VLF Trendsetter

24V (20W) to 48V (40W) Laser Power Supply Retrofit

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Revision History

Revision	Date	Author	Comments
Uncontrolled	1999:Jan:15	R.Luther	No document number.
A	1999:Jul:28	R.Luther/C.Townsend	Document number assigned. Some content revision.
A	1999:Aug:10	C.Townsend	Revision 'A' re-issued with minor addition of defined AC colour code and symbols on page 5. Date changed on cover sheet – Sapphire and Rainbow files updated. Released under ECO C722.
B	2004:Jun:23	M. Louie	Added 24V and 48V power supply setup diagrams. Modified instructions to cover both old and new wiring setups. Corrected relay part no.

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1. SCOPE

When converting any Trendsetter VLF (TS-VLF) from a 20W F-Model to the 40W V-Model, the power supply system must be upgraded to handle new requirements.

This document describes how to field convert the power supply system of a TS-VLF from 20W/24 Volts to 40W/48 Volts using kit 10-3981B.

2. REFERENCE DOCUMENTS

TS-VLF Power Wiring Diagram: 73-3316A (Sheet 2)

3. OVERVIEW OF PROCEDURE

- Remove FlatPAC power supply and existing mounting bracket from power-box.
- Install 2 new MP4 power supplies and replacement mounting bracket into power-box.
- Install new adapter plate and relay into power-box.
- Route and connect 5 new cables.
- Install 10amp slow blow fuse in F9 on the PDB (Power Distribution Box) using spare output.
- Install a special sticker beneath F9 on the PDB to label fuse rating.
- Test keyswitch, write laser and focus laser functions.

4. PARTS

The following is a list of key parts contained in the upgrade kit: 10-3981B:

- MP4 power supply mounting bracket: 57-1497B
- MP4 power supply, 48V: 13-4832 (2X)
- Cable, PDB-LPS2: 10-3982B
- Fuse 10A, 250V, Type 3, slow blow: 13-4694
- Cable, BP-PDB-RDC: 10-3983A
- Relay: 15-3358
- Bracket, focus laser relay: 57-5525A
- Cable, RDC-FOCUS EL: 10-3967A
- Cable adapter, EH-FOCUS REL: 10-3968A
- Cable, PDB-FOCUS REL: 10-3969A
- Misc. fasteners

5. REQUIRED TOOLS AND EQUIPMENT

Standard

- Metric hex key set
- Slotted screwdriver
- Small side-cutters
- Cable ties
- Loc-tite 242
- 3/8" nut driver
- #2 phillips screwdriver
- M3 nut driver

Special

- AMP PIDG crimping tool
- Digital multi-meter
- Bypass magnet for door sensor: 59-3141
- Bypass key for Omron door switch: 59-3441 or 59-3450

6. PREPARATION

Ensure machine is powered down.

For minimum access, remove service panels covering power-box, centre panel and motor (right) end.

Review and practice standard Creo laser safety and personnel static grounding procedures.

Review and understand the TS-VLF 40W power wiring diagram: 73-3316A (Sheet 2). Pay very close attention to all connection polarities – a mistake in wiring can destroy the head or cause a dangerous laser hazard.

7. INSTALLATION

IMPORTANT – There are 2 different wiring setups depending on the age of the machine.

For older machines, the power to the head is supplied (via the flextrack) by the 10-3516A (blk/red) cable and the 10-3517A (multicolor) cable. Refer to Appendix section 11.1.1 for the 24V wiring setup before the retrofit and 11.2.1 for the 48V wiring after the retrofit

For newer machines, the power to the head is supplied (via the flextrack) by the single 10-4149A (yellow) cable which splits into two. Refer to Appendix section 11.1.2 for the 24V wiring setup before the retrofit and 11.2.2 for the 48V wiring after the retrofit

7.1 24V Power Supply Removal

1. Using a small slotted screwdriver, remove the AC power cable (10-3572B) from the 24V FlatPAC power supply terminal block. Using a 3/8" nut driver or socket, remove the DC wiring from the DC output studs.
2. Remove both the 24V FlatPAC power supply and mounting bracket from the top of the MegaPAC power supply in the power-box. Set aside screws and washers attaching bracket to MegaPAC since they will be reused to mount replacement bracket.
3. Completely remove the 10-3785A RDC-BP-PDB cable from the power box. This cable runs from J17 on the PDB to J10 on the RDC board and to J27 on the BP. This cable is no longer needed.

