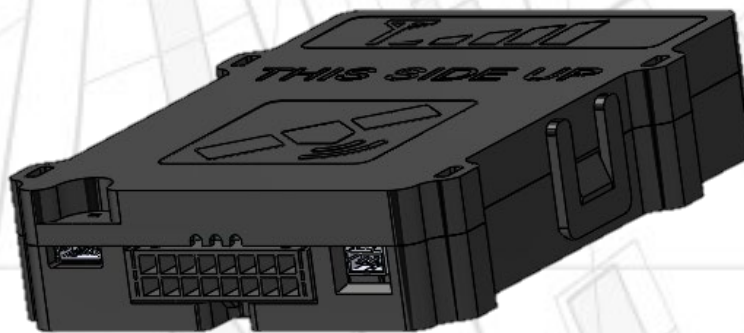


LT45-EA

GNSS VEHICLE TRACKER



User manual
Version LT45-EA

Contents

1. LT45-EA general device information	3
1.1. Safety and legal information.....	3
1.2. Description.....	3
1.3. Package	3
1.4. Technical specifications.....	4
1.5. Physical properties	4
1.6. Pinout & diagnostic LED.....	8
1.6.1. Pinout.....	8
1.6.2. Diagnostic LED	9
1.7. Installation	11
1.8. Configuration	11
1.9. Support.....	11
2. Annex 1. Installation instructions	12

1. LT45-EA general device information

1.1. Safety and legal information



Do not disassemble the device.

May interfere operation of adjacent electronic devices.

Device may be damaged by water and high humidity.

Installed by qualified professionals only.

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1.2. Description

LT45-EA is a device with GNSS and Cellular connectivity, designed for object tracking. It is able to acquire information on object location, speed, direction, etc. and transfer the data via Cellular network. Digital and analog inputs of the device may be used to connect different external sensors/devices. Outputs of the device may be used to control external equipment remotely.

Flexible configuration allows users/dealers to adjust the device to meet their specific requirements. All device settings and firmwares are updated remotely via cellular. It is possible to create setting templates for groups of vehicles, use mass updates and create unique device operation logic, fulfilling requirements of most cases on the market.

1.3. Package

LT45-EA is shipped to a customer in a cardboard box and contains all required components for operation, except a SIM card. Package contents:

1. LT45-EA device (control unit)
2. Wires + fuse

Note. SIM card is not included, but is necessary to operate the device. Contact your local Network provider to purchase a SIM card. Xirgo Global recommends an 4FF or MFF2 SIM card for best performance and reliability.

1.4. Technical specifications

Table 1. LT45-EA technical specifications

Device Variant	CAN
General	Physical Peripherals
	2x CAN lines 1-Wire RS-232 EIA-485 / J1708
Digital Inputs	4x discrete (frequency, impulse counter, ON/OFF modes)
Voltage threshold `	dynamic
Analog Inputs	3x analogue, 12 bit, 0-31V
Outputs*	Open Collector type – temperature protected
<small>*Output load won't affect device low power current</small>	
OUT1 maximum current	0,5A
OUT2 maximum current	0,5A
Extender connector*	3 PIN connector
<small>*Extender connector load won't affect device low power current</small>	
Maximum current	50 mAh
Voltage options	5V or VCC
Power supply ---	9 – 31V
Rated voltage	12/24V
Average consumption (at 12V)*	Full active without load on outputs: 100mA
<small>*With internal battery</small>	
Deep sleep:	<4mA
Internal memory	8MB / 32MB (optional)
Accelerometer	3 axis digital accelerometer
Operational temperature range	
Internal battery options	210, 850 mAh
With internal Lithium battery	from -20 to +60C° [Charging starts from 0 C°]
Without internal Lithium battery	from -40 to +85C°
Dimensions	68x90x19mm
Weight	Tracker – 64 g, set – 160 g
Bluetooth	Bluetooth Low Energy
BLE version supported	5.2
Specification	2.4GHz
Data rates	1Mbps, 2Mbps
Transmit Power	TX power -20 to +4dBm in 4dB steps
Cellular and GNSS module	Quectel EG915N-EA
RF function	LTE (CAT-1) EGPRS

