HIOTS Emission Monitoring Systems

TOWARDS A STRONG AND RELIABLE EMISSION MONITORING SYSTEM!

ioTest

Cloud Data Logger

ioTest Instruction Manual
Version 2.1

Contact our support team if you have any technical questions:

support@hiots.net

Table of Contents

Safety Considerations

About this document

- The instruction manual is an integral part of the instrument.
- Keep this documentation to hand so that you can refer to it when necessary.
- Always use the complete last version of instruction manual.
- Please read this instruction manual through carefully and familiarize yourself with the product before putting it to use.
- Hand this instruction manual on to any subsequent users of the product.
- Pay particular attention to the safety instructions and warning advice in order to prevent injury and damage to the product.

Security

General safety instructions

- Only operate the product properly, for its intended purpose, and within the parameters specified in the technical data.
- Do not operate the instrument if there are signs of damage to the housing or connected cables.
- Always comply with the locally valid safety regulations when carrying out measurements.
- Only perform maintenance and repair work on this instrument that is described in this documentation. Follow the prescribed steps exactly when doing the work.
- Use only original spare parts from HIOTS.

Warning notices

Always pay attention to any information denoted by the following warnings. Implement the precautionary measures specified!

⚠ **DANGER**

Indicates possible injury.

⚠ **WARNING**

Indicates possible damage to equipment.

1. Summary

The ioTest is a continuous emission monitoring system which can be used as a tool to monitor engine parameters such as exhaust temperature, backpressure, λ (lambda), O2, NOx, PM, RPM and other parameters according to requirements.

The ioTest collects real-time data from onboard sensors and gives this opportunity to check the measurements from anywhere through the web application. Along with online data visualization and alarm notifications, the ioTest stores sensor data, alarm codes and audit logs for compliance reporting up to 10 years. The ioTest can be used for R&D, regulatory preparation, benchmarking or monitoring components involved in the after-treatment of exhaust gases such as DPF and SCR.

Key Features:

- Sensors customization according to requirements
- Online access to data measurement and viewing LiveData
- Anytime/Anywhere access via mobile apps
- Powerful and flexible post-processing software
- Alarm notifications
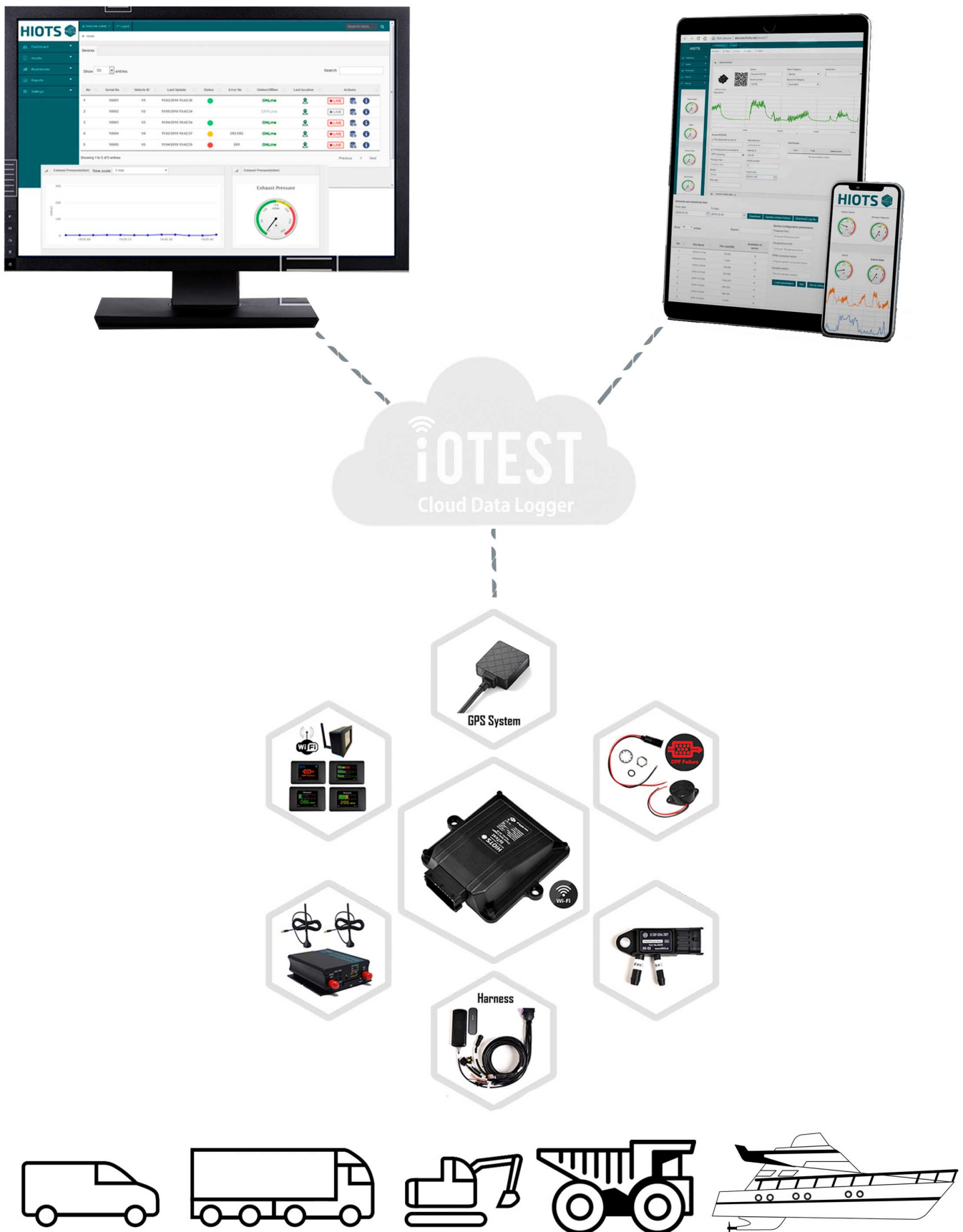- Robust design for use in harsh industrial environment
- Stores data up to 10 years

Scope:

- Passenger cars
- Commercial vehicles
- Non-road mobile machinery
- Generators
- Marine vessels
- Trains

How It Works:

2. System Overview

3. Installation of the HIOTS ioTest

3.1. Hardware Components

HIOTS Emission Monitoring Systems consist of the below components as described and shown in the following:

1. ioTest Main data logger (Part No. : 30130 – Fig. 1)
Connects to the main connector (24 pin) of cable harness

2. Cable Harness (Part No. : 30210 – Fig. 2)

3. Cellular Modem (Part No. : 30550/30560 – Fig. 3)
Option A (Standard): 4G Dongle Cellular Modem - Part No. : 30550
Option B: 4G Industrial Cellular Modem - Part No. : 30560

4. Pressure Sensor (Part No. : 30250 – Fig. 4)
Connects to the Bosch 3 pin connector of the cable harness

5. Exhaust Temperature Sensor (Part No. : 30260 – Fig. 5)
Connects to the Deutsch connector of the cable harness

6. CAN- Wideband Lambda Meter (Part No. : 30630 - Fig. 6)
Connects to the 2 pin CAN connector of the cable harness

7. Smart NOx Sensor (Part No. : 30640 – Fig. 7)
Connects to the 2 pin CAN connector of the cable harness

8. GPS Antenna (Part No. : 30220 – Fig. 8)
Connects to the 7 pin round connector of the cable harness

9. Sensors Installation Pack (Part No. : 30230 – Fig. 9)
Stainless steel pipe and fittings for pressure and temperature sensors installation

10. Fuse Kit (Part No. : 30240 – Fig. 10)
1 Ampere Fuse, fuse holder and cable clamp – integrated in the power-supply

11. LED Indicator (Part No. : 30150 – Fig. 11)
LED lamp and fittings for installation

12. Buzzer Alert (Part No. : 30160 - Fig. 11)
Alerting buzzer

13. Wi-Fi-Display (Option) (Part No. : 30140 - Fig. 12)
A touch screen, designed to be connected with the data logger through wireless connection

Fig. 1: ioTest main data logger

Fig. 2: Cable harness

Fig. 3 (A). 4G Dongle Cellular Modem

Fig. 3(B): 4G Industrial Cellular Modem

Fig. 4: Pressure sensor

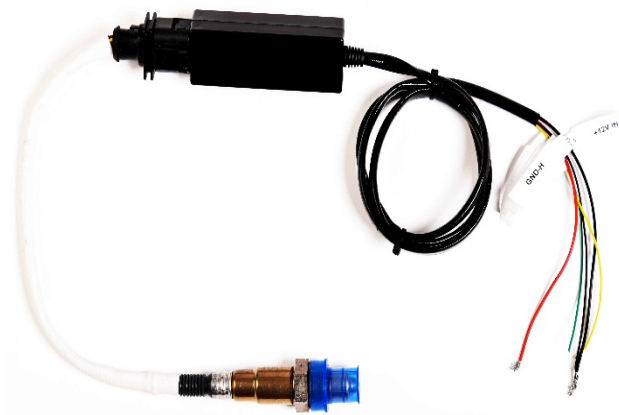Fig. 5: Exhaust Temperature sensor and fitting

Fig. 6: CAN-Wideband Lambda Meter

Fig 7: Smart NOx Sensor

Fig. 8: GPS antenna

Fig. 9: Sensors installation pack

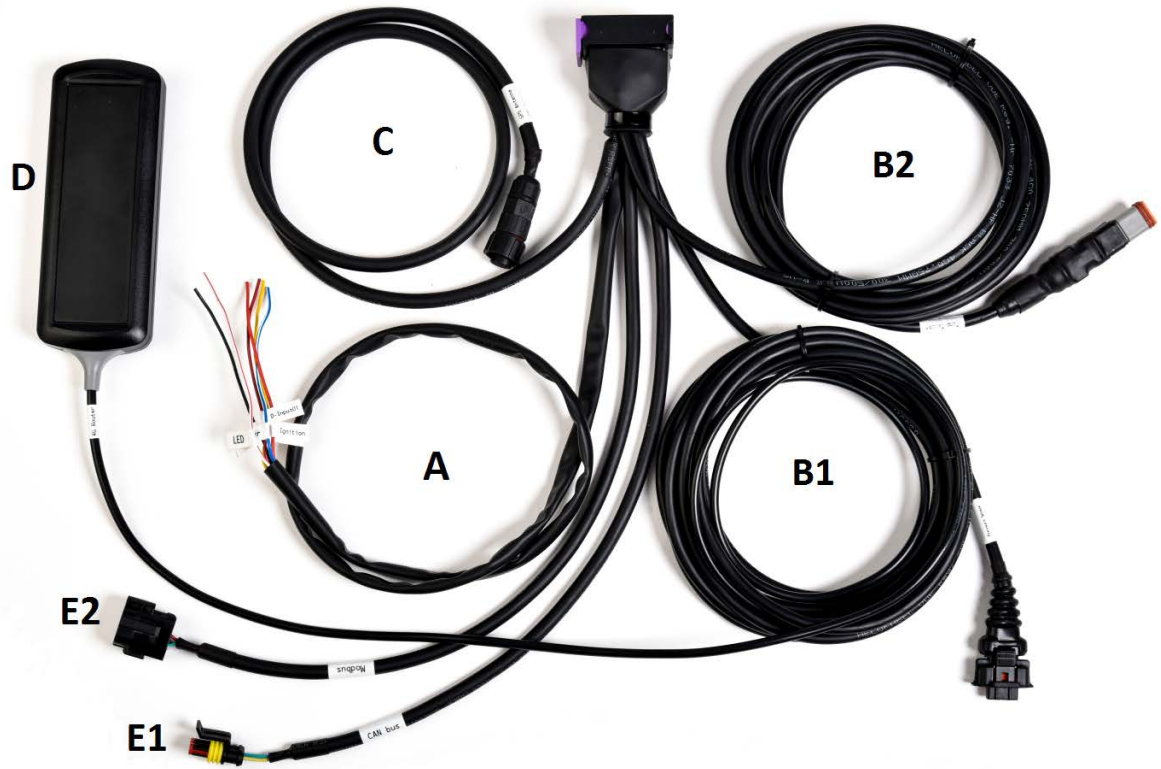Fig. 10: Fuse kit (1 Ampere Fuse)
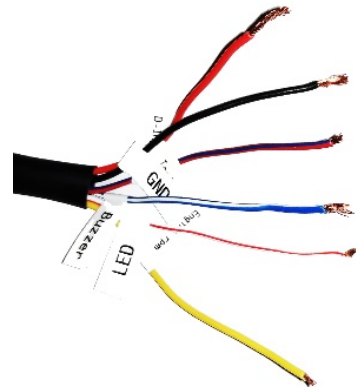

