
User's Manual

PMM SHC-1

PMM SHC-1/1000

PMM SHC-2

PASSIVE PROBES

SERIAL NUMBER OF THE INSTRUMENT

You can find the Serial Number on the handle of the probe
Serial Number is in the form : 0000X00000.

The first four digits and the letter are the Serial Number prefix, the last five digits are the Serial Number suffix. The prefix is the same for identical instruments, it changes only when a configuration change is made to the instrument.

The suffix is different for each instrument.

NOTE:

If the instrument is used in any other way than as described in this Users Manual, it may become unsafe

Before using this product, the related documentation must be read with great care and fully understood to familiarize with all the safety prescriptions.



To ensure the correct use and the maximum safety level, the User shall know all the instructions and recommendations contained in this document.

This products are a **Safety Class I** and **Installation Category II** instrument according to IEC classification and has been designed to meet the requirements of EN61010-1 (Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use).

This product has a **Pollution Degree II** normally only non-conductive pollution occurs. Occasionally, however, a temporary conductivity caused by condensation must be expected.



The information contained in this document is subject to change without notice.

KEY TO THE ELECTRIC AND SAFETY SYMBOLS:

You now own a high-quality instrument that will give you many years of reliable service. Nevertheless, even this product will eventually become obsolete. When that time comes, please remember that electronic equipment must be disposed of in accordance with local regulations. This product conforms to the WEEE Directive of the European Union (2002/96/EC) and belongs to Category 9 (Monitoring and Control Instruments). You can return the instrument to us free of charge for proper environment friendly disposal. You can obtain further information from your local NARDA Sales Partner or by visiting our website at www.narda-sts.it.



Warning, danger of electric shock



Earth



Read carefully the Operating Manual and its instructions, pay attention to the safety symbols.



Unit Earth Connection



Earth Protection



Equipotential

KEY TO THE SYMBOLS USED IN THIS DOCUMENT:



DANGER

The DANGER sign draws attention to a potential risk to a person's safety. All the precautions must be fully understood and applied before proceeding.



WARNING

The WARNING sign draws attention to a potential risk of damage to the apparatus or loss of data. All the precautions must be fully understood and applied before proceeding.



CAUTION

The CAUTION sign draws attention against unsafe practices for the apparatus functionality.



NOTE:

The NOTE draw attention to important information.

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IMPORTANT SAFETY WARNING

As specified in the Italian law Art. 345 of DPR 547 issued on 27.04.1955 when measurements are made on circuits carrying hazardous supply voltage, using an insulated probe where a metallic part is accessible, is not allowed.

It is possible to use an insulated alligator clip instead, in this case the high voltage circuit must be protected by means of a low voltage safety interlock circuit, capable to cut off high voltage before any alligator clip or probe operation.

The user must install safety protection with a low voltage interlock circuit before any use of PMM SHC-1 or PMM SHC-2 passive probes on hazardous voltage circuit.

The NARDA assumes no liability for the customer's failure to comply with these requirements.



SAFETY RECOMMENDATIONS AND INSTRUCTIONS

This product has been designed, produced and tested in Italy, and it left the factory in conditions fully complying with the current safety standards. To maintain it in safe conditions and ensure correct use, these general instructions must be fully understood and applied before the product is used.

- When the device must be connected permanently, first provide effective grounding;
- If the device must be connected to other equipment or accessories, make sure they are all safely grounded;
- In case of devices permanently connected to the power supply, and lacking any fuses or other devices of mains protection, the power line must be equipped with adequate protection commensurate to the consumption of all the devices connected to it;
- In case of connection of the device to the power mains, make sure before connection that the voltage selected on the voltage switch and the fuses are adequate for the voltage of the actual mains;
- Devices in Safety Class I, equipped with connection to the power mains by means of cord and plug, can only be plugged into a socket equipped with a ground wire;
- Any interruption or loosening of the ground wire or of a connecting power cable, inside or outside the device, will cause a potential risk for the safety of the personnel;
- Ground connections must not be interrupted intentionally;
- To prevent the possible danger of electrocution, do not remove any covers, panels or guards installed on the device, and refer only to NARDA Service Centers if maintenance should be necessary;
- To maintain adequate protection from fire hazards, replace fuses only with others of the same type and rating;
- Follow the safety regulations and any additional instructions in this manual to prevent accidents and damages.
- The probe cannot be handled in proximity of high voltage mains line.
- If the probe is to be connected to high voltage mains line a safety interlock equipment must be installed to ensure the mains line be switched off before any probe handling or connection
- The user must provide a safety protection cover with a low voltage interlock switch able to cut off mains voltage before probe handling or connection.

