SolarSCADA Integrated Environmental Sensor System (SSI Rev 03)

The SolarSCADA Integrated (SSI) sensor interface is an solar-specific data aggregation device which provides an RS-485 Modbus™ interface to the weather and environmental sensors required by IEC-61724-1. The SSI provides one block of sensors required by IEC-61724-1. The SSI interface provides no data logging, and is not programmable. It does, however, provide a one-stop installation stop for all common environmental sense and input circuits.

| SSI Specifications	
Physical Size (inches)	1u height, 11.5Wx1.725Hx3.5D. Panel, Rack, or DIN mountable
Power Requirements	12-24VDC, 5 watts max. All sensor channels isolated from system ground
Power Output	Control power and wetting voltage for attached devices.
Operating Environment	-40 to 85C
Box Style	Aluminum Extrusion
Supported Pyranometers	Qty (2) Pyranometer Channels: GHI and POA. Compatible with: Modbus® RS-485, Analog(mV, 0-1V, 4-20mA, 0-5V, 0-10V)
Supported Weather Stations	Qty (1) All-in-One SDI-12 Weather Station Input terminal: Compatible with: Meter Group™ ATMOS-14, ATMOS-22, ATMOS-41, auto-detect
Cable Attachment	Screw Terminal Blocks in 5.08mm and 3.5mm as appropriate
Communications Port	Qty (1) RS-485/Modbus™ pre-set at 19200, 8N1 [SSI Comms] Qty (1) RS-485 pass-through for surge arresting / field wire term [Inverter 485 comms] Both equipped with Surge Arrestors for external data interface
Back of Module (BOMTemp)	Qty (6) 3-wire RTD inputs. Compatible with: SolarSCADA supplied 100 Ohm RTDs. Third party RTDs or Thermocouples as a special order item.
Digital Input	(8) Optically-isolated inputs, 12-24VDC Read as discrete in via one set of registers, or KYZ energy on built-in counter registers. Channels 5/6 KYZ Pulse In for RECEIVED KYZ Energy Metering Channels 7/8 KYZ Pulse for DELIVERED KYZ Energy Metering
Outputs	3x Relays 120VAC@10A, accessible via Modbus® Registers
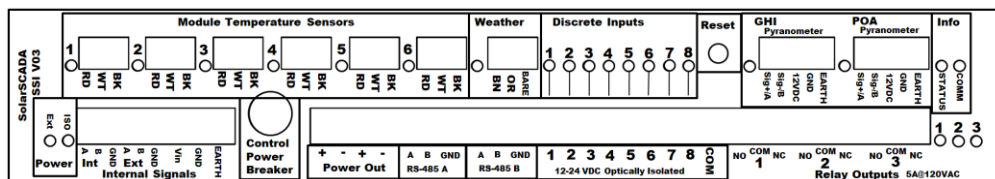
Figure 1 The Front Panel of the ESI Device. Field terminations land on all plugs directly, except for "Internal Signals"

- **Module Temperature Sensors: Quantity (6) 3-Wire RTDs:** Each input has a Status LED that illuminates when the attached sensor is attached and functional. SolarSCADA standardmodule temperature sensors are 100 Ohm RTDs supplied with pre-terminated lengths of 600VAC direct bury/outdoor-rated cable at lengths up to 800 Feet, cut-to-order. The SSI self-calibrates to account for cable length, so the cable can be cut in-field with no accuracy penalty.
- **Weather: Quantity (1) SDI-12 weather station input:** The SSI automatically detects between the Meter Group™ ATMOS-41 all-in-one, ATMOS-22 anemometer, and ATMOS-14 ambient temperature sensors. The Modbus™ map remains the same regardless of sensor attached, and current sensor status, serial number, and type can be read via the Modbus™ interface. The ATMOS-41 is fully compliant in accuracy specs required in IEC-61724-1. For more information, see https://www.metergroup.com/environment/products/.
- **Pyranometers: Quantity (2) Pyranometer Inputs:** Global Horizontal Irradiance (GHI) and Plane of Array (POI). These inputs are pre-set at the factory for the style of instrument required via internal DIP switches: 0-1V, uV/mV output, 0-5V, 0-10V, and 4-20mA. For multiple pyranometer installs, or if Modbus™ connected instruments are to be used, SolarSCADA Recommends the use of the SPD device for Pyranometers.
- **Power Indicators:** EXT power shows external power present, ISO shows internally isolated power supply is functional.
- **Internal Signals**: This is RS-485 "in" to the device's A and B ports.
- **Control Power Breaker**: Built-in 4A overcurrent protection for "power out" connector.
- **Power Out:** This provides power for the rest of the SolarSCADA panel equipment.
- **RS-485A/B:** RS-485A provides the SSI Interface Modbus™. RS-485B is provided as a surge-protected pass-through for expansion on a second serial port, such as for external pyranometers or other instruments.
- **Discrete Inputs:** This is a group of polarity-independent 12-24VDC optically-isolated inputs. They can operate as (8) separate discrete inputs, with 12 or 24VDC wetting voltage, or (4) discrete inputs and (2) Sets of KYZ pulse inputs.
- **Relay Outputs**: Quantity (3) 120VAC 10A relay contacts for trip/close/reset actions with status indicators
- **Info**: Provides STATUS light for information on system operation, and COM light for RX/TX activity of RS-485 A.

