

# SOILING MEASUREMENT KIT

NRG Systems' Soiling Measurement Kit provides users with the information needed to quantify the site-specific impacts of soiling caused by snow, dust, and other particles on prospective and current PV projects. These data are used to improve pre-construction annual energy production (AEP) estimates as well as maintenance schedules (i.e., panel washing) and forecast models in the post-construction setting.

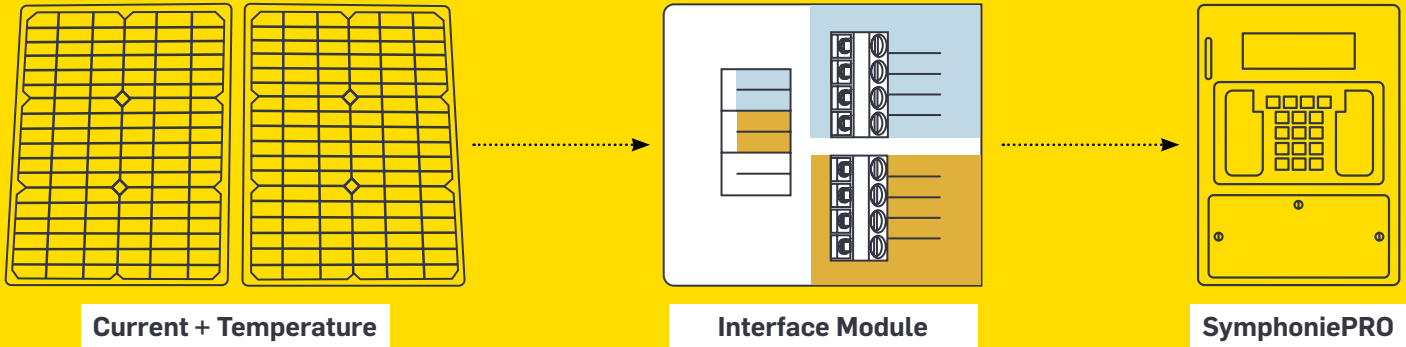
## Key Benefits

- Determine site-specific soiling loss characteristics with this turnkey soiling measurement solution.
- Install easily as an accessory to NRG's SRA System—complete with PV modules, pre-installed back-of-module temperature sensors, flexible mounting hardware, and integrated soiling interface module.
- Measure short circuit current and back-of-module temperature with user's choice of statistical interval as well as optional 1 Hz sample data collection for flexible analysis options to meet data demands.



**NRG**Systems™

## COMPONENT OVERVIEW:



| SPECIFICATIONS:           |   |  |
|---------------------------|---|--|
| <b>Description</b>        | <p><b>Soiling Ratio(*)</b></p> <ul style="list-style-type: none"> <li>• Measurement of short circuit current (Isc) of both a clean reference solar panel and un-cleaned test solar panel, including back of panel temperature compensation</li> </ul> <p><b>Application</b></p> <ul style="list-style-type: none"> <li>• Soiling loss measurement with 15W solar panel</li> </ul> | <p><b>Instrument Compatibility</b></p> <ul style="list-style-type: none"> <li>• NRG Solar Resource Assessment System using SymphoniePRO Data Logger</li> </ul> <p><b>Signal Type</b></p> <ul style="list-style-type: none"> <li>• Analog voltage outputs</li> </ul>  |
| <b>Specification</b>      | <p><b>Soiling Ratio Accuracy</b></p> <ul style="list-style-type: none"> <li>• &lt; 1% accuracy*</li> </ul> <p>*for Isc values &gt; 0.50 Amp including back of panel temperature error</p>   | <p><b>Recommended Panel Isc Measurement Range for Soiling Ratio Calculation</b></p> <ul style="list-style-type: none"> <li>• 0.50 Amp to 1.5 Amp</li> </ul>  |
| <b>Power Requirements</b> | <p><b>Supply Voltage</b></p> <ul style="list-style-type: none"> <li>• Soiling station interface module: 5-15 Vdc</li> </ul>   | <p><b>Supply Maximum Current</b></p> <ul style="list-style-type: none"> <li>• Soiling station interface module and the amplifier power for the Isc measurement: 2.5mA</li> </ul>   |
| <b>Installation</b>       | <p><b>Mounting</b></p> <ul style="list-style-type: none"> <li>• Panels: Rail mounting with angle adjustment</li> <li>• Interface Module: DIN rail mount</li> </ul>  | <p><b>Wiring/Interconnection</b></p> <ul style="list-style-type: none"> <li>• Solar panel current measurement and back of panel temperature are connected via a 5 terminal screw connector on the interface module</li> <li>• The connections to the logger from the interface module are via a 6 terminal screw connector</li> </ul>  |
| <b>Environmental</b>      | <p><b>Operating Temperature and Humidity Range</b></p> <ul style="list-style-type: none"> <li>• PCB Temperature: -40C to +65C</li> <li>• Temp Probe and adhesion Temperature: -40C to +85C</li> <li>• Humidity: 0 to 100%, Corrosion resistant, UV resistant</li> </ul>   | <p><b>IP Rating</b></p> <ul style="list-style-type: none"> <li>• Interface module: IP55 when installed in a standard Symphonie Shelter Box   FRP</li> </ul> <p><b>Electrical</b></p> <ul style="list-style-type: none"> <li>• EN 61000-4-2 ESD</li> </ul> <p><b>Compliance</b></p> <ul style="list-style-type: none"> <li>• CE</li> </ul> <p><b>Other</b></p> <ul style="list-style-type: none"> <li>• Packaging meets ISTA-1A 2014 Shock Drop Test</li> </ul> |

(\*)Michael G., Tim D., and Christopher T., "Accurately measuring PV soiling losses with soiling station employing module power measurements", Proceedings of the 42nd IEEE Photovoltaic Specialists Conference, June 14-19, 2015, New Orleans, LA.

### For more information:

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