MICROSENS

Datasheet
Smart Matrix Sensor

Made in Germany

Smart Office READY

Description

The MICROSENS Smart Matrix Sensor uses innovative infrared matrix sensor technology to measure room temperature from the ceiling position. Unlike conventional temperature sensors, which measure the temperature of the air around them, the matrix sensor measures the temperature of the surface it "looks at". This allows the mounting of the sensor on the ceiling, where normally temperature measurement is not very reliable.

The integrated 8x8 sensor matrix makes it possible to average the measured temperature over a larger detection area and filter out unwanted heat sources such as people, electronic devices or even hot coffee cups.

In addition to room temperature, the sensor also measures room brightness and humidity.

The Smart Matrix Sensor has two RJ-45 connectors with MICROSENS NeuronGrid Bus interface for connection to a MICROSENS Smart Lighting Controller. The Smart Matrix Sensor is designed for suspended ceiling mounting. Up to 24 smart[1] can be easily cascaded into a single bus line with a total length of up to 200 m to provide long range and wide area coverage.

The collected sensor data is processed directly by the Smart Director App or the MICROSENS microRTS to control the room heating/cooling and to dim the lights. In addition, the data can be visualized in the MICROSENS Smart Building Manager and made available to other systems.

[1] see controller datasheet for number of supported smart sensors

Features

- Infrared room temperature matrix sensor

- measurement of ambient light level and humidity

- RGB LED for sensor status indication

- MICROSENS NeuronGrid Sensor Bus interface for data connection and powering by MICROSENS Smart Lighting Controller.

- Daisy-chaining of several Smart Sensors possible

- Optional integrated Bluetooth Beacon for Indoor Navigation applications

Specifications

Smart Matrix Sensor

- Capture of environmental data on

  ◦ Temperature

  ◦ Ambient light level

  ◦ Humidity

- Direct transfer of captured data to MICROSENS Smart Lighting Controller

- Optional integrated Bluetooth Beacon Identifier for Indoor Navigation
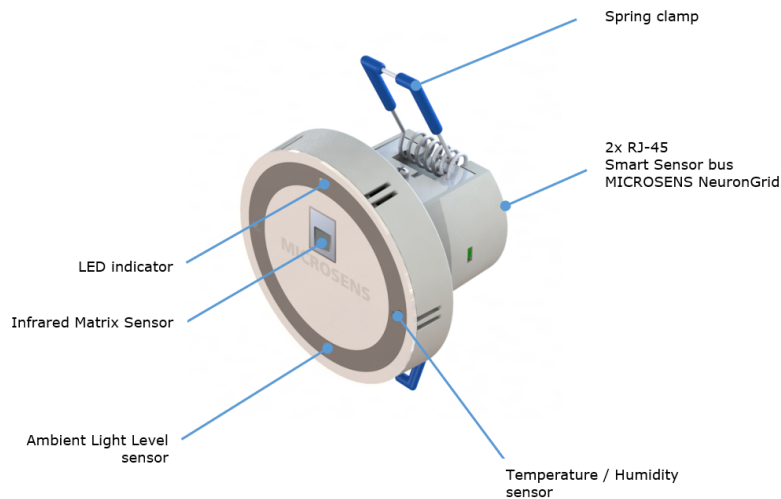
Connectors

- 2x RJ-45 jack, bus through, for daisy-chaining smart sensors and connection to sensor port of Smart Lighting Controller

- MICROSENS NeuronGrid bus interface Mounting

Power Supply

Type

- 12 VDC

Source

- Bus power is sourced by connected Smart Lighting Controller. No separate power supply needed.

