

SENSECOM-ANC

Communication unit for voltage and potentiometric inputs (probes)



Purpose

SENSECOM-ANC communication unit is designed for accurate measurement (based on 18-bits A/D) of **1-3 voltage or potentiometric inputs from sensors**. The measured values are sent via a nationwide IoT network **SIGFOX**.

SENSECOM-ANC is optimized for operation from the battery, its expected endurance with 2 value messages / day is more than 8 years.

Typical applications: accurate measurement of inclinations of structures and slopes, measurement of displacement and cracks, measurement of temperatures, etc. using voltage or potentiometric based sensors.

Device description:

SENSECOM-ANC is used for remote measurement of analog signals with 18-bit A/D converter. The device is in sleep mode by default. It wakes up on a trigger or at regular intervals, takes measurements and sends a message. Periodic measurement is performed after an adjustable delay (pre-trig), designed to activate / warming-up the probes before measurement.

The device has one built-in input channel and 2 positions for other **SENSECOM-ANCM** additional modules (channels).

The device allows you to measure one of the following values on each connected channel:

- voltage 0 to 10 V (Unbalanced)
- voltage -5 to +5 V, eventually -10V to +10V (Balanced),
- voltage on the potentiometric probe slider 5 - 50 kΩ excited by voltage from the device

The device transmits the measured values without modifications (without calibration) via the IoT network SIGFOX to the cloud. The default 2 measurements / day can be adjusted (1-140 / day).

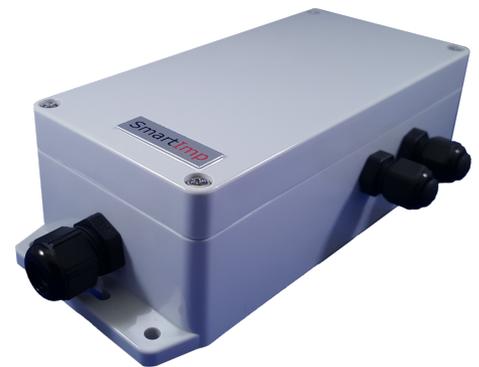
Calibration and adjustment

The measured values are transmitted without calibration. To determine the measured voltage, a calibration reading must be performed on the given channel of the device before commissioning and used for adjustment of received data.

Calibration readings can be obtained either from the incoming IoT network data or using the debug **module SENSECOM-ANCD** with a serial interface, or with a USB converter. With this module it is also possible to set the parameters of the device.

Data processing

The measured values are available for processing in the SIGFOX cloud, typically within 7 seconds from the end of the measurement. Data can be obtained using a call-back mechanism (push method), REST-API, or by downloading to a CSV file (manually) in SIGFOX cloud.



There is also **SENSEPARAM** portal available where the data is already normalized and with calibrations, if set.

With **SENSEPARAM** portal you can also setup callback, download data, setup email or SMS notification for alarms, too.

Device security

The device contains an accelerometer that indicates manipulation with the device and sends an alarm message. The device also sends 1x / day system Keep-Alive message with information about battery voltage and processor temperature. Missing Keep-Alive detects device disconnection or failure. There is also optional a temperature and humidity sensor which can indicate environmental change inner the device if the sensors are enabled (ACHT model). Message transmission has assured integrity through the AES-128 algorithm (message spoofing avoidance).

Message types

Types of transmitted messages to (from) the cloud:

- **Status message** - periodical message containing measured values from the sensors.
- **Alarm message** - a message generated when accelerometer threshold, or significant temperature or humidity change thresholds are exceeded.
- **Keep-Alive message** – 24h system periodical message.
- **Downlink acknowledge message** - System response to received downlink.
- **Configuration message** - comes after successful receipt and processing of downlink.
- **Downlink message** - message received by the device from SIGFOX back-end. It is used for configuration of the device.

Remote setup and FW upgrade

Period of value messages, inner sensors sensitivity or their de/activation can be set remotely once a day (via downlink). The device may not be able to receive a downlink message even though the uplink message has been received regularly by the network in places with poor coverage of the SIGFOX network. Remote FW upgrade is not possible.

Technical parameters

Parameter	Value
Type and number of connectable probes (sensors)	Applicable for voltage and potentiometric probes Inputs for 1-3 probes (1x built-in and positions for 2 additional modules SENSECOM-ANCM). Independent channels.
Control inputs/outputs	Output: signaling the beginning of the interval at the optocoupler before measurement (used to prepare probes for measurement) Inputs: Start of the measuring cycle by closing the potential-free contact
Measurement parameters - options	Voltage 0 to 10V (unbalanced) Voltage -5V to +5V, eventually -10 to +10V (balanced) Position of the probe potentiometer with voltage excitation from the device
Measurement accuracy	10V/16bit (<0,25 ‰)
Transmission data network	Nationwide network SIGFOX (bandwidth ISM 868MHz)
Uplink message types	Periodical with measured values Initial with measured values POST/Configuration Alarm – manipulation (accelerometer), temperature or humidity significant change Keep-Alive 24h
Periods for measurements and messages sending	10min, 30min, 1h, 2h, 4h, 12h-default , 24hod
Delay (pre-trig) before measurement starts	6s (configurable 0-30s, 2s step) Signaling the beginning of the pre-trig interval at the optocoupler
Data accessibility	SIGFOX Back-end (12 Bytes payload messages) or SENSEPARAM portal (with data normalization, eventually with calibration if set), options for data transmission: <ul style="list-style-type: none"> Call-back (push) REST-API (only SIGFOX) Email alarm notifications SMS alarm notifications (only SENSEPARAM) CSV download
Device inner sensors	Accelerometer, thermometer, humidity meter – configurable sensitivity for alarms
Antenna	Stick antenna for ISM bandwidth (868MHz), alternatively external antenna via SMA
Power supply	Lithium battery (non-rechargeable) 3,6V, soldered, size C, type SAFT LS 26500 (7,7Ah) Outlet for connecting a spare battery (with case) or external power supply possible
Expected life prior battery change	>8 years with 4 messages a day (2 measurements, 3 probes)
Probe connection	Using WAGO clamps via bushings (1xM16, 2xM12), alternatively via one larger bushing, 3 cable holes
Casing protection	IP65 (IP67 with silicon)
Weight	250g
Operating temperature	-25°C to +75°C
Case dimensions	160x80x60 mm (without bushings and flanges)
Certification SIGFOX	P_00B4_FE9C_01

SENSECOM-ANC device case

The device is in a plastic case (ABS) with dimensions 160x80x60mm (h-w-d) without bushings and flanges. The case can be attached in all 4 corners. The housing is IP65 (or IP67-68 using silicone). Bushings: 1x for RG58 cable or stick antenna and 3x bushings for probe cables. Mounting flange is designed on the bottom of the case, so it can be mounted with pan head type of screws easily.

