

- › [Sonel](#) /
- › [MPI-540 Multifunction Electrical Installation Meter RCD RMS Auto Mode](#)

## Sonel MPI-540

# Sonel MPI-540 Multifunction Electrical Installation Meter User Manual

Model: MPI-540

## 1. INTRODUCTION AND OVERVIEW

The Sonel MPI-540 is a sophisticated multifunction electrical installation meter designed for comprehensive checking of home and industrial electrical installations. This device provides precise measurements to determine the safety and quality of electrical networks. It also offers the capability to register electrical network parameters, allowing for verification of electricity quality and assessment of protection against electric shock using a single, versatile instrument.

Key features include significant automation of measurements, enabling testing of residual current circuit breakers in Auto mode and through pre-programmed measuring sequences (auto-tests). These sequences can be customized. Additionally, automatic measurement of insulation resistance for 3-, 4-, and 5-wire conductors is possible with the optional AUTO ISO-1000C adapter.



Figure 1.1: The Sonel MPI-540 Multifunction Electrical Installation Meter, showcasing its display and control interface.

## 2. PRODUCT FEATURES AND CAPABILITIES

---

The MPI-540 offers a wide range of functionalities, making it an indispensable tool for electrical professionals.

### 2.1. Core Measurement Capabilities

- Short circuit loop impedance (also in circuits with RCDs)
- Parameters of RCDs
- Insulation resistance
- Earth resistance (4 measurement methods + ground resistivity measurement)
- Continuity of protective and equipotential bondings
- Lighting measurement
- Phase sequence tester
- Motor rotation direction tester

### 2.2. Advanced Network Analysis

The device can record 50/60 Hz power network parameters in accordance with class S of EN 61000-4-30 standard:

- Voltage (L1, L2, L3) - average values in the range up to 500 V
- Current (L1, L2, L3) - average values, current measurement in the range up to 3 kA (depending on the current clamps used)
- Frequency in the range of 40 Hz - 70 Hz
- Active (P), reactive (Q) and apparent (S) power
- Power factor (PF),  $\cos\varphi$
- Harmonics (up to 40 in voltage and current)
- Total harmonic distortion (THD) for current and voltage

### 2.3. User Interface and Design

- The largest 7-inch touch panel on the market, providing remarkable ergonomics and ease of use.
- Removable memory card for easy increase of memory capacity.
- Li-Ion battery for long-term operation.
- Ability to add a voice memo or photo for measurement - a multimedia description of the measurement site.
- Automatic measurement of insulation resistance of 3-, 4- and 5-wire conductors using the AUTO ISO-1000C adapter.



Figure 2.1: The MPI-540 meter shown with its comprehensive set of accessories, including various probes, clamps, and cables.

## 2.4. Enhanced Durability and Communication

- Increased resistance to environmental conditions: The MPI-540 meter is designed for difficult environmental conditions. Protection against penetration of dust and water is ensured by a unique housing with a level of protection IP51.
- Communication and software: The device offers multiple communication interfaces (USB, portable USB memory card, or wireless communication (Bluetooth Wi-Fi)). It can generate reports on measurements for electric shock protection. Sonel PE5 program is used for saving the downloaded data to the simplest formats and printing.

## 3. SETUP

Before operating the Sonel MPI-540, ensure proper setup to guarantee accurate and safe measurements.

### 3.1. Initial Inspection and Charging

- Unpack the device and all accessories. Inspect for any visible damage.
- Ensure the Li-Ion battery is fully charged before first use. Connect the charger to the device and a power outlet. The charging indicator will show the status.

### 3.2. Connecting Probes and Accessories

- For basic measurements, connect the appropriate test leads (e.g., test lead 1.2 m, red, 1 kV) to the designated input terminals on the meter.
- For specific measurements like insulation resistance of 3-, 4-, and 5-wire conductors, connect the optional AUTO ISO-1000C adapter as per its instructions.
- When using current clamps for current measurements, ensure they are properly connected to the meter's input and clamped around the conductor.



Figure 3.1: An electrician using the MPI-540 to perform measurements within an electrical panel, demonstrating proper probe connection.

### 3.3. Memory Card Installation

- Locate the memory card slot. Insert a compatible SD card (microSD 4GB is standard) to enable data logging and storage of measurement results.

## 4. OPERATING INSTRUCTIONS

---

The MPI-540 features an intuitive touch screen interface and automated measurement sequences for efficient operation.

### 4.1. Powering On and Navigation

- Press and hold the power button to turn on the device.
- Use the 7-inch touch screen to navigate through menus and select measurement functions.

### 4.2. Performing Measurements

The meter supports various measurement modes, including manual and automated sequences.

#### 4.2.1. Auto Mode for RCD Testing

- Select the RCD test function from the main menu.
- Choose "Auto mode" to perform a sequence of tests on residual current circuit breakers automatically. The device will guide you through the necessary connections and steps.