Power Consumption

- maximum: 250 mW

Mounting

- For mounting in suspended ceiling

- Spring clamps for easy through-hole mounting

Interfaces

Spring clamp

2x RJ-45
Smart Sensor bus
MICROSENS NeuronGrid

LED indicator

Infrared Matrix Sensor

Ambient Light Level
sensor

Temperature / Humidity
sensor

Technical Specifications

Measurement

Temperature

- Metering range: 0..+60 °C
- Accuracy: +/- 0.5 °C

Humidity

- Metering range: 10..80% non-condensing
- Accuracy: +/- 2 %RH

Brightness

- 0 to 100 %, designed for Smart Director App

Connection

Connector type

- Sensor bus, MICROSENS NeuronGrid compatible

Connector

- 2x RJ-45 port, unshielded, Bus-termination required

Cable Type

- Twisted-Pair ISO/IEC 11801, Cat. 5 shielded, min. AWG 26, with RJ-45 connectors

Cable length

- min. 1 m, max. 200 m (total bus length)

Cascading

- Up to 24 Smart Sensors can be daisy-chained in one bus, see individual smart controller datasheet for supported number of sensors

Termination

- Sensor bus must be terminated on both ends with 100 Ohm terminator (termination plug)

Power Supply

Type

- 12 VDC

Source

- Bus power is sourced by connected Smart Lighting Controller. No separate power supply needed.

Power Consumption

- maximum: 250 mW

Environmental Conditions

Temperature

- Typical: 25 °C
- Operation range: -0..+60 °C
- Storage: -20..+85 °C

Humidity

- 10 .. 90%, non-condensing

Indicator

RGB LED

- Integrated RGB LED
  Colors: blue, green, red, orange, cyan, magenta, white, off

Mechanical

Dimensions

- 61 x 42 mm (diameter x height, without clamps)

Mounting hole

- 40 to 50 mm diameter

Panel Thickness

- max. 20 mm

Weight

- Approx. 100 g

Protection Class

- IP30

Standards

CE: 2014/30/EU (EMC Directive)
2011/65/EU (RoHS Directive)
REACH: 1907/2006/EC
Safety: EN 62368-1
EMC Emission: EN 55032
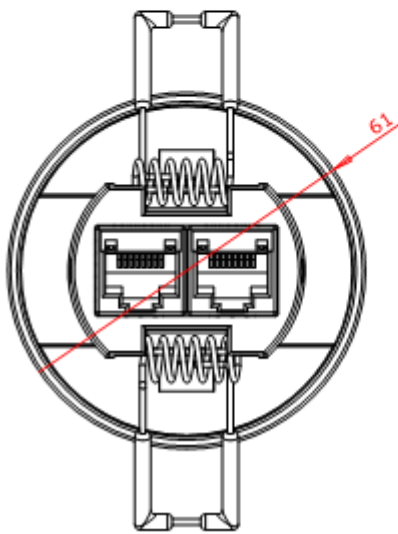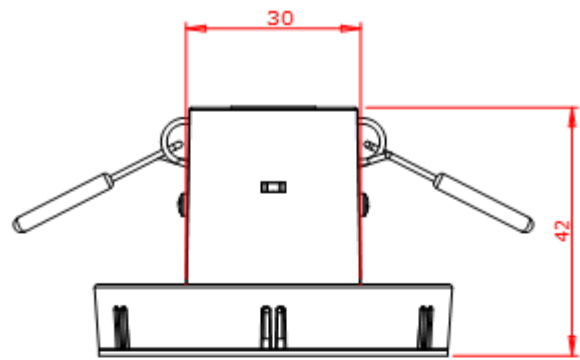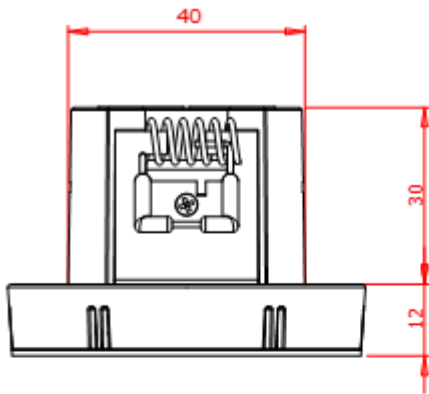**EMC Immunity:** EN 55024

