

**Fuel Management  
Banlaw On-Board Device**

Thank you for purchasing this Banlaw product. Please read through and understand the information in this Product Data Sheet (PDS) BEFORE installation or operation of the product to avoid potential health safety and environment (HS&E) risks or property damage.

## 1 PRODUCT DESCRIPTION



**Figure 1: Banlaw BOBD**

The Banlaw ResTrack™ Fuel Management System (FMS) is now equipped with automatic vehicle data capturing system, Banlaw On-Board Device (BOBD). The BOBD units can automatically capture Odometer and Engine Hours information from vehicles and plant equipment and wirelessly pass that information to the closest field controller, then adds that information into a fuel transaction record when the vehicle or plant is next refuelled.

The BOB unit uses WiFi to transmit its information and can be integrated into all existing ResTrack Advanced and Xpress controllers.

The BOBD unit is packed in IP65 enclosure and equipped with a fuse, with only 2 wire power connection to be terminated to vehicle ignition or battery isolator.

The general communication hierarchy is the following:

- Banlaw OBD vehicle unit is collecting and recording vehicle Odometer and Engine hours information.
- Banlaw Field Controller communicates to BOBD via Wi-Fi, requests for the latest information and stores it in the internal database. When refuelling to a specific unit starts, the most recent value is recorded in the transaction.
- Banlaw ResTrack Fuel Management System communicates to Field Controllers and polls transaction data along with vehicle telematics. Data is then processed and stored in the software database.



**Figure 2: Basic BOBD & FMS Architecture**

ResTrack Advanced Controllers: when a fuel transaction starts, controller checks its internal database for the equipment’s engine hours or odometer information. If the data is available in the database, it will be incorporated on the fuel transaction record and later uploaded by the FMS. If there’s no data available or if it is older than one hour, controller will prompt for the manual entry of engine hours and odometer information prior to starting the transaction.

ResTrac Xpress Controllers: when a fuel transaction starts, controller checks its internal memory for the equipment’s engine hours or odometer recording. If the data is available, it will be incorporated on the fuel transaction record and later uploaded by the FMS. If there’s no data available or if it is older than one hour, controller will prompt for the manual entry of engine hours and odometer information prior to starting the transaction.

## 2 IMPORTANT RESTRICTIONS ON THE USE OF THIS PRODUCT



The safe installation and subsequent operation of Banlaw On-Board system rely on the completion of all necessary *“due diligence”* for the assessment of the system is suitable for the intended application(s). This assessment is best achieved through the mutual cooperation of the end-user (client) and the supplier/OEM (Banlaw). Once such an assessment is completed and deems this system to be suitable, the customer or end-user shall ensure effective *“change management”* applies should any prominent or influential aspect of the application (upon which the assessment was based) be subject to change.

This Banlaw document does not contain an exhaustive (complete) list of Regulatory and Statutory requirements related to the use of the BOBD system in all international countries and regions. It remains the responsibility of the end user (Banlaw client) to assess the information within this Banlaw document and its references, and to then ascertain the relevant Regulatory and Statutory requirements that apply to the use of this Banlaw system within the country or region in which the system is to be used.

This document is not meant to substitute or override any such Regulatory and Statutory requirements, nor is this document meant to inform the end user of all such requirements that *may* apply to the use of this Banlaw system within a certain region or application.



The information within this Banlaw document was correct and current at the time of writing. **End-users are however responsible for obtaining and assessing any labels, documents or other media for a third-party product supplied by Banlaw to confirm the required approvals, certifications and specifications of the product are *appropriate* for the intended application.**

Regional Regulations/Codes/Standards/Guidelines etc. may cover the use of certain features of hardware on mining plants.

- Banlaw Pty Ltd proprietary product is approved under FCC and CE governances. Additional and/or different product certification/approval requirements may apply under alternative governances.
- Certification and/or Approval governances will apply to the use of wireless communication device within a hazardous area (i.e. explosive atmosphere). End-users are responsible for only the use of suitably certified products within such areas.



