

SENSECOM - CMD

Communication unit for serial data readings

SENSECOM-CMD with RS232 or RS485 interface

Purpose

The **SENSECOM-CMD device** is designed for data readings via serial **RS-232** or **RS-485** interface using **MODBUS** or **M-BUS** protocol. Inputs are galvanically isolated in models powered from mains, and non-isolated in case of battery models.

The device sends readings via a nationwide **SIGFOX** IoT network, directly or via repeater **SENSECOM-WSH** (for radio-hard-to-reach locations). Power outage limited functioning is ensured by the supercap. Selection of up to 15 device registers to be read is configurable via downlink.

SENSECOM-CMD contains supercap for short power back-up. **SENSECOM-CMD** is manufactured in a DIN rail casing, 3U width, IP20.



SENSECOM-CMD - illustrative photo

Typical applications:

remote readings from registers of utility meters or other devices possessing serial interface, e.g. electricity meters, gas meters, water meters, calorimeters using standardized registers and protocols. If vendor-specific protocol is applied, additional firmware development is needed to support this.

Description:

Device inputs:

SENSECOM-CMD has the following inputs:

RS-232

- models SENSECOM-CMD232

RS-485 half-duplex

- models SENSECOM-CMD485

RS-485 full-duplex

- models SENSECOM-CMD485F

Supporting up to 15 registers readout.

- Connection of external antenna (located outside of the switchboard) using coaxial cable
 - Casing the device to a separate plastic cover outside the electricity switchboard
3. Insufficient network availability in the switchboard, basement, shaft, etc., but available in diameter of ~20m from the switchboard
 - Location of the SENSECOM-WSH repeater in the area of the SIGFOX network availability and pairing it with the device

Wireless communication

SENSECOM-CMD sends reading statuses to the IoT network SIGFOX directly or indirectly via WLAN. To ensure successful sending of messages, you can use different broadcasting modes according to the availability of SIGFOX network:

1. Seamless network Availability
 - Small stick antenna (included)
2. Insufficient network availability in the switchboard, but available outside of the switchboard

Message types

Types of messages transmitted from SENSECOM-CMD to Cloud:

- **Interval reading** – Message or series of messages containing readings from serial input, by default in the 24-hour interval (the interval is adjustable for 10 min in the range 10min-1440min). If more registers are read, then messages are split into more messages, if the

content of register is higher than 4bytes, the value is split into two messages. Set of read registers can be defined by downlink – added or removed.

- **Alarm Message** – A message generated when power failure/recovery from the mains happen (if enabled), in case of physical manipulation (device shaking, tilt, etc.) detected by accelerometer.
- **Keep-Alive Message** – A periodic system message that the device broadcasts every 24 hours by default.
- **Downlink Acknowledge Message** – System response to the received downlink.
- **Downlink Message** – a message of 8 Byte length that the device receives from the SIGFOX backend as part of the first message sent after each Keep-Alive message. If there are Downlink data available on the backend, device receives message, reset parameters and accepts the message

Message delivery depends on sufficient network coverage to send or receive messages from SIGFOX network.

Source device registers reading

Selection of registers to be read of the connected device is configurable via downlink – selected registers are to be added or removed from the readings set, initial set is empty, if not preprogrammed by vendor on request (for series >100pcs). If more registers are read from the source device, then more messages are generated at each transmission period.

Optional related devices

Repeater SENSECOM-WSH

SENSECOM-WSH repeater allows communication with SENSECOM-CMD within local wireless (WLAN) broadcasting with high signal penetration within ~20m diameter (up to 200m in direct visibility) and resending it to the SIGFOX network.



Data processing

Data from the device can be accessed in two ways:

- SIGFOX Backend - received readings are stored in the SIGFOX cloud for further processing
- SENSEPARAM portal - readings are available in the in the end-values form (normalized)

In both cases, the forwarding of data to a customer is possible by these means:

- Call-back
- REST-API (only SIGFOX Backend)
- Email/SMS
- Download do CSV

Device security

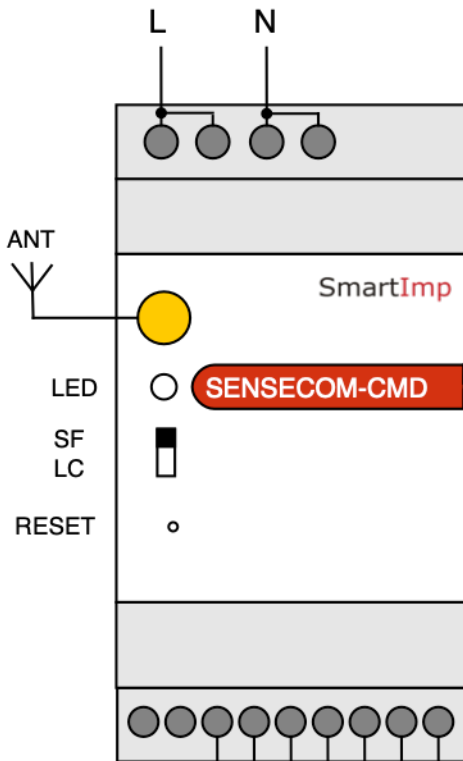
The device sends a minimum 1x/day system Keep-Alive message with the battery voltage and CPU temperature status.

Message transfer has ensured integrity by using the AES-128 algorithm (prevention of the message forgery). The device can be preconfigured by vendor on request to SW encryption of payload messages using the algorithm AES-128CTR. Message decoding is done then at customer's side. Device includes accelerometer to detect manipulation and sends alarm message even in power-off mode (there is backup by supercap for ~2h).

