



LOW VOLTAGE DISCONNECT PANEL

PRODUCT MANUAL

RECEIVING INSTRUCTIONS & GENERAL EQUIPMENT INFORMATION

Please Note: For your protection, the following information and the product manual should be read and thoroughly understood before unpacking, installing, or using the equipment.

UNIPOWER, LLC presents all equipment to the delivering carrier securely packed and in perfect condition. Upon acceptance of the package from us, the delivering carrier assumed responsibility for its safe arrival to you. Once you receive the equipment, it is your responsibility to document any damage the carrier may have inflicted, and to file your claim promptly and accurately.

1. PACKAGE INSPECTION

- 1.1 Examine the shipping crate or carton for any visible damage: punctures, dents, and any other signs of possible internal damage.
- 1.2 Describe any damage or shortage on the receiving documents, and have the carrier sign their full name.
- 1.3 If your receiving freight bill notes that a Tip-N-Tell is attached to your freight, locate it. If the Tip-N-Tell arrow has turned even partially blue, this means the freight has been tipped in transport. Make sure the carrier notes this on your receipt before you sign for the freight.

2. EQUIPMENT INSPECTION

- 2.1 Within fifteen days, open the crate and inspect the contents for damages. While unpacking, be careful not to discard any equipment, parts, or manuals. If any damage is detected, call the delivering carrier to determine appropriate action. They may require an inspection.

***SAVE ALL SHIPPING MATERIAL FOR THE INSPECTOR TO SEE!**

- 2.2 After the inspection has been made, call UNIPOWER. We will determine if the equipment should be returned to our plant for repair, or if some other method would be more expeditious. If it is determined that the equipment should be returned to UNIPOWER, ask the delivering carrier to send the packages back to UNIPOWER at the delivering carrier's expense.
- 2.3 If repair is necessary, we will invoice you for the repair so that you may submit the bill to the delivering carrier with your claim form.
- 2.4 It is your responsibility to file a claim with the delivering carrier. Failure to properly file a claim for shipping damages may void warranty service for any physical damages later reported for repair.

3. HANDLING

Equipment can be universally heavy or top-heavy. Use adequate manpower or equipment for handling. Until the equipment is securely mounted, be careful to prevent the equipment from being accidentally tipped over.

4. NAMEPLATE

Each piece of UNIPOWER equipment is identified by a part number on the nameplate. Please refer to this number in all correspondence with UNIPOWER.

5. INITIAL SETTINGS

All equipment is shipped from our production area *fully checked and adjusted*. Do not make any adjustments until you have referred to the technical reference or product manual.

6. SPARE PARTS

To minimize downtime during installation or operation, we suggest you purchase spare fuses, circuit boards and other recommended components as listed on the Recommended Spare Parts List in the back of the product manual. If nothing else, we strongly recommend stocking spare fuses for all systems.

REVISION HISTORY

| REV | DESCRIPTION | CHECKED/APPROVED BY & DATE |
|------------|--------------------|-------------------------------------------|
| 6 | See PCO 45403 | CJM / 8-8-19 |
| 7 | See ECN 46140 | JPR / 1-3-24 |

PROPRIETARY AND CONFIDENTIAL

The information contained in this product manual is the sole property of UNIPOWER, LLC. Reproduction of the manual or any portion of the manual without the written permission of UNIPOWER, LLC is prohibited.

© Copyright UNIPOWER, LLC 2015

DISCLAIMER

Data, descriptions, and specifications presented herein are subject to revision by UNIPOWER, LLC without notice. While such information is believed to be accurate as indicated herein, UNIPOWER, LLC makes no warranty and hereby disclaims all warranties, express or implied, with regard to the accuracy or completeness of such information. Further, because the product(s) featured herein may be used under conditions beyond its control, UNIPOWER, LLC hereby disclaims and excludes all warranties, express, implied, or statutory, including any warranty of merchantability, any warranty of fitness for a particular purpose, and any implied warranties otherwise arising from course of dealing or usage of trade. The user is solely responsible for determining the suitability of the product(s) featured herein for user's intended purpose and in user's specific application.

Throughout the remainder of this manual, "UNIPOWER" will mean "UNIPOWER, LLC."

PERSONNEL REQUIREMENTS

Installation, setup, operation, and servicing of this equipment should be performed by qualified persons thoroughly familiar with this Product Manual and Applicable Local and National Codes. A copy of this manual is included with the equipment shipment.

TABLE OF CONTENTS

| | | |
|---|----------------------------------------------|---|
| 1 | INSTALLATION | 1 |
| 2 | VERIFICATION OF ADJUSTMENTS | 1 |
| 3 | ADJUSTMENT OF THE LVD PANEL | 2 |
| 4 | FUNCTIONAL DESCRIPTION OF USER CONTROLS..... | 3 |
| 5 | PRODUCT SUPPORT | 4 |

1 INSTALLATION

1. Mount the low voltage disconnect panel (LVD) in a relay rack.
2. Place the control switches in their normal positions.
3. Route and connect the “HOT” lead from the load to the large lug on the LVD marked “LOAD”. Note that the “HOT” lead may be positive or negative depending on the grounding convention of the system.
4. Route and connect the “HOT” lead from the battery to the large lug on the LVD marked “BATT”. Note that the “HOT” lead may be positive or negative depending on the grounding convention of the system.
5. Place the “BYPASS/NORMAL” control switch in the “BYPASS” position.
6. Route and connect the DC control wires to the terminal block on the LVD. Be sure that the connections are properly polarized.
7. Connect any included alarm contacts. (optional)
8. Please follow the instructions below for adjustment verification of the LVD.

