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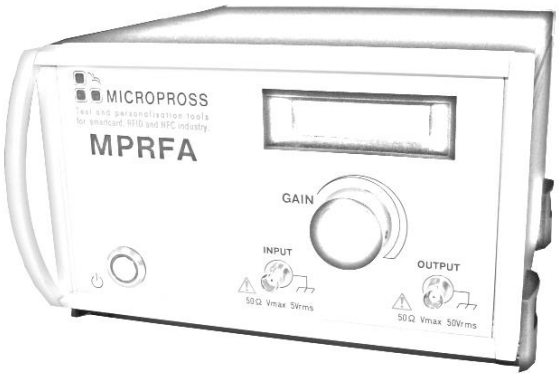
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MICROPROSS RADIO FREQUENCY AMPLIFIER



USER'S GUIDE

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This tool must be used according to the user guide. Any operation related to maintenance, reparation or calibration must be carried out by qualified personnel. Consequently, in case of failure, contact MICROPROSS to find out about the procedure to follow.

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INTRODUCTION

Introduction note from Microprossss

Dear Customer,

Congratulations on your purchase of the Microprossss Radio Frequency Amplifier. This bench top amplifier is suitable for testing all ISO, NFC, and EMVCo Standards at 13.56MHz. Based on MOSFET power devices, it provides high gain, wide dynamic range, low distortions and very good linearity even at maximum power.

Exceptional performances and efficiency are achieved by employing advanced broadband RF matching networks and EMI/RFI filters.

This manual explains how to setup and use your MP RF Amplifier.

Wishing you the best testing experience,

Microprossss

All the information contained in this manual was correct at the time of publication. However, your device's software may have a slightly different appearance or modified functionality than presented in this manual.

Instructional icons



NOTE notes, usage tips, or additional information



REFER TO pages with related information; for example: p12 (represents “see page 12”)



WARNING statements identify conditions or practices that could result in damage to the equipment or other property.



DANGER statements identify conditions or practices that could result in personal damage

Where to find the information you may need

The following table describes where to get more service information.

To learn about	Do this
Troubleshooting	Please refer to the troubleshooting section of this manual (p13), and see the frequently asked questions section at www.microprossl.com/customer_area.
Technical support	Visit www.microprossl.com/customer_area for online Helpdesk support with our engineering team (English and French).
Software updates	Visit www.microprossl.com/customer_area and use your personal access key to access to the download center
Finding your MPRFA serial number	The serial number can be found on the rear panel of the amplifier *(RFA.XX.XX.XX)*
Returning your device to Microprossl	Go to www.microprossl.com/customer_area. Use the online RMA service to get a RMA form and attach it to your shipment to : *Microprossl, 11-21 rue Hubble, Parc de la Haute Borne, 59650 Villeneuve d'Ascq, France* Afterwards, follow your RMA status at any time on our web site using your personal account.

