

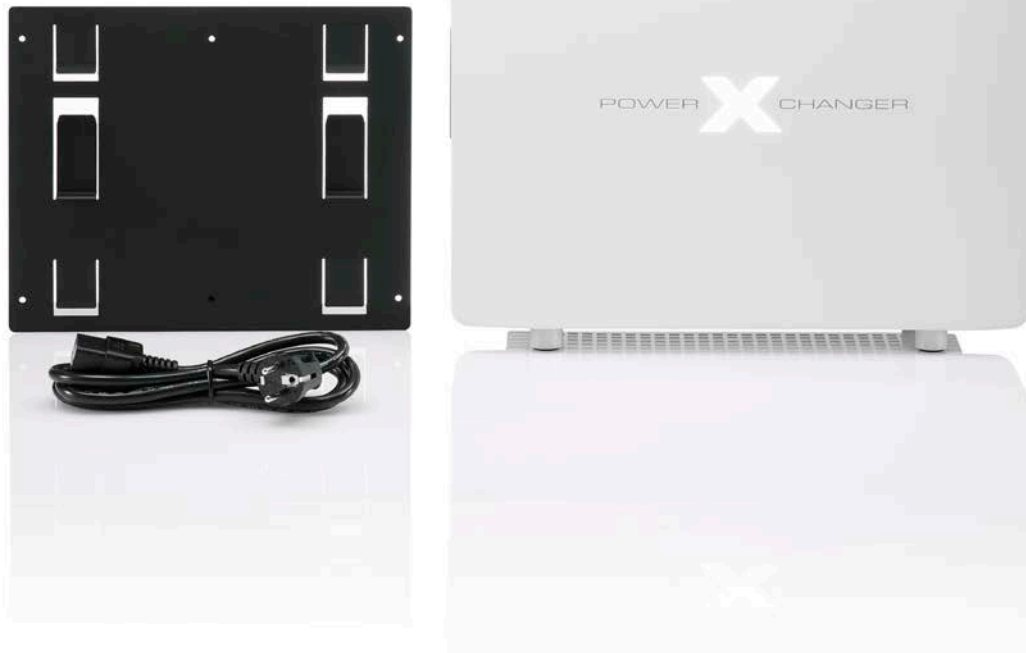
Operating Manual – PowerXchanger®

Designer Series

12060-X-05-WW
12060-X-05-BB
12060-X-10-WW
12060-X-10-BB
12060-X-15-WW
12060-X-15-BB

Read this manual before using PowerXchanger®. Failure to follow the instructions and safety precautions in this manual can result in serious injury or death.

Keep this manual in a safe location for future reference.



IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS. This manual contains important instructions that you should follow during installation and maintenance. Please read all instructions before operating the equipment and save this manual for future reference.

- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.
- Children should be supervised to ensure that they do not play with the appliance.
- This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved.
- This appliance is not intended for use by children or other persons without assistance or supervision if their physical, sensory or mental capabilities prevent them from using it safely.
- Children shall not play with the appliance.
- Cleaning and user maintenance shall not be made by children without supervision.

WARNING



- Do not connect equipment that requires 230Vac to operate to the **PowerXchanger®** which provides 120 Vac output.
- Some devices such as hair dryers use a half sine wave rectifier to reduce the blower speed. PowerXchanger will shut down and only operate at full speed.
- To comply with international standards, the sum of earth leakage current from the load connected to the **PowerXchanger®** must not exceed 1.5 mA.

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Models

PowerXchanger® Designer Series has 3 basic models

X-15 with LCD Display, Rated Power: 120V, 60Hz, 15A.



X-10 Rated Power: 120V, 60Hz, 10A.



X-5 Rated Power: 120V, 60Hz, 5A.

