




### Class A 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  $W/m^2$ , 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 9060:2018 and WMO No. 8 (Part I, Chapter 7) standards. These sensors are classified as ISO 9060 Class A. 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	DPA252.1	DPA952.1	DPA953.1
			
<b>Output</b>	$\mu V$	RS485-Modbus 4...20 mA (default) 0...20 mA, 0...1/5/10 V (configurable)	RS485-Modbus
<b>Ventilation</b>	Not included	Not included	Included
<b>Heater</b>			Yes (5 V)
<b>Tilt measurement</b>	-	-	YES (Acc $\pm$ 1°)
<b>Power supply</b>	-	7...30 V DC (RS485) 10...30 V DC (4...20 mA, 0...1/5 V) 15...30 V DC (0...10 V)	8...30 V DC
<b>Max load</b>	-	0/4...20 mA: $\leq 500 \Omega$ 0...1/5/10 V: $\geq 100 k\Omega$	-
<b>Power consumption</b>	-	37 mA @24 V DC; I <sub>out</sub> =22 mA 43 mA @12 V DC; I <sub>out</sub> =22 mA	< 3 W@12 V DC
<b>Thermopile sensitivity</b>	6...12 $\mu V/W/m^2$	NA	NA
<b>Irradiance range</b>	0...2000 $W/m^2$	RS485: -200...4000 $W/m^2$ 4...20 mA: 0...2000 $W/m^2$ 0...1/5/10 V: 0...2000 $W/m^2$	-400...4000 $W/m^2$
<b>Spectral range</b>	283...2800 nm		285...3000 nm

PN	DPA252.1	DPA952.1	DPA953.1
Temperature response	<0.5% (-10...40 °C)		<0.4% (-30...50 °C)
Zero offset a (to 200 W/m <sup>2</sup> net thermal rad)	<±7 W/m <sup>2</sup>		< ±2 W/m <sup>2</sup>
Impedance	<50 Ω	-	-
Response time (T95)	2 s	2 s	3 s
Output	Irradiance in W/m <sup>2</sup>	<ul style="list-style-type: none"> <li>Irradiance in W/m<sup>2</sup></li> <li>Sensor's temperature, RH%, pressure (only digital output)</li> </ul>	<ul style="list-style-type: none"> <li>Irradiance in W/m<sup>2</sup></li> <li>Sensor's temperature, RH%, pressure</li> <li>Tilt angle</li> <li>Fan speed RPM and current in A</li> </ul>
Output values	Instant value	Instant value	Running average value over 4 measurements, refreshed every 0.1 s
Cable	Not included (see Accessories)	Not included (see Accessories)	Not included (see Accessories)
Data logger compatibility	<ul style="list-style-type: none"> <li>Alpha-Log (using ALIEM module)</li> <li>E-Log</li> </ul>	Using RS485-Modbus output: Alpha-Log  Using 4...20 mA output: <ul style="list-style-type: none"> <li>Alpha-Log</li> <li>E-Log</li> </ul>	<ul style="list-style-type: none"> <li>Alpha-Log</li> <li>E-Log (using RS485-&gt;232 converter)</li> </ul>

### Common Technical Specifications

Class A Pyranometers	ISO 9060:2018 classification	Spectrally flat Class A (Secondary Standard)
	IEC 61724-1:2017 classification	Class A
	WMO performance level	High quality pyranometer
	WMO estimate on achievable accuracy for daily sums	±2%
	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> )
	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> )
	Standard built-in temperature sensor	YES (DPA952.1-953.1)
	Standard built-in heater	YES (12 V DC, 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	0.62 kg (DPA252.1-952.1) 0.5 kg (DPA953.1)
	Protection rate	IP67 (DPA252.1-952.1) IP66 (DPA953.1)
	Anti-radiation shield	Included

