

**USER'S  
MANUAL**

***ALF 10***



# 1. INTRODUCTION

## 1.1. Safety



**Read this User's Manual carefully and completely and follow all instructions contained therein. Otherwise using of the instrument may be dangerous for operator or for the instrument!**

**Observe the following safety precautions:**

- Make sure that the instrument, power supply cord, measuring cables and all other accessories are in flawless condition, e.g. no damaged insulation, no broken cables etc.
- Do not connect the test tips to any external voltage; tested object must be de-energized!
- Do not touch the test tip if second test tip is connected to tested object!
- The ALF 10 is not intended for unremitting connection to the mains voltage.
- Do not expose the instrument to temperature over 70 °C; otherwise the plastic case can be damaged!
- Only a trained, skilled person, who is familiar with hazardous voltage operations, can handle the instrument.
- It is necessary to respect all safety regulations applicable to particular measurement.
- Use only original standard or optional accessories.



**If there is reason to believe that safe operation has become impossible, put the instrument out of operation and secure it against any unintended operation.**

**Safe operation must be presumed to be no longer possible, if:**

- The instrument does not operate properly any longer (execute reset before putting the instrument out of operation, see chapter 4.7.).
- The instrument, power supply cord, cables, connectors or accessories exhibits visible damages.
- The instrument was stored under unfavourable conditions for a longer period.
- The instrument was exposed to extraordinary stress caused by transport.
- The bottom cover is not properly fastened with both screws.

## 1.2. Explanation of symbols on the instrument



Warning concerning a point of danger! Read User's Manual and observe all precautions!



Protection class (double insulation).

### 1.3. General description

The ALF 10 is microprocessor based, easy-to-use instrument, which is intended for measuring of:

- 10 A AC Earth bond resistance
- 10 A AC Earth bond voltage drop

It is powered from mains.

Main features:

- Auto start: measurement starts automatically after the test tips are connected to tested object.
- Lowest measured value of resistance or voltage drop is displayed.
- Test leads resistance compensation can be executed.
- Test current is displayed simultaneously with result of measurement. If test current drops under 10 A, it is indicated both by beeper and on the LCD.
- Adjustable wire cross-section and automatic comparison of measured voltage drop with EN 60204-1 limits.
- All set parameters are stored in non-volatile memory; all set parameters remain unchanged after the instrument is switched off.

### 1.4. Applied standards

Measurement ..... EN 60204-1

Safety..... EN 61010-1

EMC..... EN 55022, EN 61326-1, EN 61000-4-2, 3, 4, 5, 6, 11

### 1.5. Included in the set

- ALF 10
- Test lead, black, 1 m
- Test lead, black, 2.5 m
- Test tip black, 2 pcs
- Power supply cord
- User's manual
- Calibration certificate

### 1.6. Optional accessories

- Carrying bag, order no. P 6010
- Crocodile clip black, order no. P 4011

### 1.7. Ecology



This symbol signifies that the product should not be thrown away to municipal waste at end-of-life.

Please dispose of this product according to the relevant statutory requirements.

## 2. TECHNICAL SPECIFICATION

### 2.1. Functions

Earth bond resistance

Measuring range [ $\Omega$ ]	Resolution [ $\Omega$ ]	Reference error	Operating error
0.00 ÷ 1.50	0.01	$\pm (1.5 \% R + 5 D)$	$\pm (3 \% R + 5 D)$

Open-circuit voltage < 10 V (AC, 50 Hz)

Short-circuit current > 10 A (AC, 50 Hz)

Test lead resistance compensation yes

Earth bond voltage drop

Measuring range [V]	Resolution [V]	Reference error	Operating error
0.0 ÷ 4.5	0.1	$\pm (1.5 \% R + 5 D)$	$\pm (3 \% R + 5 D)$

Test current

Measured values are only informative; measuring error is not specified.

