# Table of Contents



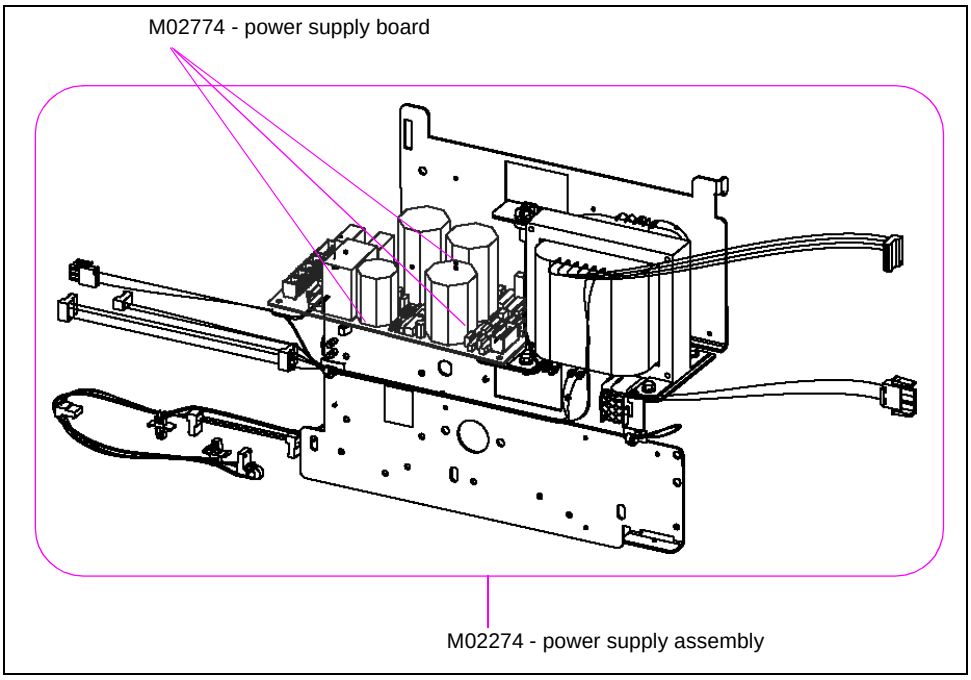
## NOTICE

In this manual, references are made to two different devices with similar part numbers.

- M02274 power supply assembly
- M02774 power supply board

The M02774 power supply board is part of and is mounted on the M02274 power supply assembly (Figure 1).

**Figure 1: Relationship Between M02274 and M02774**



# Introduction

## Purpose of this Manual

This manual provides installation instructions for the Power Supply Kit M00016K003 used in the Encore® 500 units. The transformer (M00151A002) for the M00458A00X Power Supply is no longer available, so if a transformer needs to be replaced in an Encore 500 unit, the entire power supply will be replaced with replacement kit M00016K003.

## Required Reading

Before installing the Power Supply Kit, the installer must read, understand, and follow:

- this manual
- NFPA 30A, The Automotive and Marine Service Station Code
- NFPA 70, The National Electric Code
- applicable federal, state and local codes and regulations

Failure to do so may adversely affect the safe use and operation of the equipment.

*Note: This kit must be installed by a Gilbarco Authorized Service Contractor (ASC) to ensure warranty will apply.*

## Related Documents

The following documents are related to the installation of the Power Supply Kit M00016K003:

| Document Number | Title | GOLD® Library |
|---|---|---|
| MDE-3804 | Encore and Eclipse® Series Start-Up/Service Manual | • Encore and Eclipse<br>• Service Manual |
| MDE-3893 | Encore/Eclipse Series Owner's Manual | • Encore and Eclipse<br>• Encore and Eclipse Installers |
| PT-1936 | Encore Series Pumps and Dispensers Illustrated Parts Manual | • Encore and Eclipse<br>• Encore and Eclipse Installers<br>• Parts Manual |

## Required Tools

The following tools are needed to install the Power Supply Kit M00016K003:

- cutters, wire
- nut drivers, American standard
- nut drivers, metric
- Q12534 CRIND® diagnostic card
- screwdrivers, flat head
- screwdrivers, Phillips®
- static guard wrist strap

# M00016K003 Kit Parts List

| Part No. | Description | Quantity |
|---|---|---|
| M00417B101 | screw, metric M5 x 10 | 2 |
| M03111A001 | cable, adapter, backlight power, 432 mm (17 in) | 1 |
| M00614A004 | cable, main display, backlight power, 950 mm (37.4 in) | 1 |
| M02274A001 | main power supply assembly, universal | 1 |
| M02952A001 | cable, adaptor, 50 mm (1.9 in) | 1 |
| M02774A001 | power supply board | 1 |
| M00047A001 | STP board | 1 |
| M02954A001 | cable, STP board, 170 mm (6.7 in) | 1 |
| Q10651-02 | support, circuit board, locking | 8 |
| M01665A001 | assembly, cable, VaporVac®, 500 mm (19.7 in) | 1 |
| M02993A001 | cable, 2-wire pump and CRIND device, 1150 mm (45.3 in) | 1 |
| M01591A001 | cable, power, 300 mm (11.8 in) | 1 |
| N21120-G6 * | plug, assembly, 115V | 1 |
| N21120-G8 * | plug, assembly, 220V | 1 |
| N21120-G9 * | plug, assembly, 230V | 1 |
| N21120-G10 * | plug, assembly, 240V | 1 |
| M02951A001 * | cable, varistor, 50 mm (1.9 in), 130V | 1 |
| M02951A002 * | cable, varistor, 50 mm (1.9 in), 275V<br>(for all power source voltages greater than 115V) | 1 |

* Use correct part numbers (N21120-GXX and M02951A00X) based on AC source voltage.

# Important Safety Information

This section introduces the hazards and safety precautions associated with installing, inspecting, maintaining or servicing this product. Before performing any task on this product, read this safety information and the applicable sections in this manual, where additional hazards and safety precautions for your task will be found. Fire, explosion, electrical shock or pressure release could occur and cause death or serious injury if these safe service procedures are not followed.

## Safety Symbols and Warning Words

This section provides important information about warning symbols and boxes.

### Alert Symbol

This safety alert symbol is used in this manual and on warning labels to alert you to a precaution which must be followed to prevent potential personal safety hazards. Obey safety directives that follow this symbol to avoid possible injury or death.

### Signal Words

These signal words used in this manual and on warning labels tell you the seriousness of particular safety hazards. The precautions that follow must be followed to prevent death, injury or damage to the equipment.

**⚠ DANGER**

This signal word is used to alert you to a hazard or unsafe practice which **will** result in **death or serious injury**.

**⚠ WARNING**

This alerts you to a hazard or unsafe practice that **could** result in **death or serious injury**.

**⚠ CAUTION**

This signal word designates a hazard or unsafe practice which **may** result in **minor injury**.

**CAUTION**

When used by itself, CAUTION designates a hazard or unsafe practice which may result in **property or equipment damage**.

## Preliminary Precautions

You are working in a potentially dangerous environment of flammable fuels, vapors, and high voltage or pressures. Only trained or authorized individuals knowledgeable in the related procedures should install, inspect, maintain or service this equipment.

The first and most important information you must know is how to stop all fuel flow to the pump and island.

### Emergency Total Electrical Shut-Off

Locate the switch or circuit breakers that shut-off all power to all fueling equipment, dispensing devices, and submerged turbine pumps (STPs). These you must operate in the event of an emergency.

**⚠ WARNING**

The EMERGENCY STOP, ALL STOP, and PUMP STOP buttons at the cashier's station WILL NOT shut off electrical power to the pump/dispenser.

This means that even if you activate these stops, fuel may continue to flow uncontrolled.

You must use the TOTAL ELECTRICAL SHUT-OFF in the case of an emergency and not only these cashier station "stops."

### Total Electrical Shut-Off Before Access

Any procedure requiring access to electrical components or the electronics of the dispenser requires total electrical shut-off of that unit.

NFPA 30A, Section 4-1.2, published by the National Fire Protection Association, requires the installation of an easily accessible switch or circuit breaker to shut-off the power to all fueling equipment, dispensing devices and STPs in the event of an emergency. Know the function and location of this switch or circuit breaker before inspecting, installing, maintaining, or servicing Gilbarco equipment.

## Evacuation, Barricading and Shut-Off

Any procedures requiring accessing the pump/dispenser or STPs requires the following three actions:

-  An evacuation of all unauthorized persons and vehicles
-  Using safety tape or cones as barricades to the effected units
-  A total electrical shut-off of that unit

## Read the Manual

Read, understand and follow this manual and any other labels or related materials supplied with this equipment. If you do not understand a procedure, call a Gilbarco Authorized Service Contractor or call the Gilbarco Call Center at 1-800-800-7498. It is imperative to your safety and the safety of others to understand the procedures before beginning work.

## Follow the Regulations

There is applicable information in: NFPA 30A: *Automotive and Marine Service Code*; NFPA 70: *National Electrical Code (NEC)*; OSHA regulations; and federal, state, and local codes which must be followed. Failure to install, inspect, maintain or service this equipment in accordance with these codes, regulations and standards may lead to legal citations with penalties or affect the safe use and operation of the equipment.