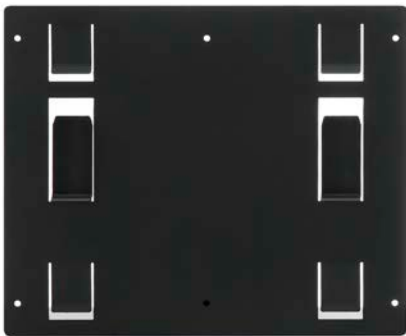


Included Accessories

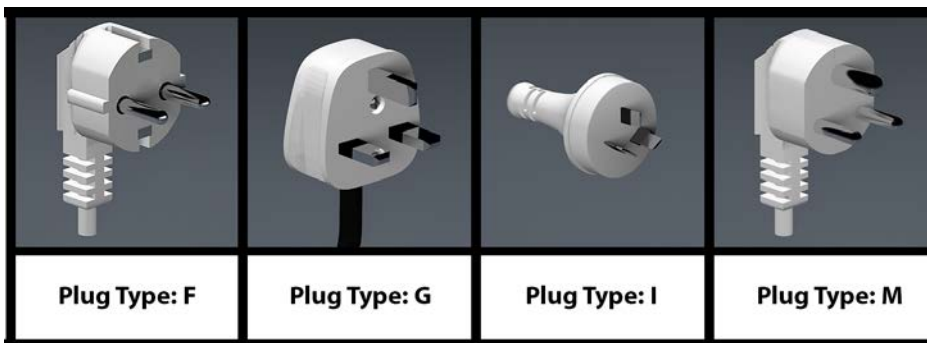
Xchange® Extension Outlet: for output power extension



Mounting Plate



International Power Cord Set: 4 of the most commonly used plug type power cords



Introduction

The **PowerXchanger**™ incorporates the most advanced double-converter technology to receive power of varying voltages and frequencies from the grid and provide a stable output sine-wave voltage at 60Hz frequency enabling the user's equipment to be plugged in to the PowerXchanger and receive stable 120V/60Hz power. The double-converter principle eliminates power spikes, surges or voltage sag that might occur in the grid power. A PFC rectifier is incorporated to improve conversion efficiency.

The PowerXchanger® conforms to the following standards and guidelines:

- UL-ULus (CCN: QQFU/7) Power Units Other Than Class 2,
- UL 1012, Seven Edition, October 14, 2008
- UL-cUL: CAN/CSA-C22.2 No. 107.1-01, September, 2001
- DEMKO-CB IEC60950-1:2005+A1:2009+A2:2013 (Ed. 2.2)
- TUV/SUD-CB IEC 60335-1:2010+A1:2013 (Ed. 5.1)
- FCC CISPR22 and Part 15: subpart B
- EMC 2004/108/EC
- RoHS Compliant Directive 2002/95/EC

Performance Characteristics and Protection Features

- Full function LCD display (For X-15 model only)
- Overload and O/P short circuit protection
- High output surge current capability for varying load
- High reliability design, with sealed circuitry
- Light Weight and High Efficiency
- Dual stage topology for stable output regulation over a wide range of input power
- Easy to install: Wall mount bracket included

Output Overload Alarm

All **PowerXchanger**® products include an overload alarm system. If the output current drawn by the load exceeds the PowerXchanger's over-current-alarm threshold (See "Overcurrent Protection Alarm Threshold" above) a white LED will blink every four seconds*. If the overload continues for more than one minute an audible alarm will sound so long as the overload is present. If the overload alarm continues for more than one minute, the Xchanger® will turn off. After a 30 second delay, the Xchanger® will turn on again.

Output Overload Protection

If the output of the **PowerXchanger**® load exceeds the output overload protection threshold for more than two seconds, the Xchanger® turns off, sounds an audible alarm, and the white LED begins blinking every four seconds*. After a 30 second delay, the Xchanger® will turn on again. If the overload is no longer present, the audible alarm will stop, the LED will stop blinking, and the Xchanger® will operate normally. If the overload is still present, the Xchanger® will once again turn off and wait 30 seconds before attempting to start again.

Output Short Circuit Protection

If the **PowerXchanger®** detects that the output voltage is 60VAC or less for at least 250ms indicating that the output is short circuited or extremely overloaded, the Xchanger® will shut down for 30 seconds and then attempt to restart. If the short circuit or overload conditions still exist, the Xchanger® will repeat the attempt to restart up to 30 times. If the short circuit or overload persists after 30 attempts, the PowerXchanger® shuts down and latches off.

