

DATASHEET

document version 2.0

Introduction

The TAC-B sensor use the mmWave contactless technology which operates in the spectrum 77 GHz. The sensor emits a scanning "chirp" and receives reflections from objects.

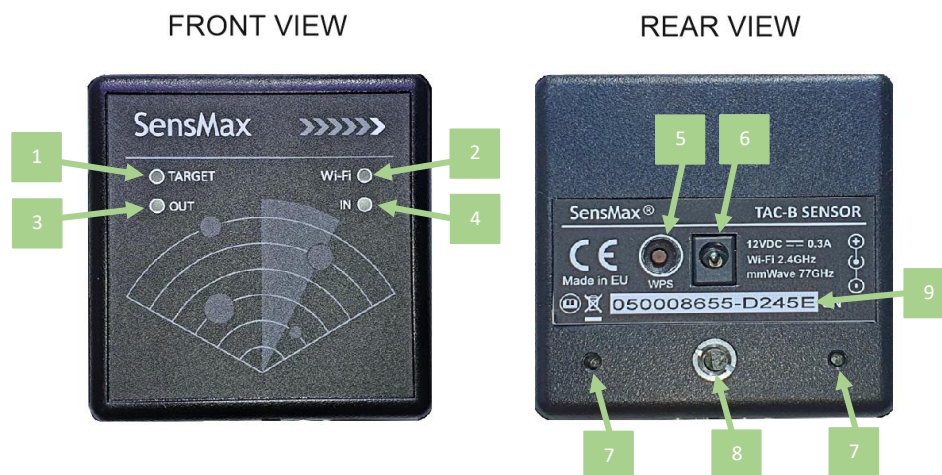
SensMax TAC-B sensors can be used for robust indoor/outdoor sensing in all lighting, smoke, fog, rain, detect very fine motions, penetration through materials like plastic, fabric, and drywall.

The SensMax TAC-B sensor was designed as standalone device for using in DIY projects etc.

Using of original SensMax software is optional, but sensor can be used without it.

The SensMax TAC-B sensor supports popular IoT MQTT protocol and Telegram API. These features gives reach opportunities for integration of TAC-B sensor to any projects.

TAC-B Sensor Elements



Item	Status	Description
1. TARGET	Blinking	Sensor captured at least one target. The blinking frequency is dependent from distance from object till sensor (fast blinking for near target and slow for the far target).
2. Wi-Fi	Lights Flashes 1 time per sec Flashes 3 times per sec	Wi-Fi Network & server both connected. Wi-Fi connected but server not connected. WPS mode activated.
3. OUT	Flashes	Blinks when sensor detects new OUTGOING visitor for any Gate or Zone.
4. IN	Flashes	Blinks when sensor detects new INCOMING visitor for any Gate or Zone.
5. WPS button	Short Press Press and hold 30 sec	Start WPS process. Apply Factory Reset.
6. Power supply	n/a	Standard 5 mm diametre power supply connector.
7. Mounting hole type A	n/a	Hole for fixing of standard SensMax bracket.
8. Mounting hole type B	n/a	Standard tripod 1/4-20 UNC thread.
9. Serial number	n/a	Device serial number.

TAC-B Sensor Technical Specification

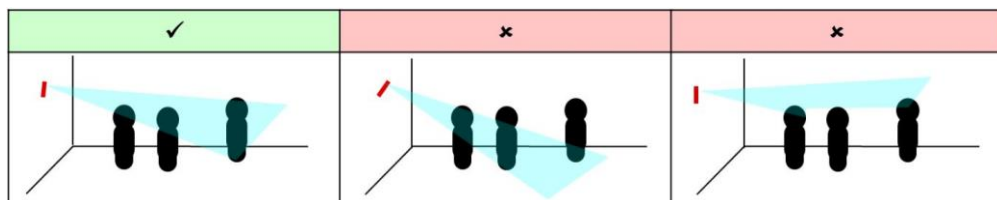
Enclosure	ABS plastic IP54
Counting accuracy	For range 6m >93% (for density 3 persons per m ²)
Field of view	120° horizontal, 30° vertical
Range	6m, 14m
Range resolution	5cm (for 6m range), 12cm (for 14m range)
Max speed of object detection	35 km/h
GDPR privacy law	100% compliant (provides complete anonymity)
Notifications & Reporting	Telegram notifications, MQTT protocol (Email notifications and reporting in case if sensor connected to my.sensmax.eu system)
Internet connection	WiFi 2.4 GHz / WPA2-PSK / WPA2-ENTERPRISE (PEAP-MSCHAPv2)
Data storage	SD card 16GB (enough for storage of 900 year of counting data with 5 minutes step)
Power	12VDC 0.5A
Dimensions	80x80x35 mm

