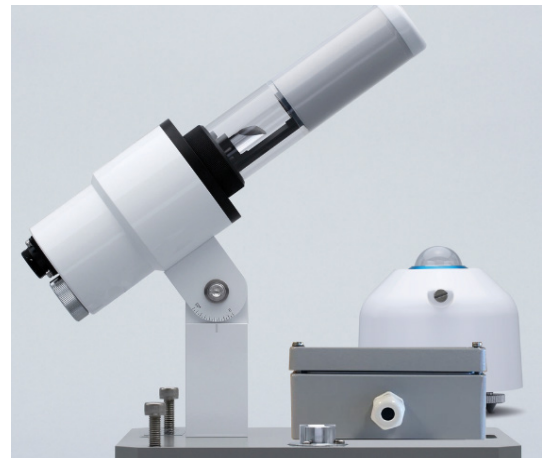


- GHI measurements of the highest accuracy and lowest uncertainty
- No sun-tracker required
- Digital RS-485 Modbus RTU output for DNI, GHI, DHI

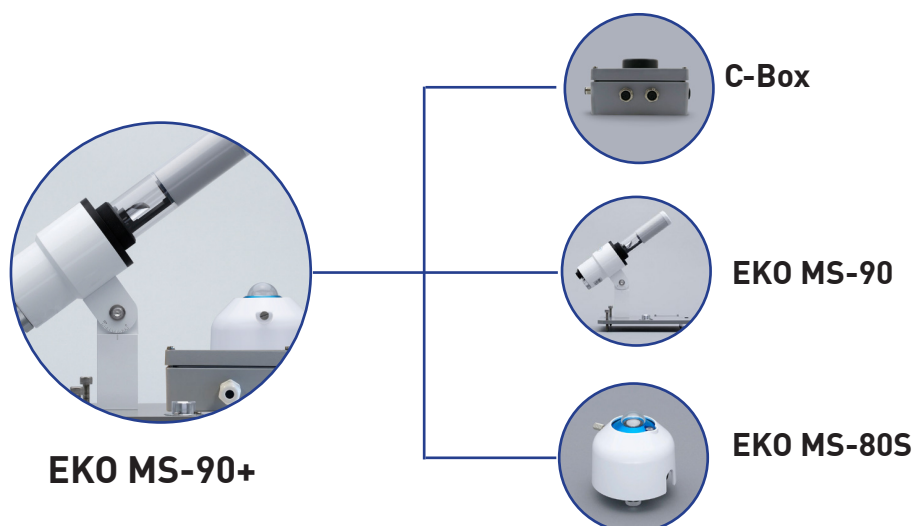


The Solar Monitoring Station EKO MS-90+ is a cost-effective system combining DNI Sensor EKO MS-90 and Pyranometer EKO MS-80S for DNI, GHI and DHI data without sun tracker. These two instruments are connected via EKO C-Box Modbus Processing interface with a GPS receiver and a processing unit.

The station accurately measures DNI and GHI and calculates Diffuse irradiance (DHI) from the measurement data and the sun position. The EKO C-Box is delivered with a 10m cable, the sensor has a 1.5 m cable to connect to the C-box.

The station provides a digital output signal (RS-485 Modbus RTU) and can be easily connected to various data acquisition systems in solar energy projects and meteorological stations (dataloggers, inverters, SCADA etc). It can also be connected to a PC.

The DNI Sensor EKO MS-90 sensor has a broad spectral response (300-2500 nm) and is calibrated outdoors with a pyrhelimeter.



Specifications

Characteristic	Description
Classification	ISO 9060:2018 Class C (DNI) + Class A (GHI, DHI)
Output	DNI, GHI, DHI (RS-485 Modbus RTU)
Temperature response -20°C ... +40°C	± 5 %
Non-linearity	± 2.5 %
Operating temperature range	-20 ... +50 °C
Wavelength range	300 - 2500 nm (50% points)
Power supply	10.5 - 12.5 VDC
Dimensions mm	350 (W) x 250 (L) x 200 (H) incl. optional base plate)
Weight	2.5 kg
Ingress protection	IP 67
Cable length	10 m
Geographic application	Latitude (-58° ... +58°) / Longitude (0° --- +360°)
Power consumption	< 6 W
Warranty	5 years
Manufacturer	EKO Instruments

C-Box Modbus Processing interface EKO

- Smart Sensor Interface
- DNI / GHI / DHI measurements
- Output 0-1V / RS-485 Modbus RTU
- GPS receiver
- All weather enclosure



The C-Box Modbus Processing interface provides different functions for sensor control and data processing of different EKO sensors.

