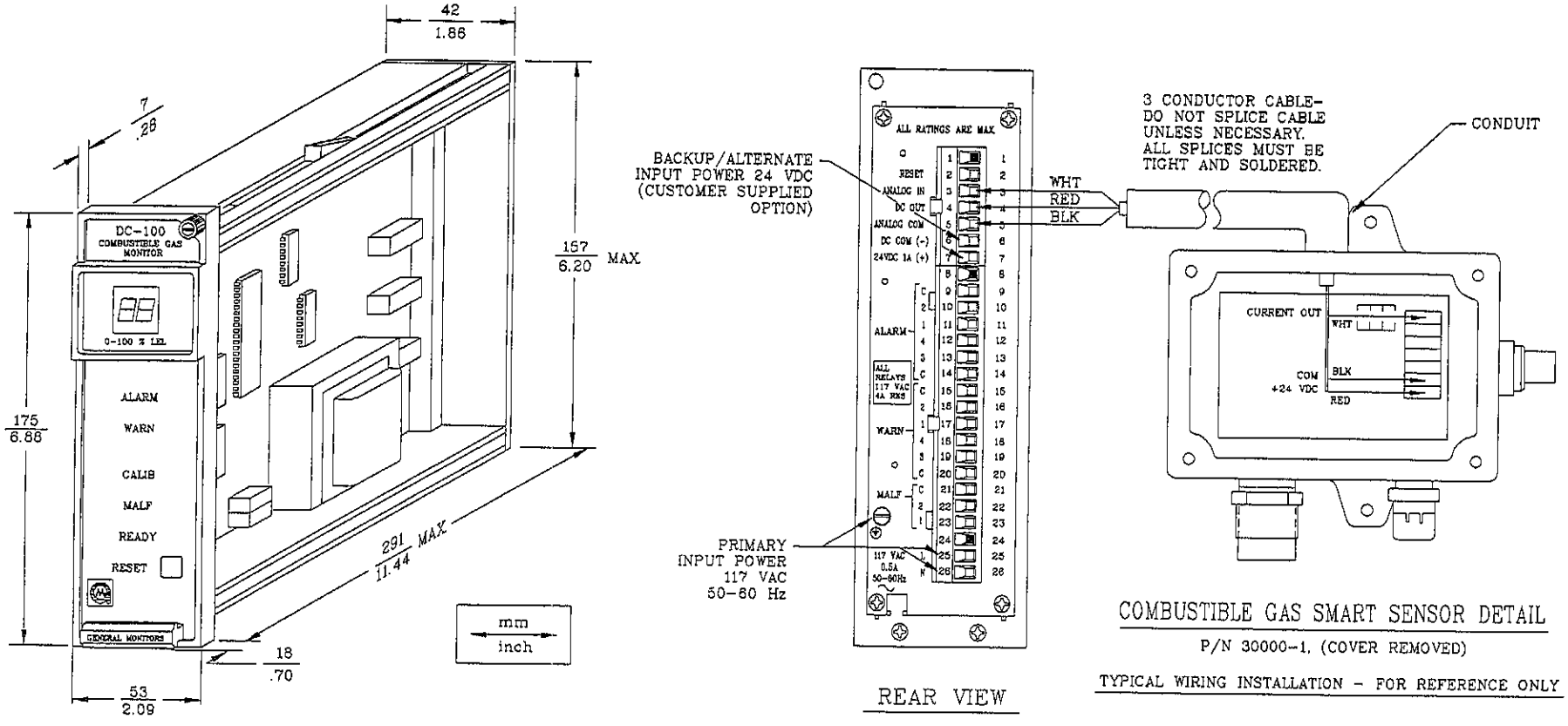
VII. RECOMMENDED SPARE PARTS

One Model DC100

For up to Two Years Operation

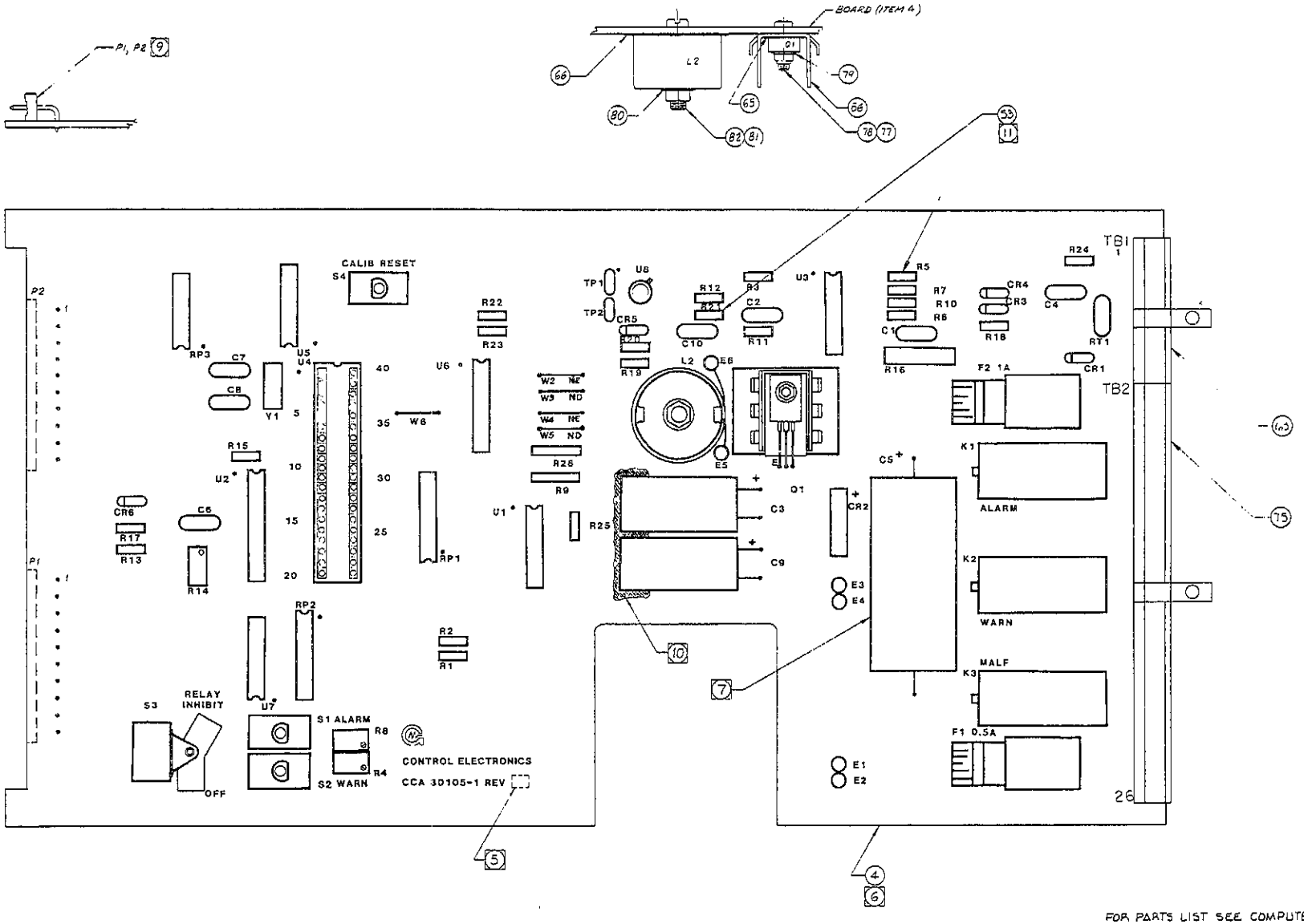
ITEM	DESCRIPTION	PART NUMBER	QTY.
1.	Fuse, .5 amp, 250 VAC	951-200	2
2.	Fuse, 1 amp, 250 VAC	951-013	2



(REF 30101A)

FIG. 1

OUTLINE DRAWING & REAR TERMINAL CONNECTIONS MODEL DC-100



FOR PARTS LIST SEE COMPUTER BOM 30105-

NO CHANGES
WITHOUT AUTHORIZATION
OF FACTORY MUTUAL

REF	-2	CCA, CONTROL ELECTRONICS(FM APM ALM)
REF	-1	CIRCUIT CARD ASSY CONTROL ELECTRONICS
QTY	PART NO	DESCRIPTION

CCA, CONTROL ELECTRONICS MODEL DC-100

(REF 30105)

