



O2 Zoned C4000 Portable Rotation System

CareMedx C5000 Multi-zoned Low Air Loss Therapy System

Service Manual

**P/N 11844-000 4/03
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Before you begin . . .

Important

- Refer to the *P4000 Multi-Functional Portable Rotation System Operator's Manual* for detailed operating instructions. Read and understand the *Operator's Manual* and all precautions prior to using the rotation system.
- Review the *SAFETY PRECAUTIONS* (see page 2) prior to servicing the unit.
- For Technical Assistance, contact Plexus Technical Assistance at (716) 662-8636 or (800) 828-7341

Symbols used within this manual:



Attention: consult accompanying documents



Dangerous voltage



Protective earth (ground)



Type BF applied equipment

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Section 1 – Safety Precautions

1.0 Safety Precautions

Review the following *SAFETY PRECAUTIONS* prior to testing or servicing the power unit.

DANGER

- Explosive hazard. Do not use in the presence of flammable anesthetics.
- Risk of electric shock. Disconnect power before servicing the C4000/C5000 control unit.

WARNING

- Read and understand the Operating manual and all precautions before using the system.
- Repairs should only be attempted by qualified personnel such as certified biomedical electronics technicians or certified clinical engineers familiar with repair practices for servicing medical devices, and in accordance with the service manual. **Damage to the unit or malfunction could otherwise result.**
- **Always perform the FUNCTIONAL CHECK and SAFETY INSPECTION after making repairs and before returning the unit to patient use. Document your findings on the INSPECTION FORM. Improper repair may result in injury, equipment damage, or malfunction.**

WARNING

- Use only Plexus replacement parts as identified in the parts lists on the assembly drawings. Use of substitute parts could lead to unit malfunction or patient injury.
- Do not connect or disconnect cables from the main control board when power is applied. Doing so could result in damage to the unit.
- Incorrect polarity or other improper connection of the cable from the display to main control board will result in circuit damage.
- Pressure sensors must be calibrated after main control board replacement.

CAUTION

- For grounding reliability, plug only into a properly grounded outlet.

(CONTINUED NEXT COLUMN)

Section 2 – Repair Policy

2.0 Repair Policy

For customers who repair Plexus units at their location, this manual contains information to allow a qualified biomedical technician to make necessary repairs. Service training for the unit is recommended and can be arranged through Plexus Technical Support.

2.1 Limited Warranty

The C4000/C5000 control unit is warranted free of defects in material and workmanship under normal use and operation for a period of two years, under the terms and conditions of the Plexus warranty in place at time of purchase. During the warranty period, Plexus will repair or replace at its sole option, free of charge, any defective parts or products returned with prior authorization prepaid to Plexus. Consumable items such as filters are excluded. The full warranty is available from Plexus upon request.

Warranty does not cover products abused, misused, or altered outside the factory. There are no obligations on the part of Plexus for consequential damages arising out of or in connection with the use or performance of this product. Plexus disclaims all implied warranties, including, but not limited to, the implied warranties of merchantability and of fitness for a particular purpose.

2.2 In-Warranty Repairs

All in-warranty field repairs must be authorized by Plexus before proceeding.


2.3 Out-of-Warranty Repairs

If the unit becomes inoperative and the cause cannot be determined, the complete unit may be returned to the factory for servicing at the purchaser's expense. Please contact Plexus to obtain a returned goods ("RG") number prior to returning equipment.

2.4 Return Authorization

Please contact your local dealer.

Section 3 – Specifications

	C4000/C5000	C4000E/C5000E
Enclosure Dimensions	10" x 12" x 6" (25 cm x 30 cm x 16 cm)	
Weight	15 pounds (6.8 kg)	
Power Cord	Detachable 14' minimum, #18 AWG usable power cord with ground wire	
Overcurrent Protection	Primary Two 5 x 20 mm fuses 5A, 250V, T, L	Primary Two 5 x 20 mm fuses 2.5A, 250V, T, L
	Secondary Two 5 x 20 mm fuses 2A, 250V, F, L	
Input	115 VAC, 50/60Hz, 5A	230 VAC, 50/60Hz, 2.5A
Operating Ambient Temperature Range	60°F to 85°F (16° - 29°C)	
Classification	Class I grounded equipment not suitable for use in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide.	
	Type BF equipment 	
	MEDICAL EQUIPMENT, classified with respect to electric shock, fire and mechanical hazards only, in accordance with UL 2601-1, CAN/CSA C22.2 NO.601.1	
	IPX0, enclosed equipment without protection against ingress of water.	
	Continuous operation	

Electromagnetic Compatibility	Meets EN60601-1-2:1993 (CISPR 11 Classified as Class A, Group 1 ISM equipment)
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Section 4 – Preventative Maintenance

4.0 Preventative Maintenance

4.1 Filter

The filter on the unit should be changed or cleaned with soap and water after approximately every three weeks, or as needed. Replace the filter only with the Plexus part number shown on the assembly drawings.



WARNING

- Use only Plexus replacement parts as identified in the parts lists on the assembly drawings. Use of substitute parts could lead to unit malfunction or patient injury.

4.2 Blower

The blower motor and fan do not require lubrication.

4.3 Enclosure Exterior

Clean the control panel and unit exterior with a soft cloth, lightly dampened with a non-staining hospital disinfectant.

Section 5 – Functional Check and Safety Inspection

5.0 Functional Check and Safety Inspection

To assure optimal performance, dependability and safety, perform either a major or minor ***FUNCTIONAL CHECK and SAFETY INSPECTION*** as follows:

Major: Perform upon receipt of the power unit and every six months thereafter. The major ***functional check and safety inspection*** consists of all procedures (5.1 through 5.5)

Minor: Perform between patient uses. The minor ***functional check and safety inspection*** consists of procedure 5.5

Inspection Form

An inspection form is provided in the next section to facilitate and document the inspection process.

Test Equipment

The following test equipment (or equivalent) is required in order to perform the inspection procedures:

- Current Leakage / Ground Resistance Tester
- Inspection form

Procedures

Perform the following procedures carefully, paying particular attention to test setups. Any deviation from the setups, procedures, or test equipment may result in incorrect or misleading results.

5.1 Enclosure (every six months)

Examine the overall condition of the unit exterior:

1. **Unplug the unit**
2. Examine the enclosure, checking for cracks or other damage.
3. Check that exterior screws are tight
4. Check that labeling and markings are legible.
5. Clean accumulated dirt from vents and clean filter.
6. Examine front overlay for cracks or holes.

5.2 Line cord (every six months)

Examine the plug and line cord:

1. Examine the attachment plug on the line cord to be sure it is in good condition.
2. Examine the cord along its entire length for physical damage, such as cuts or cracked insulation. Replace, rather than repair, damaged cords.

5.3 Ground Resistance (every six months)

Check grounding resistance:

1. Use a current leakage/ground resistance tester to measure the resistance between the grounding pin on the power plug and the screw adjacent to the ground symbol on the blower housing. Record the value.
2. The value should be less than 0.5 ohms.

5.4 Current Leakage (every six months)

Measure current leakage:

1. Measure and record the maximum earth current leakage (ground open). Use the exposed metal of the valve manifold if needed. Measure all combinations of line polarity and neutral open/closed.
2. The current leakage should not exceed 300 micro amperes in any condition.

5.5 Power-Up Self Tests (POST)

System self inspection:

1. The unit will perform the POST each time power is applied. Verify that the service light does not illuminate during the tests.
2. If the service light does illuminate, note the number indicated in the weight display when the service light came on. Then see section 7 – Troubleshooting.

5.6 - P5000 Pneumatic Leak Test

1. The system shall be capable of conducting a pneumatic mattress leak test, when requested from the control panel, that determines percentage leakage per minute for each mattress zone.
2. During System Information mode, when the Max Inflate key is pressed, the system shall initiate the pneumatic leak test.
3. While the test is in progress, status shall be displayed on the Weight display as shown in following table.

Weight Display	Test Phase
Pt.1	Open valves and ramp blower to inflation pressure, 42 mmHg.
Pt.2	Inflate all mattress zones to capacity. Show relative zone pressures on bar graphs to indicate fill progress. Show ascending ripple patterns on bar graphs.
Pt.-	(If unable to attain complete fill in any zone after 100 seconds, abort test.)
Pt.3	Turn off blower and await low manifold pressure.
Pt.4	Sample zone pressures for 30 seconds. Display elapsed time countdown on cm Height display.
Pt.5	Display relative leak rate results on zone bar graphs.

4. The system shall drive the blower manifold to 42 mmHg to inflate the mattress. If the system is unable to attain complete filling to 40 mmHg in all four zones after 100 seconds, the test shall be aborted, and the bar graphs of deficient zones shall flash at a 1.3 Hz rate.
5. At the completion of the test, relative leak rate results shall be displayed on the zone bar graphs, with lower values indicating faster leaks.
6. At the completion of the test, the Max Inflate indicator shall flash at a 1.3 Hz rate to prompt for operator key press.
7. At the completion of the test, when a Zone Adjust key is pressed, the corresponding numeric leak value in percent per minute shall appear on the Weight display.

8. The results shall remain displayed until either the Max Inflate or On/Standby key is pressed, or after 10 seconds of key inactivity, at which time the system shall resume System Information mode.

Section 6 – Inspection Form

C4000 and C5000 Functional Check and Safety Inspection							
Serial Number _____		Location _____		Initials _____		Date _____	
Maj. 6 mos.	Min. (Every use)	Procedure(s)		Done (check)	Action	Results (circle selection)	
Yes	No	5.1	Enclosure		Unplug the unit.		
					Check enclosure for cracks	pass	fail
					Check screws	pass	fail
					Check labeling and markings	pass	fail
					Clean vents and filter	pass	fail
Yes	No	5.2	Plug, Line Cord, and Strain Relief		Check overlays for cracks	pass	fail
					Examine plug	pass	fail
Yes	No	5.3	Ground Resistance		Examine cord. Check strain relief	pass	fail
					Unplug the unit and measure the ground resistance: _____ ohms. (must be $<.5\Omega$)	pass	fail
Yes	No	5.4	Current Leakage		Measure current leakage at the following settings:		
					Neutral Line	Line Polarity	VALUE
					Open	Normal	
					Open	Reverse	
					Closed	Normal	
					Closed	Reverse	
			Verify Leakage Current $<100\mu\text{A}$ for all conditions above.	pass	fail		
Yes	Yes	5.5	POST (power-up self tests)		Display Test	pass	fail
					Stuck Key Test	pass	fail
					Voltage Tests	pass	fail
					Battery Test	pass	fail
					ADC/DAC Test	pass	fail
					EEPROM Test	pass	fail
					Blower Test	pass	fail
					Valve Test	pass	fail
					EPROM Test	pass	fail
					RAM Test	pass	fail
	AP Test	pass	fail				

Section 7 - Troubleshooting

Flow charts are provided at the end of this section to assist in diagnosing failures from the Power-Up Self Tests (POST).

The eleven (ten on CareMedx) post tests are as follows:

0. Display test (all leds on)
1. Stuck Key test
2. Voltage tests
3. Battery Voltage test (ignored)
4. Analog/Digital Loop test
5. EEPROM test
6. Blower Pressure test
7. Valve test
8. EPROM test
9. RAM test
10. AP test (rotor)

The results of a failed test may be observed with the unit connected to any PC or terminal, or by observation of what test number is shown in the weight display when the service light illuminates.

7.1 Connection of the unit to a PC or terminal to assist in troubleshooting:

Connect unit to computer with interface cable TO-4164 at location J3.

Schematic for the communications cable is shown in the drawings later in this document. (Note: Silkscreen showing polarity (pin 1) at J3 is reversed on pcb assy 30142 rev 1.)

Start communication program on computer. Use Hyperterminal (or an equivalent communications program, such as ProComm) with settings at: 4800

BAUD, 7 data bits, even parity, 2 stop bits, no flow control.

Power up the control unit, and allow completion of the 10 self tests. Press the [CTRL] key and “D” simultaneously to enter the diagnostic/calibration mode.

When using the serial communications connection, the user may select option ‘T’ from the diagnostics menu to view any recorded fault codes. The fault codes are shown in tables 7.1 and 7.2

Additional Troubleshooting Tips:

The collect data option, “U”, at the diagnostic menu (press ‘control-D’ to enter the diagnostic menu), allows additional functional testing to assist in diagnostics. You can monitor pressures and command the blower, valves and APP motor during Collect Data. When Collect Data is selected, the system prints blower and sensor data once per second in the following format:

For the C4000 Output lines look like this:
0 RF. RVo LF. LV. 35 21 27 (mmHg 5.6 3.5 3.6)

For the C5000 Output lines look like this:
0 H. C. Po F. 24 17 21 18 19 (mmHg .0 .1 .0 .2 .2)

See table 7.3A and 7.3B below for interpretation of this data, and table 7.4A and 7.4B for active key commands during this session.

7.2 Main PCB Replacement:

Should it be necessary to replace the main pcb (main control board with microprocessor), the following steps must be taken after to set up the unit for service (these steps require the use of the communications cable, see section 7.1):

1. The EEPROM must be formatted for use. This is done from the diagnostics menu using the command 'R'. The EEPROM must be formatted before the system can store operating variables and set points. The serial number of the unit is also stored in the EEPROM and is entered at the time of formatting.
2. The pressure sensors must be calibrated for the system to operate properly. This is done from the diagnostic menu using the command 'W'. The blower must not be spinning and the mattress must not be attached during the sensor calibration process in order to avoid a false reading.
3. In addition, the unit may also be 'burned-in', or self exercised following significant parts replacement. The 'burn-in' is started from the diagnostic menu using the command 'Z', and entering the desired 'burn-in' in minutes. 24 hours is suggested following main pcb replacement. Note that the system will log a battery fault code during burn-in if a 9V battery is not connected to J2 pin 1+, pin 2-. This fault may be ignored, in lieu of using the battery.



WARNING

- Use only Plexus replacement parts as identified in the parts lists on the assembly drawings. Use of substitute parts could lead to unit malfunction or patient injury.
- Do not connect or disconnect cables from the main control board when power is applied. Doing so could result in damage to the unit.
- Incorrect polarity or other improper connection of the cable from the display to main control board will result in circuit damage.
- Pressure sensors must be calibrated after main control board replacement.