## Prevent Explosions and Fires

Fuels and their vapors will become explosive if ignited. Spilled or leaking fuels cause vapors. Even filling customer tanks will cause explosive vapors in the vicinity of dispenser or island.

### No Open Flames

Open flames from matches, lighters, welding torches or other sources can ignite fuels and their vapors.

### No Sparks - No Smoking

Sparks from starting vehicles, starting or using power tools, burning cigarettes, cigars or pipes can also ignite fuels and their vapors. Static electricity, including an electrostatic charge on your body, can cause a spark sufficient to ignite fuels and their vapors. After getting out of a vehicle, touch the metal of your vehicle to discharge any electrostatic charge before you approach the dispenser island.

## Hazardous Materials

Some materials present inside electronic enclosures may present a health hazard if not handled correctly. Be sure to clean hands after handling equipment. Do not place any equipment in mouth.

**⚠ WARNING**

This area contains a chemical known to the State of California to cause cancer.

**⚠ WARNING**

This area contains a chemical known to the State of California to cause birth defects or other reproductive harm.

## Other Useful Safety Information

This subsection provides additional safety information.

### OSHA Lock-Out and Tag-Out Requirements

OSHA Standard 29 CFR 1910-147 Control of Hazardous Energy Sources (Lock-Out/Tag-Out) covers ways to avoid personal injury because power was turned on or fuel pressure was applied **unexpectedly** while servicing equipment. The rule requires:

(1) Turning off equipment power and fuel under pressure.

(2) Use of a locking device (breaker, valve, etc.) or label device with a warning tag.

Station employees and service contractors need to understand and comply with this program completely to ensure safety while the equipment is down.

## Use Electrostatic Discharge Precautions

Place yourself at a neutral static-free potential by doing the following:

1. Touch an unpainted metal surface.
2.  Use a wrist strap connected to a grounded metal frame or chassis.
3. Make sure all power has been removed from unit and the CRIND device.

# Installation

Installing the Power Supply Kit M00016K003 for the Encore 500 unit includes the following tasks:



**⚠ WARNING**

**OSHA Lock-Out and Tag-Out Requirements**

OSHA Standard 29 CFR 1910-147 Control of Hazardous Energy Sources (Lock-Out/Tag-Out) covers ways to avoid personal injury because power was turned on or fuel pressure was applied **unexpectedly** while servicing equipment. The rule requires:

(1) Turning off equipment power and fuel under pressure.

(2) Use of a locking device (breaker, valve, etc.) or label device with a warning tag.

Station employees and service contractors need to understand and comply with this program completely to ensure safety while the equipment is down.

**⚠ WARNING**

Working on dispenser electronics with power applied may result in **electrocution** and **damage** to electronic components. Power down unit before beginning work.

**⚠ WARNING**

Be sure the STP wires are connected to isolation relays. Also be sure no more than one dispenser is connected to one isolation relay. If these conditions are not met, the STP wires can be **hot** even if the pump is not powered up.

**⚠ CAUTION**

Power supplies are heavy. Handle with care to avoid personal injury. Also handle with care to avoid dropping the unit and causing possible equipment damage.

## Preparing for Installation

Perform the following steps to prepare for the installation of Power Supply Kit M00016K003.

1. Read all instructions before beginning.
2. Observe all safety precautions.
3. Remove all power to the dispenser.
4. Locate the Customer Interface Module (CIM) Door (Figure 2), insert the key, and open the door. Perform this step on both sides of the dispenser.
5. Disengage the main door latches (Figure 2) and open the main door (Figure 2).

**Figure 2: Encore Unit with CIM Door Opened**

## Removing the M00458A00X Power Supply Assembly

Perform the following steps to remove the M00485A00X Power Supply Assembly.

**⚠ CAUTION**

Be careful to not short out or touch terminals and/or the lands on printed circuit boards during handling or removal of the M00485A00X power supply assembly. The large capacitors may contain a residual charge which may cause shock, personal injury, and/or equipment damage.

1 Locate and disengage any cable ties or cable clamps that may hinder the disconnect of cabling attached to the Power Supply Assembly.

2 Remove the Power Supply Module Cover (Figure 3) to access the STP board (Figure 4).

**Figure 3: M00458A00X Power Supply Assembly**

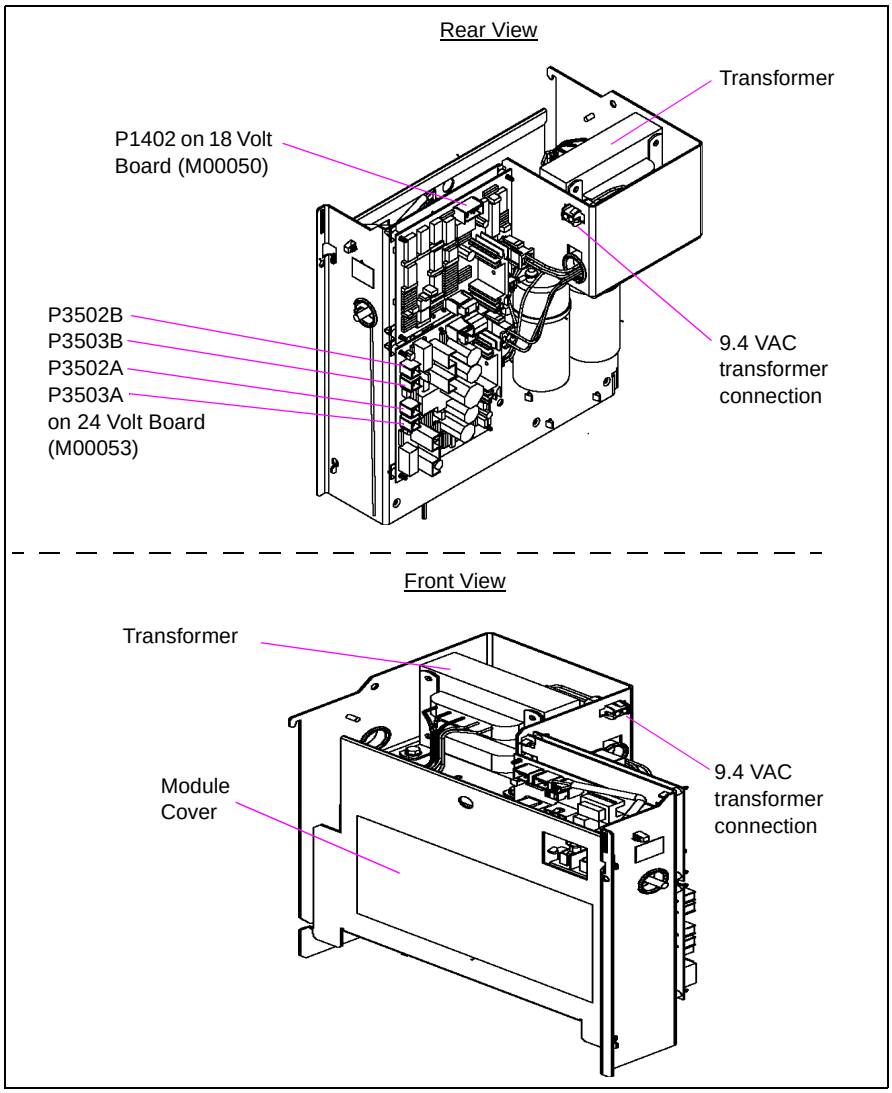
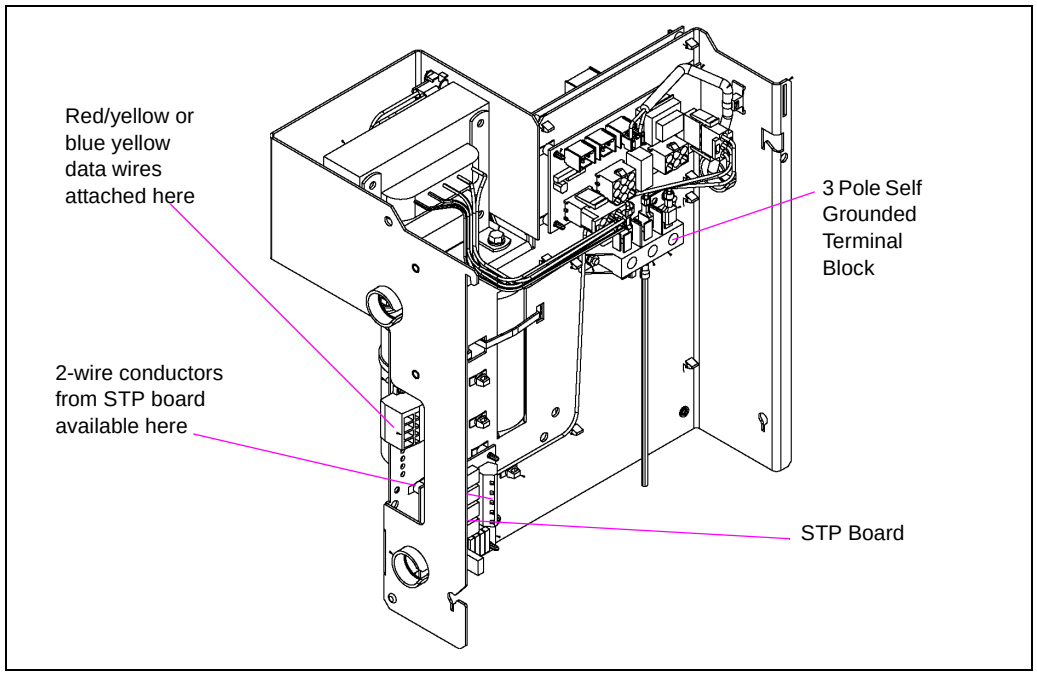


**Figure 4: M00458A00X Power Supply Assembly with Cover Removed**




**3** Disconnect the STP feed wire that goes to P1302 on the M00047A001 STP board (Figure 5).

**4** Label and disconnect the 10-pin connector (P1301) on top of the STP board (Figure 5). Route the cable through the grommet located in the side of the Power Supply Assembly housing. Separate the 10-pin cable from the cable assembly for reinstallation.

