




# Secondary Standard Pyranometers



- ▶ Spectrally flat Class A (Secondary Standard) pyranometer. Compliance with IEC 61724-1: 2017
- ▶ RVH technology: Recirculating Ventilation and Heating (DPA953.1)
- ▶ Measured sensor tilt angle (DPA953.1)
- ▶ Calibration traceability to WRR
- ▶ Outputs: irradiance in W/m<sup>2</sup>, instrument body temperature, tilt angle, internal humidity, internal pressure and ventilator speed (DPA953.1)
- ▶ Ideal instrument in PV plants performance monitoring and meteorological networks

Radiometer for solar irradiance measurement, according to ISO 9060 and WMO No. 8 (Part I, Chapter 7) standards. These sensors are classified as ISO 9060 Secondary Standard. With a total daily uncertainty of only 2% within 0...180° field of view, fast response time, these sensors are ideal for users requiring high-end accuracy and reliability.

### Technical Specifications

PN	DPA252	DPA952	DPA953.1
			
<b>Output</b>	μV	RS485-Modbus 4...20 mA	RS485-Modbus
<b>Ventilation</b>	Not included (Yes, using DPA250)	Not included (Yes, using DPA250)	Included
<b>Heater</b>			YES (5 V)
<b>Tilt measurement</b>	-	-	YES (Acc± 1°)
<b>Power supply</b>	-	7...35 Vdc	8...30 Vdc
<b>Power consumption</b>	-	< 75 x 10 <sup>-3</sup> W@12 VDC	< 3 W@12 VDC
<b>Sensitivity</b>	7...25 μV/W/m <sup>2</sup>	NA	NA
<b>Irradiance range</b>	0...4000 W/m <sup>2</sup>	-400...4000 W/m <sup>2</sup>	-400...4000 W/m <sup>2</sup>
<b>Impedance</b>	40 ± 3 Ω	-	-
<b>Response time</b>	4.5 s	4.5 s	3 s
<b>Output values</b>	Instant value	Running average value over 4 measurements, refreshed every 0.1 s	Running average value over 4 measurements, refreshed every 0.1 s
<b>Cable</b>	Not included (see Accessories)	Not included (see Accessories)	Not included (see Accessories)

PN	DPA252	DPA952	DPA953.1
<b>Output</b>	Irradiance in W/m <sup>2</sup>	<ul style="list-style-type: none"> <li>Irradiance in W/m<sup>2</sup></li> <li>Sensor body temperature (digital output only)</li> </ul>	<ul style="list-style-type: none"> <li>Irradiance in W/m<sup>2</sup></li> <li>Sensor body temperature</li> <li>Sensor internal RH%</li> <li>Sensor internal Pressure in Pa</li> <li>Instrument tilt angle</li> <li>Ventilator speed in RPM</li> <li>Ventilator current in A</li> <li>Heater current in A</li> </ul>
<b>Data logger compatibility</b>	<ul style="list-style-type: none"> <li>M-Log (ELO008)</li> <li>Alpha-Log (using ALIEM module)</li> <li>E-Log</li> </ul>	Using 4...20 mA output: <ul style="list-style-type: none"> <li>M-Log (ELO008)</li> <li>Alpha-Log (using ALIEM module)</li> <li>E-Log</li> </ul>	<ul style="list-style-type: none"> <li>M-Log (ELO008) using RS485-&gt;232 converter</li> <li>Alpha-Log</li> <li>E-Log (using RS485-&gt;232 converter)</li> </ul>

