

## **Power Conditioner and Light Module**

MODELS PL-8, PL-PLUS, and the PLP Series

### **Instruction Sheet**

#### **PL-8 Features**

- Two slide-out, swiveling light fixtures for rack illumination
- Eight accessory outlets in rear, controlled by front switch
- Triple mode varistor spike and surge protection
- RFI filtering (transverse)
- Circuit breaker, 15 Amp rating
- Dimmer control for lamp brightness
- Separate switch for lamps

#### **PL-PLUS Features**

- All PL-8 features, plus...
- Line Voltage monitor reads 90 to 128 Volts
- High performance RFI/EMI noise filter (transverse and common mode)
- Ten foot, heavy duty 14 gauge AC cord

#### **PLP Series Features**

- All PL-PLUS features, plus...
- Translucent plastic front panel in four high-tech colors
- New streamlined shape

#### **PL-8**

The Furman PL-8, PL-PLUS or PLP Series Power Conditioner and Light Module is the perfect accessory for any rack-mount system. Install a PL-8 in the top slot of your rack, and the eight switched AC outlets on the rear panel will power up all your equipment while its two slide-out light fixtures provide discreet illumination of their controls on stages, in studios, and in other dark places. A dimmer control lets you adjust the lamp brightness to just the right level.

The PL-8 protects your delicate electronic equipment by combining a high voltage surge and transient suppressor with an RFI/EMI interference filter. The fast-acting suppression circuit responds in less than a nanosecond, clamping transient voltages to safe levels. The peak clamping voltage is 340 VAC, effective for spikes on any of the three AC conductors, and the clamping circuitry can absorb a total of up to 240 Joules. These specs indicate a very high degree of protection compared to competitive products. The filter works to prevent noise from fluorescent lights, certain dimmers, radio transmitters, and similar sources of "electronic pollution" from contaminating the AC line and from there, leaking into sensitive audio, video, or computer circuits.

The eight circuit breaker protected outlets are rated at 15 Amps. If the total load on the PL-8 (combining all outlets) exceeds 15 Amps, the circuit breaker will trip, cutting off power to your rack. If this occurs, reduce the load by unplugging one or more units from the PL-8. Then push the white button on the circuit breaker (on the rear panel) down and in to reset it. The PL-8's lamps come supplied with 7 Watt night-light bulbs. Replacements are readily available at most hardware stores or almost anywhere household light bulbs are sold. Bulbs are easily replaced without removing the unit from the rack by unscrewing the cap on the end of each light tube. The caps and light tubes become quite warm to the touch in normal operation. To avoid burning your fingers, allow the cap to cool completely before unscrewing it. Be careful not to push the tubes in while the caps are unscrewed.

If you find that the heat from the tubes is excessive, try reducing the setting of the dimmer knob. As an alternative, you may wish to substitute 4 Watt bulbs or even colored Christmas tree bulbs.

The PL-8 has a master switch for the rear outlets which lights up when the power is on. There is also a separate switch for the lamps, allowing you to check your rack's settings before applying power to it. The lights do not turn off automatically when the tubes are pushed in, so be sure to use the switch.

#### **PL-PLUS**

Model PL-PLUS is an enhanced version of the PL-8. On the front panel it provides a handy display of AC line voltage by means of a 20 LED bar-graph meter on the front panel, reading from 90 to 128 Volts in two-Volt steps. The normal range voltages are indicated in green, with moderate and extremely high or low voltages in yellow and red respectively. Note that the LED meter continues to read even when the master switch is off. This was done purposely to allow you to check the voltage before powering up. The LED's are designed for continuous, ongoing use. They consume little power, just a few cents worth per month, much like a clock. The PL-PLUS also is rated at 15 Amps, but with a longer, 10 foot power cable. In addition, it offers a sophisticated RFI filter network with a greatly improved capacity for stopping line noise. This filter is a low-pass type, composed of high-voltage capacitors and an inductor. It passes the low (50 or 60 Hz) line frequency while rejecting high frequencies, with maximum attenuation in the region from 1 to 100 MHz. The PL-PLUS's voltmeter has a basic accuracy of plus or minus 2 Volts, and extreme cold or heat may cause an additional 1 Volt of error. Should the voltage reading ever become inaccurate, it can be easily recalibrated by a qualified service technician.

