



INTRODUCTION

This document provides guidance on how to install and verify the NRG Systems Soiling Interface Module | Full Sized Series (S.I.M)(30A | 100VDC) for use with the LOGR-S or SymphoniePRO data logger. The S.I.M sensors take inputs from two PV panels and outputs two differential signals corresponding to each panel's amperage values. PV Panels are provided and installed by the site.

#18243: Parts

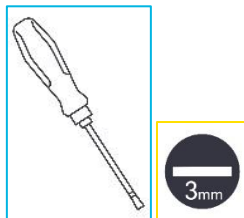
NRG Part Number	Part Description	Part Specification	Qty
18042	Interface Module	30A Soiling Module, Array Mounted	1
18112	Cable	Signal Cable, Soiling Interface Module, 30 m	1
2703	Clamp Hose	Clamp-Hose, #164,2.0"-10.75", 9/16 Hex/Slotted Screw, SS	2

Additional Parts Necessary for Symphonie PRO

NRG Part Number	Part Description	Part Specification	Qty
9128	P-SCM Card	PCBAssy, P-SCM, -6 to 58m VInput, No Exc, Tested, Sealed	2

#18243: Assembly Tools

- Ethernet Cable (LOGR-S)
- Computer with ethernet port or local network connection and USB port
- USB Type B to Type A cable (SymPRO)





PRECAUTIONS



Warning:

Do not coil any excess PV extension cable, this could cause the cable jacket to overheat. The cable jacket could become damaged, leading to exposed high-power lines.



Warning:

Before connecting the PV panels to the S.I.M.'s circuit breaker, double check all soiling module wired connections, to ensure they are properly seated and torqued (more information found in the Final Checks and Verification sections for each logger type).



Warning:

The S.I.M | 30A is rated for 100 Volts, but the system as installed in the standard configuration is only rated for 96 Volts (this value is determined by the Circuit Breakers).

INSTALLATION

J-Box Mounting:

The J-Box can be affixed to the array torque tube or array pile using the supplied brackets and hose clamps. The box should be installed as close to the soiling panels as possible for the best data, long cable runs between the PV panels and J-box may impact the measured *Soiling* values.

SETTING UP WITH LOGR-S:

Programming the logger:

- Before attempting to connect to the LOGR-S ensure you have either a direct ethernet connection or are connected to the same local network. Enter the loggers IP address into the browser of your choice (if unprogrammed, **the default address is 192.168.1.110**).

Sign in
http://192.168.1.110
Your connection to this site is not private

Username

Password

Figure 1: LOGR-S Sign-In Prompt Default Credentials



- The webpage will open to the **Sensor Outputs** home page window, this window will show all channel configuration, but maybe blank if no sensors have been programmed into the logger. To add this S.I.M. to the LOGR configuration, hover over the *Sensors* tab at the top and select *Analog Channels* from the dropdown options.

