

Power Line Filter Solutions for Single-Phase Applications

In an Enphase Microinverter System, the microinverters and the Envoy Communications Gateway use power line communications (PLC) technology to connect and communicate. The Enphase System transmits communication signals at 144 kHz across the same conductors that carry on-site AC system power.

When multiple Envoys are located on a single utility transformer or when site loads generate electrical noise that disrupt communications, you can use power line filters to separate individual Envoy domains or to filter out electrical noise.

When installing a power line filter with an Enphase Microinverter System, follow these requirements:

- Separate the Envoy and the microinverters from other site loads
- Place the power line filter in-line between the microinverter subpanel and the main AC load center
- Size the filter for the ampacity (current rating) of the system
- Protect the filter with an appropriate circuit breaker



WARNING: When using a filter, **always** install the PV Array and any Enphase AC Batteries on the same electrical load side as the Envoy-S Metered. A filter installed between the Envoy and PV Array or AC Battery(ies) will prevent the system from functioning.

Radius Power (www.radiuspower.com) manufactures electromagnetic interference (EMI) filters that provide power line filtering when applied in Enphase installations. Enphase provides this information about Radius Power filters but recommends that you contact the manufacturer or the Radius Power distributor to determine the exact PLC filter requirements for your PV installation.

Although the Radius Power RP125 series is adequate for some single-phase systems, a more reliable and robust solution for PLC filtering incorporates the Radius Power dual-stage design RP230 or RP240 series. The dual-stage design provides higher performance.

| Dual Stage Power Line Filters for Single-Phase Applications | | |
|---|---------------|---------------------|
| Radius Power Series | Part Number | Rated Current (Amp) |
| RP230 | RP230-30-10-S | 30 |
| RP230 | RP230-40-10-S | 40 |
| RP240 | RP240-80-10-S | 60 |

To find out more about Radius Power EMI filters used in Single-Phase Applications, visit <http://www.radiuspower.com/emi-filters/single-phase-emi-filters>.

To view the RP230 data sheet is available, visit <http://www.radiuspower.com/emi-filters/single-phase-emi-filters/rp230-series-detail>

For orders, email emifiltercs@astrodynetdi.com or call 714-289-0055.

Ferrite Toroids

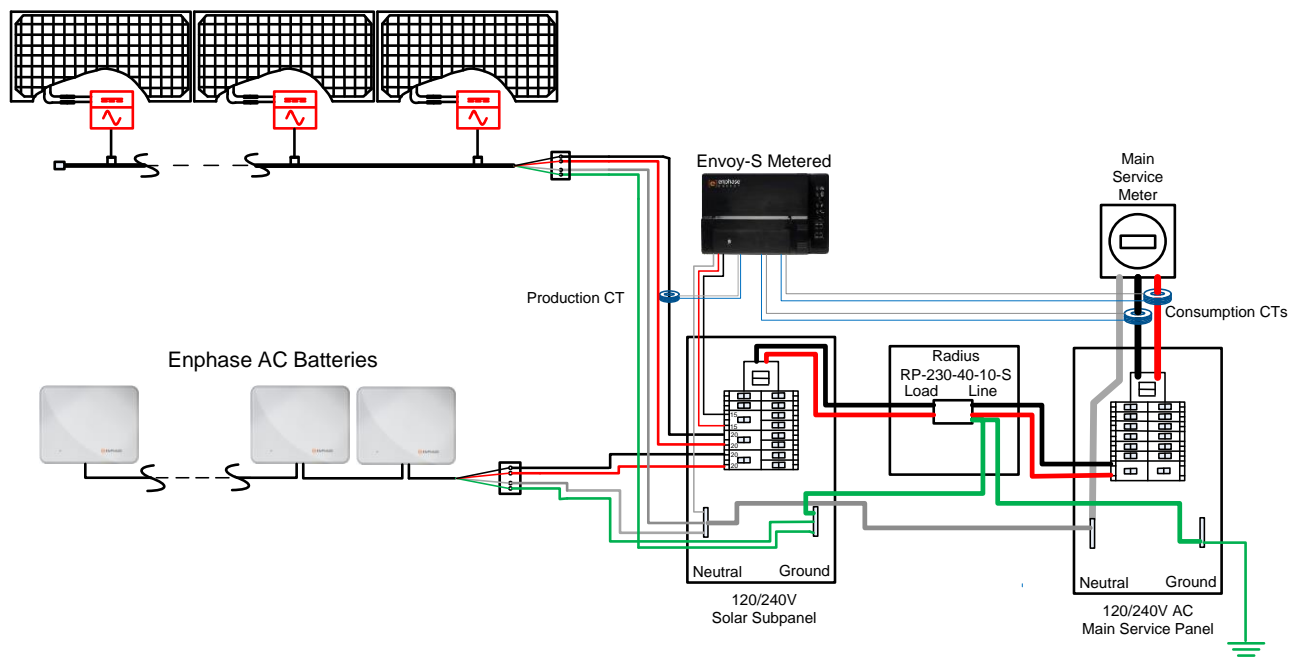
In some applications, you can use a ferrite toroid to block electrical noise. To install a ferrite toroid, pass the conductors that connect the PV subpanel and the main AC panel through the toroid (excluding neutral). For example, the Epcos B84144A0200R140 toroid distributed by Digi-Key.