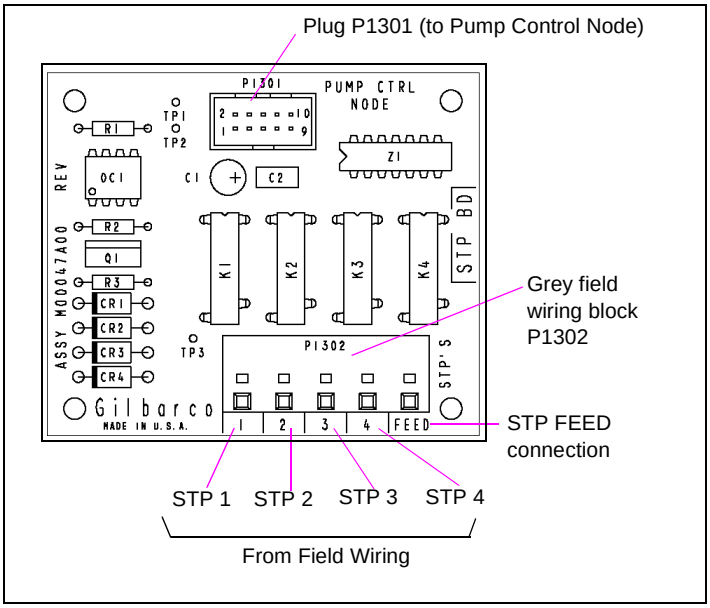
**5** Leaving the STP output wires connected, remove the M00047A001 STP board (Figure 4 and Figure 5) and lay it on an insulated anti-static bag inside the dispenser.

**⚠ WARNING**

If the STP wires are not connected to isolation relays, the STP wires will be **hot** even if the pump is not powered up. Exercise extreme caution.

**6** One by one, remove a field 2-wire conductor from the grey field wiring block (P1302) on the STP board and DIRECTLY attach it to its corresponding red/yellow or blue/yellow data wire (Figure 4 and Figure 5) using a small blue wire nut.
*Note: When disconnecting wires, ensure that the wires are properly labeled for reinstallation.*

**Figure 5: M00047A001 STP Board Connections**




**7** Label and disconnect the AC Power Distribution Cable at the Three Pole Self Grounded Terminal Block (Figure 4) on the Power Supply Assembly using a Phillips screwdriver. Place a wire nut on each wire for re-installation.
*Note: When disconnecting wires, ensure that the wires are properly labeled for reinstallation.*

In some cases, a 2-wire VaporVac connection may also be made at the terminal block. If a VaporVac connection is made, label the wires and remove the wires from the terminal block. Place a wire nut on each wire for re-installation.
*Note: When disconnecting wires, ensure that the wires are properly labeled for reinstallation.*

**8** Locate the 18V Power Supply Board M00050 (Figure 3). Label and disconnect the wire connection for the “Pump/CRIND” connection at plug P1402.

**9** Locate the 24V Power Supply Board M00053 (Figure 3). Label and disconnect wire connections for cables at plugs P3502A, P3502B, P3503A, and P3503B.

**10** Locate the Power Supply Assembly Transformer (Figure 3). Label and disconnect the 9.4V connection (for backlight) made with the transformer.

**11** Locate the Power Supply Assembly Terminal Block M00044 (Figure 6). Label and disconnect any wire connections for the Monochrome Display back light at plugs P1614A and P1614B.

**12** Disconnect the wire connection at plug P1615 (Figure 6) for the Valve board, next, disconnect the other end of this cable at the plug P1206 on the Valve board (Figure 7) and discard the cable.

**Figure 6: Power Supply Assembly Terminal Block M00044A001**

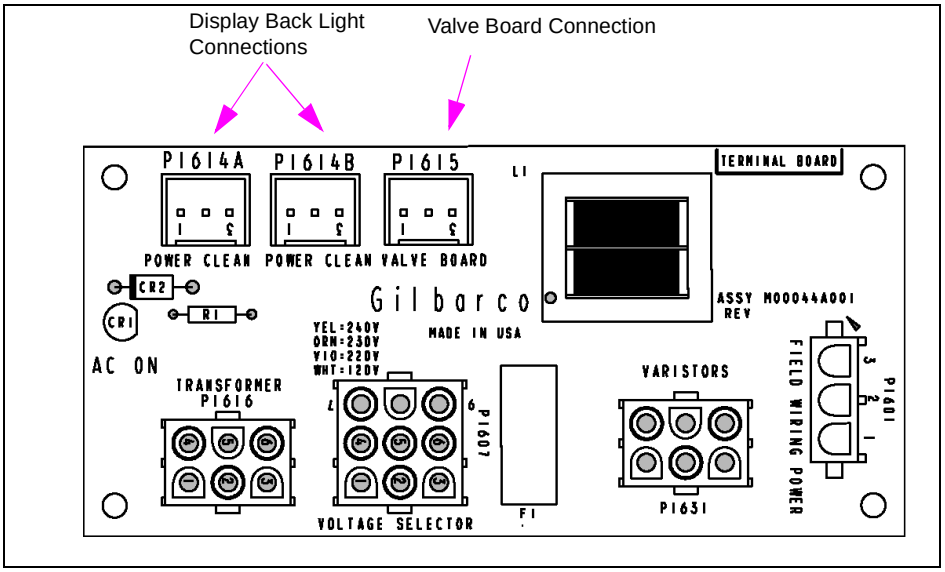
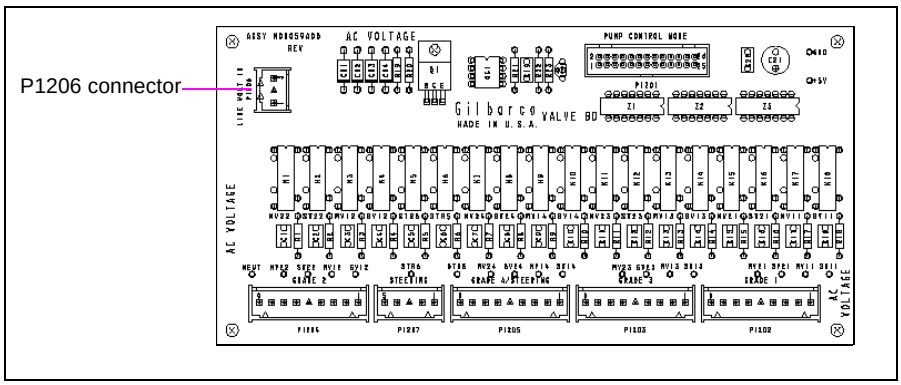



**Figure 7: Valve Board (M00059)**




**13** Verify all electrical and mechanical connections have been removed from the power supply per the preceding steps.

**14** Remove the two M5 metric fasteners that secure the Power Supply Assembly to unit's shelf, using a size 8 metric nut driver. The fasteners may be retained for reinstallation in the event the M00417B101 fasteners in the kit are lost or misplaced.

**⚠ CAUTION**

Power supplies are heavy. Handle with care to avoid personal injury. Also handle with care to avoid dropping the unit and causing possible equipment damage.

**15** Remove the Power Supply Assembly away from the unit.

## Installing the M00016K003 Kit

Perform the following steps to install the M02274A001 Power Supply Assembly.

1 Insert four plastic standoffs (Q10651-02) into the new power supply chassis for the new power supply board (M02774). See Figure 9 for power supply board location.

2 Insert four plastic standoffs (Q10651-02) into the new power supply chassis for the STP board (M00047). See Figure 8 for STP board location.

