FURMAN
PURIFY YOUR POWER

IT-Reference 16 E

Owner's Manual

Features of the IT-Reference 16 E

- Symmetrical balanced power cancels hum inducing noise from audio and video
- Four discrete power banks eliminate inter-component interference and noise
- Power Factor correction provides surplus current for power-starved amplifiers
- Linear Filtering Technology for unequaled audio / video clarity
- Virtually maintenance-free Series Multi-Stage Protection

Introduction

For over 32 years, Furman has pioneered the development of AC power products for the most demanding audio, video, and broadcast professionals. Though the need for pristine AC power is nothing new, the IT-Reference 16 E's technology and its unique implementation are revolutionary and without peer.

The extreme AC demands encountered in the professional audio/video arena have required technological developments far in excess of typical home theater/audiophile power products. In studios, live sound, and broadcast facilities, breakdown is unacceptable. Equipment failure or poor performance is costly. The same is true of today's home theater. Our solution based technology, extensive engineering expertise, and robust build quality have answered the challenge of today's corrupted power lines, and led to the creation of our flagship power conditioner, the IT-Reference 16 E.

Today's AC lines are plagued with ever increasing noise. When AC noise couples into a system's critical components, it masks low level signals and cripples performance. This low level content is critical because it relays the crucial harmonics and ambience in audio, and depth and clarity in video. With the IT-Reference 16 E's exclusive Discrete Symmetrical Power, video screens, projectors, CD-DVD players, pre-amplifiers, and scalers are fed linearly-filtered ultra-low-noise Discrete Symmetrical Power. This dramatically reduces AC noise, ensuring peak operation of your critical components. For the first time, you will see and hear your theater or audio system as it should be – uncompromised.

Further, our Discrete Symmetrical Power features total isolation between three discrete AC outlet banks. This positively breaks noise-inducing ground loops, hum bars, and power supply backwash between interconnected equipment, all without compromising electrical safety. This enables a plasma screen to function without AC ground contamination from a compact disc player, or a preamplifier-processor to function free of performance-degrading digital noise from a satellite receiver.

The IT-Reference 16 E also employs our unique Power Factor Correction Circuit. For the first time, low-level analog, digital, and video components are not modulated or distorted via the power amplifier's extreme AC current demands. Further, the power amplifier sees a highly filtered, extremely low-impedance supply of AC power. The IT-Reference 16 E, in fact, has in excess of 9 Amps of continuous current reserve (over 80 amps peak charge) for the most extreme peak power demands. This technology enables power amplifiers and powered subwoofers to work at peak efficiency and reach levels of performance previously unattainable.

No longer will your amplifier's performance be at the mercy of your home's incoming AC power or inferior AC protection/filtering devices. The net effect is as if your power amplifier doubled in power and improved immeasurably in quality.

When employing the IT-Reference 16 E you will immediately notice far clearer, stunningly focused sound and visual images from your system. Video presentation will be crisp and colors true with greater gray and black scale definition, as well as noticeably improved depth and clarity. Sonic transients will be startlingly fast with bass fundamentals that shake foundations with their weight and visceral impact. Mid and high frequencies will bloom with sweet, non-glaring ease while imaging improves dramatically, all the while remaining true to your system's inherent virtues.

Installation:

Unpacking
Before unpacking your unit, inspect the carton for any obvious severe damage to the box and internal protective materials. If internal damage is likely, contact the carrier who delivered the unit before proceeding with unpacking. If, after unpacking, shipping damage is evident, contact the carrier. Save all shipping and packing materials. You may need them if you should ever have to return the unit to the factory service center.

The box should contain the IT-Reference 16 E unit, detachable AC cord, rack mount kit, owner's manual, and warranty registration card. If anything is missing, please contact Furman Customer Service. Fill out and return your warranty registration card. Registration is recommended because it can be used to establish whether the unit is within the warranty period should your original ownership documents be lost, and it assists us in informing you about upgrades or other vital information.

Safety Information - Warnings

Please read and observe all of the safety and operating instructions before the IT-Reference 16 E is operated. Retain these instructions for future reference.

