

# User's Manual

## PMM TRF1

### BALANCED TO UNBALANCED TRANSFORMER

#### **SERIAL NUMBER OF THE INSTRUMENT**

You can find the Serial Number in a side of the box.

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 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](http://www.narda-sts.it).



Warning, danger of electric shock



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



Earth Protection



Earth



Unit Earth Connection



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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## **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.

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# 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 PMM TRF1 Balanced to Unbalanced Transformer

PMM TRF1 Balanced to unbalanced Transformer is defined in EN 55015 Normative about its circuit and principal characteristic.

The PMM TRF1 Balanced to unbalanced Transformer is used to obtain a symmetrical voltage from the radio-frequency generator in a system performing characteristics measurement of radio frequency disturbances in the range 150 kHz 1605 kHz of electric lighting equipment, as required in the EN 55015 Normative "LIMITS AND METHODS OF MEASUREMENT OF RADIO DISTURBANCE CHARACTERISTICS OF ELECTRICAL LIGHTING AND SIMILAR EQUIPMENT". It is especially designed for insertion loss measurement of luminaires connected to electrical supplies feeding residential load in the voltage range 100V/250V between phases or phase and earth, in a system using the PMM VNET 150 CISPR 150  $\Omega$  V Network.

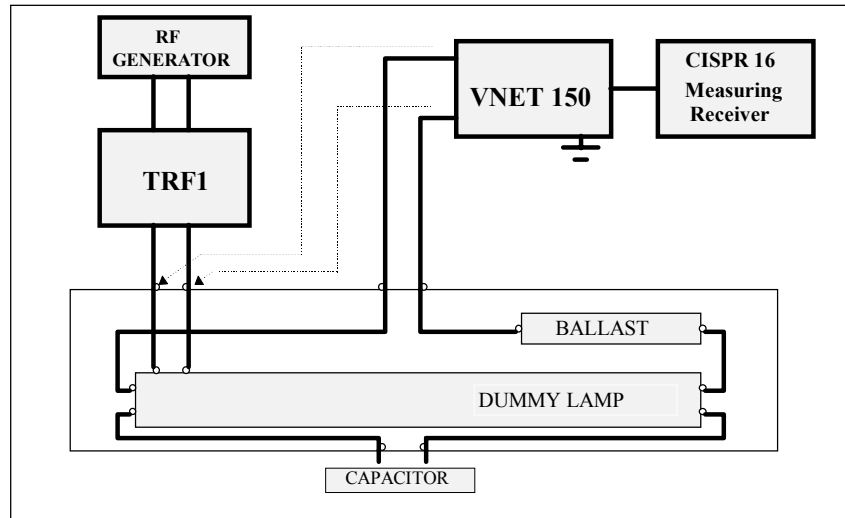
These luminaires are of following categories :

- linear fluorescent lamps
- circular fluorescent lamps
- U-type fluorescent lamps
- single -capped fluorescent lamps, without integrated starter
- single -capped fluorescent lamps, linear shaped, twin and quad tube, with integral starter

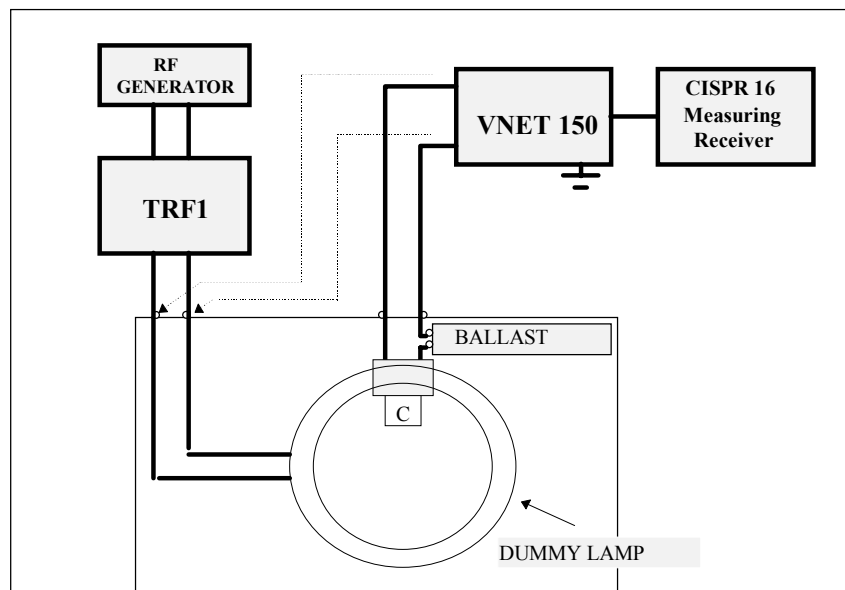
According to EN 55015 Normative the minimum values of insertion loss for the frequency range 150 kHz to 1605 kHz are indicated in the table below :