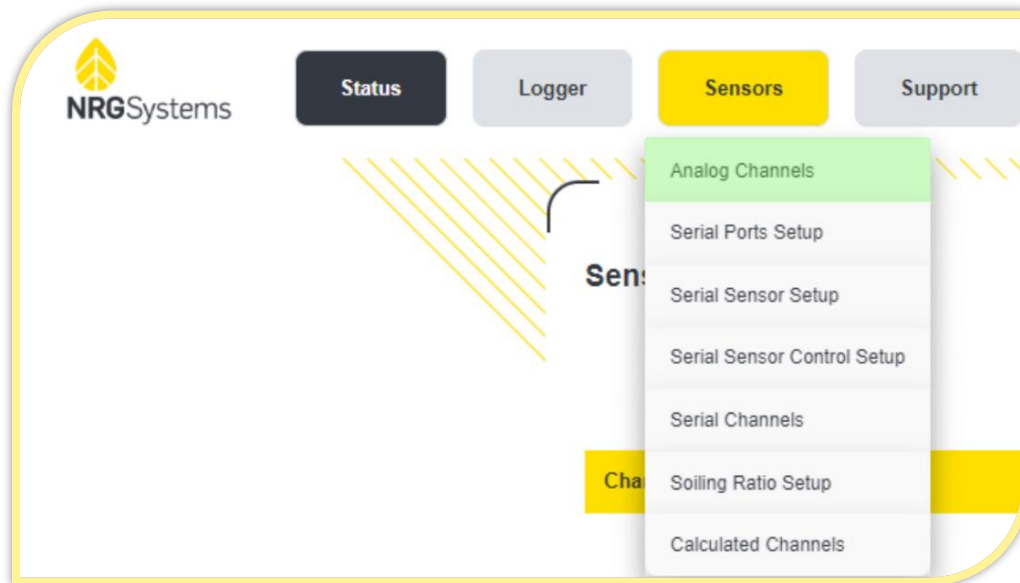


Figure 2: Click "Analog Channels" To Configure Ports A1-A7

- This page allows access to the logger’s **14 Analog Channels** (Port A1 – A7). The **S.I.M** requires two analog channels on one port to function, and any port can be utilized for this purpose. For this example, **Channels 11 & 12** (Port A6) will be configured to accept the **S.I.M | 30A** data. Scroll down to the desired channel and click **Configure** to set-up the first channel.

A6	11	No Sensor	00000000	Configure
	12	No Sensor	00000000	Configure

Figure 3: Unconfigured Channels 11 & 12 (Another Port May Be Used If Available)

- The channel’s port & number will be visible in the top left corner of this new window to ensure you are in the right channel. The following channel details are required to configure the 30A S.I.M..

S.I.M | 30A

- Sensor Type: NRG Soiling 30A



- Description: Edit to include a suffix of- “Soiled” or “Clean”
- Units: A (Amps)
- Slope: 1000
- Offset: 0

The **S.I.M | Full Size Series** outputs a millivolt signal, the settings above will scale that value to display in amps.

- Click *Done* to return to the **Analog Channels** window.

Analog Channel Configuration

Port A6-Ch 11

Enable Configuration
 Enabled

Sensor Type	Description	Units	Slope	Offset
NRG Soiling 30A	NRG Soiling 30A- Soiled	A	1000.00000	0.00000

Serial Number	Height (m)	Elevation Angle	Azimuth Angle	Modbus Address
000000000	0.00	0.0	0.0	10048

Back Reset Done

Figure 4: Soiled Channel – Configuration



Clicking **Done** DOES NOT save the channel settings; an orange ribbon will span the top and bottom of this page to show that unsaved changes have been made (See [Error! Reference source not found.6](#)).

- Repeat the previous configuration steps above to add the second channel, ensure the description reads correctly (either “Soiled” or “Clean”). Note that alternative text can be used as a description, but the channel should always include a “Soil” or “Clean” descriptor.
- Once a channel has been configured, the Analog Channels page will update with both the entered *Description* and *Serial Number* (this sensor is not serialized). Double check that your configured channels appear similar to the channel shown below in [Error! Reference source not found.5](#).



A6	11	NRG Soiling 30A- Soiled	00000000	Configure
	12	NRG Soiling 30A- Clean	00000000	Configure

Figure 5: Configured Channels 11 & 12

- Once both analog channels have been configured, scroll to the bottom of the page, and click *Save*.

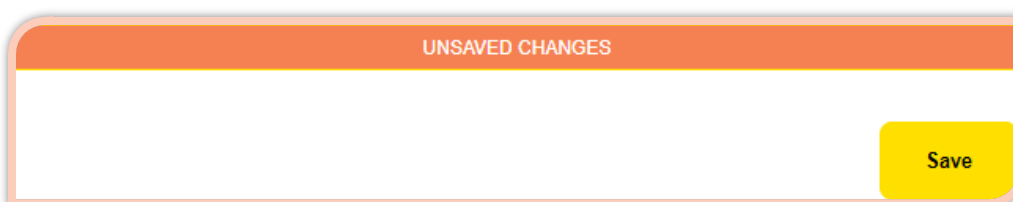


Figure 6: Confirm Unsaved Changes

- The **Sensor Outputs** page should now display the two channels that have been configured. If the **S.I.M 4C Sensor Cable** hasn't already been connected to the LOGR-S as shown in **Error! Reference source not found.7**, connect it now. Ensure that you are wiring the sensor to the same terminal port which was configured above (in this example, terminal port A6).

