



**Instaltest 61557**  
**MI 2087**  
**Instruction Manual**  
*Version 3, Code No. 20 750 702*

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

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# 1. Introduction

Congratulations on your purchase of the **Instaltest 61557** test instrument and its accessories, produced by METREL d.d. We are glad, to be able to offer high professional test equipment, for carrying out absolute inspection of electric installations in buildings. The equipment was designed and produced on basis of rich experiences, acquired through more-years long period of dealing with electric installation test equipment.

## 1.1. General description

The Instaltest 61557 is high professional, multifunctional, portable test instrument, intended for carrying out measurements, according to **European standard EN 61557**, as well as various other tests and measurements.

The instrument is equipped with all accessories, necessary for comfortable carrying out the tests. It is kept in a soft carrying bag, together with all the enclosed accessories.

Electronic part of the Instaltest 61557 is produced in SMD technology, which demands practically no service interventions. Wide, custom designed display with backlight offers easy to read main results as well as wide range of subresults, parameters and messages. Operation is simple and clear; operator does not need any special training (except to read this Instruction Manual) to operate the instrument.

In order the operator to be familiar enough with measurements in general, it is advisable to read the enclosed handbook **Measurements on electric installations in theory and practice**

Professional PC SW enables simple transfer of test results and other parameters to PC, as well as automatic forming of final protocols.

## 1.2. Warnings

In order to reach high operator's safety, while carrying out various measurements and tests using the Instaltest 61557, as well as to keep the test equipment undamaged, it is necessary to consider the following general warnings:

- **If the test equipment is used in manner not specified in this Instruction Manual, the protection provided by the equipment may be impaired!**
- **Do not use the instrument and accessories, if any damage is noticed!**
- **In case of blown any fuse, follow the instructions in this Instruction Manual, to replace it!**
- **Service intervention or calibration procedure is allowed to be carried out only by a competent, authorised person!**
- **Consider all generally known precautions, in order to avoid risk of electric shock, while dealing with hazardous voltages!**
- **Use only standard or optional test cables supplied by your dealer!**

### 1.3. List of parameters measurable by the Instaltest 61557

Parameter	Switch position	Description
<b>Insulation Resistance Ri</b>	RISO	- Test voltage: 50 ÷ 1000V in step of 10V
<b>Continuity R of protective conductors</b>	R ±200 mA	- Test current > 200 mAd.c. - Single measurement - Auto polarity reverse
<b>Continuity Rx</b>	R ±200 mA	- Test current < 7 mA - Continuous measurement
<b>Fuse/Fault/Conductor locator</b>	LOCATOR	- In combination with hand-held indicator - Line voltage loading or imposing of test signal
<b>Fault Loop Resistance RL-PE</b>	RLOOP, ISC UL-PE	- Max. test current 2,5A
<b>Fault Loop Prospective Short-circuit Current Ipsc</b>	RLOOP, ISC UL-PE	- Calculation: $I_{psc} = U_N \cdot 1,06 / R_{L-PE}$
<b>Voltage UL-PE</b>	RLOOP, ISC UL-PE	- 0 ÷ 264 V
<b>Line Resistance RL-N</b>	RLINE, ISC UL-N	- Max. test current 2,5A
<b>Line Prospective Short-circuit Current Ipsc</b>	RLINE, ISC UL-N	- Calculation: $I_{psc} = U_N \cdot 1,06 / R_{L-N}$
<b>Voltage UL-N</b>	RLINE, ISC UL-N	- 0 ÷ 264 V
<b>Phase rotation</b>	phase rotation	
<b>RCD - Contact Voltage Uc</b>	Uc,RL	- Without test rod - No trip-out RCD
<b>RCD - Fault Loop Resistance RL (external source)</b>	Uc, RL	- Without test rod - No trip-out RCD
<b>RCD - Trip-out Time tΔN</b>	tΔN	- At 0,5IΔN, IΔN, 2IΔN and 5IΔN
<b>RCD – Trip-out Current IΔ</b>	IΔ, tΔ	- Rising current (0,2 ÷ 1,1)IΔN
<b>RCD - Trip-out Time tΔ at Trip-out Current IΔ</b>	IΔ, tΔ	
<b>RCD - Automatic test</b>	RCDAUTO	- Contact voltage meas. - Trip-out time measurement at 0,5IΔN, IΔN and 5IΔN (both test curr. start phases)
<b>Illumination</b>	SENSOR	
<b>Varistor Over-voltage Device - Breakdown Voltage Ub</b>	varistor TEST	- Rising test voltage 0 ÷ 1000 Vd.c.
<b>UL-N Voltage Recording</b>	UL-N LOG	- 1 ÷ 1999 samples - sampling rate 1 ÷ 99 s

## 1.4. Standards applied

The Instaltest 61557 is designed according to European safety standard

- ◆ EN 61010 – 1

EMC (noise and immunity) according to European standards

- ◆ EN 50081 – 1
- ◆ EN 50082 – 1

**Measurements according to European standard EN 61557:**

- ◆ Insulation Resistance ..... Part 2
- ◆ Loop Resistance ..... Part 3
- ◆ Resistance of earth connection and equipotential bonding ..... Part 4
- ◆ Residual Current Devices (RCD) in TT and TN systems ..... Part 6
- ◆ Phase Sequence ..... Part 7

Illumination measurement according to standard

- ◆ DIN 5032 ..... Part 7

## 2. Instrument description

### 2.1. Front panel

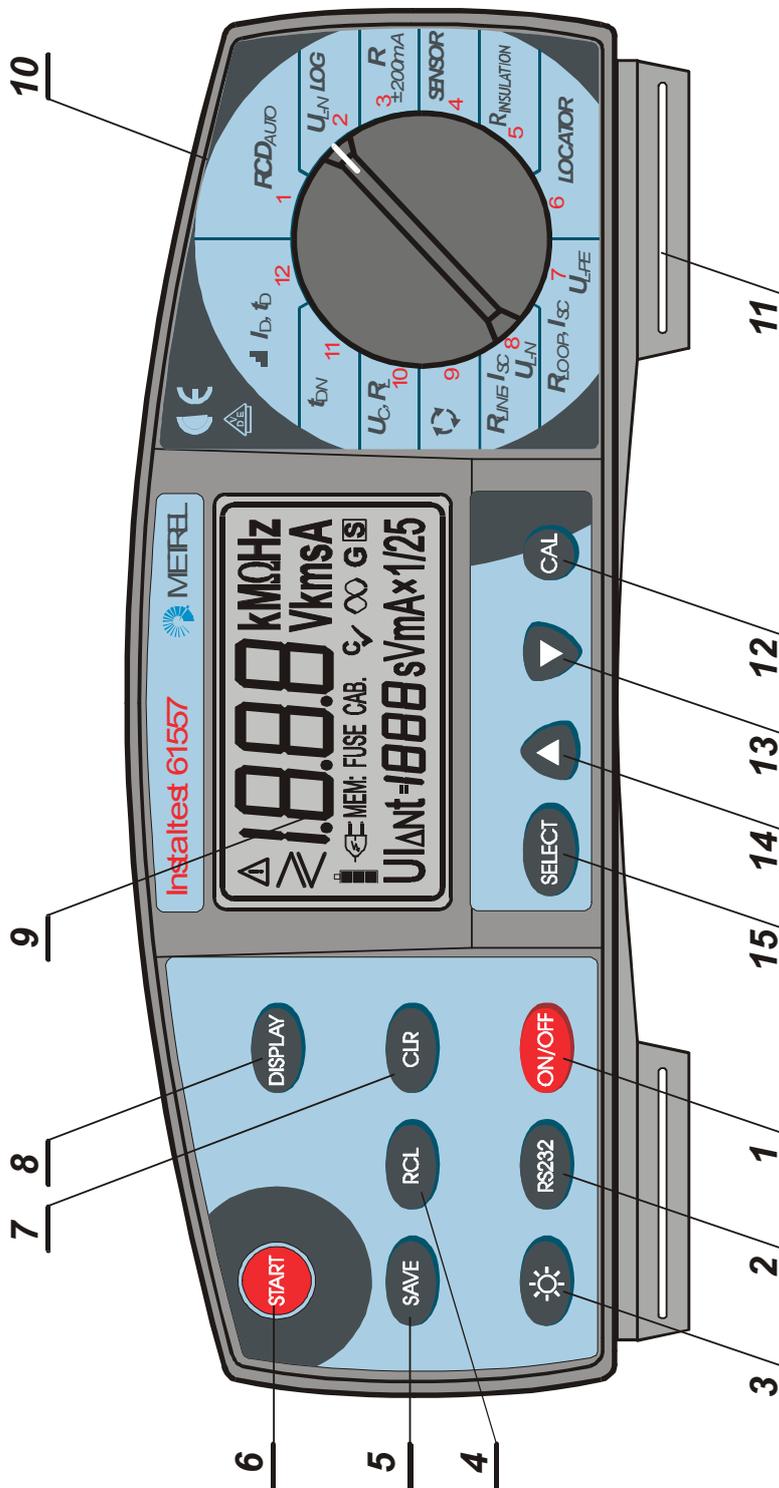


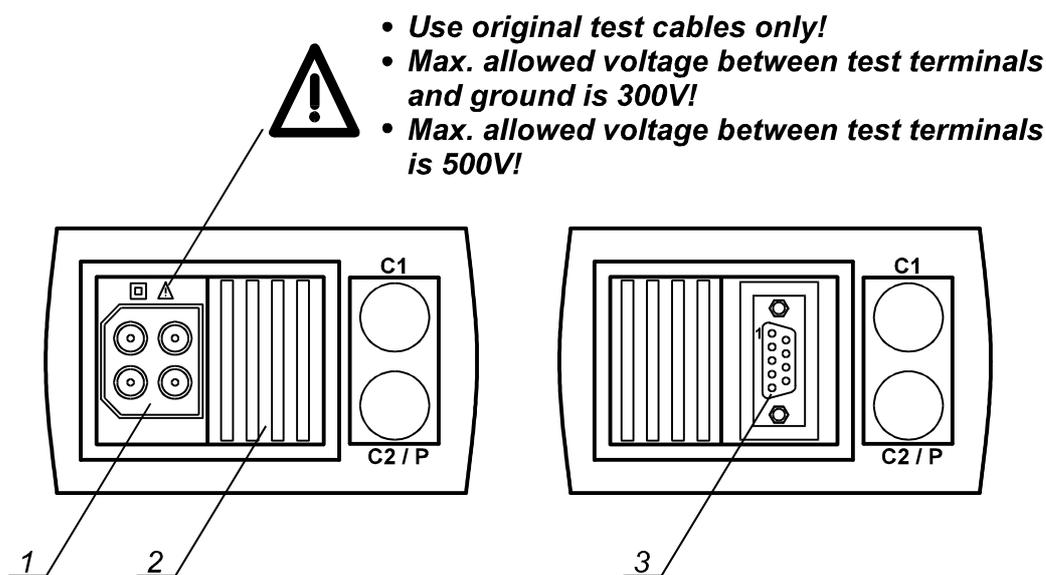
Fig. 1. Front panel

**Legend:**

- 1 **ON/OFF key**, to switch ON or OFF the instrument. Auto OFF will occur automatically 10 minutes after last strike to any key or function switch rotation.
- 2 **RS 232 key**, to communicate with PC.
- 3 **LAMP key**, to turn ON or OFF display backlight. Auto OFF will automatically occur 20 seconds after last strike to any key or function switch rotation.
- 4 **RCL key**, to recall stored results.
- 5 **SAVE key**, to store test results.
- 6 **START key**, to start any measurement.
- 7 **CLR key**, to erase stored results.
- 8 **DISPLAY key**, to:
  - Check last actual test voltage (**RINS** position), after finishing the measurement.
  - Switch between Continuity of protective conductors and General Continuity functions (**R ±200mA** position).
  - Check lower partial result in Continuity of protective conductors function, when main test result is displayed (**R ±200mA** position).
  - Switch between Voltage and Frequency measurement (**RLINE, Isc UL-N** or **RLOOP, Isc UL-PE** position), before **START** key is pressed.
  - Check Prospective Short-circuit Current  $I_{psc}$  (**RLINE, Ipsc UL-N** or **RLOOP, Ipsc UL-PE** position), when main test result is displayed.
  - Check Fault Loop Resistance value and set Limit Contact Voltage (**Uc, RL** position), when result  $U_c$  is displayed.
  - Check Contact Voltage and set Limit Contact voltage (**t $\Delta$ N** position), when result  $t_{\Delta N}$  is displayed.
  - Check Contact Voltage, Trip-out Time at trip-out current and set Limit Contact Voltage (**I $\Delta$ , t $\Delta$**  position), when result  $I_{\Delta}$  is displayed.
  - Check Lowest, Highest and Average value of Recorded voltage as well as Set parameters (**UL-N LOG** position), after the measurement is finished.
- 9 **LCD** with backlight.
- 10 **Function switch**, to select appropriate parameter to be tested.
- 11 **Belt slot**, to fix carrying belt.
- 12 **CAL key**, to compensate resistance of test leads in **R ±200mA** function.
- 13 **↓ key**, to reduce settable parameter value.
- 14 **↑ key**, to increase settable parameter value.
- 15 **SELECT key**, to select/set function parameters as follows:
  - Insulation Resistance (Nominal test voltage and Low limit value of test result).
  - Continuity of protective conductors (High limit value of test result).
  - Contact Voltage (Nominal differential current, RCD type and Limit contact voltage).

- Trip-out Time (Nominal differential current, Multiplier of Nominal differential current and RCD type).
- Trip-out current (Nominal differential current).
- AUTO RCD test (Nominal differential current and RCD type).
- Voltage Logging (Period between sampling and Total number of samples).
- Varistor breakdown voltage (High and Low limit value of test result).
- Illumination (Low limit value of measured result).

## 2.2. Connector panel

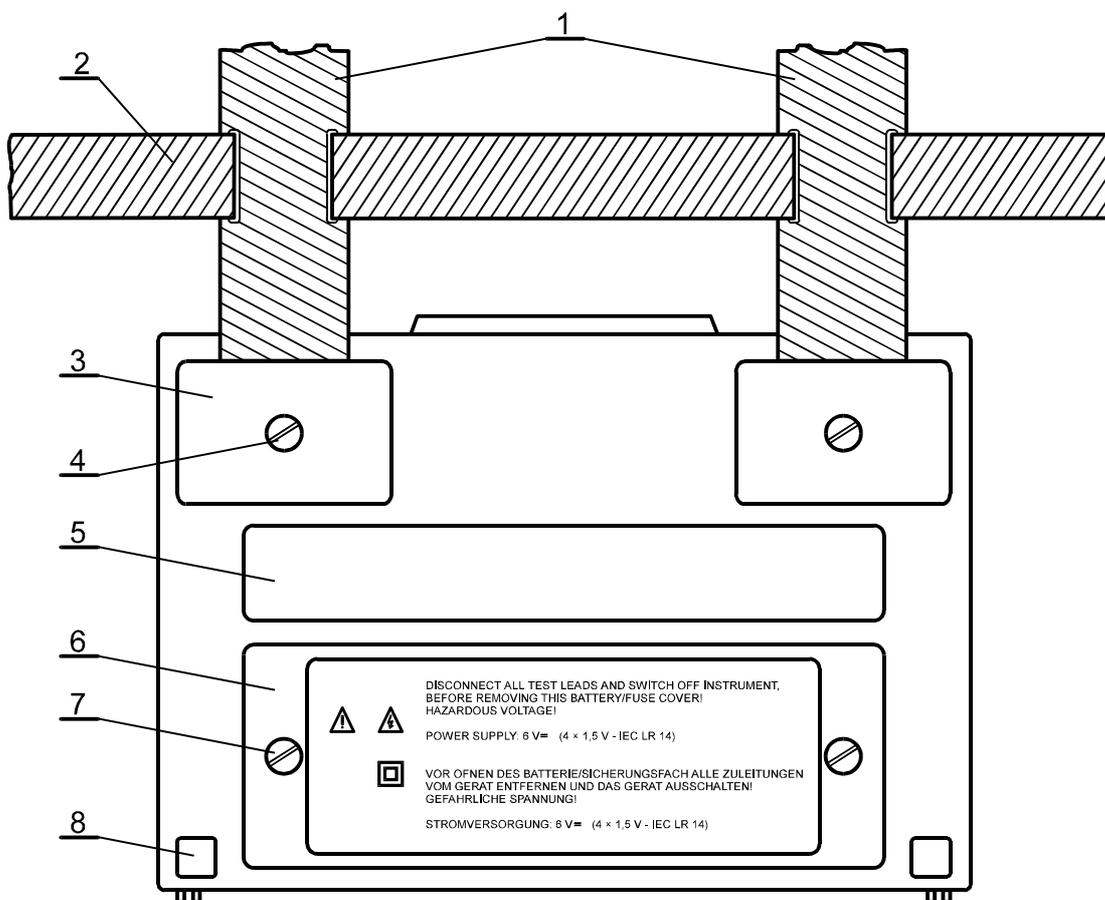


**Fig. 2. Connector panel**

### Legend:

- 1 Main test connector
- 2 Protection connector cover (protects simultaneous connection of test and RS232 cable)
- 3 RS 232 connector (to connect Instaltest 61557 to PC)

## 2.3. Bottom side



**Fig. 3. Bottom side**

### Legend:

- 1 Nylon strip (it serves the operator to carry the instrument hung on his neck).
- 2 Auxiliary nylon strip (it serves the operator to fix the instrument along his body).
- 3 Plastic cover (it fixes nylon strip to the instrument). There is a screw under the cover, which is to be unscrewed, when opening the instrument for service or calibration purpose.
- 4 Screw (unscrew it, to remove carrying strip or to open the instrument).
- 5 Label with measurement ranges.
- 6 Battery/fuse compartment cover.
- 7 Screw (unscrew it to replace batteries or blown fuse).
- 8 Rubber foot.

