

## FMS 116, 196: Smart Sensor viaSens116/196

### How energy efficiency is improved

Smart multi-sensors in a mesh network for recording movement/presence, brightness, temperature, humidity, air quality and sound pressure levels in rooms or room zones for energy-optimising room automation and for good, pleasant room air.

### Features

- Measurement of indoor air quality (IAQ<sup>1)</sup>), such as temperature, humidity and air quality (VOC<sup>2)</sup>)
- Measurement of indoor environment quality (IEQ<sup>3)</sup>), such as motion/presence, brightness and sound pressure level
- Sensor values can be linked together for more precise information on the state of the room (sensor fusion)
- For ceiling mounting (recessed/surface-mounted)
- Minimal sensor wiring thanks to Bluetooth<sup>® 4)</sup> mesh network
- Controllable coloured LED ring for displaying the room status to room users
- Parameterisable animation profiles for LED ring, e.g. room reserved/available, room air quality good/bad, room ready for cleaning, etc.)
- Bluetooth Beacon function for locating the room user with a smartphone and optimised use of SAUTER Mobile Building Services (Mobile Room Control app)
- Simple integration into the SAUTER automation system with viaSens196
- For up to 16 sensors for an ecos504/505 room controller
- Complete commissioning with CASE Suite and Bluetooth smartphone app
- Meshing of up to 15 viaSens116 sensors via Bluetooth mesh technology to the viaSens196 sensor gateway
- IoT ready thanks to encrypted MQTT communication in the viaSens196 as an MQTT client



FMS1\*6F121



FMS1\*6F121A

### Technical data

#### Power supply

|                     |                          |
|---------------------|--------------------------|
| Power supply        | 12...34 VDC, typ. 24 VDC |
| Current consumption | Max. 80 mA at 24 VDC     |
| Power consumption   | Typ. 2 W                 |

#### Parameters<sup>5)</sup>

|                               |                                  |                                 |
|-------------------------------|----------------------------------|---------------------------------|
| Temperature (TDIG)            | Method of measurement            | CMOS technology (SHT40)         |
|                               | Measuring range                  | 0...40 °C                       |
|                               | Resolution                       | 0.1 K                           |
|                               | Time constant                    | Approx. 8 s (dew 63%)           |
| Temperature (TFIR)            | Method of measurement            | Far infrared (MLX)              |
|                               | Measuring range                  | 15...40 °C                      |
|                               | Resolution                       | 0.1 K                           |
|                               | Measuring accuracy <sup>6)</sup> | ±1 K                            |
|                               | Emissivity                       | 0...100%, parameterisable       |
| Relative humidity (HUM)       | Method of measurement            | CMOS technology (SHT40)         |
|                               | Measuring range                  | 0...100%, typ. 20...80% rh      |
|                               | Resolution                       | 1%                              |
|                               | Measuring accuracy               | ±2% in 10...90% range at 25 °C. |
|                               | Time constant                    | Approx. 8 s (dew 63%)           |
| Volatile compound gases (VOC) | Method of measurement            | CMOS technology (SGP40)         |
|                               | Measuring range                  | 1...500 VOC index               |
|                               | Resolution                       | 1 VOC index                     |
|                               | Time constant                    | < 10 s (dew 63%)                |

<sup>1)</sup> IAQ: indoor air quality

<sup>2)</sup> VOC: volatile organic compounds

<sup>3)</sup> IEQ: indoor environment quality

<sup>4)</sup> The Bluetooth<sup>®</sup> word mark and logos are registered trademarks of Bluetooth SIG, Inc.