- Do not disassemble or modify in any way. No user-serviceable parts inside.
- Keep away from moisture and avoid excessive humidity
- Do not allow liquids or foreign objects to enter the unit
- Household lighting equipment may not be connected to the IT-Reference 16 E because their sockets are not designed for use with balanced symmetrical power and may present a shock hazard. We recommend that only audio, video and computer processing equipment be

connected to the IT-Reference 16 E.

The IT-Reference 16 E should be serviced by qualified service personnel when:

- The power supply cord or plug has been frayed or cut.
- Objects have fallen or liquid has spilled into the unit.
- The IT-Reference 16 E has been exposed to rain or other moisture.
- The IT-Reference 16 E does not appear to operate normally, or exhibits a marked change in performance.
- The IT-Reference 16 E has been dropped, or the enclosure damaged.

Power Source

The power source to which the IT-Reference 16 E is connected should ideally be adequate for use at 16 Amps. Though the system may function with a 10 Amp panel circuit breaker, nuisance circuit breaker tripping could result at your service panel. If your system includes multi-channel audio power amplifiers that require more than modest power demands, a circuit breaker with a rating of at least 16 Amps (13 in the U.K.), is essential for optimum performance.

Placement

The IT-Reference 16 E is manufactured with four rubber feet for placement on any table, cabinet, shelf, or floor capable of supporting its 37 kg weight. These rubber feet may be easily removed with a standard Philips screw driver when rack mounting adjacent to other components. Because of the IT-Reference 16 E's internal shielding, placement or proximity to other components is not critical, and the IT-Reference 16 E does not produce any appreciable heat under standard use. The IT- Reference 16 E may also be rack mounted in a standard 19" (48 cm) rack by attaching the IT-Reference 16 E rack ears. These rack ears (contained within the plastic rack kit package) mount flush with the back portion of the IT- Reference 16 E's front panel. They are attached to the chassis by removing the (3) countersunk screws on each forward-side of the chassis top cover. Each rack ear is installed with pan-head Philips screws contained within the IT-Reference 16 E rack mounting kit. Due to the weight of the IT-Reference 16 E (37 kg.), it is recommended that placement be at or near the bottom of your rack when choosing this mounting option.

Connections:

AC Cable Routing

Once the IT-Reference 16 E is placed, the female end of the AC cord must be plugged into the male IEC connector located on the lower left hand side of the rear panel (when facing the rear panel). Next, the male plug must be connected to an appropriate socket. This AC cord will carry substantial unbalanced AC current, so it should be dressed away from critical signal-carrying cables, or at the very least, cross them at a 90 degree angle. The same is true of the power amplifier AC cords when plugged into the IT- Reference 16 E's "High Current - Amplifier Power" AC filtered outputs. All other components plugged into "Discrete Symmetrical Power" outlets (A) through (C) have symmetrical balanced AC current and will radiate virtually no field; as a result of this technology, their placement is not critical.

Connecting Components to the Symmetrical Power Banks

The IT-Reference 16 E's "Symmetrical

Power Outlets" should be employed for all components other than receivers, power amplifiers, powered subwoofers, or powered loudspeakers. Each "Discrete" bank (A) through (C) contains two to four parallel outputs, that are symmetrically balanced, filtered, and totally isolated from adjacent output banks and the (4) "High Current - Power Amplifier" outlets.

It should be noted that since each of the AC bank's symmetrical outlets are in parallel (for instance two per bank "A"), some component power supply noise could potentially "back-wash" between these units. For this reason it is recommended that systems with minimal componentry (three units or less, excluding the power amplifiers) utilize one "Discrete" bank per component. This will maximize performance by eliminating inter- component AC noise contamination entirely! For systems utilizing more componentry, a very high level of performance will still be achieved with careful routing of component AC cords to the IT-Reference 16 E's three "Discrete" power banks. We recommend separating digital processors, DVD's, and CD players from pre-amplifiers, tuners, and tape machines. Further, video monitors and scalers should ideally be separated from audio components.

Connecting Components to the High Current Power Amplifier Banks:
Many audiophile and premium home theater systems will have combined continuous current demands far below 16 Amps. It is rare, in fact, for large power amplifiers to draw more than 3 amps continuously.