Bands/Frequency	GSM/EDGE Bands 3: 1710 – 1785 MHz (TX), 1805 – 1880 MHz (RX) GSM/EDGE Bands 8: 880 – 915 MHz (TX), 925 – 960 MHz (RX) LTE BANDS 1: 1920 – 1980 MHz (TX), 2110 – 2170 MHz (RX) LTE BANDS 3: 1710 – 1785 MHz (TX), 1805 – 1880 MHz (RX) LTE BANDS 7: 2500 – 2570 MHz (TX), 2620 – 2690 MHz (RX) LTE BANDS 8: 880 – 915 MHz (TX), 925 – 960 MHz (RX) LTE BANDS 20: 832 – 862 MHz (TX), 791 – 821 MHz (RX) LTE BANDS 28: 703 – 748 MHz (TX), 758 – 803 MHz (RX)
Transmitting power	Class 3(23dBm±2dB) for LTE-FDD Bands Class 3(23dBm±2dB) for LTE-TDD Bands
Cellular antenna	PCB Antenna
GNSS	GPS GLONASS BeiDou (optional) Galileo (optional) QZSS (optional) SBAS (optional)
GNSS antenna	SMD patch antenna
GNSS antenna gain	GPS : -0.14 dBi typ. GLONASS : 1.75 dBi typ.
GNSS sensitivity	Cold start: -146dBm Reacquisition: -160dBm Tracking: -159dBm

1.5. Physical properties

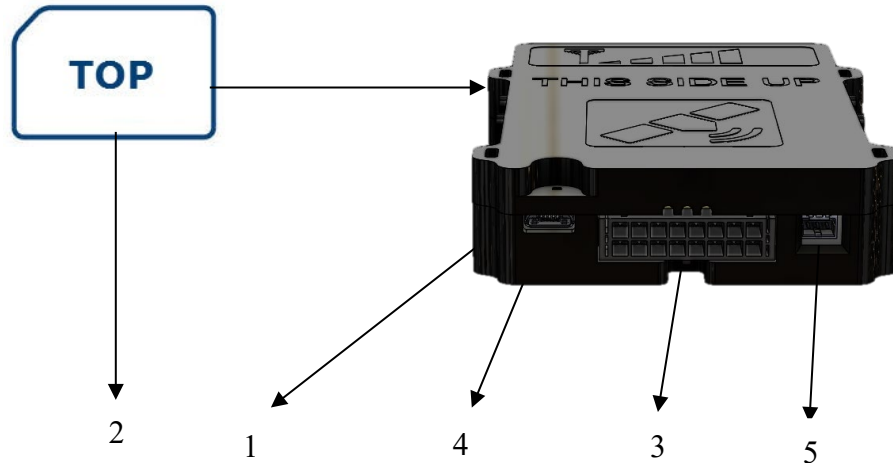


Fig. 1. LT45-EA front view.

Note. To insert a SIM card, open the box by lifting plastic holders from both sides.

Table 2. LT45-EA components.

No.	Short description
1	LED indicator
2	SIM card
3	Socket 2x8 pins
4	Micro-USB interface
5	Extender connector