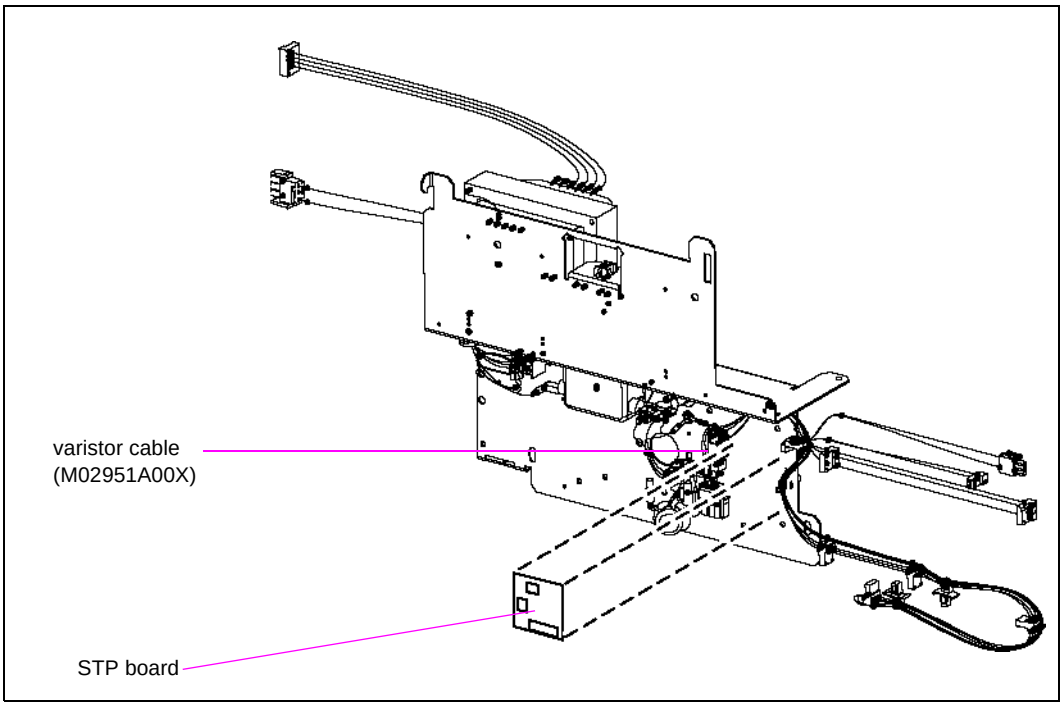
3 Mount the power supply board on the four plastic standoffs on the power supply assembly (Figure 9).

**⚠ CAUTION**

Power supplies are heavy. Handle with care to avoid personal injury. Also handle with care to avoid dropping the unit and causing possible equipment damage.

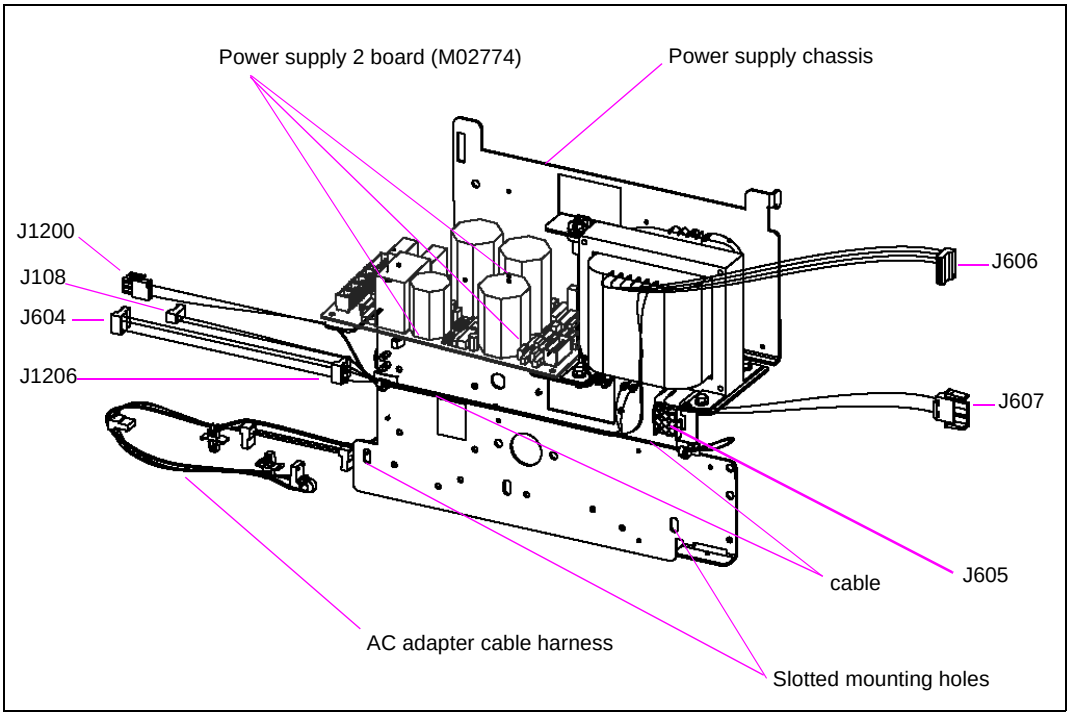
4 Mount the M00047A001 STP board on four plastic standoffs (Figure 5 and Figure 8).

**Figure 8: Power Supply Assembly M02274A001 - STP Board Location**



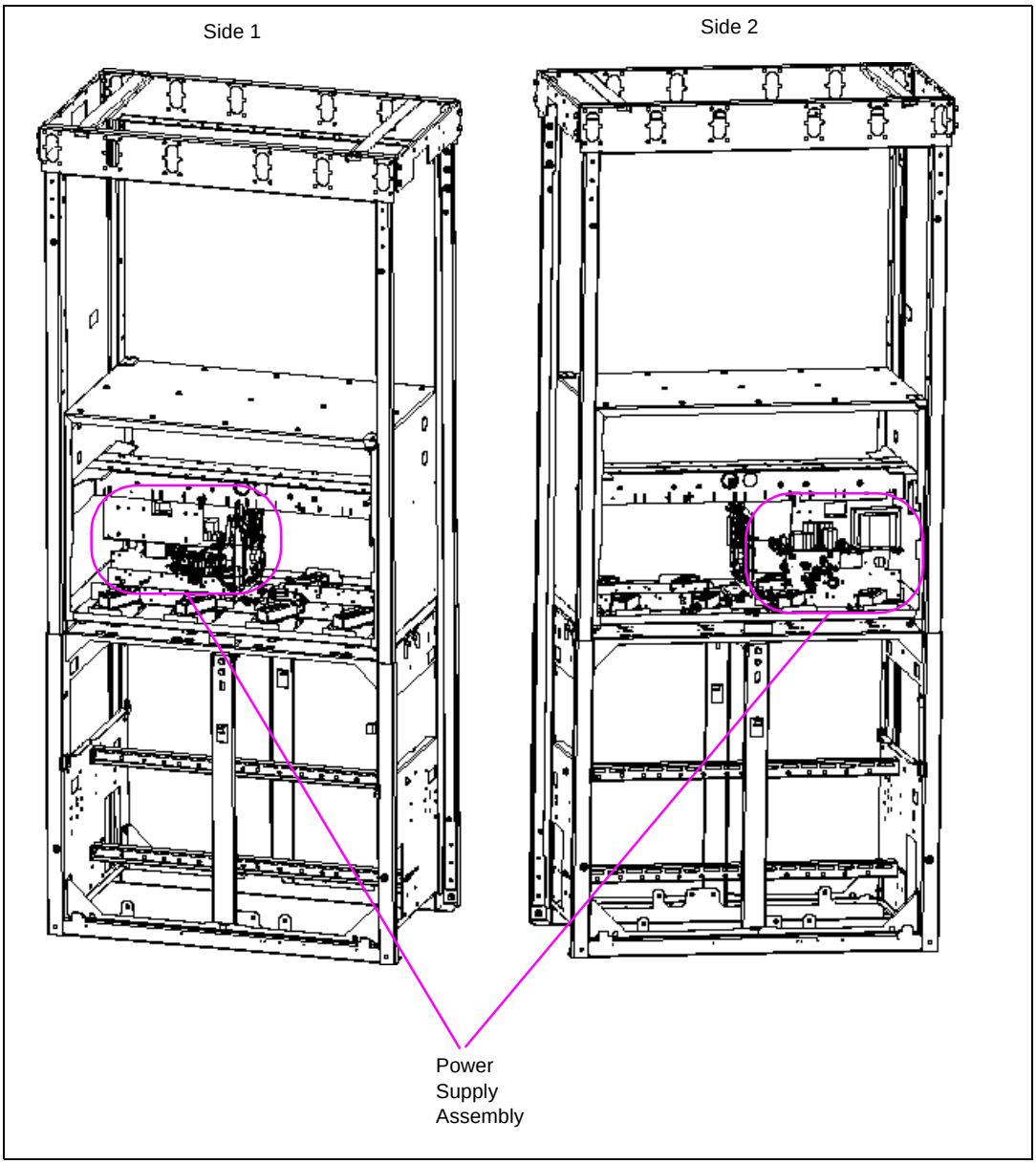

5 From Side 1 of the unit, position the M02274A001 Power Supply Assembly onto the electronics shelf where the previous power supply was mounted (hanging from the top crossbrace). Install the power supply such that the front (Figure 9) of the power supply is facing Side 2 and the power supply support brackets align with the holes in the unit's frame.