Figure 3: BRTBOB General View

### 3 OEM SPECIFICATIONS

<b>Product Name</b>	BOBD (Part # BRTBOB)
<b>Display</b>	2 LEDs for Device Status Wi-Fi – Red, GPS – Green
<b>Weight</b>	450g
<b>Internal Memory</b>	16 Mbytes (up to 22000 data records)
<b>Internal Sensors</b>	3 Axis Accelerometer, Vehicle Battery Voltage, Backup Battery Voltage, Temperature

#### 3.1 Power Specifications

<b>Operating Voltage</b>	8 - 32 VDC
<b>Power Consumption</b>	70 mA (Active) 10 mA (Sleep) Max < 250 mA
<b>Fuse</b>	Automotive, 32V DC, 1A
<b>Internal Backup Battery</b>	Li-Polymer 3.7V @ 180 mAh

#### 3.2 Environment Specifications

<b>Operating Temperature</b>	-20°C < T <sub>amb</sub> < +70°C (-4°F < T <sub>amb</sub> < 158°F)
<b>Storage Temperature</b>	-40°C < T <sub>amb</sub> < +85°C (-40°F < T <sub>amb</sub> < 185°F)
<b>IP Rating</b>	IP65 IEC 529

#### 3.3 Communications Specifications

<b>Wi-Fi</b>	Protocol: 802.11 b/g/n Sensitivity: -98 dBm Security: Supports WPA/WPA2 and WPS modes Mode: Station & Soft-AP Antenna: Internal only
<b>GPS</b>	GPS Chipset: U-blox 6m GPS module Sensitivity: Autonomous: -147 dBm, Hot start: -160 dBm, Tracking: -162 dBm Position Accuracy: Autonomous: < 3m, SBAS: 2.0m TTFF (Open sky and AGPS): Cold start: 25s average, Warm start: < 25s, Hot start: < 1s

#### 3.4 LED Device Status indication

The BOBD has 3 LEDs that indicate the Device Status for its main functions WIFI (Red), GPS (Green) and OBD (Orange). Please refer to the table below for more information.

LED	Device Status	LED Display
<b>Wi-Fi (Red)</b>	Module power off	100ms ON, 6s OFF
	Searching Wi-Fi AP	1s ON, 1s OFF
	Connected Wi-Fi AP	500ms ON, 500ms OFF
	Connected to Server	100ms ON, 100ms OFF
	Sending data	Always ON
<b>GPS (Green)</b>	Module power off	100ms ON, 6s OFF
	Searching GPS info	1s ON, 1s OFF
	2D fixed	500ms ON, 500ms OFF
	3D fixed	100ms ON, 100ms OFF

3.5 Dimensions

<b>Length</b>	144.8 mm
<b>Height</b>	39.9 mm
<b>Width</b>	65.7 mm
<b>Conduit Length</b>	3000 mm