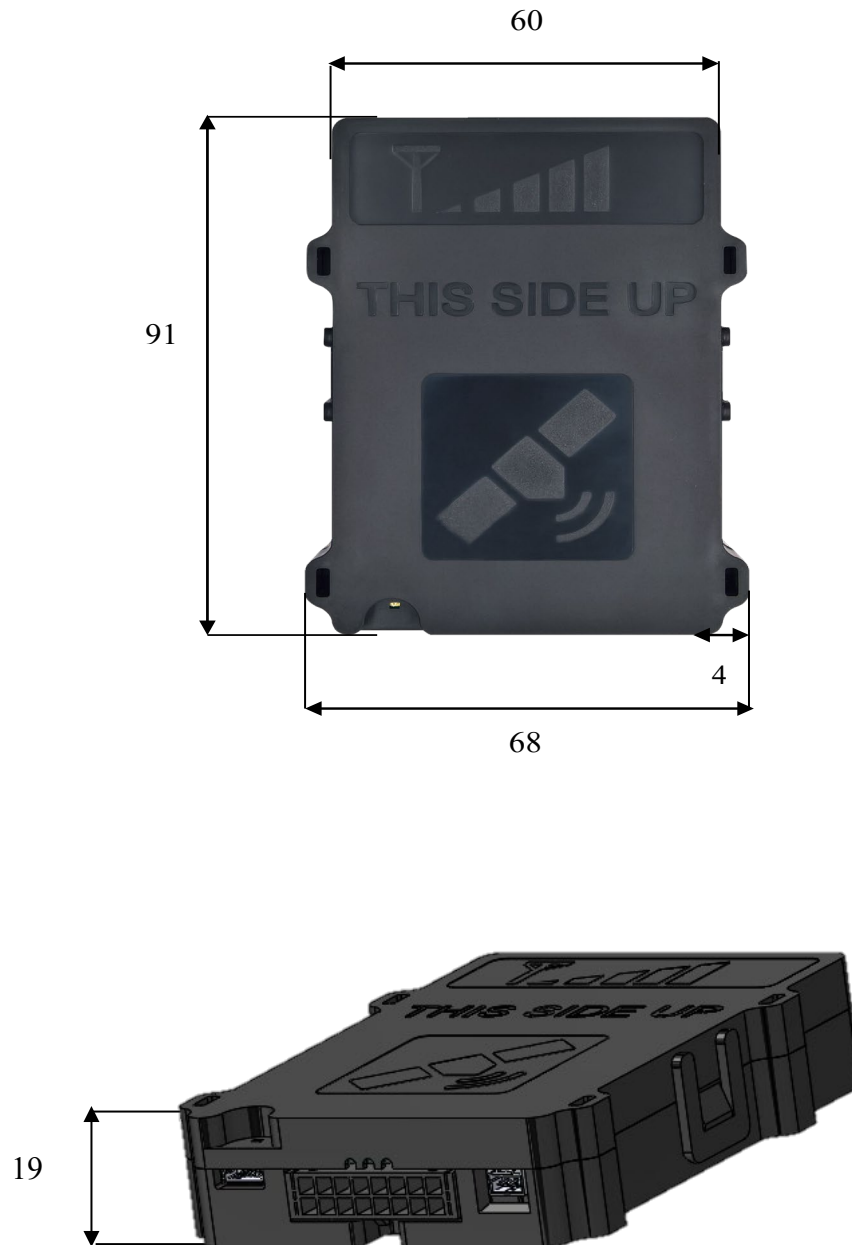


Fig. 2. LT45-EA dimensions, mm

1.6. Pinout & diagnostic LED

1.6.1. Pinout

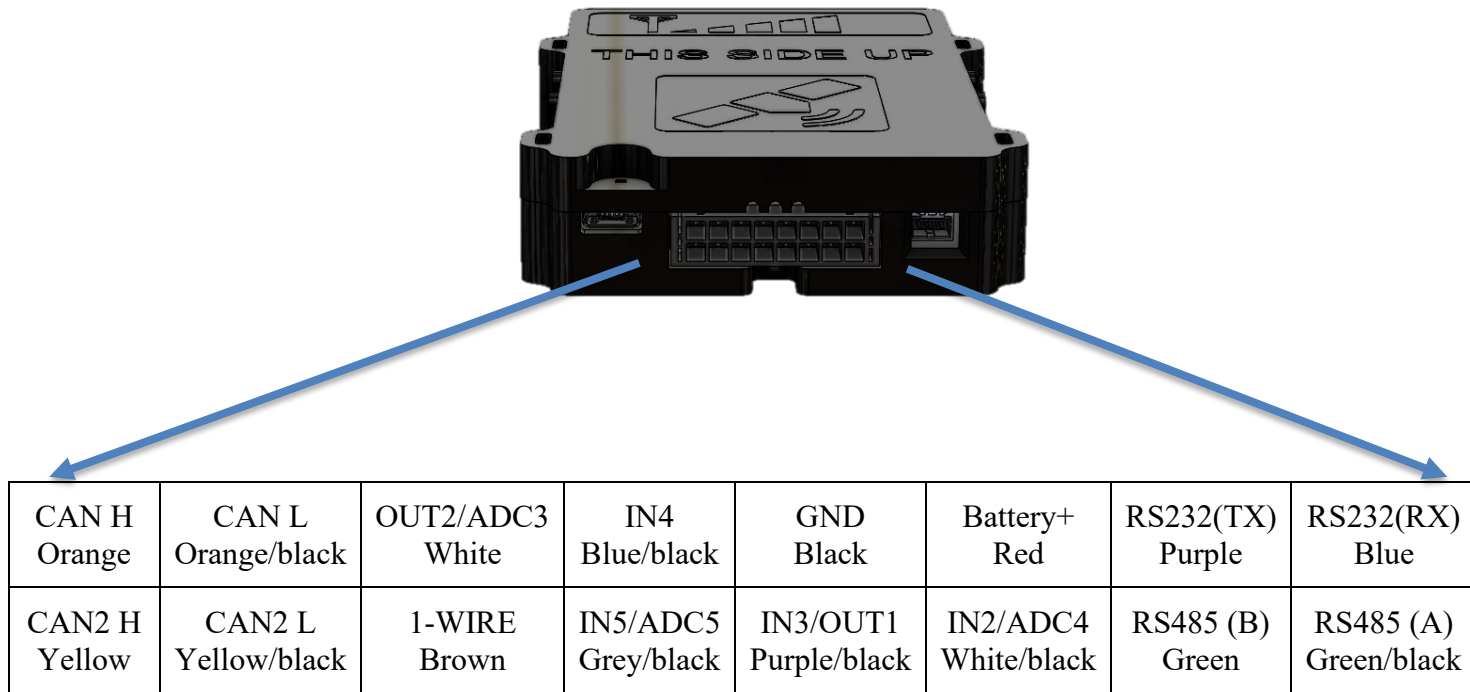


Fig. 3. LT45-EA pinout and cable colors.

1.6.2. Diagnostic LED

LT45-EA has an indication LED – for GNSS, Cellular modem and CAN line status. LED starts flashing only if IN5 digital input is connected to battery +.

