



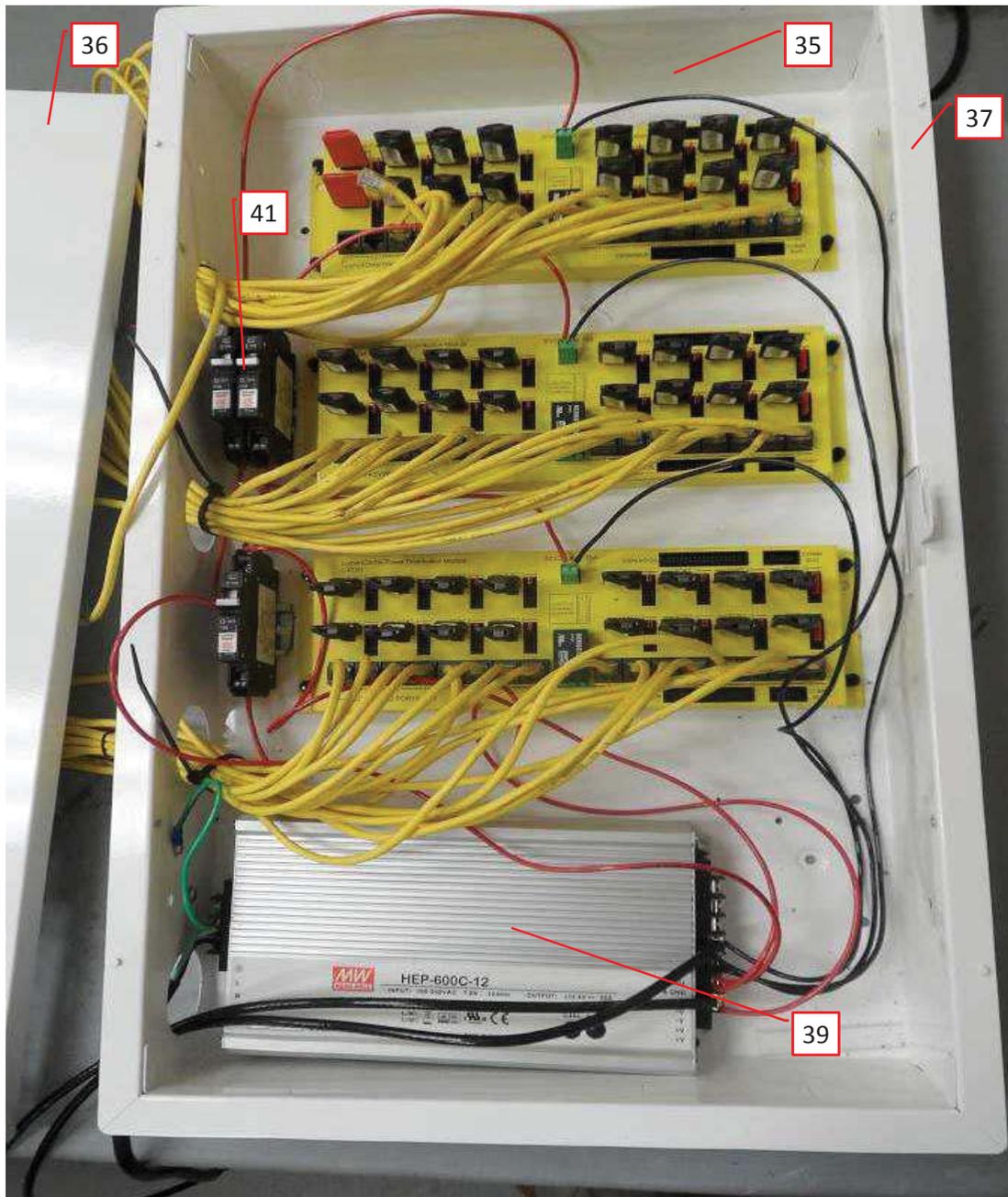
Listing Constructional Data Report (CDR)

