

Koolmesh BMS

MAKE EVERY ROOM VISIBLE

Designed for retrofit, refurbishment, integration and smart-building projects where room-level visibility, open system connection and practical deployment matter



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HYTRONIK
SENSORS & LIGHTING CONTROL

Koolmesh
— TAILOR MAKE YOUR SOLUTION

Smart Building Intelligence for Every Building
From a single room to a full estate



What Koolmesh BMS is

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What is Koolmesh BMS?

A room-level building intelligence and integration portfolio

It helps bring lighting-side data, occupancy sensing, IAQ monitoring, HVAC terminal control, energy visibility, gateways and supervisory platform functions into practical building operation.

Koolmesh BMS starts from Hytronik’s lighting-control foundation and extends into room-level building intelligence where the project requires it.



Lighting-Side Data



IAQ Monitoring



Energy Visibility



Occupancy Sensing



HVAC Terminal Control



Gateways and Supervisory Platform

Wireless-first, but wire-friendly. Where the project needs cable, it can also be cabled — same intelligence layer either way.

Koolmesh BMS is

A room-level intelligence and integration solution.

A way to bring lighting-side and room-level data into building operation.

A flexible route that can work with existing systems where integration is available.

A platform direction that can include sensing, HVAC terminal control, energy visibility and gateway integration.



Koolmesh BMS is NOT

A claim to replace every traditional BMS platform.

Only a lighting-control product.

A single fixed architecture for every project.

A guarantee that every building can be upgraded in the same way.



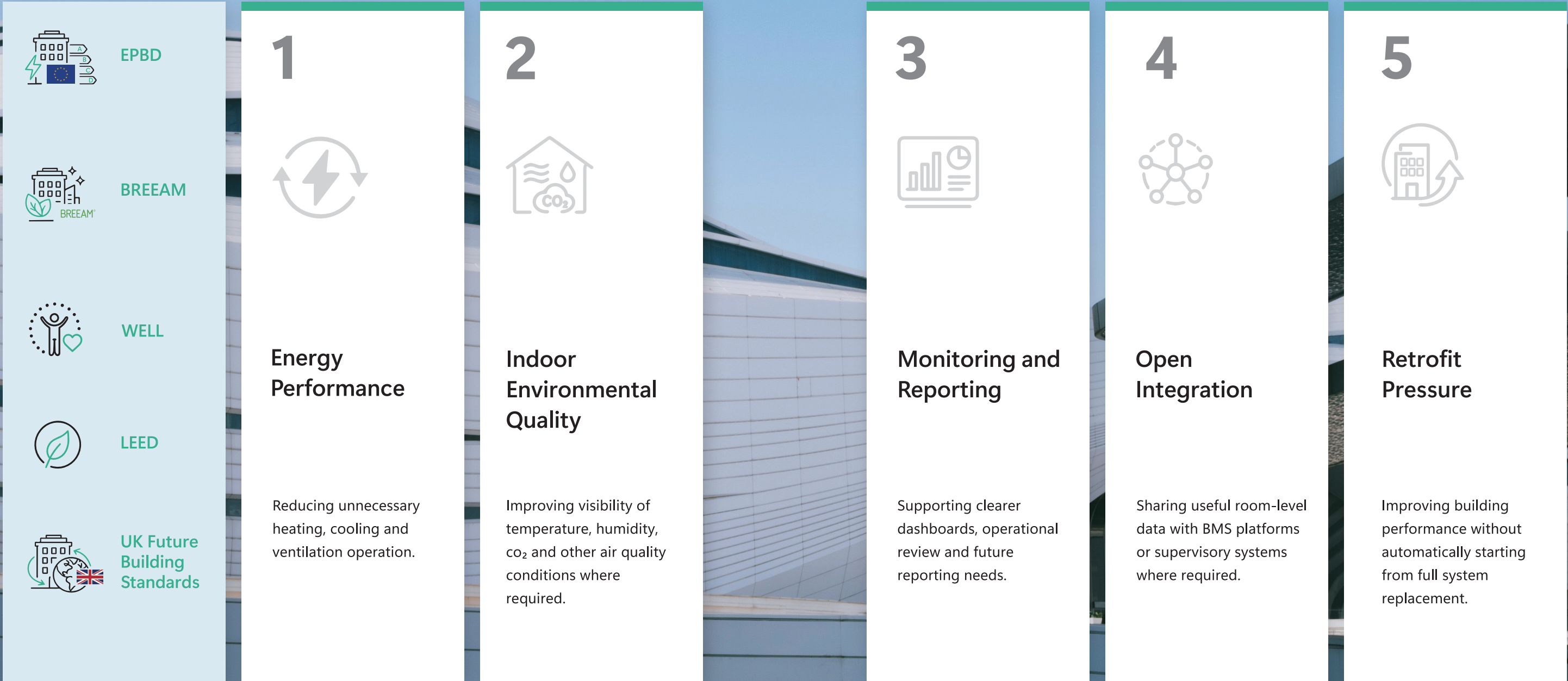
The exact project scope should be defined according to the existing building system, required data points, HVAC type, network access and integration requirements.

Project Drivers and Compliance Readiness



Building projects are increasingly being shaped by energy performance, indoor environmental quality, monitoring and reporting requirements.

Koolmesh BMS can help support these directions by improving room-level visibility, HVAC optimisation, sensing and open integration readiness.



i Final compliance requirements should always be reviewed project by project.

How Koolmesh BMS Connects the Building

Koolmesh BMS connects room-level information with building operation through three simple steps.



STEP 3

Supervise / Integrate

Support dashboards, logic, reporting and wider building operation.



FIN-based integration routes



- Existing BMS platforms
- Koolmesh BMS Platform
- FIN-based supervisory routes
- Support Multiple standard protocols: BACnet, MQTT, and Modbus
- Multi-protocol field-device routes



STEP 2

Connect

Bring room-level data into usable building-system formats.