2 VERIFICATION OF ADJUSTMENTS

The LVD adjustments can be completely verified with a quality voltmeter and a small screwdriver. If it is desired to keep the load energized while checking the LVD, the “BYPASS/NORMAL” switch must be moved to the “BYPASS” position before moving the “CALIBRATE/NORMAL” switch to the “CALIBRATE” position. If the “BYPASS/NORMAL” switch is left in the “NORMAL” position, the contactor can de-energize when the low voltage trip point is simulated during the test. This can be useful for checking the operation of the contactor or intentionally dropping the load, but in most instances the load should remain energized.

1. Place the “BYPASS/NORMAL” switch in the “BYPASS” position.
2. Place the “CALIBRATE/NORMAL” switch in the “CALIBRATE” position.
3. Connect a voltmeter to the test jacks on the front of the LVD panel. Be sure to observe the polarity and range restrictions of the voltmeter.
4. Locate the “CAL. V. ADJ.” Potentiometer and turn it fully clockwise. This potentiometer may be adjusted through the access hole on the front of the LVD. Note that this control cannot provide a voltage for calibration that is higher than the existing battery voltage.
5. Slowly turn the “CAL. V. ADJ.” Potentiometer counterclockwise until the LED (light emitting diode) marked “DISC.” Turns on. This simulates the point at which the LVD would disconnect the load under normal conditions. If this voltage is not set as desired, (typically 1.75 volts per cell for lead-antimony and lead-calcium cells) follow the instructions for adjustment below.
6. Slowly turn the “CAL. V. ADJ.” Potentiometer clockwise until the LED marked “DISC.” Turns off. This simulates the point at which the LVD would re-connect the load under normal conditions. If this voltage is not set as desired, (typically 2.08 volts per cell for lead-antimony and lead-calcium cells) follow the instructions for adjustment below.

NOTE: If the connect and disconnect voltages are set as desired, follow steps 7 through 11 to place the LVD in normal service.

7. Turn the “CAL. V. ADJ.” Potentiometer fully clockwise.
8. Place the “CALIBRATE/NORMAL” switch in the “NORMAL” position.
9. Verify that the lamp marked “DISC.” Is off. If the lamp is on when performing step 10, the load will be dropped.
10. Place the “BYPASS/NORMAL” switch in the “NORMAL” position.
11. Disconnect the voltmeter from the test jacks on the front of the LVD panel.

3 ADJUSTMENT OF THE LVD PANEL

The LVD can be completely adjusted with a quality voltmeter and a small screwdriver. If it is desired to keep the load energized while adjusting the LVD, the “BYPASS/NORMAL switch must be moved to the “BYPASS” position before moving the “CALIBRATE/NORMAL” switch to the “CALIBRATE” position. If the “BYPASS/NORMAL” switch is left in the “NORMAL” position, the contactor can de-energize when the low voltage trip point is simulated during the test. This can be useful for checking the operation of the contactor or intentionally dripping the load, but in most instances the load should remain energized.

1. Place the “BYPASS/NORMAL” switch in the “BYPASS” position.
2. Place the “CALIBRATE/NORMAL” switch in the “CALIBRATE” position.
3. Connect a voltmeter to the test jacks on the front of the LVD panel. Be sure to observe the polarity and range restrictions of the voltmeter.
4. Locate the “CAL. V. ADJ.” Potentiometer and turn it fully counterclockwise. This potentiometer may be adjusted through the access hole on the front of the LVD. Note that this control cannot provide a voltage for calibration that is higher than the existing battery voltage.
5. Locate the “CONN. V. ADJ.” Potentiometer and turn it fully clockwise. This potentiometer may be adjusted through the access hole on the front of the LVD.
6. Locate the “DIFF. V. ADJ.” Potentiometer and turn it fully counterclockwise. This potentiometer may be adjusted through the access hole on the front of the LVD.
7. Verify that the LED marked “DISC.” is turned on.
8. Turn the “CAL. V. ADJ.” Potentiometer clockwise until voltmeter shows the voltage at which the LVD is desired to re-connect the load after disconnection. (Typically 2.08 volts per cell for lead-antimony and lead-calcium cells.)
9. Slowly turn the “CONN. V. ADJ.” Potentiometer counterclockwise until the LED marked “DISC.” Turns off.
10. Turn the “DIFF. V. ADJ.” Potentiometer fully clockwise.
11. Verify that the LED marked “DISC.” Remains turned off.

12. Turn the “CAL. V. ADJ.” Potentiometer counterclockwise until the voltmeter shows the voltage at which the LVD is desired to disconnect the load. (Typically 1.75 volts per cell for lead-antimony and lead-calcium cells.)
13. Slowly turn the “DIFF. V. ADJ.” Potentiometer counterclockwise until the LED marked “DISC” turns on.
14. Turn the “CAL. V. ADJ.” Potentiometer fully clockwise.
15. Slowly turn the “CAL. V. ADJ.” Potentiometer counterclockwise until the LED marked “DISC.” Turns on. Verify that the voltage shown on the voltmeter is the proper disconnect voltage.
16. Slowly turn the “CAL. V. ADJ.” Potentiometer clockwise until the LED marked “DISC” turns off. Verify that the voltage shown on the voltmeter is the proper re-connect voltage.

NOTE: If the voltages are not set properly, repeat steps 4 through 16 above until the desired thresholds are achieved. If the connect and disconnect voltages are set as desired, follow steps 17 through 21 to place the LVD in normal service.

