

## PDU Care

Normally, PDU requires no maintenance and no calibration. It is recommended, though, to periodically inspect PDU for overheating.

During its normal operation PDU may have elevated temperature which would feel “warm” to the touch, but not what is considered “hot.” If the PDU does feel “hot” to the touch (more than 70°C or 158°F), turn off PDU and disconnect equipment that is powered by PDU immediately. First, verify that the total current load does not exceed PDU’s maximum rating. Keep in mind that sometimes stated power rating of equipment is “typical” rather than “maximum” - it is prudent to load PDU to no more than 75% of its capacity to accommodate for such situations. Then, check if heat dissipation of the PDU is obstructed by improper installations such as objects placed on its top or lack of space around it for proper ventilation, or its placement in a small confined space. If such problem is identified, correct it, let PDU cool down and turn it back on. Check within 30 minutes and then within an hour the temperature of the PDU. If the PDU still feels “hot” to the touch, turn PDU off, disconnect your equipment, and discontinue using PDU. For warranty or other repair contact factory or its authorized distributors.

## Life Critical Applications

**OnFILTER products shall not be used in life-critical or mission-critical applications.** While OnFILTER believes it designs and manufactures very reliable products, many of the vendors that OnFILTER sources components from do not recommend or endorse the use of their products in life- or mission-critical applications. By extension, OnFILTER must adhere to the same business policy.

## Disclaimer

OnFILTER products are not designed, intended, authorized, tested, or listed for use in systems intended to support or sustain life, or for any other application in which the failure of an OnFILTER product could create a situation where personal injury or death may occur. Should Buyer purchase or use OnFILTER products for any such unintended or unauthorized application, Buyer shall indemnify and hold OnFILTER and its officers, employees, subsidiaries, affiliates, agents and distributors harmless against all claims, costs, damages and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim or personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that OnFILTER was negligent regarding the design or manufacture of the part.



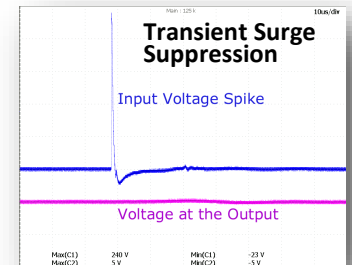
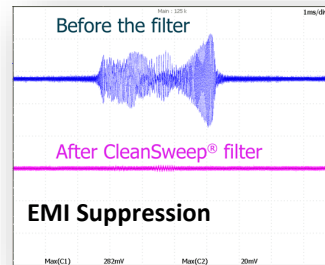
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# CleanSweep®

## Power Distribution Units (PDU) with EMI Filtering and Advanced Transient Surge Protection AR Series



## User's Guide



Thank you for buying CleanSweep® rack-mounted PDU!

Your new CleanSweep® PDU (power distribution unit) will provide your sensitive equipment with AC power free from electromagnetic interference (EMI) and power-line transients. Such artifacts on power lines and ground cause numerous equipment malfunctions, including lock-up, erratic response, software errors, and other often “unexplained” behavior. Excessive transients and noise can also cause damage to sensitive components via induced electrical overstress (EOS). For more details on this subject please visit [Library](#) section on our web site [www.onfilter.com](http://www.onfilter.com).

## Safety First!

CleanSweep® PDUs operate with high voltage - improperly installed or used PDU may cause property damage, injury and death. Always observe safety measures when using power line filters. Here are some of the key safety precautions you should take:

### WARNING

- Do not exceed PDU’s maximum rating - it may cause overheating
- Use PDU after the fuse or circuit breaker of no more than specified max. rating
- Use only with the power cord supplied by manufacturer
- This PDU is not for household use
- PDU must be plugged into a properly wired grounding type outlet
- No serviceable parts inside - do not open. High voltage is present inside.



## Introduction

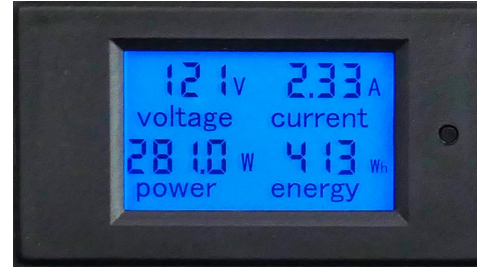
CleanSweep® filtered PDUs reduce noise on power lines providing clean power to your equipment. High levels of noise (also called conducted **Electro Magnetic Interference - EMI**) interferes with normal operation of electronic equipment and can cause physical component damage inside the equipment. Noise on power lines is common in industrial and office environment and the only practical way to deal with it is by using properly-designed filter which is a part of CleanSweep® PDU. In addition to effectively suppressing EMI, OnFILTER’ CleanSweep® PDU provides advanced transient surge protection by reducing power line transients down to insignificant levels surpassing conventional surge protection.