To restore the PowerXchanger® to operation, remove the load which is the cause of the output short circuit or extreme overload, turn the input switch to OFF, wait 5 seconds, and then turn the switch to ON.

Thermal Protection

If the **PowerXchanger®** detects an overheating condition, a sequence of 3 beeps every 2 seconds will sound. For the Designer Series, a white LED will also blink every two seconds.

If the Xchanger continues to overheat, it will eventually turn itself off to protect itself from damage. Once the PowerXchanger has cooled off sufficiently, it will automatically restart.

Environmental Specifications

Parameter	Model	Min	Nominal	Max	Units	Notes
Voltage, Nominal	All	0		40	°C	Full rated output load. Up to 2000m above sea level
Output Power Derating With Ambient Air Temperature	X-5		15		W/°C	All units are derating linearly from full rated output power at 40°C to zero output power at 80°C. See Note 1 below
	X-10		30			
	X-15		45			
Ambient Air Temperature, Storage and Transportation	All	-15		60		
Relative Humidity	All	5		95	%	Non-condensing
Altitude, Operating	All			3000	m	

Note 1: For example, at 50 °C ambient temperature, the maximum average output power of the X-10 is 900 W. The calculation is:
 $1200\text{ W} - 30\text{ W/°C} \times (50\text{ °C} - 40\text{ °C}) = 1200\text{ W} - 300\text{ W} = 900\text{ W}$

Dust and Moisture Resistance

The electronics of all models of the **PowerXchanger®** are sealed to protect against the intrusion of dust and moisture. All PowerXchangers® are rated IP52 (protected against intrusion of dust and water when tilted at an angle up to 15°).

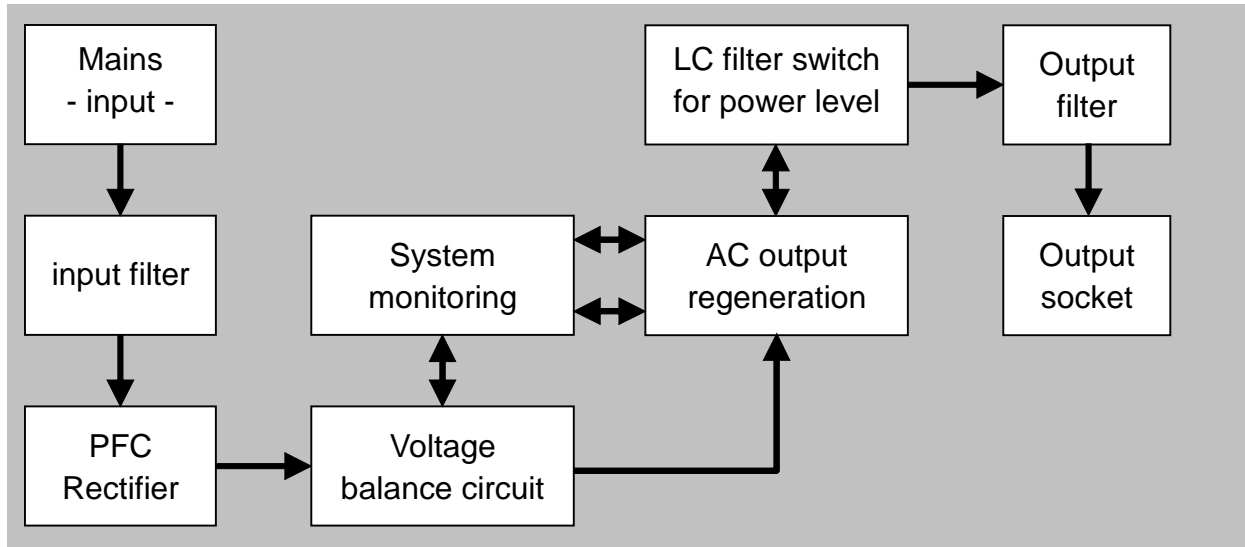
Cooling

All units are designed to operate with natural convection cooling. The X-5, X-10, and X-15 models have an auxiliary fan that will operate only if needed to keep the **PowerXchanger®** at a safe operating temperature.

