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ielivate[®]

SWCF-B1 Prototype Portfolio

Ielivate Smart Water Control — Powered by AI Optimization

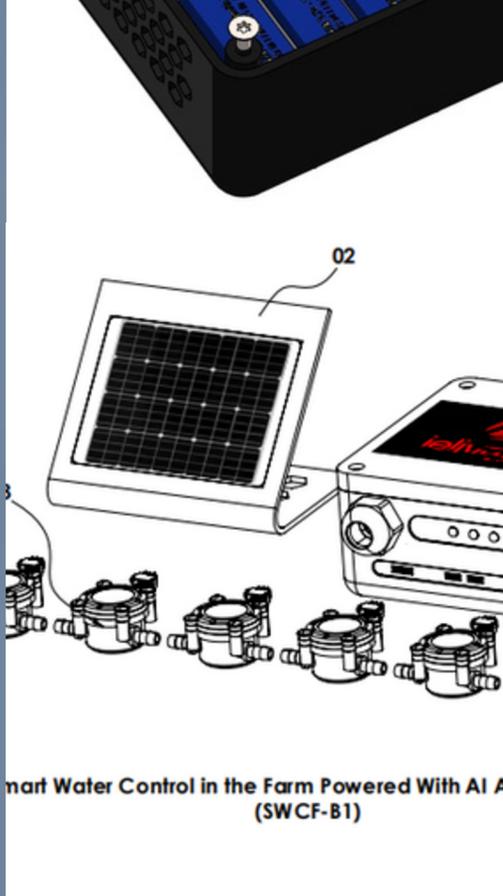
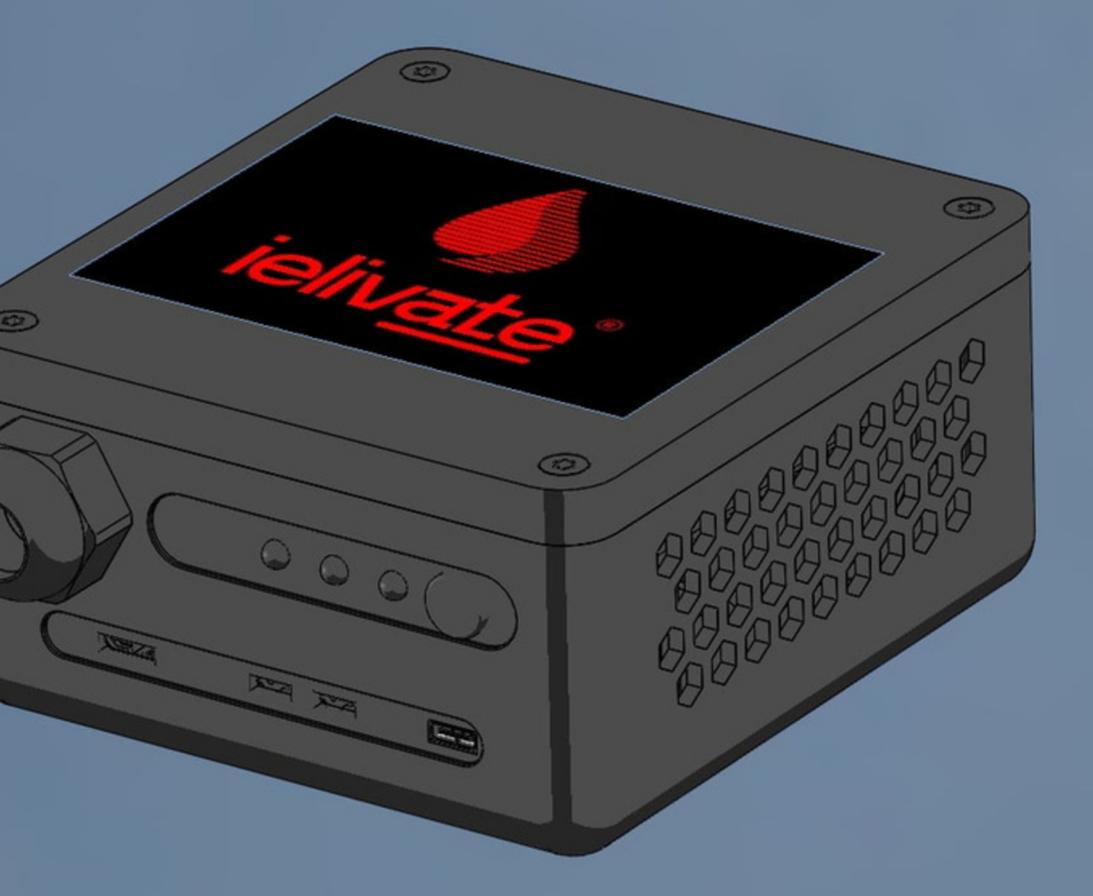
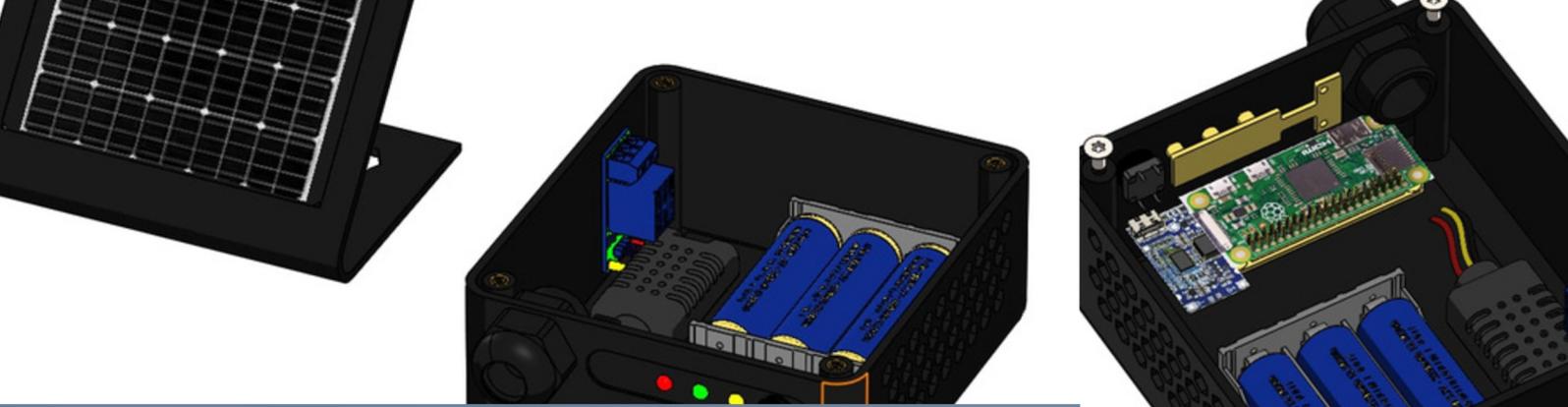
[Pammas Technologies Inc.](#)