Fig. 11: LED indicator/ Buzzer Alert

Fig. 12: Wi-Fi-Display

![HIOTS - Helvetia IoT Solutions logo]

3.2. Cable harness specification

A   Power supply

Red Wire   →   Supply(+) 10 ~ 38 Vdc
Black Wire   →   Ground -
Yellow Wire →   Engine rpm
Red.White Wire →   LED indicator
Blue.White Wire →   Buzzer

Red/Blue Wire   →   Digital Input /
Analog input

⚠ **WARNING**
*Note: **Integrate FUSE KIT in the power-supply (permanent positive polarity) to provides protection against overvoltage**
*Note: **Connect Supply (+) to the ACC/ignition (Accessory power) instead of constant battery (+) to Keeping the ioTest system powered off when Engine ignition is off.**

![HIOTS - Helvetia IoT Solutions logo]

B   Sensors connection

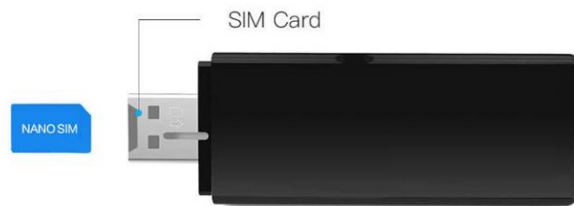| B2 | Temperature sensor connection | |
| B1 | Pressure sensor connection | |

C   GPS connection

| GPS antenna connection | |

D   Modem section

| 4G Dongle Cellular Modem with SIM card slot | *(Note: This section is not available in Industrial Modem version)* | |

Note: Please insert a Local SIM card with sufficient internet access into the modem slot.

Generally, to make sure the internet is available on the Modem, you can connect devices such as smart phones and tablets to the modem Wi-Fi with SSID and Password printed on the sticker on the bottom of the modem and check availability of internet!

E   Data connection
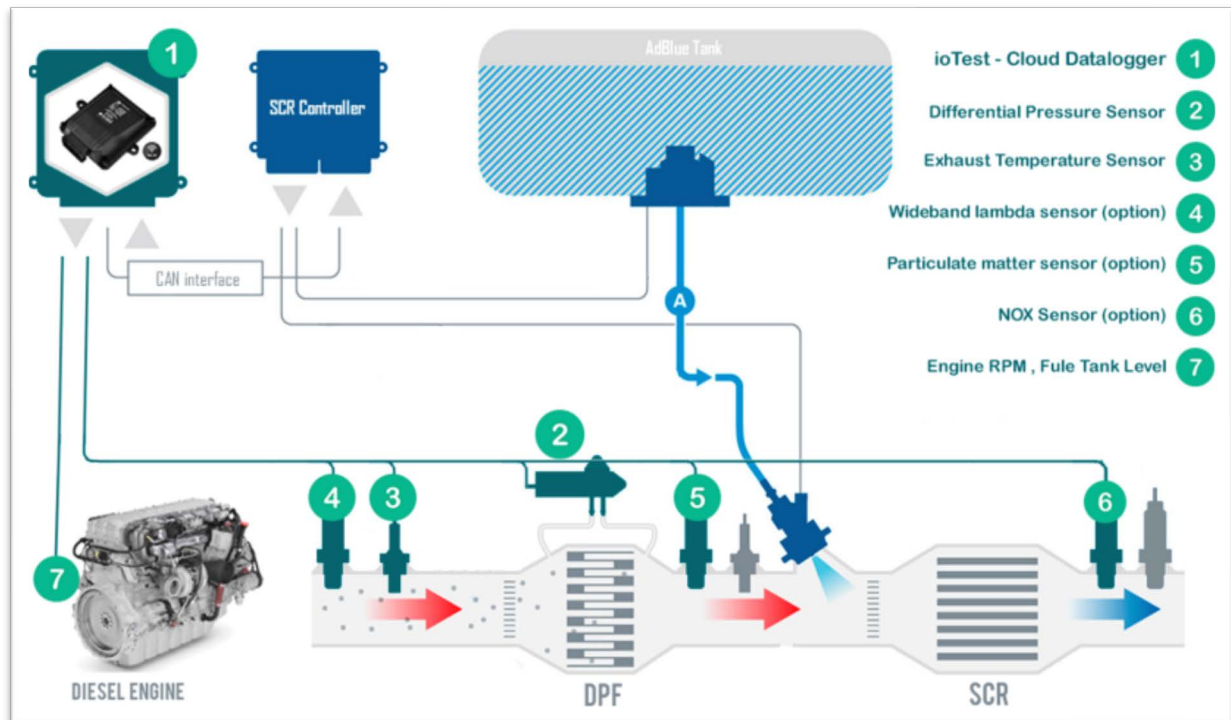
| E1 | CAN bus connection | |
| E2 | Modbus connection | |

3.3. Installation

The below picture illustrates the overview of the system installation.

3.3.1. Main data logger

At first, choose the appropriate position of the main device according to the permissible cable length starting from the main data logger to each component position. We recommend that the main data logger be placed in the vehicle with vibration-absorbing materials.

⚠ **WARNING**
The Main data logger must not be positioned too close to components that may get so hot like engine exhaust and manifold. Insulate cables when running them close to hot parts.

Try to isolate the main logger and modem module with a protective box in order to protect them from any unauthorized accessibility. In addition, using vibration-absorbing material beyond the main device is highly recommended.

3.3.2. Cable harness

- The cable harness must be disconnected from the power supply when installing and connecting the systems.
- Insulate cables when running them close to hot parts.
- To avoid short circuits, insulate the free ends of unused wires.
- The plug connectors must face downwards.

**IMPORTANT: DISCONNECT THE BATTERY BEFORE INSTALLATION!**

3.3.3. Differential pressure sensor

1- Differential pressure sensor includes an installation package. This package contains exhaust pressure sensor (with two inputs), steel pressure pipe, clamp-ring, fitting and hose.

2- **Pay attention to the correct installation of upstream and downstream measuring inputs on the sensor (Ø 8 mm connection: upstream of DPF, Ø 6 mm connection: Downstream of DPF or may be left unused in case of ambient pressure reference usage).**

Before DPF — Inputs — After DPF
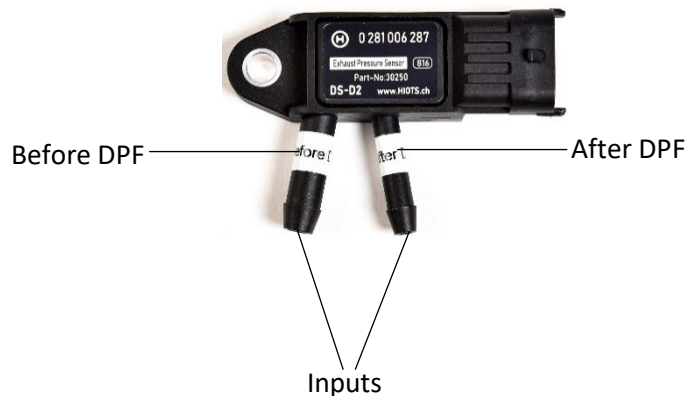
3- **The differential pressure sensor must be installed in a higher place than the measuring point (figure below). For this, use the provided stainless steel pipe and hose to keep pressure sensor away from exhaust pipe heat.**
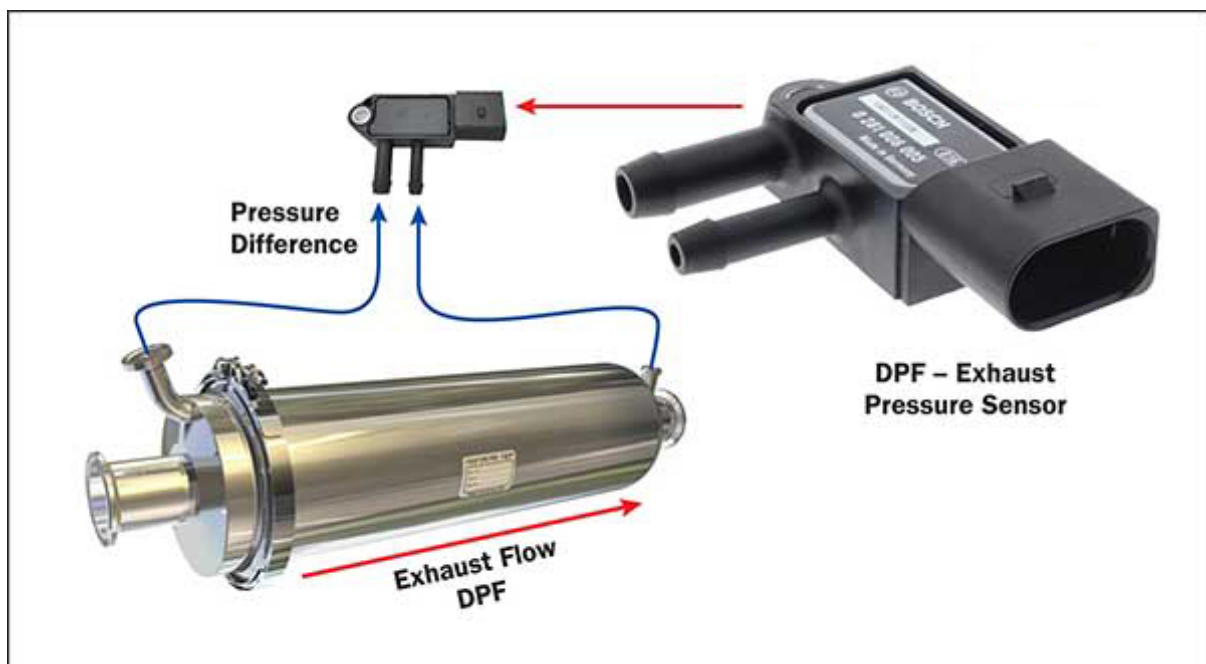
4- To install the sensor, you need to drill a hole in exhaust pipe in upstream of DPF. You can either bolt or weld the provided fitting to the exhaust pipe. Insert the provided steel pipe into the fitting (approx. 3 cm into the exhaust sampling line) and tighten the nut. Connect the other end of the steel pipe to the "Before DPF" input (Pay attention to the attached labels) through the provided hose and clamp-ring.

5- Please note that the current sensor includes two inputs. First input (Before DPF) must be connected upstream in order to measure the backpressure. Second input (After DPF) can either be connected downstream of DPF or remain unused.