EC Conformity Certificate

(in accordance with the directives: EMC 89/336/EEC and low voltage 73/23/EEC)

This is to certify that the product: PMM SHC-1 and PMM SHC-1/1000 Passive Probes

Produced by: NARDA S.r.l.
Safety Test Solution
Via Benessea 29/B
17035 Cisano sul Neva (SV) - ITALY

complies with the following European Standards
Safety: CEI EN 61010-1 (2001) and CEI EN 61010-031 (2004)

This product complies with the requirements of the Low Voltage Directive 2006/95/CE and the EMC Directive 2004/108/CE.

NARDA S.r.l.

EC Conformity Certificate

(in accordance with the directives: EMC 89/336/EEC and low voltage 73/23/EEC)

This is to certify that the product: PMM SHC-2 Passive Probe

Produced by: NARDA S.r.l.
Safety Test Solution
Via Benessea 29/B
17035 Cisano sul Neva (SV) - ITALY

complies with the following European Standards
Safety: CEI EN 61010-1 (2001) and CEI EN 61010-031 (2004)

The product herewith complies with the requirements of the Low Voltage Directive 2006/95/CE and the EMC Directive 2004/108/CE.

NARDA S.r.l.

1 - General Information

1.1 Documentation

Enclosed with this manual are a service questionnaire to send back to NARDA in case that equipment service is needed, and an accessories check list to verify all accessories enclosed in the packaging, as well as a calibration certificate.

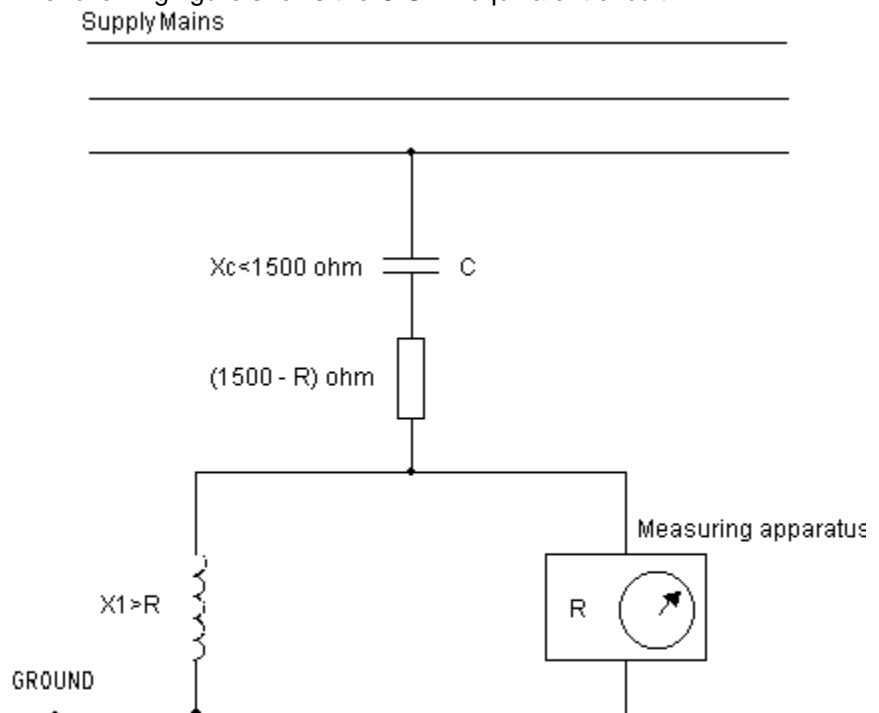
1.2 Introduction to Passive Probes

When LISN (Line Impedance Stabilization Network) are not applicable to EMI conducted test because the current flowing is too high, the conducted interferences are measured by means of a high impedance voltage probe, according to C.I.S.P.R 16-1 subclause 12.2.

The passive probes are designed to comply with C.I.S.P.R. 16-1 regulation and thus include a blocking capacitor to decouple the measured signal from any AC supply voltage which may be present on the line under test, they have a total internal resistance between line and earth of more than 1500 ohm.

Designed according to criteria of cheaply and compactness they can be used together with PMM 7000, PMM 8000 Plus and PMM 9000 Systems for Conducted Interferences measurement, or any other RF receiver.

The following figure shows the CISPR equivalent circuit.



