

TECHNICAL DATA

# SMFT-1000 Solar Multifunction PV Tester, Performance Analyser and I-V Curve Tracer



## Your new all-in-one test solution to verify PV system performance and safety

The Fluke SMFT-1000 Solar Multifunction PV Tester with I-V curve tracing helps you test that photovoltaic (PV) systems are performing to their optimal power output and are operating safely. Designed for PV professionals who provide installation, commissioning, and maintenance services on solar systems that operate at 1000 V DC or under, the Fluke SMFT-1000 provides a complete PV testing solution that conforms to IEC 62446-1 standards. Using Fluke's TruTest™ software, measurement data from solar site installation and commissioning testing can be seamlessly imported, organised, and analysed for effortless reporting – all without needing to bring a laptop on-site.

## CRITICAL TESTING FEATURES FOR THE PERIODIC INSPECTION OF PV SYSTEMS

### Full sequence safety testing –IEC 62446-1 Category 1:

- Protective resistance earth (RLO/RPE)
- Voltage on open circuit, including polarity (VOC)
- Short circuit current (ISC)
- Insulation resistance (RINS)

### System performance testing –IEC 62446-1 Category 2:

- I-V Curve tracing and analysis with TruTest™ software
- Irradiance, temperature, tilt, and cardinal direction

## Accurate I-V curve measurements with the included Wireless Irradiance Meter

### No leads required

To perform precise I-V curve measurements, real-time irradiance and temperature data is needed. The included Fluke IRR2-BT Irradiance Meter wirelessly connects to the SMFT-1000 to communicate data in real-time, providing the most accurate I-V curve measurements possible. If the wireless connection is interrupted for any reason, the IRR2-BT will continue recording data locally for up to 17 hours which can later be matched to tests taken with the SMFT-1000.



**Setup only once with 'Keep the Leads'**  
**Quick and accurate testing saves time and money**

Save time with the Fluke's patented "Keep the Leads" system for quick and accurate testing of PV systems. Follow simple on-screen guided test setup instructions and use Auto Test Mode to perform automatic sequences of tests in various combinations – all without needing to adjust the leads once they have been setup. This system minimises setup time, reduces user errors, and allows you to confidently get more done in less time.



**Colour Screen with Integrated Interface**  
**On-screen instructions provide any easy walkthrough of test procedures**  
**Automatic testing saves time**

Switch the Fluke SMFT-1000 to Auto Test Mode to perform an automatic sequence of tests in a variety of combinations, including:

- Tests with insulation test or without insulation test
- IEC 62446-1 testing for Category 1 or Category 1 and 2
- IEC 62446-1 testing for Protection Class I or Protection Class II

**On-location I-V curve results: compare manufacturer I-V curve data to measured data instantly**

While taking an I-V curve reading in the field, the Fluke SMFT-1000 will display the curve as it loads in the test data and compares it against the module specifications defined by the manufacturer. This makes it easy to immediately confirm measurements in the field without the use of a laptop or tablet. Run the I-V curve test on new installations to confirm they are working according to the site specifications, or to test if existing modules or strings are working to their expected performance levels.



## Visual inspections made easy

To meet the PV system IEC regulations for visual inspections, the Fluke SMFT-1000 features a convenient setting that allows you to record observations directly into the device's local memory. You can then download this data into the TruTest™ software and seamlessly incorporate it into your project reports.



## TruTest™ Solar Data Management Software

Spend less time processing test results and compiling reports

One of the more challenging and time-consuming aspects of any project is compiling reports. Fluke's modern and intuitive TruTest™ Data Management Software helps you cover all your certification and documentation needs with a single software platform, encompassing solar asset management, data storage, and reporting. Whether you are analysing panel efficiency through I-V curves, or safety testing a system through the Category 1 test regime in conformance to IEC 62446-1, proper data management is critical for producing easy-to-understand reports for your clients.

Fluke TruTest™ software allows you to quickly and easily import measurement results directly from your Fluke SMFT-1000 to your PC, intuitively organise and analyse captured data, and compare individual asset data against previously imported measurements to provide comprehensive and visual client reports.

- Easily manage measurement data from solar site installation and commissioning testing
- Quickly create inspections and reports compliant with IEC 62446-1 and other directives
- I-V curve analysis with easy pass/fail visuals; see changes in I-V curve over multiple site visits
- Compare site data to previous site data to see changes over time
- A free 60-day demo version of TruTest™ is available for download on [fluke.com.au](http://fluke.com.au) Purchase a software key to unlock the Lite or Advanced version.



