SMARTEC

Insulation / Continuity

MI 3121

Instruction manual

Version 1.0, Code no. 20 751 283

METREL®

Distributor:

Manufacturer:

METREL d.d.
Ljubljanska cesta 77
1354 Horjul
Slovenia
web site: http://www.metrel.si
e-mail: metrel@metrel.si

CE Mark on your equipment certifies that this equipment meets the requirements of the EU (European Union) concerning safety and electromagnetic compatibility regulations

1. Safety and operational considerations

1.1. Warnings

- This document is a supplement to the Instruction manual!
- ⚠ Warning on the instrument means »Read the Instruction manual with special care to safety operation«. The symbol requires an action!
- If the test equipment is used in a manner that is not specified in this user manual, the protection provided by the equipment might be impaired!
- Read this user manual carefully, otherwise use of the instrument may be dangerous for the operator, for the instrument or for the equipment under test!
- 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 or adjustment and calibration procedure is allowed to be carried out only by a competent authorized person!
- Use only standard or optional test accessories supplied by your distributor!
- Consider that older and some of new optional test accessories compatible with this instrument meet overvoltage category CAT III / 300 V! It means that maximum allowed voltage between test terminals and ground is 300 V!
- Instrument contains rechargeable NiCd or NiMh battery cells. The cells should only be replaced with the same type as defined on the battery placement label or in this manual. Do not use standard alkaline battery cells while power supply adapter is connected, otherwise they may explode!
- Hazardous voltages exist inside the instrument. Disconnect all test leads, remove the power supply cable and switch off the instrument before removing battery compartment cover.
- All normal safety precautions have to be taken in order to avoid risk of electric shock when working on electrical installations!
- Do not touch the test object during the measurement or before it is fully discharged! Risk of electric shock!
- Automatic discharge of capacitive object will take some time after the finished insulation resistance measurement. Actual voltage is displayed during discharging until it drops below 10 V. In no case the test leads should be disconnected until tested object is completely discharged!

1.2. Battery handling

- ⚠ **Before opening battery / fuse compartment cover, disconnect all accessories connected to the instrument and switch off the instrument.**
- Insert cells correctly, otherwise the instrument will not operate and the battery could be damaged.
- Remove all battery cells from the battery compartment if the instrument is not used for a long period of time.
- Alkaline or rechargeable Ni-Cd or Ni-MH batteries (size AA) can be used. The operating hours are given for cells with normal capacity of 2100 mAh.
- Do not charge alkaline battery cells!

The battery is charged whenever the power supply adapter is connected to the instrument. In-built protection circuits control the charging procedure and assure maximal battery lifetime. Power supply socket polarity is shown in figure below.

Power supply socket polarity

Note:
Use only power supply adapter delivered from the manufacturer or distributor of the test equipment to avoid possible fire or electric shock!

1.3. Communication

There are two communication interfaces available on the instrument: USB or RS 232.

How to transfer stored data:

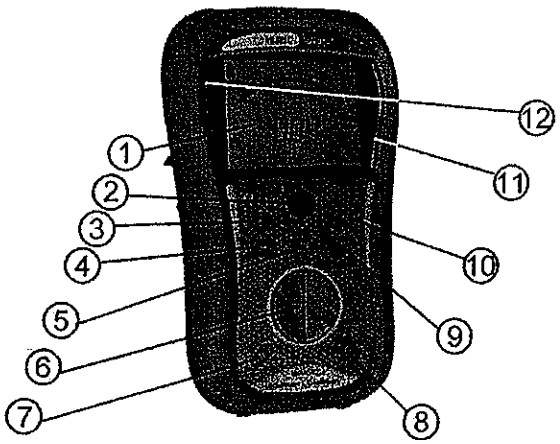
- Select appropriate communication interface (USB / RS 232) and connect the instrument and PC.
- Switch on the PC and the instrument.
- Run the Eurolink program.
- The PC and the instrument will automatically recognize each other.
- The instrument is prepared to download data to the PC.

Note:

- USB drivers should be installed on PC before using the USB interface. Refer to USB installation instructions available on installation CD.

Communication transfer speed:
RS 232 ..... 115200 baud
USB ..... 256000 baud

2. Instrument front panel



Legend:

1 ..... Custom display with backlight.
2 ..... TEST, starts a measurement.
3 ..... UP, modifies selected parameter.
4 ..... DOWN, modifies selected parameter.
5 ..... MEM, store / recall / clear tests in memory of instrument.
6 ..... Function selectors, select test function.
7 ..... Changes backlight level.
8 ..... Switches the instrument power on or off.
9 ..... CAL, compensates test leads resistance in RLOW and CONT functions.
10 ... TAB, selects the parameters in selected function.
11 ... PASS, indicates acceptance of result.
12 ... FAIL,

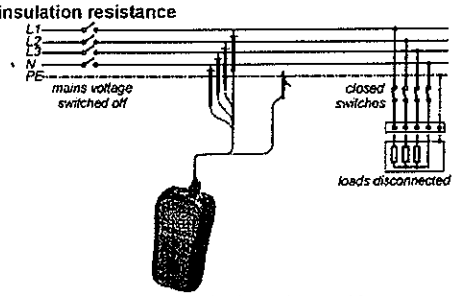
3. Measurements

3.1. Insulation resistance

① **Set function**
- Select the **INS** function.