**Figure 9: Power Supply Assembly M02274A001**




**6** Insert the two M5 metric hex head fasteners (M00417B101) through the two outward slotted holes in the lower part of the power supply (Figure 9) and into unit frame, and secure the power supply assembly to frame by tightening the fasteners using a size 8 metric nut driver (Figure 10).

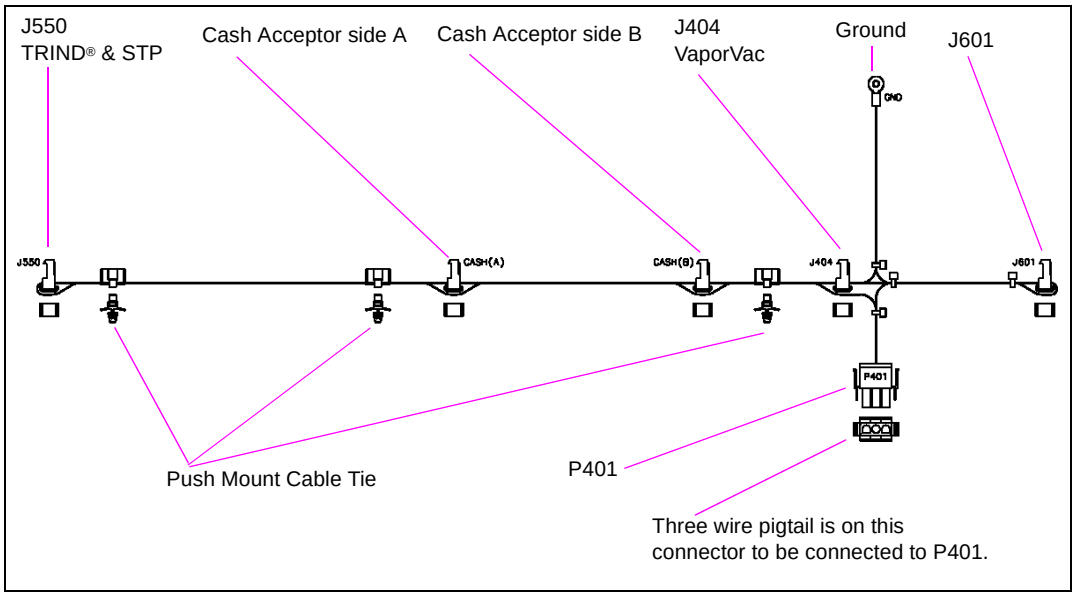
**Figure 10: Location of Power Supply Assembly M02274A001 in Encore Unit**




**7** Use wire nuts to join the field AC wiring (disconnected from old power supply in Step 7 on page 13) to the 3-wire pigtail (Figure 11).

*Note: See Figure 17 in the Appendix for a power supply wiring diagram. See Figure 18, Figure 19, and Figure 20 in the Appendix for Encore 500 block diagrams related to the power supply.*

**Figure 11: M01589A001 AC Adaptor Cable Harness**

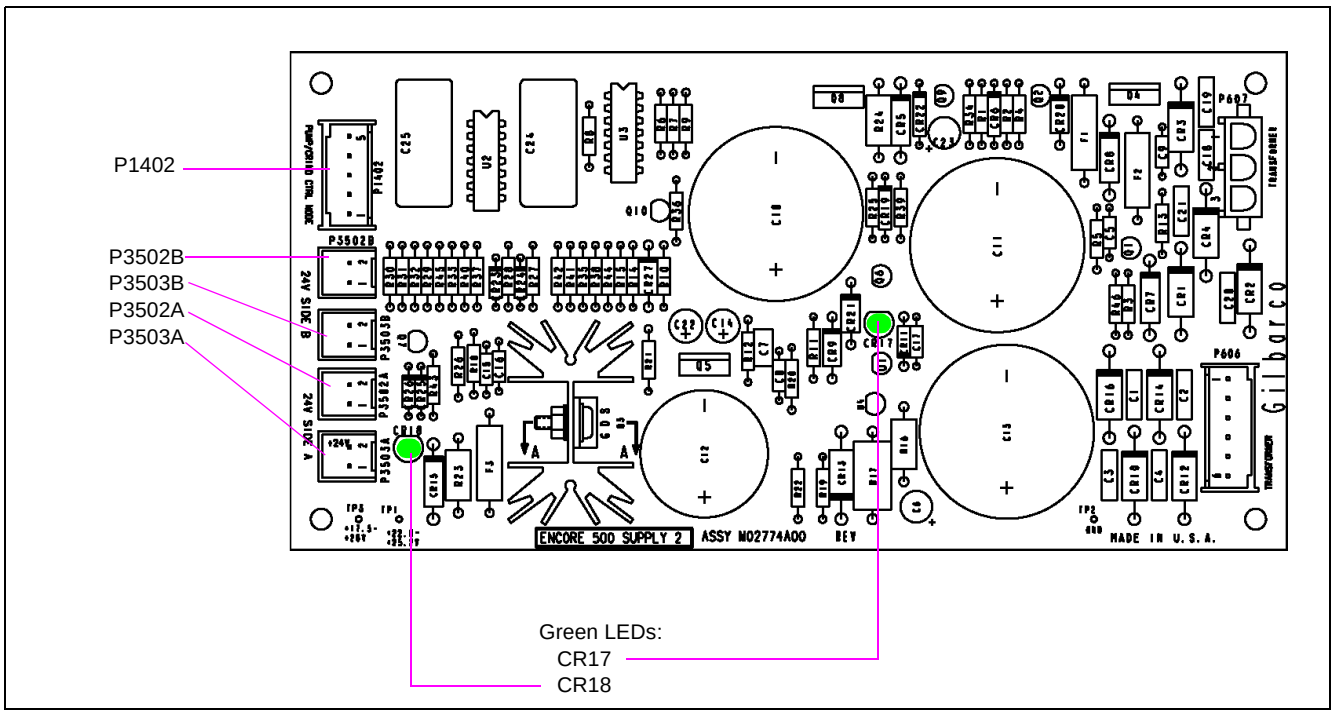



**8** Locate the Power Supply Board (Figure 12) and connect the appropriate cables connectors to P3502B, P3503B, P3502A, and P3503A connectors.

**9** Connect the “Pump/CRIND” cable to the “Pump/CRIND CTRL Node” connection P1402 (Figure 12) on the power supply assembly.

**Figure 12: Power Supply Board M02774**

*Note: This board supplies all DC power to the dispenser.*



**10** Reconnect the Pump Control Node cable to the 10-pin connector P1301 on the STP board (Figure 5).

**11** Use the supplied 3-pin to black wire adapter to pick off AC power from J550 on the AC harness (Figure 11) to go to the STP feed connector (Figure 5).

**12** Look for two 4-pin connectors (J604 and J1206) from the power supply (Figure 9). Use the supplied 4-pin to 3-pin adapter cable (M02952A001) to connect J604 on the power supply to P1206 on the M00059A00X valve board (Figure 7).

**13** If the dispenser has a monochrome display with a flourescent backlight, locate a three connector adapter with two red wires. Look at it carefully. One connector has two wires going to positions 1 and 2; on the other two, two wires go to positions 1 and 3.

**14** Plug the connector that has wires going to positions 1 and 2 into the AC adapter cable harness (Figure 11).

**15** Plug the monochrome backlight cables (M03111A001 and M00614A004) into the other two positions.

**16** If the dispenser has a TRIND device, plug the TRIND device into the AC adapter cable harness (Figure 11).

**17** If the dispenser has VaporVac device, use cable assembly M01665A001 (Figure 13) to connect the VaporVac device to J404 on the power supply AC adapter cable harness (Figure 11) and to P404 on the M02710A001 VaporVac power cable (Figure 14).

