

INSTRUCTION MANUAL

NEAR FIELD

PROBE SET

BROADBAND RESPONSE

MODEL EM-6992

3 kHz - 1.5 GHz

THIS INSTRUCTION MANUAL AND ITS ASSOCIATED INFORMATION IS PROPRIETARY. UNAUTHORIZED REPRODUCTION IS FORBIDDEN.

© 2014 ELECTRO-METRICS CORP.

NEAR FIELD PROBE SET

BROADBAND RESPONSE

3 kHz – 1.5 GHz

ELECTRO-METRICS

MODEL EM-6992

SERIAL NO: TYPICAL

ELECTRO-METRICS CORPORATION

231 Enterprise Road, Johnstown, New York 12095
Phone: (518) 762-2600 Fax: (518) 762-2812

EMAIL: info@emihq.com

WEB: <http://www.electro-metrics.com>

MANUAL REV. NO: 0414

ISSUE DATE: APRIL 01, 2014

PRINTED IN THE UNITED STATES OF AMERICA

WARRANTY

This Model EM-6992 Near Field Probe Set is warranted for a period of 12 months (USA only) from date of shipment against defective materials and workmanship. This warranty is limited to the repair of or replacement of defective parts and is void if unauthorized repair or modification is attempted. Repairs for damage due to misuse or abnormal operating conditions will be performed at the factory and will be billed at our commercial hourly rates. Our estimate will be provided before the work is started.

Table Of Contents

Section	Title	Page
1.0	Description	1
2.0	Specifications	2
3.0	Applications	2
4.0	Typical Calibration Chart, H-Field Probes	3

EM-6992-i

DESCRIPTION AND USE OF ELECTRO-METRICS MODEL EM-6992 NEAR FIELD PROBE SET

1.0 Description

The EM-6992 Near Field Probe Set is intended to serve as a versatile aid for diagnostic testing of radiated emissions over a broad range of frequencies from below 100 kHz to above 1 GHz. The probe set consists of three (3) magnetic field probes, two (2) electric field probes, 20 cm extension handle, and custom carrying case. In addition, an optional EM-6990A broadband pre-amplifier is also available (Refer to Paragraph 4.0 for Description/Specifications).

The three magnetic field probes are electrically small (i.e. resonant frequency above 1 GHz) loops of varying sensitivities. The loops are wound within a balanced Faraday shield that reduces their response to electric fields to a negligible factor. Each successively larger loop increases sensitivity (independent of frequency) by approximately 12 to 15 dB. Probes of reduced sensitivity may be of assistance in isolating an emission source more precisely.

A ball probe and a stub probe comprise the two electric field probes. Each probe responds primarily to the electric field component and rejects the magnetic field component.

Type BNC (female) connectors are used as the output connector on all the probes plus the probe extension handle.

While the accompanying typical calibration data assumes that the indicating instrument presents a 50-ohm impedance to the probe and connecting cable, this is by no means mandatory. The high impedance of an RF Voltmeter or oscilloscope may be used with the probes.

When making before-and-after measurements to determine the effectiveness of an attempted EMI solution, some care should be used to ensure that the measurements are repeatable. Of chief importance is the distance from the probe to the item under test. Even small changes in this spacing can yield large variations in amplitude. The E-field probes are also susceptible to measurement variations due to capacitive coupling to external objects such as equipment chassis, human bodies, large metal objects, etc. The H-field probes do not exhibit this effect.

The response of the E-field probes is essentially omni-directional. The response of the H-field probes is a figure-8 response, typical of a dipole. The primary pickup direction is broadside to the loop, with sharp notches in the pickup pattern in the plane of the loop.

2.0 Specifications

Model EM-6993:	6 cm Loop, H-field Sensor.
Connector:	BNC, female.
Model EM-6994:	3 cm Loop, H-field Sensor.
Connector:	BNC, female.
Model EM-6995:	1 cm Loop, H-field Sensor.
Connector:	BNC, female.
Model EM-6996:	3.5 cm Ball, e-field Sensor.
Connector:	BNC, female.
Model EM-6997:	0.3 cm Stub, E-field Sensor.
Connector:	BNC, female.

3.0 Applications

The probe set is designed for use with many different indicating instruments such as EMI receivers, spectrum analyzers, oscilloscopes. The selected probe is connected to the indicating device using a 50-ohm coaxial cable (Model EM-1107 or equivalent).

Probe choice is determined by the type of signal under observation, signal strength, and the physical size of the area to be investigated. Comparison of the response to both H-field and E-field probes will provide the user with some idea as to the relative magnitude of the E-field and H-field of each component, thus providing a clue toward solving the emission problem.

The larger probes provide increased sensitivity while the smaller probes permit a more precise location of the emission source.

4.0 Typical Calibration Chart H-Field Probes

The calibration chart of Page 6 shows typical antenna calibration data for the three (3) H-Field probes supplied with the EM-6992 Probe Set.

Three typical calibration data plots are shown:

Upper Plot: 1 cm Loop,

Middle Plot: 3 cm Loop,

Lower Plot: 6 cm Loop.

The Y-axis is denoted in dB(Sm-1).

The X-axis is denoted in Frequency (MHz).

dB(Sm-1) = dB above 1 Siemens/meter.

Add dB(Sm-1) to meter reading in dB(μ V) to obtain dB Siemens.

dB(Sm-1) = dB(μ A/m).

dB(Sm-1) + 51.5 dB = dB(μ V/m)(Far Field).

dB Siemens + 2 dB = dB(pT).

dB Siemens -158 dB = dB gauss.

