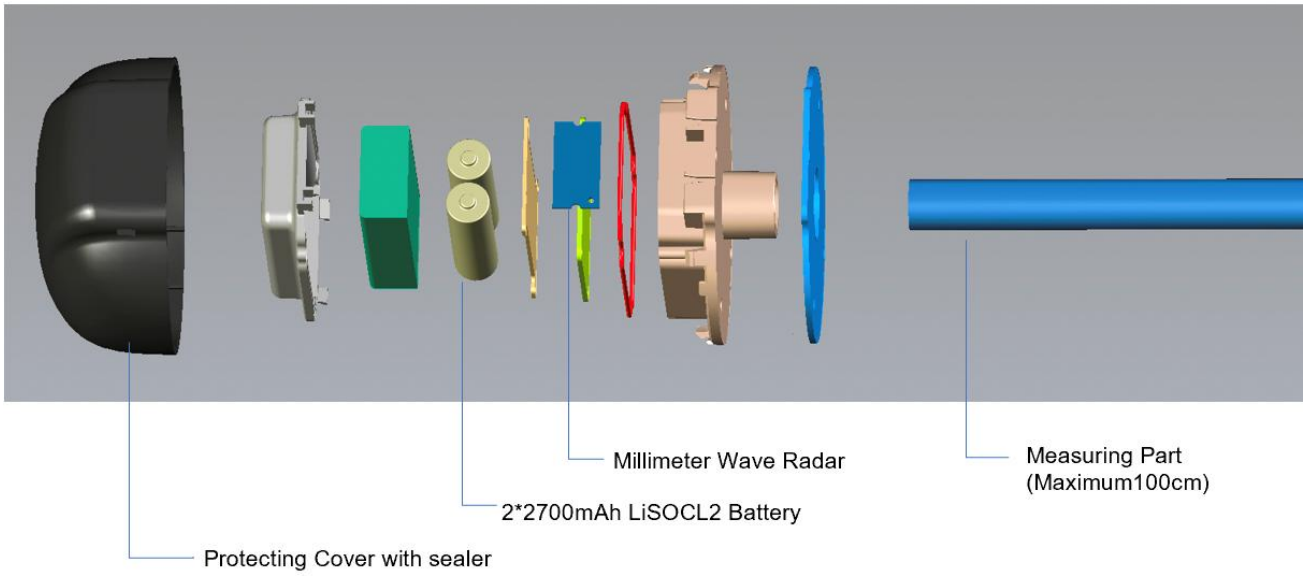
All-in-one Capacitive Fuel Level Sensor
With built-in Bluetooth & Radar

Model: CPM212



1. Features

- Wireless installation to prevent from tamper
- Built-in long life battery support 5~8 years
- Built-in Millimeter Wave Radar (optional) to detect human being to prevent fuel theft
- Built-in temperature and tilt sensor for flexible algorithm
- Easy installation and cuttable capacitive tube
- Support harsh environment from -40℃~85℃ with IP69 waterproof
- Support Gasoline, Diesel, LPG and all non-conductive liquid

2. Specification

Specification		
Accuracy	99.5%	
Resolution	0.1mm	
Battery	Life	5~8years
	Capacity	2*2700mAh, Li-SOCl2 replicable industrial battery
	Working Temperature	-55~ 85℃
Bluetooth	Bluetooth Version	BLE 5.4
	Transmission Mode	iBeacon Broadcasting
	Broadcasting Interval	1s as default, programmable
	Range of wireless connection (direct sight without interference and obstacles)	Maximum 100 meters
	Transmission power	- 96 ~ 4 dBm
Millimeter Wave Radar	Average Current	50 uA
	Working Temperature	-40~ 85℃
	Transmission power (EIRP)	10 dBm
	Detection Range	0.2~5 meters
	Detection Resolution	0.2m
	Horizontal Detection Angle	100 degrees
	Vertical Detection Angle	120 degrees
Tilt Angle Sensor	0~180 degrees	
Temperature Sensor	-40~120 ℃	
Working Environment	Working Temperature	-40℃~85℃
	Storage Temperature	-45℃~85℃
Capacitive Tube Range	0~1000mm (support cutting at site)	
Dimensions(mm)	98x45x(L), L: length of the measuring tube part, 10~100cm	
Weight	1kg when L=70cm	
Waterproof Class	IP69	
Explosion-proof Class	II 1 G Ex ia IIB T6 Ga	
Application		
Tank Material	Aluminum, Plastic, Metal, Ion, Stainless Steel	
Liquid	Gasoline, Diesel, LPG or other Non-conductive liquid	

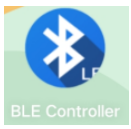
3. Quick Installation Guide

Before test the fuel sensor, need to download and install the following APP. The APP is only for Android phones and does not support iOS phones.