BACnet / IP / MS / TP



Modbus RTU / TCP



Where available or required



STEP 1

Sense

Collect room-level information



Occupancy / presence



Daylight level



Energy consumption



Lighting status



HVAC terminal status



Temperature



Humidity



CO₂ / IAQ data



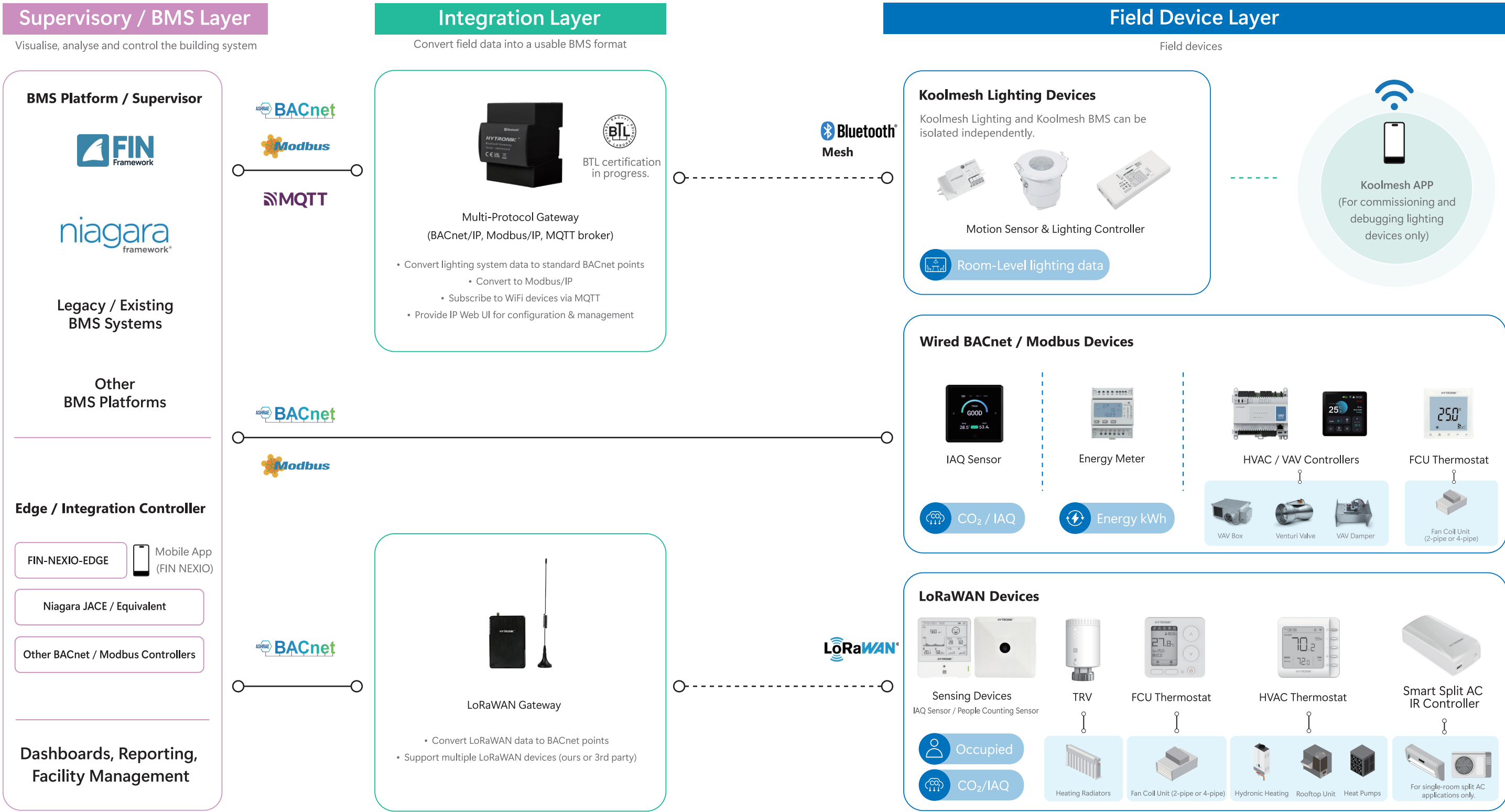
Device condition and alarms

Koolmesh BMS System Architecture

From Field Data to BMS Supervision

Koolmesh BMS is designed to fit into existing BMS projects without replacing the BMS platform or the customer's established workflow.

A typical project works across three layers:



Three Starting Points for Koolmesh BMS

Koolmesh BMS can start from different project needs. The suitable route depends on the building condition, existing system, customer role and project objective.

Best Fit by Project Type



Project Situation

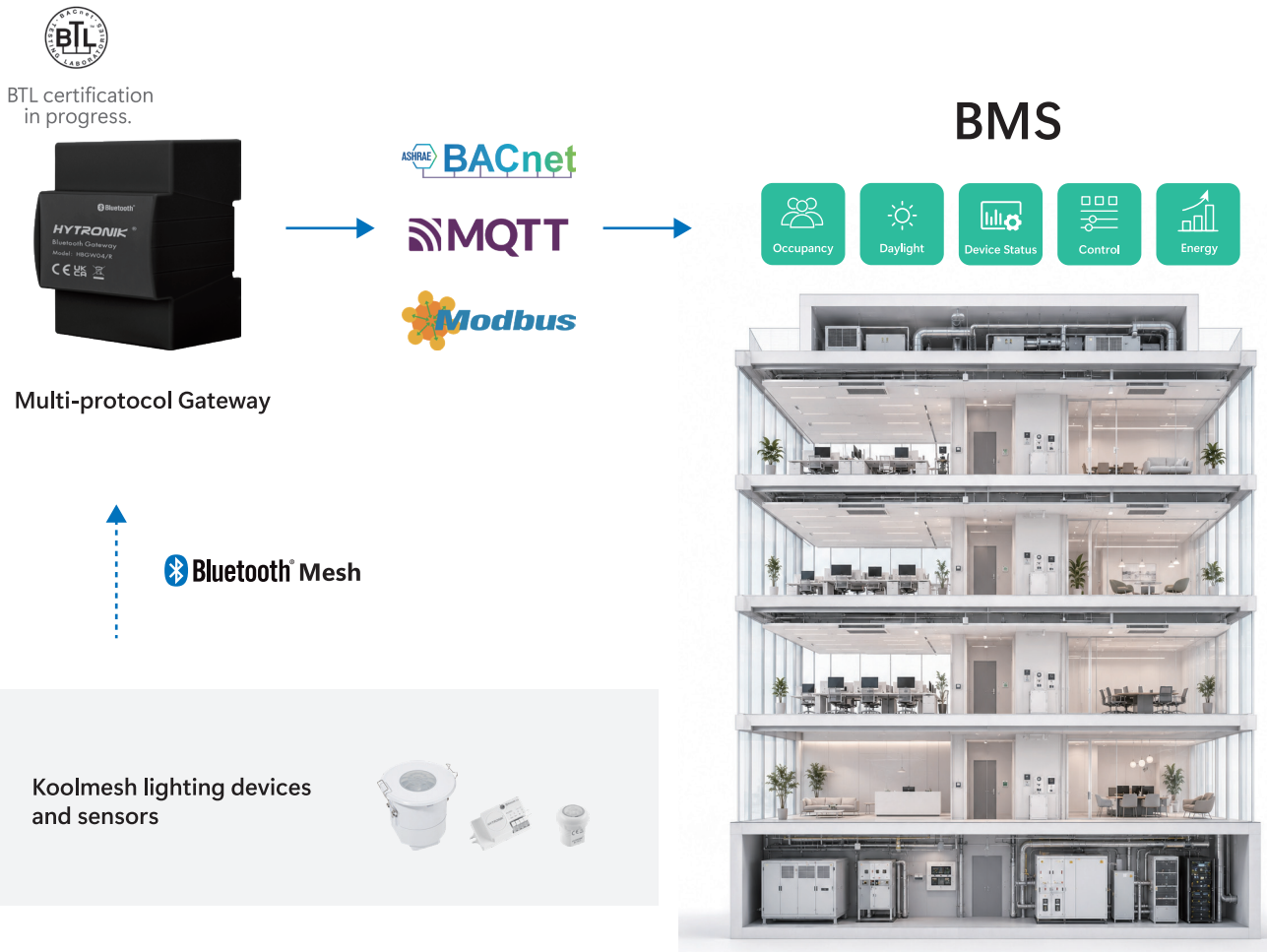
Recommended Route

Existing lighting project wants BMS visibility	➔	Path 1
Existing building needs wireless room-level HVAC / IAQ	➔	Path 2
Project needs dashboard, logic, reporting and multi-protocol integration	➔	Path 3
Existing BMS / SI already present	➔	Path 1 or Path 2, integrated into their platform
No BMS or small retrofit pilot	➔	Path 3

Path 1

Lighting Data to BMS

For projects where Koolmesh lighting-control and sensor data need to support BMS dashboards, reporting, and wider building operation, with integration to an existing BMS, a BMS platform, or the Koolmesh BMS Platform where required.



