

MESH

AI-assisted greenhouse automation
for broader farm adoption



MESH is a modular greenhouse automation ecosystem designed to help farms start practical automation with less burden, clearer operation, and more room to grow.

Instead of forcing growers into oversized, rigid systems from day one, MESH lets them begin with the control, sensing, and software they actually need then expand step by step.

- Start with what matters
- Keep useful equipment
- Operate clearly on site
- Expand without rebuilding everything
- Grow toward smarter farm operation over time

Built for real greenhouse adoption

MESH is designed for growers and partners who need automation that can fit the reality of the site — not only the ideal of a brand-new facility.

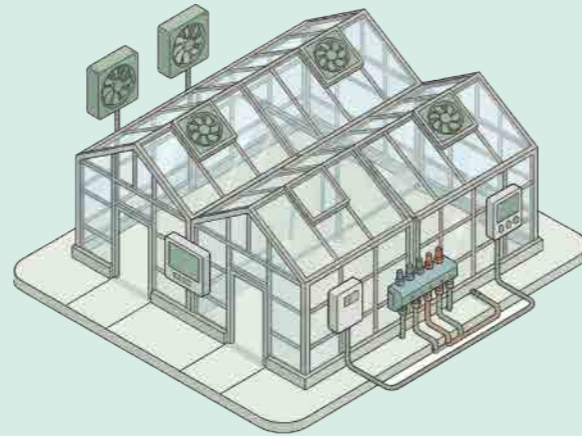
01



For first-time greenhouse growers

Start with essential control channels and core sensing, then expand the system as crop strategy, budget, and operation mature.

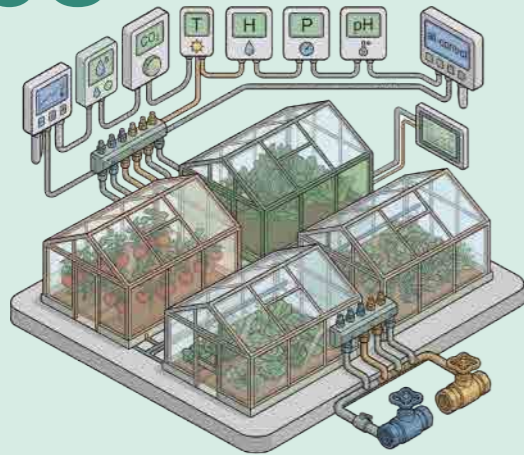
02



For retrofit and upgrade projects

Modernize critical parts of an existing greenhouse while keeping useful equipment in place and reducing the pressure of all-at-once replacement.

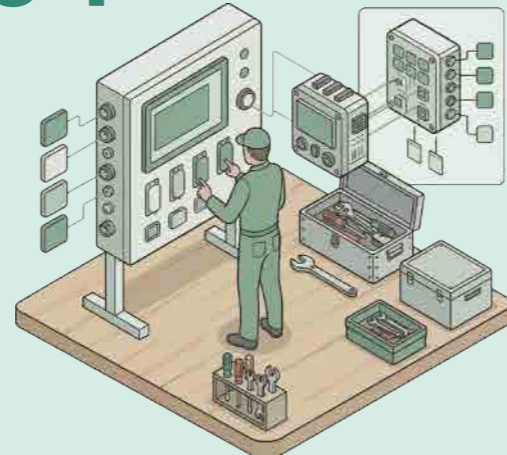
03



For new builds and multi-zone farms

Create a repeatable control structure from the beginning, with room to grow across more zones, crops, and operating requirements over time.

04



For installers, integrators, and dealers

Deploy a structure that is easier to configure, easier to repeat, and easier to support in the field.

One ecosystem for smarter greenhouse control

MESH connects control, sensing, local orchestration, and daily operation into one modular ecosystem that is easier to understand and easier to expand.

