MODEL S700/S701

Carbon Monoxide
Smart Sensors
0689

GENERAL MONITORS

PLEASE NOTE
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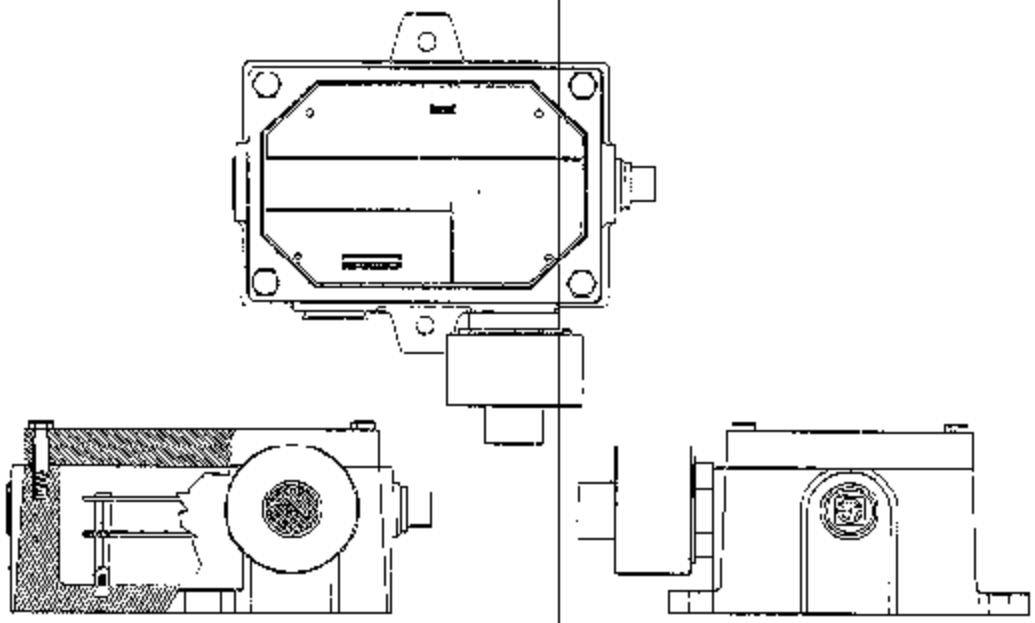
15 September 1994

To All Model S700 Users:

The Model S700 Instruction Manual does not adequately reflect the current revision of this unit. This manual is in the process of being updated, and in order to continue servicing you on this product, please make note of the following change:

> The housing has been upgraded such that a breather drain is not necessary. The housing has been designed to work in Class I, Division 1, Group B, C & D hazardous classified locations.



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

Respectfully,

Charles Simek
General Monitors, Inc.

WARNING

The Model S700/S701 contains components which can be damaged by static electricity. Special care should be taken when wiring the system to ensure that only the connection points are touched.

CONTENTS

MODELS S700/S701

CARBON MONOXIDE SMART SENSOR

I. INTRODUCTION

A. Notice

All information contained in this instruction manual may be used only to install and operate the Models S700/S701 Systems 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 Models S700/S701 Systems are easy to install and operate. However, this manual should be read in full and the information contained herein understood, before attempting to place the systems in service.

B. General

The General Monitors' Models S700/S701 are microprocessor based carbon monoxide sensors which have all the electronics located in the sensor housing. Sensor data and status information may be transmitted up to 2,000 meters (6,000 feet) using a 4-20 milliamp signal. The unit will indicate a malfunction (zero output signal) if the sensor baseline is out of range, or if the DC power to the unit is below a lower limit. This malfunction status is also indicated at the sensor by means of a blinking daylight-type LED which is an integral part of the CALIBRATE switch.

During the calibration procedure, the output signal is set to 1.5mA and remains there until the calibration gas is removed and the sensor detects less than a 10 percent full scale concentration. There are no potentiometers to adjust either in the field or at the factory. If the "baseline" and "sensitivity" parameters are not within prescribed limits, the unit will revert to the malfunction mode until there is a proper calibration.

The unit operates from an unregulated 24 VDC supply which may be located up to 2000 meters (6000 feet) from the sensor electronics. The 4-20 milliamp signal output may be applied directly to one of the General Monitors' Smart Sensor readout/relay modules; or it may be fed to industrial analog to digital converters for use in multipoint computer based monitoring systems.

C. Sensor Operating Principle

The carbon monoxide electrochemical cell is of the micro fuel cell type and is designed to be maintenance free and stable. The detector uses capillary barrier technology which results in low temperature coefficient and a direct response to concentration which is relatively unaffected by pressure. The use of electrodes based on fuel cell technology gives a high reserve of activity which makes for long term stability.

The electrochemical cell, a three-electrode type with goldplated, push fit locating pins, allows easy replacement of the detector. The change of the potential of the sensing electrode on exposure to carbon monoxide produces a signal which is proportional to the concentration present.

II. SYSTEM COMPONENTS

A. Sensor Assembly

The Model S700 SENSOR ASSEMBLY (see Figure 1) is classified explosion proof and consists of the sensor plus sensor housing. The sensor assembly is designed for NEC Class I, Division 1, Group C and D hazardous areas.

Detection range of the sensor is 0-500ppm. A 0-100 ppm option is available.

The Model S701 (see Figure 2) is classified weatherproof and consists of the sensor plus sensor housing.

Detection range of the sensor is also 0-500ppm and a 0-100ppm option is available.