#### 4.2.2. Pre-programmed Measuring Sequences (Auto-tests)

- The device comes with pre-programmed auto-tests for common installation checks. Select the desired sequence from the menu.
- Follow the on-screen prompts to connect the leads and initiate the test. The meter will automatically perform a series of measurements and display the results.
- Users can also extend these with their own customized sequences.

### 4.2.3. Data Logging and Reporting

- Measurement results can be saved to the internal memory or the inserted SD card.
- Use the Sonel PE5 software on a computer to download, analyze, and generate reports from the stored data via USB or Bluetooth/Wi-Fi.

## 5. MAINTENANCE

---

Proper maintenance ensures the longevity and accuracy of your Sonel MPI-540 meter.

### 5.1. Cleaning

- Regularly clean the device's exterior with a soft, damp cloth. Do not use abrasive cleaners or solvents.
- Ensure the display is clean for optimal readability.

### 5.2. Battery Care

- Recharge the Li-Ion battery when the low battery indicator appears.
- For long-term storage, ensure the battery is partially charged (around 50%) and store the device in a cool, dry place. Avoid extreme temperatures.

### 5.3. Storage

- Store the meter and its accessories in the provided carrying case to protect them from dust, moisture, and physical damage.

### 5.4. Calibration

- To maintain measurement accuracy, it is recommended to have the MPI-540 calibrated periodically by an authorized Sonel service center. Refer to the official Sonel documentation for recommended calibration intervals.

## 6. TROUBLESHOOTING

---

This section provides solutions to common issues you might encounter with your MPI-540 meter.

### 6.1. Device Not Powering On

- **Check Battery:** Ensure the Li-Ion battery is sufficiently charged. Connect the charger and allow it to charge for a period.
- **Battery Connection:** Verify that the battery is correctly inserted into its compartment.
- **Power Button:** Ensure the power button is pressed firmly and held for a few seconds.

### 6.2. Inaccurate Readings

- **Probe Connection:** Ensure all test leads and probes are securely connected to the device and the circuit being tested.
- **Measurement Mode:** Verify that the correct measurement function is selected for the task.
- **Environmental Conditions:** Extreme temperatures or humidity can affect readings. Operate the device within its specified environmental limits.
- **Calibration:** If readings are consistently off, the device may require recalibration. Contact Sonel service for assistance.

## 6.3. Data Transfer Issues

- **USB Connection:** Ensure the USB cable is properly connected to both the meter and the computer.
- **Software Installation:** Verify that the Sonel PE5 software is correctly installed on your computer.
- **Memory Card:** Check if the SD card is properly inserted and not full or corrupted.
- **Bluetooth/Wi-Fi:** Ensure wireless communication is enabled on both the meter and the receiving device, and that they are paired correctly.

## 7. SPECIFICATIONS

The following tables detail the technical specifications of the Sonel MPI-540 meter.

### 7.1. General Specifications

Parameter	Value
Brand	Sonel
Model	MPI-540
Power Source	Battery Powered (Li-Ion)
Display	7-inch TFT LCD touch screen (800x480 pixels)
Protection Class	IP51
Communication	USB, Portable USB Memory Card, Bluetooth/Wi-Fi

### 7.2. Measurement of Short Circuit Loop Impedance $Z_{L-PE}$ or $Z_{L-N}$

Display Range	Resolution	Accuracy
0.000...19.999 $\Omega$	0.001 $\Omega$	$\pm(5\% \text{ m.v.} + 3 \text{ digits})$
20.00...199.99 $\Omega$	0.01 $\Omega$	$\pm(2\% \text{ m.v.} + 3 \text{ digits})$
200...1999 $\Omega$	0.1 $\Omega$	$\pm(6\% \text{ m.v.} + 5 \text{ digits})$

*Note: Rated voltage: 95...270 V, Frequency: 45...65 Hz.*

### 7.3. Measurement of RCD Tripping Current $I_{\Delta}$

Rated Current	Meas. Range	Resol.	Test Current	Accuracy
10 mA	3.3...10.0 mA	0.1 mA	$0.5 \times I_{\Delta n}$	$\pm 5\% I_{\Delta n}$
30 mA	9.0...30.0 mA	0.1 mA	$0.5 \times I_{\Delta n}$	$\pm 5\% I_{\Delta n}$
100 mA	33.3...100 mA	0.1 mA	$0.5 \times I_{\Delta n}$	$\pm 5\% I_{\Delta n}$
300 mA	90...300 mA	1 mA	$0.5 \times I_{\Delta n}$	$\pm 5\% I_{\Delta n}$
500 mA	150...500 mA	1 mA	$0.5 \times I_{\Delta n}$	$\pm 5\% I_{\Delta n}$

Rated Current	Meas. Range	Resol.	Test Current	Accuracy
1000 mA	330...1000 mA	1 mA	$0.5 \times I_{\Delta n}$	$\pm 5\% I_{\Delta n}$

Note: Measurement can be started from positive or negative half-period of forced leakage current (AC).