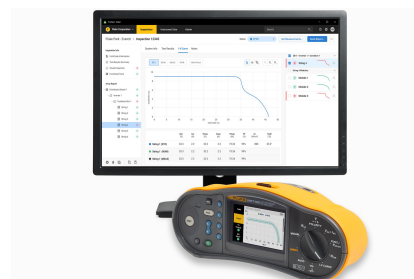
Function	Demo	Lite	Advanced
Maximum addable clients	1	10	Unlimited
Maximum addable site/client	2	5	Unlimited
Maximum addable strings	5	50	Unlimited
Maximum addable modules (per string)	50	50	Unlimited
Edit distribution board information		•	•
Edit circuit information		•	•
Edit inverter information		•	•
Edit combiner box information		•	•
Edit string information		•	•
Edit module information		•	•



Record Data



Export Data



Report Data

## Specifications

### Protective conductor resistance RLO

Display range	Measuring range	Resolution	Accuracy
0.00 Ω - 19.99 Ω	0.20 Ω - 19.99 Ω	0.01 Ω	± (2 % + 2 Digit)
20.0 Ω - 199.9 Ω	20.0 Ω - 199.9 Ω	0.1 Ω	± (2 % + 2 Digit)
200 Ω - 2000 Ω	200 Ω - 2000 Ω	1 Ω	± (5 % + 2 Digit)
<b>Test current</b>	≥ 200 mA (≤ 2Ω + Rcomp)		
<b>Test voltage</b>	4 V DC ... 10 V DC		
<b>Polarity reversing</b>	Yes		
<b>Test lead zero (Rcomp)</b>	Up to 3 Ω		

### PV module/PV string, open-circuit voltage (Voc)

Display range	Measuring range	Resolution	Accuracy
0.0 V - 99.9 V	5.0 V - 99.9 V	0.1 V	± (0.5 % + 2 Digit)
100 V - 1000 V	100 V - 1000 V	1 V	± (0.5 % + 2 Digit)
<b>Polarity test</b>	Yes		

### PV module/PV string, short-circuit current (Is/c)

Display range	Measuring range	Resolution	Accuracy
0.0 A - 20.0 A	0.2 A - 20.0 A	0.1 A	± (1 % + 2 Digit)

**Insulation resistance RINS**

Display range	Measuring range	Resolution	Accuracy
0.00 MΩ - 99.99 MΩ	0.20 MΩ - 99.99 MΩ	0.01 MΩ	± (5 % + 5 Digit)
100.0 MΩ - 199.9 MΩ	100.0 MΩ - 199.9 MΩ	0.1 MΩ	± (10 % + 5 Digit)
200 MΩ - 999 MΩ	200 MΩ - 999 MΩ	1 MΩ	± (20 % + 5 Digit)
Test voltage @ no load	50 V / 100 V / 250 V up to 199.9 MΩ 500 V / 1000 V up to 999 MΩ	1 V	0 % to + 20 %
Test voltage @ ≥ 1 mA	250 V @ 250 kΩ 500 V @ 500 kΩ 1000 V @ 1 MΩ	1 V	0 % to + 10 %
Testing current	Min. 1 mA (@ 250 kΩ / 500 kΩ / 1 MΩ) Max. 1.5 mA (short circuit)		

**Overvoltage protective devices (BV)**

Display range	Measuring range	Resolution	Accuracy
0 V DC - 1000 V DC	50 V DC - 1000 V DC	1 V DC	± (10 % + 5 Digit)

**AC/DC voltage measurement via 4 mm test sockets**

Display range	Measuring range	Resolution	Accuracy
0.0 V AC - 99.9 V AC	5.0 V AC - 99.9 V AC	0.1 V	± (2.5 % + 2 Digit)
100 V AC - 700 V AC	100 V AC - 700 V AC	1 V	± (2.5 % + 2 Digit)
0.0 V DC - 99.9 V DC	5.0 V DC - 99.9 V DC	0.1 V	± (2.5 % + 2 Digit)
100 V DC - 1000 V DC	100 V DC - 1000 V DC	1 V	± (2.5 % + 2 Digit)
<b>Detection AC/DC</b>	Yes (Automatic)		
<b>+ / - polarity check</b>	Yes		

**AC/DC current with i100 clamp**

Display range	Measuring range	Resolution	Accuracy (DC, AC 50 Hz/60 Hz)
0.0 A DC - 100 A DC	1.0 A DC - 100 A DC	0.1 A	± (5 % + 2 Digit) *
0.0 A AC - 100 A AC TRMS	1.0 A AC - 100 A AC TRMS		± (5 % + 2 Digit) *

\* i100 clamp tolerances not inclusive

**i100 Clamp Tolerances**

Display range	Measuring range	Output signal	Accuracy (DC, AC 50 Hz/60 Hz)
N/A	1 A - 100 A DC or AC < 1 kHz	10 mV/A AC/DC	± (1.5 % + 0.1 A)