7.2 New cables

1. Install the new 10-3983A RDC-BP-PDB cable. This cable plugs into J9 on the RDC board, J27 on the BP, and J17 on the PDB.
2. Install the focus laser relay bracket (57-5525A) using 52-3252 (4X) and 52-3057 (4X). See Figure 1.
3. Install new 15-3358 relay using 52-3197 (2X) and 52-3057 (2X). See Figure 1.
4. Install the 10-3967A RDC-FOCUS RELAY cable from J10 on the RDC board to pin 6 (black) and pin 1 (orange) on the focus laser relay as shown in Figure 1.
5. Disconnect the existing 10-3517A or 10-4149A EH-PDB cable from J1 on the PDB. Install the new 10-3969A PDB-FOCUS RELAY cable from J1 on the PDB to pins 2 and 5 on the focus laser relay as shown in Figure 1.
6. Install the new 10-3968A EH-FOCUS RELAY adapter between the disconnected 10-3517A or 10-4149A cable and pins 3 and 4 on the focus laser relay (right-hand side relay) as shown in Figure1.

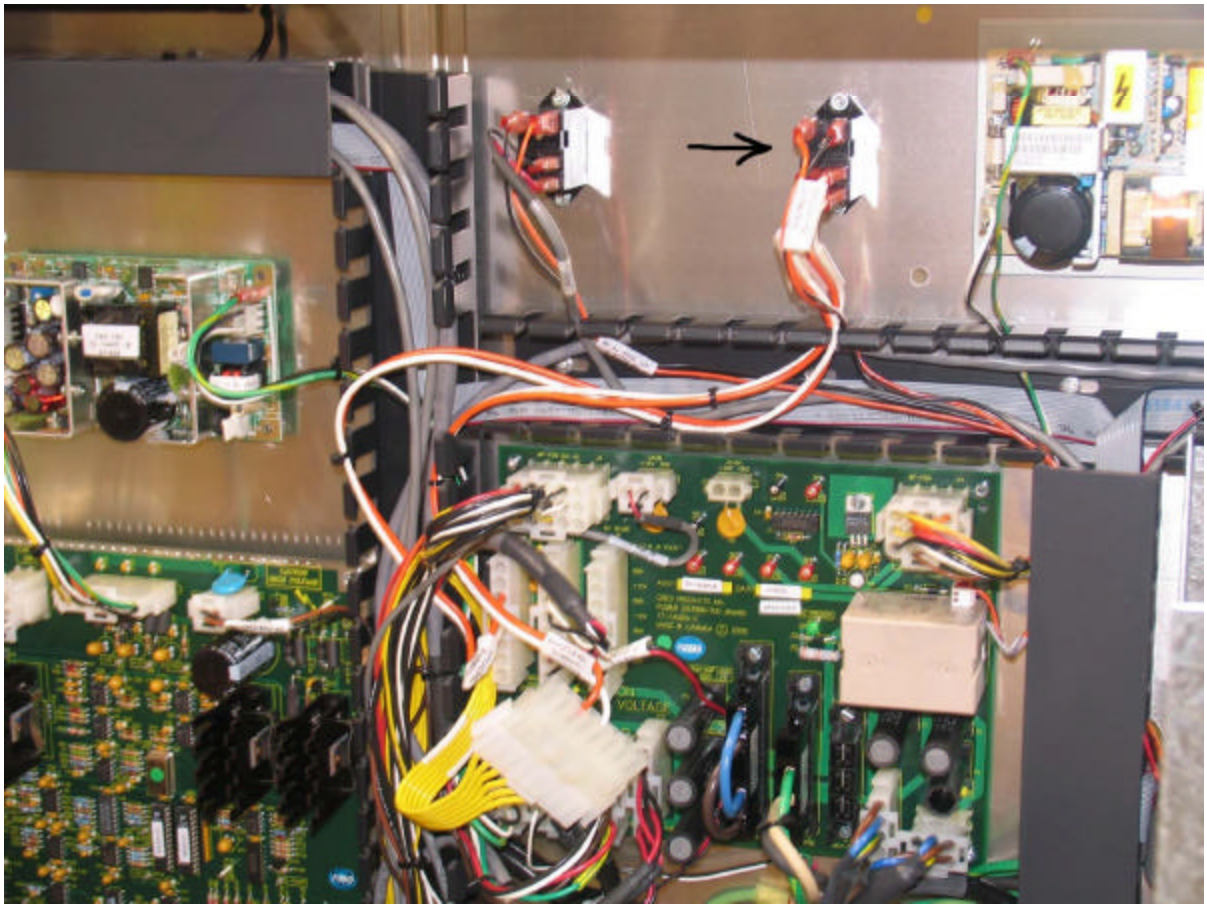


Figure 1: Focus laser relay location and wiring

7. Disconnect the existing 10-3514A PDB-MegaPAC cable from J16 on the PDB. Insert the 3 female pins from the new 10-3982B PDB-LPS2 cable into pin 4 (brown), pin 5 (blue), and pin 6 (green-yellow ground) on the mate-n-lock connector. Route cable through to the area behind the MegaPAC power supply.

8. Behind the MegaPak, use the PIDG crimp tool to attach the16-3367 fork terminals onto the bare wires of the existing 10-3572A PDB-LPS cable assembly. NOTE: The 16-3367 fork terminals are part of the 11-0626A kit.

7.3 48V Power Supply Mounting

1. Locate the DC terminals of the two new power supplies (13-4832) and use a permanent ink pen to label 'plus and minus' terminal polarities according to Figure 2.

2. Use a permanent ink pen and mark one power supply (13-4832) with the label "PS5" and the other with label "PS6". Refer to Figure 4 for recommended location of labels.
NOTE: Also mark the plate underneath the power supplies in order to avoid confusion if the power supplies are removed or replaced.



Figure 2: Marking DC terminal polarities on new power supplies

3. Install PS5 onto the centre set of mounting holes on the mounting bracket (57-1497B) using four M4 button-head screws (52-4172) and four M4 flat washers (52-4054). Note the proper orientation of the power supply with respect to the two semi-circular cuts in the front flange. NOTE: PS5 is the one closest to the PDB board. See Figure 3 for more detail.

