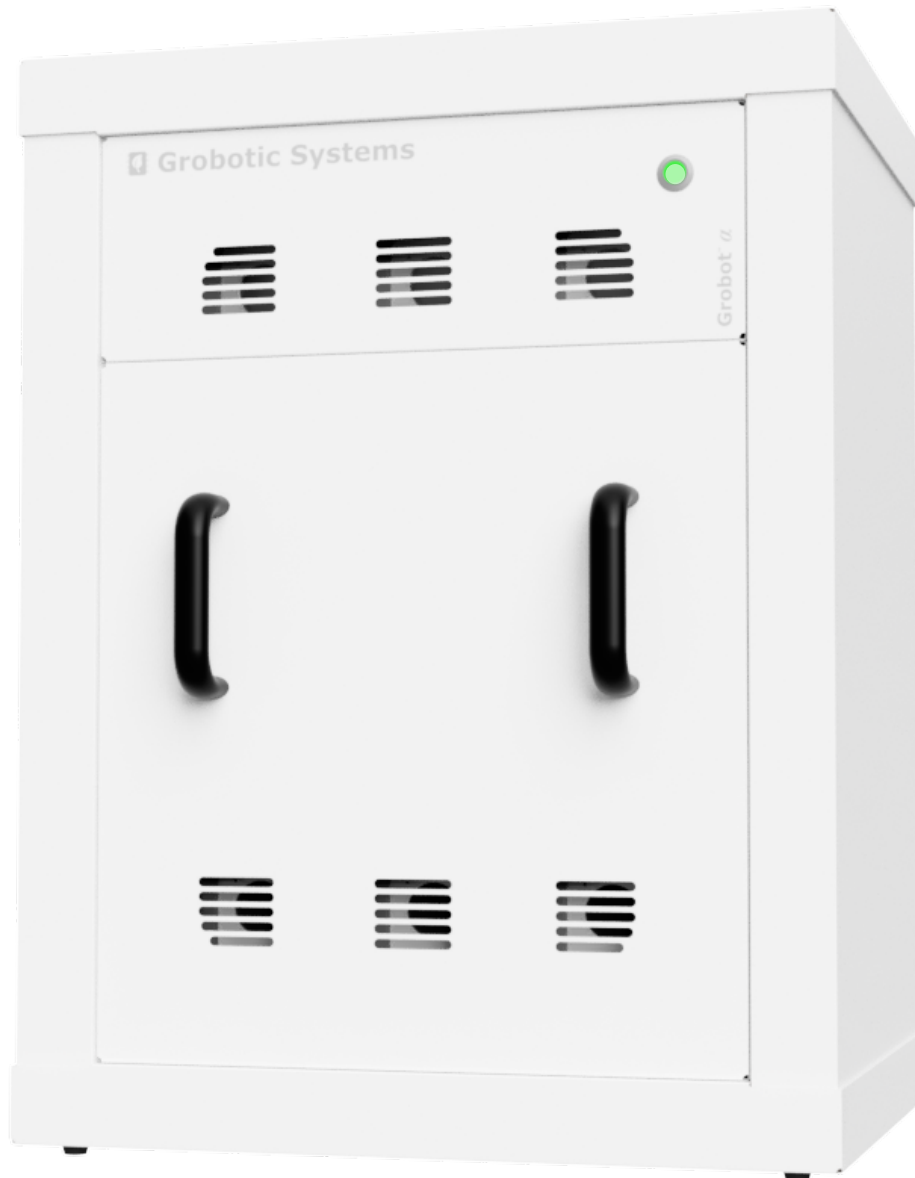




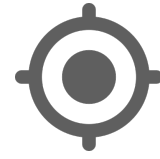
# Grobotic Systems®

Enabling discoveries in plant science.





