# INSULATION GUARD

# MEG-1000

**(Code 2 28 981)**

# INSTRUCTION MANUAL

**( M 981 220 / 99A )**

# ***Insulation guard MEG-1000***

## 1.- BASIC INSTRUCTIONS

### 1.1.- Delivery spot check

This manual is issued to help all the MEG-1000 users to install and use it in order to get the best from it. After receiving the unit please check the following points:

(a) Does this device corresponds to your order specifications?
(b) Check if any damage was done during the shipment process.
(c) Verify that it includes one instruction manual.

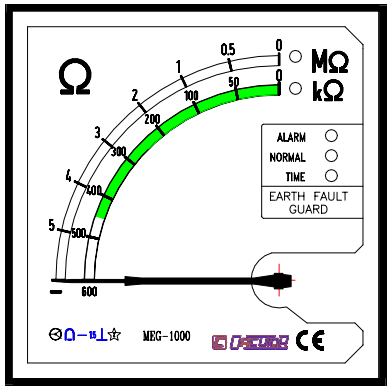
### 1.2.- Connection procedures 

For the safe use of MEG-1000 is basic that people who install or handle it follow the normal safety considerations and the diverse advises related in this manual.

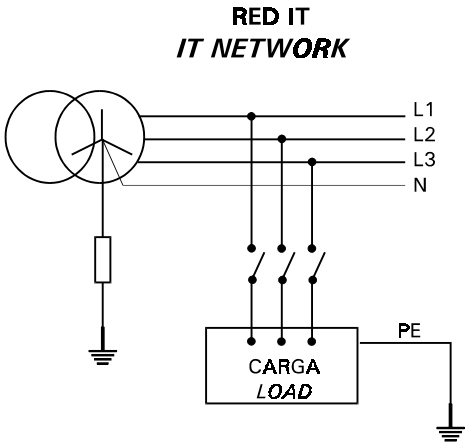
Before connecting verify:

a. The power supply of the instrument (as default, **230 Va.c. ± 20 %)** corresponds to the rated voltage of the mains where you have to power it.
b. The voltage between phase and ground (points between which the insulating level will be measured) have to be in normal conditions lower or equal than **600 Va.c**.
c. Due to its operation mode, the device can only be used in A.C. networks.

## 2.- MAIN CHARACTERISTICS




MEG-1000 is an electronic device that measures the insulating resistance between the ground and one phase of an insulated neutral network (IT).




The insulating resistance value shows on a double scale galvanometer, which the equipment selects automatically depending on the value.

Two output relays with temporisation adjustment are available: high resistance relay (**NORMAL**) and low resistance relay (**ALARM**). The trip value and the delay can be adjusted on each relay. The adjustment is done by means of three rear push buttons (**MODE**, ↑, ↓). All adjustments are memorised even if the equipment is not powered on.

The equipment has five led in the front plate, that indicate the measuring scale and the output relays status in the operation mode; and the adjusted parameter in the set-up mode.

Before operating the instrument read the **INSTALLATION** and **ADJUST** chapters and choose the properly operation mode.

## 3.- INSTALLATION AND START-UP

The manual you hold in your hands contains information and warnings that the user should respect in order to guarantee a proper operation of all the instrument functions and keep its safety conditions.

The instrument must not be powered on and used until its definitive assembly on the cabinet's door.

**If the instrument is not used as manufacturer's specifications, the protection of the instrument can be damaged.**

When any protection failure is suspected to exist (for example, it presents external visible damages), the instrument must be immediately powered off. In this case contact a qualified service representative.

### 3.1.- INSTALLATION

Before applying AC power to the instrument, check the following points:

a.- **Auxiliary voltage supply**: 230 Va.c. ± 20 %
- *Connection terminals: A1-A2.*
- *Instrument consumption: 2.8 VA.*

b.- **Measuring network structure:** A.C. insulated or impedant neutral network (IT) with phase-ground voltage ≤ 600 Va.c.

c.- **Maximum permanent voltage between the measuring connection terminals (E-R)**: 1000 Va.c.*
- *Connection terminals: E-R.*

** This value allows the instrument to be protected from a phase fall on ground.*

d.- Operation conditions:
- Working temperature: -20 to +50 ºC.
- Protection degree: Front plate: IP 52 / Connection terminals: IP 20.
- Indoor use.

e.- Safety: Designed to meet protection class I as per EN 61010.