TABLE 7.1 FAULT CODES FOR THE C4000 (controller p/n 30142 rev 1, firmware v1.4)

IF THE FIRST DIGIT OF THE C4000 FAULT WORD IS.....	THEN THE FOLLOWING FAULTS HAVE BEEN RECORDED
0XXX	NONE
1XXX	APP SENS TEST
2XXX	VALVE TEST
3XXX	APP SENS TEST & VALVE TEST
4XXX	KEY TEST
5XXX	KEY TEST & APP SENS TEST
6XXX	KEY TEST & VALVE TEST
7XXX	KEY TEST & VALVE TEST & APP SENS TEST
8XXX	NOT A VALID FAULT CODE
9XXX	NOT A VALID FAULT CODE
AXXX	NOT A VALID FAULT CODE
BXXX	NOT A VALID FAULT CODE
CXXX	NOT A VALID FAULT CODE
DXXX	NOT A VALID FAULT CODE
EXXX	NOT A VALID FAULT CODE
FXXX	NOT A VALID FAULT CODE
IF THE SECOND DIGIT OF THE C4000 FAULT WORD IS.....	THEN THE FOLLOWING FAULTS HAVE BEEN RECORDED
X0XX	NONE
X1XX	BLO TEST
X2XX	ROM TEST
X3XX	ROM TEST & BLO TEST
X4XX	RAM TEST
X5XX	RAM TEST & BLO TEST
X6XX	RAM TEST & ROM TEST
X7XX	RAM TEST & ROM TEST & BLO TEST
X8XX	APP MOTOR TEST
X9XX	APP MOTOR TEST & BLO TEST
XAXX	APP MOTOR TEST & ROM TEST
XBXX	APP MOTOR TEST & ROM TEST & BLO TEST
XCXX	APP MOTOR TEST & RAM TEST
XDXX	APP MOTOR TEST & RAM TEST & BLO TEST
XEXX	APP MOTOR TEST & RAM TEST & ROM TEST
XFXX	APP MOTOR TEST & RAM TEST & ROM TEST & BLO TEST
IF THE THIRD DIGIT OF THE C4000 FAULT WORD IS.....	THEN THE FOLLOWING FAULTS HAVE BEEN RECORDED
XX0X	NONE
XX1X	DISP TEST
XX2X	BAT TEST
XX3X	BAT TEST & DISP TEST
XX4X	ADC TEST
XX5X	ADC TEST & DISP TEST
XX6X	ADC TEST & BAT TEST
XX7X	ADC TEST & BAT TEST & DISP TEST
XX8X	EEPROM TEST

XX9X	EEPROM_TEST & DISP_TEST
XXAX	EEPROM_TEST & BAT_TEST
XXBX	EEPROM_TEST & BAT_TEST & DISP_TEST
XXCX	EEPROM_TEST & ADC_TEST
XXDX	EEPROM_TEST & ADC_TEST & DISP_TEST
XXEX	EEPROM_TEST & ADC_TEST & BAT_TEST
XXFX	EEPROM_TEST & ADC_TEST & BAT_TEST & DISP_TEST
IF THE FOURTH DIGIT OF THE C4000 FAULT WORD IS.....	THEN THE FOLLOWING FAULTS HAVE BEEN RECORDED
XXX0	NONE
XXX1	VOLT_AC_TEST
XXX2	VOLT_15_TEST
XXX3	VOLT_15_TEST & VOLT_AC_TEST
XXX4	VOLT_HOLD_TEST
XXX5	VOLT_HOLD_TEST & VOLT_AC_TEST
XXX6	VOLT_HOLD_TEST & VOLT_15_TEST
XXX7	VOLT_HOLD_TEST & VOLT_15_TEST & VOLT_AC_TEST
XXX8	VOLT_VIN_TEST
XXX9	VOLT_VIN_TEST & VOLT_AC_TEST
XXXA	VOLT_VIN_TEST & VOLT_15_TEST
XXXB	VOLT_VIN_TEST & VOLT_15_TEST & VOLT_AC_TEST
XXXC	VOLT_VIN_TEST & VOLT_HOLD_TEST
XXXD	VOLT_VIN_TEST & VOLT_HOLD_TEST & VOLT_AC_TEST
XXXE	VOLT_VIN_TEST & VOLT_HOLD_TEST & VOLT_15_TEST
XXXF	VOLT_VIN_TEST & VOLT_HOLD_TEST & VOLT_15_TEST & VOLT_AC_TEST

TABLE 7.2 FAULT CODES FOR THE C5000 (controller p/n 30142 rev 1, firmware v2.1.4)

IF THE C5000 LISTS THE FOLLOWING FAULT CODE...	THEN THE FOLLOWING FAULT HAS BEEN RECORDED
Ky	KEY_TEST
So	VALVE_TEST
Ra	RAM_TEST
Ro	ROM_TEST
Bl	BLO_TEST
Ee	EEPROM_TEST
Ad	ADC_TEST
Ba	BAT_TEST
Di	DISP_TEST
Vi	VOLT_VIN_TEST
Vh	VOLT_HOLD_TEST
Vd	VOLT_15_TEST
Va	VOLT_AC_TEST

TABLE 7.3A C4000 INTERPRETATION OF ‘COLLECT DATA’ MODE:

Column #	Meanings of output line columns:
1	Blower command level (0..255)
2	Right Fill Solenoid State (J13.1,2) (.=closed o=open)
3	Right Vent Solenoid State (J13.3,4) (.=closed o=open)
4	Left Fill Solenoid State (J13.5,6) (.=closed o=open)
5	Left Vent Solenoid State (J13.7,8) (.=closed o=open)
6	Raw Blower Pressure Sensor (U25) (0..255)
7	Raw Right Bladder Sensor (U26) (0..255)
8	Raw Left Bladder Sensor (U27) (0..255)
9	Blower Pressure in mmHg (filtered and adjusted with sensor calibration)
10	Right Bladder Pressure in mmHg (filtered and adjusted with sensor calibration)
11	Left Bladder Pressure in mmHg (filtered and adjusted with sensor calibration)

TABLE 7.3B C5000 INTERPRETATION OF ‘COLLECT DATA’ MODE:

Column #	Meanings of output line columns:
1	Blower command level (0..255)
2	Head Zone Solenoid State (J13.3,4) (.=closed o=open)
3	Chest Zone Solenoid State (J13.7,8)
4	Pelvic Zone Solenoid State (J13.5,6)
5	Foot Zone Solenoid State (J13.1,2)
6	Raw Blower Pressure Sensor (U25) (0..255)
7	Raw Head Zone Sensor (U22) (0..255)
8	Raw Chest Zone Sensor (U23) (0..255)
9	Raw Pelvic Zone Sensor (U24) (0..255)
10	Raw Foot Zone Sensor (U25) (0..255)
11	Blower Pressure in mmHg (filtered and adjusted with sensor calibration)
12	Head Zone Pressure in mmHg (filtered and adjusted with sensor calibration)
13	Chest Zone Pressure in mmHg (filtered and adjusted with sensor calibration)
14	Pelvic Zone Pressure in mmHg (filtered and adjusted with sensor calibration)
15	Foot Zone Pressure in mmHg (filtered and adjusted with sensor calibration)

TABLE 7.4A C4000 KEY COMMANDS ACTIVE DURING COLLECT DATA SESSION:

Key	Action
0	Blower speed = 0 DAC units, control voltage = 0
1	Blower speed = 50 DAC units, control voltage = 1.96v
2	Blower speed = 60 DAC units, control voltage = 2.35v
3	Blower speed = 80 DAC units, control voltage = 3.14v
4	Blower speed = 100 DAC units, control voltage = 3.92v
5	Blower speed = 120 DAC units, control voltage = 4.71v
6	Blower speed = 140 DAC units, control voltage = 5.49v
7	Blower speed = 160 DAC units, control voltage = 6.27v
8	Blower speed = 180 DAC units, control voltage = 7.06v
9	Blower speed = 250 DAC units, control voltage = 9.80v
,	Decrement blower speed by 1 DAC unit, control voltage by 39mV
<	Decrement blower speed by 1 DAC unit, control voltage by 39mV
.	Increment blower speed by 1 DAC unit, control voltage by 39mV
>	Increment blower speed by 1 DAC unit, control voltage by 39mV

a	Command APP motor to seek upper position
s	Command APP motor to seek center position
d	Command APP motor to seek lower position
A	Command APP motor to run CCW continuously (don't monitor APP sensors)
S	Command APP motor to stop (don't monitor APP sensors)
D	Command APP motor to run CW continuously (don't monitor APP sensors)
L	Open left fill valve (and close left vent valve if Auto-Close mode set)
^l (control-L)	Open left vent valve
l	Close left fill and vent valves
R	Open right fill valve (and close right vent valve if Auto-Close mode set)
^r (control-R)	Open right vent valve
r	Close right fill and vent valves
B	Open both fill valves (and close vent valves if Auto-Close mode set)
^b	Open both vent valves
b	Close all valves
n	Disable vent auto-close mode, prevents simultaneous fill and vent
x	Set vent auto-close mode, allows simultaneous fill and vent
P	enable periodic bladder sampling
p	cancel periodic bladder sampling
ESC	exit Collect Data
Enter	exit Collect Data

TABLE 7.4B C5000 KEY COMMANDS ACTIVE DURING COLLECT DATA SESSION:

Key	Action
0	Blower speed = 0 DAC units, control voltage = 0
1	Blower speed = 50 DAC units, control voltage = 1.96v
2	Blower speed = 60 DAC units, control voltage = 2.35v
3	Blower speed = 80 DAC units, control voltage = 3.14v
4	Blower speed = 100 DAC units, control voltage = 3.92v
5	Blower speed = 120 DAC units, control voltage = 4.71v
6	Blower speed = 140 DAC units, control voltage = 5.49v
7	Blower speed = 160 DAC units, control voltage = 6.27v
8	Blower speed = 180 DAC units, control voltage = 7.06v
9	Blower speed = 250 DAC units, control voltage = 9.80v
,	Decrement blower speed by 1 DAC unit, control voltage by 39mV
<	Decrement blower speed by 1 DAC unit, control voltage by 39mV
.	Increment blower speed by 1 DAC unit, control voltage by 39mV
>	Increment blower speed by 1 DAC unit, control voltage by 39mV
A	Open Head Zone solenoid
S	Open Chest Zone solenoid
D	Open Pelvis Zone solenoid
F	Open Foot Zone solenoid
G	Open all solenoids
a	Close Head Zone solenoid
s	Close Chest Zone solenoid
d	Close Pelvis Zone solenoid
f	Close Foot Zone solenoid
g	Close all solenoids
P	enable periodic zone sampling
p	cancel periodic zone sampling