Scan the code to download the APP

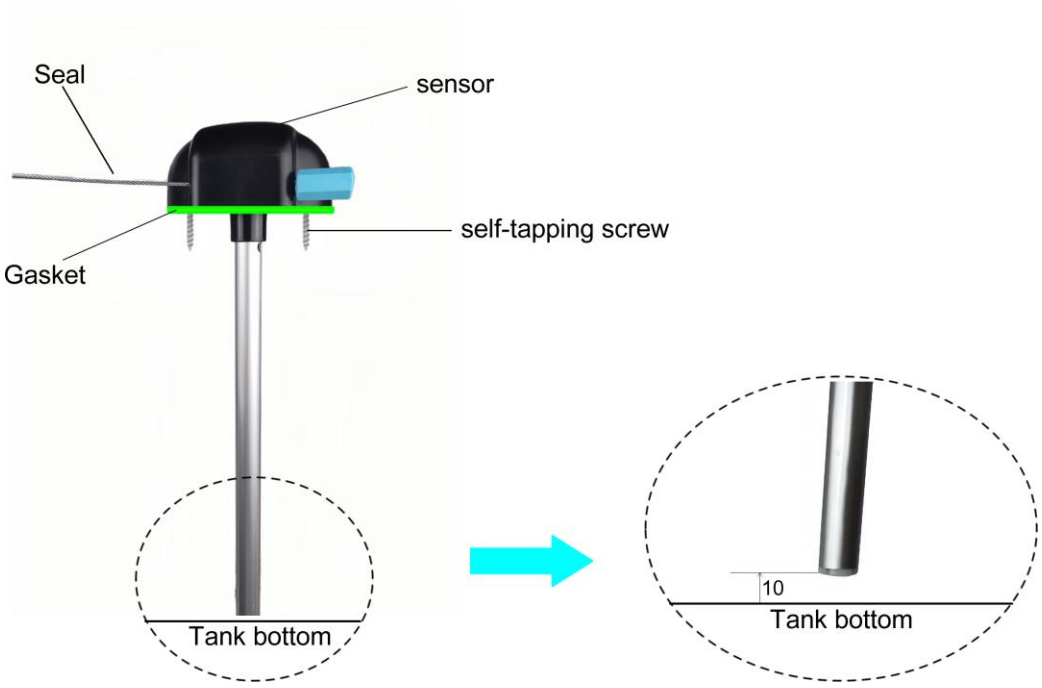
1) APP to configure fuel tank parameter

BleController_SW3.0.6



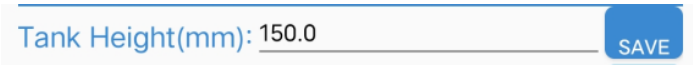
2) APP to read original iBeacon RAW data for diagnostic

3.1 Measure tank depth and cut the tube to fit the tank



3.2 Set tank height on APP: Please fill in according to the height fuel level in the fuel tank

For example: if fuel tank height 150mm, please set tank height to 150

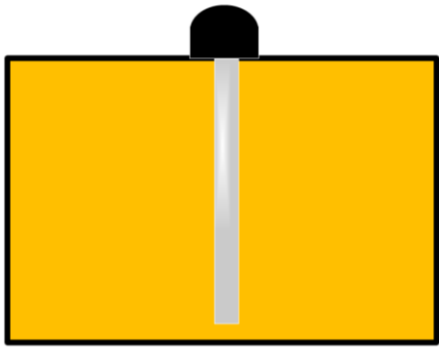


3.3 Configure Full

Option 1: Fill the tube outside the tank (this option can be used once fuel tank is NOT FULL)

Closing the drain holes, rotating the sensor, and fllingthe tubes with fuel

Option 2: Dip the tube inside the tank directly and read full data when fuel tank is FULL



Filling the tubes by immersing the sensor in fuel (drainholes open)

Power on the sensor and place it in fuel. Click the "Full" button on the APP to perform full calibration

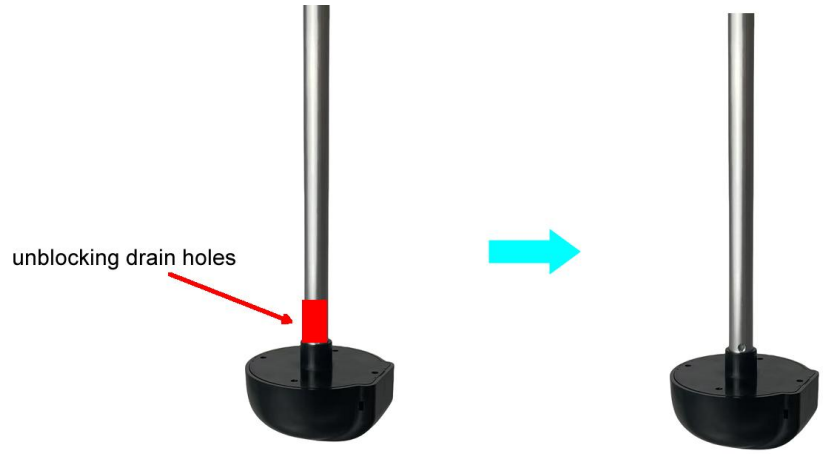
Noted: The testing liquid must be a non-conductive liquid, which can be lubricating oil, peanut oil, diesel, and water cannot be used for testing

Please noted:

1) After the calibration is full, FLS HEX Data will show 00FFFF

2) The liquid level height will remain the same as the tank height

3.4 Configure Empty



Then,drain the fuel from the tubes,wait 2~3 mintues,allowing the fuel to completely drain and the level to stabilize,and press“Empty”

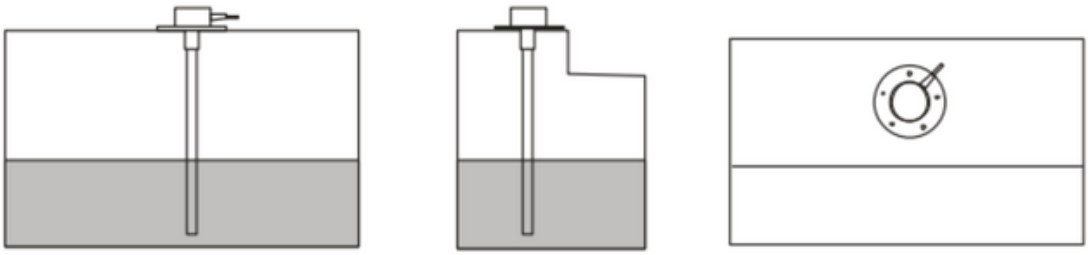
Power on the sensor and place it in the air. Click the "Empty" button on the app to perform empty calibration