Theme: Rouge (#FF0000) & Noir (#0A0A0A)



2025





Smart Water Control in the Farm Powered With AI A
(SWCF-B1)

PORTFOLIO



CO-FOUNDER
BELHACHEMIA
MOHAMMED
2025



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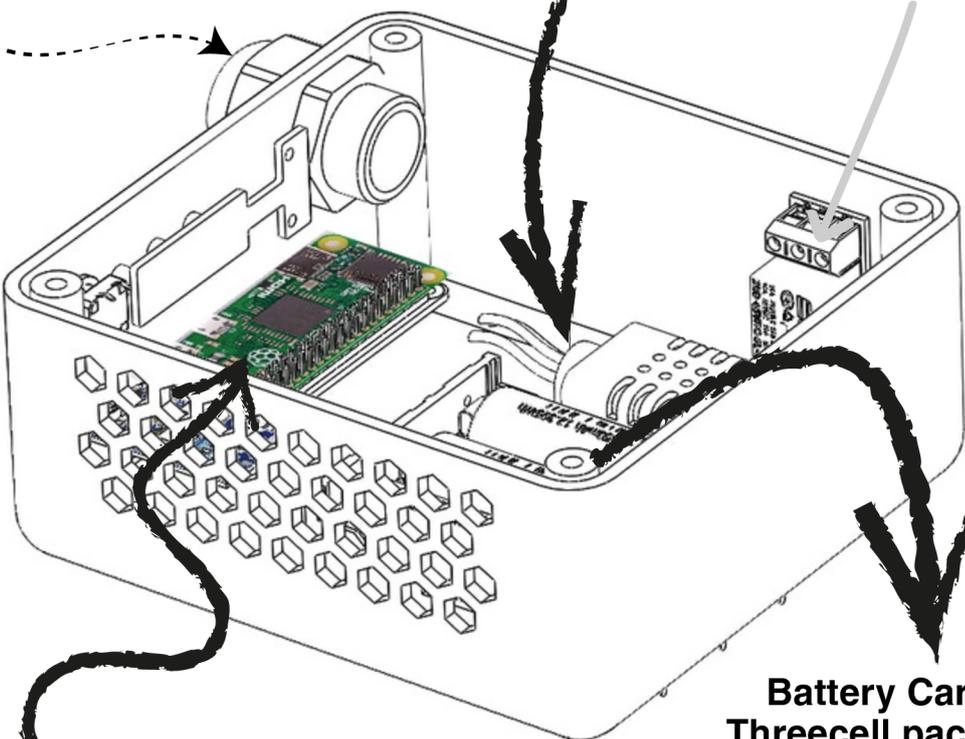
This document compiles prototype renders, assembly views, and branding references for the Ielivate Smart Water Control in the Farm (SWCF-B1). It highlights the system concept, a high-level component analysis, and explodes key internal modules. Original visuals from engineering PDFs are appended as image pages to preserve fidelity.

• Purpose — showcase the device, its parts, and how they fit together. • Scope — combines labeled overview (01–03) and exploded modules (04–14). • Brand — updated red #FF0000 with black #0A0A0A throughout.

! AI Algorithm Optimization Small Box SWTCH1

Power/Driver Board — High current switching (relay/MOSFET) and protection; isolates valve transients from logic rails.

Pump/Valve Set — Five compact inline actuators for zone control; distribute and dose water to independent irrigation lines.



Controller

Battery Carrier — Threecell pack cradle providing solar autonomy and balanced weight distribution.

Controller Board – Pi Zero 2 W
quad-core 64-bit ARM Cortex-A53 processor clocked at 1GHz and 512MB of SDRAM, Zero 2 is up to five times as fast as the original Raspberry Pi Zero

WiFi Bluetooth SD

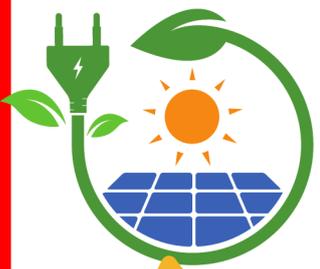
System Overview (Labels 01–03)



Based on the labeled overview page, the system comprises: (01) the SWCF-B1 controller unit, (02) a standalone photovoltaic panel, and (03) a set of five compact in-line pumps/valves for zone control. The appended overview page should be used as the visual reference for these labels.

- 01 — Controller: housing with front user interface (rotary/knob, status LEDs) and I/O ports; side ventilation for thermal management.
- 02 — Solar panel: provides off-grid power; panel stand optimizes angle and stability in field conditions.
- 03 — Pump/valve set: five actuated nodes for distributing and dosing water to independent irrigation lines.

See the appended “Plan d’assemblage final (overview)” page for the pictured layout and numbering.



**Solar Panel — Offgrid power input;
angle adjustable stand for optimal
irradiance and stable mounting in field
conditions**

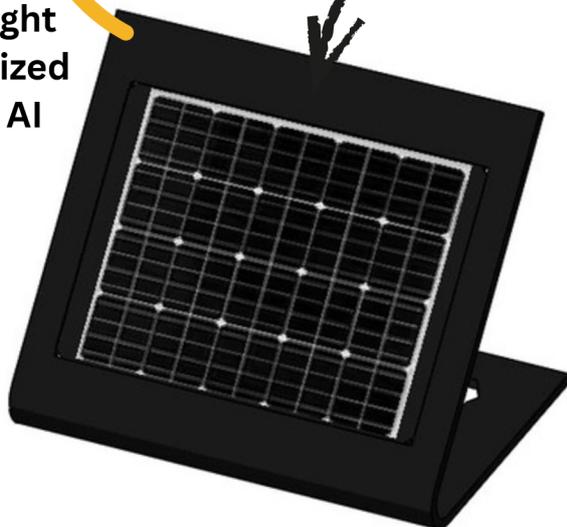
The diagram shows a solar panel with a grid of cells, a sun icon, and a plug icon, all enclosed in a green circular frame with a leaf. A yellow arrow points from this icon to the solar panel in the main diagram.

use light
optimized
with AI



**WSMB1 Smart
Water Box —
Callout
Boxes**

The diagram shows a black rectangular box with a red battery pack inside. A red circle highlights the battery pack, and a red arrow points from the text to it.