For superior performance, it is vital that an AC filter possess extraordinarily low impedance, and have the capability to pass peak current demands far in excess of the RMS (continuous) current rating. The IT-Reference 16 E was designed to more than meet this demand. Additionally, our Power Correction Circuitry effectively creates a current reserve in excess of 80 amps peak up-charge that is cleaner and faster than a dedicated line from your local power station. This feature eliminates any concern regarding the current compression that can result from typical power conditioners, and the peak power reservoir dramatically benefits any power amplifier's performance.

The High Current Amplifier bank features (3) typical IEC female outlets, and one 16 amp IEC outlet for those amplifiers with extreme current demands (rare).

Note about Power Factor Correction and Current Consumption:
When power correction technology is employed with even the most sophisticated circuit breakers, it effectively adds to the perceived current load. Though the IT-Reference 16 E was designed for steady 16 amp operation, and peak current demands many times that, the maximum total continuous current draw may be limited to a range between 2400 - 3600 Watts per each IT-Reference 16 E employed.

The RMS current available before the circuit breaker trips varies due to the vector load. Simply put, the type of power supplies or electronic circuits connected to the IT-Reference 16 E will have an effect on its circuit breakers perceived current load, and therefore, when it will trip. Though the benefits of power factor correction far outweigh the small reduction in continuous current draw, this must be accounted for when constructing a large

system with high current demands.

The total continuous current draw of most electronic components is typically listed in watts by their AC input cord or AC connector. Watt ratings are simply added to determine the total system RMS current draw. It should also be noted that the IT- Reference 16 E's power correction circuitry has no actual effect on the power drawn from your utilities' power meter. The IT-Reference 16 E draws a mere 2 watts independent of other components, so it may be left on at all times.

Soft Start - Continuous Use and Break-In Time:

When power is first applied to the IT-Reference 16 E, (the front panel breaker- power toggle must be switched to the "on" position) the Soft Start feature is activated. There is an audible "clack" when the IT-Reference is first turned on or off. This sound is produced by the Soft Start circuit's 30 Amp relay engaging or disengaging. There is nothing in the IT-Reference 16 E's construction, design, or componentry to wear over the lifetime of the product, and there is no power draw from your electric service meter aside from the LED power indicator, relay, and GFCI protection circuit. For this reason the IT-Reference 16 E may be left with its power engaged permanently. This is an added benefit, as many audio/videophiles find performance improves significantly when leaving low-powered components permanently charged (turned on). In fact, this is true of the IT- Reference 16 E. Though it will function flawlessly right from its shipping carton, the performance of its circuit parts will improve after approximately two weeks of continuous use or "break-in."

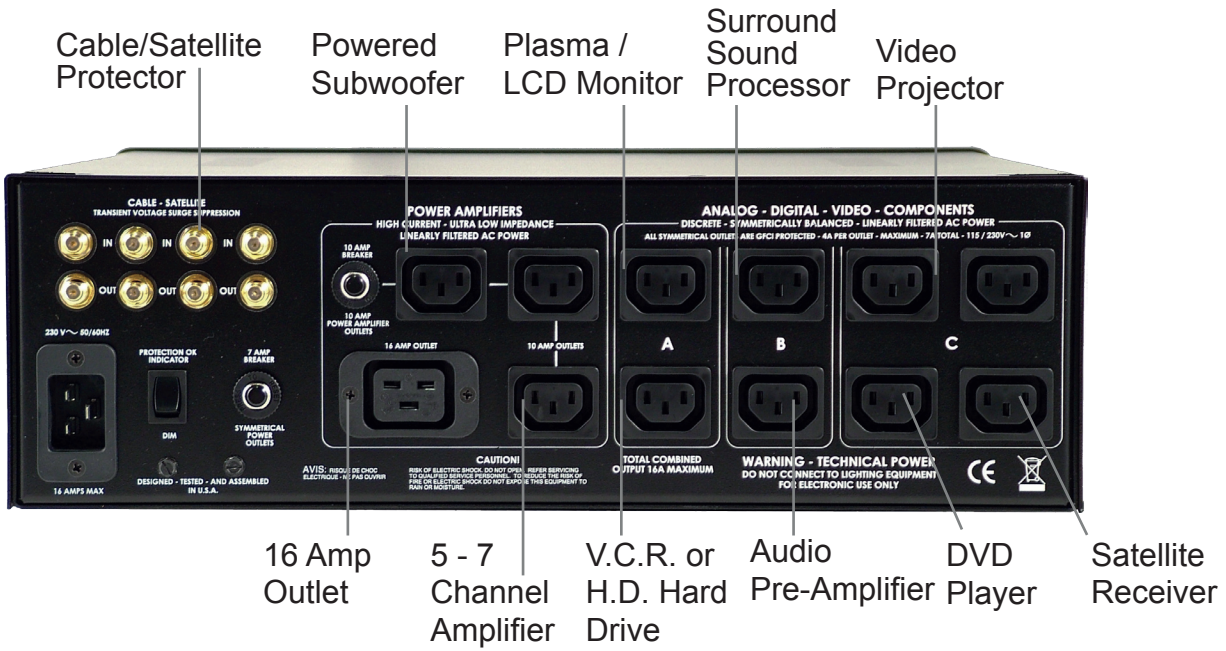
Ground Fault Interrupter (GFCI):