## 2.4. Standard accessories

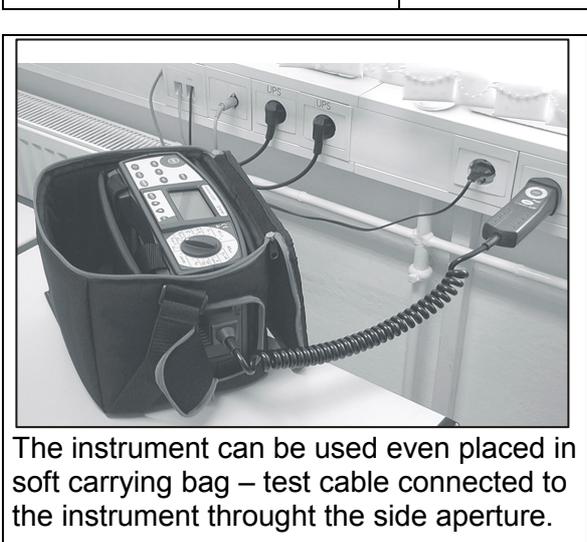
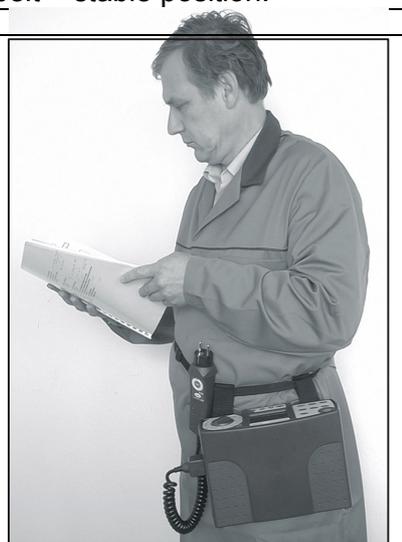
See attached sheet, to compare received set of accessories with listed one.

## 2.5. Optional accessories

See attached sheet, to check the list of possible optional accessories, which may be supplied upon request.

## 2.6. Ways of carrying the instrument

As two carrying belts (neck and back) are supplied in standard set, various possibilities of carrying the instrument are available. Operator can choose appropriate one on bases of his operation, see the following examples:

	 <p>The instruments is hung around operator's neck only – quick placing and displacing.</p>	 <p>The instruments is hung around operator's neck and fixed to this body with back belt – stable position.</p>
 <p>The instrument can be used even placed in soft carrying bag – test cable connected to the instrument throught the side aperture.</p>	<p>The instrument is fixed to operator's bodi with back belt only – it can be simply moved from side to front position for measurement purpose and back again.</p>	

## 2.7. Accessories required for specific measurement

The table below presents accessories (standard or optional) required for specific measurement. The accessories marked as **optional** may also be **standard** ones in some set configurations; Please see attached list of standard accessories for your set configuration or contact your dealer for further information.

FUNCTION	REQUIRED ACCESSORIES
<b>Insulation Resistance</b>	- Universal Test Cable or Tip Commander (Option – Order No. <b>A 1002</b> )
<b>Continuity of Protective Conductor</b>	- Universal Test Cable or Tip Commander (Option – Order No. <b>A 1002</b> ) - Probe Test Lead 4m (Option – Order No. <b>A 1012</b> )
<b>Continuity</b>	- Universal Test Cable or Tip Commander (Option – Order No. <b>A 1002</b> )
<b>Fault Loop Resistance, Ipsc</b>	- Universal Test Cable or Plug Commander (Option – Order No. <b>A 1001</b> )
<b>Line Resistance, Ipsc</b>	- Universal Test Cable or Plug Commander (Option – Order No. <b>A 1001</b> )
<b>RCD – Contact Voltage at I<sub>ΔN</sub></b>	- Universal Test Cable or Plug Commander (Option – Order No. <b>A 1001</b> )
<b>RCD – Trip-out Time</b>	
<b>RCD – Trip-out Current</b>	
<b>RCD – Fault Loop Resistance</b>	
<b>RCD – Automatic Test</b>	
<b>Phase Rotation</b>	- Universal Test Cable or Three-phase Cable (Option – Order No. <b>A 1110</b> ) or Three-phase Adapter (Option – Order No. <b>A 1111</b> )
<b>Fuse, Fault, Conductor Tracing</b>	- Universal Test Cable - Fuse / Fault / Conductor Locator (Option – Order No. <b>A 1005</b> )
<b>Varistor Overvoltage Device – Breakdown Voltage</b>	- Universal Test Cable
<b>Illumination</b>	- LUXmeter probe type B (Option – Order No. A 1102) - LUXmeter probe type C (Option – Order No. A 1119)
<b>Voltage Logging</b>	- Universal Test Cable or Plug Commander (Option – Order No. <b>A 1001</b> ) or Tip Commander (Option – Order No. <b>A 1002</b> )

## 3. Measurement instructions

### 3.1. Insulation resistance

There are different objects, where insulation resistance is to be measured, in order to assure safety against electric shock. Let's list a few examples:

- Insulation resistance between installation conductors (all combinations).
- Insulation resistance of non-conductive rooms (walls and floors).
- Insulation resistance of ground cables.
- Resistance of semiconductive (antistatic) floors.

For additional general information concerning Insulation Resistance measurement, refer to enclosed handbook **Measurements on electric installations in practice and theory**.

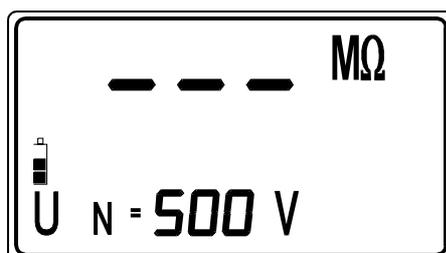
#### Warnings!

- **Make sure tested object to be deenergised (mains voltage disconnected), before starting the measurement!**
- **When measuring Insulation Resistance between conductors, all loads must be disconnected and all switches closed!**
- **Do not touch tested object while testing it, risk of electric shock!**
- **Do not connect test terminals to external voltage higher than 600 V a.c. or d.c., in order not to damage the test instrument!**
- **In case of capacitive test object (capacitive compensation of reactive power, long tested cable etc.), automatic discharge of the object may not be done immediately after finishing the measurement. Falling voltage will be displayed in that case – do not disconnect test leads until the voltage drops below 50V or carefully discharge the tested object manually!**

### How to carry out the measurement?

#### Step 1

- Connect test cable (Universal test cable or Tip Commander) to Instaltest 61557.
- Set function switch to **RISO** position, the following menu will be displayed:



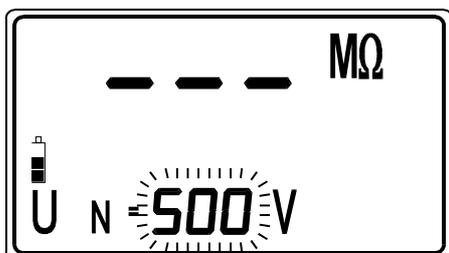
*Fig. 4. Insulation Resistance initial menu*

**Step 2**

- Set Nominal Test Voltage.

**How to set the Test Voltage?**

- Press the **SELECT** key twice and release it, to enter “Test voltage adjustment mode”, the following menu will be displayed:



Last set Nominal test voltage is blinking.

Available nominal test voltages (V)	Step (V)
50 ÷ 1000	10

**Fig. 5.** Test voltage adjustment menu and the Table of available nominal test voltages

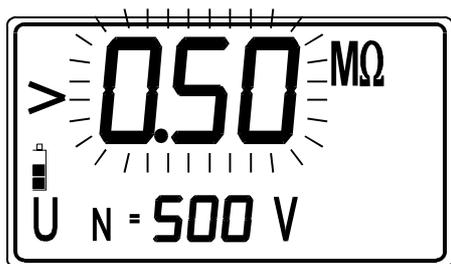
- Use the ↑ and ↓ keys, to set required Nominal test voltage. Individual strike will increase/decrease the voltage for one step, while continuous pressure will increase/decrease it continuously (the value will stop for a while, when reaching standard value like 100, 250 or 500 V, enabling the operator to depress used key).

**Step 3**

- Set **Low Limit Insulation Resistance Value**. Later will test results be compared with the set limit value and, if lower, they will be equipped with “!” mark.

**How to set the Low Limit Value?**

- Press the **SELECT** key after setting Nominal test voltage, to enter “Low Limit Value adjustment menu”; see the figure below:



Last set Low limit value is blinking.

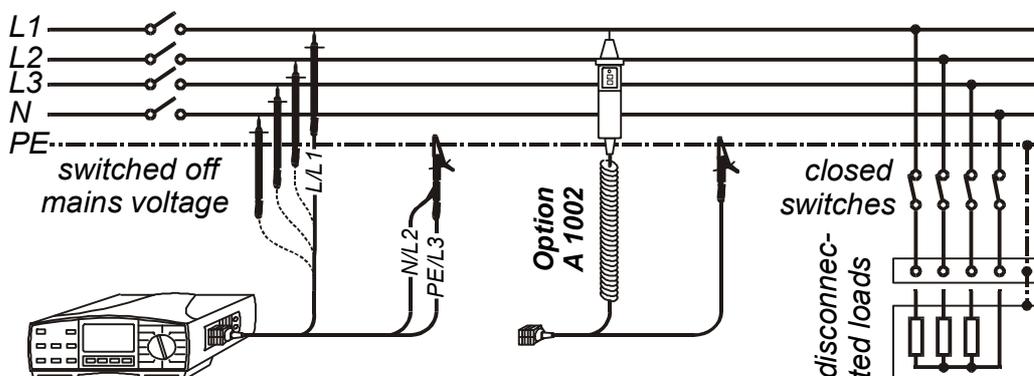
Available low limit values (MΩ)	Step (MΩ)
0,01 ÷ 0,25	0,01
0,25 ÷ 1	0,05
1 ÷ 10	1
10 ÷ 200	10

**Fig. 6.** Low Limit Value adjustment menu and the Table of available limit values

- Use the  $\uparrow$  and  $\downarrow$  keys, to set required Low Limit Value. Individual strike will increase/decrease the value for one step, while continuous pressure will increase/decrease it continuously. If test results are not to be compared with Low Limit Value at all then press the **CLR** key, **no** will be displayed instead of set value.
- Press the **SELECT** key again after setting limit value, to return to “Insulation Resistance initial menu”.

#### Step 4

- **Connect test cable** to tested object, according to the figure below:



**Fig. 7.** Connection of Universal Test Cable and optional Tip Commander (Order No. **A 1002**)

#### Step 5

- Press the **START** key and keep it pressed, until result is stabilised, then release the key. Last result will stay displayed.
- Check last actual test voltage pressing the **DISPLAY** key.
- Store displayed result for documentation purpose; see instructions how to store it in chapter 4.1. Storing of test results.

**Notes!**

- In case of present external voltage higher than 29 V a.c./d.c. between test terminals, the Insulation Resistance measurement will not be carried out after pressing **START** key, but the voltage will be displayed, equipped with “!” mark! Beep warning sound will be affected too.
- Tested object is discharged automatically after finishing the measurement, actual voltage is displayed during discharging, until the voltage drops below 30 V!
- If test result is out of measurement range (open test leads or good isolation), **>1000 MΩ** message will be displayed ( $U_N \geq 250$  V) or **>200 MΩ** ( $U_N < 250$  V)!
- Positive pole of test voltage is attached to blue test lead (Universal test cable) or to commander test tip (Tip Commander)!
- **bat** message, displayed during or after finishing the measurement means batteries are too weak to guarantee correct result. Replace the batteries.

### 3.2. Varistor Over-voltage Protection Devices

For general information concerning the measurement, refer to enclosed handbook **Measurements on electric installations in practice and theory**.

#### How to carry out the Breakdown voltage measurement?

##### Step 1

- Connect Universal test cable to Instaltest 61557.

##### Note!

Set function switch to **Riso** position and press the **SELECT** key to enter the selection menu. Use the  $\uparrow$  and  $\downarrow$  keys to select between **“ISO”** (Insulation resistance) and **“tSt”** (Varistor Over-voltage Protection Devices) functions. Press **SELECT** key when **“tSt”** is displayed to enter the Varistor Over-voltage Protection Devices function. Press the **SELECT** key twice to skip limit adjustment menus and to enter **Varistor test** initial menu.

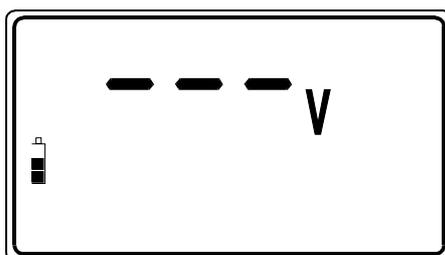


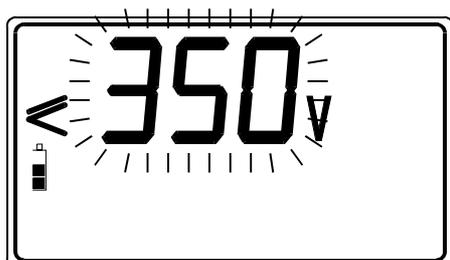
Fig. 8. Varistor Test initial menu

##### Step 2

- Set **High Limit Breakdown Varistor Voltage**. Later will test results be compared with the set limit value and, if higher, they will be equipped with **“!”** mark.

#### How to set the High Limit value?

- Press the **SELECT** key twice, to enter **“High Limit value adjustment mode”**, the following menu will appear:



Last set High limit value is blinking.

Available values (V)	Step (V)
0 ÷ 1000	10

Fig. 9. High limit value adjustment menu and the table of available limit values

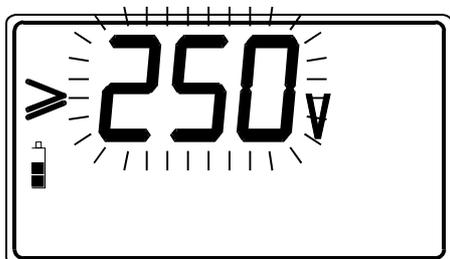
- Use the  $\uparrow$  and  $\downarrow$  keys, to set required High Limit Value. Individual strike will increase/decrease the value for one step, while continuous pressure will increase/decrease it continuously. If test results are not to be compared with High Limit Value at all, then press the **CLR** key, **no** will be displayed instead of set value.

### Step 3

- Set **Low Limit Breakdown Varistor Voltage**. Later will test results be compared with the set limit value and, if lower, they will be equipped with “!” mark.

#### How to set the Low Limit Value?

- Press the **SELECT** key after setting the High Limit Value, to enter “Low Limit Value adjustment mode”, the following menu will be displayed:



Last set Low limit value is blinking.

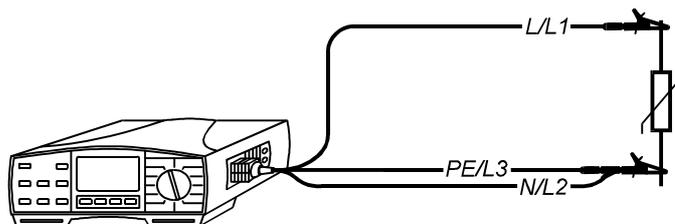
Available values (V)	Step (V)
0 ÷ 1000	10

**Fig. 10.** Low limit value adjustment menu and the table of available limit values

- Use the  $\uparrow$  and  $\downarrow$  keys, to set required Low Limit Value. Individual strike will increase/decrease the value for one step, while continuous pressure will increase/decrease it continuously. If test results are not to be compared with Low Limit Value at all, then press the **CLR** key, **no** will be displayed instead of set value.
- Press the **SELECT** key again after setting the limit values, to return to “Varistor Test initial menu”.