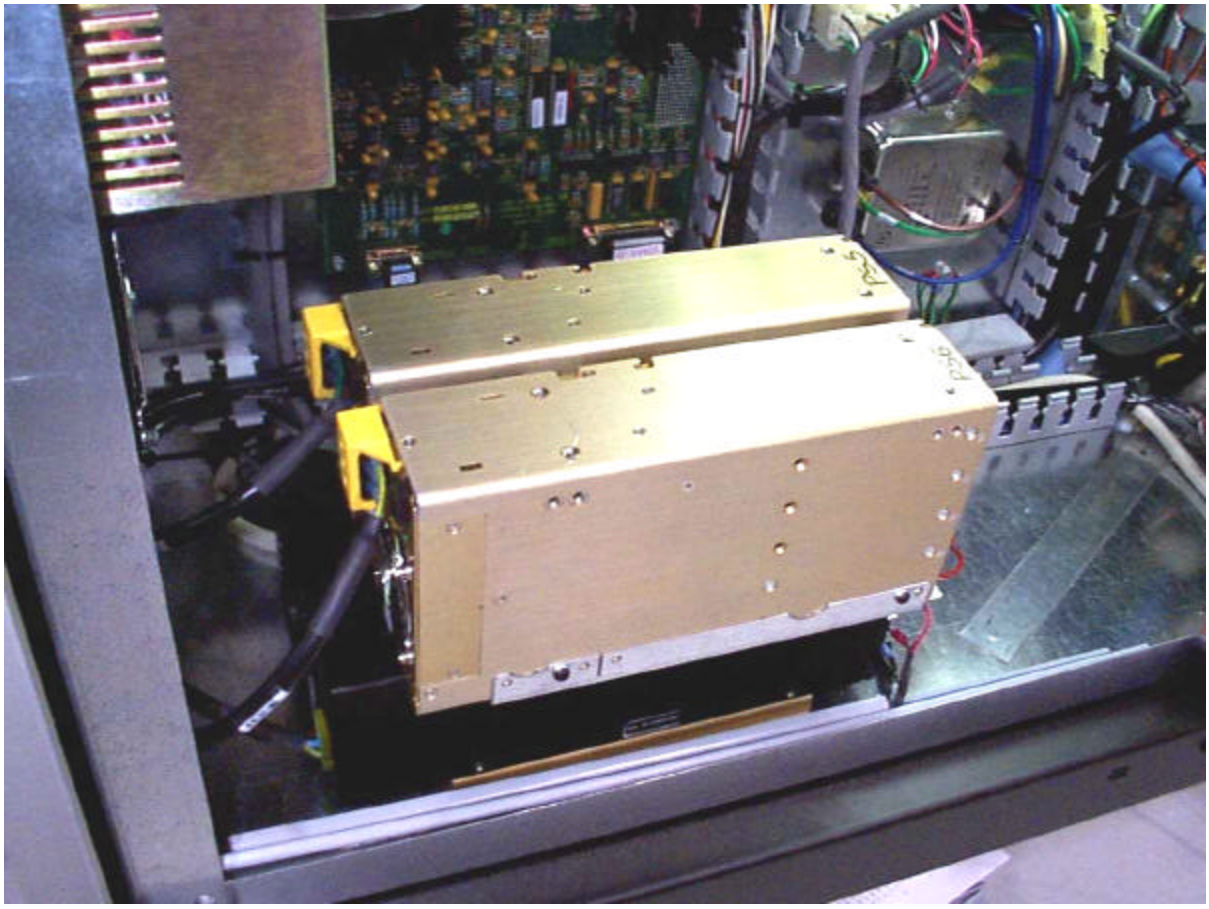


Figure 3: PS5 and PS6 location and AC wiring.

4. Attach the existing 10-3572A PDB-LPS cable to the AC terminal on the back of PS5 as shown in Figure 3. The European color code and symbols for AC wiring is defined accordingly:

	Line or L1	Neutral or L2	Ground
Colour	Brown	Blue	Green - Yellow
Symbol			

5. Reuse M4 button-head screws and M4 washers to mount the 57-1497B power supply bracket to top of the MegaPAC power supply as shown in Figure 3.

6. Attach the new 10-3982A PDB-LPS2 cable to the AC terminal on the back of PS6 as shown in Figure 3. Mount PS6 to side flange of bracket (57-1497B) using two M4 button-head screws (52-4172) and two M4 flat washers (52-4054) as shown in Figure 3.

7.4 48V Power Supply DC Wiring

Refer to the Appendix power supply setup diagrams and the 77-3316A head wiring diagram.

1. If the machine has the older 10-3517A cable, connect the wires directly to the PS5 and PS6 power supplies according to Table 1. Tie unused red and black wires neatly out of the way with cable ties. See Figure 4.

2. If the machine has the newer 10-4149A and 10-4148A cables, discard the 10-4148A and replace with the 10-4147A cable. Then connect the 10-4147A to the PS5 and PS6 power supplies according to Table 1. See Figure 5.

CAUTION: If the 10-3516A or 10-4148A cable is not wired correctly to PS5 and PS6, the exposure head can be damaged or the write laser can be permanently enabled! Double-check your wiring connections before applying power.

Pins on cable 10-3516A or 10-4147A	Power Supply	Power Supply Polarity
Pin 4	PS5	Positive (+)
Pin 6	PS5	Negative (-)
Pin 1	PS6	Positive (+)
Pin 3	PS6	Negative (-)

Table 1: Power Supply Connections .

3. Place the 10A slow blow fuse (13-4694) into the F9 fuse holder on the PDB. Mark label (74-3174) with text “PS6 : 10A/SB” and affix it to the PDB directly underneath F9.

