



**Low Voltage  
Disconnect Panel  
PRODUCT MANUAL**

PM990-3291-00, Issue 10

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## **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 humanpower 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.

This manual applies to the following Part Numbers:

± 24 VDC

<u>Max. Current (Amps)</u>	<u>Model Number (without alarm)</u>	<u>Model Number (with alarm)</u>
50	111B.3291.00	111B.3291.10
100	111B.3291.01	111B.3291.11
200	111B.3291.02	111B.3291.12
400	111B.3291.03	111B.3291.13
800	111B.3291.04	111B.3291.14
1200	111B.3291.06	111B.3291.16

± 48 VDC

<u>Max. Current (Amps)</u>	<u>Model Number (without alarm)</u>	<u>Model Number (with alarm)</u>
50	111B.3294.00	111B.3294.10
100	111B.3294.01	111B.3294.11
200	111B.3294.02	111B.3294.12
400	111B.3294.03	111B.3294.13
800	111B.3294.04	111B.3294.14
1200	111B.3294.06	111B.3294.16

**ISSUE HISTORY**

<b>ISSUE</b>	<b>PAGE(S)</b>	<b>DESCRIPTION</b>	<b>ISSUED BY /DATE</b>
10	All	Updated UNIPOWER logo & contact information. See PCO# 44448.	WD 6/26/17

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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.

## 1. EQUIPMENT DESCRIPTION

- 1.1 General Description: The UNIPOWER Low Voltage Disconnect Panel (LVD) provides protection for stationary battery systems and connected equipment. When the battery voltage drops below an adjustable level, the LVD disengages a contactor to disconnect all loads from the batteries. This prevents excessive battery discharge and protects the connected system from low voltages.
- 1.2 Physical Specifications:
- |             |   |
|-------------|---|
| Dimensions: | 5.25" H x 19"/23" W x 6" D  |
| Weight:     | 7 – 12 lbs.   |
| Accuracy:   | ± 0.1% deviation from setpoint or ± 1 digit (3 ½ digit DVM), whichever is larger. |
- 1.3 Operating/Storage Temperatures:
- |                        |                              |
|------------------------|------------------------------|
| Storage Temperature:   | -40 to 85 °C                 |
| Operating Temperature: | 0 to 50 ° C                  |
| Operating Humidity:    | 0 to 99% non-condensing      |
| Circuit Protection:    | One GMT-type indicating fuse |
- 1.4 Features:
- ◆ LED status indicators
  - ◆ On-line calibration without load disturbance
  - ◆ On-line detector verification without load disturbance
  - ◆ Manual disconnect pushbutton with enable pushbutton
  - ◆ Disconnect Inhibit Pushbutton
  - ◆ LED test pushbutton
  - ◆ Automatic or manual reconnection
  - ◆ Extended disconnect delay—Adjustable delay (3-375 seconds) prevents undesired load disconnection due to sluggish battery response

## 2. INSTALLATION

### FACTORY WIRING

- 2.1 The DIP (Dual Inline Package) switch on the back of the panel circuit board will be used to configure panel functions as described in this section.
- 2.2 To install the LVD Panel, please refer to drawing J 111B.3291 or J 111B.3294 and the following instructions. If the system has been factory installed, skip "Field Wiring".
- 2.3 Mount the panel in a 19" or 23" relay rack or enclosed box assembly using 12 – 24 hardware.
- 2.4 Using 18 GA wire, connect TB1 as follows:
- |                |                  |
|----------------|------------------|
| Terminal on TB | Connect to:      |
| 1 (BATT +)     | Positive Bus Bar |
| 2 (BATT -)     | Negative Bus Bar |
- 2.5 Using 20 GA wire, connect Terminal 3 (FA) to the Meter and Alarm Panel or fuse alarm circuit.

- 2.6 Terminals 4, 5, and 6 are optional relay alarm terminal. If supplied, connect as specified by field engineer.
- 2.7 Terminals 7 and 8 are factory jumpered. If a remote means of disconnecting the load is desired, remove the jumper and connect terminals 7 and 8 to a normally closed switch.
- 2.8 Contactor/Breaker Selection: When this DIP switch is turned ON, the LVD can operate a remote disconnect assembly using contactors; current is removed from the contactor coils for disconnect assembly using shunt-trip circuit breakers; current is fed to the shunt trip coil for disconnection.
- 2.9 Positive/Negative Ground: The Low Voltage Disconnect Panel is built for use in a positive ground system. If the panel is to be used in a negative ground system, use the following procedure to reverse the polarity. Procedures are also given to change a negative ground system to positive ground.

#### Positive to Negative Ground

1. On TB1, move the white wire on Terminal 2 to Terminal 1, and move the red wire from Terminal 1 to Terminal 2.
2. On Circuit Board A1, unplug the red wire from COM (X4) and the blue wire from P NEG (X1). Reconnect the red wire to P NEG (X1), and the blue wire to COM (X4).

#### Negative to Positive Ground

1. On TB1, move the white wire on Terminal 1 to Terminal 2, and move the red wire from Terminal 2 to Terminal 1.
2. On Circuit Board A1, unplug the red wire from P NEG (X1) and the blue wire from COM (X4). Reconnect the red wire to COM (X4), and the blue wire to P NEG (X1).

### FIELD WIRING

- 2.10 Using 18 GA wire, make the following connections:

<u>Terminal</u>	<u>Connect to:</u>
1	Battery Positive
2	Battery Negative
3	Fuse Alarm Circuit
4, 5 & 6	Optional Remote Alarm Relay
7 & 8	Remote Disconnect

- 2.11 Remote Disconnect Operation: To configure the LVD for remote disconnect operation, remove the jumper from terminals 7 & 8 of terminal block TB1. Route wires from a remotely located, normally closed, single-pole switch to terminals 7 & 8. Use 18 GA minimum wire.

**NOTE:** Make sure to post suitable cautionary signs near any remote disconnect switches to emphasize the consequences associated with their use.

- 2.12 **Disconnect Time Delay:** This feature provides an adjustable time delay between detection of the automatic disconnect condition and actual disconnection of the load. DIP switches 3, 4, 5 and 6 have time values associated with them of 25, 50, 100 and 200 seconds, respectively. The time values are additive; if DIP switches 3 and 5 are turned on, the disconnect time delay will be 125 seconds. The normal factory setting is 3 seconds.
- 2.13 **Automatic/Manual Reconnect:** This feature allows the user to select automatic or manual reconnection of the load after a disconnection. When this switch is turned OFF, automatic reconnection of the load will occur when the battery voltage exceeds the preset reconnect threshold. When this switch is ON, the load can only be reconnected by pressing the RECONNECT/INHIBIT pushbutton on the front panel after the battery voltage rises above the preset disconnect voltage. Press the Normal pushbutton to return the circuit to automatic disconnect. The normal factory setting is automatic reconnect

### 3. **OPERATION**

- 3.1 Six pushbuttons are located on the front of the LVD select the operating mode of the unit.

**CAUTION:** Note that the load can be disconnected when these procedures are followed.

- 3.2 **Manual Disconnect Mode:** To activate this mode, the DISC ENABLE pushbutton must be pressed and held while the MANUAL DISC pushbutton is pressed. If DISC ENABLE and MANUAL DISC are not pressed together, with DISC ENABLE pressed first, the LVD will not enter the manual disconnect mode. The manual disconnect mode is indicated by the flashing red MANUAL DISC LED and flashing red LOAD DISC LED.
- 3.3 **Normal Mode:** This mode, activated with the NORMAL pushbutton, removes the LVD from the Manual Disconnect, Reconnect/Inhibit, or Calibration modes. In the Normal mode, the LVD disconnects and reconnects the system automatically. (The Automatic reconnect must be enabled per section 2.13).
- 3.4 The normal mode is indicated by the steady green NORMAL LED. Load status is indicated by the steady green LOAD CONN and flashing red LOAD DISC LEDs.

**CAUTION:** When the reconnect/inhibit mode is activated with the RECONNECT/INHIBIT pushbutton on the LVD, the load will be connected indefinitely with out protection.

- 3.5 **Reconnect/Inhibit Mode:** If automatic reconnection is disabled, this mode is activated momentarily to reconnect the load when desired. The Reconnect/Inhibit mode is indicated by the flashing red RECONNECT/INHIBIT and steady green LOAD CONN LEDs.

**CAUTION:** When the calibration mode is activated with the CAL pushbutton, the load will be connected indefinitely without protection.

- 3.6 **Calibration Mode:** A synthesized test voltage controlled by the TEST VOLT ADJ adjustment is directed to the detection circuitry to allow verification and calibration of the circuitry. The calibration mode is indicated by the flashing red CAL and steady green LOAD CONN LEDs.



3.7 LED Test: The LED TEST pushbutton verifies LED operation by turning on all operable LEDs.

#### 4. ADJUSTMENT

4.1 Instructions to adjust the Disconnect Time Delay, Automatic/Manual Reconnect, Contactor/Breaker Selection or to configure the LVD for remote disconnection are located in the Section 2, "Installation".

4.2 Two methods exist for verifying and making adjustments. The indirect method uses scaled voltages at front panel test points to represent the disconnect and reconnect thresholds. The direct method connects a synthesized voltage to the circuitry to actuate threshold detectors and status indicators.

#### INDIRECT VERIFICATION AND ADJUSTMENT

4.3 Activating the calibrate mode by pushing the CAL pushbutton will prevent the load from being dropped during adjustment. Before returning to Normal mode, make sure that the flashing red LOAD DISC LED is OFF.

4.4 Adjustment of the Reconnect Voltage Setting: To adjust the reconnect voltage setting, use the following procedure:

1. Use a quality, external Digital Voltmeter (DVM) to measure the voltage between the front panel test jacks marked REF and CONN VOLT ADJ.
2. The voltage displayed on the voltmeter will be  $1/10^{\text{th}}$  the actual voltage threshold at which the LVD will reconnect the load.
3. If this voltage is not as desired, use a small screwdriver to adjust the control directly above the CONN VOLT ADJ test jack until the voltmeter reads  $1/10^{\text{th}}$  the desired voltage.