### Step 4

- Connect Universal test cable** to tested Varistor Over-voltage Protection Device, according to the figure below.



**Fig. 11.** Connection of Universal Test Cable

## Step 5

- Press the **START** key and release it. Test voltage starts to rise (500 V/s) and as soon as varistor's forward current reaches the value of 1 mA (Breakdown Voltage is defined at that current), the voltage will be displayed. Generator will stop to generate test voltage.
- Check the Breakdown voltage scaled to a.c. value called Uac pressing the **DISPLAY** key.

### Meaning of the Uac voltage:

Protection devices intended for a.c. network are usually dimensioned approx. 20% of nominal mains voltage above peak value of nominal mains voltage.

Example:

Nominal mains voltage  $U_n = 230V$

$U_{peak} = 230V \cdot 1,41 = 324V$

$U_{breakdown} = (U_{peak} + 0,2 \cdot U_n) \cong U_n \cdot 1,6 = 368V$

Uac voltage may be directly compared with the voltage declared on tested protection device.

- Store displayed result for documentation purpose; see instructions how to store it in chapter 4.1. Storing of test results.

### Notes!

- In order test result not to be influenced by connected loads, tested Over-voltage Protection Device must be removed from installation, before testing it.
- If the Over-voltage Protection Device to be tested is not possible to be removed from installation (permanent connection), make sure to disconnect all other elements connected to installation, which may influence on test result.

**bat** message, displayed during or after finishing the measurement means batteries are too weak to guarantee correct result. Replace the batteries.

### 3.3. Continuity of protective conductors

Continuity of protective conductors is to be measured, before mains voltage is connected to tested installation (new or adapted installations). Max. allowed resistance value depends on power of connected loads, used installation system (TN, TT) etc.

For additional general information concerning Continuity measurement, refer to enclosed handbook **Measurements on electric installations in practice and theory**.

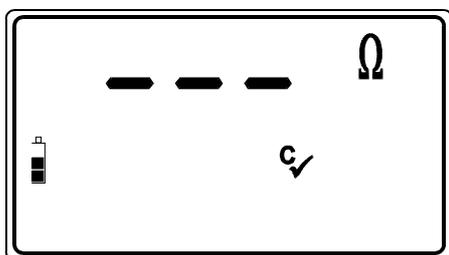
#### Warning!

- **Make sure tested object to be deenergised (mains voltage disconnected), before starting the measurement!**

### How to carry out the measurement?

#### Step 1

- Connect test cable (Universal test cable or Tip Commander) to Instaltest 61557.
- Set function switch to **R ±200mA** position, the following menu will be displayed:



C✓ ..... Resistance of test leads has been compensated.

*Fig. 12. Continuity of protective conductors initial menu*

#### Step 2

- Set **High Limit Resistance Value**. Later will test results be compared with the set limit value and, if higher, they will be equipped with “!” mark.

#### How to set the High Limit value?

- Press the **SELECT** key, to enter “High Limit adjustment menu”; see the figure below.



Last set High Limit Value is blinking.

Available high limit values ( $\Omega$ )	Step ( $\Omega$ )
0,0 ÷ 20,0	0,1

**Fig. 13.** High Limit adjustment menu and the table of available high limit values

- Use the  $\uparrow$  and  $\downarrow$  keys, to set required High Limit value. Individual strike will increase/decrease the value for one step, while continuous pressure will increase/decrease it continuously. If test results are not to be compared with High Limit value at all, then press the **CLR** key, **no** will be displayed instead of set value.
- Press the **SELECT** key again after setting the limit value, to return to “Continuity initial menu”.

### Step 3

- **Compensate test leads** (if they have not been compensated yet or, if already compensated test leads have been exchanged).

#### How to carry out the compensation?

- Short test leads; see the figure below.



**Fig. 14.** Shorted test leads

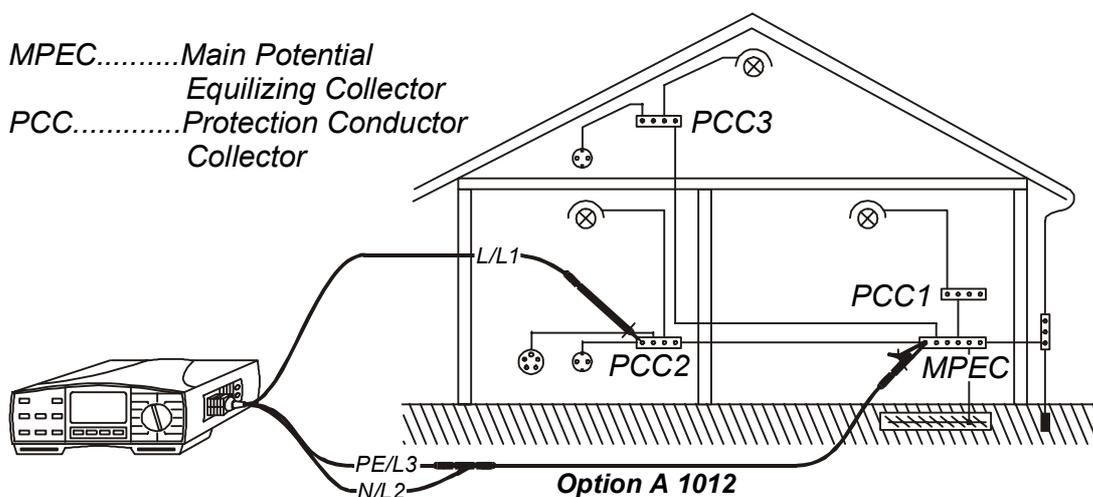
- Press the **START** key and release it in order to carry out regular measurement, result (close to 0  $\Omega$ ) will be displayed.
- Press the **CAL** key and release it, displayed result will alter to **0,00  $\Omega$**  and **C✓** mark will appear, indicating the compensation was successfully accomplished. Test instrument is thus ready to be used.

In order to annul potential compensation, follow the procedure, described in this step, at open test leads. **C✓** mark will disappear after finishing the procedure, indicating the compensation has been annulled.

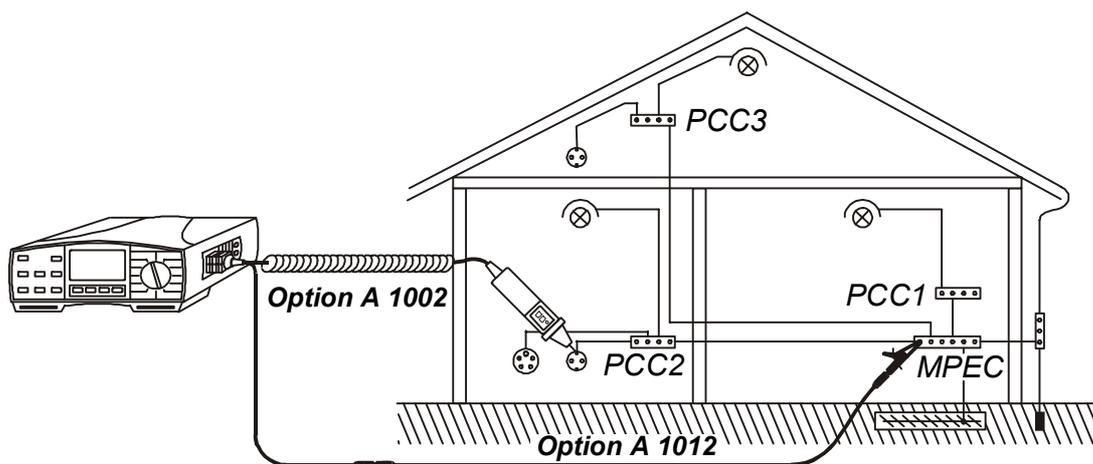
Compensation, effected in this function, will be considered in **CONTINUITY** function too.

**Step 4**

- **Connect test leads** to tested object according to the figures below.



**Fig. 15.** Connection of Universal Test Cable and optional Probe Test Lead (Order No. A 1012)



**Fig. 16.** Connection of optional Tip Commander (Order No. A 1002) and optional Probe Test Lead (Order No. A 1012)

**Step 5**

- Press the **START** key and release it. Measurement will be carried out and result displayed afterwards. Each measurement is accomplished in two steps (polarity is reversed between the two steps automatically). Higher partial result is displayed. The result, if lower than set High limit value, will be equipped with beep sound signal.
- Check lower partial result, pressing the **DISPLAY** key.
- Store displayed result for documentation purpose; see instructions how to store it in chapter 4.1. Storing of test results.

**Notes!**

- In case of present external voltage higher than 9 V a.c./d.c. between test terminals, the Continuity measurement will not be carried out after pressing **START** key, but the voltage will be displayed, equipped with “!” mark! Beep warning sound will be affected too.
- If resistance value higher than 5  $\Omega$  (measured with not-compensated instrument) is displayed, compensation will not be carried out after pressing **CAL** key, but already effected compensation will be annulled (**C✓** mark will disappear)!
- If test result is out of measurement range (open test leads), **>1999  $\Omega$**  message will be displayed!
- **bat** message, displayed during or after finishing the measurement means batteries are too weak to guarantee correct result. Replace the batteries.

### 3.4. Continuity

The function is intended to be used especially when arranging terminal-to-terminal connections, maintaining and/or repairing electric equipment, carrying out auxiliary measurements etc. The function operates continuously and serves as ordinary  $\Omega$ -meter with low test current.

For additional general information concerning Continuity measurement, refer to enclosed handbook **Measurements on electric installations in practice and theory**.

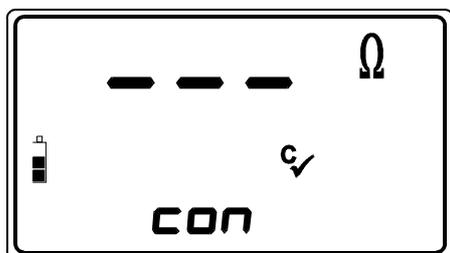
#### Warning!

- Make sure tested object to be deenergised (mains voltage disconnected), before starting the measurement! If test tips are connected to mains voltage during the measurement is running, fuse M 0,315A/250V (placed in vertical plastic cylinder under battery cover) will blow (see the chapter 5.2. Fuses).

### How to carry out the measurement?

#### Step 1

- Connect test cable (Universal test cable or Tip Commander) to Instaltest 61557.
- Set function switch to **R  $\pm 200\text{mA}$**  position and press the **DISPLAY** key, to enter "General Continuity initial menu"; see the figure below:



C✓ ..... Resistance of test leads has been compensated in Continuity of protective conductors function.

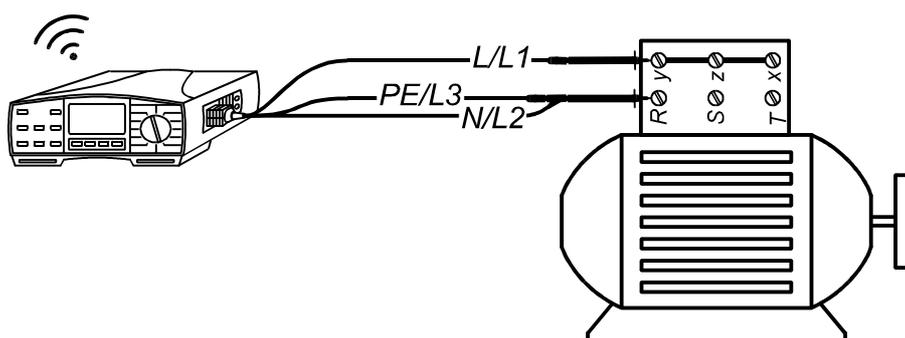
*Fig. 17. General Continuity initial menu*

#### Step 2

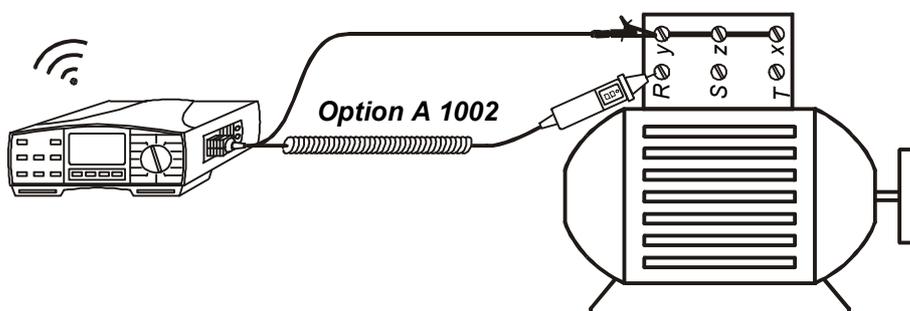
- Press the **START** key and release it. Measurement starts to run (continuous measurement), results are currently displayed.

#### Step 3

- **Connect test leads** to tested object according to the figures below and follow displayed result or sound information (result is accompanied with bip, bip, ... sound signal, if displayed value is lower than  $20\Omega$ ).



**Fig. 18.** Connection of Universal Test Cable



**Fig. 19.** Connection of optional Tip Commander (Order No. A 1002)

- Press the **START** key again after finishing the measurement, last result will stay displayed. The result cannot be stored (just auxiliary result).

#### Notes!

- In case of present external voltage higher than 9 V a.c./d.c. between test terminals, the Continuity measurement will not start after pressing **START** key, but the voltage will be displayed, equipped with “!” mark! Beep warning sound will be affected too.
- If test result is out of measurement range (open test leads), **>1999 Ω** message will be displayed!
- Positive pole of test voltage is attached to blue test lead (Universal test cable) or to commander test tip (Tip Commander)!
- Compensation of test leads, affected in Continuity of Protective Conductors function, will be considered in this function too.
- **bat** message, displayed during or after finishing the measurement means batteries are too weak to guarantee correct result. Replace the batteries.

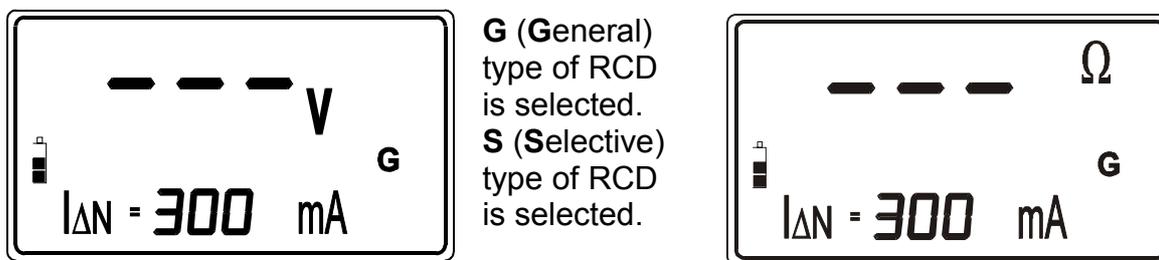
### 3.5. RCD - Contact Voltage and Fault Loop Resistance

For general information concerning Contact Voltage / Fault Loop Resistance measurement refer to enclosed handbook **Measurements on electric installations in practice and theory**.

#### How to carry out the measurement?

##### Step 1

- Connect test cable (Plug commander or Universal test cable) to Instaltest 61557.
- Set function switch to **Uc, RL** position, “Contact Voltage initial menu” or “Fault Loop Resistance initial menu” will be displayed; see the figure below. **Uc** or **loop** is displayed for a while before initial menu appears.



*Fig. 20. Contact Voltage initial menu (left) and Fault Loop Resistance initial menu*

##### Step 2

- Select required function i.e. Contact Voltage or Fault Loop Resistance by pressing the SELECT key first. Previously set function (**Uc** or **loop** message) starts to flash. Select the function by using the ↑ and ↓ keys.

Fault Loop Resistance function takes longer measurement time but offers better accuracy of Fault Loop Resistance result (in comparison with the RL subresult in Uc function).

##### Step 3

- Select Nominal differential current  $I_{\Delta n}$  as follows:
- Press the **SELECT** key, last set Nominal differential current starts to blink.
- Select appropriate value by using the ↑ and ↓ keys. The following values are available to be selected: 10, 30, 100, 300, 500 or 1000 mA.