ESC	exit Collect Data
Enter	exit Collect Data

Figure 7.1- Troubleshooting Chart – *No Power-Up, No Processor Activity*

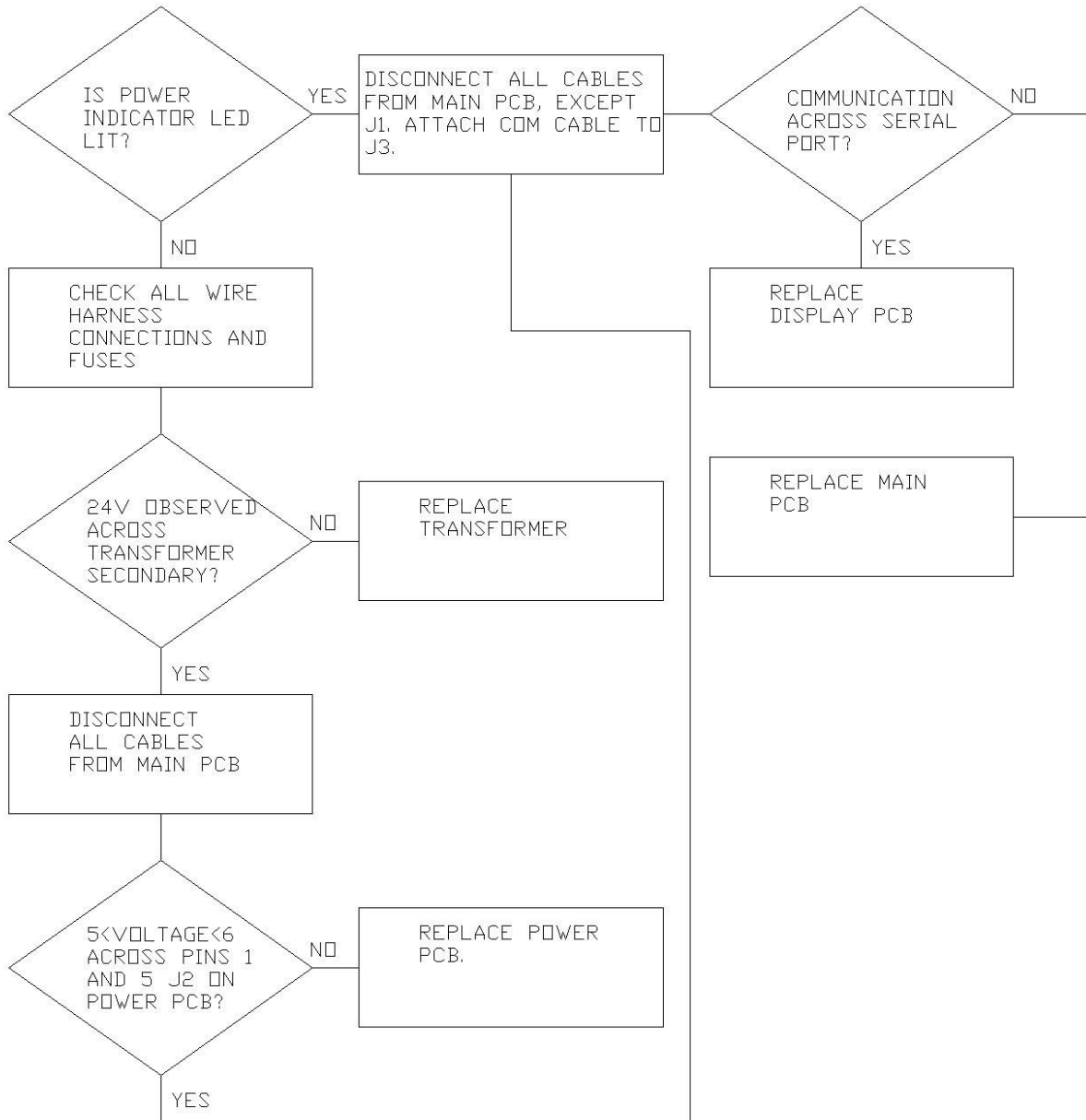


Figure 7.2 - Troubleshooting Chart – *POST Test 0 (DISPLAY TEST)*

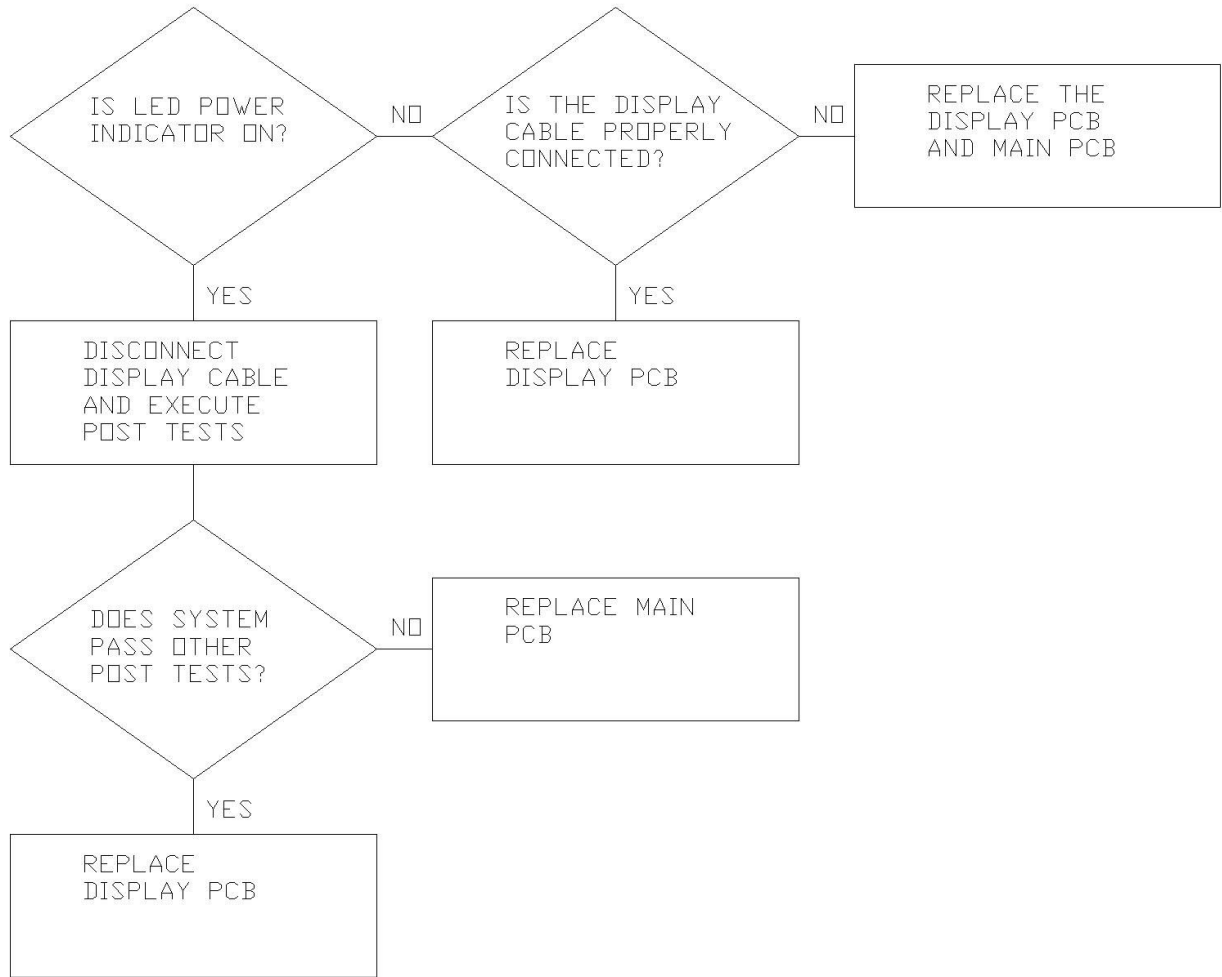


Figure 7.3 - Troubleshooting Chart – *POST Test 1 (STUCK KEY TEST)*

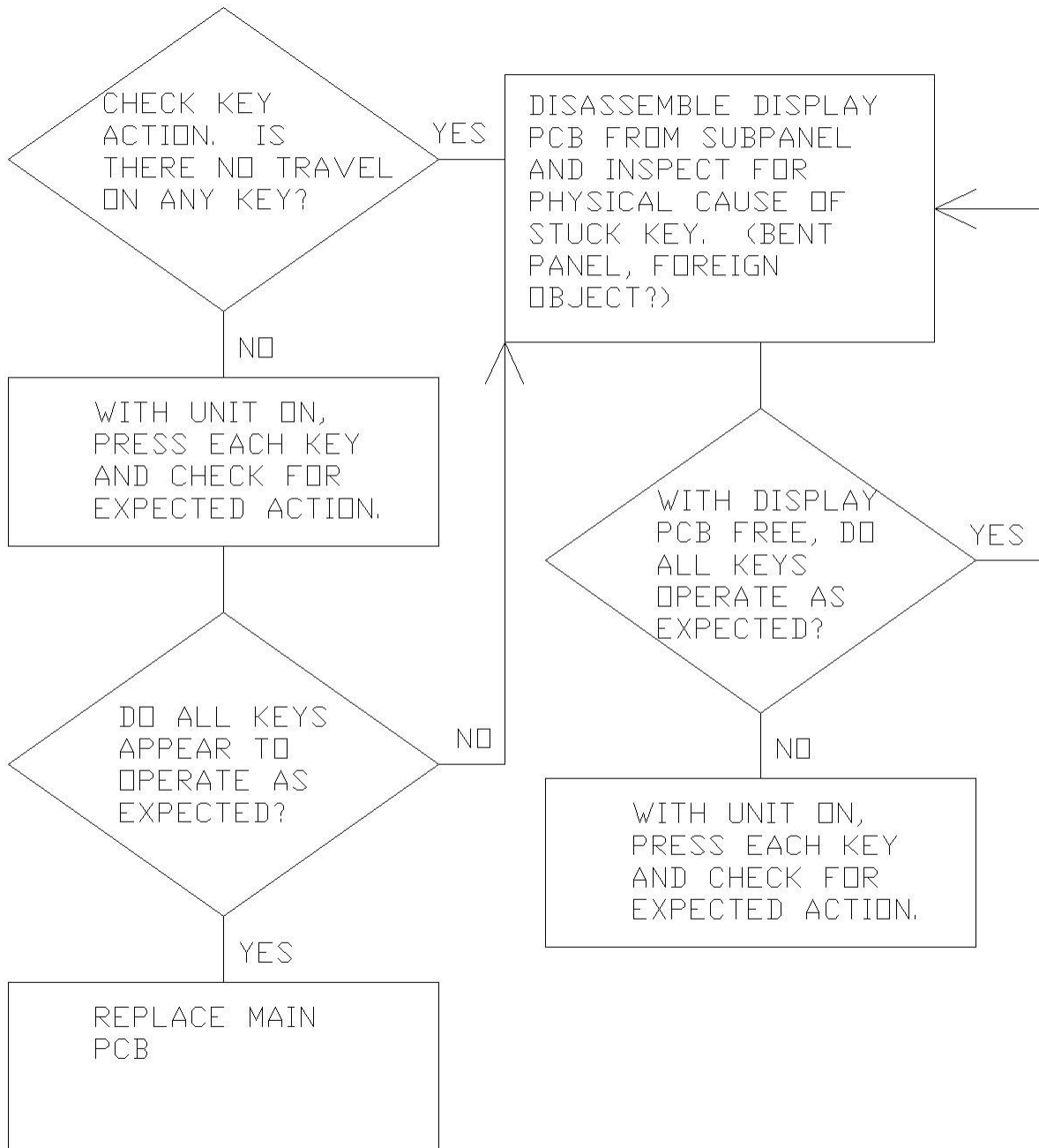


Figure 7.4 - Troubleshooting Chart – *POST Test 2 (VOLTAGE TESTS)*

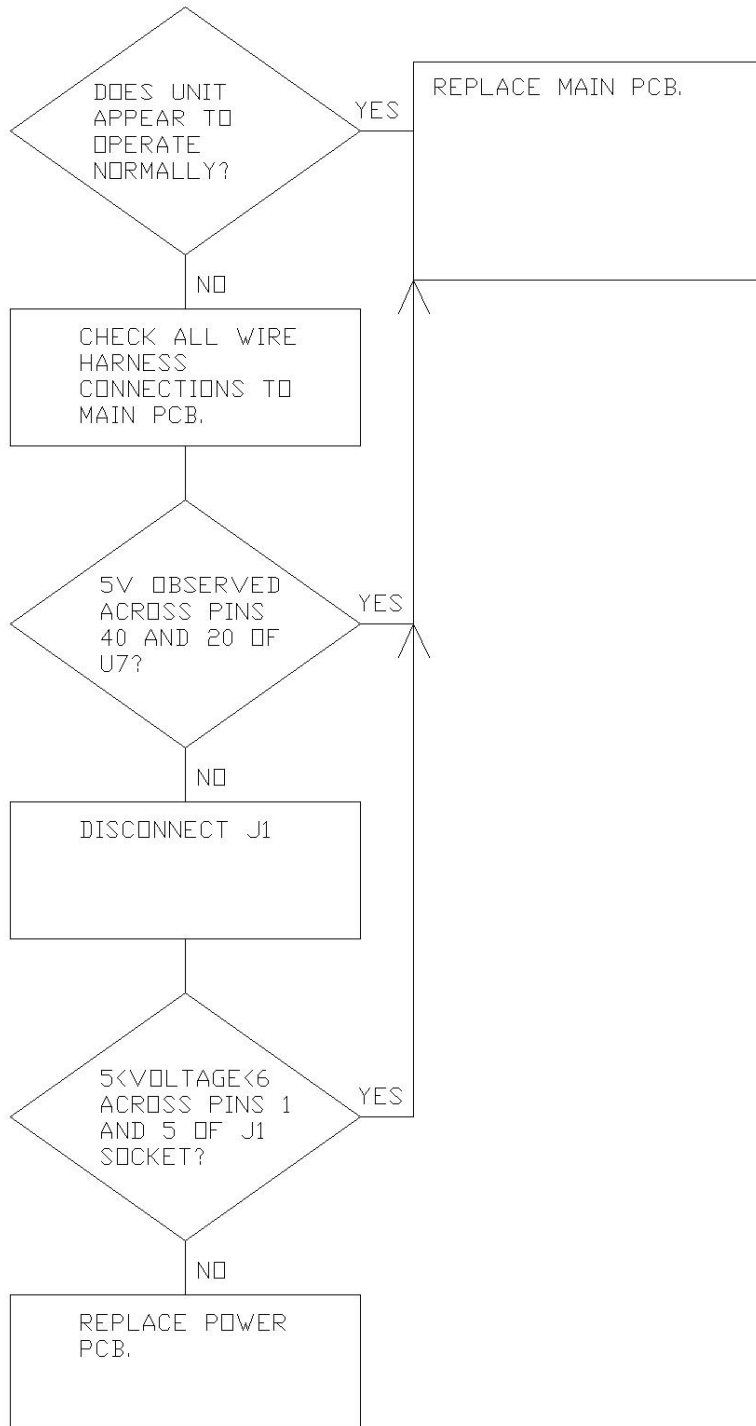


Figure 7.5 - Troubleshooting Chart – *POST Test 3 (BATTERY TEST)*

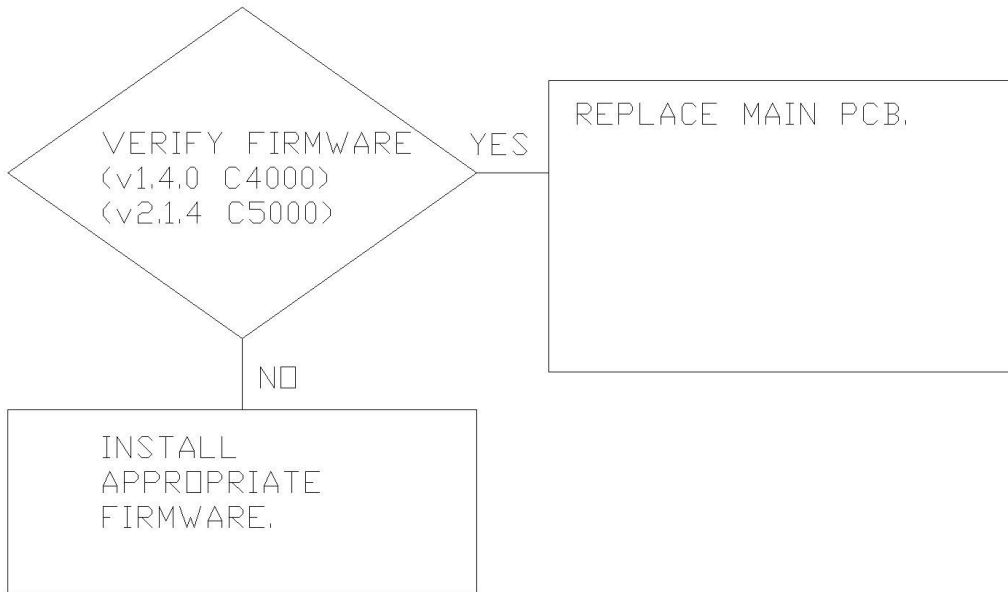