FIG. 2 SHT 1

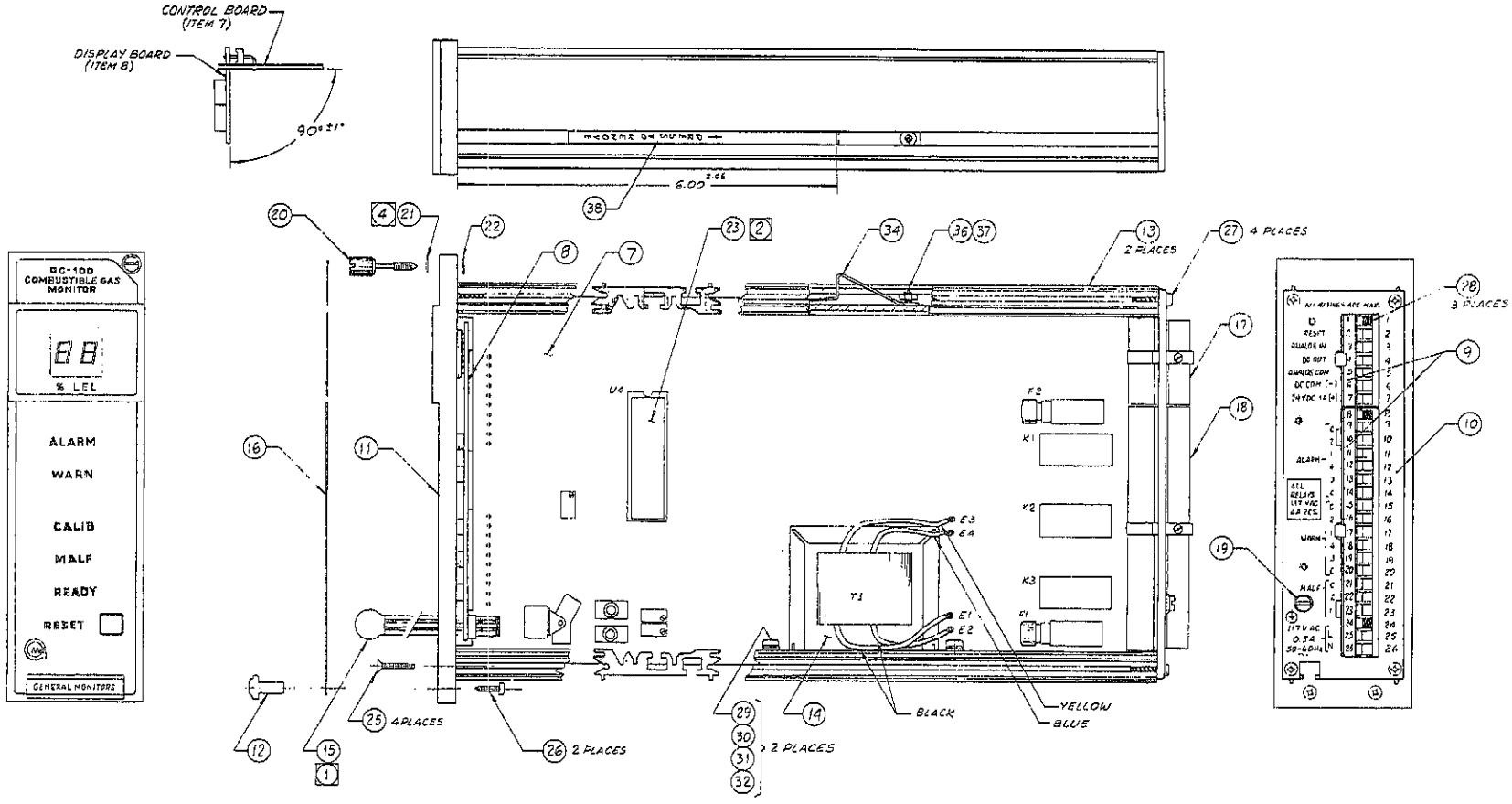
				99
				98
				97
				96
				95
				94
				93
				92
				91
AR	932-002	COATING, CONFORMAL		90
				89
				88
				87
1	948-410	HEATSINK		86
				85
1	921-711	SOCKET, I.C. 40-PIN	XU4	84
				83
1		SCREW, MACH M3 x 20, PAN HD-SL-NY		82
1		NUT, HEX M3, NY		81
1		WASHER, FLAT #6 O.D. 9.5mm/.375 IN., FIBER		80
				79
1		SCREW, MACH M3x12, PAN HD-PHIL-SST		78
1		LOCKNUT M3, NY INSERT, STL-CAD-PLT		77
				76
				75
2		TEST POINTS .100 SPACING	TP1, 2	74
5		JUMPER, .500 SPACING	W2-6	73
				72
1	951-200	FUSE, MINIATURE .5 A	F1	71
1	951-013	FUSE, MINIATURE 1 A	F2	70
1	951-321	SWITCH, ROCKER SPDT	S3	69
3	951-417	SWITCH, PUSHBUTTON SPDT	S1, 2, 4	68
				67
1	931-040	INSULATOR, SIL PAD		66
1	931-036	INSULATOR, SIL PAD		65
				64
23	921-357	TERMINAL BLOCK (2, 6 & 15-POS)	TB1, 2, 3	63
1	948-238	TRANSISTOR, PNP 2N5194	Q1	62
				61
1	947-529	POTENTIOMETER, 500Ω	R14	60
2	947-548	POTENTIOMETER, 2K	R4, 8	59
				58
1	947-700	RESISTOR, COEF TEMP RANGE	RT1	57
1	947-908	" PACK, 220Ω	RP3	56
2	947-907	" PACK, 22K	RP1, 2	55
1	947-203	" 330Ω, 1W, 5%	R16	54
2		" SELECT O.C. PROC 30006102-1	R5, 21	53
2	947-419	" 250Ω, 1W, 1%	R9, 26	52
1	947-301	" 10K, 1%, RN55D	R20	51
1	947-611	" 28.0K, 1%, RN55D	R19	50
1	947-328	" 1.00K, 1%, RN55D	R12	49
2	947-325	" 20.0K, 1% RN55D	R6, 7	48
1	947-309	RESISTOR, 1.21K, 1%, RN55D	R3	47
				46
1	947-018	RESISTOR, 330Ω, 1/4W, 5%	R24	45
2	947-039	" 22K, 1/4W, 5%	R22, 23	44
1	947-012	" 100Ω, 1/4W, 5%	R18	43
1	947-011	" 1.6K, 1/4W, 5%	R17	42
1	947-036	RESISTOR, 10K, 1/4 W, 5%	R15	41
QTY.	PART NO.	DESCRIPTION		ITEM

1	947-016	RESISTOR, 360Ω, 1/4W, 5%	R13	40
2	947-033	" 5.6K, 1/4W, 5%	R11, 25	39
1	947-048	" 100K, 1/8W, 5%	R10	38
2	947-045	RESISTOR, 1.8K, 1/4W, 5%	R1, 2	37
				36
3	945-039	RELAY 12E, 24V	K1, 2, 3	35
				34
1	931-388	I.C., PROG VOLT REF, ICL8211MTY	U8	33
3	931-425	" ARRAY, HI VOLT, ULN2004A	U5, 6, 7	32
1	931-386	" PULSE WIDTH MOD, TL494IN	U3	31
1	931-427	" 8-BIT, ADC0804LCN	U2	30
1	931-428	I.C., 8-CHAN, ANGL, MC14051B	U1	29
				28
2	921-607	FUSE HOLDER	XF1, 2	27
1	30011-1	INDUCTOR, 2.4MHZ	L2	26
				25
				24
1	948-104	DIODE, 1N4148	CR5	23
1	948-124	" 1N4934	CR4	22
1	948-035	" P6KE39A	CR3	21
1	948-107	" MDA942A2	CR2	20
1	948-102	DIODE, 1N4002	CR1	19
1	948-030	DIODE ZENER, 1N4733A	CR6	18
				17
1	923-001	CRYSTAL, 3MHz	Y1	16
				15
1	915-036	CAPACITOR, 1.0 UF, 50V	C10	14