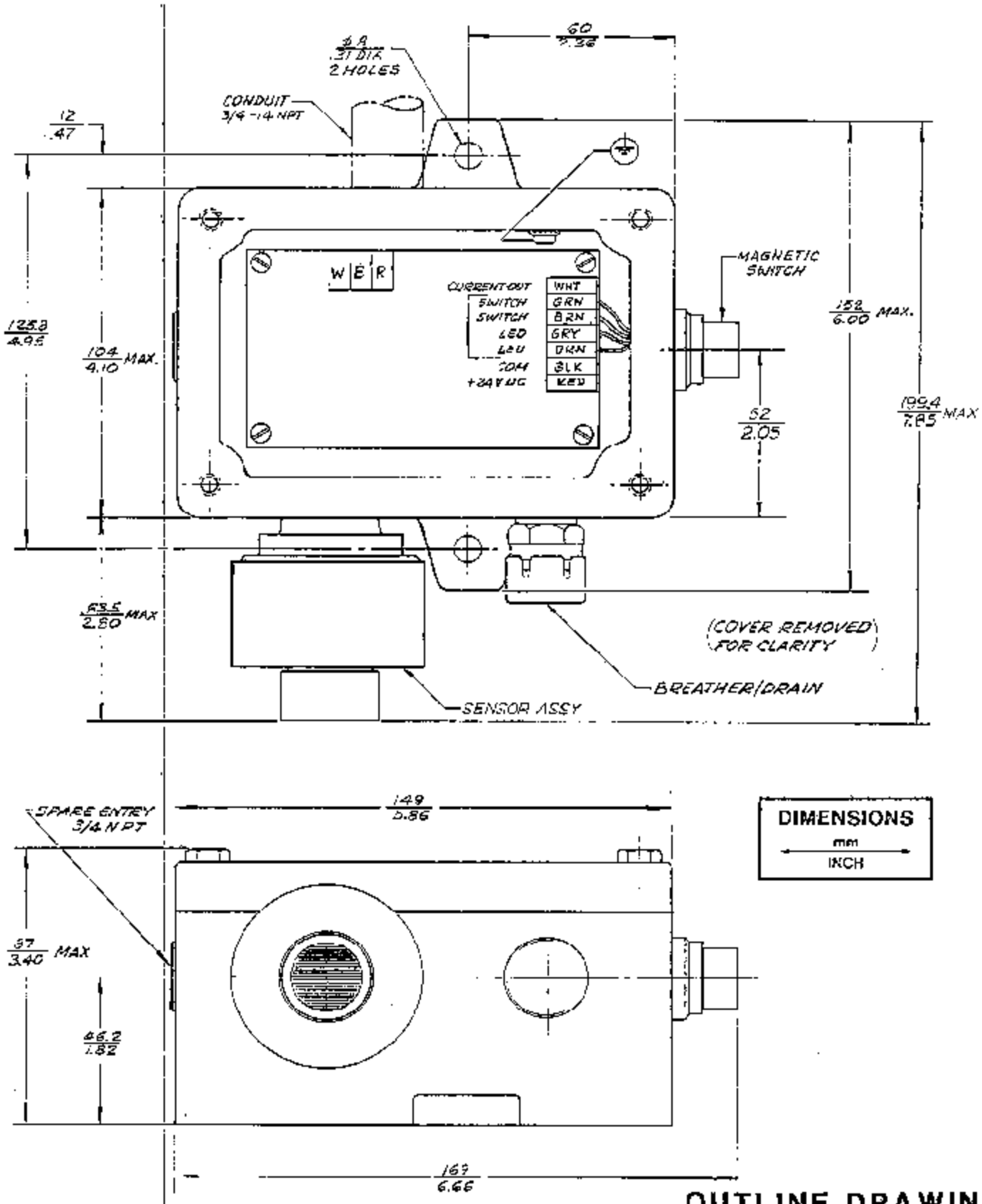
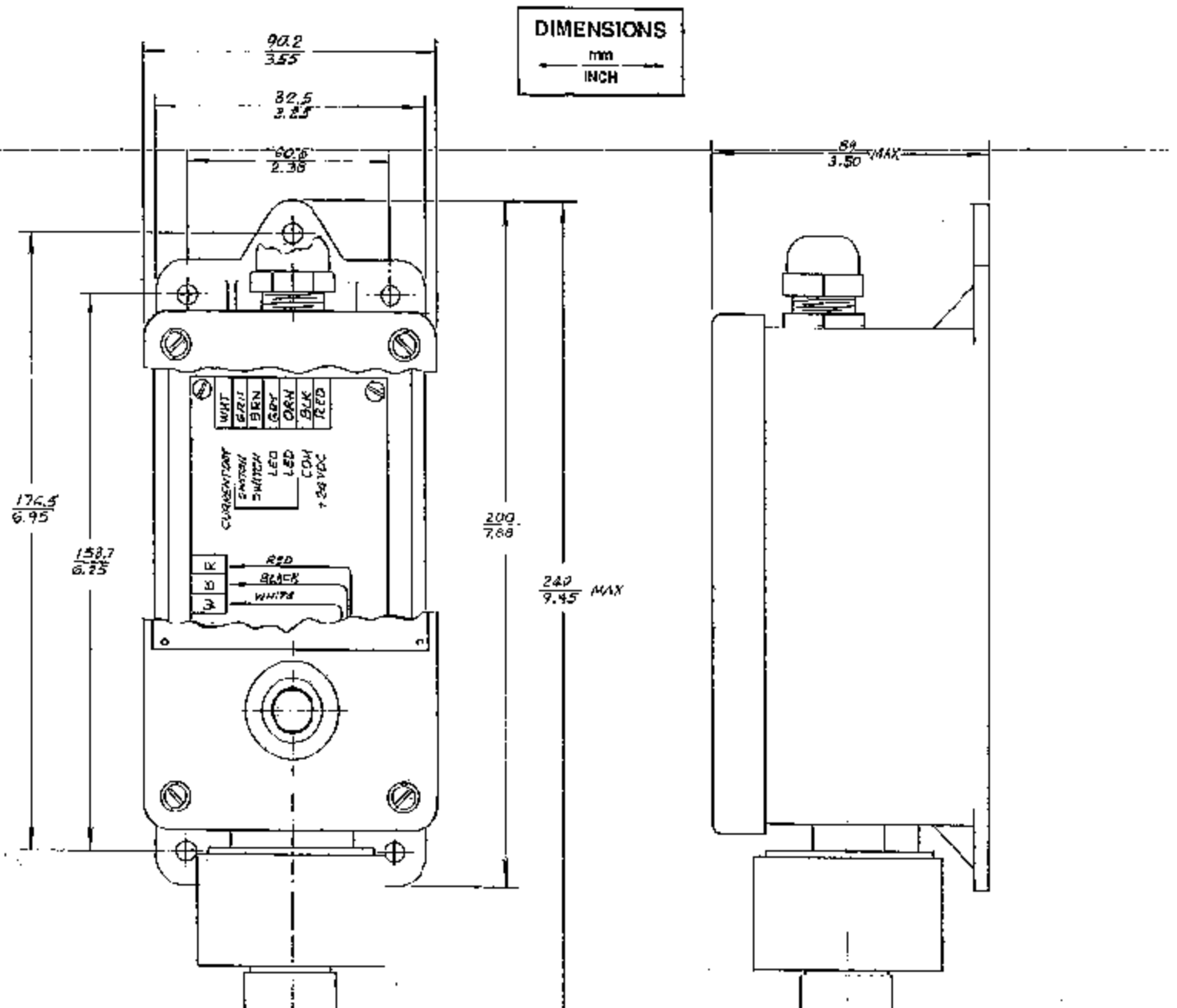


FIG. 1 **OUTLINE DRAWING & FIELD TERMINATIONS**

(REF 60001-XP) **CO GAS MODEL S 700XP**



60001 - WP

FIG.2

OUTLINE DRAWING & FIELD TERMINATIONS
MODEL S701 - WP

III. INSTALLATION INSTRUCTIONS

To make the input and output connections to the Models S700/S701, remove the four (4) bolts holding the cover and remove the cover to gain access to the terminals. Note that for Model S701 the reset switch is mounted on the cover so that care should be taken not to damage the switch interconnections.

PARTICULAR CARE SHOULD BE TAKEN TO AVOID CONTACT WITH CIRCUIT BOARD COMPONENTS.