**Structural Base/Chassis —
Anchors PCBs, battery, and I/O;
ensures stiffness and heat path.**

The diagram shows a black rectangular box with a grid of cells on top. A black arrow points from the text to the box.

Exploded Internal Modules (Labels 04–14)

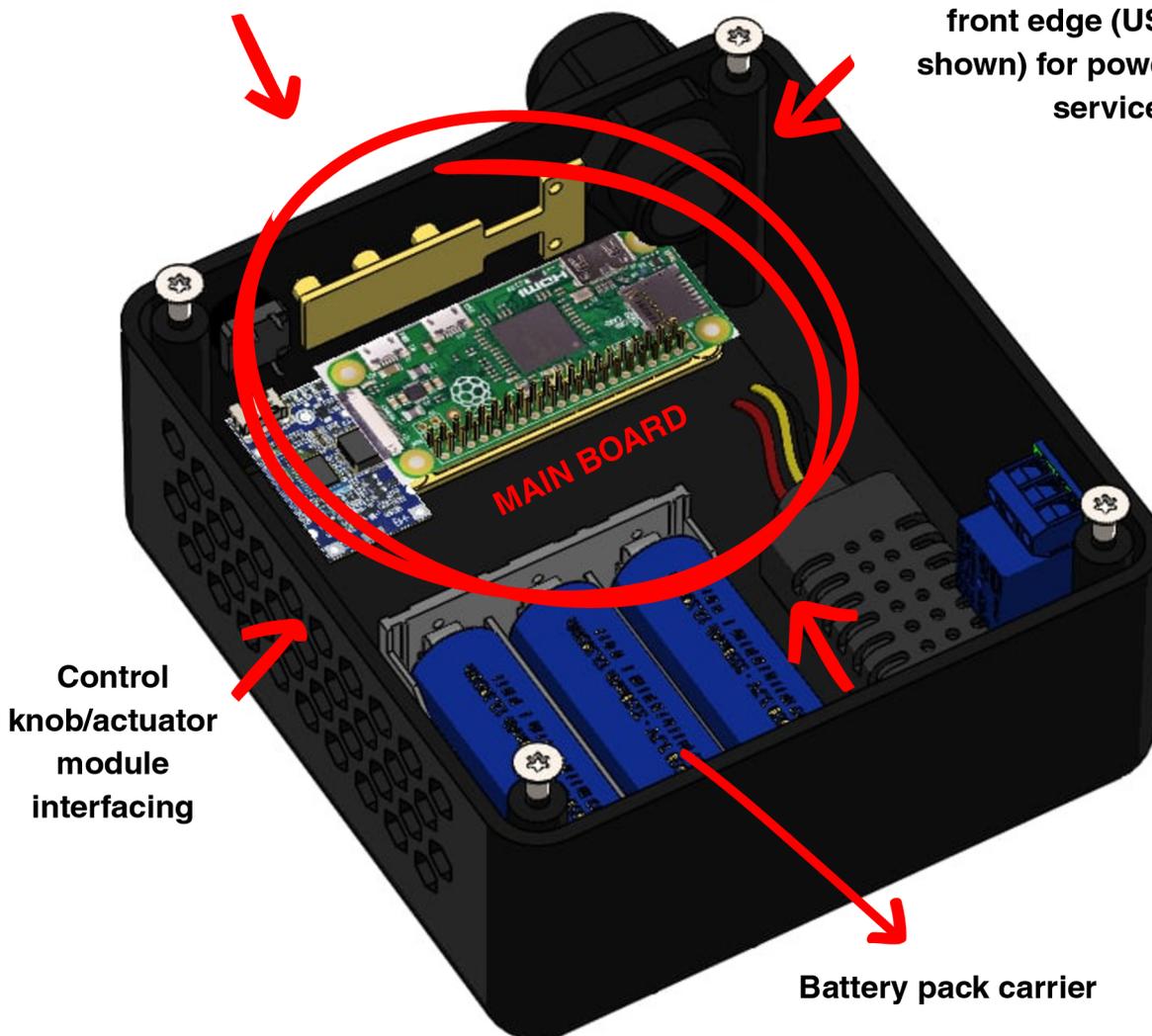


The exploded views reveal the controller's internal layout. The numbering below follows the annotated page. Descriptions focus on function rather than exact part names; confirm with CAD/BOM as needed.

