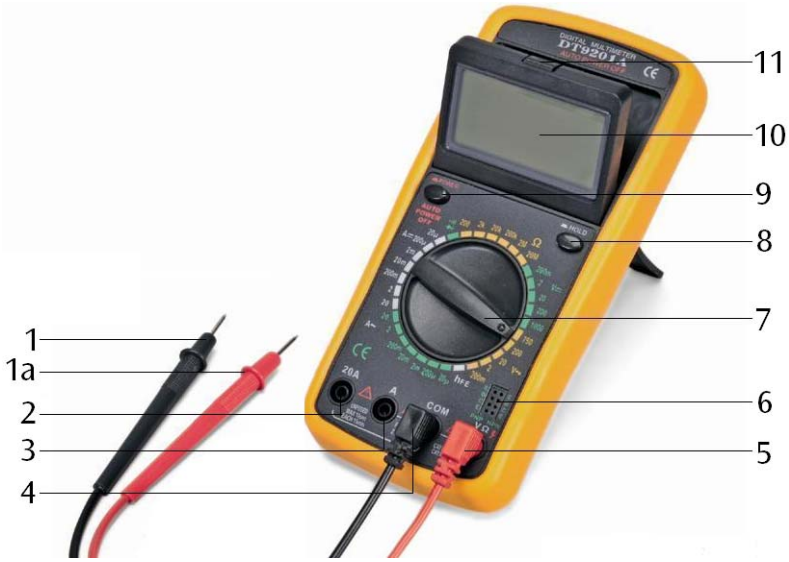
# Digital Multimeter E 1006809

## Instruction sheet

05/12 ALF




1 Measuring probe
1a Finger guards
2 Measurement socket “20 A“for current measurement 20 A range (plus)
3 Measurement socket “A” for current measurement for up to 2 A (plus)
4 Measurement socket “COM“ (minus)
5 Measurement socket “V/Ω“ for voltage and resistance measurement (plus)
6 Transistor test socket
7 Measurement range dial
8 Button Hold function
9 On/Off switch
10 Display
11 Unlock button

## ⚠ 1. Safety instructions

The Digital Multimeter E conforms to the safety requirements for electrical equipment for measurement, control and laboratory use in DIN EN 61010 part 1. Safe operation of the apparatus is guaranteed with correct handling. However, safety is not guaranteed if the apparatus is handled improperly or carelessly.

- Read this manual carefully before using the digital multimeter and follow the instructions!
- Before using the meter, check the case and test leads for any damage. In the event of any malfunction/operational defect or visible damage, do not use the meter. Pay particular attention to the insulation surrounding the measurement sockets.
- Use with caution when working above 30 V ACrms, or 60 V DC. Such voltages pose a shock hazard.
- The limit of the measurement range must not be exceeded. If the values of the measurand are unknown, always switch from a higher measurement range to a lower one.
- When measuring current, turn off circuit power before connecting the meter in the circuit.
- Connect the common test lead before you connect the live test lead. When you disconnect test leads, disconnect the live test lead first.
- When using the measuring probes, keep your fingers behind the finger guards on the probes.
- Do not operate the meter around explosive gas, vapour, or dust.
- Do not conduct measurements in a humid environment. Work area, hands, shoes and floor must be dry.
- To avoid false readings, which could lead to possible electric shock or personal injury, replace the batteries as soon as the low battery indicator ( + - ) appears.
- Before the case is opened, the meter has to be switched off and the leads must be disconnected from the meter.
- Never use the meter when the case is open.
- When disposing empty batteries follow the local regulations. Never dispose of them in the regular household garbage.

## 2. Symbol legend

 Read instruction sheet

 Dangerous voltages

**V ⎓** DC voltage

**A ⎓** DC current

**V ~** AC voltage

**A ~** AC current

 Diode and continuity test

**hFE** Current amplifying factor of a transistor

**Ω** Resistance

 Empty battery

## 3. Description

The Digital Multimeter E is a robust, battery operated multimeter with a 3½-digit LCD display for measuring voltage, current and resistance as well as for diode and hFE gain testing.