<sup>5)</sup> For explanations, see the "Abbreviations (sensor types and functions)" list

<sup>6)</sup> Thermal objects can affect the measuring accuracy



|                                  |                                   |   |
|----------------------------------|-----------------------------------|---|
| Motion, presence (PIR)           | Method of measurement             | Four-element IR detector (PYQ)  |
|                                  | Detection range <sup>7)</sup>     | Ø 9 m and approx. 8 × 8 m area at 2.5 m fitting height, 360° tangential and radial  |
|                                  | Field of view (FOV)               | 120°  |
|                                  | Fresnel lens                      | 34 zones  |
| Brightness (LUX)                 | Method of measurement             | Digital light sensor (APDS)   |
|                                  | Measuring range                   | 0...16 000 lux  |
|                                  | Resolution                        | 1 lux   |
|                                  | Field of view (FOV)               | 140°  |
| Sound pressure level (SPL)       | Measuring range                   | 0...120 dB(A)   |
|                                  | Frequency spectrum                | 60...20 000 Hz  |
|                                  | Filter type                       | A weighting   |
|                                  | Sensitivity                       | -26 dB on the measuring range, ±1 dB tolerance  |
| Technology                       | Processor                         | Dual-Core ARM Cortex, 32-bit, 240 MHz   |
| <b>Ambient conditions</b>        |                                   |   |
|                                  | Operating temperature             | 0...45 °C   |
|                                  | Storage and transport temperature | -25...70 °C   |
|                                  | Ambient humidity                  | 10...80% rh, no condensation  |
| <b>Display and operation</b>     |                                   |   |
|                                  | Indicator/display <sup>8)</sup>   | LED ring with 12 LEDs, RGB colours (red, green, blue; 24 bit)<br>Configurable animation profiles with 16 predefined colours                                 |
|                                  | Push-button, capacitive           | Identification, service menu, restart, factory reset (front)  |
| <b>Interfaces, communication</b> |                                   |   |
| Bluetooth mesh                   | Network                           | Bluetooth mesh node (2.4 GHz), up to 8 TTL hops   |
|                                  | Radio frequency                   | 2.4 GHz (5 dBm)   |
|                                  | Range <sup>9)</sup>               | Up to 10 m  |
|                                  | Bluetooth mesh profile            | FMS 116: Bluetooth mesh relay node, sensor-node (sensor server model, V1.0)<br>FMS 196: Bluetooth mesh, sensor gateway (sensor server + client model, V1.0) |
|                                  | Localisation                      | Bluetooth beacon (iBeacon), indoor position determination   |
| Ethernet (FMS 196)               | Ethernet network                  | 1 × RJ-45 connector   |
|                                  | 10/100 BASE-T(X)                  | 10/100 Mbit/s   |
|                                  | Communication protocol            | MQTT client V3.1.1/V5, MQTT(S), TLS V1.2, WS(S) (ISO/IEC 20922)   |
|                                  | NFC (near field communication)    | Product data and configuration parameters   |
|                                  | Slide switch <sup>10)</sup>       | (De)activation of sound pressure level (rear)   |
|                                  | Serial port                       | UART for firmware update (point to point), 3.3 V TTL  |
|                                  | WiFi (802.11 a/b/g/n)             | WLAN client deactivated, can be temporarily activated for firmware update with app  |

<sup>7)</sup> As per IEC 63180:2020

<sup>8)</sup> Example application: Presence: LED ring off/blue, room climate / air quality: LED ring green/red

<sup>9)</sup> Depending on building and room structure; planning recommendation: max. 10 m between two Bluetooth mesh nodes

<sup>10)</sup> Switching only takes effect when the power is off

## Construction

|                           |   |
|---------------------------|---|
| Dimensions <sup>11)</sup> | Surface Ø × D: 103 × 30 mm<br>Recessed Ø × D: min. 50 × 35 mm |
| Housing material          | Thermoplastic (PC, PC-ABS)                                    |
| Fitting <sup>12)</sup>    | Recessed, surface and hollow ceiling mounting                 |
| Fitting height            | 2.5...3.5 m (ceiling)   |