4. At the exposure head end of the flex track, connect the 10-3896B EH adapter to the10-3517A or 10-4149A EH-PDB cable.

5. Tie loose cables. Place wiring into appropriate cable ducts.



Figure 4: Older PS5 and PS6 DC Wiring

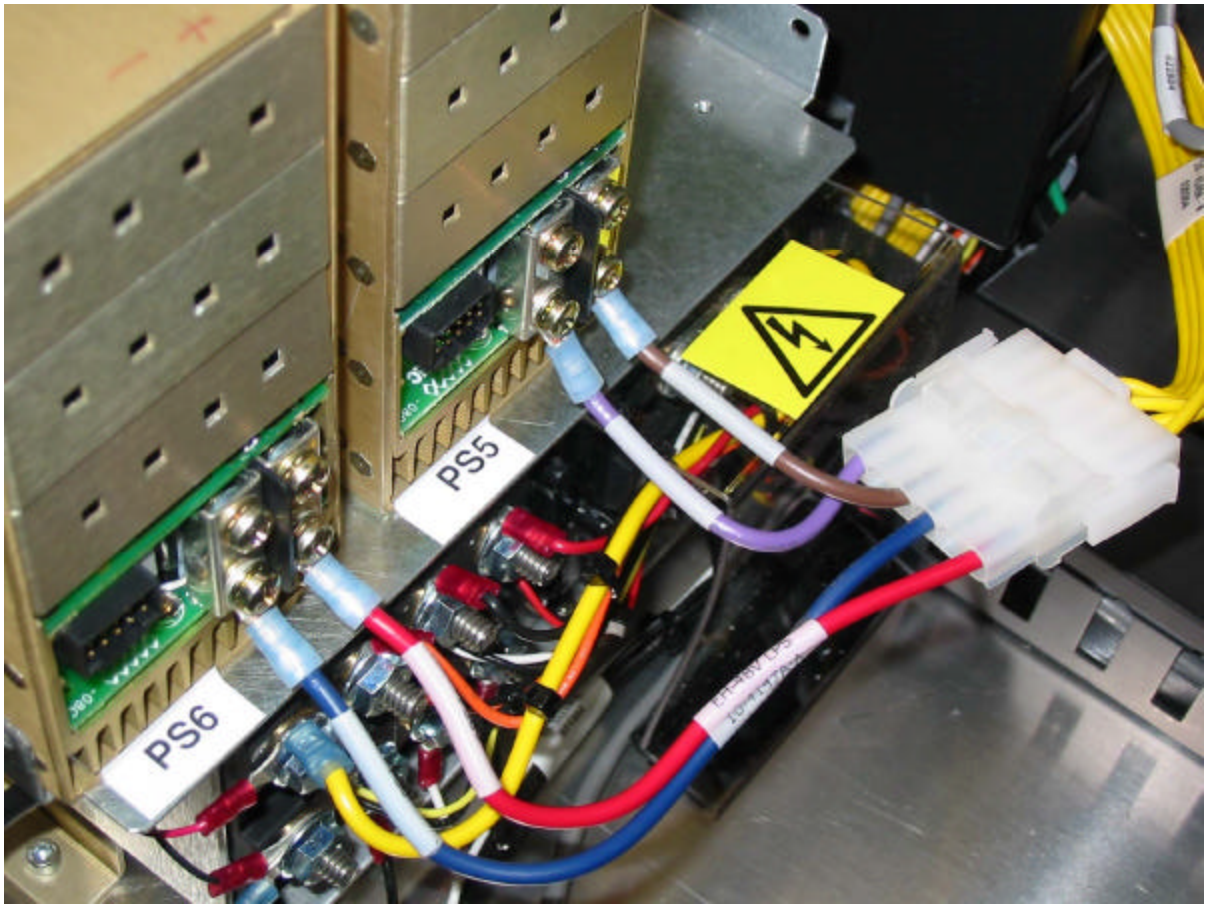


Figure 5: Newer PS5 and PS6 DC Wiring

8. CHANGE IN KEYSWITCH OPERATION WITH THE 40W V-HEAD

With this power supply upgrade from the 20W system, there are important changes in the keyswitch operation worth noting:

1. The write laser will no longer be enabled with the keyswitch in the “Laser / Mechanical Hazards” position. The write laser will only work with the keyswitch in the “Normal Operation” position and with all panels in place.
2. The focus laser will be enabled with the keyswitch in the “Laser / Mechanical Hazards” position, so the head can still be installed and zeroed without defeating any panel sensors.

9. TESTING FOR PROPER KEYSWITCH OPERATION WITH THE 40W V-HEAD

There are four tests to confirm proper operation of the keyswitch, focus laser and write laser functions. These tests are summarized in Table 2.

To complete these tests, the FDPE board and all panels except front centre must be installed.

The centre panel interlock switch will be 'open' or 'closed' (bypassed) corresponding with the test number in table. Bypass will be done with magnet or Omron key depending upon TS-VLF undergoing conversion.

The workstation command "laser off" will be entered through the diagnostic monitor at the start of each of the four tests.

CAUTION: Bypassing the panel interlock switch creates a potentially hazardous situation! Take precautions to not accidentally expose yourself to the lasers.

Cable 10-3896 will be disconnected from the head and specific pin voltages measured during each of the four tests according to the following:

- Focus Laser is "On" when 24V DC measured between pins 8 and 9.
- Focus Laser is "Off" when 0V DC measured between pins 8 and 9.
- Writer Laser is "On" when 48V DC measured between pins 3 and 6.
- Write Laser is "Off" when 0V DC measured between pins 3 and 6.