Figure 7.6 - Troubleshooting Chart – *POST Test 4 (ADC/DAC TEST)*

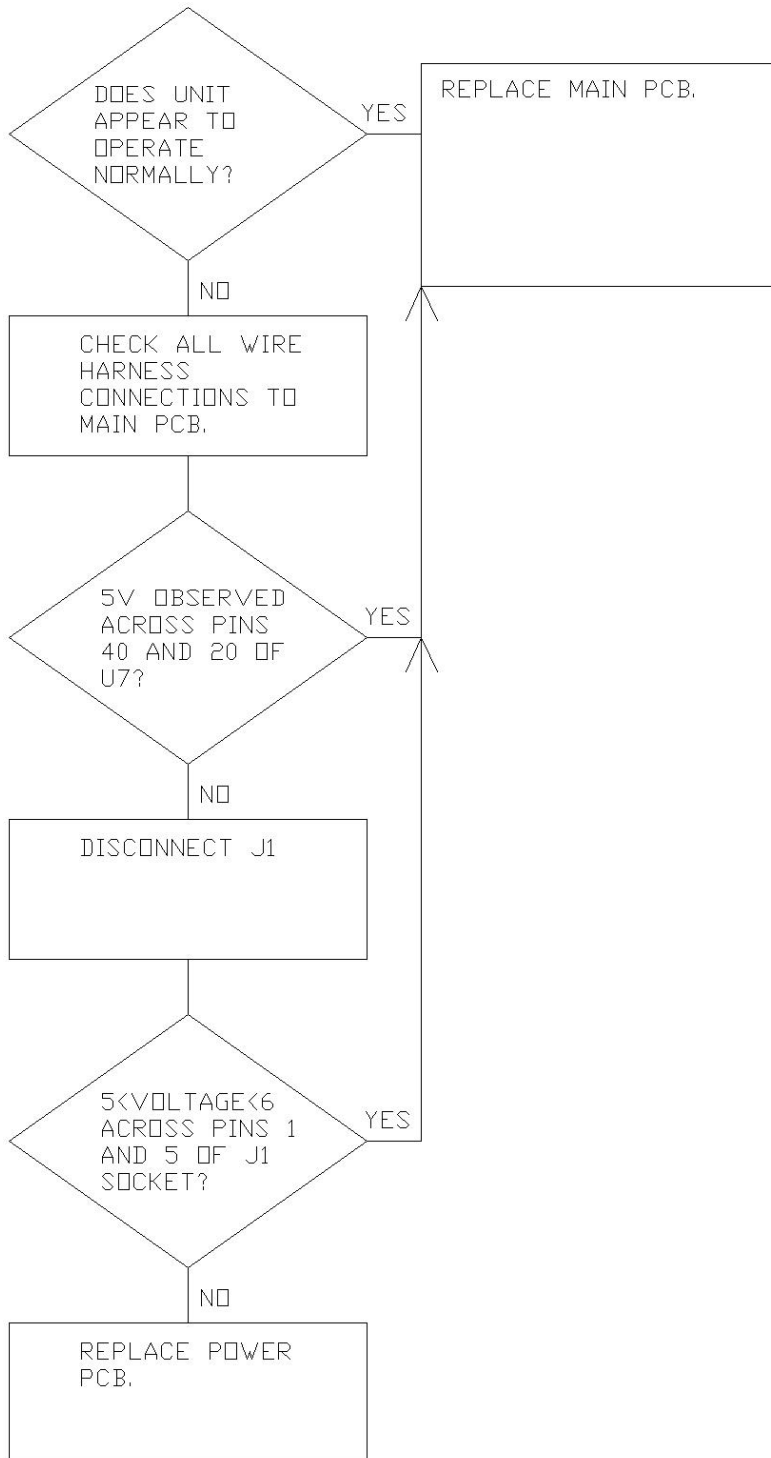


Figure 7.7 - Troubleshooting Chart – *POST Test 5 (EEPROM TEST)*

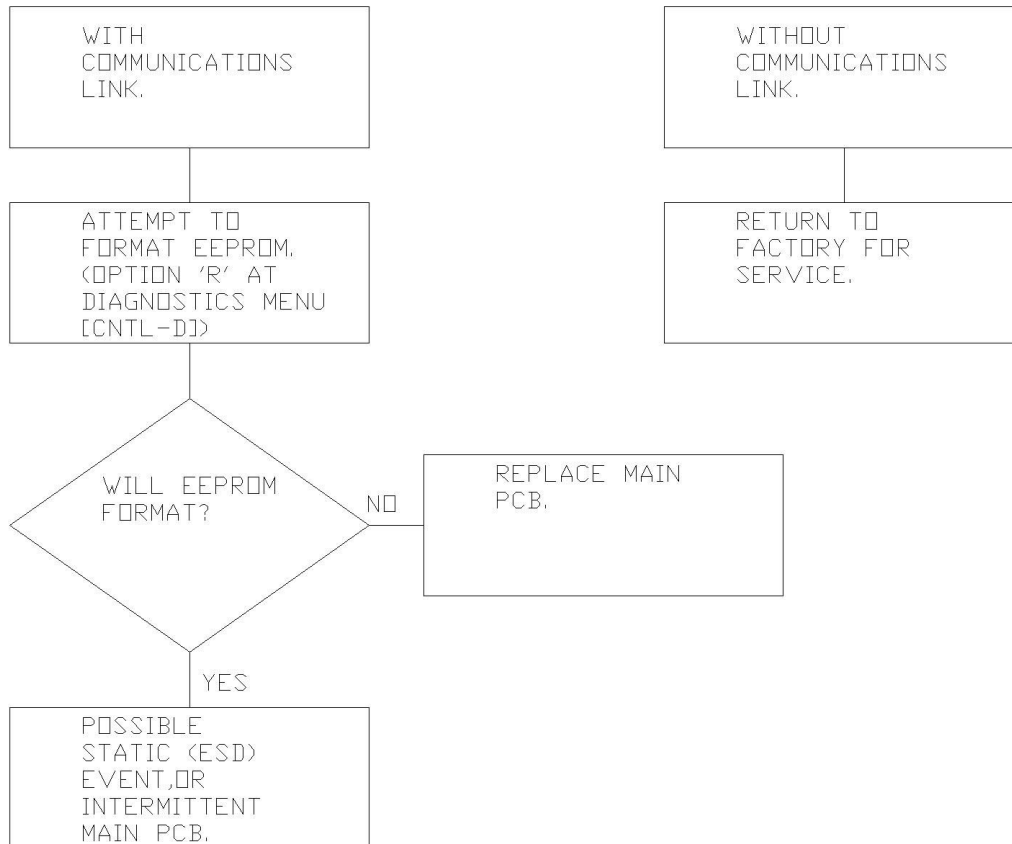


Figure 7.8 - Troubleshooting Chart – *POST Test 6 (BLOWER TEST)*

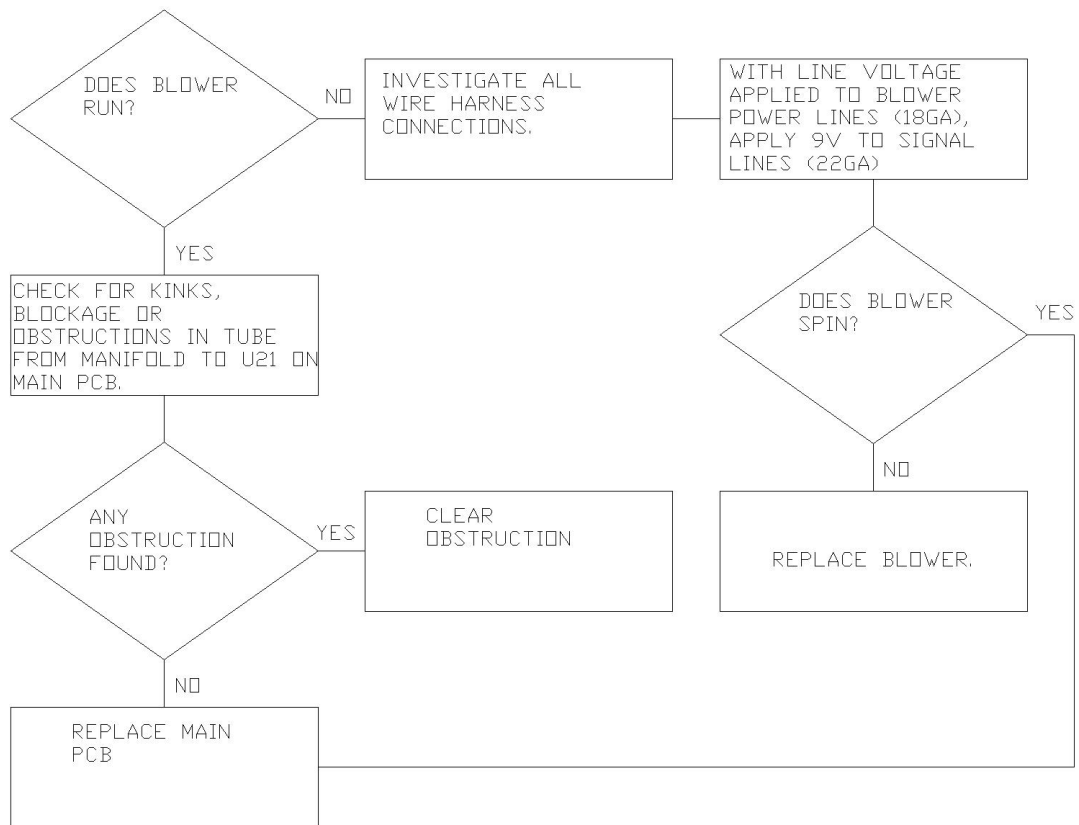


Figure 7.9 - Troubleshooting Chart – *POST Test 7 (VALVE TEST)*

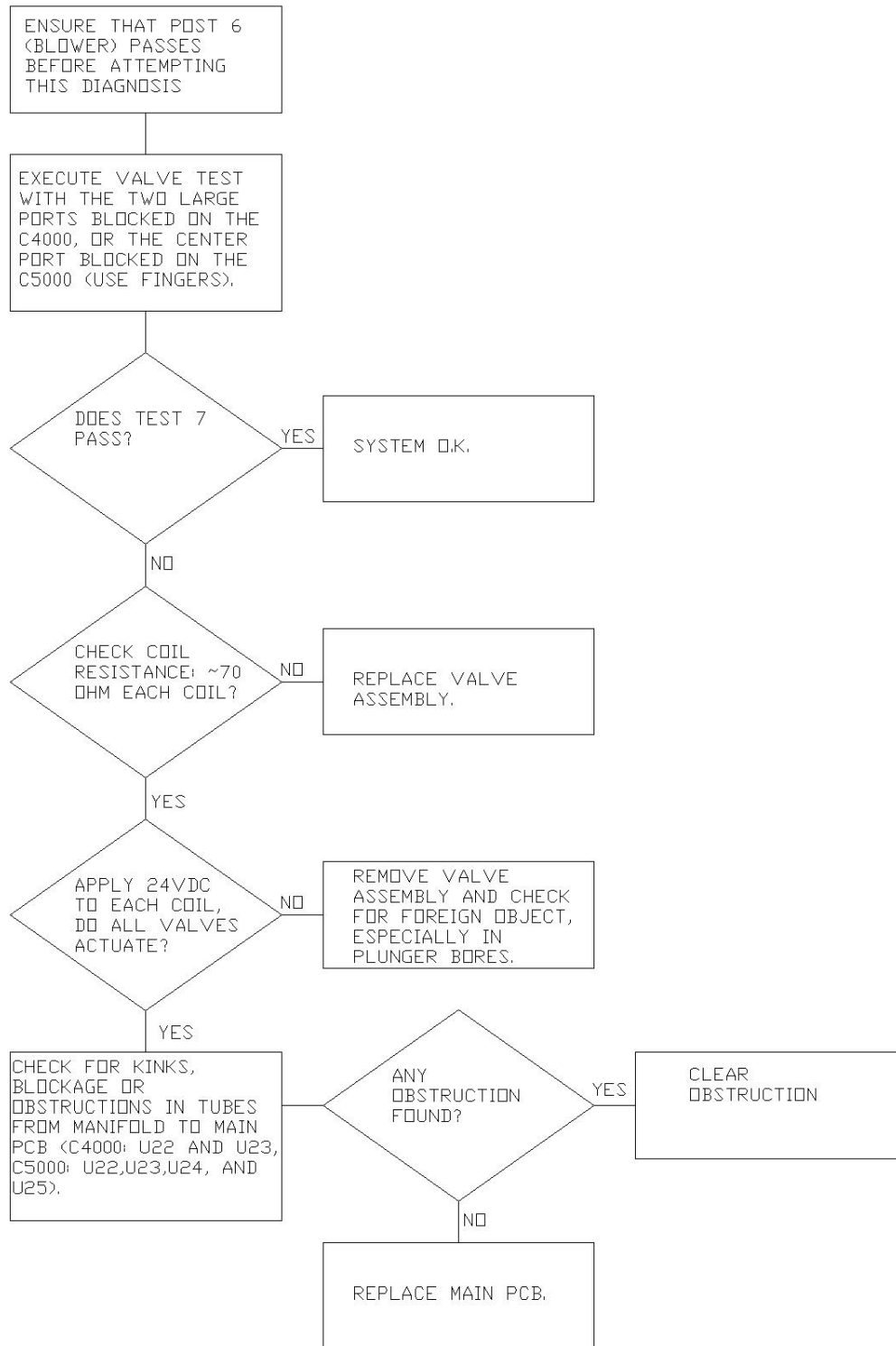


Figure 7.10 - Troubleshooting Chart – *POST Test 8 (EPROM TEST)*

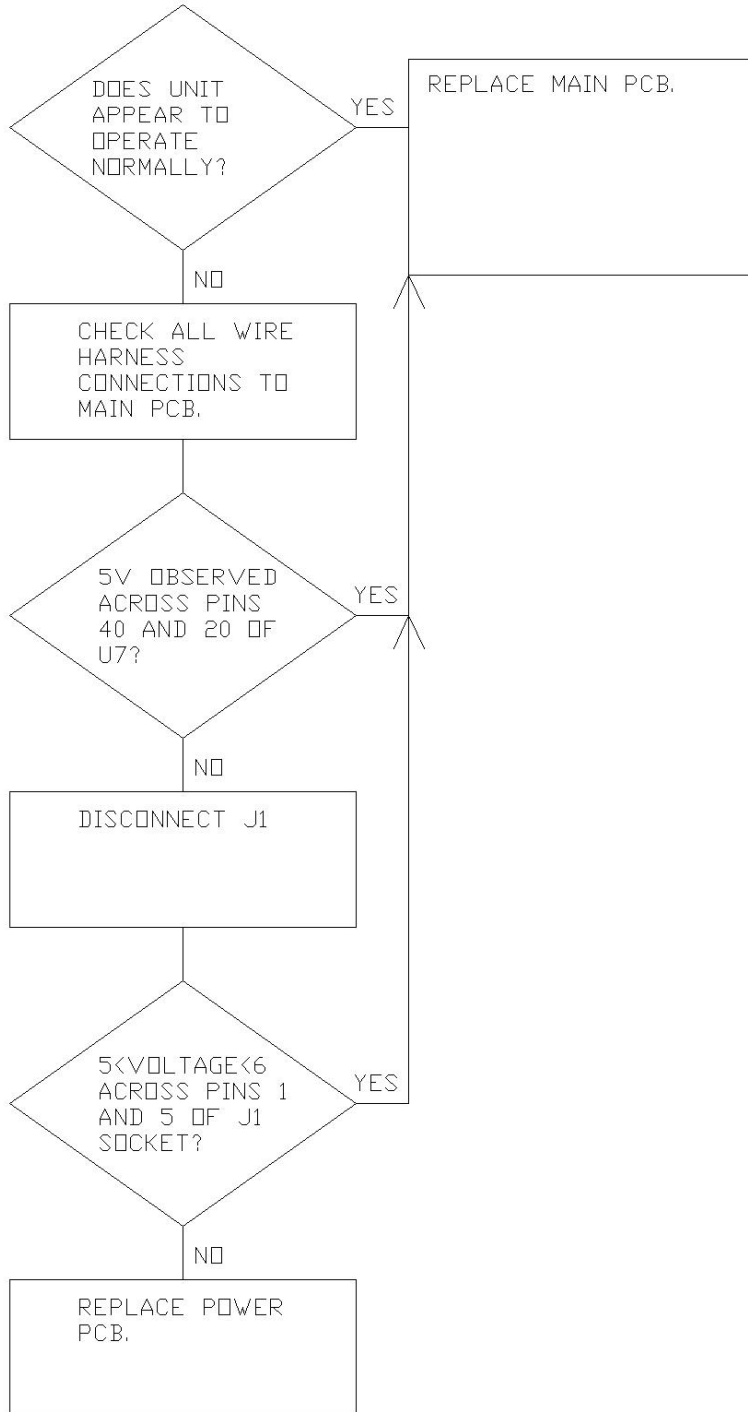