- 04 — Top cover / cosmetic lid with Ielivate branding, protects the stack and provides visual identity.
- 05–07 — Front interface bracket & light-pipe/encoder sub-assembly that supports the main knob and indicators.
- 08 — Control knob/actuator module interfacing to the UI bracket for user input (e.g., rotary + push).
- 09 — Main controller PCB hosting MCU/SoC, comms, and sensing; connects upstream/downstream modules.
- 10 — Power/driver board for high-current loads and protection (relays/MOSFETs as applicable).
- 11 — Terminal/block connector that routes field wiring to pumps/valves and sensors.
- 12 — Battery pack carrier (three cylindrical cells) for energy storage and solar autonomy.
- 13 — Structural base / chassis that anchors PCBs, battery cradle, and I/O.
- 14 — I/O daughterboard along the front edge (USB/ports shown) for power, data, or service.

Main controller PCB

I/O daughterboard along the front edge (USB/ports shown) for power, data, or service.



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Branding & Colors

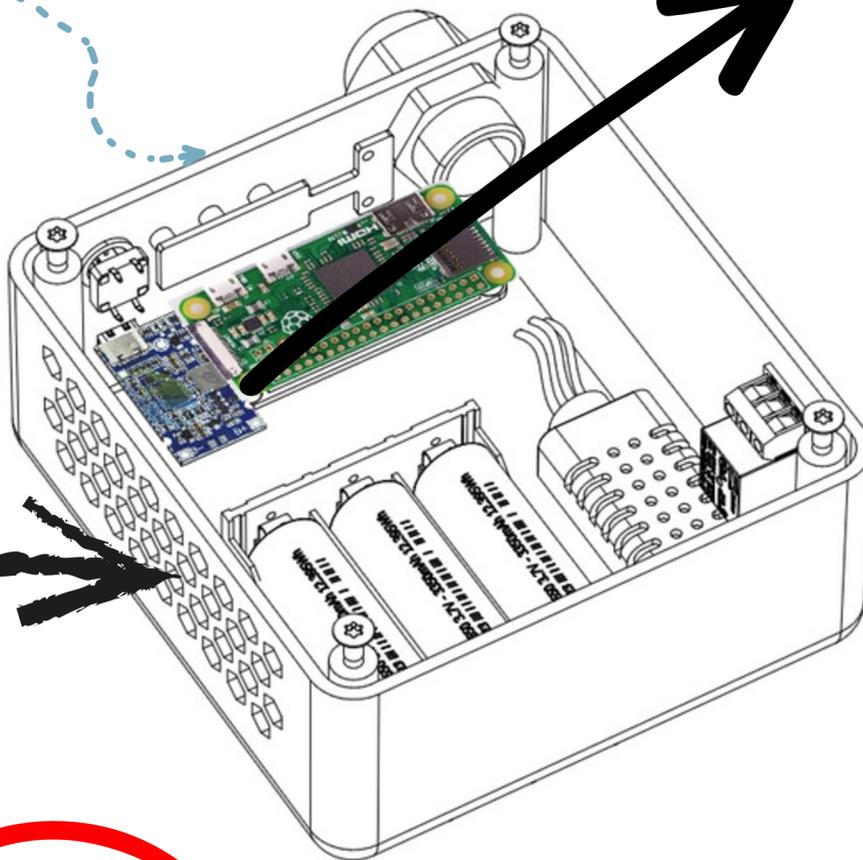


Brand palette used throughout this report: Red #FF0000 (RGB 255,0,0; CMYK 0,100,100,0) and Black #0A0A0A (RGB 10,10,10; CMYK 90,67,68,75). The logo dimension spec shows L1 = 100 mm usage.

