

RS485/ModBus Gateways



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E-IOT RS485 and Modbus gateways connect wired meters, sensors and controllers to wireless networks and cloud services. NeoMesh and cellular variants provide two complementary connectivity options: multiple devices can share a mesh-to-cloud gateway, or an individual installation can communicate directly through a cellular network.

Products shown

- **DIN-rail RS485-to-LPWA gateway** — A cabinet-mounted connectivity extension for smart meters and other compatible RS485 devices, providing a direct cellular route to the cloud.
- **DIN-rail RS485-to-NeoMesh gateway** — A wireless interface for integrating compatible wired equipment into a local NeoMesh network, with cloud access through a shared gateway.

- **Compact RS485-to-NeoMesh node** — The open unit in the center combines a NeoCortec radio module, local processing, an RS485 terminal connection and an external antenna connector.
- **RS485-to-cellular MA510 board** — The open unit on the right incorporates a Fibocom MA510 modem and a PCB antenna structure. Its board marking identifies a 5–24 V supply range.
- **Illustrated Modbus controller** — The background shows a typical panel-mounted controller, representing equipment whose measurements and operating parameters can be accessed through a compatible RS485/Modbus interface.

Product features and operation

Connecting existing equipment

The gateways add connectivity to equipment that already provides an RS485 communication port. This allows existing meters, controllers and sensors to become part of the E-IOT ecosystem while retaining their original measurement and control functions.

RS485 provides the electrical communication interface, while Modbus defines how supported devices exchange commands and data. Integration therefore requires both compatible wiring and knowledge of the connected device's communication settings and register map.

Modbus data acquisition

In a polling configuration, the gateway requests selected registers from the connected Modbus RTU devices. These registers may contain measurements, counters, operating states or configuration parameters.

The application interprets the returned values using the manufacturer's register definitions, including data type, scaling and byte order. For example, a raw register value may need to be converted into temperature, energy consumption, pressure or another engineering quantity before transmission to the cloud.

Device addresses, baud rate, parity and polling intervals must match the installation. Supported register sets and functions depend on the gateway firmware and the connected equipment.

Wireless integration through NeoMesh

The RS485-to-NeoMesh variant acquires data locally and transfers it through the wireless mesh network. A compatible NeoMesh-to-cloud gateway then forwards the information to the server.

This architecture allows several separate RS485 installations to share one Internet connection. Each local node serves its connected equipment, while NeoMesh carries the application data between distributed locations and the central gateway.

Local polling and transmission of selected values can reduce wireless traffic. The wireless connection should not be assumed to provide a transparent, timing-equivalent replacement for an RS485 cable; message handling depends on the implemented firmware.

Direct cellular connectivity

The cellular variant combines the RS485 interface and mobile-network uplink in one device. It is suitable for isolated meters, remote controllers and installations where a shared local wireless network is unnecessary.

The illustrated MA510-based platform supports NB-IoT and LTE-M, with optional 2G fallback according to the modem configuration and available network service. A suitable SIM and cellular coverage allow data transmission without access to the customer's Wi-Fi or wired Internet connection.

The choice between direct cellular and NeoMesh connectivity depends on the number of monitoring points, their distribution, available power and uplink requirements.

Bidirectional communication and control

Where supported by the firmware and connected device, communication can include both reading data and writing permitted parameters. A remote application can request an update or send a command that the gateway translates into the corresponding Modbus transaction.

This can support functions such as changing a controller setpoint or adjusting an operating parameter. Write operations must follow the equipment's register definitions and application permissions. Successful wireless delivery alone does not confirm that the connected controller accepted or applied a command; its response must also be evaluated.

E-IOT Cloud integration

The gateway or host application associates acquired values with the originating device and prepares them for transmission to the E-IOT Cloud. Reports can include measurements, device addresses, communication status and diagnostic information.

The cloud application can display current readings, retain historical records and generate configured notifications. Communication diagnostics help distinguish a missing response

from a valid measurement, preventing an unavailable device from being interpreted as a zero reading.

Installation and commissioning

DIN-rail housings support integration into control cabinets and metering installations, while compact variants provide options for installation close to individual devices.

Commissioning includes checking supply requirements, RS485 polarity, device addressing and serial settings. Bus topology, termination and biasing must suit the installation, and radio placement must provide reliable mesh or cellular reception.

The gateway configuration should also account for any existing Modbus master to avoid conflicting access to the same bus.

Typical applications

- Remote reading of electricity and other utility meters.
- Refrigeration-controller monitoring and parameter access.
- HVAC and building-automation integration.
- Industrial process and equipment-status monitoring.
- Acquisition of Modbus soil, water and environmental sensor data.
- Connecting distributed RS485 installations through a shared NeoMesh network.
- Direct cellular monitoring of isolated equipment.
- Retrofitting cloud connectivity to existing Modbus-enabled systems.

Cybersecurity and Protection of Refrigerated Goods

Connecting refrigeration controllers to the cloud creates valuable opportunities for remote monitoring and control, but it also introduces responsibilities throughout the equipment's operating life. If an Internet-accessible gateway or remote-management service is compromised, an attacker may gain access to connected controllers and change critical operating parameters.

For refrigeration applications, unauthorized changes to temperature setpoints can have direct physical consequences: rising storage temperatures, spoiled goods and substantial financial losses. The risk becomes particularly important when connectivity equipment remains in service after security updates and vendor support have ended.

Reducing direct Internet exposure

The E-IOT architecture is designed to reduce direct exposure of field devices. In NeoMesh-based installations, refrigeration controllers connect through a non-IP wireless mesh layer, while a separate gateway handles cloud communication. The controllers and mesh nodes are therefore not individually exposed as publicly addressable Internet endpoints.

This separation creates an additional architectural barrier between Internet connectivity and local equipment. Communication passes through the gateway and the implemented application-message interface, providing a point at which access and permitted commands can be controlled.

On-demand cellular communication

For direct cellular Modbus installations, the E-IOT approach uses scheduled or on-demand communication rather than requiring a continuously accessible inbound connection. The device initiates communication with the configured server to exchange measurements and supported commands.

Where the modem and application are configured to close communication between reporting windows, this can reduce the period of active connectivity. The security benefit comes from the complete configuration—including restricted inbound access and controlled application traffic—not from the LPWA radio technology alone.

Temperature feedback and alerts

Alongside preventive measures, the E-IOT Cloud provides operational visibility by monitoring reported temperatures. When a received measurement exceeds a configured limit, the application can generate an alert, helping operators identify an abnormal temperature rise and take corrective action.

This feedback can reveal the consequences of an unauthorized setpoint change, equipment failure or another operational problem. Detection and notification time depend on the measurement interval, reporting schedule, network availability and alert-delivery configuration.

Protection through multiple layers

Network separation and on-demand communication reduce exposure, but they must be complemented by secure implementation and lifecycle maintenance. Gateway and cloud authentication, protection of data in transit, restricted write permissions, command validation and supported firmware remain essential.

For refrigeration installations, remote access should be limited to the functions actually required. Where remote parameter changes are necessary, permitted commands and setpoint ranges should be constrained, with changes recorded for review.

The E-IOT approach combines reduced field-device exposure with temperature monitoring and alerts, helping operators protect both connected equipment and the goods it safeguards.