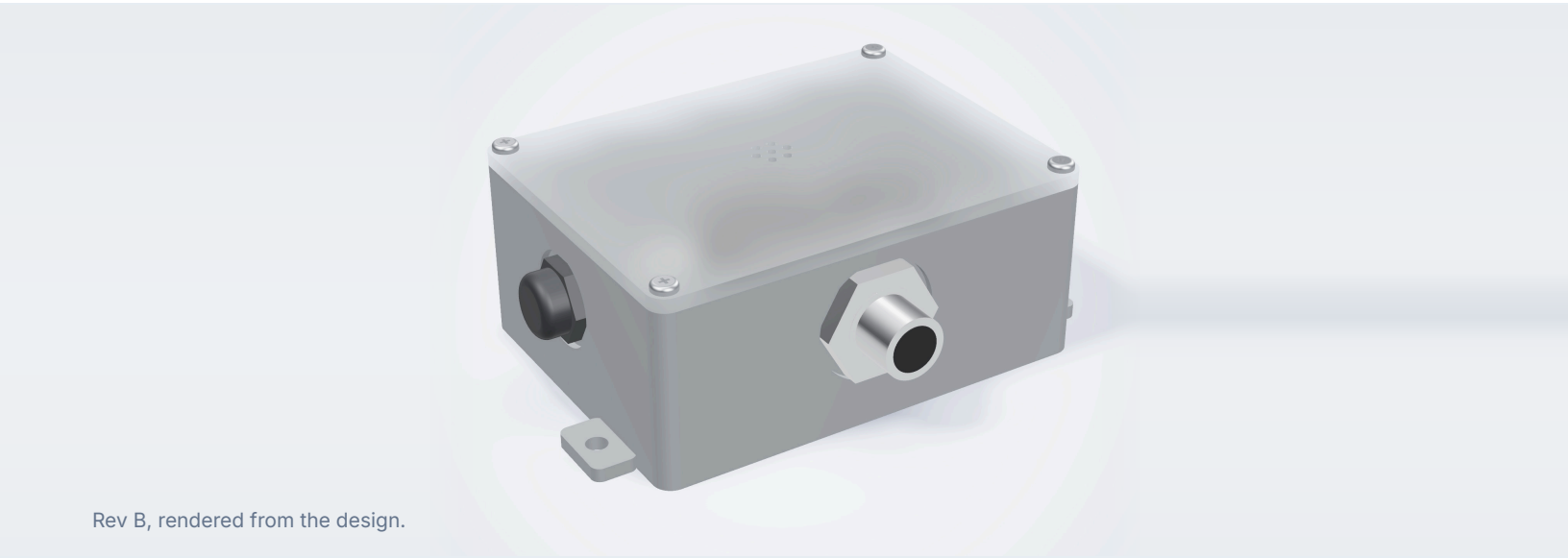
GCU FAMILY

LWV GCU V5

Runs each grow room on its own.

The LWV GCU V5 is the controller in each grow room, pod or container. It reads CO_2, temperature, humidity, leaf wetness and light over a wired RS-485 bus, and runs lights, fans, cooling, dehumidifiers and mini-splits from schedules, sensor rules and grow programs. Installers set it up from a phone over Bluetooth, growers watch it from GCU Cloud, and the room keeps running if the network drops.



Rev B, rendered from the design.

2 × 0–10 V
dimming outputs on the board; relays through LWV-IO-4R2D modules

RS-485
Modbus RTU bus for sensors, I/O modules and IR blasters

Wi-Fi + BLE
Wi-Fi to GCU Cloud, Bluetooth for setup from a phone

1 M12
sealed 8-pin connection for 24 V DC, the bus and both dimming outputs

FEATURES

Runs the room itself

Schedules with sunrise and sunset ramps, sensor rules and grow programs run on the GCU, not on a server. A battery-backed clock keeps them on time, and the room carries on if the network drops.

Alarm you see and hear

Sixteen red LEDs light the translucent lid and a 32 mm sounder calls for a person. A warning pulses the light; an alarm pulses light and sound together.

Wired sensors, no batteries

CO_2, temperature, humidity, leaf wetness and light come in over one wired RS-485 Modbus bus. The GCU works out VPD from temperature and humidity.

Bluetooth setup, printed PIN

Set up Wi-Fi, the cloud login and the I/O modules from a phone with the LWV-GCU app. The pairing PIN is printed on the unit's label and never changes.

Lights, relays and HVAC

Two 0–10 V dimming outputs are on the board; if the GCU loses power, the lights go to full. LWV-IO-4R2D modules add relays, and RS-485 IR blasters run mini-splits.

Watched from GCU Cloud

Readings and state changes stream to GCU Cloud, and each command comes back confirmed by the GCU. Firmware updates arrive over the air, and LWV support can reach the unit over WireGuard.

