



**Variable Transformer**  
**MA 4804**  
**Instruction manual**  
*Version 3.0., Code no. 20 750 280*

Distributor:

Manufacturer:

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Mark on your equipment certifies that this equipment meets the requirements of the EC (European Community) regulations concerning safety and electromagnetic compatibility.

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# 1 Preface

Congratulations on your purchase of the instrument from METREL. The instrument was designed on basis of rich experience, acquired through many years of dealing with variable transformers.

The Variable transformer MA 4804 is intended for dedicated equipment and circuits that requires separating (insulating) from mains supply. In general the MA 4804 offers the following:


- ❑ Floating secondary circuit,
- ❑ Robust construction,
- ❑ Adjustable output AC voltage from 0 V to 245 V,
- ❑ Permanent load current is 3.1 A,
- ❑ Possible overloading for short period,
- ❑ 4 A output circuit protection,
- ❑ Measuring of output voltage and load rms current,
- ❑ Inrush current limiting to prevent automatic disconnection of supply voltage.

The MA 4804 is very useful equipment for all electrical laboratories, service shops and others who need to change the mains or other AC voltage levels.

## 2 Safety and operational considerations

### 2.1 Warnings and notes

In order to reach high level of operator's safety while carrying out various applications of MA 4804, as well as to keep the equipment undamaged, it is necessary to consider the following general warnings:

- The  symbol on the instrument means »Read the Instruction manual with special care for safe operation«. The symbol requires an action!
- If the MA 4804 is used in a manner not specified in this Instruction manual the protection provided by the equipment might be impaired!
- The MA 4804 is intended for indoor use only.
- Do not use the instrument and accessories if any damage is noticed!
- In case a fuse has blown follow the instructions in this manual to replace it!
- Consider all generally known precautions in order to avoid risk of electric shock while dealing with hazardous voltages!
- Service intervention and calibration procedure is allowed to be carried out only by a competent authorized person!
- All normal safety precautions have to be taken in order to avoid risk of electric shock when working on electrical installations!

## 2.2 Standards applied

The MA 4804 is manufactured and tested according to the following regulations as listed below.

### *Electromagnetic compatibility (EMC)*

EN 61326-1	Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 1: General requirements
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### *Safety (LVD)*

EN 61010-1	Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements
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EN 61558-1	Safety of power transformers, power supplies, reactors and similar products – Part 1: General requirements and tests
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EN 61558-2-1	Safety of power transformers, power supplies, reactors and similar products – Part 2-1: Particular requirements and tests for separating transformers and power supplies incorporating separating transformers for general applications
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EN 61558-2-14	Safety of transformers, reactors, power supply units and combination thereof – Part 2-14: Particular requirements and tests for variable transformers and power supply units incorporating variable transformers
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### **Note about EN and IEC standards:**

Text of this manual contains references to European standards. All standards of EN 6xxxx (e.g. EN 61010) series are equivalent to IEC standards with the same number (e.g. IEC 61010) and differ only in amended parts required by European harmonization procedure.