17. Turn the “CAL. V. ADJ.” Potentiometer fully clockwise.
18. Place the “CALIBRATE/NORMAL” switch in the “NORMAL” position.
19. Verify that the lamp marked “DISC.” Is off. If the lamp is on when performing step 20, the load will be dropped.
20. Place the “BYPASS/NORMAL” switch in the “NORMAL” position.
21. Disconnect the voltmeter from the test jacks on the front of the LVD panel.

4 FUNCTIONAL DESCRIPTION OF USER CONTROLS

The “BYPASS/NORMAL” switch allows the user to pull in the contactor for an indefinite period of time. This feature is used if interruption of the load is undesirable while calibrating the LVD or removing the LVD circuit board from the LVD panel. Note that when this switch is in the “BYPASS” position, the LVD cannot protect the batteries from excessive discharge.

The “CALIBRATE/NORMAL” switch allows the user to simulate low battery conditions and adjust the >VD without an external variable voltage source. When the switch is in the “CALIBRATE” position, the battery voltage is divided by the potentiometer marked “CAL. V. ADJ.” Before reaching the voltage sensing circuitry of the LVD. The user can vary the voltage fed into the LVD without discharging the battery bank and thus simulate battery voltage conditions over a wide range. Note that if the “BYPASS/NORMAL” switch is in the “NORMAL” position, and the “CALIBRATE/NORMAL” switch is in the “CALIBRATE” position, the load can be disconnected by operation of the “CAL. V. ADJ.” potentiometer.

The “BYPASS/CALIBRATE” lamp will be illuminated whenever the “BYPASS/NORMAL” and /or the “CALIBRATE/NORMAL” switches are not in their “NORMAL” positions.

The fuse holder marked “FUSE” accepts indicating type fuses. If the fuse blows, an indicator will protrude from the fuse holder. In addition the terminal marked “FUSE SIG.” on the rear of the LVD will close to negative. This allows the connection of external alarms.

The “DISCONNECT” lamp will be illuminated whenever the LVD circuit board is in the disconnect state. Note that this lamp operates independently of the “BYPASS/NORMAL” switch and the load can be disconnected only if the switch is in the “NORMAL” position.

The “CAL. V. ADJ.” Potentiometer, when activated by placing the “CALIBRATE/NORMAL” switch in the “CALIBRATE” position, allows simulation of varying battery voltage. Please refer to the section above pertaining to the “CALIBRATE/NORMAL” switch.

The “CONN. V. ADJ.” Potentiometer adjusts the voltage at which the LVD re-connects the load after disconnection.

The “DIFF. V. ADJ.” Potentiometer adjusts the difference between the voltages at which the LVD disconnects and then re-connects the load.

The test jacks marked “+” and “-” allow the user to monitor the battery voltage as seen by the LVD. If the “CALIBRATE/NORMAL” switch is in the “CALIBRATE” position, the measured voltage will be simulated voltage as set by the “CAL. V. ADJ.” potentiometer.

5 PRODUCT SUPPORT

Product support can be obtained using the following addresses and telephone numbers.

Manufacturing facility:

UNIPOWER, LLC
65 Industrial Park Rd
Dunlap, TN 37327
United States

Phone: +1-954-346-2442

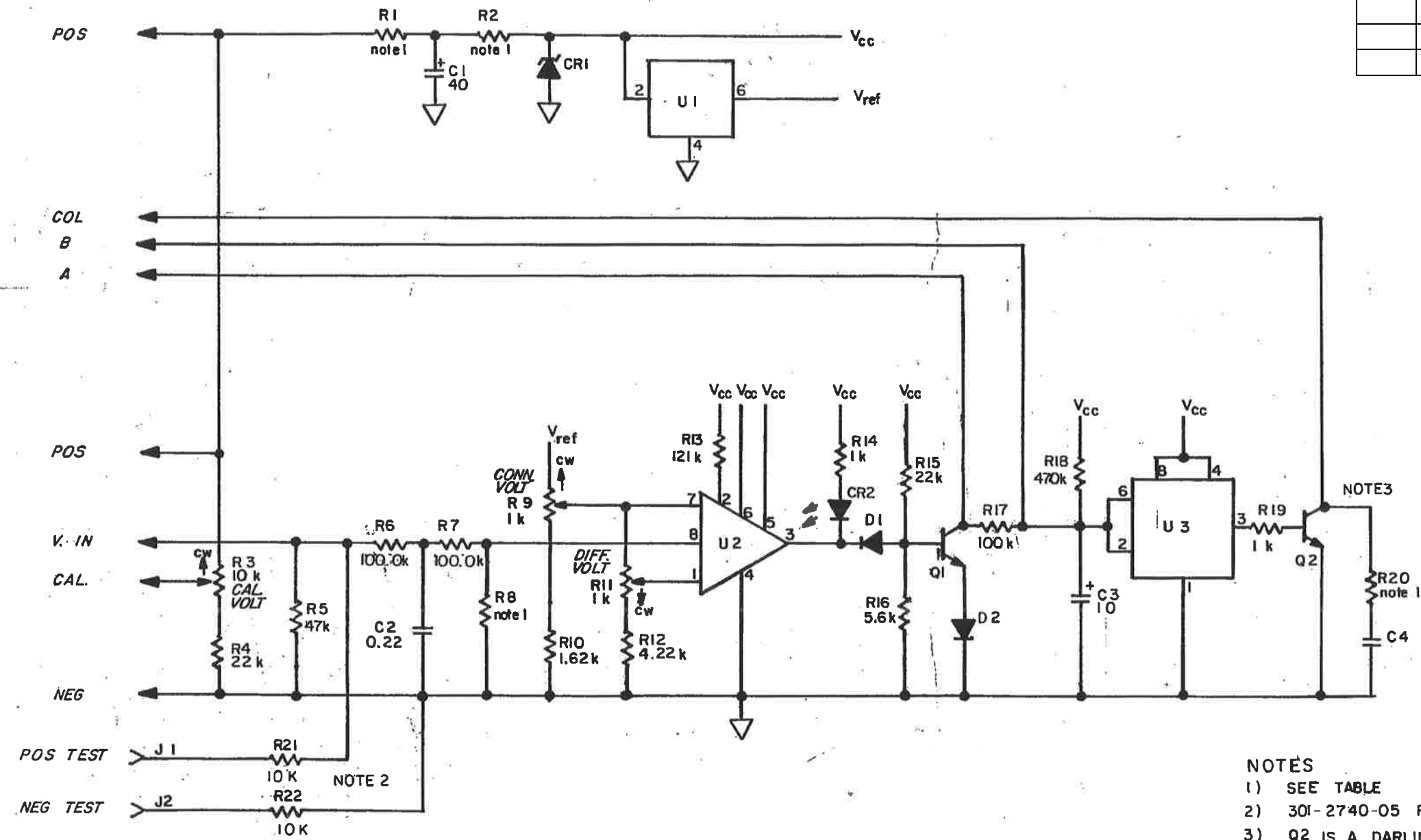
Toll Free: 1-800-440-3504

Web site – www.unipowerco.com

When contacting UNIPOWER, please be prepared to provide:

1. The product model number, spec number, S build number, and serial number - see the equipment nameplate on the front panel
2. Your company’s name and address
3. Your name and title
4. The reason for the contact
5. If there is a problem with product operation:
 - Is the problem intermittent or continuous?
 - What revision is the firmware?
 - What actions were being performed prior to the appearance of the problem?
 - What actions have been taken since the problem occurred?

| Rev | Description | Date | Issued by |
|-----|----------------|---------|-----------|
| 4 | See PCO# 44442 | 6/21/17 | WD |
| | | | |
| | | | |
| | | | |
| | | | |



- NOTES
- 1) SEE TABLE
 - 2) 301-2740-05 R21 AND R22 BECOME 47K 0.5W
 - 3) Q2 IS A DARLINGTON ON ALL VERSIONS EXCEPT THE 301-2740-05 (120) WHICH USES A F.E.T.

TABLE

| -XX | VOLTAGE | R1 | R2 | R8 | R20 | | CR1 | Q2 | C4 |
|-----|---------|--------|--------|-------|-----|--|---------|---------|------------------|
| -01 | 12V | 22 1W | 22 1W | 110K | 4.7 | | 8.2V 5W | RCA122 | 47 μ fd 100V |
| -02 | 24V | 150 2W | 150 2W | 41.2K | 10 | | 10 V 5W | RCA122 | 47 μ fd 100V |
| -03 | 32V | 220 2W | 220 1W | 31.6K | 22 | | 10V 1W | RCA122 | 47 μ fd 100V |
| -04 | 48V | 400 5W | 400 5W | 20.0K | 22 | | 10V 1W | RCA122 | 47 μ fd 100V |
| -05 | 120V | 1K 10W | 1K 10W | 7.50K | 22 | | 10V 1W | BUZ-76A | 40 μ fd 250V |

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS: DECIMALS: ANGLES:
 \pm .XX \pm .XXX \pm
MATERIAL N/A
FINISH N/A
DO NOT SCALE DRAWING

FILE:
301-2740-XX_SHT_1_ISS_4
APPROVALS
DRAWN PKD
DESIGNED R. HAZEN
CHECKED R. HAZEN
ISSUED R. HAZEN
DATE
9-21-82
9-22-82
9-22-82

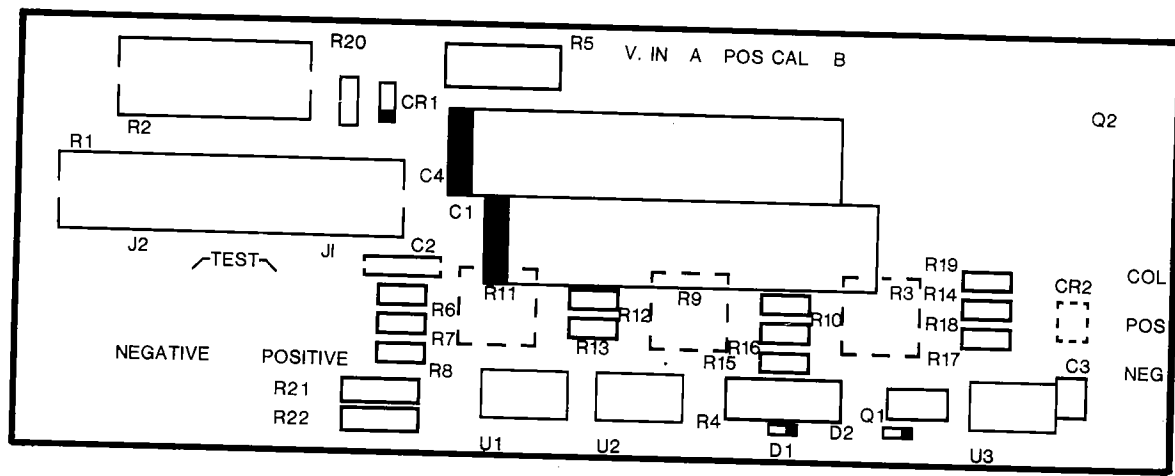


PROPRIETARY INFORMATION
NOT TO BE COPIED, USED, TRANSMITTED, OR DISCLOSED WITHOUT
PRIOR WRITTEN PERMISSION FROM UNIPOWER, LLC.