For each of the four tests, 48V DC must always exist between pins 1 and 4 on cable 10-3896.

Centre Panel Pos.	Keyswitch Position "Laser/Mechanical Hazards"	Keyswitch Position "Normal Operations"
Open (not installed)	**TEST #2** Focus Laser = "On" Write Laser = "Off"	**TEST #1** Focus Laser = "Off" Writer Laser = "Off"
Closed (switch defeated)	**TEST #3** Focus Laser = "On" Write Laser = "Off"	**TEST #4** Focus Laser = "On" Write Laser = "On"

Table 2: Truth table for testing keyswitch and laser operations

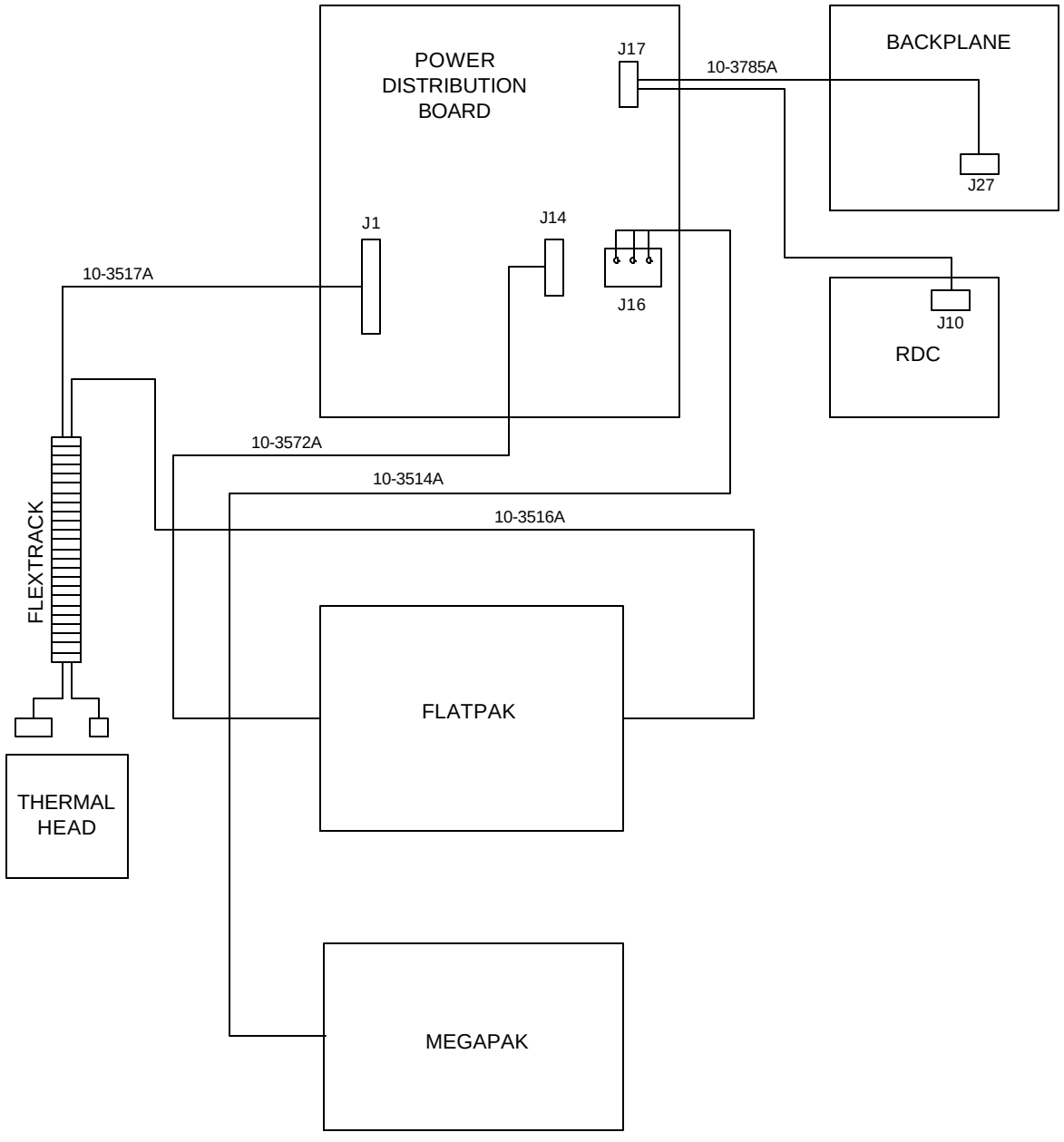
10. FINAL NOTE

After testing, retrieve bypass magnet or Omron key from machine and be certain to take it with you when leaving the customer site.

