Agrinovo

AGRINOVO-OMNI-GENESIS

4-Port Multi-Protocol IoT Controller

1. Overview

The Omni Genesis is an industrial, multi-protocol data acquisition and control unit for field deployment in agriculture, aquaculture, and environmental monitoring. It provides four modular sensor ports, each configurable from the cloud across I²C, Analog, Digital, 1-Wire, RS485 (Modbus-RTU), and SDI-12. One controller connects soil, water, and climate sensors of any type, with no additional circuitry and no firmware changes.

Genesis runs on dual rechargeable 18650 Li-ion batteries with built-in solar charging and a deep-sleep power cycle that keeps consumption under 30 µA between readings, so it operates for months fully off-grid. It connects to OmniCloud over 4G-LTE cellular by default, with Wi-Fi and Bluetooth built in. The IP65-rated enclosure and corrosion-resistant connectors are designed for open fields, ponds, greenhouses, and cold rooms.

Key Features

- 4 modular, cloud-configurable sensor ports
- I²C, Analog, Digital, 1-Wire, RS485, SDI-12
- 4G-LTE cellular, Wi-Fi, and Bluetooth
- Solar charging with dual 18650 batteries
- Under 30 µA sleep current, months off-grid
- Over-the-air firmware updates
- Local data logging with cloud sync
- IP65 enclosure, -20°C to +70°C operation

Applications

- Aquaculture and mariculture water quality monitoring (pH, EC, DO, ORP, temperature, ammonia)
- Soil moisture, irrigation, and climate monitoring
- Environmental logging of air, water, and soil parameters
- Greenhouse, hydroponic, and precision farming systems

2. Specifications

Parameter	Specification
Sensor Ports	4 modular ports, cloud-configurable
Supported Protocols	I²C, Analog, Digital, 1-Wire, RS485 (Modbus-RTU), SDI-12
Sensor Power	Switched 5 V / 12 V supply, managed per reading cycle
Power Supply	Dual 18650 Li-ion batteries (rechargeable)
Solar / DC Input	6-32 V DC
Sleep Current	<30 µA
Connectivity	4G-LTE cellular, Wi-Fi 2.4 GHz, Bluetooth 5.0
Expansion	Modular communication slot, LoRa/LoRaWAN and GPS capable
Enclosure Rating	IP65 (dust-tight, water-resistant)
Operating Temperature	-20°C to +70°C
Storage Temperature	-40°C to +85°C
Data Logging	Local storage with cloud sync
Firmware Updates	Over-the-air via OmniCloud

3. Sensor Ports

Each of the four ports is a keyed connector carrying power and two data lines. The data lines take on the signals of the protocol assigned to the port, so the same physical port reads an RS485 probe, an I²C sensor, an analog tensiometer, or a 1-Wire temperature string depending on its cloud configuration.

Port Pinout

Pin	Function	Description
V+	Power	Sensor power (switched 5 V or 12 V)
GND	Ground	Power ground
D1	Data	Protocol signal (RS485-A, SDA, analog in)
D2	Data	Protocol signal (RS485-B, SCL)

RS485 Probes

Agrinovo digital probes communicate over RS485 Modbus-RTU at 9600 bps, 8 data bits, no parity, 1 stop bit. Multiple RS485 probes share a single bus, each at its own Modbus address, so one controller reads a full set of water quality probes.

Changing What a Port Reads

Port configuration lives in OmniCloud. Swap a tensiometer for a pH probe, change a port from analog to RS485, or adjust sampling intervals from the dashboard. No rewiring, no firmware update, no site visit.

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4. Connectivity

Interface	Role
4G-LTE Cellular	Primary field connectivity. The controller connects on its own wherever there is cellular coverage; a global roaming SIM is included with the OmniCloud subscription.
Wi-Fi 2.4 GHz	Connectivity for sites with local network coverage.
Bluetooth 5.0	Local access.
Modular Slot	The communication slot is LoRa/LoRaWAN and GPS capable for project-specific configurations.

Genesis can operate as a gateway, repeater, or end node in distributed deployments.

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5. Power System

Genesis is designed for unattended, off-grid operation:

- **Batteries:** Dual rechargeable 18650 Li-ion cells power the controller through day and night cycles.
- **Solar charging:** Any 6-32 V DC solar panel connects directly; the controller manages charging internally. The same input accepts fixed DC power where available.
- **Deep-sleep cycle:** The controller wakes on schedule, powers the sensors, takes readings, transmits, and returns to sleep. Sleep current is under 30 µA.
- **Managed sensor power:** Each port is powered only while it is being read, at the voltage its sensor requires.

There are no batteries to replace and no power cables to run.

6. OmniCloud Integration

Every Genesis controller is managed through OmniCloud:

Capability	Description
Live Dashboards	Real-time and historical data from every sensor, on web and mobile
Alerts	Instant notifications by WhatsApp or email when a reading crosses a threshold
Remote Configuration	Port protocols, sampling intervals, and calibration values set from the dashboard
OTA Updates	Firmware improvements pushed over the air while the device is deployed
Data Export	Historical readings available for analysis and reporting

7. Installation Notes

Placement

- Mount vertically with connectors facing down
- Face the solar panel toward the sun, clear of shading
- Confirm cellular coverage at the mounting point
- Keep unused port connectors capped

Maintenance

- No scheduled battery replacement
- Keep connectors clean and dry when swapping sensors
- Firmware stays current automatically over the air
- Check panel surface seasonally for dust buildup

8. Ordering Information

Item	Model
Omni Genesis 4-Port IoT Controller	AGRINOVO-OMNI-GENESIS
Omni Genesis Lite 1-Port IoT Controller	AGRINOVO-OMNI-GENESIS-LITE