Functional Description

A PFC rectifier converts the variable input VAC to 400 VDC. The 400VDC is divided into 2 series connected direct voltage, 0V/200V/400V. A voltage balancing circuit is used to prevent damage that might otherwise be caused by abnormal voltages. From these DC voltages; an AC output circuit generates a sinusoidal AC voltage to supply power to the connected load. Two LC filters switch automatically to maintain the high efficiency regardless of the connected load level.

Simple Wiring Diagram



Messages and Status

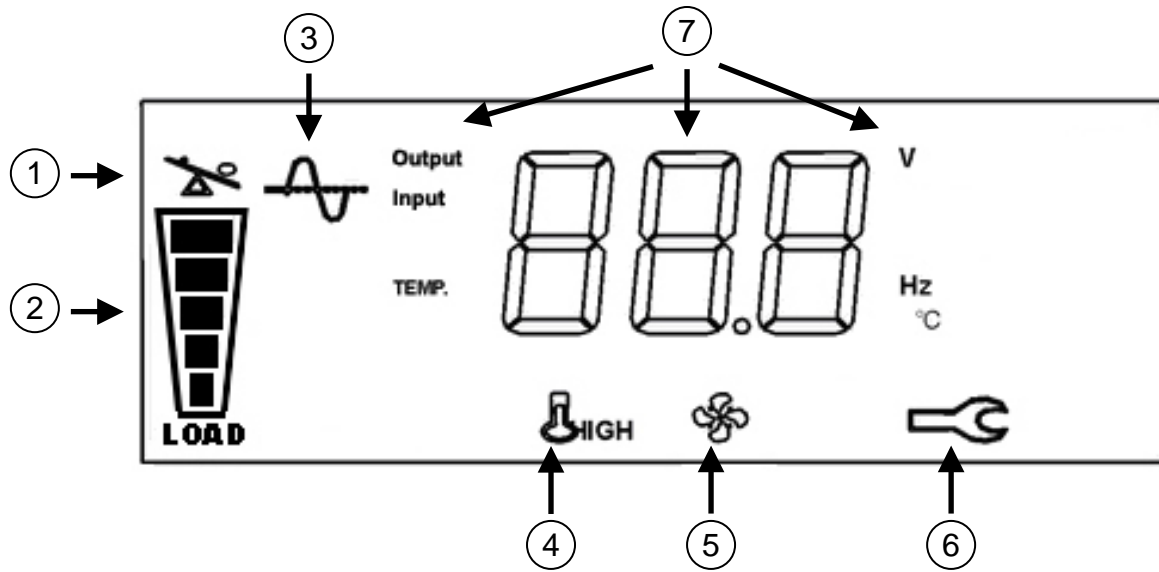
Operating State	LED Signal
Input voltage is too low (PowerXchanger® turned off)	One short flash every 2 seconds
ECO mode (no load or low load level)	Reduced lighting
Normal operation	Continuous light
Over load	One blink every 4 seconds
Over temperature	One blink every 2 seconds

Abnormal Status	Buzzer
Over load	Continuous alarm
Over temperature	32 beeps in 2 seconds <i>(occurring every other 2 seconds)</i>
Output short circuit	One beep every 2 seconds
Circuit Fault	One beep every 2 seconds
Unbalanced load	One beep every second
Input voltage is too low (PowerXchanger® turns off)	1 beep every 8 seconds

X-5, X-10 and X-15 LED Location



LCD Functions for X-15



1. Over load indication
2. Load level indication
3. AC input good indication
4. Heat sink too hot indication
5. Fan status, the fan symbol will light when the fan is running
6. Output error, the wrench symbol will light when the output fails or short circuits
7. The AC input voltage, AC output voltage/frequency and heat sink temperature display

Selecting the Optimal Location for Desktop or Wall Mount Installation

Your **PowerXchanger**® can be used on a desktop at the point of use (models X-10 and X-15), with your equipment plugged in directly to the unit, or using the Extension Outlet that comes with the unit, it can be located 6 feet away, and avoiding necessity for extension cords on the floor.