6- In order to prevent the condensed water droplets blocking the hosing line or reaching to the pressure sensor, try to avoid making U-shapes in both steel pipe and pressure hose and always install the hosing in a rising line up to the pressure sensor.
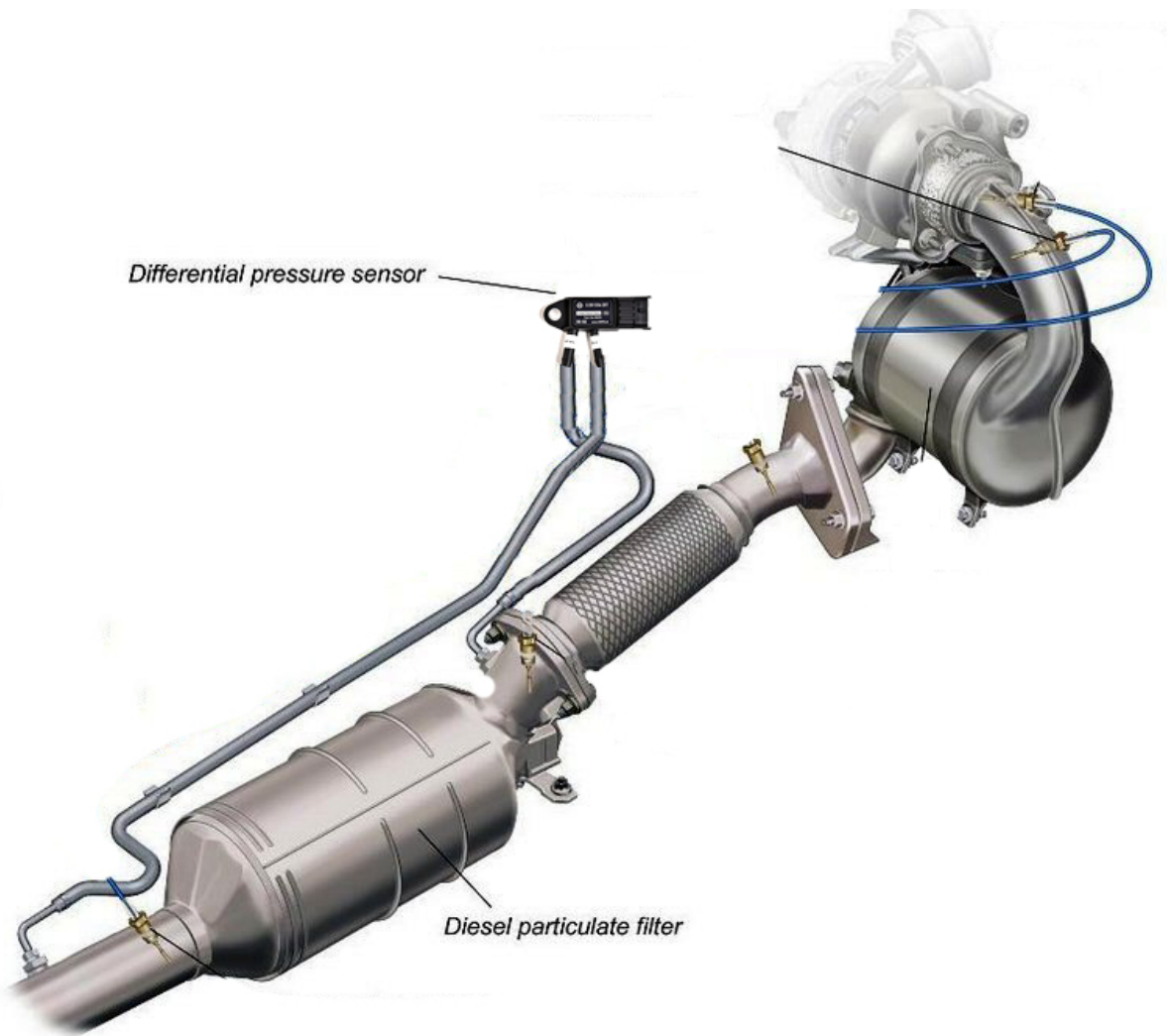
7- If you need to lower the size of steel pipe for a proper installation, try to make round coils instead of cutting pipe to the suitable size.

3.3.4. Temperature sensor

1- When using the sensor, remove the plastic cap.

2- Exhaust temperature sensor should be placed close to engine and in the upstream of the DPF/SCR.

3- Drill a hole in the exhaust pipe/manifold and thread the tap. Attach the provided fitting to the exhaust pipe/manifold and tighten it. Insert the sensor tip (probe) in the sampling line as long as it gets to the direct stream of exhaust gas (approx. 3 to 5 cm) and tighten the nut. You can also weld the provided fitting than wrenching it (in this case you do not need to thread the tap).
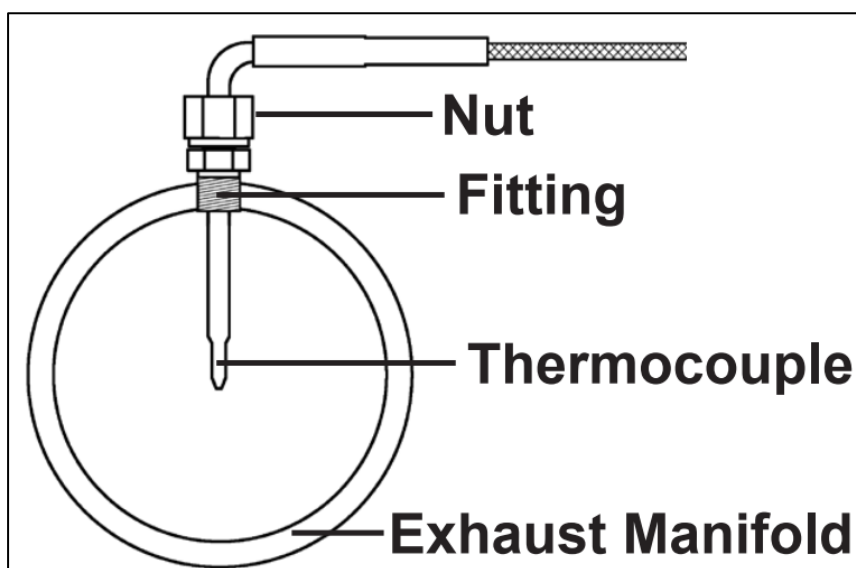
4- Be careful not to over tighten the screw connection, as this could damage the probe. Before fully tightening the nut, make sure the cable starts 90 Degrees from the final resting position. In addition, try to avoid temperature wire contact with components that heat up.
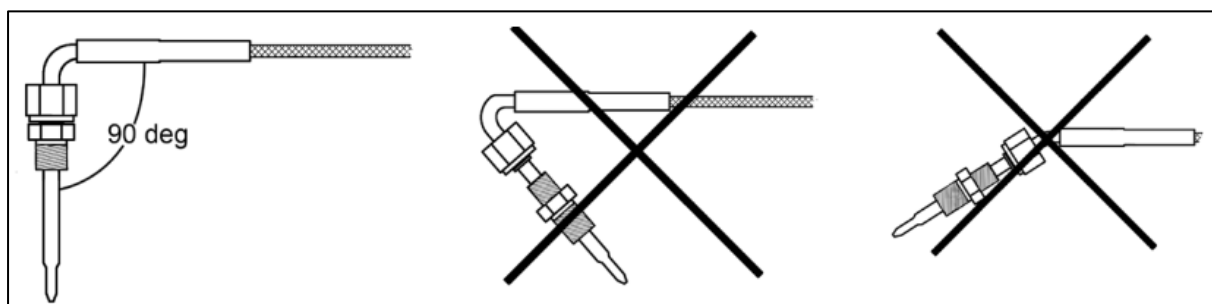
5- Connect the probe wire to the harness wire and be careful not to damage the lock.

3.3.5. CAN-Wideband Lambda Meter (option)

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⚠ DANGER

The Lambda Sensor used in this device gets very hot in operation. Do not touch the hot sensor. Do not let a hot sensor touch a combustible surface. Do not use the sensor with or near flammable liquids or gases. Failure to heed these warnings may result in severe burns, explosions or fires.

</div>

1. <u>When using the sensor, remove the plastic cap.</u>
2. The sensor body should be perpendicular to the exhaust gas flow, and it should also be tilted in the range of 10˚ to 75˚ from the horizontal line (see the figure). The typical tilt-angle is 30˚. The sensor probe should be close to the center of the exhaust pipe.
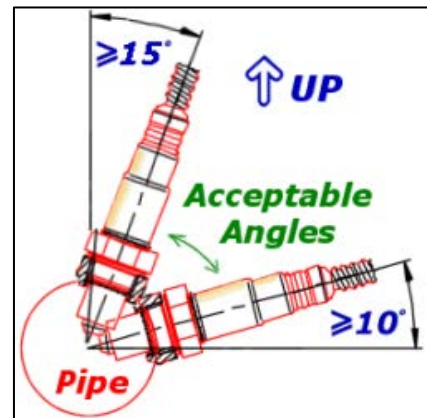
3. Find a location in upstream of the exhaust pipe (down the merge collector), drill a hole of 18 mm in diameter and weld the provided threaded bung onto it. <u>Small pin-hole leak in a poorly welded sensor bung will affect the accuracy and performance of your sensor. Remember, any deviation from the instructions provided for proper sensor installation will lead to inaccurate readings.</u>
4. The sensor is not to be fitted near to the exhaust pipe outlet, so that the influence of the outside air can be ruled out.
5. The sensor connects through the 2-pin CAN bus connection of the HIOTS cable harness.
6. Make sure the connection is fused with a minimum fuse size of 5A.
7. <u>Lambda Meter Operating Voltage is 10 ~ 15 Vdc. In case that only 24 voltage source is available, a voltage converter 24 to 12 volt must be placed.</u>
8. <u>Supply Lambda Meter to the ACC/ignition (Accessory power) instead of constant battery (+) to Keeping the Lambda Meter powered off when engine ignition is off.</u>

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⚠ WARNING

When the Lambda Sensor installed in the exhaust, the sensor MUST be connected and operated whenever the engine is running. An un-powered sensor will be damaged when exposed to hot exhaust gases.

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3.3.6. Smart NOx Sensor (option)

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⚠ DANGER

The Smart NOx Sensor used in this device gets very hot in operation. Do not touch the hot sensor. Do not let a hot sensor touch a combustible surface. Do not use the sensor with or near flammable liquids or gases. Failure to heed these warnings may result in severe burns, explosions or fires.

</div>

1. When using the sensor, remove the plastic cap.

Remove the plastic cap

2. The sensor body should be perpendicular to the exhaust gas flow, and it should also be tilted in the range of 10˚ from the Vertical line (see the figure).
3. The sensor is not to be fitted near to the exhaust pipe outlet, so that the influence of the outside air can be ruled out.
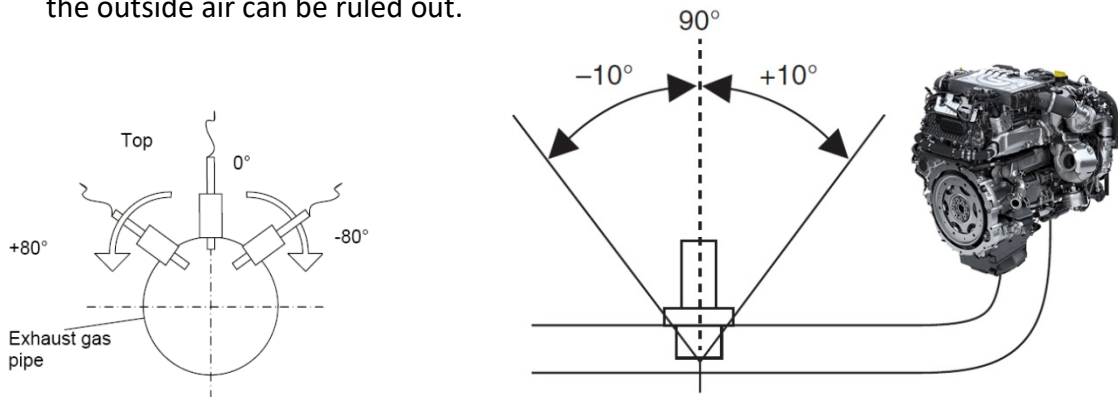
4. Punch a hole in exhaust pipe and weld the provided threaded bung onto it.
5. After finding the right location on the exhaust pipe, drill a hole of 18 mm in diameter. Use the tightening torque of 50 Nm.
6. The sensor connects through the 2-pin CAN bus connection of the cable harness.
7. Make sure the connection is fused with a minimum fuse size of 5A.
8. Smart NOx Sensor Operating Voltage is 24 Vdc.
9. <u>Supply Smart NOx Sensor to the ACC/ignition (Accessory power) instead of constant battery (+) to Keeping the Smart NOx Sensor powered off when engine ignition is off</u>.

<div style="background:yellow">

# ⚠ WARNING

When the Smart NOx Sensor installed in the exhaust, the sensor MUST be connected and operated whenever the Engine is running. An un-powered sensor will be damaged when exposed to hot exhaust gases.