4.5 Adjustment of the Disconnect Voltage Setting: To adjust the disconnect voltage setting, use the following procedure:

1. Use the DVM to measure the voltage between the front panel test jacks marked REF and DISC VOLT ADJ.
2. The voltage displayed on the voltmeter will be  $1/10^{\text{th}}$  the actual voltage threshold at which the LVD will execute a disconnect.
3. If this voltage is not as desired, use a small screwdriver to adjust the control directly above the CONN VOLT ADJ test jack until the voltmeter reads  $1/10^{\text{th}}$  the desired voltage.

#### DIRECT VERIFICATION AND ADJUSTMENT

4.6 Direct Verification:

1. Activate the calibration mode by pressing the pushbutton marked CAL.

2. Use a quality DVM to measure the voltage between the front test jacks marked REF and TEST VOLT ADJ. The meter will display 1/10<sup>th</sup> of the actual voltage at which the LVD will execute a disconnect or reconnect.
3. Slowly rotate the control above the TEST VOLT ADJ test jack throughout its range.
4. As the control is rotated, note the voltages at which the LOAD DISC and LOAD CONN LEDs light. The contactor is inhibited from dropping the load in the Calibrate mode.
5. Before returning the LVD to the Normal mode, make sure the LOAD DISC LED is OFF.

#### 4.7 Direct Adjustment:

1. Activate the calibration mode by pressing the pushbutton marked CAL.
2. Use a quality DVM to measure the voltage between the front panel test jacks marked REF and TEST VOLT ADJ. The meter will read 1/10<sup>th</sup> of the actual voltage.
3. Turn the TEST VOLT ADJ and CONN VOLT ADJ controls fully clockwise.
4. Turn the DISC VOLT ADJ control fully counterclockwise.
5. Turn the TEST VOLT ADJ control counterclockwise until the voltmeter displays 1/10<sup>th</sup> the desired disconnect voltage.
6. Slowly turn the DISC VOLT ADJ control clockwise until the LOAD DISC LED lights.
7. Turn the TEST VOLT ADJ control clockwise until the voltmeter displays 1/10<sup>th</sup> the desired reconnect voltage.
8. Slowly turn the CONN VOLT ADJ control counterclockwise until the LOAD CONN LED illuminates.
9. Before returning the LVD to the Normal mode, make sure the LOAD DISC LED is OFF.
10. Adjustments may now be verified as described above in Section 4.1, (Indirect Verification and Adjustment”.

## 5. CIRCUIT DESCRIPTION

### OVERVIEW

- 5.1 The LVD consists of five major section: power supply and reference voltage, mode selection, display, voltage threshold detector and disconnect drive. Please refer to the schematic diagram (SD 301.3291 or SD 301.3294) at the rear of this manual while reading this discussion. Integrated circuit will be referred to by reference number and associated pin numbers (e.g. U10(1 2 8) means the portion of U10, which consists of, pins 1, 2, and 8).

## POWER SUPPLY AND REFERENCE VOLTAGE

- 5.2 Components R12, R13 and C35 provide filtering and current limiting for the power supply. Regulation for the power supply is provided by component D32. Components R14 and D5 provide an accurate, temperature-stable voltage reference for use in the voltage threshold detector discussed below. Bypass capacitors C4 – C15 preventive power supply noise from affecting circuit operation.

## MODE SELECTION

- 5.3 Components S4, S5, U7(8 9 10 11 12 13) and associated components comprise the manual disconnect lockout. The output of this circuit is combined with conditioned signals from components S1 – S3 and fed into the logic circuitry consisting of U9, U10 and portions of U1, U2, U5, U6, and U7. The major purpose of this logic circuitry is to prevent more than one mode from being activated at once when multiple buttons are pushed. Additionally, if more than one button is pushed, the logic selects the mode which has the least capability for inadvertent disconnection of the load. Outputs of the mode circuitry at U10(6), U9(10), U10(10) and U7(2) are used to control other parts of the circuitry.

## DISPLAY

- 5.4 The display section consists of components D23 – D28 and associated components. As an example, current flow in D23 is limited by R39. U3(10 11) acts as the LED current sink. Components D11 and D12 are steering diodes to prevent current sink damage when the LED test button is pressed. Power for the LEDs is provided from the power supply via Q2. When the red LEDs are turned on by their respective current sink, an oscillator consisting of C19, R45, R50 and U2(10 11) turns Q2 on intermittently to cause the LEDs to blink. When the calibrate button is pressed power is provided to D28 via U2(5 6) and D34 to bypass the oscillating power coming through D35. This defeats the flashing of D28 in the calibrate mode and eases adjustment of the unit.

## VOLTAGE THRESHOLD DETECTOR

- 5.5 Battery voltage is scaled and fed into U11(10 11 12). The synthesized test voltage is generated by R21. U11(10 11 12) and U11(6 8 9) allow either the scaled battery voltage or the synthesized test voltage (calibrate mode only) to be fed into the detection circuitry. U12(1 2 3) compares this signal with an adjustable reference set by R28 to generate a disconnect signal. The output of U12 is then delayed by component U8 (adjustable by S7) before being passed on to the input of flip-flop U6 (1 2 3 4 5 6) and causing a disconnect. U12(5 6 7) compares the input voltage with a reference compared to R29 to generate a reconnect signal. This is logically combined with outputs from the mode selection circuitry before being passed on to the input of U6(1 2 3 4 5 6).

## DISCONNECT DRIVE

- 5.6 The output of U6(1 2 3 4 5 6) activated the connect and disconnect LEDs and is then passed on the U13(11 12 13) where it is logically combined with the calibrate lockout signal S7(1 16) and inverts the drive signal to allow use with either contactors or shunt-trip circuit breakers. The signal is then delivered to Q1, which activates the external disconnect device.

**ENGINEERING NOTES**

- 51. PANELS CAN BE MOUNTED IN A 19 OR 23 INCH RACK BY PROPER PLACEMENT OF ADAPTER BRACKETS, EXCEPT FOR 800 AND 1200 AMP UNITS WHICH ARE AVAILABLE ONLY IN A 23" PANEL.
- 52. PANEL IS FACTORY WIRED FOR A NEGATIVE GROUND SYSTEM. TO CONVERT PANEL TO A POSITIVE GROUND SYSTEM, DO THE FOLLOWING:
  - A. ON TB1 MOVE THE WHITE WIRE FROM TERMINAL 1 TO TERMINAL 2 AND THE RED WIRE FROM TERMINAL 2 TO TERMINAL 1.
  - B. ON CIRCUIT BOARD A1, UNPLUG THE RED AND BLUE WIRES, RECONNECT THE RED WIRE TO COM (X4) AND THE BLUE WIRE TO P NEG (X1).
- 53. REMOTE DISCONNECT TERMINALS 7 AND 8 ARE FACTORY JUMPERED, IF A REMOTE MEANS OF DISCONNECTING THE LOAD IS DESIRED, REMOVE THE FACTORY JUMPER AND CONNECT TERMINALS 7 AND 8 TO A NORMALLY CLOSED SWITCH, 16 GA MINIMUM.
- 54. SEE THE MANUAL FOR OPERATING AND ADJUSTMENT INSTRUCTIONS.
- 55. THE ALARM CIRCUIT SHOWN IS AN OPTION. THE COMPONENTS WILL BE FACTORY WIRED AS SHOWN, WHEN ORDERED, RELAY CONTACTS ARE RATED 2 AMPS AT 28 VOLT DC, 1 AMP AT 60 VOLT DC, AND 1/2 AMP AT 120 VOLT DC RESISTIVE.
- 56. NOTE NOT APPLICABLE.
- 57. NOTE NOT APPLICABLE.
- 58. NOTE NOT APPLICABLE.
- 59. TYPICAL VIEW FOR PANELS 400 AMPS AND BELOW.
- 60. 400 AMP UNIT USES A CONTACTOR (K1) WITH A SERIES DROPPING RESISTOR (R1, 10.0 OHM 10 WATT) TO REDUCE THE COIL VOLTAGE.
- 61. 800 AMP UNIT USES TWO CONTACTORS (K1 AND K2). THE CONTACTS ARE PARALLELED WITH THE BUS BAR AND THE COILS ARE CONNECTED IN PARALLEL WITH A SERIES DROPPING RESISTOR (R1, 10 OHM 20 WATT) TO REDUCE THE COIL VOLTAGE.
- 62. RENUMBERED TO NOTE 102.
- 63. RENUMBERED TO NOTE 103.
- 64. FOR 1200 AMP UNIT USE ONE CONTACTOR (K1) WITH A SERIES OF DROPPING RESISTOR (R1, 75 OHM 25 WATT) AND A BRIDGE RECTIFIER (CR1, 30A 400V), FOR PROPER INPUT VOLTAGE.
- 65. THE ALARM CONTACT SHOWN IS AN OPTION. THE COMPONENTS WILL BE FACTORY WIRED AS SHOWN, WHEN ORDERED, SWITCH CONTACTS ARE RATED AT 15 AMPS AT 28 VOLT DC, 1 AMP AT 120 VOLT DC, AND 1/2 AMP AT 120 VOLT DC RESISTIVE.

**MANUFACTURING NOTES**

- 101. ALL WIRES 20 GAUGE UNLESS OTHERWISE SPECIFIED, EXCEPT: 400 AND 800 AMP: USE 18 GAUGE UNLESS OTHERWISE NOTED. 1200 AMP: USE 16 GAUGE UNLESS OTHERWISE NOTED.
- 102. VALUE FOR FUSE F1 IS GIVEN IN TABLE A.
- 103. ATTACH MIDDLE (COMMON) LEAD FROM C1 TO TB1 MOUNTING SCREW, AND OTHER LEADS TO POS. 1 AND 2 ON TB1. SOLDER TO TABS 253-0096-00.