UNPACKING

Package content

1	MP RF amplifier	
1	Power cord	
1	USB cord	
1	This user's guide	

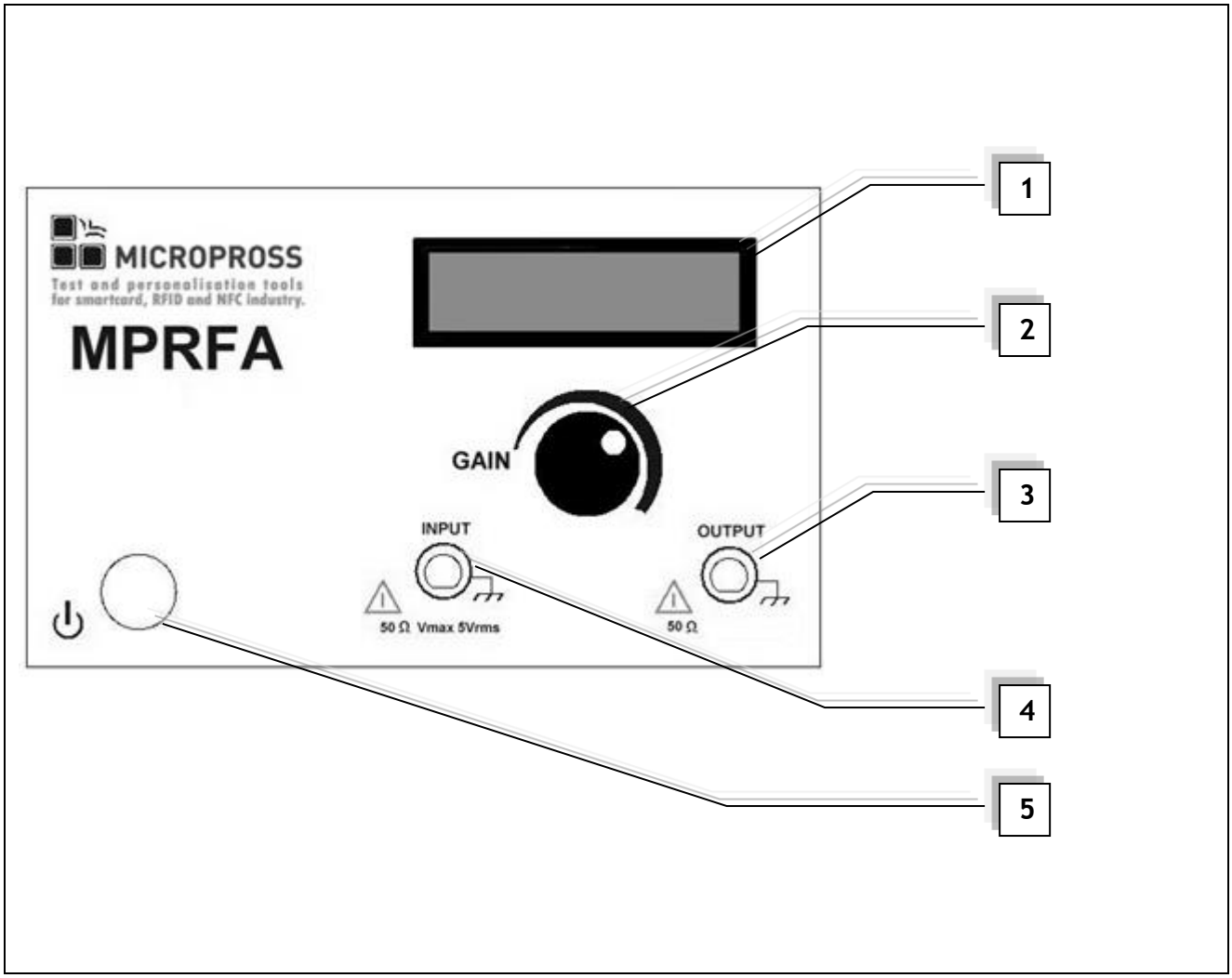
MPRFA at a glance / Installation



MPRFA is built into a table top enclosure with two adaptable stands. Pull out and extend the stands on the bottom frame if needed.

Ensure that the amplifier is not too close from the RF test equipment, to avoid RF perturbations and that enough airflow is available in its environment to keep it cool.