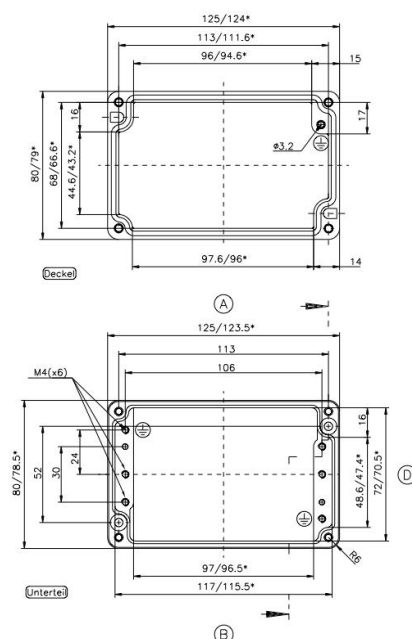
In combination with the DNI sensor EKO MS-90, the pulsed output can be converted into a continuous output Voltage or RS-485 Modbus RTU signal. With an additional pyranometer and optional GPS receiver a turnkey system can be configured to measure DNI, GHI and DHI over Modbus.

By using this device, the DNI sensor EKO MS-90 analogue voltage output peaks correspondent to DNI are detected and converted to digital. It then transmits and receives data with serial communication method.

Since it is compatible with RS-485 communication, it is possible to connect with PV monitoring devices, which have this communication function. By setting the pyranometer sensitivity on signal converter, the voltage signal output from pyranometer can be converted to solar irradiance.

The signal converter is integrated in an IP65 enclosure for outdoor installation. The settings for the measurements and communication can be changed by using the setup software.

Dimensional drawing (in mm)



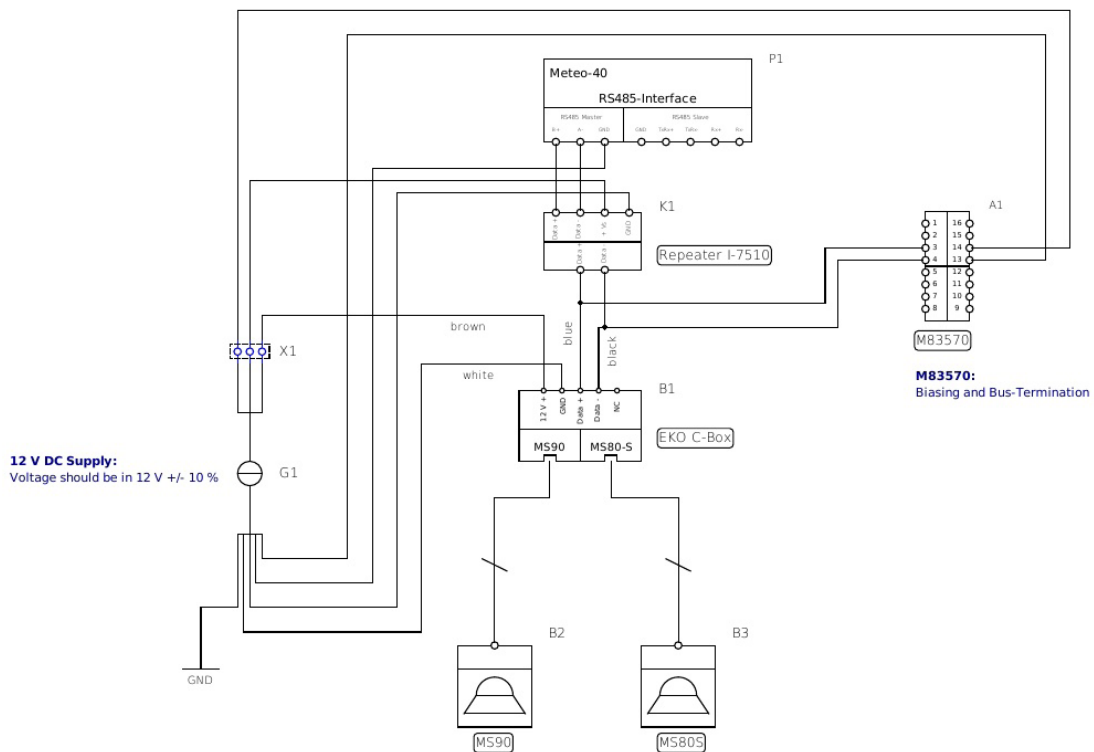
C-Box Modbus Processing interface EKO

Specifications

Characteristic	Description	
Communication interface	RS-485 Modbus RTU	
Channels	2 units	
Functions	DNI, GHI, DHI processing	
Operating temperature range	-40 ... +80 °C	
Voltage range	12 V	
Power consumption	< 1 W	
Average Power Consumption	0.5 W	
Power Supply	12 VDC \pm 10% (Note: Supply voltage critical for MS-90)	
Protection	IP 65	
Dimension (W x L x H)	125 x 60 x 80 mm	
Weight (without cable)	0.5 kg	
Input Signals	EKO MS-90 DNI sensor	Analog pulse 0 .. 2 V
	EKO MS-80S pyranometer	RS-485 Modbus RTU
Warranty	5 years	
Manufacturer	EKO Instruments	
C-Box system Specification		
Input parameters	EKO MS-90 DNI sensor	DNI
	EKO MS-80S pyranometer	GHI
Output parameters	DNI / GHI / DHI (Meta data T, RH, Tilt, Long / Lat position, Solar Position, Time)	
Sampling	1 s (15 s DNI)	
Irradiance range DNI (Measured)	120 ... 1600 W/m ²	
Irradiance range GHI (Measured)	0 ... 1600 W/m ²	
Irradiance range DHI (Calculated)	0 ... 500 W/m ² (DHI = GHI when DNI < 120 W/m ²)	


C-Box Modbus Processing interface EKO

Sensor connection diagrams: connection to Ammonit Meteo-40 data logger



Recommended connection of C-Box to Ammonit Meteo-40 Data Logger

Biasing with M83570 and galvanic isolation with Repeater M84100.

