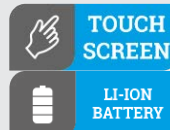


MeasureEffect™

**PVM-1530**



**IRM-1**



**CMP-1015-PV**



PVM-1530

**reSYNC**

automatic  
synchronization of  
STC parameters

## Professional meter for photovoltaic installations up to 1500 V

### Features

#### PVM-1530

- It can be used for category 1 measurements according to EN 62446-1.
- It allows the measurement of the I-U curve for category 2 according to EN 62446-1 and EN 61829.
- It allows the measurement of photovoltaic panels, including bifacial and high-efficiency panels.
- Ability to define measurement procedures.
- It converts measured parameters into STC conditions according to EN IEC 60891 by cooperation with the IRM-1 solar radiation and temperature meter.
- **reSYNC** function – automatic completion of results with environmental parameters and their conversion to STC conditions after restoring connection with IRM-1.
- The attachable radio interface ensures cooperation with the IRM-1 meter over long distances.
- Built-in Bluetooth and Wi-Fi for communication with external devices.
- Large structured memory of measurements.
- Large touchscreen for good visibility in bright sunlight.

#### IRM-1

- Measurement of solar radiation and temperature.
- The LoRa interface for communication with a master meter – offers a larger range than the Bluetooth technology!
- Automatic data synchronization with a master meter with reSYNC function.
- Built-in compass and inclination sensor.
- Built-in recorder that can be used to record solar radiation before constructing PV systems, as well as to measure the shading of existing systems.
- Large measurement memory: 999 cache memory cells and 5000 recorder records available (one-time recording) with the option of overwriting them (continuous recording).

Choose the best set for your needs

PVM-1530

IRM-1

CMP-1015-PV

## PVM-1530 Max

Photovoltaic meter, two solar radiation and temperature meters and clamp meter



## PVM-1530 Pro

Photovoltaic meter, solar radiation and temperature meter and clamp meter



## PVM-1530

Photovoltaic meter



## Sonel MeasureEffect™

The meter is a part of the **Sonel MeasureEffect™** platform. It is a comprehensive system that enables you to take measurements, store and manage data, and provides multi-level control of your instruments.

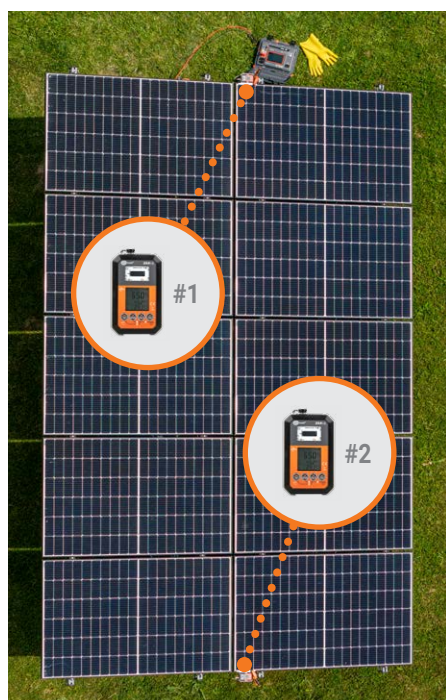
## Measured parameters

### PVM-1530

- Measurement of I-U and P-U characteristics. Conversion to STC conditions.
- The open circuit voltage of the PV panel or a chain of panels, up to 1500 V DC.
- RMS voltage of the AC network up to 1000 V with frequency measurement.
- Short circuit current of a PV panel or chain of panels - up to 40 A DC.
- Insulation resistance of PV panels - measuring voltage of 250, 500, 1000, 1500 V DC, simultaneous measurement of two values:  $R_{ISO+}$  and  $R_{ISO-}$ .
- Insulation resistance of AC circuits - measuring voltage 250, 500, 1000 V DC.
- Resistance of protective conductors and equipotential bonding with  $\pm 200$  mA current.
- Measurement of PV panels operating current and AC current - all with CMP-1015-PV meter.
- AC/DC power measurement.
- Test of bypass diodes, automatic polarity detection.
- Test of blocking diodes with 1000, 1500 V DC voltage.