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3.3.7. RPM signal input

HIOTS Emission Monitoring Systems measure the rotation speed of a crankshaft and calculate the revolutions per minute (RPM). Typically, alternator W terminal (AC Signal) use for this purpose. You can connect the RPM wire (yellow wire) on cable harness to engine's alternator W terminal to obtain engine RPM. The W terminal generally outputs an unrectified AC voltage, the frequency of which is proportional to the engine speed.

In cases where alternator's signal is not available, you can connect any type of RPM Sensor with pulse output to obtain engine RPM.
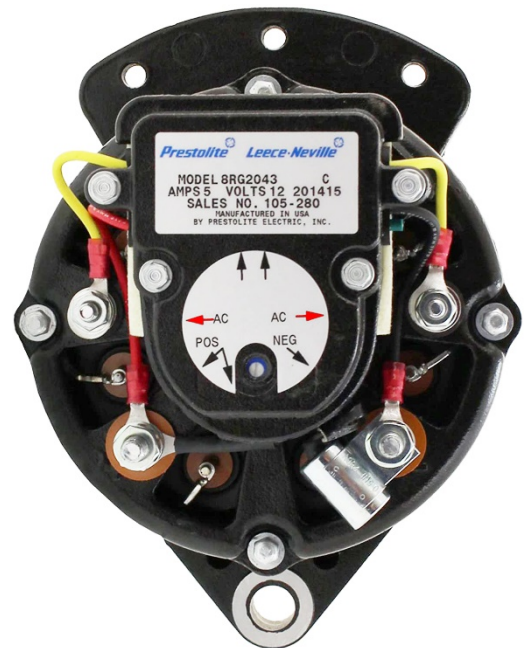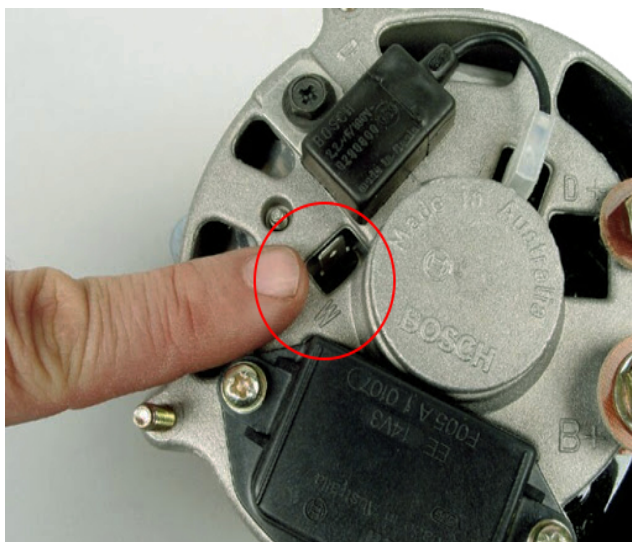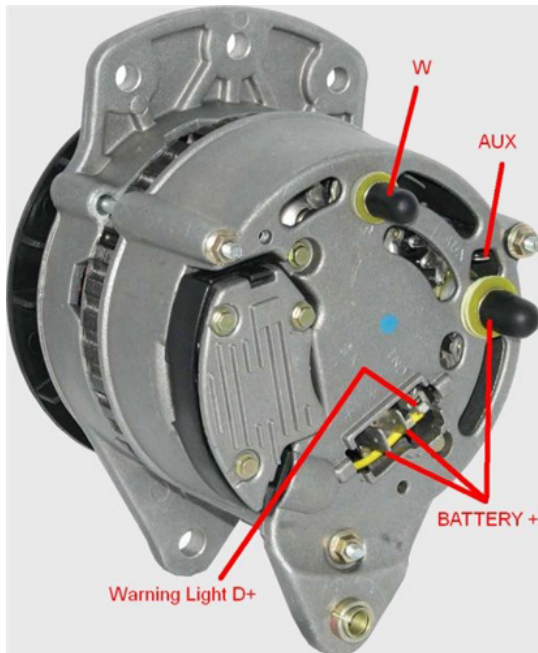
3.3.8. Engine RPM correction factor

To calculate the engine RPM correction factor, knowing the correct pulses per rotation cycle (P) and the diameters of the V-belt pulley of the crankshaft (d1) and the diameters of the alternator pulley (d2) is important. Alternator mostly gives 6 pulses in each single rotation cycle (in some cases it could be 4 or 8 according to the alternator concept of design).
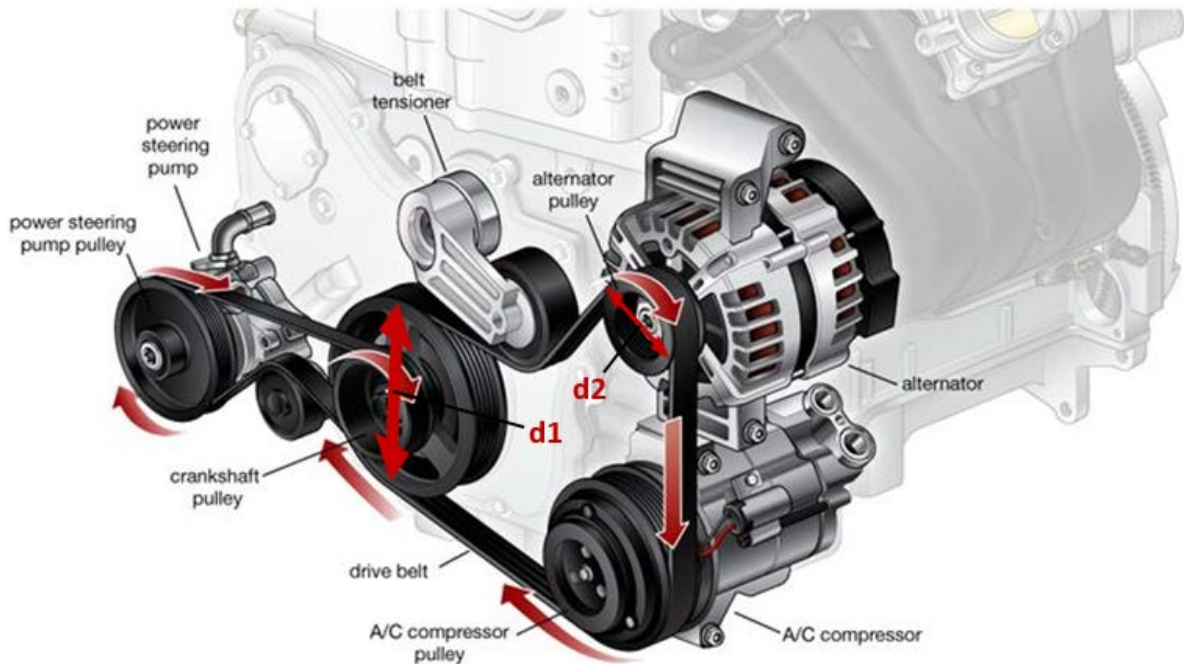
d_1: crankshaft pulley diameter, d_2 alternator pulley diameter

Once you know the parameters, use this formula to determine RPM correction factor:

$$P \times \frac{d_1}{d_2}$$

Example:

Crankshaft pulley diameter: d_1= 385 mm, Alternator pulley diameter: d_2 = 82 mm

Number of pulses in each revolution: P = 6

RPM correction factor = $6 \times \frac{385}{82}$ = 28.171

The RPM pulses can also be obtained from engine ECU output or RPM sensor with pulse output. In these cases, mostly the number of pulses per minute represents the real engine speed and RPM correction factor = 1.

3.4. Technical specifications

3.4.1. Data Logger and Modem

The ioTest data logger is a completely isolated device which collects, stores and transmits data to a cloud database without being dependent on any external sources. The main data logger section (Fig. 1) is responsible for collecting data coming from sensors and storing them on an internal SD card. Benefiting from a Wi-Fi connection provided by external 4G cellular modem (Fig. 3 / Fig. 4), data would be transmitted to the data server.

Data logger

Power supply	10 – 38 VDC
Pressure range	0 – 700 mbar
Temperature range	0 – 900 ˚C
RPM range	0 – 10000 rpm
Memory capacity	16 GB - Storage up to 10 years
Wi-Fi protocols	802.11 b/g/n
Wi-Fi frequency range	2.4 ~ 2.5 GHz
Processor cores	2
Operating Temp	-20 ~ 80 ˚C
Dimensions	120 × 108 × 32 mm

Modem	4G LTE/3G with up to 150 Mbps
	Connect via Wi-Fi
	Onboard SIM card slot
	WPA2^{TM} and Wi-Fi protected setup^{TM} (WPS)

3.4.2. Exhaust Pressure Sensor

Measuring range (max)	700.00 mbar
Measuring range (min)	0.00
Operating Temperature range (max)	130 ˚C
Operating Temperature range (min)	- 40 ˚C
Response time	1 ms

3.4.3. Exhaust Temperature Sensor

Type	PT200 resistance thermometer
Measuring range (max)	900.00 ˚C
Measuring range (min)	0.00 ˚C
Response time	1 ms

3.4.4. CAN-Wideband Lambda Meter (option)

HIOTS CAN-Wideband Lambda Meter is an air-fuel-ratio (AFR) meter which uses the Bosch LSU-ADV (gasoline/Diesel/E85) wideband oxygen sensor to accurately measure the AFR or lambda for variant combustion engines, or to simply measure the oxygen concentration of variant exhaust gases. It has the full function of a wideband controller and the only thing it needs is a **12V power supply.**

Input voltage range	Range: DC 9V~15 V(12V Typical)
Sensor	Bosch LSU-ADV (gasoline/Diesel/E85)
Range of measurement	$\lambda = 0.5 \sim \infty$
Measurement accuracy	± 0.008 @ λ=1.00 ± 0.01 @ λ=0.80 ± 0.05 @ λ=1.70
Range of O_2%	-21% ~ 21%
Response time	5 ms
Main-Processor	16-bit micro-processor Automotive level

The highlights of new Bosch LSU ADV sensors:

- Sensing Element
- New sensing element design: linear shape (LSU ADV) vs radial shape (LSU4.9)
- Optimized heater design for reduced heater power demand and faster light-off time
- Robustness against thermal shock improved
- Protection Tube
- Triple protection tube
- Reduced heater voltage demand
- Higher robustness against sooting
- Connector / wire harness
- Free choice of connector; LSU ADV only has 5 pins
- No trim resistor, automatic calibration available
- Savings one wire, and less failure mode

3.4.5. Smart NOx Sensor (option)

HIOTS data loggers are compatible to be used with Smart Emission Measurement Systems (SEMS) in on-road test principles. Thus, the option of nitrogen oxides (NO_x) measurement, as a concerning air pollutant, is made possible with the use of a smart NO_x sensor. In order to check the compliance with the different emission legislations in an on-road test, the NO_x sensor option could be used on engines with different kinds of exhaust gas aftertreatment systems both at gasoline and diesel engines, or it may be used on an engine without any type of aftertreatment equipment.

Sensor Application

The smart sensor is a stand-alone, multifunctional sensor, which measures both the nitrogen oxides (NOx) and Oxygen (O_2) concentration of the exhaust gas in ppm or vol%. Then the real-time measured data are transmitted to the HIOTS data logger via the CAN bus and could be accessed on the cloud-based server as well.