TABLE A					
MAX CURRENT	MODEL NUMBER (W/O OPTIONAL ALARM)	MODEL NUMBER (W/OPTIONAL ALARM)	NOTES	CONTACTOR	FUSE F1
50A	111B-3291-00	111B-3291-10	-	1x 246-0020-00	2A 280-0735-00
400A	111B-3291-03	111B-3291-13	60	1x 246-0045-02	2A 280-0735-00
800A	111B-3291-04	111B-3291-14	61	2x 246-0045-02	2A 280-0735-00
1200A	111B-3291-06	111B-3291-16	65	1x 246-0839-00	2A 280-0735-00

**ISSUES**

ISSUE #	DESCRIPTION	ISS. BY ISS. DATE
15	SEE PCO# 44448.	WD 6/26/17

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON:	APPROVALS		DATE
	±	DRAWN SAN	
HOLES +0.004 -0.002	CHECKED BW		7/21/87
FRACTIONS ±1/32	APPROVED MAI		12/17/96
DECIMALS (XX) ±0.020	APPROVED		
DECIMALS (XXX) ±0.010			
ANGLES ±1/2°			

SQUARE CORNERS AND ANGLES ARE 90° UNLESS OTHERWISE SPECIFIED.

WORKMANSHIP:  
PER SPEC ENG032

MATERIAL:

FINISH:

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**LOW VOLT, DISCONNECT PANEL**  
+/-24 VOLT DC  
19/23"

SIZE	DOC TYPE / NUMBER	ISSUE
B	PN 111B-3291	15

SCALE:	SHEET:	FILE NAME:
N/A	A1 OF	PN111B-3291_SHT_A1_ISS_15

**SHEET INDEX NOTE:**

THE ISSUE OF SHEET REFLECTS THE LATEST ISSUE OF THE DRAWING SET. WHEN THE DRAWING SET IS REVISED, ONLY THE ISSUE NUMBERS OF MODIFIED SHEETS ARE CHANGED. THE ISSUE NUMBERS OF UNMODIFIED SHEETS ARE NOT CHANGED.

**SHEET INDEX**

SH NO	A1	B1	C1	C2	C3
ISSUE	15	9	12	4	6

A

B

C

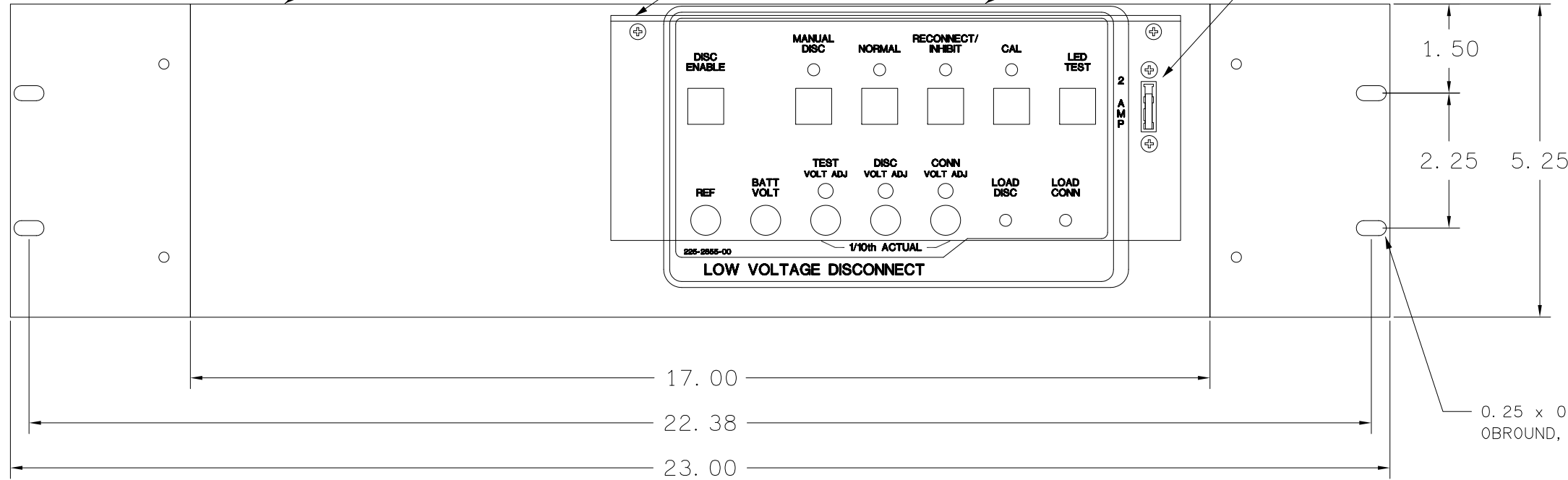
D

PANEL 1200A 202-3737-02  
 PANEL 800A 202-3737-01  
 PANEL 400A 202-3736-00

PROTECTIVE COVER  
 213-2865-01

LABEL FRONT  
 225-2855-00

FUSE (NOTE 102)

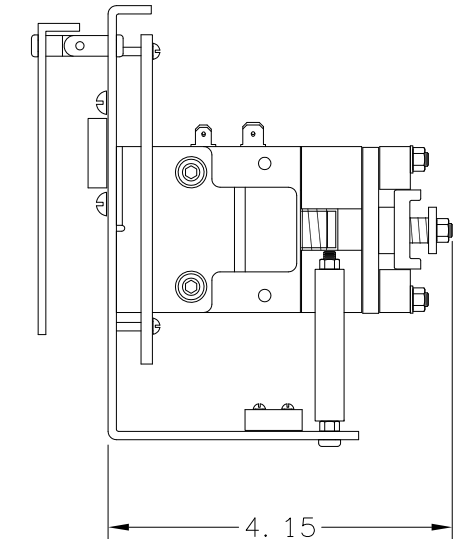


(NOTE 51)

**FRONT VIEW**

(NOTE 59)

225-2855-00  
 1/10th ACTUAL  
**LOW VOLTAGE DISCONNECT**



**RIGHT SIDE VIEW**

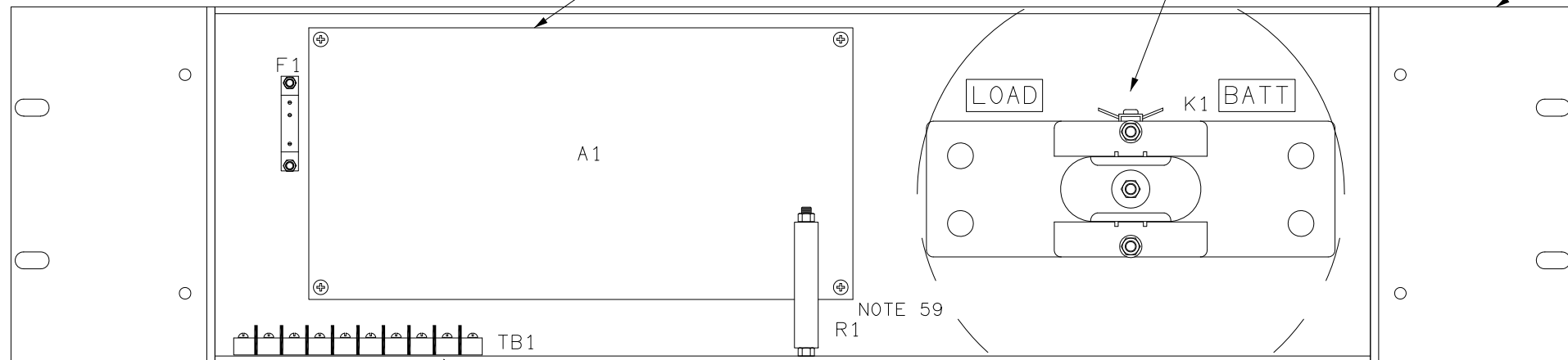
(NOTE 59)

0.25 x 0.50  
 OBROUND, 4 PLS

CIRCUIT BOARD  
 301-2772-02

CONTACTOR  
 SEE TABLE A

MOUNTING BRACKET  
 208-4052-00, 2 EA  
 (NOTE 51)



NOTE 59

R1

BARRIER BLOCK  
 252-0070-00

RESISTOR  
 675-0060-00

SEE NOTE 59, 60, 61, 65

**REAR VIEW**

(NOTE 59)

<b>PROPRIETARY INFORMATION</b> NOT TO BE COPIED, USED, TRANSMITTED, OR DISCLOSED WITHOUT PRIOR WRITTEN PERMISSION FROM UNIPOWER, LLC.		
SIZE <b>B</b>	DOC TYPE / NUMBER PN 111B-3291	ISSUE 9
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A

