Wireless Smart Building Systems

EnOcean®-based sensor and edge architectures

SENSOR	RECEIVER	EDGE CONTROLLER	CLOUD
EnOcean Wireless Sensor	EnoDisc® / Access Point	VL-700 BASE	MQTT / Cloud Platform

Smart Building • Indoor Air Quality • Energy Monitoring • Edge Intelligence

ARCHITECTURE OVERVIEW

01 SYSTEM ARCHITECTURE

Wireless sensor networks and scalable edge infrastructure

p. 4-12

02 INFRASTRUCTURE & CONTROL

Edge controller, receivers and system integration

p. 13-20

03 SENSOR PORTFOLIO

People, air quality, environmental and energy monitoring

p. 21-46

04 SOLUTIONS

Application-driven system configurations

p. 47-52

05 SERVICE & SUPPORT

Planning, commissioning and lifecycle support

p. 53-56

Buildings are becoming **data-driven systems.**

Sensors no longer measure isolated values.
They form intelligent networks that enable transparency, efficiency and control.

Wireless sensor infrastructures reduce complexity in modern buildings.

Edge intelligence ensures local processing, reliability and security.

Scalable cloud integration enables system-wide insight and long-term optimization.

SYSTEM PRINCIPLES

WIRELESS

Cable-free sensor networks based on energy harvesting and EnOcean® radio standards.

Low installation effort.
Minimal maintenance.
Flexible retrofitting.

EDGE INTELLIGENCE

Local data processing ensures reliable operation and reduced latency.

Autonomous decision-making.
Secure system architecture.
Scalable control layers.

SCALABLE CLOUD

Cloud connectivity enables centralized monitoring and long-term optimization.

Cross-site analytics.
API-based integration.
Future-ready system expansion.

SYSTEM ARCHITECTURE

SENSOR CLUSTER	RECEIVER LAYER	EDGE	CLOUD
People	EnoDisc®	VL-700 BASE	Cloud Platform
Indoor Air Quality	aruba Access Point		
Energy Monitoring			

01 SYSTEM ARCHITECTURE

SENSOR LAYER

People
Indoor Air Quality
Energy
Occupancy

RECEIVER LAYER

EnoDisc®
Access Point

EDGE CONTROLLER

VL-700 BASE

MQTT INTERFACE

Standard MQTT
Communication

CLOUD & INTEGRATION

Cloud Platform
Building Management
Systems (BMS)
Energy Management
3rd Party Analytics

Designed for long-term building intelligence.

An integrated architecture that connects sensing, processing and cloud integration into one scalable system.

01

Reduced complexity

Wireless sensors eliminate cabling and simplify retrofitting.
A structured receiver and edge layer ensures controlled data flow and system clarity.

02

Reliable local control

Edge processing guarantees fast response times,
operational stability and secure decision-making.

03

Open integration

Standard MQTT communication enables seamless integration into BMS, energy platforms and analytics systems.

02 INFRASTRUCTURE & CONTROL

Receiver architecture, edge intelligence and secure system integration form the operational core of smart buildings.

Wireless sensing creates data.
Infrastructure turns data into controlled intelligence.

Through structured receiver layers, powerful edge controllers and standardized MQTT communication, **our systems ensure stability, security and long-term scalability.**

Control Architecture

RECEIVER LAYER	EDGE CONTROLLER	MQTT INTERFACE	CLOUD
EnoDisc® Access Point	VL-700 BASE	Standard MQTT Communication	Cloud Platform BMS Energy Management 3rd Party Systems

The infrastructure layer aggregates, processes and distributes data across the building ecosystem – ensuring operational stability and open integration.

03 SENSOR PORTFOLIO

Data begins at the source

Sensors form the foundation of intelligent building systems. They capture environmental, energy and occupancy data – creating structured inputs for scalable control architectures.

Modular sensing enables flexible configuration, seamless retrofitting and long-term system adaptability.

