SOILING MEASUREMENT KIT

For Operational and Site Assessment

1. Dedicated Soiling Rate Python Script

2. Full Compatibility Kintech Engineering data loggers

3. Precision Temperature & SC Current Sensors

The Soiling Measurement Kit supplied by Kintech Engineering allows users to estimate the site-specific effects of soiling on PV modules

How it works

What is Soiling loss? This term refers to the power lost due to snow, dirt, dust and other particles that cover the PV module surface.

The short-circuit current, essential characteristic of the PV panels, is proportional to the PV panels effective radiation. By comparing the short circuit current of a "clean" PV panel to the "soiled" PV panel, and compensating for PV panel temperature we can estimate the exact effect of soiling.

The output data from the PV panels and temperature sensors is fully compatible with the analog input channels on the Orbit 360 data logger. Once the dataset has been downloaded, a dedicated Python script calculates the exact soiling ratio between "dirty" panel and "clean" panel and automatically adds a new data column in your dataset.

What is included in the Soiling Kit

- Two 10W-monocrystalline-PV panels from the same production lot*
- High precision temperature sensors (preinstalled on the back of the PV panels)
- High precision current measurement sensors
- Support bracket for PV panels (adjustable)
- Cabling (for solar panel and temperature sensors)
- Dedicated Python Script

Required

- Data Logger (e.g. Orbit 360)
- Frequent maintenance for cleaning of the "clean" PV panel

* We check short-circuit current values on both panels to assure equal performance.

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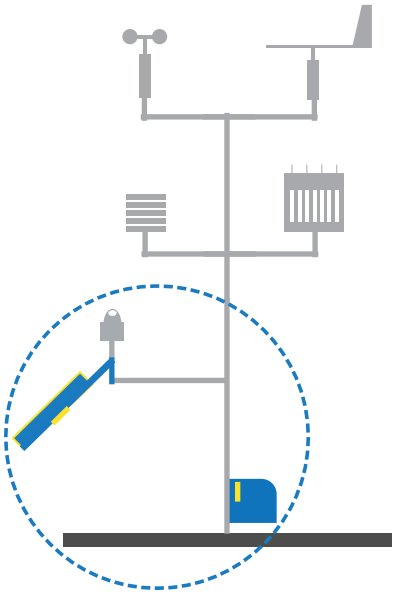
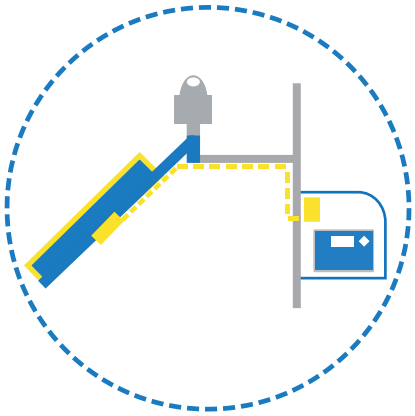
The support bracket supplied with the Soiling Measurement Kit assure the exact same inclination and orientation of both solar panels.





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Soiling data automatically added to your dataset

SHORT CIRCUIT CURRENT MEASURMENT

CHARACTERISTIC	VALUE
Current sensor type	Shunt resistor + Current sense amplifier
Output signals type	Analog Signal (Slope=200)
Shunt Resistor	0.05Ohm +/-0.1%
Current range measurement	±1 A
Accuracy:	
Gain Error:	0.20% (max)
Gain Drift:	2.5 ppm/°C (max)
Offset Voltage:	±25 µV (max)
Offset Drift:	250 nV/°C (max)
V supply	12Vdc
Temperature range	-40...+85 ºC

TEMPATURE MEASUREMENT

CHARACTERISTIC	VALUE
Temperature sensor type	Precision integrated-circuit temperature
Range	-50…+100ºC
Output signal type	Analog signal (from 0 to 10 mV)

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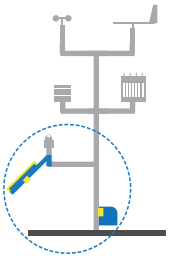