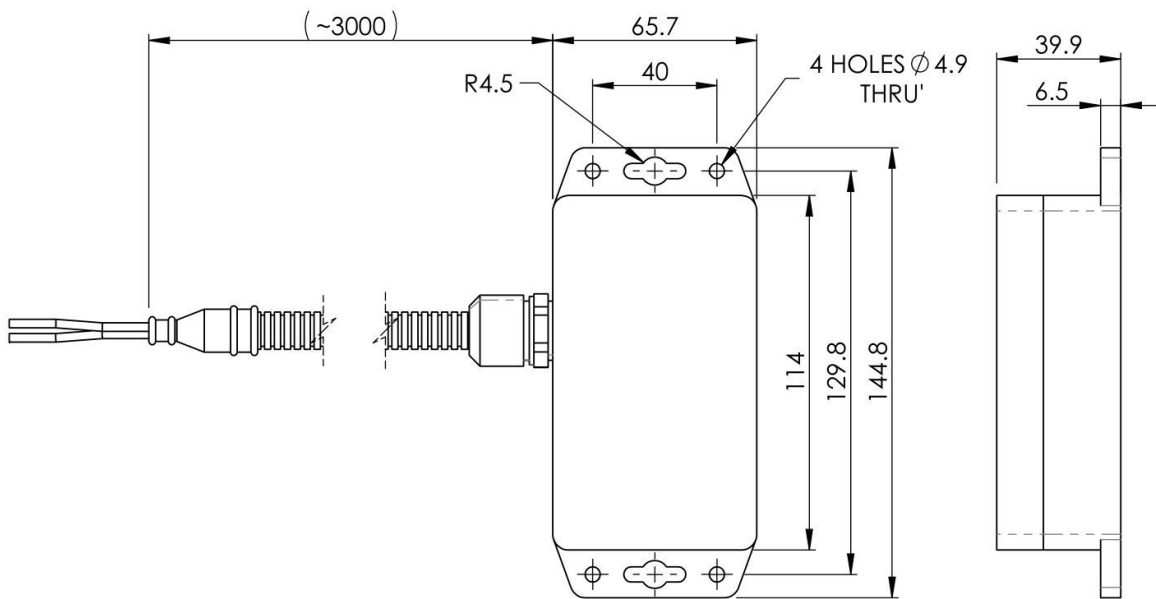


Figure 4: Dimensions of BRTBOB

## 4 CONFIGURATION

This section describes the configuration procedure of the Banlaw OBD unit.

Requirements:

- Banlaw On Board Device Configuration Tool
- MicroUSB cable
- PC (Windows)

### 4.1 Configure BOBD

1. Remove the transparent top cover from the enclosure to access BOBD configuration port, which is located on the side face of the vehicle device.
2. Access programming port and connect BOBD to PC with MicroUSB cable. The device is powered through the USB connection too, therefore does not have to be connected to power for programming.
3. On the PC, start the Banlaw BOBD Configuration tool. Upon the first launch, Windows Defender might falsely recognize the tool as hazardous. Click “More info” and then “Run anyway”:



Figure 5: At the first launch

4. The BOBD Configuration Tool is successfully launched:

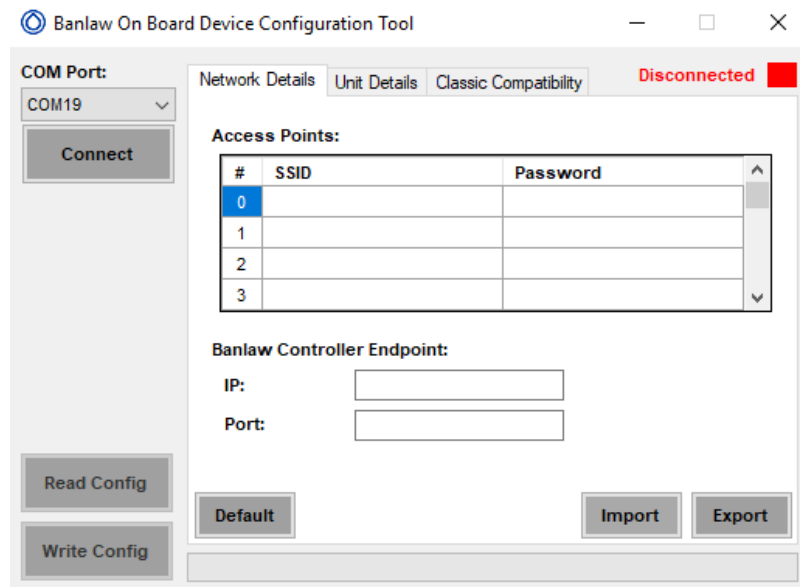


Figure 6: Banlaw On Board Device Configuration Tool

5. In the COM Port dropdown, select the required COM port. Software will automatically detect and display COM port where BOBD is connected.

- Click **Connect** and observe loading bar to complete and status change to Connected.