PEOPLE & PRESENCE

People Detection
Occupancy
Movement patterns

INDOOR AIR QUALITY

CO_2
Temperature
Humidity
Radon
VOC

ENERGY

Electricity
Thermal Energy
Submetering

ENVIRONMENTAL

Light
Noise
Outdoor Conditions

PEOPLE & PRESENCE

Measurement layers inside intelligent buildings

ROOM & AREA LEVEL

- EnoSense® Presence Count

ACCESS LEVEL

- EnoSense® People Counter PRO

RETROFIT LEVEL

- EnoSense® People Counter

PEOPLE & PRESENCE

EnoSense® Presence Count

Accurate people counting for intelligent space analytics.

The EnoSense® Presence Count sensor provides reliable people counting for commercial and public buildings.

Powered via Power over Ethernet (PoE) or external power supply, the device ensures stable operation and continuous data availability.

The sensor enables occupancy analytics, space utilization monitoring and data-driven building optimization within scalable smart building

01

Accurate people counting

Reliable detection of occupancy levels for data-based space management and utilization analysis.

02

PoE or external power supply

Stable operation through Power over Ethernet or dedicated power connection.

03

Standard MQTT integration

Structured data transmission via MQTT ensures seamless integration into BMS and analytics platforms.

EnoSense® People Counter PRO

High-precision people counting for demanding access points.

The EnoSense® People Counter PRO uses advanced Time of Flight (ToF) technology to deliver highly accurate counting performance in commercial and public buildings.

3D depth sensing enables reliable differentiation of individuals – even in bidirectional traffic or close encounters within narrow passages.

Powered via Power over Ethernet (PoE) or external power supply, the device ensures stable operation and continuous data availability.

01

High-precision ToF technology

Advanced Time of Flight sensing enables accurate counting and reliable differentiation of crossing individuals.

02

Stable powered operation

Power over Ethernet (PoE) or external power supply ensures continuous operation in high-traffic environments.

03

Standard MQTT integration

Structured data transmission via MQTT ensures seamless integration into BMS and analytics platforms.

PEOPLE & PRESENCE

EnoSense® People Counter

Flexible people counting for retrofit and scalable building integration.

The EnoSense® People Counter provides reliable people counting for offices, educational facilities and public buildings.

Powered by two internal AA batteries, the device enables flexible installation without additional wiring.

The sensor supports occupancy monitoring and structured integration into scalable smart building systems.

01

Reliable people counting

Accurate monitoring of occupancy levels for space management and utilization analysis.

02

Battery-powered operation

Two internal AA batteries allow independent installation without infrastructure requirements.

03

Standard MQTT integration

Structured data transmission enables seamless integration into BMS and analytics platforms.

EnoSense® PIR DOT

Compact PIR motion sensor for flexible indoor integration.

The EnoSense® PIR DOT sensor provides reliable motion-based detection using passive infrared (PIR) technology.

Its compact design and integrated internal magnet allow fast and flexible installation without additional brackets.

Powered by internal batteries and based on EnOcean® wireless communication, the device integrates seamlessly into scalable smart building architectures via the VL-700 BASE.

01

Compact PIR motion detection

Reliable motion-based detection using passive infrared technology.

02

Magnetic installation concept

Integrated internal magnet enables tool-free mounting on suitable surfaces.

03

EnOcean wireless integration

Battery-powered operation enables flexible installation without wiring.

EnoSense® PIR Ceiling

Ceiling-mounted motion detection for wide-area coverage

The EnoSense® PIR Ceiling sensor provides motion-based detection using passive infrared technology.

Designed for ceiling installation, the sensor supports wide-area motion detection in offices and public environments.

Powered by an integrated solar cell with backup battery and based on EnOcean® wireless communication, the device integrates seamlessly into scalable smart building architectures via the VL-700 BASE.

01

Wide-area motion detection

Reliable PIR-based motion detection for ceiling-mounted applications.

02

Solar-powered operation

Integrated solar cell with backup battery for maintenance-reduced operation.

03

EnOcean wireless integration

Communication via receiver and VL-700 BASE enables structured MQTT data transmission.

EnoSense® Desk

Modular desk occupancy sensing with configurable detection modes.

The EnoSense® Desk sensor enables reliable workplace occupancy detection in modern office environments.