Circuit for RF voltage measurement on supply mains (subclause 12.2)

Equivalent CISPR circuit

Fig. 1-1 Equivalent CISPR circuit

1.3 Insertion loss

The insertion loss of the probes is calibrated in a 50 ohm system over the frequency range of 9 kHz to 30 MHz.

The only difference from PMM SHC-1 and PMM SHC-2 probes is the insertion loss respectively 35 dB typical for SHC-1 and 30 dB typical for SHC-2.

NOTE

The attenuation of the probes must be taken into account during measurement, the level indicated on the receiver must be increased of 30 or 35 dB corresponding to the attenuation of the probe used.

1.4 Shipping components

The passive probes kit is composed by the following parts:

- The passive probe and cable.
- Test probe tip.
- Test probe tip safety cap.
- Test alligator clip.
- Operating Manual.
- Calibration Chart
- Return for repair form

1.5 Packing/Unpacking

Inspect the shipping container for damage.

If the shipping container or cushion material is damaged, it should be kept until the contents of the shipment have been checked for completeness and the instrument has been checked mechanically and electrically.

Verify the accessories availability in the shipping container referring to the accessories check list enclosed with the Operating Manual.

Notify any damage to the carrier as well as the NARDA Representative.

1.6 Environment

The operating environment is specified to be within the following limitations :

- Temperature 0° to +45° C
- Humidity < 90% relative

The instrument should be stored in a clean, dry environment

The storage and shipping environment is specified to be within the following limitations :

- Temperature -25° to + 70° C
- Humidity < 95% relative

1.7 Return for service

If the instrument should be returned to NARDA for service, please complete the service questionnaire enclosed with the Operating Manual and attach it to the instrument.

To minimize the repair time, be as specific as possible when describing the failure. If the failure only occurs under certain conditions, explain how to duplicate the failure.

If possible, reuse of the original packaging to ship the equipment is preferable.

In case other package should be used ensure to wrap the instrument in heavy paper or plastic.

Use a strong shipping container and use enough shock absorbing material around all sides of the equipment to provide a firm cushion and prevent movement in the container.

Seal the shipping container securely with shipment tape.

Mark the shipping container FRAGILE to encourage careful handling.

2 – PMM SHC Passive Probes

2.1 Main specifications

Table 1-1 lists performance specifications.
 The following conditions apply to all specifications:

- The ambient temperature must be 0° to 45°.

TABLE 1-1 Main specifications	
Electrical characteristics	Performance Limits
Insertion loss:	SHC-1 35 dB (typical) SHC-1/1000 35 dB (typical) SHC-2 30 dB (typical)
Input impedance:	> 1500 Ohm
Input capacity :	< 10 pF
Frequency range :	9 kHz ÷ 30 MHz
Max permissible input operating voltage:	SHC-1 300 Volt AC SHC-2 300 Volt AC SHC-1/1000 1000 Volt AC
RF output:	BNC male
Rated temperature:	0 to + 45 C
Storage temperature:.	- 25 to + 70 C



Fig. 2-1 Passive probe and accessories

2.2 Passive Probes and accessories

Legend:

- 1- Passive probe
- 2- Test probe tip and safety cap
- 3- Test alligator clip
- 4- RF output to EMI Signal Analyzer (50 ohm, BNC male connector)
- 5- RF input probe tip
- 6- RF Ground lead alligator clip