Delivery / Contents

Standard Packaging

Standard Packaging

- **Contents**: 1x Smart Sensor

Bulk Packaging

- **Contents**: 6x Smart Sensor

Dimensions (mm)
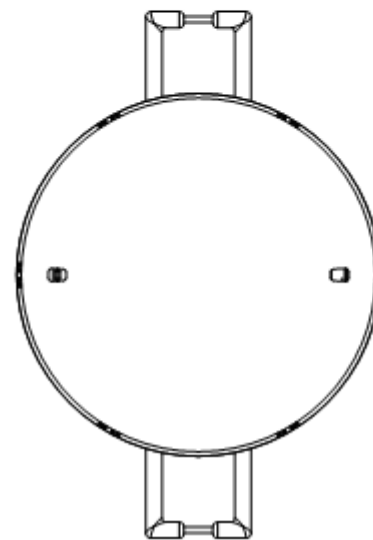
Installation Guidelines

Mounting

The Smart Matrix Sensor is intended for direct mounting through a hole in a suspended ceiling. The integrated spring clamps make the installation very easy and provide a level of tolerance for different installation situations. The internal height of the suspended ceiling must be sufficient to route the twisted-pair cable used for the sensor connection within the bending limits.
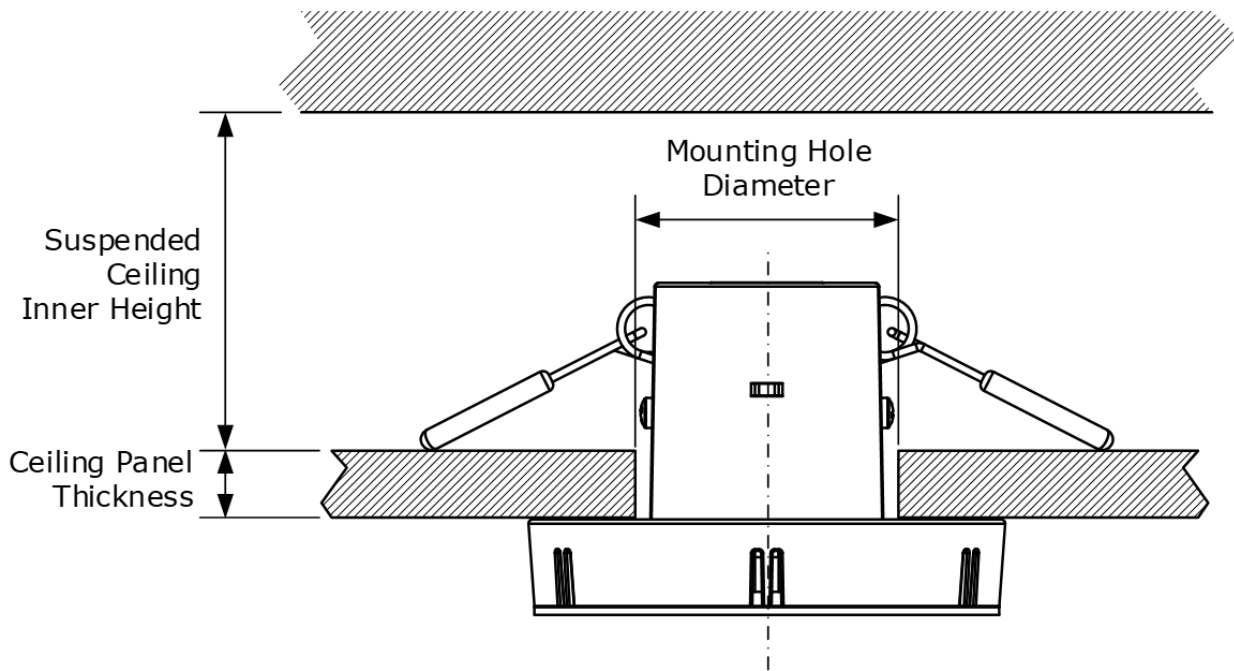
Mounting hole diameter: 40 to 50 mm Ceiling panel thickness: max. 20 mm Suspended ceiling inner height: min. 70 mm (depending on cable used)

If installation in the ceiling is not possible, a special adapter for surface mounting is available, which allows the complete sensor to be mounted on the ceiling.

