

TECH OFFER

IP over Modbus/RS485: Smart Building Automation Without Rewiring



KEY INFORMATION

TECHNOLOGY CATEGORY:

Green Building - Sensor, Network, Building Control & Optimisation
Green Building - Heating, Ventilation & Air-conditioning
Infocomm - Networks & Communications

TECHNOLOGY READINESS LEVEL (TRL): **TRL9**

COUNTRY: **JAPAN**

ID NUMBER: **TO175367**

OVERVIEW

In today's Building Automation (BA) industry, the growing demand for smarter, more connected buildings is accelerating the shift from traditional Modbus/RS485-based devices to Ethernet-enabled BA devices. RS485 is a long-established serial communication standard valued for its reliability over long distances and in electrically noisy environments—making it a staple in industrial and building automation systems.

However, upgrading to Ethernet typically requires costly and labor-intensive rewiring to replace existing Modbus/RS485 cabling with Ethernet cables.

This technology offers a cost-effective alternative by enabling IP-based data communication over the existing Modbus/RS485 infrastructure already deployed in facilities. It supports communication speeds ranging from several Mbps to tens of Mbps and

transmission distances of several kilometres, making it especially suitable for large-scale building environments.

The technology provider is seeking to collaborate with commercial building owners, industrial facilities and manufacturing plants, building automation companies, system integrators, and facility management firms that are looking to enhance operational efficiency and upgrade infrastructure with minimal retrofitting.

TECHNOLOGY FEATURES & SPECIFICATIONS

Enabling Cost-Effective IP Communication

- IP communication is possible using existing Modbus/RS485 cabling.
- Effective communication speeds range from several Mbps to several tens of Mbps, depending on cable type and wiring environment (for comparison, Ethernet typically supports speeds from several hundred Mbps to several Gbps).
- Supports flexible topologies, including star, tree, daisy chain, ring, and more.

Enabling the Construction of Large-Scale Networks

- Example of maximum communication distance (1-to-1 connection):
 - Twisted pair: up to 1,200 meters
 - Up to 10 times the communication distance can be achieved using the automatic relay function (for comparison, Ethernet typically supports up to 100 meters per segment).
- Supports up to 1,024 terminals with a single master device.

POTENTIAL APPLICATIONS

Cost-effective IP communication is achieved in the following industries by leveraging existing Modbus/RS485 cabling:

- Building Management Systems (BMS)
- Energy Management Systems (EMS)
- Heating, Ventilation, and Air Conditioning (HVAC) Systems
- Access Control Systems
- Environmental Monitoring Systems

MARKET TRENDS & OPPORTUNITIES

The Building Automation (BA) industry has experienced significant growth in recent years, driven by increasing demand for smarter and more energy-efficient buildings. As of 2025, the global BA market is valued at approximately USD 101.7 billion and is projected to reach USD 191.1 billion by 2030, with a compound annual growth rate (CAGR) of 13.4%.

Traditionally, many building systems have relied on Modbus/RS485 communication due to its reliability and simplicity. However, the shift toward IP-based systems is accelerating, as they enable better integration with cloud services, remote monitoring, and advanced analytics. Replacing existing RS485 cabling with Ethernet can be costly, prompting growing interest in technologies that support IP communication over existing Modbus/RS485 infrastructure—offering a cost-effective path to modernization.

UNIQUE VALUE PROPOSITION

Low-Cost Network Deployment

- Enables network construction at a low cost (e.g., 20% to 50% savings, depending on the environment).

System Upgrades Without New Wiring

- Enhances image quality for video intercom systems and improves air conditioning and energy management efficiency — all without requiring new wiring.