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

### Common Technical Specifications

<b>Class B 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

### Class C 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, Class C according to 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>	$\mu\text{V}$	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 V AC/DC	10...30 V AC/DC
<b>Power consumption</b>	-	0.5 W	0.5 W
<b>EMC</b>	-	EN 61326-1: 2013	EN 61326-1: 2013
<b>Thermopile ensitivity</b>	10...15 $\mu\text{V/W/m}^2$	NA	NA
<b>Measuring range</b>	See Irradiance range	0...1500 $\text{W/m}^2$	0...1500 $\text{W/m}^2$
<b>Impedance</b>	40 $\pm$ 3 $\Omega$	-	-
<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</li> </ul>	DYA034 (horizontal) or DYA035 (tilting) arms + DYA049 collar	
<b>Data logger compatibility</b>	<ul style="list-style-type: none"> <li>Alpha-Log (using ALIEM module)</li> <li>E-Log</li> </ul>	<ul style="list-style-type: none"> <li>Alpha-Log (using ALIEM module)</li> <li>E-Log</li> </ul>	<ul style="list-style-type: none"> <li>Alpha-Log</li> <li>E-Log (using RS485-&gt;232 converter)</li> </ul>

### Common Technical Specifications

<b>Class C 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
	Non linearity	± 1% (100...1000 W/m <sup>2</sup> )
	Temperature response	<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>DYA130</b>	Tilting arm for two pyranometers DPA252.1-952.1
	<b>DYA032</b>	Horizontal arm for fixing DPA053A to DYA049 collar
	<b>DYA034</b>	Horizontal arm for fixing DPA953-154-855-980-863-983 pyranometers to DYA049 collar Length 440 mm
	<b>DYA134</b>	Horizontal arm for fixing DPA252.1-952.1 pyranometers to DYA049 collar Length 440 mm
	<b>DYA034.1</b>	Horizontal arm for fixing DPA953-154-855-980-863-983 pyranometers to DYA049 collar Length 650 mm
	<b>DYA134.1</b>	Horizontal arm for fixing DPA252.1-952.1 pyranometers to DYA049 collar Length 650 mm
	<b>DYA035</b>	Tilting arm for fixing DPA953-154-855-980-863-983 pyranometers to DYA049 collar
	<b>DYA135</b>	Tilting arm for fixing DPA252.1-952.1 pyranometers to DYA049 collar
	<b>DYA060</b>	Lateral fixing arm for pyranometer installation on PV module. Suitable for DPA953-154-855-980-863-983-053A models
	<b>DYA060</b>	Lateral fixing arm for pyranometer installation on PV module. Suitable for DPA252.1-952.1 models
	<b>DPA245</b>	Occultation shadow band for diffuse radiation
	<b>DYA150</b>	Kit plate and screws for DPA953.1-154-855-980-863-983-053A pyra-
	<b>DYA152</b>	Kit plate and screws for DPA252.1-952.1 pyranometer installation on
	<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 V AC/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>SVACA4001</b>	Calibration certificate ISO7025 (Solar irradiance)
	<b>DYA049</b>	Collar for fixing DYA032-034-035 to Ø 45...65 mm pole
	<b>DWA205A</b>	Cable for DPA252.1 L=5 m
	<b>DWA210A</b>	Cable for DPA252.1 L=10 m
	<b>DWA225A</b>	Cable for DPA252.1 L=25 m
	<b>DWA205B</b>	Cable for DPA952.1 L=5 m
	<b>DWA210B</b>	Cable for DPA952.1 L=10 m
	<b>DWA225B</b>	Cable for DPA952.1 L=25 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>DWA405A</b>	Cable for DPA855-980-863-983. L=5 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>CCCOA5001</b>	Female 5 poles connector for DPA252.1 sensor cable
	<b>CCCOA5002</b>	Female 5 poles connector for DPA952.1 sensor cable
	<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.R</b>	Spare anti-radiant shield for DPA863-983 and DPA154-855-980
	<b>DPA294</b>	Hygroscopic salts cartridge for radiometers DPA154-855-980-053A-863-983