Operational Limits

The Smart Matrix Sensor calculates the room temperature from the infrared radiation detected by its integrated 8x8 thermopile sensor array. The integrated algorithm filters and averages the 64 temperature measurements to get a realistic room temperature value. Unwanted heat sources such as people, electronic devices or even hot coffee cups are suppressed.
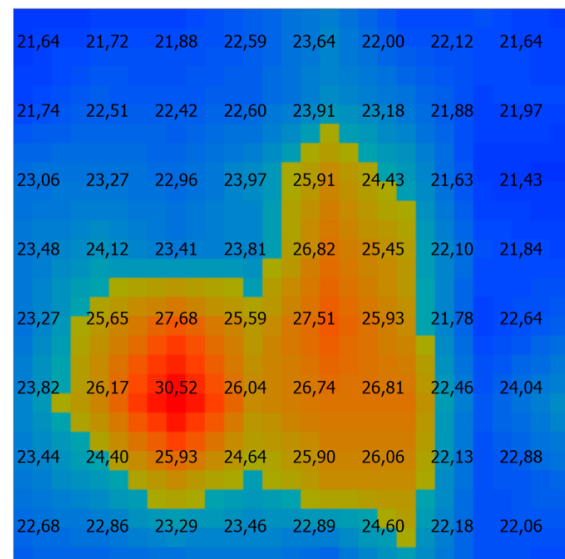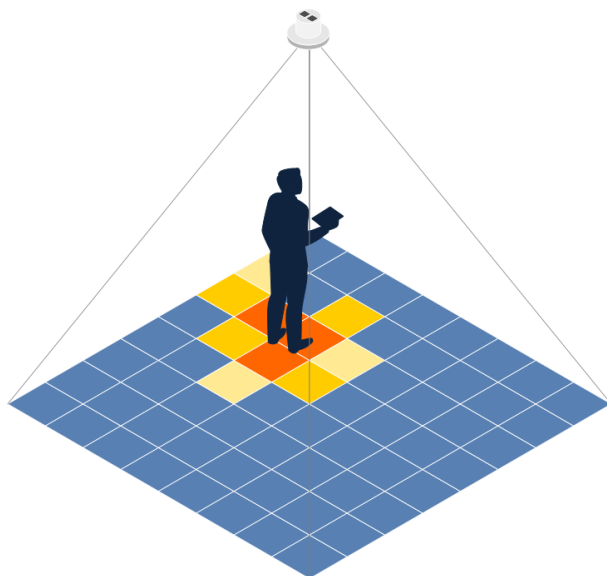
To avoid falsification of the measurement result, the sensor should not directly be targeted to know heat sources like radiators. As the sensor measures infrared radiation, the temperature of reflecting objects like mirrors or blank metal surfaces cannot be measured, as they reflect the radiation around them.

The sensor is not suitable for rooms with floor heating.