The IT- Reference 16 E's "Discrete Symmetrical Filtered AC outlets" incorporate a balanced AC power output, whereby both the neutral and positive leads of the AC cable run at 115 Volts AC in opposing polarity, referenced to ground (0 Volts AC). This is but one of the IT- Reference 16 E's advantages over other AC-filter/protection designs.

Though virtually all electronic equipment is designed to detect electrical shorts and other potentially dangerous equipment problems in the line lead referenced to its Neutral, this is inadequate when power is "balanced." With the IT-Reference 16 E, both neutral and positive legs contain 115 VAC relative to their Ground tab. This is not a problem or safety hazard, unless there is a defect in either the IT- Reference 16 E's transformer, or the power supply of a connected component. In this instance, we need to assure that safety is always maintained. The solution is our GFCI (ground fault circuit interrupter).

The Furman GFCI detects any imbalance in the current flowing in the two hot legs. The missing current is presumed to be flowing through the ground conductor (the round pin on an AC outlet). Ground current often indicates a dangerous partial or full short circuit. If an imbalance is detected, the GFCI will trip the main circuit breaker/power switch. To restore operation, correct the fault and turn the unit on again. 5 mA of current is enough to cause the GFCI to trip; to troubleshoot this type of problem, start with nothing connected to the IT-Reference 16 E. Then, add each piece of equipment until the GFCI trips. Contact the manufacturer of the suspect unit for possible solutions.

Suggested AC Connection



Testing the IT-Reference 16 E's GFCI once a year is recommended. Simply press the button marked "GFI TEST." If the GFCI is functioning properly, this will cause the main circuit breaker/power switch to trip and cut off power. After verifying the GFCI's proper operation, simply restore power by switching the Circuit Breaker/Power Switch to the "1" position.

AC Transient Voltage Surge Suppression and Extreme Voltage Shutdown

Extreme Voltage Shutdown Indicator:
This LED is normally off. It monitors AC wiring faults – for example, accidental connection to an open neutral (in some countries) could put well over 300 VAC RMS onto the mains outlet. When the Series Multi-Stage Protection Plus (SMP+) circuit senses voltages that are so high that operation would be impossible, it shuts the power down before damage can occur. Upon initially applying power to these units, the Extreme Voltage indicator LED will light if the input voltage is above the extreme voltage cutoff, and power will not be applied to the unit's outlets. If the unit has been operating with an acceptable input voltage and subsequently that voltage exceeds 270 VAC, it will shut off power to the outlet and the Extreme Voltage LED will light.

Protection OK Indicator:
Although the Furman SMP circuit assures virtually maintenance free protection from transient voltage spikes and surges, nature has a way of occasionally creating electrical forces that are beyond the capabilities of any

Transient Voltage Surge Suppression device to absorb without some degree of damage. In the rare instance that this occurs, the blue LED located in the center of the front panel will dim, even though AC power is present at the unit's outputs. If this happens, some level of protection from voltage surges will remain, but the Furman's clamping voltage rating will be compromised. The unit must be returned to Furman Sound, or an authorized Furman Service Center for repair.

NOTE: If the mains power is above the high cutoff voltage and has caused the unit to remove power from its outlets, it cannot restore power without the operator manually turning the unit off, then on again. Avoid turning the unit back on without first checking the source of the problem, and perhaps changing the AC source.