A

B

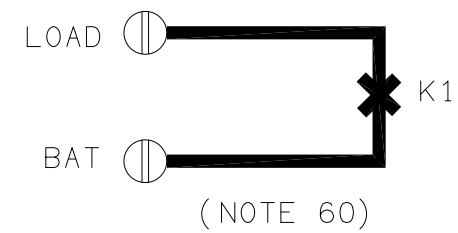
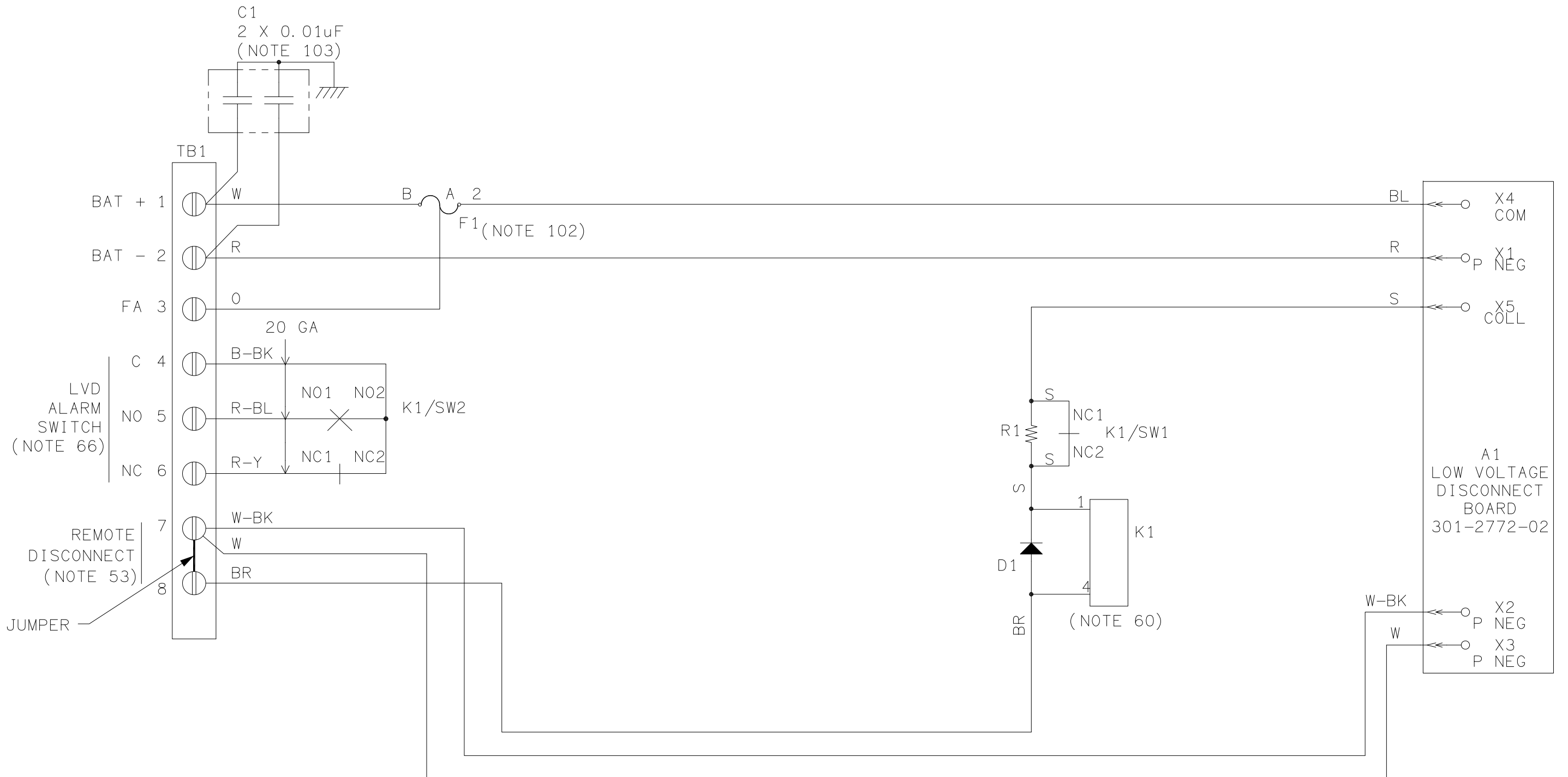
B

C

C

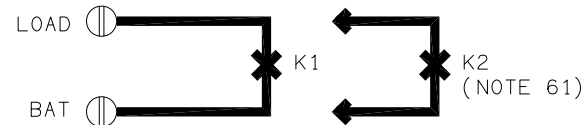
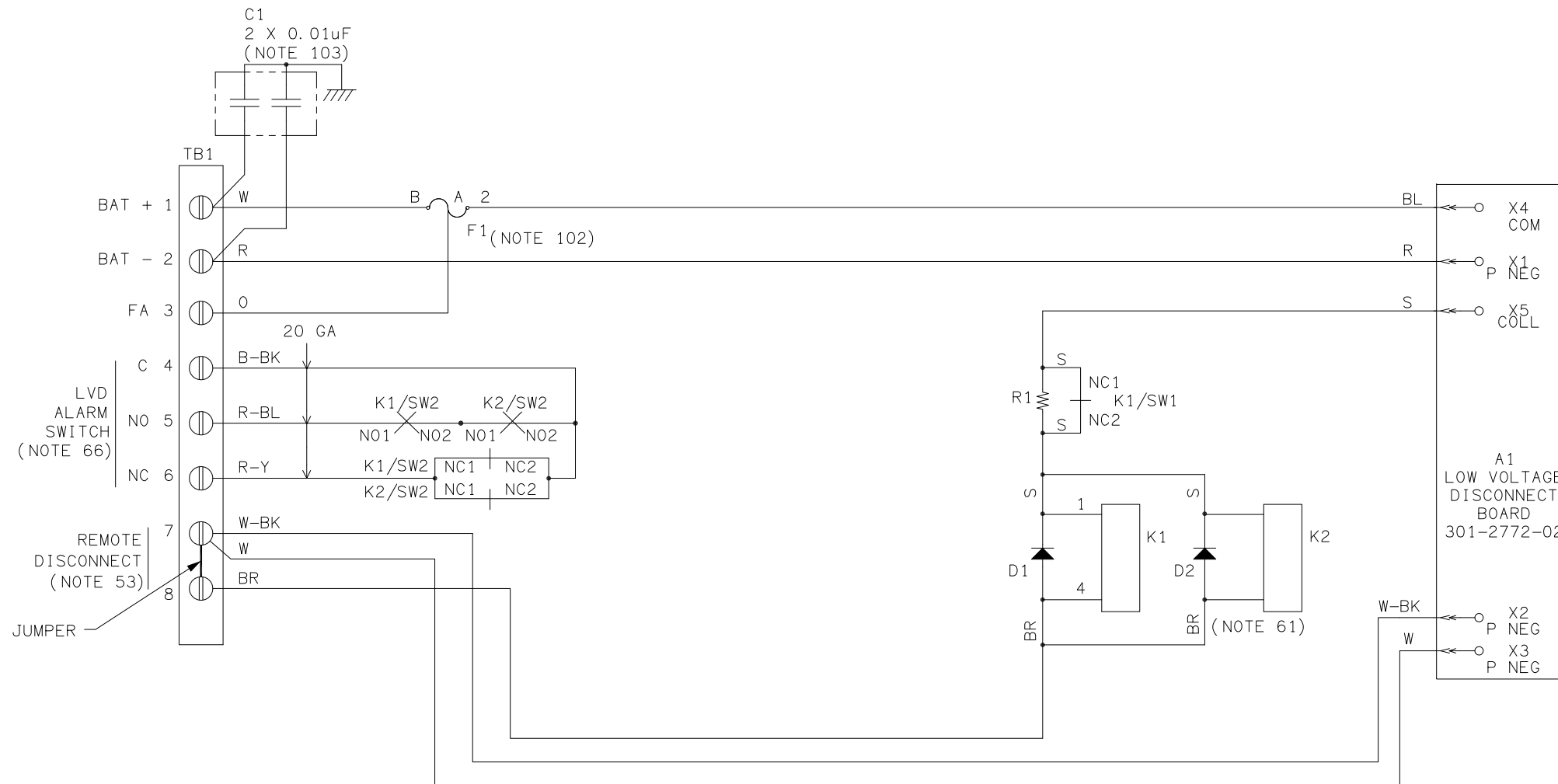
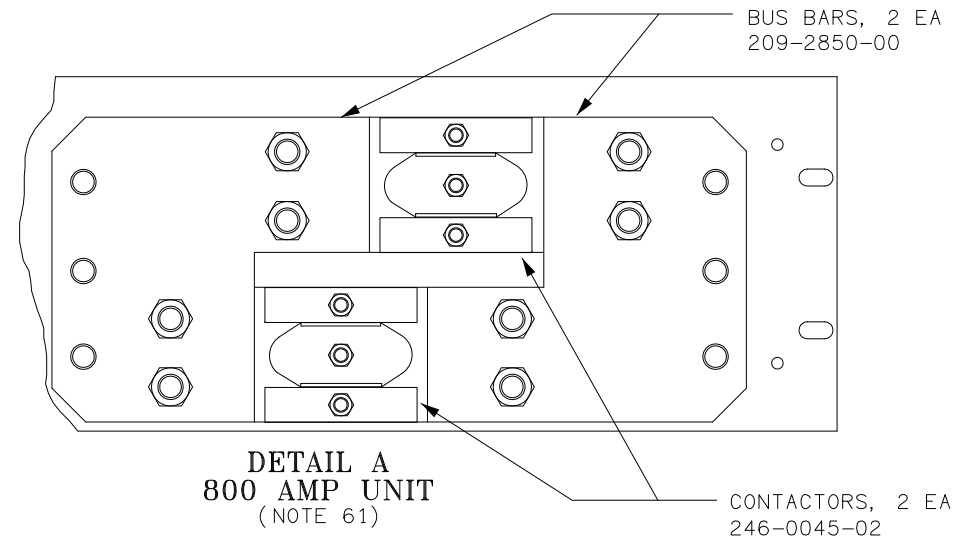
D