A. Power Connections

The system operates on nominal power of 24 VDC. 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.) Use any 24VDC nominal supply with a minimum rating of 0.15 amperes. Adequate wire size should be used to prevent excessive voltage drop, and the run should be less than 6000 feet. The total loop resistance must be 30 ohms or less. Connect the positive supply lead to +24VDC RED (TB1-7) and the negative supply lead to COM-BLK (TB1-6) on the terminal block TB1 inside the sensor housing (see Figure 1 for Model S700 or Figure 2 for Model S701). This information is also contained on an information plate on the inside of the housing cover.

WARNING: DO NOT CONNECT POWER TO THE SENSOR TERMINAL BLOCK (TB-2). THIS WILL DAMAGE THE SENSOR.

B. Sensor Output Current Connection (See Fig. 1, Model S700 or Fig. 2, Model S701)

To connect the 4-20mA output signal, connect the signal lead to the terminal labeled CURRENT OUT. The readout unit common must be connected to the Model S700 or S701 common or the power supply common.

C. Choosing Sensor Locations

There are no hard and fast rules governing the selection of optimum sensor locations. The customer must evaluate conditions at his own facility to make this determination. The following are the major factors to be considered.

1. Likely Sources of Escaping CO

   In general, at least one sensor should be located in close proximity to each point where CO is most likely to escape into the air. Consideration should also be given to placing sensors at locations where the CO may be carried by local air currents, ventilation equipment, etc.

C. Choosing Sensor Locations continued

2. 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.

3. "Poisons" and "Contaminants"

Sensors may be adversely affected by prolonged exposure to certain materials. Loss of sensitivity 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).
- Silicones (often contained in greases and aerosols). Silicones do not chemically attack the sensor, they instead coat it and therefore reduce or stop its response to CO.
- Acid vapors.
- Caustic liquids or vapors.

The presence of such materials in an areas does not necessarily preclude the use of an electrochemical 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 six month warranty would not apply.

D. Models S700/S701 Installation

CAUTION

CMI discourages the painting of sensor assemblies. If the sensor head is painted over, gas will not be able to diffuse into the sensor.

The Model S700 installation as shown in Figure 1 consists of a sensor plus CMI P/N 10280 sensor housing. This assembly is designed for use in NEC Class I, Division 1, Groups C and D hazardous areas.

D. Models S700/S701 Installation continued

The Model S701 installation is shown in Figure 2 and consists of a sensor plus GMI P/N 32151-1 weatherproof housing assembly.

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 of the Model S700 must never be opened when power is on, otherwise the explosion-proof integrity is violated. The four bolts on the housing lid of the S700 must be fully engaged.

IV. START UP AND OPERATION

A. Initial Application of Power

Before applying power for the first time double check all wiring components, and ensure the S700/S701 has been on power for at least 30 minutes to let the sensor stabilize before it is calibrated. The S700/S701 may initially indicate a "baseline" malfunction, but this will clear as soon as the electrochemical cell stabilizes.

B. Calibration

The smart carbon monoxide sensor is calibrated by exposing the sensor to a carbon monoxide concentration of 250 ppm (50 ppm for 0-100 ppm range). This is accomplished automatically when the calibration procedure, shown below, is followed. If a substantial quantity of carbon monoxide gas is present when the calibration is attempted, then significant errors will result. Therefore, the Models S700/S701 will indicate a fault condition if they are placed in the calibration mode with carbon monoxide gas present. In this case, the calibration bottle must be initially purged with air that is free of carbon monoxide, and a pneumatic fitting is installed on the bottle to accomplish this.

Calibration Procedure:

Note - If no carbon monoxide gas is present in the atmosphere then skip Step 2.

1. Place a 250 (50) ppm CO ampoule in the breaking apparatus of the calibration bottle. Insert the sensor through the hole in the bottle's lid.

2. Attach the "zero" air purge hose to the pneumatic fitting on the side of the calibration bottle, and allow the bottle to purge for at least one minute. Shut off the purge.

3. Put the Model S700 in the calibration mode by holding the magnetic end of the furnished screwdriver next to the LED in the CALIBRATION switch for at least three seconds, until the LED illuminates. If the LED blinks rapidly there is a significant level of carbon monoxide gas present and the air purge must be used. For the Model S701 depress the calibration switch for three seconds to put it in the calibration mode.

4. Break the ampoule by rotating the thumbscrew clockwise. In one to two minutes the LED will blink slowly, indicating that the S700/S701 electronics has accepted the calibration level.

Calibration Procedure continued

5. Remove the calibration bottle and briefly purge it with air to remove any residue CO. Replace the bottle over the sensor and purge it as detailed in Step 2 above until the calibration LED extinguishes and the smart sensor returns to the normal operating condition.

If it is desired to return the Model S700 to normal operation without performing a calibration, and it has been in the calibration mode for at least 90 seconds, reapply the magnetic end of the screwdriver to the CALIBRATION switch. Manually depress the CALIBRATION switch for the Model S701.

NOTE: If a true malfunction occurs while in the CALIBRATE mode, the Models S700/S701 will shift to the MALFunction mode until the cause of the malfunction is corrected.

After each use of the field calibrator plastic bottle, it is necessary to clear the bottle of residual CO gas. This may be done by flushing the plastic bottle with clean air.

V. SYSTEM PROBLEMS AND TROUBLE-SHOOTING

A. General

It is highly recommended that a spare sensor be on hand at all times. 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 S700/S701 systems be returned to the factory for repair even if the warranty has expired.

NOTE: Spare sensors should remain in their sealed containers and stored in a cool environment.

B. Trouble-Shooting Table

As with all General Monitors' products, the Models S700/S701 have been designed to provide many years of trouble free operation. However, the system has not been designed to permit repairs to be made to the printed circuit boards. If the various actions suggested in the Trouble-Shooting Table fail to restore normal operation, we recommend that the factory be consulted and, if necessary, the system be returned to the factory for check-out.

As an additional aid in locating the source of trouble in a Model S700 or S701, the system has been designed to provide diagnostic flashing of the LED to indicate several abnormal conditions, in addition to the normal operation and calibration sequences already described. Refer to Figure 8 for the complete identification of the malfunction LED flashing sequence.

C. Maintenance

Once installed, the Models S700/S701 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.

After the warranty period has expired, or if it is not possible to return the S700 or S701 to the factory, replacement sets of printed circuit boards may be ordered and replaced in the field.

CAUTION

Again observe caution not to touch components or traces on the printed circuit boards to prevent possible static electricity from damaging the unit.

C. Maintenance continued

The two circuit boards should only be replaced as a set and should not be separated from each other, except under static free laboratory conditions. General Monitors strongly recommends that this set of boards be returned to the factory where they will be checked out and the faulty board replaced.