Mounting: 

The instrument is to be mounted on a panel. All connections keep inside the cabinet.

Note that with the instrument powered on, the terminals could be dangerous to touching and cover opening actions or elements removal may allow accessing dangerous parts. Therefore, the instrument must not be used until this is completely installed.

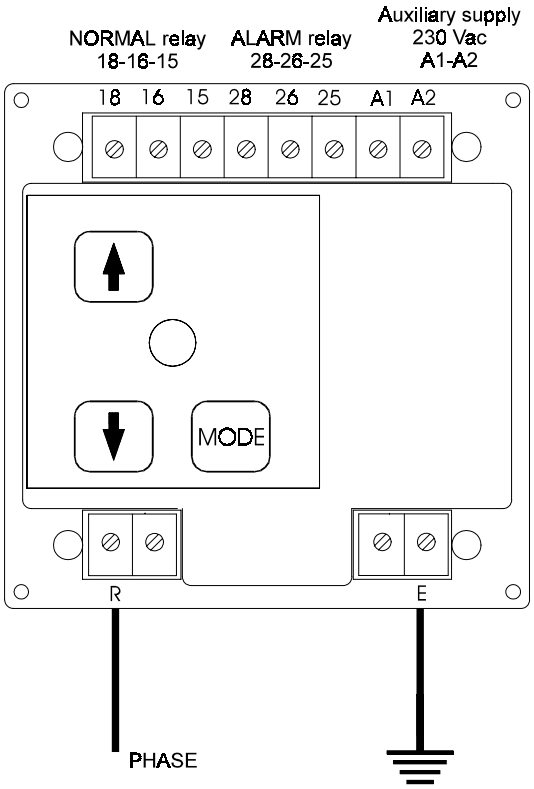
The instrument must be connected to a power supply circuit protected with gl type (IEC 269 ) or M type fuses rated between 0.5 and 2 A. This circuit should be provided with an automatic switch or any equivalent element to disconnect the instrument from the power supply network. The supply and measuring voltage circuits will be both connected through a wire with a minimum cross-section of 1 $mm^2$.

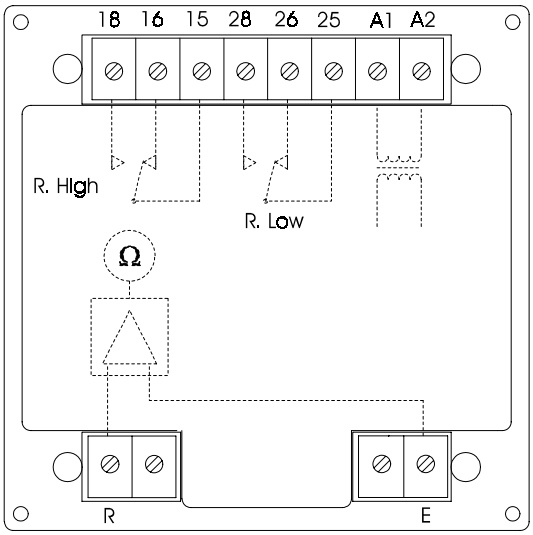
### 3.2.- MEG-1000 CONNECTION

#### 3.2.1.- Connection terminals

| *Name* | *Concept* |
|---|---|
| **A1 - A2** | Auxiliary supply of the device (230 Va.c. ± 20 %) |
| **E – R** | Measuring of the insulation between a phase (R) and earth (E) |
| **15 - 18 - 16** | NORMAL relay with switchover contacts (free of voltage).<br>15-18: NO contact. 15-16: NC contact. |
| **25 - 28 - 26** | ALARM relay with switchover contacts (free of voltage).<br>25-28: NO contact. 25-26: NC contact. |