The device supports modular sensing configurations combining vibration and PIR detection – allowing flexible adaptation to different desk types and usage patterns.

Powered by internal batteries and based on EnOcean® wireless communication, the sensor integrates seamlessly into scalable smart building architectures via the VL-700 BASE.

01

Modular multi-sensor configuration

Supports vibration, PIR or combined sensing modes for enhanced workplace analytics.

02

Battery-powered operation

Internal batteries enable flexible installation without additional wiring.

03

Structured MQTT integration

EnOcean communication via receiver and VL-700 BASE ensures seamless cloud connectivity.

EnoSense® Desk VIB

Vibration-based desk occupancy sensing with flat-mount flexibility.

The EnoSense® Desk VIB sensor provides vibration-based workplace occupancy detection.

The PIR-free design enables flexible flat-surface installation independent of desk edge positioning.

Powered by internal batteries and using EnOcean® wireless communication, the sensor integrates into scalable smart building systems via the VL-700 BASE.

01

Optimized vibration detection

Reliable workplace occupancy detection through vibration sensing.

02

Flexible mounting options

Installation independent of desk edge positioning.

03

Standard MQTT integration

EnOcean communication via receiver and VL-700 BASE ensures structured data transmission.

EnoSense® Wall & Desk

Solar-powered vibration-based occupancy detection for flexible workplace monitoring.

The EnoSense® Wall & Desk sensor enables vibration-based occupancy detection in workplace environments.

Powered by an integrated solar cell with backup battery, the device ensures maintenance-reduced operation in suitable lighting conditions.

Based on EnOcean® wireless communication, the sensor integrates into scalable smart building architectures via the VL-700 BASE.

01

Solar-powered operation

Integrated solar cell with backup battery for reduced maintenance.

02

Standard MQTT integration

EnOcean communication via receiver and VL-700 BASE ensures structured data transmis-

ENVIRONMENTAL

INDOOR AIR QUALITY

Integrated monitoring of CO_2, particulate matter and volatile compounds for healthy and efficient indoor environments.

High indoor air quality is a key factor for productivity, well-being and energy-efficient building operation.

Continuous monitoring of CO_2 concentration, particulate matter (PM1, PM2.5, PM4, PM10), VOC index, temperature and relative humidity enables transparent assessment of room conditions and supports demand-based ventilation strategies.

Integrated wireless communication allows seamless connection to the existing system architecture.

EnoSense® and EnoPuck® sensors form a scalable system for comprehensive indoor air quality management within modern building infrastructures.

INDOOR AIR QUALITY

EnoSense® RADON

Continuous radon monitoring for healthy indoor environments.

The EnoSense® RADON sensor enables continuous and reliable radon monitoring in occupied buildings.
Based on energy harvesting EnOcean® wireless technology, it operates maintenance-free and integrates seamlessly into scalable smart building architectures.

- Reliable long-term radon measurement
- Wireless EnOcean® communication
- Structured integration via standard MQTT
- Suitable for schools, offices and public facilities

INDOOR AIR QUALITY

EnoSense® CO2

Precision CO_2 monitoring for demand-controlled ventilation.

The EnoSense® CO_2 sensor provides accurate indoor air quality data for optimized ventilation control in commercial and public buildings.

Based on energy harvesting EnOcean® wireless technology, it operates maintenance-free and integrates seamlessly into scalable smart building architectures.

01

High measurement accuracy

Reliable CO_2 data for stable ventilation control and improved indoor comfort.

02

Maintenance-free wireless operation

Battery-free EnOcean® communication enables flexible installation and long-term reliability.

03

Standard MQTT integration

Structured data transmission via MQTT ensures seamless integration into BMS and analytics platforms.

ENVIRONMENTAL

EnoSense® PM VOC

Comprehensive air quality monitoring for intelligent indoor environments.

The EnoSense® PM VOC sensor provides continuous measurement of particulate matter (PM1, PM2.5, PM4 and PM10) in indoor environments.

In addition, the device monitors air quality using a VOC Index and measures temperature and relative humidity.