Best For

- 

Lighting-to-BMS integration
- 

Smart luminaire projects
- 

Occupancy visibility
- 

Building data projects
- 

Lighting partners entering smart-building applications



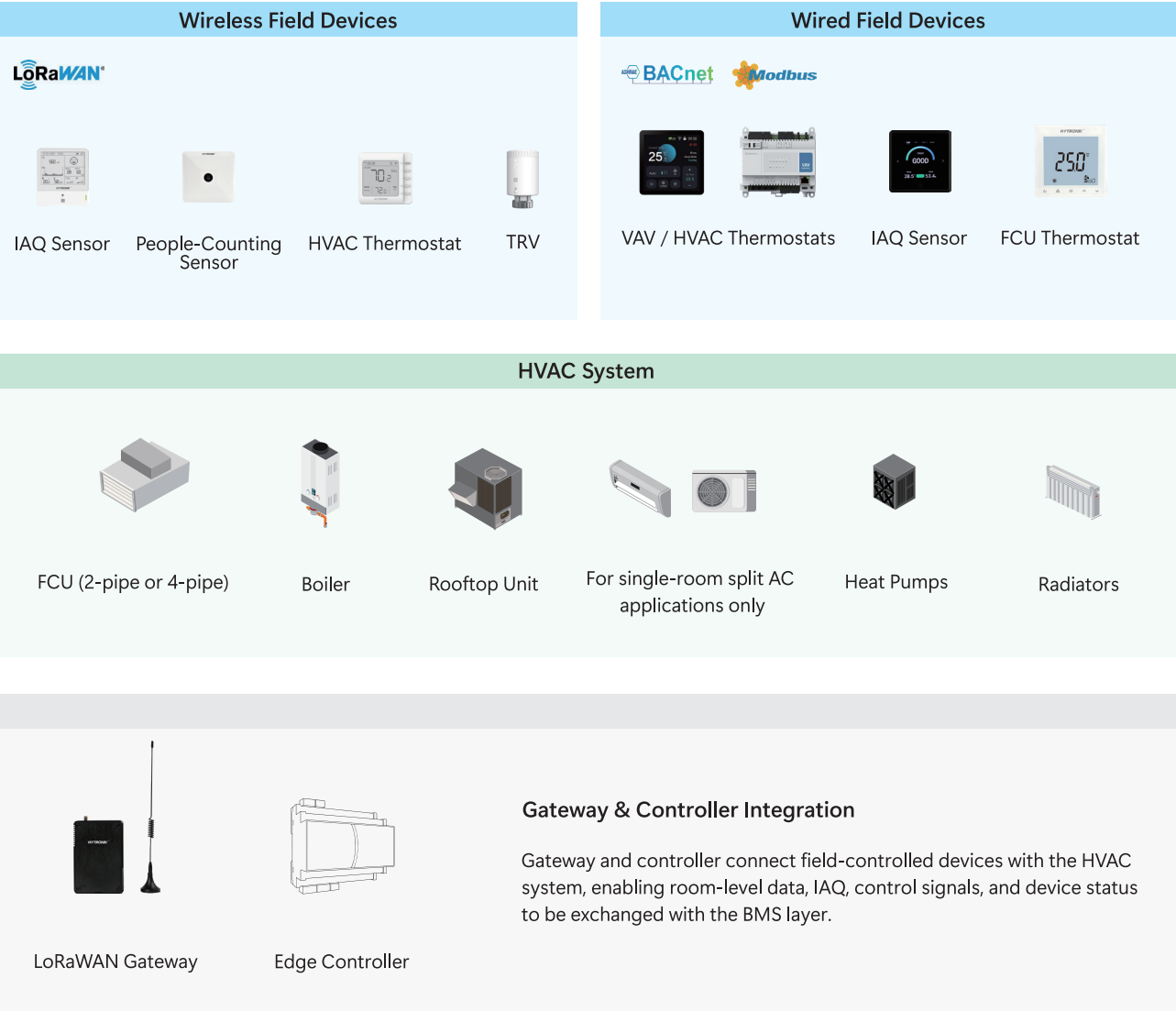
Customer Value

Lighting-control infrastructure becomes more than lighting. It becomes a room-level data source for wider building operation.

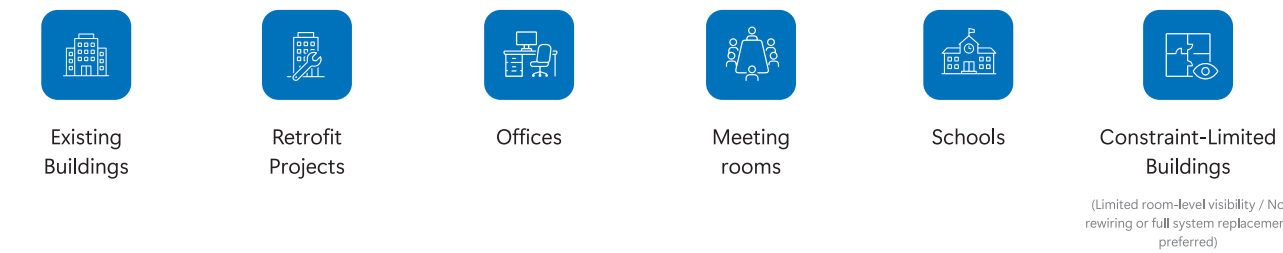
Path 2

Room-Level HVAC and IAQ

For buildings that need better room-level comfort, air quality visibility or HVAC terminal control.



Best For



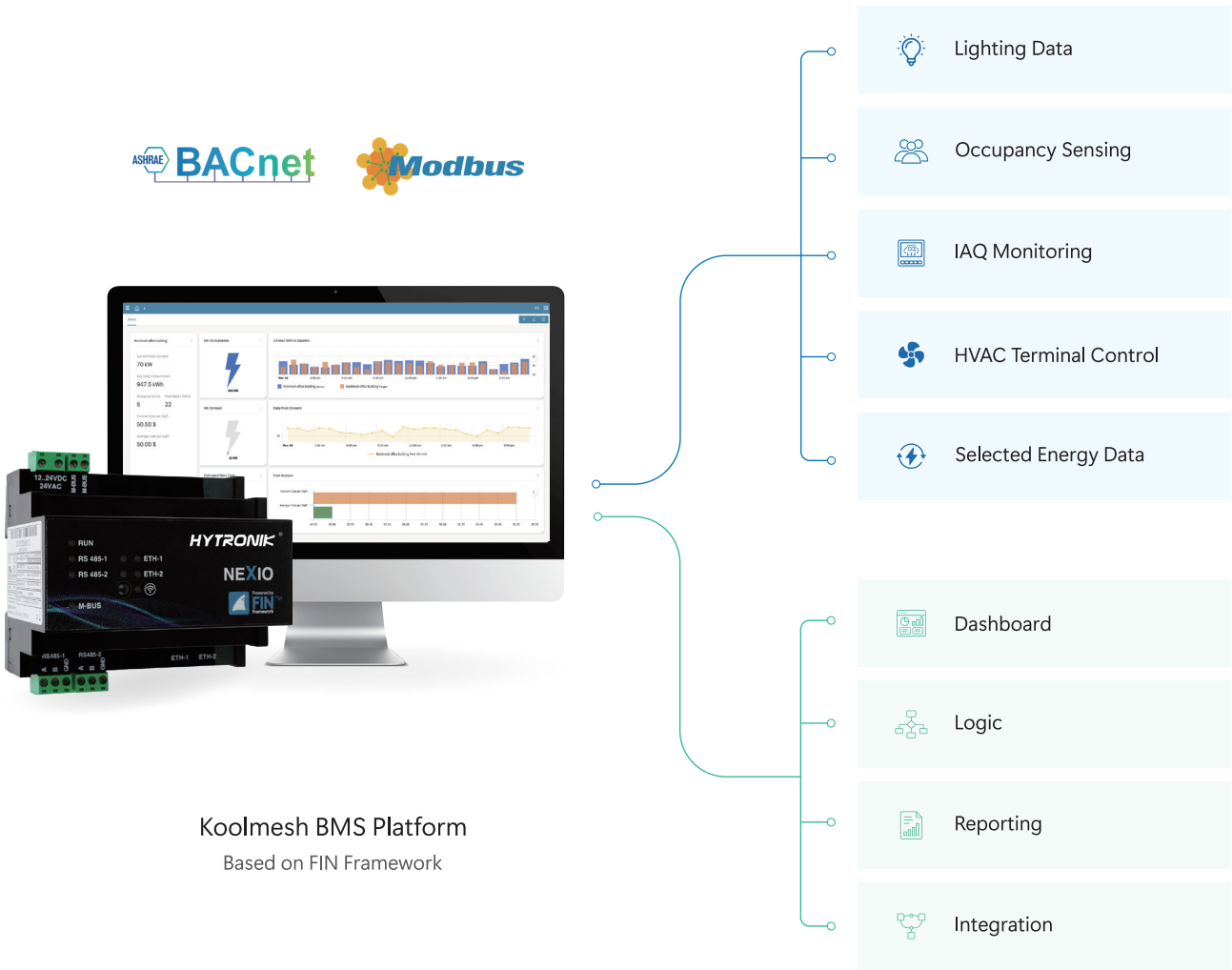
Customer Value

Buildings can gain room-level visibility and terminal control without replacing the existing BMS or central plant system.

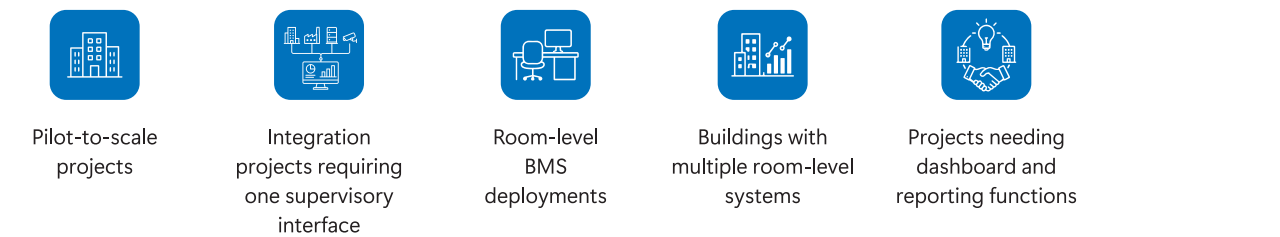
Path 3

Koolmesh BMS Platform

For projects that need dashboards, logic, reporting and multi-protocol integration.



Best For



Customer Value

Koolmesh BMS provides a practical supervisory layer for room-level building intelligence, supported by a proven software foundation

Koolmesh BMS Solution Portfolio

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Koolmesh BMS can be built from different product families depending on the required data, control function and integration route.

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Note:
The products shown in this brochure represent typical solution options and may vary depending on project requirements, system architecture, communication protocols, regional availability and certification status.
Final product selection, compatibility and system configuration must be reviewed and confirmed by the Koolmesh BMS team for each project. Please contact us to discuss your specific application and requirements.