### IRM-1

- Solar radiation intensity (irradiance) in  $W/m^2$  or  $BTU/ft^2h$ .
- PV panel temperature in  $^{\circ}C$  or  $^{\circ}F$ .
- Ambient temperature in  $^{\circ}C$  or  $^{\circ}F$ .
- Inclination angle of panels
- Orientation of the panels with the built-in compass.







## PVM-1530: cat. 1 measurements and I-U characteristics —

The PVM-1530 is a pioneering meter for photovoltaic installations up to 1500 V with such a substantial number of measurement functions. Their selection is done via a touch screen. The screen is large, colorful and with strong backlight so that operation in full sunlight is not a problem. Extensive structural memory significantly reduces the time for preparing post-measurement documentation.

## IRM-1: simple and compact —

IRM-1, small, but indispensable for testing PV systems. By measuring solar radiation values, as well as panel and ambient temperatures, it provides the necessary data to convert the results into STC conditions. A built-in recorder with a memory of 5000 records enables the instrument to be used as a tool in the PV plant design process, as well as to diagnose panel shading problems.

## Tightness and durability —

The meters perform well in harsh environmental conditions. The PVM-1530's housing is rugged and tight when closed to easily ensure that the meter is protected during measurement.



## Communication and software —

Measurement data from the IRM-1 can be transferred to a computer via the USB port. In addition, the device has a built-in wireless **LoRa interface** (Long Range) for automatic data exchange with the master meter – even over long distances.

Measurement data from the PVM-1530 can be transferred to a computer via cable or wireless communication. Saving the downloaded data to popular formats and printing is ensured by **Sonel Reader**. In order to generate a report on electric shock protection use the optional software: **Sonel Reports Plus**.

## Trouble? reSYNC! —

It may happen that in the course of measurements the PVM-1530 moves away from the IRM-1 so far, that communication between them is lost. If the measurements are continued, then after the connection is restored, the results will be automatically **supplemented with environmental parameters**, which in the meantime were recorded by the IRM-1 in its **temporary memory**, and converted into STC conditions.



## Specifications

Parameter	Measurement range	Display range	Resolution	Accuracy ±(% m.v. + digits)
<b>Voltage</b>				
AC voltage	0.0 V...1000.0 V	0.0 V...1000.0 V	0.1 V	±(2% m.v. + 6 digits)
DC voltage	0.0 V...1500.0 V	0.0 V...1500.0 V	0.1 V	±(0.5% m.v. + 2 digits)
<b>Frequency</b>	10.0 Hz...100.0 Hz	0 Hz...100.0 Hz	0.1 Hz	±(0.5% m.v. + 2 digits)
<b>Short circuit current I<sub>sc</sub></b>				
Voltage 1500 V DC	0.00...30.00 A	0.00...30.00 A	0.01 A	±(1% m.v. + 2 digits)
Voltage 1000 V DC	0.00...40.00 A	0.00...40.00 A	0.01 A	±(1% m.v. + 2 digits)
<b>Insulation resistance</b>				
Insulation resistance at AC side				
Measuring voltage 250 V	250 kΩ...200 MΩ acc. to EN IEC 61557-2	0.0 kΩ...200.0 MΩ	from 0.1 kΩ	±(3% m.v. + 8 digits)
Measuring voltage 500 V	500 kΩ...500 MΩ acc. to EN IEC 61557-2	0.0 kΩ...500.0 MΩ	from 0.1 kΩ	±(3% m.v. + 8 digits)
Measuring voltage 1000 V	1000 kΩ...1.000 GΩ acc. to EN IEC 61557-2	0.0 kΩ...1.000 GΩ	from 0.1 kΩ	±(3% m.v. + 8 digits)
Insulation resistance at DC side				
Measuring voltage 250 V / 500 V / 1000 V / 1500 V	250 kΩ...500 MΩ acc. to EN IEC 61557-2	0.0 kΩ...500.0 MΩ	from 0.1 kΩ	±(8% m.v. + 8 digits)
<b>Resistance of protective conductors and equipotential bondings</b>				
Measurement of resistance of protective conductors and equipotential bondings with ±200 mA current	0.10 Ω...1999 Ω acc. to EN IEC 61557-4	0.00 Ω...1999 Ω	from 0.01 Ω	from ±(2% m.v. + 3 digits)
<b>Operating current</b>	as for CMP-1015-PV	as for CMP-1015-PV	as for CMP-1015-PV	as for CMP-1015-PV
<b>Active power</b>	0.0 kW...999.0 kW	0.0 kW...999.0 kW	0.1 kW	±(6% m.v. + 5 digits)

