

## ES 685

# ES 685 400 Amps DC/AC Current Probe/DMM with Frequency User Manual

Model: 685

## 1. INTRODUCTION

This manual provides comprehensive instructions for the safe and effective operation of your ES 685 400 Amps DC/AC Current Probe/DMM with Frequency. This device is a versatile tool designed for measuring DC and AC current, voltage, resistance, frequency, and continuity. Please read this manual thoroughly before use and retain it for future reference.



Figure 1: ES 685 Current Probe Digital Multimeter. This image displays the main unit of the multimeter, featuring the clamp jaw, rotary dial, LCD screen, and function buttons.

## 2. SAFETY INFORMATION

Always observe safety precautions when using electrical testing equipment. Failure to do so may result in injury or damage to the meter.

- Do not apply more than the rated voltage, as marked on the meter, between terminals or between any terminal and ground.
- Use caution when working with voltages above 30V AC RMS, 42V peak, or 60V DC. These voltages pose a shock hazard.
- Always disconnect the test leads from the circuit before changing functions or ranges.
- Ensure the battery compartment is securely closed before operation.
- Do not operate the meter if it appears damaged or if the case is open.
- Refer to local and national safety codes.

### 3. PRODUCT OVERVIEW

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The ES 685 is a compact and robust current probe digital multimeter. It includes the main meter unit, test leads, a 9V battery, and a carrying case.

#### 3.1 Components

- **Clamp Jaw:** For non-contact current measurement. Clamp opening is approximately 7/8 inches.
- **Rotary Function Switch:** Selects measurement modes (Amps DC/AC, Volts, Ohms, Frequency, Continuity).
- **LCD Display:** Shows measurement readings, units, and function indicators.
- **ZERO Button:** Used to zero the DC current reading before measurement.
- **HOLD Button:** Freezes the current display reading.
- **Hz/% Button:** Toggles between frequency and duty cycle measurements.
- **Input Jacks:** For connecting test leads (V $\Omega$ Hz and COM).
- **Test Leads:** Red and black leads for voltage, resistance, and frequency measurements.
- **9V Battery:** Powers the unit.
- **Carrying Case:** For protection and portability.



Figure 2: ES 685 Multimeter with included accessories. This image shows the multimeter unit alongside its red and black test leads and a 9V battery, illustrating the complete package.





Figure 3: ES 685 Multimeter carrying case. This image displays the black zippered carrying case designed to protect and transport the multimeter and its accessories.

## 4. SETUP

### 4.1 Battery Installation

1. Ensure the meter is turned OFF.
2. Remove the protective rubber holster from the meter.
3. Locate the battery compartment cover on the back of the meter.
4. Unscrew the retaining screw(s) and remove the cover.
5. Connect a 9V battery (included) to the battery connector, observing correct polarity.
6. Place the battery into the compartment and replace the cover, securing it with the screw(s).
7. Reinstall the protective rubber holster.

### 4.2 Initial Check

After battery installation, turn the rotary switch to any function. The LCD display should illuminate and show a reading. If not, check battery installation or replace the battery.

## 5. OPERATING INSTRUCTIONS

The ES 685 features auto-ranging for most functions, simplifying operation. It offers 10 test functions and 35 test ranges.

### 5.1 DC/AC Current Measurement (Amps)

1. Turn the rotary switch to the desired DC A or AC A range (e.g., 200A, 400A).
2. For DC current, press the **ZERO** button to clear any offset before clamping.
3. Open the clamp jaw and enclose only one conductor of the circuit. Ensure the jaw is fully closed.
4. Read the current value on the LCD display.

### 5.2 Voltage Measurement (Volts)

1. Insert the red test lead into the VΩHz jack and the black test lead into the COM jack.
2. Turn the rotary switch to the desired DC V or AC V range.
3. Connect the test leads in parallel to the circuit or component to be measured.
4. Read the voltage value on the LCD display.

### 5.3 Resistance Measurement (Ohms)

1. Ensure the circuit is de-energized before measuring resistance.
2. Insert the red test lead into the VΩHz jack and the black test lead into the COM jack.
3. Turn the rotary switch to the Ω (Ohms) range.
4. Connect the test leads across the component to be measured.
5. Read the resistance value on the LCD display.

### 5.4 Frequency and Duty Cycle Measurement (Hz/%)

1. Insert the red test lead into the VΩHz jack and the black test lead into the COM jack.
2. Turn the rotary switch to the Hz/% range.
3. Connect the test leads across the signal source.
4. The display will show the frequency in Hz. Press the **Hz/%** button to toggle to duty cycle measurement.

### 5.5 Continuity Test

1. Ensure the circuit is de-energized before testing continuity.
2. Insert the red test lead into the VΩHz jack and the black test lead into the COM jack.
3. Turn the rotary switch to the continuity (beep) range.
4. Connect the test leads across the component or wire.
5. If continuity exists (low resistance), the meter will emit an audible beep.

### 5.6 Data Hold Function

- Press the **HOLD** button to freeze the current reading on the display.
- Press the **HOLD** button again to release the reading and resume live measurement.

### 5.7 Auto Power Off

The meter is equipped with an auto power-off feature to conserve battery life. It will automatically turn off after a period of inactivity. To reactivate, turn the rotary switch to OFF and then back to the desired function.

## 6. MAINTENANCE

### 6.1 Cleaning

Wipe the meter with a dry, soft cloth. Do not use abrasives or solvents.

## 6.2 Battery Replacement

When the battery indicator appears on the LCD, replace the 9V battery as described in Section 4.1.

## 7. TROUBLESHOOTING

- **No Display:** Check battery installation and charge. Ensure the rotary switch is not in the OFF position.
- **Inaccurate Readings:**
  - For DC current, ensure the ZERO button was pressed before measurement.
  - Ensure the clamp jaw is fully closed and enclosing only one conductor for current measurements.
  - Verify correct function and range selection.
  - Check test lead connections for voltage/resistance measurements.
- **Continuity Test Not Beeping:** Ensure the circuit is de-energized. Check for open circuits or high resistance.

## 8. SPECIFICATIONS

Feature	Detail
Brand	ES
Model	685
Measurement Type	Multimeter (DC/AC Current, Voltage, Resistance, Frequency, Continuity)
Max Current (DC/AC)	400 Amps
Clamp Opening	7/8 inches
Test Functions	10
Test Ranges	35
Power Source	9V Battery (included)
Auto-Ranging	Yes
Auto Power Off	Yes
Data Hold	Yes
Item Weight	1.1 Pounds (approx. 0.5 kg)
Product Dimensions (L x W x H)	6.2 x 9.2 x 2.6 inches (approx. 15.7 x 23.4 x 6.6 cm)
UPC	855174001045, 855174000000, 069060129489

## 9. WARRANTY AND SUPPORT

For warranty information or technical support, please refer to the documentation provided with your purchase or contact ES customer service. Keep your proof of purchase for warranty claims.