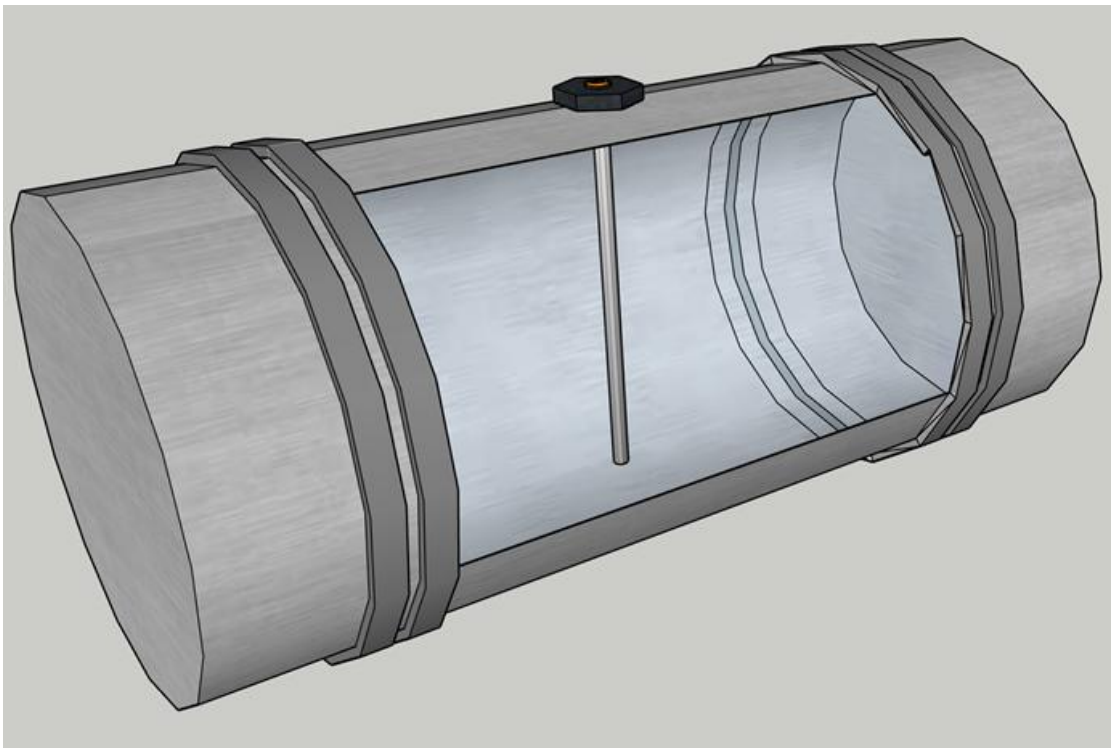
Please noted:

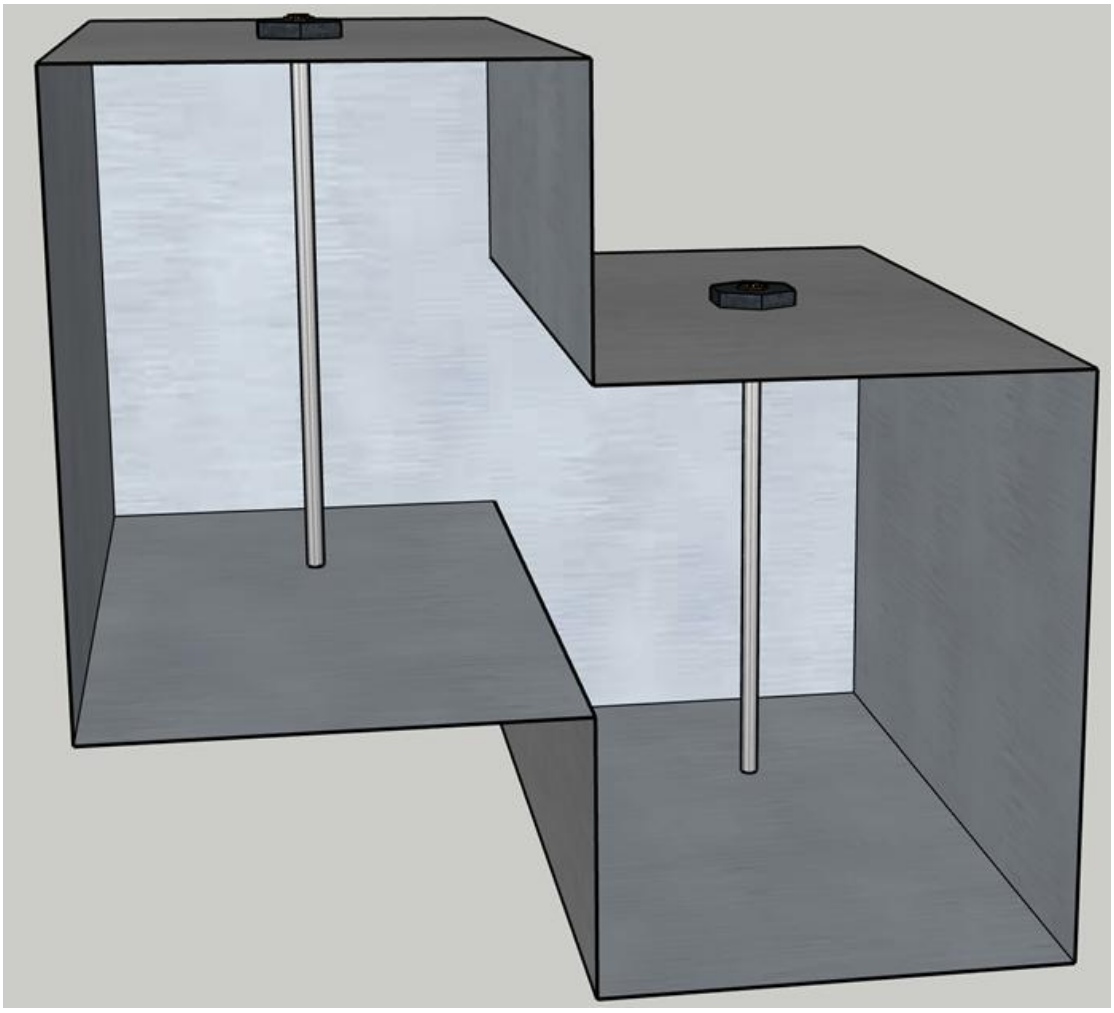
1) After the calibration is empty, FLS HEX Data will show 000000
2) The liquid height will be show 0.0 or close to 0.0