With an opening angle of 60°, the sensor matrix can cover the following detection areas depending on the installation height of the sensor.
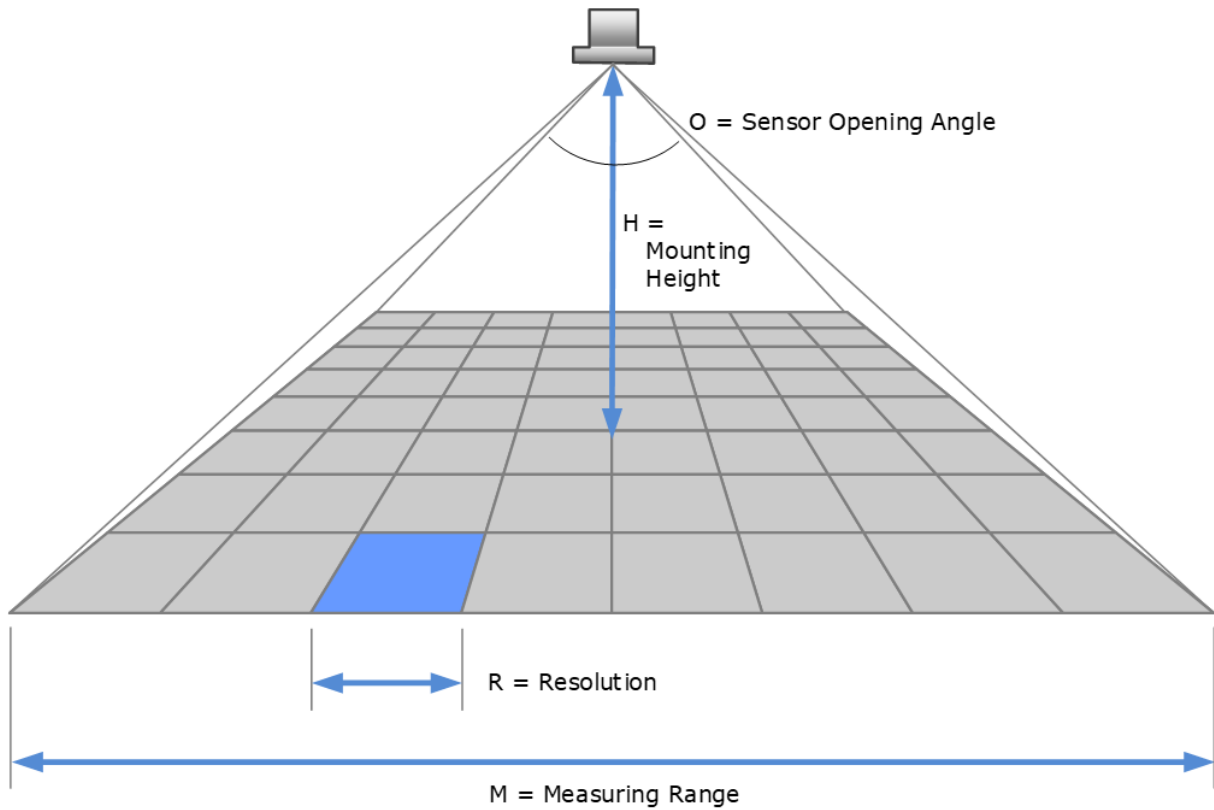

Table 1. Sensor typical installation parameters

Mounting Height H	Measuring Range M	Resolution R
m	m	cm
1,00	1,15	14
2,00	2,31	29
2,25	2,60	32
2,50	2,89	36
2,75	3,18	40
3,00	3,46	43
3,25	3,75	47
3,50	4,04	51
3,75	4,33	54
4,00	4,62	58

> **Example**
> When mounted on a ceiling with 3 m height, the sensor covers a square of 3.46 x 3.46 m at the floor level. Each sensing pixel covers an area of 43 x 43 cm. If you look for the temperature at desk level (at 75 cm height), the effective height of the sensor is 3 − 0.75 = 2.25 m, where we have a detection area of 2.6 x 2.6 m.