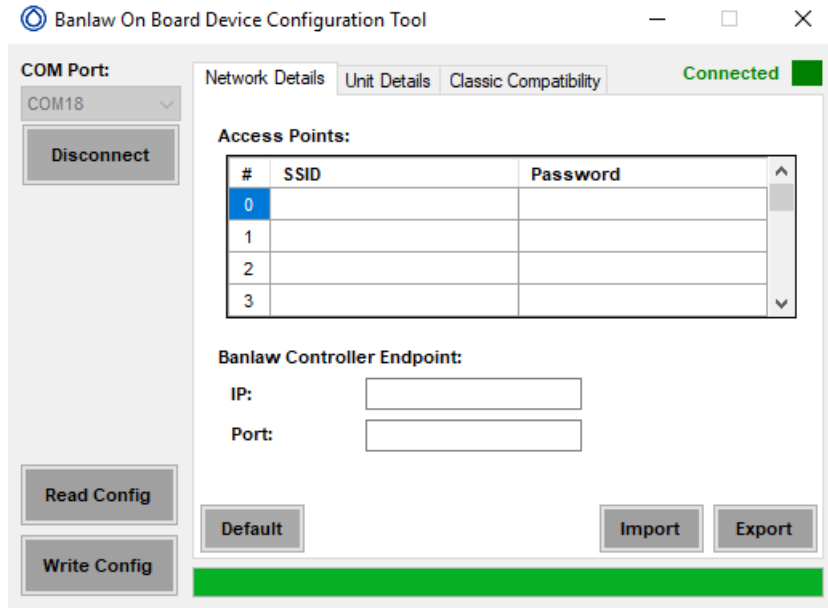


Figure 7: Connection established

- Click **Read Config** button to read the configuration stored in the BOBD unit:

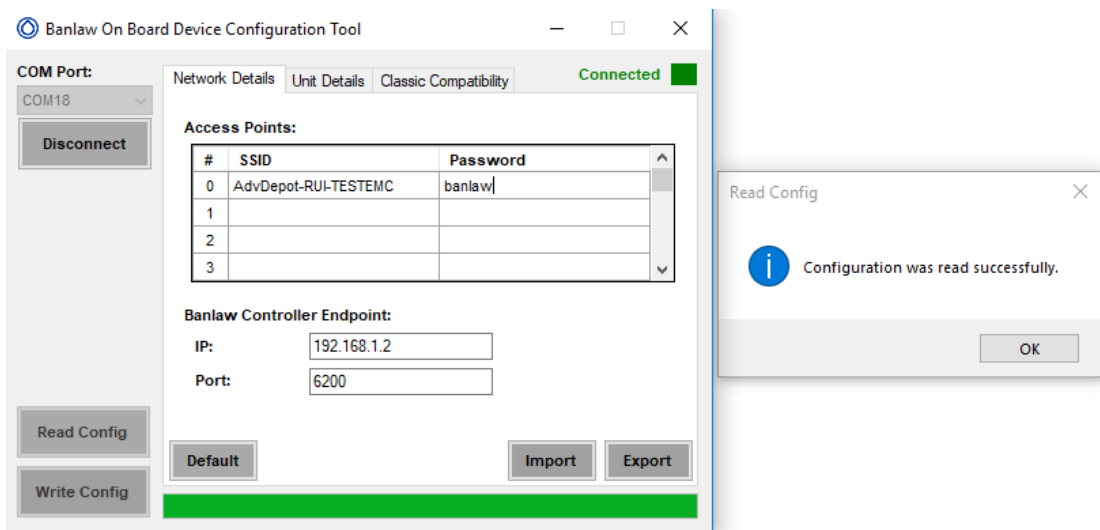


Figure 8: Configuration was read successfully

- On the Network Details tab, configure the following parameters:

<b>Access points</b>	List of up to 16 SSIDs and Passwords of WiFi networks BOBD connects to. Banlaw ResTrack Controller router WiFi or Xpress Access Point.
<b>IP</b>	Advanced Controller: IP address of the controller on the internal subnet 192.168.1.0/24. By default is 192.168.1.2
<b>Port</b>	BOBD communication protocol port, by default is 6200

- On the Unit Details tab, configure the following parameters:

<b>Vehicle Name</b>	ResTrack name of the vehicle where BOBD is being installed on NOTE: it is essential for the correct operation of the system that the vehicle name in configurator matches the vehicle name in ResTrack
<b>Odometer</b>	Current vehicle odometer reading
<b>Engine Hours</b>	Current vehicle engine hours reading