Product Benefits

- Wide range of applications: Gasoline/Diesel engines, Light/Heavy duty segment, On-road/Off-road and marine application.
- Signal output: Nitrogen oxides (NO_x), Oxygen (O_2)
- Standard parameter output format: In ppm and vol% for NO_x and O_2 respectively
- Real-time online and live data access

Measuring range	NO_x: 0 – 3000 ppm O_2: -12 – 21 vol%
Accuracy	NO_x: @ 0 ppm = ± 10 ppm
Response Time	NO_x: 1300 ms O_2: 1000 ms
Measuring frequency	1 Hz
Maximum exhaust gas temperature	800 ˚C (100 hour allowed up to 950 ˚C)
Lifespan approved by life cycle pattern	2000 hours or 120K miles
Supply voltage	24 V
Supply current	Average: 0.6 A Maximum peak supply current: 10 A
Maximum power requirement	20 w
Sensor manufacturer	Continental AG

3.4.6. Particulate Matter Sensor (option)

HIOTS data loggers also offer the option of exhaust particulate matter or soot monitoring with the aid of an on-road PM sensor module. These specific sensors are designed to be used in automotive exhaust systems to detect the presence of particulate matter. Based on a resistive measuring concept between two platinum sensing electrodes, the PM sensor outputs a linearized dimensionless value which could be correlated to the standard PM measuring units by the use of soot emission models. This specially suits the HIOTS PM sensor for the reliable evaluation of Diesel Particle Filters (DPF) working efficiency.

DPF Monitoring with On-road PM sensor

The HIOTS DPF monitoring concept is a model-based DPF diagnostic that compares the PM sensor output with a modeled sensor response for a diesel particulate filter leaking at the On-board diagnostic (OBD) threshold. Thus, by adjusting the desired PM limit value the status of a DPF failure could be detected.

Sensor Application

- Designed to be used in both heavy and light-duty diesel automotive applications.
- Can be used in an existing DPF monitor, or as part of a DPF monitoring solution.

Technical Specifications

Measuring concept	Cumulative PM sensor on a resistive-based technology
Measuring output	Dimensionless signal value considered as response time for the accumulated PM mass
Data communication	CAN bus
Lifespan	250,000 km
Sensing temperature range	< 850 ˚C of Exhaust gas
Supply voltage	9 – 24 V

3.4.7. Wi-Fi Display (option)

Wi-Fi- Display, a resistive touch wirelesses LCD screen, can be used with HIOTS ioTest Cloud Data Logger. This completely customized configurable LCD display can communicate with the HIOTS data loggers remotely with a wireless connection protocol. The Wi-Fi Display shows the real-time measuring data as well as the alarms and error codes coming from the HIOTS data logger through the wireless communication. Benefiting from a Wi-Fi communication module makes Wi-Fi Display a suitable and easy installing monitoring device customized for the vehicle driver or equipment operators with an up to 18m distance with the main data logger.

Wi-Fi Display Features:

- Powerful intelligent LCD display with full color icons
- 3.2" 320 x 240 Resolution resistive touch panel
- Built in Wi-Fi communication with HIOTS data loggers
- Real-Time wireless high-speed data display sent from data loggers
- Coverage of all DPFs crucial parameters (exhaust backpressure and temperature, engine rpm)
- Easy installation, only a power supply and without any need of cable connection protocols
- 18 m wireless connection distance coverage
- Module dimensions: 115.5 x 77.8 x 40.5 mm

Display	3.2" RGB 65K true to life colors
Touch Screen	TFT Screen with integrated 4-wire Resistive Touch Panel
Resolution	320 x 240 px
Wi-Fi	WiFi 2.4 GHz, supporting WPA/WPA2 and WEP/TKIP/AES, along with STA/AP/STA+AP/P2P operation modes
Operating Temperature	-20 to 50 ˚C
Supply	5 / 24 V dc
Module dimensions	115.5 x 77.8 x 40.5 mm

4. Initial steps to start operation

The HIOTS ioTest data logger does not need much effort to get ready for initial use. After the successful installation, the date and time would be adjusted over the air via internet connection. Furthermore, there is no need of zero calibration for the measuring sensors. Also the predefined basic settings are flexible to be changed according to the customer desired setup via internet connection. The factory settings are shown in below table.

Upper backpressure limit set for alarm	150 mbar
Upper temperature limit set for alarm	550 ˚C
Alternator correction factor to measure engine rpm	28 (default set for a common diesel alternator)
Sampling interval	selectable between 1 – 60 second
Speed unit:	Km/h

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5. Error Codes Guide

Error Code	Error Type	Description	LED	Buzzer	Troubleshooting
E1	High Pressure	Pressure > P Limit For continuous 10 seconds	Blink 1 Sec	ON only for 10 Sec (repeats every 30 minutes)	Check DPF status. Service DPF if needed.
E2	High Temperature	Temp > T Limit For continuous 10 seconds	Blink 1 Sec		Check DPF status. Service DPF if needed.
E3	Pressure Sensor failure	No signal receives from pressure Sensor	ON	OFF	Check wiring of pressure sensor and sensor itself.
E4	Temp Sensor failure	No signal receives from Exhaust Temp Sensor	ON		Check wiring of temperature sensor and sensor itself.
E5	Incorrect Pressure data	if temp >250 & Pressure = 0 For Continuous 10 min	ON		Check pressure sensor installation and possible leakage of pressure tube.
E6	Incorrect Temp data	if pressure >10 & temp< 80 For Continuous 10 min	ON		Check temperature sensor, installation and sensor itself.
E7	RPM Sensor Failure	if temp >100 & RPM=0 For Continuous 10 min	OFF		Check the wiring of rpm / alternator
E8	SD Memory error		OFF		Contact device specialist.

Note:

The values of parameters for triggering the above-mentioned error codes are set according to the HIOTS standards and could be changed for different applications and costumers needs.

6. Data download and cloud server

In order to access the HIOTS cloud database, you need to access to the following webpage link:

Address: https://hiots.net/

After a click on the **"Device Management"** section, you have to login to the specified account of your local project.

NOTE:

Please contact to: support@hiots.net for your custom login information.
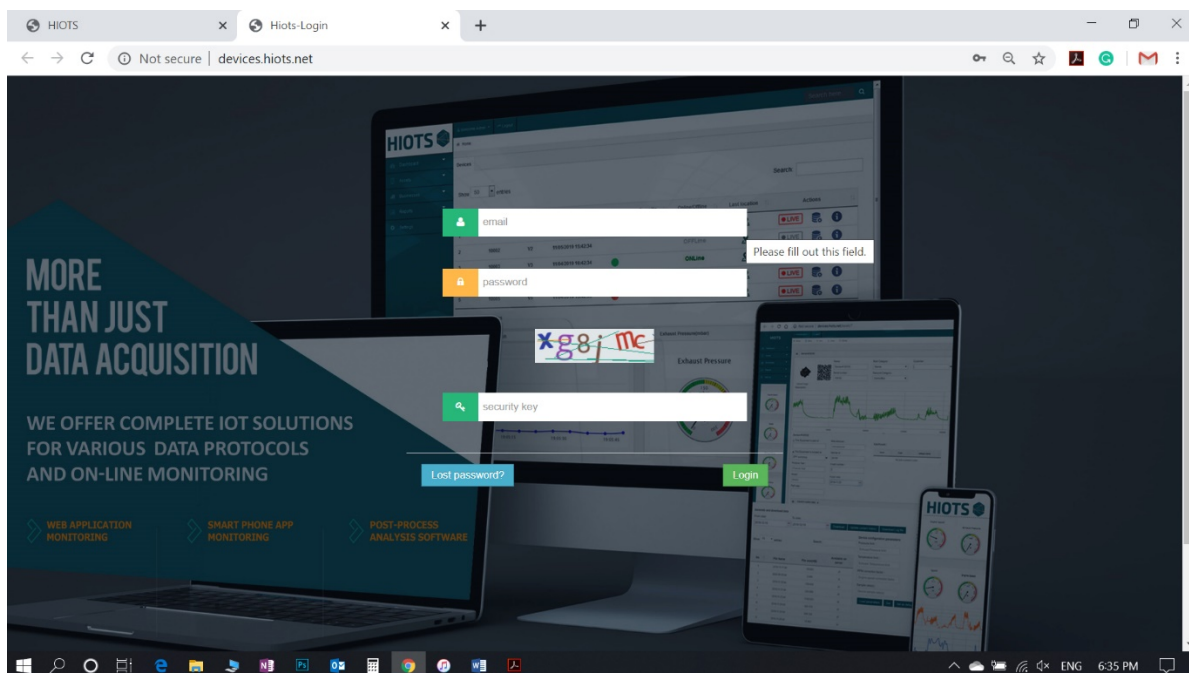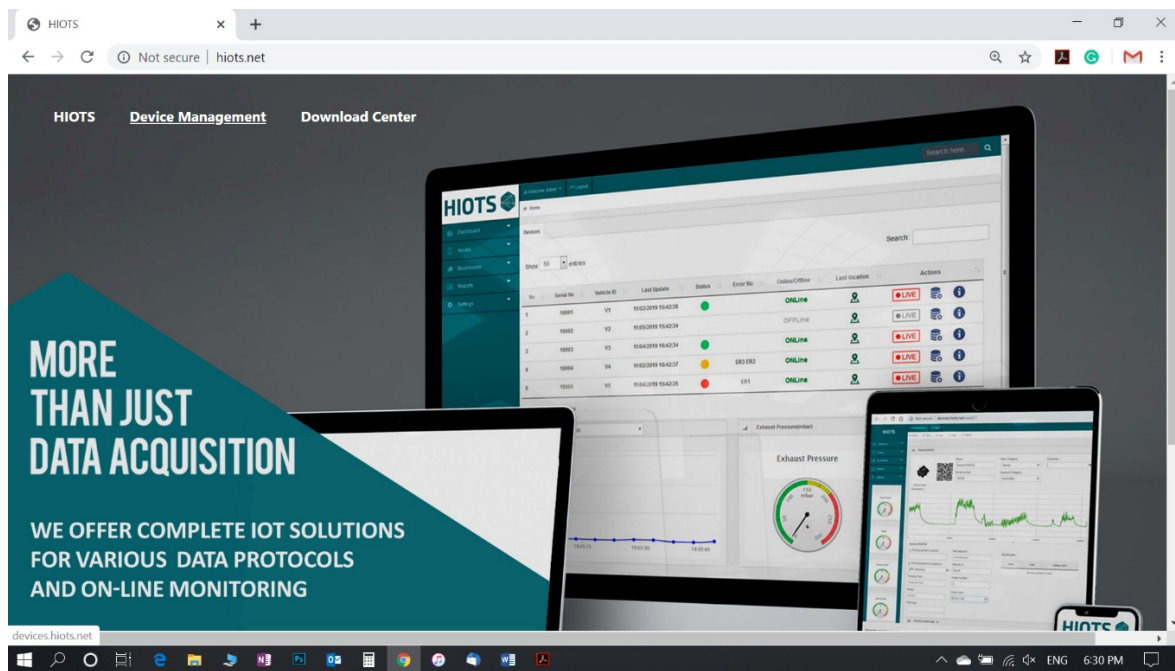
After a successful login you will be seeing your all data loggers' information in a table like below:
(**_NOTE: Wait 10 seconds for the data to be updated_**)
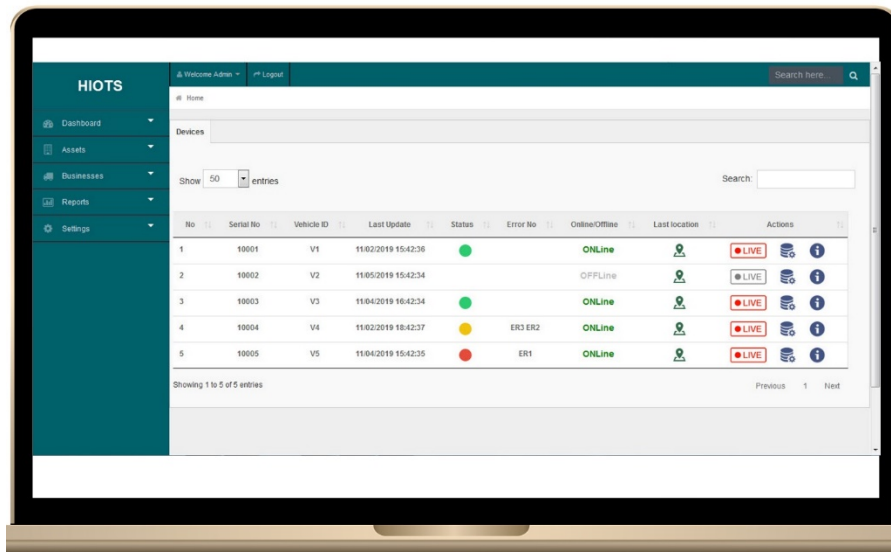
The information shown in this page for each device are:

1- Device Serial No.
2- Vehicle ID
3- Last update date and time
4- Current status according to the activated error codes:

🟢 Green light: no error codes,

🟡 Yellow light: some error codes except the high backpressure/ High Temperature has been activated.