### 3 Instrument description

#### 3.1 Front panel

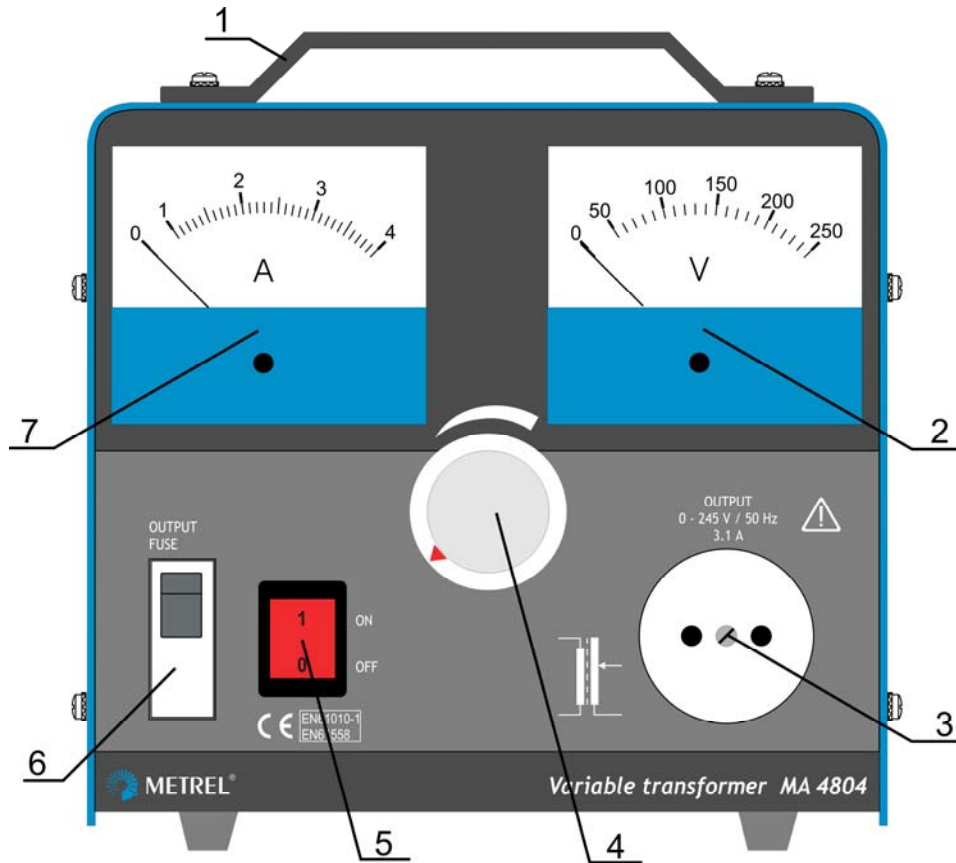


Figure 3.1: Front panel

Legend:

1	Handel	Intended for moving the MA 4804 by hand.
2	V-meter	Indicates output voltage.
3	Output socket	Prepared for connection of floating load.
4	Dial	Knob for manual regulation of output voltage.
5	I/O switch	Main switch for turning power on/off.
6	Automatic fuse	Protects output circuit.
7	A-meter	Indicates rms value of load current.

## 3.2 Back panel

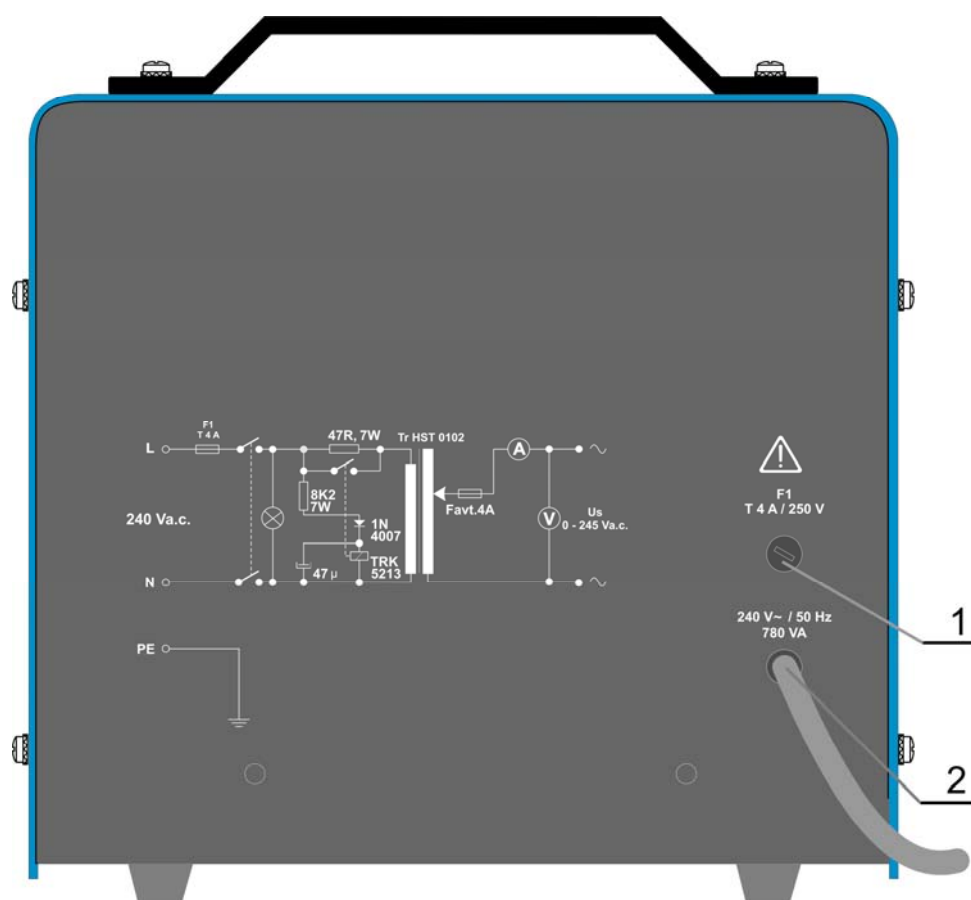


Figure 3.2: Back panel

Legend:

1	Fuse F1	T 4 A / 250 V (Breaking capacity: >150 A)
2	Cord entry	For power supply entry

## 3.3 Instrument set

- ❑ Instrument – variable transformer MA 4804
- ❑ Instruction manual



## 4 Instrument operation

### 4.1 Working with MA 4804

The MA 4804 is class I equipment. It means that all accessible conductive parts (case) are connected to PE. For safety working the following shall apply:

 **Warnings:**

- ❑ **Use wall socket with proper earthing on PE terminal!**
- ❑ **Never disconnect PE wiring nor cut it, it is hazardous live!**
- ❑ **Secondary circuit is floating, it is separated from mains input and separated from PE. Keep secondary circuit floating or connect to PE only if necessary!**

### 4.2 Application of MA 4804

General application procedure for MA 4804 is as follows:

- ❑ Before connection to mains supply keep I/O switch in O (OFF) position, switch off automatic fuse and rotate dial knob c.c.w. to limit position (0 V position).
- ❑ Connect MA 4804 into proper wall socket (see 4.1).
- ❑ Connect the circuit supplied from MA 4804 into output socket.\*\*
- ❑ Turn mains switch to I (ON), turn on output fuse and adjust output voltage.

\*\* If the circuit requires limited voltage range then the last two steps are modified as follows:

- ❑ Turn mains switch to I (ON), turn on output fuse and adjust output voltage into required voltage range.
- ❑ Turn off output fuse.
- ❑ Connect the circuit supplied from MA 4804 into output socket.
- ❑ Turn on output fuse.

**Application examples**

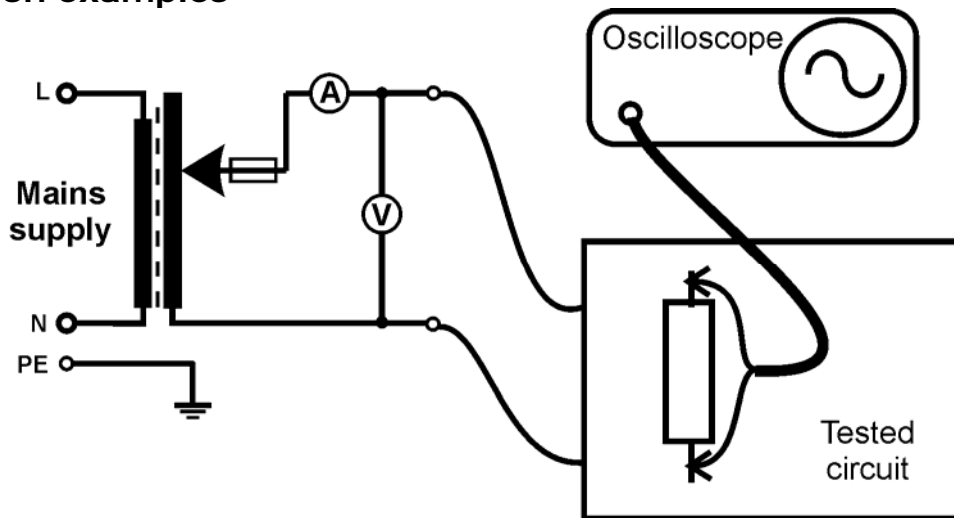


Figure 4.1: Observing in circuit

**Note:**

- Pay attention that the observed circuit is completely floating in other case the short circuit will arise through oscilloscope grounding.

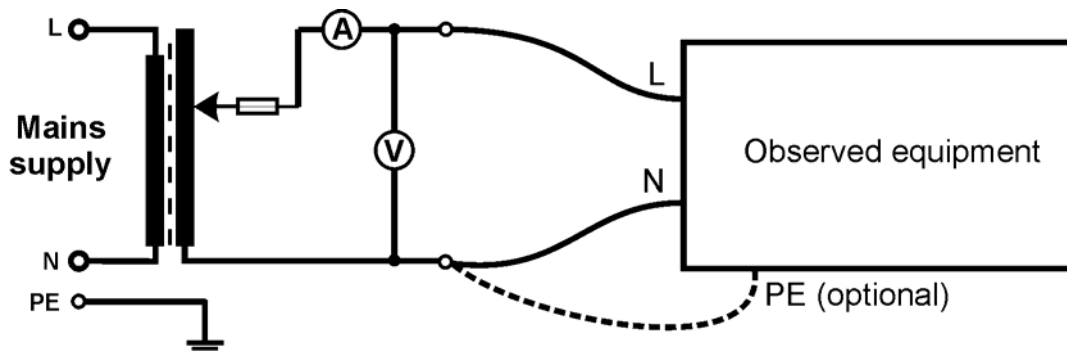


Figure 4.2: Testing to supply voltage variations or supplying the equipment with other rated AC power supply voltage

**Notes:**

- PE shall be connected as shown if observed equipment requires TN/TT supply voltage condition.
- The PE of observed equipment might be connected to the PE of supply system for special purpose only, e.g. as functional earth or additional guarding to minimize EMI problems.
- To prevent unintentional working conditions or even damage of the observed equipment, set the output voltage into rated supply voltage range of observed equipment and then connect the equipment to MA 4804 output.