LOW VOLTAGE DISCONNECT RELAY
DRIVER

| SIZE | FSCM NO. | DWG. NO. | REV. |
|-------|----------|-------------|--------------|
| B | | 301-2740-XX | 4 |
| SCALE | NA | 9M | SHEET 1 OF 2 |

| REVISIONS | | | |
|-----------------------------------|-------------|------|----------|
| REV. | DESCRIPTION | DATE | APPROVED |
| SEE SHEET 1 FOR REVISION LEVEL(S) | | | |



| | | | | | | | | |
|---------------------------------------------------------------------------------------------------------------------------------|----------------------------------|--|--------------------------------------------------------------------------------------------------------------------------------------|--|----------------------------------------|----------|-------------------------|-----------|
| UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES = .XX ± = .XXX ± = | FILE: 301-2740-XX_SHT_2_ISS_4 | | PROPRIETARY INFORMATION NOT TO BE COPIED, USED, TRANSMITTED, OR DISCLOSED WITHOUT PRIOR WRITTEN PERMISSION FROM UNIPOWER, LLC. | | | | | |
| | APPROVALS | | DATE | | LOW VOLTAGE DISCONNECT RELAY DRIVER | | | |
| | DRAWN PKD | | 9-28-82 | | | | | |
| | DESIGNED R. HAZEN | | 9-28-82 | | | | | |
| MATERIAL NA | CHECKED R. HAZEN | | 9-28-82 | | SIZE A | FSCM NO. | DWG. NO. 301-2740-XX | REV. 4 |
| FINISH NA | ISSUED R. HAZEN | | 9-28-82 | | SCALE 1 X | | SHEET 2 OF 2 | |
| NOT SCALE DRAWING | | | | | | | | |

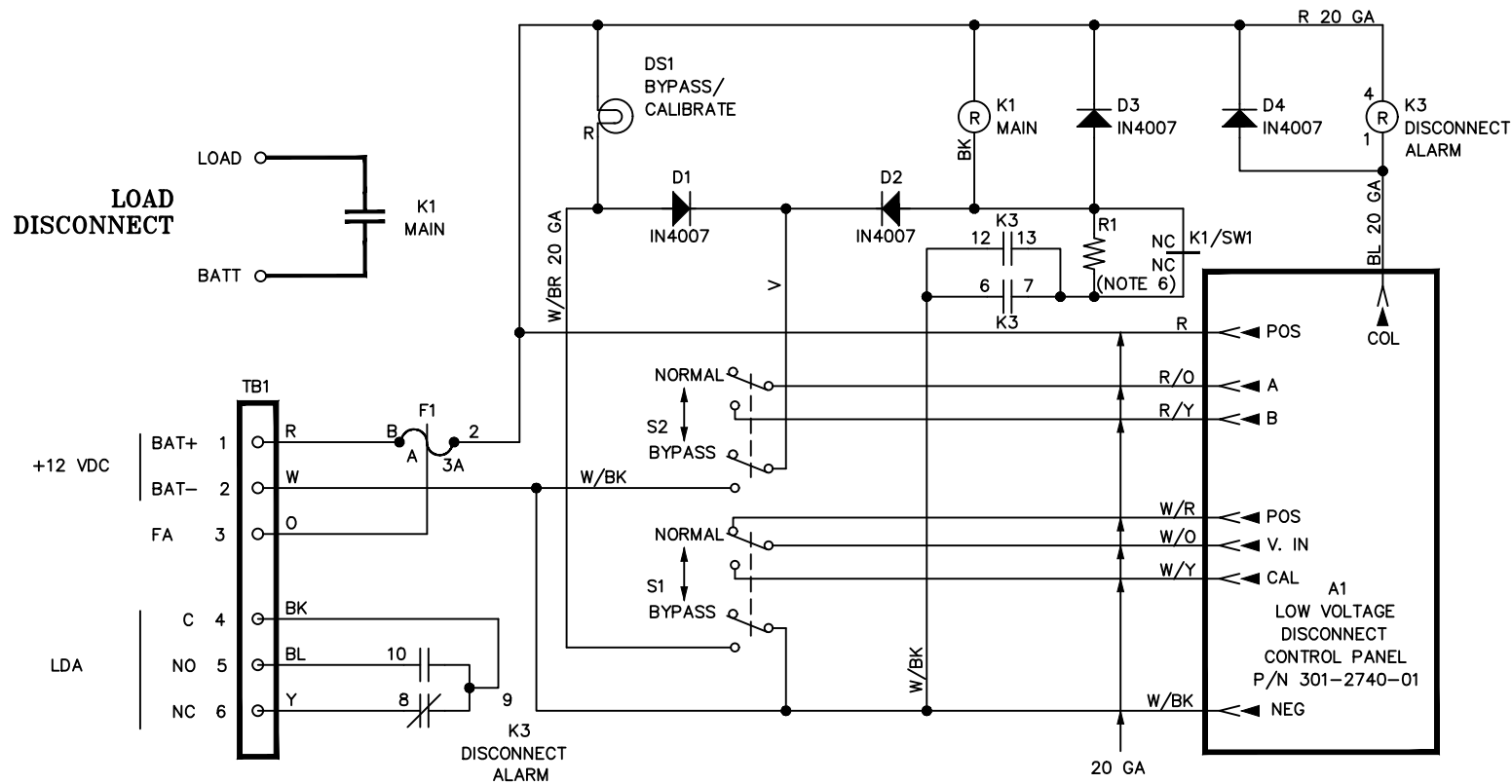
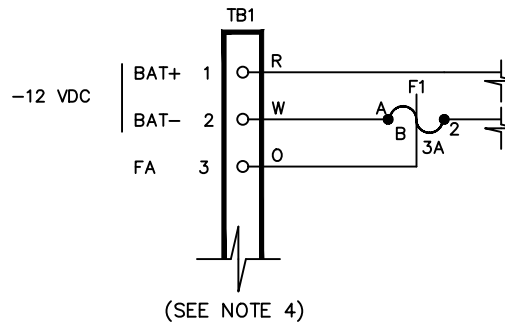