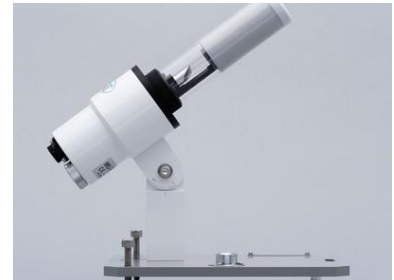
 **Important Note:** Restrict the power supply for the C-Box to 12 V.

Cable Color C-Box	Function
brown	+ 12V DC
white	GND
blue	Data +
black	Data -
grey	not connected

Cable Colors for C-Box cable: Supply and RS485 Interface

DNI Sensor EKO MS-90

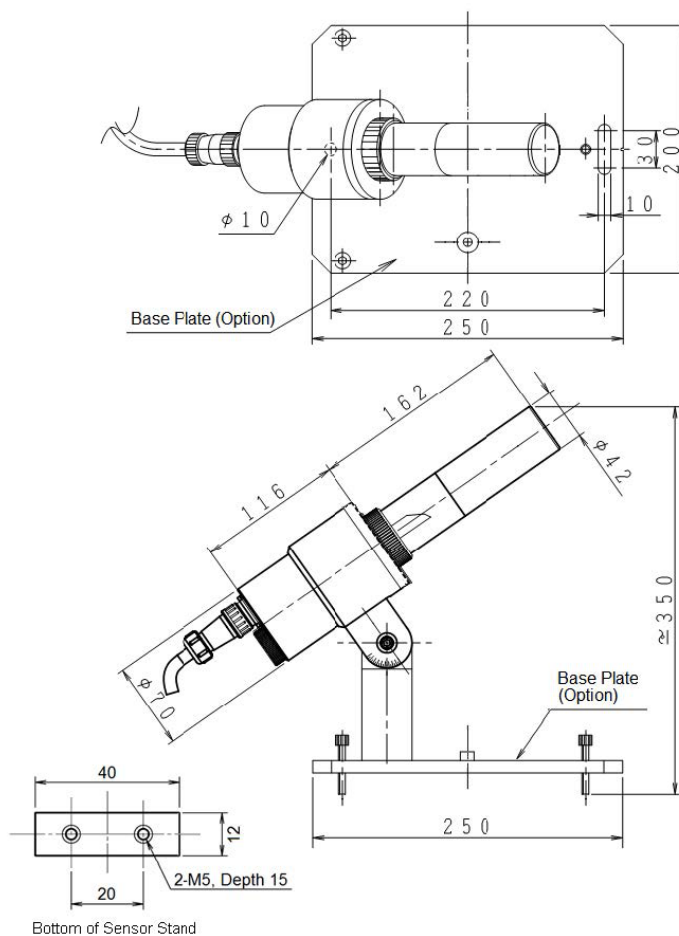
- Configurable to measure DNI / GHI / DHI
- No sun-tracker required
- Spectral range 300 – 2500 nm



The DNI Sensor EKO MS-90 measures the Direct Normal Irradiance (DNI) without a sun-tracker. It has a rotating mirror, which only reflects the sunbeam onto a thermal detector.

The DNI Sensor EKO MS-90 can be used in combination with any pyranometer to measure the DNI and Global Horizontal Irradiance (GHI). Hence the Diffuse Horizontal Irradiance (DHI) can be calculated.

Dimensional drawing (in mm)



DNI Sensor EKO MS-90

Specifications

Characteristic	Description
Classification	ISO 9060:2018
Sensitivity	1.785 $\mu\text{V}/\text{W}/\text{m}^2$
Spectral range	300 ... 2700 nm
Operating temperature	-20 ... +50 °C
Power supply	10.5 ... 12.5 V DC
Output	0-2V (Pulse)
Non-linearity	± 2.5 %
Wavelength range	300 - 2500 nm (50% points)
Geographic application	Latitude (-58° to 58°) / Longitude (0° to 360°)
Power consumption	< 5 W
Protection	IP67
Dimension (W x L x H)	350 x 250 x 200 mm (incl. optional base plate)
Weight (without cable)	2.5 kg
Cable length	10 m
Options	
Cable length	20 / 30 / 50 m
Base plate	350 x 250 / levelling feet mm
Power supply	100 to 240 VAC / 12VDC / 200 x 140 x 80 mm / 2.5 kg
Warranty	5 years
Manufacturer	EKO Instruments