

The Next Step

Noise on power lines is harmful to sensitive equipment and components and needs to be controlled. There are several methodologies to accomplish noise reduction, among them identifying most polluting noise sources in your environment and isolating them; rearranging power and grounding branches and using EMI filters, the latter being most effective both for noise reduction and cost since filtering of noise does not involve rewiring your facility. Please visit www.onfilter.com for more technical information on the subject.

OnFILTER manufactures a line of advanced EMI filters for suppression of noise on power lines and ground in actual installations. Please consider OnFILTER' CleanSweep® power line and ground line EMI filters to manage EMI in your facility.

Customer and Technical Support

For customer service and technical support contact factory at +1-831-824-4052 or info@onfilter.com or your local authorized OnFILTER representative -- see distributor's section at www.onfilter.com

Important Notice

All statements, technical information, and recommendations related to OnFILTER's products are based on information believed to be reliable, but the accuracy or completeness is not guaranteed. Before using this product, you must evaluate it and determine if it is suitable for your intended application. You assume all risks and liability associated with such use.

Any statements related to the product which are not contained in OnFILTER's current publications, or any contrary statements contained on your purchase order shall have no force or effect unless expressly agreed upon, in writing, by an authorized officer of OnFILTER,.

Warranty; Limited Remedy; Limited Liability

This product will be free from defects in material and manufacture for a period of three (3) years from the time of purchase. OnFILTER, INC. MAKES NO OTHER WARRANTIES INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

If this product is defective within the warranty period stated above, your exclusive remedy shall be, at OnFILTER's option, to replace or repair the OnFILTER product or refund the purchase price of the OnFILTER product.

Except where prohibited by law, OnFILTER, Inc. will not be liable for any indirect, special, incidental or consequential loss or damage arising from this OnFILTER's product, regardless of the legal theory asserted. For full text of Warranty and Terms and conditions of Sale please see www.onfilter.com

Power Line PLC / EMI Adapter MSN17



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
info@onfilter.com



Overview

Thank you for buying Power Line PLC/EMI Adapter! MSN17 will help you to observe and measure high frequency signals and noise on power lines and ground with the help of your spectrum analyzer or an oscilloscope, providing valuable diagnostics means, as well enable monitoring and measurements of the majority of power line communication (PLC) signals.

MSN17 Power Line PLC/EMI Adapter galvanically isolates its output from 50/60Hz input voltage on the mains while passing through high-frequency signals on power line allowing connection to conventional instrumentation such as oscilloscopes and spectrum analyzers for analysis.

True balanced input of MSN17 in conjunction with its galvanic separation between input and output eliminates ground loops even if your instrument is AC powered.

PLC/EMI Adapter has 50 Ohms BNC output, allowing its connection to many instruments. Please read cautionary note further in this document before connecting MSN17 to your instrument.

If your interests are more in EMI on power conductors other than just in electric outlets, and on grounded objects, please consider model MSN15.

What is included with your PLC/EMI Adapter:

- PLC/EMI Adapter MSN17
- Power cable C5
- BNC-BNC cable, 10' (~3m)
- BNC T-adapter
- BNC 50 Ohms terminator
- This User's Guide



- ✓ Power cable with IEC 60320 C6 connector
- ✓ AC plug type depends on model ordered
- ✓ BNC coax cable, 6' (1.8m)
- ✓ 50 Ohms BNC terminator
- ✓ BNC T-adapter

Optional accessories (ordered separately):

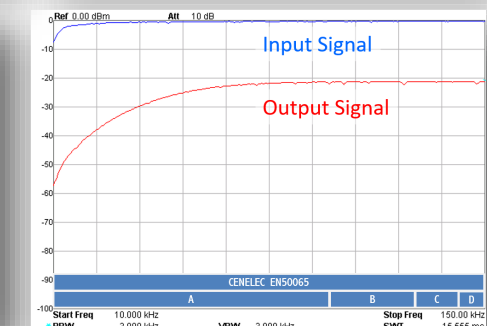
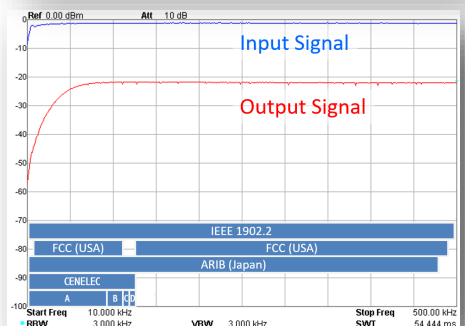
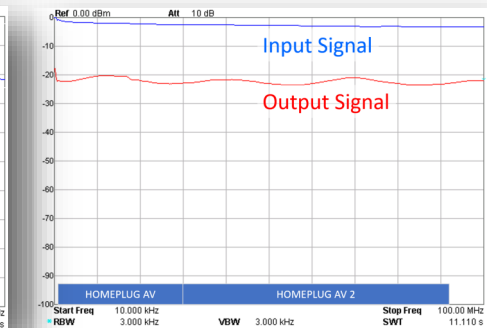
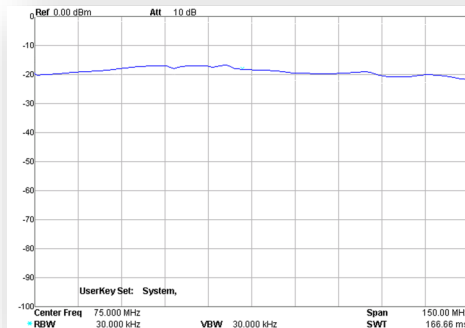
- Attenuator **AMS22**
 - BNC attenuator 20dB
- Signal Cable Kit **AMS23**
 - Spare BNC cable/T-connector/50 Ohms terminator pack