🔴 Red light: the error code related to the high backpressure or High Temperature has been activated.

⚪ Gray light: The Device not updated for more than 10 days, check electrical connections & make sure the SIM card has enough credit.

5- Activated error codes. **(Details are shown by keeping mouse pointer on the number)**

6- Current Device online/offline status

7- Last location of the device/ vehicle

8- Action section:

 Monitoring real-time data of the moment

 Data download

 Device additional information

6.1. Real-time live data ●LIVE

By clicking on the "LIVE" icon and waiting about 10 seconds for the data to be synchronized, you will be able to see the real-time moment-to-moment data of the selected device.
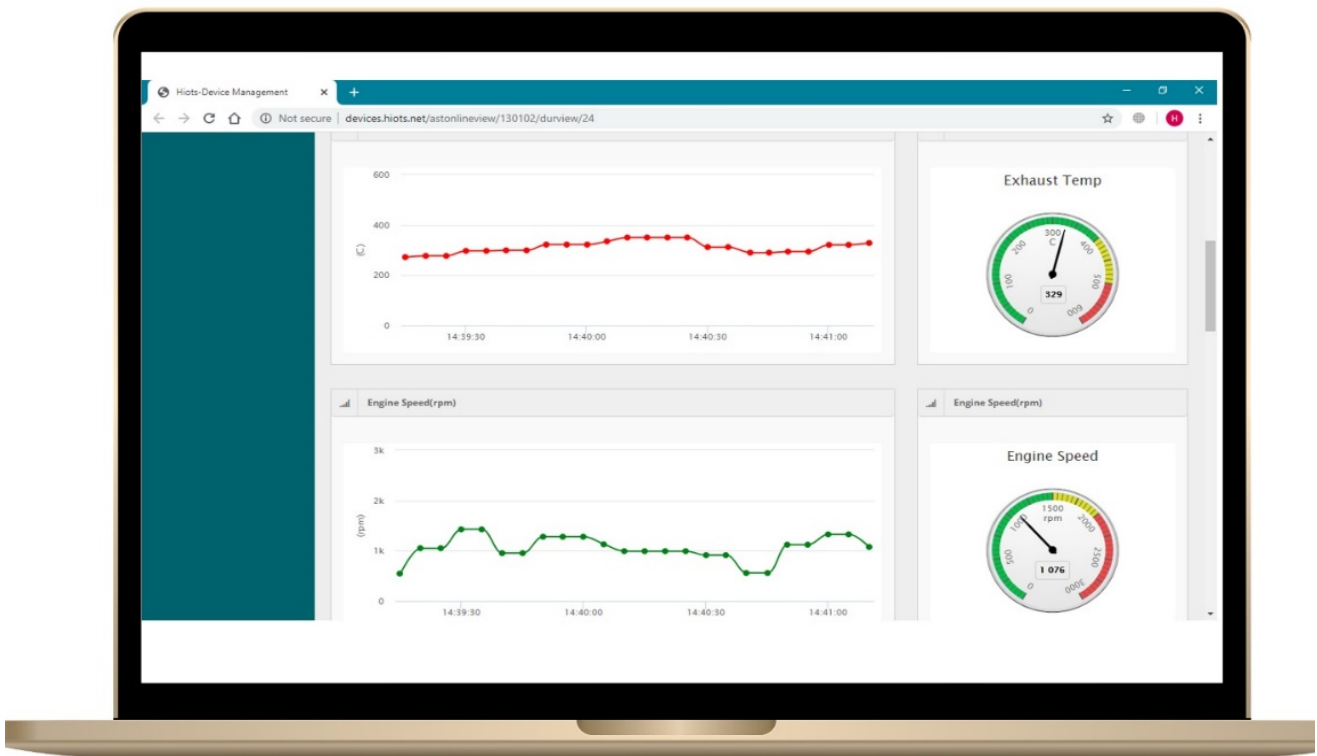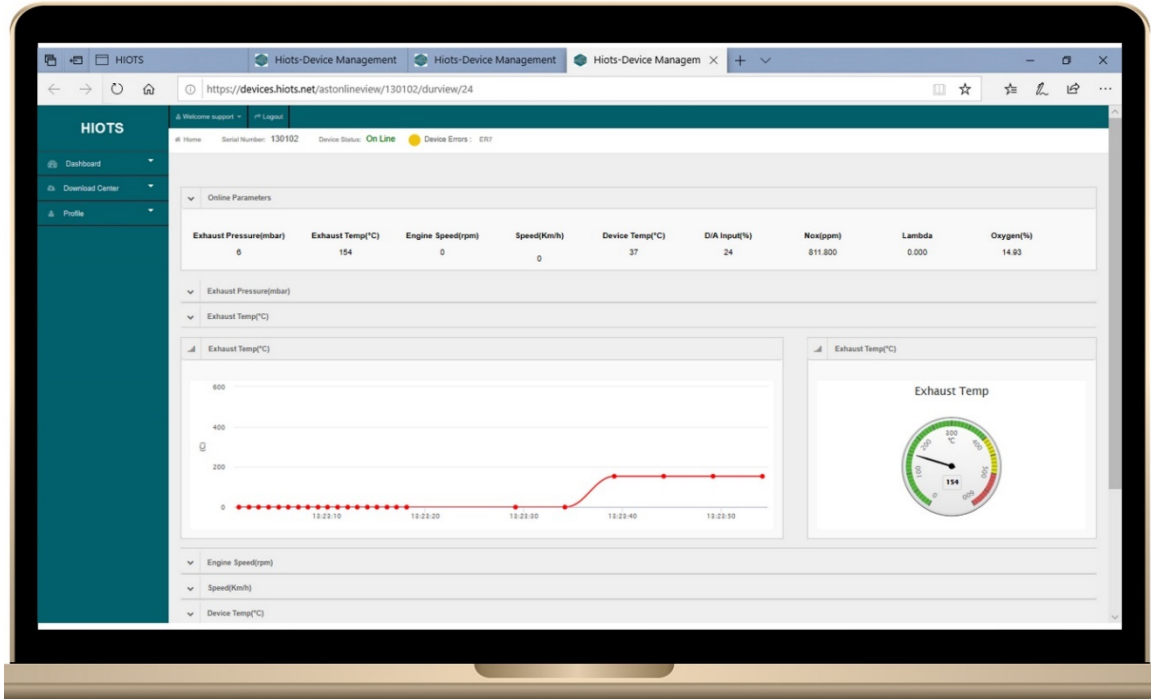

Note: The operator's desired time scale for data display could be set in the provided box above diagram.

6.2. Data Management 🗄️⚙️

Clicking on "Data Management" icon will lead you to the page of data management.

6.2.1 Index Files

On this tab you can see a table contains a list of your data files which are transformed from data logger to the server. Index files can be sorted based on file number, file name and file size. To update the list, you need to press "Update Index Files". To download a data file of a specific date from the list, the file size on device should be equal to file size on server (in this case, you will see a tick mark in "Available on Sever" box). If you do not see the tick, you need to manually synchronize the data either by clicking 🔄 icon or selecting the date and pressing "Sync" button. As you see the tick in the box, you can download your data file by pressing ⬇️ icon. The device log file information is also accessible in this table. These data show general status of your device including turn on/off times frameware version and errors. You may download the last log file of the server via "Download Log file" icon. In order to get latest Log file of the data logger, please click "Update Log file" command.
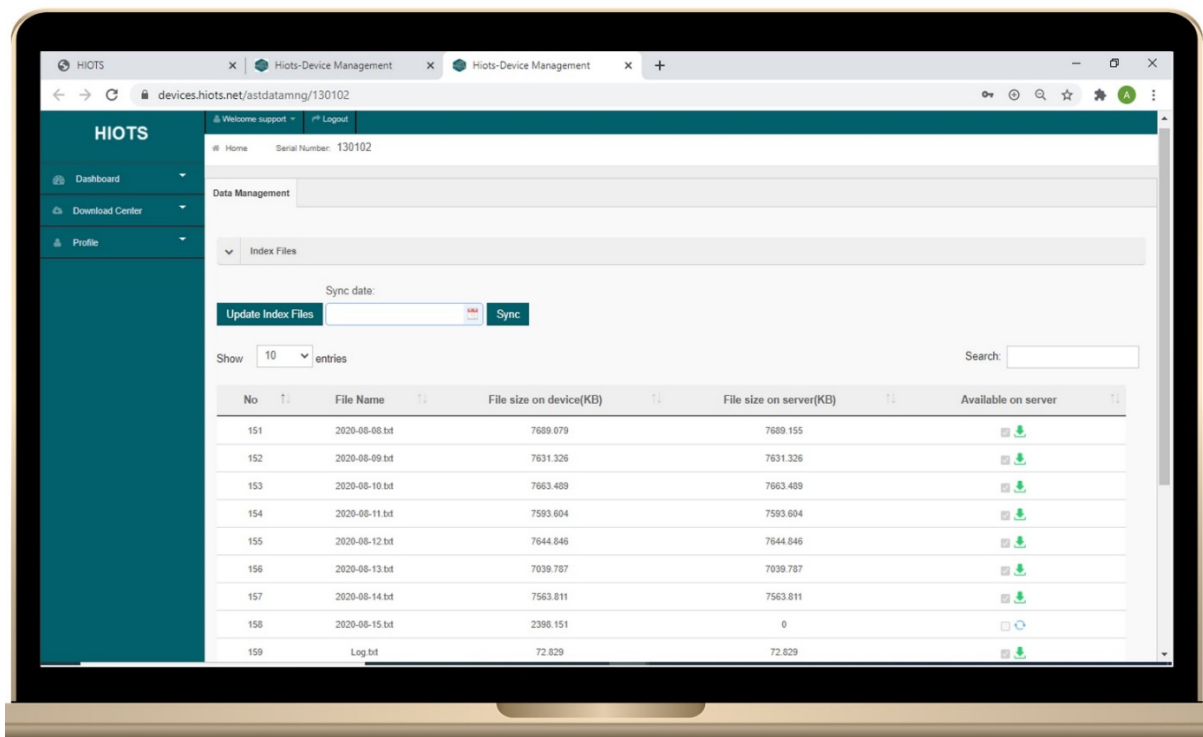
**Note: Normally No need to use Manual sync, the data is automatically transmitted to the server.**

6.2.2 Generate Data

On this tab you can download your data file through a custom date range. By selecting the start and ending date and clicking on "Download" icon, the desired time range data would be available for download.
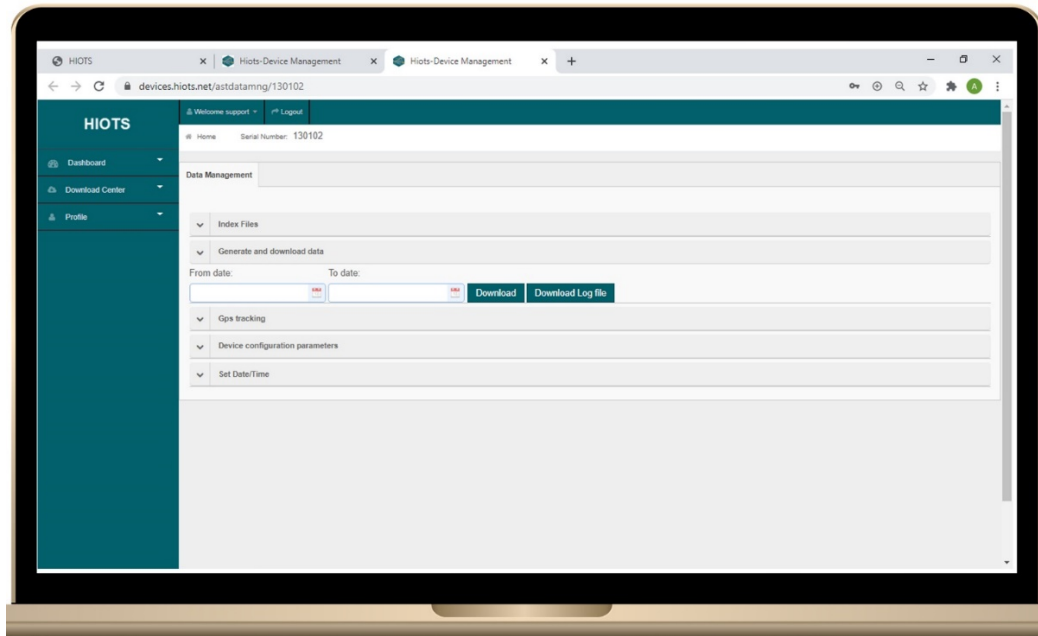
6.2.3 GPS Tracking