Front panel



1 LCD Display (p. 10)

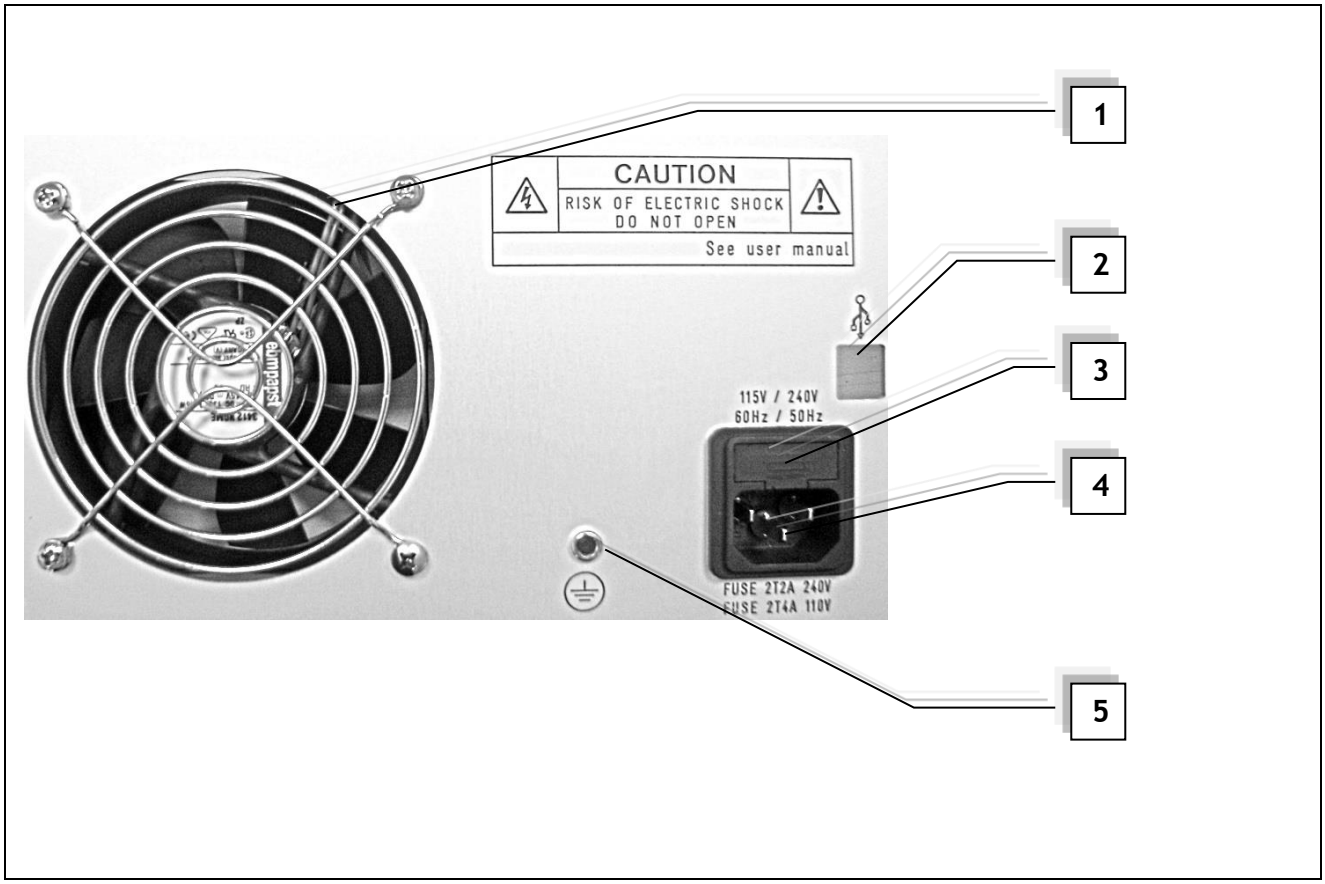
2 Gain control (p. 10)