1.0 Reference and Address			
Report Number	101902573CHI-001	Original Issued: 11-Oct-2016	Revised: None
Standard(s)	Low Voltage Lighting Systems [UL 2108:2015 Ed.2], Second Edition)		
Applicant	<u>Lumen Cache, Inc.</u>	Manufacturer	Lumen Cache, Inc.
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Country	USA	Country	USA
Contact	Mr. Derek Cowburn	Contact	Mr. Derek Cowburn
Phone	317-222-1314	Phone	317-222-1314
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2.0 Product Description					
Product	Power Unit				
Brand name	NA				
Description	The product covered by this report is Recessed Wall mount Power Unit , suitable for Dry locations only. All products are provided with a means of permanent connection to the supply source in accordance with all applicable codes.				
Models	L-ENC; followed by 1, 2, 3 or 4 followed by BC, PS or EX; followed by -12 or -24				
Model Similarity	<p>See Illustration # 17-19 for model Nomenclature</p> <p>Models with a PS option are mains connected and utilize an Internal switching mode power supply</p> <p>Models with a BC option are powered from an external battery and battery charger combination.</p> <p>Models with an EX option are powered from a remote Power supply, supplied by the end user during installation. This figuration is intended by means of permanent connection to the supply source in accordance with all applicable codes</p> <p>See Illustration # 8 for List of components utilized in power system</p>				
Ratings	Model Rating Information				
	Model	Input Voltage	Input Current (A)	Max Output Voltage (Vdc)	Max Output Current (A)
	L-ENC; followed by 1, 2, 3 or 4 followed by BC or EX; followed by -12 or -24	10-30 Vdc	20	53.3V/port (Max 16 ports)	0.3A/port (Max 16 ports)
	L-ENC; followed by 1, 2, 3 or 4 followed by PS; followed by -12 or -24	120-240 Vac	20	53.3V/port (Max 16 ports)	0.3A/port (Max 16 ports)
Other Ratings	NA				