Wiring sensor to LOGR-S:

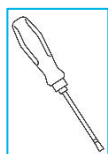


Table 1: LOGR-S Connections – S.I.M Full Sized		
Color	Reference	Termination
Red	PV Soiled Signal +	SIG+
White	PV Clean Signal +	SIG
Black	PV Soiled Signal -	GND
Green	PV Clean Signal -	
Bare	Shield	SHD

Figure 7: LOGR-S Wiring

For system diagrams, see the LOGR-S Reference Diagrams at the end of this document (**Figures 17 and 18**).



Verification of Installation on LOGR-S:

Sensor Outputs

Active ▾

Channel Number	Type	Description	Data
11	Analog	Soiling Interface Module_Soil	-0.03 A
12	Analog	Soiling Interface Module_Clean	-0.02 A

Figure 8: S.I.M | 5A Signal with no PV input

The two channels (Soil & Clean) should read approximately the same value when the PV panels are disconnected, or if the circuit breaker is off. Shown below in **Error! Reference source not found.** is the readings from two 5-Amp power supplies. The **S.I.M | Full Sized** sensor is now fully configured, and the panels can be connected.



Ensure that the bare end of the MC4 extension cable is fully secured before connecting to the PV Panels.

Sensor Outputs

Active ▾

Channel Number	Type	Description	Data
11	Analog	Soiling Interface Module_Soil	4.97 A
12	Analog	Soiling Interface Module_Clean	4.97 A

Figure 9: Reading two 5-Amp power supplies



SETTING UP WITH SYMPHONIE PRO:

- Connect the SymPRO to the 26 or 16 Channel Wiring Panel. See Symphonie PRO Manual for additional information: [SymphoniePRO User’s Manual](#)
- Connect the SymPRO to a 12VDC Power source.
- The **S.I.M** requires two Analog P-SCM channels to function. For this example, **Channels 25 & 26** will be configured to accept the **S.I.M | 30A** data.
- Two #9128 P-SCM cards are required. Insert one card into each associated channel slot (one for Channel 25, and one for Channel 26); the slots are labeled with channel numbers. See figure, right.
- Connect the SymPRO to the computer via USB and open the SymPRO Desktop App.
- Select the SymPRO logger to be programmed from the **Fleet View** tab.
- Select the Channels tab from the left side, then navigate to the channels that the correct channels and click the “+” button to expand the channels for configuration.
- Edit the channel to reflect the following information for the **S.I.M. | 30A**
 - Data Logging Mode: Statistics
 - Channel Type: Analog
 - Description: Edit to read “Soiling 30A” and include a suffix of- “Soiled” or “Clean”
 - Scale Factor: 1000
 - Offset: 0
 - Units: A (Amps)
 - SymphoniePRO Signal Conditioning Module (P-SCM): #9128

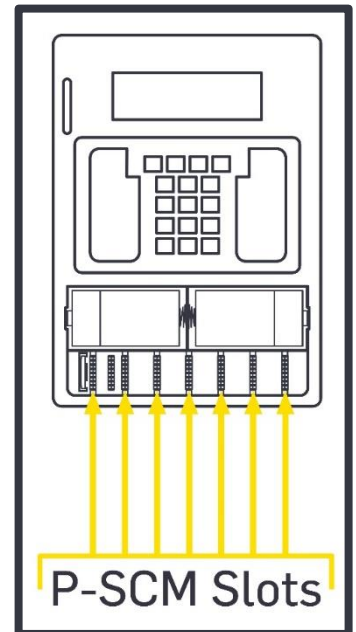


Figure 10: SymPRO P-SCM Locations

The **S.I.M | Full Size Series** outputs a millivolt signal, the settings above will scale that value to display in amps.



- Click either the 'Save All' button on the bottom left of the screen, or the "Save To Logger" button on the top of the screen to confirm the settings.