TABLE 1-1 Insertion loss values	
Frequency range (kHz)	Minimum insertion loss (dB)
150 to 160	28
160 to 1400	28 to 20*
1400 to 1605	20
* Decreasing linearly with the logarithm of frequency.	

The following figures show the measurement circuit as described in Fig. 1, 2, 3 of the EN 55015 Normative.

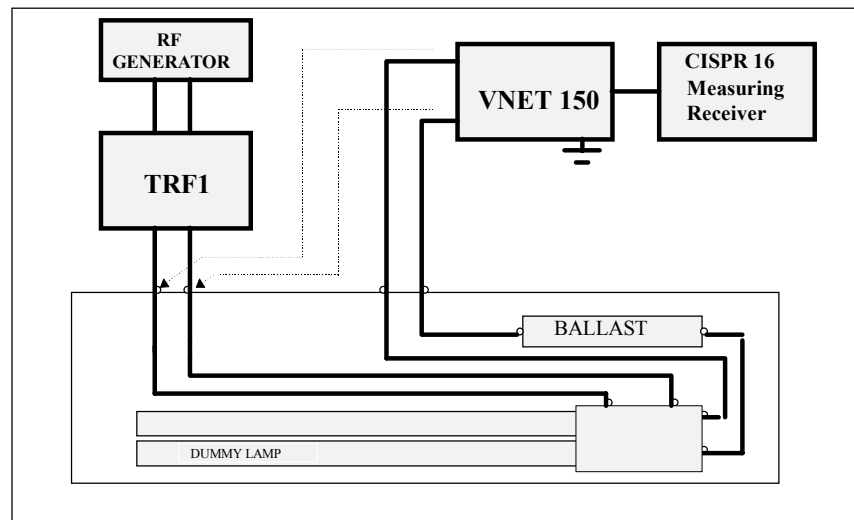


**Fig. 1-1** Insertion loss measurement on linear and U-type fluorescent lamp luminaires.



**Fig. 1-2** Insertion loss measurement on circular fluorescent lamp luminaires





**Fig. 1-3** Insertion loss measurement for single-capped fluorescent lamps with integrated starter

### 1.3 Shipping components

PMM TRF1 Balanced to unbalanced Transformer is composed by the following parts:

- PMM TRF1.
- Operating Manual.
- Calibration Chart
- Return for repair form

### 1.4 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

### 1.5 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.

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## 2 - Main specifications

### 2.1 Main specifications

Table 1-1 lists the TRF1 Balanced to unbalanced Transformer performance specifications.

The following conditions apply to all specifications :