Figure 7.11 - Troubleshooting Chart – *POST Test 9 (RAM TEST)*

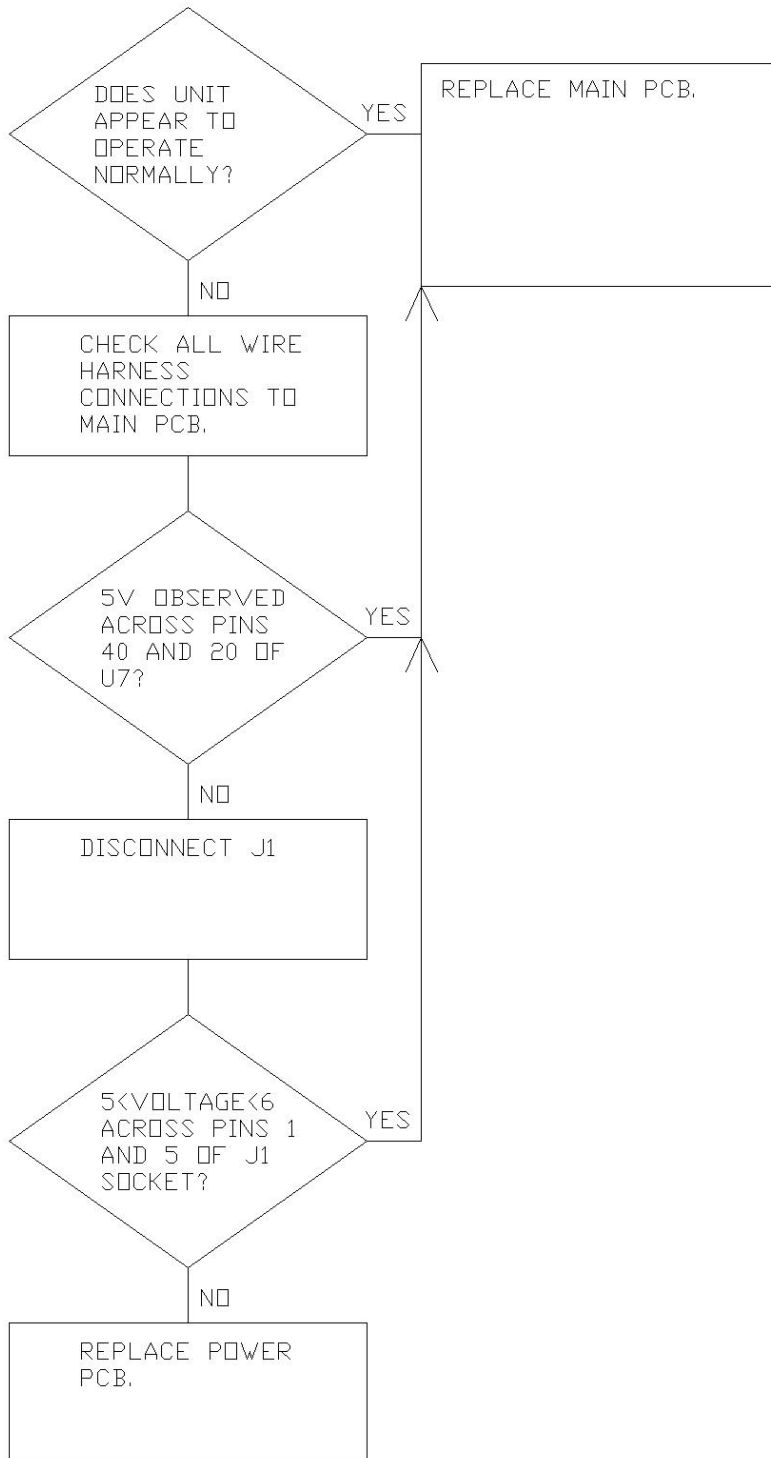


Figure 7.12 - Troubleshooting Chart – *POST Test 10 (AP TEST)*

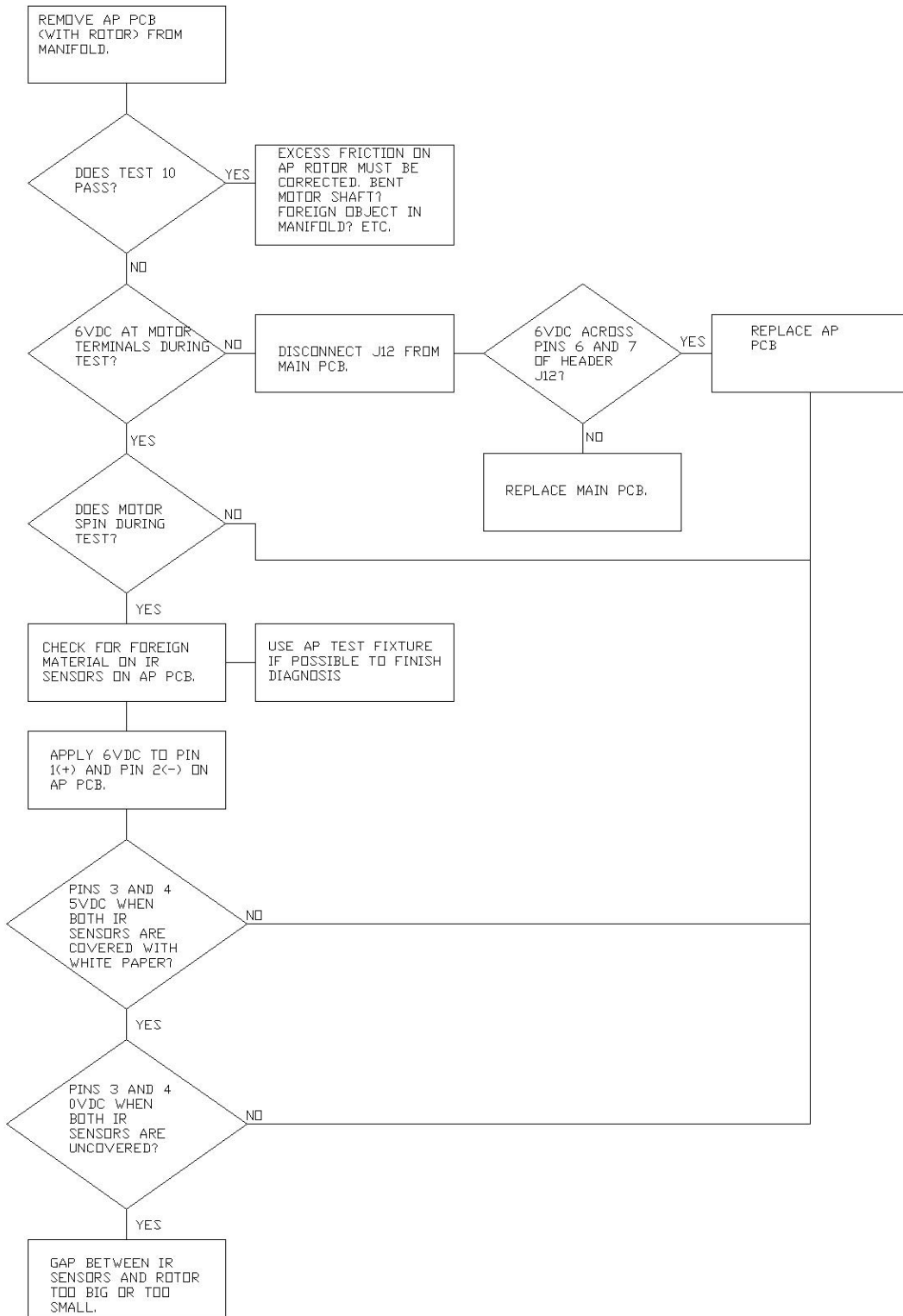


Figure 8.1 – Assembly Drawing/Parts List – C4000 REAR ENCLOSURE page 1 of 4

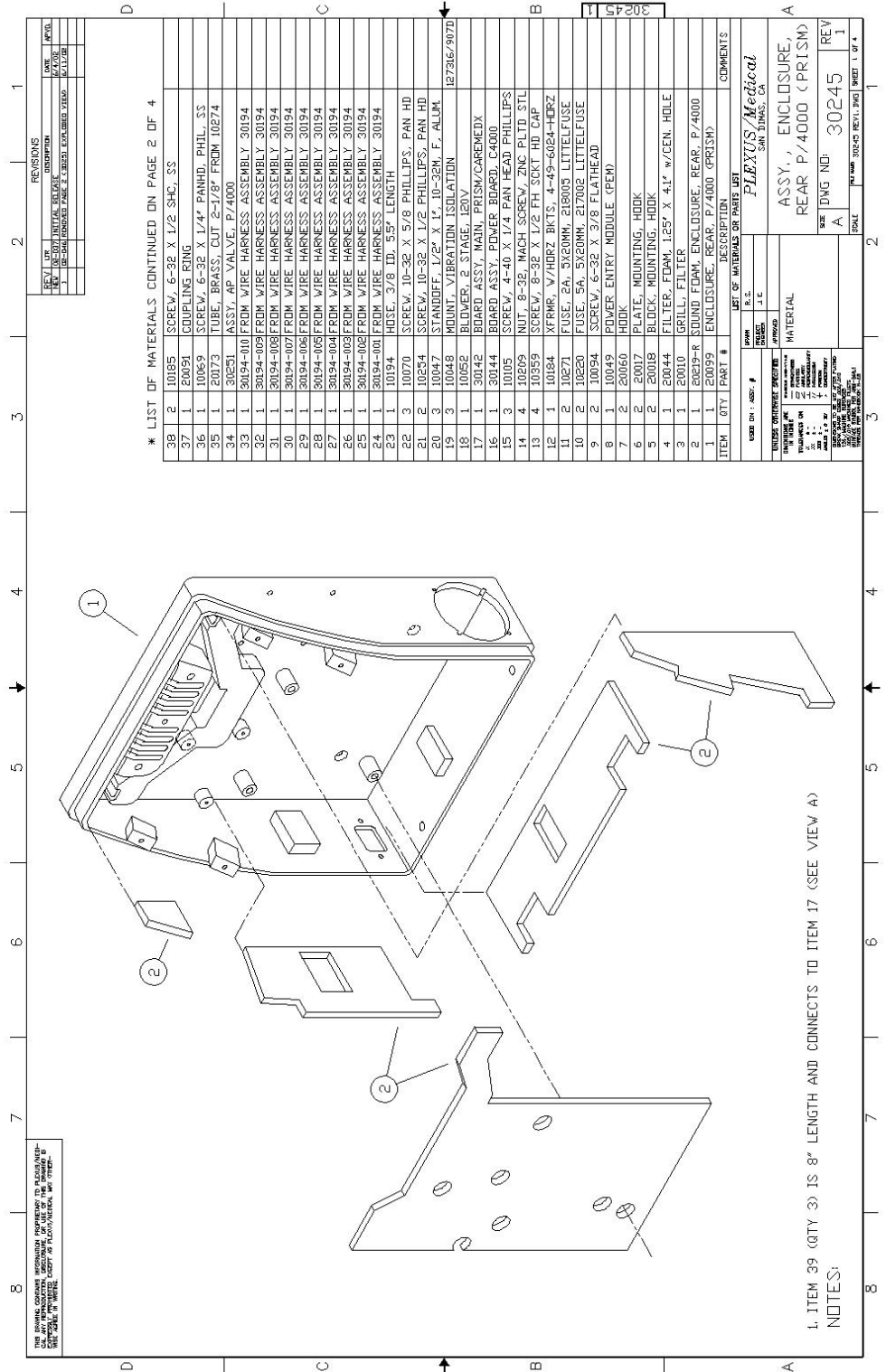


Figure 8.2 – Assembly Drawing/Parts List – C4000 REAR ENCLOSURE page 2 of 4

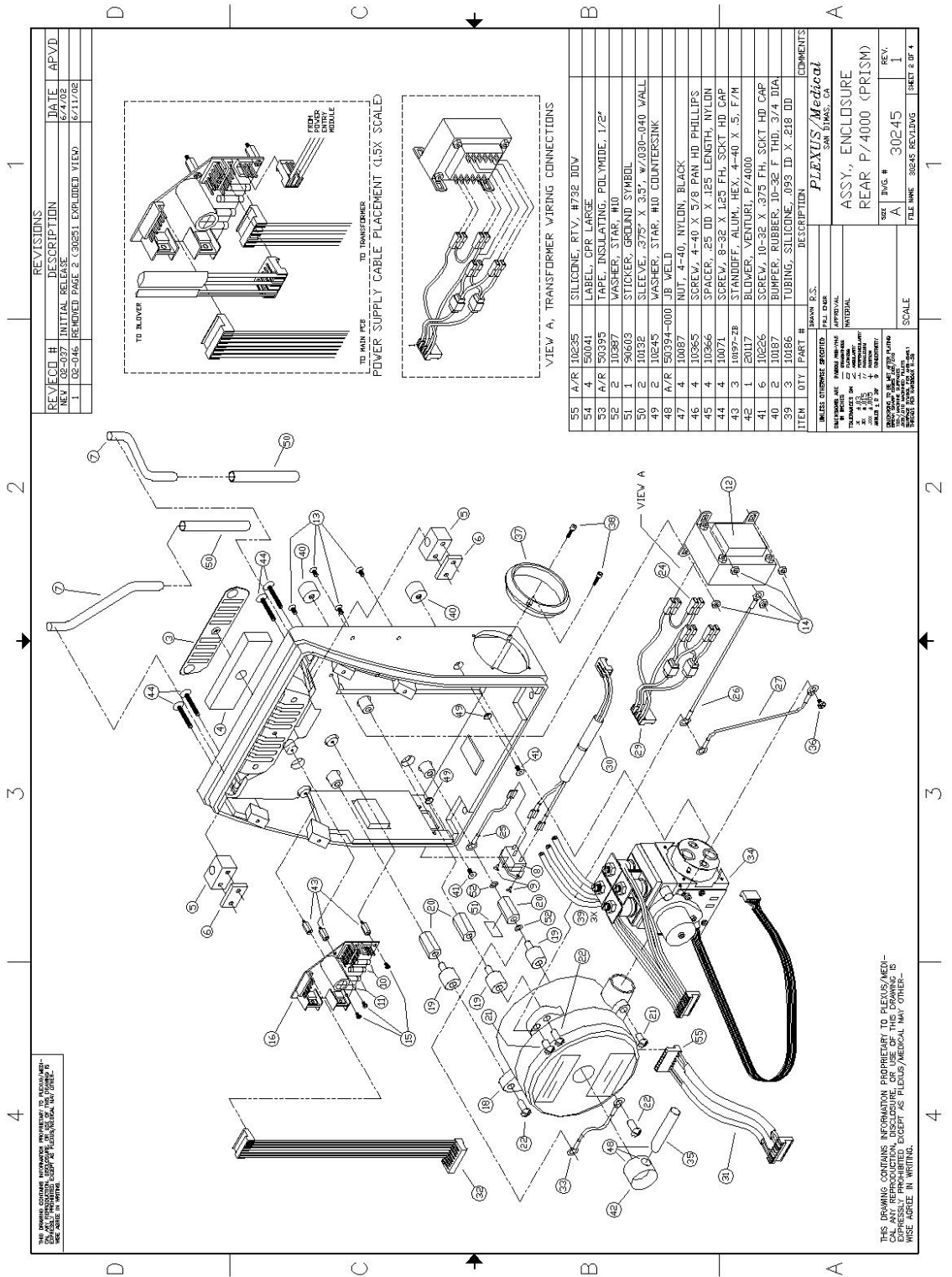


Figure 8.4 – Assembly Drawing/Parts List – C4000 REAR ENCLOSURE page 4 of 4

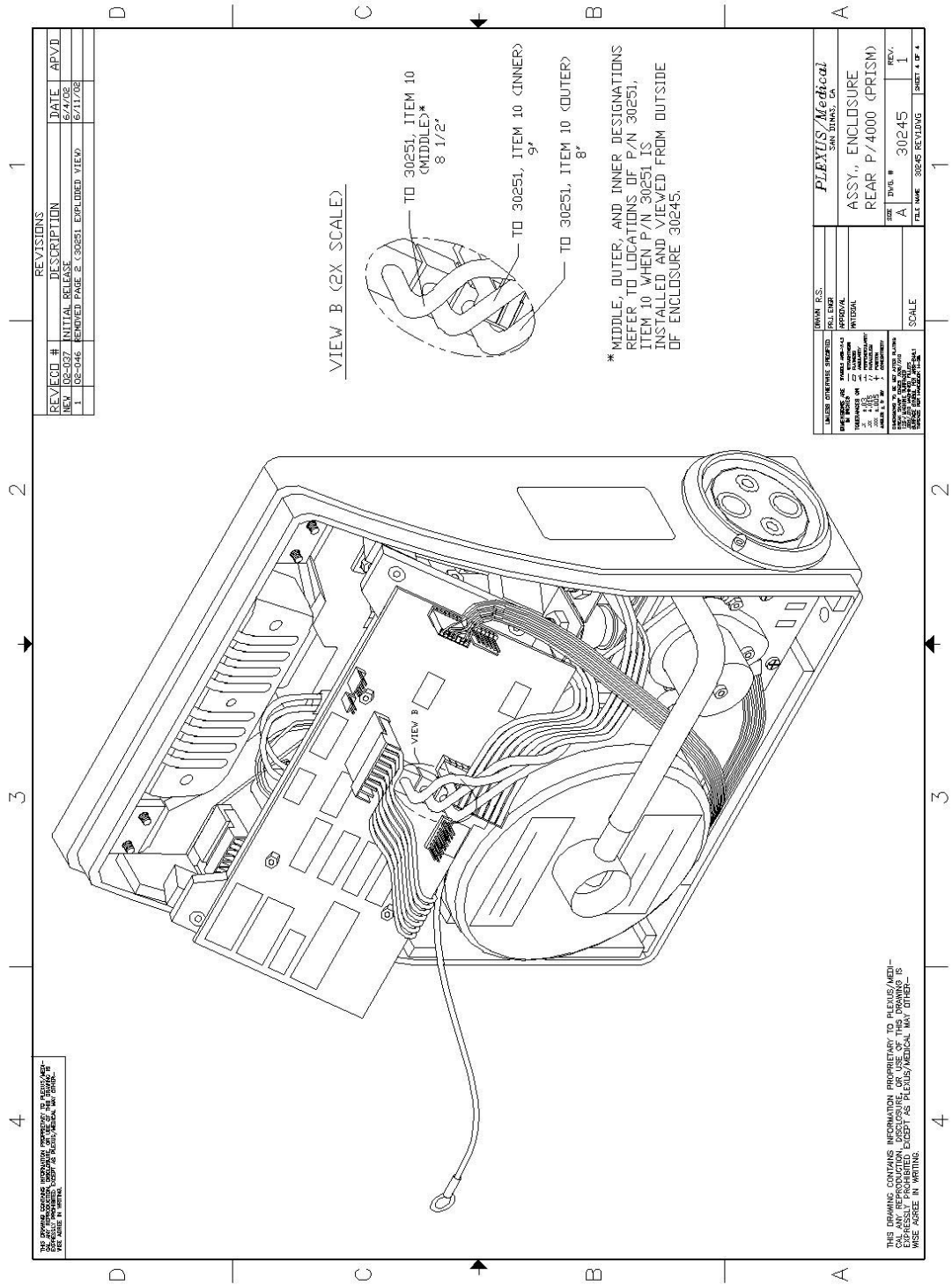


