



PPD / EED / Infrastructure Group / D0

D0 Procedure / Hazard Analysis Document
D0_ELE_CAL_001

Disconnect / Reconnect Cal. BLS Power Supply Chassis

Date: 13-Jun-07

Latest revision: 11-Sep-07

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Safety Approval By (date):

Personal Protective Equipment: (Check protective equipment required for the job.)

- | | |
|---|---|
| <ul style="list-style-type: none">● Safety glasses□ Hearing Protection□ 3.0 Braising goggles● Face shield (optional)
□ Leather gloves□ Chemical resistant gloves (specify type):□ Other required PPE (specify): | <ul style="list-style-type: none">● Side shields (optional)
● Hard Hats□ Impact goggles□ Rubber apron
□ Hot/Cold thermal protective gloves□ Respirators□ Fall protection equipment (specify): |
|---|---|

Proper radiation dosimetry required for collision hall access.

Log survey meter (LSM) required during controlled access to D0 collision hall.

Work Plan History Information: (List any lessons learned accidents from this job, tips from previous jobs)

Overview:

D0 Calorimeter Base Line Subtractor (BLS) Crates are located in the Platform area under the D0 Detector in the D0 Collision Hall. Each Calorimeter BLS Power Supply Chassis supplies necessary voltages (-12V, -5.2V, -3V, +5V, +7V and +13V) to two BLS Crates. A BLS Power Supply Chassis and the two associated BLS Crates sit in three adjacent 19 inch equipment racks. The three sit abreast with the BLS Power Supply Chassis in the middle. Typically, three BLS Power Supply chassis are mounted in each BLS Power Supply Rack.

BLS Power Supply Racks are located in the North, Central and South sections of the Platform area. The Procedure for disconnecting and reconnecting a BLS Power Supply

Chassis is envisioned to be the same regardless of the physical location. If there are any location-specific deviations to this procedure they will be highlighted in parentheses []].

There are two spare BLS Power Supply Chassis kept in the collision hall. One is on the east side under the stairs, and one is in the southwest corner under the stairs. Insure that the spare has a green ‘GOOD’ tag on the handle prior to use.

A mechanical crew will move the failed BLS Power Supply Chassis from the rack in which it is located using procedure D0_OP_MECH_001, and will move a ‘Good’ power supply into the rack position vacated by the failed power supply.

Procedure / Hazard Analysis document; D0_OP_MECH_001 “BLS TO/FROM DETECTOR PLATFORM RACKS” contains details regarding moving BLS Power Supply Chassis into place on the platform. Procedure / Hazard Analysis document D0_OP_MECH_002 “BLS TO/FROM COLLISION HALL” contains details regarding moving the BLS Power Supply Chassis between the repair/testing station on the third floor and the storage locations for spares in the collision hall.

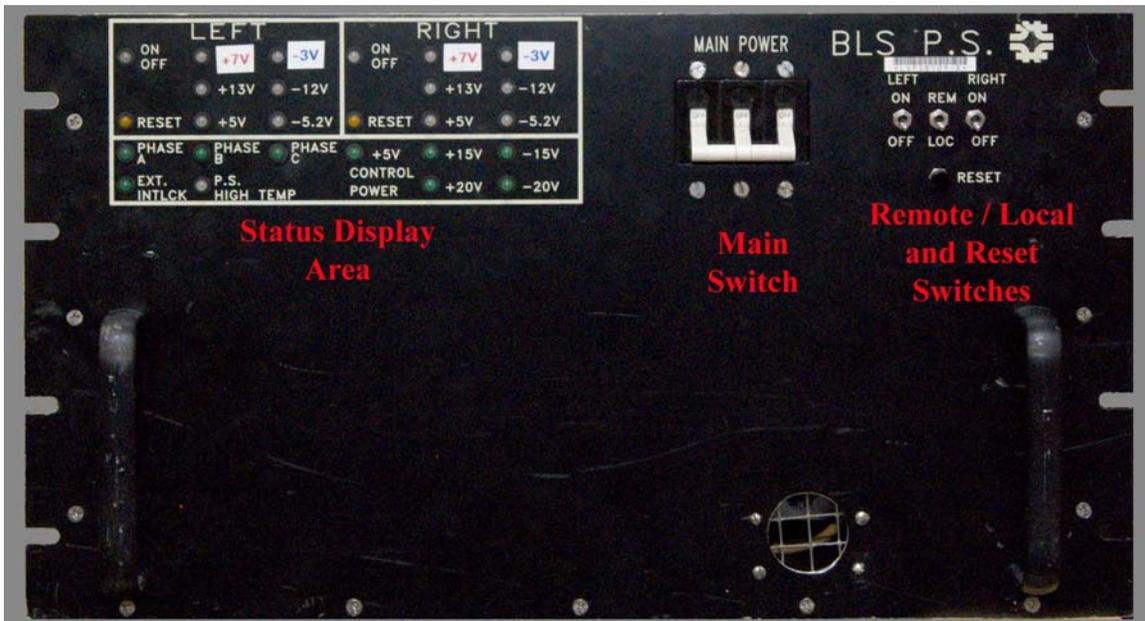


Figure 1. Front Panel of BLS Power Supply Chassis



Figure 2. Rear Panel of BLS Power Supply Chassis

Training Requirements:

- Appropriate training to be issued a key to the D0 Collision Hall
- Basic Electrical Safety (minimum)
- D0 Hazard Awareness

Important Information:

- BLS Power Supply Chassis are heavy, weighing at least 120 pounds.
- The BLS Power Supply Chassis is water cooled. Water inlet and outlet hoses on the back of the chassis utilize quick-connect fittings. Water may spray out when disconnecting / reconnecting these fittings.

Required Tools:

With the exception of the Digital Volt Meter and the bucket / container, the following tools should already be located in a tool pouch labeled “BLS”.

- Flashlight
- Paper.
- Digital Volt Meter (DVM)
- Phillips and standard head screwdrivers.
- Supply of Failure Indication Tags with diagnostic information form, plus a pen to fill out the tag.
- Disconnect fitting plugs (2) for water hoses (kept with spare supplies).
- Kimwipes.
- A bucket or container to catch cooling water if necessary.

Procedure:

Ensure that the D0 Control Room personnel responsible for Calorimeter Detector operation are aware of replacement prior to entering D0 Collision Hall.

1. Collect the BLS tool bag before entering the collision hall.

Disconnect Procedure:

2. Take a blank Failure Indication Tag from the tool bag. (See example in Figure 3.) Check all appropriate boxes on the tag to identify the reason why the supply is being removed from service. Initial and date the tag. The abbreviations OV, UV, OI and OT refer to “over voltage”, “under voltage”, “over current” and “over temperature”, respectively.
3. Affix the completed Failure Indication Tag to one of the front handles of the BLS Power Supply Chassis being taken out of service.

<p style="text-align: center;">FAILED</p> <p style="text-align: center;">BLS Power Supply Chassis</p> <p>Serial Number: _____</p> <p>Date: _____</p> <p>Initials: _____</p>	<p style="text-align: center;">CHECK ALL APPLICABLE BOXES BELOW TO FULLY DESCRIBE PROBLEM</p> <table border="1"><tr><td><input type="checkbox"/> LEFT SIDE BAD</td><td><input type="checkbox"/> RIGHT SIDE BAD</td></tr><tr><td><input type="checkbox"/> A (+7V) <input type="checkbox"/> B (-3V)</td><td><input type="checkbox"/> A (+7V) <input type="checkbox"/> B (-3V)</td></tr><tr><td><input type="checkbox"/> C (+5V) <input type="checkbox"/> D (-5.2V)</td><td><input type="checkbox"/> C (+5V) <input type="checkbox"/> D (-5.2V)</td></tr><tr><td><input type="checkbox"/> E (+13V) <input type="checkbox"/> F (-12V)</td><td><input type="checkbox"/> E (+13V) <input type="checkbox"/> F (-12V)</td></tr><tr><td><input type="checkbox"/> OV <input type="checkbox"/> UV <input type="checkbox"/> TRIP</td><td><input type="checkbox"/> OV <input type="checkbox"/> UV <input type="checkbox"/> TRIP</td></tr><tr><td><input type="checkbox"/> OI <input type="checkbox"/> OT</td><td><input type="checkbox"/> OI <input type="checkbox"/> OT</td></tr></table>	<input type="checkbox"/> LEFT SIDE BAD	<input type="checkbox"/> RIGHT SIDE BAD	<input type="checkbox"/> A (+7V) <input type="checkbox"/> B (-3V)	<input type="checkbox"/> A (+7V) <input type="checkbox"/> B (-3V)	<input type="checkbox"/> C (+5V) <input type="checkbox"/> D (-5.2V)	<input type="checkbox"/> C (+5V) <input type="checkbox"/> D (-5.2V)	<input type="checkbox"/> E (+13V) <input type="checkbox"/> F (-12V)	<input type="checkbox"/> E (+13V) <input type="checkbox"/> F (-12V)	<input type="checkbox"/> OV <input type="checkbox"/> UV <input type="checkbox"/> TRIP	<input type="checkbox"/> OV <input type="checkbox"/> UV <input type="checkbox"/> TRIP	<input type="checkbox"/> OI <input type="checkbox"/> OT	<input type="checkbox"/> OI <input type="checkbox"/> OT
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	PHASE FAULT <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C												