6 - 1 - 1

Koolmesh Lighting-control Devices and Sensors

Integrate room-level lighting device data into the BMS.

A luminaire is no longer only a light source — with Koolmesh BMS gateway, it can become an active smart-building node.

Bluetooth® Mesh



Practical field-level data

- Occupancy
- Daylight
- Energy
- Device Status
- Control

Built-in / stand-alone installation

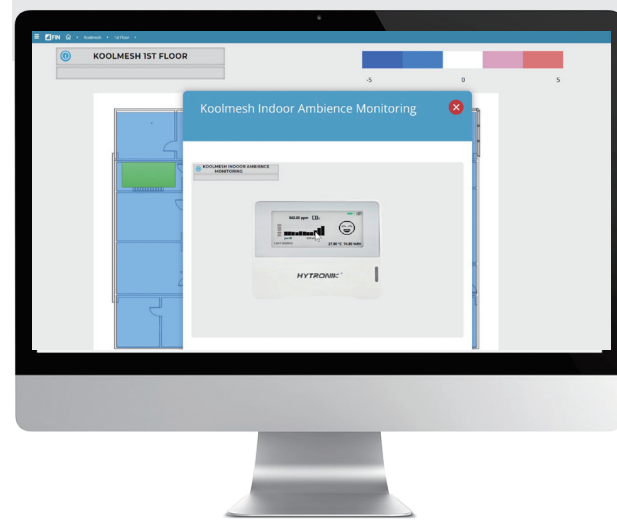
PIR / HF microwave presence

Compatible with lighting standards such as DALI / DALI-2

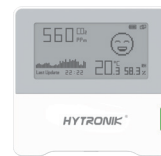
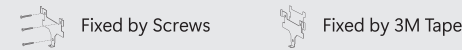
Bluetooth lighting-control nodes and sensor-ready control devices

Wireless IAQ Sensor

Ideal for retrofit IAQ monitoring without new wiring



Real-time IAQ Data Synchronization



3-in-1



6-in-1

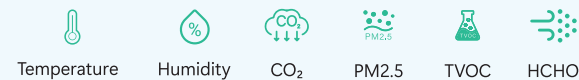
Wireless Transmission Mode: OTAA/ABP Class A

Room-level Air Quality Visualization

Integrated tri-color LED indicators and emoticon display provide clear real-time air quality status and CO₂ level feedback.



Essential IAQ Monitoring



Long Battery Life, No Wiring Required

3-in-1 version: up to 3 years
6-in-1 version: over 1 year

Simple Setup, Flexible Placement

- Easy NFC Configuration
- Adhesive mounting and no control wiring required

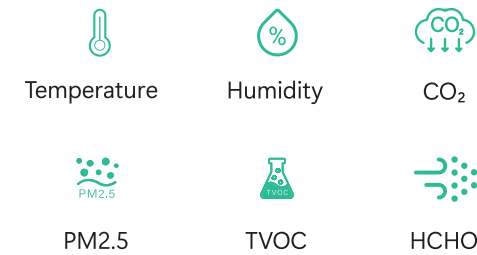


Wired IAQ Sensor

Ideal for new-build and BMS-integrated IAQ projects



Essential IAQ Monitoring



Power Supply: 24VAC/DC(0.1A)
Connected inside the flush-mounted back box

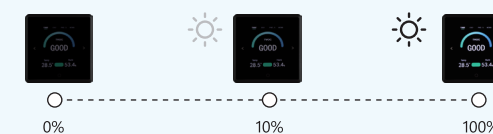
Color Alarm In Traffic Light

Display indoor air quality and let you know your surroundings air quality at one glance.



Smart Backlight

Automatically adjusts screen brightness according to ambient light conditions.



Smart Linked

Standard linear output signals (4-20mA/0-10V/passive) are used to connect the HVAC intelligent control system, thereby improving indoor air quality.

People Counting Sensor

Accurate and Anonymous People Counting by AI & ToF Technology



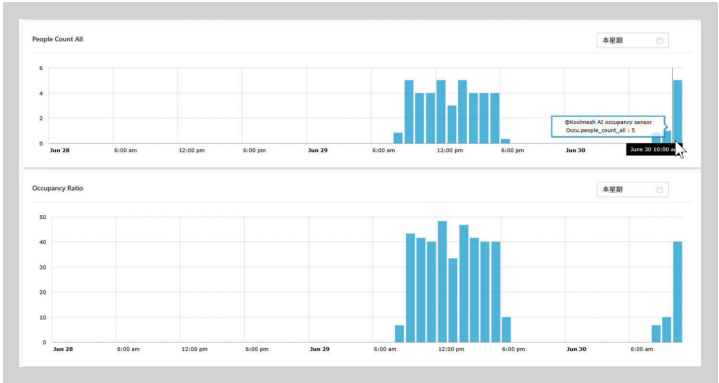
Wireless Transmission Mode: OTAA/ABPClassC

			
	AI	AI & 2 nd Gen ToF	AI & 2 nd Gen ToF
Field of View:	190° Horizontal, 112° Vertical	98 ° Horizontal, 80 ° Vertical	98° Horizontal, 80° Vertical (Standard Version) 60° Horizontal, 45° Vertical (High-bay Version)
Installation Height:	2.3m to 4m	2.5m to 3.5m	2.5m to 3.5m (Standard Version) 3.5m to 6.5m (High-bay Version)
Detection Area:	2.6m×8.6m to 6.8m×18.8m	1.84m×1.34m to 4.14m×3.02m	1.84m×1.34m to 4.14m×3.02m (Standard Version) 2.08m×1.49m to 5.54m×3.98m (High-bay Version)

Surface mounting



Occupancy Analytics Visualization



Basic Functionality

- Bi-Directional People Counting
- Regional People Counting
- Dwell Time Detection
- Multi-Zone Occupancy Detection (AI Version)

Superior Recognition And People Counting

3D Sensing / ToF (Time-of-Flight) / On-Board AI Algorithm

Privacy-focused design



No imaging or identity data retained on the device

Convert Numbers Into Decision-making Insights

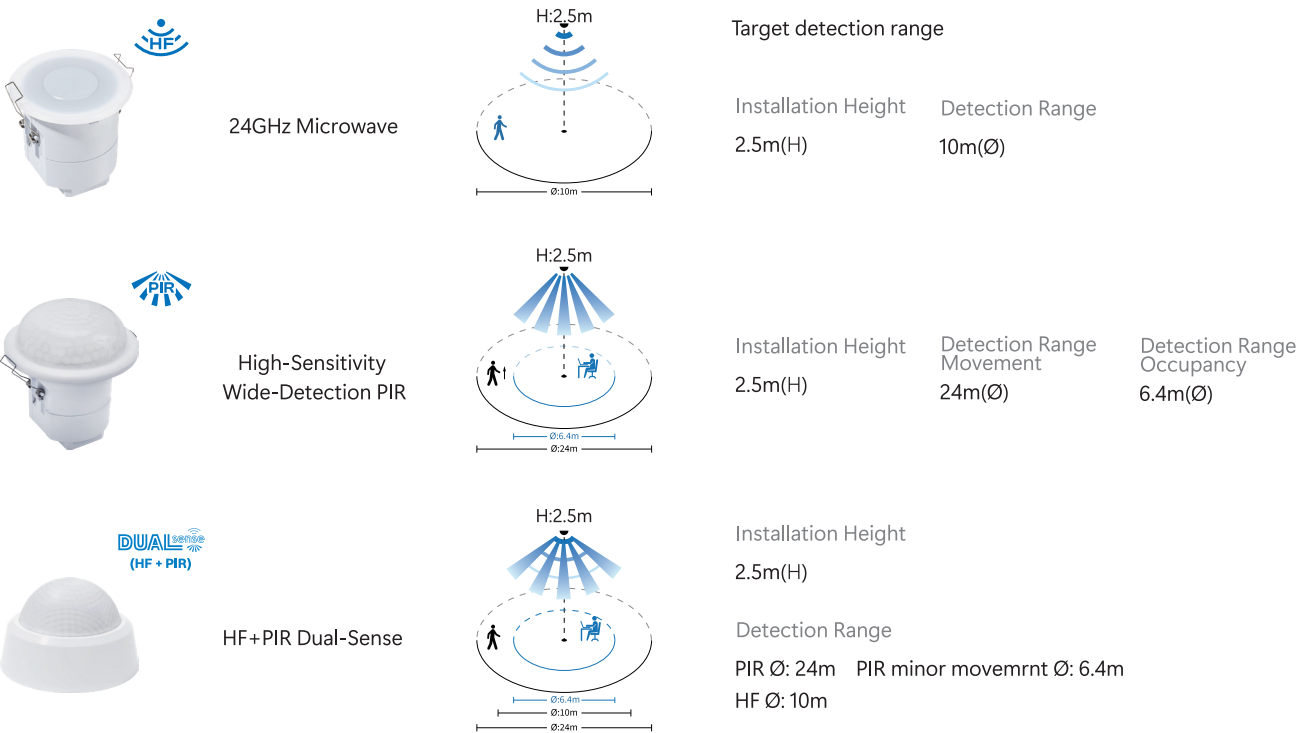
People Flow Analytics, Customer Flow Analytics, HVAC System Management

Occupancy Sensor (Roadmap 2027)



Control-oriented Room Presence Detection

Ceiling / Surface Mounting



Presence Detection

Detects room occupancy status for reliable control decisions.