Electrical Installation

⚠️ Only compatible Smart Sensors may be connected to the Smart Sensor bus. Do not connect any other devices to the bus. Connecting incompatible devices to the bus may cause irreparable damage to the devices, the Smart Lighting Controller or other Smart Sensors on the bus.
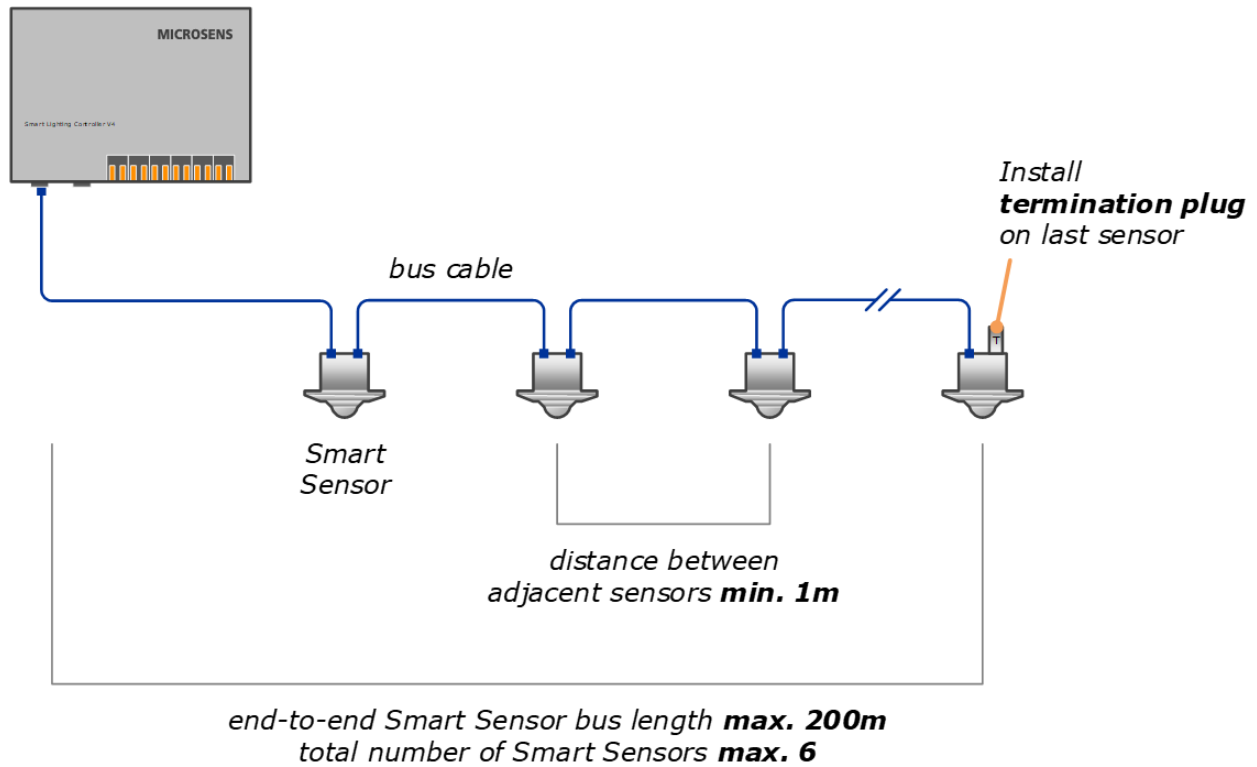
General Design Rules

1. Maximum number of Smart Sensors that can be connected to one bus:

   ◦ **24** to a CSLC

   ◦ **6** to a SLC-V4

   ◦ **2** to a SLC-V3

2. The **minimum** cable length between two adjacent sensors on the bus is **1 m**

3. The **maximum** end-to-end cable length of the Smart Sensor bus is **200 m**

4. The Smart Sensor bus must be **terminated** on the open end with a smart sensor bus termination plug

5. The single bus connector on a **SLC** device is internally terminated

6. The two bus connectors on a **CSLC** device are internally connected and form together one bus. They **are not** internally terminated.