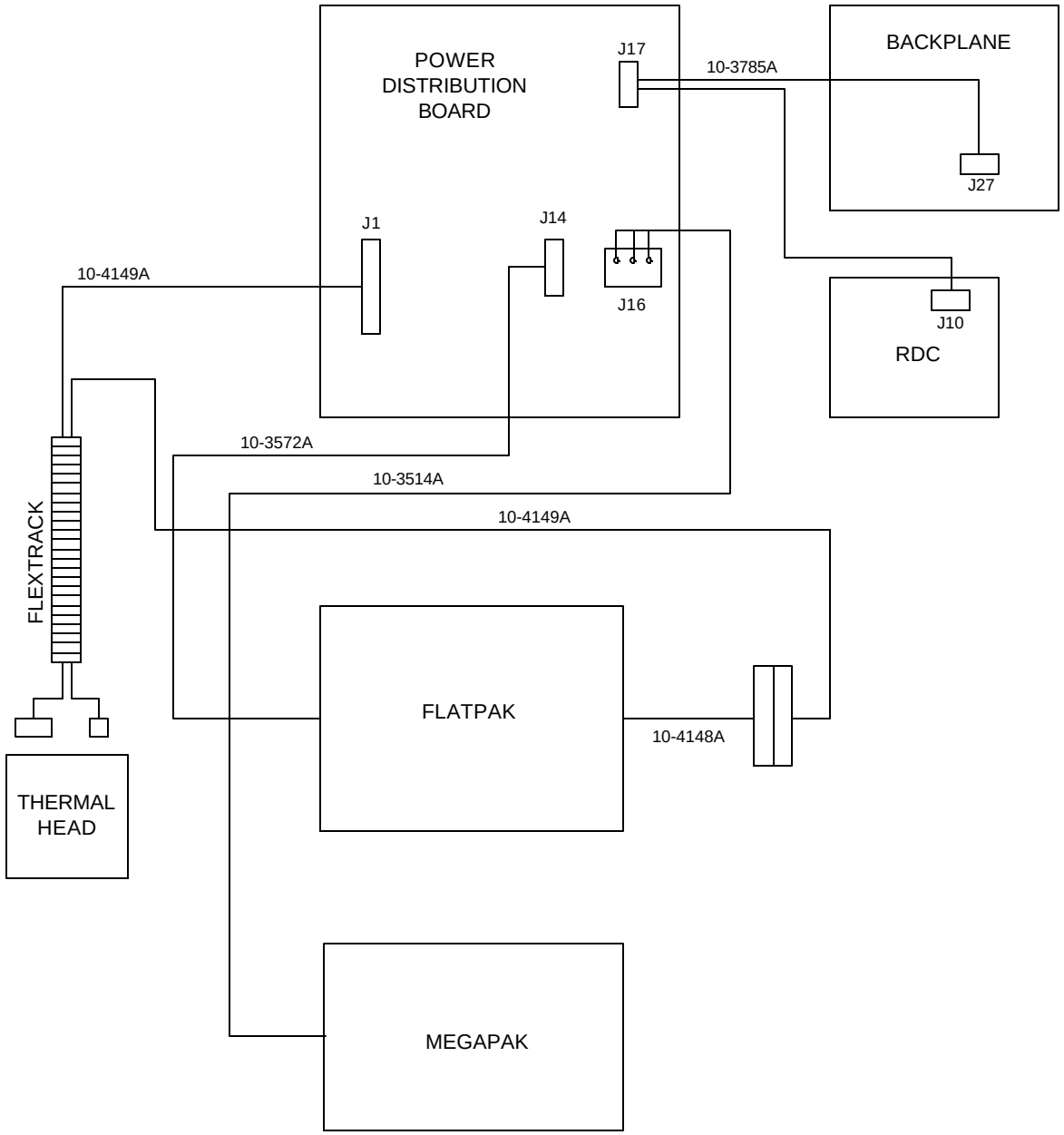
11. APPENDIX

11.1 24V (20W) Thermal Head Power Supply Setup (Before Retrofit)