Control where it matters

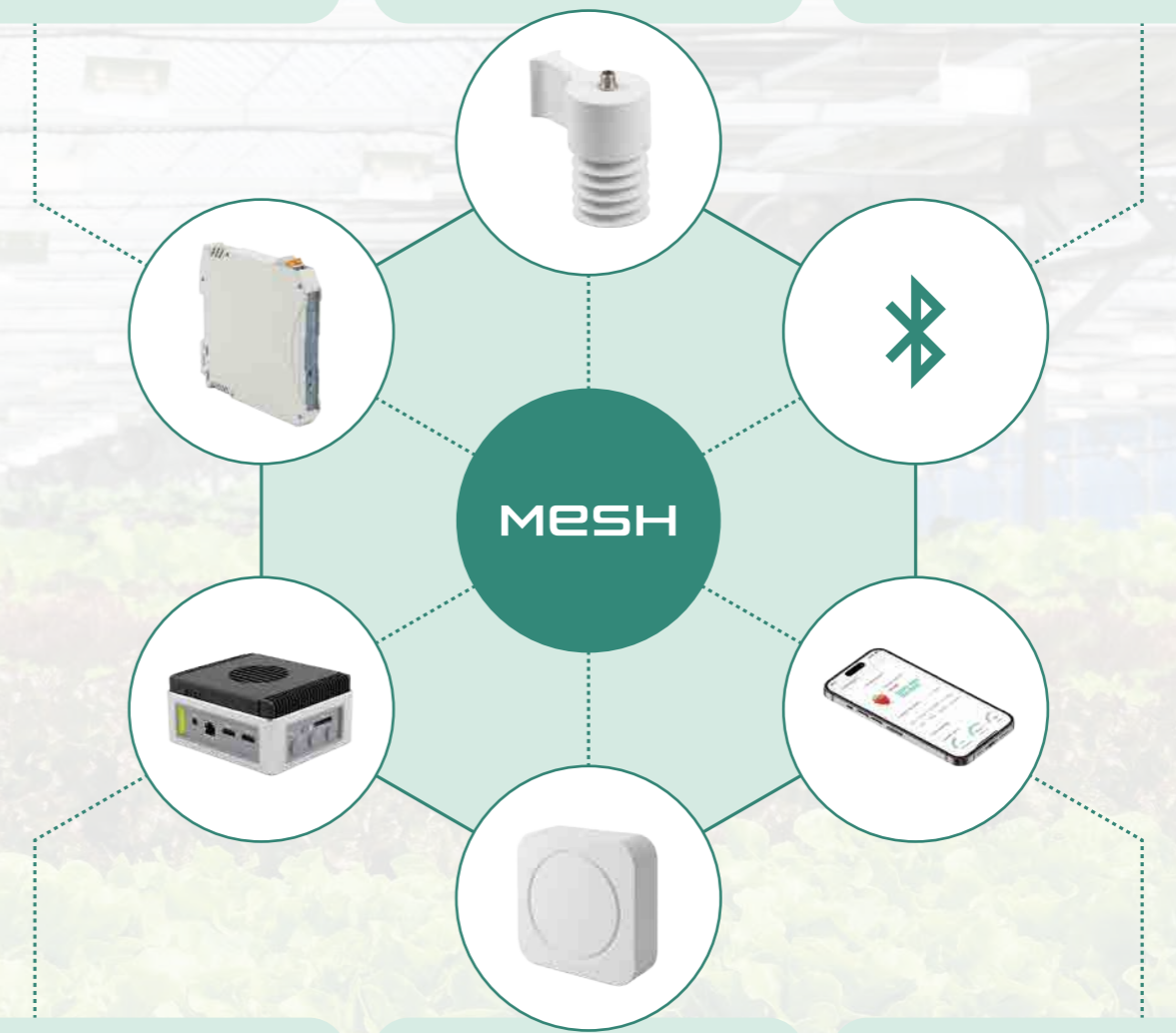
Dedicated control modules manage actuators such as vents, fans, curtains, pumps, fogging, lighting, and other field devices.

