

LOW VOLTAGE DISCONNECT PANEL

PRODUCT MANUAL

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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.

C & D Technologies 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 C & D Technologies. 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 C & D Technologies, ask the delivering carrier to send the packages back to C & D Technologies 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 C & D Technologies equipment is identified by a part number on the nameplate. Please refer to this number in all correspondence with C & D Technologies.

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.

ISSUE HISTORY

ISSUE	PAGE(S)	DESCRIPTION	DATE
1		Original Issue	Oct. 1995
2	ALL	Changed throughout manual & cover to read “C & D Technologies, Inc. Power Solutions” and/or “C & D Technologies, Inc.”. Changed cover to include Dunlap Plant address, phone #'s, fax #'s, web-site address, etc. Added updated Receiving Instructions & General Equipment Information sheet –issue 7 Added updated drawings & Added Issue History sheet See ECN 12667	MCM 12/1/99
3	ALL	SEE ECN 15561	MCM 5/30/06

PURPOSE: The purpose of this manual is for proper Installation and Operation of the C & D Low Voltage Disconnect Panel (series – 111.274X.XX).

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SECTION ONE: 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.

SECTION TWO: 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.

SECTION THREE: 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.

SECTION FOUR: 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.