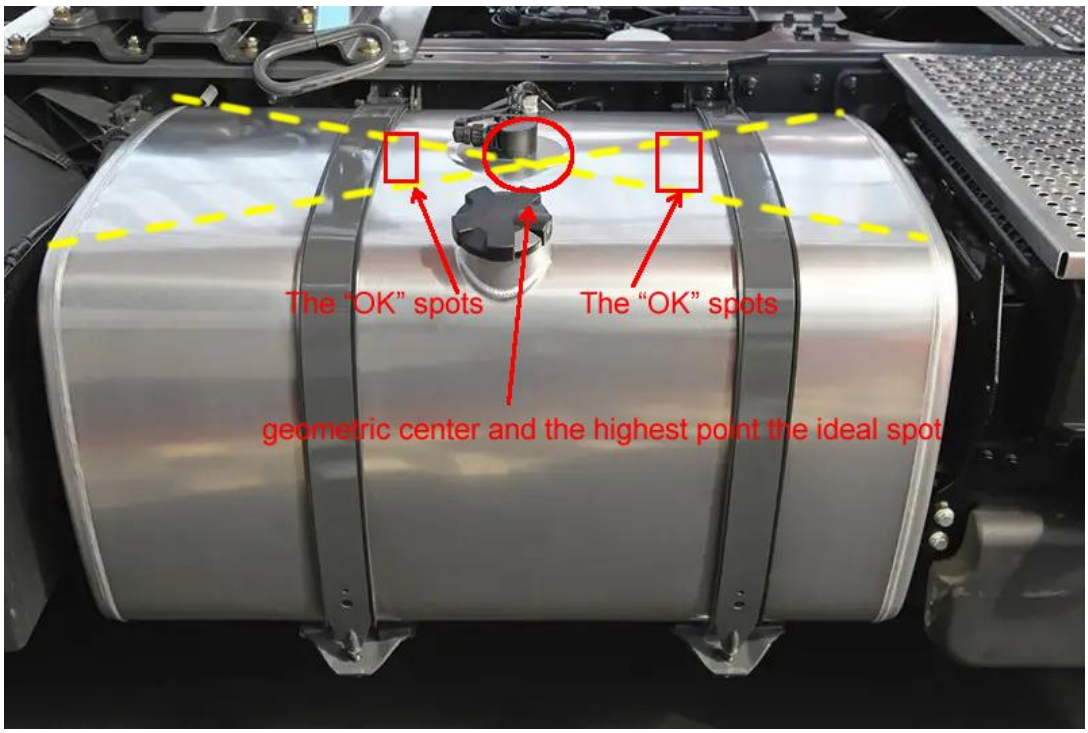
3.5 Draw Holes and Fix Sensor

1) Find geometric center of the tank and drill a hole

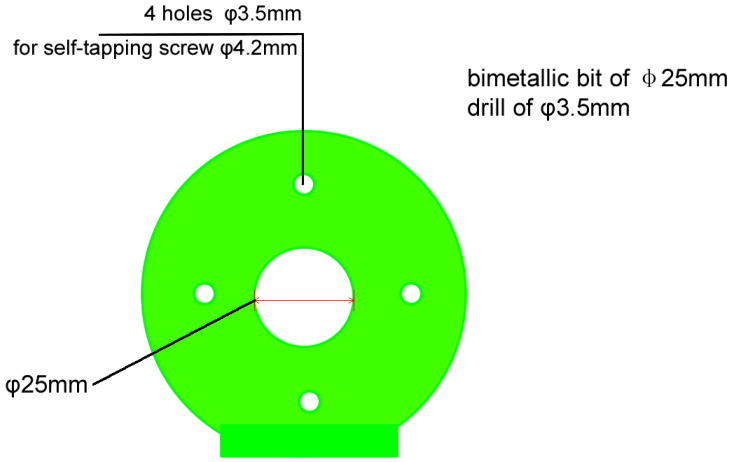








2) Use a screwdriver remove the cut place,avoid the metal shavings falling into the tank



The diameters of the holes are given for self-tapping screws, if necessary, mark places for anotherfastening according to the centers of specified holes.

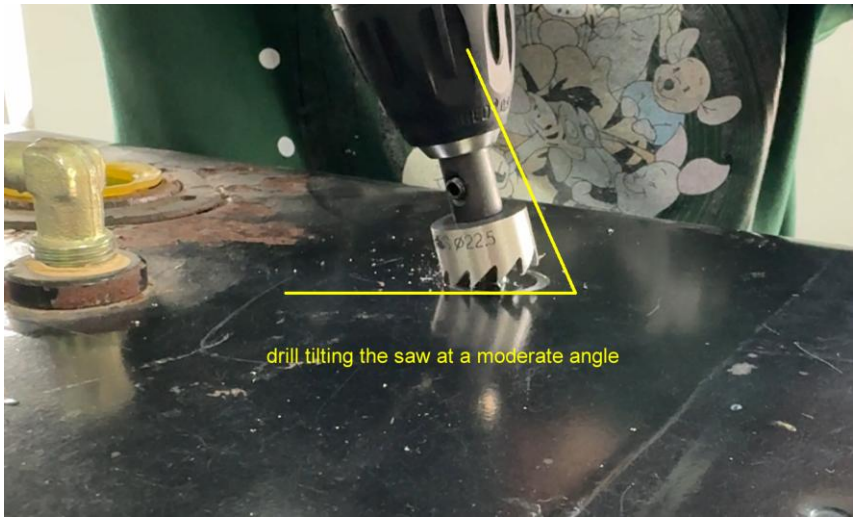
3) Mark Location

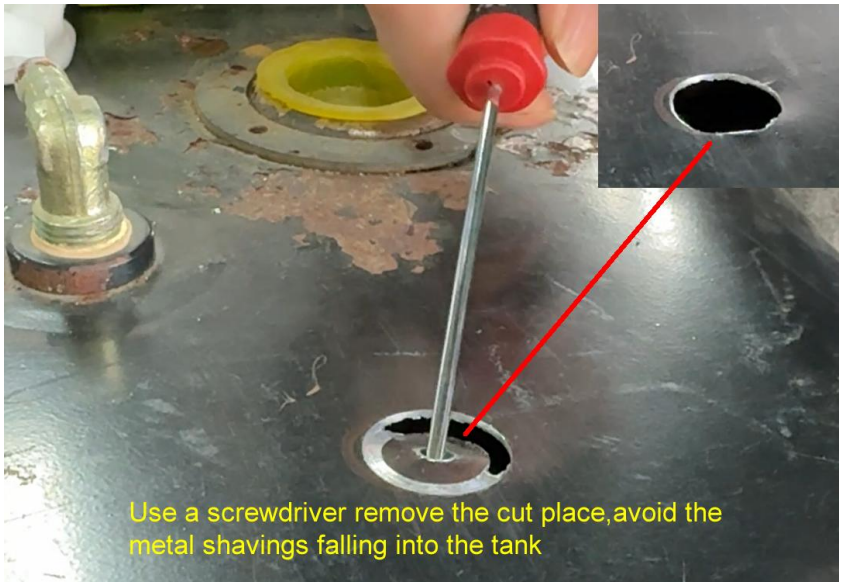
Clean the installation position of the oil sensor and remove dust and dirt from the surface of the fuel tank