Sense conditions across the greenhouse

Environmental sensor nodes collect the data needed to understand zone conditions, microclimate differences, and daily operating changes.

Connect devices through BLE Mesh

Distributed BLE Mesh communication reduces wiring burden, supports flexible placement, and makes phased expansion easier.



Run locally through the Hub

The MESH Hub supports local orchestration, data caching, device diagnostics, and local operation on site.

Integrate through Link

When farms need to work with legacy controllers or third-party equipment, Link extends MESH through RS-485 / Modbus-based integration.

Operate through App

Operators can check live status, receive alerts, review trends, manage logs, and follow recommended actions through one connected interface.

The MESH product family

Operate. Control. Sense. Integrate. Expand.

MESH is not a single controller. It is a modular product family designed to let farms start with the functions they need today and expand into a broader automation ecosystem over time.

| | | | |
|------------------------------|------------------|--|---|
| Operate | Hub | local orchestration, data caching, diagnostics, and field continuity | Platform : Rpi CM5 based OS : Linux (Debian) Wireless : BLE 5.4 Mesh Comm : Ethernet, Wifi, 4G |
| | App | web/app operating interface for status, alerts, history, logs, and recommended actions | - |
| Control | FR Series | dedicated actuator control modules for screens, curtains, windows, and motorized devices | INPUT : 24 DC(CONTROL) + 220V AC(POWER) OUTPUT : 220V AC (FWD/REV) DRIVE : Relay Contact COMM : Bluetooth 5.4 Mesh/RS485 |
| | SW Series | practical ON/OFF control for fans, pumps, fogging, circulation, and auxiliary equipment | POWER : 24 DC(CONTROL) SWITCH : 220V AC, 1ch (Triac, Zero-Cross) COMM : Bluetooth 5.4 Mesh/RS485(Modbus) |
| Sense & Integrate | Air nano | Compact temperature and humidity sensing for enhanced zone coverage | - |
| | Link | RS-485 / Modbus integration for retrofit and third-party equipment | - |
| Expand | Display | local at-a-glance visibility on site | Eye camera-based crop and anomaly signals for future visual intelligence |

Hardware designed for easier installation, maintenance, and scale

MESH lowers the barrier to greenhouse automation through integrated control modules, simpler field deployment, and a more scalable architecture.

01 Direct control where it matters

Modules are designed to connect directly to field devices such as actuators, motors, and pumps.

02 Intelligence inside each module

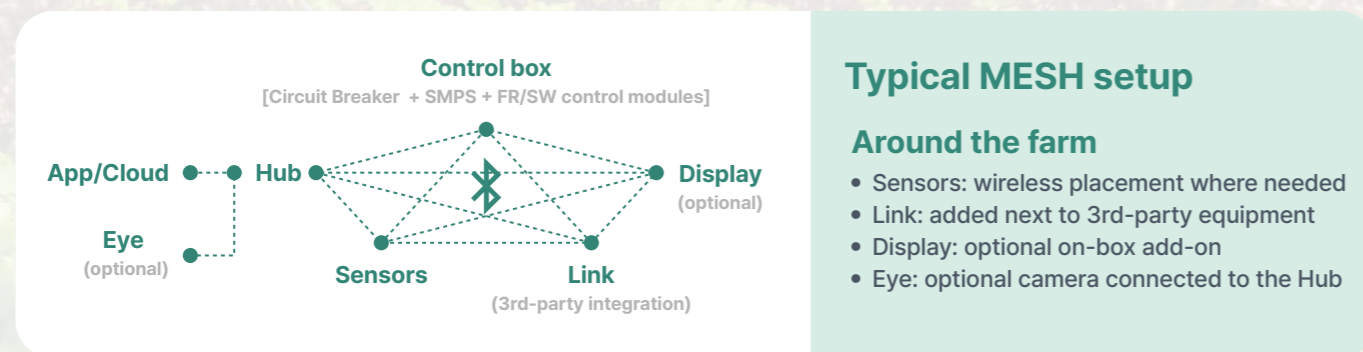
An onboard MCU supports smarter device handling, while built-in current sensing helps monitor behavior and detect abnormalities.