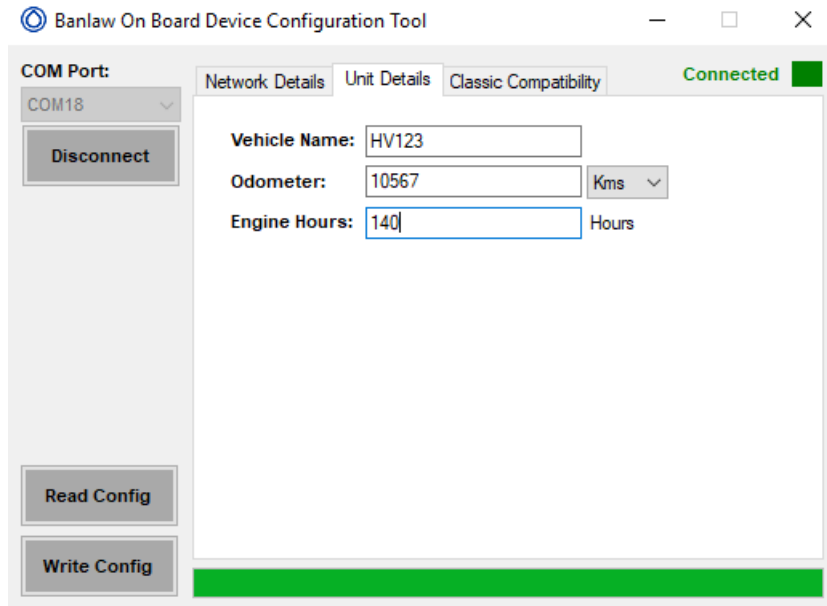


Figure 9: Unit Details configuration parameters

10. Click **Write Config** and observe a successful write config confirmation pop-up:

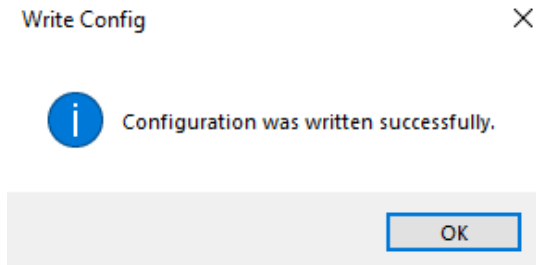


Figure 11: Write success

#### 4.2 ResTrack Configuration

Once the device is configured with BOBD Configuration tool, it is ready to use. When powered up and in range of the configured Access Point, it will establish communications with Banlaw Controller and record odometer and engine hours readings against every fuel transaction.

However, a K-factor adjustment is typically required for BOBD in order to match odometer readings on a vehicle dashboard. This adjustment is performed in the vehicle record in ResTrack software.

Login to ResTrack and proceed to **Asset management – Units** tab:





Figure 12: ResTrack Units tab

Find the record of the vehicle the BOBD being installed on and select **Action – Edit**. Scroll down towards the bottom of the record and set the following parameters:

<b>Odometer K-Factor</b>	A coefficient that is applied to BOBD readings in order to bring them in line with the vehicle odometer readings. If not known, use the default value of 1.
<b>Odometer initial value</b>	The initial odometer reading from the vehicle dashboard, taken prior to installing BOBD.

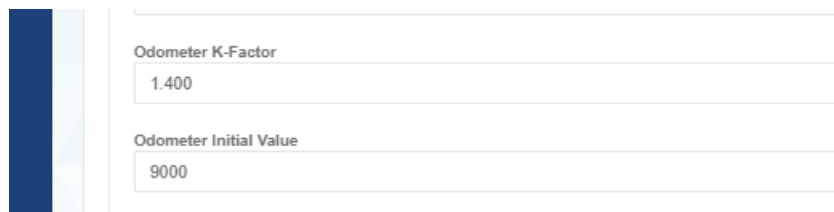


Figure 13: Odometer K-Factor and Initial Value

Follow this process to determine and set BOBD K-Factor:

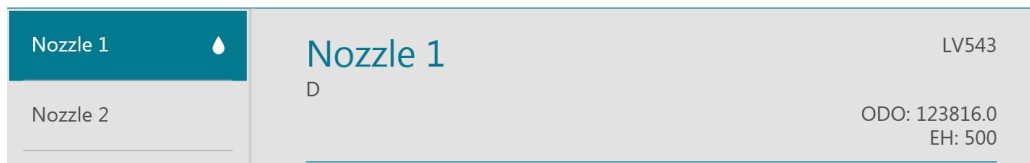
1. At the initial configuration, set K-Factor to 1 and both parameters Odometer in BOBD Configurator and Odometer Initial Value in ResTrack to the current odometer reading at the dashboard of vehicle:

<p>a) Get the Odometer reading from vehicle dashboard</p>	
<p>b) Enter the reading in BOBD Configurator and write to device</p>	

c) In ResTrack, go to **Asset Management – Units**. Edit the unit record, set K-Factor to 1 and enter the odometer reading, save and **Write Tags** to the controller

*NOTE:* make sure that the unit is assigned to the correct template

2. Continue using the vehicle for at least 500km and observe Odometer readings at Banlaw Controller screen during refuelling:



**Figure 14: Successful ODO and EH reading at the start of fuel transaction**

If the displayed values differ from the odometer reading at the vehicle dashboard, K-Factor adjustment is required.

3. New K-factor can be evaluated using the following formula:

$$K_{FAC} = \frac{Current\_BOBD\_ODO}{Current\_Vehicle\_ODO} \times K_{FAC0}$$

Where  $K_{FAC0}$  equals to 1 at the first adjustment

Repeat 1c) to change K-Factor in ResTrack

*NOTE:* Odometer initial value and BOBD Config odometer values remain unchanged.



- The value of the Odometer K-factor is not known from the beginning and needs to be evaluated based on the experimental data. It is recommended to run a vehicle for a certain period of time to gather data and then adjust the odometer K-factor if the difference between dashboard and BOBD readings is out of tolerance (1%).

## 5 INSTALLATION GUIDE

### Note:



- If the asset line is fitted with an existing BOBD system, please contact Banlaw *prior* to installation of a new unit.
- If BOBD has already been pre-programmed to wirelessly communicate with the Banlaw Advanced Controller or Xpress Controller at the fuel dispensing point, the unit can be installed on the vehicle. If not been pre-programmed, it should be programmed using BOBD Configuration Tool *prior* to installation to configure the unit.



Conduct a Health Safety and Environment (HS&E, WHS) risk assessment (e.g. SWMS or JHA) *prior* to commencing the installation of any Banlaw supplied product. For a typical installation, particular attention is drawn to the following areas:

- Isolation and bleeding of residual fuel pressure.
- Appropriate personal protective equipment (PPE).
- Use of appropriate tools and equipment.
- Use of trained, qualified and competent personnel.
- Barricade the area (if required) to restrict unauthorised personnel and vehicle access.
- Place Personal Locks, Tags etc. on equipment required to be positively isolated.
- The presence of a spill kit designed to manage fuel spills.
- The presence and good working order of fire suppression devices such as fire extinguishers.
- If performing any work within a zone/area identified as hazardous (i.e. explosive atmosphere), strictly adhere to all necessary precautions etc. applicable to work in such areas. Such precautions are likely to include the use of specialist (certified) equipment.
- Assessment of and adherence to all relevant Regulatory and Statutory guidelines.
- Assessment of and adherence to all relevant product OEM installation guidelines.

This section describes the installation procedure of BOBD. The installation may differ for each vehicle/asset type, Banlaw should be contacted for further assistance.

Banlaw On-Board Device needs to be configured to the site requirements prior to its installation on a vehicle/asset. BOBD Configuration tool is used for this purpose. If configuring multiple vehicles to connect to the same list of access points, it is highly recommended to make use of BOBD Configuration Tool import/export feature.