### 3.2.2- Wiring diagram



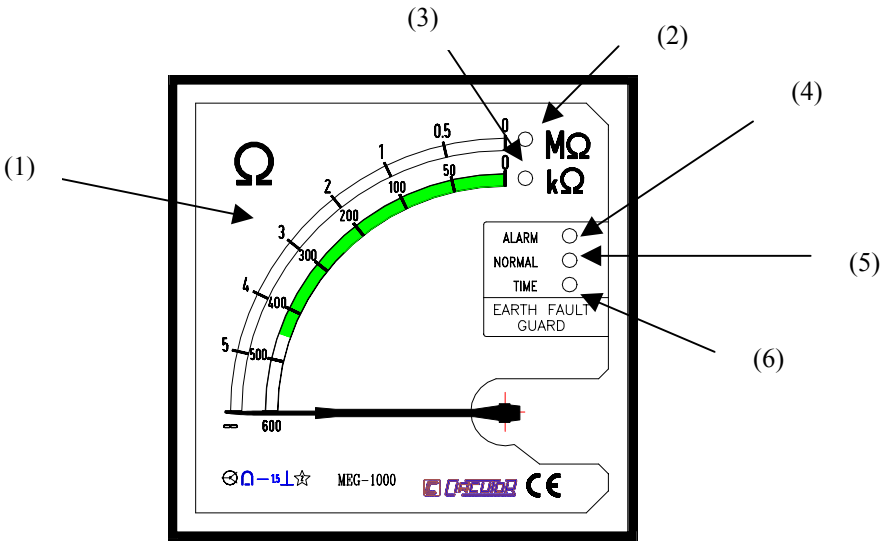



## 4.- OPERATION MODE

The user is informed about all the parameters by means of:

- Double scale galvanometer, that shows the value of the insulating resistance (1).

- 5 front plate leds:
  - **MΩ** (2) and **kΩ** (3) leds indicate the measuring scale.
  - **ALARM** (4) and **NORMAL** (5) leds indicate if the resistance is lower or higher than the adjusted trip values.
  - **ALARM** (4), **NORMAL** (5) and **TIME** (6) leds indicate the adjusted parameter, when you are in adjusting mode.



The operation mode of the insulating guard is the following:

1. The device applies 24 Vd.c. voltage between the phase (R connection terminal) and the ground (E connection terminal) and measures the current.
2. The insulating resistance value, that is showed in the front plate galvanometer (1), is obtained from the voltage and current values.

The instrument changes automatically the measuring scale, depending on the value of the resistance. (2) and (3) yellow leds indicate whether the value is referred to the MΩ scale or to the kΩ scale.

### 4.1.- OUTPUT RELAYS. OPERATION AND INDICATORS

Two output relays are available: ALARM relay and NORMAL relay. The trip value and the delay time can be adjusted in each relay.

- **NORMAL relay**

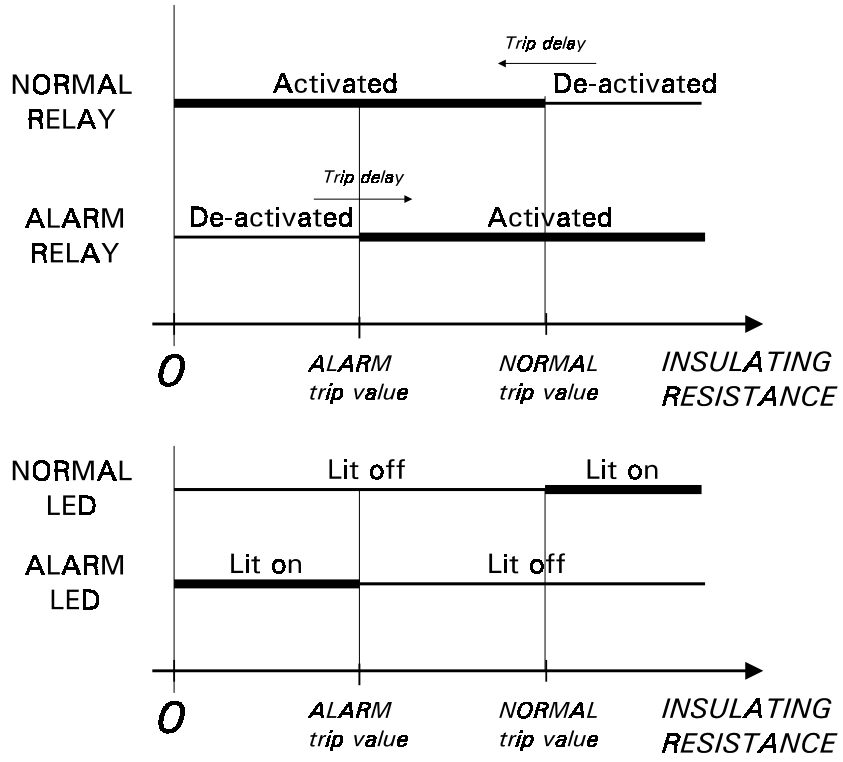
  While the insulating resistance is higher than the adjusted trip value the NORMAL relay keeps de-activated. If the resistance being measured is lower than the adjusted trip value the relay is activated after a set time.