## Installation

Proper installation of PDU helps to assure its continuous operation for a long time. Please follow these requirements for installation:

- Use PDU in a dry location away from debris and from the possibility of spillage, including from cleaning
- Ambient temperature at the place of installation should not exceed the range of 5°...40°C
- Firmly fasten PDU in a 19” rack using all four screw (supplied)
- Install PDU close to your equipment
- Do not install PDU in small confined spaces with restricted air circulation in order to avoid overheating. Allow some space on each side for proper ventilation

## Display



Front panel display shows the following parameters and functions:

Parameter	Function
Backlight	AC power is on
Voltage	AC RMS Voltage at the outlets, V
AC Current	Total AC RMS current to all loads of this PDU, A
Power	Total power of all loads of this PDU, W
Energy	Total energy consumed by all loads since last reset, W/Hr

### Operation

By default the display will show all the above parameters. If this is all you need, there is nothing to do.

### Backlight

If you turn off the backlight you may not have an indication of power state from the front panel. Should you still want to turn off backlight, momentarily press the control button with a non-sharp tool. Press control button momentarily again to turn backlight on.

### Reset Energy Readings

Energy readings are cumulative since the last reset and are preserved when PDU is powered off. To reset energy readings long-press control button for 5 seconds until the Energy number flashes and release the button. Then momentarily press control button again and the energy readings will be reset to zero.

Should other numbers begin to flash, don’t do anything for at least three seconds. The display will go back to its default state. Nothing that you do with the display will affect the power supplied to your load.

Note that PDU shipped from the factory may or may not have some energy readings already, mostly from test.

## Specification

Below are typical performance data for CleanSweep® PDU AREC148FD. For more specifics and technical information please visit our [web site](http://www.onfilter.com) www.onfilter.com

Voltage	250VAC max., 50/60Hz
Current	20A RMS max. total for all outlets 15A RMS for each outlet It is recommended to use no more than 75% of the max. current in order not to trip circuit breaker
Ambient temperature	+5 <sup>o</sup> C to +40 <sup>o</sup> C AR-series PDU should be used only in indoor non-hazardous applications

## Connectivity

Inlet	IEC60320 C20
Outlets	IEC60320 C13, 8 ea.

## Electrical Parameters

Circuit breaker	20A Combined with power switch Slow action with power indication
Leakage current	3.5mA max.

## EMI Filtering

Types	Differential mode; common mode; ground
Pulse Attenuation (typical or better):	
Differential mode	24dB
Common mode	20dB
Continuous emission	See graphs of typical performance on page 4 All performance parameters are measured in 1/100 Ohms setup as it closely resembles real-life environment.

## Transient Surge Suppression

### Stage 1 (MOV)

High peak surge current rating	22kA, single 8/20μs pulse
Clamping voltage at 1mA	430V max.
Clamping voltage at 100A	640V
Voltage protection rating	800V

### Stage 2 (EMI Filter)

Transient voltage spike	10V max. (typ.)
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## Mechanical Specification

Material	Powder-coated aluminum
Dimensions (without ears)	17"Wx8"Dx3.48"H (432mmx203mmx88mm)
Mounting	Standard 19" rack, 2-Up

## Included

AR series PDU	1 ea.
Power cable	1 ea.
Mounting screws 10-32	4 ea.
This User's Guide	1 ea.

## Connections



### WARNING

- Before attempting any electrical connection, verify that your power source, such as electrical outlet or junction box, is correctly wired and properly grounded.
- Do not use PDU without proper grounding! Failure to properly ground the PDU may result in failure to ground your equipment; in unsafe situation that can cause property damage and injury; as well as failure of PDU to perform.
- Use only the power cable supplied with the PDU. Other cables that may look very similar to the one supplied may not have the same voltage/current ratings.



You would need commonly available C13/C14 cables to connect your equipment

To connect PDU follow the steps below:

- Install PDU in a rack and firmly fasten its front panel to the rack's railing using supplied screws
- Make sure PDU's power switch on the back is in "Off" position
- Power down and unplug your equipment that will be powered by PDU
- Connect supplied power cable to the inlet on the back of PDU
- Plug the PDU's cable into the power outlet
- Turn power switch on PDU on ("RESET" position). The red light in the power switch and lit display on the front panel will indicate that it provides power to the outlets
- Plug your equipment into the outlets of PDU using common C13/C14 power jumper cables and turn it on

## PDU Operation and Performance

CleanSweep® PDU provides several functions:

- Distributes power to up to eight loads
- Serves as overcurrent protection (circuit breaker)
- Blocks EMI from AC power lines providing your equipment with clean AC power and ground
- Uses advanced transient surge protection to protect your equipment from harmful power line spikes

### Overload Protection

CleanSweep® PDU AR series is equipped with a built-in circuit breaker combined with the power switch on its rear panel. It is prudent to have typical total load current of no more than 75% of the circuit breaker' rating in order to avoid shutdown during occasional excessive current peaks which may not be stated in your equipment's specification. Should the current through the PDU exceed its maximum rated current, this circuit breaker will trigger and disconnect power to PDU and to all equipment plugged into it. In this case do not reset the circuit breaker until you unplug equipment that may contribute to excessive current consumption and wait a few minutes to let circuit breaker "cool off." Circuit breaker can be reset by simply toggling switch on the front panel into Reset (upper) position.