Stable Control Signal

Provides consistent trigger output for HVAC and lighting systems.

Privacy-First Design

No imaging or identity tracking, fully suitable for GDPR environments.

LoRaWAN Connectivity

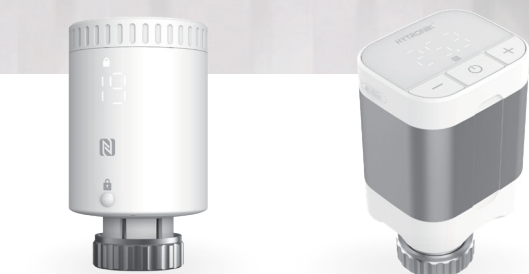
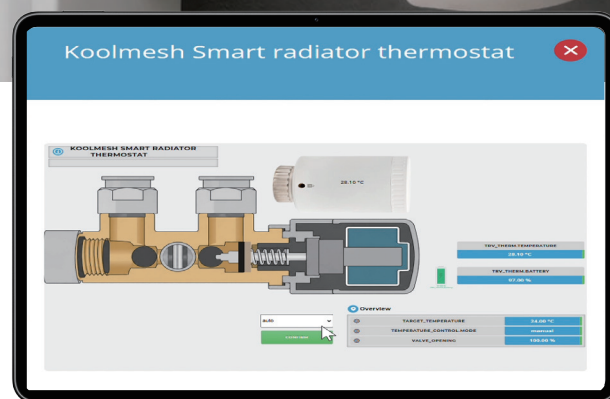
Enables long-range, low-power deployment across large buildings.

6-1-3

TRV

Slash Heating Consumption by **30%**

Smart radiator control for comfort, efficiency and protection.



Replaceable Batteries

Self-powered or USB-C port

Wireless Transmission Mode: OTAA/ABP, Class A

Wireless Transmission Mode: OTAA/ABP, Class A/Class B

Real-time Device Status Visualization

Key Features



Flexible LED Display Direction



Up to 16 Heating Plans



Open-Window Detection



Freeze Protection



Easy Configuration via NFC



Built-in Temperature Sensor



Resolution: 0.1°C



Accuracy: $\pm 0.5^{\circ}\text{C}$ (0°C – 50°C)



Supports calibration via external button

Optional valve adapters



M28 (Comap, Herz, TA)



Giacomini



Danfoss RA



Danfoss RAVL



Danfoss RAV

Data Sources & Field Devices



HVAC Thermostat

Long-range, secure and flexible HVAC control



Wireless Transmission Mode: OTAA/ABP Class C

Easy Installation

Low-Voltage Back Box

Fits standard low-voltage wall boxes for clean installation.

Power Supply: 24 VAC
Suitable for the North American



Long Range Communications

2 km in Urban Areas
15 km in Rural Areas



Secure Data Transmission



Easy Configuration via NFC



Up to 16 Time Slots



Up to 1,000 records of data store capacity



64 Unique Rules



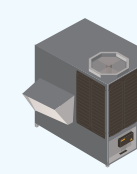
Optional Back Plate

Covers wall openings for a neater finish.

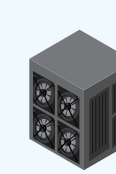
Applications



Hydronic Heating



Rooftop Unit



Heat Pumps



Temperature Threshold Alert



Constant Low-Temperature Warning



Temperature Threshold Alert



Constant High-Temperature Warning

FCU Thermostat

Local Temperature Control for Fan Coil Applications

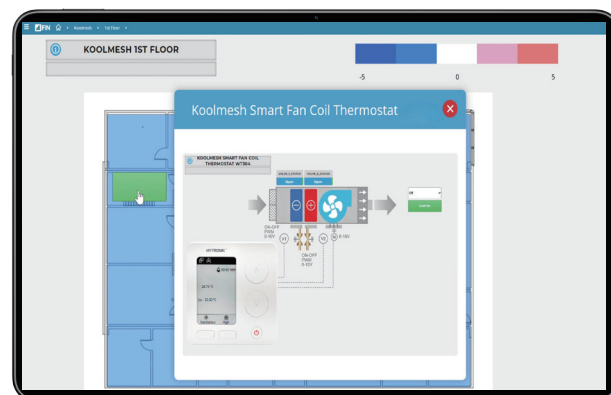


Wide System Compatibility

- 2-Pipe & 4-Pipe Systems
- 2/3-Wire On/Off Valve
- 0-10V Valve
- AC / EC Fan

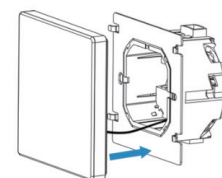
Key Features

- Working Modes**
Heat / Cool / Ventilation / Auto / ECO
- Schedule**
8 custom schedules
each allowing up to 16 execution times
- Freeze Protection**
- Manual Temperature Adjustment**
- Area Control**
Group control for multiple rooms
- Optional Accessory**
External NTC Sensor
- Easy Configuration via NFC / WIFI**



Real-time Device Status Visualization

Easy Installation:



Connected inside the
flush-mounted back box

Power Supply:
100 ~ 240VAC, 50 ~ 60Hz



Wired FCU Thermostat

Ideal for new-build and BMS-integrated FCU control applications



System Compatibility

2-pipe and 4-pipe fan coil systems

Key Features

- HVAC Control**
 - 3-speed fan control
 - (High / Medium / Low)
 - Heating and cooling valve control
- Manual Control**
 - Adjust temperature manually
 - Set fan speed
 - Select operating mode
- Integration**
 - External temperature sensor support
 - Room card input support

Installation

Mounted in a standard 86 wall box

Power Supply:
Input Voltage 100~240 VAC, 50/60 Hz



6-1-3

Smart Split AC IR Controller

Wireless retrofit control for
split AC units and heat pumps



Power Supply: 5VDC/1A via Type-C Port

Wireless Transmission Mode:
OTAA/ABP Class B, Class C

Key Features



Wireless IR Retrofit

No control cabling
required



IR Code Library+Learning

Works with major
AC brands



Smart Monitoring

Built-in sensor +
external sensor
inputs



Local Rules

AC on/off
schedules and
temperature
adjustment



Real-Time Alerts

Detect sudden
temperature
changes

Applications



Wall-mounted AC Indoor Units



Ceiling Cassette Indoor Units

For split AC units and compatible infrared-controlled indoor units.

Data Sources & Field Devices

VAV Control Solution

Controller + Panel working together for local VAV control and airflow management



Office VAV Application

For VAV boxes, dampers
and 0-10V actuators



HVAC / VAV Controller

- BACnet MS/TP & Modbus RTU (RS-485)
- 24VDC power supply
- VAV control
- 0-10V actuator airflow and fan speed control
- Project-defined VAV / valve control logic



VAV Panel

- BACnet MS/TP & Modbus RTU (RS-485)
- 24VDC power supply
- IAQ monitoring and local VAV control
- Local VAV interface
- Local setpoint and mode adjustment

How They Work Together



VAV Panel

Send commands /
display data
BACnet MS/TP /
Modbus RTU
(RS-485)



HVAC / VAV Controller

Control airflow /
valves / actuators



VAV Boxes / Dampers /
0-10V Actuators

Local control
interface

Independent controller &
actuator, compatible
with 0-10V motors

Lower cost,
flexible sourcing,
quick replacement

Basic electrical
compatibility check
required

Three-phase DIN-rail Energy Meter

Selected electricity metering and energy data collection for BMS integration and energy visibility.



A compact DIN-rail energy meter for three-phase electricity monitoring and data collection. It supports Modbus-based integration into BMS and FIN energy dashboards for energy visibility, reporting readiness, and consumption review.