**Reproducible.** Outstanding environmental uniformity and stability.



**Precise.** Fine control over light, temperature, and irrigation.



**Easy.** Intuitive web platform for chamber control and data management.



**Efficient.** Dramatic energy savings for ultra low running costs.



**Flexible.** Run on your desk, under the bench, or stacked to save space.



**Imaging.** Phenotype your plants and monitor experiments from home.



**Intelligent.** Email and SMS alerts if conditions deviate from setpoints.

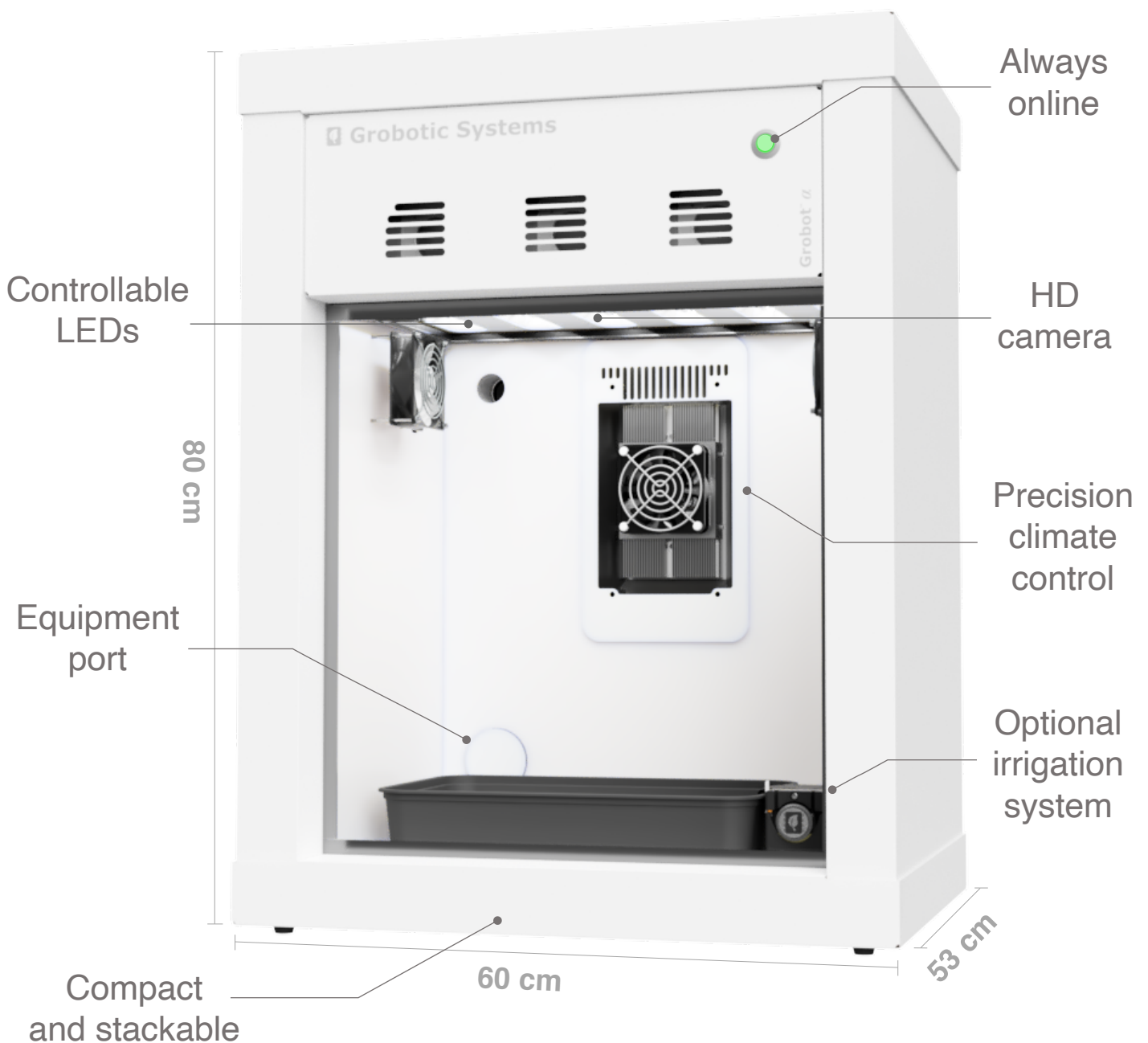


**Personal.** Compact and affordable - your own experimental chamber.

# Grobot™ $\alpha$

A new class of plant growth chamber  
for plant science research.

