



## STR-21G-S1 Solar Monitoring Systems

### Technical Specifications

Turnkey Solar Monitoring Station

DNI/GHI/DHI measurements

ISO 9060 secondary standard sensors

Low power consumption

ISO17025 calibration

EKO's new solar Monitoring System, called STR-21G-S1, is a dedicated sensor system to perform the most accurate solar radiation measurements of the three solar radiation components (Direct, Diffuse and Global). It can be easily integrated to any DAQ system, which has multiple analog or digital inputs. With the standard sun-position sensor and GPS receiver built inside the sun tracker the system set-up will be quick and easy.

The system is based on the STR-21G Sun tracker with a new shading disk assembly which can be mounted on one arm of the tracker. In combination with the new generation MS-80 Secondary standard pyranometer and MS-57 First class pyrheliometer, the STR-21G-S1 is the most "high end" sensor system for solar energy research.

The STR-21G-S1 system can be freely configured to measure the required Solar radiation components in the most accurate way. Hence a cost-effective solution

can be created for every application. In harsh climate environments, the MV-01 ventilator & heater can be used. The MS-57 pyrheliometer has a heated front window to avoid condensation and ice which can affect the measurements.

Global radiation can be composed by the sum of the cosine weighted direct and diffuse. This way the sun tracker with pyrheliometer and shaded pyranometer can provide all three Solar radiation components. Unique to the system, EKO's radiometers have the ability to sample much faster than traditional solar sensors. Faster sample rates allow the sensor to 'catch' more accurately the peak irradiance value under variable atmospheric conditions and lower the measurement uncertainty of one-minute average values.

	<b>STR-21G-S1</b>
Pyrheliometer	MS-57-SET-10-P-MR
Sun Tracker	STR-21G-SET
Pyranometer Diffuse Irradiance	MS-80-SET-10
Shading disk assembly	MD-81-10
Top mounting plate	TMP-S-80

Options	<b>STR-21G-S1</b>
Pyranometer (GHI)	MS-80A / MS-80M
Ventilation unit	MV-01

	<b>STR-21G</b>
Arms	1
Pointing accuracy Solar elevation: 0 to 87°	< 0.01 °
Angle resolution	0.009 °
Rotation angle Zenith	-15 - 95 °
Rotation angle Azimuth	0 - 360 °
Torque	12 Nm
Payload side arms	7 kg
Sun sensor FOV	30 °
Ingress protection IP	65
Operating temperature range	-40 - 50 °C
Communication	RS-422 / 232C
Power consumption	< 10 W

Power supply	21 to 32 VDC / 20W
Power supply (Power Adapter)	100 to 240 VAC / 20W
Dimensions mm	430 (W) x 380 (L) x 440 (H)
Weight	14.5 kg (With tripod)
Motor	Stepper motor
Driving technology	Harmonic drive®
Tracking mode	Solar position / Free positioning
Tripod	Table tripod
Pyrheliometer mount	Adjustable / One position
Cable length	10 m

Options	STR-21G
Cable length Power cable	20 / 30 m
Cable length Communication cable	5 / 10 m
Shading assembly Disk	MD-81-10 (MS-80)
Top mounting plate A (1 position)	TMP-S-(sensor model)
Top mounting plate B (2 positions)	TMP-D-(sensor model)

	MS-80
ISO 9060:2018	Class A
ISO 9060:1990	(Secondary Standard)
Sub-category "Spectrally flat"	Compliant
Sub-category "Fast response"	Compliant
Output	Analog (mV)

Response time 95%	< 0.5 Sec.
Zero off-set a) 200W/m <sup>2</sup>	+/- 1 W/m <sup>2</sup>
Zero off-set b) 5K/hr	+/- 1 W/m <sup>2</sup>
Complete zero off-set c)	+/- 2 W/m <sup>2</sup>
Non-stability change/1 year	-
Non-stability change/5 years	+/- 0.5 %
Non-linearity at 1000W/m <sup>2</sup>	+/- 0.2 %
Directional response at 1000W/m <sup>2</sup>	+/- 10 W/m <sup>2</sup>
Spectral error	+/- 0.2 %
Temperature response -10°C to 40°C	+/- 1 %
Temperature response -20°C to 50°C	+/- 1 %
Tilt response at 1000W/m <sup>2</sup>	+/- 0.2 %
Sensitivity	Approx. 10 μV/W/m <sup>2</sup>
Impedance	< 45000 Ω
Operating temperature range	-40 - 80 °C
Irradiance range	0 - 4000 W/m <sup>2</sup>
Wavelength range	285 - 3000 nm (50% points)
Ingress protection IP	67
Cable length	10 m

Options	MS-80
Cable length	20 / 30 / 50 m
Ventilation unit	MV-01
Albedo mounting kit	MS-albedo Kit

	<b>MS-57</b>
ISO 9060:2018	Class A
ISO 9060:2018	First Class
Sub-category "Spectrally flat"	Compliant
Sub-category "Fast response"	Compliant
Output	Analog (mV)
Response time 95%	< 0.2 Sec.
Zero off-set a) 200W/m <sup>2</sup>	0 W/m <sup>2</sup>
Zero off-set b) 5K/hr	< 1 W/m <sup>2</sup>
Complete zero off-set c)	< 1 W/m <sup>2</sup>
Non-stability change/1 year	-
Non-stability change/5 years	< 0.5 %
Non-linearity at 1000W/m <sup>2</sup>	< 0.2 %
Spectral error	+/- 0.2 %
Temperature response -10°C + 40°C	-
Temperature response -20°C to 50°C	+/- 0.5 %
Tilt response at 1000W/m <sup>2</sup>	< 0.2 %
Sensitivity	Approx. 7 μV/W/m <sup>2</sup>
Impedance	< 15000 Ω
Operating temperature range	-40 - 80 °C
Irradiance range	0 - 4000 W/m <sup>2</sup>
Wavelength range	200 - 4000 nm (50% points)
Ingress protection IP	67

<b>Cable length</b>	10 m
<b>Options</b>	<b>MS-57</b>
<b>Cable length</b>	20 / 30 m

Specifications are subject to change without further notice.