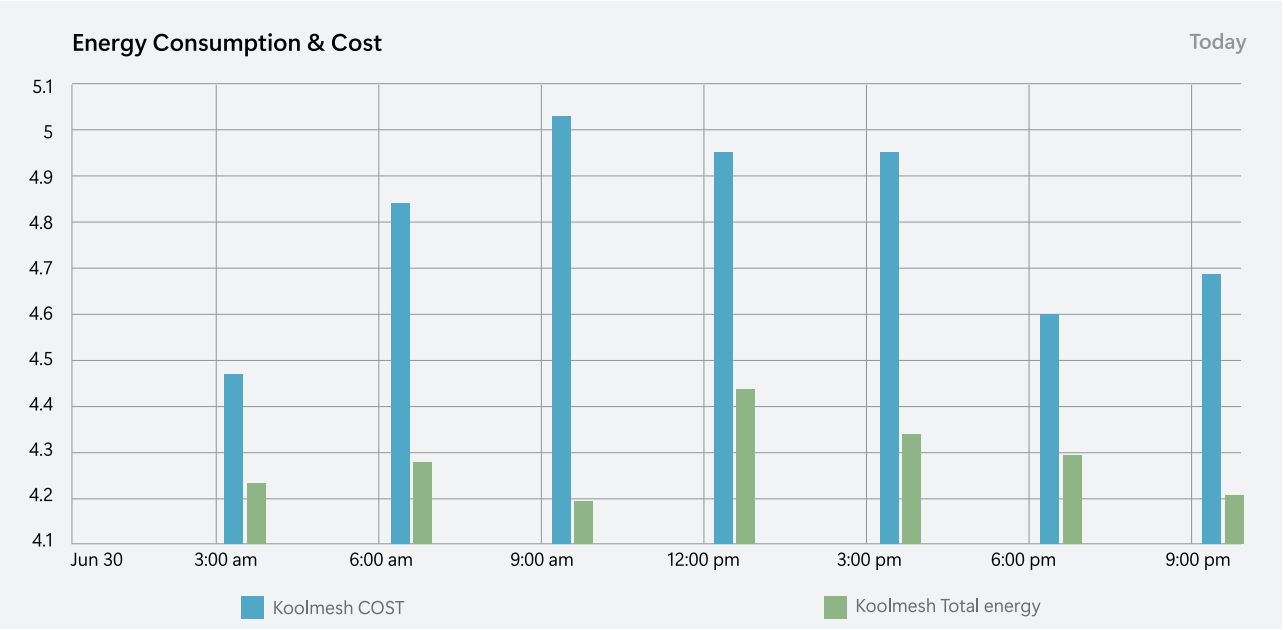
Data transmission path



Main Functions

- **EU-compliant Design**
Designed for EU compliance.
MID certified (Class 0.5)
 - **High Accuracy**
Ensures reliable energy data.
- **Bi-directional Metering**
Monitors import and export energy.
 - **Demand Analysis**
Monitors peak power demand.
- **Flexible Connection**
Supports direct and CT connection.
 - **Tariff & Data History**
Supports tariff plans and historical data.

24-hour Energy Monitoring



Key Electrical Parameters

Parameter	Specification
Current range	0.01–1(6)A (CT input), 0.1–10(80)A / 0.1–10(100)A (Direct input)
Power input	3×230/400V
Accuracy	Class 0.5 measurement
Measured values	U, I, P, Q, S, PF, F
Energy data	Active and reactive kWh, import and export
Harmonics	2nd–31st voltage and current harmonics
Display / setup	LCD display with backlight, 3-key parameter setup
Pulse output	Active pulse output

Optional Accessory: Split core current transformers



- **Split-Core Retrofit Design**- Easy installation without disconnecting existing cables.
- **Wide Current Range**- Multiple apertures options support 150A–1000A current monitoring.
- **High Measurement Accuracy**- Class 0.5 accuracy ensures reliable power monitoring.
- **Safe & Durable Construction**- Flame-retardant housing with reliable 720V AC performance.

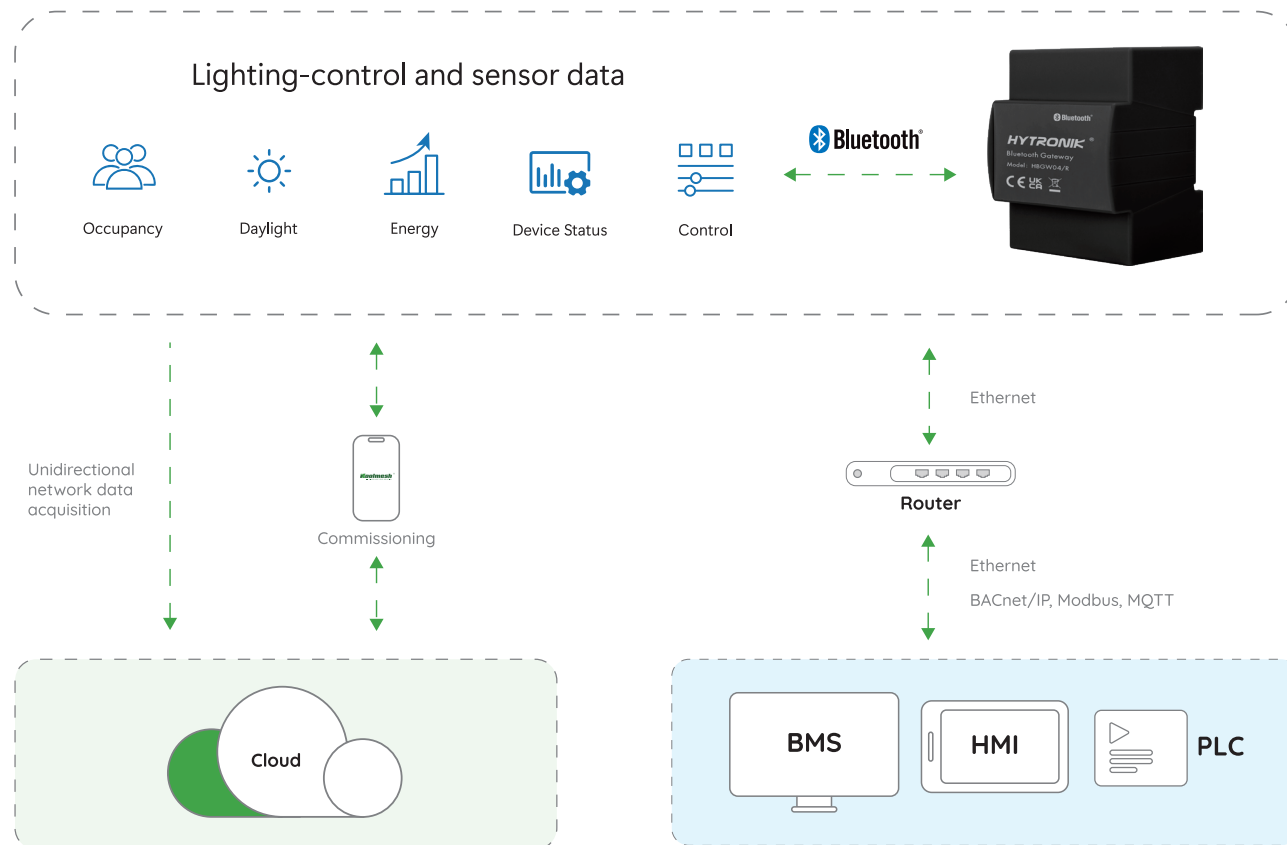


Installation Standard DIN-rail (DIN 35 mm)

Bluetooth to Multi-Protocol BMS Route



Koolmesh Bluetooth-to-BMS gateway integration, make your lighting network BMS-ready.



Installation: • Standard DIN-rail (DIN 35 mm)

Technical Specifications

- Power supply: 5VDC / 3A
- Power Supply Port: USB Type-C

Main Functions

- Supports multiple standard protocols including BACnet, MQTT, and Modbus
- Enables lighting systems to become fully BMS-ready and interoperable
- Supports real-time data transmission from field devices to BMS platforms
- Built-in IP Web UI for configuration, monitoring, and remote management

LoRaWAN Wireless Device Route



Provide a practical retrofit route for legacy buildings or projects with wiring constraints.