3.0 Product Photographs

Photo 1 - View of Enclosure for L-ENC-3-PS



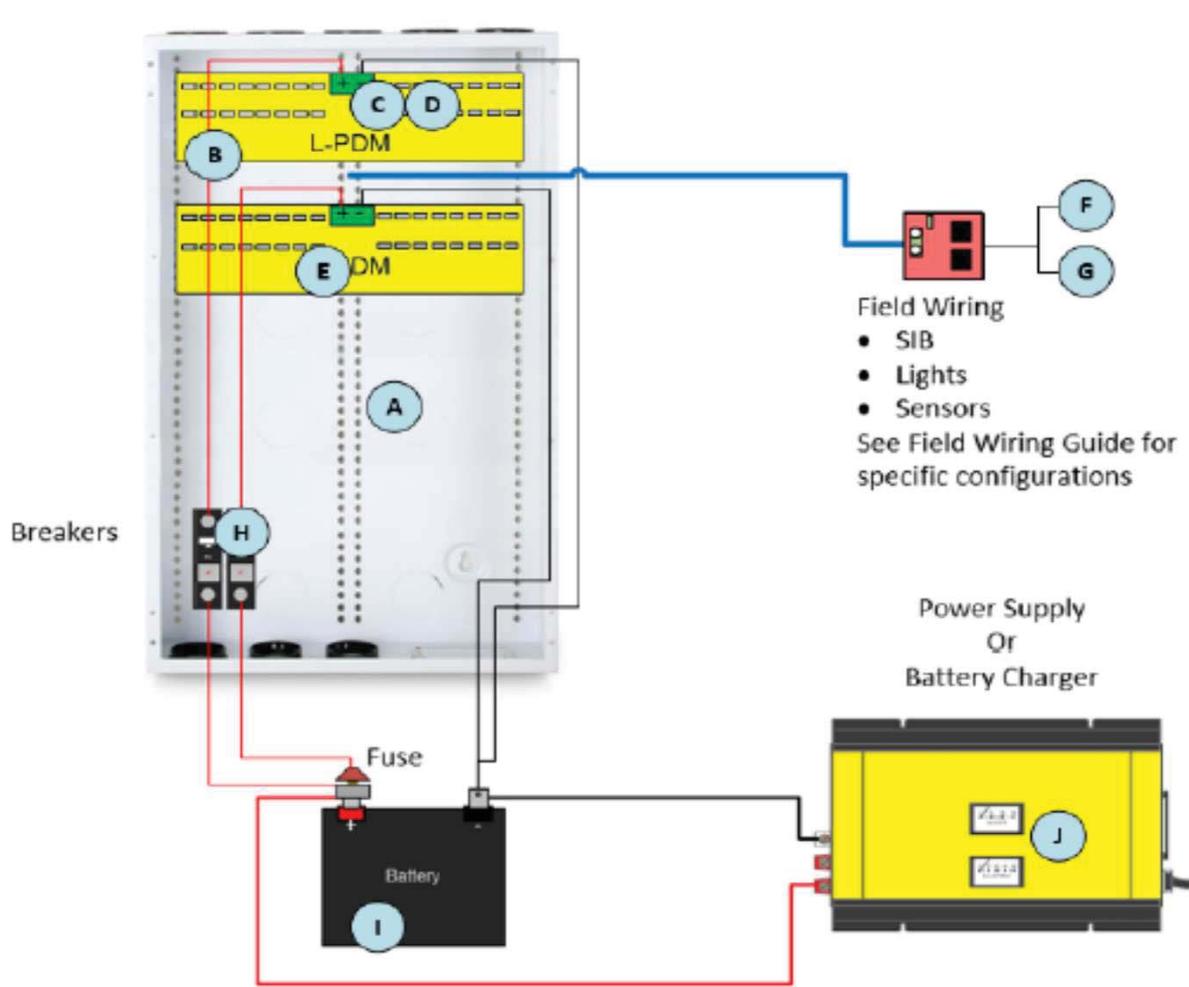
7.0 Illustrations

Illustration 29 - LiBre Field Manual (3 of 15)

SYSTEM ARCHITECTURE

OVERVIEW

- | | |
|--|------------------------------|
| A. Enclosures | F. Lights |
| B. Power Distribution Modules (L-PDM) | G. Switch Inputs |
| C. LED Drivers (L-CCB-xxxx, L-SV1) | H. DC Breakers |
| D. Switch Drivers (L-WP1) | I. Batteries |
| E. Accessory Power Regulator (L-PDM-PSx) | J. Chargers & Power Supplies |

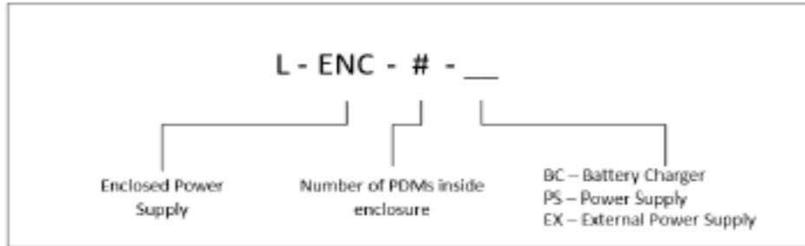


7.0 Illustrations

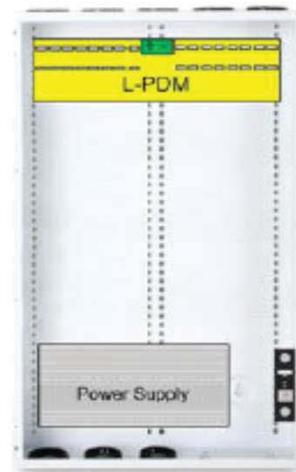
Illustration 30 - LiBre Field Manual (4 of 15)

CONFIGURATIONS

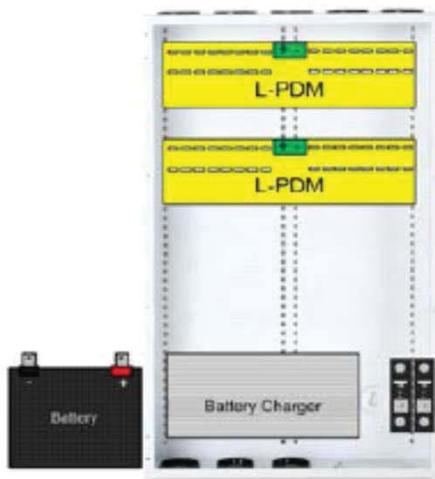
The LumenCache power unit comes configured in one of the following L-ENC named configurations. Alternate configurations are NOT covered under the UL rating and are subject to local building and electrical codes.