3 RF Output (p. 9)

4 RF Input (p. 9)

5 ON / OFF button (p. 9)

Rear panel



1 Exhaust fan

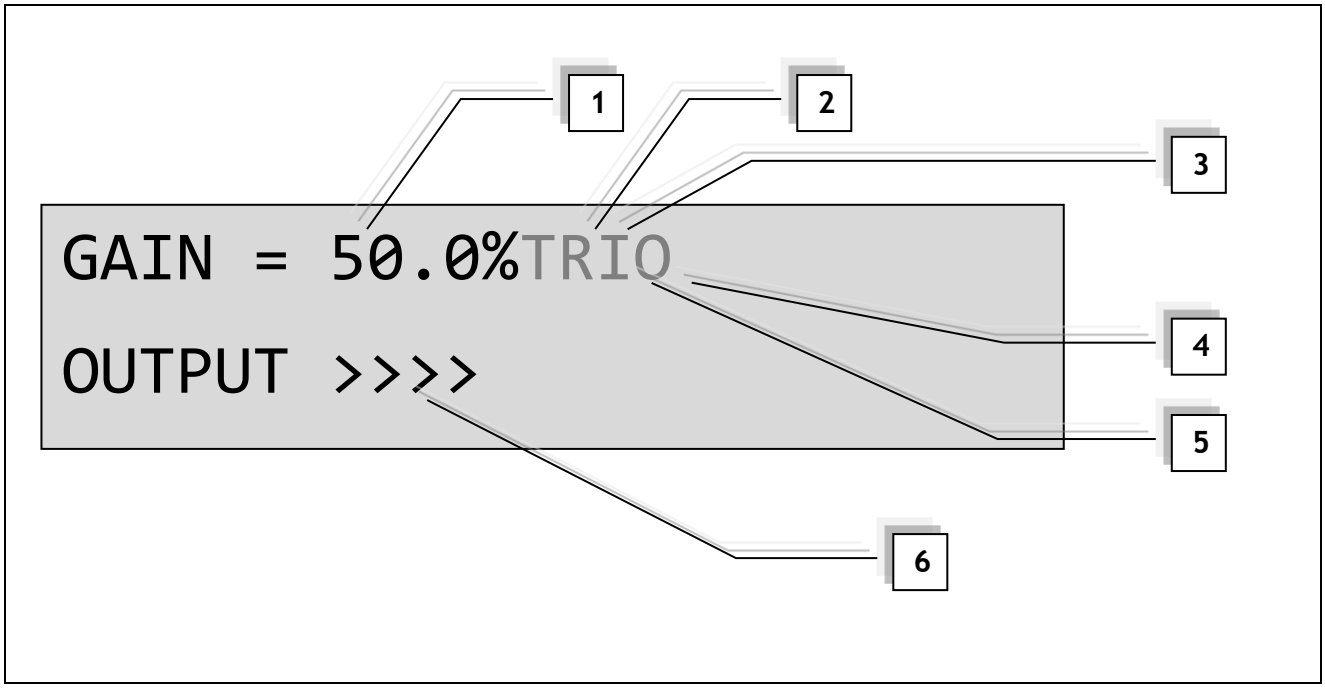
2 USB connector

3 Fuses compartment

4 AC inlet (p. 9)

5 Ground

LCD Display



1 Gain indicator (p. 10)

2 Hardware defect indicator (p. 13)

3 Remote control indicator

4 Output overload indicator (p. 13)

5 Input overload indicator (p. 13)

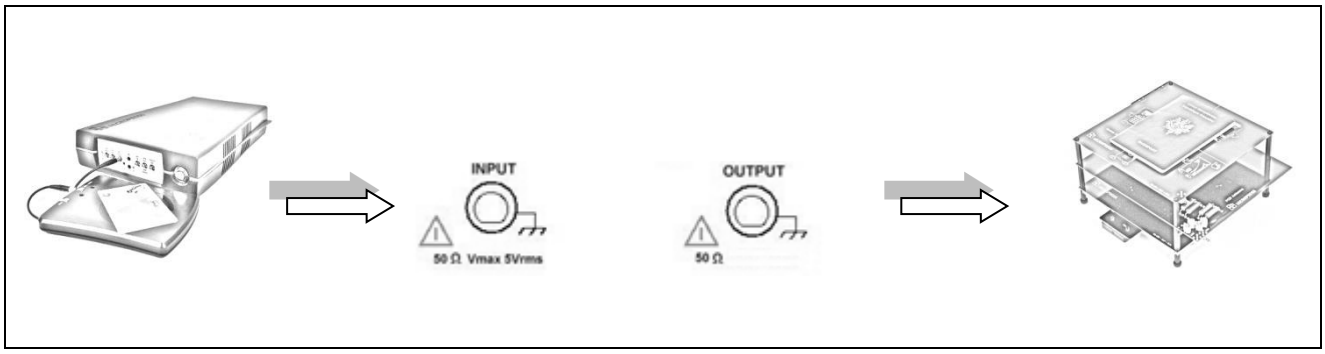
6 Power out indicator (p. 10)

Remote controlling is only available when using *MP Platform* software.

