

## Filter Care

Normally, filter requires no maintenance and no calibration. It is recommended, though, to periodically inspect filter for overheating and to clean its surface with dry cloth.

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

CleanSweep® power line filters do not contain any components that may deteriorate under normal use. If you wish to verify the proper operation of the filter use power line EMI Adapters, such as MSN15 or MSN17 (shown on page 6) and oscilloscope to measure high-frequency noise before and after the filter.

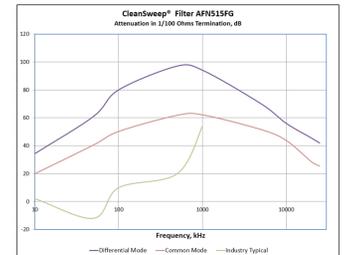
## Life Critical Applications

**OnFILTER products shall not be used in life 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 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

# CleanSweep® AC Power Line EMI Filters



## User's Guide



OnFILTER, Inc.  
730 Mission Dr. Ste. 102  
Santa Cruz, CA 95060 U.S.A.  
Tel. +1.831.824.4052  
FAX +1.206.350.7458  
[www.onfilter.com](http://www.onfilter.com)  
[info@onfilter.com](mailto:info@onfilter.com)



Included:	
Axxxxxx Filter	1 ea.
Power Cord	1 ea.
(except models with terminal blocks)	
This User's Guide	1 ea.



Thank you for buying CleanSweep® filter!

Your new CleanSweep® power line filter 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 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® filters operate with high voltage that 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 filter’s maximum rating - it may cause overheating
- Do not place anything on top of filter during its operation to avoid overheating
- Use filter after the fuse of no more than specified max. rating
- Use only with the power cord supplied by manufacturer
- This filter is not for household use
- Filter must be plugged into a properly wired grounding type outlet
- No serviceable parts inside - do not open. High voltage is present inside.

**Brief Summary**

CleanSweep® EMI filters reduce noise on power lines providing clean power to your equipment. High levels of noise (also called conducted ElectroMagnetic 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 filters. OnFILTER® CleanSweep® EMI filters are designed to effectively suppress noise and short surges on power lines and ground in real-life environment.

**Installation**

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

- Place filter horizontally with its label facing up
- Install filter in a dry location away from debris and from the possibility of spillage, including from floor cleaning
- Ambient temperature at the place of installation should not exceed the range of 5°...40°C
- Install filter away from traffic where it does not interfere with movement of personnel and machinery.
- Install filter close to your equipment
- Do not install filter in small confined spaces with restricted air circulation in order to avoid overheating. Allow at least 15cm (6") on each side for proper ventilation

**Specification**

Performance of CleanSweep® EMI filters slightly varies from model to model. For the specifics please visit our web site [www.onfilter.com](http://www.onfilter.com) Below are typical performance data for the filters.

**Types of Noise Suppression**

- Differential
- Common Mode
- Ground

All performance parameters are measured in 1/100 Ohms setup as it closely resembles real-life environment.

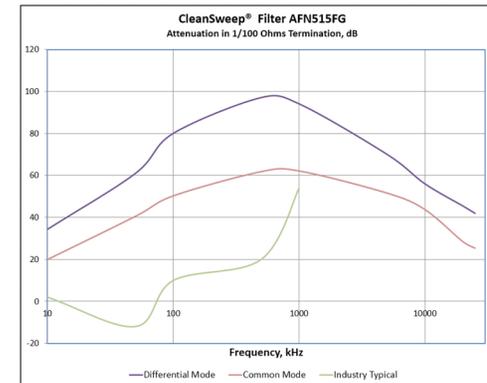
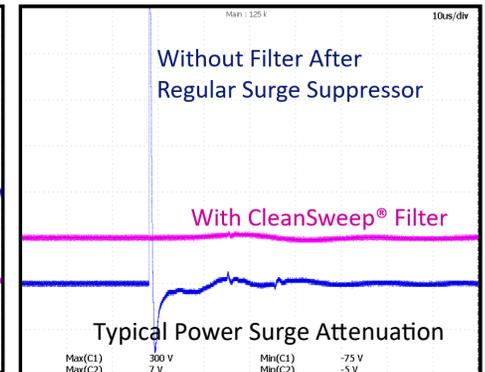
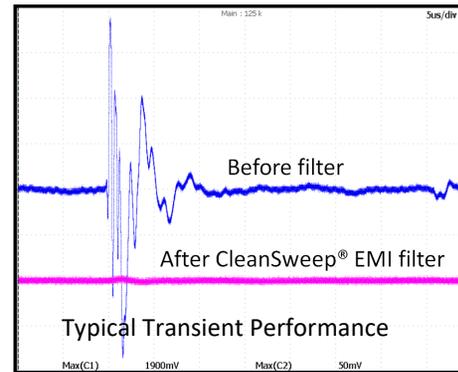
**Pulse Attenuation (typical):**

Differential:	24dB
Common Mode:	20dB

**Leakage Current**

Standard models	<3.5mA
Medical version	<0.5mA

**Power Indication** LED



Typical Frequency Domain Attenuation

## Filter Applications

### Achieving the Most Results from Your Filter

There are two basic ways to place EMI filters for the best results:

- To isolate strongest noise sources
- To protect EMI-sensitive equipment

Noise on power lines can be generated by equipment anywhere in the facility, which makes it very difficult, if not practically impossible, to identify a specific source of noise. It is possible, though, with proper instruments, such as OnFILTER' EMI Adapter MSN17 (pictured to the right) and an oscilloscope, to identify the most likely noise polluters.