TAC-B Sensor Installation

For best results, the sensor should be positioned high enough to be above the top of tracked objects and with a slight down tilt. The aim is to position the sensor so that the antenna beam can encompass the area of interest. If the down tilt is too severe, noise from ground clutter increases and the effective sensing area decreases. If there is no down tilt, counting performance would be worse for cases in which one person is in line with and shielded by another person. Given the antenna radiation pattern of the sensor node, consideration should be taken to not mount the sensor node too close or oriented with the beam directed to the ceiling as this can increase the noise floor and result in less optimal performance.

Optimal installation height: 2-2.5m

Down tilt: 10-15 degrees



Picture bellow shows possible installation using of standard SensMax bracket:



Configuration of TAC-B sensor using web page

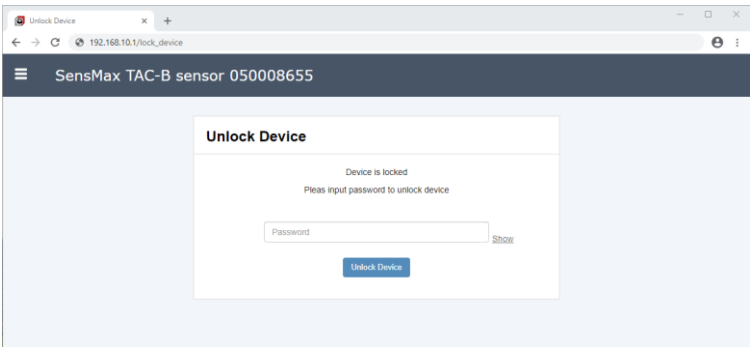
All configurations are available on the device web page.

To access settings web page, please do following steps:

- Connect device to power supply.
- Scan for available Wi-Fi networks on your Laptop or Mobil Phone.
- Connect to TAC-B AP (AP name is “SensMax TAC-B XXXXXXXXX”).
The default password is same as device Serial Number.
For example, in this document the device AP will be SensMax TAC-B 050008655, and password will be 050008655.
- Open your web browser.
- Input IP address 192.168.10.1 to address bar and press Enter.

The login page will be opened.

To unlock settings, please input your password again (for this example, password is 050008655).



Home web page

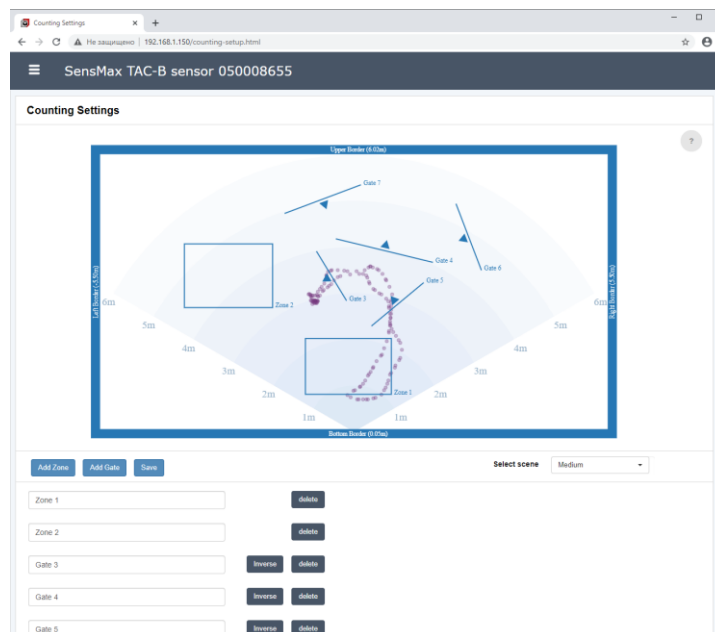
The **Home** page shows user defined gates and zone, how also currently tracked objects. The table below shows detailed counting result for every gate and every zone.