#### Step 4

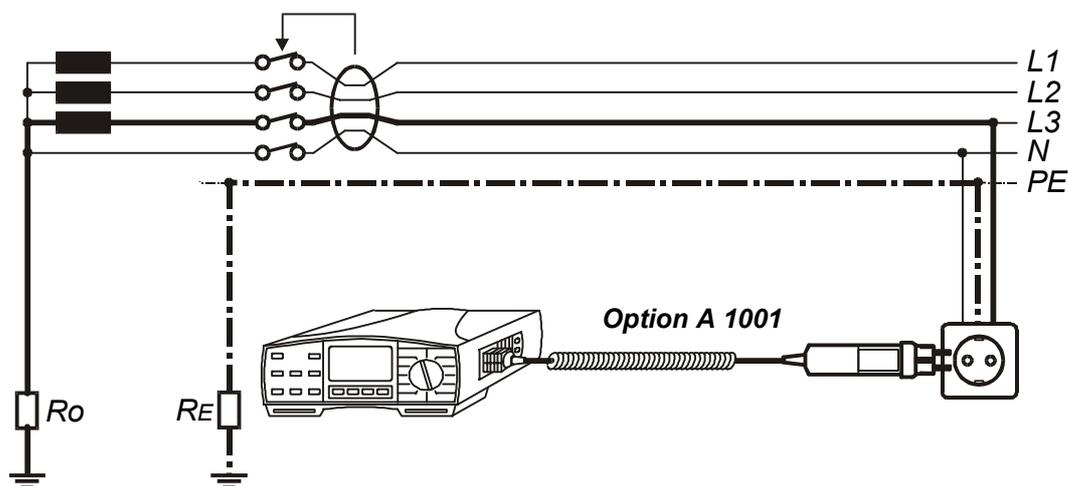
- Select Type of involved RCD as follows:
- Press the **SELECT** key after setting Nominal differential current, last set type starts to blink.
- Select appropriate type using the  $\uparrow$  and  $\downarrow$  keys. Standard (General) type (**G** is displayed) or Selective type (**S** is displayed) can be selected.

#### Step 5

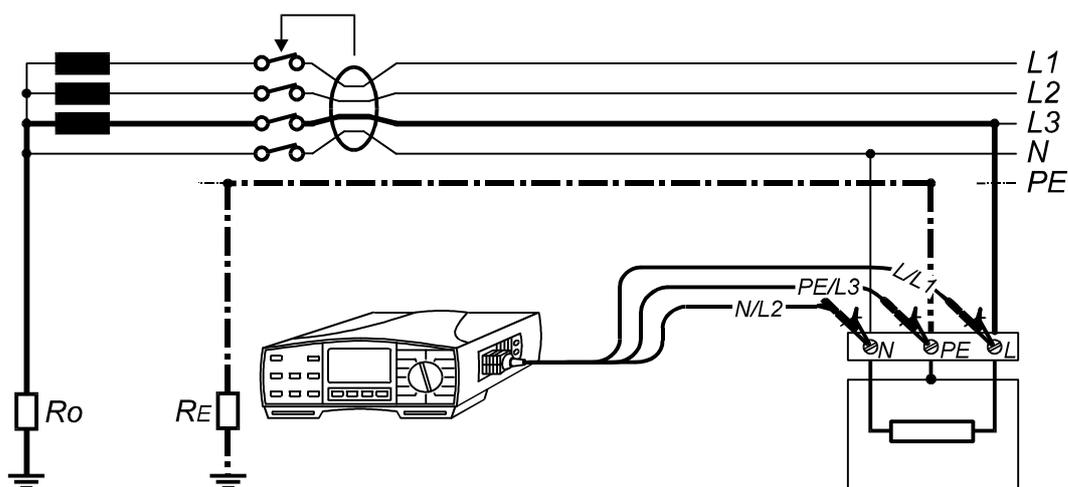
- Select Limit Contact Voltage value  $U_{lim}$  as follows:
- Press the **SELECT** key after setting RCD type, last set Limit Contact Voltage starts to blink.
- Select appropriate value using the  $\uparrow$  and  $\downarrow$  keys. 50 or 25 V can be selected.
- Press the **SELECT** key again after selecting the Limit Contact Voltage, to enter "Contact Voltage" or "Fault Loop Resistance" initial menu.

#### Step 6

- **Connect test cable** to tested object (mains outlet or other test terminals), according to one of the figures below. **Mains plug** mark will be displayed as soon as mains voltage appears at test terminals.



**Fig. 21.** Connection of optional Plug Commander (Order No. A 1001)



**Fig. 22.** Connection of Universal Test Cable

### Step 7 (Uc function is selected)

- Press the **START** key and release it. Measurement will be carried out and result ( $U_c$  at  $I_{\Delta N}$  - standard RCD or  $U_c$  at  $2I_{\Delta N}$  - selective RCD) will be displayed.
- Check Fault Loop Resistance subresult and preset Limit Contact voltage by using the **DISPLAY** key.
- Store displayed result for documentation purpose; see instructions how to store it in chapter 4.1. Storing of test results.

### Step 8 (loopP function is selected)

- Press the **START** key and release it, the measurement will start to run. Three dots (. . .) will flash until the measurement is finished, then result is displayed. The measurement may last longer (up to 1 min approx.) in order to assure accurate and stable test result.
- Check Contact Voltage subresult ( $U_c$  at  $I_{\Delta N}$  – standard RCD or  $U_c$  at  $2I_{\Delta N}$  – selective RCD) and preset Limit Contact voltage by using the **DISPLAY** key.
- Store displayed result for documentation purpose; see instructions how to store it in chapter 4.1. Storing of test results.

### Notes!

- If RCD trips during the measurement (some fault or leakage current is probably already flowing to ground), **rcd** mark will start to blink.
- RCD type, Limit Contact Voltage and Nominal differential current set in this function, will be offered in other RCD functions (wherever actual)!
- Current, flowing to PE protective conductor, caused by faulty appliances or capacitive connection between L and PE terminals will influence the test result. Disconnect such appliances before the measurement is started!
- Specified accuracy of  $U_c/RL$  measurement is valid only if earthing system connected to PE terminal is free of interfering voltages!
- **bat** message, displayed during or after finishing the measurement means batteries are too weak to guarantee correct result. Replace the batteries.

### 3.6. RCD - Trip-out Time

In order to assure safe conditions, RCD device must trip-out within a certain time, in case of present fault on connected electric appliance. See allowed trip-out time ranges in the following table.

Type of RCD protection switch	$I_{\Delta n}$	$2I_{\Delta n}$	$5I_{\Delta n}^*$	Remark
Standard	0,3 s	0,15 s	0,04 s	max. allowed trip-out time
Selective	0,5 s	0,2 s	0,15 s	max. allowed trip-out time
	0,13 s	0,06 s	0,05 s	min. allowed trip-out time

\* If  $I_{\Delta n} \leq 30$  mA, test current of 0,25 A is used instead of  $5I_{\Delta n}$ .

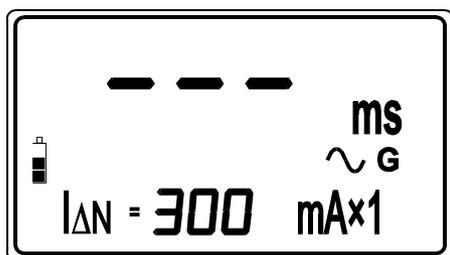
**Table 1.** Allowed trip-out times according to EN 61009 standard

For additional general information concerning the measurement, refer to enclosed handbook **Measurements on electric installations in practice and theory**.

### How to carry out the measurement?

#### Step 1

- Connect test cable (Plug commander or Universal test cable) to Instaltest 61557.
- Set function switch to  $I_{\Delta n}$  position, "Trip-out Time initial menu" will be displayed; see the figure below.



- G ..... Standard (**G**eneral) type of RCD is selected. **S** is displayed, if Selective type is selected.
- ~ ..... Start polarity of test current.
- ×1 ..... Selected multiplier of nominal differential current.

**Fig. 23.** Contact Voltage initial menu

#### Step 2

- Select Nominal differential current  $I_{\Delta n}$  as follows:
- Press the **SELECT** key, last set Nominal differential current starts to blink.
- Select appropriate value using the  $\uparrow$  and  $\downarrow$  keys. The following values are available to be selected: 10, 30, 100, 300, 500 or 1000 mA.

**Step 3**

- Select **Multiplier** of Nominal differential current as follows:
- Press the **SELECT** key after setting Nominal differential current, last set Multiplier starts to blink.
- Select appropriate value by using the  $\uparrow$  and  $\downarrow$  keys. The following values are available to be selected:  $\times 1/2$ ,  $\times 1$ ,  $\times 2$ ,  $\times 5$ . The value  $\times 5$  is not available, if Nominal current  $I_{\Delta N} = 1000$  mA.

**Step 4**

- Select Type of tested RCD as follows:
- Press the **SELECT** key after setting the Multiplier, last set type starts to blink.
- Select appropriate type using the  $\uparrow$  and  $\downarrow$  keys. Standard (General) type (**G** is displayed) or Selective type (**S** is displayed) can be selected.

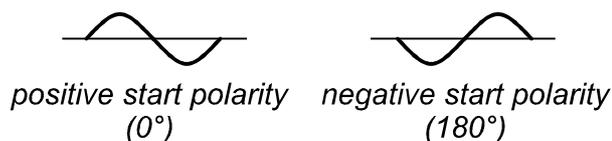
**Step 5**

- **Connect test cable** to tested object (mains outlet or other test terminals), according to the figure 21. (Plug commander) or figure 22. (Universal test cable).

**Step 6**

Press the **START** key and release it. Measurement will be carried out and result displayed afterwards (Trip-out time at set differential current).

Double click to **START** key will change positive start polarity of test current to negative one; see the figure below.



**Fig. 24.** Positive and negative start polarity of test current

- Check Contact Voltage at set Nominal differential current (Standard RCD type) or at double Nominal differential current (Selective RCD type) and set Limit Contact voltage by using the **DISPLAY** key.
- Store displayed results for documentation purpose; see instructions how to store it in chapter 4.1. Storing of test results.

**Test of Selective RCD**

For safety reason, Contact voltage measurement is carried out (regardless of RCD type) before Trip-out Time measurement is realised. As the Selective type of RCD (delayed trip-out) operates on basis of integration of fault current, it is necessary to relax it, before Trip-out Time measurement is carried out, otherwise the test is not relevant. That is why waiting time of 30s is involved before Trip-out Time measurement. The waiting time is presented on display as countdown from 30 to 0.

**Notes!**

- If RCD trips during Contact voltage measurement (some fault or leakage current is probably already flowing to ground), **rcd** mark will start to blink.
- RCD type and Nominal differential current set in this function will be offered in other RCD functions (wherever actual)!
- Limit Contact Voltage U<sub>lim</sub> can be set in **Contact voltage** function only!
- For safety reason will Trip-out Time measurement be carried out only, if Contact voltage at nominal differential current is lower than set limit value!
- Current, flowing to PE protective conductor, caused by faulty appliances or capacitive connection between L and PE terminals, will influence on test result. Disconnect such appliances before measurement is started!
- Specified accuracy of tested parameters is valid only, if earthing system connected to PE terminal is free of interfering voltages!
- **bat** message, displayed during or after finishing the measurement means batteries are too weak to guarantee correct result. Replace the batteries.

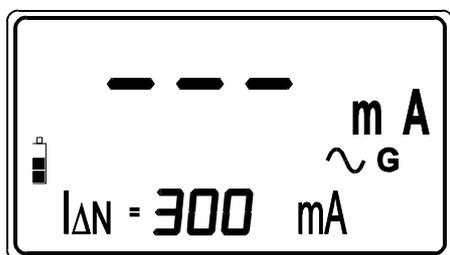
### 3.7. RCD – Trip-out Current

For general information concerning Trip-out current measurement, refer to enclosed handbook **Measurements on electric installations in practice and theory**.

#### How to carry out the measurement?

##### Step 1

- Connect test cable (Plug commander or Universal test cable) to Instaltest 61557.
- Set function switch to  $I_{\Delta}$ ,  $t_{\Delta}$  position, “Trip-out current initial menu” will be displayed; see the figure below.



G ..... Standard (**G**eneral) type of RCD is selected. **S** is displayed if Selective type is selected.

~ ..... Start polarity of test current.

*Fig. 25. Trip-out current initial menu*

##### Step 2

- Select Nominal differential current  $I_{\Delta n}$  as follows:
- Press the **SELECT** key, last set Nominal differential current starts to blink.
- Select appropriate value using the  $\uparrow$  and  $\downarrow$  keys. The following values are available to be selected: 10, 30, 100, 300, 500 or 1000 mA.

##### Step 3

- **Connect test cable** to tested object (mains outlet or other test terminals), according to the figure 21. (Plug commander) or figure 22. (Universal test cable).

##### Step 4

Press the **START** key and release it (double click to **START** key will change positive start polarity of test current to negative one; see the figure 24). Measurement will be carried out and result displayed afterwards.

- ◆ Check Contact Voltage at Trip-out current, Trip-out Time at Trip-out Current and set Limit Contact voltage by using the **DISPLAY** key.
- Store displayed results for documentation purpose; see instructions how to store it in chapter 4.1. Storing of test results.

**Notes!**

- If RCD trips during Contact voltage measurement (some fault or leakage current is probably already flowing to ground), **rcd** mark will start to blink.
- Nominal differential current, set in this function, will be offered in other RCD functions (Contact Voltage, Trip-out Time and Auto RCD test)!
- Limit Contact Voltage U<sub>lim</sub> can be set in **Contact voltage** function only!
- For safety reason will Trip-Out Current measurement be carried out only, if Contact voltage at nominal differential current is lower than set limit value!
- Current, flowing to PE protective conductor, caused by faulty appliances or capacitive connection between L and PE terminals, will influence on test result. Disconnect such appliances before measurement is started!
- Specified accuracy of tested parameters is valid only, if earthing system connected to PE terminal is free of interfering voltages!
- **bat** message, displayed during or after finishing the measurement means batteries are too weak to guarantee correct result. Replace the batteries.

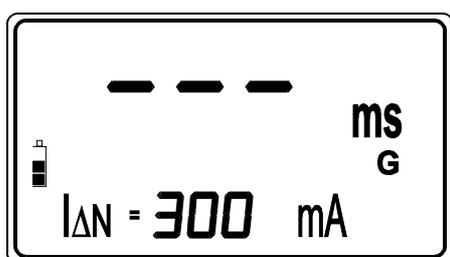
### 3.8. RCD - Automatic Test

Purpose of the function is to carry out complete test of RCD and measurement of belonging parameters (Contact Voltage, Fault loop resistance and Trip-out time at different fault currents) in one set of automatic tests, led by the instrument. If any false parameter is noticed during this automatic test, individual parameter test is to be used for further investigation.

#### How to carry out the automatic test?

##### Step 1

- Connect test cable (Plug commander or Universal test cable) to Instaltest 61557.
- Set function switch to **RCD AUTO** position, "Auto function initial menu" will be displayed; see the figure below.



G ..... Standard (**G**eneral) type of RCD is selected. **S** is displayed if Selective type is selected.

*Fig. 26. Auto function initial menu*

##### Step 2

- Select Nominal differential current  $I_{\Delta n}$  as follows:
- Press the **SELECT** key, last set Nominal differential current starts to blink.
- Select appropriate value using the  $\uparrow$  and  $\downarrow$  keys. The following values are available to be selected: 10, 30, 100, 300 or 500 mA.

##### Step 3

- Select Type of tested RCD as follows:
- Press the **SELECT** key after setting Nominal differential current, last set type starts to blink.
- Select appropriate type using the  $\uparrow$  and  $\downarrow$  keys. Standard (General) type (**G** is displayed) or Selective type (**S** is displayed) can be selected.

**Step 4**

- **Connect test cable** to tested object (mains outlet or other test terminals), according to the figure 21. (Plug commander) or figure 22. (Universal test cable).

**Step 5**

Press the **START** key and release it. Measurement will start to run, partial results will be currently displayed as follows:

The following presentation is valid for Standard RCD type; see additional information about the procedure for Selective one on page 33.

**1<sup>st</sup> test**

Trip-out time measurement, using test current  $I_{test} = I_{\Delta n}/2$ , at positive start polarity of test current ( $0^\circ$ ). Tested RCD should not trip, the following display message will appear for a while:



t1.....Test 1

*Fig. 27. First test is running*

Successfully ended first test (RCD does not trip) will automatically be followed by the second one.