USING YOUR MPRFA

Connecting your RF test equipment

- Before making any connections, read the manuals supplied with your RF equipment.
- Use good quality 50 Ω cables long enough to connect the amplifier to the antenna.
- Don't connect the power cord until you've completed and double-checked all connections.
- Push plugs in all the way to make good connections (loose connections can cause malfunctions).
- To prevent interference, keep RF cable away from power cord.



Using BNC cables:

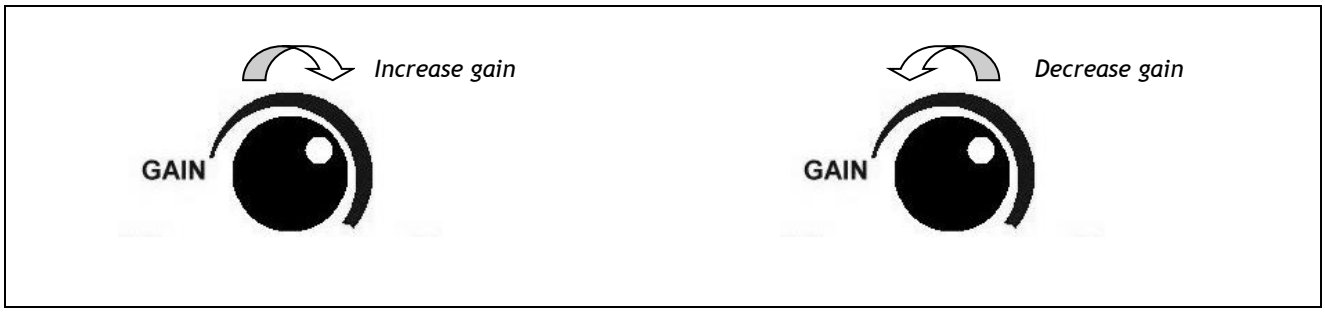
- Connect the INPUT connector of the MPRFA to the OUTPUT connector of the RF waveshape generator/reader.

- Connect the OUTPUT connector of the MPRFA to the INPUT connector of an external RF antenna.

Then, connect the supplied power cord to the amplifier's AC inlet, and plug it into an AC outlet.

How do I set a gain?

- Ensure that your test equipment is connected to the MP RF Amplifier.
- Press the **ON** button on the front panel. The amplifier comes on, the display lights.
- To adjust the gain, use the **GAIN** control on the front panel. The gain range is 0 to 100 %.



- The power out indicator shows you the amount of power delivered by the device.

Each > symbol displayed on the power out indicator represents 10 to 15% of the max output power.

TECHNICAL SPECIFICATIONS

MAIN FEATURES

- High speed modulation ready.
- Optimized for 13.56MHz operations at all data rates (Type A, B, FeliCa, and Vicinity).
- Suitable for digital signals from **106kb/s** up to **6.8MB/s**.
- 50Ω ± 0.5Ω Input impedance
- Optimized for **minimum distortion** of modulation.