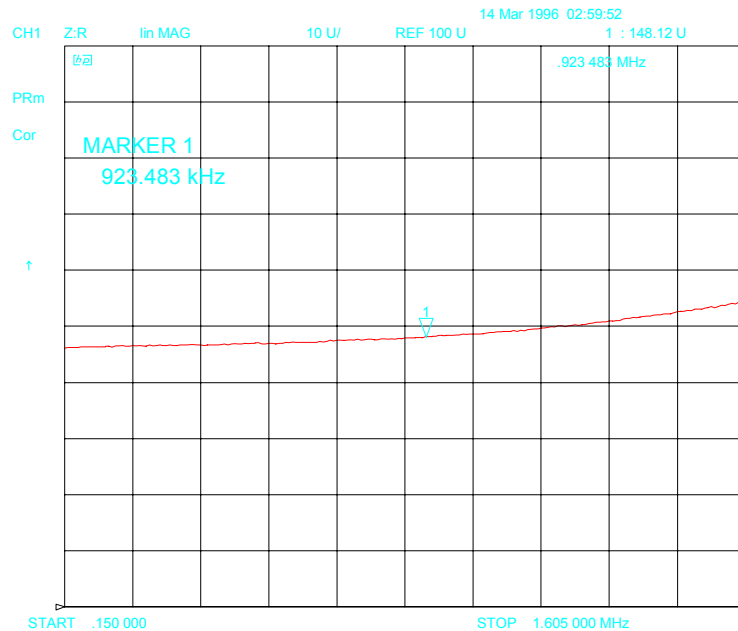
- The ambient temperature must be 0° to 45°.

TABLE 2-1 Main specifications	
Electrical characteristics	Performance Limits
Insertion loss:	< 0.5 dB in the range 150 kHz ÷ 1605 kHz
Input impedance:	50 Ohm
Output impedance	150 Ohm $\pm$ 10 %
Phase angle	< 10°
Frequency range :	150 kHz - 1605 kHz
RF output:	2 x grommet
Input	BNC female
Rated temperature:	0 to + 45 C
Storage temperature:	- 25 to + 70 C
Dimensions	104 mm x 104 mm x 104 mm
Weight	470 g.

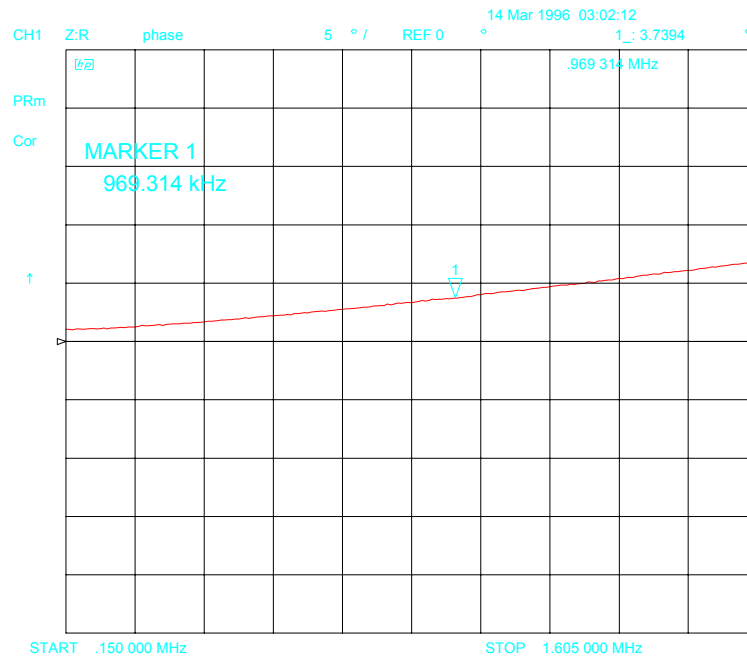
## 2.2 Electrical basic requirements 1

The following figures show the PMM TRF1 Balanced to unbalanced Transformer typical circuit characteristics.

The output impedance of PMM TRF1 Balanced to unbalanced Transformer, when the input is terminated by 50 Ohm, shall be  $150 \text{ Ohm} \pm 15 \text{ Ohm}$  with a phase angle not exceeding  $10^\circ$  on the frequency range 150 kHz - 1605 kHz