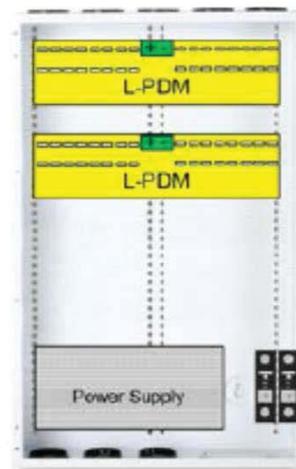
L-ENC-1-BC



L-ENC-1-PS



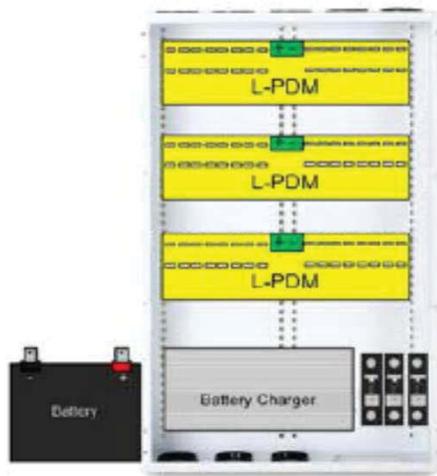
L-ENC-2-BC



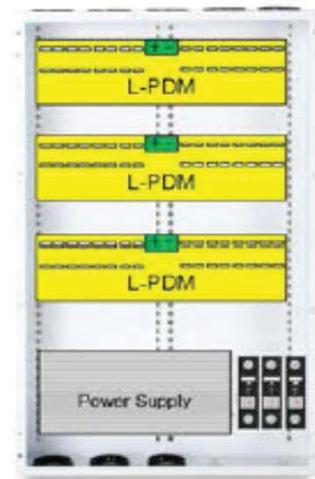
L-ENC-2-PS

7.0 Illustrations

Illustration 31 - LiBre Field Manual (5 of 15)