Counting Setup web page

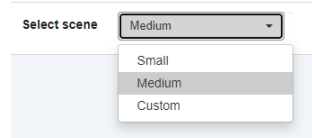
To enter page please press  button and select **Counting Setup** tab.

The **Counting Setup** page allows to setup user defined gates, zones and other parameters. User can add up to 5 gates and up to 5 zones.



Scene

To provide best counting and tracking results it is important to select scene correctly. User can select one from three pre-defined scenes (Small, Medium or Custom).



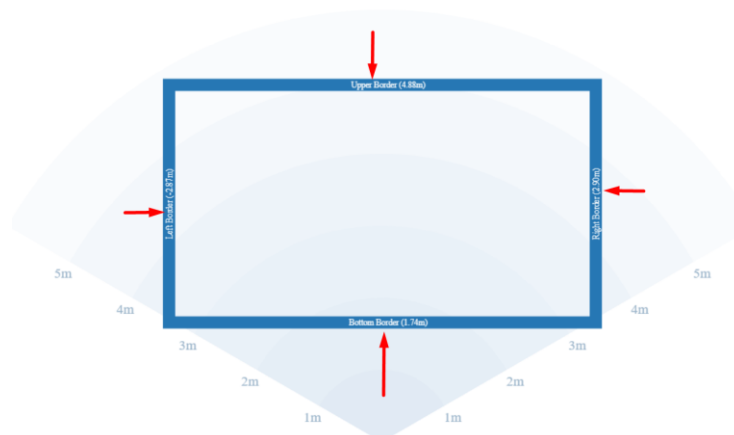
The **Small** scene is recommended to use in small rooms (elevators etc). The maximum range is limited by 3 meters for the Small scene.

The **Medium** scene it is common scene which have maximum range 6 meters.

The **Custom** scene allows use advanced settings, for example set range up to 14 meters. The advanced settings is described in **SensMax Custom Scene Setup** user manual.

In addition, the user can configure the active area by moving the borders.

Targets inside active area will be detected and tracked, targets outside of this area are ignored.



Route line

For convenient adjustment of the sensor, the movement of the objects are displayed on the field of view. Routes are not erased, so you can accurately position the counting zones based on the image of the routes.

Gates

The Gate indicates doors or entrances.

Each Gate has an IN and OUT direction.

The arrow located on the line of passage indicates the IN direction.

To add a Gate, click the **Add Gate** button and double-click the mouse, at the start point and at the end point.

To change the direction of the IN, click the **Inverse** button for the corresponding Gate.

Zones

Counting zones are indicated as rectangles.

The IN and OUT directions are not defined for the counting zone.

All visitors entering the zone will be counted with the direction IN, and all those who leave the zone will be counted with the direction OUT.

The zone has the INSIDE parameter, which displays the number of people inside the zone at the moment.

To add a counting zone, click the **Add Zone** button, and with two clicks, mark the beginning and end of the zone.

Example of adding new gate:

- Go several times along the route where the gate should be marked. Your route will be drawn on field of view (yellow line on picture below).
- Press **Add Gate** button.
- Click in desired place to indicate the beginning of gate.
- Click again to indicate the end of gate.
- Press **Save** button.