2	915-026	CAPACITOR, 20PF, 100V	C7, 8	13
1	915-033	" 0.1 UF, 50V	C4	12
2	915-168	" 68 UF, 60V	C3, 9	11
1	915-017	" .01 UF, 50V	C2	10
2	915-027	" 150PF, 100V	C1, 6	9
1	915-169	CAPACITOR, 2200 UF, 50V	C5	8
				7
2	921-707	CONNECTOR, 10-POS	P1, 2	6
				5
1	30106-1	C.C.D. CONTROL ELECTRONICS		4
INFO	30102	SCHEMATIC DIAGRAM		3
				2
—	-1	CCA, CONTROL ELECTRONICS		1
QTY.	PART NO.	DESCRIPTION		ITEM

(REF 30105)

FIG.2 SHT2 **CCA, PARTS LIST DC-100**



OPTION TABULATION

FUNCTION	JUMPER	NORMALLY ENERGIZED	NORMALLY DE-ENERGIZED	
WARN	W2 W3	○—○	○ ○	CONTROL BOARD (ITEM 7)
ALARM	W4 W5	○—○	○ ○	
WARN	W6	LATCHING ○—○	NON-LATCHING ○ ○	
	W1	○ ○	○—○	DISPLAY BOARD (ITEM 8)

NO CHANGES WITHOUT AUTHORIZATION OF FACTORY MUTUAL

FOR PARTS LIST SEE COMPUTER BOM 30100-

QTY	PART NO.	DESCRIPTION
REF	-2	FINAL ASSY, DISPLAY MODULE (FM APPROVED ALM)
REF	-1	FINAL ASSY, DISPLAY MODULE

(REF 30100A)

FIG. 3 SHT 1

FINAL ASSEMBLY MODEL DC-100

30100	INFO		FINAL ASSY DISPLAY MODULE COMB GAS	C	12541	2		WASH #M4 FLT STL CAD PLT	
30117-1	1		PANEL REAR SSCRN DC100 DT200 D300	B	9119	2		WASH #8 INT-T SST	
30112-1	1		PANEL FRONT MOLDED BLUE DC100	C	12523	2		NUT M4 HEX ST DIN 934	
30113-1	1		MEMBRANE SWITCH ASSY	B	9488	4		SCR 4 X 1/2 PHIL FLT HD SELF TAP ZN	
30115-1	1		INLAY FRONT PANEL LEL	C	928-725	1	8-T005	TRIM ADJ TOOL	
10179	2		PLATE MOUNTING -49 TOP & BOTTOM	C	1003	2		CLAMSHELL, ANTI-STATIC CONTROLLER	
10159-1	1		HANDLE UNIVERSAL -38 CO. NAME	E	1040	1		SCR 6-32X3/16 SKT CP PT SST HXSO	
921-364	1	1758623	TERM BLK PLUG-IN 7 POS BLK		1044	1	1200-12-ST-ZD	GRIP RING, EXTERNAL .100DIA SHAFT	
921-366	1	1757187	TERM BLK PLUG-IN 19 POS GRN		1043	1	5610-55-20	WASH NYLON .128 I.D. X .245 O.D.	
921-384	3	1759994	KEY PIN TYPE CS-MSTB NYLON		9096	1		NUT 6-32 STL CAD PLT HEX	
928-315	1	3960	SCREW GUILLOTINE #6-32 X 3/8		9118	1		WASH #6 FLT SST	
10165-1	1		SAFETY LATCH RACK MTG CONTR INSTR	B	10072	1		NAMEPLATE INSTRUMENT CSA	F
10166-1	1		LABEL SAFETY LATCH RACK MOUNTING	A	10209	1		CAUTION LABEL CSA	B
10283-1	1		SCREW CAPTIVE M4-.274 THL PLSTC PNL	B	30105-1	1		CCA CONTROL CARD	F
10381-1	1		MARKER STRIP 1-26	B	30108-1	1		CCA DISPLAY BOARD	C
9420	4		SCR 4 X 1/2 PAN HD SELF TAP ZINC		50684-1	1		XFMR POWER 117	A
1025	2		SCR 6-20X3/8 PH FLT HD TYPE 25 BLK		10284-1	1		MICRO COMPUTER PROGRAMMED DC100	A
12568	2		SCR M4X0.7X8 PHIL PAN HD SST		10450-1	1	A35S/M-1450	SCREWDRIVER MAGNET TIP	B

(30100-1 C)