SPECIFICATIONS

Control	
Processor	Seeed XIAO ESP32-S3, dual-core 240 MHz, socketed
Firmware	GCU firmware 6.2.32 or later
Automation	schedules with on and off ramps, sensor rules, grow programs, HVAC day and night profiles
Output control	Off, On or Auto per output; timed runs with an on-time guard
Real-time clock	RV-3032-C7, temperature compensated, ±2.5 ppm from −40 to 85 °C; CR1220 backup cell
Data flash	16 MB SPI NOR (not used by the firmware yet)

Power	
Supply	24 V DC, on M12 pin 1
Input protection	1.5 A resettable fuse, reverse-polarity protection, 36 V surge clamp
Consumption	To be confirmed

Field bus	
Bus	RS-485, 2-wire; Modbus RTU master, 19 200 baud, 8N1
Termination	120 Ω, switch on the board
Protection	TVS on A and B; transceiver rated for ±70 V bus faults
Sensors	up to 2 CO_2 / temperature / humidity and 2 leaf-wetness sensors; light from the IR blaster
Control modules	up to 8, counting the GCU's own outputs

Outputs on the board	
Dimming	2 × 0–10 V, sink type, 12-bit
Without power	dimming lines open: drivers go to 100 %
Flasher	16 red LEDs in four strings around the board edge, lighting the lid
Sounder	32 mm (1.26 in) piezo, 3.2 kHz, rated 96 dB min at 30 cm (11.8 in)
Sound level, lid on	To be confirmed

Connectivity	
Wi-Fi	2.4 GHz, 802.11 b/g/n
Bluetooth	Bluetooth LE 5.0, LE Secure Connections; 6-digit PIN on the label
Cloud	GCU Cloud over MQTT with TLS, one login per unit
Updates	over the air from GCU Cloud
Remote support	WireGuard, through an LWV site router

Enclosure	
Size	97.5 × 73.5 × 40.6 mm (3.84 × 2.89 × 1.60 in); 115.5 mm (4.55 in) across the ears
Case	printed grey ASA base, flat translucent PETG lid
Seal	closed-cell silicone foam cord; four M3 lid screws in heat-set inserts
Vent	M12 × 1.5 ePTFE breather
Ingress protection	IP65 (design target)
Operating temperature	To be confirmed
Mounting	two ears, Ø 4.5 mm (0.18 in) holes for #8 or M4 screws
Weight	To be confirmed

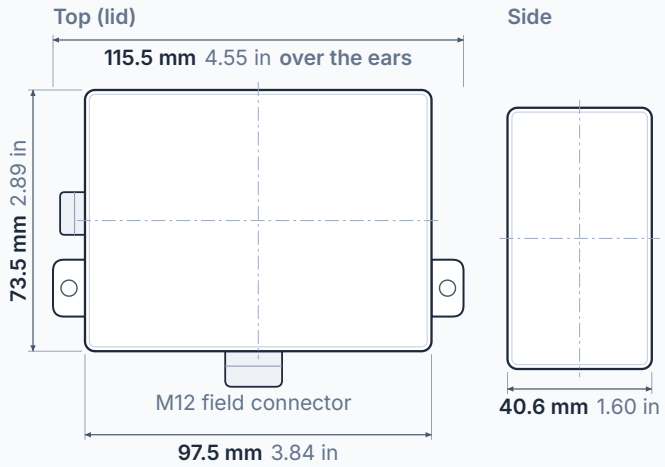
CONNECTORS

PORT	TYPE	USE
FIELD	M12 A-coded, 8-pin, female; rear-mount, M16 × 1.5 panel thread	power, RS-485 and both dimming outputs: 1 +24 V, 2 B (D−), 3 GND, 4 A (D+), 5 DIM A+, 6 DIM B+, 7 DIM A− (GND), 8 DIM B− (GND, centre pin)
USB-C	on the processor module	service only, lid off

STATUS LIGHTS

LIGHT	MEANING
Power (green)	on: the GCU has power
Flasher, double pulse	warning: a rule switched the flasher on, or the network has been down for more than 5 minutes
Flasher and sounder, 300 ms on, 200 ms off	alarm: a rule switched the sounder on

DIMENSIONS



Weight	To be confirmed
Mounting	Two mounting ears at floor level on the short ends, Ø 4.5 mm (0.18 in) holes for #8 or M4 screws; 115.5 mm (4.55 in) across the ears

WORKS WITH

- GCU Cloud: monitoring, control, grow programs, alerts and firmware updates
- LWV-GCU app: Bluetooth setup from a phone (iPhone and Android availability to be confirmed)
- LWV-IO-4R2D I/O module: 4 relays and 2 × 0–10 V outputs each
- LWV IR blaster (RS-485): one per mini-split indoor unit
- LWV CS-1 canopy sensor: read as a CO_2 / temperature / humidity sensor on current firmware
- SenseCAP S-CO2-03 CO_2 / temperature / humidity and S-YM-01 leaf-wetness sensors, up to 2 each
- LED drivers with a 0–10 V dimming input
- 24 V DC power supply

ORDERING

PART	DESCRIPTION
GCU V5	Greenhouse control unit, Rev B: sealed case, M12-8 field connector, clock cell, GCU firmware and a label with the Bluetooth PIN. Ordering code to be confirmed.
M12-8 field cable	A-coded 8-pin, male at the GCU end; length to order.

1. Figures to be confirmed will be measured on the first units. Specifications may change without notice.
2. Rev B needs GCU firmware 6.2.32 or later for its RV-3032 clock; it refuses an update from GCU Cloud to older firmware.
3. The dimming outputs sink current: they suit LED drivers whose 0–10 V input supplies its own current. For an input that needs a voltage from the controller, use an LWV-IO-4R2D output in source mode.
4. Field cables are male at the GCU end. The USB-C port on the module is for service, with the lid off.
5. IP65 is a design target; the enclosure has not been tested.