Technical Specifications:

Connectivity Options:

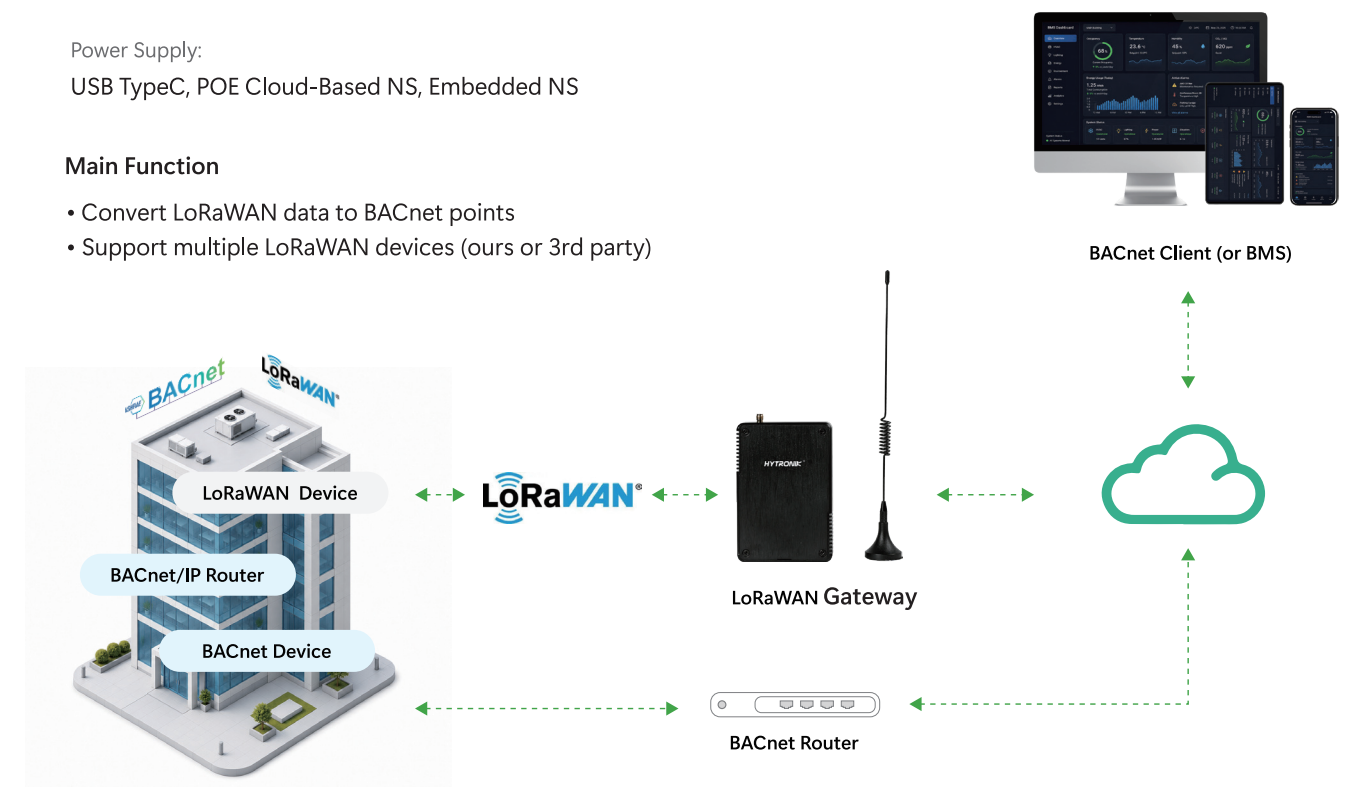
Ethernet Wi-Fi Cellular

Power Supply:

USB TypeC, POE Cloud-Based NS, Embedded NS

Main Function

- Convert LoRaWAN data to BACnet points
- Support multiple LoRaWAN devices (ours or 3rd party)



Wall / Cabinet Mounting: Bracket installation.

Desktop Mounting: Flat surface placement.

Why LoRaWAN

LoRaWAN® is a long range, wide area, and low-power networking protocol.

Wide coverage

Low power consumption

High capacity

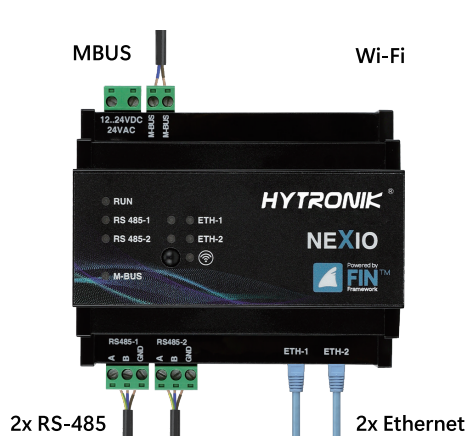
Enhanced Security

FIN-based Supervisory Route

A ready-to-use building control system built for real project delivery



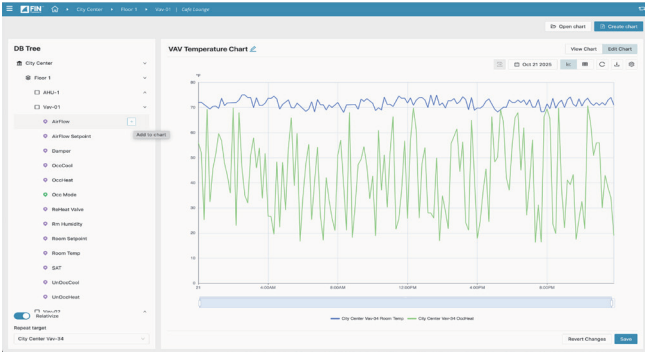
Support fuller Koolmesh BMS deployments, pilot-to-scale projects and wider building integration.



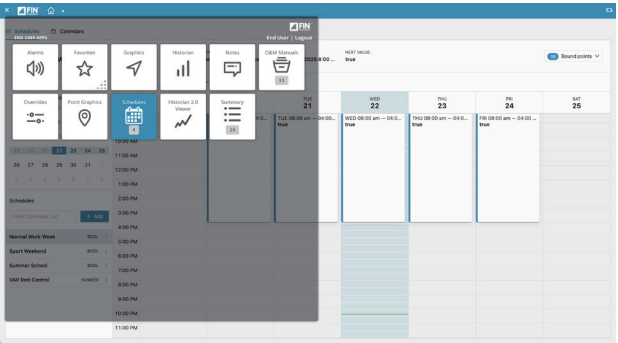
- Multi-Protocol Integration**
Supports BACnet MS/TP & IP, Modbus RTU & IP, M-Bus and more.
- Hotspot WiFi Configuration**
Built-in hotspot WiFi enables quick local configuration and commissioning.
- Flexible IO Expansion**
Supports multiple IO expansion modules for analog outputs, universal inputs, digital outputs and resistive sensors.
- DIN-Rail Mounting**
Designed for easy installation inside electrical panels or control cabinets.
- Flexible Power Supply**
Operates with 12–24V DC/AC power input for wider installation compatibility.



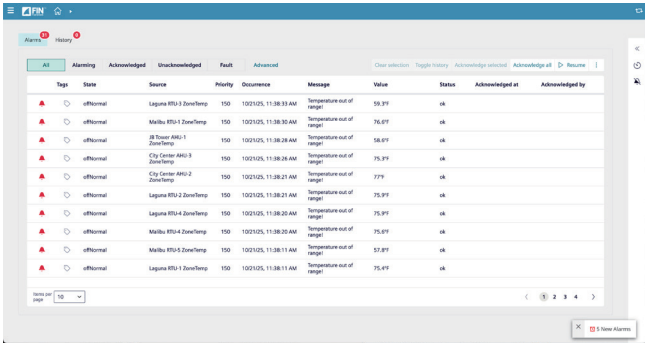
Data Tracking and Analysis



24-hour View Support



Schedule



Alarm

Why Choose Hytronik Edge Controller?

The same FIN5 engine, enhanced with Koolmesh integration and Hytronik project support.

Proven FIN5 Engine
Reliable software foundation for BMS integration and control.

Pre-Integrated Controller
Designed for Koolmesh BMS, not supplied as a bare platform.

Wireless Device Access
Connects Koolmesh wireless sensors, gateways and room devices.

Easier Commissioning
Simplifies setup, mapping and handover.

One Supplier Support
Hardware, field devices and integration guidance from Hytronik.

Lower Project Cost
Reduces engineering time and whole-life cost.

