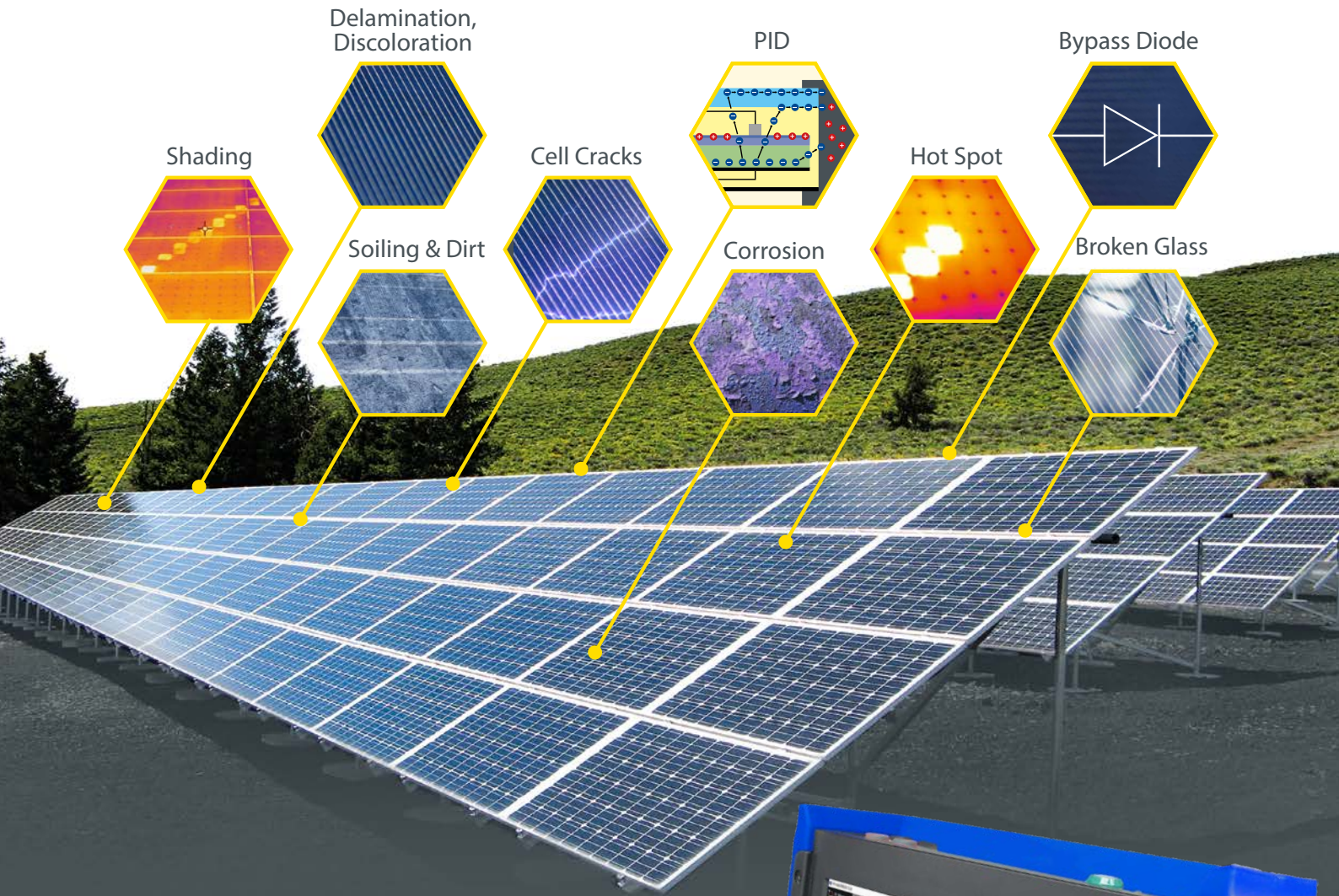




MULTI-CHANNEL IV CURVE TRACER

MESSTECHNIK

World's most versatile Solar Power Plant diagnostic system

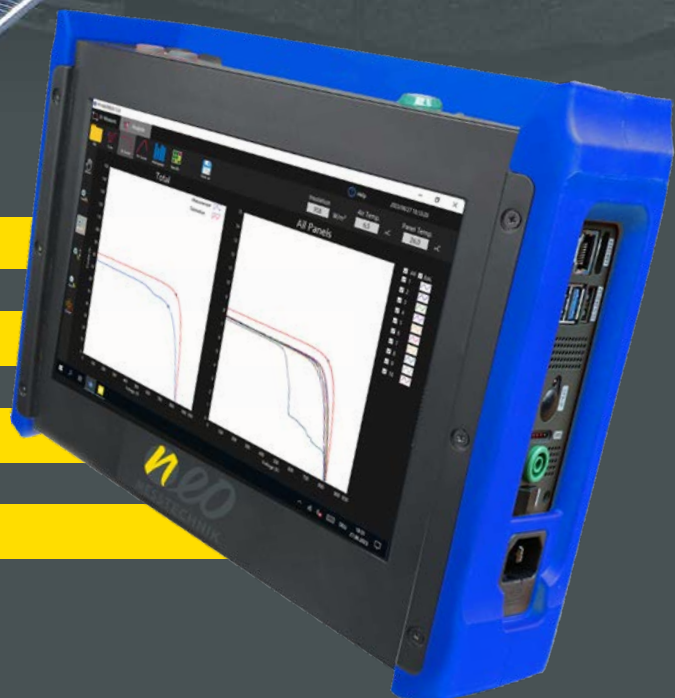


POWER PERFORMANCE

IV-CURVE-TRACING

DISTANCE-TO-FAULT

LEAKAGE MEASUREMENT



IV-curve tracing up to 45A



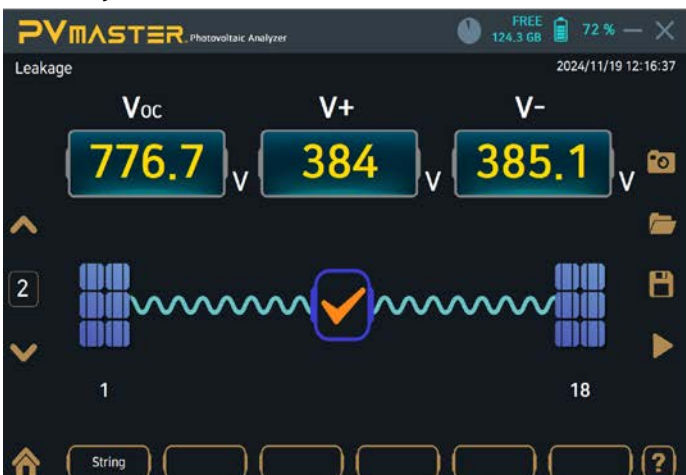
The measured IV (up to 2200 data points) curve is compared with the reference curve. The differences between the two indicate different errors. A total of 1-20 strings are measured per measurement. The analysis can then be carried out using the various software tools. This measurement can be carried out on **any type of module**, such as **N-type**, **P-type** and even **high-capacitance modules** with **inrush currents up to >200A**.

Automatic Analysis



In the automatic fault analysis, the measured curves are analyzed and divided into fault groups. This step makes it easier for technicians to identify faults and subsequently correct them.

Safety measurement & Distance-to-Fault



The safety measurement is used to determine whether leakage currents occur on the string. This measurement provides protection for both the measuring device and the technician. The benefit of this measurement is that the location of the fault is displayed as well.

Advantages



Why is it the world's most versatile Solar Power Plant diagnostic system?

ADAPTIVE SWITCHING
Precise (accuracy of 0.05%)
IV-Curve tracing for both
- Single PV modules or full
strings up to 1500 V starting
at 400 W/m²
solar radiation.

IV CURVE TRACING
1500 V / 30 A
High Power Rating
(optional 45 A)

LEAKAGE DETECTION & DISTANCE TO FAULT FUNCTION

EXTENSION BOX
For measuring
up to 20 strings
simultaneously
- IV and Leakage
measurement.

DIAGNOSIS
Automatic detection of
many types of
performancereducing faults,
such as Mismatch, PID,
Hotspots, Cell Cracks,
BPD breakage and others.

SENSOR BOX EXPERT
Bifacial PV module support.
Exact temperature and
irradiance measurement.