Note:

R - Reading

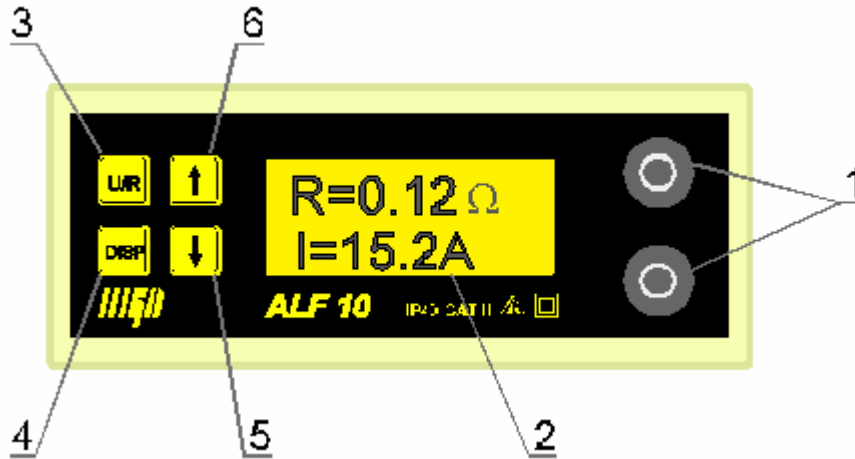
D - Digit

### 2.2. General data

Display	backlighted alphanumerical LCD, 2 lines x 8 characters
Protective class	II (double insulation)
Over voltage class	CAT 2
Pollution degree	2
Degree of protection	IP 40
Reference condition:	
Line voltage	230 V $\pm$ 5 % / 50 Hz $\pm$ 1 Hz
Ambient temperature	23 °C $\pm$ 2 °C
Humidity	45 % ÷ 55 % RH @ 23 °C
Position	arbitrary
Operating condition:	
Line voltage	230 V $\pm$ 10 % / 50 Hz $\pm$ 1 Hz
Ambient temperature	5 °C ÷ 40 °C
Humidity	max. 75 % RH @ 23 °C (condensation not allowed)
Position	arbitrary
Storage temperature / humidity	-10 °C ÷ 50 °C / max. 75 % RH (condensation not allowed)
Dimensions	155 x 135 x 65 mm
Mass	950 g

### 3. DESCRIPTION OF THE INSTRUMENT

#### 3.1. Front panel



- 1 Test terminals
- 2 Backlighted alphanumerical LCD
- 3 The **U/R** key switches measuring function
- 4 The **DISP** key for displaying of test current / wire cross-section / test time
- 5 The ↓ key for selecting of test time and wire cross-section
- 6 The ↑ key for selecting of test time and wire cross-section

#### 3.2. Rear panel

Main switch and socket for connection of power supply cord are placed on the rear panel.

## 4. MEASUREMENTS

### 4.1. Prior to measurement

- Connect test leads with test tips (or with optional crocodile clips) to the test terminals **1**.
- Connect power supply cord to the socket on the rear panel of the instrument and then plug it to the mains outlet.
- Switch on the main switch placed on the rear panel of the ALF 10. Short beep is generated and "ILLKO" message is displayed for a while. The instrument is now ready for measurements.

### 4.2. Earth bond resistance measurement

Auto start is implemented in the instrument; measurement starts automatically after the test tips are connected to tested object.

- Prepare the ALF 10 for measurement - see chapter 4.1.
- If there is displayed "U=READY" in the top line of the display, then press and release the **U/R** key in order to switch to the resistance measurement. "R=READY" must be displayed. Check if the test lead resistance compensation was executed: short the test tips. Measurement is carried out and the result is displayed; it should be  $0.00 \div 0.02 \Omega$ . If the result is higher, it is recommended to carry out compensation according to procedure described in chapter 4.6.
- By repetitive pressing of the **DISP** key you can select a parameter displayed in the bottom line of the display: "t" (test time) / "I" (test current) / "S" (wire cross-section). An example of displayed information:

R=READY I=ready
--------------------

- Connect the test tips to tested object. Measurement starts and measured values are continuously displayed:

R=0.12Ω I=20.1A
--------------------

- After test time elapses (see chapter 4.4.), minimal value of measured resistance is displayed until next measurement is carried out or any key is pressed. Minimal value is not displayed if test current was lower than 10 A or if the timer is off.

Rm=0.11Ω I=20.1A
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If "HOT" message is displayed, internal circuits of the instruments are overheated. Measurements are possible after the instrument cools down.

### 4.3. Voltage drop measurement

Auto start is implemented in the instrument; measurement starts automatically after the test tips are connected to tested object.

- Prepare the ALF 10 for measurement - see chapter 4.1.
- If there is displayed "R=READY" in the top line of the display, then press and release the **U/R** key in order to switch to the voltage drop measurement. "U=READY" must be displayed. Check if the test lead resistance compensation was executed according to description in chapter 4.6.
- Set cross-section of tested wire – see chapter 4.5. An example of displayed information:

<p>U=READY S=1.5mm<sup>2</sup></p>
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- Connect the test tips to tested object. Measurement starts and measured values of voltage drop are continuously displayed. The displayed values are corrected to test current 10 A.