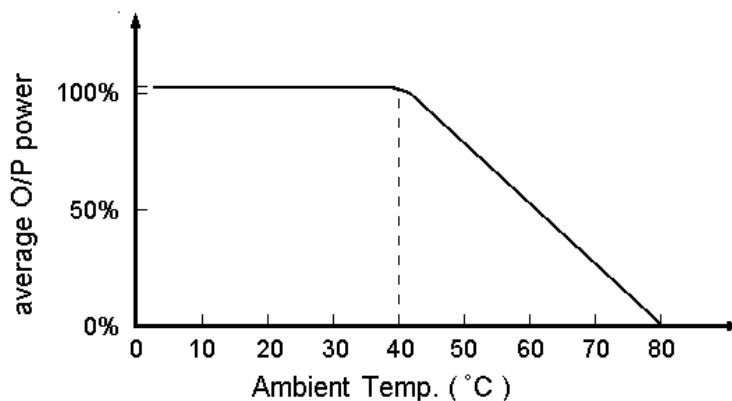
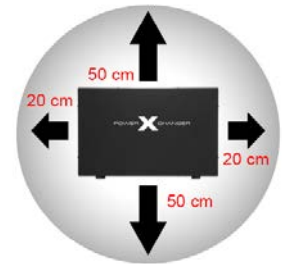
All models, X-5, X-10 and X-15 can be mounted on a wall, and the legs removed (X-10 and X-15)

Consider the Following When Selecting a Location for Use:

- Indoor Installation Only
- Select a well-ventilated and cool area. PowerXchangers have sealed electronics and cool only with natural ventilation. This has the benefit that they are not susceptible to dust and humidity and operates silently, since they have no internal fans
- Do not place or install in an airtight closet or cabinet
- Avoid direct sunlight. Direct sunlight will increase the surface temperature

Additionally, Consider the Following When Selecting a Location for Wall Mounting

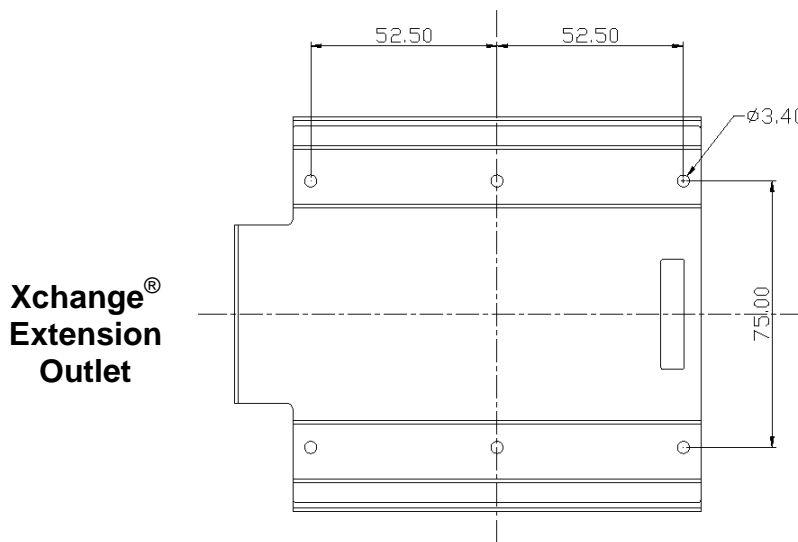
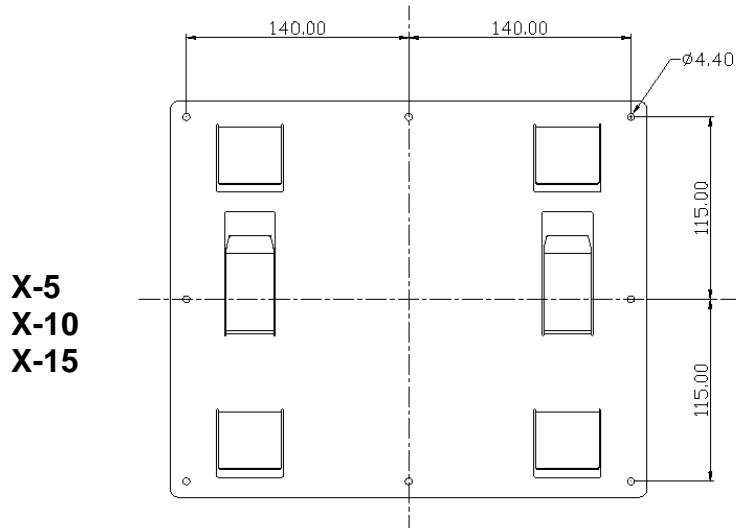
- Do not mount the PowerXchanger on flammable construction material.
- Mount on solid surface
- For proper air circulation and heat dissipation, allow a clearance of 20 cm on the sides and 50 cm above and below the unit
- The ambient temperature should be between 0°C and 40°C to ensure optimal operation, over this range will reduce the average output power for thermal de-rating.