## Standards, directives

|                                   |  |
|-----------------------------------|--|
| Type of protection                | IP20 (EN 60730)  |
| Protection class                  | III  |
| Environment class                 | 3K3 (IEC 60721)  |
| Plastic fire classification       | UL94   |
| CE/UKCA conformity <sup>13)</sup> | EMC-D 2014/30/EU (CE)  |
|                                   | EN 301489 (EMC for radio equipment)<br>EN 60730-1 (residential premises) |
|                                   | EMC-2016 (UKCA)  |
|                                   | See EMC Directive  |
|                                   | LV-D 2014/35/EU (CE)   |
|                                   | EN 60730-1, EN 62311   |
|                                   | EESR-2016 (UKCA)   |
|                                   | EN 60730-1, EN 62311   |
|                                   | RED 2014/53/EU (CE)  |
|                                   | ETSI EN 300 328 (V2.2.2),<br>2.4 GHz band                                |
|                                   | RER-2017 (UKCA)  |
|                                   | ETSI EN 300 328 (V2.2.2),<br>2.4 GHz band                                |
|                                   | RoHS-D 2011/65/EU &<br>2015/863/EU (CE)                                  |
|                                   | EN IEC 63000   |
|                                   | RoHS-2012 (UKCA)   |
|                                   | EN IEC 63000   |

## Overview of types

| Type        | Description   | Weight | Housing            |
|-------------|---|--------|--------------------|
| FMS116F121  | Smart sensor, Bluetooth mesh, TDIG, TFIR, HUM, VOC, PIR, LUX, SPL           | 0.2 kg | Traffic white (ws) |
| FMS116F121A | Smart sensor, Bluetooth mesh, TDIG, TFIR, HUM, VOC, PIR, LUX, SPL           | 0.2 kg | Jet black (sw)     |
| FMS196F121  | Smart sensor, MQTT/ETH, Bluetooth mesh, TDIG, TFIR, HUM, VOC, PIR, LUX, SPL | 0.3 kg | Traffic white (ws) |
| FMS196F121A | Smart sensor, MQTT/ETH, Bluetooth mesh, TDIG, TFIR, HUM, VOC, PIR, LUX, SPL | 0.3 kg | Jet black (sw)     |

 *FMS196F121(A) has the same sensor characteristics as FMS116F121(A). The additional Ethernet interface is used as a sensor gateway for the Bluetooth mesh network and for integrating the sensor network in the automation system with MQTT via TCP/TCP+TLS (MQTT/MQTTS) or via web socket (WS/WSS)*

 *Housing: matt, traffic white similar to RAL 9016, jet black similar to RAL 9005*

## Abbreviations (sensor types and functions)

|          |   |
|----------|---|
| FOV      | Field of view   |
| HUM      | Measurement of relative humidity with digital measuring element |
| LUX      | Measurement of illuminance                                      |
| MQTT/ETH | Ethernet interface for MQTT                                     |
| PIR      | Motion and presence detection with passive infrared sensor      |
| SPL      | Measurement of sound pressure level                             |
| TDIG     | Temperature measurement with digital measuring element          |
| TFIR     | Temperature measurement with far infrared temperature element   |
| VOC      | Measurement of volatile organic compounds                       |

## Accessories

| Type        | Delivery quantity | Description                     |
|-------------|-------------------|---------------------------------|
| 0940241101  | 1 pcs.            | Mounting plate, recessed, white |
| 0940241101A | 1 pcs.            | Mounting plate, recessed, black |

<sup>11)</sup> For dimensions of accessories, see fitting instructions

<sup>12)</sup> Recessed mounting with box at least 45 mm deep for FMS 116 and at least 61 mm deep for FMS 196 (Ethernet cable bending radius). Mounting in hollow ceiling with spring clamps, at ceiling thickness 2...20 mm hole diameter 68 mm; at 20...25 mm hole diameter 75 mm. Surface mounting with box 28 mm deep for FMS 116 and 53 mm deep for FMS 196