FIG 3 SHT 2

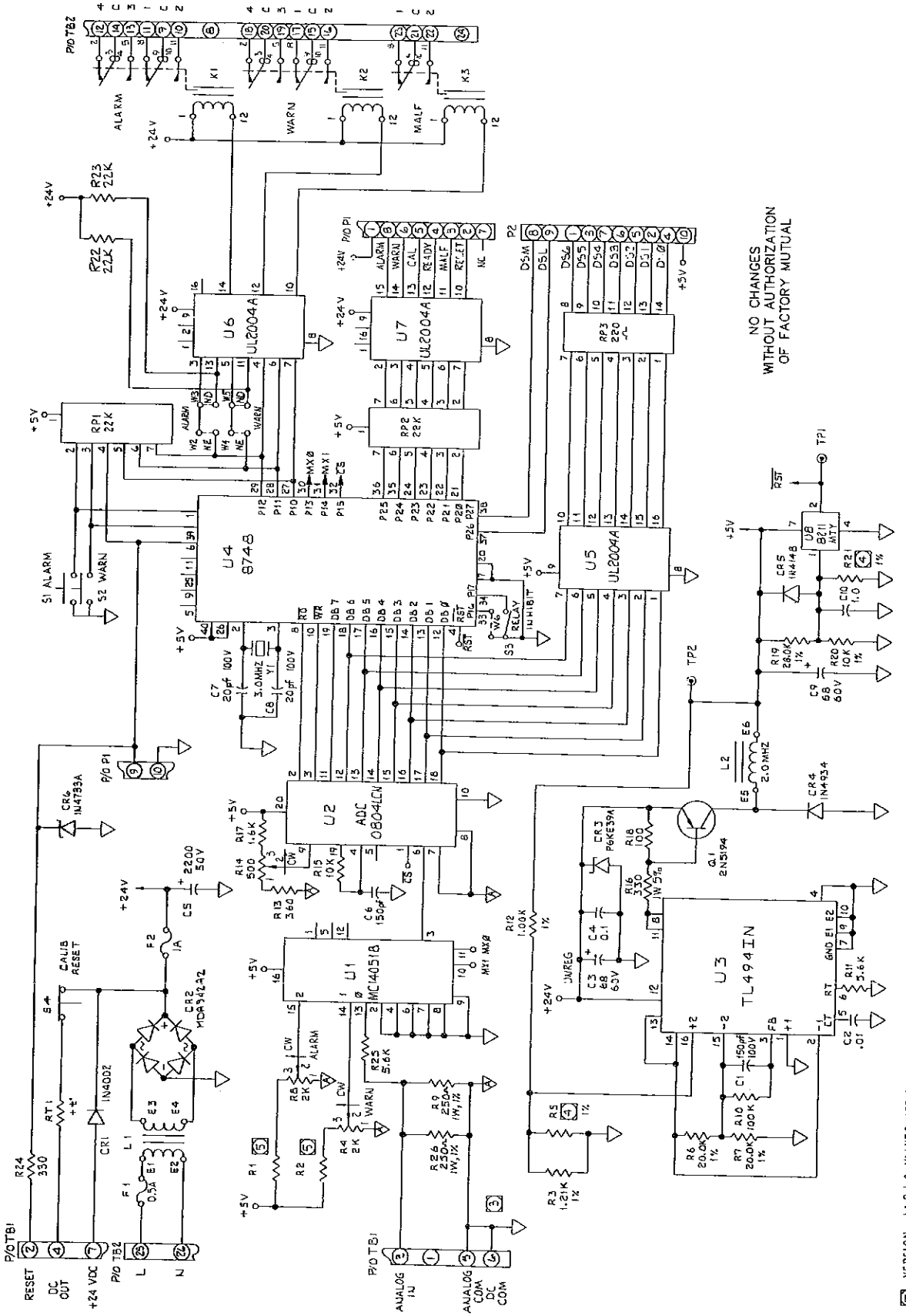
PARTS LIST
FINAL ASSEMBLY
MODEL DC100-STD

30100	INFO		FINAL ASSY DISPLAY MODULE COMB GAS	C	12541	2		WASH #M4 FLT STL CAD PLT
30117-1	1		PANEL REAR SSCRN DC100 DT200 D300	B	9119	2		WASH #8 INT-T SST
30112-1	1		PANEL FRONT MOLDED BLUE DC100	C	12523	2		NUT M4 HEX ST DIN 934
30113-1	1		MEMBRANE SWITCH ASSY	B	9488	4		SCR 4 X 1/2 PHIL FLT HD SELF TAP ZN
30115-1	1		INLAY FRONT PANEL LEL	C	928-725	1	8-T005	TRIM ADJ TOOL
10179	2		PLATE MOUNTING -49 TOP & BOTTOM	C	1003	2		CLAMSHELL, ANTI-STATIC CONTROLLER
10159-1	1		HANDLE UNIVERSAL -38 CO. NAME	E	1040	1		SCR 6-32X3/16 SKT CP PT SST HXSO
921-364	1	1758623	TERM BLK PLUG-IN 7 POS BLK		1044	1	1200-12-ST-ZD	GRIP RING, EXTERNAL .100DIA SHAFT
921-366	1	1757187	TERM BLK PLUG-IN 19 POS GRN		1043	1	5610-55-20	WASH NYLON .128 I.D. X .245 O.D.
921-384	3	1759994	KEY PIN TYPE CS-MSTB NYLON		9096	1		NUT 6-32 STL CAD PLT HEX
928-315	1	3960	SCREW GUILLOTINE #6-32 X 3/8		9118	1		WASH #6 FLT SST
10165-1	1		SAFETY LATCH RACK MTG CONTR INSTR	B	10072	1		NAMEPLATE INSTRUMENT CSA F
10166-1	1		LABEL SAFETY LATCH RACK MOUNTING	A	10209	1		CAUTION LABEL CSA B
10283-1	1		SCREW CAPTIVE M4-.274 THL PLSTC PNL	B	30105-2	1		CCA CONTROL CARD FM A
10381-1	1		MARKER STRIP 1-26	B	30108-1	1		CCA DISPLAY BOARD C
9420	4		SCR 4 X 1/2 PAN HD SELF TAP ZINC		50684-1	1		XFMR POWER 117 A
1025	2		SCR 6-20X3/8 PH FLT HD TYPE 25 BLK		10284-1	1		MICRO COMPUTER PROGRAMMED DC100 A
12568	2		SCR M4X0.7X8 PHIL PAN HD SST		10450-1	1	A35S/M-1450	SCREWDRIVER MAGNET TIP B

(30100-2 A)

