

# TECHNICAL SPECIFICATION

AquaPen AP 110-C

AquaPen AP 110-P



## PROTOCOLS

AquaPen AP 110-C	<ul style="list-style-type: none"><li>· Ft - Instantaneous chlorophyll fluorescence</li><li>· QY - Quantum Yield</li><li>· OJIP – Chlorophyll fluorescence induction kinetics</li><li>· NPQ - Non-photochemical quenching</li><li>· LC - Light curve</li><li>· <b>OD - Optical density at 680 and 720 nm</b></li></ul>
AquaPen AP 110-P	<ul style="list-style-type: none"><li>· Ft – Instantaneous chlorophyll fluorescence</li><li>· QY - Quantum Yield</li><li>· OJIP – Chlorophyll fluorescence induction kinetics</li><li>· NPQ - Non-photochemical quenching</li><li>· LC - Light curve</li></ul>

## ILLUMINATION

LED emitter	AP 110-C: Red-orange (peak $\lambda$ 630 nm) and blue (peak $\lambda$ 455 nm) AP 110-P: Blue (peak $\lambda$ 470 nm), different wavelengths on request  12-bit DAC for light control
Saturating pulse intensity	AP 110-C: Up to 8,000 $\mu\text{mol}(\text{photon}).\text{m}^{-2}.\text{s}^{-1}$ (455 nm) Up to 3,500 $\mu\text{mol}(\text{photon}).\text{m}^{-2}.\text{s}^{-1}$ (630 nm) AP 110-P: Up to 4,000 $\mu\text{mol}(\text{photon}).\text{m}^{-2}.\text{s}^{-1}$ (470 nm)  Adjustable from 10 to 100 %
Actinic light	Adjustable from 10 to 1,000 $\mu\text{mol}(\text{photon}).\text{m}^{-2}.\text{s}^{-1}$
Measuring flash pulse	Up to 0.09 $\mu\text{mol}(\text{photon}).\text{m}^{-2}.\text{s}^{-1}$ per pulse  Adjustable from 10 to 100 %

## DETECTOR

Type	PIN photodiode with bandpass filters
Wavelength range	From 665 to 750 nm
Resolution	12-bit with variable gain amplifier
Acquisition rate	10 ms (0.1 MHz)

## SYSTEM SPECIFICATION

Internal memory capacity	16 Mb
Internal data logging	Up to 149,000 measurements (depending on protocol complexity)
Record length	40 ms – 600 s
Real-time clock	YES
Communication	USB 2.0 Bluetooth (transfer up to 3 Mbps for distance up to 20 m)

PC software	FluorPen 1.1 (Windows 7 and higher)
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## BATTERY

Type	Li-Ion rechargeable battery
Capacity	2,000 mAh
Max. charging current	0.5 A
Charging	Via USB port - PC, power bank, USB charger, etc.
Battery life	48 hours typical with full operation (low battery indicator)

## GENERAL SPECIFICATION

Sample holder	AP 110-C: 4 ml cuvette AP 110-P: Submersible optical probe
Display	Graphical display
Keypad	Sealed, 2-key tactile response Turns off after 5 minutes of no use
Built in GPS module	Ultra-high sensitivity down to -165 dBm High accuracy of < 1.5 m in 50% of trials
Size	165 x 65 x 55 mm
Weight	290 g
Operating conditions	Temperature: 0 to +55 °C Relative humidity: 0 to 95 % (non-condensing)
Storage conditions	Temperature: -10 to +60 °C Relative humidity: 0 to 95 % (non-condensing)
Warranty	1-year parts and labor