

Portable Photosynthesis System		
		Offered equipment:  Manufacturer: Type/Model: Country of origin:
No.	Required parameters	Offered parameters
1.	High precision portable photosynthesis system for gas exchange measurements	
CO <sub>2</sub> gas analyzer		
2.	Type of analyzer: absolute non-dispersive infrared gas analyzer located in the sensor head	
3.	Number of CO <sub>2</sub> analyzers: min. 2	
4.	Measurement range: min. 0 – 3100 µmol/mol	
5.	Precision at 400 µmol/mol and 1 Hz, RMS with a 4 sec averaging signal: ≤ 0,1 µmol/mol	
6.	Accuracy at ≥200 µmol/mol: max. ±1% of reading at <200 µmol/mol: max. ±2 µmol/mol	
H <sub>2</sub> O gas analyzer		
7.	Type of analyzer: absolute non-dispersive infrared gas analyzer located in the sensor head	
8.	Number of H <sub>2</sub> O analyzers: min. 2	
9.	Measurement range: min. 0 – 75 mmol/mol	
10.	Precision at 10 mmol/mol and 1 Hz, RMS with a 4 sec averaging signal: ≤ 0,01 mmol/mol	
11.	Accuracy at >5 mmol/mol: max. ±1,5% of reading at <5 mmol/mol: max. ±0,08 mmol/mol	
Gases control		
12.	Automated control of CO <sub>2</sub> concentration in the gas stream CO <sub>2</sub> control range: min. 0 – 2000 µmol/mol	
13.	CO <sub>2</sub> cartridge lifetime: > 8 hours after puncture Alert when the CO <sub>2</sub> source is low	
14.	H <sub>2</sub> O fully automated under software control to humidity or dry the air stream H <sub>2</sub> O control range: min. 0 – 90% RH	
15.	Flow rate to leaf chamber: min. 0 – 2000 ml/min	

Temperatures		
16.	Operating temperatures range: min. 0 – 50°C	
17.	Leaf temperature control range: min. ±10°C from ambient	
18.	Temperature setpoint resolution: min. 0,1°C	
19.	Chamber exhaust air temperature : Type: thermistor Range: min. -10°C - 60°C Accuracy: ≤±0,15°C	
20.	Leaf temperature sensor: Type: fine-wire thermocouple Range: min. -10°C - 60°C Accuracy: <±0,5°C	
Pressure		
21.	Console pressure sensor: Range: min. 50 – 110 kPa Accuracy: ≤±0,4 kPa Resolution: min. 1,5 Pa S/N peak-to-peak with 4 sec signal averaging: ≤0,004 kPa	
22.	Chamber pressure sensor: Range: min. -2 – 2 kPa Resolution: < 1,0 Pa S/N peak-to-peak with 4 sec signal averaging: min. 1 Pa Control range: min. 0 – 200 Pa	
Air flow rates		
23.	Bulk flow rate range at ambient temperature 25°C and pressure 100 kPa: min. 680-1700 μmol/sec	
24.	Leaf chamber flow rate at ambient temperature 25°C and pressure 100 kPa: 0 – 1400 μmol/sec	
Light measurement		
25.	Chamber and light source PAR sensors: Sensitivity range: min. 0 – 3000 μmol/m <sup>2</sup> sec Resolution: < 1 μmol/m <sup>2</sup> sec Calibration accuracy: ±5% of reading	
Light source		
26.	Total output range at 25°C: min. 0 – 2000 μmol/m <sup>2</sup> sec	
27.	Blue output range at 25°C: min. 0 – 400 μmol/m <sup>2</sup> sec	
28.	Red output range at 25°C: min. 0 – 1600 μmol/m <sup>2</sup> sec	
29.	Red peak wavelength: 660 nm ±5nm	
30.	Blue peak wavelength: 450 nm ±5nm	

31.	Uniformity: ±10% over 90% ± 2% of the aperture with white top gasket ±10% over 80% ±3% of the aperture with black top gasket	
32.	Compatible with clear top chamber. Possibility to disconnect from the chamber	
33.	Max. dimensions (L cm x W cm x H cm): 7 x 6 x 6	
34.	Weight: max. 250g	
<b>Sensor head</b>		
35.	Clear top chamber with min. 3 apertures of the following sizes: 3 x 3 cm 3 x 2 cm 3 x 1 cm	
36.	Equipped with a LCD display for live data values Display dimension (diagonal): min. 1,2" Display resolution: min. 128 x 128 pixels	
37.	Max. dimensions with connected 3 x 3 cm chamber (L cm x W cm x H cm): 40 x 12 x 22	
38.	Weight without chamber: max. 2,2 kg	
<b>Console</b>		
39.	Memory: RAM: min. 512 MB Flash memory: min. 8 GB	
40.	Display: Graphic backlit, sunlight-readable LCD with capacitive touch screen Resolution: min. 1024x600 pixels Display dimension (diagonal): min. 10"	
41.	Communication: RJ-45 Ethernet (TCP/IP) for network and computer: min. 1 USB port: min. 1	
42.	Max. external dimensions (L cm x W cm x H cm): 20 x 28 x 22	
43.	Weight: max. 6,5 kg	
44.	Power supply: min. 2 Lithium Ion batteries inside the console Total capacity of the 2 batteries: min. 13,5 Ah	
<b>Miscellaneous</b>		
45.	The possibility of extending the system in the future with the measurement of chlorophyll fluorescence	
46.	The possibility of extending the system in the future with the measurement of rate of diffusion of CO <sub>2</sub> from the soil surface	
47.	Accessories supplied with Portable Photosynthesis System: - Cable Assembly for connection console and sensor head - Console carrying harness - Tripod	

	<ul style="list-style-type: none"> <li>- Panhead mount</li> <li>- System case</li> <li>- Accessory case</li> <li>- Lithium Ion batteries: min. 3</li> <li>- AC to DC Power supply (230V/50Hz AC to 24V DC)</li> <li>- Kit for gas conditioning</li> <li>- CO<sub>2</sub> cartridges: min. 30</li> <li>- Clear leaf chamber spares kit</li> <li>- Light source spares kit</li> </ul>	
<b>Additional requirements</b>		
48.	<b>Declaration of conformity CE</b> <ul style="list-style-type: none"> <li>- all devices must have the CE mark</li> <li>- Declaration of conformity CE enclosed with the offer</li> </ul>	
49.	<b>Warranty:</b> <ul style="list-style-type: none"> <li>- warranty for all device components, minimum 12 months from the date of delivery</li> </ul>	
50.	<b>Post-warranty service:</b> <ul style="list-style-type: none"> <li>- post-warranty service, available on request and the cost of the Purchaser</li> <li>- availability of spare parts for a minimum of 10 years from the date of installation</li> </ul>	
51.	<b>User manual:</b> Delivered with devices in English, in paper and electronic version.	
52.	<b>Workshop</b> Minimum 2-day workshop at the registered office of the ordering party (Stężyca, Poland)	