Please note that the voltage reading is advisory only. The PL-PLUS does not compensate for high or low line voltage. If you frequently move your rack to different locations, derive power from generators, use long extension cords, travel internationally, or are in an area prone to brownouts, you may benefit from the use of one of Furman's AR Series AC Line Voltage Regulators.

## PLP Series

The new PLP Series power conditioners (models PLP-BLU, PLP-RED, PLP-VIO and PLP-GRN) are electronically identical to the PL-PLUS, but feature a new, streamlined shape and translucent plastic front panel available in four bright, high-tech colors: Blue, Red, Violet, or Green.

## 220/240 Volt Versions ("E" Suffix)

Versions of the PL-8, PL-PLUS or PLP Series with the "E" suffix are intended for use in countries with nominal 220 to 240 Volt AC lines. These units have ten rear panel outlets, using the internationally-accepted IEC-320 connectors, and are rated at 10 Amps. The voltmeter on the PL-PLUS-E, PLP-BLU-E, PLP-RED-E, PLP-VIO-E and PLP-GRN-E reads from 180 to 256 Volts AC.

## Effects of Lightning and Incorrect Voltages

Lightning presents the most difficult circumstance faced by power protection products. The degree of protection a PL-8, PL-PLUS or PLP Series unit can offer depends on the intensity of the strike. If lightning strikes a distant power line and causes a relatively small disturbance to reach your location, the spike suppressors in the PL unit will absorb the excess voltage invisibly and harmlessly. However, if lightning strikes the actual building where the PL unit is installed (or somewhere nearby), some damage may be unavoidable due to the extremely high voltage and current present. If this does occur, most likely damage will be limited to the PL unit itself and will affect only the spike suppression components (called varistors or MOV's.) In this "suicide" mode, the PL unit will sustain minor damage to itself but generally will protect all equipment plugged into it from much more serious and costly damage as long as that equipment is properly grounded. Proper grounding requires the use of 3-prong AC cords and that the outlets themselves are actually grounded as specified by electrical codes.

Any PL unit known to have taken a direct lightning hit should be checked by a qualified technician or the Furman factory to determine whether the MOV's need replacement. (If they are damaged, the PL unit may appear to be working normally, but its vital spike-suppression capability will be eliminated.)

For optimum protection, you should not rely exclusively on the PL unit to protect against a direct lightning hit. The first line of defense against lightning should be a lightning arrestor installed on your building's electrical service entrance. If your building does not have one, contact your local power company or an electrical contractor to have one installed.

The PL-8, PL-PLUS and PLP Series are not intended to protect against accidental connection to an improper supply voltage (such as 220 Volts in North America or 380 Volts in other areas.) If such a connection is made, the PL unit's MOV's will most likely be destroyed, which may or may not provide sufficient time for its circuit breaker to trip. If it does not trip in time, it is possible for equipment downstream to be damaged. In our experience, such accidents happen surprisingly often. For complete protection against this possibility, a more sophisticated protection device is needed, such as the Furman PRO Series Power Conditioners, or the AR Series AC Line Voltage Regulators.

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## DEFINITIONS

**SPIKE:** A pulse of energy on the power line. Spikes can have voltages as high as 6000 Volts. Though they are usually of very short duration, the energy they contain can be considerable, enough to damage sensitive solid-state components in audio and computer equipment. Spikes can also foul switch contacts and degrade wiring insulation. They are an unavoidable component of electric power. They are caused unpredictably by electric motors switching on or off (on the premises or outside), utility company maintenance operations, lightning strikes, and other factors. Spikes (also called surges or transients) are absorbed by special components called varistors or MOV's in the PL-8 and PL-PLUS to provide safe voltage levels to protect your equipment.

