

# SENSECOM- IMNT



## NB-IoT communication equipment for impulse readings

### Purpose

The SENSECOM-IMNT device is designed for **pulse readings of 1-2 channels** (CNT0, CNT1) with digital input for flow direction resolution for CNT0 channel. The device includes also one separate digital input. The SENSECOM-IMNT sends statuses and alarms via a **NB-IoT** type wide area IoT network operated by certain mobile operators.

The SENSECOM-IMNT is battery powered with a lifetime of about **10 years** without battery replacement (one day of sending message, hourly statuses).

**Typical use:** remote readings from billing and sub-meters with high accuracy, e.g. water meters, gas meters, or other sensors with pulse output, with ability to detect leaks and evaluate peaks.



### Description of equipment:

#### Device inputs

**SENSECOM-IMNT** has the following inputs:

- **CNT0, CNT1** - two separate pulse inputs from the voltage-free contact input (gas meters, water meters)\*.
- **DIR** - input for determining the direction of flow on CNT0\* (independent direction counters)
- **DI** - digital voltage-free input\* (for switched contact)

\*Alternatively, it is possible to connect an output with an open collector with a maximum on-state voltage of 0.5V at a current up to 0.5mA, in this case it is necessary to observe the polarity.

#### Wireless communication

SENSECOM-IMNT sends the readout statuses to the **NB-IoT** network. Multiple antenna types with SMA connector can be used for NB-IoT network. Dipole antenna (for sticking to non-metallic surface) with 1m cable is included.

#### Data processing

Data from the readout unit can be accessed in two ways:

- **SENSEPARAM portal** - values (charts, tables) are made available in processed, transformed form. Further transmission is possible in the form:
  - Call-back do server
  - Notifications Email / SMS
  - Download to CSV
- **UDP packets** directly from NB-IoT network to the customer's server with raw data

#### Device security

The device sends a Keep-Alive message at least once/day with the battery voltage and CPU temperature status and other system data.

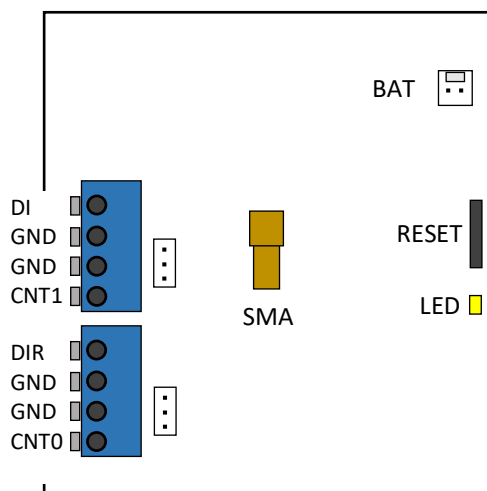
The device can be configured for SW encryption of transmitted data using the AES-256 algorithm. In this case, the decoding of messages is performed in the SENSEPARAM portal. User access portal with SSL encryption and can use 2FA (required for L2, L3 user rights).

#### Types of messages

Types of messages transmitted to (from) the cloud:

- **Periodic statuses** - interval message containing readings from pulse inputs, normally in 24-hour interval (adjustable from 15min-1day). The message also contains the maximum value (peak) since the previous message.
- **Volume statuses** - A readout status message sent when a preset volume of pulses counted from the previous message is reached. Configurable volume is 1-50000.
- **Alarm message** - a message generated when the threshold values of the normal consumption pulses are exceeded in a measured period of 10s (adjustable 10-85s), i.e. signalling extreme consumption (crash, media leak) if it is switched on. The device is also capable of sending alarms such as: change of flow direction in CNT0, change on digital input.
- **Keep-Alive message** - a periodic daily system message
- **Downlink message** - a message received by the device from the back-end for configuration purpose.

## Connecting the SENSECOM-IMNT device



Legend:

**CNT0, CNT1...** pulse inputs from voltage-free contact\* (from water meter, gas meter, etc.)

**DIR** ... input for media flow direction for CNT0 \* (by voltage-free contact, i.e. by switching DIR to GND)

**DI** ... digital input from a voltage-free contact\* (e.g. from a float)

**GND** ... ground

**SMA** ... output to external antenna via SMA connector

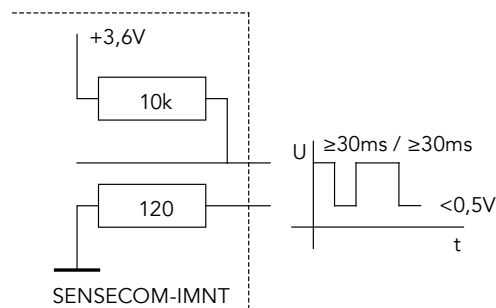
**LED** ... two-color indicative LED for initiation and operation