  Delay only takes place in relay activation; thus, when the resistance goes beyond the relay trip value the relay is instantaneously de-activated.

  NORMAL (5) green led lit on means that the insulating resistance is higher than the NORMAL trip value.

- **ALARM relay**
  While the insulating resistance is lower than the adjusted trip value the ALARM relay keeps de-activated. If the resistance being measured is higher than the adjusted trip value the relay is activated after a set time.
  Delay only takes place in relay activation; thus, when the resistance lowers under the relay trip value the relay is instantaneously de-activated.
  ALARM (4) red led lit on means that the insulating resistance is lower than the ALARM trip value.

In a chart:



## 4.2.- EQUIPMENT ADJUSTMENT

The equipment has three rear push buttons in order to adjust the ALARM and NORMAL values and their corresponding temporisation:

- **MODE** push button
  **MODE** push button gives access to different adjustments and allows to pass from one adjustment to the other.
- Upward ↑ and downward ↓ push buttons
  These two buttons adjust the selected value through the indication needle on the scale.

In the adjustment mode the equipment has a safety temporisation. After 10 seconds without pressing one of the push buttons, the equipment automatically goes back to working mode, only updating the values entered pressing **MODE** (see adjustment sequence in page 12).

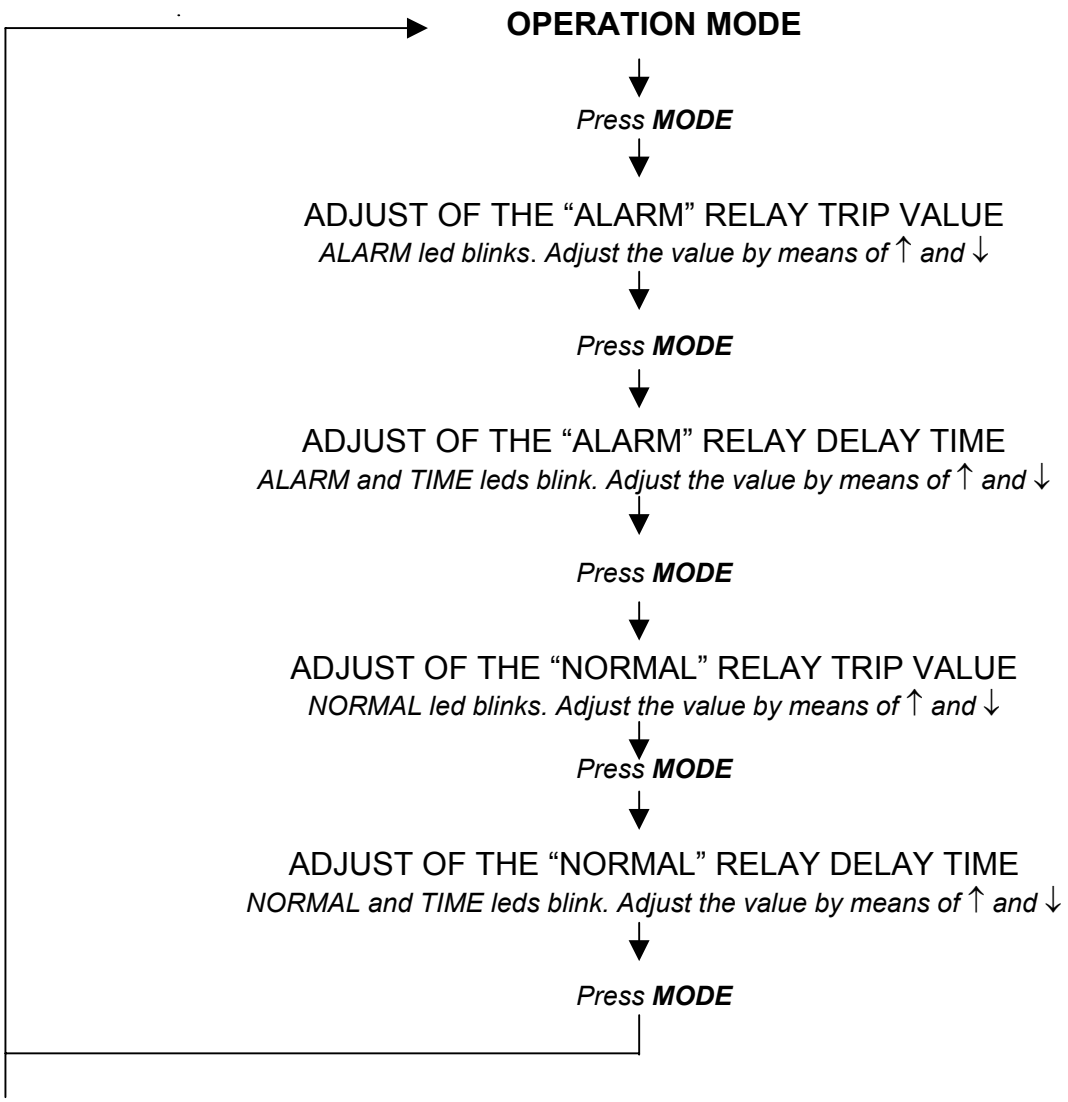
The pointer and the scale leds (kΩ (2) and MΩ (3)) show the trip value when it is being adjusted. Any value within the measuring range can be adjusted. For a properly operation of the instrument, the NORMAL relay trip value should be higher than the ALARM relay trip value.