The most effect can be achieved by identifying the most sensitive equipment in your facility and powering this equipment through the CleanSweep® filters. It is also beneficial, once you know which equipment generates the most noise, to place this equipment behind its own filter as well since CleanSweep® filters suppress noise in both directions.

Try to place the filter as close to the equipment it will be protecting as possible - this will reduce influence of radiated noise on the cables after the filter.



OnFILTER' MSN17  
Power Line EMI Adapter

## Multiple Load and Filter

When using more than one equipment plugged into the filter' output, keep in mind that:

- Total current consumption shall never exceed maximum filter rating, and
- There is no filtering between the loads at the output of the filter

The latter is illustrated in the figure to the right. As seen, the noise from one equipment easily propagates between equipment connected to the output of the filter. In short, if you want to protect a particular piece of equipment from noise, do not connect any other equipment to the output of the same filter. For example, if you want to protect your measurement instrument from transient signals from commutation of a nearby tool, connect your instrument after the filter while keeping other equipment plugged in before the filter.



- Do not put any objects on the top of the filter in order to allow for its normal cooling
- Do not install filter in a cluttered situation where it is difficult to observe the filter and to reach it for a periodic check
- Preferably, install filter so that you are be able to see its power LED from a distance

## Connections

The OnFILTER' CleanSweep® EMI filters come in three basic configurations: with detachable power cable; with attached power cable (some 30A models); and with terminal blocks.



### 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 the filter without proper grounding! Failure to properly ground the filter may result in failure to ground your equipment, in unsafe situation that can cause property damage and injury, as well as failure of the filter to perform.

### Filters with Power Cable

### WARNING

Use only the power cable supplied with the filter. Other cables that may look very similar to the one supplied may not have the same voltage/current ratings.

The power cable supplied with the filter has the same type of plug as the outlet on the filter itself. This simplifies connection of the filter in your facility.

Follow the steps below:

- Power down and unplug your equipment
- Place filter in the location where it will reside. See above section on location of the filter
- If the filter comes with the detachable power cable, connect the cable to the inlet of the filter
- Plug the filter's cable into the power outlet where your equipment was plugged before. The green LED on the filter should light up indicating that it receives the power
- Plug your equipment into the outlet of the filter and turn it on

## Filters with Terminal Blocks

### WARNING

This connection requires help of a qualified electrician – if you are not the one, do not attempt this connection by yourself!

This section is for equipment that is hard-wired to your facility' power lines. Extreme caution must be exercised in installation. For connecting wires to the filter you will need wire strippers and a slot (blade) screwdriver (size depends on the type of the filter). Plus, you may need other tools and supplies to connect wires from the filter to your junction box.



Connecting filter would require additional wires – prepare adequate lengths of wire of appropriate gauge and rating. See table below for recommendations on minimum wire gauge.

Max. Current Rating, A	3	10	15	20	30
Wire Gage (AWG)	18	16	14	12	10
Wire Diameter, mm	1.0	1.3	1.6	2.0	2.5

Hard-wired equipment may have all of its wires looking the same. Before proceeding any further, properly identify every wire in your current connection. Wrong connection can provide live voltage to ground, swap phase and neutral or reverse the phases – all of this can cause death, injury and/or severe equipment damage. Prepare labels for every wire of your existing connection between your equipment and the junction box. Labels should indicate phase, neutral and ground

- Disable power to the junction box, typically by turning off the circuit breaker in your facility. Verify with proper voltmeter that there is no voltage on the connections
- Apply prepared labels to the appropriate wires
- Take a photo of the junction box with connection before disconnecting the wires, or draw a detailed sketch – you will thank yourself for this later
- Disconnect wires between your equipment and the junction box
- If your equipment is grounded separately from the junction box, disconnect equipment ground from your facility ground
- Place filter in the location where it will reside.
- Connect ground wire from your equipment to the output ground terminal of the filter
- Strip ~10mm (0.4") of insulation from the ends of the wires for connection to the filter.
- Connect the rest of the wires from your equipment to the appropriate terminals at the output of the filter.
- Connect wires to the input terminals of the filter. Tighten connections using screwdriver. Do not over-tighten the screws.
- Label these wires according to the connection of the equipment
- Connect other ends of the wires to the appropriate terminals/wires in your junction box. Refer to your previously-made photo or sketch. Provide necessary insulation to the newly-made contacts if necessary

- Verify with a multimeter that there are no shorts (use test contacts/screw heads on the terminal block)
- Turn on the circuit breaker in the junction box. The LED on the filter should now be “on.”
- Turn on your equipment

## Filters with Mounting Flanges

Some models of CleanSweep® filters are equipped with mounting flanges. The metal enclosure of the filter is electrically connected to the ground terminal of the filter's output. In order to preserve EMI filtering in ground do not place these filters on a metal surface which is electrically connected to the ground of the input power.



## Filter and Circuit Breaker

CleanSweep® filters are equipped with built-in circuit breakers. It is prudent to have typical load current of no more than 75% of the circuit breaker' rating to avoid shutdown during occasional current peaks. Should the current through the filter exceed filter's maximum rated current, this circuit breaker will trigger and disconnect power to your equipment plugged into the filter. 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 depressing its actuator until it “clicks.”