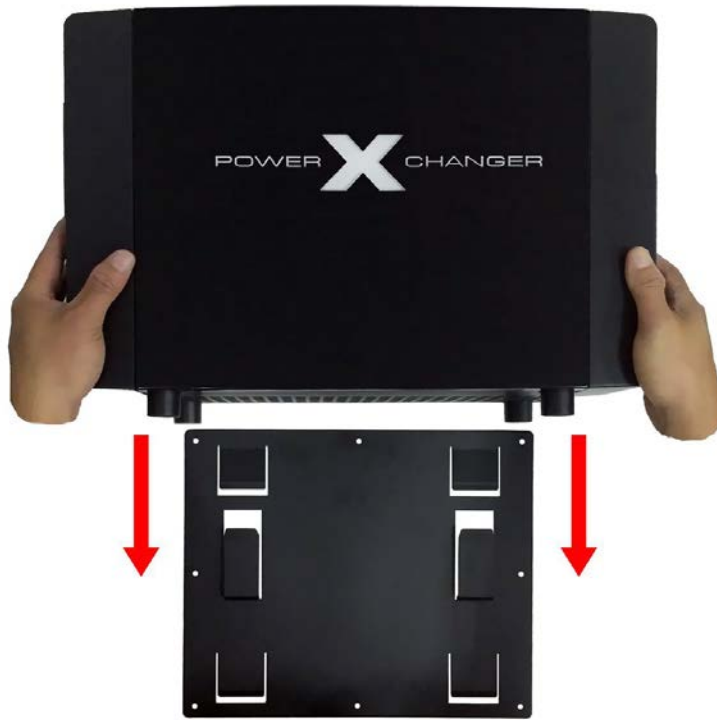
Mounting Unit

Installation to the wall should be implemented with the proper screws. Mount the wall bracket so that the **PowerXchanger®** can be easily attached to the wall. After that, the device should be bolted on securely.

1. **Drill four or eight holes in the marked locations and fix the bracket with screws.**



2. Place the unit on bracket slowly down.



3. Check if the unit is firmly secured.



Technical Data**Output**

Output Voltage	120Vac
Power Levels crated at nominal inputs	X-5: 120Vac/ 5A (600W) X-10: 120Vac/10A (1200W) X-15: 120Vac/15A (1800W)
Voltage Waveform	Sine wave
Crest Factor	X-5: 8:1 X-10: 4:1 X-15: 3:1
Output Frequency	60Hz (Auto-Synchronized to Mains)
Regulation	±2% of rating voltage
Total Harmonic Distortion (THD)	<3% at 100% Linear load
Over current protection	X-5 & X-10: Over load alarm level 100% ~ 135% (alarm after 1 minute delay) Over load shutdown level 136% (2 seconds delay) X-15: Over load alarm level 100% ~ 119% (alarm after 1 minute delay) Over load shutdown level 120% (2 seconds delay)
Short Circuit protection	Pulsating type, 40A peak (30 seconds Auto-Restart)