**2<sup>nd</sup> test**

Trip-out time measurement, using test current  $I_{test} = I_{\Delta n}/2$ , at negative start polarity of test current ( $180^\circ$ ). Tested RCD should not trip, the following display message will appear for a while:



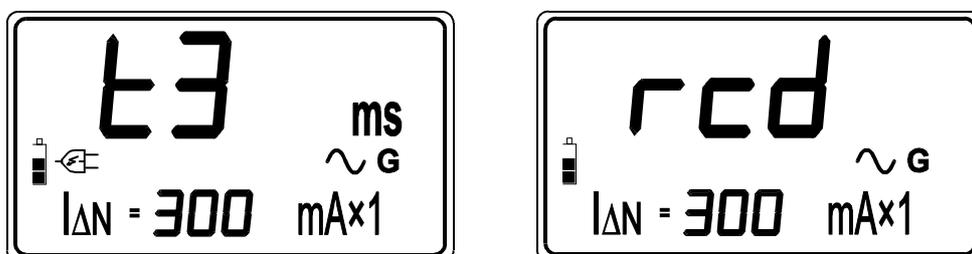
t2.....Test 2

*Fig. 28. Second test is running*

Successfully ended second test (RCD does not trip) will automatically be followed by the third one.

**3<sup>rd</sup> test**

Trip-out time measurement, using test current  $I_{test} = I_{\Delta n}$ , at positive start polarity of test current ( $0^\circ$ ). The display message, presented on left side of the next figure, will appear for a while. Successfully ended third test (RCD trips within allowed time period) will be followed by **r c d** message, informing the operator to reswitch the RCD; see the figure below (right side).

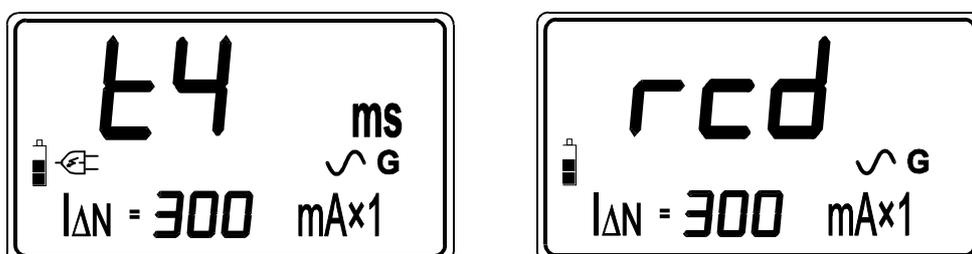


**Fig. 29.** Third test is running (left figure) and **r c d** message, displayed after tripping out RCD (right figure)

After reswitching RCD, fourth test will follow automatically.

**4<sup>th</sup> test**

Trip-out time measurement, using test current  $I_{test} = I_{\Delta n}$ , at negative start polarity of test current ( $180^\circ$ ). The display message, presented on left side of the next figure, will appear for a while. Successfully ended fourth test (RCD trips within allowed time period) will be followed by **r c d** message, informing the operator to reswitch the RCD; see the figure below (right side).

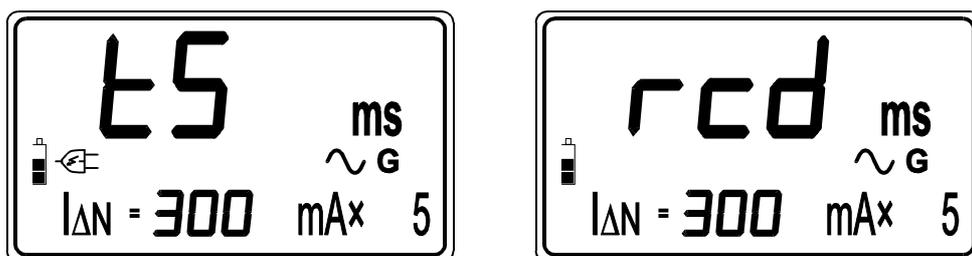


**Fig. 30.** Fourth test is running (left figure) and **r c d** message, displayed after tripping out RCD (right figure)

After reswitching RCD, fifth test will follow automatically.

**5<sup>th</sup> test**

Trip-out time measurement, using test current  $I_{test} = 5I_{\Delta n}$ , at positive start polarity of test current ( $0^\circ$ ). The display message, presented on left side of the next figure, will appear for a while. Successfully ended fifth test (RCD trips within allowed time period) will be followed by **r c d** message, informing the operator to reswitch the RCD; see the figure below (right side).

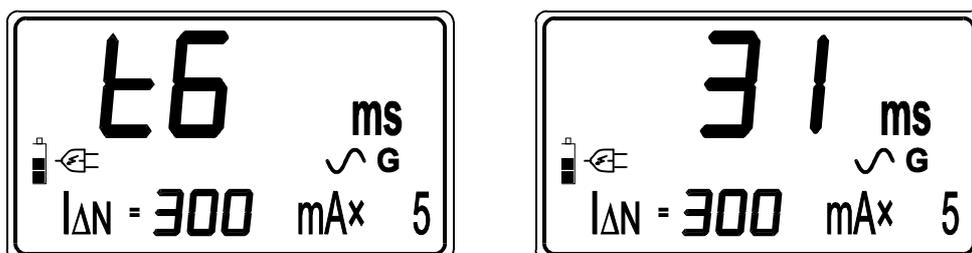


**Fig. 31.** Fifth test is running (left figure) and **rcd** message, displayed after tripping out RCD (right figure)

After reswitching RCD, sixth test will follow automatically.

### 6<sup>th</sup> test

Trip-out time measurement, using test current  $I_{test} = 5I_{\Delta n}$ , at negative start polarity of test current ( $180^\circ$ ). The display message, presented on left side of the next figure, will appear for a while. Successfully ended sixth test (RCD trips within allowed time period) will be followed by result of the sixth test; see the figure below (right side).



**Fig. 32.** Sixth test is running (left figure) and result of the sixth test (right figure)

- Check partial results (Trip-out Times) separately for each step from 1<sup>st</sup> up to 6<sup>th</sup> as well as Contact Voltage at set Nominal differential current (Standard RCD type) or at double Nominal differential current (Selective RCD type) by using the **DISPLAY** key.
- Store displayed result for documentation purpose; see instructions how to store it in chapter 4.1. Storing of test results.

If trip-out time in any step is out of allowed range (see the table 1.), automatic test will be stopped and appropriate message will be displayed (**>xxx ms / <xxx ms**), where xxx means limit value according to the table 1.

If RCD trips during Contact voltage measurement (some leakage current is already flowing to PE conductor or tested RCD is too sensitive), **rcd** message will be displayed blinking way.

**Test of Selective RCD**

For safety reason, Contact voltage measurement is carried out in each step (regardless of RCD type), before Trip-out Time measurement is done. As the Selective type of RCD (delayed trip-out) operates on basis of integration of fault current, it is necessary to relax it, before Trip-out Time measurement is carried out, otherwise the test is not relevant. That is why 30s of waiting time is involved in some steps namely: Step 3, Step 4, Step 5 and Step 6. The waiting time is presented on display as countdown from 30 to 0.

**Notes!**

- Limit Contact Voltage U<sub>lim</sub> can be set in **Contact voltage** function only!
- RCD type and Nominal differential current set in this function will be offered in other RCD functions (wherever actual)!
- For safety reason will Automatic RCD test be carried out only, if Contact voltage at nominal differential current (Standard RCD is selected) or at double nominal differential current (Selective RCD is selected) is lower than set limit value!
- Current, flowing to PE protective conductor, caused by faulty appliances or capacitive connection between L and PE terminals, will influence on test result. Disconnect such appliances before measurement is started!
- Specified accuracy of tested parameters is valid only, if earthing system connected to PE terminal is free of interfering voltages!
- **bat** message, displayed during or after finishing the measurement means batteries are too weak to guarantee correct result. Replace the batteries.

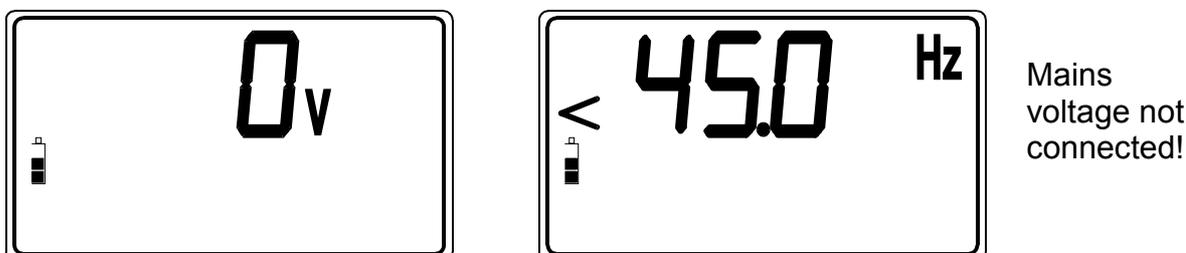
### 3.9. Fault Loop Resistance and Prospective Short-circuit Current

For general information concerning the measurement, refer to enclosed handbook **Measurements on electric installations in practice and theory**.

#### How to carry out the measurement?

##### Step 1

- Connect test cable (Plug commander or Universal test cable) to Instaltest 61557.
- Set function switch to **RLOOP, Isc UL-PE** position, L-PE voltage measurement will start to run; see the figure below (left side):



*Fig. 33. L-PE voltage and frequency measurement*

- Check Frequency of mains voltage, pressing the **DISPLAY** key; see the figure above (right side).

##### Step 2

- **Connect test cable** to tested object (mains outlet or other test terminals), according to the figures below.

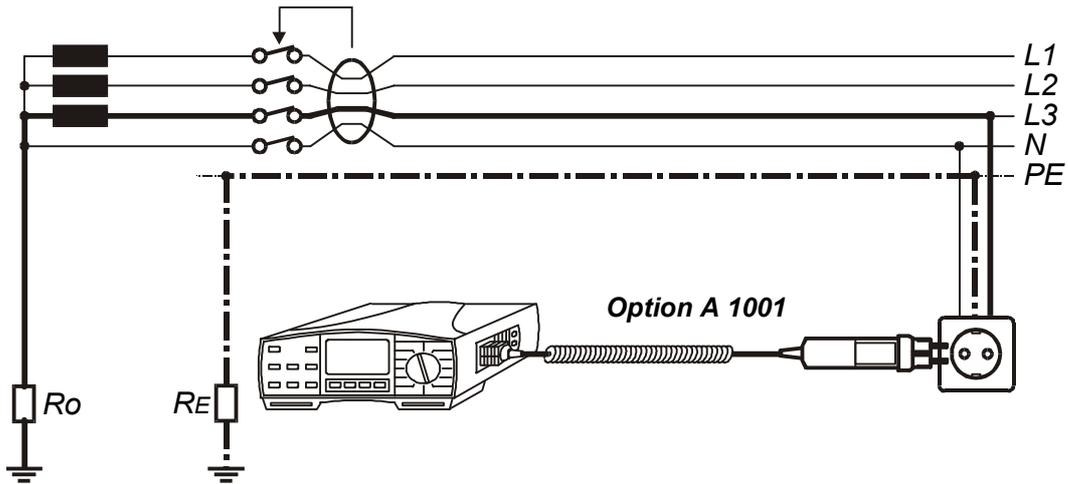


Fig. 34. Connection of optional Plug Commander (Order No. 1001)

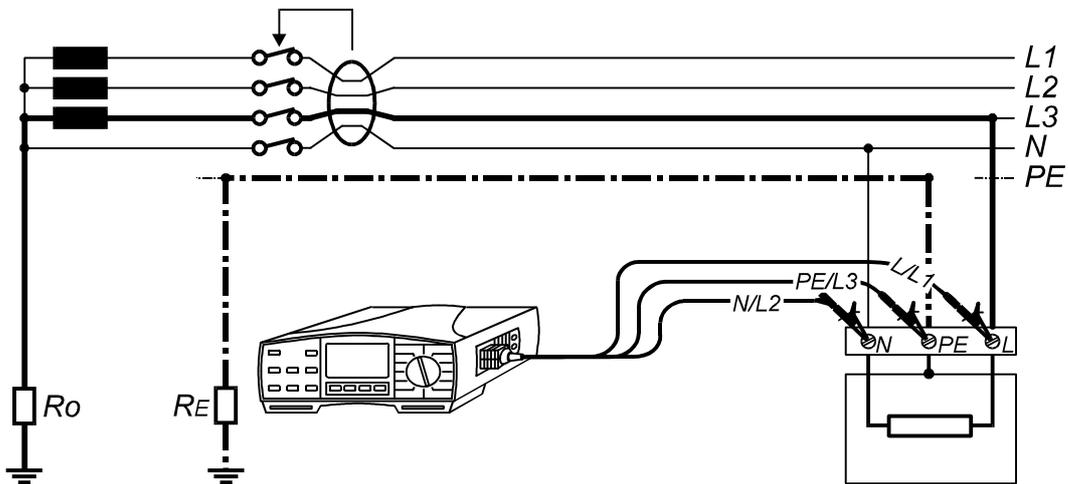


Fig. 35. Connection of Universal Test Cable

### Step 3

- Press the **START** key and release it. Measurement will be carried out and result displayed afterwards.
- Check calculated Prospective Short-circuit Current, pressing the **DISPLAY** key.

The current is calculated as follows:  $I_{psc} = U_n \cdot 1.06 / R_{L-PE}$

Where:

$U_n$  ..... 115 V (100 V  $\leq$   $U_{L-PE}$  < 160 V)  
 230 V (160 V  $\leq$   $U_{L-PE}$   $\leq$  264 V)

- Store displayed results for documentation purpose; see instructions how to store it in chapter 4.1. Storing of test results.

If RCD trips during Contact voltage measurement, **rcd** message will be displayed blinking way.

**Notes!**

- Nominal input voltage range is  $100 \div 264$  V, if input voltage is out of the range, the voltage value equipped with “!” mark will be displayed after pressing **START** key. Warning sound signal will be effected too.
- The instrument will exchange L and N terminals automatically, if N/L2 and L/L1 test leads (Universal test cable) are connected reversed way or terminals on tested wall plug are reversed or Plug commander is turned around.
- If test result is out of display range, **>1999  $\Omega$**  message will be displayed!
- Specified accuracy of tested parameters is valid only, if mains voltage is stabile during the measurement!
- **bat** message, displayed during or after finishing the measurement means batteries are too weak to guarantee correct result. Replace the batteries.

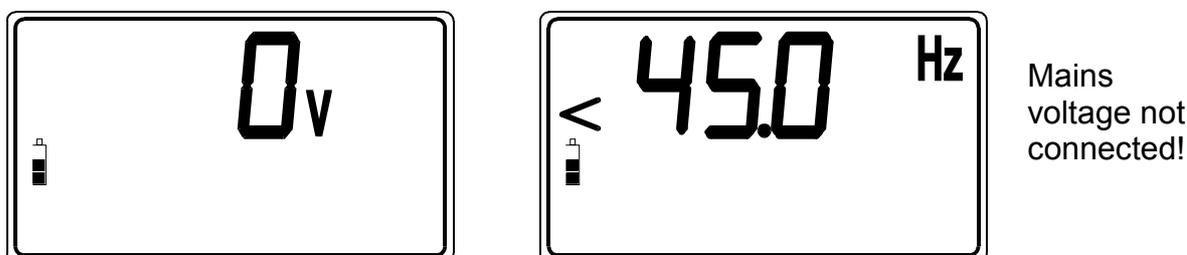
### 3.10. Line Resistance RL-N/RL-L and Prospective Short-circuit Current

For general information concerning the measurement, refer to enclosed handbook **Measurements on electric installations in practice and theory**.

#### How to carry out the measurement?

##### Step 1

- Connect test cable (Plug commander or Universal test cable) to Instaltest 61557.
- Set function switch to **RLINE, Isc UL-N** position, L–N(L) voltage measurement will start to run; see the figure below (left side):

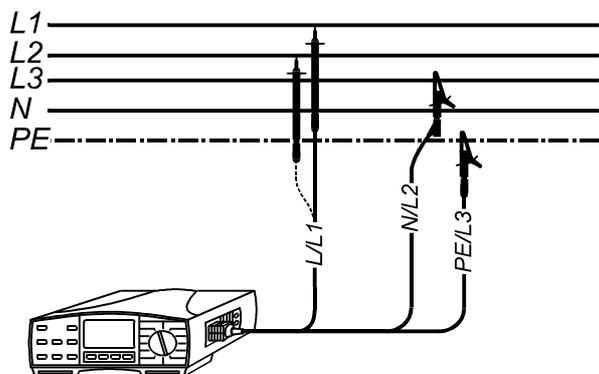


*Fig. 36. L-N(L) voltage and frequency measurement*

- Check the Frequency of mains voltage, pressing the **DISPLAY** key; see the figure above (right side).