ELECTRICAL SPECIFICATIONS @ T=25°C, 50Ω

- Class A device
- Output power: >30Wrms typ @ 5.5Vrms input.
- Maximum input power: 0.75Wrms.
- Gain adjustment range@ 13.56MHz : -20dB to 20dB
- Rise and fall times (13.56MHz, all modulations): < 200ns under 50Ω
- Modulation bandwidth: 6-20MHz
- Harmonics @ 13.56MHz: <-50dB
- Flatness 6MHz - 17MHz: < 3dB
- Power output@1dB compression point: > 50W.
- Supply voltage (single phase) VAC 100 240 VAC
- Power line consumption: 315W

ENVIRONMENTAL SPECIFICATIONS

- Operating temperature: +10°C + 28°C
- Precision operating temperature: +18°C + 25°C
- Storage temperature: -10°C +60°C
- Relative humidity without condensation RH: 95 %

PROTECTIONS

- **Input overdrive**: 6Vrms max. without damage
- **Input max** (without harmonic distortion): 5.5Vrms
- Overdrive short and open load continuously.
- **Thermal overheat** 80°C shutdown max

MECHANICAL SPECIFICATIONS

- **Dimensions** (H x W x D): 177mm x 235mm x 244mm
- **Weight**: 5.580Kg
- **BNC** RF Connectors
- Cooling built in forced-air system

TIPS AND TROUBLESHOOTING

Most problems with your device can be solved by following the advice in this chapter. If you can't resolve the issue yourself, please contact Microprossss.

General recommendations for use



In the case of a weak signal applied on the RF input power, the RF signal output can be weak and noisy. Maximize first the input signal and then adjust the gain to obtain the right output level.



Always adjust your antenna (50Ω impedance) to obtain a proper matching.



WARNING: Do not apply more than 6VRMS on the RF input. (RF input limit = 0.75W)



DANGER: Do not touch the external antenna during amplification to avoid getting burnt.

Troubleshooting

CAN'T TURN ON THE MPRFA

- Make sure that the power cord is properly plugged.
- Unplug the power cord from the outlet, wait five seconds or more, and then plug it again.
- Check fuses (2 x 4A 250V fuses).

MPRFA TURNS OFF UNEXPECTEDLY

- Please return the device to Microprossss. Use the online ticketing system to submit a ticket and establish a RMA.

MPRFA FANS STOP WORKING

- Please return the device to Microprossss. Use the online ticketing system to submit a ticket and establish a RMA.

NO SIGNAL FROM THE MPRFA FR OUTPUT

- Check your connections. If needed, exchange cables.
- Apply a signal to the RF INPUT on the amplifier, set a 50% gain. The power level output indicator should at least contain one > symbol.

MPRFA WARNS ME WITH THE "OVERHEAT" MESSAGE



Ensure that the amplifier doesn't operate in an overheated environment and that the exhaust fan works properly (Do not put anything in front of it).

- When an overheat warning occurs, the amplifier's internal controller :
  - Temporarily shut down The RF output.
  - Waits for the temperature to lower below the indicated value.
  - When done, apply the previous gain enabling the current test to go further.

MPRFA WARNS ME WITH THE "OVERCURRENT" MESSAGE

Power off the device

- When an overcurrent warning occurs, the amplifier's internal controller :
  - Shuts down immediately the RF output to protect the equipment.
  - Shows the overcurrent error.

- In case of brief overcurrent condition, the gain will automatically decrease until the RF output current is back to normal.

- Check the followings :
  - Is the RF output correctly plugged ? Check your connections. If needed, exchange cables, a cable may be in short circuit.
  - Is there any input/output overload ?
- You must correct the physical environment error before power on the MPRFA.

You must control the maximum allowed power versus the maximum input power show in the safe operation area table.

Safe operation area table

Input power on 50Ω	Input Vrms	Output power (50Ω @ Gain 100%)	(50Ω @ Gain 125%)	(50Ω @ Gain 160%)	(50Ω @ Gain 200%)
0.6W	5.5	50W			
0.5W	5		50W		
0.32W	4			50W	
0.18W	3				<50W
0.08W	2				<<50W
0.02W	1				<<50W

- If this problem persists, please submit a RMA ticket to return the device to Microprossss.

THE HARDWARE DEFECT INDICATOR IS ON

- **This is a hardware defect**. Please submit a RMA ticket to return the device to Microprossss.

THE INPUT OVERLOAD INDICATOR IS ON

- This warning appears when RF input > 6VRMS.
- Try to lower the input voltage to keep the best testing conditions.