Designed for permanent operation via external power supply, the sensor enables stable long-term monitoring in demanding building environments.

Based on EnOcean® wireless communication, the device integrates seamlessly into scalable smart building architectures via the VL-700 BASE.

01

Multi-size particulate monitoring

Simultaneous measurement of PM1, PM2.5, PM4 and PM10 for differentiated air quality assessment.

02

VOC Index monitoring

Continuous evaluation of volatile organic compounds based on indexed air quality indication.

03

Integrated climate parameters

Additional measurement of temperature and relative humidity for extended indoor environmental transparency.

ENVIRONMENTAL

EnoPuck® CO_2

Comprehensive indoor climate monitoring with visual air quality indication.

The EnoPuck CO_2 sensor provides continuous measurement of carbon dioxide concentration in indoor environments.

In addition, the device measures temperature and relative humidity to support comprehensive room climate assessment.

Integrated RGB LEDs enable configurable visual indication, either as a CO_2 traffic light or via freely programmable status control.

The sensor can be placed on a desk or mounted on a wall using a screw-head suspension.

Based on EnOcean® wireless communication, the device integrates seamlessly into scalable smart building architectures via the VL-700 BASE.

01

CO_2 concentration measurement

Reliable monitoring of indoor carbon dioxide levels for optimized ventilation control.

02

Integrated climate parameters

Additional measurement of temperature and relative humidity for extended room climate transparency.

03

RGB status indication

Configurable LED visualization as CO_2 traffic light or freely programmable signal interface.

ENVIRONMENTAL

EnoPuck® CO_2 NOISE

Integrated CO_2, climate and acoustic monitoring with visual air quality indication.

The EnoPuck® CO_2 NOISE sensor provides continuous measurement of carbon dioxide concentration in indoor environments.

In addition, the device measures temperature, relative humidity and sound pressure levels (dB SPL).

Integrated RGB LEDs enable configurable visual indication, either as a CO_2 traffic light or via freely programmable status control.

The sensor can be placed on a desk or mounted on a wall using a screw-head suspension.

Based on EnOcean® wireless communication, the device integrates seamlessly into scalable smart building architectures via the VL-700 BASE.

01

CO_2 concentration measurement

Reliable monitoring of indoor carbon dioxide levels for optimized ventilation control.

02

Integrated acoustic monitoring

Measurement of sound pressure levels (dB SPL) for extended room condition analysis.

03

Integrated climate parameters and RGB

Measurement of temperature and humidity combined with configurable LED status visualization.

ENVIRONMENTAL

EnoPuck® CO_2 WALL

Wall-mounted indoor climate monitoring with integrated visual air quality indication.

The EnoPuck® CO_2 WALL sensor provides continuous measurement of carbon dioxide concentration in indoor environments.

In addition, the device measures temperature and relative humidity to support comprehensive room climate assessment.

Integrated RGB LEDs enable configurable visual indication, either as a CO_2 traffic light or via freely programmable status control.

The sensor is designed for fixed wall installation using a dedicated mounting ring.

Based on EnOcean® wireless communication, the device integrates seamlessly into scalable smart building architectures via the VL-700 BASE.

01

CO_2 concentration measurement

Reliable monitoring of indoor carbon dioxide levels for optimized ventilation control.

02

Wall-mounted installation

Defined positioning via mounting ring for permanent room integration.

03

Climate parameters and RGB indication

Configurable LED visualization as CO_2 traffic light or freely programmable signal interface.

ENVIRONMENTAL

EnoSense® LUX

Ambient light measurement for optimized indoor lighting control.

The EnoSense® LUX sensor provides precise measurement of ambient light levels in indoor environments.

Powered by internal batteries and based on EnOcean® wireless communication, the device integrates seamlessly into scalable smart building architectures via the VL-700 BASE.

Continuous light monitoring enables demand-based lighting control and supports energy-efficient building operation.

01

Precise illuminance measurement

Reliable detection of ambient light levels.

02

Battery-powered operation

Flexible installation without additional wiring.

03

Structured MQTT integration

EnOcean communication via receiver and VL-700 BASE ensures seamless cloud connectivity.

