

# SENSECOM-OMD

Communication device with optical head for electricity meter readings

## Purpose

The **SENSECOM-OMD** acquires **data from the meter** (or other meters) by means of an optical readout head, which is simply attached to the meter by a built-in magnet. It then sends the readings wirelessly over the **SIGFOX** IoT network, typically **at daily or hourly** intervals (depending on the device model and settings).

### Typical use:

Remote daily readings, including the possibility of continuous (1-hour intervals) measurement of electricity consumption and production (active energy) from electricity meters at consumption points of the distribution network.



## Description of equipment:



The **SENSECOM-OMD** series of devices is in the form of an optical readout head, defined by **IEC(CSN) 62056-21** with a communication protocol type "C". The device is designed to be easily deployable by the end user, i.e. without specific knowledge or competence.

**SENSECOM-OMD-E** models (i.e. in preset energy mode) are designed to send 4 selected basic data related to consumption (both tariffs), energy production (supply) and meter number. These data are identical to the data visible on the meter display and label. Some distribution companies require reporting or approval of the placement of the device on the selected meter. The **SENSECOM-OMD-E** device has a preset energy mode to make approval seamless.

The models also differ primarily in the way they are powered:

- **OMDs** have replaceable 3.6V lithium batteries
- **OMD-D** are rechargeable (LiPOL) with USB-C charging (with a common mobile phone adapter)
- **OMD-P** have a USB-C power connector (for connection to an adapter, power bank, etc.), they do not include a battery as standard, however, they can be fitted with replaceable 3.6V lithium batteries as a backup power supply in case of power failure

The basic **OMD** model is designed for once a day readings, where there is no need to change the battery for approximately **10** years. For more frequent readings, e.g. hourly, the **OMD-P** (adapter) or **OMD-D** (with recharging at approx. 6-12 month intervals) models are more suitable. The device can be set to power saving mode, where only data from registers where differences between current and previous values have been detected are sent (the entire data set is sent once every 28 days).



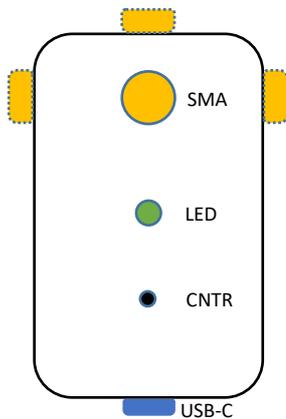
## Data processing and security

Data transmission can be secured by E2E encryption with individual keys for each device. The data is made available in the **SENSEPARAM** information system portal (with content decryption). From this system, the data can be sent via callback to the customer database over a secure SSL connection or downloaded to a csv file. In the case of large amounts of data, decryption can be performed in the customer database. The security of the message transmission is ensured against spoofing in the SIGFOX network by system authentication of the messages via the AES-128 algorithm. The device with encryption fulfils comparable technical and security requirements for communication as those imposed on AMM meters (type C1-C3). The mode of sending messages and their period can be set remotely on the device. The device sends once a day a keep-alive system message with information about the battery voltage status. Once a day, the configuration of the device can be changed remotely. FW upgrade cannot be done remotely.

The device forwards the readings either directly to the **SIGFOX** IoT network or alternatively indirectly via a repeater (or gateway) up to approx. 20m away. The repeater is normally used for electricity meters installed in places that are difficult to reach by radio, such as in full-panel switchboards, basements, shafts, etc.). Insufficient network availability inside the (metal) cabinet, but sufficient outside, can also be solved by connecting an external antenna (located outside the cabinet) connected with a coaxial cable of max. 2m length.

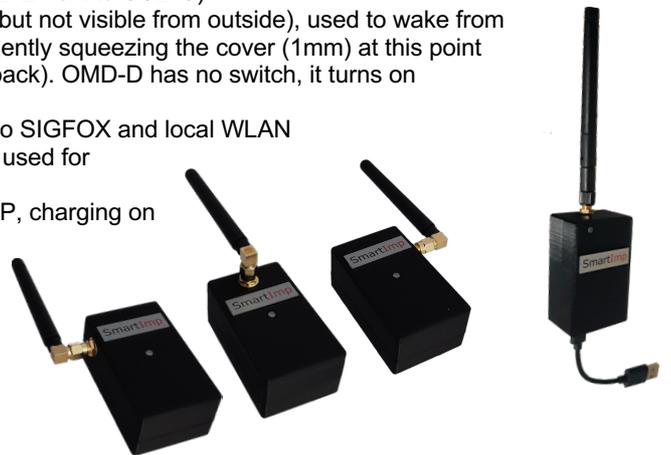
## Device design

OMD devices are available in several types of mechanical design:



### Legend:

- SMA...** Output for small rod antenna or SMA connector of external antenna cable (for OMD it can be placed in the middle part, on the left or right, for OMD-P in the upper part, for OMD-D the antenna is built in the device)
- LED...** Two-color indication LED for initialization and operation (for OMD in the middle of the front, for OMD-P in the upper left corner, for OMD-E next to USB-C)
- CNTR...** Control microswitch (operable but not visible from outside), used to wake from sleep (and reset) or return to sleep by gently squeezing the cover (1mm) at this point (OMD from the front, OMD-P from the back). OMD-D has no switch, it turns on automatically when recharging finishes.
- SF/LC...** Switch between transmission to SIGFOX and local WLAN (accessible by opening the cover), also used for pairing with the repeater
- USB-C ...** USB-C power input on OMD-P, charging on OMD-D



## Models of the SENSECOM-OMD series:

|     |   |   |       |     |   |   |
|-----|---|---|-------|-----|---|---|
| OMD | - | E | C/L/R | P/D | B | A |
|-----|---|---|-------|-----|---|---|

**E...** device mode

- **not specified** - universal mode for setting up to 13 read registers (E2E encryption optional)
- **E** - energy mode with 4 fixed preset readout registers and E2E encryption

**C/L/R ...** antenna pin direction (SMA connector), for OMD basic battery model (not specified for OMD-P, OMD-D models)

- **Not specified** or **C** - central
- **L** - left
- **R** - right

**P/D ...** power method,

- **n/a** - powered with non-rechargeable replaceable lithium batteries (no USB-C connector)
- **P** - USB-C power (with the option to add batteries for backup power)
- **D** - power supply from built-in LiPOL battery with USB-C charging

**B...** battery backup

- **n/a** - no backup
- **B** - with backup (non-rechargeable replaceable lithium batteries), only in combination with P (see above)

**A...** E2E encryption

- **n/a** - without encryption
- **A** - E2E encryption using AES-128CTR (decryption in SENSEPARAM portal)

## Optional related devices

### Repeater/gateway SENSECOM-WSH, SENSECOM-WSHD, SENSECOM-WNH

The SENSECOM repeater (gateway) allows communication with the SENSECOM-OMD device within a local wireless network (WLAN). It transmits with high signal penetration within a ~20m radius (up to 200m line-of-sight) and forwards data to the SIGFOX or NB-IoT network.