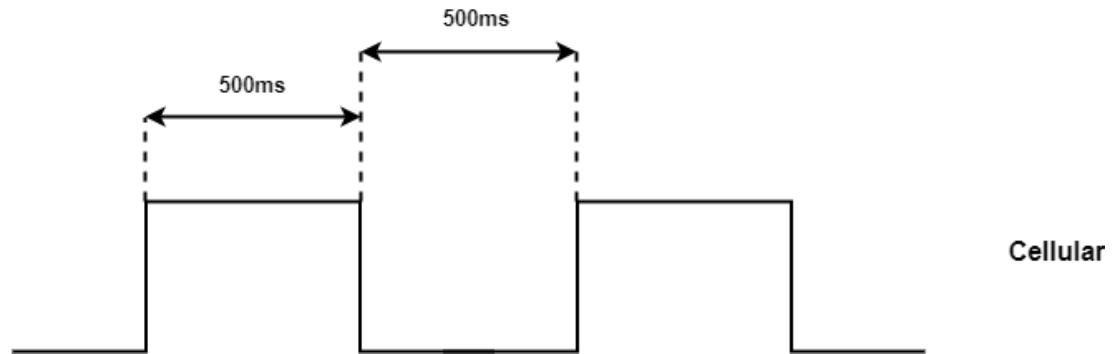


Fig 4. Cellular signal flashing example

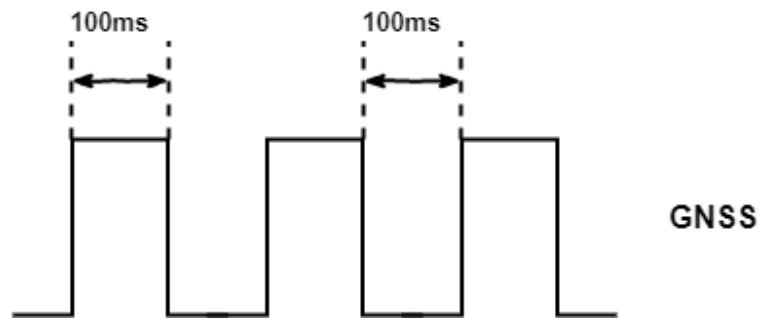


Fig 5. GNSS signal flashing example

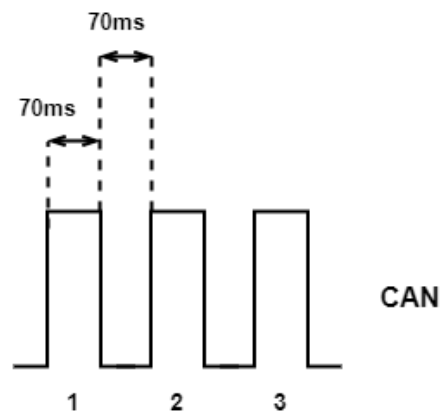


Fig 6. CAN signal flashing example

Table 3. CAN status flashing meaning

Flashes count	Meaning
1	Reading CAN1 line
2	Reading CAN2 line
3	Reading CAN1 & CAN2 lines

Table 4. GNSS status flashing meaning

Flashes count	Meaning
1	No GNSS signal
2	Poor precision. HDOP>1.5
3	3 satellites locked. HDOP<1.5
...	...
12	12 satellites locked. HDOP<1.5

Table 5. Cellular modem status flashing meaning

Flashes count	Meaning
1	Modem connected to server, Modem connected to Internet, Modem GPRS registered, Modem GSM registered, Modem SIM card ok, Modem turned on
2	Modem connected to Internet, Modem GPRS registered, Modem GSM registered, Modem SIM card ok, Modem turned on
3	Modem GPRS registered, Modem GSM registered, Modem SIM card ok, Modem turned on
4	Modem GSM registered, Modem SIM card ok, Modem turned on
5	Modem SIM card ok, Modem turned on
6	Modem turned on
7	Device started

1.7. Installation

LT45-EA is installed where risk of mechanical damage, high humidity and extreme heat is low. Device is mounted stable to vehicle body, therefore ensuring correct operation of the internal accelerometer. Complete installation manual is available as Annex 1.

1.8. Configuration

LT45-EA is to be configured via a configuration server, where dealers/users can adjust operation of their devices to fulfill specific requirements.

1.9. Update

LT45-EA firmware and configuration can be updated both via over-the-air through the configuration server or via the micro-USB interface.

1.9.1. Uploading files to device

Instructions on how to perform local Firmware or configuration upload to the device:

Step 1: Using a USB – micro-USB cable connect device to a computer.

Note: The device must be disconnected from any power source (internal battery also).

Step 2: A new flash drive will appear. In some cases, you might need to format the flash, before uploading the file.

Step 3: Copy/paste the configuration file or the firmware file to the flash drive.

Step 4: Disconnect the USB cable and power up the device. It should take a couple of seconds for the device to boot up and flash the new settings or FW.