All measurement ranges are selected by means of a rotary dial. All measurement ranges are protected against overload except the 20 A range.

The meter is equipped with a hold function, negative polarity indication, over range indication, low battery indication and automatic switch off after 15 minutes. After the power is automatically switched off it needs to be turned off and turned on again to continue the power.

The digital display is folding for ease of reading and on the backside there is a fold out prop for standing the device on a table.

## 4. Equipment supplied

1 Digital multimeter
1 Pair of measuring probes
1 Battery
1 Instruction manual

## 5. Technical data

**General specifications**

| | |
|---|---|
| Display: | 3½- display LCD, 24 mm, max. 1999 |
| Operating voltage: | 9 V battery 6F22 |
| Fuse: | F2A/250 V |
| Measurement rate: | 2 - 3 / sec |
| Operating temperature: | 0°C - 40°C, 0 - 75% R.H. |
| Storage temperature: | -10°C - 50°C, 0 - 75% R.H. |
| Safety classification: | CAT II |
| Dimensions: | 85x185x35 $mm^3$ approx. |
| Weight: | 310 g approx. (including battery) |

**Electrical specifications**

| **V ⎓** | |
|---|---|
| **Measuring range** | **Accuracy** |
| 200 mV | ±0.5 % ± 3 digits |
| 2 V, 20 V, 200 V | ±0.8 % ± 2 digits |
| 1000 V | ±1.0 % ± 2 digits |

DC voltage
Input impedance: 10 MΩ

| **V ~** | |
|---|---|
| **Measuring range** | **Accuracy** |
| 200 mV | ±1.2 % ± 5 digits |
| 2 V, 20 V, 200 V | ±1.0 % ± 5 digits |
| 750 V | ±1.2 % ± 5 digits |

AC voltage
Input impedance: 10 MΩ
Frequency range: 40 – 400 Hz

| **A ⎓** | |
|---|---|
| **Measuring range** | **Accuracy** |
| 20 µA | ±1.8 % ± 2 digits |
| 200 µA, 2 mA, 2 mA 20 mA, 200 mA | ±2.0 % ± 2 digits |
| 2 A, 20 A | ±2.0 % ± 10 digits |

DC current
Measuring voltage drop: 200 mV

| A ~ | |
|---|---|
| **Measuring range** | **Accuracy** |
| 20 µA, 200 µA, 2 mA<br>20 mA | ±2.0 % ± 3 digits |
| 200 mA | ±2.0 % ± 5 digits |
| 2 A, 20 A | ±2.5 % ± 10 digits |

AC current
Measuring voltage drop: 200 mV
Frequency range: 40 – 400 Hz

| Ω | |
|---|---|
| **Measuring range** | **Accuracy** |
| 200 Ω | ±1.0 % ± 10 digits |
| 2 kΩ, 20 KΩ, 200 kΩ<br>2 MΩ | ±1.0 % ± 4 digits |
| 20 MΩ | ±1.0 % ± 10 digits |

Accuracy is given for 1 year after calibration at 23°C ±5°C, RH<75%.

## 6. Operation

### 6.1 Method of measurement

Warning! Dangerous voltages may be present at the Input terminals and may not be displayed.

#### 6.1.1 Voltage measurement

- Set the measurement range dial at the required position V ⎓ or V ~.
- Connect the black test lead to the measurement socket "COM" and the red test lead to the "V/Ω" socket. The meter is connected parallel to the measuring point. The polarity of the red lead connection will be indicated at the same time as the voltage.

**Note**

- If the voltage to be tested is unknown beforehand, set the measurement range dial to the highest range and work down.
- When only the figure "1" is displayed, over range is being indicated and the measurement range dial has be set to a higher range.
- Never measure voltages higher than 1000 V.