Figure 8.5 – Assembly Drawing/Parts List – C4000 FRONT ENCLOSURE page 1 of 5

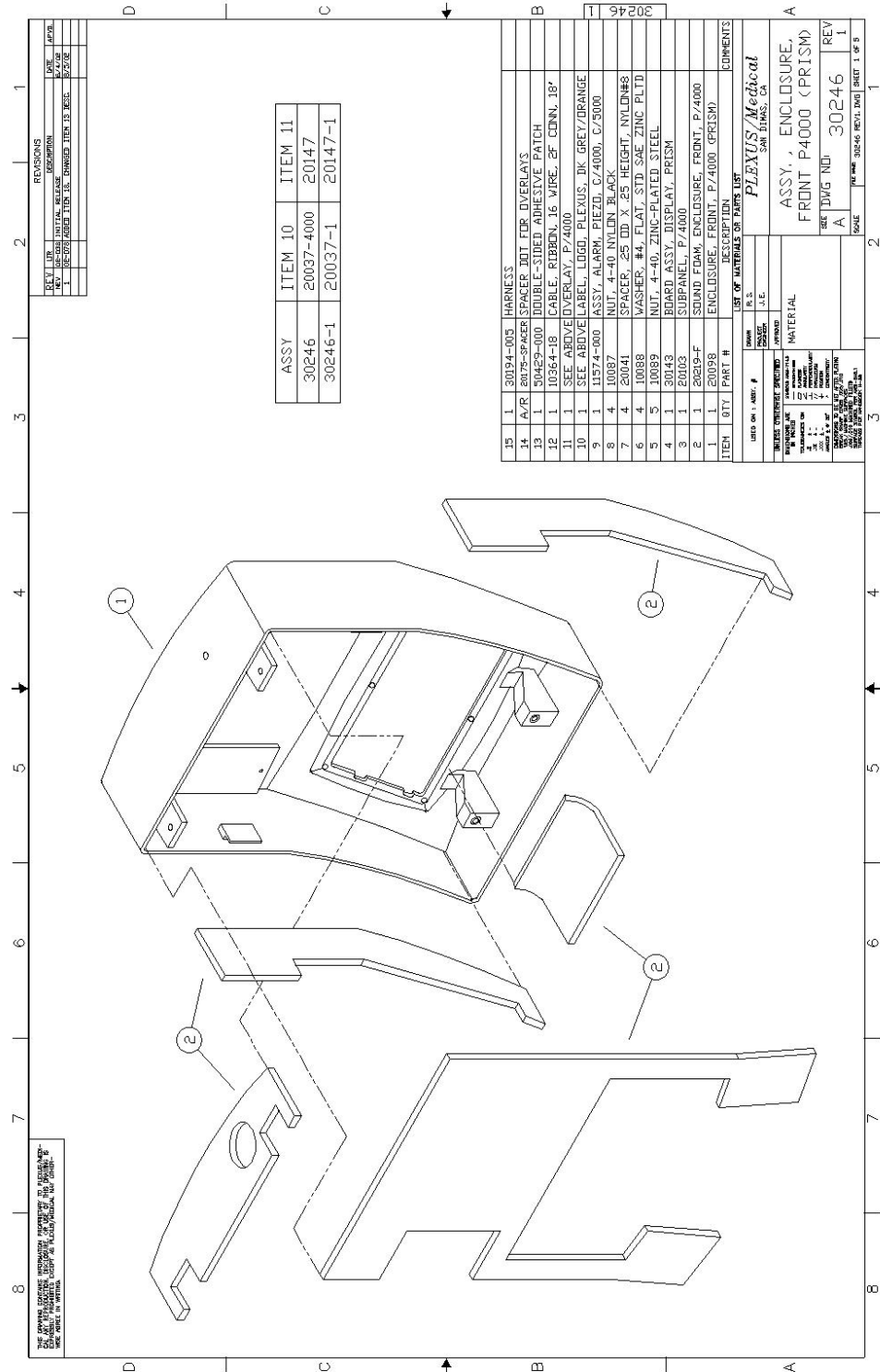


Figure 8.6 – Assembly Drawing/Parts List – C4000 FRONT ENCLOSURE page 2 of 5

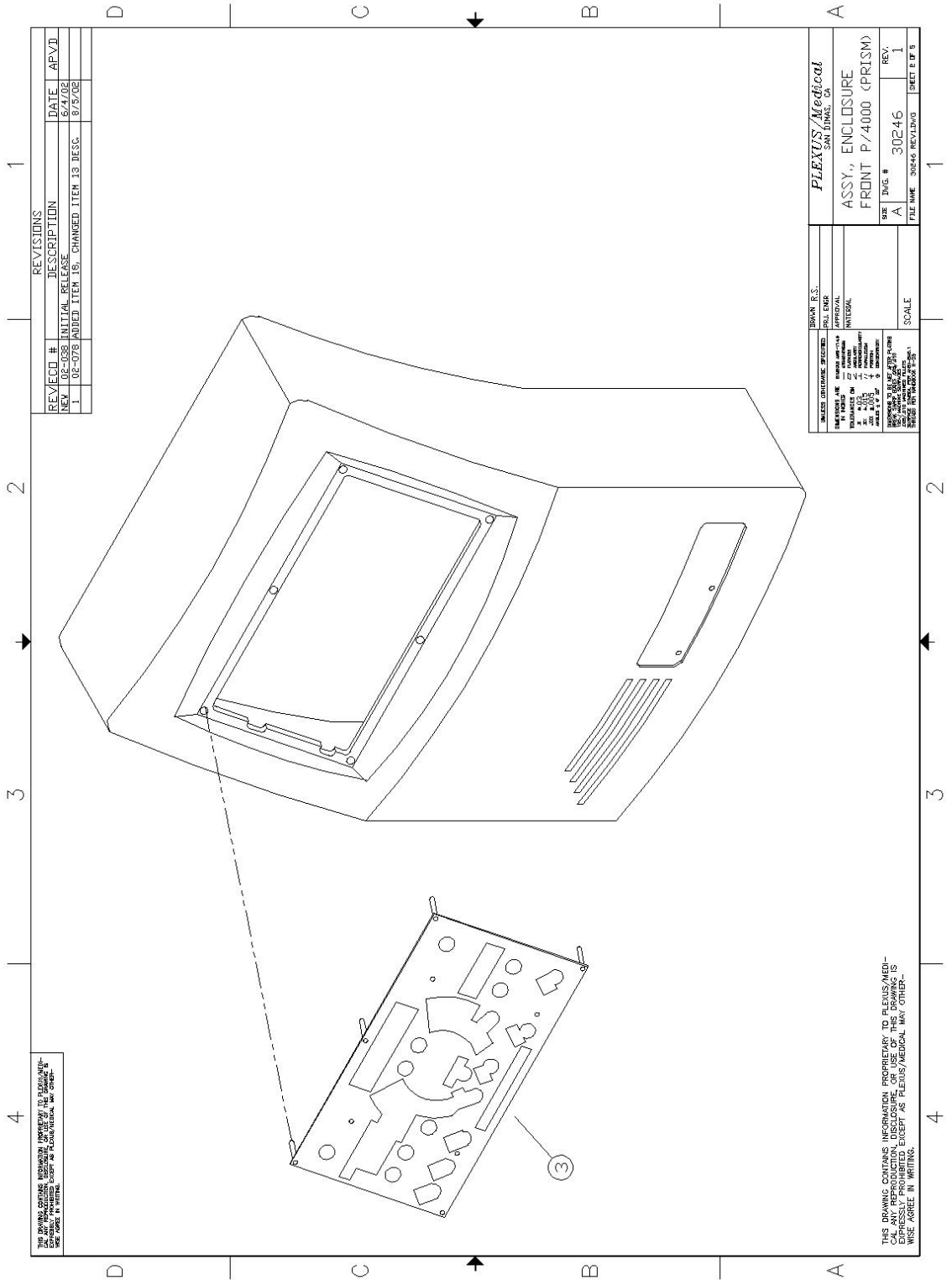


Figure 8.8– Assembly Drawing/Parts List – C4000 FRONT ENCLOSURE page 4 of 5

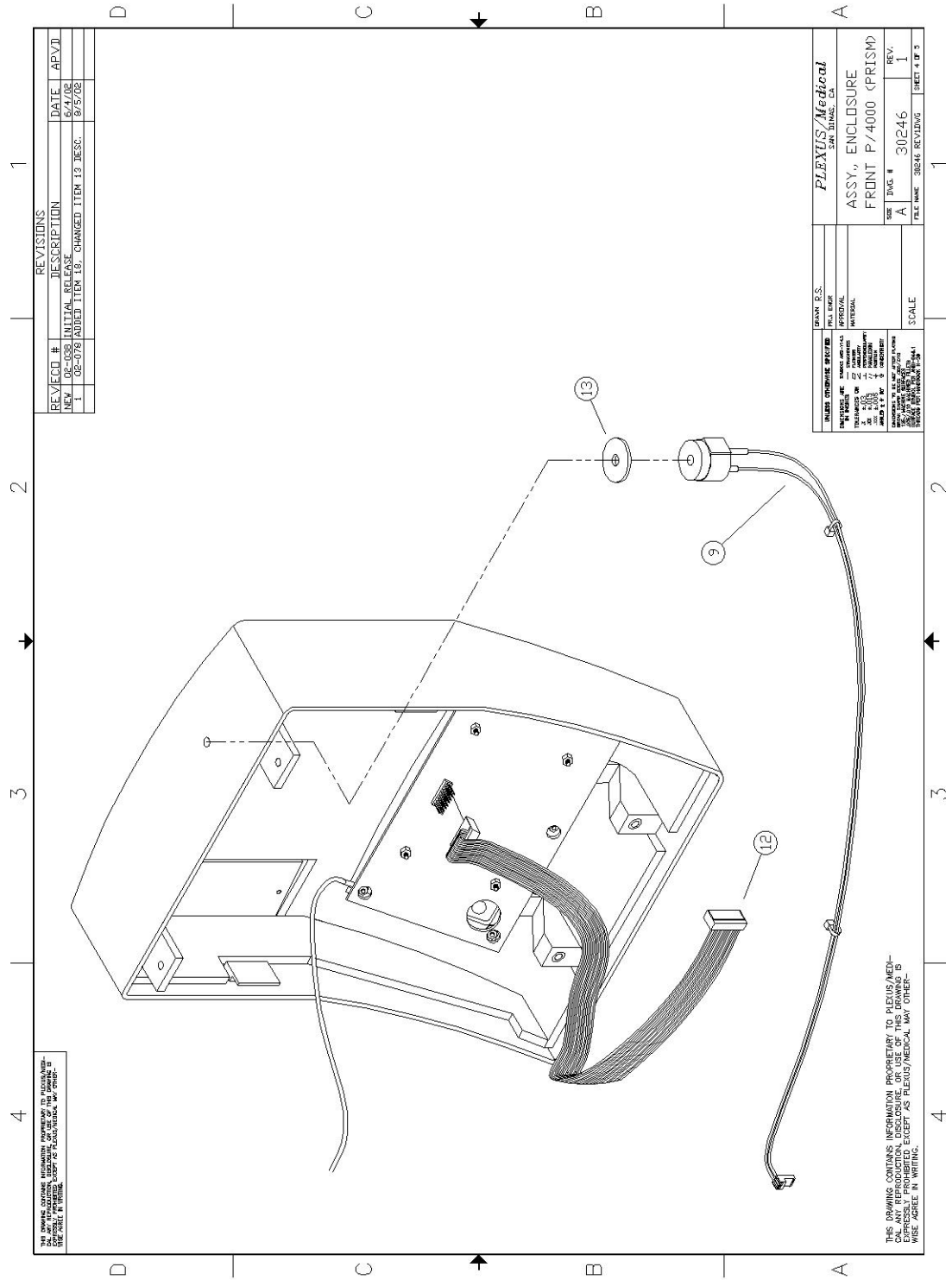


Figure 8.9 – Assembly Drawing/Parts List – C4000 FRONT ENCLOSURE page 5 of 5

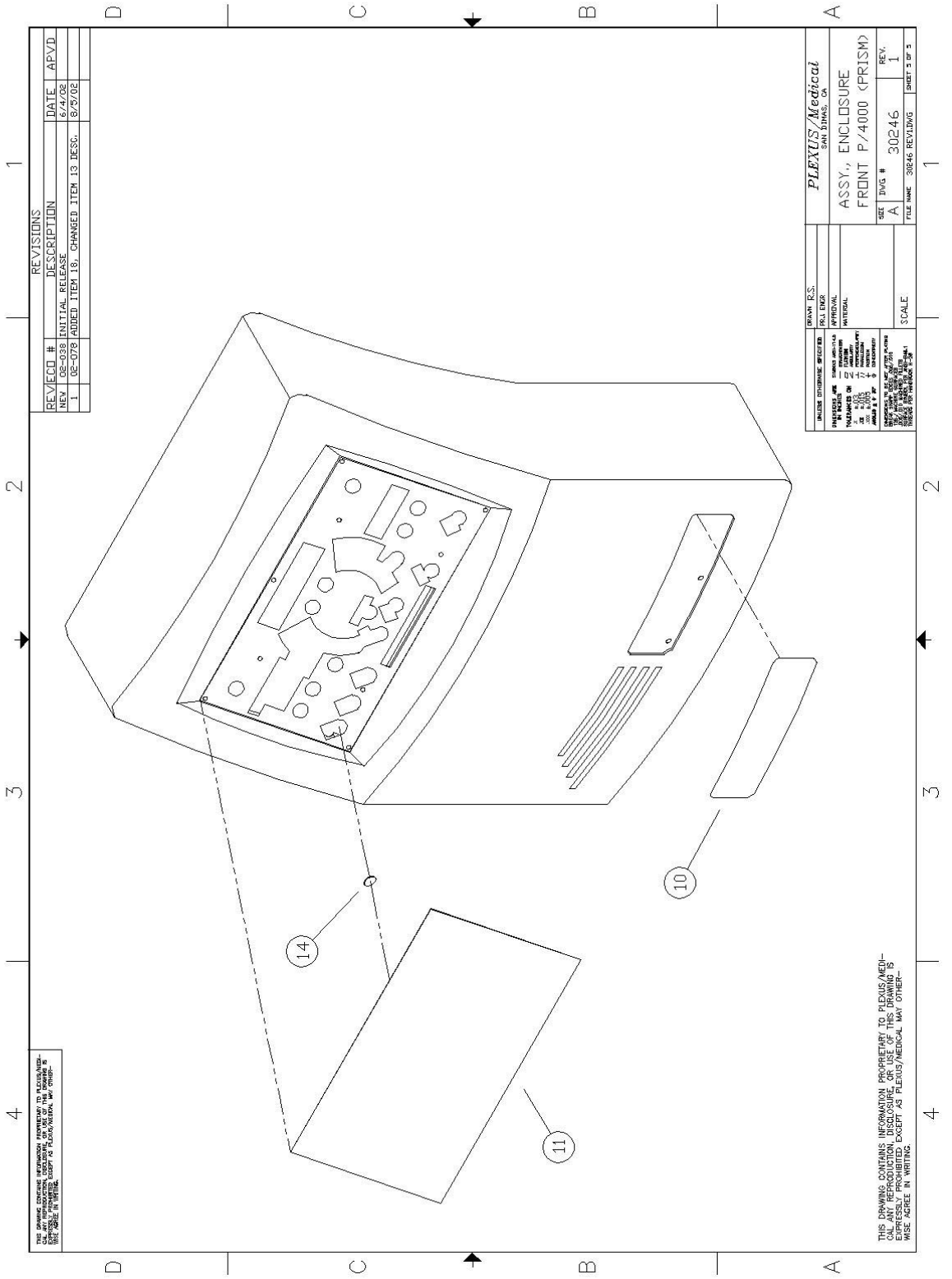


Figure 8.11 – Assembly Drawing/Parts List – C5000 REAR ENCLOSURE page 2 of 4

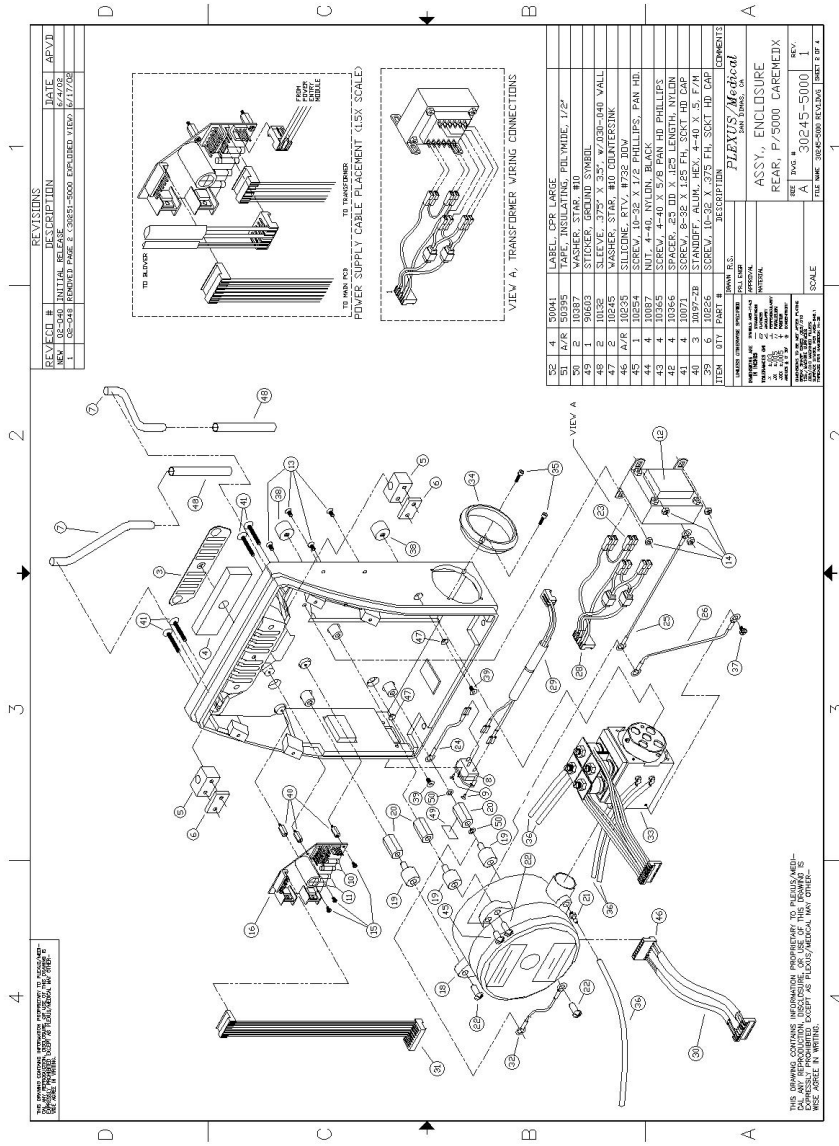