In this section you can, you can see the last location of your device/vehicle on the provided map. If you are interested to check the routes traversed by the vehicle in a custom date range, you can select a date range and then click on "show route on map". To check the total length of the traversed routes, click on the last blue balloon on the map.
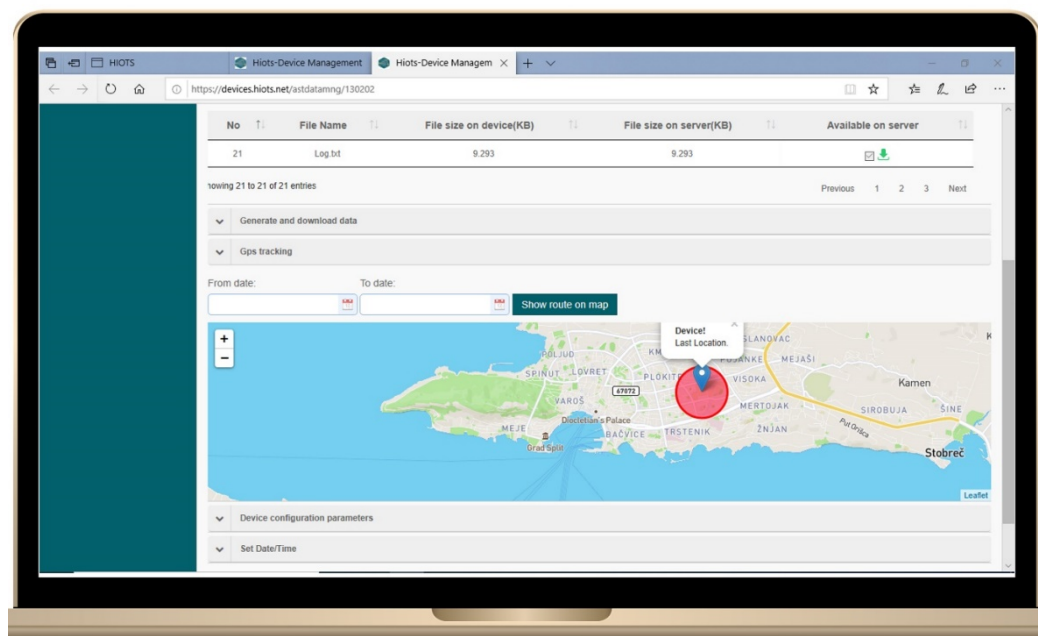
6.2.4. Device Configuration

This tab enables you to change your device settings over the air. These settings include pressure and temperature limit numbers, RPM correction factor (described above), sample rate (The time it takes the device to acquire data), calibration factors, configure secondary Wi-Fi and speed unit.

Sample rate specifies the time it takes the device to acquire data. The default value is 1 (Sec) which means that data will be saved on your data logger SD card every second.

Calibration factors (A&B) are the coefficients that are determined by the manufacturer.

Configure secondary Wi-Fi enables you to set additional Wi-fi and connect it to the data logger. To do this, you only need to set your secondary Wi-Fi network name (SSID) and password.

Note: At the end of new configuration, you need to click on "Apply" and "Restart" buttons. Also, you can click on "Apply" button and then switch off/on the data logger manually.
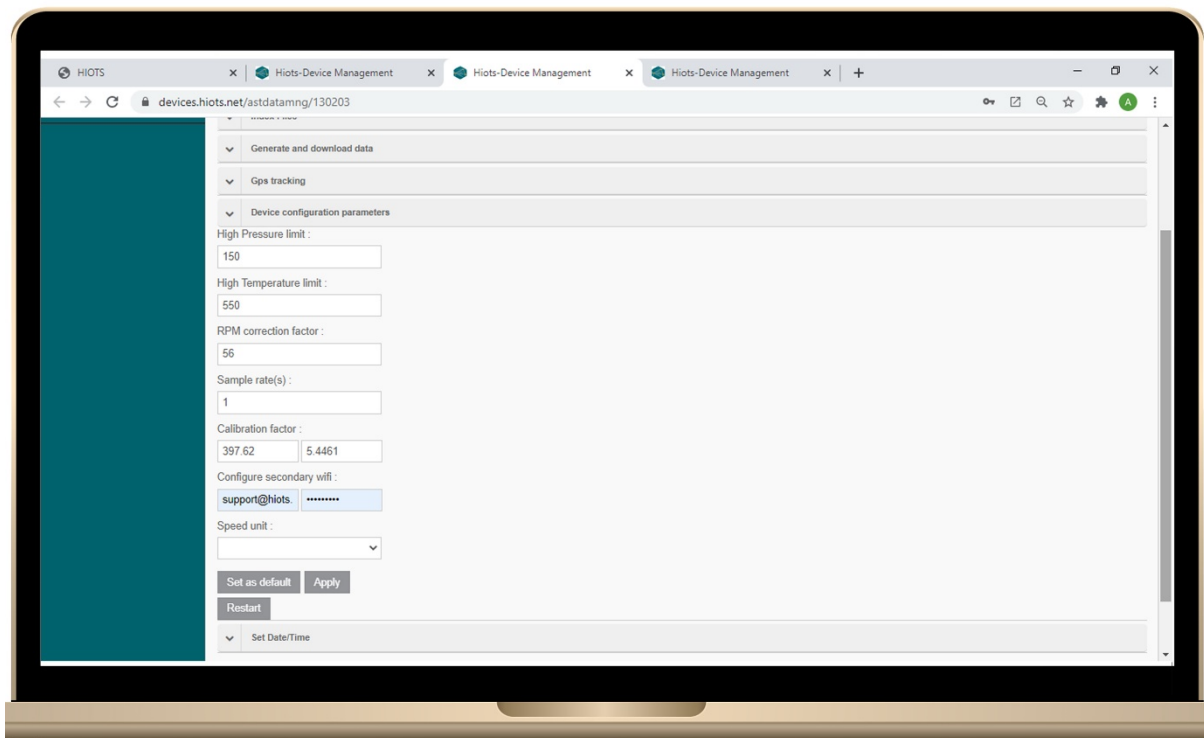
6.2.5 Set Date/Time Manually

On this tab you can manually adjust the data and time of the device remotely. For this purpose, you need to set the date and local time and then press the "Apply" button.
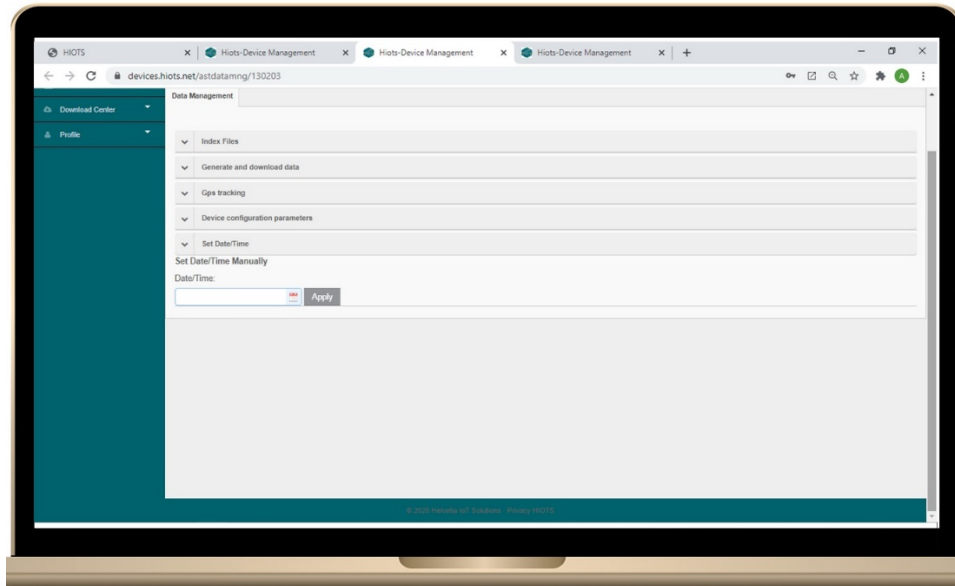
6.3. Device additional information ℹ️

In this section, device properties and related descriptions are visible.
General tab shows information on the vehicle which is equipped with ioTest data logger. It is also possible to add some additional data in this tab using "General custom data".
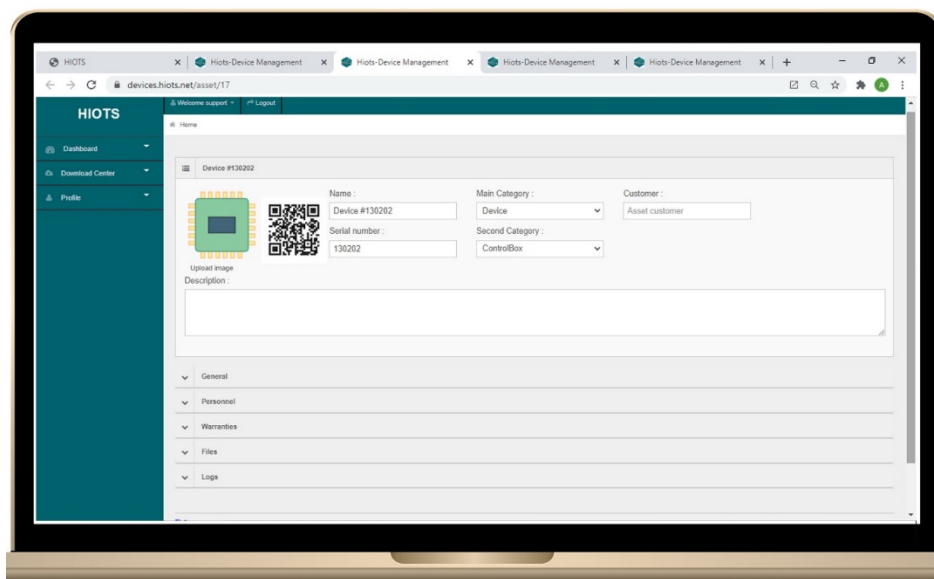
Note: As a client, you can only visit different information in this section and any changes is made by admin.