#### 6.1.2 Current measurement

- Set the measurement range dial at the required position A ⎓ or A ~.
- Connect the black test lead to the measurement socket "COM" and the red test lead to the "A" socket for measurements up to 2 A. For measurements over 2 A connect it to the socket “20A”. The meter is connected in series to the measuring object. The polarity of the red lead connection will be indicated at the same time as the current.

**Note**

- If the current to be tested is unknown beforehand, set the measurement range dial to the highest range and work down.
- When only the figure "1" is displayed, over range is being indicated and the measurement range dial has be set to a higher range.
- Limit measurements inthe 20A range to max. 15 s.

#### 6.1.3 Resistance measurement

Warning! To avoid electrical shock or damage to the meter when measuring resistance in a circuit, make sure the power to the circuit is turned off and all capacitors are discharged.

- Set the measurement range dial to the Ω range.
- Connect the black test lead to the measurement socket "COM" and the red test lead to the "V/Ω" socket. Measurement is done parallel to the resistor

**Note**

- If the resistance to be tested is unknown beforehand, set the measurement range dial to the highest range and work down.
- When only the figure "1" is displayed, over range is being indicated and the measurement range dial has be set to a higher range.

When the input is not connected, i.e. at open circuit, the figure "1" will be displayed for the over range conditlon.

#### 6.1.4 Diode test

- Set the measurement range dial to ▶|– ○)).
- Connect the black test lead to the measurement socket "COM" and to the cathode of the diode. Connect the red test lead to the "V/Ω" socket and the anode of the diode.

**Note**

When the input is not connected, i.e. at open circuit, the figure "1" will be displayed

The meter displays the forward voltage drop and displays figure "1" for overload when the diode is reversed.

#### 6.1.5 Continuity test

Warning! To avoid electrical shock or damage to the meter when measuring continuity in a circuit, make sure the power to the circuit is turned off and all capacitors are discharged.

- Set the measurement range dial to ▶|– ○)).

- Connect the black test lead to the measurement socket "COM" and the red test lead to the "V/Ω" socket.

A built-In buzzer sounds if the resistance is less than 30 ± 10 Ω.

#### 6.1.6 Transistor hFE test

- Set the measurement range dial to **hFE**.
- Make sure the transistor is "NPN" or "PNP" type. Insert the transistor correctly into the corresponding transistor test socket.

Display reading is approx. transistor hFE value. Base current approx. 10 µA, $V_{CE}$ approx.2.8 V.

### 6.2 LCD Display panel angle selection

LCD display panel is locked in lie down position in normal operating condition and storage.

- To change the display panel angle, push down the button which is above the top case, and release lock.
- Rotate the display panel to the best angle.

### 6.3 Battery and fuse replacement

- Battery and fuse replacement should only be done after the test leads have been disconnected and power is off.
- Loosen screws with suitable screwdriver and remove case bottom.
- Replace the battery resp. the fuse.
- Replace the case bottom and reinstall the three screws. Never operate the meter unless the case bottom is fully closed.

## 7. Maintenance

Beyond replacing batteries and fuses, do not attempt to repair or service your meter unless you are qualified to do so and have the relevant calibration, performance test, and service instructions.

- Turn off the meter and remove the test leads before you service or clean the device.
- Periodically wipe the case with a damp cloth and mild detergent.
- Do not use abrasives or solvents.

Dirt or moisture in the measurement sockets can affect readings.

- Shake out any dirt that may be in the measurement sockets.
- Soak a new swab with isopropyl alcohol and work around the inside of each measurement socket.

## 8. Disposal

- The packaging should be disposed of at local recycling points.
- Do not dispose of the battery in the regular household garbage. Follow the local regulations.
- Should you need to dispose of the equipment itself, never throw it away in normal domestic waste. Local regulations for the disposal of electrical equipment will apply.