**RESET** ... reed relay for resetting the device with an attached magnet (does not reset the readings, permanent attachment is ignored)

**BAT** ... battery inlet connector (has a lock for polarity and attachment)

If several devices are connected to the inputs (CNT0, CNT1, DIR, DI) and share a common ground between them, the common ground must also be observed when connecting their wires to the GND of the SENSECOM-IMNT inputs.

\*Alternatively, it is possible to connect an **open-collector** output with a maximum on-state voltage of 0.5V at a current up to 0.5mA, but the polarity of the connected wires must be observed: + to the input and - to GND. For this type of connection, it is necessary to check the documentation of the manufacturer of the device providing the pulses. For possible higher voltages in the switched state, functionality cannot be guaranteed.



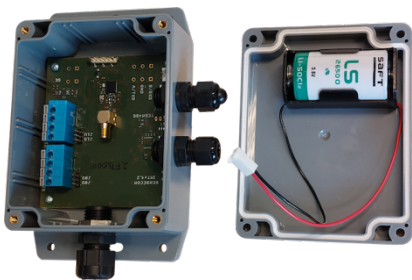
# Technical parameters

Parameter	SENSECOM-IMNT
Main reading inputs	Primary - <b>CNT0 pulse input</b> (voltage-free contact input*), 2 state-filled pulse counters on digital input DIR. Secondary - <b>CNT1 pulse input</b> (voltage-free contact input*).
Digital inputs	<b>DIR input</b> - input of flow direction, tariff, etc. resolution on CNT0 pulse input (voltage-free contact input*), from which it divides pulses into 2 counters <b>DI input</b> - digital input (voltage-free contact input*), e.g. for signaling from a float sensor about shaft flooding
Accuracy of readings	>99% of pulses
Network for data transmission	NB-IoT
Types of messages	<ul style="list-style-type: none"> <li>Normal interval or volume with read pulse values</li> <li>Initialization with configuration values</li> <li>Alarm - excessive consumption/media leakage, change of power supply status, change of tariff (adjustable alarm activation)</li> <li>Keep-Alive (24h) system message</li> </ul>
Interval sending of messages with values	10-1440min ( <b>default 1440min=24h</b> ), adjustable in 10min increments
Pulse volumes for volume messages	1,2,5,10,20,50,100,200,500,1k,2k,5k,10k,20k, <b>0-off</b> (default),
Delayed interval between alarms	<b>20min</b> , the first alarm message of a given type is without delay
Additional features	<ul style="list-style-type: none"> <li>identification of CNT0 consumption peaks in short intervals (10-85s)</li> </ul>
Access to data	Sending UDP packets to the destination server (configurable via SENSEPARAM portal) or SENSEPARAM portal with middleware (data normalization, conversions to final values), data transfer variants: <ul style="list-style-type: none"> <li>Call-back (push)</li> <li>Email / SMS</li> <li>CSV download</li> </ul>
Manipulation detection	No (can be added for orders from 100 pcs upwards)
Antenna	External NB antenna, connected via connector (SMA-M), dipole antenna with 1m cable included
Connecting inputs	Spring self-locking clamps
Power	Lithium non-rechargeable battery <b>3.6 V</b> , type LS 14 5,8Ah size "C", connecting to the connector on the board starts the power supply of the device
Coverage	IP67
Weight	150g
Dimensions	115x90x55mm (without grommets and handles)

\* Alternatively, it is possible to connect an **open-collector** output with a maximum voltage in the switched state of 0.5V at a current up to 0.5mA, in this connection it is necessary to observe the polarity + CNT and - GND. When connecting multiple inputs, a common ground (GND) must be maintained if the connected devices on the inputs also share a common ground on their side.

## Device design

The SENSECOM-IMNT is supplied in an IP67 ABS housing with 1-2 M12 grommet for pulse input and 1 M16 grommet for external antenna (SMA connector can be threaded through). A dipole ISM antenna (with self-adhesive tape) with 1m coaxial cable terminated with SMA connector is included as standard.



SENSECOM-IMNT2



Dipole antenna with SMA

SENSECOM model	Number of signal grommets M12
IMNT1	1
IMNT2	2