ENVIRONMENTAL

EnoSense® NOISE

Acoustic level monitoring for controlled indoor environments.

The EnoSense® NOISE sensor provides reliable measurement of sound pressure levels (dB SPL) in indoor environments.

The device records the peak sound pressure value within defined measurement intervals of four minutes.

Powered by an integrated solar cell with backup batteries and based on EnOcean® wireless communication, the sensor integrates seamlessly into scalable smart building architectures via the VL-700 BASE.

01

Peak sound pressure measurement

Detection of the maximum dB SPL value within each four-minute interval.

02

Solar-powered operation

Integrated solar cell with backup batteries enables maintenance-reduced operation.

03

Structured MQTT integration

EnOcean communication via receiver and VL-700 BASE ensures seamless cloud connectivity.

ENVIRONMENTAL

EnoSense® Temp/RH

Temperature and humidity monitoring for stable indoor environments.

The EnoSense® Temp/RH sensor provides reliable measurement of temperature and relative humidity in indoor environments.

Powered by internal batteries and based on EnOcean® wireless communication, the device integrates seamlessly into scalable smart building architectures via the VL-700 BASE.

Continuous environmental monitoring supports stable indoor climate conditions and energy-efficient building operation.

01

Precise temperature measurement

Reliable monitoring of indoor temperature conditions.

02

Relative humidity monitoring

Supports stable and healthy indoor environments.

03

Structured MQTT integration

EnOcean communication via receiver and VL-700 BASE ensures seamless cloud connectivity.

SENSOR PORTFOLIO

ENERGY

Current measurement and load transparency for intelligent building operation.

Transparent energy monitoring enables detailed insight into electrical load distribution across building infrastructures.

Structured data acquisition supports optimization of energy usage, early detection of load imbalances and improved operational efficiency.

Integrated wireless communication allows seamless connection to the existing system architecture.

EnoSense® Current 3PH 80A

Three-phase current measurement up to 80 A per phase.

The EnoSense® Current 3PH 80A sensor enables continuous monitoring of electrical current in three-phase systems.

Measurement is performed via external 80 A clip-on current transformers, allowing non-invasive installation without interrupting the power supply.

Based on EnOcean® wireless communication, measured values are transmitted directly into the scalable building infrastructure.

Integrated energy harvesting technology eliminates the need for batteries or external power sources.

01

Three-phase measurement up to 80 A

Simultaneous monitoring of three phases using external 80 A clip-on transformers.

02

Non-invasive installation

Installation without disconnecting the electrical supply.

03

Self-powered operation

Energy harvesting eliminates batteries and additional wiring requirements.

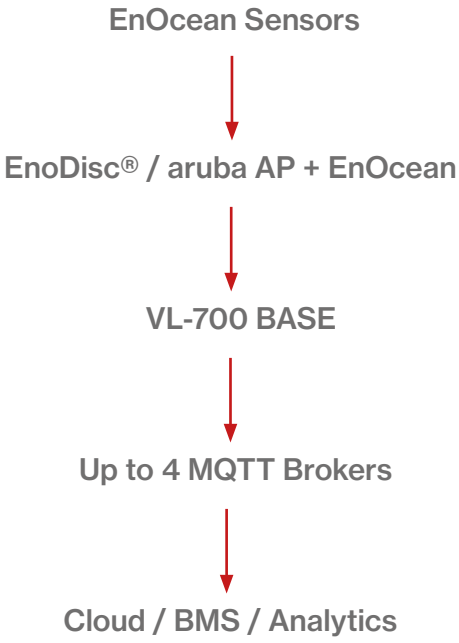
SYSTEM ARCHITECTURE

CONNECTIVITY

EnOcean data aggregation and scalable gateway infrastructure.

Reliable wireless sensor communication requires structured data aggregation and secure system integration.

EnoDisc transceivers and the VL-700 BASE form the scalable communication backbone of the smart building architecture.


EnOcean Sensors
EnoDisc® / aruba AP + EnOcean
VL-700 BASE
Up to 4 MQTT Brokers
Cloud / BMS / Analytics

SYSTEM ARCHITECTURE

VL-700 BASE

Central EnOcean gateway and scalable MQTT interface for structured building integration.