CAUTION! If you are using a different AC power cable from the one supplied, make sure to use only safety-approved GROUNDED quality power cord with IEC 60320 C5 connector

Specification

Max. AC Voltage	250VAC RMS
Measurement Category	CAT II 250V
Frequency Response	30kHz...150MHz
	AC Mains frequencies are fully blocked
Output Impedance	50 Ohms
Connector	BNC
Internal Signal Limiter, Typ.	15V peak either polarity (typ.)
Ambient Temperature	+5°...40°C
Climatic Category	+05/04/00



Typical frequency responses and corresponding PLC standards into 50 Ω load

All specifications are subject to change without notice.

Making Measurements

Connecting it all together

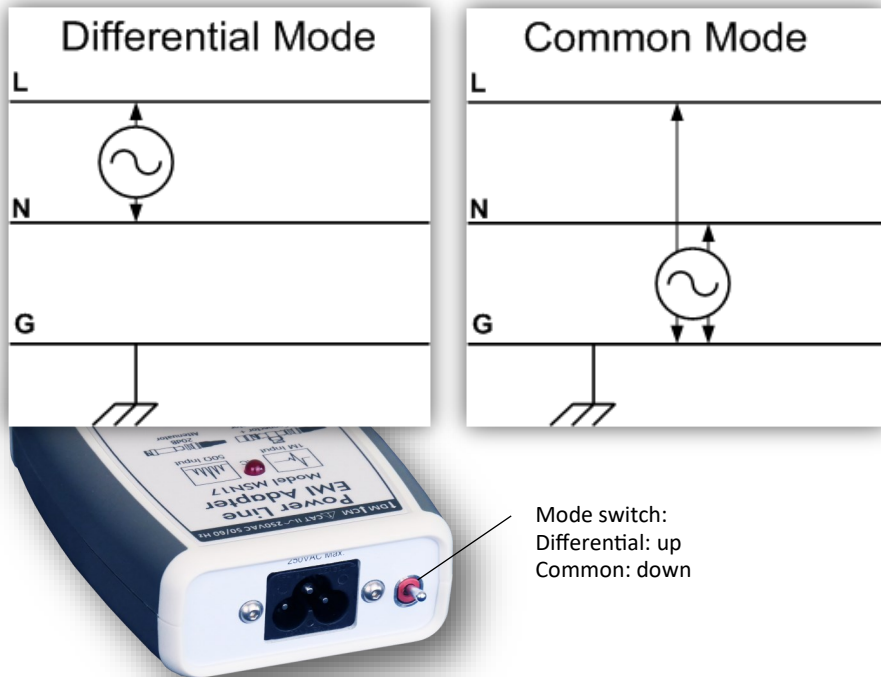
- Connect MSN17 to your instrument as shown on the previous page 5.
- Plug C6 end of the supplied power cable into the inlet of MSN17. Hold MSN17 firmly as you are doing it. The same applies when you disconnect power cable from MSN17
- Plug AC plug into your power outlet
- Noise on power lines can be common-mode and differential (also called “normal”) mode. The high-frequency signals may be different for each mode.
- Set the Differential/Common Mode switch in the desired position

Common Mode and Differential Noise

Noise on power lines can be common-mode and differential (also called “normal”) mode. The high-frequency signals may be different for each mode.

Differential signal exists between wires carrying power, such as Live and Neutral. Mains voltage of 50/60Hz itself is a differential signal. Communication over power lines also utilizes mostly differential mode signals. As seen, signal of differential mode can be either “good” or “bad.”

Common mode signals are never good news. This type of signal is often result of parasitic “leakage” of current from Live or Neutral to Ground. It also can be generated when power cable passes nearby strong emission source, such as other cables or a transformer.



Brief Tour of your MSN17 EMI Adapter

Please refer to the rest of this User’s Guide for a detailed explanation of each connection. MSN17 has no battery. There are no serviceable or replaceable parts inside.