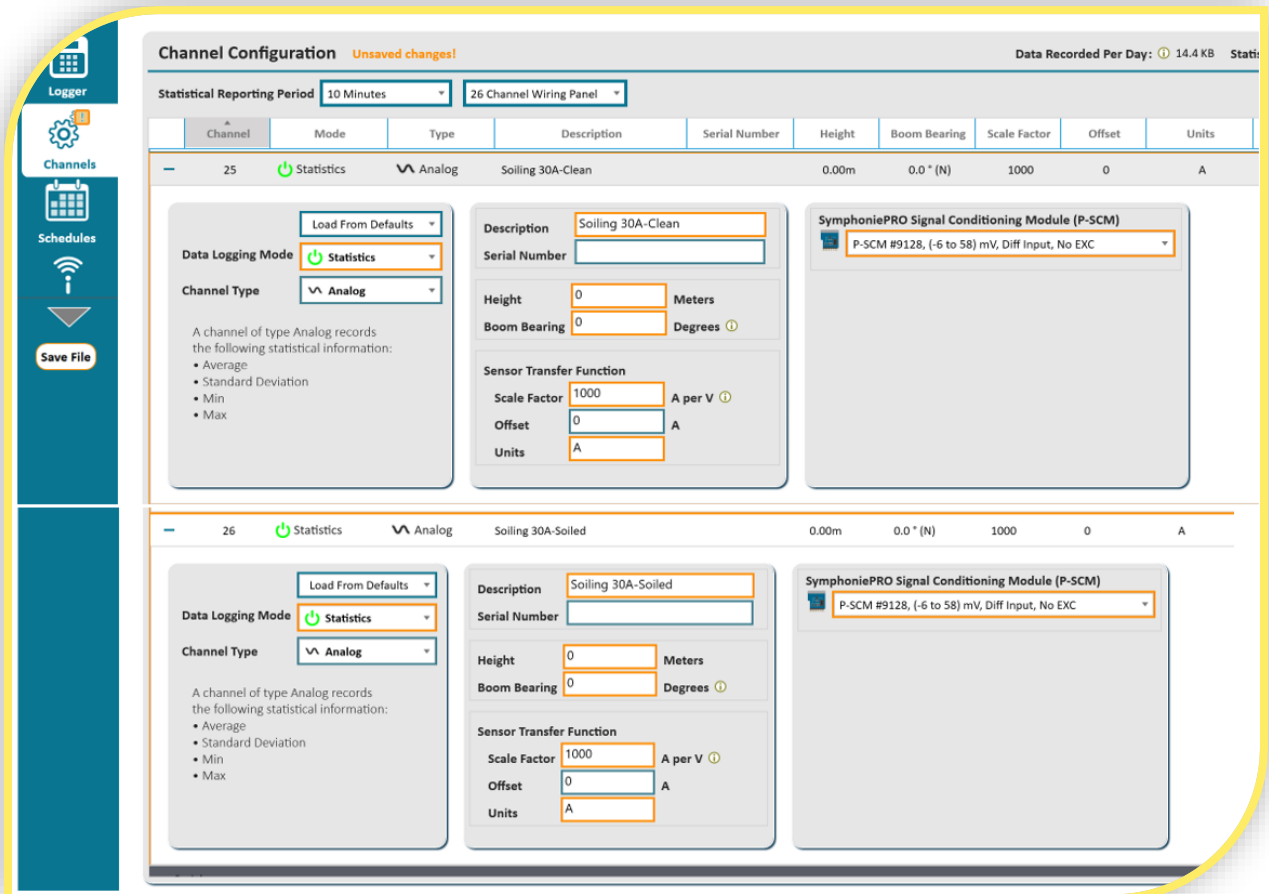


Figure 11: Channel configuration for S.I.M | 30A

The **Channels** tab should now display the two channels that have been configured.

- If the **S.I.M 4C Sensor Cable** hasn't already been connected to the SymPRO Wiring Panel as shown in [Error! Reference source not found.12](#), connect it now. Ensure it is being wired to the correct two channels being utilized.