2.3 PMM SHC-1 and SHC-1/1000 passive probe schematics

PMM SHC-1
PMM SHC-1/1000
ATT. 35 dB 9kHz-30 MHz

DATA 15-06-89
REV. 24-07-96

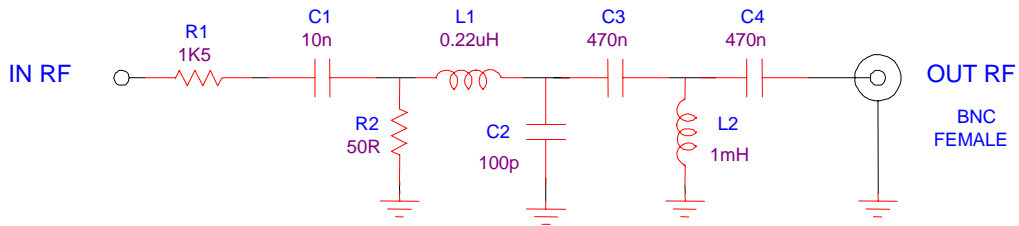


Fig. 2-2 PMM SHC-1 and SHC-1/1000 passive probe schematics

2.4 PMM SHC-2 passive probe schematics

PMM SHC2
ATT. 30 dB 9kHz-30MHz

DATA 15-06-89
REV. 24-07-96

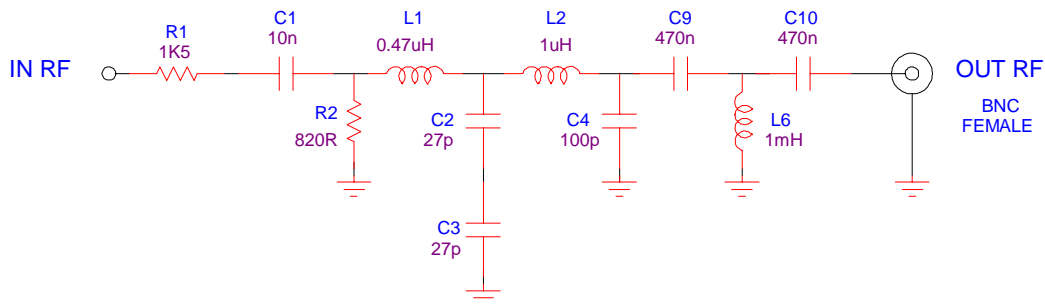


Fig. 2-3 PMM SHC-2 passive probe schematics

3 - Preparation for use

3.1 Introduction

This section provides the information needed to install the passive probes. Included is information pertinent to initial inspection, power requirements, interconnections, environment, instrument mounting, cleaning, storage and shipment.

3.2 Packing Unpacking

Inspect the shipping container for damage. If the shipping container or cushion material is damaged, it should be kept until the contents of the shipment have been checked for completeness and the instrument has been checked mechanically and electrically. Verify the accessories availability in the shipping container referring to the accessories check list enclosed with the Operating Manual. Notify any damage to the carrier as well as the NARDA Representative.

3.3 Initial inspection

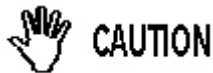
Inspect the probe for damage before use.



To avoid hazardous electrical shock, do not use the passive probe when there are signs of shipping damage to any portion of it.

3.4 Preparation for use

The BNC plug of the passive probe must be connected to the RF input socket of the EMI test receiver.



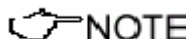
To avoid any damage caused by transient current pulses, it is advisable to use a pulse limiter between the passive probe and the RF input of the EMI test receiver.

Depending on the measurement to be performed, the passive probe can be used either with the test probe tip or the alligator clip provided as accessories.

For connections where it is difficult to hang the alligator clip to the circuit, the test probe tip provided can be used, plugging it on the passive probe.




When measurements are made on circuits carrying hazardous AC supply voltage the alligator clip provided can be used, taking care to connect the alligator clip and the passive probe before energizing the circuit under test.



The attenuation of the probes must be taken into account during measurement, the level indicated on the receiver must be increased of 30 or 35 dB corresponding to the attenuation of the probe used.

Input RF ground connection of the passive probe is very important for interfering voltage measurement in the range 9 kHz to 30 MHz, it should be less than $\lambda/100$.

 NOTE

A rather short ground connection is always desirable to avoid picking up other interferences.

The passive probes ground connection is 15 cm long. For measurements where the RF ground requires a longer ground lead the total length must be less than or equal to one tenth of the wavelength of the frequency to be measured.

 WARNING

Before connecting passive probe to the associated test instrument, ensure that an uninterruptible safety earth ground is provided from the main power source to the EMI test receiver protective earth connection.

 WARNING

To avoid hazardous electrical shock, the passive probe must be connected to the supply mains under test only before energizing any circuit.

 WARNING

To avoid hazardous electrical shock, prior to energizing either unit and prior passive probe connection, verify that a common ground exists between EMI test receiver and ground to be connected to the passive probe RF input ground.

 WARNING

To avoid hazardous electrical shock, take care to ground the passive probe RF input ground to the AC supply earth or, if this cannot be done, to ground the probe permanently to the protective earth ground conductor.

 WARNING


Any interruption or loosening of the protective earth ground conductor, either inside or outside the units or in an extension cable will cause a potential shock hazard that could result in personal injury.

 WARNING

Verify the safety earth ground functionality before operation.

3.5 Equipment cleaning

Use a clean, dry non abrasive cloth for external cleaning of the probe.

 CAUTION

To clean the equipment do not use any solvent, thinner, turpentine, acid, acetone or similar matter to avoid damage to external plastic and surfaces.