##### Step 2

- **Connect test cable** to tested object (mains outlet or other test terminals), according to the figure 34. or 35. (phase to neutral measurement) or according to the figure below (phase to phase measurement) .



*Fig. 37. Phase to phase measurement*

**Step 3**

- Press the **START** key and release it. Measurement will be carried out and result displayed afterwards.
- Check calculated Prospective Short-circuit Current, pressing the **DISPLAY** key.

The current is calculated as follows:  $I_{psc} = U_n \cdot 1,06 / R_{L-N(L)}$

Where:

$U_n$  ..... 115 V ( $100 \text{ V} \leq U_{L-N} < 160 \text{ V}$ )

230 V ( $160 \text{ V} \leq U_{L-N} \leq 264 \text{ V}$ )

400 V ( $264 \text{ V} > U_{L-N} \leq 440 \text{ V}$ )

- Store displayed results for documentation purpose; see instructions how to store it in chapter 4.1. Storing of test results.

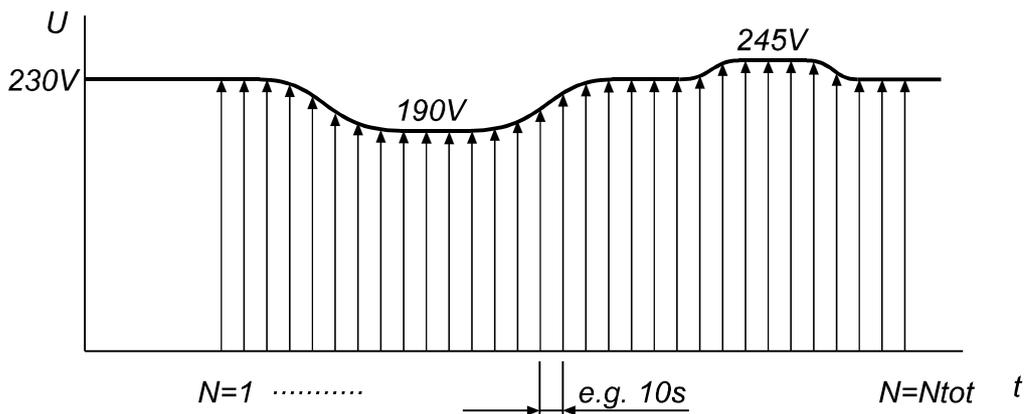
**Notes!**

- Nominal input voltage range is  $100 \div 440 \text{ V}$ , if input voltage is out of the range, the voltage value equipped with “!” mark will be displayed after pressing **START** key. Warning sound signal will be effected too.
- If test result is out of display range, **>1999  $\Omega$**  message will be displayed!
- Specified accuracy of tested parameters is valid only, if mains voltage is stabile during the measurement!
- **bat** message, displayed during or after finishing the measurement means batteries are too weak to guarantee correct result. Replace the batteries.

### 3.11. Voltage Logging

Mains voltage instability may be important reason for different malfunctions noticed at sensitive electrical equipment, machinery, appliances etc. The instability may appear periodically during a certain period of time (starting-up or switching off powerful machinery, transformers, distribution systems etc.).

In order to record and later analyse the voltage variations, the Instaltest 61557 can perform the long-term Logging measurements. The instrument is intended for recording of slow voltage variations; see the figure below.



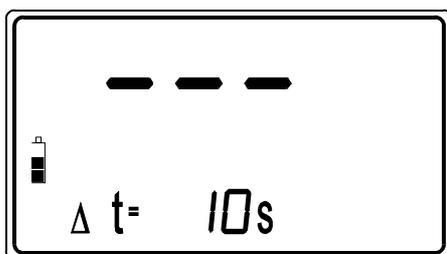
**Fig. 38.** Slow voltage variations measurable by the Logging function

Measurement parameters like sampling period and total number of measurements are presettable.

### How to carry out the measurement?

#### Step 1

- Connect test cable (Plug commander or Universal test cable) to Instaltest 61557.
- Set function switch to **UL-N LOG** position, "Logging initial menu" will be displayed; see the figure below.



$\Delta t$ ..... Last set Sampling periode

**Fig. 39.** Logging initial menu

- Clear all potentially stored results, preparing enough free locations for the Logging operation, regardless of total number of all measurements set in continuation. If stored results are still needed for documentation purpose (they should not be erased in that case) then transfer them to PC first and then erase. Press the **CLR** key twice in order to erase all stored results.

## Step 2

- Set **Sampling period** (one measurement will be performed every set period).

### How to set the Sampling period

- Press the **SELECT** key to enter **Sampling period adjusting mode**, last set period starts to blink.
- Set appropriate value using the ↑ and ↓ keys. Value from 1 up to 99 can be set.

## Step 3

- Set Total number of measurements.

### How to set the Number?

- Press the **SELECT** key after setting Sampling period to enter **Total number adjusting mode**, last set total number starts to blink.
- Set appropriate value using the ↑ and ↓ keys. Value from 1 up to 1999 can be set.
- Press the **SELECT** key after setting the Total number of measurements, **Voltage Logging initial menu** will be displayed again; see the figure 35.

## Step 4

- Connect test cable to tested object (terminals).
- Press the **START** key to start the Logging operation, actual present voltage will be currently displayed and **mem** mark will blink each set period, indicating the actual voltage has been stored. Number of already carried out samples will be currently displayed as well.
- Once preset total number of samples is reached, **End** indication is displayed.
- Check the lowest voltage value stored during the Logging operation, then the highest one, the average one and finally preset parameters by using the **DISPLAY** key.

**Notes!**

- Nominal input voltage range is 0 V ÷ 440 V.
- Results of the Logging function can be transferred to PC for further analysing, all stored values will be transferred not only the min, max and AVG value.
- Stored results of the Logging function have to be erased before any other measurement will be stored, otherwise **LOG MEM** indication will be displayed for a while after any attempt to store any result.
- **bat** message, displayed during or after finishing the measurement means batteries are too weak to guarantee correct result. Replace the batteries.

### 3.12. Phase rotation

For general information concerning the test, refer to enclosed handbook **Measurements on electric installations in practice and theory**.

#### How to carry out the measurement?

##### Step 1

- Connect test cable (Three phase cable or Universal test cable) to Instaltest 61557.
- Set function switch to **phase rotation** position, “Phase rotation initial menu” will be displayed; see the figure below.

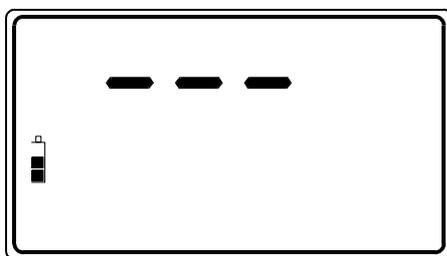


Fig. 40. Phase rotation initial menu

##### Step 2

- **Connect test cable** to tested object (three-phase mains outlet or other test terminals), according to the figure below.

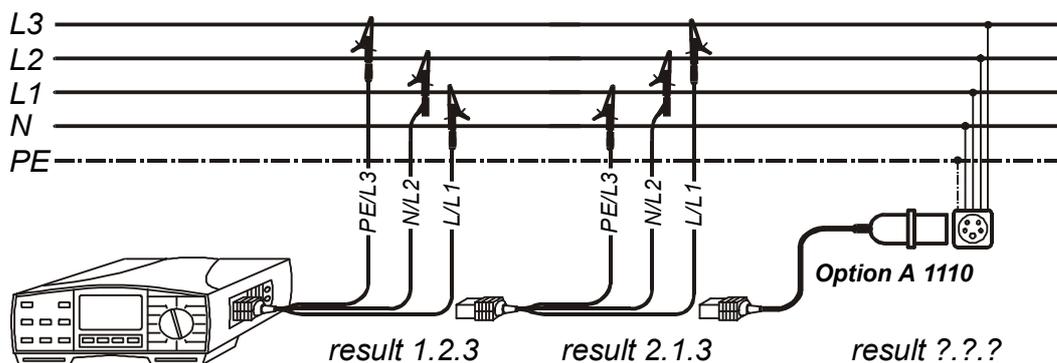


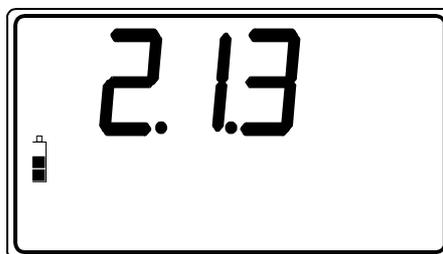
Fig. 41. Connection of Universal Test Cable and optional Three-phase Cable (Order No. A 1110)

**Step 3**

- Press the **START** key and release it. Measurement starts to run (continuous measurement), result is currently displayed; see an example of the result on the figure below.



Phase sequency **in accordance** with cable marks.



Phase sequency **not in accordance** with cable marks.

**Fig. 42.** Phase rotation test result

- Press the **START** key again, to stop the measurement. Last current result will stay displayed.
- Store displayed result for documentation purpose; see instructions how to store it in chapter 4.1. Storing of test results.

**Notes!**

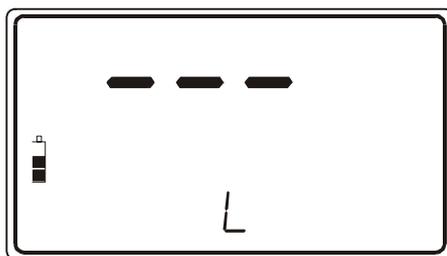
- Nominal input voltage range is 100 V ÷ 440 V.
- If there are mains voltages present at test tips, but they do not correspond to three-phase system (for example two test tips are connected correctly to two phases, while the third one is connected to neutral terminal), **1.1.1** message will be displayed.
- **bat** message, displayed during or after finishing the measurement means batteries are too weak to guarantee correct result. Replace the batteries.

### 3.13. Illumination

#### How to carry out the illumination measurement?

##### Step 1

- Connect LUXmeter probe to Instaltest 61557.
- Set function switch to **SENSOR** position, the following menu will be displayed.



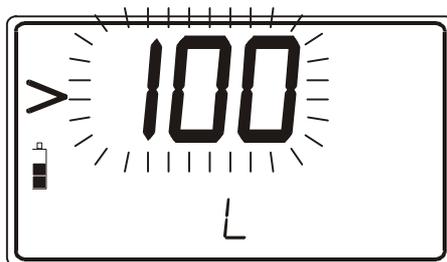
*Fig. 43. Illumination measurement initial menu*

##### Step 2

- Set **Low limit Illumination value**. Later will measured results be compared with the set limit value and, if lower, they will be equipped with “!” mark.

#### How to set the Low limit value?

- Press the **SELECT** key, to enter “Low Limit value adjustment mode”, the following menu will appear:

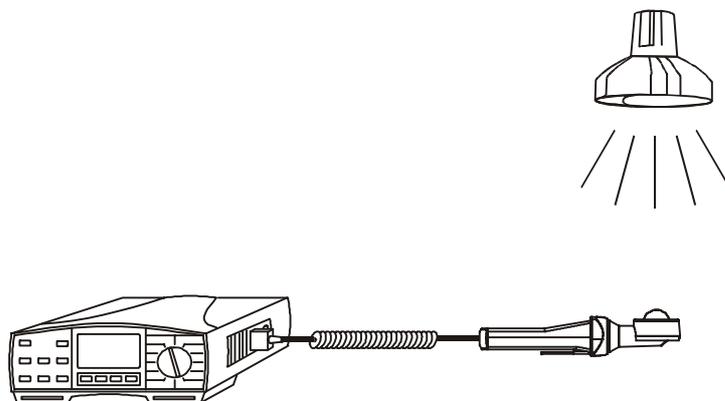


*Fig. 44. Low limit value adjustment menu and the table of available limit values*

- Use the  $\uparrow$  and  $\downarrow$  keys, to set required Low Limit Value. Individual strike will increase/decrease the value for one step, while continuous pressure will increase/decrease it continuously. If test results are not to be compared with Low Limit Value at all, then press the **CLR** key, **no** will be displayed instead of set value.

**Step 3**

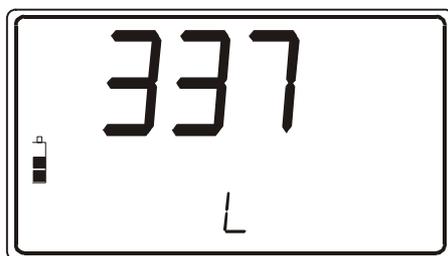
- Position LUXmeter probe parallel to the surface to be evaluated. Turn on the LUXmeter probe pressing **ON/OFF** key. Green lamp should light.



*Fig. 45. LUXmeter probe positioning*

**Step 4**

- Press the **START** key and release it. Instrument will start measuring illumination. Press the **START** key to stop the measurement. Last measured result will be shown on display. See an example of test result on the figure below.



*Fig. 46. Illumination value displayed*

Store displayed result for documentation purpose; see instructions how to store it in chapter 4.1. Storing test results.

**Notes!**

In order measured value not to be influenced by shadows and nonuniform surface illumination one has to be careful when positioning LUXmeter probe.

bat message, displayed during or after finishing the measurement means batteries are too weak to guarantee correct result. Replace the batteries.

### 3.14. Tracing of electric installation

There are two possible manners to trace installation by using the Instaltest 61557 namely:

- Instaltest 61557 loads installation under mains voltage in a pulsed manner. In that case, hand-held indicator follows electro-magnetic field, generated around the loaded conductor.
- The Instaltest 61557 imposes it's own test signal to voltage-free installation. In that case, hand-held indicator follows radiated signal around connected conductor.

For additional general information concerning the operation, refer to enclosed handbook **Measurements on electric installations in practice and theory**.

Let's see the procedure.

#### Step 1

- Connect test cable (Universal test cable or Plug commander) to Instaltest 61557.
- Set function switch to **LOCATOR** position, the following menu will be displayed:

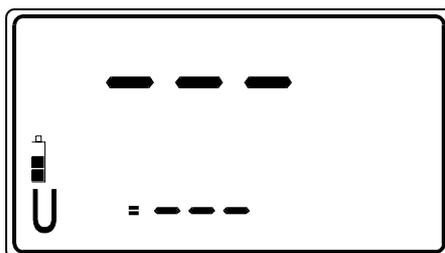


Fig. 47. Installation tracing initial menu

#### Step 2

- **Connect test cable** to tested object, according to the figure below.

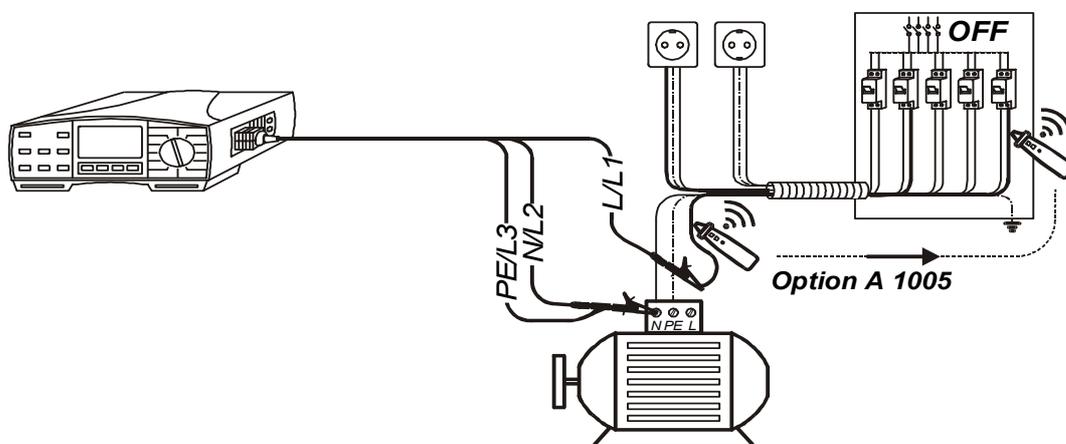
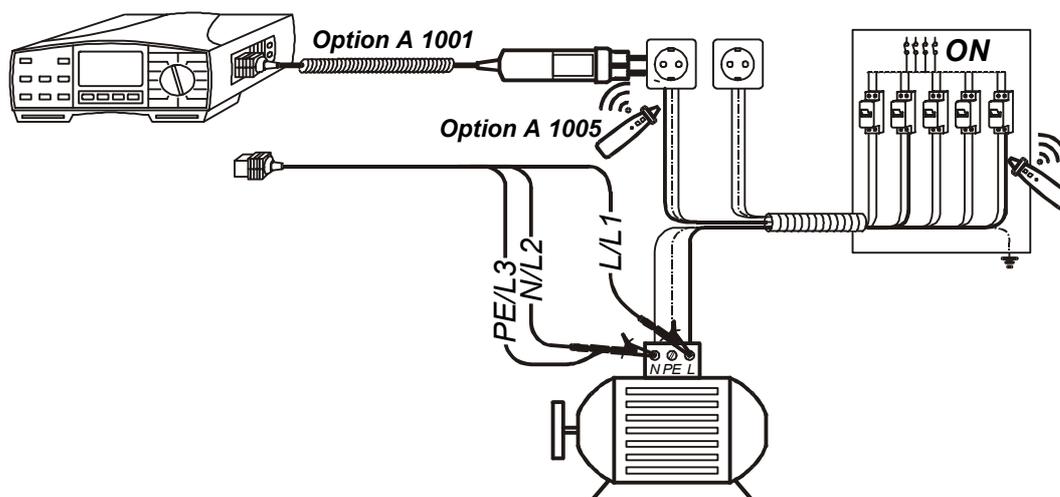


Fig. 48. Connection of Universal Test Cable to a voltage-free conductor

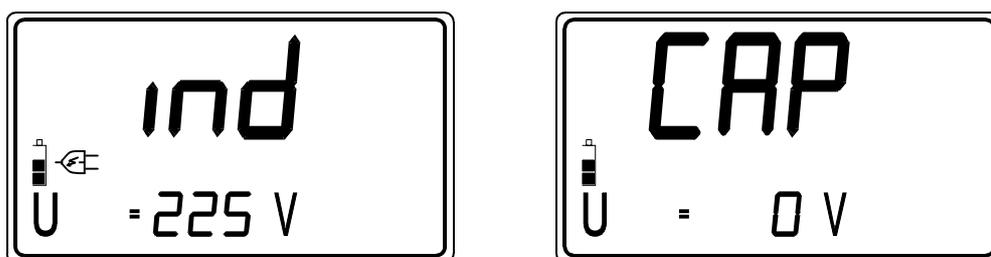
ested conductor shall be disconnected from load (motor), enabling the test signal to spread along phase conductor.