![HIOTS logo - Helvetia IoT Solutions]

7. Progressive Web Application

For better performance, we offer you to use our Progressive Web Application (PWA).
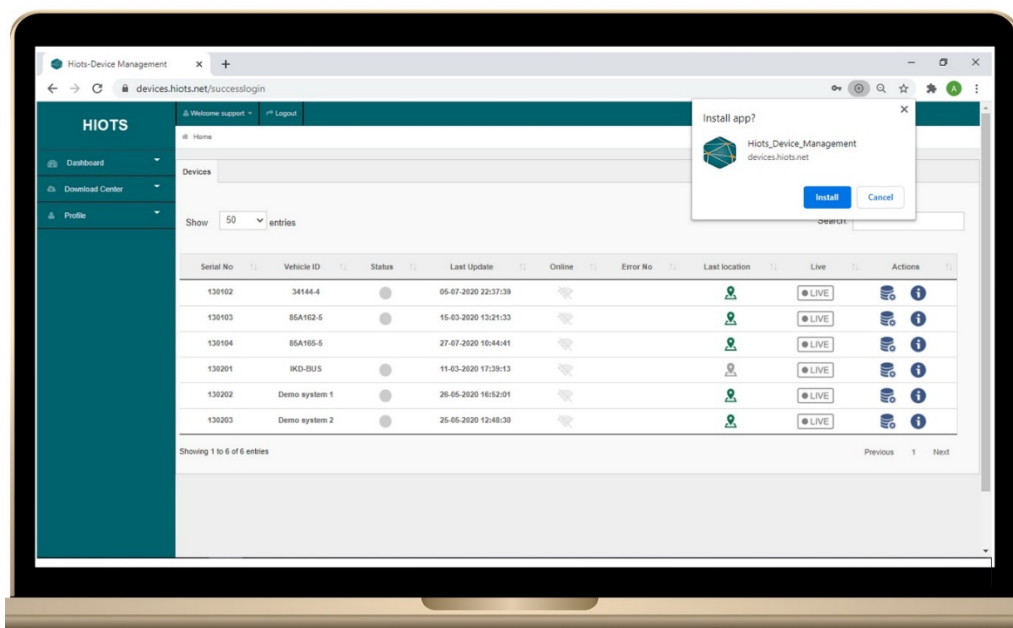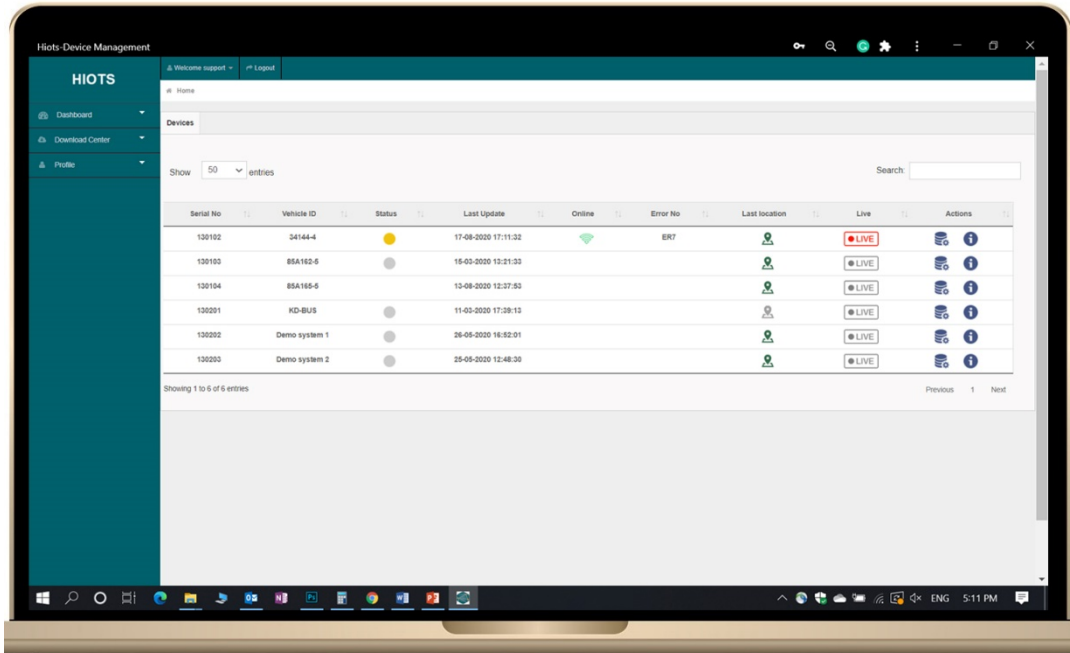You can add this application to your computer or mobile device and easily use it.

7.1. Desktop

1- On your computer, login to your HIOTS account through google chrome browser.

2- After a successful login, you see ⊕ icon in the right corner of the address bar.
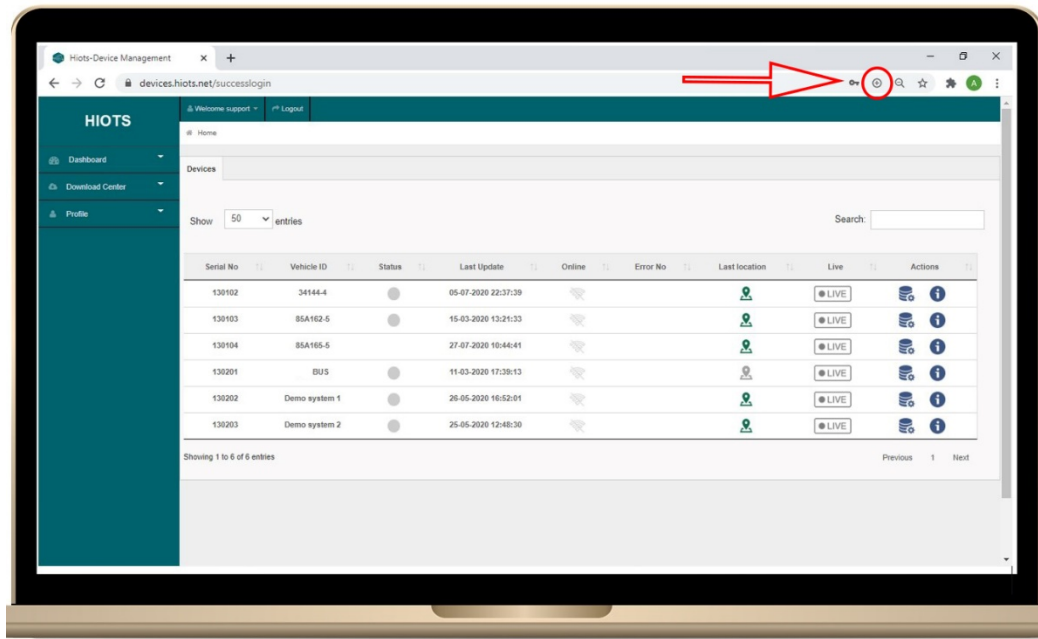
3- Click the icon and then click "Install" to add HIOTS web application to your desktop.
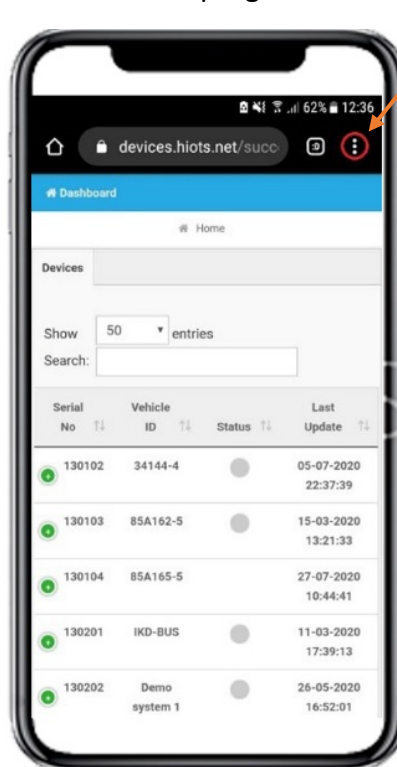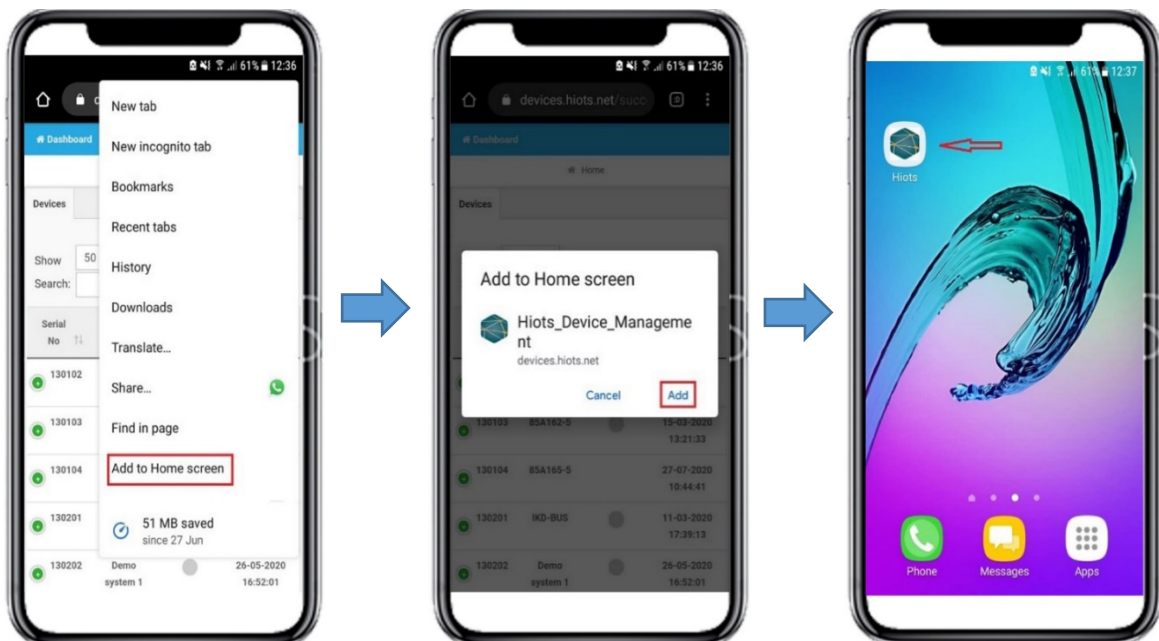
7.2. Android

1- Open google chrome browser on your smartphone and login to your HIOTS account.

https://hiots.net/

2- Tap the three-dot overflow menu in the top-right corner of your screen.

3- Then select "Add to Home Screen" and tap on "Add". Once done, you've installed the HIOTS web application.

7.3 IOS

1- At first step, you need to use your **Safari Browser** on your iOS devices. The process only works from the Safari browser.

2- Login to your account and tap on "share button" ⬆️ in the bottom of your screen.

Tap on "share button"
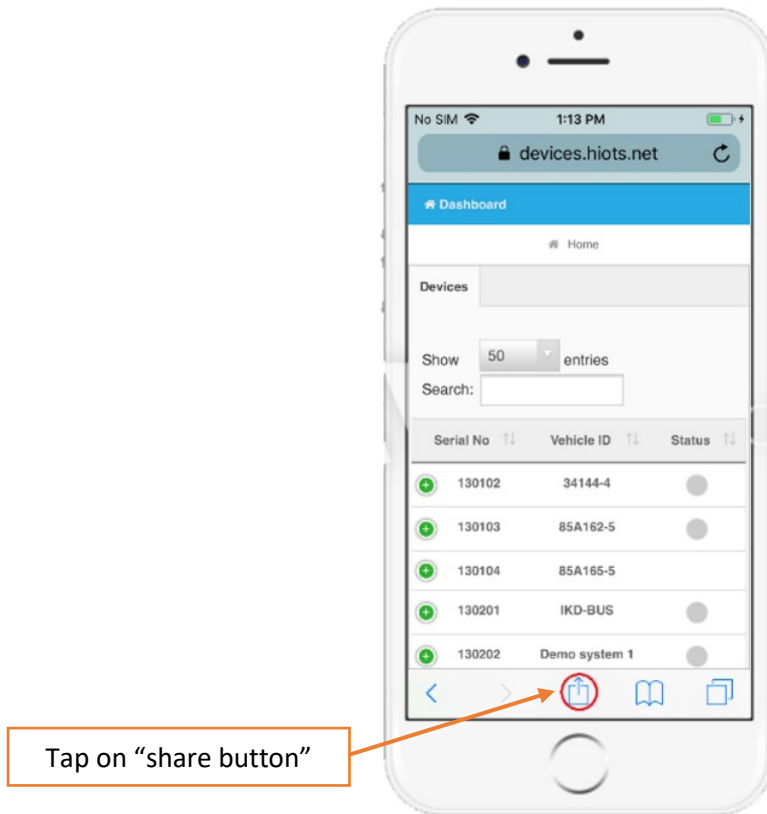
3- Scroll down and tap on "Add to Home Screen" and then tap "Add". Then the HIOTS PWA will be added to your home screen.