7. For bus cabling, twisted-pair cable according to ISO/IEC 11801, shielded Cat 5, AWG 26 or better must be used. RJ-45 connectors on both ends, 8 pins, pinout straight 1:1, pairs on pins 1/2, 3/6, 4/5, 7/8
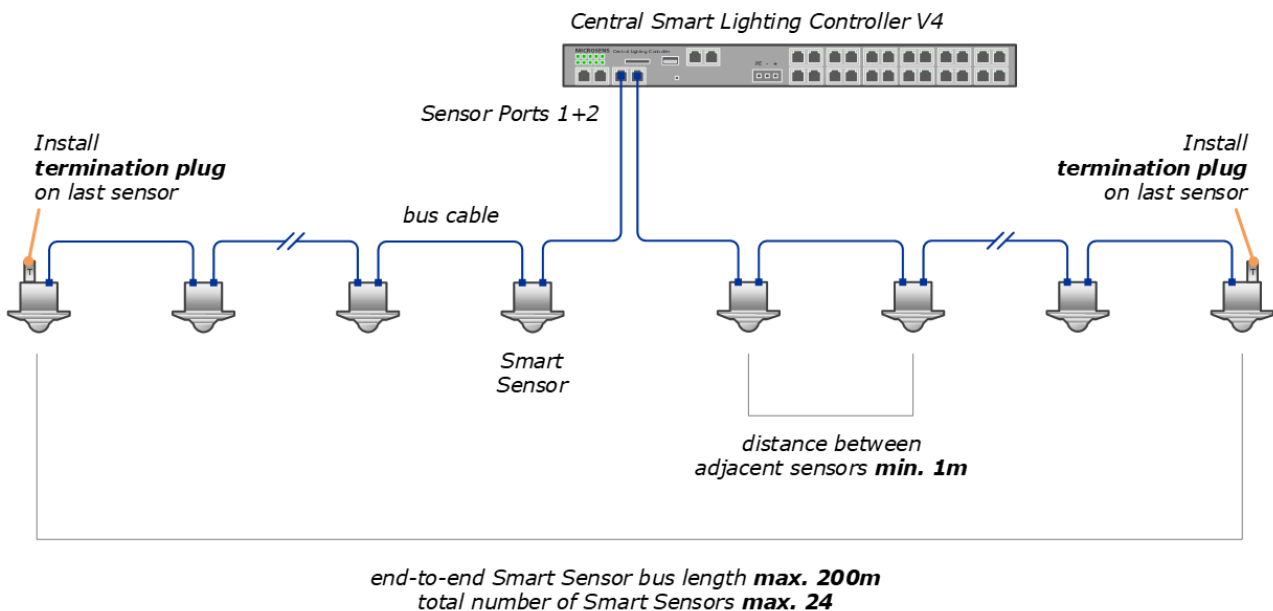
Smart Sensor Installation with single bus segment (SLC-V4)

Smart Lighting Controller-V4

Install **termination plug** *on last sensor*

bus cable

Smart Sensor

distance between adjacent sensors **min. 1m**

end-to-end Smart Sensor bus length **max. 200m**
total number of Smart Sensors **max. 6**

Smart Sensor Installation with dual bus segment (CSLC)

Central Smart Lighting Controller V4

Sensor Ports 1+2

Install **termination plug** *on last sensor*

Install **termination plug** *on last sensor*

bus cable

Smart Sensor

distance between adjacent sensors **min. 1m**

end-to-end Smart Sensor bus length **max. 200m**
total number of Smart Sensors **max. 24**
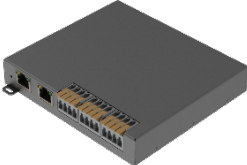
Unused Sensor Ports must be terminated!

Ordering Information

Description	Article-No.
Smart Matrix Sensor Integrated infrared matrix sensor for room temperature measurement. Additional sensors for ambient light level and humidity. RGB LED indicator. 2x RJ-45 connector (MICROSENS NeuronGrid bus compatible)	**MS660240**

Accessories

Description	Article-No.
Central Smart Lighting Controller Central Smart Lighting Controller for LED lighting, 24x LED driver output (RJ-45), 2x Sensor input (RJ-45), 1x Power Input 54 VDC, 1x 1000BasedTX (RJ-45, shielded), 2x 100BasedTX (RJ-45, shielded), 1x USB	**MS660301M-V4**
Smart Lighting Controller V3 – 2 Channel Smart Lighting Controller 90W with 2 LED Channels PoE++ network powered controller for LED lighting, 2x driver outputs for LED lights, slim-format, 1x RJ-45 jack for 10/100Base-TX, PoE++ PD input, max. 90W, 1x RJ-45 jack for MICROSENS NeuronGrid Smart Sensor (up to 2 Sensors)	**MS660103M**
Smart Lighting Controller V4 – 6 Channel Smart Lighting Controller 90W with 6 LED Channels PoE network powered controller for LED lighting, 6x driver outputs for LED lights, desktop-format, 1x RJ-45 jack for 10/100Base-TX, PoE PD input, max. 90W, 1x RJ-45 jack for MICROSENS NeuronGrid Smart Sensor (up to 6 Sensors)	**MS660104M**
Smart Sensor Bus Termination Plug Termination resistor for Smart Sensor Bus, 100 Ohm, RJ-45 plug	**MS660309**

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https://www.microsens.com/fileadmin/files/downloads/Impressum/MICROSENS_AVB_EN.pdf).

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