- Multimeter Mode (U, I, P)
- Mobile Operation up to 4 hours
- Easy Remote Connection (LAN, WLAN, UMTS)
- Direct Analysis on the Instrument using the 10.1 inch Multi-Touch-Screen

World's only instrument to detect parallel Mismatch-Losses

Automatic Report

<p>NEO MESSTECHNIK PV MASTER I-V Measurement Report</p> <p>Basic Information:</p> <p>Operator/Contact: Andre Dimitroff Signature: <i>Andre Dimitroff</i></p> <p>Inspector/Contact: Bernhard Gasser Signature: <i>Bernhard Gasser</i></p> <p>Client: NEO PV MASTER Client Date of Inspection: 2023/09/09 Time of Inspection: 09:59:59 Name of Site: NEO Messtechnik Office Location of Site: Sonnenweg 4, 2071 Zibben, Austria Module Size: 18 series x 20 parallel PV Station Size: 131,400 kW Installation Degree: 11° Instrument Name: PV MASTER 10 Version of Software: 1.0.0 Calibration Date: Virtual Calibrated</p> <p>PV Module Specifications:</p> <table border="1" style="width: 100%; font-size: small;"> <tr><td>PV Module</td><td>1-64.1.1</td></tr> <tr><td>Pmp [W]</td><td>396</td></tr> <tr><td>Vmp [V]</td><td>29.53</td></tr> <tr><td>Imp [A]</td><td>13.392</td></tr> <tr><td>Voc [V]</td><td>48.03</td></tr> <tr><td>Isc [A]</td><td>1.832</td></tr> <tr><td>FF</td><td>0.779</td></tr> </table>	PV Module	1-64.1.1	Pmp [W]	396	Vmp [V]	29.53	Imp [A]	13.392	Voc [V]	48.03	Isc [A]	1.832	FF	0.779	<p>NEO MESSTECHNIK PV Plant Leakage Check Result</p> <table border="1" style="width: 100%; font-size: x-small;"> <thead> <tr> <th>Channel</th> <th>V Positive [V]</th> <th>V Negative [V]</th> <th>Difference [V]</th> <th>Safety</th> <th>Location</th> </tr> </thead> <tbody> <tr><td>Ch 1</td><td>419.2</td><td>389.1</td><td>29.1</td><td>0</td><td>-</td></tr> <tr><td>Ch 2</td><td>410.4</td><td>404.7</td><td>5.7</td><td>0</td><td>-</td></tr> <tr><td>Ch 3</td><td>401.1</td><td>397.3</td><td>3.8</td><td>0</td><td>-</td></tr> <tr><td>Ch 4</td><td>410.8</td><td>396.6</td><td>14.2</td><td>0</td><td>-</td></tr> <tr><td>Ch 5</td><td>410.1</td><td>407.3</td><td>2.8</td><td>0</td><td>-</td></tr> <tr><td>Ch 6</td><td>407.6</td><td>407.1</td><td>0.5</td><td>0</td><td>-</td></tr> <tr><td>Ch 7</td><td>409.4</td><td>400.2</td><td>9.2</td><td>0</td><td>-</td></tr> <tr><td>Ch 8</td><td>405.1</td><td>395.9</td><td>9.0</td><td>0</td><td>-</td></tr> <tr><td>Ch 9</td><td>408.4</td><td>405.3</td><td>3.0</td><td>0</td><td>-</td></tr> <tr><td>Ch 10</td><td>413.8</td><td>400.3</td><td>13.4</td><td>0</td><td>-</td></tr> <tr><td>Ch 11</td><td>406.0</td><td>394.9</td><td>11.0</td><td>0</td><td>-</td></tr> <tr><td>Ch 12</td><td>410.0</td><td>396.6</td><td>13.4</td><td>0</td><td>-</td></tr> <tr><td>Ch 13</td><td>411.1</td><td>405.8</td><td>5.3</td><td>0</td><td>-</td></tr> <tr><td>Ch 14</td><td>411.9</td><td>405.8</td><td>6.1</td><td>0</td><td>-</td></tr> <tr><td>Ch 15</td><td>418.7</td><td>403.9</td><td>14.8</td><td>0</td><td>-</td></tr> <tr><td>Ch 16</td><td>419.8</td><td>398.1</td><td>21.7</td><td>0</td><td>-</td></tr> <tr><td>Ch 17</td><td>408.0</td><td>407.7</td><td>0.3</td><td>0</td><td>-</td></tr> <tr><td>Ch 18</td><td>418.3</td><td>397.2</td><td>21.1</td><td>0</td><td>-</td></tr> <tr><td>Ch 19</td><td>410.9</td><td>400.9</td><td>10.0</td><td>0</td><td>-</td></tr> <tr><td>Ch 20</td><td>371.9</td><td>342.8</td><td>29.1</td><td>0</td><td>0</td></tr> </tbody> </table>	Channel	V Positive [V]	V Negative [V]	Difference [V]	Safety	Location	Ch 1	419.2	389.1	29.1	0	-	Ch 2	410.4	404.7	5.7	0	-	Ch 3	401.1	397.3	3.8	0	-	Ch 4	410.8	396.6	14.2	0	-	Ch 5	410.1	407.3	2.8	0	-	Ch 6	407.6	407.1	0.5	0	-	Ch 7	409.4	400.2	9.2	0	-	Ch 8	405.1	395.9	9.0	0	-	Ch 9	408.4	405.3	3.0	0	-	Ch 10	413.8	400.3	13.4	0	-	Ch 11	406.0	394.9	11.0	0	-	Ch 12	410.0	396.6	13.4	0	-	Ch 13	411.1	405.8	5.3	0	-	Ch 14	411.9	405.8	6.1	0	-	Ch 15	418.7	403.9	14.8	0	-	Ch 16	419.8	398.1	21.7	0	-	Ch 17	408.0	407.7	0.3	0	-	Ch 18	418.3	397.2	21.1	0	-	Ch 19	410.9	400.9	10.0	0	-	Ch 20	371.9	342.8	29.1	0	0	<p>NEO MESSTECHNIK Results (Ch. 11-20)</p> <p>PV I-V Curve main features:</p> <table border="1" style="width: 100%; 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The expected since natural shading effect of sun on the irradiated periodically, especially at the lower part of the day.</p> <p>- Characteristics table for the generation of bypass diode short-circuit fault (Voc) is not shown.</p>	Param	101-078	Vmp [V]	177.7	Imp [A]	177.8	Voc [V]	172.8	Isc [A]	1.728	FF	0.725	Imp [A]	1.023	Tmod [°C]	18.9	Tamb [°C]	12.0	<p>NEO MESSTECHNIK</p> <p>This Test Report shall not be reproduced except in full, without the written approval of the "Bernhard Gasser". This test report presents information about the tested PV system via Leakage test and I-V curves.</p> <p>The Accuracy of PV MASTER 10 used to process this report is +/- 5%. Since the outdoor real time measurement process is not repeatable, it is impossible to determine the accuracy of the input value itself, therefore it is notified that a value beyond the above accuracy may exist.</p> <p>Reference Standards</p> <ul style="list-style-type: none"> IEC 60904-1 Photovoltaic devices - Part 1: Measurement of photovoltaic current-voltage characteristics IEC 60891 Photovoltaic devices - Procedures for temperature and irradiance corrections to measured I-V characteristics <p>Terminology</p> <ul style="list-style-type: none"> Pmp: Max Power Vmp: Voltage at Pmp Imp: Current at Pmp Voc: Open Circuit Voltage Isc: Short Circuit Current FF: Fill Factor Imp: Solar Irradiance Tmod: Module Temperature Tamb: Ambient Temperature
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With the automatic report function, fault reports can be created in seconds. These are saved as PDF files. The report can be customized with various customization options.