D



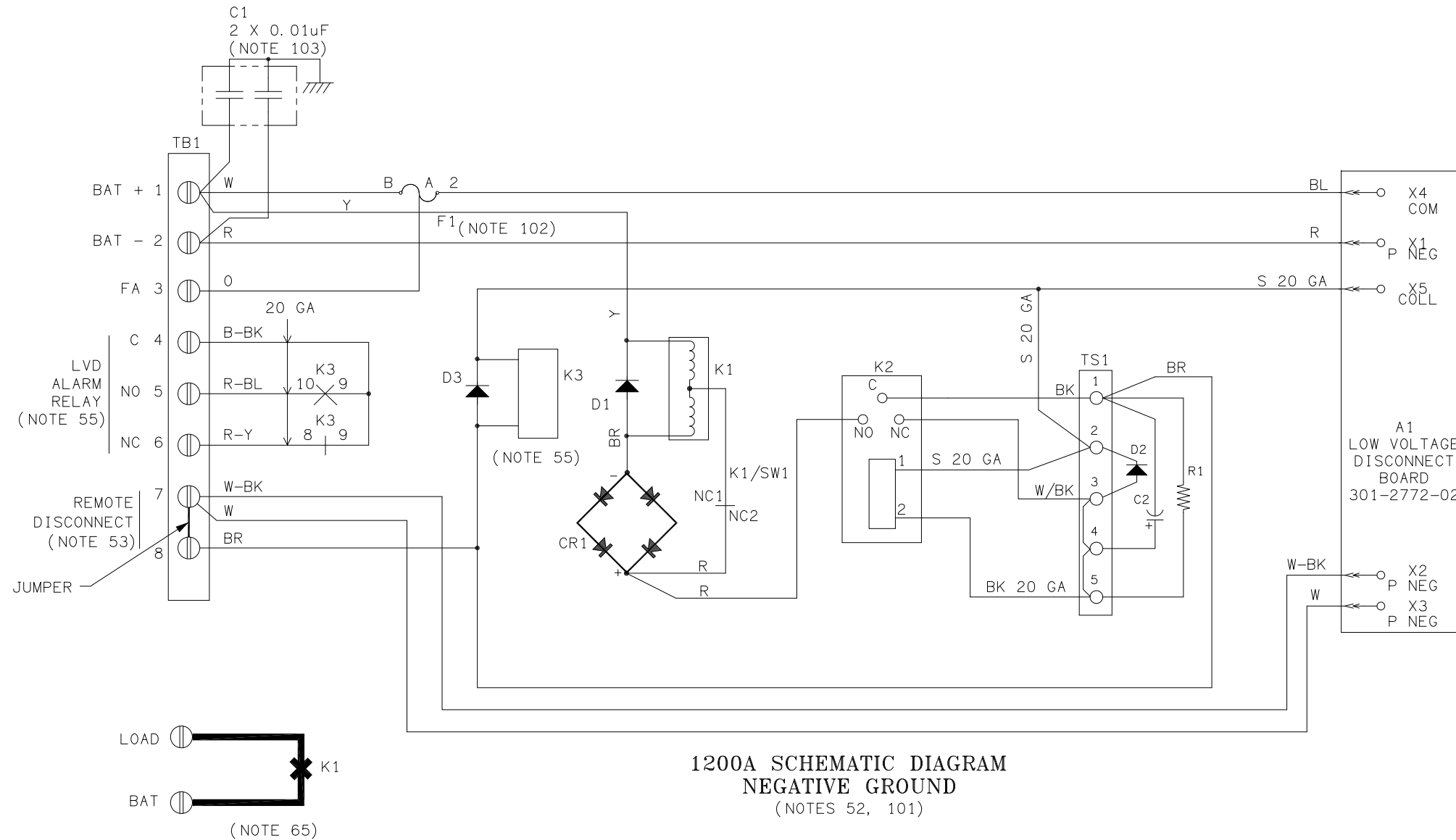
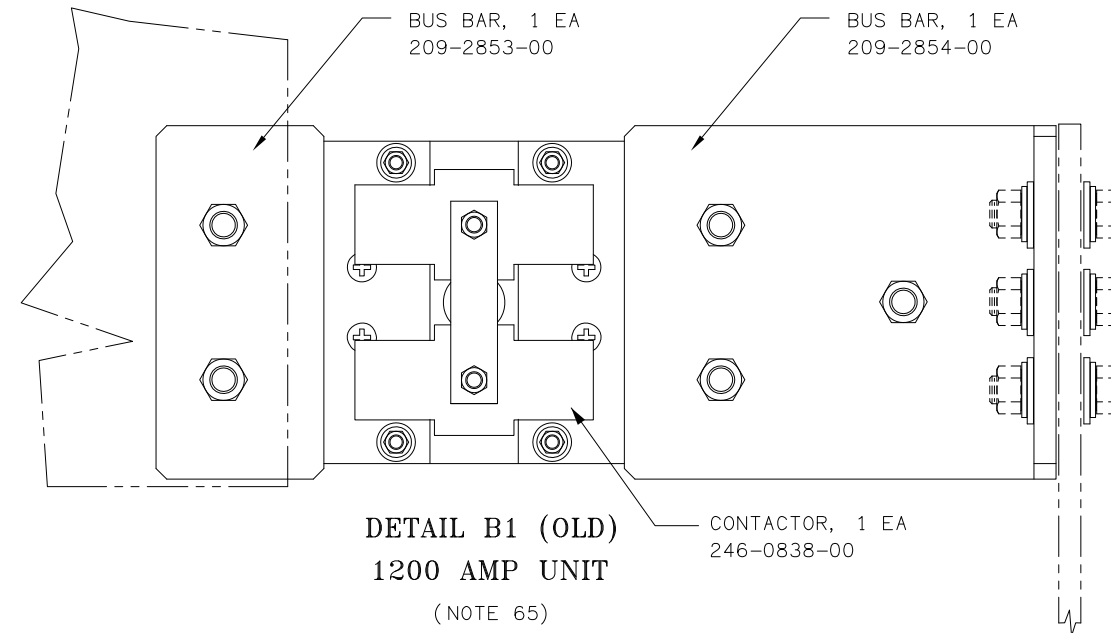
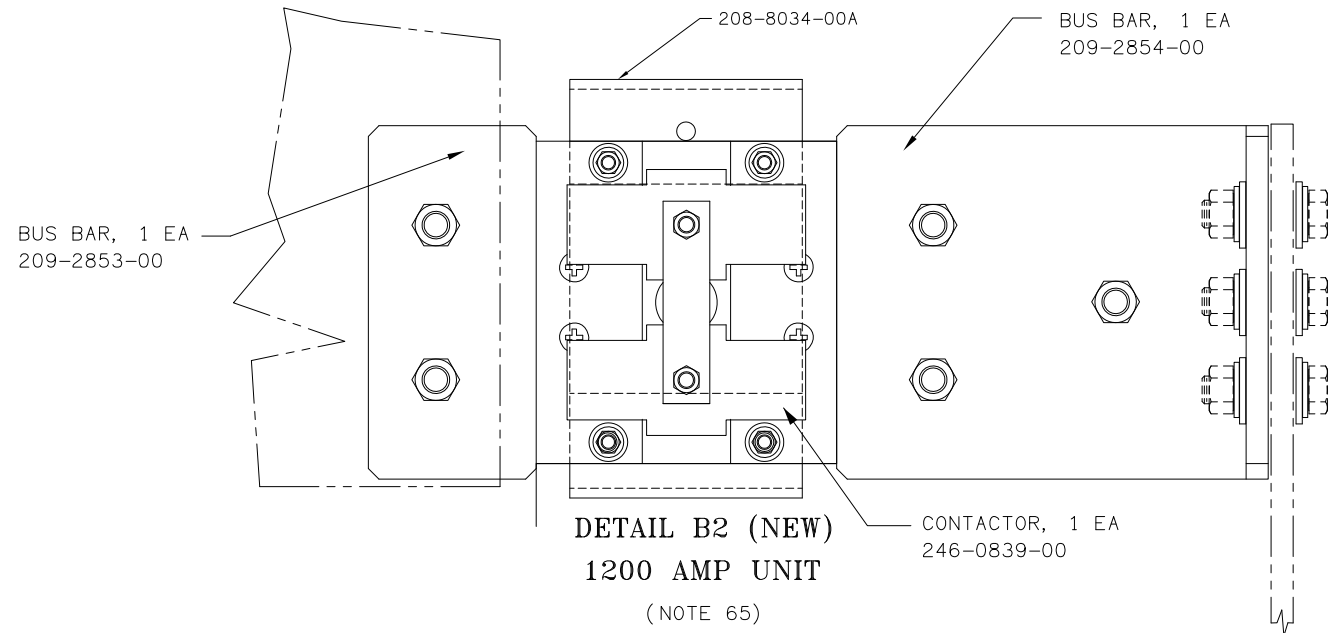
400A SCHEMATIC DIAGRAM  
 NEGATIVE GROUND  
 (NOTES 52, 101)

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SIZE <b>B</b>	DOC TYPE / NUMBER PN 111B-3291	ISSUE 12
SCALE: NONE	SHEET: C1 OF	FILE NAME: PN111B-3291_SHT_C1_ISS_12



**800A SCHEMATIC DIAGRAM**  
**NEGATIVE GROUND**  
(NOTES 52, 101)

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SIZE <b>B</b>	DOC TYPE / NUMBER PN 111B-3291	ISSUE 4
SCALE: NONE	SHEET: C2 OF	FILE NAME: PN111B-3291_SHT_C2_ISS_4



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SIZE <b>B</b>	DOC TYPE / NUMBER PN 111B-3291	ISSUE 6
SCALE: NONE	SHEET: C3 OF	FILE NAME: PN111B-3291_SHT_C3_ISS_6