Figure 8.12 – Assembly Drawing/Parts List – C5000 REAR ENCLOSURE page 3 of 4

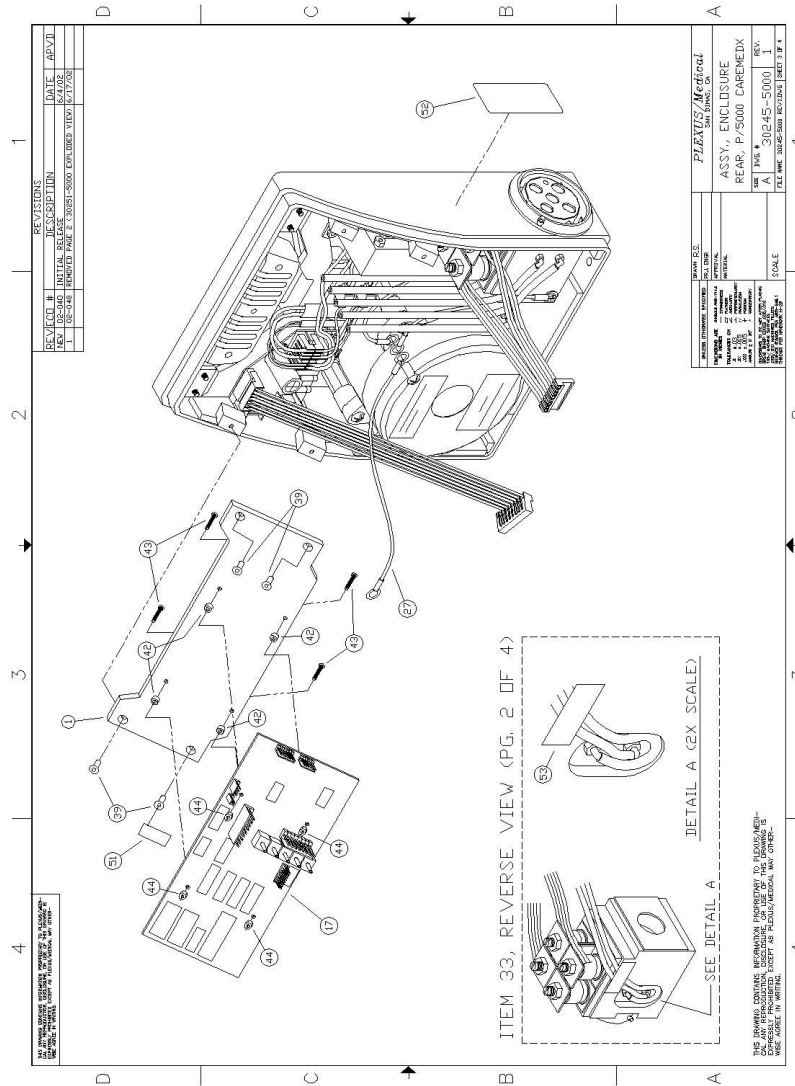


Figure 8.15 – Assembly Drawing/Parts List–C5000 FRONT ENCLOSURE page 2 of 5

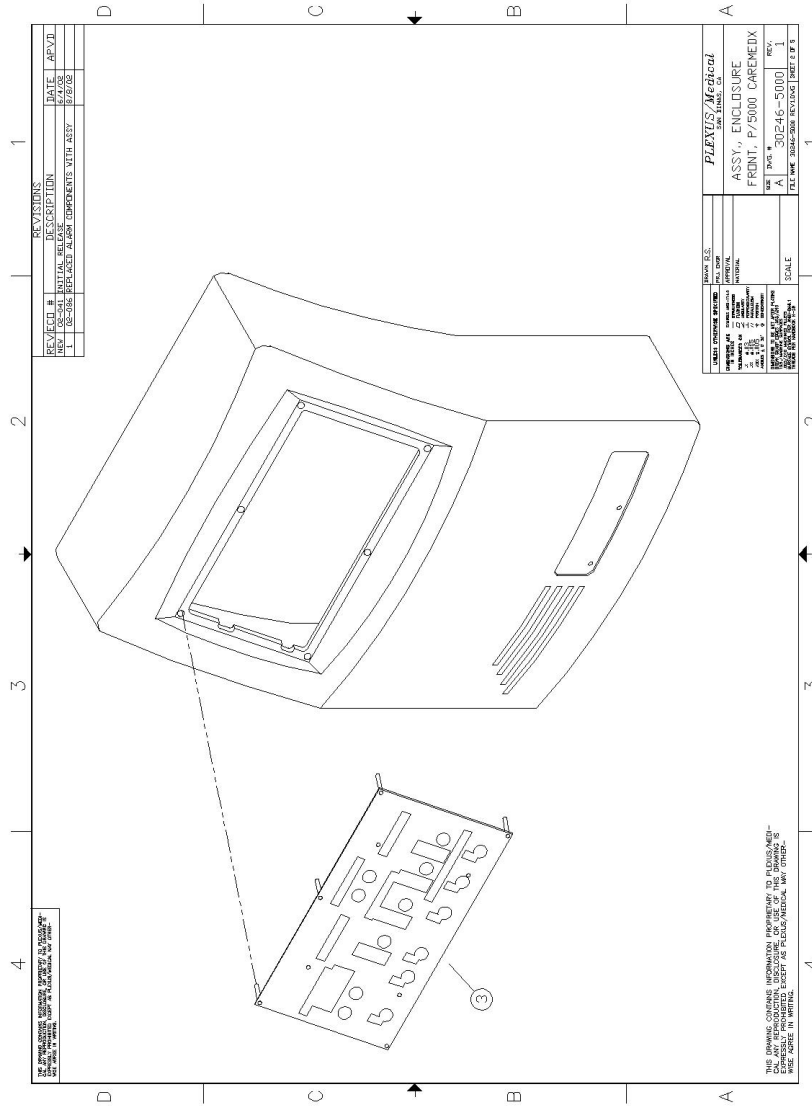


Figure 8.16 – Assembly Drawing/Parts List–C5000 FRONT ENCLOSURE page 3 of 5

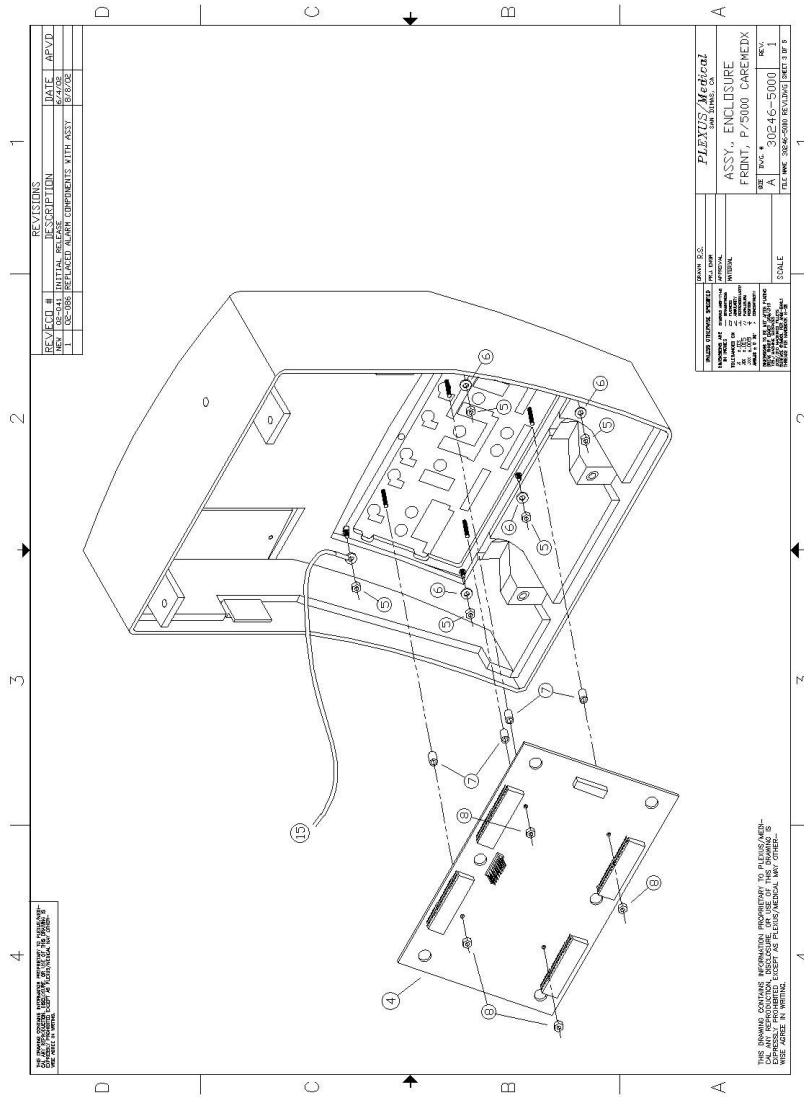


Figure 8.19 – Assembly Drawing/Parts List–C5000 FRONT ENCLOSURE page 5 of 5

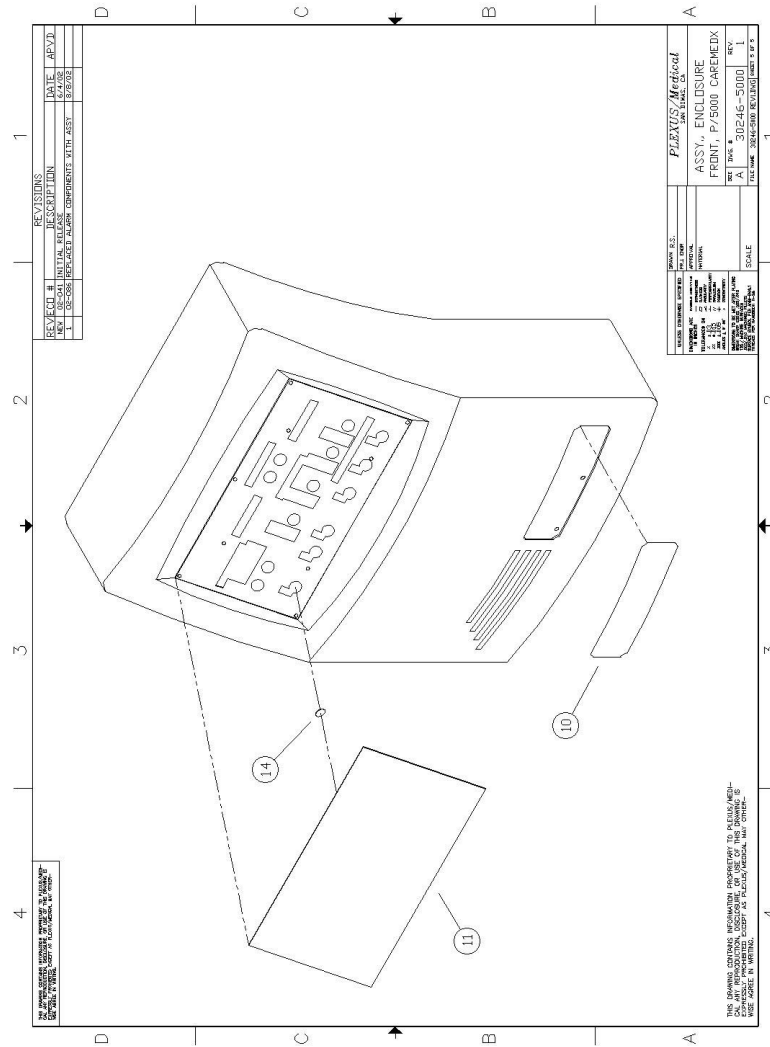


Figure 8.20 – Assembly Drawing/Parts List–C4000 MANIFOLD page 1 of 2

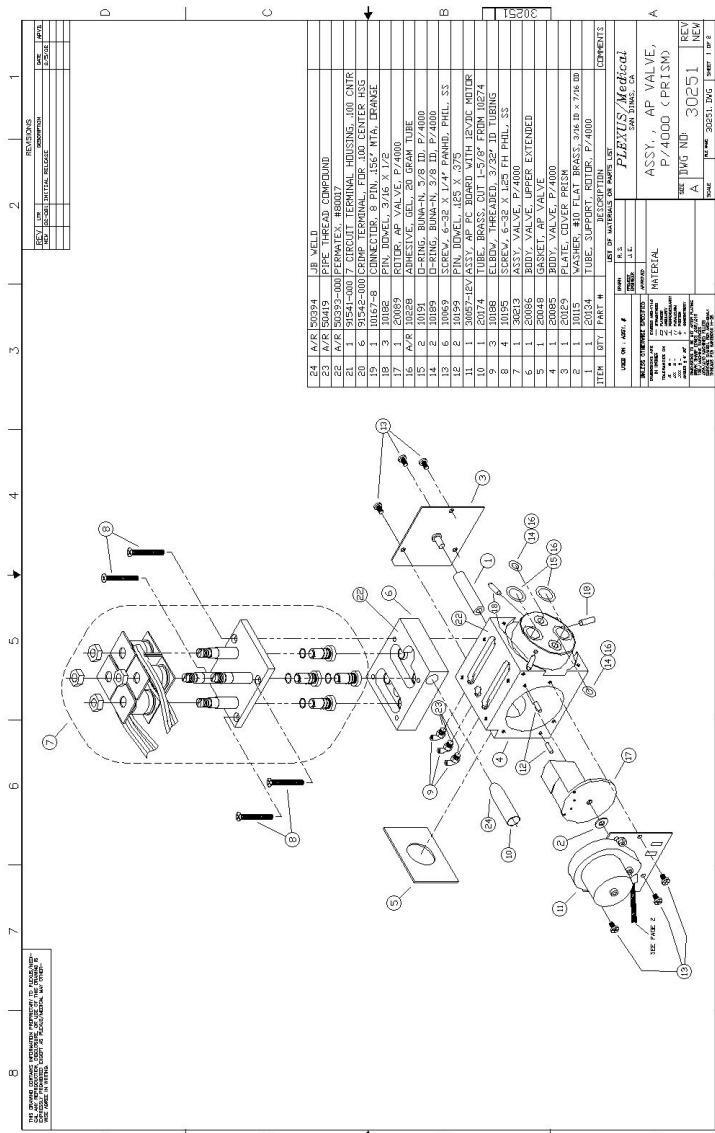