The following steps should be used when replacing the set of printed circuit boards:

1. Transport and keep the replacement set of boards in their static proof plastic bags until ready to install.

2. Area must be declassified before removing the sensor housing cover.

3. Remove power from the sensor preferably at a central distribution station or, if powered from a General Monitors Readout/Relay Module, from terminals "DC OUT" and "DC-COM" on the rear of the Module.

4. Remove the four (4) bolts holding the sensor cover and remove the cover.

5. Remove the three (3) sensor leads from terminal block TB2.

6. Remove all leads from terminal block TB1.

7. Remove the four (4) Phillips head screws in each of the four corners of the PC board assembly and carefully remove the set of boards.

8. Replace with the new set of boards from the static proof plastic bag and place the old set in the bag for protection.

9. To reassemble, reverse Steps 3 through 7.

Sensor replacement:

When a sensor requires replacement follow Steps 2 & 3 above, then unscrew the sensor cover and remove the old sensor. This is a plug-in device which plugs directly into the housing PC board. The cell contains three terminal pins identified by the letters "R", "S" and "C" which plug into mating microjacks on the PC board. The PC board also contains an alignment pin to assist in the cell installation (see Figure 6). The shorting wire between pins R & S must be removed before installation, but should remain in place while the sensor is in storage. Install the new sensor and replace the cover.

DO NOT USE A WRENCH TO REPLACE THE COVER. INSTALL ONLY HAND TIGHT.

C. Maintenance continued

Switch replacement:

Replacing the calibration switch follows a similar sequence as the sensor. Follow steps 2, 3 & 4 above. Then remove the four (4) leads on TB1 identified as "SWITCH GRN", "SWITCH BRN", "LED GRY" and "LED ORG." Remove the switch and install the replacement. Again it is necessary to install the switch HAND TIGHT.

Ensure the new switch leads are securely held in their terminal block before replacing sensor housing cover.

V. MODEL S700 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.

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

PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
No output signal and LED is off.	No DC power to the unit.	Be sure the +24VDC is applied with the correct polarity.
No output signal, LED blinking rapidly with an even duty cycle.	Improper calibration. Background of CO present.	Re-calibrate the unit. Purge sensor with "C" air. ("O" air is air containing less than 1ppm CO)
	Sensor out of tolerance. Initial sensor stabilization.	Replace the sensor and re-calibrate. Wait a few minutes for sensor to stabilize.
No output signal, LED blinking rapidly with the LED mostly off.	Low DC input voltage at the sensor electronics.	Be sure DC supply is operating properly and the current carrying capacity and supply wiring are adequate.
4mA output signal - normal (READY) can't enter CAL mode when actuating CAL switch for 1 minute.	Switch contacts bad.	Replace switch.

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 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 display unit or output signal level. The visual display will indicate the gas concentration, and alarm indicators/ circuits will activate in direct relationship to gas concentration.

2. GENERAL MONITORS cautions, as with all equipment of this type, that high levels or long exposure to certain atmospheres will "poison" the sensor and eventually affect sensitivity. See Section III C.3 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 warranty will be voided if customer personnel or third parties damage the system during repair attempts.

VII. WARRANTY

GMI warrants all its products to be free from defects in workmanship or material under normal use and service within two (2) years for Gas Detection and one (1) for Flame Detection from date of shipment. The CO sensor carries a six 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 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 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.

VIII. GENERAL SPECIFICATIONS

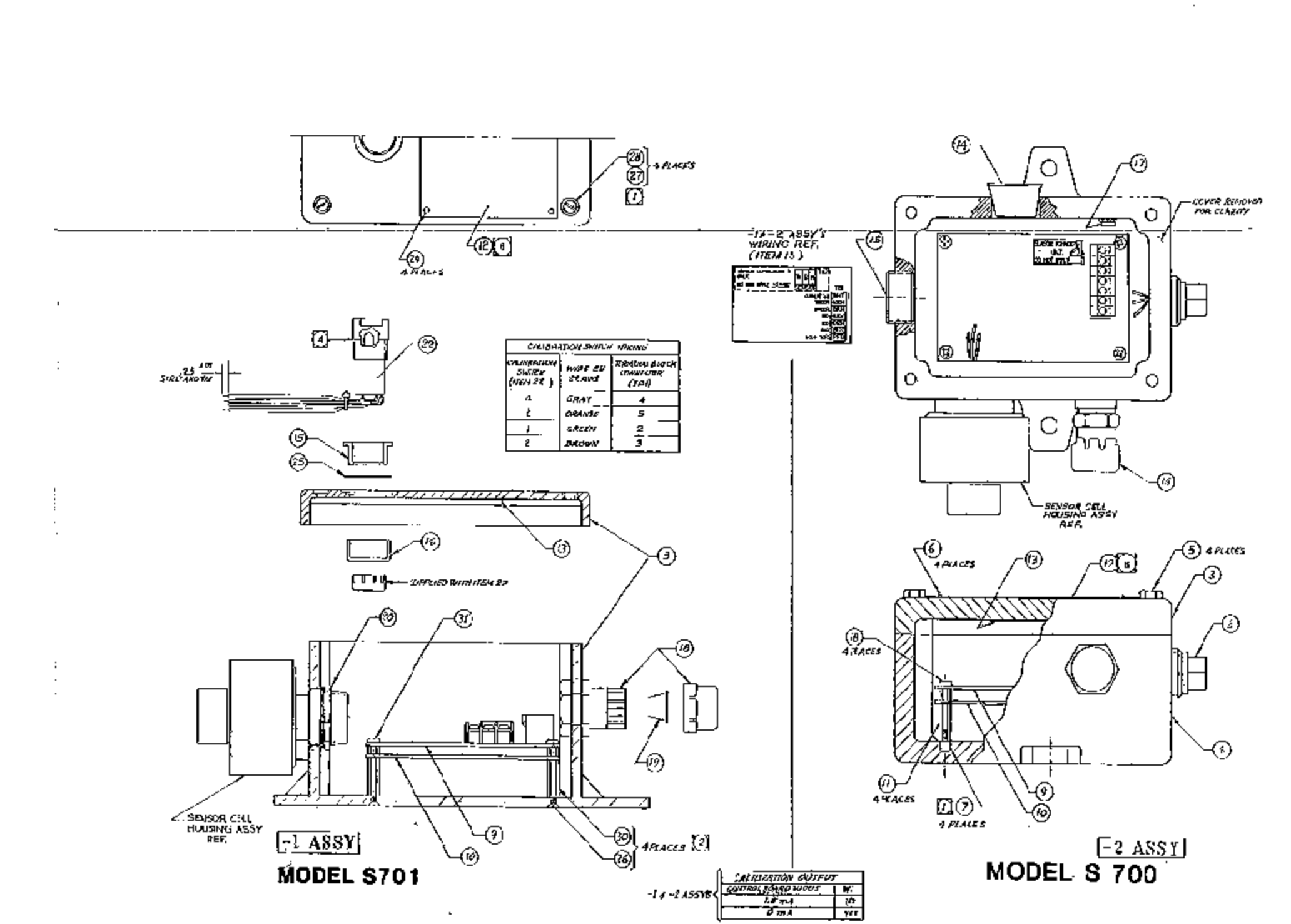
Sensor Type:	Electrochemical Cell
Detection Range:	0 - 500ppm (0-100 ppm optional)
Temperature Range Continuous:	14 to 104 degrees Fahrenheit for ± 10% linearity -10 to +40 degrees Celsius
Temperature Range Intermittent:	-4 to +122 degrees Fahrenheit for ± 25% linearity -20 to +50 degrees Celsius
Zero Drift:	Less than ± 3ppm
Response Time:	Typically less than 60 sec. to 70% of final value
Input Power:	24VDC nominal at 0.15 amps
Output Current:	0mA - Malfunction 1.5mA - Calibration Mode 4-20mA - Instrument dynamic range (0-500/100ppm CO)
Cable Length:	6000ft. maximum using 14 AWG
Status Indicator:	Calibration LED on Calibration accepted - LED blinking slowly Malfunction - LED blinking rapidly
Malfunction Monitoring:	Low supply voltage Fail to calibrate Sensor baseline out of range
Time Out:	45 seconds
Warranty:	Electrochemical Cell - 6 months (typical lifetime 1 - 2 years) Electronics - 2 years
Dimensions:	Model S700 6.7 ins (170mm) long 7.8 ins (200mm) wide 3.4 ins (87mm) high Model S701 9.5 ins (240mm) long 3.6 ins (90mm) wide 3.5 ins (89mm) high
Electrical Classification:	Model S700 Suitable for Class I, Division 1, Groups C and D Model S701 Weatherproof