### ENGINEERING NOTES:

- 51. UNASSIGNED
- 52. PANEL CAN BE MOUNTED IN A 19 OR 23 INCH RACK BY PROPER PLACEMENT OF ADAPTER BRACKETS, EXCEPT FOR 800 AMP AND 1200 AMP UNITS WHICH ARE AVAILABLE ONLY IN A 23" PANEL.
- 53. PANEL IS WIRED FOR A POSITIVE GROUND SYSTEM. TO CONVERT PANEL TO A NEGATIVE GROUND SYSTEM, DO THE FOLLOWING:
  - A. ON TB1 MOVE THE WHITE WIRE FROM TERMINAL 2 TO TERMINAL 1 AND THE RED WIRE FROM TERMINAL 1 TO TERMINAL 2. DO NOT MOVE ~~THE WHITE/BLACK WIRE ON TERMINAL 2.~~
  - B. ON CIRCUIT BOARD A1, UNPLUG THE RED AND BLUE WIRES, RECONNECT THE RED WIRE TO P NEG (X1), AND THE BLUE WIRE TO COM (X4).
- 54. REMOTE DISCONNECT TERMINALS 7 AND 8 ARE FACTORY JUMPERED, IF A REMOTE MEANS OF DISCONNECTING THE LOAD IS DESIRED, REMOVE THE FACTORY JUMPER AND CONNECT TERMINALS 7 AND 8 TO A NORMALLY CLOSED SWITCH, 16 GA MINIMUM.
- 55. SEE THE MANUAL FOR OPERATING AND ADJUSTMENT INSTRUCTIONS.
- 56. THE ALARM CIRCUIT SHOWN IS AN OPTION. THE COMPONENTS WILL BE FACTORY WIRED AS SHOWN, WHEN ORDERED, RELAY CONTACTS ARE RATED 2 AMPS AT 28 VOLT DC, 1 AMP AT 60 VOLT DC, AND 1/2 AMP AT 120 VOLT DC RESISTIVE.
- 57. RENUMBERED TO NOTE 101.
- 58. NOTE NOT APPLICABLE.
- 59. NOTE NOT APPLICABLE.
- 60. TYPICAL VIEW FOR PANELS 400 AMPS AND BELOW.
- 61. PANEL MAY BE EQUIPPED WITH:
  - A. THE 400 AMP UNIT USES: ONE CONTACTOR (K1) WITH A SERIES DROPPING RESISTOR (50 OHM 5 WATT, 2 EACH IN PARALLEL) TO REDUCE THE COIL VOLTAGE.
  - B. THE 800 AMP UNIT USES: TWO CONTACTORS (K1,K2),WITH 48 VDC CONTROL COILS. THE CONTACTORS ARE PARALLELED WITH THE BUS BAR AND THE CONTROL COILS ARE CONNECTED IN PARALLEL WITH A SERIES DROPPING RESISTOR (R2, 20 OHM 10 WATT) TO REDUCE THE COIL VOLTAGE. SEE DETAIL A.
  - C. THE 1200 AMP UNIT USES: ONE CONTACTOR (K1) WITH 48VDC CONTROL COILS. A SERIES OF TWO DROPPING DROPPING BRIDGE RECTIFIERS (CR1/CR2, 30A 400V) FOR PROPER INPUT VOLTAGE, SPECIFIED PER CONTACTOR MANUFACTURER. CONTACTOR (K1) IS CONTROLLED BY RELAY (K2) IN SERIES WITH DROPPING RESISTORS (R1, 500 OHM 20 WATT) AND (R2, 200 OHM 20 WATT). SEE DETAIL B.

### ENGINEERING NOTES: (CONT'D)

- 62. NOTE NOT APPLICABLE.
- 63. RENUMBERED TO NOTE 103.
- 64. RENUMBERED TO NOTE 102.
- 65. THE ALARM CIRCUIT SHOWN IS AN OPTION. THE COMPONENTS WILL BE FACTORY WIRED AS SHOWN, WHEN ORDERED, SWITCH CONTACTS ARE RATED 15 AMPS AT 28 VOLT DC, 1 AMP AT 60 VOLT DC, AND 1/2 AMP AT 120 VOLT DC RESISTIVE.
- 66. LVD POWER UP CHECK BOARD (301.2771.48) RATED FOR 2A SWITCHING. USE FOR 400A PANEL ONLY.800A AND 1200A PANELS MAY REQUIRE DIFFERENT RELAY RATING.

### MANUFACTURING NOTES:

- 101. ALL WIRE IS 20 GA UNLESS OTHERWISE NOTED. EXCEPT: 400 AMP AND 800 AMP; USE 18 GA WIRE UNLESS OTHERWISE NOTED. 1200 AMP; USE 16 GA WIRE UNLESS OTHERWISE NOTED.
- 102. VALUE FOR FUSE F1 IS GIVEN IN TABLE A. APPLY 5 AMP LABEL, P/N 225-3161-01 ON 111B-3294-06 AND 111B-3294-16 ONLY.
- 103. ATTACH MIDDLE (COMMON) LEAD FROM C1 TO TB1 MOUNTING SCREW, AND OTHER LEADS TO POS. 1 AND 2 ON TB1. SOLDER TO TABS 253-0096-00.
- 104. ADD LVD POWER UP CHECK BOARD (301.2771.48)TO 400A PANEL ONLY.

### SHEET INDEX NOTE:


THE ISSUE OF SHEET REFLECTS THE LATEST ISSUE OF THE DRAWING SET. WHEN THE DRAWING SET IS REVISED, ONLY THE ISSUE NUMBERS OF MODIFIED SHEETS ARE CHANGED. THE ISSUE NUMBERS OF UNMODIFIED SHEETS ARE NOT CHANGED.

SHEET INDEX

SH NO	1	2	3	4	5
ISSUE	13	9	11	2	3

TABLE A

MAX CURRENT	MODEL NUMBER (W/O OPTIONAL ALARM)	MODEL NUMBER (W/OPTIONAL ALARM)	NOTES	CONTACTOR	FUSE F1
50A	111B-3294-00	111B-3294-10		1x 246-0029-00	2A 280-0735-00
100A	111B-3294-01	111B-3294-11		1x 246-0029-00	2A 280-0735-00
200A	111B-3294-02	111B-3294-12		1x 246-0029-00	2A 280-0735-00
400A	111B-3294-03	111B-3294-13	66,104	1x 246-0060-02	2A 280-0735-00
800A	111B-3294-04	111B-3294-14	66	2x 246-0060-02	2A 280-0735-00
1200A	111B-3294-06	111B-3294-16	66	1x 246-0840-00	5A 280-0740-00

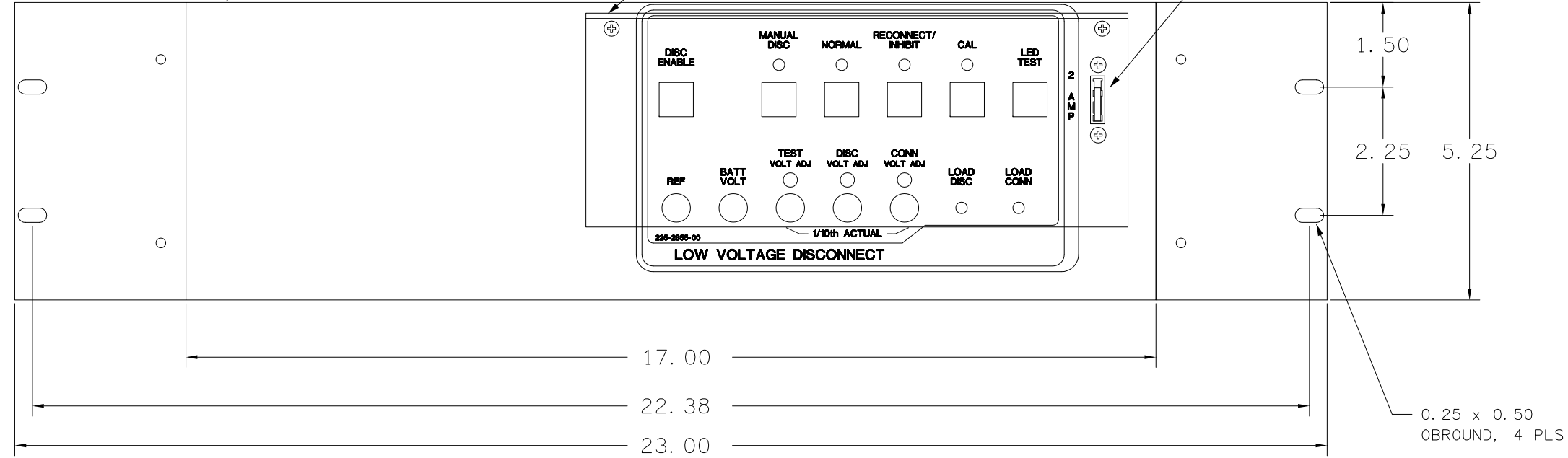
ISSUES		
ISSUE #	DESCRIPTION	ISS. BY ISS. DATE
13	SEE PCO# 44448.	WD 6/26/17
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON:		APPROVALS
±		DATE
HOLES	+0.004 -0.002	DRAWN SAN
FRACTIONS	±1/32	CHECKED BW
DECIMALS (xx)	±0.020	APPROVED
DECIMALS (xxx)	±0.010	APPROVED
ANGLES	±1/2°	
SQUARE CORNERS AND ANGLES ARE 90° UNLESS OTHERWISE SPECIFIED.		
WORKMANSHIP: PER SPEC ENG032		
MATERIAL:		
FINISH:		
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LOW VOLTAGE DISCONNECT PANEL, (LVD) -48 VOLT DC		
SIZE B	DOC TYPE / NUMBER PN 111B-3294	ISSUE 13
SCALE: N/A	SHEET: 1 OF 5	FILE NAME: PN111B-3294_SHT_1_ISS_13