Satellite – Cable Transient Voltage Surge Suppressors

The IT-Reference 16 E features transient voltage surge suppression for both cable and satellite lines utilizing standard coaxial connectors. As these surge suppressors are in-line, they will require an additional cable to connect from their output to the control device requiring protection.

All in-line surge suppressors feature our exclusive ground contamination free technology. This aids in eliminating audio buzzing, and the video hum-bars that can result from typical in-line suppressors. Further, our cable and satellite suppressors are TIVO friendly as well as HD-Digital Television ready. Both DC carrier signals as well as high bandwidth signals can pass through our circuit. In fact the bandwidth is less than 0.1dB loss at 1GHz!

To connect your cabling to these in-line protectors, simply follow the in and out indications marked next to the Cable and Satellite connectors.

NOTE: It is not possible to make an in-line cable or satellite protector "maintenance-free" as we have accomplished with the 230 VAC line. This would necessitate limited signal bandwidth that would not allow the signal to pass. Under extreme conditions, it is possible that the surge suppression in one of these devices could sacrifice itself after a catastrophic event. If the cable or satellite connector becomes deformed in any way due to an extreme lightning strike, please contact your local service representative, installer or Furman Authorized service center.

Warranty

Furman Sound, LLC. warrants to the original purchaser of this product, the Furman IT-Reference 16 E, that the product will be free from defects in material and workmanship for a period of five years from the date of purchase. The purchaser of the product is allowed fifteen days from the date of purchase to complete warranty registration by mail or on-line at the Furman website. If the purchaser fails to complete the aforementioned registration, the warranty period will be reduced to one year from the date of purchase.

If the product does not conform to this Limited Warranty during the warranty period (as herein above specified), purchaser shall notify Furman in writing of the claimed defects. If the defects are of such type and nature as to be covered by this warranty, Furman shall authorize the purchaser to return the product to the Furman factory or to an authorized Furman repair location. Warranty claims should be accompanied by a copy of the original purchase invoice showing the purchase date; this is not necessary if the Warranty Registration was completed either by mailing in the completed warranty card or by registering on-line at the Furman website. Shipping charges to the Furman factory or to an authorized repair location must be prepaid by the purchaser of the product. Furman shall, at its own expense, furnish a replacement product or, at Furman's option, repair the defective product. Return shipping charges back to purchaser will be paid by Furman.

CONNECTED EQUIPMENT WARRANTY: Furman Sound's Connected Equipment Warranty covers equipment that is damaged by transient voltage (an "Occurrence") while properly connected through the Furman IT-Reference 16 E to a properly wired AC power line with a protective ground in an indoor location. Furman's Connected Equipment Warranty is limited to the amount of the deductible on the Purchaser's personal property insurance policy up to $500.00. In order to make a claim for this Connected Equipment Warranty, the Purchaser must forward a copy of his/her personal property insurance claim for the damaged equipment to Furman and complete the Furman Connected Equipment Warranty claim form (call Furman at (707) 763-1010 to obtain the form). Furman reserves the right to review the damaged Furman product, the damaged connected equipment, and the site where the damage occurred. All cost of shipping damaged equipment to Furman for inspection shall be borne solely by the Purchaser. Damaged equipment must remain available for inspection until the claim is finalized. The Connected Equipment Warranty is also in effect for a period of three years unless the Purchaser does not complete the warranty registration within fifteen days from date of purchase, at which time, the Connected Equipment Warranty period is also reduced to one year from the date of purchase.

All warranties contained herein are null and void if: the Furman Surge Protector in use during the occurrence is not provided to Furman for inspection upon Furman's request at the sole expense of the Purchaser, Furman determines that the Furman Surge Protector has been opened, improperly installed, altered in any way or tampered with, Furman determines that the damage did not result from the Occurrence or that no Occurrence in fact took place or Furman determines that the connected equipment was not used under normal operating conditions or in accordance with Manufacturer's instructions for the connected equipment. All Furman Surge Protectors must be plugged directly into a properly wired AC power line with a protective ground and must not be "daisy-chained" together in serial fashion with other power strips, UPS's, other surge protectors, three-to-two-prong adapters, or extension cords. Any such installation voids this warranty. The Furman warranty only protects against damage to properly connected equipment where Furman has determined, at its sole discretion, that the damage resulted from an Occurrence and does not protect against acts of God (other than lightning) such as flood, earthquake, war, terrorism, vandalism, theft, normal-use wear and tear, erosion, depletion, obsolescence, abuse, damage due to low-voltage disturbances (i.e. brownouts or sags), non-authorized program, or system equipment modification or alteration. Do not use this product in anyway with a generator, heater, sump pump, water-related device, life support device, medical device, automobile, motorcycle, or golf-cart battery charger. To be used indoors only and in dry areas. All warranties contained herein are null and void if used in anyway with any of the aforementioned devices.