FIG A
POSITIVE GROUND



NOTES:

- | | CURRENT | PANEL WIDTH | ALARM CONTACTS |
|-----|---------|-------------|----------------|
| -53 | 400 | 19/23" | YES |
- ALL WIRES ARE 18 GA UNLESS SPECIFIED.
- ALARM CONTACTS ARE RATED 2 AMP RESISTIVE AT 12-24 VDC, 1 AMP AT 48 VDC AND 0.5 AMP 120 VDC.
- PANEL IS WIRED FOR A NEGATIVE GROUND SYSTEM. TO CONVERT THE PANEL TO A POSTIVE GROUND SYSTEM, WIRE THE PANEL AS SHOWN IN FIG. A.
- APPLY A "3 AMP" LABEL FOR FUSE "F1" ON FRONT OF PANEL, (202-3730-10).
- THE PANEL USES ONE (1) CONTACTOR, (K1), WITH A SERIES DROPPING RESISTOR, (R1), 2 OHM 10 WATT, TO REDUCE COIL VOLTAGE.

ISSUES

| ISSUE # | DESCRIPTION | ISS. BY ISS. DATE |
|---------|-----------------|----------------------|
| 5 | SEE PCO# 44442. | WD 6/21/17 |

| UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES ± TOLERANCES ON: | | APPROVALS | DATE |
|----------------------------------------------------------------------|------------------|-----------------|---------|
| HOLES | +0.004 -0.002 | DRAWN MRB | 4/19/94 |
| FRACTIONS | ±1/32 | CHECKED KEL | 1/30/15 |
| DECIMALS (XX) | ±0.020 | APPROVED DBW | 2/19/15 |
| DECIMALS (XXX) | ±0.010 | APPROVED | |
| ANGLES | ±1/2° | | |

SQUARE CORNERS AND ANGLES ARE 90° UNLESS OTHERWISE SPECIFIED.

WORKMANSHIP:
PER SPEC ENG032

MATERIAL:

FINISH:

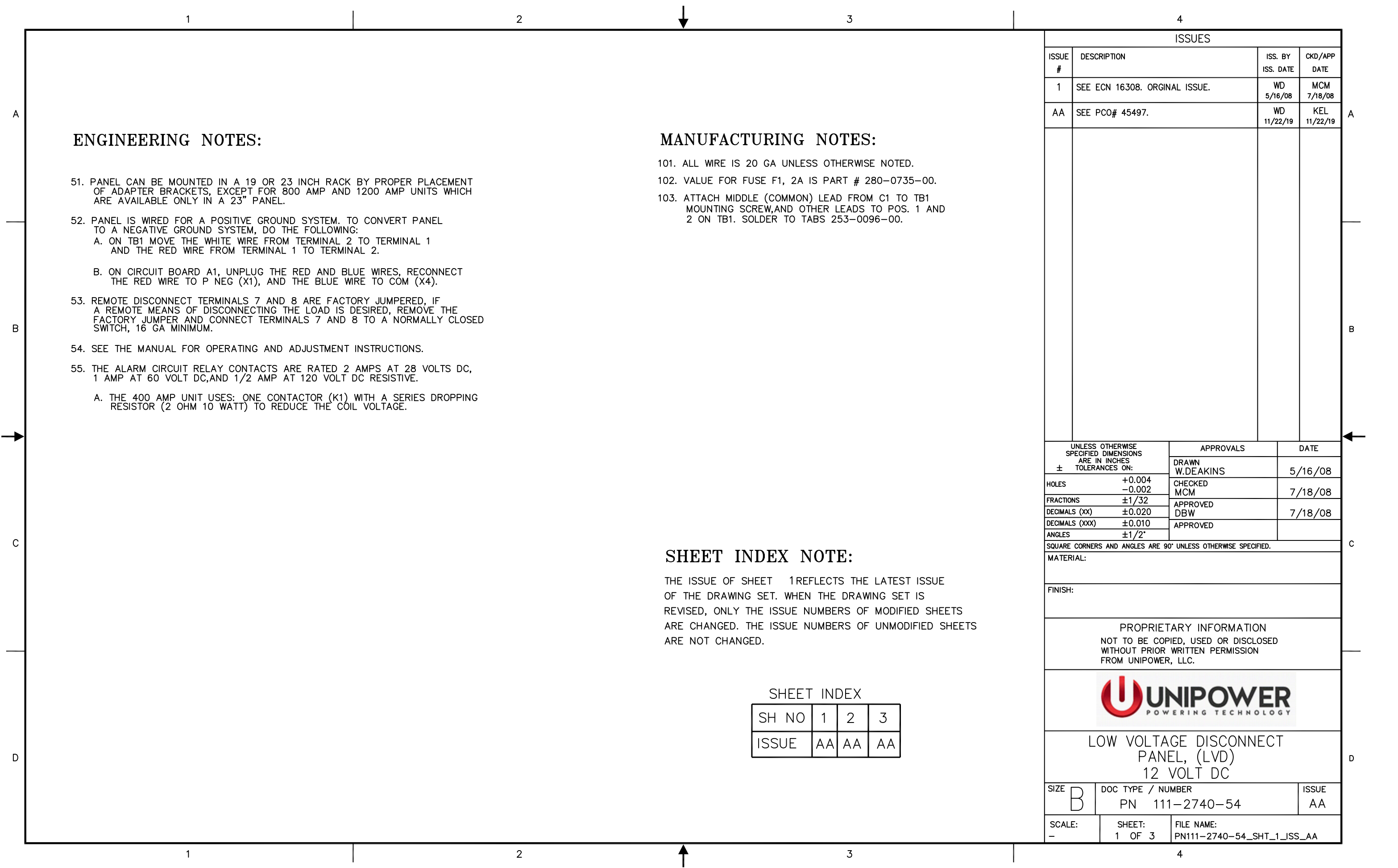
PROPRIETARY INFORMATION

NOT TO BE COPIED, USED, TRANSMITTED, OR DISCLOSED WITHOUT
PRIOR WRITTEN PERMISSION FROM UNIPOWER, LLC.



LOW VOLTAGE
DISCONNECT PANEL
+12/-12 VDC

| SIZE | DOC TYPE / NUMBER | ISSUE |
|---------------|-------------------|-----------------------------------|
| B | SD 111-2740-53 | 5 |
| SCALE: N/A | SHEET: 1 OF 1 | FILE NAME: SD111-2740-53_JSS_5 |



ISSUES

| ISSUE # | DESCRIPTION | ISS. BY ISS. DATE | CKD/APP DATE |
|---------|-------------------------------|----------------------|-----------------|
| 1 | SEE ECN 16308. ORGINAL ISSUE. | WD 5/16/08 | MCM 7/18/08 |
| AA | SEE PCO# 45497. | WD 11/22/19 | KEL 11/22/19 |

| UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON: | APPROVALS | DATE |
|--------------------------------------------------------------------|--------------------|---------|
| ± | DRAWN W.DEAKINS | 5/16/08 |
| HOLES +0.004 -0.002 | CHECKED MCM | 7/18/08 |
| FRACTIONS ±1/32 | APPROVED DBW | 7/18/08 |
| DECIMALS (XX) ±0.020 | APPROVED | |
| DECIMALS (XXX) ±0.010 | | |
| ANGLES ±1/2° | | |

SQUARE CORNERS AND ANGLES ARE 90° UNLESS OTHERWISE SPECIFIED.

MATERIAL:

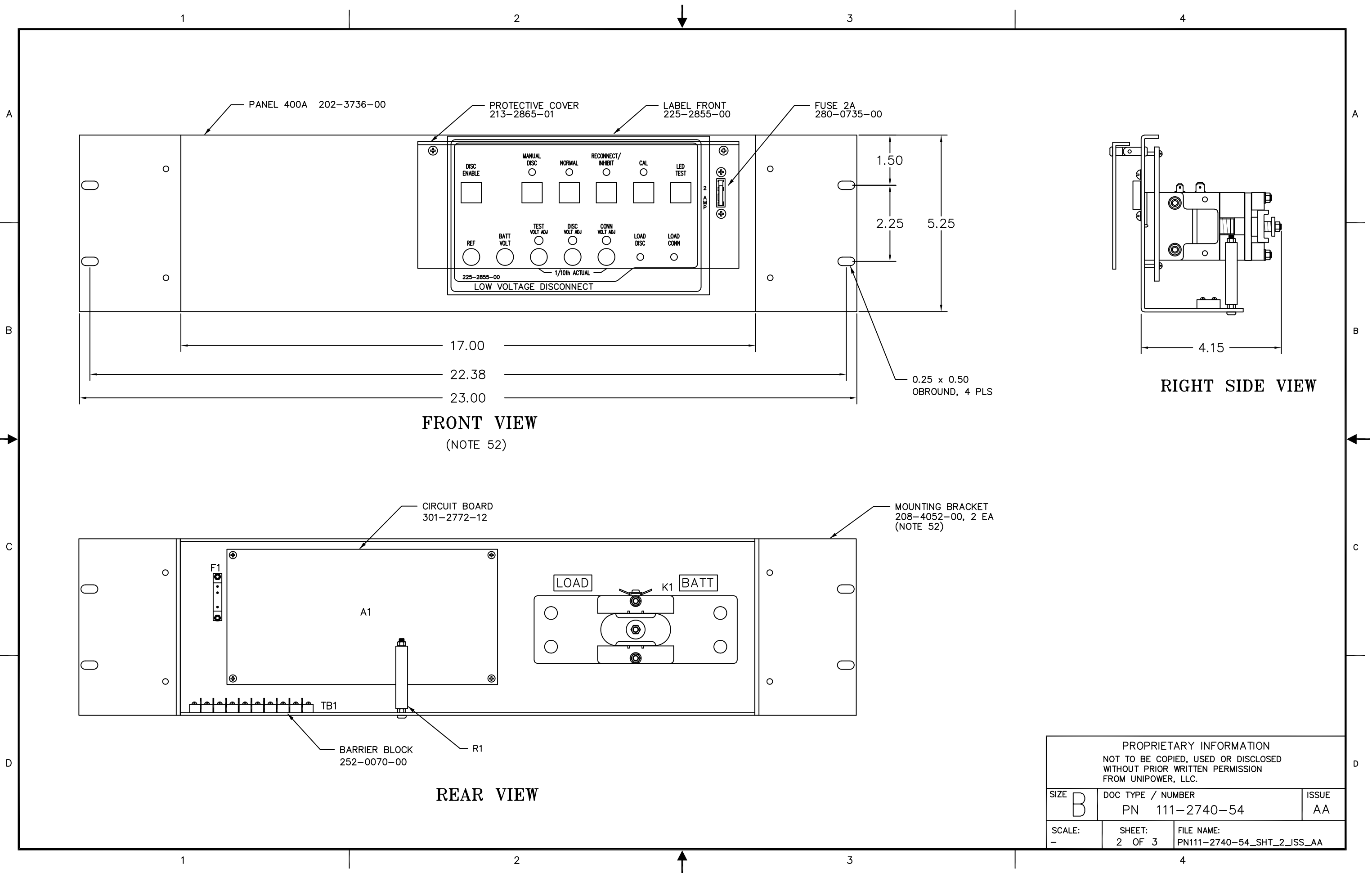
FINISH:

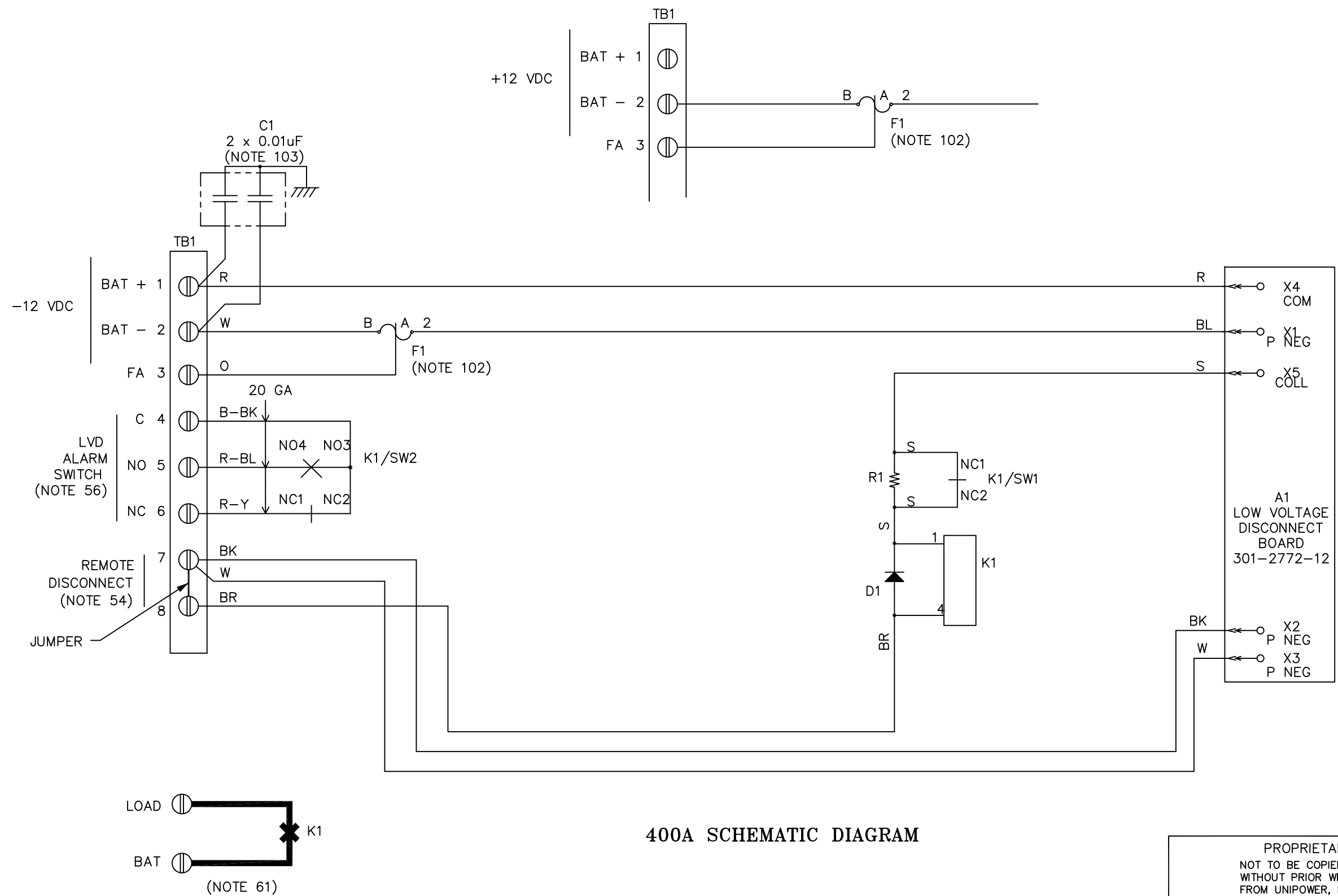
PROPRIETARY INFORMATION
NOT TO BE COPIED, USED OR DISCLOSED
WITHOUT PRIOR WRITTEN PERMISSION
FROM UNIPOWER, LLC.



LOW VOLTAGE DISCONNECT
PANEL, (LVD)
12 VOLT DC

| | | |
|-------------|-------------------------------------|------------------------------------------|
| SIZE B | DOC TYPE / NUMBER PN 111-2740-54 | ISSUE AA |
| SCALE: - | SHEET: 1 OF 3 | FILE NAME: PN111-2740-54_SHT_1_ISS_AA |





| | | |
|---------------------------------------------------------------------------------------------------------------------------|-------------------------------------|------------------------------------------|
| PROPRIETARY INFORMATION NOT TO BE COPIED, USED OR DISCLOSED WITHOUT PRIOR WRITTEN PERMISSION FROM UNIPOWER, LLC. | | |
| SIZE B | DOC TYPE / NUMBER PN 111-2740-54 | ISSUE AA |
| SCALE: - | SHEET: 3 OF 3 | FILE NAME: PN111-2740-54_SHT_3_ISS_AA |