<sup>13)</sup> Explanation of abbreviations in the "Additional technical information" section of the product data sheet and in the appendix to SAUTER product catalogues

| Type        | Delivery quantity | Description                                 |
|-------------|-------------------|---|
| 0940241110  | Set of 10         | Mounting plate, recessed, white             |
| 0940241110A | Set of 10         | Mounting plate, recessed, black             |
| 0940241201  | 1 pcs.            | Mounting plate, surface, 53 mm, white       |
| 0940241201A | 1 pcs.            | Mounting plate, surface, 53 mm, black       |
| 0940241210  | Set of 10         | Mounting plate, surface, 53 mm, white       |
| 0940241210A | Set of 10         | Mounting plate, surface, 53 mm, black       |
| 0940241301  | 1 pcs.            | Mounting plate, surface, 28 mm, white       |
| 0940241301A | 1 pcs.            | Mounting plate, surface, 28 mm, black       |
| 0940241310  | Set of 10         | Mounting plate, surface, 28 mm, white       |
| 0940241310A | Set of 10         | Mounting plate, surface, 28 mm, black       |
| 0940241420  | 2 sets of 10      | Mounting spring, false ceiling              |
| 0940241510  | Set of 10         | PIR orifice plate, 180° angle (half), white |
| 0940241510A | Set of 10         | PIR orifice plate, 180° angle (half), black |
| 0949360014  | Set of 10         | Terminal, 2-pin, push-in, @2×2P (green)     |

 The sensors are supplied without mounting accessories. Accessory 0949360014 for power supply connection is supplied

## Description of operation

The Smart Sensor viaSens is a communicative multi-sensor for room automation. As a ceiling sensor, the device operates as a motion detector and can thus detect room occupancy. The light sensor detects the brightness in the room. Together with automation, light functions are possible (constant light control, lighting control, dimming etc.). Room climate variables such as temperature, relative humidity and an index for room air quality (VOC index) are used for automation (regulation or control) together with the actuators for heating, cooling and ventilation in the room. The sound pressure level sensor measures the noise level in the room and can indicate occupancy in the room or characterise the room as a quiet zone.

The Smart Sensor has a controllable coloured LED ring on the edge of the housing. Commands to the sensor activate the LED animation profile configured in the sensor. The LED ring can indicate the room status defined with the animation profile to the user.

The viaSens116 is a Bluetooth mesh relay node. The viaSens196 can integrate up to 15 viaSens116 sensors in a Bluetooth mesh sensor network as a Bluetooth mesh Ethernet sensor gateway. The information from the meshed sensor network is communicated to the ecos504/505 room automation station via the viaSens196 sensor gateway as an MQTT client via Ethernet.

The Bluetooth beacon function can be activated for location in the room. The Mobile Room Control app from Mobile Building Services can identify the beacon in the room. The appropriate configuration for the operation and view of the room is then loaded.

## Intended use

This product is only suitable for the purpose intended by the manufacturer, as described in the "Description of operation" section.

All related product regulations must also be adhered to. Changing or converting the product is not admissible.

## Improper use

The product is not suitable for:

- Use outdoors and in areas where there is a risk of condensation
- Use in transport vehicles or vessels
- Safety applications: The device is not failsafe

The product is not a measuring instrument in accordance with the Measuring Instruments Directive 2014/32/EU.

## Additional technical information

### Abbreviations used

|           |  |
|-----------|--|
| CE        | Manufacturer's Declaration of Conformity for the European Union (EU)   |
| UKCA      | Manufacturer's Declaration of Conformity for the United Kingdom of Great Britain and Northern Ireland (UK)     |
| EMC-D     | Electromagnetic Compatibility Directive 2014/30/EU   |
| EMC-2016  | Electromagnetic Compatibility Regulations 2016 (UK)  |
| EESR-2016 | Electrical Equipment (Safety) Regulations 2016 (UK)  |
| LV-D      | Low Voltage Directive 2014/35/EU   |
| RED       | Radio Equipment Directive 2014/53/EU   |
| RER-2017  | Radio Equipment Regulations 2017 (UK)  |
| RoHS-D    | Restriction of Hazardous Substances in Electrical and Electronic Equipment Directives 2011/65/EU & 2015/863/EU |
| RoHS-2012 | Restriction of Hazardous Substances (RoHS) Regulations 2012 (UK)   |

### Disposal

When disposing of the product, observe the currently applicable local laws.

More information on materials can be found in the Declaration on materials and the environment for this product.

### Dimension drawing

All dimensions in mm.