03 Faster field recovery

A front-side one-button recovery design helps operators restore modules more quickly when issues occur.

04 Less wiring, easier expansion

Bluetooth-based communication reduces wiring burden and supports more flexible installation and step-by-step expansion.



Flexible to deploy. Easier to afford.

51.7% lower deployment cost

1ha greenhouse scenario
Built at about 48.3% of the previous setup cost

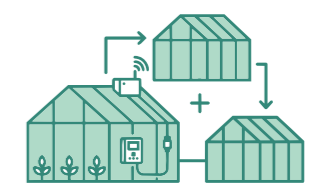
*Internal comparison. Actual cost varies by site and configuration.



Starter
For first-time growers and smaller greenhouses



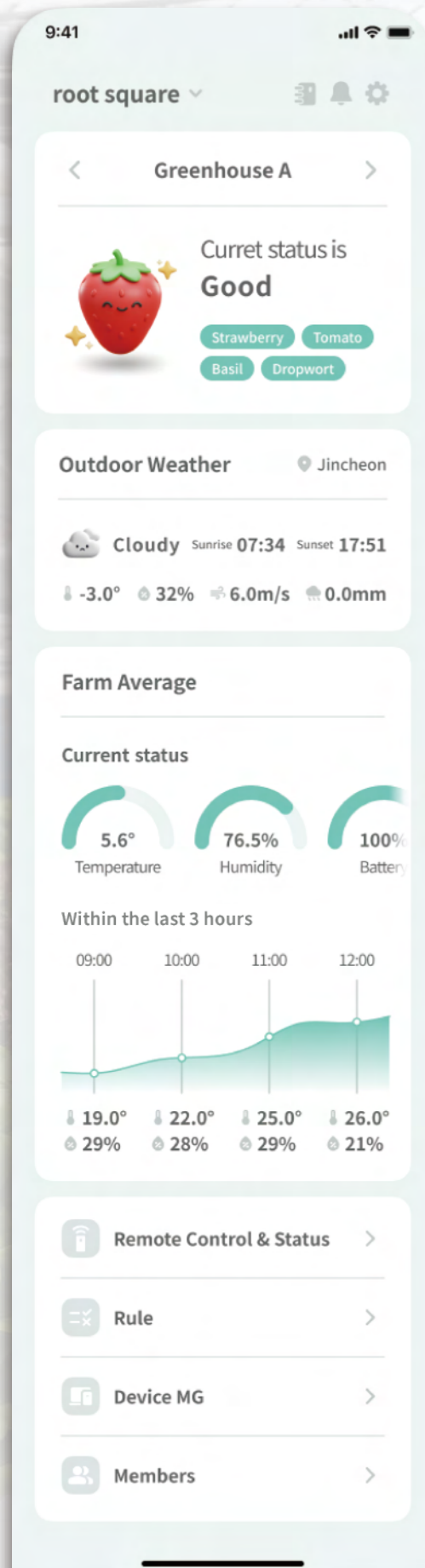
Retrofit
For upgrades and mixed-equipment sites



Multi-zone
For scalable farms and new projects

Operate with clarity through the MESH App

MESH App helps growers understand farm conditions more clearly, respond faster, and keep daily operation better organized in one place.



See what matters now

Check zone conditions, device status, and key alerts in one place.