② **Set parameters and limits**
U_{iso}.....Test voltage.
Limit .....Minimum insulation resistance.

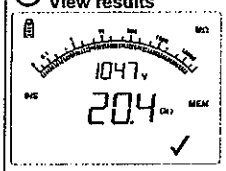
③ **Test circuits for insulation resistance**



Connection of universal test cable

④ **Insulation resistance measuring procedure**
- **Disconnect** tested installation from mains supply (and discharge tested insulation).
- **Connect** test cable to the instrument and to the item to be tested.
- Press the **TEST** key to perform the measurement (double click for continuous measurement and later press to stop the measurement).
- After the measurement is finished **store** the result (optional).

⑤ **View results**



Displayed results:

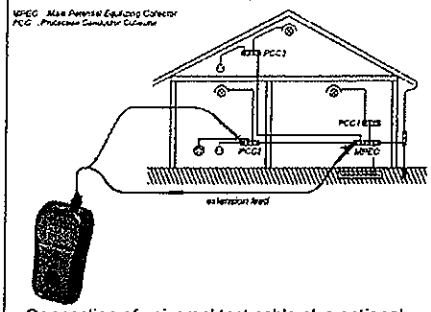
Insulation resistance - value.
Insulation resistance – analog presentation.
Test voltage – actual value.

3.2. Resistance to earth connection and equipotential bonding

① **Set function**
- Select the RLOW or CONT function.

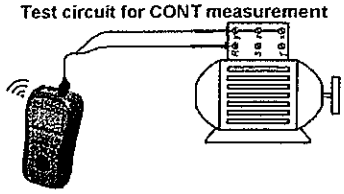
② **Set parameters and limits**
Limit .....Maximum resistance.

③ **Test circuit for RLOW measurement**



Connection of universal test cable plus optional extension lead

Test circuit for CONT measurement



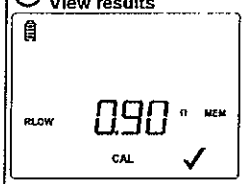
Universal test cable application

④ **Measurement procedure**

- **Connect** test cable to the top of the instrument.
- **Compensate** test leads resistance (if necessary).
- **Disconnect** tested installation from mains supply (recommended).
- **Connect** the test leads to the appropriate PE wiring.
- Press the **TEST** key to perform the measurement.
- After the measurement is finished **store** the result (optional).

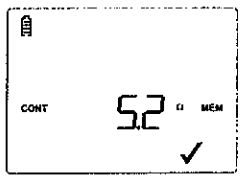
- **Connect** test cable to the top of the instrument.
- **Compensate** test leads resistance (if necessary).
- **Disconnect** from mains supply and discharge the object to be tested.
- **Connect** test leads to the tested object.
- Press the **TEST** key to start continuous measurement.
- Press the **TEST** key to stop measurement.
- After the measurement is finished **store** the result (optional).

⑤ **View results**



Displayed result:

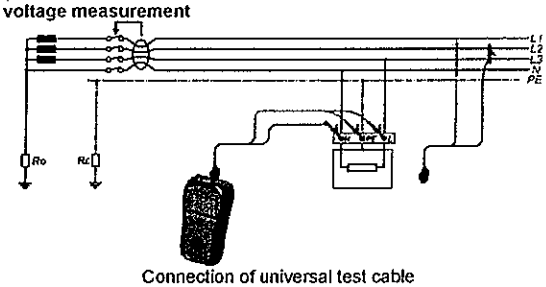
Resistance



3.3. Voltage and frequency

① **Set function**
- Select the VOLT function.

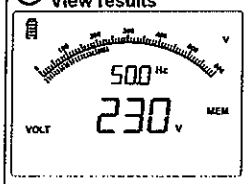
② **Circuits for voltage measurement**



Connection of universal test cable

③ **Measurement procedure**
- Connect test cable to the instrument.
- Connect test leads to the tested object.
- Store current measurement result (optional).

④ **View results**



Displayed results:

Voltage between test terminals – value,
Voltage between test terminals – analog presentation,
Frequency.

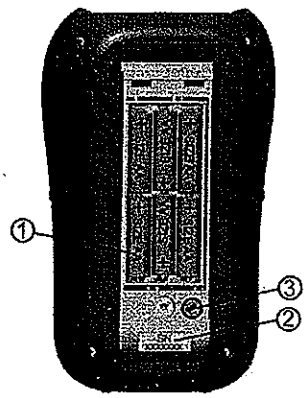
4. Maintenance

4.1. Replacing fuses

- F1
  M 0.315 A / 250 V, 20x5 mm
  This fuse protects internal circuitry for continuity functions if test probes are connected to the mains supply voltage by mistake during measurement.

Warnings:

- ⚠ Disconnect all measuring accessory and switch off the instrument before opening battery / fuse compartment cover, hazardous voltage inside!
- Replace blown fuse with original type only, otherwise the instrument may be damaged and/or operator's safety impaired!



Battery and fuse compartment

Legend:

1 .....Battery cells (alkaline or NiMH, size AA).
2 .....Serial number label.
3 .....Fuse F1.