IX. RECOMMENDED SPARE PARTS

One Model S700/S701

for up to Two Years Operation

Item	Description	Part Number	Qty
1	Switch, calibration - S700	30021 1	1
2	Switch, calibration - S701	32152-2	1
3	Sensor	929-022	1



FINAL ASSEMBLY - CO GAS SMART SENSORS

FIG.3 sht 1

PART#.....	QTY	MFG-PART#.....	DESC.....	REV	REV-DATE	ITM	REFDES .....
60000	INFO		SMART SENSOR CO	C	03-23-89		
60001-XP	INFO		OUTLINE DWG & FIELD TERM EP	A	02-08-88		
60808	INFO		SCHEMATIC DIA CONTROL ELECTRONICS	A	02-11-88		
30002	INFO		SCHEMATIC DIAGRAM CONVERTER BOARD	C	09-01-88		
10301-1	1		COVER EXPL PROOF ENCLOSURE	G	06-20-88	3	
10300-1	1		BASE EXPL PROOF ENCLOSURE	H	12-08-88	4	
10286-1	4		SCREW CAPTIVE HEX HEAD	B	03-19-88	5	
928-321	4	6320B-18	STUD 6-32 TYPE D BRASS			7	
30013-1	1		LABEL FIELD CONNECTIONS	C	02-08-89	13	
928-539	4	8218-N-0632	STDF 6-32 X 1/4 X 3/4 NY			11	
60920-1	1		NAMEPLATE SMART SENSOR CO	C	03-28-89	12	
914-865	1	CUP-2	PLUG 3/4 IN CLOSE UP			15	
914-860	1	KDB-1	BREATHER/DRAIN EXPL PROOF			16	
928-315	1	3960	SCREW GUILLOTINE #6-32 X 3/8			17	
9053	4		SCR 6-32X9/16 PHIL PN HD SST			18	
9483	4		SCR 2 X 3/16 DRIVE			6	
9487	1		CAPLUG TAPERED 3/4" 12-K			14	
60005-1	1		CCA CONTROL ELECTRONICS	A	01-05-88	9	
30008-1	1		CCA CONVERTER BD SC100XP/S700	D	07-27-88	10	
30021-1	1		SWITCH CALIBRATION ASSY	B	03-03-87	8	
60025	INFO		SENSOR HOUSING ASSEMBLY	A	02-08-88		
925-022	INFO	AB004-327-10	SENSOR CARBON MONOXIDE 100PPM				
60024-1	1		LABEL LED FLASHING SEQ	A	01 12 89	2	

(60000-2 B)

FIG.3

SHT 2

PARTS LIST
FINAL ASSEMBLY
MODEL S700

PART#	QTY	MFG-PART#	DESC	REV	REV-DATE	ITM REFDES
60000	INFO		SMART SENSOR CO	A	04-11-88	
60001-MP	INFO		OUTLINE DWG & FIELD TERM MTNPRF	A	02-08-88	
60008	INFO		SCHEMATIC DIA CONTROL ELECTRONICS	A	02-11-88	
30002	INFO		SCHEMATIC DIAGRAM CONVERTER BOARD	B	12-21-84	
32151-1	1		ENCL MP RACK COVER & BASE	B	02-29-88	8
60022-1	1		NAMEPLATE SMART SENSOR CO MP	B	04-10-84	12
30013-1	1		LABEL FIELD CONNECTIONS	B	10-30-86	13
32154-1	1		BUSHING SWITCH	A	11-30-87	15
32155-1	1		CUP SWITCH SUPPORT	A	11-30-87	16
960-318	1	3216	CABLE FITTING LIQUID TIGHT			18
925-574	1	4	CAP RECEPTACLE DUST			19
925-564	1	PRP-568-020	O-RING 7/8 ID X 1.00 OD SILICONE			25
961-009	1	BLS675	LOCKNUT SEALING 3/4 NPT STEEL			20
32152-2	1		SWITCH ASSY PUSHBUTTON	A	11-13-87	22
928-539	4	8216-M-0632	STDF 6-32 X 1/4 W 3/6 MY			26
928-110	4	PR10-832	RETAINER FLUSH NTP 8-32 THD SST			27

(60000-1 A)

PART#	QTY	MFG-PART#	DESC	REV	REV-DATE	ITM REFDES
929-022	INFO	AB304-327-10	SENSOR CARBON MONOXIDE 100PPM			
928-320	4	PS10-832-40	SCREW CAPTIVE 8-32 SST SLOT			24
9483	4		SCR DRIVE 2 X 3/16 SST			29
9046	4		SCR 6-32X7/16 PH-FL-HD 100DE SST			33
9053	4		SCR 6-32X9/16 PHIL PN HD SST			31
9197	.75		WIRE GRAY 22 AWG BU			
9192	.75		WIRE ORANGE 22 AWG BU			
9193	.75		WIRE YELLOW 22 AWG BU			
9190	.75		WIRE BROWN 22 AWG BU			
9332	AR		ADH RTV 108 GE 684			35
60015-1	1		CCA CONTROL ELECTRONICS	A	01-05-88	9
30008-1	1		CCA CONVERTER BD SC100XP/S700	C	11-15-85	11
60025	INFO		SENSOR HOUSING ASSEMBLY	A	02-08-88	