Names of Gates and Zones

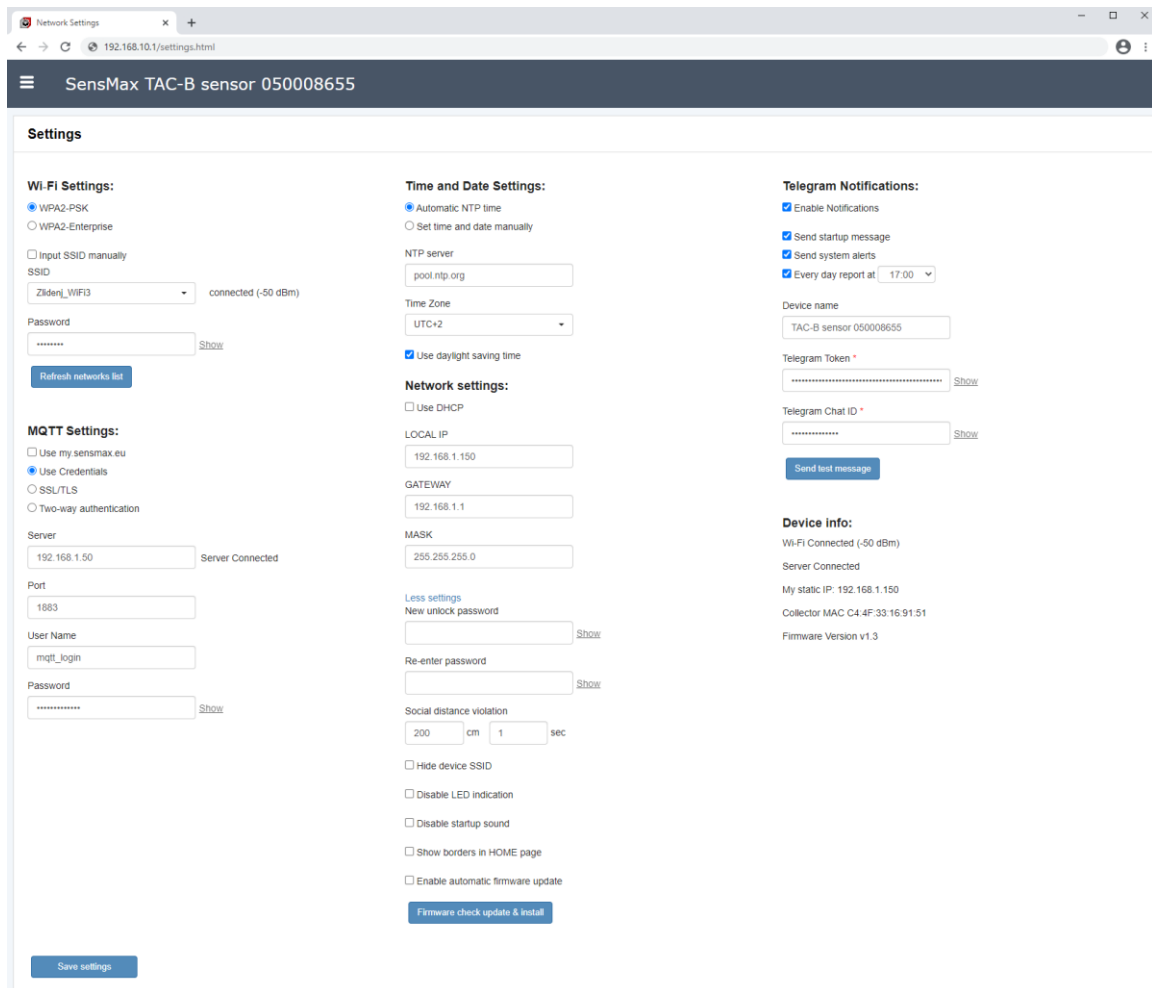
User able to rename gates and zones. Only Latin characters are supported.

Max name length is 16 characters.

If device connected to **my.sensmax.eu** system, these names will be synchronized with web application.

Settings web page

To enter page please press  button and select **Settings** tab.