**Fig. 49.** Connection of Universal Test Cable and optional Plug Commander (Order No. **A 1001**) to energised installation

### Step 3

- Press the **START** key and release it. Generating of test signal starts to run (continuous function). The Instaltest 61557 will recognise automatically, whether there is a free-voltage installation or energised one. On that basis it will start either to impose it's own signal (free-voltage installation) or to load mains voltage (mains voltage present). The following message will be displayed:



**Fig. 50.** Display message, while tracing function is running - installation under mains voltage (left figure) and voltage-free installation (right figure)

**ind** ..... Inductive mode (Mains voltage is loaded),  
**CAP** ..... Capacitive mode (Mains voltage is not present)

### Step 4

- Set the same test signal receiving mode on hand-held indicator, as written on display of the instrument (see the figure above).
- Press the **START** key on hand-held indicator and keep it pressed, while tracing test signal.

## 4. Memory and other operations

### 4.1. Storing of test results

In order memory manipulation to be as clear as possible and recognition of measurement location stored result belongs to be as understandable as possible, practical model of electric installation is used.

Let's see a general, practical diagram of electric installation usually met, when dealing with measurements on electric installations (figure 47).

On basis of this diagram, the following basic structure can be defined:

**FUSE CABINET** Offices  
    **FUSE** Lamps  
    **FUSE** Wall outlets  
    **FUSE** Computer system  
    .  
    .

**FUSE CABINET** Development dpt.  
    **FUSE** Lamps  
    **FUSE** Working station  
    .  
    .

**FUSE CABINET** Industrial hall  
    **FUSE** Lamps  
    **FUSE** Wall outlets  
    **FUSE** CNC machine  
    .  
    .

Two main levels are involved namely: **FUSE CABINET** (higher level) and **FUSE** (lower level)

This is the system, used in the Instaltest 61557. Instead of actual names of FUSE CABINETS and FUSES three-digit code is used. The code range is 001 up to 999.

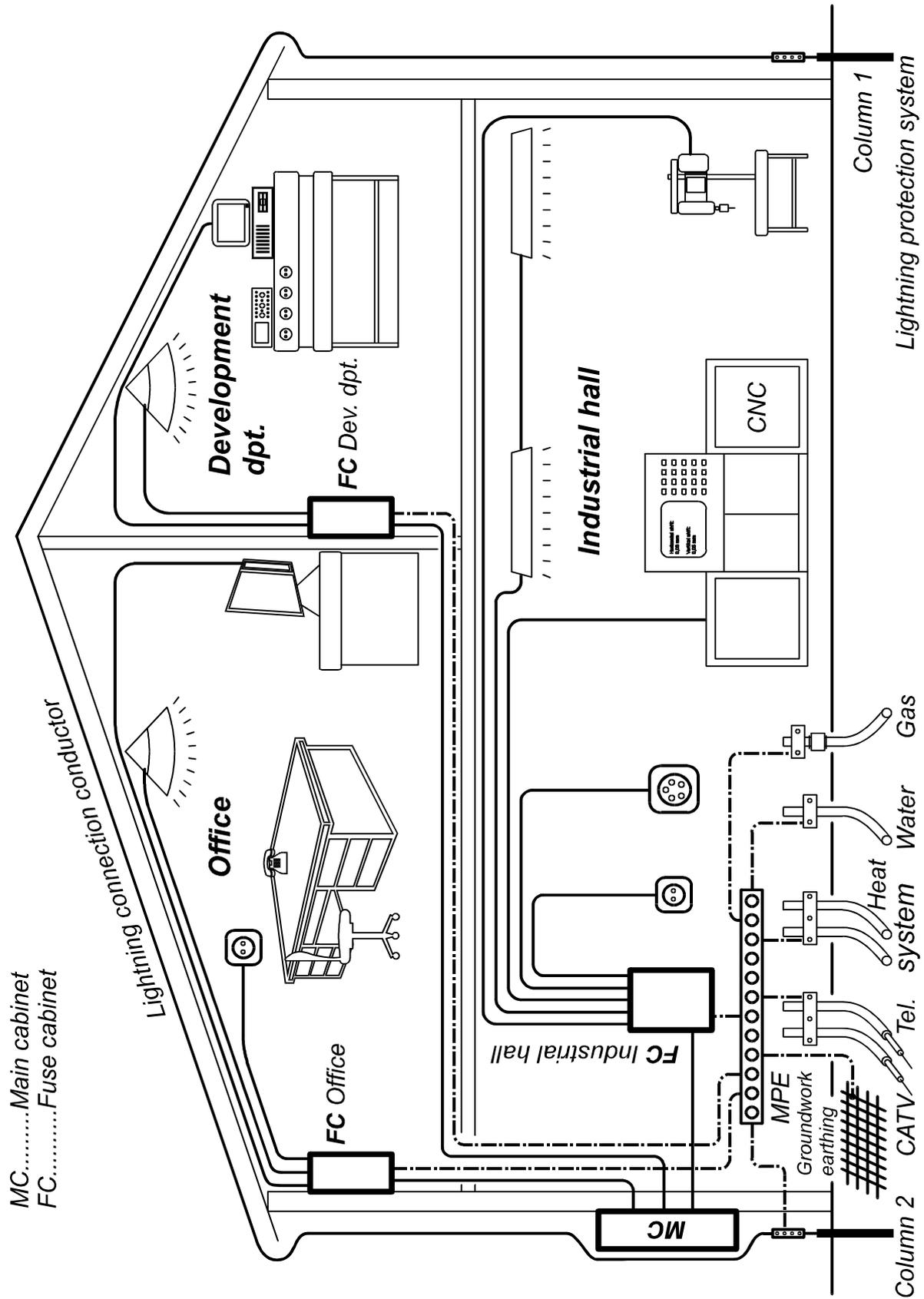


Fig. 51. General electric installation

All test results can be stored, except the following: Continuity (auxiliary function), Phase rotation (comparative test) and Voltage/Frequency.

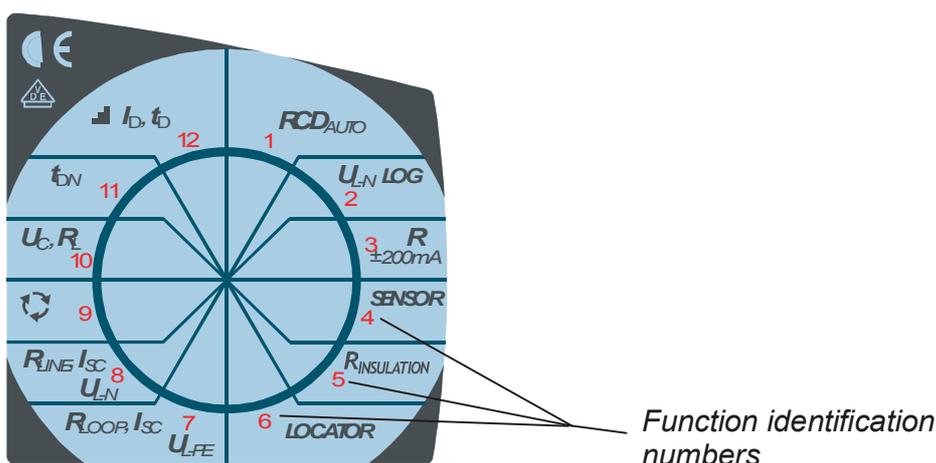
### How to store displayed test result?

- SAVE** FUSE code is offered (blinking).
- ▲ ▼** Set FUSE code (001 up to 999 can be set).
- SELECT** FUSE CABINET code is offered (blinking).
- ▲ ▼** Set FUSE CABINET code (001 up to 999 can be set).
- SAVE** Store displayed result under set FUSE / FUSE CABINET code.

Result is thus stored, note used FUSE CABINET and FUSE codes down to electric diagram of tested installation for later recognition of stored result.

Main result, potential subresults and potential function parameters as well as Function identification number (see the figure below) are stored, whenever “Store” procedure is affected.

More test results (regardless of test function) can be stored under the same FUSE CABINET/FUSE code. This will be done simply, effecting double click to **SAVE** key. **FUL** message will be displayed in case all memory locations are occupied.



**Fig. 52.** Function identification numbers

Aim of storing the identification number is to make clear which function recalled result belongs to.

## 4.2. Recalling of stored results

Stored results can be displayed whenever needed for visual check. Main result, potential subresults and potential function parameters as well as function identification number can be recalled.

### How to recall stored results?



FUSE location will be offered (blinking). Function identification number of last result, stored under offered FUSE/FUSE CABINET code, will be displayed.



Set FUSE code (001 up to 999 can be set).



FUSE CABINET code will be offered (blinking).



Set FUSE CABINET code (001 up to 999 can be set).



FUSE CABINET code will stop blinking.



Check main result, subresults and function parameters, hidden behind displayed Function identification number.



Move to other test results, stored under the same FUSE / FUSE CABINET code using the ↑ and ↓ keys.



Check main result, subresults and function parameters, hidden behind displayed Function identification number.



Repeat the whole procedure, to recall results, stored under other FUSE / FUSE CABINET codes.

If there is no stored result at all, **no** message will be displayed for a while, after pressing RCL key.

If there is no stored result under set FUSE / FUSE CABINET code, **no** message will blink, whenever the code is changed.

Organisation of memory locations, under a certain FUSE / FUSE CABINET code, is presented on the figure below.



### 4.3. Erasing of stored results

Two modes of erasing stored results are available namely:

- All stored results can be erased in one step
- A certain stored result only can be erased

#### How to erase all stored results in one step?

Change function switch position in order to exit any potentially started operation (recalling, storing test result ...), then press the **CLR** key, **Clr ALL** message starts to blink. Confirm erasing, pressing the **CLR** key again, all stored results will be erased.

#### How to erase a certain stored result only?

Recall a certain result to be erased, following the procedure described in paragraph 4.2. **Recalling of stored results.**

Press the **CLR** key, **Clr** message starts to blink. Confirm erasing, pressing the **CLR** key again. Only result, displayed before **CLR** key was pressed, will be erased.

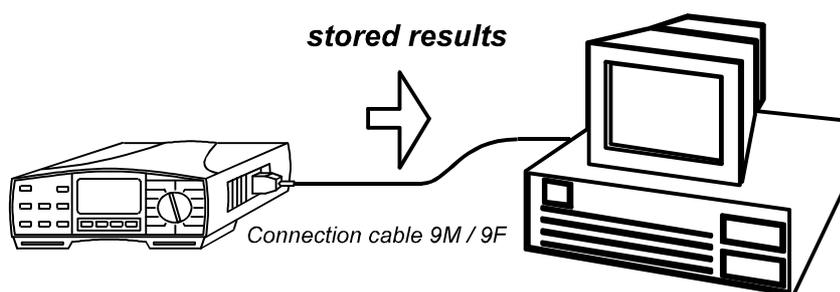
Function number of the next stored result will be offered to be erased. The procedure may be repeated, in order to erase other stored results too.

### 4.4. RS 232 communication

Stored results can be transferred to PC, where final test protocol will be formed. PC SW **Instal – Link** (enclosed in Standard set) is needed for this operation.

#### How to transfer stored results?

- Connect the Instaltest 61557 to PC as shown on the figure below.



**Fig. 54.** Connection of the Instaltest 61557 to PC

- Install and run PC SW **Instal – Link**.
- Set the Instaltest 61557 to RS232 mode, pressing the **RS232** key. **rS** indication will be displayed.
- Use **Instal – Link** commands on PC, to transfer stored results from Instaltest 61557 to PC and later to form final test protocol.

## 4.5. Reset of the instrument

If any malfunction is noticed when dealing with the Instaltest 61557, it is advisable **RESET** of the instrument to be carried out. In that case all settable parameters will be set to their initial values; see the table below. Stored results will not be erased.

### How to reset the instrument?

- Switch OFF the instrument.
- Press the **CAL** key and keep it pressed, while switching ON the instrument. **rES** message will be displayed for a while meaning RESET function has been completed.

Parameter	Function	Initial value
Compensation of test leads	R±200mA	Annulled
High limit value	R±200mA	no
Nominal differential current	All RCD functions	10 mA
Type of RCD	All RCD functions	G (general)
Limit Contact voltage	All RCD functions	50 V
Multiplier of Nominal differential current	tΔN	× 1/2
Period between two measurements	UL-N LOG	1s
Total number of measurements	UL-N LOG	100
High limit of Breakdown voltage	varistor TEST	no
Low limit of Breakdown voltage	varistor TEST	no
Low limit of illumination	SENSOR	no
Test voltage	R ISO	50 V
Low limit of Insulation Resistance	R ISO	no

**Table 2.** Initial values of settable parameters

## 5. Maintenance

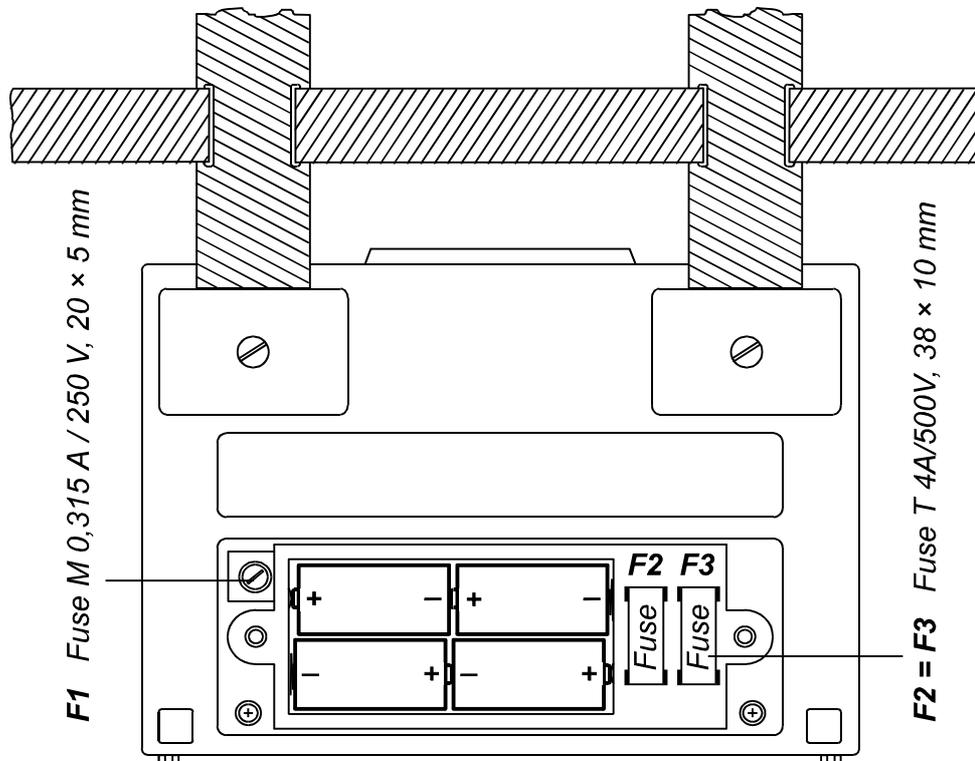
### 5.1. Batteries

-  - Disconnect test cable and switch off the instrument, before removing battery compartment cover!
-  - Hazardous voltage under the battery compartment cover!