Other device parameters

The consumption of the device is < 0.5 VA (the device can be powered even from a non-measured side of meter if approved by Electrical Energy Distributor). There are some battery model options, too. The power from mains is backed up by a supercap – allows to send a message about the loss of power from mains.

SENSECOM-CMD wiring scheme



Warning: The device installation may only be carried out by a person qualified to work with LV voltage distribution.

The device is supplied in a DIN-type plastic housing, **3U wide**, in IP20 enclosure, which is designed to be place on a DIN rail. The device can be mounted the way allowing to access front panel after closing and sealing the switchboard without interfering measurements and meters in non-destructive manner. Connection scheme for different models is shown here.

Legend:

CMD485FG ... RS485 Full Duplex serial bus, galvanically separated inputs: A, B, Y, Z and G apply (cannot be used in Half Duplex mode)

CMD485G ... RS485 Half Duplex serial bus, galvanically separated inputs: A, B and G apply

CMD485T ... RS485 serial bus, battery type without galvanic separation

CMD232G...RS232 serial bus, galvanically separated inputs: Rx and Tx inputs, eventually RST/CTS apply

CMD232T ... RS232 serial bus, battery type without galvanic separation

L... Phase input (220-240V, 50Hz),

N... Neutral input

Note: L and N uses two terminals internally joined for throughout connections

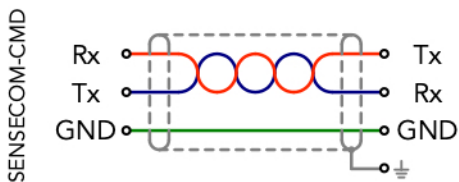
CMD485FG	:	:	Z	Y	G	B	A
CMD485G	:	:	-	-	G	B	A
CMD232G	:	:	CTS	Rx	G	Tx	RTS
CMD485T	:	:	-	-	G	A	B
CMD232T	:	:	Rx	Tx	G	-	-

ANT... Output to a small stick or external antenna via SMA connector

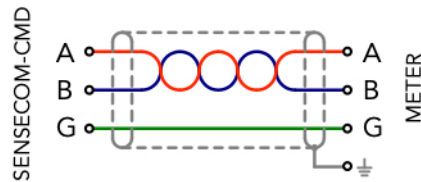
LED... Two-color indicative LED for initiating and operations

SF/LC... Switch between transmission to SIGFOX and to the local WLAN

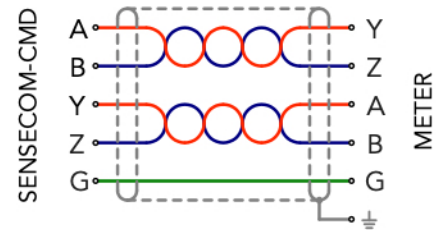
RESET... Device reset (permanent push is ignored)



RS232 Interconnection



RS485 Half Duplex Interconnection



RS485 Full Duplex Interconnection

Ordering specifications

Device	Device type	Casing	Protocol	Interface	Inputs isolation	Power
SENSECOM -	CM	D...DIN rail	O...MODBUS M...M-BUS	232...RS-232 485(H or void) ...RS-485 half duplex 485F...RS-485 full duplex	void...no isolation G...galvanic isolation 4,5kV	void...Mains T...Battery

Example: SENSECOM-CMD0485T includes RS485 Half Duplex serial interface with MODBUS protocol, battery mode (not mains supply).

Currently available models: SENSECOM-CMD0232T, CMD0485T, CMD0232G, CMD0485G, CMD0485FG

Technical parameters

Parameter	CMD485G	CMD485FG	CMD485T	CMD232G	CMD232T
Reading serial interface	RS485 half duplex (3 wires)	RS485 full duplex (5 wires)	RS485 half duplex (3 wires)	RS232 (3 wires or 5 wires with CTS/RTS)	
Reading communication protocol	MODBUS (CMDO... type) M-BUS (CMDU... type)				
Power supply	Mains 240V/50Hz		Battery 3,6V (SAFT LS26500)	Mains 240V/50Hz	Battery 3,6V (SAFT LS26500)
Transmission network	SIGFOX (ISM 868MHz bandwidth)				
Data payload	8Bytes / message (or 12Bytes using repeater, 4 bytes reserved for source device ID). Each register can be sent by 1-2 messages (2 messages apply for >4Bytes register contents)				
Source device Registers selection	Set of source device registers to be read is setup by downlink by adding or removing ones in the set, initial set is empty. Maximum 15 registers are supported. Initial set of registers can be pre-set by vendor on request for 100+ series at production.				
Message types	<ul style="list-style-type: none"> ▪ Periodical ▪ Initial with device current pre-set values ▪ Alarm – manipulation with device (detected by accelerometer), change of power state ▪ Keep-Alive (24h) 				
Message period setup	10min-24h (step 10min), default 24h				
Messages interval hold-on period	10min between alarm messages, the first alarm message is instant (no hold-on)				
Data access	SIGFOX back-end, data transmission options: <ul style="list-style-type: none"> ▪ Call-back (push) ▪ REST-API ▪ Email ▪ CSV download 				
Secondary sensors – Accelerometer	Yes				
Antenna	Stick antenna for ISM bandwidth, connected via SMA-M connector at the front panel of the device				
Expected backup power life during mains power failure	2h with up to 5 messages sent in backup mode for models powered from mains (back-up ensured by supercap)				
Inputs and power connection	Screw terminals				
Casing	IP20				
Weight	120g				
Dimensions	3U (for DIN rail), 90x53x50mm				

Device design

The SENSECOM-CMD is in a DIN rail housing of 3U width, with a stick antenna attached to the SMA connector on the front panel.