Safety

MSN17 is certified to meet or exceed requirements of IEC61010-1:2010; IEC61010-031:2015; UL61010-031 Edition 2; and CAN/CSA-C22.2 No. 61010-031-07 Equipment for Measurement, Control and Laboratory Use. Note: Rated for indoor use only.



WARNING: Observe proper safety precautions when working with voltages over 60 VDC or 30 VACRMS. These voltages pose shock hazard. Use only power cable supplied with the product or appropriate safety approved power cable.



WARNING: To avoid electrical shock or fire, make sure that the power cable is in good condition. Contact OnFILTER for repair or replacement.



WARNING: To avoid electric shock or fire, keep MSN17 body and its output cable away from the circuits being measured. The MSN17 body and output cable are not intended to be in contact with the circuits being measured.



CAUTION: High-frequency and transient signals on power lines can reach significant magnitude. MSN17 adapter limits peak amplitude of such signals typically to no more than 15V. This may exceed maximum allowed signal amplitude for 50 Ohms input in some instruments. In order to avoid damage to your instruments by such signals see proper connection techniques on page 5 of this User's Guide.



CAUTION: Always read instructions to your instruments
 For instruments that allow either 50 Ohms or 1 MOhm input selection, always choose 1 MOhm input and use supplied adapters as shown in this User's Guide to maintain 50 Ohms impedance
 For instruments that have only 50 Ohms input always use optional attenuator (20dB is recommended) in line with the 50 Ohms input.

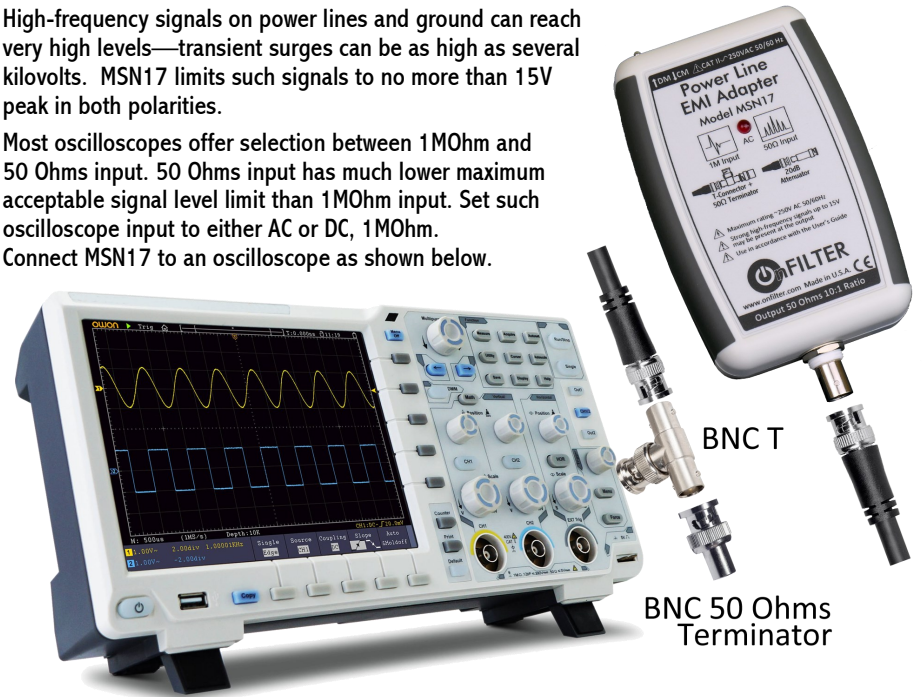
Observe caution when working with high voltage:

- Avoid working alone.
- Do not use the PLC/EMI Adapter if it is damaged, or if it's safety is impaired.
- Inspect power cable for damaged insulation or exposed metal.
- Damaged power cable should be replaced.
- Use only the accessories provided or approved by the manufacturer.
- Connect power cable first to MSN17 and then to the outlet
- Disconnect power cable from the outlet before disconnecting it from MSN17.
- Follow all safety procedures for equipment being tested.

Connecting to an Oscilloscope with 1MOhm Input

High-frequency signals on power lines and ground can reach very high levels—transient surges can be as high as several kilovolts. MSN17 limits such signals to no more than 15V peak in both polarities.

Most oscilloscopes offer selection between 1MOhm and 50 Ohms input. 50 Ohms input has much lower maximum acceptable signal level limit than 1MOhm input. Set such oscilloscope input to either AC or DC, 1MOhm. Connect MSN17 to an oscilloscope as shown below.



Connecting to an Oscilloscope or a Spectrum Analyzer with 50 Ohms Input

Spectrum analyzers normally have only 50 Ohms input. Some high-speed oscilloscopes also use only 50 Ohms input as well. Unless your 50 Ohms instrument can safely withstand 15V peak signals, we recommend to use optional in-line BNC attenuator as shown below. This way the maximum signal will not exceed 1.5V (typ.).