### Common Technical Specifications

<b>Secondary Standard Pyranometers</b>	ISO 9060 2018 classification	Spectrally flat Class A (Secondary Standard)
	IEC 61724-1: 2017 classification	Class A (DPA252 e DPA952 only with DPA250)
	WMO performance level	High quality pyranometer
	WMO estimate on achievable accuracy for daily sums	±2%
	Spectral range	285...3000 nm
	Non-stability	<± 0.5% change per year
	Directional response	<±10 W/m <sup>2</sup>
	Tilt response	<± 0.2% (0...90° at 1000 W/m <sup>2</sup> )
	Temperature response	<± 0.4% (-30...50°C)
	Zero offset a (response to 200 W/m <sup>2</sup> net thermal radiation)	<5W/m <sup>2</sup> (unventilated) < 2 W/ m <sup>2</sup> (DPA953.1)
	Zero offset b (response to 5K/h change in ambient temperature)	<±2 W/m <sup>2</sup>
	Non linearity	<± 0.2 % (100...1000 W/m <sup>2</sup> )
	Stability (% change/year)	<± 0.5 %
	Standard built-in temperature sensor	YES (DPA952-953.1 only)
	Standard built-in heater	YES (12 Vdc, 1.5 W) (DPA953.1 only)
	Standard built-in bubble level	YES, including adjusting leveling screws (on mounting arm)
Data provided with each sensor	<ul style="list-style-type: none"> <li>Calibration certificate</li> <li>Temperature dependence data</li> <li>Directional response data</li> </ul>	

	Operative temperature	-40...80°C
	Calibration traceability	To WRR
<b>General Information</b>	Housing	Anodized aluminum
	Recalibration	Every 2 years
	Mounting (pole Ø 45...65 mm)	Using DYA034 (horizontal) or DYA035 (tilting) arms + DYA049 collar
	Weight	0.5 kg
	Protection rate	IP66
	Anti-radiation shield	Included

### First Class Pyranometers



- ▶ Spectrally flat Class B (First Class) pyranometer. Compliance with IEC 61724-1: 2017
- ▶ Electrical insulated (DPA855-980), Galvanic insulated (DPA980)
- ▶ Calibration traceability to WRR
- ▶ Modbus register for Instant value, Ave/Min/Max values over programmable time base (DPA980)
- ▶ 10...30 Vac/dc power supply (DPA855/980)
- ▶ Ideal instrument in PV plants performance monitoring and meteorological networks

Radiometer for solar irradiance measurement, according to ISO 9060 and WMO No. 8 (Part I, Chapter 7) standards. These sensors are classified as ISO9060 First Class. With a total daily uncertainty of 5% within 0...180° field of view, flat spectral response (285-3000 nm) and optimal temperature stability, this sensor represents the optimal compromise between cost and quality of irradiance measurement.

#### Technical Specifications

PN	DPA154	DPA855	DPA980
<b>Output</b>	µV	4...20 mA	RS485-Modbus
<b>Protocol</b>	-	-	Modbus RTU®, TTY-ASCII
<b>Programmable output</b>	-	-	Inst, max/min/ave (1...3600 s)
<b>RS485 protection</b>	-	-	Galvanic insulation (3 kV, UL1577)
<b>RS485 speed</b>	-	-	1200...115 kbps
<b>Power supply</b>	-	10...30 Vac/dc	10...30 Vac/dc
<b>Max. Load</b>	-	300 Ohm	300 Ohm
<b>Power consumption</b>	-	0.5 W	0.5 W
<b>EMC</b>	-	EN 61326-1: 2013	EN 61326-1: 2013
<b>Sensitivity</b>	10...15 µV/W/m <sup>2</sup>	NA	NA
<b>Measuring range</b>	0...4000 W/m <sup>2</sup>	0...1500 W/m <sup>2</sup>	0...1500 W/m <sup>2</sup>
<b>Impedance</b>	40 ± 3 Ω	-	-
<b>Calibration certificate</b>	Not included (see Accessories)		
<b>Cable</b>	L=10 m included	Not included (see Accessories)	Not included (see Accessories)
<b>Data logger compatibility</b>	<ul style="list-style-type: none"> <li>• M-Log (ELO008)</li> <li>• Alpha-Log (using ALIEM module)</li> <li>• E-Log</li> </ul>	<ul style="list-style-type: none"> <li>• M-Log (ELO008)</li> <li>• Alpha-Log (using ALIEM module)</li> <li>• E-Log</li> </ul>	<ul style="list-style-type: none"> <li>• M-Log (ELO008) using RS485-&gt;232 converter</li> <li>• Alpha-Log</li> <li>• E-Log. Using RS485-&gt;232 converter</li> </ul>