L-ENC-3-BC



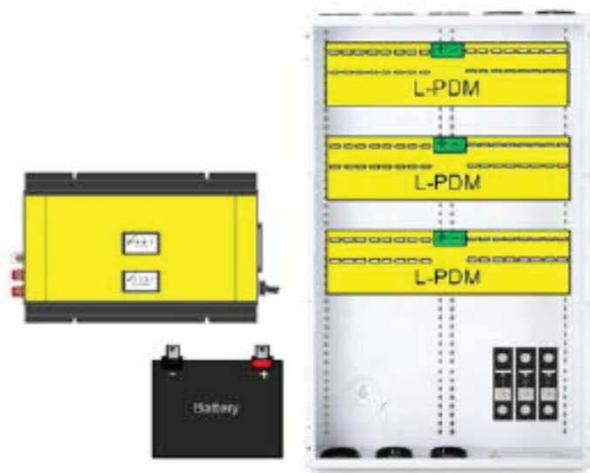
L-ENC-3-PS



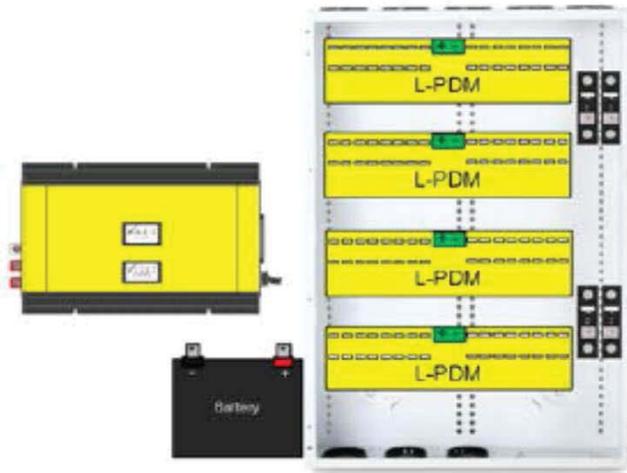
L-ENC-1-EX



L-ENC-2-EX



L-ENC-3-EX

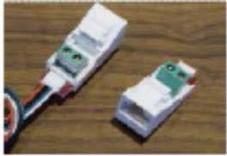


L-ENC-4-EX

7.0 Illustrations

Illustration 32 - LiBre Field Manual (6 of 15)

COMPONENTS

Component	Image	Purpose
Enclosure		Wiring enclosure holds PDMs and protects equipment from physical damage. Enclosures should be placed in conditioned space as per the environmental specifications.
Power Distribution Module L-PDM		Platform base for termination of up to 16 field wires via RJ45 Ports. LED Driver and Switching modules plug into 16 Port Sockets.
LED Driver L-CCB-Bxxx		LED Drivers inserted into PDM Port Sockets provide constant current power to LED Luminaire fixtures connected to the SIBs at the far end of the wires. Typically, <u>one driver is required for each fixture</u> . Some fixtures below 7W can be run in Series up to 3 per driver (refer to fixture specs). The on/off/dim state of the driver is controlled by signals received from a SwitchPuck over the selected PDM Channel.
Switched Voltage Driver L-SV1		Constant voltage power is used for some multi-bulb fixtures and strip lights where the total current depends on the number of bulbs or the length of the strip. Control signal is received from the PDM Channel.
SwitchPuck Zone Controller L-WP1		SwitchPucks read dry contact and analog signals from field switch inputs and produce a PDM Channel control signal. Up to 96 LED Drivers can listen to that Channel and be controlled by the switch inputs. This is how “zones” of lights are grouped to together with switches. SwitchPucks are also controllable via the PDM Comm Bus allowing third-party controllers to set the output level of lights and read the status of light levels.
Accessory Power Regulator L-PDM-PSx		Provides 12V DC regulated power to SwitchPucks. This power is also shared with the 16 PDM Ports allowing smart devices connected to the SIB Accessory Power pins to remain powered regardless of the LED Power state.
Smart Interface Block L-SIB-K		A simple interface for connecting LED Power Output, 12V Accessory Power Output, and Switch signal input to a PDM Port and Port Socket. Some lights and Switches have the SIB component built-in and require no additional connections beyond the Cat5 field wire. The L-SIB-K contains a screw terminal for LED Power output and an optional wire harness for connecting Accessory Power and Switch Input.

7.0 Illustrations

Illustration 33 - LiBre Field Manual (7 of 15)

<p>Smart Interface Block L-SIB-SE</p>		<p>L-SIB-SE is a multi-purpose SIB simplifying connection of Constant Current LEDs and/or Switch Inputs. It also makes Series connections easy when 2-3 share a single PDM Port. See fixture specs when this is allowed.</p>
<p>Lights</p>		<p>Constant Current LED Luminaries contain no driver circuits. A SIB connects the LED array to the Driver inserted in the PDM Port Socket via the Cat5 wire attached to the PDM Port.</p>
<p>Switch Inputs</p>		<p>Provide signals to SwitchPucks inserted in PDM Port Sockets indicating what channel output level is desired. Momentary contact switches provide the most flexibility but simple on/off switches are acceptable. Only a tiny control voltage passes through the switch inputs. DO NOT connect AC Power or AC Dimmers to LumenCache.</p>
<p>Occupancy Sensor Inputs</p>		<p>Occupancy detectors produce a 7.5kOhm resistance across the C and S pins on the SIB when occupancy is detected. Modes 3-6 detect the change from Unoccupied to Occupied and from Occupied to Unoccupied. Modes 1 & 2 use the occupancy detector as a simple switch. Some have ambient light detection features.</p>
<p>DC Breakers</p>		<p>Breakers protect PDMs from enclosure wiring faults between the battery and the PDM input block.</p>
<p>Batteries</p>		<p>Batteries provide backup power, primary power, and power smoothing. Constant Current LED drivers are unaffected by fluctuations in their supply voltage that cause flicker, winks, and ripples in traditional AC lighting.</p>
<p>Chargers & Power Supplies</p>		<p>Provide charging and maintenance of the batteries. Chargers must be sized to provide sufficient current for full load from the lights and a little extra to recharge the batteries in the event they are depleted.</p>