Figure 3. Front and back side of Failure Indication Tag

4. Locate and turn off the circuit breaker for the bad supply on the Power Distribution Chassis located at the bottom the rack. Verify that lit status indicators on the target BLS Power Supply Chassis are extinguished. Other BLS Power Supply Chassis in the rack should still have their status indicators active.
5. Remove the rear door of the rack containing the supply and also the rear doors of the racks adjacent to left and right. (Access to the racks left and right of the supply will be required to disconnect and reconnect the water hoses.)
6. Locate and disconnect the AC cord from the failed BLS Power Supply Chassis from the Power Distribution Chassis.
7. Locate and disconnect the water hose "quick-connects" that feed each side of the BLS Power Supply Chassis. Do not allow the hose fittings to drip or spray on equipment - use the fitting plugs if necessary to abate leaks. Each rack has drip detectors located near the bottom. These detectors are sensitive and will turn off power to the rack if a drip is detected. Once tripped, the drip detector needs to be dried sufficiently to allow power to be reapplied. It is wise to try and pull the hoses far enough out of the rear of the rack so that any water spray that does occur falls outside of the racks.

Detail	Hazard	Precautions / Safety Procedures
Cooling water may be under pressure.	Possible water spray during making / breaking of quick-connects may enter eyes.	Wear safety glasses or face shield.

8. Cables should be labeled so that reconnection to new supply is straight forward. Note the connection of any unmarked cables to the BLS Power Supply Chassis.
9. With the assistance of the mechanical crew, slide the BLS Power Supply Chassis out of the rack approximately 5 inches.
10. Disconnect all cables from the rear of the BLS Power Supply Chassis.
 - a. Use care when removing the four ribbon cable connections labeled ‘Left Analog Out’, ‘Right Analog Out’, ‘Digital Out’ and ‘Digital In’. **Do not pull on the cable.** Use fingernails or a small screwdriver to gently lever the connector end away from the supply. Pulling on the cable will damage the connector and force subsequent accesses.
 - b. Insure that the RG58 coax ‘External Interlock’ BNC connector is also removed.
 - c. Visually inspect *both* BNC sockets at the back of the supply for damage, especially if they appear crushed or out-of-round. If damage is present, *note on the tag.*
11. Remove the white "personality plug" from upper center rear of the BLS Power Supply Chassis and set aside in a convenient location. This will be reinstalled on the replacement chassis.
12. Stand at the rear of the rack. Guide the AC power cord and water lines out of the rack while the mechanical crew removes the BLS Power Supply Chassis.

Reconnect Procedure:

13. Stand at the rear of the rack. Guide the AC power cord and water lines in and through the rack while the mechanical crew installs the replacement BLS Power Supply Chassis. Keep equipment out of the way of the moving chassis.

Detail	Hazard	Precautions / Safety Procedures
The BLS Power Supply Chassis is heavy. As it is installed, spaces between the chassis and the rack diminish to nearly nothing. The chassis slides on the side shelves with no convenient means of lifting it while in motion.	Fingers and / or hands might get pinched if left in the path of the chassis as it is moved.	Keep fingers and hands away from the path taken by the chassis during installation.

14. Reinstall the "personality plug".
15. Reinstall all cables to the power supply. Use notes for any unmarked cables.
16. Reconnect the water lines and check carefully for leaks.

Detail	Hazard	Precautions / Safety Procedures
Cooling water may be under pressure.	Possible water spray during making / breaking of quick-connects may enter eyes.	Wear safety glasses or face shield.

17. Reconnect the AC cord. *Insure that the AC cord has been pre-twisted so that after insertion cable tension keeps the cord plug from loosening.*
18. Clean up any traces of water in rear of rack. Insure all drip detectors are dry.
19. Inspect adjacent racks; reset any "tripped" Rack Monitor Interfaces as necessary.
20. Remove any tags from Power Supply Chassis. Typically, these would indicate that the chassis had been tested and passed.
21. Turn on the circuit breaker for the replaced BLS Power Supply Chassis on the Power Distribution Chassis.
22. Turn on the power supply main switch on the front of the replaced BLS Power Supply Chassis.
23. Reset the BLS Power Supply Chassis by pressing the "Reset" button on the front panel. The chassis is reset when the 8 green status indicators in the lower third of the status area on the front panel are lit.
24. Set the power supply "Local/Remote" switch on the front panel to "Remote" (switch blade in the up position). Ensure that the 7 green status indicators in the two boxes in the upper two thirds of the status area on the front panel are lit.
25. Reinstall the rear doors and close up the racks.
26. Contact Calorimeter Shifter in the control room to verify that the power supply is operating properly.