## Common Technical Specifications

<b>First Class pyranometer</b>	ISO 9060 2018 classification	Spectrally flat Class B (First Class)
	IEC 61724-1: 2017 classification	Class B (except for heating)
	WMO performance level	Good quality pyranometer
	WMO estimate on achievable accuracy for daily sums	±5%
	Spectral range	285...3000 nm
	Non-stability	<± 1% change per year
	Response time	20 s
	Non linearity	<± 1% (100...1000 W/m <sup>2</sup> )
	Directional response (0...180°C field of view)	<±20 W/m <sup>2</sup>
	Tilt response	<± 2%
	Temperature response	<±2% (-15...35°C)
	Zero offset a (response to 200 W/m <sup>2</sup> net thermal radiation)	<12W/ m <sup>2</sup>
	Zero offset b (response to 5K/h change in ambient temperature)	<±3 W/m <sup>2</sup>
	Built-in bubble level	YES
	Operative temperature	-40...80°C
Calibration traceability	To WRR	
<b>General Information</b>	Housing	Anodized aluminum
	Recalibration	Every 2 years
	Mounting (pole Ø 45...65 mm)	Using DYA034 (horizontal) or DYA035 (tilting) arms + DYA049 collar
	Protection rate	IP66
	Anti-radiation shield	Included

### Second Class Pyranometers



- ▶ Spectrally flat Class C (Second Class) pyranometer. Compliance with IEC 61724-1: 2017
- ▶ Electrical insulated (DPA863-873), Galvanic insulated (DPA983)
- ▶ Calibration traceability to WRR
- ▶ Modbus register for Instant value, Ave/Min/Max values over programmable time base (DPA983)
- ▶ Ideal instrument in PV plants performance monitoring and meteorological networks

Radiometer for solar irradiance measurement, according to Second class as ISO 9060 and WMO No. 8 standards. This sensor is a good compromise for basic meteorological, agrometeorological and solar energy applications.

#### Technical Specifications

PN	DPA053A	DPA863	DPA983
			
<b>Output</b>	μV	4...20 mA	RS485-Modbus
<b>Protocol</b>	-	-	Modbus RTU®, TTY-ASCII
<b>Programmable output</b>	-	-	Ist., max/min/ave. (1...3600 s)
<b>RS485 protection</b>	-	-	Galvanic insulation (3 kV, UL1577)
<b>RS485 speed</b>	-	-	1200...115 kbps
<b>Power supply</b>	-	10...30 Vac/dc	10...30 Vac/dc
<b>Power consumption</b>	-	0.5 W	0.5 W
<b>EMC</b>	-	EN 61326-1: 2013	EN 61326-1: 2013
<b>Sensitivity</b>	10...15 μV/W/m <sup>2</sup>	NA	NA
<b>Measuring range</b>	See Irradiance range	0...1500 W/m <sup>2</sup>	0...1500 W/m <sup>2</sup>
<b>Impedance</b>	40 ± 3 Ω	-	-
<b>Calibration certificate</b>	Included	Not included (see Accessory)	Not included (see Accessory)
<b>Cable</b>	L= 5 m included	Not included (see Accessories)	Not included (see Accessories)
<b>Built-in bubble level</b>	NO (Yes, using DYA048 plate)	YES	YES

PN	DPA053A	DPA863	DPA983
<b>Mounting</b>	<ul style="list-style-type: none"> <li>DYA032 arm + DYA049 collar (horizontal)</li> <li>DYA048 plate + DYA035 arm + DYA049 collar (tilting)</li> </ul>	DYA034 (horizontal) or DYA035 (tilting) arms + DYA049 collar	
<b>Data logger compatibility</b>	<ul style="list-style-type: none"> <li>M-Log (ELO008)</li> <li>Alpha-Log (using ALIEM module)</li> <li>E-Log</li> </ul>	<ul style="list-style-type: none"> <li>M-Log (ELO008)</li> <li>Alpha-Log (using ALIEM module)</li> <li>E-Log</li> </ul>	<ul style="list-style-type: none"> <li>M-Log (ELO008) using RS485-&gt;232 converter</li> <li>Alpha-Log</li> <li>E-Log (using RS485-&gt;232 converter)</li> </ul>