HOW IT WORKS

Each Power Distribution Module (PDM) Port connects via Cat5 wire to a Smart Interface Block (SIB) in the building. The SIB may be a separate block or built into a light fixture, switch input, occupancy sensor, or other device.

7.0 Illustrations

Illustration 34 - LiBre Field Manual (8 of 15)

Each Port supports THREE internal connections:

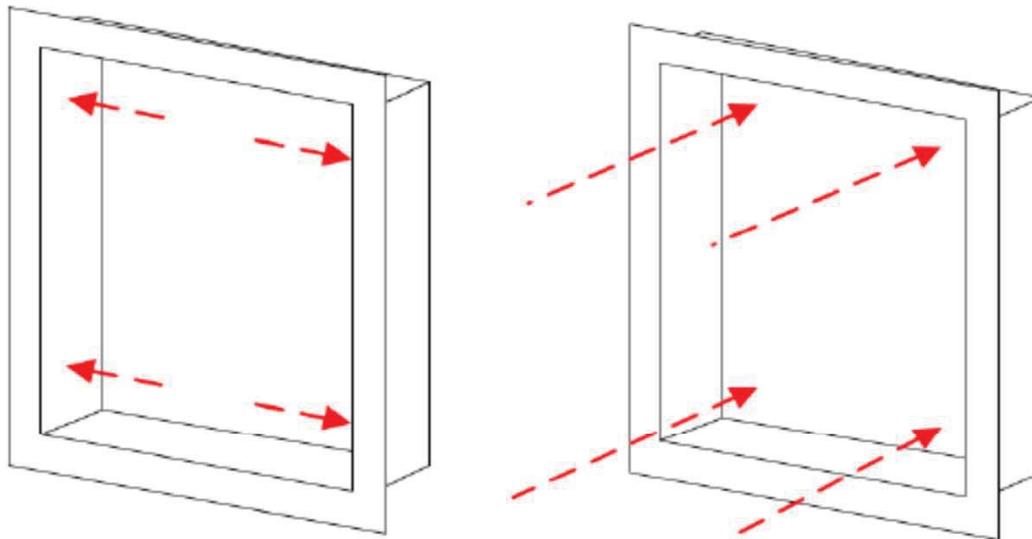
• LED Power	The main power for the LED or end device sent by a L-CCB-xxxx driver or L-SV1
• Switch/Data Input signal	Input command signals read by L-WP1.
• 12V Accessory power	Standby & other low power used by Occupancy Sensors or other embedded processors in field devices.

The SIB provides an easy connection point for these three connections.

Often, only 1 or 2 of the connections are used by the end device. An LED light may only use the LED Power connection

POWER UNIT INSTALLATION

MOUNTING THE POWER UNIT



Flush Mounting

Surface Mounting

Flush Mounting

Mount the enclosure to two studs using 4 x 1.25in-3in metal wood screws. The holes for flush mounting are located on the side walls of the enclosure.

Surface mounting

Screw the enclosure to the wall using 4 x 1.25in-3in metal wood screws. The holes for surface mounting are located on the rear face of the enclosure beneath the spaces for the first and third PDMs.