Wiring sensor to SymPRO Wiring Panel (Analog P-SCM Channels):






Table 2: SymPRO Connections – S.I.M Full Sized		
Color	Reference	Termination
Red	PV Soil Signal +	SIG+
White	PV Clean Signal +	
Black	PV Soil Signal -	SIG-
Green	PV Clean Signal -	
Bare	Shield	SHD

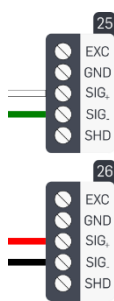


Figure 12: SymPRO S.I.M. Wiring

- If cables from the PV panels have not been connected, do so now as shown in [Figure 13](#).

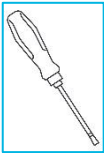




Table 3: Connection to PV Disconnects – S.I.M Full Sized		
Color	Reference	Terminations Left to Right
Red	PV Soiled +	Soiled
Black	PV Soiled -	Soiled PV-
Red	PV Clean +	Clean PV+
Black	PV Clean -	Clean PV-

Figure 13: PV panels cables to S.I.M. connections

*Note PV disconnects are labeled. When wiring ensure the Soiled panel cable is connected at the Soiled terminal, and Clean panel is connected at the Clean terminal.

Final Checks:

Double check the **S.I.M.'s** to ensure they are properly seated and torqued (the **Soiling Disconnect** should be off, as shown in [Error! Reference source not found.19 and 20](#)). A pull test by hand is sufficient to check the wire connection coming from the Soiling Module. If any of the wires do pull out, reseal them, and torque the terminals according to the values in [Table4](#).




Table 4: PV Input - Strip Length & Torque			
Sensor Version	Strip Length	Torque	Termination
S.I.M 30A	11mm	2.4 N·m [21.2 lb·in]	40A Circuit Breakers

Figure 14: Torque and strip specs



Verification of Installation on SymphoniePRO:

+	25	Statistics	Analog	Soiling 30A-Clean	0.00m	0.0 * (N)	1000	0	A
+	26	Statistics	Analog	Soiling 30A-Soiled	0.00m	0.0 * (N)	1000	0	A

Figure 15: S.I.M | 5A signal with no PV input

With SymphoniePRO Live Data turned ON, the two channels (Soil & Clean) should read approximately the same value when the PV panels are disconnected, or if the circuit breaker is off; shown above in [Figure 15](#) (far right column). Shown below in [Figure 16](#) is the readings from two 3-Amp power supplies (far right column). The **S.I.M | Full Sized** sensor is now fully configured, and the panels can be connected.



Ensure the bare end of the MC4 extension cable is fully secured before connecting to the PV Panels.

+	25	Statistics	Analog	Soiling 30A-Clean	0.00m	0.0 * (N)	1000	0	A	2.97 A
+	26	Statistics	Analog	Soiling 30A-Soiled	0.00m	0.0 * (N)	1000	0	A	2.99 A

Figure 16: Reading two 3-Amp power supplies

For system diagrams, see the SymPRO Reference Diagrams at the end of this document ([Figures 19 and 20](#)).



REFERENCES:

Reference Diagrams:

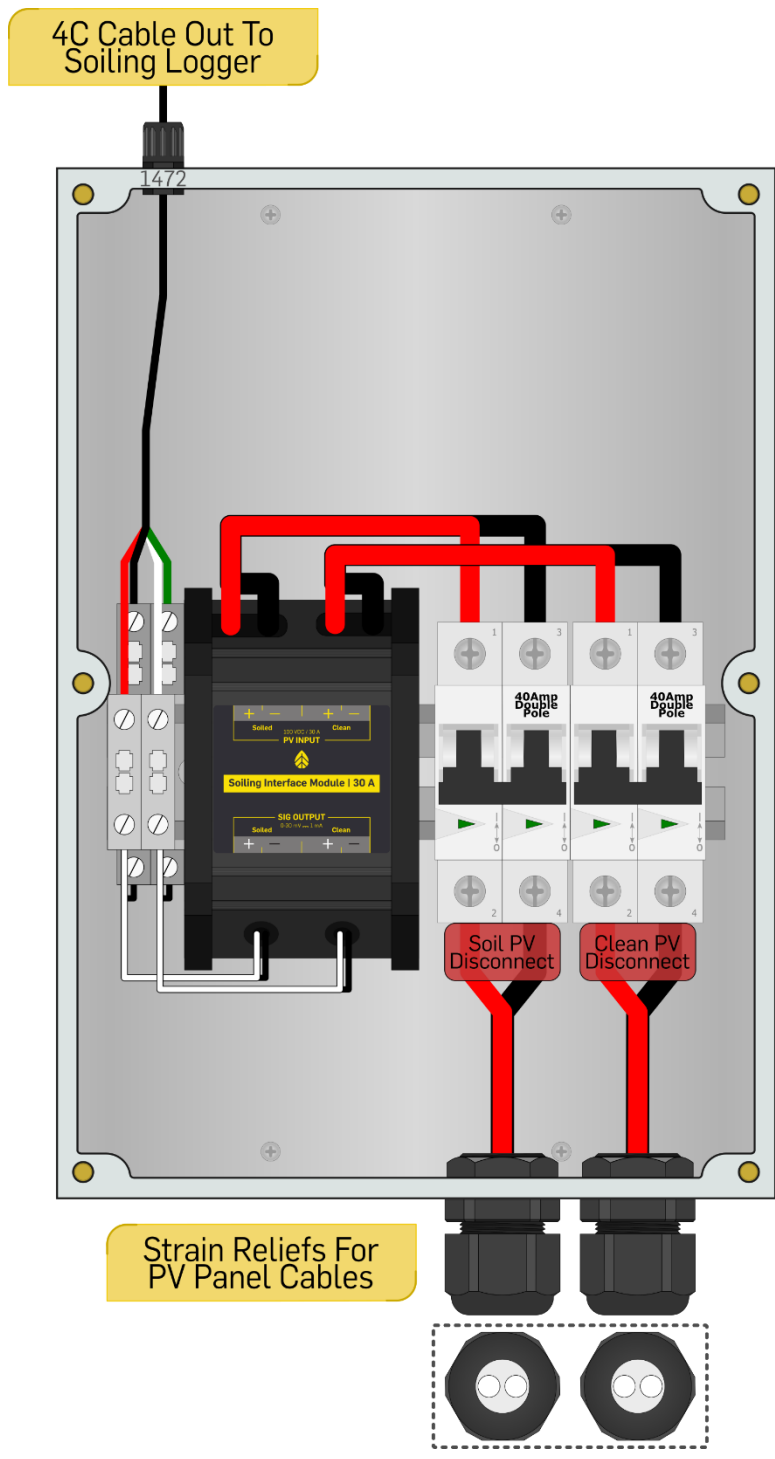


Figure 17: Soiling Interface Module | 30A J-Box

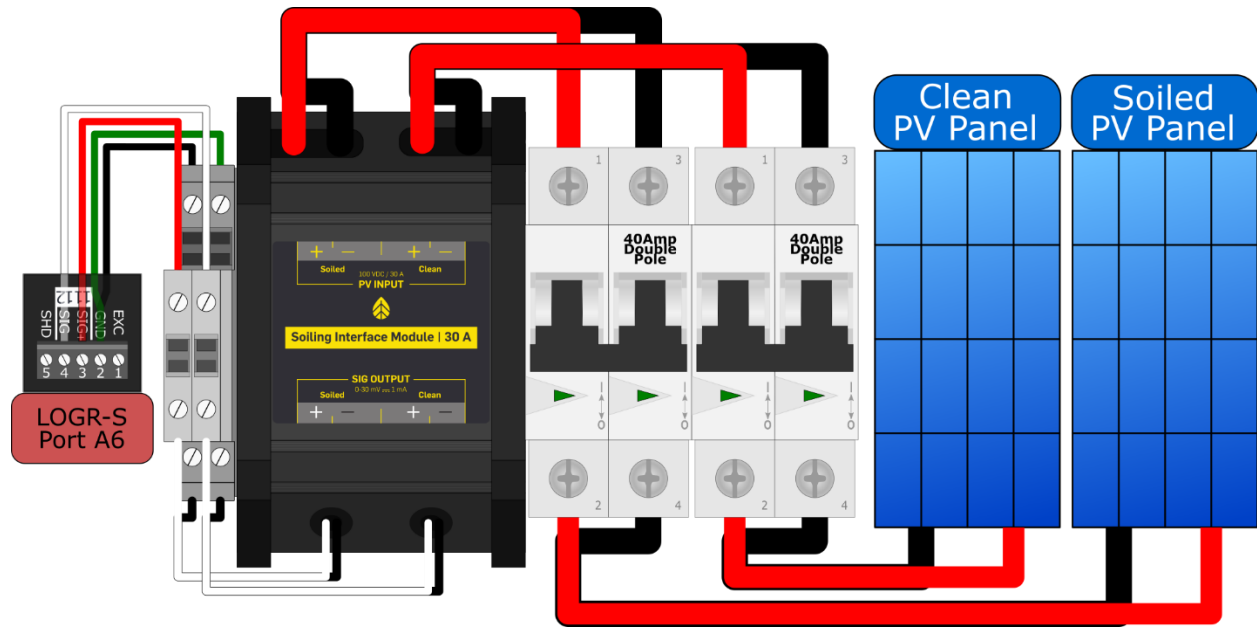


