

SENSECOM-WSH, WNH

Communication gateway or repeater between WLAN - SIGFOX and WLAN - NB-IoT

Objective:

The device works as a gateway for data transfer from selected* SENSECOM end devices via WLAN to the selected full IoT network:

- **SIGFOX** (type SENSECOM-WSH)
- **NB-IoT** (SENSECOM-WNH type)



SENSECOM-WSH
(battery case C)

SENSECOM-WSHD, WNH
(battery case D, D+)

*possibly from one end device as a repeater

Typical use:

- Transmission of data from radio-hard-to-reach places, where the full-area network is available at a distance of up to 20m (as a repeater)
- Data transmission to the full-area network simultaneously from multiple devices located in the vicinity up to 20m (in the gateway function)

Description of equipment:

The **SENSECOM-WSH, WNH** is designed as a repeater for one SENSECOM device or as a gateway for data transmission from multiple SENSECOM devices equipped with a modem for WLAN transmission. The repeater or gateway provides further communication to one of the nationwide IoT networks: the SIGFOX or NB-IoT of mobile operators. The **SENSECOM-WSH, WNH** is used in cases where the SENSECOM terminal device is located in a radio-hard-to-reach location or for bundled transmission of multiple SENSECOM devices within a radius of up to 20m.

The device is designed to be easily installed by the end user without specific knowledge or competence. It has a built-in reed switch near the LED to activate the device by the magnet from sleep mode and initiate pairing.

The device is powered by replaceable, non-rechargeable, lithium batteries, size C or D, with standard or higher current load (D+). Battery life of the device is 5-10 years (depending on the number of messages transmitted, battery size, network type).

Types of equipment

The devices are manufactured in the following versions:

Primary function	Number of connectable devices	Battery size	SIGFOX	NB-IoT
Repeater	1	C	WSH	-
		D (D+)	WSHD	WNH
WSHD3				
WSHD5				
WSHD15				
Gateway	3	D (D+)	WNH	
	5			
	15			

Data processing

The data transmitted from SENSECOM end devices via SENSECOM-WSH, WNH are available for processing in the IoT network typically within 10 seconds after the end device in the WLAN network has finished transmitting, unless multiple messages are set to be sent together in periods. In case of attempted simultaneous transmissions in the WLAN or WLAN and IoT network, a delay may occur, with communication possibly repeated several times.

The data can be collected with respect to the type of network and portal solution as follows:

- **SENSEPARAM portal**
 - Portal access to processed SENSECOM data and subsequent call-back to the database, notification (SMS, e-mail) or download to CSV file
- **SIGFOX cloud**
 - by call-back (push method), REST-API, or by downloading to CSV file (manually)
- **NB-IoT**
 - Through the SENSEPARAM portal
 - Alternatively, using UDP direct data transfer to the customer server as agreed with the provider

The data transmitted through this gateway (or repeater), which is made available in the SENSEPARAM manufacturer's portal, is processed and displayed as if it were transmitted directly from the SENSECOM end devices. SENSECOM-WSH, WNH devices have their own initialization and pairing messages or downlink messages for repeater/gateway setup.

Equipment and communication security

The device may include an accelerometer to indicate tampering/manipulation of the device. In the event of an intrusion, it sends an alarm message. The device also sends a 1x/day system keep-alive message on battery voltage and processor temperature. The message transmission has integrity assured in the case of the SIGFOX network via the AES-128 algorithm (to prevent message spoofing). In the NB-IoT network, authenticity is provided by SIM. Data can be E2E encrypted. Data transfer in NB-IoT, from the SIGFOX cloud or from SENSEPARAM is secured in the Internet by SSL (login to the

SENSEPARAM portal is subject to 2FA authentication for operators and administrators).

Types of messages

Types of transmitted messages:

- **Daily status reports** - reports on the configuration and status of the device.
- **Alarm message** - message generated when accelerometer thresholds are exceeded.
- **Keep-Alive message** -system periodic message sent by the device after 24 hours. (SIGFOX network)
- **Downlink acknowledge message** - system response to a received downlink (SIGFOX network).
- **Configuration message** - arrives after the downlink has been successfully received and processed.
- **Downlink message** - a message that the device receives from the back-end system as part of a message send if the device requests it (before going to sleep). It is used for possible device reconfiguration or one-time commands.

Remote setup and FW upgrade

The basic period of sending value messages, the sensitivity of the internal sensors and their de/activation can be remotely reset once a day as standard. In locations with poor network coverage, the device may not be able to receive a downlink message even though the network has received uplink messages from the device. Device FW upgrades cannot be done remotely in SIGFOX networks, only in NB-IoT.

Equipment housing:

The device is supplied in an ABS housing with IP65 or IP67 protection. Antenna is included in the base plate of the device. The device is available in 3 versions - with narrow housing with lithium battery size "C" (repeater mode in SIGFOX network), with standard housing with lithium battery size "D" (gateway mode for both types of networks).

Technical parameters

SENSECOM	WSH	WSHD	WSHDx	WNH
Local network	WLAN			
IoT transmission network	SIGFOX			NB-IoT
Basic mode	Repeater		Gateway	
Number of connectable SENSECOM devices	1		3 (WSHD3) 5 (WSHD5) 15 (WSHD15)	
Connectable to SENSECOM devices	ACH, ACP, IMD, IMT, CMD, OMD, DI, SK, FU, SE and possibly others (specified in the documentation for these devices)			
Datagram	12 Bytes (8+4 Bytes) - 8B is the datagram from the SENSECOM end device and 4B is its ID			packets of length 28-1240B (with eventual message aggregation)
Types of messages	<ul style="list-style-type: none"> ▪ Interval (periodic) ▪ Initial (configuration) ▪ Alarm ▪ Keep-Alive (24h) 			<ul style="list-style-type: none"> ▪ Interval (single or combined) ▪ Initial (configuration) ▪ Alarm
Interval status msg.	Adjustable 10min-24h in 10min increments, default is 24h interval			
Delay interval	10 min interval between alarm messages of the same origin, the first alarm is immediate (no delay)			
Access and data transfer options	SENSEPARAM: <ul style="list-style-type: none"> ▪ Visualization of processed data (reports, tables, graphs) ▪ Email or SMS event notifications ▪ Call-back (push) of processed data ▪ CSV download of processed data SIGFOX back-end: <ul style="list-style-type: none"> ▪ Call-back of source data ▪ REST-API of source data ▪ Email notification of communication loss and network events ▪ CSV download of source data 			The APN of the NB-IoT operator: <ul style="list-style-type: none"> ▪ UDP source data
Auxiliary sensors	Accelerometer (selected models), Thermometer (processor temperature)			
Power	Battery "C" LS 26500	Battery "D" LS 33600		Battery "D+" LSH 20
Battery endurance estimation	approx. 2-8 years*	approx. 5-10 years*	approx. 3-10 years*	approx. 2-8 years*
Antenna	Embedded			
Coverage	IP67			
Weight	200g		300g	
Dimensions	36x184x35mm		80x160(190)x55mm	
Method of attachment	Adhesive tape or 2 dow.		For 2-4 dowels	

*Depends mainly on the total number of messages sent