FIG 3 SHT 3

PARTS LIST
FINAL ASSEMBLY
MODEL DC100-FM



NOTES: UNLESS OTHERWISE SPECIFIED

1. CAPACITOR VALUES ARE IN MICROFARADS 10% 50V.
2. RESISTOR VALUES ARE IN OHMS 1/4W 5%.

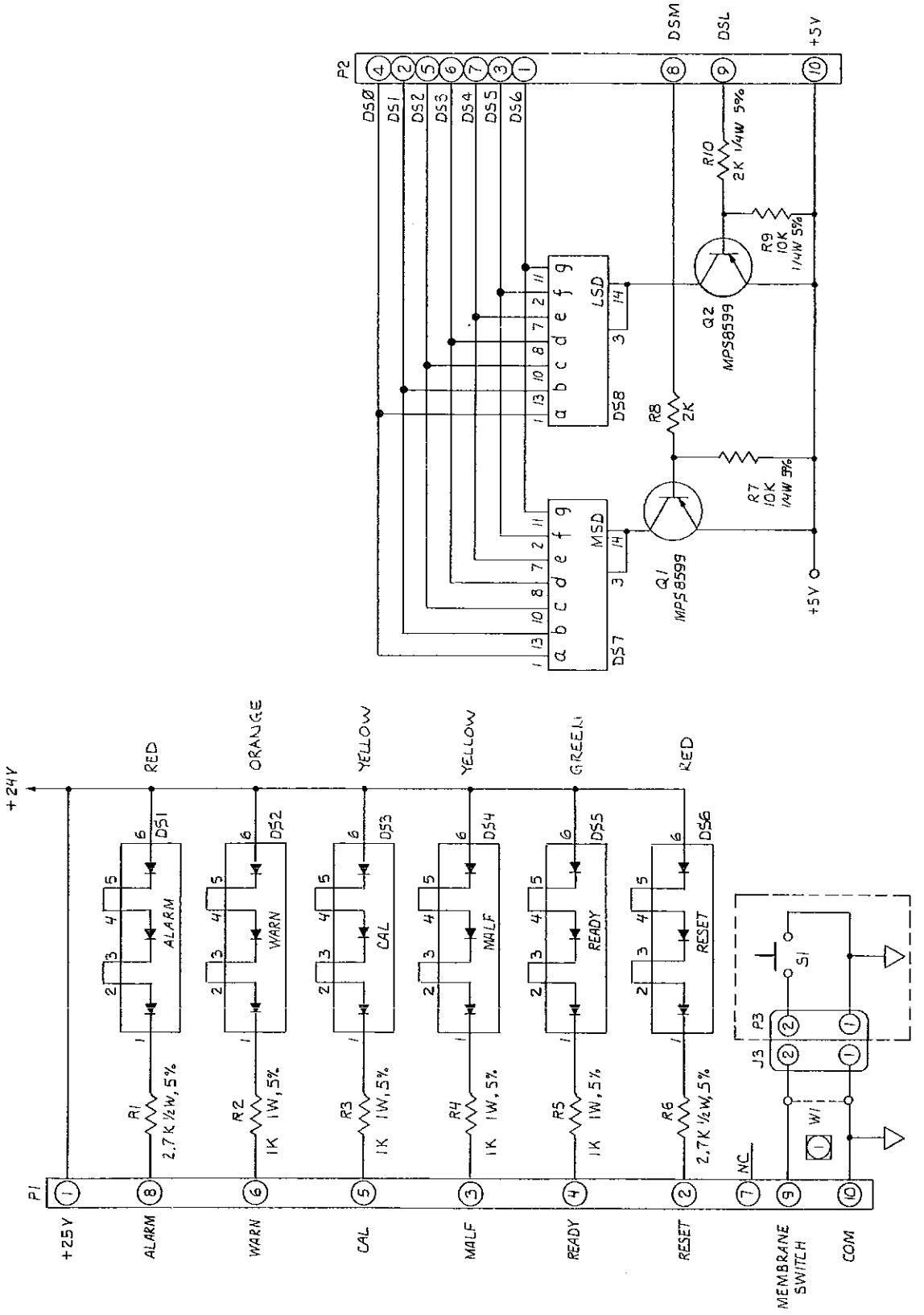
4 SELECT RESISTOR PER GMI QC PROCEDURE NO. 30DC102.

5 VERSION -1: R1,2 VALUES ARE 1.8K
VERSION -2: R1,2 VALUES ARE 3.4K (FM REQUIRED).

SCHEMATIC - CONTROL ELECTRONICS

(REF 30102)