PANEL 1200A 202-3737-02  
 PANEL 800A 202-3737-01  
 PANEL 400A 202-3736-00

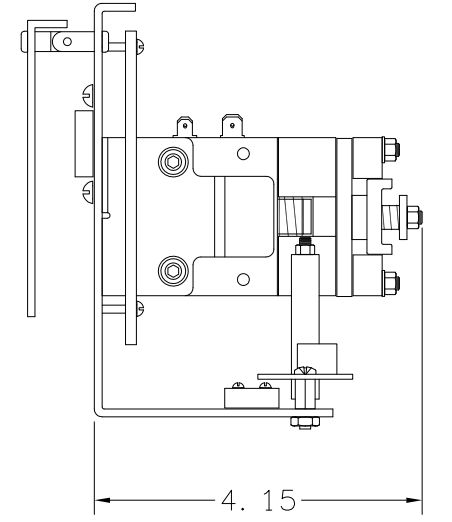
PROTECTIVE COVER  
 213-2865-01

LABEL FRONT  
 225-2855-00

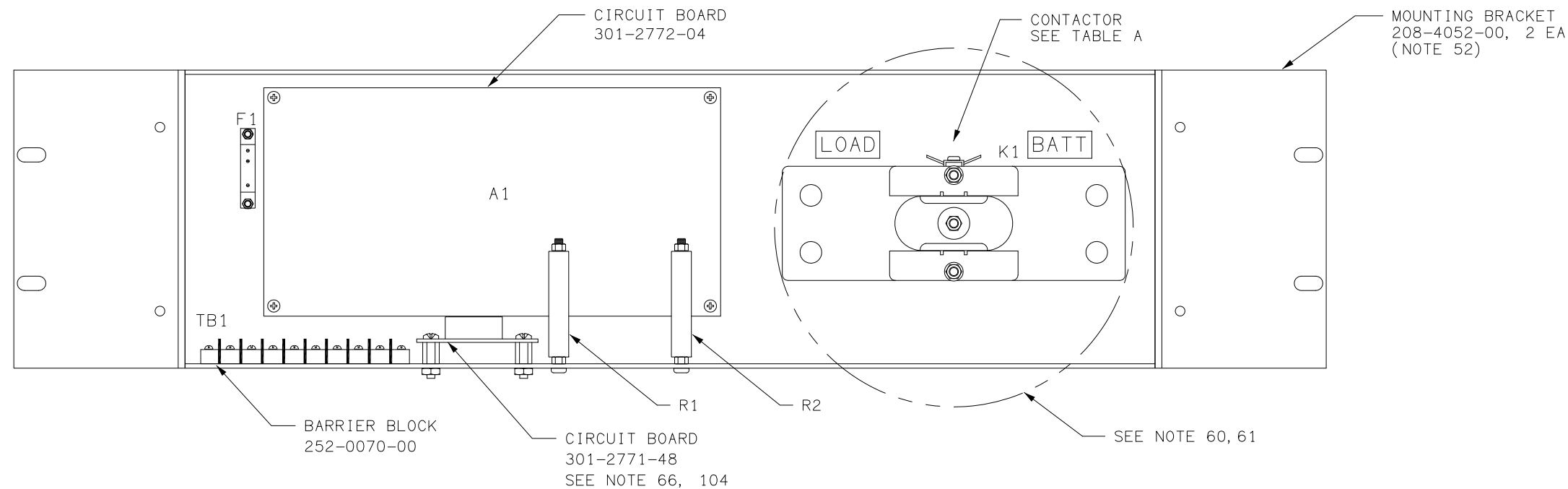
FUSE 2A  
 280-0735-00



**FRONT VIEW**  
 (NOTE 52, 60)

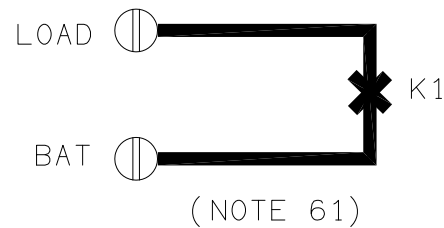
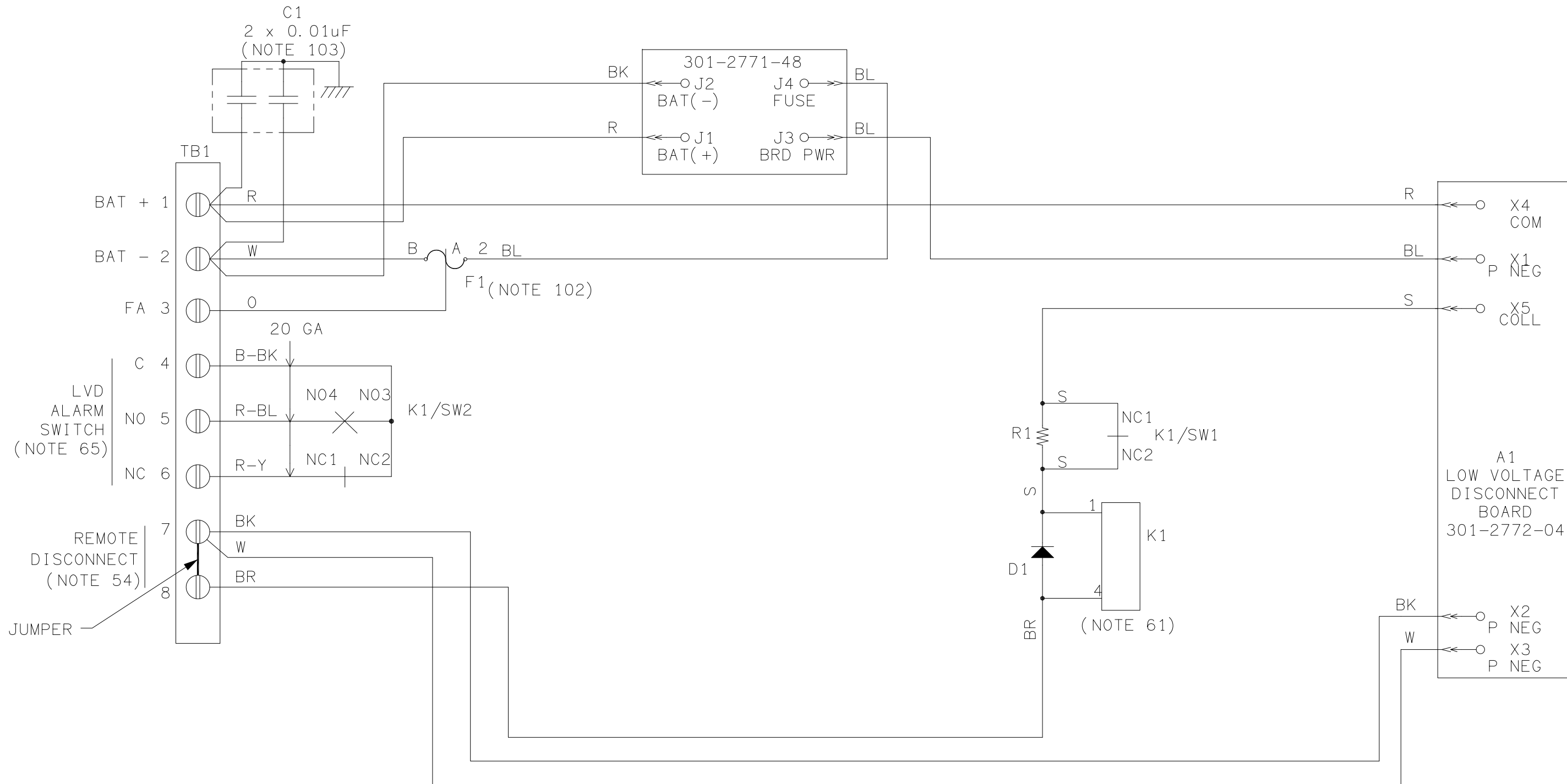


**RIGHT SIDE VIEW**  
 (NOTE 60)



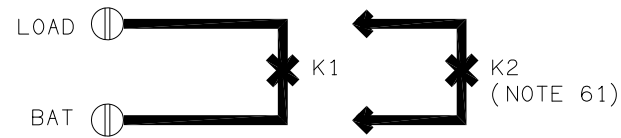
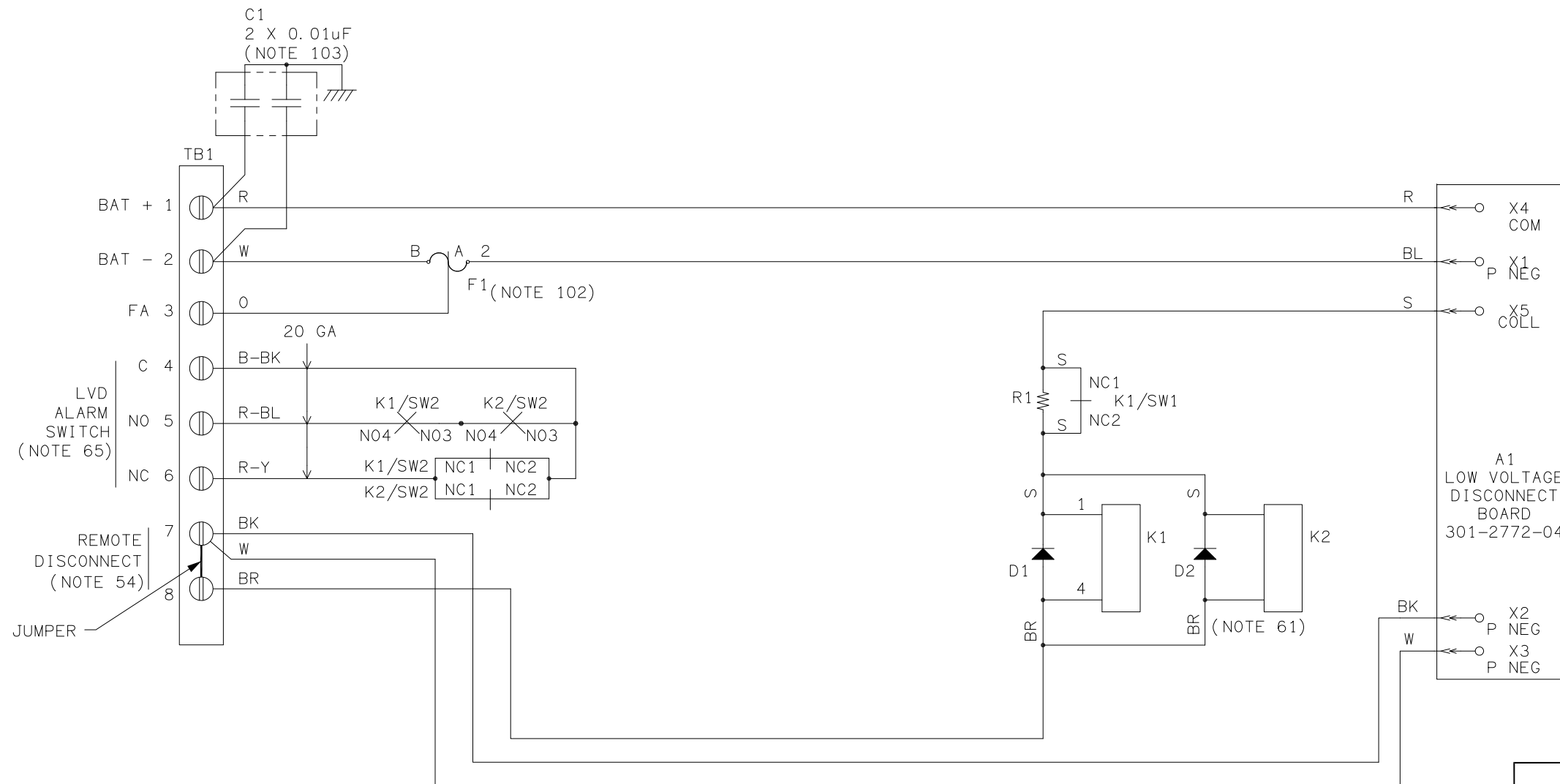
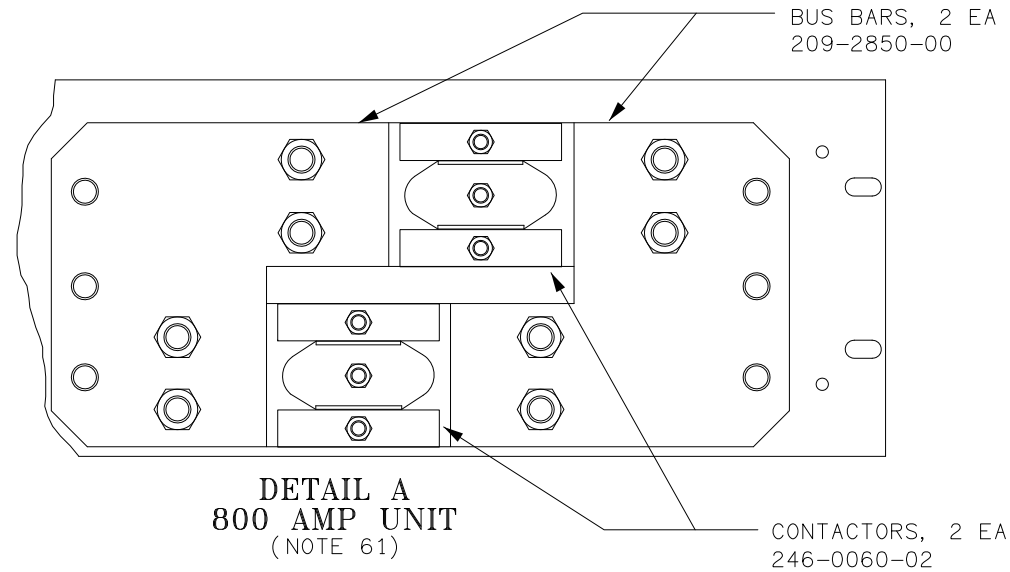
**REAR VIEW**  
 (NOTE 60)