Reference pages are appended at the end for accurate color/mark reproduction.

Main Controller PCB — MCU/SoC, comms, and sensing hub; connects upstream UI and downstream power/sensor modules.

ON/OFF SWITCH



**Power & I/O
Harness Block**
— external cable
entry and terminal
interface.

External Power & Sensor Harness — field-grade cable feed for solar, battery, and valve lines. Routed through sealed glands into the chassis; connects to internal terminal block for regulated 12 V and I/O.



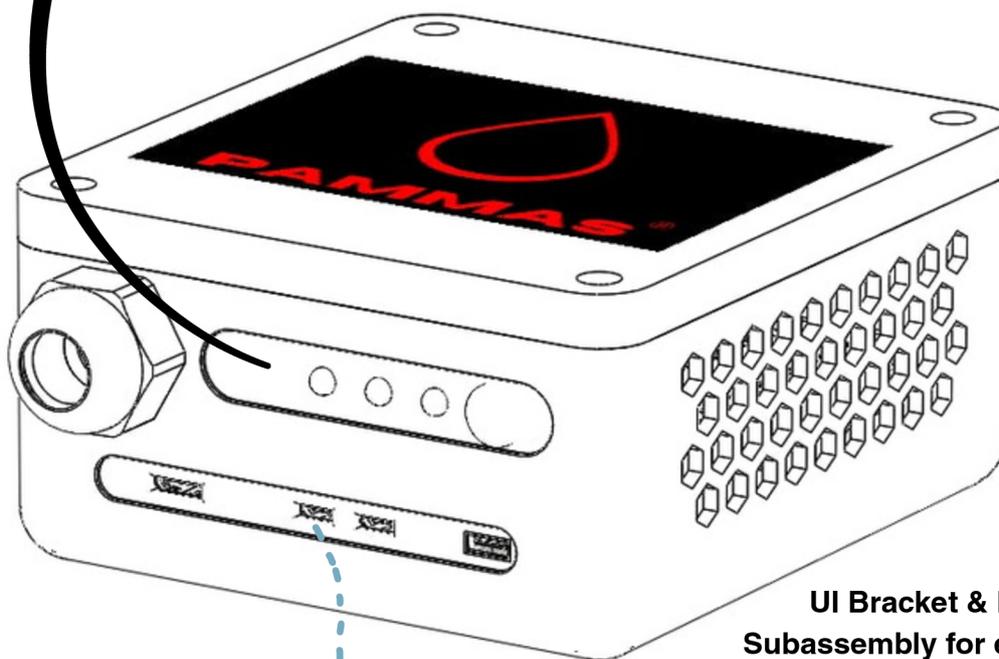
- Overview renders (black & white / full-color).
- Labeled overview (01–03).
- Exploded assemblies (04–14).
- Brand color & logo specification.

The following pages are the original PDFs appended without compression to preserve clarity.

! DISCLAIMER

I/O Daughterboard —
Front edge USB/ports for power, data, or service; keeps main PCB uncluttered.

Controller Unit — Enclosed electronics with user interface (knob + status LEDs), ports, and side ventilation; hosts compute, drivers, and I/O routing



UI Bracket & Lightpipes —
Subassembly for encoder/knob and indicators; aligns optics and provides mechanical support.

Front Connectivity & Ventilation Zone
houses multi-port I/O daughterboard, air inlets, and lateral vents for thermal regulation.