Visualize

Analyze

Integrate

Connect

Manage

Control

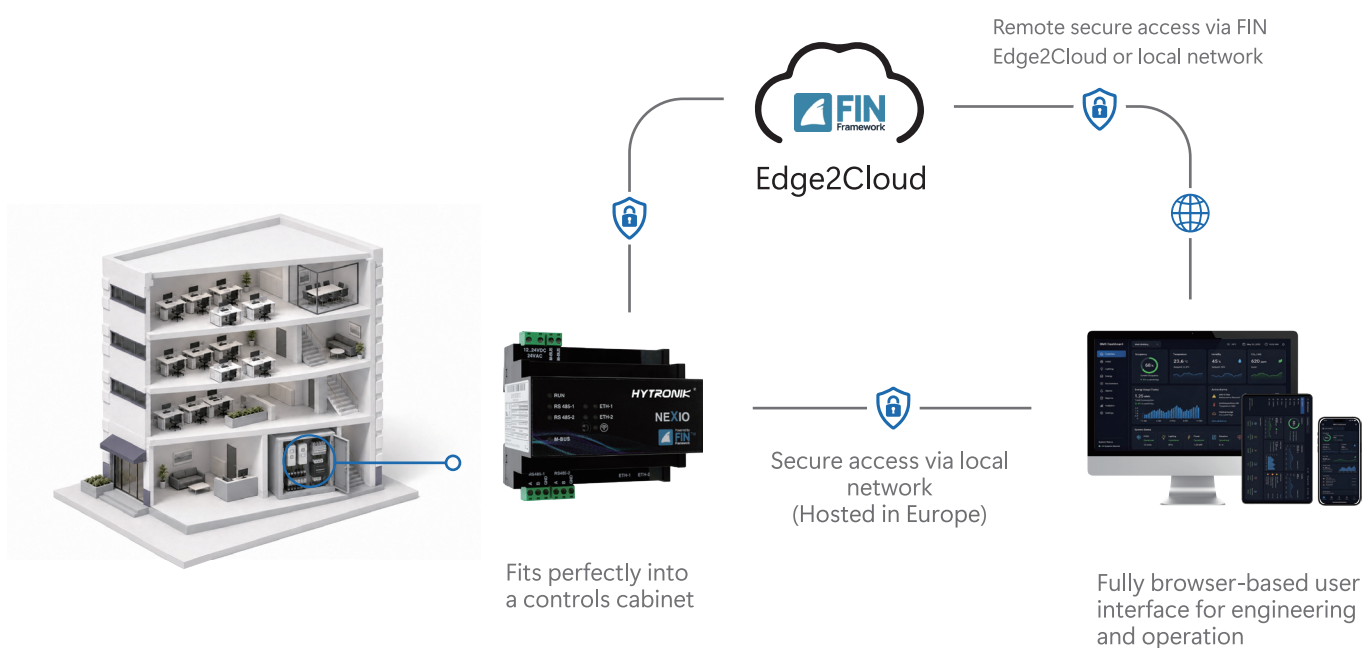
Embedded Software / Edge Controller Options

Embedded Points	Historical Points	Use Case & Scale	Data & Analytics	Integration Complexity
500-point software	100 historical points	Small project / single floor / demo / small office	Basic real-time control	Single system logic (e.g. lighting or simple HVAC)
1000-point software	200 historical points	Medium building / multi-zone office / light commercial	Control + basic analytics	Multi-system coordination (lighting + HVAC + IAQ)
2000-point software	400 historical points	Large building / multi-floor / full BMS integration	Full data set + cross-system analytics	Full building intelligence (energy + fault + optimization + API)

Point packages are scalable and upgradeable. System capacity, historical capacity, cloud services and analytics can be expanded anytime based on project requirements.

Secure Access. Operational Support.

FIN-based Engineering & Operation



SECURE REMOTE ACCESS

FIN Edge2Cloud — EU-based

Secure remote access via FIN Edge2Cloud, EU-based. Koolmesh BMS stays the lead brand; FIN is the engine underneath.



Secure Access. Operational Support.

What if the gateway or cloud goes down?

Control is executed at terminal level.

Mesh distributes intelligence across nodes, while LoRaWAN embeds it in each device.

Gateway loss only affects supervision and remote visibility, not local operation.



Bluetooth Mesh · Koolmesh native

Mesh topology, logic at the edge. Local lighting control and scenes **keep working** if the gateway or cloud fails — intelligence is distributed across the mesh. No gateway dependency for local control.



LoRaWAN layer

Star topology — devices talk to their gateway, not each other. If the LoRaWAN gateway fails, those devices lose communication. **Gateway-dependent** — handle per project design

"No BMS or cloud outage turns into a lighting outage."

“ For corporate BMS projects, security is a mandatory question. A concrete, specific answer builds credibility with the technical buyer. ”

Encrypted Channels

Encrypted Communication And Secure Device Commissioning Across Every Layer.

Role-based Access

Distinct Operator / Integrator / Admin Roles With Scoped Permissions.



Signed Firmware & OTA

Signed Firmware And Controlled Over-the-air Updates Only.

Network Segmentation

Segmentation Between Field, Integration And Supervisory Layers.

Example Control Scenarios

Multi-device inputs are translated into automated control logic that drives HVAC response and building-level outcomes.



Intelligent Occupancy-Driven HVAC Control

Use people-counting data and occupancy ratio to support fresh-air start-up timing, ventilation demand, heating response or AC fan-speed adjustment.



People-Counting Sensor

IAQ Sensor

HVAC Terminal Control Devices

Presence > 30s



Temp > 26°C

Cooling Mode ON

> 8 people



Temp > 26°C

Start immediately

4-8 people



Temp > 26°C

Start after 5 min

< 4 people



Temp > 26°C

Start after 10 min

Presence



Temperature drops to 25°C

Reduce Fan Speed

No occupancy > 5 min

/

System OFF



CO₂ Monitoring and Ventilation Alert

Use CO₂, temperature, humidity, PM2.5, TVOC or other IAQ data to trigger alarms, ventilation actions or operator notifications.



People-Counting Sensor

IAQ Sensor

BMS Platform

Presence



CO₂ > 1000 ppm



Alarm/FAU Control
Display in Koolmesh Cloud
Send Notification to Facility Manager (FM)



Energy Monitoring & Optimisation Support

Use metering data to support energy dashboards, consumption review, savings analysis and optimisation strategies.



Energy Monitoring

BMS Platform

Energy Dashboard



Room-Level Automation and O&M Supervision

Combine device status, alarms, setpoints and operating data for monitoring, diagnostics and basic O&M supervision.

Field Devices data



Occupancy



Daylight



Energy



Device Status



Control



Air quality



BMS Platform



Dashboard



Logic



Reporting



Alert



Integration

Clear Priorities, Predictable Control

When everything acts on one room, who wins?

Operator Override

Time-limited manual control

ALWAYS WINS Level 1

Schedule

Calendar / operating hours

Level 2 ↑

IAQ & CO₂

Air-quality Alert & Environmental Monitoring

Level 3 ↑

Occupancy

Presence Detection

Level 4 ↑

Local user

Panel/App adjust

Level 5 ↑

Example

A CO₂ alert (level 3) opens ventilation even if the schedule (level 2) says it is outside hours. Operator override (level 1) always wins. The hierarchy is adjustable per project — Koolmesh resolves the conflict automatically.

Note: Control logic and priority levels can be configured according to project requirements and BMS strategy.

Service, Warranty & Support Scope

Included Services

Item	Indicative Price	Scope
Product Warranty	Included	5-year hardware warranty
		
Remote Support	Included	Online troubleshooting & technical guidance
		
Pre-sales Review	Included	Solution design & integration advisory
		
Documentation	Included	Datasheets, wiring & integration notes
		

Optional & Paid Services

Item	Indicative Price	Scope
Site Survey & Design	£750–£1,500 / site £650–£950 / day	Site survey, point schedule, system design
Deployment & Commissioning	12–18% hardware value £750–£950 / engineer-day	Installation support & commissioning
On-site Diagnosis	Quotation-based	Local troubleshooting visit
Cloud Monitoring	£0.40–£0.60 / point / month	Remote monitoring, alarms & dashboards
Analytics & Reporting	£0.65–£0.90 / point / month £6,000–£12,000 / year	Energy analytics & compliance reporting
Annual Maintenance	10–15% installed value / year	System health check & support
Custom Integration	Project-based	BACnet / Modbus / MQTT / API integration

Note:
All prices and service scopes are indicative only and subject to project-specific confirmation. Indicative prices, year 2026, in £, subject to review and adjustment by project scope, market and country.

Getting Started

Every building and project starts from a different point.

Hytronik can help review the building condition, required data, control needs and integration route before recommending the most suitable starting point.

Step		What to Confirm
1	Identify the building condition	New build, existing building, no BMS, accessible BMS, locked legacy system or retrofit project.
2	Define the required data and control functions	Occupancy, daylight, lighting status, IAQ, HVAC terminal control, energy data, reporting or dashboard needs.
3	Review existing systems and access	BMS platform, HVAC system type, network access, available protocols and site constraints.
4	Select the suitable device and integration path	Bluetooth to multi-protocol BMS path, LoRaWAN, wired field-device path, FIN-based supervisory path or other suitable path.
5	Start with a demo or pilot project	Use a focused area to validate the concept, data points, installation method and integration requirements.
6	Expand where justified	Scale to more rooms, floors, buildings or supervisory functions when the project case is clear.

Next step



Contact Hytronik to review the project type, existing system, required data points and suitable starting route.



Scan to explore the complete Koolmesh BMS solution.