Figure 18: Soiling Interface Module | 30A – Flow Diagram | LOGR

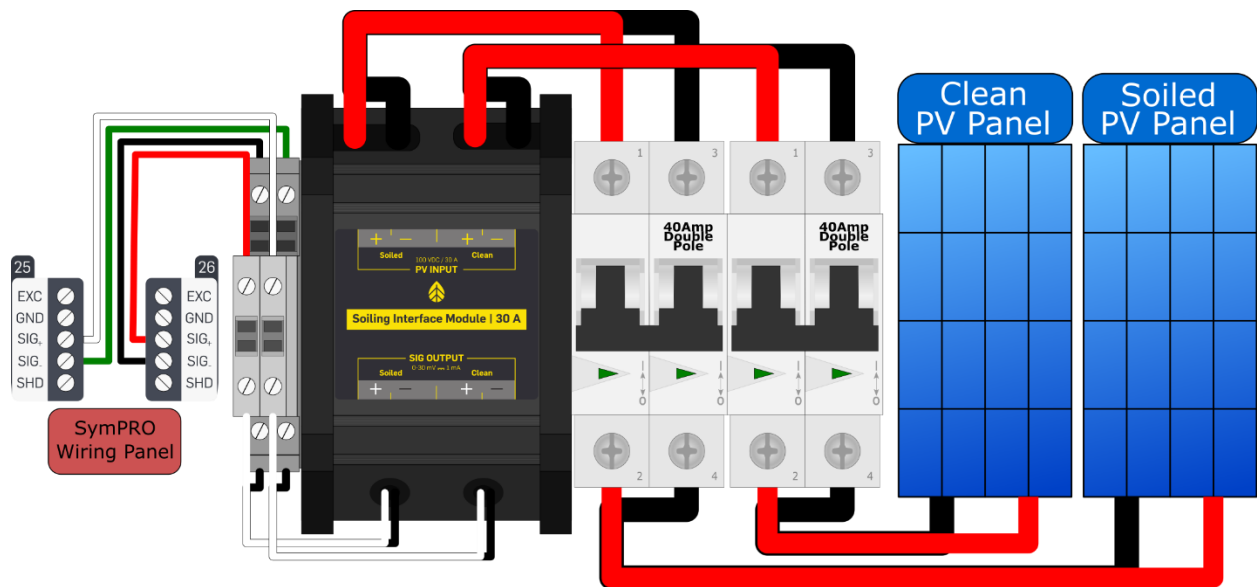


Figure 19: Soiling Interface Module | 30A – Flow Diagram | SymphoniePRO