# Technical parameters

| SENSECOM   | OMD  | OMD-P   | OMD-D  |       |      |  |                       |  |                |  |       |                     |                  |
|--|--|---|--|-------|------|--|-----------------------|--|----------------|--|-------|---------------------|------------------|
| Readout interface  | Optical head interface with serial data transmission according to IEC (CSN) 62056-21   |   |  |       |      |  |                       |  |                |  |       |                     |                  |
| Communication protocol                                       | IEC 620561-21 Protocol "C" (OBIS codes with C.D.E structure)   |   |  |       |      |  |                       |  |                |  |       |                     |                  |
| Number of readout registers                                  | <ul style="list-style-type: none"> <li>The basic OMD model has up to 13 adjustable registers (OBIS codes) for readings (downlink adjustable)</li> <li>The OMD-E model has 4 fixed preset registers of readings from billing meters:</li> </ul> <table border="1"> <thead> <tr> <th>Value</th> <th>OBIS</th> </tr> </thead> <tbody> <tr> <td>Positive active energy (A+) in tariff T1 [kWh] (consumption)</td> <td>1.8.1 (1.8.0, 1.8.2)*</td> </tr> <tr> <td>Positive active energy (A+) in tariff T2 [kWh] (consumption)</td> <td>1.8.2 (1.8.3)*</td> </tr> <tr> <td>Negative active energy (A-) total [kWh] (supply)</td> <td>2.8.0</td> </tr> <tr> <td>Gauge serial number</td> <td>C.1.0 (or 0.0.0)</td> </tr> </tbody> </table> <p>* Configurable options (OBIS meter settings may vary for different energy distributors)</p> |   |  | Value | OBIS | Positive active energy (A+) in tariff T1 [kWh] (consumption) | 1.8.1 (1.8.0, 1.8.2)* | Positive active energy (A+) in tariff T2 [kWh] (consumption) | 1.8.2 (1.8.3)* | Negative active energy (A-) total [kWh] (supply) | 2.8.0 | Gauge serial number | C.1.0 (or 0.0.0) |
| Value  | OBIS   |   |  |       |      |  |                       |  |                |  |       |                     |                  |
| Positive active energy (A+) in tariff T1 [kWh] (consumption) | 1.8.1 (1.8.0, 1.8.2)*  |   |  |       |      |  |                       |  |                |  |       |                     |                  |
| Positive active energy (A+) in tariff T2 [kWh] (consumption) | 1.8.2 (1.8.3)*   |   |  |       |      |  |                       |  |                |  |       |                     |                  |
| Negative active energy (A-) total [kWh] (supply)             | 2.8.0  |   |  |       |      |  |                       |  |                |  |       |                     |                  |
| Gauge serial number  | C.1.0 (or 0.0.0)   |   |  |       |      |  |                       |  |                |  |       |                     |                  |
| Transmission network   | SIGFOX (ISM 868MHz band)   |   |  |       |      |  |                       |  |                |  |       |                     |                  |
| Connectible to the repeater                                  | SENSECOM-WSH, SENSECOM-WSHD to SIGFOX, SENSECOM-WNH to NB-IoT  |   |  |       |      |  |                       |  |                |  |       |                     |                  |
| Datagram   | 8Bytes/message (or 12Bytes via repeater, where 4 bytes are reserved for the source device ID). One message contains the value of one register (OBIS code)  |   |  |       |      |  |                       |  |                |  |       |                     |                  |
| Types of messages  | <ul style="list-style-type: none"> <li>Interval (periodic)</li> <li>Initial with setting status</li> <li>Alarm - reading error, missing OBIS code, tampering with the device (detected by accelerometer)</li> <li>Keep-Alive (24h)</li> </ul>  |   |  |       |      |  |                       |  |                |  |       |                     |                  |
| Setting the readout interval and messages                    | <p>Readout interval adjustable in 10min multiples (number of registers * 10min is the minimum readout interval, the shortest possible interval is 15min, automatic correction in case of inappropriate configuration).</p> <p>The interval of messages in one set (one reading) is fixed at 10min, except for the set of messages of the first reading after reset (message interval about 15s).</p>   |   |  |       |      |  |                       |  |                |  |       |                     |                  |
| Default reading interval                                     | 24h  | 1h  | 1h   |       |      |  |                       |  |                |  |       |                     |                  |
| Jam interval   | <b>10 min</b> interval between alarm messages of the same origin, the first alarm is immediate (no delay)  |   |  |       |      |  |                       |  |                |  |       |                     |                  |
| Access to data   | Back-end of SIGFOX network or SENSEPARAM portal (with normalized values), data transfer options: <ul style="list-style-type: none"> <li>Call-back (push)</li> <li>REST-API (SIGFOX B/E only)</li> <li>Email alarm notifications</li> <li>SMS alarm notifications (SENSEPARAM only)</li> <li>CSV download</li> </ul>  |   |  |       |      |  |                       |  |                |  |       |                     |                  |
| Data encryption  | OMD-A models use <b>E2E</b> encryption by <b>AES-128CTR</b> (AES-256 possible) with individual keys for each device. Decryption on the SENSEPARAM portal or in the customer database.  |   |  |       |      |  |                       |  |                |  |       |                     |                  |
| Internet transmission security                               | <b>SSL/HTTPS, callback</b> SIGFOX cloud -> SENSEPARAM or SIGFOX cloud -> customer databases, similarly SSL/HTTPS, callback from SENSEPARAM to customer database  |   |  |       |      |  |                       |  |                |  |       |                     |                  |
| Auxiliary sensors  | Thermometer (processor temperature) or accelerometer (on request for series >100pcs)   |   |  |       |      |  |                       |  |                |  |       |                     |                  |
| Power  | 2x lithium non-rechargeable replaceable batteries size "A", 3,6V, type LS17500   | Via <b>USB-C</b> connector from an adapter, power bank, etc. (can add batteries for power backup) | built-in accumulator, rechargeable via <b>USB-C</b> connector                    |       |      |  |                       |  |                |  |       |                     |                  |
| Estimated battery life                                       | <b>approx. 10 years</b> - with one reading of 4 registers per day  | -   | <b>approx. 9 months</b> on one battery charge - with 1hr readings of 4 registers |       |      |  |                       |  |                |  |       |                     |                  |
| Antenna  | Bar antenna for ISM band, placed on the front or side of the device  | Stick antenna for ISM band, connectable via SMA-M connector on the top of the device              | Built-in antenna   |       |      |  |                       |  |                |  |       |                     |                  |
| Coverage   | IP52   |   |  |       |      |  |                       |  |                |  |       |                     |                  |
| Weight   | 200g   |   |  |       |      |  |                       |  |                |  |       |                     |                  |
| Dimensions without antenna and SMA                           | 45x68x40mm   | 41x68x36mm  | 45x78x36mm   |       |      |  |                       |  |                |  |       |                     |                  |