## 7.4. Three-Phase Electrical Network Parameters

Parameter	Measurement Range	Max. Resolution	Accuracy
Alternating Voltage (TRMS)	0.0...500 V	0.01% $U_{nom}$	$\pm 0.5\% U_{nom}$ $\pm 2\%$ m.v. for m.v. $\leq 10\%$
Alternating Current (TRMS)	depending on clamp*	0.01% $I_{nom}$	$\pm 2\%$ m.v. for m.v. $\leq 10\%$ $\pm$ (error does not account for clamps error)
Frequency	40.00...70.00 Hz	0.01 Hz	$\pm 0.05$ Hz
Active, Reactive, Apparent and Distortion Power	depending on configuration (transformers, clamp)	up to for decimal places	depending on configuration (transformers, clamp)
Active, Reactive Apparent Energy	depending on configuration (transformers, clamp)	up to for decimal places	as power error
cosφ and Power Factor (PF)	0.00...1.00	0.01	$\pm 0.03$
Harmonics (Voltage)	as for alternating voltage	as for alternating voltage	$\pm 5\%$ m.v. $\pm 3\% U_{nom}$
Harmonics (Current)	as for alternating voltage	as for alternating voltage	$\pm 5\%$ m.v. $\pm 10\% I_{nom}$
THD (Voltage)	0.0...100.0% (in regard to sine RMS value)	0.1%	$\pm 5\%$
Voltage Asymmetry	0.0...10.0%	0.1%	$\pm 0.15\%$ (absolute error)

\*Clamp F-1A, F-2A, F-3A, 0...3000 A (10000 A); Clamp C-4A, 0...1000 A (3600 A); Clamp C-6A, 0...10 A (36 A); Clamp C-7A, 0...100 A (360 A).

## 8. WARRANTY AND SUPPORT

Sonel provides support for its products to ensure customer satisfaction and product longevity.

### 8.1. Warranty Information

Specific warranty terms and conditions for the Sonel MPI-540 are typically provided with the product documentation at the time of purchase. Please refer to the warranty card or the official Sonel website for detailed information regarding warranty duration, coverage, and claims procedures.

### 8.2. Technical Support







For technical assistance, troubleshooting beyond this manual, or service inquiries, please contact Sonel's authorized support channels. Contact information can usually be found on the Sonel official website or in the product packaging.

- **Manufacturer:** Sonel
- **Website:** [www.sonel.pl](http://www.sonel.pl) (Please check the official website for the most current contact details and support resources.)



© 2024 Sonel. All rights reserved. This manual is for informational purposes only.

Related Documents - MPI-540

	<p><a href="#">Sonel EVSE-01 User Manual: Adapter for Testing Vehicle Charging Stations</a></p> <p>Comprehensive user manual for the Sonel EVSE-01 adapter, detailing its use for testing electric vehicle charging stations, safety precautions, measurement procedures, and technical specifications. Compatible with various Sonel MPI meters.</p>
	<p><a href="#">Sonel MPI-520 / 520 Start: Professional Electrical System Measurement</a></p> <p>Discover the Sonel MPI-520 / 520 Start, a multi-function meter for electrical system parameters. Ideal for commissioning and safety testing of electrical installations, it offers comprehensive measurements including loop impedance, RCD testing, insulation resistance, and power analysis. Features IP54 protection and versatile data communication.</p>
	<p><a href="#">Sonel MPI-502F, MPI-506, MPI-507 User Manual: Electrical Installation Parameter Meter</a></p> <p>This user manual provides comprehensive guidance for the Sonel MPI-502F, MPI-506, and MPI-507 electrical installation parameter meters. It details operations, safety, measurement procedures for voltage, frequency, fault loop impedance, RCD testing, insulation resistance, and troubleshooting.</p>
	<p><a href="#">Sonel MPI-502F, MPI-506, MPI-507 User Manual: Electrical Installation Parameter Meter</a></p> <p>Comprehensive user manual for Sonel MPI-502F, MPI-506, and MPI-507 meters. This guide details safety, operation, measurement procedures, technical specifications, and troubleshooting for these electrical installation parameter testers.</p>





**USER MANUAL**  
**METER FOR ELECTRICAL**  
**INSTALLATION PARAMETERS**  
**MPI-530 • MPI-530-IT**

Sonel MPI-530 / MPI-530-IT User Manual: Electrical Installation Parameter Meter

This user manual provides comprehensive guidance for the Sonel MPI-530 and MPI-530-IT meters. These advanced devices are engineered for accurate electrical installation parameter measurements, crucial for ensuring electrical safety and compliance with relevant standards. The manual details device operation, measurement procedures, safety precautions, technical specifications, and accessories.



## Sonel MPI-540 / MPI-540-PV Multifunction Installation Tester - Technical Specifications

Detailed technical specifications, features, and accessories for the Sonel MPI-540 and MPI-540-PV multifunction installation testers, including photovoltaic testing capabilities and network analysis.