**AC/DC Power measurement (with i100 clamp)**

Display range	Measuring range	Resolution	Accuracy (DC, AC 50 Hz/60 Hz)
0.0 V AC - 700 V AC 0.0 V DC - 1000 V DC	5.0 V AC - 700 V AC 5.0 V DC - 1000 V DC	0.1 V	± (2.5 % + 2 Digit)
0 A AC/DC - 100 A AC/DC	1 A AC/DC - 100 A AC/DC	0.1 A	± (6.5 % + 3 Digit)
0 kW/kVA - 100 kW/kVA	5 kW/kVA - 100 kW/kVA	1 kW/kVA	± (10 % + 4 Digit)

## Product specifications

<b>SMFT-1000 PV Tester, and Performance Analyser, I-V Curve Tracer</b>	
<b>SMFT-1000 size</b>	10 cm x 25.0 cm x 12.5 cm
<b>SMFT-1000 weight</b>	1.4 kg
<b>Battery</b>	6 AA IEC LR6
<b>Operating temperature</b>	0 °C to 50 °C
<b>Storage temperature</b>	-30 °C to 60 °C batteries removed
<b>Operating altitude</b>	up to 2000 m
<b>Storage altitude</b>	up to 2000 m
<b>Safety</b>	
<b>SMFT-1000 PV Analyser</b>	IEC 61010-1 Pollution Degree 2 IEC 61010-2-034 CAT III 1000 V dc, CAT III 700 V AC
<b>i100 Current Clamp</b>	IEC 61010-2-032, Type D (for insulated conductors), 1000 V
<b>Accessories</b>	IEC 61010-031
<b>TL 1000-MC4</b>	CAT III 1500 V, 20 A
<b>TP1000 Remote Probe (with cap)</b>	CAT IV 600 V, CAT III 1000 V, 10 A
<b>TP1000 Remote Probe (without cap)</b>	CAT II 1000 V, 10 A
<b>TL 1000 Test Leads</b>	CAT III 1000 V, 10 A
<b>TL 1000/30M Test Leads</b>	CAT III 1000 V, CAT IV 600 V, 5 A (on reel) 10 A (fully extended)
<b>TP74 Test Probes (with cap)</b>	CAT III 1000 V, 10 A
<b>TP74 Test Probes (without cap)</b>	CAT II 1000 V, 10 A
<b>AC285 Alligator Clip</b>	CAT III 1000 V, 10 A
<b>Performance</b>	IEC 61557-1, IEC 61557-2, IEC 61557-4, IEC 61557-10
<b>Electromagnetic Compatibility (EMC)</b>	
<b>International</b>	IEC 61326-1: Portable Electromagnetic Environment, CISPR 11: Group 1, Class A Group 1: Equipment has intentionally generated and/or uses conductively-coupled radio frequency energy that is necessary for the internal function of the equipment itself. Class A: Equipment is suitable for use in all establishments other than domestic and those directly connected to a low-voltage power supply network that supplies buildings used for domestic purposes. There may be potential difficulties in ensuring electromagnetic compatibility in other environments due to conducted and radiated disturbances. Caution: This equipment is not intended for use in residential environments and may not provide adequate protection to radio reception in such environments.
<b>Wireless Radio Module</b>	
<b>Frequency range</b>	2.402 GHz to 2.480 GHz
<b>Output power</b>	8 dBm

## Ordering information

### Fluke SMFT-1000 Multifunction PV Analyser

#### What's included

- Fluke SMFT-1000-BP Professional Tool Backpack
- SMFT-1000 Multifunction PV Analyser
  - Carry strap
  - Fuse pack
  - Adapter Cable IRDA Optical-to-USB
  - Zero adapter
- IRR2-BT Wireless Solar Irradiance Meter Pro
  - 80PR-IRR External Temperature Probe
  - Mounting Bracket for solar panel
  - Carry Case
- i100 AC/DC Current Clamp 100 A
  - TPAK Magnet Set
- TP1000 Test Probe with Remote Test Button
- TL1000 Test Lead Set

- TL1000-MC4 Test Lead Set
- TL1000/30M Test Lead on Reel
- Coupler set
- (6) AA Batteries

Visit [www.fluke.com.au](http://www.fluke.com.au) to get complete details on these products or ask your local Fluke sales representative.

The SMFT-1000 is compatible with the Fluke portfolio of test and measurement tools and is an integral part of your total PV system testing solution.

Also available as a kit with Advanced TruTest™ Software and MC4 Solar Clamp Test Lead Set SMFT-1000/KIT

### Recommended tools for use with the SMFT-1000

- TruTest™ Data Management and Reporting Software
- Fluke 393 FC CAT III 1500 V Solar Clamp Meter
- Fluke 87V MAX True-RMS Digital Multimeter
- Fluke 1587 FC Insulation Multimeter
- Fluke Ti480 PRO Infrared Camera
- Fluke 1625-2 GEO Earth Ground Tester
- Fluke 500 Series Battery Analysers
- Pomona PVLEAD3 MC4 Solar Clamp Test Lead Set



**Fluke.** *Keeping your world up and running.*

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