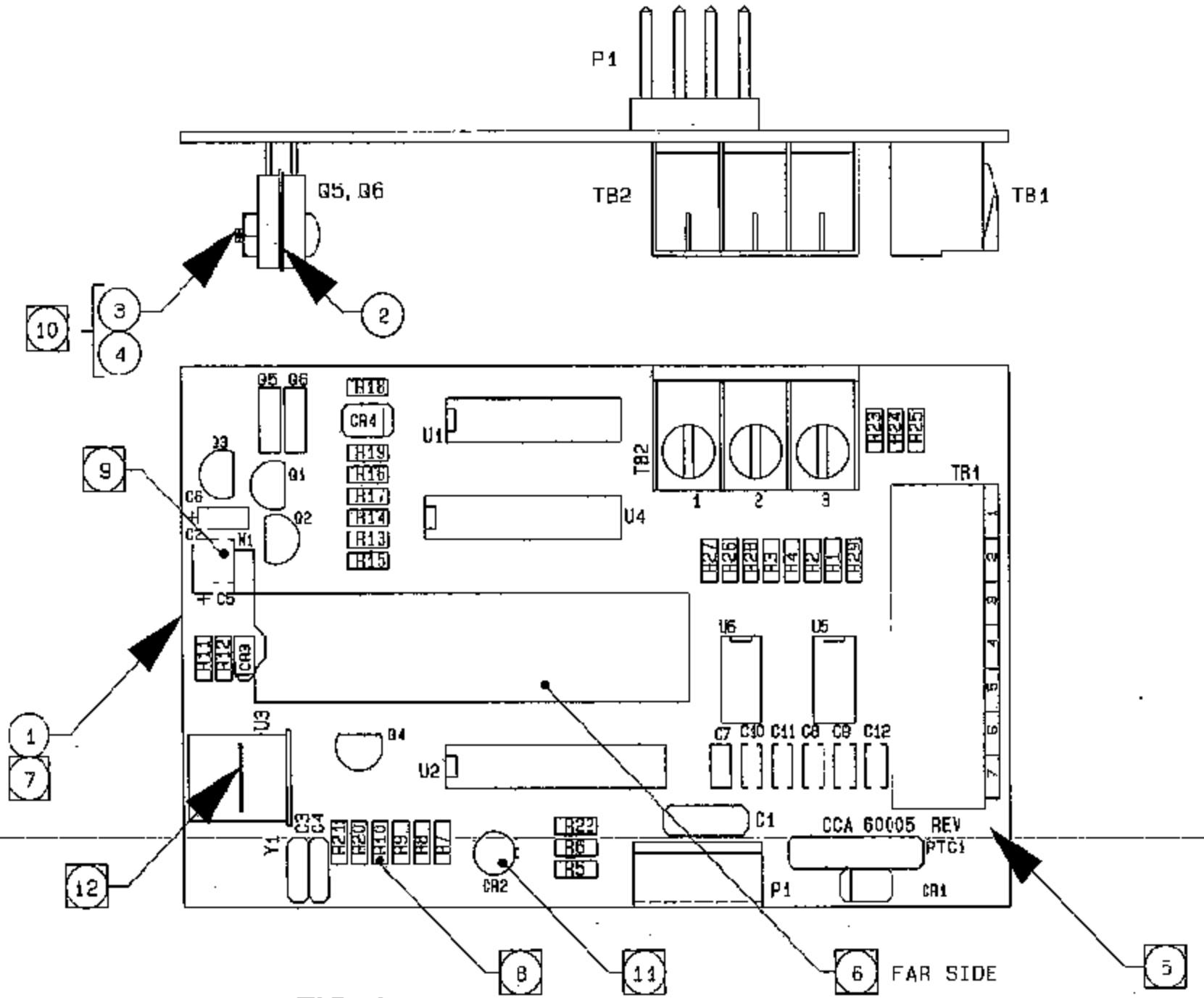
FIG. 3

SHT 3

PARTS LIST

FINAL ASSEMBLY

MODEL S701



(REF 60005)

FIG 4 SHT 1

CONTROL ELECTRONICS

MODEL S 700/S 701

PART#	QTY	MFG-PART#	DESC	REV	REV-DATE	ITM	REFDES
60005	INFO		CCA POP BOARD	1	04-15-87		
60006-1	1		CCD CONTROL ELECTRONICS	1	04-15-87	1	
915-027	1	CH05FD151J03	CAP 150PF 100V DIPPED MICA				C1
915-129	2	T350A226K006AS	CAP 22UF 6V TANT				C2,6
915-026	2	CH04CD200J03	CAP 20PF 100V DIPPED MICA				C3,4
915-033	6	CW20C104K-244	CAP .1UF 20V CER				C5,8,9,10,11,12
915-031	1	CW15C103X	CAP .01UF 50V MONOLITHIC-CER				C7
948-102	2	1N4002	DIODE 1N4002 100V 1A				CR1,4
948-043	1	LM136H-2.5V	DIODE REF VOLTAGE 2.5V				CR2
948-104	1	1N4148	DIODE 1N4148 SIGNAL				CR3
921-719	1	09-80-1043	CONN WAFER 4 POS .156 CTR GLD P				P1
947-700	1	RGE185A	RES 40A 50V PTC DEVICE				PTC1
948-245	3	MPS 8099	TRANS MPS 8099 NPN				Q1,2,4
948-250	1	MPSW45	TRANS NPN GTL 1W 40V MPSW45				Q3
947-327	2		RES 2K 1% RN55D METAL FILM				R1,7
947-328	3		RES 1K 1% RN55D METAL FILM				R2,23,29
947-619	1		RES 20.0 OHM 1% RN55D METAL FIL				R3
947-648	1		RES 976 OHM 1% RN55D				R4
947-339	1		RES 15K 1% RN55 METAL FILM				R5
947-393	3		RES 2.2M OHMS 1% RN55D				R6,16,21
947-315	1		RES 2.21K 1% RN55D METAL FILM				R8
947-352	1		RES 249 OHM 1% RN55 METAL FILM				R9
QC-SELECT	1		QC SELECT PROCEDURE				R10
947-643	4		RES 47K 1/4W 5% CARBON				R11,12,13,14
947-632	1		RES 4.7K 1/4W 5% CARBON				R15
947-367	1		RES 40.2 OHM 1% RN55D METAL FIL				R17
947-620	1		RES 806 OHM 1% RN55D METAL FILM				R18
947-618	1		RES 402 OHM 1% RN55D METAL FILM				R19
947-379	1		RES 4.75K 1% RN55D METAL FILM				R20
947-301	3		RES 10K 1% RN55D METAL FILM				R22,24,25
947-314	1		RES 49.9 OHM 1% RN55D METAL FIL				R26
947-318	1		RES 1.5K 1% RN55D METAL FILM				R27
947-338	1		RES 1M 1% RN55D METAL FILM				R28
921-373	1	1790364	TERM BLOCK 5CL POS BID PC MT				TB1A
921-372	6	1796319	TERM BLOCK SINGLE POS PC MT				TB1B
921-361	1	A102203-3L	TERM BLOCK 3 POS .325 CTR FLAT				TB2
931-001	1	7404-05FR-5B	INSULATOR SIL-PAD			2	
931-500	1	MC14052BCL	IC AGA MUX/DEMUX DTFF 4 CHANNEL				U1
931-438	1	ADC0803LCD	IC 8 BIT MICROPRO A/D CONVERTER				U2
931-384	1	X2210PI	IC RAM NONVOLATILE STATIC 64 X				U4
931-395	2	ICL7650CTV-1	IC CHOP STAB OPER AMP 8-PIN TO-				U5,6
923-001	1	HC-18/U 3.000DM	CRYSTAL 3.0000 MHZ 18PF -40 TO				Y1
12517	1		NUT #3X0.5 NYLON HEX			3	
12515	1		SCR #3X0.5MM SLOT PAN HD NYL			4	
10284-17	1		MICROCOMPUTER PGMD S700		10-06-87		U3
30015-1	2		TRANSISTOR MATCHING PROCEDURE	A	03-29-84		Q5,6