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SIZE <b>B</b>	DOC TYPE / NUMBER PN 111B-3294-	ISSUE 9
SCALE: NONE	SHEET: 2 OF 5	FILE NAME: PN111B-3294_SHT_2_ISS_9



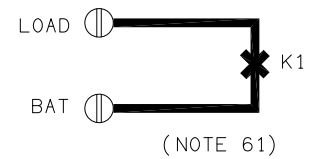
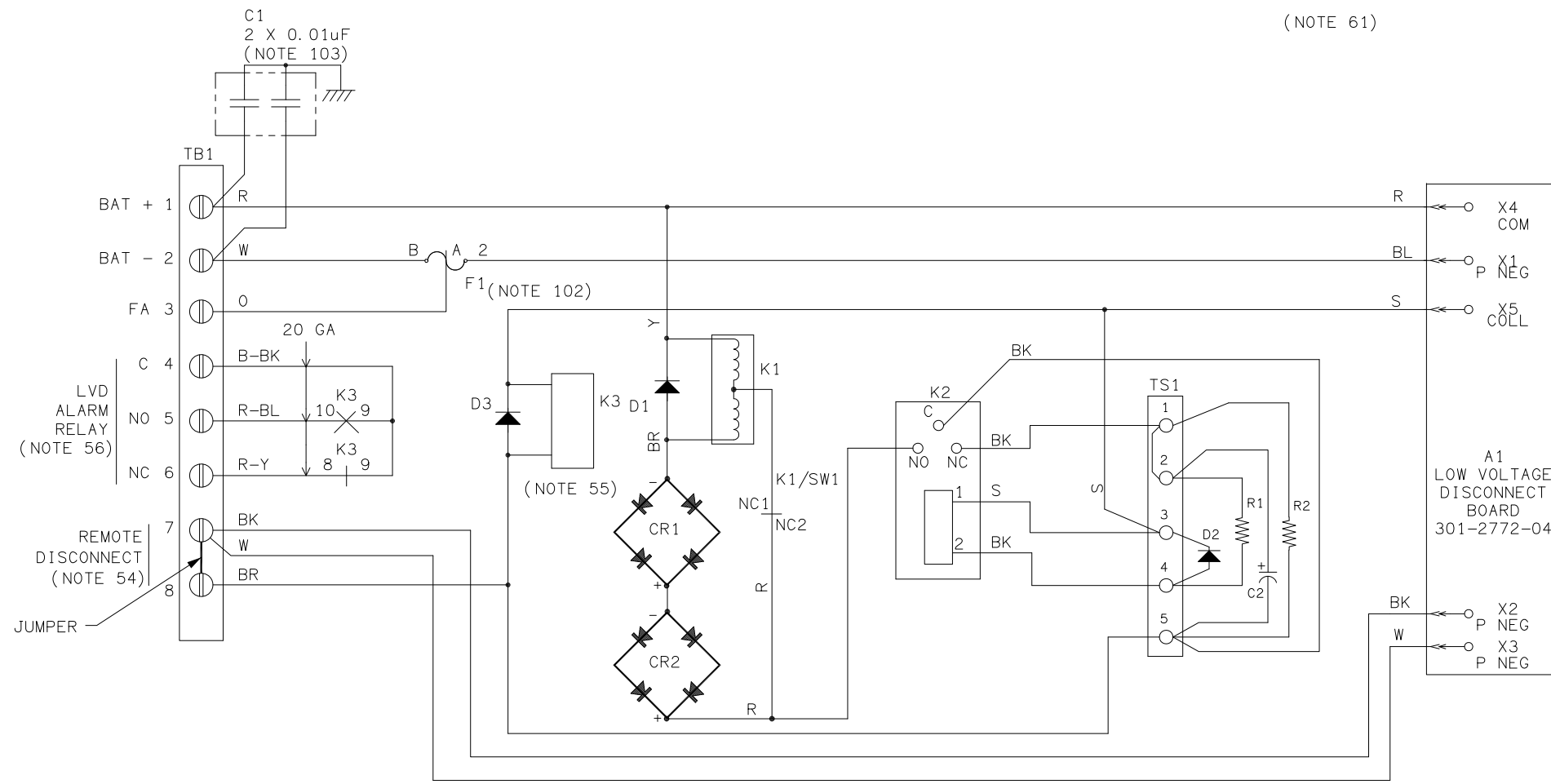
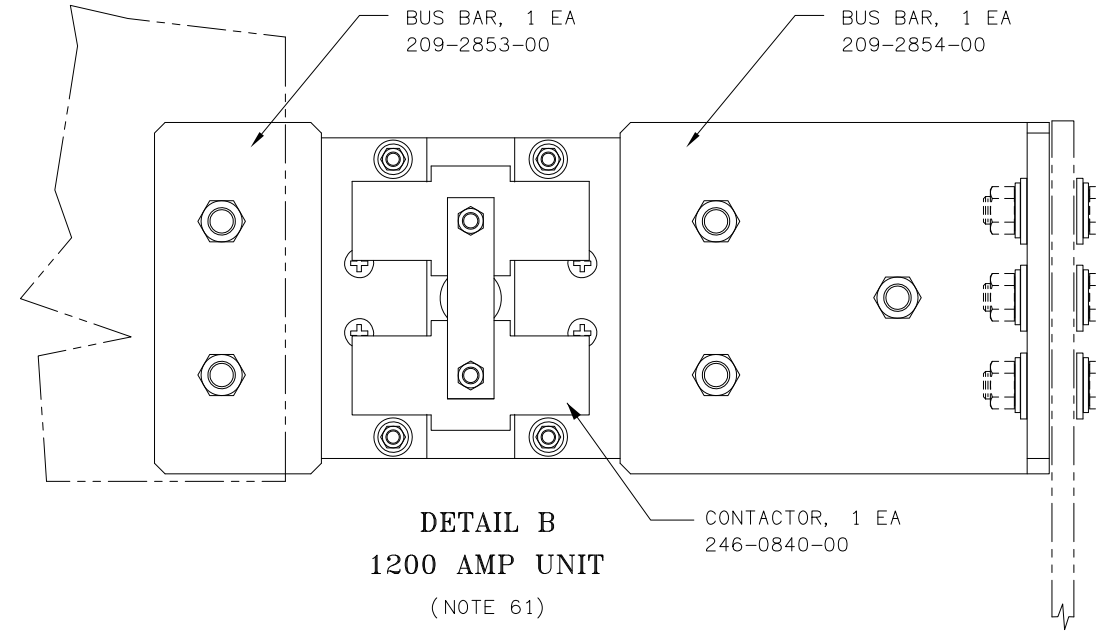
400A SCHEMATIC DIAGRAM  
(NOTES 53, 101)

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SIZE <b>B</b>	DOC TYPE / NUMBER PN 111B-3294-	ISSUE 11
SCALE: NONE	SHEET: 3 OF 5	FILE NAME: PN111B-3294_SHT_3_ISS_11



**800A SCHEMATIC DIAGRAM**  
**POSITIVE GROUND**  
(NOTES 53, 101)

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SIZE <b>B</b>	DOC TYPE / NUMBER PN 111B-3294-	ISSUE 2
SCALE: NONE	SHEET: 4 OF 5	FILE NAME: PN111B-3294_SHT_4_ISS_2



**1200A SCHEMATIC DIAGRAM**  
POSITIVE GROUND  
(NOTES 53, 101)

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SIZE <b>B</b>	DOC TYPE / NUMBER PN 111B-3294	ISSUE 3
SCALE: NONE	SHEET: 5 OF 5	FILE NAME: PN111B-3294_SHT_5_ISS_3