## 5 Maintenance

Unauthorized person is not allowed to open the MA 4804. There are no user serviceable components inside the instrument.

In the event of noticing any visible damage, if the instrument does not function properly, if it has been stored for a long period of time under unfavourable conditions, or has been exposed to strong blows during transportation, refrain from operating it immediately.

### 5.1 Replacing fuse

There is a fuse on the backside of the MA 4804.

- F1  
T 4 A / 250 V, 20×5 mm, (IEC 60127), Breaking capacity: >150 A

#### Warnings:

- **Disconnect power cord from main supply before replacing the fuse!**
- **Replace blown fuse with original type only, otherwise the instrument may be damaged and/or operator's safety impaired!**

Position of fuses can be seen in *Figure 3.4* in chapter *3.3 Back panel*.

### 5.2 Cleaning

No special maintenance is required for the housing. To clean the surface of the instrument use a soft cloth slightly moistened with soapy water or alcohol. Then leave the instrument to dry totally before use.

- Do not use liquids based on petrol or hydrocarbons!
- Do not spill cleaning liquid over the instrument!

### 5.3 Periodic calibration

It is essential that the test instrument is regularly calibrated in order the technical specification of built in instrument is guaranteed. We recommend an annual calibration. Only an authorized technical person can do the calibration. Please contact your dealer for further information.

### 5.4 Service

For repairs under warranty, or at any other time, please contact your distributor.

## 6 Technical specifications

Rated mains supply voltage ..... 230 V  
 Rated supply frequency ..... 50 Hz  
 Maximum output voltage ..... 245 V (no load)  
 Continuous output current ..... 3.1 A  
 Idle run current consumption .... 70 mA  
 Automatic output fuse ..... 4 A (type C), (IEC 60898)  
 Mains fuse ..... T 4 A, 250 V, 5 mm x 20 mm, (IEC 60127),  
 breaking capacity: >150 A  
 Loading characteristics ..... see graph below

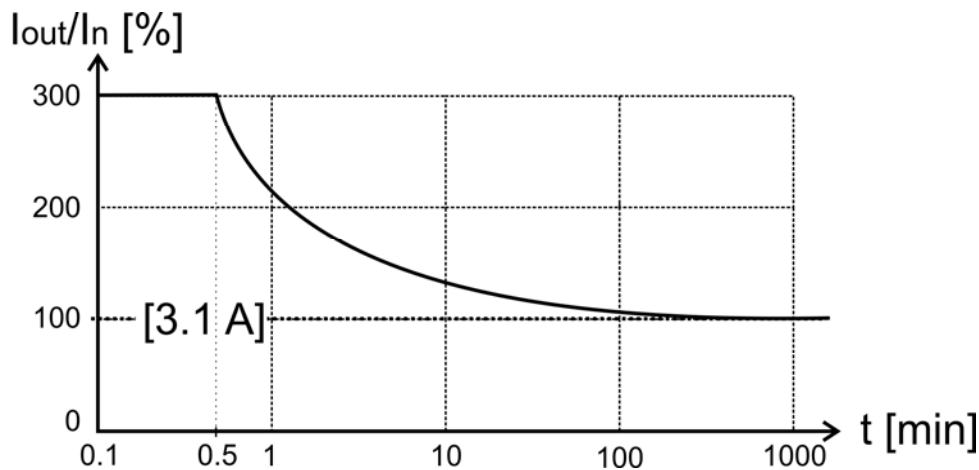


Figure 6.1: Loading characteristic of MA 4804

Input overvoltage category ..... 300 V CAT II  
 Protection class ..... I  
 Transformer type ..... separating  
 Pollution degree ..... 2  
 Protection degree ..... IP30

Dimensions (w × h × d) ..... 228 mm x 216 mm x 210 mm  
 Weight ..... approx. 11 kg

### Reference conditions

Reference temperature range .... 10 °C ÷ 30 °C  
 Reference humidity range ..... 40 %RH ÷ 70 %RH

### Operation conditions

Working temperature range ..... 5 °C ÷ 40 °C  
 Maximum relative humidity ..... 95 %RH (0 °C ÷ 40 °C), non-condensing

### Storage conditions

Temperature range ..... -10 °C ÷ +70 °C  
 Maximum relative humidity ..... 90 %RH (-10 °C ÷ +40 °C)  
 80 %RH (40 °C ÷ 60 °C)