Figure 8.21 – Assembly Drawing/Parts List–C4000 MANIFOLD page 2 of 2

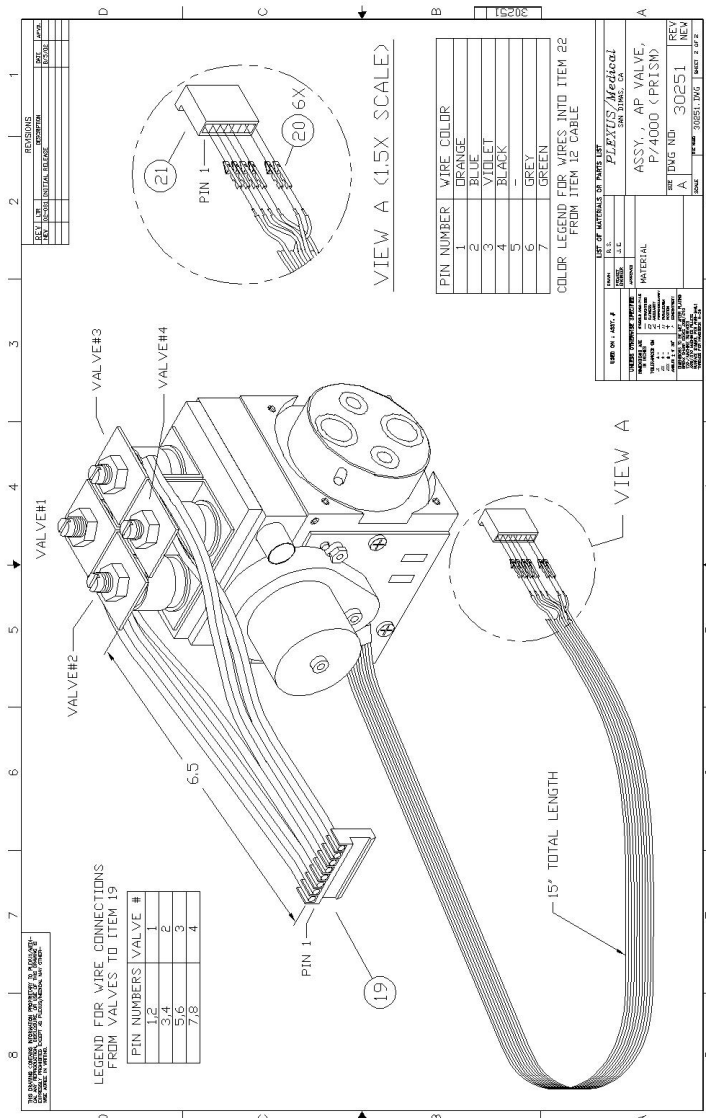


Figure 8.22 – Assembly Drawing/Parts List–C5000 MANIFOLD

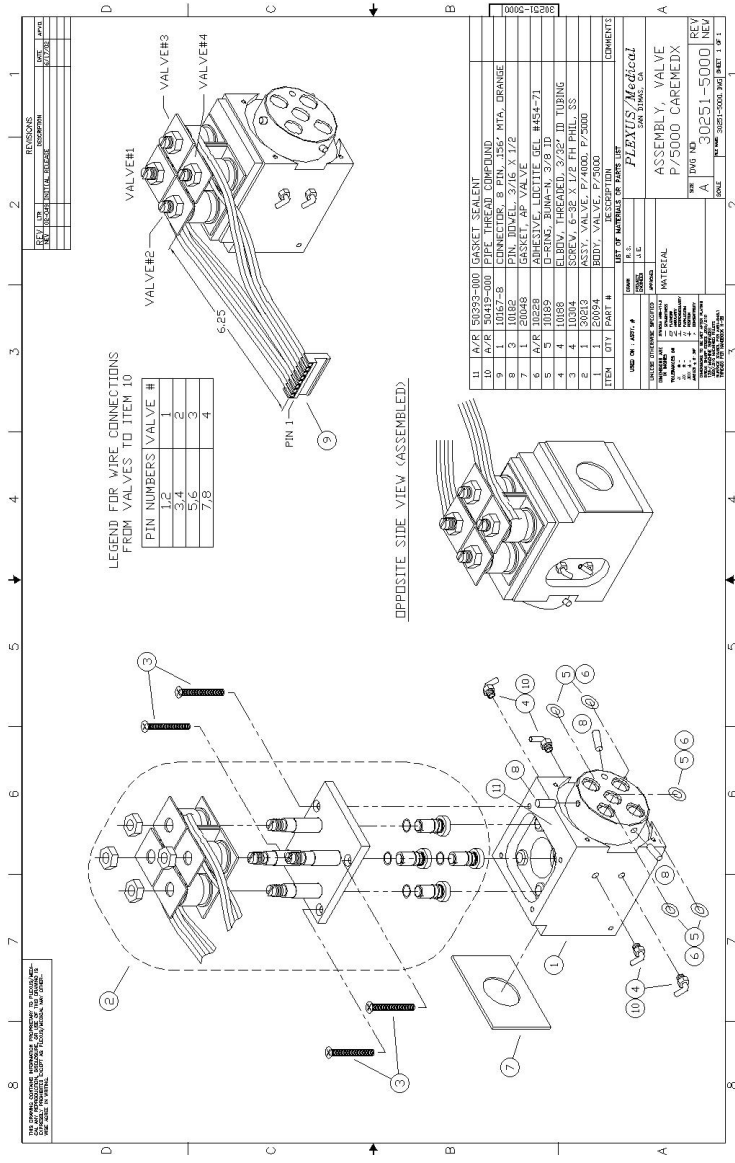


Figure 9.1 – Assembly Drawing/Parts List – **COMMUNICATIONS CABLE**

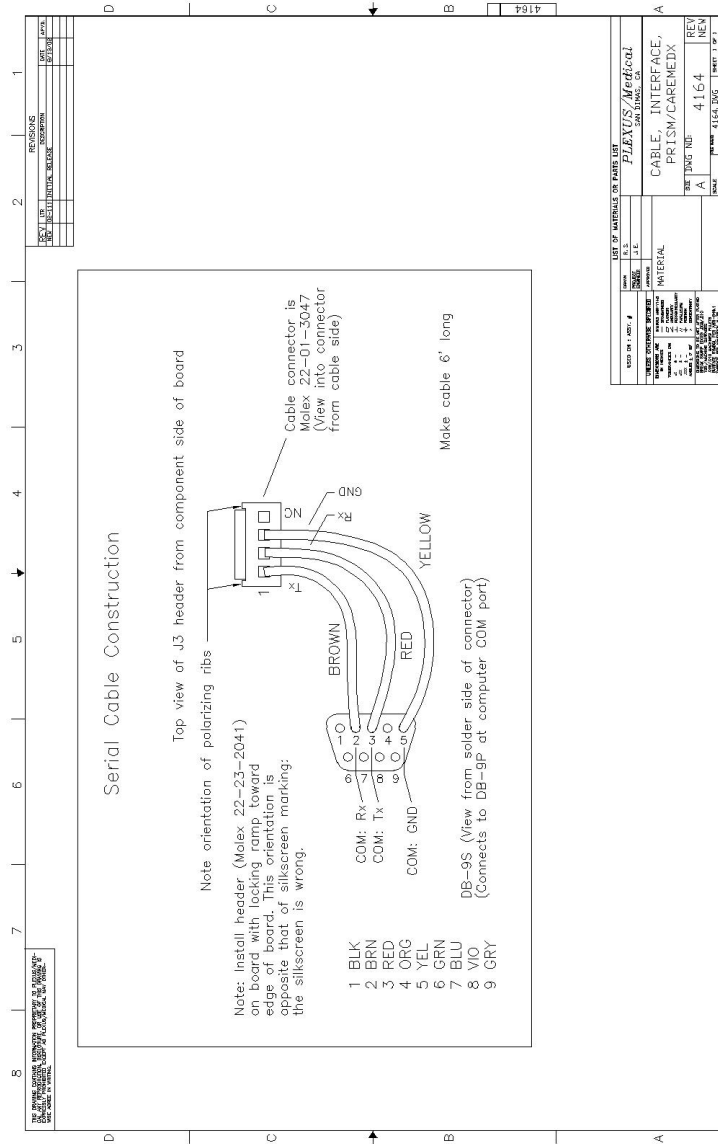


Figure 9.2 – Assembly Drawing/Parts List – AP PCB TEST FIXTURE page 1 of 2

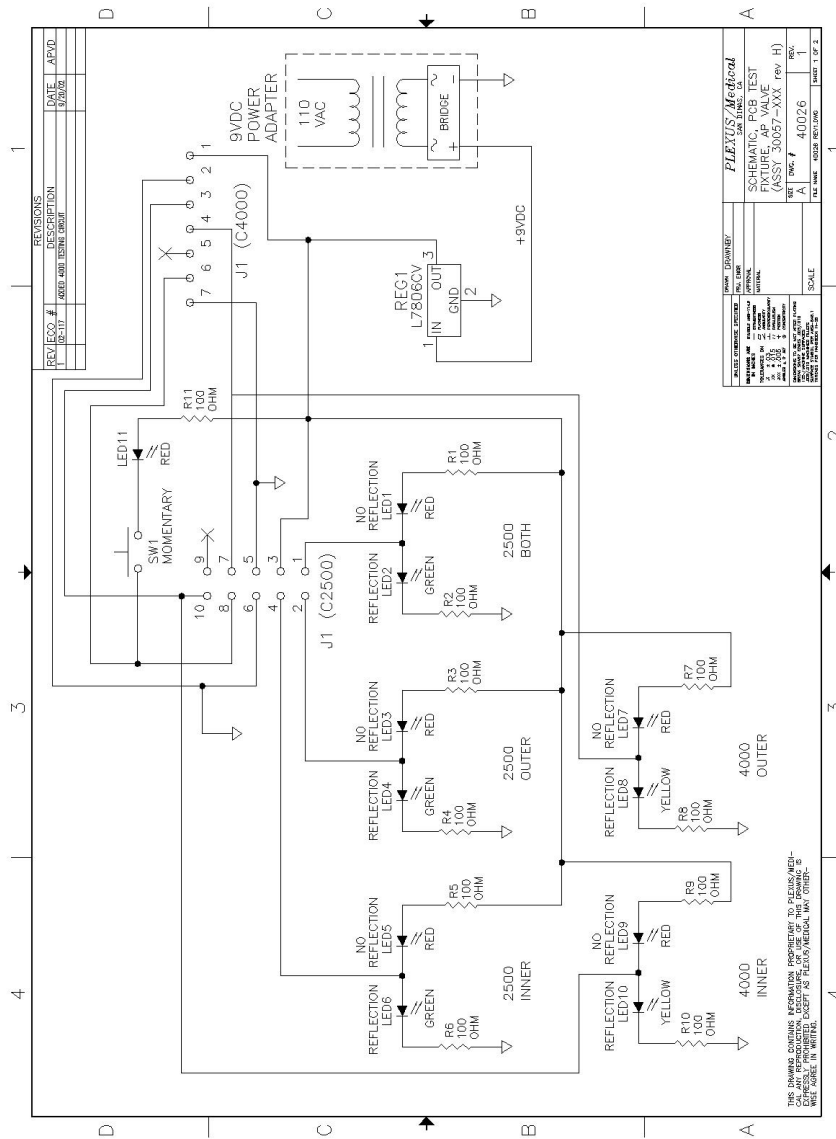


Figure 9.3 – Assembly Drawing/Parts List – AP PCB TEST FIXTURE page 2 of 2

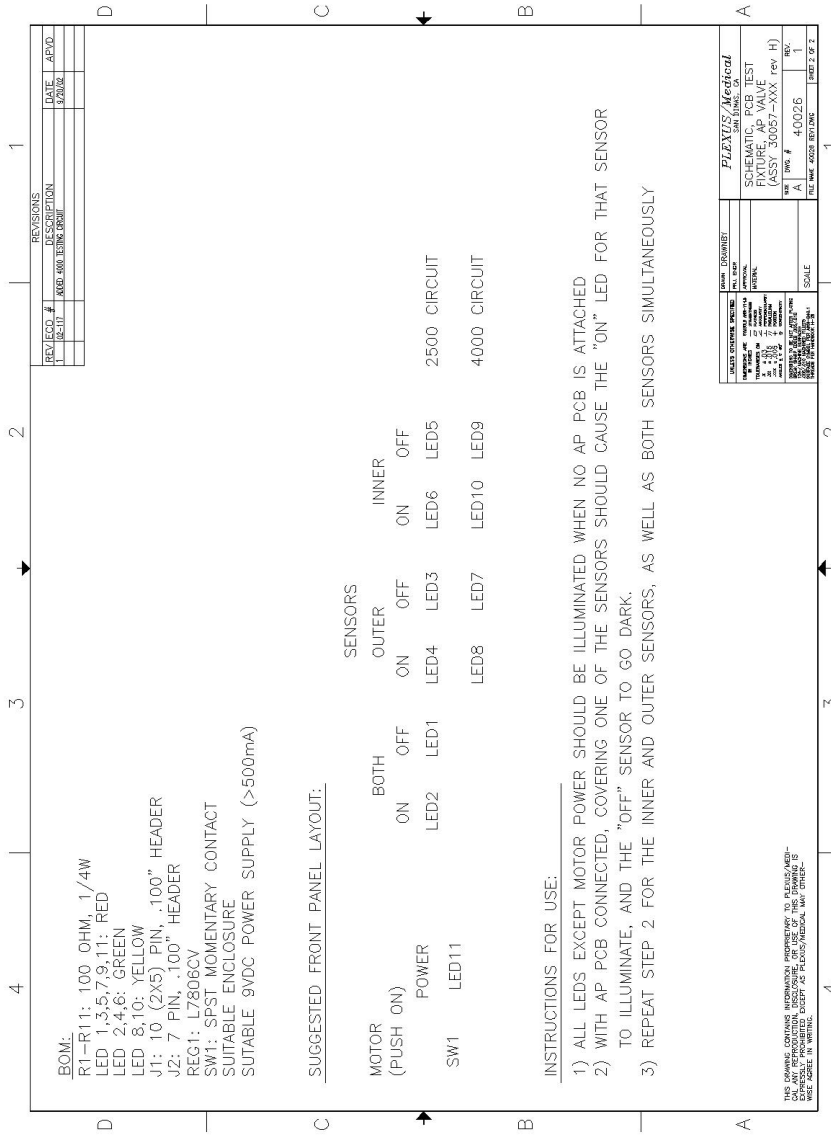


Figure 10.1 – **WIRING DIAGRAM**

