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SolarSIM-iSG

Modbus Quick Start Guide

For applications where a Campbell Scientific datalogger is used, please refer to our Application Note: "Interfacing the SolarSIM-GPV+iSG with a Campbell Scientific Datalogger". For other setups, please follow this guide:

1. Configure Modbus port: baud rate of 19200 bps, even parity, 8 data bits, 1 stop bit.
2. Set Modbus slave ID as 55.
3. Write multiple input registers as per the Modbus input register map below to initiate the iSG measurement. The "MEASUREMENT_STATE" register must be set to **1**. Please take a special note of how to format the timezone, latitude, and longitude parameters. Latitude is positive for the Northern hemisphere. Longitude is positive for the Eastern hemisphere.
4. Wait for 2500 ms before reading output registers.
5. Read output registers as per Modbus output register map to retrieve processed SolarSIM-GPV data. We suggest retrieving and saving all values from the output registers.
6. To obtain global irradiance, combine base and fractional parts:

$$GHI = GHI\_BASE + GHI\_FRAC / 1000.0 \quad \text{in } W/m^2$$

Modbus *Input* Register Map					
Register number	Parameter	Description	Formula	Units	Type / Format
0	MEASUREMENT_ STATE	Set to **1** to initiate iSG measurement			R/W, U16
1	YEAR	Current year			R/W, U16
2	MONTH	Current month			R/W, U16
3	DAY	Current day			R/W, U16
4	HOUR	Current hour		hr	R/W, U16
5	MINUTE	Current minute		min	R/W, U16
6	SECOND	Current second		sec	R/W, U16
7	TIMEZONE	Local timezone, can be fractional	INT((Timezone + 12.0) * 8.0)[1]	hrs	R/W, U16
8	LATITUDE	Local latitude, positive for Northern hemisphere	INT((Latitude + 91.0) * 100.0)	deg	R/W, U16
9	LONGITUDE	Local longitude, positive for Eastern hemisphere	INT((Longitude + 181.0) * 100.0)	deg	R/W, U16
10	ALTITUDE	Local altitude	INT(Altitude)	m	R/W, U16

[1] e.g. if your local timezone is Eastern Standard Time (EST) or -5 hours, set TIMEZONE register value to 56

Modbus *Output* Register Map					
Register number	Parameter	Description	Formula	Units	Type / Format
11	SERIAL_ NUMBER	Serial number, SolarSIM-GPV			R, U16
12	AMBIENT_ PRESSURE	Ambient pressure	value / 50.0 / 10.0	kPa	R, U16
13	AMBIENT_ TEMP	Ambient temperature	value / 8.0 / 75.0 – 50.0	C	R, U16
14	AMBIENT_ HUM	Ambient humidity	value / 6.0 / 100.0	%	R, U16
15	INTERNAL_ TEMP	Internal temperature	value / 8.0 / 75.0 – 50.0	C	R, U16
16	INTERNAL_ HUM	Internal humidity	value / 6.0 / 100.0	%	R, U16
17	V_CH1	Voltage, CH1	value / 10.0	mV	R, U16
18	V_CH2	Voltage, CH2	value / 10.0	mV	R, U16
19	V_CH3	Voltage, CH3	value / 10.0	mV	R, U16
20	V_CH4	Voltage, CH4	value / 10.0	mV	R, U16
21	V_CH5	Voltage, CH5	value / 10.0	mV	R, U16
22	V_CH6	Voltage, CH6	value / 10.0	mV	R, U16
23	V_CH7	Voltage, CH7	value / 10.0	mV	R, U16
24	V_CH8	Voltage, CH8	value / 10.0	mV	R, U16
25	V_CH9	Voltage, CH9	value / 10.0	mV	R, U16
26	GHI_BASE	Global irradiance, base		W/m^2	R, U16
27	GHI_FRAC	Global irradiance, fraction	value / 1000.0	W/m^2	R, U16
28	G_SCF_1	Spectral correction factor, panel 1	(value / 1000.0) – 1.0		R, U16
29	G_SCF_2	Spectral correction factor, panel 2	(value / 1000.0) – 1.0		R, U16
30	G_SCF_3	Spectral correction factor, panel 3	(value / 1000.0) – 1.0		R, U16
31	G_SCF_4	Spectral correction factor, panel 4	(value / 1000.0) – 1.0		R, U16
32	G_SCF_5	Spectral correction factor, panel 5	(value / 1000.0) – 1.0		R, U16
33	G_SCF_6	Spectral correction factor, panel 6	(value / 1000.0) – 1.0		R, U16
34	G_SCF_7	Spectral correction factor, panel 7	(value / 1000.0) – 1.0		R, U16
35	G_SCF_8	Spectral correction factor, panel 8	(value / 1000.0) – 1.0		R, U16
36	G_SCF_9	Spectral correction factor, panel 9	(value / 1000.0) – 1.0		R, U16