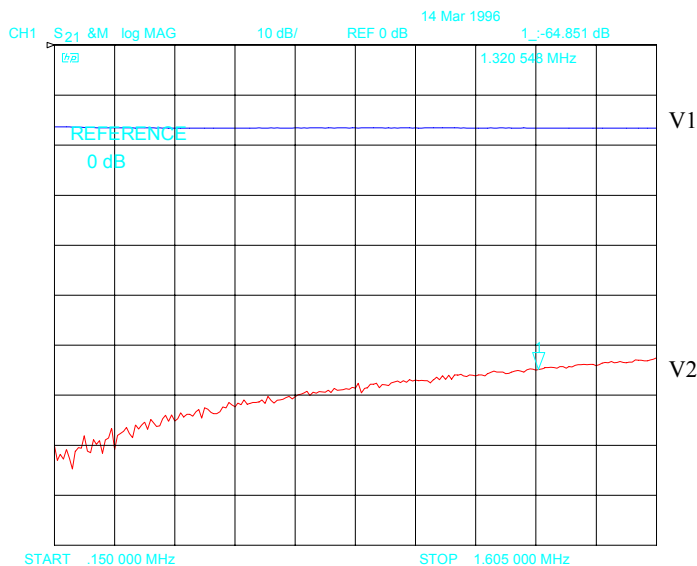
**Fig. 2-1** PMM TRF1 Balanced to unbalanced Transformer typical output impedance



**Fig. 2-2** PMM TRF1 Balanced to unbalanced Transformer typical impedance phase angle.

## 2.3 Electrical basic requirements 2

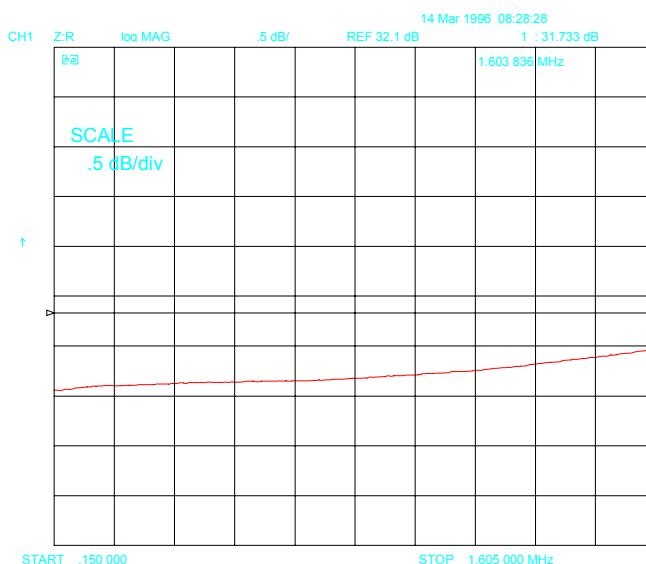
Using a high impedance voltmeter shunted with a 150 Ohm resistor, the voltages  $V_2$  and  $V_2'$  measured between each secondary terminal and the earth connection of the transformer, shall be at least 43 dB below the voltage  $V_1$  measured across the secondary terminals, with constant output level from R.F. generator in the frequency range 150 kHz - 1605 kHz.



**Fig. 2-3** PMM TRF1 Balanced to unbalanced Transformer typical  $V_1 - V_2$  ratio.

## 2.4 Electrical basic requirements 3

In the frequency range 150 kHz - 1605 kHz, the PMM TRF1 Balanced to unbalanced Transformer shall have a transfer characteristic which is flat within 0,5 dB.



**Fig. 2-4** PMM TRF1 Balanced to unbalanced Transformer typical transfer characteristic.

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## 3 - Preparation for use

### 3.1 Introduction

This section provides the information needed to install the PMM TRF1 Balanced to unbalanced Transformer .

Included is information pertinent to initial, 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 PMM TRF1 Balanced to unbalanced Transformer for damage before use.



#### WARNING

**To avoid hazardous electrical shock, do not use PMM TRF1 Balanced to unbalanced Transformer when there are signs of shipping damage to any portion of it.**

### 3.4 Preparation for use

The BNC input connector of the PMM TRF1 Balanced to unbalanced Transformer must be connected to the RF input socket of the EMI test receiver.



#### NOTE

Refer directly to EN 55015 Normative section 5, "Method of measurement of the insertion loss of luminaires", for test set up and insertion loss measurement.