(60005-1)

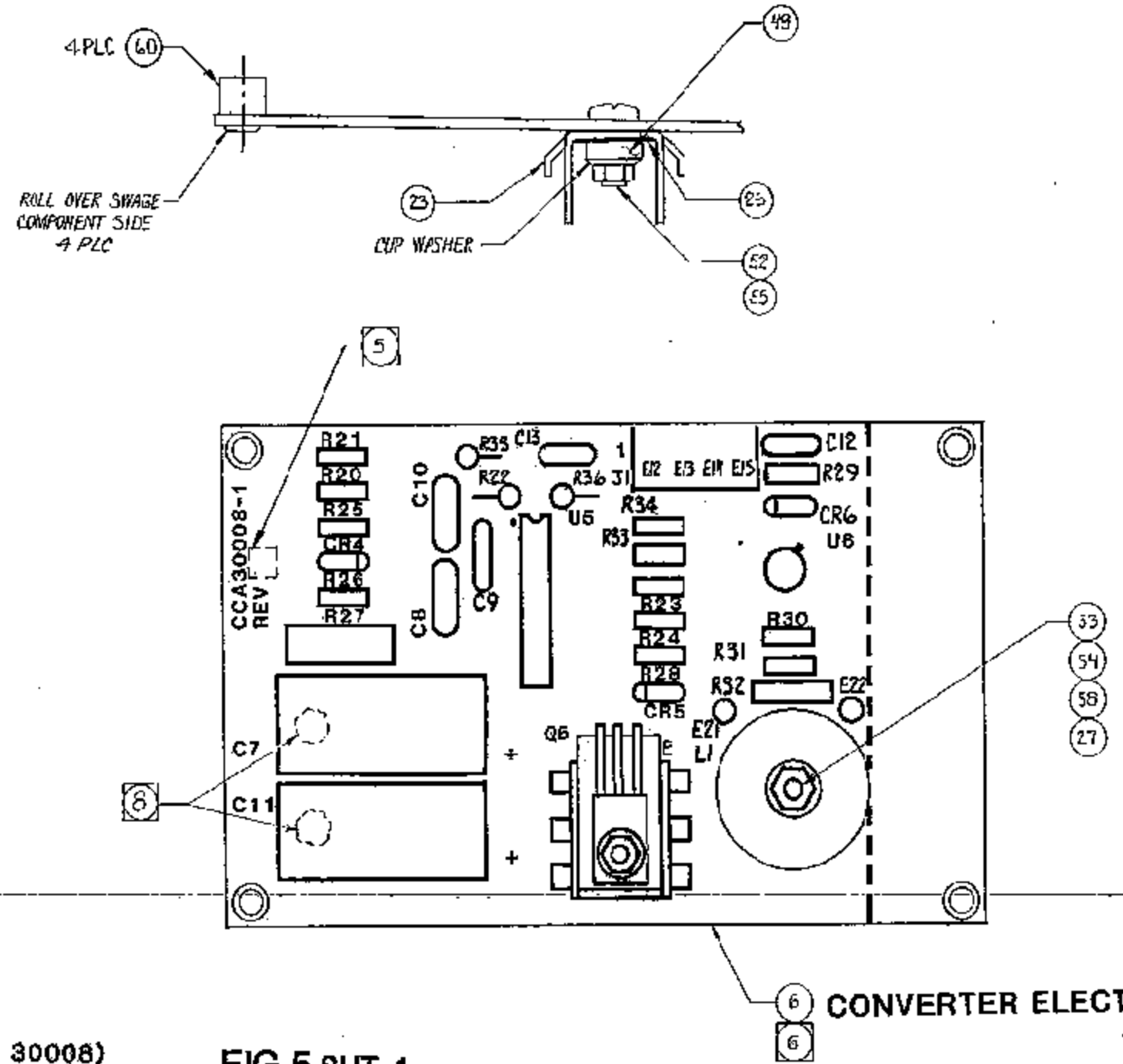
FIG. 4

SHT 2

PARTS LIST

CONTROL ELECTRONICS

MODEL S700/S701



(REF 30008)

FIG.5 SHT 1

QTY.	PART NO.	DESCRIPTION		ITEM
				80
				79
				78
				77
				76
				75
				74
				73
				72
				71
				70
				69
				68
				67
				66
				65
				64
AR	932-002	CONFORMAL COATING		63
				62
				61
4	928-420	SPACER, SWAGE ¼ DIA x 3/16 LG, .140 DIA CLEAR HOLE, AL		60
				59
1		WASHER, FLAT #6 9.6MM/.35IN. O.D. FIBER		58
				57
				56
1		NUT, LOCK-M3, NY INSERT, STL-CAD PLT		55
1		NUT, HEX-M3, NY		54
1		SCREW, MACH-M3 x 80 PAN-NY-SL		53
1		SCREW, MACH-M3 x 12 PAN-SST-PHIL		52
				51
				50
1	948-238	TRANSISTOR, PNP 2N5191	Q6	49
				48
				47
				46
2		RES, SEL. C.C. FRO. 3030002-1	R24, 31	45
1	947-416	RESISTOR 1 OHM, 1W, 1%	R32	44
1	947-203	RESISTOR, 330 OHM, 1W, 5%	R27	43
				42
				41
QTY.	PART NO.	DESCRIPTION		ITEM