Mark the gasket points with a marker pen

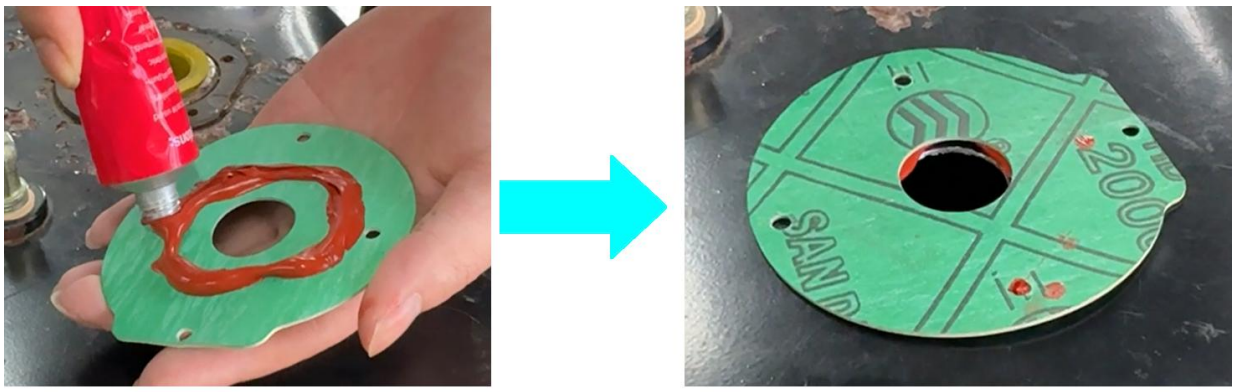
Remove the gasket


Check if there are baffles or reinforcing plates inside the storage tank
Then use a drill bit to open a small hole first


drill tilting the saw at a moderate angle

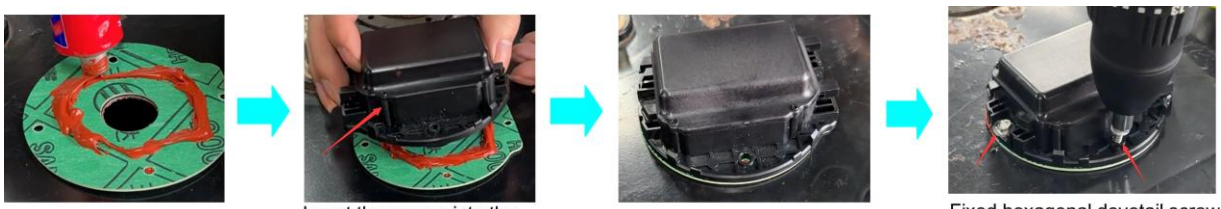

Use a screwdriver remove the cut place,avoid the
metal shavings falling into the tank

4) Install the gasket



Silicone gasket-free sealant to the back of the gasket and
Install the gasket above the hole position, paying attention to alignment

5) Insert the fuel sensor into the tank and secure it in place



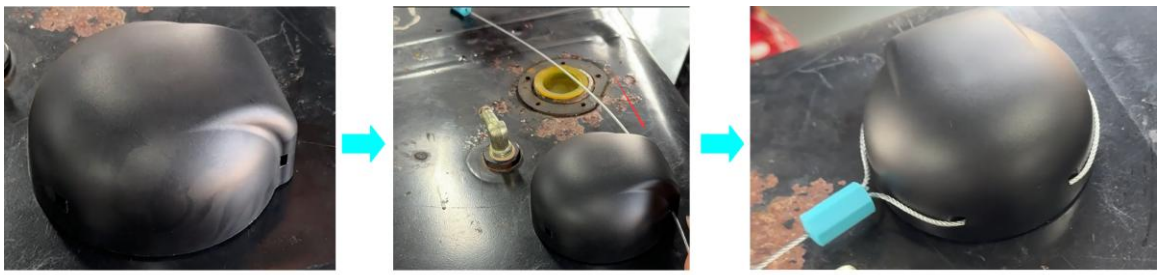
Silicone gasket-free sealant above the gasket

Insert the sensor into the fuel tank and align it with the gasket

Insert completed

Fixed hexagonal dovetail screw
All four screws need to be fixed

6) Fasten the seal



Cover the outer shell

Insert the seal according to the direction of the arrow

Fasten the seal

3.6 Calibrate via mobile APP

1) Enter the total height of the fuel tank, Based on the actual height of the fuel tank

2) Configure volume parameters:

Operate1： Quickly calibrate volume

a)Calculate the total volume based on the length, width, and height of the fuel tank,

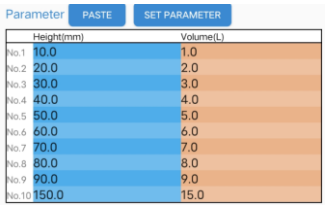
b)Divide the total height into 10 equal parts on average