THE FOREGOING IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Furman does not warrant against damages or defects arising out of improper or abnormal use or handling of the product; against defects or damages arising from improper installation, against defects in products or components not manufactured by Furman, or against damages resulting from such non-Furman made products or components. This warranty shall be cancelable by Furman at its sole discretion if the product is modified in any way without written authorization from Furman. This warranty also does not apply to products upon which repairs have been affected or attempted by persons other than pursuant to written authorization by Furman.

THIS WARRANTY IS EXCLUSIVE. The sole and exclusive obligation of Furman shall be to repair or replace the defective product in the manner and for the period provided above. Furman shall not have any other obligation with respect to this product or any part thereof, whether based on contract, tort, strict liability, or otherwise. Under no circumstances, whether based on this Limited Warranty or otherwise, shall Furman be liable for incidental, special, or consequential damages. Furman's employees or representatives' ORAL OR OTHER WRITTEN STATEMENTS DO NOT CONSTITUTE WARRANTIES, shall not be relied upon by purchaser, and are not a part of the contract for sale or this limited warranty. This Limited Warranty states the entire obligation of Furman with respect to the product. If any part of this Limited Warranty is determined to be void or illegal, the remainder shall remain in full force and effect.

Warranty claims should be accompanied by a copy of the original purchase invoice showing the date of purchase (if a Warranty Registration Card was mailed in at the time of purchase or if the product was registered on-line, this is not necessary). Before returning any equipment for repair,

IT-REFERENCE 16 E SPECIFICATIONS:

AC Current Capacity:
Input - 16 Amp capacity required*
Output - 8 - 16 Amp RMS * (maximum, all outlets combined - continuous)

** Due to the Power Factor Correction circuit, available RMS power varies with the reactance of the load (vector). However, this only affects the circuit breaker for continuous RMS current draw. Since power amplifiers will require high transient current demands, the IT-Reference 16 E will never succumb to current compression. Quite the opposite, in fact, it will buffer the power amplifier's power supply, while lowering the AC input impedance, allowing power amplifiers to work more efficiently.*

Linear Noise Attenuation:
Transverse (Differential) Mode:
>15 dB from 1Khz. - 3 kHz. >40 dB from 3 Khz. – 100 kHz. > 80 dB from 100 kHz. - 1GHz
(Linear attenuation curve from 0.05 – 100 ohms line impedance)
Common Mode:
>90 dB, 10 Hz - 50kHz. > 40 dB 50 kHz. - 1MHz.

Transient Voltage Surge Suppression:
266 VAC - Series Multi-Stage Protection Plus - Non-Sacrificial with Zero Ground Contamination.
(376V peak clamping @ 6000V 3000A input)
Extreme Voltage Shutdown (>275 VAC)
Cable / Satellite (less than .1dB insertion loss)

Power Consumption:
2 Watts for display and control circuits independent of actual load.

Outlets:
8 (symmetrical balanced outlets)
4 (power factor corrected outlets – 9 amps RMS reserve – resistive load – over 80 amps peak charge)

Transient Voltage Surge Suppression:
230VAC Line – Series Multi-Stage Protection Plus - Non-Sacrificial with Zero Ground Contamination

Extreme Voltage Shutdown:
275V (+/- 5V)

Cable / Satellite Transient Voltage Surge Suppresion (less than .1dB insertion loss @ 1 GHz)

Dimensions:
152mm H x 432mm W x 413mm D (standard 3RU without feet)

Weight:
37 kg.

Power Consumption:
2 watts for display and control circuits independent of actual load.

Safety Agency Listing:
CE

FURMAN

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