The screenshot shows the 'Settings' page for a SensMax TAC-B sensor. The page is organized into several sections:

- Wi-Fi Settings:** Includes options for WPA2-PSK (selected) or WPA2-Enterprise, a checkbox for 'Input SSID manually', a dropdown for SSID (currently 'Zliden_WIFI3'), a password field, and a 'Refresh networks list' button.
- MQTT Settings:** Includes checkboxes for 'Use my.sensmax.eu', 'Use Credentials' (selected), 'SSL/TLS', and 'Two-way authentication'. It also has fields for Server (192.168.1.50), Port (1883), User Name (mqtt_login), and Password.
- Time and Date Settings:** Includes checkboxes for 'Automatic NTP time' (selected) or 'Set time and date manually', a text field for NTP server (pool.ntp.org), a dropdown for Time Zone (UTC+2), and a checkbox for 'Use daylight saving time'. It also has a 'Network settings' section with fields for LOCAL IP (192.168.1.150), GATEWAY (192.168.1.1), and MASK (255.255.255.0).
- Telegram Notifications:** Includes checkboxes for 'Enable Notifications', 'Send startup message', 'Send system alerts', and 'Every day report at' (17:00). It also has fields for Device name (TAC-B sensor 050008655) and Telegram Token.
- Device Info:** Displays Wi-Fi Connected (-50 dBm), Server Connected, My static IP (192.168.1.150), Collector MAC (C4:4F:33:16:91:51), and Firmware Version (v1.3).

Buttons at the bottom include 'Save settings' and 'Firmware check update & install'.

Wi-Fi Settings

To connect to new Wi-Fi network, please press the **Refresh networks list** button.

After few seconds, all founded networks will be displayed in SSID list. Please choose the correct Wi-Fi network and input password.

To connect to hidden Wi-Fi network, please set **Input SSID manually** flag and input desired SSID and password manually.

MQTT Settings

This section allows to configure the MQTT connection.

To setup device for working with **my.sensmax.eu** system, the **Use my.sensmax.eu** setting should be used.

To setup own MQTT broker, please use one from possible settings: Credentials, SSL/TLS, Two-way authentication.

Time and Date Settings

The TAC-B sensor supports the NTP time protocol. If **Automatic NTP Time** option selected, device will get internet time automatically.

Also it is possible to set time and date manually.

The sensor has a built-in non-volatile clock that continue working even if the sensor power is turned off.

Network settings

If **Use DHCP** selected, all network settings will be obtained from internet router automatically (the DHCP should be enabled in your internet router).

Or you can input all network settings manually.

More settings

PASSWORD

Here you can change password which used for collector AP and settings page both.

We recommend to change password if you still use default password.

Social distance violation

Here you can adjust parameters for social distance violation.

The sensor measures the distance between nearby objects, and if this distance is less than the determined value and persists for longer than the specified time, the sensor generates a notification.

Social distance monitoring is performed for all user zones.

Please refer to **Notification web page** section of this manual for getting more information about notifications.

Hide device SSID

If this setting selected, you cannot connect to device directly using of connection to collector AP.

But if collector already connected to your local network, you able login to settings web page from any PC inside this network. To do this, you will need to input the collector IP address in internet browser.

Disable LED Indication

If selected, all LED indication will be disabled.

Disable startup sound

If selected, the greeting melody will not be played when device startup.

Show borders in HOME page

If selected, the borders of active area will be showed on home page.

Enable automatic firmware update

If enabled, device will check firmware updates in random period of time 2...8 hours.

If new firmware found, it will be installed automatically. Device will reboot after update.

If disabled, user can check firmware update manually.

Telegram notifications


The TAC-B sensor support the API of Telegram Messenger. This allows to send notifications from device to Telegram chat directly.