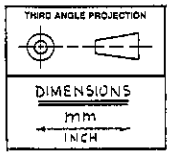
FIG.4

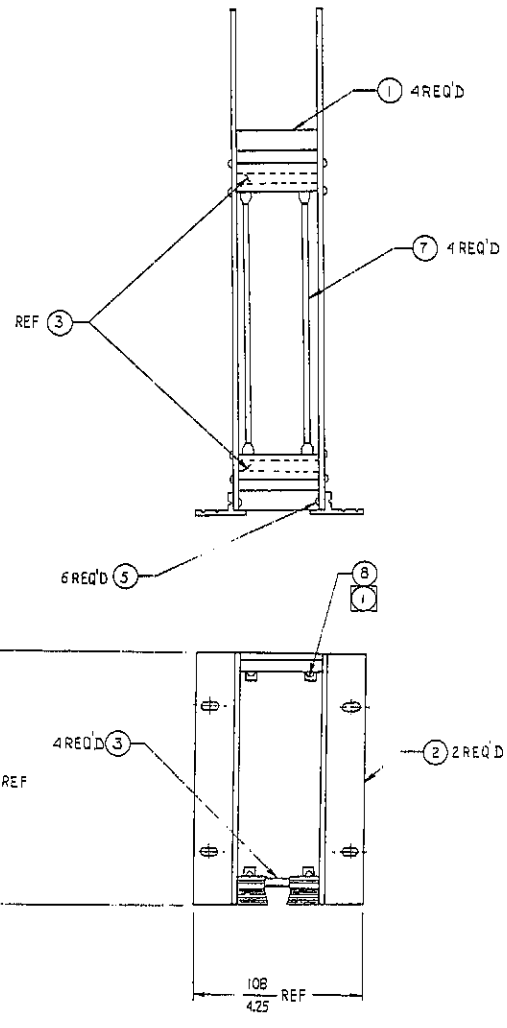


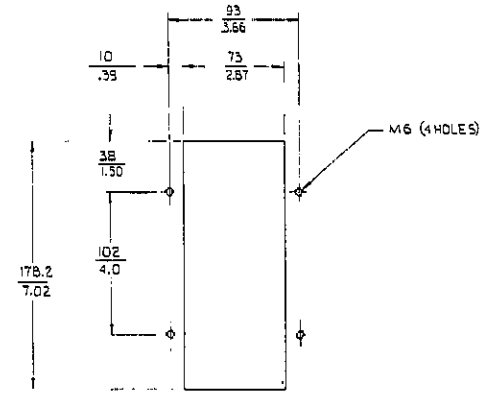
SCHEMATIC - DISPLAY BOARD
MODEL DC 100

FIG.5

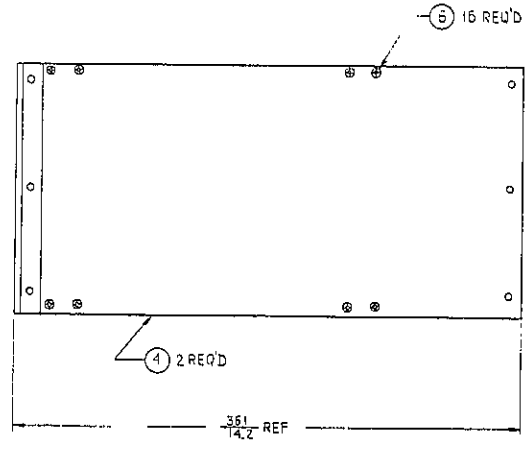
(REF 30103)







CUSTOMER PANEL
CUTOUT DIMENSIONS



	1	1	NUT, SQUARE M4x0.7 STL-CAD-PLT	8
	4	921-209	GUIDE, SNAP-IN	7
	16		SCR, THD. FORMING, M3x0.5x12 P-PH-ST-ZI	6
	6	DIN 7985	SCR, MACH - M3x0.5x6, P-PHIL-SST	5
	2	10197	SIDE PANEL	4
	4	10185-1	STRIP, LOCATING	3
	2	10196	MOUNTING BRACKET, FRONT VERTICAL	2
	4	10198-1	HORIZONTAL MEMBER	1
QTY-2	QTY-1	PART NO.	DESCRIPTION	ITEM

1 INSERT SQ NUT INTO TOP GUIDE AS INDICATED. (SUPPLIED WITH KIT PPL 928-313)

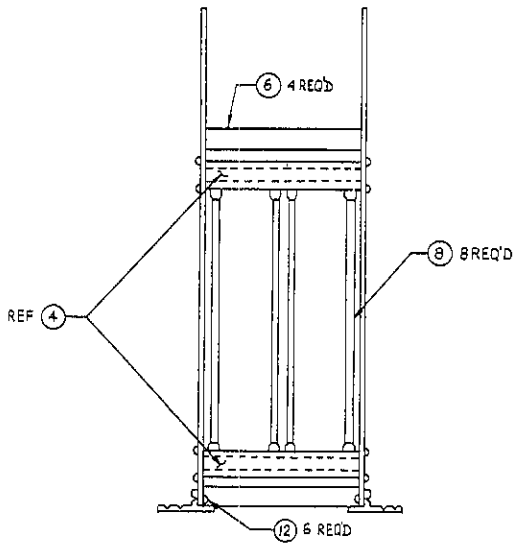
(REF 10201)