## Other technical data

### Safety and work conditions

#### Measuring category according to EN IEC 61010-2-030

Terminal group: „-“, „+“, $\perp$	CAT III 1500 V DC
Terminal group: R <sub>CONT</sub> -, R <sub>CONT</sub> +	CAT III 600 V

#### Ingress protection

Closed cover	IP65
Open cover	IP40

#### Type of insulation according to EN 61010-1 and EN IEC 61557

	double
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<b>Power supply</b>	mains, Li-Ion 7.2 V, 9.8 Ah rechargeable battery
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<b>Dimensions</b>	390 x 308 x 172 mm
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<b>Weight</b>	ca. 8.8 kg
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<b>Operating temperature</b>	-10...+45°C
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<b>Storage temperature</b>	-20...+60°C
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<b>Humidity</b>	20...90%
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<b>Nominal temperature</b>	23 ± 2°C
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<b>Reference humidity</b>	40%...60%
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### Memory and communication

<b>Memory of measurement results</b>	9999 records
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<b>Data transmission</b>	USB, RJ-45, Bluetooth, Wi-Fi
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<b>Communication with IRM-1</b>	wireless
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### Other information






<b>The product meets the EMC (emission for industrial environment) requirements according to standards</b>	EN IEC 61326-1 EN IEC 61326-2-2
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## Standard accessories

		PVM-1530 Max	PVM-1530 Pro	PVM-1530
		WMGBPVM1530MAX	WMGBPVM1530PRO	WMGBPVM1530
	<b>IRM-1 solar radiation and temperature meter</b> WMGBIRM1	2	1	
	<b>CMP-1015-PV digital clamp meter for photovoltaic installations + standard accessories</b> WMGBCMP1015PV	1	1	
	<b>LORA-S1 USB adapter for data transmission</b> WAADAUSBLORA	1	1	
	<b>MC4-banana sockets adapter 1.5 kV (set)</b> WAADA5KVMC4KPL	1	1	1
	<b>Cable 2 m with MC4 plugs (set of 2 pcs)</b> WAPRZ002MC4KPL	1	1	1
	<b>Test lead 3 m blue 5 kV (banana plugs)</b> WAPRZ003BUBB5K	1	1	1
	<b>Test lead 3 m yellow CAT III 1500 V (banana plugs)</b> WAPRZ003YEBB1K5V	1	1	1
	<b>Test lead 1.8 m red 5 kV (banana plugs)</b> WAPRZ1X8BLBB5K	1	1	1
	<b>Test lead 1.8 m black 5 kV (banana plugs)</b> WAPRZ1X8BLBB5K	1	1	1
	<b>Crocodile clip 1 kV 20 A black</b> WAKROBL20K01	2	2	2
	<b>Pin probe 5 kV (banana socket) black</b> WASONBLOGB2	2	2	2
	<b>Solar radiation meter mounting kit for PV panels + probe for measuring the temperature of PV panels and the ambient temperature</b> WASONTPVCKPL	2	1	
	<b>5 V power supply with USB 2.0 output and a detachable micro-USB cable</b> WAZASZ24	2	1	
	<b>L-4 carrying case</b> WAFUTL4	1	1	1
	<b>USB cable</b> WAPRZUSB	1	1	1
	<b>Mains cable with IEC C13 plug</b> WAPRZ1X8BLIEC	1	1	1

