8.0 Test Summary			
Evaluation Period	04/01/15 - 10/11/16		Project No. G123456789
Sample Rec. Date	03/16/15, 03/10/15	Condition Prototype	Sample ID. AH03162015030600, 03102015040049, AH03102015035922
Test Location	Intertek, 545 East Algonquin Road, Suite F, Arlington Heights, IL 60005 USA		
Test Procedure	Testing Lab		
<p>Determination of the result includes consideration of measurement uncertainty from the test equipment and methods. The product was tested as indicated below with results in conformance to the relevant test criteria. These products were also evaluated to the Standard for Safety for Light Emitting Diode (LED) Equipment for use in Lighting Products, (UL 8750, 2nd Ed.); Standard for Safety Class 2 Power Units, (UL 1310 / 6th Ed., Rev 05/30/14)</p>			
The following tests were performed:			
Test Description	UL 2108 Clause	UL 8750 Clause	UL 1310 Clause
Input Test	--	8.2	--
Maximum Output Test	33.2	--	28
Normal Temperature Test	34	8.3	33.1
Overload Test	36	--	--
Dielectric Voltage Withstand Test	37	8.4	34.1
Input Test	33.1	--	--
Component Fault Test	39	8.5.2	--
Output Loading Test	--	8.5.3	--
Determination of Low Voltage Limited Energy Circuit	--	8.14	--
Output Current and Power Test (Inherently Limited)	--	--	30.2
Full-Load Output Current Test	--	--	32
Abnormal Output Short Circuit Test	--	--	39.2.2
Abnormal Component Breakdown Test	--	--	39.7
8.1 Signatures			
A representative sample of the product covered by this report has been evaluated and found to comply with the applicable requirements of the standards indicated in Section 1.0.			
Completed by:	Kris Flores	Reviewed by:	Carl Bloomfield
Title:	Senior Project Engineer	Title:	Engineer Review
Signature:		Signature:	

11.0 Manufacturing and Production Tests

The manufacturer agrees to conduct the following Manufacturing and Production Tests as specified:

Required Tests

Dielectric Voltage Withstand Test, Grounding Continuity Test

11.1 Dielectric Voltage Withstand Test

Method

One hundred percent of production of the products covered by this Report shall be subjected to a routine production line dielectric withstand test.

The test shall be conducted on products, which are fully assembled. Prior to applying the test potential, all switches, contactors, relays, etc., should be closed so that all primary circuits are energized by the test potential. If all primary circuits cannot be tested at one time, then separate applications of the test potential shall be made.

The test voltage specified below shall be applied between primary circuits and accessible dead-metal parts. The test voltage may be gradually increased to the specified value but must be maintained at the specified value for one second or one minute as required.

Test Equipment

The test equipment shall incorporate a transformer with an essentially sinusoidal output, a means to indicate the applied test potential, and an audible and/or visual indicator of dielectric breakdown.

The test equipment shall incorporate a voltmeter in the output circuit to indicate directly the applied test potential if the rated output of the test equipment is less than 500VA.

If the rated output of the test equipment is 500VA or more, the applied test potential may be indicated by either:

- 1 - a voltmeter in the primary circuit;
- 2 - a selector switch marked to indicate the test potential; or
- 3 - a marking in a readily visible location to indicate the test potential for test equipment having a single test potential output.

In cases 2 and 3, the test equipment shall include a lamp or other visual means to indicate that the test potential is present at the test equipment output. All test equipment shall be maintained in current calibration.

Products Requiring Dielectric Voltage Withstand Test:

<u>Product</u>	<u>Test Voltage</u>	<u>Test Time</u>
Applies to all models with a PS supply option.	1000V	60 s
	or	
	1200V	1 s

11.2 Grounding Continuity Test

Method

At least once per quarter, each representative design listed below shall be subjected to a test to determine that there is continuity between accessible dead-metal parts of the product and the grounding conductor, grounding terminal, or grounding pin or blade of the attachment plug.

If all accessible dead metal is connected, only a single test need be performed. The measured or calculated resistance between the point of connection of the grounding means and any non current carrying metal parts shall not exceed 0.10 Ω

Products Requiring Grounding Continuity Test:

All products covered by this Report.