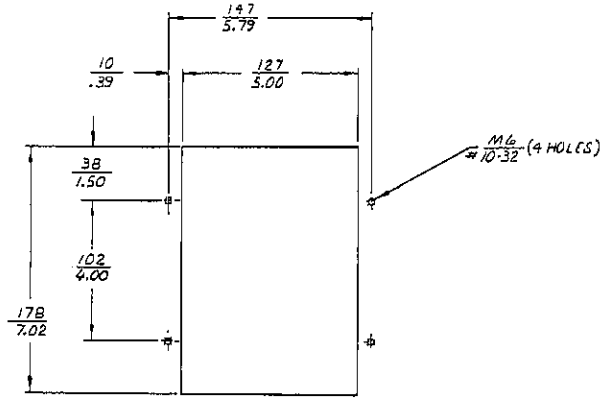
FIG. 6

RACK ASSEMBLY, PANEL MOUNT - 49
P/N 10201-1

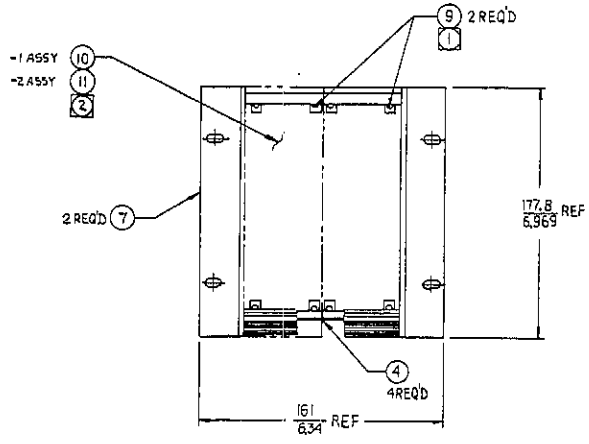
THIRD ANGLE PROJECTION

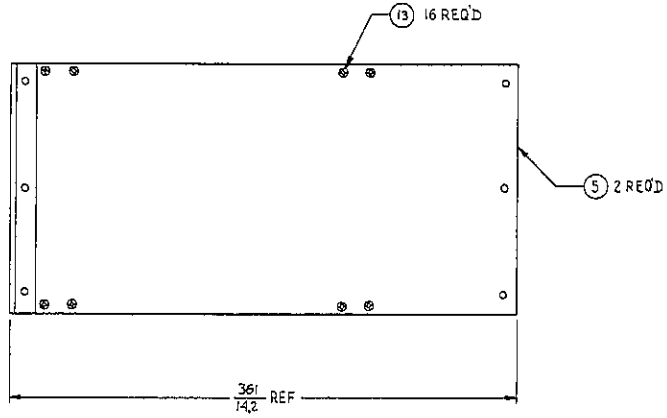
DIMENSIONS
mm
INCH





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	—	10187-2	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 928-313).

(REF 10199)

FIG. 7

RACK ASSEMBLY, PANEL MOUNT - 98

P/N 10199-1

4-20ma CONVERSION CHART

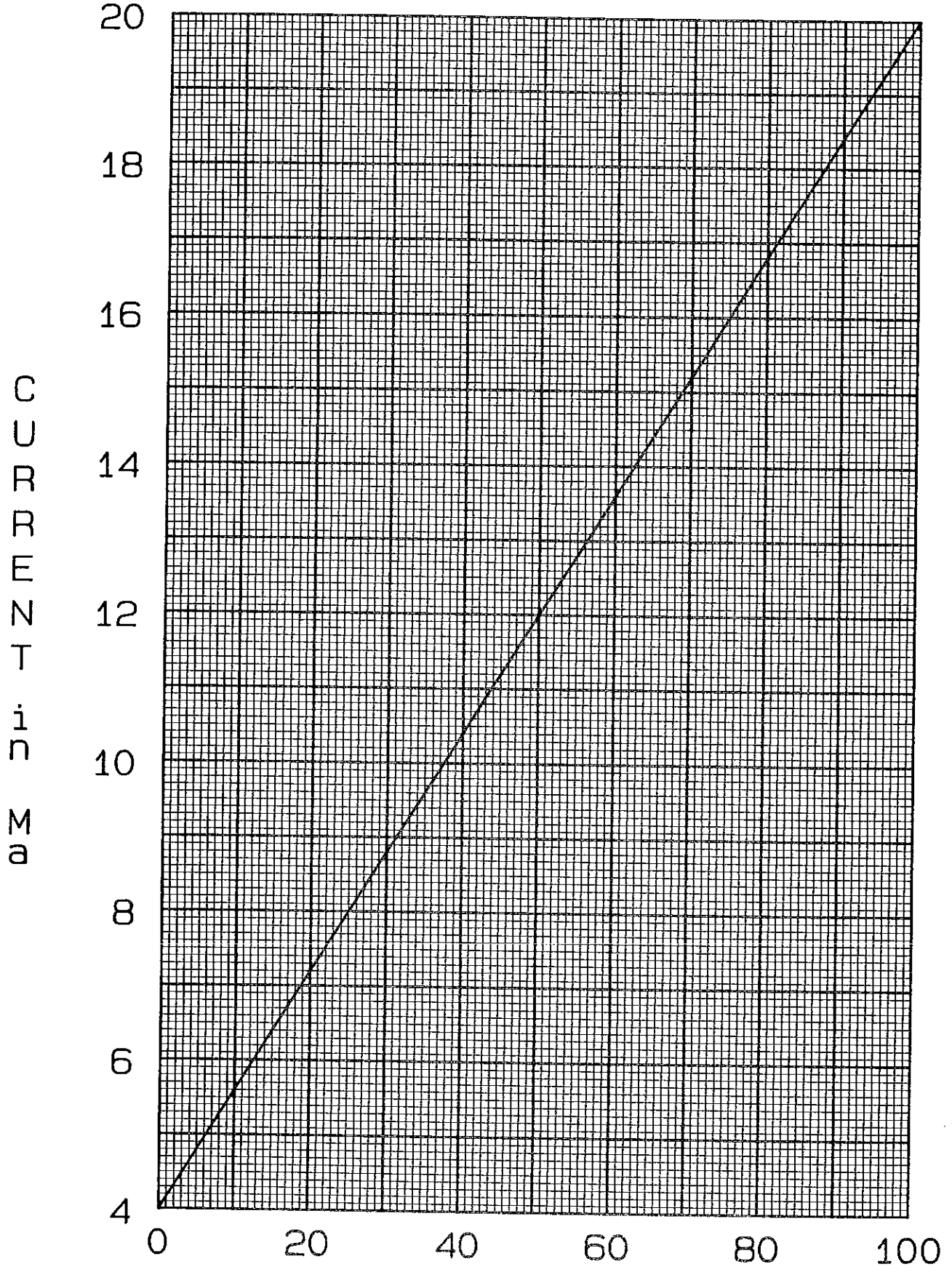


FIG.8