Order at [info@groboticsystems.com](mailto:info@groboticsystems.com) or +44 (0) 114 360 2221

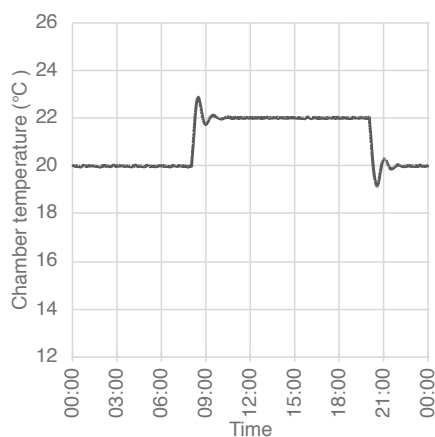


## Grobot™ α specifications:

Physical properties		
External dimensions (W x D x H)		60 cm x 53 cm x 80 cm
Internal dimensions (W x D x H)		48 cm x 35 cm x 50 cm (designed for a single plant propagator tray)
Weight		~28kg
Performance and control		
Temperature	range†	17°C to 35°C (lights on at 150 $\mu\text{mol m}^{-2} \text{s}^{-1}$ ) 15°C to 35°C (lights off)
	stability	$\pm 0.2^\circ\text{C}$ (Fig. 1)
Light	intensity	Controllable from 0 to 250 $\mu\text{mol m}^{-2} \text{s}^{-1}$ at 10 cm from chamber base
	quality	Samsung LM301B 4000K neutral white LEDs (Fig. 2)
	uniformity	$\pm 3\%$ of intensity setpoint at 10 cm from chamber base (Fig. 3)
Irrigation*	reproducibility	$\pm 3\%$ of irrigation volume setpoint
	precision	5 mL
	type	Drip irrigation or subirrigation
User interface		Browser-based chamber control, imaging, and data management platform
User programmable functions		Temperature, light intensity, photoperiod, irrigation* frequency and volume
Connectivity		Wi-Fi or wired ethernet
Data logging functions		Full HD image capture at user-defined intervals; time lapse video download
		Temperature and relative humidity at 1-minute intervals
Alarms and safety		Setpoint deviation, power, and connectivity loss; remote monitoring service**
		Audible local alarms; email and SMS remote alarms
Electrical service		Standard outlet (240V / 50hz / 4A)
Energy use†		80W average (running 22°C lights on @ 150 $\mu\text{mol m}^{-2} \text{s}^{-1}$ for 16 hrs / 18°C lights off for 8 hrs)

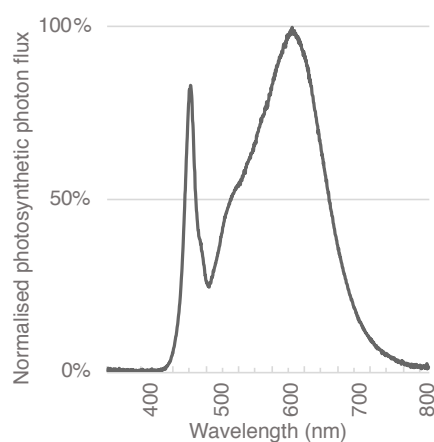
\*Irrigation system sold separately. \*\*Remote monitoring service free for first year then requires Service and Maintenance Contract.

†Temperature range and Energy use @ 22°C ambient temperature.



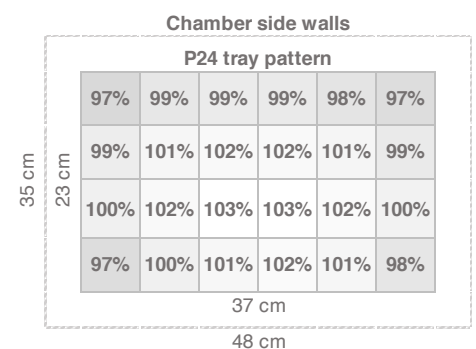
**Fig. 1 Temperature stability**

Temperature stability over 24 hr cycle (22°C lights on @ 150  $\mu\text{mol m}^{-2} \text{s}^{-1}$  for 12 hrs / 20°C lights off for 12 hrs).



**Fig. 2 Light quality**

Samsung LM301B 4000K LED spectrum in normalised photosynthetic photon flux.



**Fig. 3 Light uniformity**

Variation against mean light intensity measured at 10 cm from chamber base across a P24 tray pattern, setpoint 150  $\mu\text{mol m}^{-2} \text{s}^{-1}$ . SD = 2%. P24 tray pattern (shaded boxes) and chamber side walls (dashed line).