

# PM-8

## POWER CONDITIONER



# PM-8 POWER CONDITIONER OWNERS MANUAL

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*Congratulations on your purchase of a Furman PM-8 Power Conditioner/Monitor. The PM-8 is an ideal accessory for any rack-mount system.*

## PROTECTION CIRCUITRY

The Furman PM-8 protects your delicate electronic equipment by combining high voltage spike and surge suppression circuitry with a sophisticated 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 250 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 RFI filter is a low-pass type, composed of three high voltage capacitors and a common-mode choke. It passes the low (50 or 60 Hz) line frequency while rejecting high frequencies, with maximum attenuation in the region from 1 to 100MHz. Its purpose is to prevent noise from fluorescent lights, certain motor and lighting dimmers, radio transmitters, and similar sources of "electronic pollution" from contaminating the AC line and from there, leaking into sensitive audio, video, or digital circuits.

The nine (one in front, eight in the rear) circuit breaker protected outlets are rated at 15 amps. If the total load on the PM-8 (combining all outlets) exceeds 15 amps, the circuit will trip, cutting off power to your rack. If this occurs, reduce the load by unplugging one or more units from the PM-8. Then push the white button on the circuit breaker down and in to reset it.

The PM-8 has a master switch for the rear outlets which lights up when the power is on. The front panel outlet is unswitched, meaning power is available from it at all times, regardless of the position of the master switch.

## VOLTMETER AND AMMETER

On the PM-8's front panel are two LED bar-graph meters. The voltmeter reads AC voltage from 90 to 135 volts in 5-volt steps. The normal range voltages are indicated in green, with moderate and extremely high or low voltages in yellow and red respectively. The ammeter reads AC current from 0 to 20 amps, in 2-amp steps. Currents above the 15 amp limit read red, with yellow indicating a warning zone. Note that the meters continue to read even when the master switch is off. This was done purposely to allow you to check the

voltage before powering up (though the current meter will show no load - 0 amps; until the master switch is in the "on" position. The LED's are designed for continuous, ongoing use. They consume little power, just a few cents worth per month, like a clock. Please keep in mind that the ammeter may not read at all if the total load connected is less than 2 amps (240 watts). This is a likely occurrence if only relatively low power, signal processing-type equipment is connected. With the master switch off, the ammeter can still read, but will only do so if equipment drawing at least 2 amps is connected to the unswitched outlet.

The PM-8's ammeter is capable of giving a reliable indication of current drawn by all kinds of equipment, thanks to its true-RMS-reading circuitry. This means that loads like power amplifiers, which are primarily capacitive or inductive, will read as accurately as purely resistive loads like heaters. Ammeters that respond only to average AC current may vary widely from RMS reading meters. Please note that the voltage reading is advisory only. The PM-8 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 AC Line Voltage Regulators. The PM-8's voltmeter has a basic accuracy of  $\pm 5$  volts; the ammeter is  $\pm 2$  amps. Should the readings ever become inaccurate, they can be easily recalibrated by a qualified service technician. See the section on Meter Calibration below for details.

## 220/240V VERSION (MODEL PM-8E)

The PM-8E is intended for use with nominal 220 to 240 volt AC lines. The PM-8E differs in the following ways from the PM-8: The PM-8E is rated at 10 amps. It has ten rear panel outlets, using the internationally-accepted IEC-320 connectors. The voltmeter on the PM-8E reads from 210 to 255 volts AC, and the ammeter reads from 0 to 10 amps AC. The spike and surge clamping voltage is 500 volts peak.

## EFFECTS OF LIGHTNING AND INCORRECT VOLTAGES

Lightning is a natural phenomenon of overwhelming force that represents the most difficult circumstance faced by a power protection product. The degree of protection a PM-8 can offer depends on the intensity of the strike. If lightning strikes a distant power line and cause

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a relatively small disturbance to reach your location, the spike suppressors in the PM-8 will absorb the excess voltage invisibly and harmlessly. However, if lightning strikes the actual building where the PM-8 is installed (or somewhere very 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 PM-8 itself and will affect only the spike suppression components (called varistors or MOV's). In this "suicide" mode, the PM-8 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 PM-8 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 PM-8 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 PM-8 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 PM-8 is not intended to protect against accidental connection to an improper supply voltage (such as 220V

in North America). If such a connection is made, the PM-8'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 do happen surprisingly often. For complete protection against this possibility, a more sophisticated protection device is needed, such as a Furman PM-PRO Power Conditioner/Monitor or AR-1215 AC Line Voltage Regulator. Both of these products have Extreme Voltage Shutdown circuits.

## METER CALIBRATION

The meters in your PM-8 have been preset by the factory, but if necessary they may be recalibrated or rechecked by a qualified service technician. Extreme caution must be used, as potentially lethal voltages are present on the meter circuit board. Adjustments of the trimpots should be done with a non-conducting screwdriver. Avoid rotating the trimpots all the way to the ends of their range.

**Voltmeter:** Measure the AC line voltage supplying the PM-8 with an accurate multimeter. Remove the PM-8's top cover. The voltage adjust trimpot on the circuitboard is labeled "V set". Adjust it until the PM-8's voltmeter matches the multimeter reading.

**Ammeter:** Connect a purely resistive load such as a heater or hair dryer to the PM-8 and measure the AC current with an accurate multimeter. Adjust the Amp Set trimpot so that the PM-8's reading matches the multimeter. Replace the top cover.

## THREE YEAR



Line Voltage Meter

Current Meter

Circuit Breaker

Unswitched Convenience Outlet

Power Switch



(8) Switched AC Outlets



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## LIMITED WARRANTY

The Furman PM-8 is 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 (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 PM-8 has been subjected to physical abuse or has been modified in any way without written authorization from Furman. Furman's liability under the 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 the above limitations 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).

## SERVICE

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. We suggest that you save the original packaging and use it to ship the product for servicing. Also, please enclose a note giving your name, address, phone number and a description of the problem.

NOTE: All equipment being returned for repair must have a Return Authorization (R/A) Number. To get an R/A Number, please call the Furman Service Department, (707) 763-1010 ext. 120 or 121, between 8 a.m. and 5 p.m., U.S. Pacific Time. Please display your R/A Number prominently on the front of all packages.

## SPECIFICATIONS

### Current rating:

PM-8: 15 amps; PM-8E: 10 amps

### Input Voltage:

PM-8: 85 to 135 VAC; PM-8E: 190 to 255 VAC

### Meter Accuracy:

Voltmeter:  $\pm 5$  VAC; Ammeter:  $\pm 2$  amps, calibrated with trimpot adjustments

### Spike Protection Modes:

Line to neutral, neutral to ground, line to ground

### Clamping Voltage, all modes:

PM-8: 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); PM-8E: initial turn-on at 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:

PM-8: 285 joules total;  
PM-8E: 540 joules total

### Noise attenuation:

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 circuit boards.

### Agency Approvals:

UL, C-UL, CE.

# **FURMAN**

Furman Sound, Inc.  
1997 South McDowell Blvd.  
Petaluma, California 94954-6919 USA  
Phone: 707-763-1010  
Fax: 707-763-1310  
Web: [www.furmansound.com](http://www.furmansound.com)  
E-mail: [info@furmansound.com](mailto:info@furmansound.com)