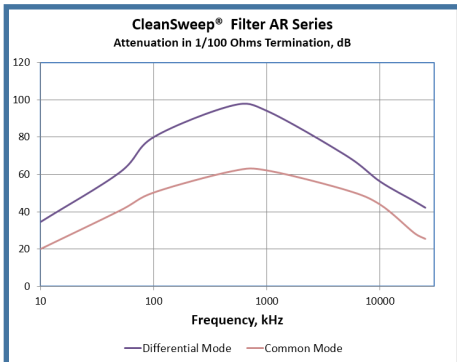
The red light in the circuit breaker is "On" when power is on. When power is off and if circuit breaker cuts off power, the light will be off.

### EMI Filtering

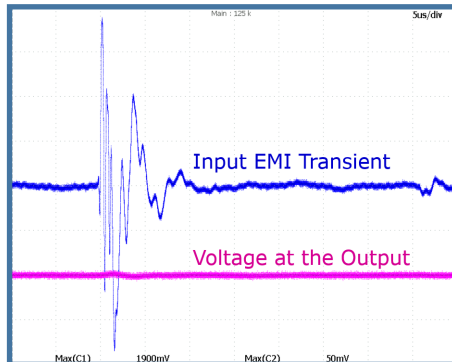
EMI filter incorporated into CleanSweep® PDU AREC144FG provides significant noise suppression in several modes—differential (between live and neutral), common mode (live and neutral to ground) and, uniquely, in ground line itself. Note that if the equipment powered by PDU is grounded elsewhere, ground EMI filtering provided by PDU will not be effective.

Unlike conventional EMI filters, CleanSweep® PDU offers effective noise suppression for real-life situations in real-life use. For technical details on this please see [OnFILTER Advantage App. Note](http://www.onfilter.com) on our [web site](http://www.onfilter.com) www.onfilter.com.

The charts below show typical EMI suppression performance of AREC144FG PDU.



Attenuation of EMI in Frequency Domain



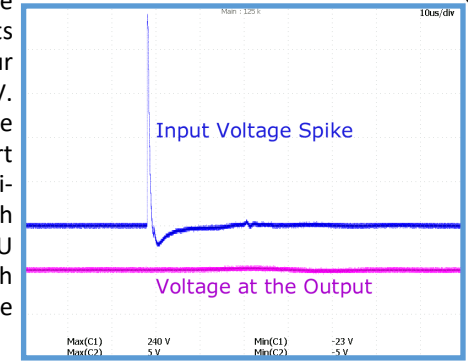
Attenuation of EMI in Time Domain

## Advanced Transient Surge Suppression

Power line transient surge is a sudden high energy disturbance in line voltage typically lasting less than one cycle which causes short high voltage increases (up to 3kV or even higher). This may cause data corruption, equipment malfunction, equipment damage and process interruption.

CleanSweep® AR-series PDU has two stages of transient surge protection. First stage protects your equipment from long-lasting surges (typically lasting less than a second). Special high energy absorbing MOV (Metal Oxide Varistors) installed between Live-Neutral, Live-Ground and Neutral-Ground absorb surges with peak current up to 22kA.

The second stage is most important. While conventional surge protection limits transients by amplitude, this may leave your equipment exposed to spikes up to 700V. CleanSweep® PDU utilizes special unique short transient suppressor circuit as a part of its EMI filtering to limit power line transients to no more than 10V (typ.). The graph on the right shows how CleanSweep® PDU suppresses transient surge spike which would go unnoticed by conventional surge suppressors.



Transient surge response of AR-series PDU

With these two transient suppression stages working together your equipment is well-protected.

Note that MOV may lose some effectiveness if there are many very strong surges; however EMI filter protection (second stage) does not wear out.

### Multiple Loads and EMI Filtering

When using more than one equipment plugged into CleanSweep® PDU output, keep in mind that:

- Total current consumption shall never exceed maximum total current rating, and
- There is no filtering or surge protection between the loads at the output

EMI filtering and surge protection are provided only between the inlet and outlets of PDU. There is no filtering or other protection between the outlets—they are simply connected in parallel. If you have a known piece of equipment which is "noisy" it would be better to power it up separately so that it won't pollute the rest of equipment.