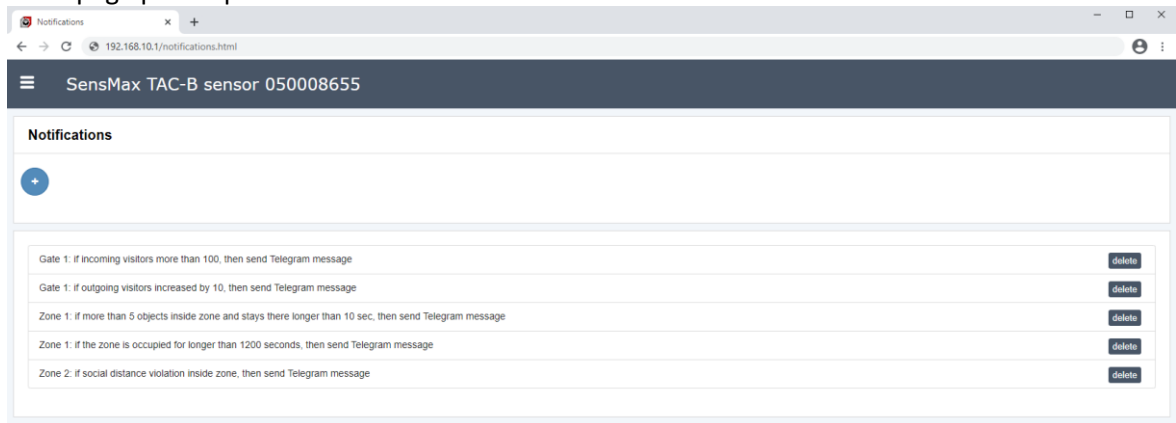
To enable Telegram notifications, please select the **Enable Notifications** option.

User can select the type of notifications which can be send.

To obtain **Telegram token** and **Telegram Chat ID**, please refer to **AN020 (SensMax telegram connection)** document or Telegram API documentation.

Notification web page


To enter page please press  button and select **Notifications** tab.

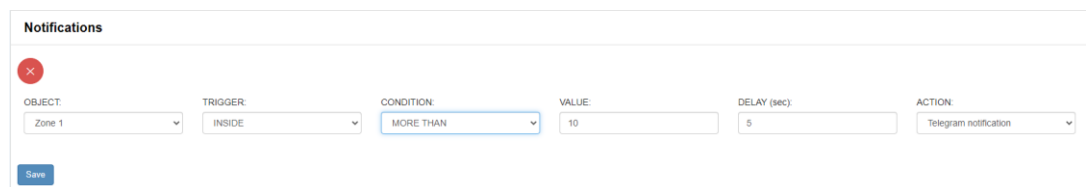


On this page, the user can configure various notifications.


Currently, only Telegram notifications are supported. However, support for MQTT notifications will be added in nearest firmware release.

*Please note: to receive notifications, it is necessary to enable and setup the Telegram Notifications. Please refer to **Settings web page** section of this manual.*


For creating of new notification, please press the  button and setup desired parameters:



Notifications



OBJECT: Zone 1 TRIGGER: INSIDE CONDITION: MORE THAN VALUE: 10 DELAY (sec): 5 ACTION: Telegram notification



OBJECT

In this list all user defined object (gates and zones) are presented. Need to select one.

TRIGGER

Depending from object type (zone or gate) there will be allowed different triggers for selection.

Supported triggers for the GATE:

- INPUT (the count of incoming visitors)
- OUTPUT (the count of outgoing visitors)

Supported triggers for the ZONE:

- INPUT (the count of incoming visitors)
- OUTPUT (the count of outgoing visitors)
- INSIDE (number of objects currently inside the zone)
- SOCIAL DISTANCE VIOLATION
- TOTAL OCCUPANCY TIME

CONDITION

In this list presented the type of conditions: MORE THAN and EVERY NEXT

If MORE THAN selected, sensor will generate single notification when defined value will be reached.

If EVERY NEXT selected, sensor will generate notification every time when counting result increases by defined value.

VALUE

The value which should be reached for trigger activation.

DELAY

This setting presented for the INSIDE trigger only. When the object count inside selected zone is more than defined value, this condition should stay during DELAY period before notification will be generated.

ACTION

Defines the notification type: Telegram notification or MQTT notification