



LIGO Laboratory / LIGO Scientific Collaboration

LIGO-T1100047-v3

LIGO

04/16/2011

aLIGO DC Power Supply Requirements

D.Kinzel

Distribution of this document:
LIGO Scientific Collaboration

This is an internal working note
of the LIGO Laboratory.

California Institute of Technology
LIGO Project – MS 18-34
1200 E. California Blvd.
Pasadena, CA 91125
Phone (626) 395-2129
Fax (626) 304-9834
E-mail: info@ligo.caltech.edu

Massachusetts Institute of Technology
LIGO Project – NW22-295
185 Albany St
Cambridge, MA 02139
Phone (617) 253-4824
Fax (617) 253-7014
E-mail: info@ligo.mit.edu

LIGO Hanford Observatory
P.O. Box 1970
Mail Stop S9-02
Richland WA 99352
Phone 509-372-8106
Fax 509-372-8137

LIGO Livingston Observatory
P.O. Box 940
Livingston, LA 70754
Phone 225-686-3100
Fax 225-686-7189

<http://www.ligo.caltech.edu/>

1 Introduction

This document describes the requirements of the DC power supplies that are to be used to provide the DC power required to power Advanced LIGO (aLIGO) electronic racks.

2 Scope

The scope of this document is to specify the requirements of the DC power supplies required to support aLIGO electronic chassis. Due to the existence of a variety of power requirements, the scope is limited to a known specific subset of DC power requirements. Outlying voltage requirements are discussed briefly at the end.

3 Requirements for Standard DC Power Supplies for aLIGO Electronics Racks

The following is a list of requirements for the DC Power Supplies intended to source DC power to racks in our electronics rooms. We intend to provide 4 (four) standard voltages for each electronics rack. The voltage and current requirements are

- -18VDC @ 20A
- +18VDC @ 20A
- -24VDC @ 20A
- +24VDC @ 20A

For simplicity, the same type of variable power supply can be specified.

- Each supply must be a linear regulated power supply.
- Output requirements:
 - Range: 0-25VDC
 - 20A current
 - Regulation: better than 0.1% no load to full load, 105-125V AC input
 - Ripple: <0.2mV rms, <1mV p-p, 20Hz-10MHz
 - Drift : <0.01% over 8 hours
- Each supply must have a front panel on / off switch.
- Each supply must have a front panel on indicator light.
- Each supply must have front panel readout of both the voltage and the current.
- Each supply must present a 0-10V full-scale voltage monitoring signal and a 0-10V full-scale current monitoring signal. These monitoring signals should be presented on a rear-mounted DB9 female bulkhead connector according to Figure 1.
- Each supply must have front panel voltage adjustment.
- Each supply must operate in a voltage regulation mode, with front panel current limiting adjustment.
- Mechanical requirements
 - 19 inch rack mountable
 - Standard half-rack form factor (or smaller) for each power supply
 - Maximum 3U height

- Output connection - rear mounted terminal block or barrier strip
- Input (120V) connection – either cord or rear mounted terminal block or barrier strip
- Each supply must work over an input voltage range of 105-125VAC @ 47-65Hz
- Each supply must be UL approved.
- Each supply must have fully isolated output with better than 450V of isolation between each terminal and ground.
- Each supply must refrain from exceeding its regulated voltage after an input power failure.
- Each supply must refrain from exceeding its regulated voltage after an input power failure followed by a sudden return of input power.

4 Outlying Voltage Requirements

There are a variety of other voltages that are required for aLIGO. These needs will be addressed on an as-needed basis, with the intent to conform wherever possible to the same requirements listed above.

Figure 1: Voltage and Current Monitoring Signals