The VL-700 BASE aggregates EnOcean telegrams from distributed EnoDisc transceivers or Aruba access points with EnOcean USB interface.

Up to 32 distributed receivers can be managed within a single system architecture.

A typical deployment consisting of one VL-700 BASE and 32 EnoDisc units supports integration of up to 500 EnOcean sensors.

Processed data is transmitted via MQTT / JSON to up to four independent MQTT brokers, enabling parallel integration into cloud platforms, BMS and analytics systems.

01

Central device management

Management of up to 32 distributed EnOcean transceivers.

02

Scalable sensor integration

System architecture supporting up to 500 sensors.

03

Flexible MQTT distribution

Simultaneous transmission to up to four MQTT brokers.

32

Managed EnoDisc or Aruba AP

500

Sensors per typical deployment

4

MQTT Brokers simultaneously

EnoDisc®

Ceiling-mounted EnOcean transceiver for distributed sensor integration.

The EnoDisc transceiver enables reliable bidirectional EnOcean communication in distributed building environments.

Installed on the ceiling and connected via Ethernet (RJ45), the device communicates over IP and is powered via Power over Ethernet (PoE).

Data is exchanged with the VL-700 BASE, forming a scalable EnOcean backbone architecture for structured building integration.

As an alternative, Aruba access points equipped with an EnOcean USB interface can be integrated into the same system architecture.

01

Ceiling-mounted transceiver

Reliable bidirectional EnOcean communication for distributed installations.

02

PoE-powered Ethernet integration

RJ45 connection with Power over Ethernet for simplified infrastructure deployment.

03

Scalable system architecture

Up to 32 EnoDisc or Aruba access points can be managed by a single VL-700 BASE.

SERVICES

Project-based system integration and implementation support.

In addition to delivering hardware components, we provide structured project support for planning, configuration and commissioning.

All system components – including sensors, VL-700 BASE units and EnoDisc transceivers – can be pre-configured, labeled and documented according to project specifications.

Our services ensure efficient installation, reduced commissioning time and reliable system integration.

Project implementation and support

Structured project implementation

01

Pre-configuration and labeling

All sensors, gateways and transceivers are configured and labeled according to project documentation before delivery.

02

Documentation integration

System components are incorporated into planning documents and network structures as required.

03

Global project delivery

Complete systems are shipped directly to customer construction sites, including international locations.

04

Optional on-site commissioning

Installation support and system commissioning can be provided as part of the project scope.

SOLUTIONS

Application-driven system configurations

Smart building systems require structured sensing, controlled data aggregation and scalable integration.

Our modular architecture enables application-driven system configurations tailored to specific building types and operational requirements.

Sensors, receivers and edge controllers form a coordinated infrastructure that supports reliable data acquisition, local processing and standardized MQTT-based system integration.

System configuration logic

01 Sensing Layer
People • Indoor Air Quality • Environmental • Energy

02 Receiver Layer
EnoDisc® or Aruba Access Point with EnOcean USB

03 Edge Layer
VL-700 BASE with structured MQTT distribution

04 Integration Layer
Cloud Platforms • BMS • Energy Systems • Analytics

01 Office Intelligence Deployment

Integrated monitoring for occupancy,
indoor air quality and energy transparency
in modern office environments.

- CO_2, PM VOC, Temperature, Humidity
- Desk and PIR occupancy sensing
- 3PH current monitoring
- Central aggregation via VL-700 BASE
- Structured MQTT export to BMS and analytics

02 Educational Facility Air Quality

Comprehensive indoor air quality monitoring
with visual indication and standardized reporting.

- RADON and CO_2 monitoring
- PM VOC for particulate assessment
- CO_2 traffic light indication
- Centralized MQTT-based data integration

03 Energy Transparency Deployment

Non-invasive three-phase current monitoring
for scalable load analysis and optimization.

- EnoSense® Current 3PH 80A
- Edge aggregation via VL-700 BASE
- Multi-broker MQTT distribution
- Integration into energy management platforms