c)Calculate the volume corresponding to different heights

d)Fill in the 10 sets of data calculated by j into the APP for calibration

No.1 input minimum volume, No.10 input maximum volume

Calibrate 10 points arbitrarily according to the actual situation

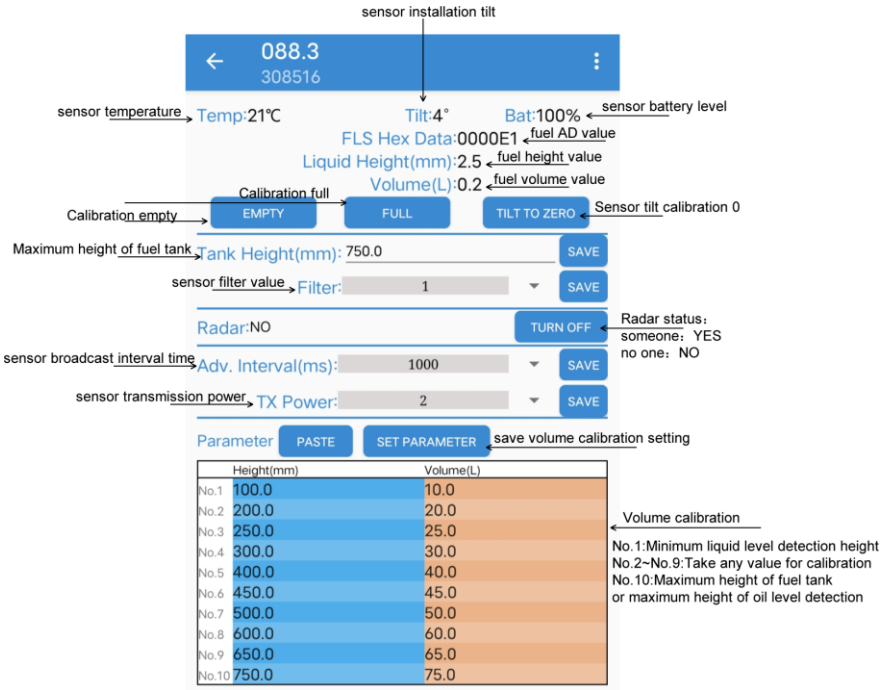


Operate2: Real time calibrate volume

a) Add 10L or 20L of fuel to the fuel tank each time and record the height and volume values obtained on the APP.

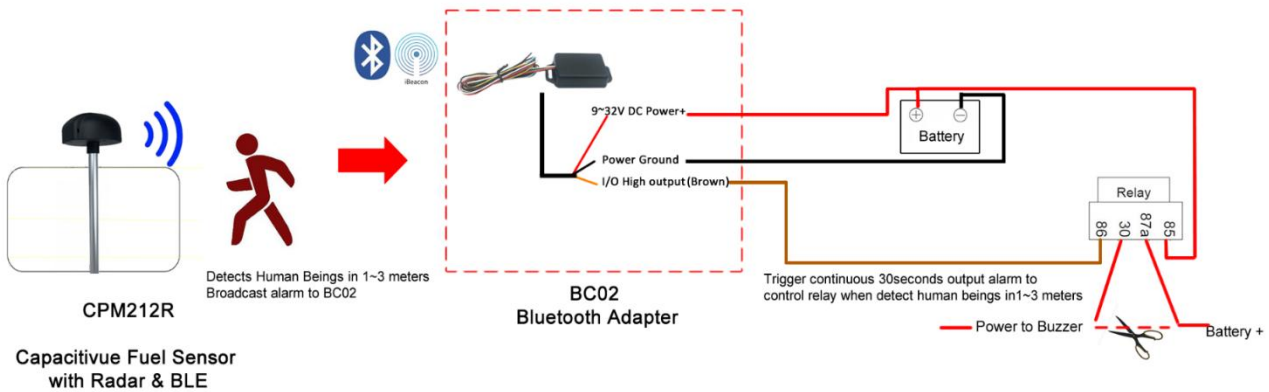
b) After completing 10 sets of refueling, fill in the recorded 10 sets of data into the APP calibration

3) Complete APP menu show and describe:

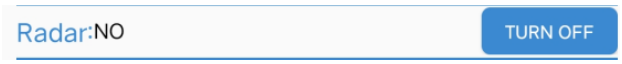


3.7 How does Millimeter Wave Radar function work?

(support disable/enable the Millimeter Wave Radar function via mobile APP)



1) Turn on rader



2) People walk close to the front of Dashcam in 1~3 meters.

If the APP status shows "YES" , it indicates that a person has been detected nearby.

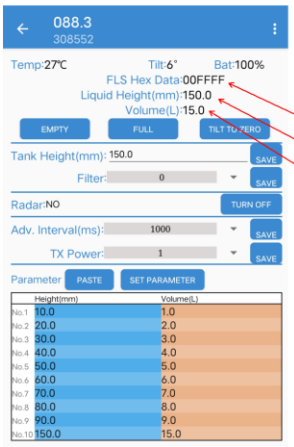
If the APP status shows "No", it indicates that no person has been detected nearby.

3.8 How to check fuel sensor Bluetooth broadcast data?

1) Open the APP "nRF connect"

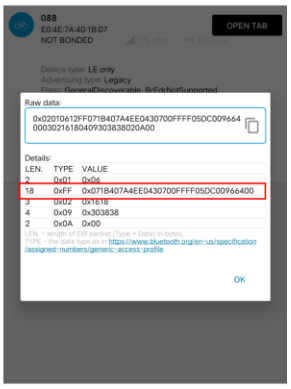
2) Search and find the device with Bluetooth broadcast name "088"

3) Bluetooth broadcast protocol



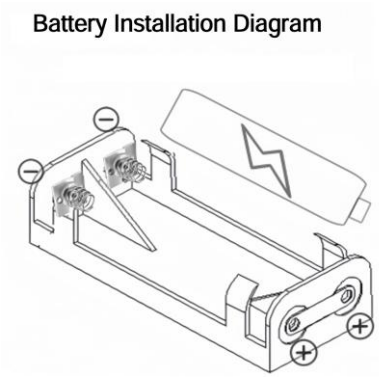
Example：0xFF071B407A4EE043070 0FFF 05DC 0096 6400

0xFF data	Data Length	Data Denfinition	unit	Description
071B407A4EE0	6Bety	MAC address，Little Endian		
0x43	1Byte	temperature data	celsius degree	0x43 means 67 in deciaml, which equals to 67-40=27℃
0x07	1Byte	tilt angle	degree	range 0~180
0x00FFFF	3Byte	FLS diagnostic data		
0x05DC	2Byte	fuel height	0.1mm	0x05DC convers to decimal is 1500，1500x0.1mm=150mm
0x0096	2Byte	volume	0.1L	0x0096 convers to decimal is 150，150x0.1L=15L
0x64	1Byte	battery	1%	0x64 convers to decimal is 100，100x1%=100%
0x00	1Byte	Radar status		00: No one 01: Someone