Battery condition is currently displayed; see the battery condition mark in the left side of display. Fully dark battery mark presents full-capacity batteries. Follow the battery condition even during carrying out measurements. Results obtained with low battery voltage (the results may be incorrect) will be marked with **bat** mark after finishing the measurement.

**Replace all four batteries, when the battery mark is empty in static mode (no measurement is running) or when the battery mark trips to empty frame just temporarily, while a measurement is running!**

Nominal power supply voltage is 6 Vd.c. Use four 1,5 V alkaline batteries, type IEC LR14 (dimensions: diameter = 26 mm, height = 50 mm).



**Fig. 55. Correct polarity of inserted batteries**

**One set of full-capacity batteries can supply the instrument for approx. 50 hours at the ratio measurement / pause = 5s / 25s.**

**Commander and Locator batteries:**

Red lamp ON means low battery condition. Unscrew two screws on backside of the device in order to remove battery cover. Use 9V battery type 6 LR 61!

**LUXmeter batteries:**

Blinking green lamp means low battery condition. Unscrew two screws on backside of the device in order to remove battery cover. Use 9 V battery type 6 LR 61!

**Notes!**

- Insert batteries correctly, otherwise test instrument will not operate and batteries may be discharged; see the figure 51. for correct battery polarity.
- Transfer stored results to PC, before removing the batteries!
- The results will be lost, when the batteries are removed and all settable parameters will be set to their initial values after replacing the batteries; see the paragraph
- 4.5. Reset of the instrument.

In order not to loose stored data, follow the next procedure when replacing the batteries:

- Switch OFF the instrument.
- Replace the batteries within one minute.
- Switch ON the instrument, **Clr** message will not be displayed, indicating stored data has not been erased.

## 5.2. Fuses

There are three fuses under battery compartment cover (see the figure 51.).

- **F1 = M 0,315A/250V**, 20 × 5 mm (It protects internal circuitry of the test instrument, if test tips are connected to mains voltage during Continuity of protective conductors or Continuity measurement by mistake).
- **F2 = F3 = T 4A/500V**, 38 × 10 mm, Breaking capacity 10kA/500V, type FLQ4, produced by Littelfuse (General fuse on input of measurement terminals L/L1 and N/L2).

Check the fuses F2 and F3, if one of the following malfunctions is noticed:

- **r**cd message is blinking after pressing the **START** key in all RCD functions as well as in RLINE/Ipsc and RLOOP/Ipsc function.
- **>1999Ω** message is displayed in R±200 mA functions, in spite of shorted test leads.
- **>200 MΩ** or **>1000 MΩ** message is displayed in R ISO function, in spite of shorted test leads.
- **>1000 V** message is displayed in varistor TEST function, in spite of shorted test leads.

Check the fuse F1, if **FuS** message is displayed in R±200 mA functions.

**Warning!**

- Replace blown fuse with original one only, otherwise the instrument may be damaged and/or operator's safety impaired!

**5.3. Cleaning**

Use soft patch, slightly moistened with soap water or alcohol, to clean the surface of Instaltest 61557 and leave the instrument to dry totally, before using it.

**Notes!**

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

**5.4. Periodic calibration**

It is essential, that all measurement instruments are regularly calibrated. For occasional daily use, we recommend an annual calibration to be carried out. When the instrument is used continuously every day, we recommend that calibration is carried out every sixth months.

**5.5. Service**

Repairs under or out of warranty time: Please contact your distributor for further information.

Distributor's address:

Producer's address:

METREL d.d.  
Ljubljanska 77  
SI-1354 Horjul

Tel.: +386 1 75 58 200  
Fax.: +386 1 75 49 226  
<http://www.metrel.si>  
E-mail: [metrel@metrel.si](mailto:metrel@metrel.si)

Unauthorised person is not allowed to open the Instaltest 61557. There are no user replaceable components inside the instrument, except the fuse, refer to paragraph **5.2. Fuses.**

## 6. Technical specification

### 6.1. Functions

#### Insulation resistance

Meas. range Riso (Un ≥ 250V) ... (0.008 ÷ 1000)MΩ

Display range Riso (MΩ) Un ≥ 250V	Resolution (MΩ)	Accuracy*
0.000 ÷ 1.999	0.001	±(2% of r. + 2D)
2.00 ÷ 19.99	0.01	
20.0 ÷ 199.9	0.1	
200 ÷ 1000	1	±(10% of r.)

\*Specified accuracy is valid, if **Universal test cable** is used while it is valid up to 200 MΩ if **Tip Commander** is used.

Meas. range Riso (Un < 250V) .. (0.012 ÷ 199.9)MΩ

Display range Riso (MΩ) Un < 250V	Resolution (MΩ)	Accuracy
0.000 ÷ 1.999	0.001	±(5% of r. + 3D)
2.00 ÷ 19.99	0.01	
20.0 ÷ 199.9	0.1	

Display range Test voltage (V)	Resolution (V)	Accuracy
0 ÷ 1200	1	±(2% of r. + 3D)

Nom. test voltage .... 50 ÷ 1000Vd.c. in steps of 10V  
 Current capability of test generator  
 (at Utest. > Un) ..... >1mA  
 Short-circuit test current ..... <3 mA  
 Automatic discharge of tested object ..... yes

#### Continuity of protective conductors

Meas. range R.....(0.08 ÷ 1999)Ω

Display range R (Ω)	Resolution (Ω)	Accuracy
0.00 ÷ 19.99	0.01	±(2% of r. + 2D)
20.0 ÷ 199.9	0.1	±(3% of r.)
200 ÷ 1999	1	

Open-terminal test voltage ..... 4 - 7 Vd.c.  
 Short-circuit test current ..... > 200 mA  
 Compensation of test leads (up to 5 Ω) ..... yes  
 Sound signal ..... yes  
 Automatic polarity exchange ..... yes  
 Measurement mode ..... single measurement

#### Continuity

Display range R (Ω)	Resolution (Ω)	Accuracy
0.0 ÷ 199.9	0.1	±(3% of r. + 3D)
200 ÷ 2000	1	

Open-terminal test voltage.....4 - 7 Vd.c.  
 Short-circuit test current.....< 7 mA  
 Sound signal .....yes  
 Measurement mode ..... continuous measurement

#### RCD – general data

Nominal differential  
 currents ..... 10, 30, 100, 300, 500, 1000 mA  
 Accuracy of actual differential currents:  
 -0 / +0.1·IΔ; IΔ = IΔN, 2·IΔN, 5·IΔN  
 -0.1·IΔN / +0; IΔ = 0.5·IΔN  
 Accuracy of actual diff. currents..... (-0 / +0.1)IΔN  
 Test current shape ..... sine wave  
 Test current start at..... 0° or 180°  
 RCD type ..... Standard or Selective

#### RCD – Contact Voltage Uc

Meas. range Uc..... (10 ÷ 100)V

Display range Uc (V)	Resolution (V)	Accuracy*
0.00 ÷ 9.99	0.01	(-0 / + 10)% of r. ± 0.2V
10.0 ÷ 100.0	0.1	(-0 / + 10)% of r.

\*The accuracy is valid if:  
 Mains voltage is stabile during the  
 meas.  
 PE terminal is free of interfering voltage

Measurement principle ..... without aux. probe  
 Test current..... < 0.5 IΔN  
 Limit contact voltage ..... 25 or 50 V  
 The Contact Voltage is calculated to IΔN  
 (standard type) or to 2IΔN (selective type).

#### RCD – Fault Loop Resistance RL (Loop function)

Display range RL (Ω)	Resolution (Ω)	Accuracy
0.00 ÷ 19.99	0.01	±(5% of r. + 0.05V/ IΔN + 0.2Ω)
20.0 ÷ 199.9	0.1	
200 ÷ 1999	1	
2.00k ÷ 10.00k	0.01k	

Calculation .....  $RL = U_c / I_{\Delta N}$   
 Measurement principle..... without auxiliary probe  
 Test current .....  $< 0.5 I_{\Delta N}$

**RCD – Trip-out time**

Test current .....  $0.5 I_{\Delta N}, I_{\Delta N}, 2 I_{\Delta N}, 5 I_{\Delta N}$   
 (multiplier 5 is not available, if  $I_{\Delta N} = 1000mA$ )

Meas. range t (G type) .... (0ms ÷ upper disp. value)

Display range t (ms) G type	Resolution (ms)	Accuracy
0 ÷ 300 (1/2I <sub>ΔN</sub> , I <sub>ΔN</sub> )	1	±3ms
0 ÷ 150 (2I <sub>ΔN</sub> )	1	
0 ÷ 40 (5I <sub>ΔN</sub> )	1	

Meas. range t (S type)..... (0ms ÷ upper disp. value)

Display range t (ms) S type	Resolution (ms)	Accuracy
0 ÷ 500 (1/2I <sub>ΔN</sub> , I <sub>ΔN</sub> )	1	±3ms
0 ÷ 200 (2I <sub>ΔN</sub> )	1	
0 ÷ 150 (5I <sub>ΔN</sub> )	1	

**RCD – Trip-out current**

Meas. range I<sub>Δ</sub> ..... (0.2 ÷ 1.1) I<sub>ΔN</sub>

Display range I <sub>Δ</sub>	Resolution	Accuracy
0.2I <sub>ΔN</sub> ÷ 1.1I <sub>ΔN</sub>	0.05I <sub>ΔN</sub>	±0.1I <sub>ΔN</sub>

Meas. range t<sub>Δ</sub> ..... (10 ÷ 300)ms

Display range t <sub>Δ</sub> (ms)	Resolution (ms)	Accuracy
0 ÷ 300	1	±3ms

Meas. range U<sub>ci</sub> ..... (10 ÷ 100)V

Display range U <sub>ci</sub> (V)	Resolution (V)	Accuracy*
0.00 ÷ 9.99	0.01	(-0/+10)% of r. ± 0.2V
10.0 ÷ 100.0	0.1	(-0/+10)% of r.

\*The accuracy is valid if:  
 Mains voltage is stabile during the meas.  
 PE terminal is free of interfering voltage  
 U<sub>ci</sub> voltage is calculated to Trip-out current I<sub>Δ</sub>.

**Fault Loop Resistance and Prospective Short-circuit Current**

Meas. range RL-PE .....(0.20 ÷ 1999)Ω

Display range RL-PE, (Ω)	Resolution (Ω)	Accuracy
0.00 ÷ 19.99	0.01	±(5% of r. + 5D)
20.0 ÷ 199.9	0.1	
200 ÷ 1999	1	

Display range I <sub>psc</sub> (A)	Resolution (A)	Accuracy
0.06 ÷ 19.99	0.01	Consider accuracy of RL-PE
20.0 ÷ 199.9	0.1	
200 ÷ 1999	1	
2.00k ÷ 19.99k	10	
20.0k ÷ 24.4k	100	

I<sub>psc</sub> calculation: ..... I<sub>psc</sub> = U<sub>N</sub>·1.06 / RL-PE  
 U<sub>N</sub> = 115 V; (100 V ≤ U<sub>L-PE</sub> < 160 V)  
 U<sub>N</sub> = 230 V; (160 V ≤ U<sub>L-PE</sub> ≤ 264 V)  
 Max. test current (at 230 V) ..... 2.5 A  
 Nominal voltage range ..... 100 ÷ 264V / 45 - 65 Hz

**Line Resistance and Prospective short-circuit current**

Meas. range RL-N(L) ..... (0.20 ÷ 1999)Ω

Display range RL-N(L), (Ω)	Resolution (Ω)	Accuracy
0.00 ÷ 19.99	0.01	±(5% of r. + 5D)
20.0 ÷ 199.9	0.1	
200 ÷ 1999	1	

Display range I <sub>psc</sub> (A)	Resolution (A)	Accuracy
0.06 ÷ 19.99	0.01	Consider accuracy of RL-N(L)
20.0 ÷ 199.9	0.1	
200 ÷ 1999	1	
2.00k ÷ 19.99k	10	
20.0k ÷ 24.4k	100	

I<sub>psc</sub> calculation: ..... I<sub>psc</sub> = U<sub>N</sub>·1.06 / RL-N(L)  
 U<sub>N</sub> = 115 V; (100 V ≤ U<sub>inp</sub> < 160 V)  
 U<sub>N</sub> = 230 V; (160 V ≤ U<sub>inp</sub> ≤ 264 V)  
 U<sub>N</sub> = 400 V; (264 V < U<sub>inp</sub> < 440 V)  
 Max. test current (at 230 V) ..... 2.5 A  
 Nominal voltage range ..... 100 ÷ 440 V / 45 - 65 Hz

**Phase rotation**

Nominal mains voltage range ..... 100 ÷ 440V  
 Result displayed..... 1.2.3 or 2.1.3

**Voltage**

Display range U (V)	Resolution (V)	Accuracy
0 ÷ 440	1	±(2% of r. + 2D)

Nominal frequency range ..... 45 – 65 Hz

**Frequency**

Display range f (Hz)	Resolution (Hz)	Accuracy
45.0 ÷ 65.0	0.1	±(0.1% of r. +1D)

Nominal voltage range ..... 10 ÷ 440V

**Varistor Over-voltage Protection Devices (Breakdown voltage)**

Display range U (V)	Resolution (V)	Accuracy
0 ÷ 1000	1	±(5% of r. + 10V)

Measurement principle ..... d.c.voltage ramp  
 Test voltage slope .....500 V/s  
 Threshold current ..... 1 mA

**Illumination (LUX meter type B)**

Display range E (Lux)	Resolution (Lux)	Accuracy
0.01 ÷ 19.99	0.01	±(5 % of r. + 2D)
20.0 ÷ 199.9	0.1	
200 ÷ 1999	1	
2.00 ÷ 19.99 k	10	

Measurement principle .....  
 .....silicion photodiode with V(λ) filter  
 Spectral response error .....  
 ..... less than 3.8 % according to CIE curve  
 Cosine error .....  
 .less than 2.5 % up to an incident angle of +/- 85 degrees

Overall accuracy match to DIN 5032 Class B standard  
**Illumination (LUX meter type C)**

Display range E (Lux)	Resolution (Lux)	Accuracy
0.1 ÷ 19.99	0.01	±(10 % of r. +
20.0 ÷ 199.9	0.1	
200 ÷ 1999	1	
2.00 ÷ 19.99 k	10	

Measurement principle ..... silicion photodiode  
 Cosine error .....  
 . less than 3.0 % up to an incident angle of +/- 85 degrees  
 Overall accuracy match to DIN 5032 Class C standard

**Fault/Fuse/Conductor locator**

Principle ..... Line loading or Imposing of test signal

Loading (mains voltage range  
 30÷264V/45÷65Hz):

Is < 1A pulsed  
 fs = 3600 Hz

Imposing (voltage free installation):

Us < 7V pulsed  
 fs = 3600 Hz  
 Isc < 50mA pulsed

**Voltage Logging**

Final result ..... UAVG, Umax/Nmax, Umin/Nmin  
 Input voltage range .....0÷440V  
 Sampling once per ..... 1s÷99s in steps of 1s  
 Total number of samples ..... 1÷1999

**6.2. General characteristics**

Power supply ....6Vd.c. (4 × 1.5V battery IEC LR14)  
 Automatic comparison of test result with set  
 high and low limit value ..... yes  
 Visual and sound warnings ..... yes  
 Dimensions (w × h × d) .....26.5 × 11 × 18.5 cm  
 Weight (without accessories, with batteries).. 1.8 kg  
 Display..... LCD with backlight  
 Memories .....approx. 1000 measurements  
 Computer connection ..... RS 232

Protection classification ..... double insulation  
 Over-voltage cat. ....CATIII/300V or CATII/600V  
 Pollution degree ..... 2  
 Degree of protection ..... IP 44  
 Working temp. range ..... 0 ÷ 40 °C  
 Nominal (reference) temp. range ..... 10 ÷ 30 °C  
 Max. humidity ..... 85 % RH (0 ÷ 40°C)  
 Nominal (reference) hum. range ..... 40 ÷ 60 % RH  
 Auto power off .....yes