Input

Nominal Voltage	200V/220V/230V/240V
Input Frequency	46Hz ~ 65Hz
Efficiency	92% (typical)
Noise Filtering	Full time EMI/RFI filtering
Over current protection	By re-settable over current protector
Voltage Range	180Vac ~ 265Vac
Power Factor	> 0.95
Audible alarm	Over Load Alarm, continuous alarm Short-Circuit Alarm, 1 beep every 2 seconds Thermal Alarm, every other 2 seconds, 32 beeps in 2 seconds

Environmental and Safety

Operating Temperature	Up to 2000 meters: 0°C to 45°C (32°F to 113°F)
Transit/storage Temp.	-15°C to 60°C (5°F to 140°F)
Relative Humidity	5 - 95% non condensing
Operating Altitude	0 ~ 3000 meters
Moisture Sensitivity	Sealed Electronics

Warranty

Warranty	2 Years, Full Replacement
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Quality Control Standard

Quality Control Standard	ISO9001
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Approvals

Approvals	UL,UC,CB,CE, Demko,TUV,FCC
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US. Pat Nos 9,331,566, D769,819 and other Pending US and related foreign patents

LIMITED WARRANTY

Adaptive Frequency Inc. warrants for two years from the date of shipment, the product is free of manufacturing defects and conforms to Adaptive's product specifications in force as of the date of manufacture of the product shipped.

This warranty does not apply to accidental damage, shipping damage, misuse, abnormal line or source voltage, abnormal conditions of operation beyond the parameters specified in this product manual;

- Products which have been opened, misused, tampered with internally and or deliberately modified will void the warranty;
- The failure to return a unit claimed to be defective in its original packaging will void the warranty;
- Upon receiving the properly returned defective unit, Adaptive will verify that the unit is defective and upon verification will ship a replacement unit at Adaptive's cost and also reimburse purchaser's shipping charges for return of the defective unit.
- Prior to shipping the defective unit, purchaser shall contact Adaptive at returns@adaptivefrequency.com to obtain a return authorization form and so that Adaptive can assist in making the shipping arrangements;
- Any claim under this warranty requires that purchaser send with the return shipment, a proof of purchase, the unit serial number and the return authorization form;
- If it is determined that this warranty has been voided for any of the above reasons, the unit will be returned to the sender;

Adaptive shall only be liable under this warranty if the product has been used in accordance with Adaptive's instructions, in force on the date of purchase.

The purchaser must examine the product when received and promptly notify Adaptive in writing of any non-conformity before the product is used and no later than 30 days after such non-conformity is first discovered. If Adaptive, in its sole discretion, determines that the product has breached the above warranty, it will, at its sole discretion: replace the non-conforming product; refund the purchase price; or issue a credit in the amount of the purchase price. This is the sole and exclusive remedy for breach of this warranty. Any modification of this Warranty shall be binding only if such modification is in writing, and signed by an Adaptive officer. This information supersedes all other sales information received by the purchaser during the sales process.

THE FOREGOING WARRANTY SHALL BE EXCLUSIVE AND IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, AND ALL OTHER WARRANTIES OTHERWISE ARISING BY OPERATION OF LAW, COURSE OF DEALING, CUSTOM, TRADE OR OTHERWISE.

LIMITED LIABILITY

Adaptive Frequency Inc. (“Adaptive”) shall not be liable in contract or in tort including, without limitation, negligence, strict liability or otherwise for loss of sales, revenues or profits; cost of capital or funds; business interruption or cost of downtime, loss of use, damage to or loss of use of other property (real or personal); failure to realize expected saving; frustration of economic or business expectations; claims by third parties (other than for bodily injury), or economic losses of any kind; or for any special; incidental, indirect, consequential, punitive or exemplary damages arising in any way out of the performance of, or failure to perform, its obligations under any contract for sale of product, even if Adaptive could foresee or has been advised of the possibility of such damages.

In addition, Adaptive’s liability shall be limited to the purchase price of the Adaptive product or products that is the source of the claim, and in no event more than the aggregate purchase price, for the last six months, of Adaptive’s products purchased by the purchasing party. The Parties expressly agree that these limitations on damages are allocations of risk constituting, in part, the consideration for this agreement, and also that such limitations shall survive the determination of any court of competent jurisdiction that any remedy provided in these terms or available at law fails of its essential purpose.