## Standard accessories

	PVM-1530 Max	PVM-1530 Pro	PVM-1530
	WMGBPVM1530MAX	WMGBPVM1530PRO	WMGBPVM1530
 <b>Key for MC4 connectors</b> WAPOZKEYMC4	1	1	1
 <b>Fuse 0.5 A, 1000 V AC/DC, 6.3x32 mm</b> WAPOZB05A1000V	1	1	1
 <b>Factory calibration certificate - PVM-1530</b>	1	1	1
 <b>Factory calibration certificate - IRM-1</b>	2	1	
 <b>Factory calibration certificate - CMP-1015-PV</b>	1	1	



## Optional accessories

	PVM-1530 Max	PVM-1530 Pro	PVM-1530
	WMGBPVM1530MAX	WMGBPVM1530PRO	WMGBPVM1530
 <b>IRM-1 solar radiation and temperature meter</b> WMGBIRM1		✓	✓
 <b>CMP-1015-PV digital clamp meter for photovoltaic installations + standard accessories</b> WMGBCMP1015PV			✓
 <b>Optional accessories for CMP-1015-PV</b>	✓	✓	
 <b>MC4 splitter for power measurement in PV installations 1500 V (set of 2 pcs.)</b> WAADAMC4SV2KPL	✓	✓	✓
 <b>AC-16 line splitter (facilitates current measurements)</b> WAADAAC16	✓	✓	✓
 <b>Industrial socket adapter 16 A / 32 A</b> WAADAAGT16T / WAADAAGT32T	✓	✓	✓
 <b>Three-phase socket adapter 16 A / 32 A</b> WAADAAGT16P / WAADAAGT32P	✓	✓	✓
 <b>Three-phase socket adapter 63 A</b> WAADAAGT63P	✓	✓	✓
 <b>Crocodile 1 kV 20 A clip red / blue / yellow</b> WAKRORE20K02 / WAKROBU20K02 / WAKROYE20K02	✓	✓	✓
 <b>Pin probe 1 kV (banana socket) red / blue / yellow / black</b> WASONREOGB1 / WASONBUOGB1 / WASONYEGB1 / WASONBLOGB1	✓	✓	✓
 <b>Barcode scanner (USB)</b> WAADACK2D	✓	✓	✓
 <b>Report / barcode printer D2 SATO (USB, portable)</b> WAADAD2	✓	✓	✓
 <b>Tape / paper (glued) for D2 printer</b> WANAKD2	✓	✓	✓
 <b>Ink tape for D2 printer</b> WANAKD2BAR	✓	✓	✓

		PVM-1530 Max	PVM-1530 Pro	PVM-1530
		WMGBPVM1530MAX	WMGBPVM1530PRO	WMGBPVM1530
	<b>Report / barcode printer D3 Brother (Wi-Fi / USB, portable)</b> WAADAD3	✓	✓	✓
	<b>Ink tape for D3 printer</b> WANAKD3	✓	✓	✓
	<b>Rechargeable battery for D3 printer</b> WAAKU19	✓	✓	✓
	<b>Sonel Reader software</b> WAPROREADER	✓	✓	✓
	<b>Sonel Reports Plus software</b> WAPROREPORTSPUS	✓	✓	✓
	<b>Calibration certificate with accreditation - PVM-1530</b>	✓	✓	✓
	<b>Calibration certificate without accreditation - IRM-1</b>	✓	✓	
	<b>Calibration certificate with accreditation - CMP-1015-PV</b>	✓	✓	