THE OUTPUT OVERLOAD INDICATOR IS ON

- This warning appears when RF output > 60VRMS.
- Check your output connection to your RF equipment.



In case of output overload condition, the gain will automatically decrease until the RF output ≤ 64 VRMS.

SUPPORT AND MAINTENANCE AGREEMENT

Microprossupport

Don't hesitate to visit our interactive helpdesk at www.microprossupport.com/customer_area. You'll be able to:

- Get all the answers to your questions with the online helpdesk (*3 months of software support are free of charge from the delivery date*). Our engineers accompany you during your projects development to ease our tools integration.
- Download the latest software and resources available in the download center.
- Follow your current orders and RMAs

Maintenance agreement

To get benefit from a full technical support of your products, feel free to request a quotation atsales@microprossupport.com

SAFETY NOTES

The general safety information in this summary is for operating and servicing personnel. Specific warnings and caution can be found throughout the manual where they apply and may not appear in this summary.

TERMS AS MARKED ON THE EQUIPMENT

CAUTION indicates a hazard to property, including the equipment itself, and could cause minor personal injury.

WARNING indicates solely a personal injury hazard not immediately accessible as you read the marking

DANGER indicates a personal injury hazard immediately accessible as you read the marking.

SYMBOLS AS MARKED ON EQUIPMENT



DANGER – High voltage



Protective ground (earth) terminal



ATTENTION – REFER TO MANUAL

GROUNDING THE PRODUCT

This product is intended to operate from a power source that does not apply more than 250VRMS between the supply conductors or between supply conductor and ground.

WARNING: This product is grounded through the grounding conductor of the power cord. To avoid electrical shock, plug the power cord into a properly wired receptacle.
A protective-ground connection by way of the grounding conductor in the power cord is essential for safe operation.

DANGER ARISING FROM LOSS OF GROUND

Upon loss of the protective-ground connection, all accessible conductive parts can render an electric shock.

POWER DISCONNECT

The main power disconnect is by means of the power cord or, if provided, an AC power switch.

USE THE PROPER POWER SUPPLY (IF PROVIDED)

If your product requires an AC/DC adapter, use only the adapter specified for your product.

WARNING: The AC/DC adapter provided insures correct grounding of the product. To avoid electrical shock, your product must be grounded.

USE THE PROPER POWER CORD

Use only the power cord and connector specified for your product. Use only a power cord that is in good condition.

USE THE PROPER FUSE

To avoid fire hazard use only a fuse of the correct type, voltage rating and current rating. Disconnect power cord before any intervention.

USE THE PROPER VOLTAGE SETTING

Make sure the line selector is in the proper position for the power source being used.

REMOVE LOOSE OBJECTS.

During disassembly or installation procedures, screws or other small objects may fall to the bottom of the mainframe. To avoid shorting out the power supply, do not power up the instrument until such objects have been removed.

DO NOT OPERATE WITHOUT COVERS

To avoid personal injury, remove jewelry such as rings, watches and other metallic objects before removing the cover. Do not touch exposed connections and components within the product while the power cord is connected. Always remove the power cord before removing the cover.

REMOVE FROM OPERATION

If you have reason to believe that the instrument has suffered a component failure, do not operate the instrument until the cause of failure has been determined and corrected.

DO NOT OPERATE IN EXPLOSIVE ATMOSPHERE

To avoid explosion, do not operate this product in an explosive atmosphere unless it has been specifically certified for such operation.

KEEP AWAY FROM LIVE CIRCUITS

Operating personnel must not remove instrument covers. Components replacement and internal adjustments must be made by qualified maintenance personnel. Do not replace components with the power cable connected. Under certain conditions, dangerous voltages may exist even with the power cable removed. To avoid injuries, always disconnect power and discharge circuits before touching them.

DO NOT SERVICE OR ADJUST ALONE

Do not attempt internal service or adjustment unless another person, capable of rendering aid and resuscitation, is present.

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