Up to 20 strings simultaneously

The modular system of the PV-Master series offers the user the greatest possible flexibility.

Via an external switch box, 1, 4, 8 or 20 input channels can be connected to the device.

4 Channel Extension: ~80 kW per measurement (PM10-EXT-4CH)

8 Channel Extension: ~160 kW per measurement (PM10-EXT-8CH)

20 Channel Extension: ~400 kW per measurement (PM10-EXT-20CH)



Sensorbox Expert

Temperature measurement

- Up to 5 Sensors
- PT100/PT1000/Thermocouple



Connectivity

- WIFI up to 100 m
- Cable connection
- Live values on the display

Solar Irradiance measurement

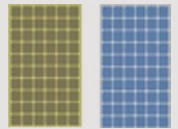
- Pyranometer Class A, B or C



- Reference cell



- „Golden String Measurement“



- Up to 3 pyranometers for bifacial modules

Additional inclination measurement

PV MASTER 10



SPECIFICATION

Measurement range	current	45 A
	voltage	1500 V
Measurement accuracy	0,05%	
Safetycategory	CAT III 1000V	
Data points per IV curve	2285	
Measurement time per string	~200 ms	
max. Inrushcurrent	200 A	
min. Irradiation	400 W/m ²	
Battery	4 h	
Internal SSD	2 x 256 GB	
Interfaces	LAN/WLAN/USB/HDMI optional LTE	
Size	298 x 225 x 95 mm	
Weight	4,3 kg	



Website and Videos