**Figure 13: Cable Assembly M01665A001**

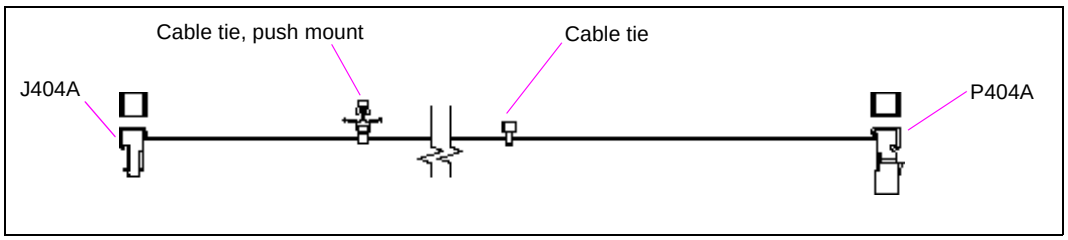
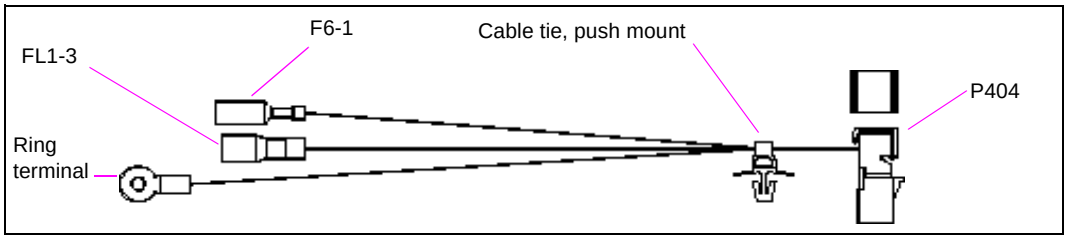



**Figure 14: Cable Assembly M02710A001**

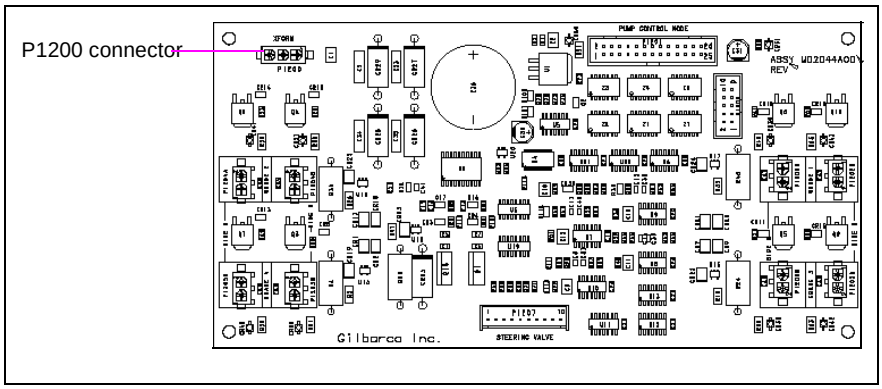


**18** Make the remaining connections per Table 1.

**Table 1: Remaining Connections**

| Connector# | via Cable | to Board | at Connector# |
|---|---|---|---|
| J605 (see Figure 9 and Figure 17) | n/a | n/a | P605 (N21120-GXX) (see Figure 17) |
| J606 (see Figure 9) | | M02774A001 (Universal Power Supply Board) | P606 (see Figure 16) |
| J607 (see Figure 9) | | M02774A001 (Universal Power Supply Board) | P607 (see Figure 16) |
| J1200 (see Figure 9) | | M02044 (Valve Converter Board) - used with the Proportional Control Valve | P1200 (see Figure 15) |
| J550 & 3-pin to black wire adapter (see Figure 9 and Figure 11) | M02954A001 | M00047 (STP Board) | STP feed (see Figure 4 and Figure 5) |
| Varistor Cable (M02951A00X) (see Figure 8) | n/a | n/a | Varistor Connector (M01589A001) |

**Figure 15: Valve Converter Board (M02044)**




**19** Inspect the dispenser for missing connections prior to power up.

## Completing Installation

After the Power Supply Assembly has been installed, perform the following steps.

**1** Verify that all newly installed cables and wires are properly dressed and do not obstruct main door and CIM Door closure.

**2** Restore unit power. Observe that the CR17 and CR18 on Power Supply Board M02774 (Figure 12 or Figure 16) are lit.

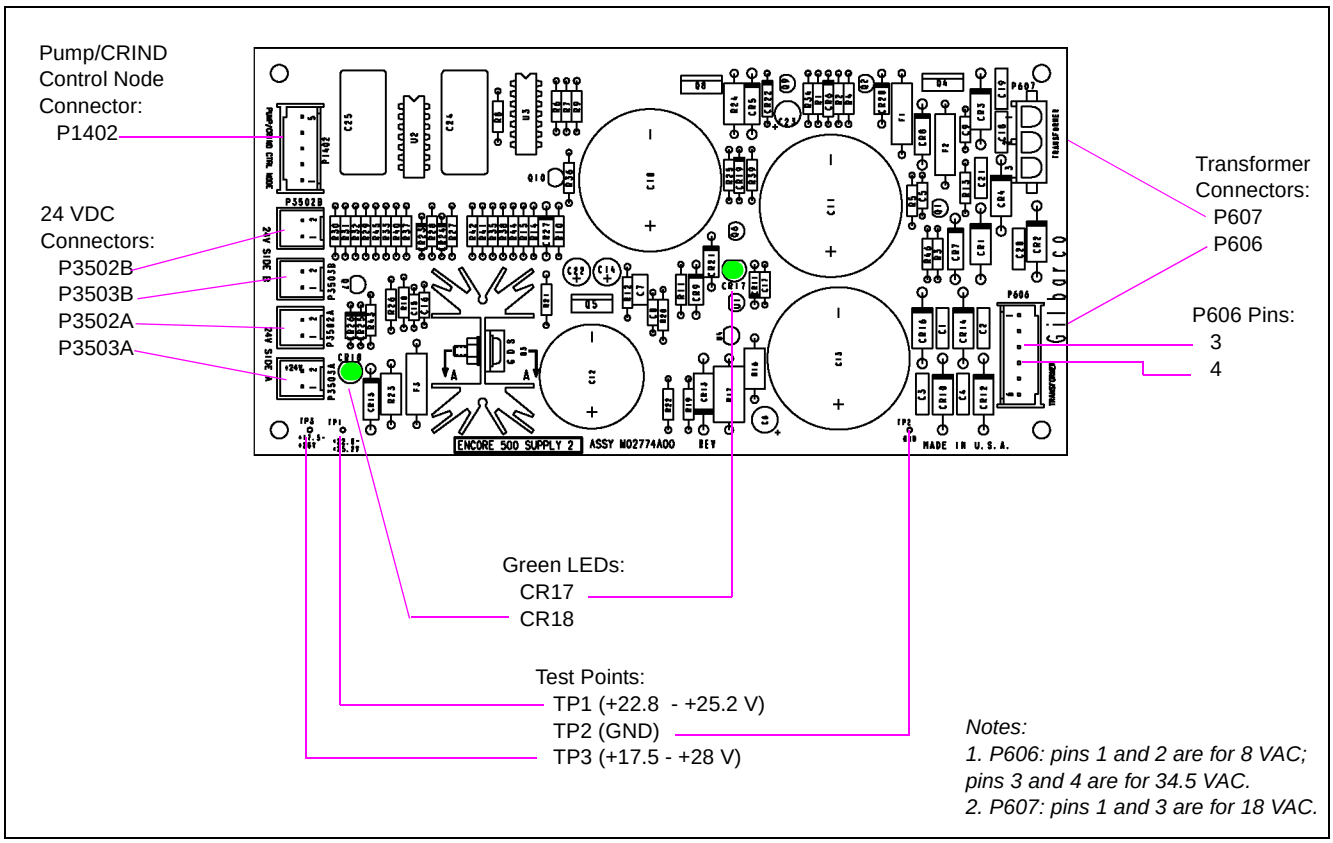
**3** Close and secure all doors.

**4** Perform a short sale to verify the dispenser is working properly.

**5** Clean up the work site, removing all materials to be discarded and all tools.

# Troubleshooting the M02774 Power Supply Board

**Figure 16: M02774 Connectors, LEDs, and Test Points**




## 24 VDC Problem

If one or more 24 VDC devices in the dispenser fails to operate, examine CR18 (Figure 16) on M02774 and perform the action in the following If/Then table.

*Note: Examples of 24 VDC devices are the CRIND printer, the monochrome display backlight, and the LED board for the bar code scanner.*

| If ... | Then ... |
|---|---|
| CR18 is lit | if you still have problems, trace out the connections from the M02774 board to the affected device.<br>• If bad connection found, fix problem.<br>• If still no problem found, verify the voltages with respect to ground (TP2) at test points TP1 and TP3 (*Figure 16*).<br>*Note: The 24 VDC power connection is made on any of P3502A, P3502B, P3503A, and/or P3503B (Figure 16).* |
| CR18 is not lit | either the M02774 board is bad or the transformer (part of the M02274 power supply assembly) feeding the 24 VDC section of the M02774 board is bad.<br>Measure AC voltage across pins 3 and 4 on connector P606 (Figure 16). The voltage should be in the 30 VAC to 40 VAC range.<br>• If not in that range, suspect the transformer.<br>• If in that range, suspect the M02774 board. |

## Local Operating Network (LON) Power Problem

A LON power problem can appear as pump power cycling off and on every 2 or 3 seconds, or as the pump logic boards having no power. See the following If/Then table.