Understand changes over time

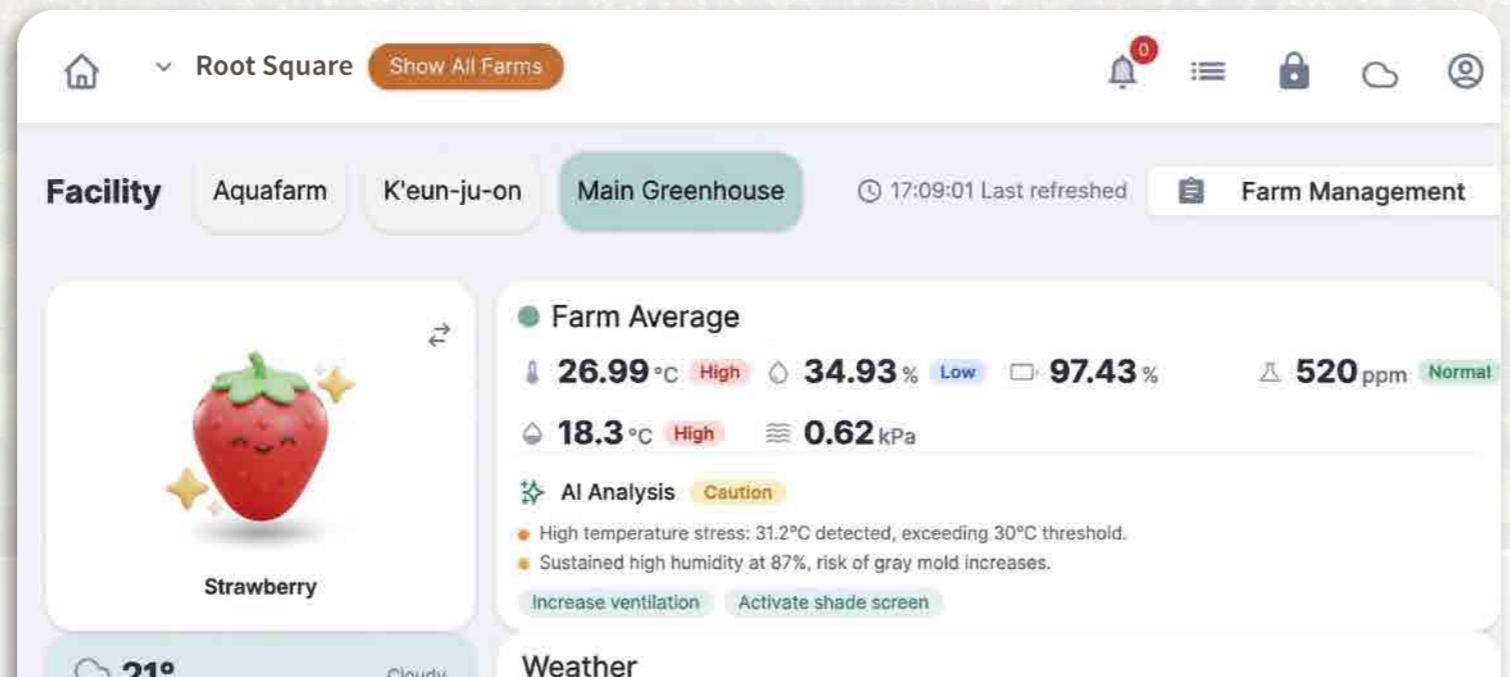
Review history and trends to see what changed and when attention is needed.

Keep farm records connected

Daily notes and logs become easier to organize, review, and reuse over time.