11.1.1 Older Wiring

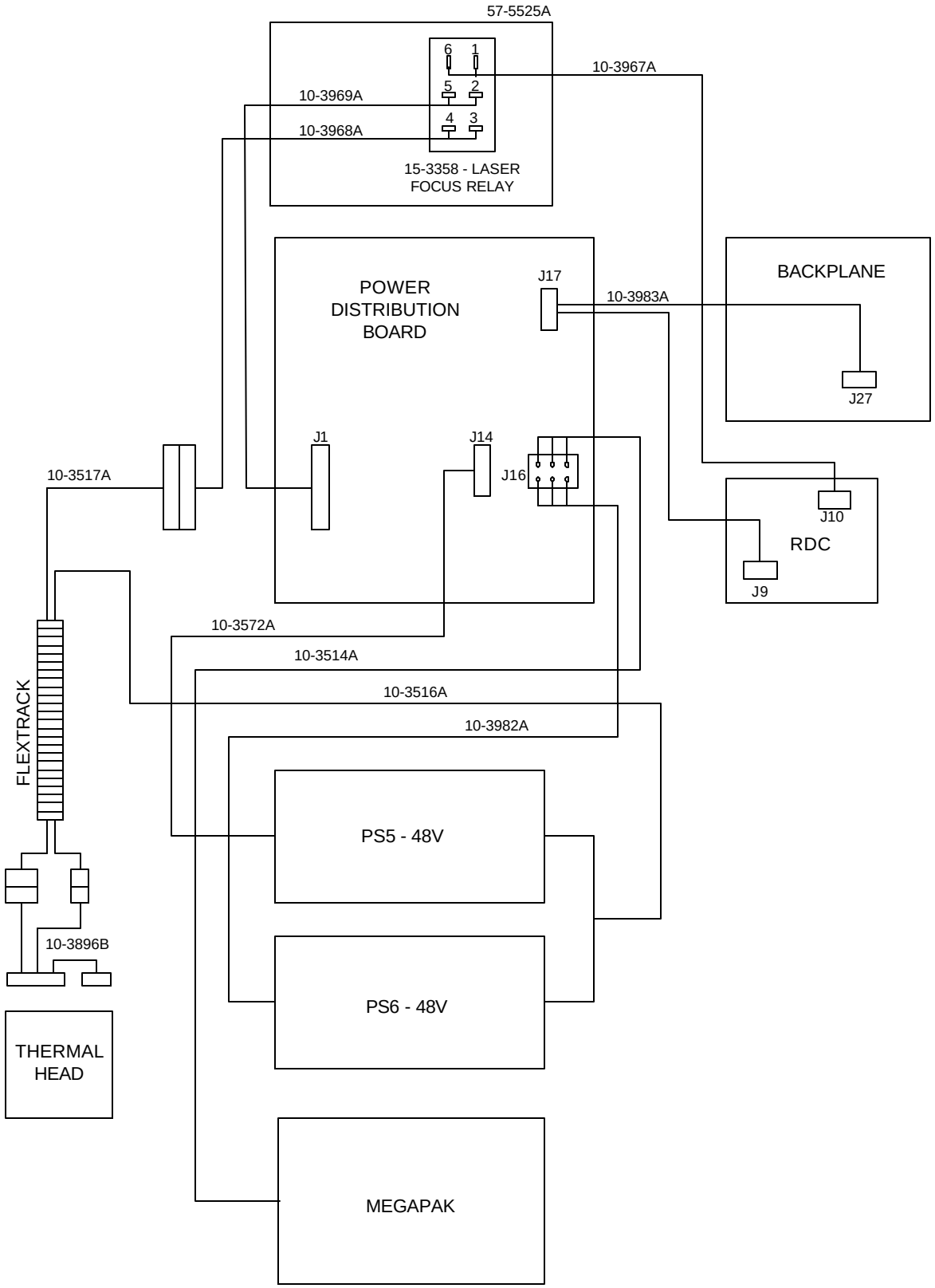


11.1.2 Newer Wiring



11.2 48V (40W) Thermal Head Power Supply Setup (After Retrofit)

11.2.1 Older Wiring



11.2.2 Newer Wiring