<b>Second Class pyranometer</b>	ISO 9060 2018 classification	Class C (Second Class)
	IEC 61724-1: 2017 classification	Class C
	WMO performance level	Moderate Quality
	WMO estimate on achievable accuracy for daily sums	±10%
	Spectral range	285...3000 nm
	Temperature response	<± 0.7% (-10...40°C)
	Irradiance range	0...2000 W/m <sup>2</sup>
	Recommended recalibration	Every 2 years
	Operative temperature	-40...80°C
	Calibration traceability	To WRR
<b>General Information</b>	Housing	Anodized aluminum
	Protection rate	IP66
	Anti-radiation shield	Included

### Accessories

	<b>DYA030</b>	Tilting arm for two pyranometers
	<b>DYA032</b>	Horizontal arm for fixing DPA053A to DYA049 collar
	<b>DYA034</b>	Horizontal arm for fixing DPA252-952-953-154-855-980-863-983 pyranometers to DYA049 collar Length 440 mm
	<b>DYA034.1</b>	Horizontal arm for fixing DPA252-952-953-154-855-980-863-983 pyranometers to DYA049 collar Length 650 mm
	<b>DYA035</b>	Tilting arm for fixing DPA252-952-953-154-855-980-863-983 pyranometers to DYA049 collar
	<b>DPA245</b>	Occultation Shadow band for diffuse radiation
	<b>DPA250</b>	External module for heating and ventilation for DPA252 and DPA952. Weight: 1 kg
	<b>DEA420.1</b> <b>DEA420.2</b>	Signal amplifier for Pyranometers. Output: 4...20 mA Programmable pyranometer sensitivity ( $\mu\text{V}/\text{Wm}^2$ ) Power supply 10...30 Vac/dc For more technical information, see MW9008 catalogue
	<b>MDMMA1010.1</b>	Same features as DEA420.1 but: Output: RS-485 Modbus-RTU



**Accessories**

	<b>SVICA4001</b>	Calibration certificate. Under the sun. ISO9001 (Global radiation)
	<b>SVICA4701</b>	Calibration certificate. Under the lamp. ISO9001 (Global radiation)
	<b>DYA049</b>	Collar for fixing DYA032-034-035 to Ø 45...65 mm pole
	<b>DWA205</b>	Cable for DPA252-952. L=5 m
	<b>DWA210</b>	Cable for DPA252-952. L=10 m
	<b>DWA225</b>	Cable for DPA252-952. L=20 m
	<b>DWA205.1</b>	Cable for DPA953.1 L=5 m
	<b>DWA210.1</b>	Cable for DPA953.1 L=10 m
	<b>DWA220.1</b>	Cable for DPA953.1 L=20 m
	<b>DWA605A</b>	Cable for DPA154. L=5 m
	<b>DWA610A</b>	Cable for DPA154. L=10 m
	<b>DWA625A</b>	Cable for DPA154. L=25 m
	<b>DWA626A</b>	Cable for DPA154. L=50 m
	<b>DWA410A</b>	Cable for DPA855-980-863-983. L=10 m
	<b>DWA425A</b>	Cable for DPA855-980-863-983. L=25 m
	<b>DWA426A</b>	Cable for DPA855-980-863-983. L=50 m
	<b>DWA427A</b>	Cable for DPA855-980-863-983. L=100 m
	<b>DYA048</b>	Plate for levelling DPA053A on DYA034 or DYA035 arm. Including bubble level
	<b>DYA120</b>	Spare anti-radiant shield for DPA053A
	<b>MC1177</b>	Spare anti-radiant shield for DPA863-983 and DPA154-855-980