! Setup OS

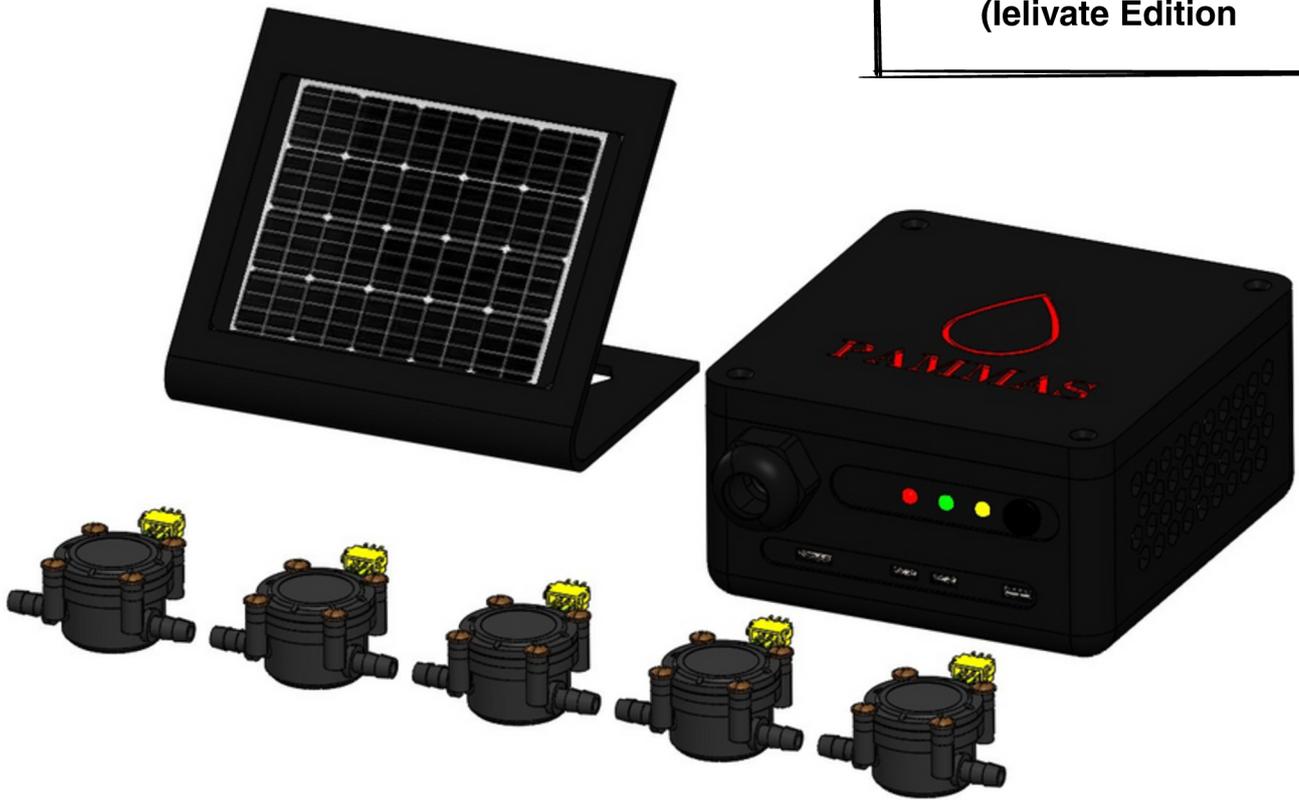


- **Local UI (Next.js)** – Static control pages exported to /opt/waterbox/www; Setup, Control, Network, Sensors, System, MQTT.
- **Device API (Flask)** – /status and /sensors (GET); /config and /valve (POST); token gate + CORS hardening.
- **Networking Modes** – AP first-run SSID ‘WaterBox-Setup’ at 192.168.4.1; Station mode joins farm Wi-Fi; optional MQTT bridge.
- **Autostart & Services** – systemd (waterbox.service) and/or PM2 to resurrect Node-RED/API; logs retained for troubleshooting.
- **Captive Portal (opt.)** – iptables DNAT to force HTTP:80 to setup page during AP pairing; disable AP after credentials saved.
- *MQTT Topics – waterbox/box1/cmd, /state, /metrics, /events; bridge to cloud broker via TLS for remote fleet control.*
- *Edge AI (opt.) – Collect flow/pressure/soil; Edge Impulse anomaly model; gate irrigation decisions with policy thresholds.*



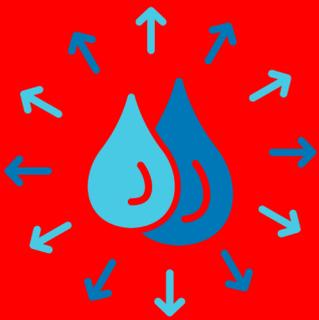
BOX

WCF-B1 Smart Water Control
(Ielivate Edition)



solar-powered irrigation controller with
five smart valves and onboard AI
management for autonomous zone
watering.





The WSM-B1 Smart Water Box prototype represents a complete convergence of design, energy autonomy, and AI-driven water management.

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