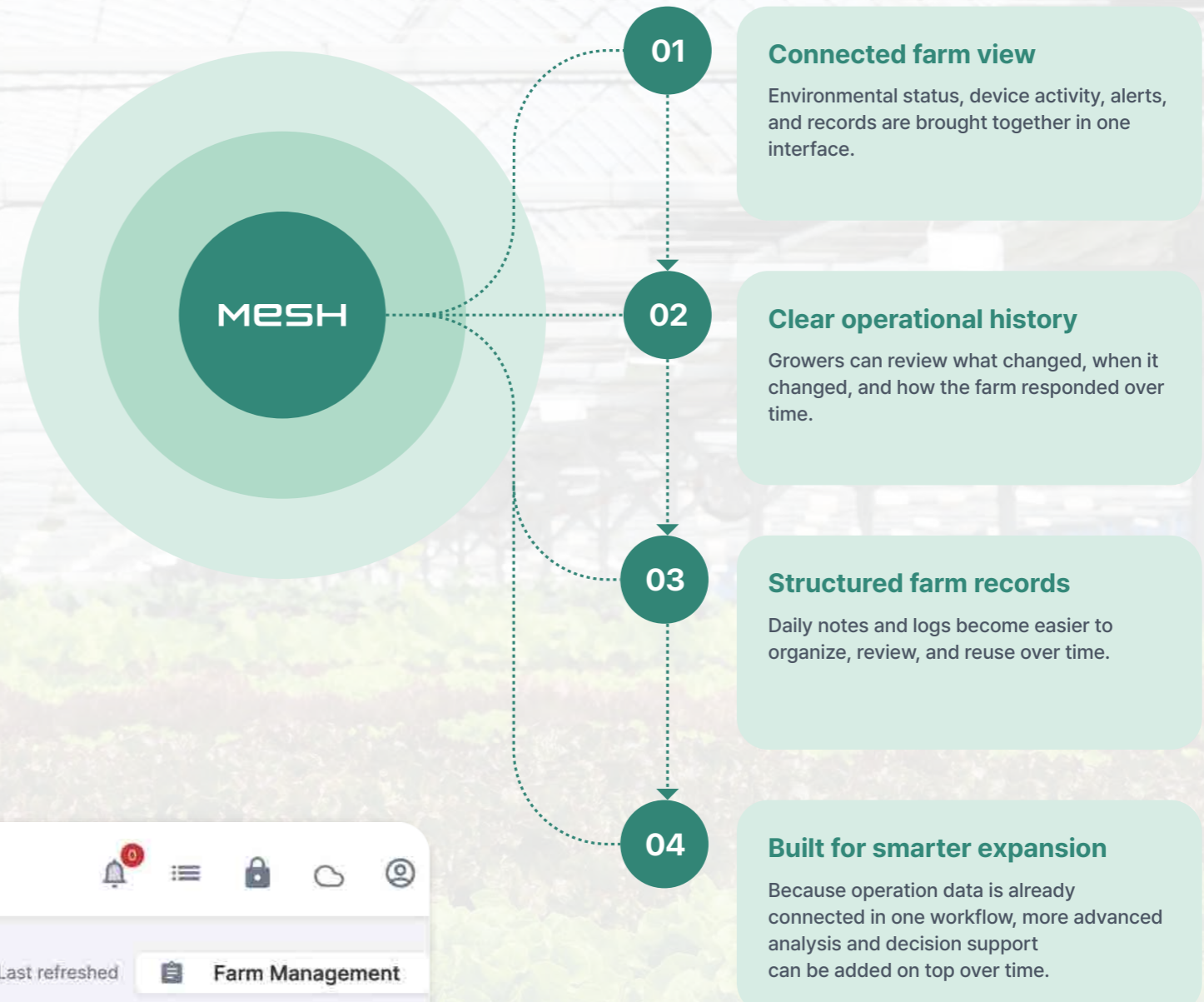
Respond faster from the app

Operators can monitor device conditions, receive alerts, and act more quickly from the app.



MESH App One interface for connected farm operation

MESH App brings together farm status, device activity, alerts, records, and operational history into one connected operating interface. This gives growers a clearer daily workflow today, while creating the foundation for more advanced decision support over time.





From selected beta deployments to broader market launch

MESH is currently being refined through selected field deployments and real operator feedback.

Based on this foundation, MANNA CEA plans to begin broader market introduction from GreenTech 2026 and continue expanding the MESH product line over time.

MESH is backed by real smart farm implementation experience, practical cultivation knowledge, and a broader solution ecosystem that connects environmental control, cultivation, and farm operations.



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