Sensor Model	PV pannels & Temperatures	Isc measurement device*				Orbit 360			EOL Zenith	
						Section	Terminal	Type	Section	Type
	PV soil (-)	A		G	GND	Frequency Channels	1 4 7 10 13 16 19 22 25 28	(-)	Anemometer Inputs	– –
	PV soil (+)	B		E	Isc soil	Analog Channels	48 52 56 60 65 69 73 77 81 84 85 86 90 91 92	Signal	Analog Inputs Extra Analog	1 2 3 4 5 1 2 3 4 5 6 7 8
	PV clean (-)	C		F	Isc clean	Analog Channels	48 52 56 60 65 69 73 77 81 84 85 86 90 91 92	Signal	Analog Inputs Extra Analog	1 2 3 4 5 1 2 3 4 5 6 7 8
	PV clean (+)	D		H	Vcc	Frequency Channels	3 6 9 12 15 18 21 24 27 30	5V	Anemometer Inputs	5V 5V
	Temp soil (-)					Analog Channels	47 51 55 59 64 68 72 76 80 87	(-)	Analog Inputs	– –
	Temp soil signal					Analog Channels	48 52 56 60 65 69 73 77 81 84 85 86 90 91 92	Signal	Analog Inputs Extra Analog	1 2 3 4 5 1 2 3 4 5 6 7 8
	Temp soil (+)					Analog Channels	50 54 58 62	*5п	Analog Inputs	*+ +
	Temp clean (-)					Analog Channels	47 51 55 59 64 68 72 76 80 87	(-)	Analog Inputs	– –
	Temp clean signal					Analog Channels	48 52 56 60 65 69 73 77 81 84 85 86 90 91 92	Signal	Analog Inputs Extra Analog	1 2 3 4 5 1 2 3 4 5 6 7 8
	Temp clean (+)					Analog Channels	50 54 58 62	*5п	Analog Inputs	*+ +

Note: *5п, + + = *Pulsating 5V with current limited (4mA). Only 1 sensor must be powered.*
Isc measurement device is provided by Kintech Engineering.

REQUIRED DATA LOGGER VERSION

Minimum data logger required: **ORBIT 360 BASIC PLUS**.
Minimum **firmware** required: **any**.

HOW TO CONFIGURE IN ATLAS

Start Atlas and open the data logger you are working on. Now go to Site settings and scroll down to the Channels section and select the following type and model:

ISC soil & ISC clean
- Group: Analog channels
- Sensor Type: Voltage
- Sensor Model: **Volts**
- Slope: 200
- Offset: 0

TEMP soil & TEMP clean
- Group: Analog channels
- Sensor Type: Voltage
- Sensor Model: **Volts**
- Slope: 100
- Offset: -60

Important! Please make sure you are working with the latest version of Atlas. To check for new updates click the Check for updates button in the left-hand menu located in the main dashboard.

HOW TO CONFIGURE THIS SENSOR ON SITE

We recommend performing the entire sensor configuration using Atlas at the office before installing sensors onsite. Once the sensor is correctly setup in Atlas, use the Upload settings tool, to upload the sensor configuration to the data logger.
In case you are already on site and need to configure the sensor directly on the data logger, follow these steps:

1. Turn on the data logger.
2. Using the keypad on the data logger, navigate the menu until you see Sensor model, then click the “right arrow” on the keypad.
3. Now scroll down to the channel you are going to connect the sensor to, and click the “right arrow” on the keypad.
4. Now click “Set” on the keypad and scroll up in the menu to set the sensor model type according to the table here below. Once you have found the correct sensor model, click the “right arrow” key twice to select it and save.
5. Click the “left arrow” several times to go back to the main menu.

Data logger model	Firmware version	Sensor model type on data logger		
		Magnitude	Number	Name
ORBIT 360	any	ISC	01	milliVolts
		PV Temp	01	milliVolts
EOL ZENITH	any	ISC	01	miliVolts
		PV Temp	01	miliVolts

Keep in mind: *if the sensor channel has been configured as milliVolts, the output values on data logger display will always be shown in milliVolts. Remember to fill in both the slope and the offset for the pyranometer sensor to see real sensor values in* A and ºC *in your datasets during a real-time connection with the data logger (from either Atlas or Atlas Mobile).*

HOW TO CONFIGURE IN EOL MANAGER

Open EOL Manager and go to Settings of the data logger you are working on. Open the Inputs tab and select the following type and model:

ISC soil & ISC clean

- Group: Analog Inputs
- Sensor Type: Voltmeter
- Sensor Model: **Generic Voltimeter**
- Slope: 200
- Offset: 0

TEMP soil & TEMP clean

- Group: Analog Inputs
- Sensor Type: Voltmeter
- Sensor Model: **Generic Voltimeter**
- Slope: 100
- Offset: -60

For more information please contact **web@kintech-engineering.com**
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