1.10. Support

LT45-EA is built to be a reliable, stable and easy to install device. Please read and follow provided installation and operating instructions carefully. However, if you encounter difficulties while installing or using this product, technical support is available and may be reached by e-mail supportxg@sensata.com.

2. Annex 1. Installation instructions

General

Central unit is only mounted in inside of the vehicle, it can not be installed in the engine chamber, next to the cabin, or in the area of exposure to direct external conditions. Central unit should be protected from moisture exposure. Device must be fastened in a stable position to avoid random twitches and displacements (suspension on cables is strictly prohibited). Central unit must be mounted horizontally. Precise orientation is of particular importance to flawless operation of the system, since the device is equipped with acceleration sensors recording the data which directly affects the results obtained.

List of suitable vehicles

LT45-EA is intended for internal combustion engines, hybrid and electric engines, where power supply specifications are met. Device must be connected to the vehicle battery (12/24V), ensuring constant power supply even if the engine is not working and ignition is off.

Basic instructions before beginning the installation

Quality of connections, location of the device, etc. play a significant role on accurate operation of the system. Below are some tips and rules for correct installation to attain professional quality and ensure maximum efficiency of the device.

Mechanical connections

To highest possible extent, cavities in the vehicle should be used for wiring. If you need to make a new hole, it must be protected against corrosion appropriately!

Wiring connection must be made by brazing, and not merely mechanical wire connection. It is especially important to protect the connections with insulation for high-resistance atmospheric conditions. Do not use insulation with unknown resistance parameters.

Efforts should be made to tie the new wiring into the car's standard wiring bales.

Installation of central unit

Steps to install central unit:

1. Open the housing by gently lifting the plastic holders on each side and remove the PCB from it.
 - Use thin screwdriver to lift the enclosure holders as alternative to open them without breaking it.
2. Locate the SIM holder and following the printed picture on the PCB insert the SIM card.
3. Place the PCB to the housing and close it.
4. Use plastic fastening straps to fix device in a stable position (units housing has four holes, for straps to go through and fasten them to the body of the vehicle).
5. Connect power supply;
6. Connect ignition wire to a digital input (usually IN5);
7. Connect array;
8. Connect other devices (optional).

Tools/equipment necessary for the installation:

1. Pliers
2. Stripping pliers
3. Screwdriver
4. Multimeter (tester)
5. Fastening straps
6. Isolation tape

SIM card

SIM card must be inserted into the device before starting installation. The device must be turned off when inserting SIM card. Before inserting the SIM card, make sure you have all network services activated, the card's PIN code must be disabled.

If the vehicle is travelling to foreign countries, roaming service must be activated for the SIM card. The SIM card and phone number must be checked and clearly marked on the installation certificate of the device.

IMPORTANT! Before inserting a SIM card, do not forget to disable PIN code. Otherwise, the device will not work, and the SIM card will be blocked.

GNSS antenna

GNSS antenna is the main element responsible for vehicle positioning accuracy and quality. LT45-EA units are equipped with internal GNSS antennas. To ensure best possible signal reception and evaluating GNSS signal character, there are strict requirements for correct installation of the tracking unit:

- The accordingly marked side of the device must be invariably directed to the sky. The device must be oriented horizontally (not at an angle) and oriented with the corresponding side towards the top.
- The device should not be covered with metal sheet or reinforced glass. In vehicles with standard glass (e.g., without built-in heating elements).
- Fixing of the device must be stable and immobile, providing for the installation durability. It is necessary to take into account events, which may lead to loss of device stability, to select the mounting location and methods that would allow to avoid these factors.

Cellular antenna

Cellular antenna is responsible for transfer of collected data and connection with central server. Good antenna's performance is the key element in obtaining information from the device. LT45-EA series trackers are equipped with internal Cellular antennas.

Cellular antenna does not require orientation to open sky; however you should be aware that metal elements weaken the cellular signal. It is also necessary to take into account the emission of the antenna's high frequency radio waves, which may interfere with operation of electronic devices.