To find out more about the Epcos toroid, visit

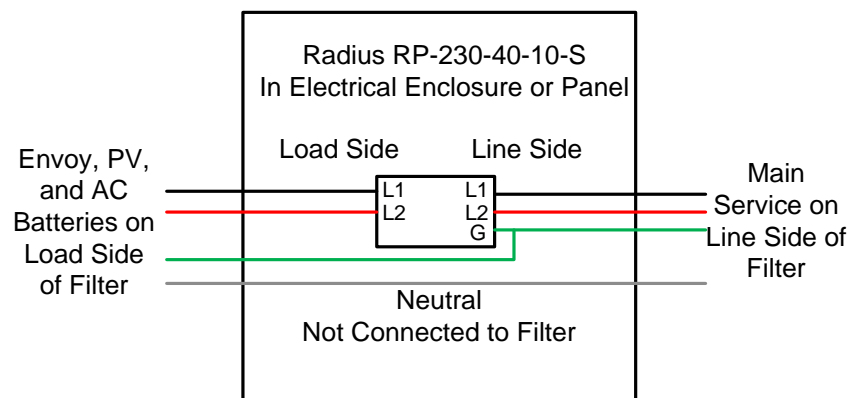
http://www.digikey.com/product-search/en?lang=en&site=US&WT.z_homepage_link=hp_go_button&Keywords=495-3871-ND&x=0&y=0.

The Epcos toroid listed above will saturate at currents above 20A. For commercial applications and larger residential systems, consider using a ferrite toroid from Magnetics, Inc. (part number C055433A2).

Schematic



Filter Detail

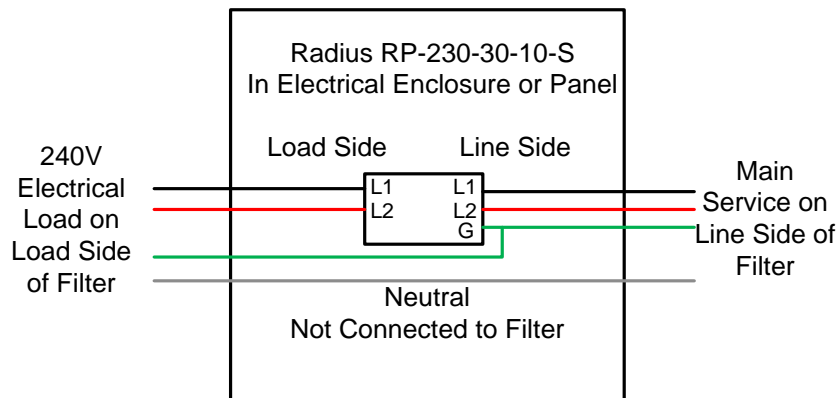


Filtering an Individual Load that is Causing Noise

In many instances, a specific load at the site may be causing the electrical noise that is interfering with the power line communication between the microinverters and the Envoy. In that situation, use a filter for the individual load.

Electrical noise sources often include light dimmers, touch lamps, EV chargers, fluorescent lighting ballasts, or any device with a switching power supply (wall warts). If a 120V appliance causes a noisy electrical load, plugging that device into a power strip with surge protection may filter the noise.

Filtering 240V Loads with a Power Line Filter



Filtering 120V Loads with a Power Line Filter