QTY.	PART NO.	DESCRIPTION		ITEM
1	947-033	RESISTOR, 5.6 K, 1/4W, 5%	R25	40
1	947-012	100 OHM, 1/4W, 5%	R26	39
2	947-316	100K, 1% RN55D	R22, 36	38
1	947-611	28.0K, 1%, RN55D	R30	37
3	947-326	20.0K, 1%, RN55D	R20, 21, 33	36
2	947-301	10.0K, 1%, RN55D	R29, 34	35
1	947-309	4.21K, 1%, RN55D	R23	34
1	947-988	1K, 1%, RN55D	R28	33
				32
1	947-621	RESISTOR 86.6K 1% RN55D	R35	31
1	931-388	I.C. PROGRAM. VOLT. REF. ±1% ACCURACY	U6	30
1	931-386	I.C. PULSE-WIDTH-MOD. TL494 IN	U5	29
				28
1	931-040	INSULATOR PAD		27
1	931-036	INSULATOR, SIL-PAD		26
				25
1	30011-1	INDUCTOR 2.0 MH	L1	24
1	948-410	HEATSINK		23
				22
1	948-104	DIODE, SIGNAL 1N4148	CR6	21
1	948-124	DIODE, RECTIFIER 1N4934	CR5	20
1	948-035	DIODE, ZENER P6KE39A	CR4	19
				18
1	921-720	CONNECTOR, 4 POS	J1	17
				16
				15
2	915-027	CAPACITOR, 150PF, 100V	C9, 13	14
				13
2	915-168	680F, 60V	C7, 11	12
1	915-038	1.0 UF, 50V	C12	11
1	915-033	0.1UF, 50V	C8	10
1	915-017	CAPACITOR, .01UF, 50V	C10	9
				8
				7
1	30008-1	C.C.D., CONVERTER ELECTRONICS		6
				5
INFO	30002	SCHEMATIC DIAGRAM		4
				3
				2
—	-1	CCA, CONVERTER ELECTRONICS		1
QTY.	PART NO.	DESCRIPTION		ITEM

PARTS LIST

CONVERTER ELECTRONICS

MODEL 8700/8701

FIG 5 SHT. 2

(REF 30008-1)

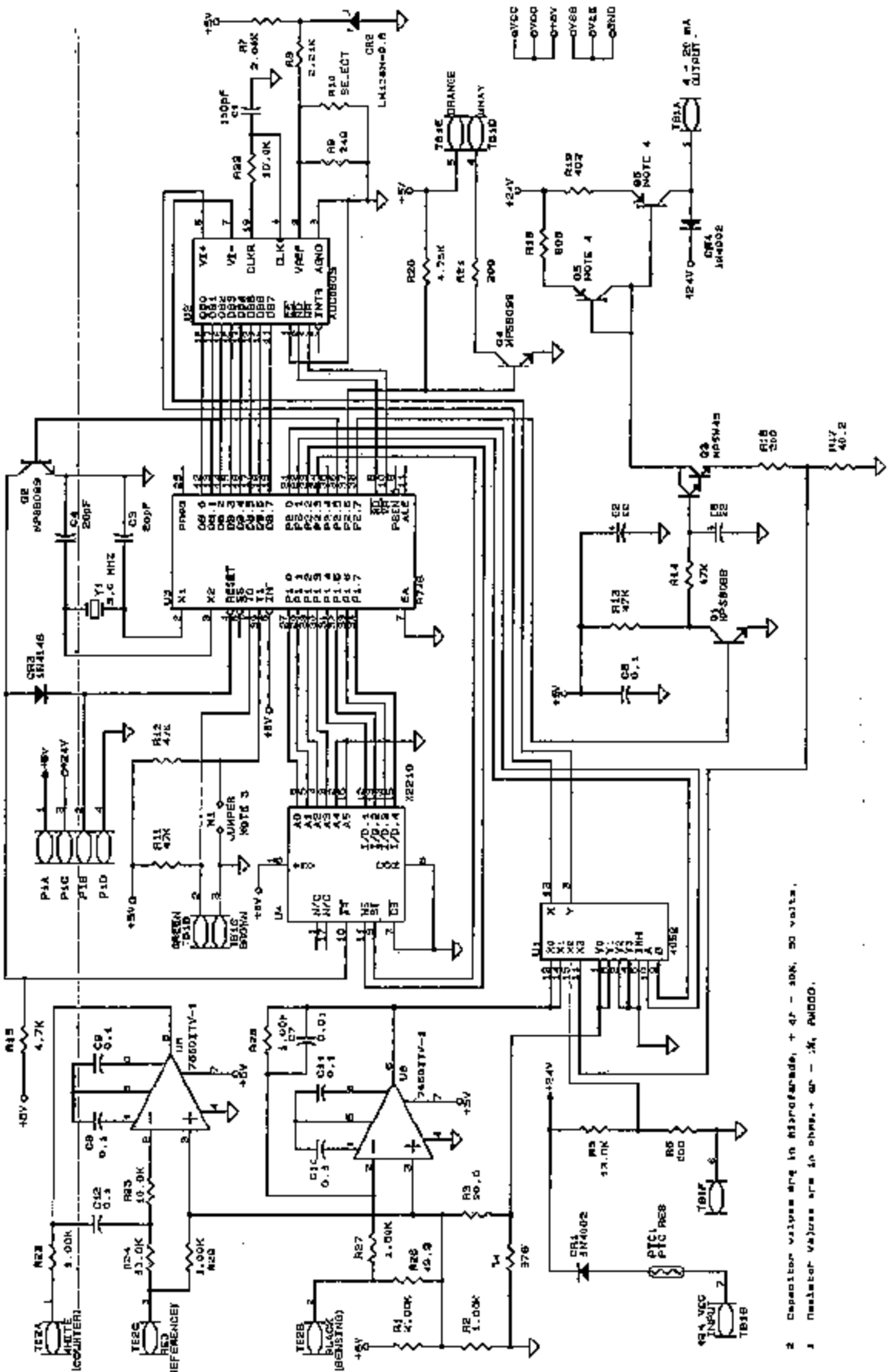


FIG. 6

SCHEMATIC DIAGRAM

MODEL S700/S701

(60008)

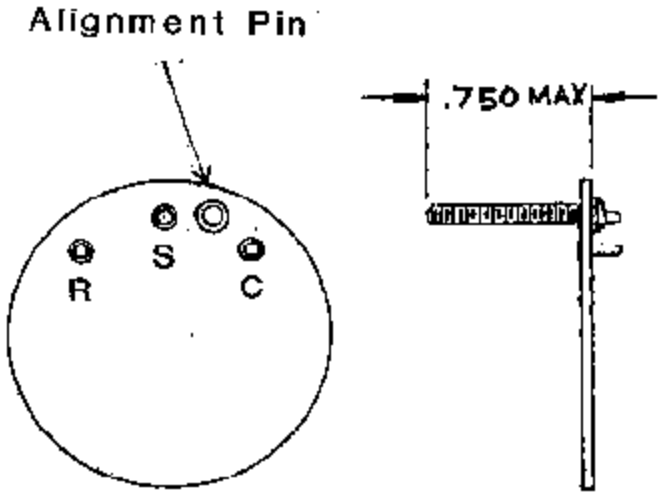


FIG. 7

SENSOR CELL HOUSING
BOARD ASSEMBLY
MODEL S700/S701

MALFUNCTION LED FLASHING SEQUENCE

Model S700/S701