<p>U=0.2V S=1.5mm<sup>2</sup></p>
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- After test time elapses (see chapter 4.4.), minimal value of measured voltage drop is displayed until next measurement is carried out or any key is pressed. Minimal value is not displayed if test current was lower than 10 A or if the timer is off.

<p>Um=0.2V S=1.5mm<sup>2</sup></p>
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The ALF 10 automatically compares measured voltage drop with limit value according to EN 60204-1. If limit is exceeded, it is indicated both by beeper and by blinking result.

S [mm <sup>2</sup> ]	$\Delta U$ [V]
1.0	3.3
1.5	2.6
2.5	1.9
4.0	1.4
6.0	1.0

If "HOT" message is displayed, internal circuits of the instruments are overheated. Measurements are possible after the instrument cools down.

#### 4.4. Timer setting

The ALF 10 has built-in timer, which enables to set test time between 1 and 12 s or to set continuous measurement. The timer runs from the moment when test current exceeds 10 A. If test time is displayed in the bottom line of the display (displayed parameter can be selected by the **DISP** key), countdown is displayed during measurement.

- Disconnect the instrument from measured object.
- By repetitive pressing of the **DISP** key select “t” (test time) as a parameter displayed in the bottom line of the display.

R=READY t=03sec
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- Use the ↑ and ↓ keys for setting of the timer. Measuring time 1 ÷ 12 s can be set or continuous measurement - “TMR OFF” message. If continuous measurement is set, the instrument carries out measurement as long as the test tips are connected to tested object.

If the test tips are disconnected from tested object before the timer elapses, it is paused. When the test tips are connected to tested object again, the timer continues to countdown. The timer runs only when test current is > 10 A.

#### 4.5. Wire cross-section setting

The ALF 10 automatically compares measured voltage drop with limit value according to EN 60204-1. Limit value depends on wire cross-section.

- By repetitive pressing of the **DISP** key select “S” (wire cross-section) as a parameter displayed in the bottom line of the display.

R=READY S=4.0mm <sup>2</sup>
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- Use the ↑ and ↓ keys for setting. “S” can be set to 1.0, 1.5, 2.5, 4.0 and 6.0 mm<sup>2</sup>.

#### 4.6. Test lead resistance compensation

After test lead resistance compensation is carried out, it is automatically subtracted from all resistance measurements and thus only *actual* resistance of tested object is displayed. Current compensation constant (= resistance of the test lead) remains in instrument's non-volatile memory until new compensation or reset is executed.

- Set test time to 3 s (see chapter 4.4.).
- Short-circuit the test tips.
- Press the ↑ and ↓ keys at the same time during measurement. “COMPENS.” message is displayed for a while.
- Wait until test time elapses.



## 4.7. Reset

It is recommended to execute reset, if the instrument does not operate properly.

After reset all parameters of the instruments are set to initial values:

$$S = 1 \text{ mm}^2$$

$$t = 3 \text{ s}$$

No compensation of test lead resistance

Test current is set as parameter displayed in the bottom line of the display

- Switch off the instrument.
- Press the **DISP** key and keep it pressed. Switch on the instrument. "RESET" and firmware version are displayed for a while. Release the **DISP** key.

## 4.8. Display contrast adjustment

- Press the **DISP** key and keep it pressed.
- Press the  $\uparrow$  or  $\downarrow$  key and keep it pressed until the LCD reaches required contrast. Release the  $\uparrow$  or  $\downarrow$  key.
- Release the **DISP** key.

## 5. MAINTENANCE

### 5.1. Calibration and service

#### Calibration

Measuring instruments should be regularly calibrated. We recommend interval of calibration 1 year. Furthermore we recommend carrying out calibration after each repair. Contact your local distributor for more information.

#### Service

*There are no user replaceable components inside the instrument!*  
Contact your local distributor for more information.

### 5.2. Maintenance

Regularly check the technical safety and integrity of test lead, plastic case and accessories. Plastic case should not be polluted with substances, which can noticeably degrade case's insulation quality.

Disconnect both test tips from tested object before cleaning of the instrument!

Use soft cloth, slightly moistened with lukewarm soap water for plastic case cleaning. Do not spill cleaning liquid over the instrument! Do not use cleaning liquids based on petrol, hydrocarbons etc. Wait until the instrument becomes totally dry before using it!

### 5.3. Manufacturer



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