Modbus™ Point Map (FW 3201)

Items in **BOLD** are those required for IEC-61724-1 compliance.

Offset	Input Registers Name	ALL ARE FIXED POINT OUTPUT, 16-bit integers Modbus Register Meaning	Description
0	**POA.2 (GHI)**	**Watts / Square Meter * 10**	**GHI (Global Horizontal) irradiance in w/m^2**
1	**POA.1 (POA)**	**Watts / Square Meter * 10**	**POA (plane of array) irradiance in w/m^2**
2	**TmpBOM1**	**Degrees C * 10**	**Back of Module Temperature in Celsius**
3	**TmpBOM2**	**Degrees C * 10**	**Back of Module Temperature in Celsius**
4	**TmpBOM3**	**Degrees C * 10**	**Back of Module Temperature in Celsius**
5	**TmpBOM4**	**Degrees C * 10**	**Back of Module Temperature in Celsius**
6	**TmpBOM5**	**Degrees C * 10**	**Back of Module Temperature in Celsius**
7	**TmpBOM6**	**Degrees C * 10**	**Back of Module Temperature in Celsius**
8	**TmpAmb**	**Degrees C * 10**	**Back of Module Temperature in Celsius**
9	**RH%**	**Relative Humidity % *10**	**Relative Humidity (percent)**
10	BaroPressure	Barometric Pressure kpa*10	Barometric pressure (kilopascal)
11	**WndSpd**	**Wind Speed (m/s) * 10**	**Wind Speed (m/s)**
12	**WndGust**	**Wind Speed (m/s) * 10**	**Wind Speed Gust (m/s)**
13	WndDir	Wind Direction (degrees)	Wind direction (degrees)
14	**Precip**	**mm/hour * 10**	**Rain fall (mm/hour)**
15	VaporPress	N/A	Not implemented
16	LightningCount	Lightning Counter	Lightning Counts from last read
17	LighningDist	Distance (km) * 1	Lightning Distance from last read
18	IsoInput	Bitmap input status	1 = input ACTIVE, 0 = INPUT inactive.
19	Temp_Internal	Degrees C * 10	Internal Temperature (Celsius)
20	GHI_WS_Builtin	Watts / Square Meter	Silicon GHI Sensor (ATMOS-14 only)
21	TmpHumSensor	Degrees C * 10	Temperature of Humidity Sensor (Celsius)
22	WS_Xorient	Degrees * 10	X-Tilt of weather station
23	WS_Yorient	Degrees * 10	Y-Tilt of Wetaher station
24	WS_CompassAngle	N/A	N/A
25	WndSpd_North	Wind Speed (m/s) * 10	North component of wind speed (m/s)
26	WndSpd_East	Wind Speed (m/s) * 10	East Component of wind speed (m/s)
27	FW_Version	Version	Firmware Version of SSI
28	WS_Type	WS Type 1 = 41, 2=22, 3=14	Weather Station Type
29	BOMTemp_Status	Bitmap status: 1 if Sense OK	1 = OK, 0 = Sensor bad or disconnected
30	KW_Rec	kW * 10	KYZ Pin 5/6 kW (Power) Received
31-32	KWH_Rec	UINT-32 Kwh Delivered	KYZ Pin 5/6 kwh (Energy) Received
33	KW_Del	kW * 10	KYZ Pin 7/8 kW (Power) Delivered
34-35	KWH_Del	UINT-32 Kwh Delivered	KYZ Pin 7/8 kwh (Energy) Delivered