**RFI/EMI INTERFERENCE:** Noise from RFI (Radio Frequency Interference) or EMI (Electro Magnetic Interference) involves lower voltages and less energy than is found in spikes, but it is continuous rather than transient in nature. It is not likely to cause damage, but it can certainly be annoying, producing static in audio circuits, "snow" on video screens, or garbled data in computers. Noise can be introduced into AC lines by nearby radio transmitters, certain kinds of lighting, electric motors, and others. Because noise occurs at higher frequencies than the 50 or 60 Hz AC line, it can be effectively reduced through use of low-pass filtering.

## SPECIFICATIONS

Current rating:	15 Amps ("E" versions 10 Amps)
Input Voltage:	85 to 135 VAC ("E" versions 190 to 270 VAC)
Voltmeter Accuracy:	PL-PLUS only: $\pm 3$ VAC, calibrated with internal trimpot adjustments
Spike Protection Modes:	Line to neutral, neutral to ground, line to ground
Spike Clamping Voltage:	Initial turn-on at 200 Volts; TVSS rating of 400 Volts peak at 500 Amps, L-N, N-G, L-G (tested to UL-1449) (Initial turn-on for "E" versions, 390 Volts peak L-N; 680 Volts peak N-G, L-G)
Response time:	1 nanosecond
Maximum surge current:	6,500 Amps
Maximum spike energy:	80 Joules per mode, 240 Joules total protection ("E" versions 130 Joules L-N, 160 Joules N-G, L-G, 450 Joules total)
Noise attenuation:	PLP, PL-PLUS: Transverse and common modes: 20 dB at 200 kHz, rising to >40 dB, 1 to 100 MHz
Mechanical:	Dimensions: 1.75" H x 19" W x 8" D. Weight: 6 lbs (2.7 kg). Construction: Steel chassis, zinc chromate plating; .125" brushed and black anodized aluminum front panel; glass epoxy printed circuit boards.
Power Consumption:	PL-8, 14 Watts; PL-PLUS and PLP Series, 20 W
Safety Agency Listings:	UL, CUL, CE

Specifications subject to change without notice

## Three Year Limited Warranty

The Furman PL-8, PL-PLUS, and PLP Series are warranted against failures due to defective parts or faulty workmanship for a period of three years after delivery to the original owner. During this period, Furman will make any necessary repairs without charge for parts or labor. Shipping charges to the factory or repair station must be prepaid by the owner; return shipping charges (via UPS ground) will be paid by Furman. This warranty applies only to the original owner and is not transferable. Also, it does not apply to repairs done other than by the Furman factory or Authorized Repair Stations.

This warranty may be cancelled by Furman at its sole discretion if the unit has been subjected to physical abuse (including, but not limited to, connection to improper AC or DC voltages), or has been modified in any way without written authorization from Furman. Furman's liability under this warranty is limited to repair or replacement of the defective unit.

Furman will not be responsible for incidental or consequential damages resulting from the use or misuse of its products. Some states do not allow the exclusion of incidental or consequential damages, so this limitation may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Warranty claims should be accompanied by a copy of the original purchase invoice showing the purchase date (if a Warranty Registration Card was mailed in at the time of purchase, this is not necessary). Before returning any equipment for repair, please be sure that it is adequately packed and cushioned against damage in shipment, and that it is insured. Please enclose a note giving your name, address, phone number and a description of the problem.

**Service:** All equipment being returned for repair must have a Return Authorization (RA) Number. To get an RA Number, please call the Furman Service Department, (707) 763-1010 ext. 40, between 8 a.m. and 5 p.m. U.S. Pacific Time, or fax to (707) 763-1310. Please display your RA Number prominently on the front of the package.