The pointer and the scale leds (kΩ (2) and MΩ (3)) show the delay time when it is being adjusted:

- ALARM relay temporisation. Each 100 kΩ means a trip delay of 1 second. The active measuring scale is the kΩ scale. The adjusting range is within 0.1 and 3 s.

- NORMAL relay temporisation. If the active measuring scale is the kΩ scale, each 100 kΩ means a trip delay of 1 second. If the active measuring scale is MΩ, each 1 MΩ means a trip delay of 10 seconds. The adjusting range is within 0.1 and 30 s.

Adjustment push buttons give access to different adjustments according to the following sequence:




- **Quick adjustment mode**

Besides of the explained adjusting mode, the instrument has a “quick adjustment” where the next default values are loaded:

| | |
|---|---|
| ALARM relay trip value ..... | 440 kΩ |
| ALARM relay delay time ..... | 0.5 s |
| NORMAL relay trip value ..... | 3 MΩ |
| NORMAL relay delay time ..... | 3 s |

In order to load these values all three push buttons (**MODE**, ↑ and ↓) must be pressed at the same time for a minimum of 2 seconds; during that time all led blink simultaneously. When the leds are off the equipment returns to working mode.

***NOTICE:*** *When pressing the three push buttons do not press **MODE** button first, otherwise the equipment will go to adjustment mode.*

## 5.- TECHNICAL CHARACTERISTICS

**Auxiliary supply**

Voltage: 230 V ± 20% 50...60 Hz.
Consumption: 2.8 VA.

**Measuring circuit**

Measuring range: within 0 and 500 kΩ, in kΩ measuring scale.
within 0.5 and 5 MΩ, in MΩ measuring scale.

Accuracy:1.5 class
Maximum permanent voltage between E and R connection terminals: 1000 Va.c.
Voltage applied by the equipment between E and R connection terminals in order to measure the insulating resistance: 24 Vd.c.