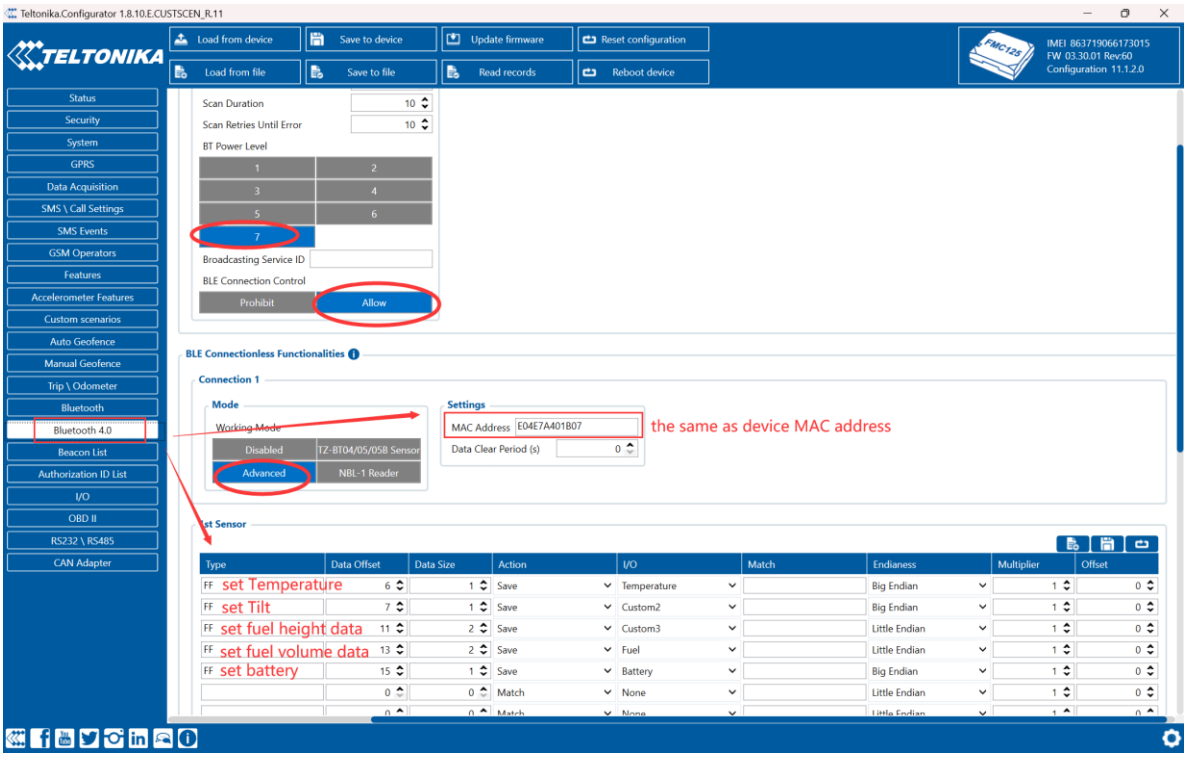


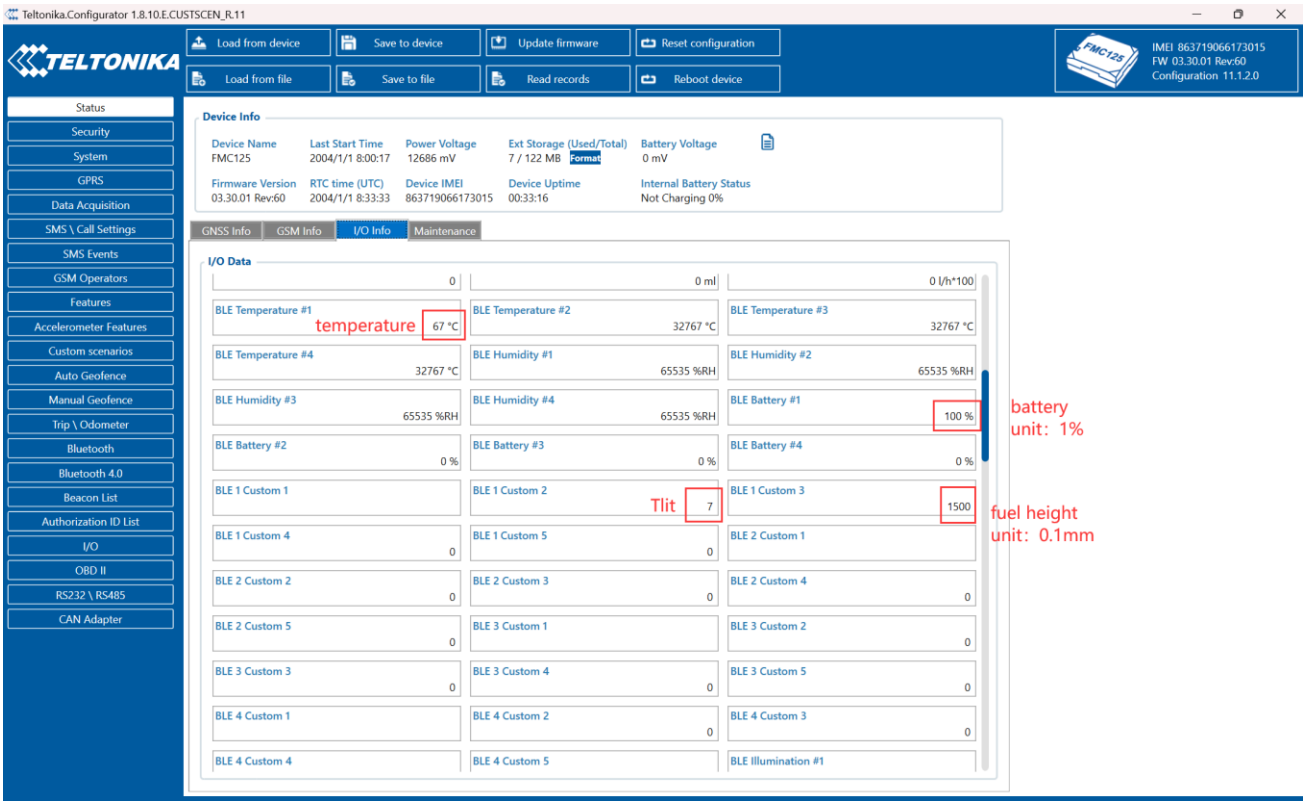
4. FAQ:

4.1 If the battery needs to be replaced after being depleted, please refer to the picture below to replace the battery



4.2 How to connect Teltonika device via Bluetooth?


Teltonika.Configurator 1.8.10.E.CUSTSCEN_R.11
TELTONIKA
Load from device
Save to device
Update firmware
Reset configuration
Load from file
Save to file
Read records
Reboot device
IMEI 863719066173015
FW 03.30.01 Rev:60
Configuration 11.1.2.0
Status
Security
System
GPRS
Data Acquisition
SMS \ Call Settings
SMS Events
GSM Operators
Features
Accelerometer Features
Custom scenarios
Auto Geofence
Manual Geofence
Trip \ Odometer
Bluetooth
Bluetooth 4.0
Beacon List
Authorization ID List
I/O
OBD II
RS232 \ RS485
CAN Adapter
Scan Duration
Scan Retries Until Error
BT Power Level
Broadcasting Service ID
BLE Connection Control
Prohibit
Allow
BLE Connectionless Functionalities
Connection 1
Mode
Working Mode
Disabled
TZ-BT04/05/05B Sensor
Advanced
NBL-1 Reader
Settings
MAC Address E04E7A401B07
the same as device MAC address
Data Clear Period (s)
st Sensor
Type
Data Offset
Data Size
Action
I/O
Match
Endianess
Multiplier
Offset
set Temperature
set Tilt
set fuel height data
set fuel volume data
set battery
Save
Match
Temperature
Custom2
Custom3
Fuel
Battery
None
Big Endian
Little Endian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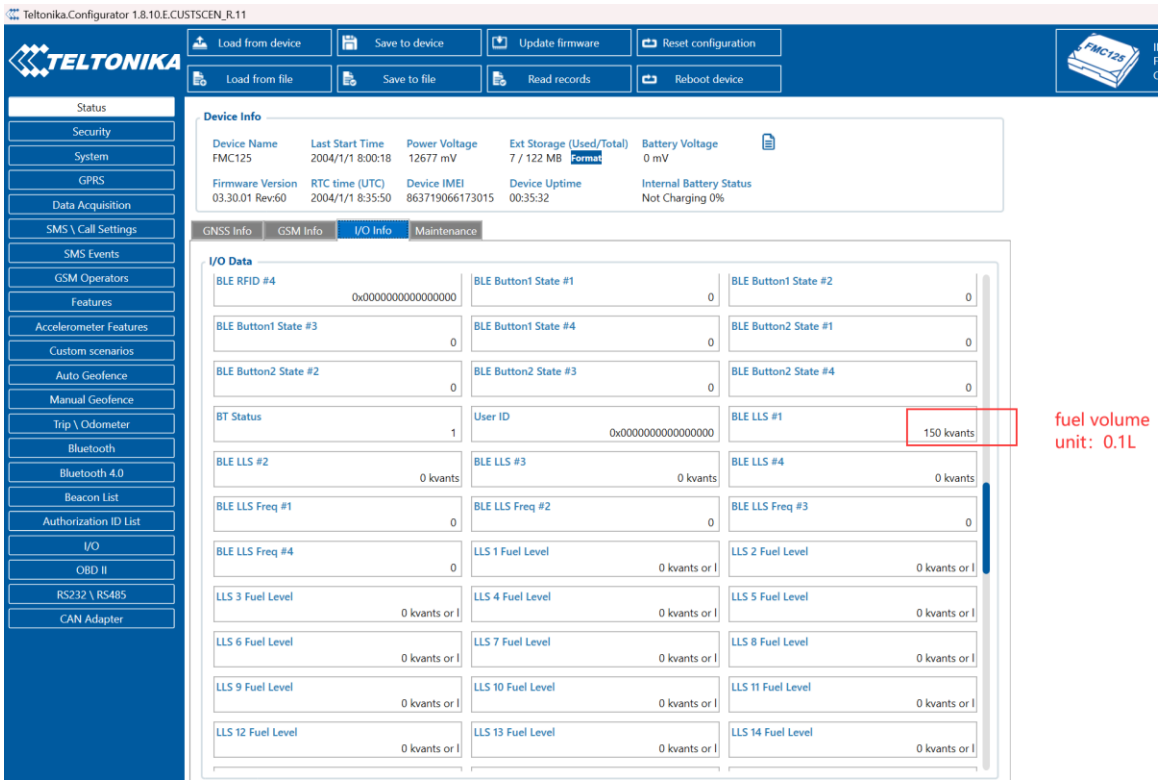
Manual Geofence
Trip \ Odometer
Bluetooth
Bluetooth 4.0
Beacon List
Authorization ID List
I/O
OBD II
RS232 \ RS485
CAN Adapter
Device Info
Device Name
FMC125
Last Start Time
2004/1/1 8:00:17
Power Voltage
12686 mV
Ext Storage (Used/Total)
7 / 122 MB
Format
Battery Voltage
0 mV
Firmware Version
03.30.01 Rev:60
RTC time (UTC)
2004/1/1 8:33:33
Device IMEI
863719066173015
Device Uptime
00:33:16
Internal Battery Status
Not Charging 0%
GNSS Info
GSM Info
I/O Info
Maintenance
I/O Data
BLE Temperature #1
temperature
67 °C
BLE Temperature #2
32767 °C
BLE Temperature #3
32767 °C
BLE Temperature #4
32767 °C
BLE Humidity #1
65535 %RH
BLE Humidity #2
65535 %RH
BLE Humidity #3
65535 %RH
BLE Humidity #4
65535 %RH
BLE Battery #1
100 %
battery
unit: 1%
BLE Battery #2
0 %
BLE Battery #3
0 %
BLE Battery #4
0 %
BLE 1 Custom 1
BLE 1 Custom 2
Tlit
7
BLE 1 Custom 3
1500
fuel height
unit: 0.1mm
BLE 1 Custom 4
BLE 1 Custom 5
BLE 2 Custom 1
BLE 2 Custom 2
BLE 2 Custom 3
BLE 2 Custom 4
BLE 2 Custom 5
BLE 3 Custom 1
BLE 3 Custom 2
BLE 3 Custom 3
BLE 3 Custom 4
BLE 3 Custom 5
BLE 4 Custom 1
BLE 4 Custom 2
BLE 4 Custom 3
BLE 4 Custom 4
BLE 4 Custom 5
BLE Illumination #1



fuel volume
unit：0.1L