| If ... | Then ... |
|---|---|
| Pump power cycles off and on every 2 to 3 seconds | 1 Power off the dispenser.<br>2 Disconnect 5-pin P1402 connector to the pump or CRIND node (Figure 16).<br>3 Reapply power to dispenser.<br>4 If the power cycling stops, the pump or CRIND node may be defective.<br>5 If the cable goes to a car wash kiosk, pin 3 on the cable might need to be omitted.<br>*Note: The cable to a car wash kiosk should have a 002 suffix; all other CRIND cables should have a 001 suffix.* |
| Pump logic boards have no power - CR17 is not lit (Figure 16) | 1 Disconnect 3-pin P607 connector from M02774 board (Figure 16).<br>2 Measure AC voltage between pins 1 and 3 on the cable connector.<br>• If voltage across pins 1 and 3 is in 17 VAC and 35 VAC range, the M02774 board may be defective.<br>• If voltage across pins 1 and 3 is not in 17 VAC and 35 VAC range, the transformer on the M02274 power supply assembly may be defective.<br>3 Disconnect 5-pin P1402 connector from M02774 board (Figure 16).<br>4 Measure resistance across pins 1 and 5 on the cable connector.<br>• If 800 ohms or more, reconnect the cable to P1402, and power up the dispenser. This procedure is over.<br>• If under 800 ohms, proceed to next step.<br>5 To find bad node or board, temporarily disconnect each node/board one at a time per Table 2 on page 23, and measure the resistance across pins 1 and 5 on the cable.<br>• If 800 ohms or more with board disconnected, replace the disconnected node/board.<br>• If under 800 ohms and each node/board has been temporarily disconnected, proceed to next step.<br>*Note: Components using 18 V include all nodes and the monochrome board. The pump node receives 18 V from a direct plug-in while all other nodes receive 18 V over the LON cable.*<br>6 If no bad board or node is found, a cable problem could exist. Use a test cable to temporarily replace each cable in the chain, measuring ohms (800 or more), until defective cable is found.<br>• If no defective cable is found, escalate the problem through normal channels.<br>• If defective cable is found, proceed to next step.<br>7 Replace defective cable.<br>8 Reconnect all nodes/boards and cables.<br>9 Power up dispenser. |

**Table 2: Node Resistance Measurement Preparation**

| Node | What to Do Before Measuring Resistance Between Pins 1 and 5 |
|---|---|
| Pump | Temporarily disconnect the LON cables to Pump Node. |
| CRIND device | Temporarily disconnect monochrome interface board. |
| Last Node in Chain | Temporarily disconnect its LON cable and temporarily move the LON terminator to the node immediately upstream. |
| Others | Temporarily bypass them with a LON jumper cable. |

## Gilbarco Extranet Resources

Other power supply troubleshooting information may become available after this document has been published. To determine if any new information is available, have your Gilbarco Extranet login and password ready and go to the Technician Resources page at the Gilbarco Extranet site at www.gilbarco.com/interactive/login.cfm . Search for power supply information dated later than January 10, 2003, under the following Technician Resources folders:

- Advanced Troubleshooting
- Encore
- Encore 500 and Eclipse

# Appendix: Wiring Diagrams

**Figure 17: M02274A001 Schematic Diagram**

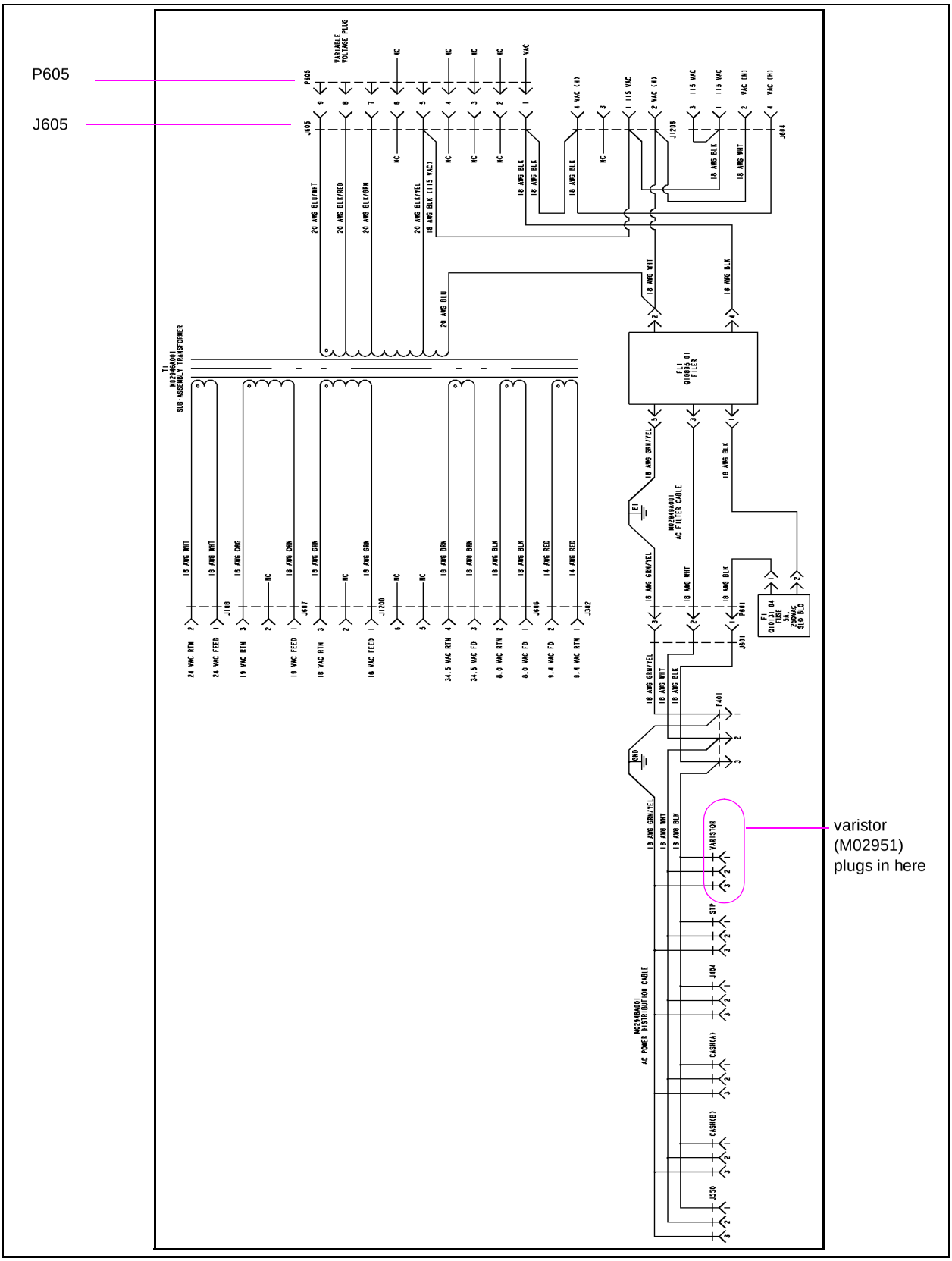


**Figure 18: M02320 Diagram (Sheet 2) - With Junction Box and Conduit**

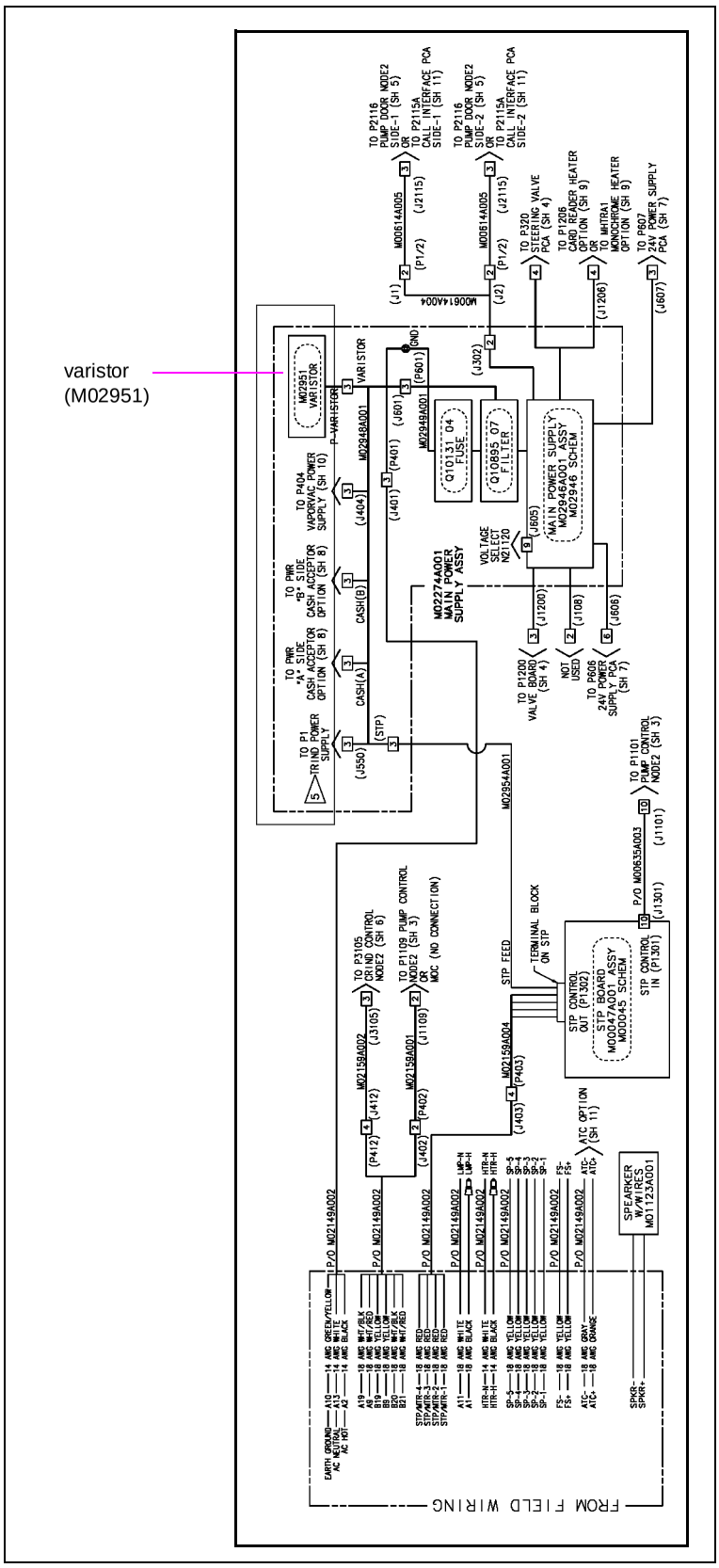


**Figure 19: M02320 Diagram (Sheet 2) - Without Junction Box and Conduit**

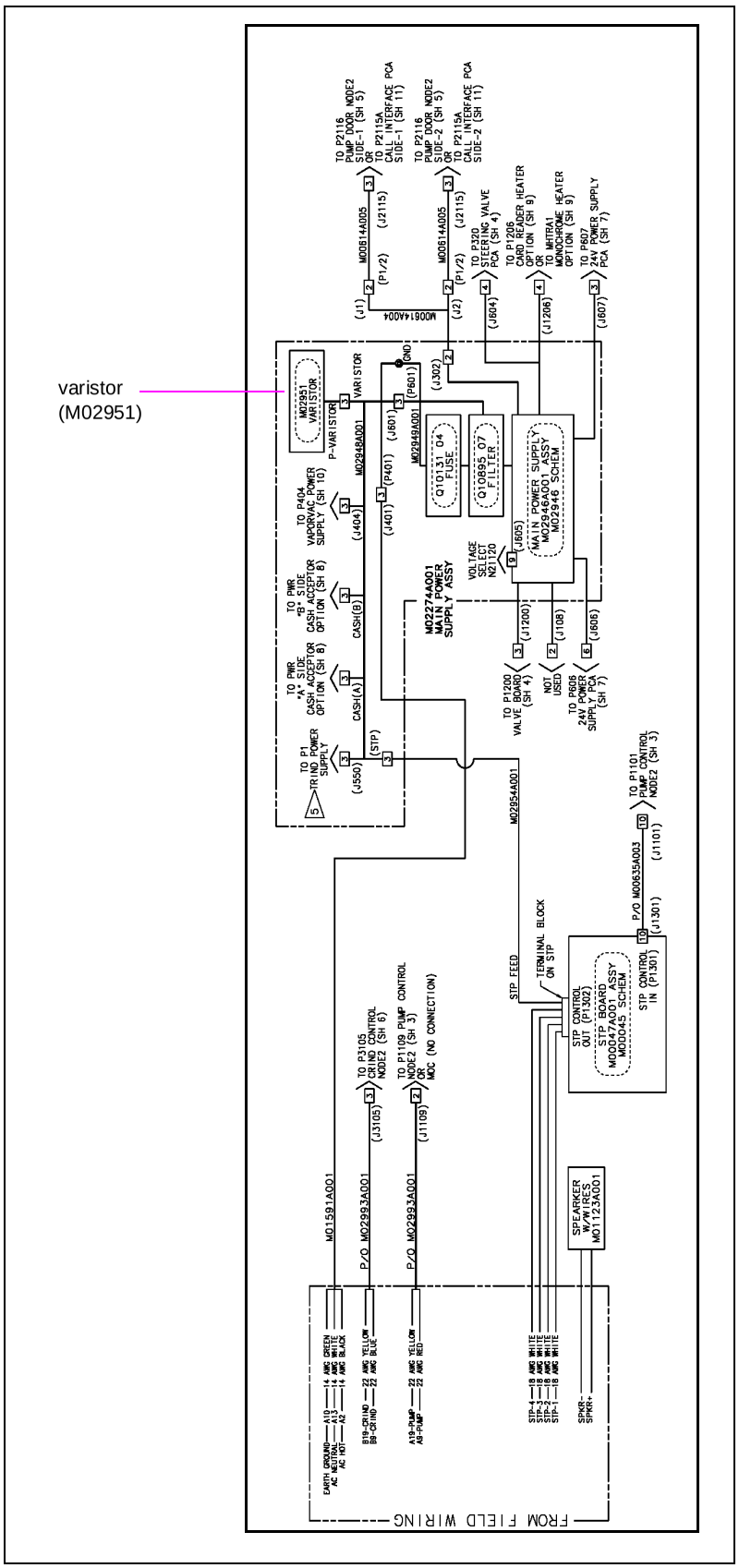
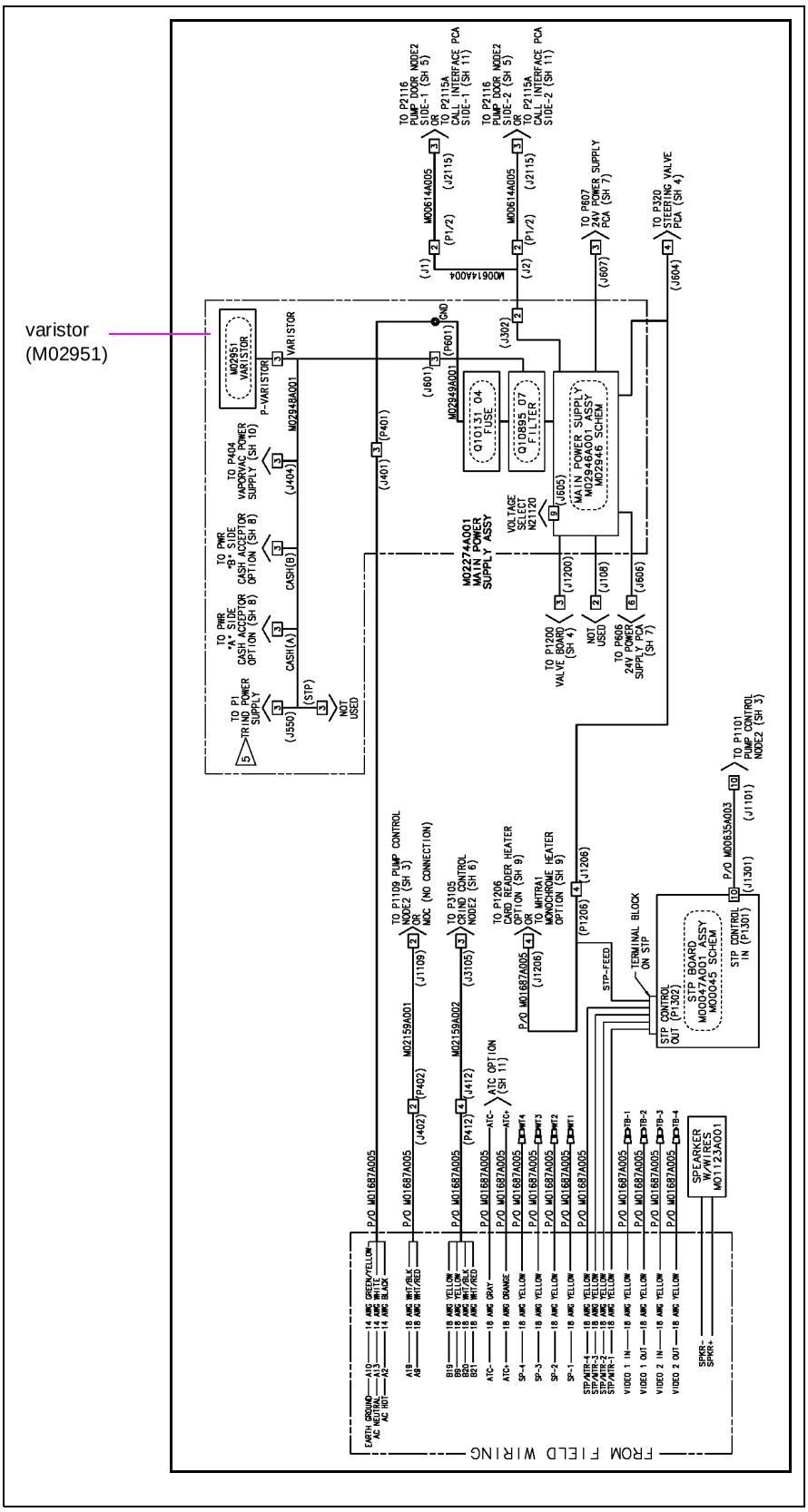


**Figure 20: M02320 Diagram - Self Contained Pumping Units Only (Sheet 12)**



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