**Output relays**
Relays: ALARM (15-16-18) and NORMAL (25-26-28).
Type: mechanical, 3 terminals, free of voltage.
Use: AC11 250 V/8 A
Isolation between contacts: 1000 Va.c.
between coil and contacts: 4000 Va.c.

**Relays temporisation adjustment**
ALARM relay: from 0.1 to 3 s.
NORMAL relay: from 0.1 to 30 s.
Accuracy: ± 10 %.

**Isolation**
Between any connection terminal and the case: 2.5 kV 50 Hz for 1 min.
Insulating resistance between the inputs, the outputs and the power supply: 1 GΩ.
Insulating resistance between any connection terminal and the case: 1 GΩ.

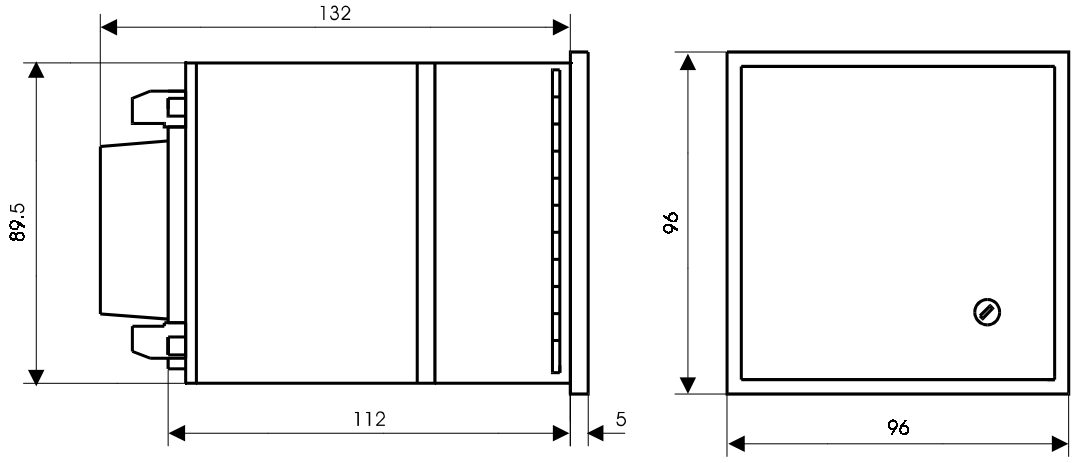
**Working conditions**
Working temperature: -20 / +50ºC.
Use: indoor.

**Constructive characteristics**
Case material: ABS self-extinguishing (as per UL 94 V1) and high resistance against impacts.
Protection degree: Case: IP 52 / Terminals: IP 20
Screwed transparent cover for the adjustment push buttons.

**Safety**
Category I , EN-61010.

**Standards**
IEC 255-5, IEC 1010-1, EN 61010-1, IEC 801-2, IEC 801-3, IEC 801-4.

Dimensions:




Panel hole: 92 $mm^{+0.8}$ x 92 $mm^{+0.8}$

## 7.- SAFETY CONSIDERATIONS

All installation specification described at the previous chapters named INSTALLATION AND STARTUP and SPECIFICATIONS.

Note that with the instrument powered on, the terminals could be dangerous to touching and cover opening actions or elements removal may allow accessing dangerous parts. This instrument is factory-shipped at proper operation condition.

## 8.- MAINTENANCE

The MEG-1000 does not require any special maintenance. No adjustment, maintenance or repairing action should be done over the instrument open and powered and, should those actions are essential, high-qualified operators must perform them.

Before any adjustment, replacement, maintenance or repairing operation is carried out, the instrument must be disconnected from any power supply source.

When any protection failure is suspected to exist, the instrument must be immediately put out of service. The instrument's design allow a quick replacement in case of any failure.

## 9.- TECHNICAL SERVICE

For any inquiry about the instrument performance or whether any failure happens, contact to CIRCUTOR's technical service.

*CIRCUTOR S.A. – Aftersales Service*
*c / Lepanto , 49*
*08223 - TERRASSA (Barcelona) - SPAIN*
*Telf. 34 - 93 - 745 29 00*
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