**Before connecting PMM TRF1 Balanced to unbalanced Transformer to the associated test instruments, ensure that an uninterruptible safety earth ground is provided from the main power source to the system equipment.**



#### WARNING

**To avoid hazardous electrical shock, prior to energizing either unit in the system, verify that a common ground exists between them.**

**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.**

**Verify the safety earth ground functionality before operation.**

### 3.5 Equipment cleaning

Use a clean, dry non abrasive cloth for external cleaning of the PMM TRF1 Balanced to unbalanced Transformer .



#### 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.**

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Caro cliente

grazie per aver acquistato un prodotto NARDA! Sei in possesso di uno strumento che per molti anni ti garantirà un'alta qualità di servizio. NARDA riconosce l'importanza del Cliente come ragione di esistenza; ciascun commento e suggerimento, sottoposto all'attenzione della nostra organizzazione, è tenuto in grande considerazione. La nostra qualità è alla ricerca del miglioramento continuo. Se uno dei Suoi strumenti NARDA necessita di riparazione o calibrazione, può aiutarci a servirla più efficacemente compilando questa scheda e accludendola all'apparecchio.

Tuttavia, anche questo prodotto diventerà obsoleto. In questo caso, ti ricordiamo che lo smaltimento dell'apparecchiatura deve essere fatto in conformità con i regolamenti locali. Questo prodotto è conforme alle direttive WEEE dell'Unione Europea (2002/96/EC) ed appartiene alla categoria 9 (strumenti di controllo). Lo smaltimento, in un ambiente adeguato, può avvenire anche attraverso la restituzione del prodotto alla NARDA senza sostenere alcuna spesa. Può ottenere ulteriori informazioni contattando i venditori NARDA o visitando il nostro sito Web [www.narda-sts.it](http://www.narda-sts.it).

Dear Customer

thank you for purchasing a NARDA product! You now own a high-quality instrument that will give you many years of reliable service. NARDA recognizes the importance of the Customer as reason of existence; in this view, any comment and suggestion you would like to submit to the attention of our service organization is kept in great consideration. Moreover, we are continuously improving our quality, but we know this is a never ending process. We would be glad if our present efforts are pleasing you. Should one of your NARDA equipment need service you can help us serve you more effectively filling out this card and enclosing it with the product. 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](http://www.narda-sts.it).

☒ **Servizio richiesto:** ☒ *Service needed:*

☐ Solo taratura ☐ Riparazione ☐ Riparazione & Taratura ☐ Taratura SIT ☐ Altro:  
☐ Calibration only ☐ Repair ☐ Repair & Calibration ☐ Certified Calibration ☐ Other:

**Ditta:**

*Company:*

**Indirizzo:**

*Address:*

**Persona da contattare:**

*Technical contact person:*

**Telefono:**

*Phone n.*

**Modello:**

*Equipment model:*

**Numero di serie:**

*Serial n.*

☒ **Accessori ritornati con l'apparecchiatura:** ☐ **Nessuno** ☐ **Cavo(i)** ☐ **Cavo di alimentazione** ☐ **Altro:**  
☒ *Accessories returned with unit:* ☐ *None* ☐ *Cable(s)* ☐ *Power cable* ☐ *Other:*

☒ **Sintomi o problemi osservati:** ☒ *Observed symptoms / problems:*

☒ **Guasto:** ☐ **Fisso** ☐ **Intermittente** **Sensibile a:** ☐ **Freddo** ☐ **Caldo** ☐ **Vibrazioni** ☐ **Altro**  
☒ *Failure:* ☐ *Continuous* ☐ *Intermittent* *Sensitive to:* ☐ *Cold* ☐ *Heat* ☐ *Vibration* ☐ *Other*

**Descrizione del guasto/condizioni di funzionamento:**

*Failure symptoms/special control settings description:*

**Se l'unità è parte di un sistema descriverne la configurazione:**

*If unit is part of system please list other interconnected equipment and system set up:*

[illegible]