The following steps are provided as a guide only:

1. Complete all necessary Safety and Environmental pre-work requirements, including the positive isolation and de-energisation of the system on which work is to be conducted.
2. Remove the new BOBD from its packaging and inspect visually for any transportation damage
3. Remove the top cover to access programming port of the BOBD unit
4. Program BOBD as per Configuration section of this document
5. Locate a suitable spot to mount the enclosure on the vehicle. If required, perform an electrical engineering analysis to determine a suitable position. Consider the following when selecting the location:

- Mount BRTBOB within the reach of provided power cable and conduit to connect to vehicle ignition or battery isolator (3m)
- Mount BRTBOB as clear off significant obstruction from top (for GPS signal) and on sides (for Wi-Fi signal), as reasonably achievable
- Mount BRTBOB in protected areas, where it is unlikely to incur physical damage to the enclosure
- Select spots away from direct sunlight and from high pressure washing jets if possible

Examples of good mounting on Light vehicle:

- On the roof of the vehicle tucked under the roof racks
  - Between the cabin and toolboxes
  - Under the dashboard (provided reliable comms can still be achieved)
6. Route the cable and conduit to vehicle ignition source or battery isolator and terminate the cables. Affix loose conduit to vehicle structure with cable ties.



Due to the numerous requirements – as per above – that may apply to a Banlaw product, the client shall liaise with Banlaw *prior* to the use of the product within an application that is potentially deemed to be “uncommon”. The majority of Banlaw clients shall already be familiar with Banlaw products, and the applications for which each product/system are suited.



Failing to properly and thoroughly identify, investigate, assess and subsequently conform with all necessary requirements for a Banlaw product application *may* pose potentially serious risks, hazards and consequences.

***“IF IN DOUBT, ASK!”***

7. Start ignition or enable battery power to conduct a live test. Remove isolation lock if necessary and follow the existing live testing procedure. Confirm that BOBD is powered and both GPS and Wi-Fi status LEDs indicate positive communication.
8. Power down the system and conduct a final inspection of the BOBD install to ensure all equipment is installed securely.
9. Once the system is ready, remove all personal locks, barriers and isolation in readiness to return the equipment into operation.
10. Complete BOBD SAT Checklist (FRM-TEC-180).

**6 MAINTENANCE**



It is typically a *legal* responsibility of the person(s) who have identified the potential hazard to isolate the part of the system whose use is likely to result in an unacceptable risk to health, safety and environment. Complete the applicable procedure for the

proper and positive isolation of the system and inform worksite management immediately.



**Note:** The scope of this section – and Banlaw document in general – is restricted to recommended service and maintenance requirements for the BOBD. It is the responsibility of the end-user to identify and adequately conduct any necessary service and maintenance requirements for other equipment and items within the fluid transfer system.

The Banlaw On-Board is a *non-serviceable* product. Should the Banlaw On-Board malfunction, promptly contact Banlaw or your nearest Banlaw Distributor. Visit [www.banlaw.com](http://www.banlaw.com) for warranty details and a full list of distributors near your area to source replacement parts.



**Note:** Batteries used in this system contain Lithium-ion. Please follow appropriate battery disposal or recycling practices for used batteries of this type.

## 7 TROUBLESHOOTING

If the wireless system stops transmitting vehicle’s information, please follow the below troubleshooting guide.

Issue	Possible Solution
BOBD does not power up	<ul style="list-style-type: none"> <li>• Check that correct voltage is supplied to the device</li> <li>• Check the integrity of conduit and wiring</li> <li>• Check for enclosure damage and water ingress</li> <li>• Check if the fuse is blown</li> </ul>
BOBD does not connect to the Wi-Fi	<ul style="list-style-type: none"> <li>• Check the Wi-Fi LED state (refer to 3.4 LED Device Status indication)</li> <li>• In BOBD configuration tool, check that correct AP SSID and password are configured</li> <li>• Ensure that BOBD is in range of the access point and not obstructed by large objects</li> <li>• Check that the Access Point is operational, by connecting another device from the same location (e.g. laptop)</li> </ul>
Incorrect Value of Odometer and/or Engine Hours	<ul style="list-style-type: none"> <li>• Check the GPS LED state (refer to 3.4 LED Device Status indication), confirm that device is not obstructed and can maintain uninterrupted connection to GPS</li> <li>• Confirm that odometer value is configured in BOBD, odometer initial value is configured in ResTrack unit record</li> <li>• Re-write configuration to BOBD                             <ul style="list-style-type: none"> <li>• Perform another k factor adjustment process (refer to 4.2 ResTrack Configuration)</li> </ul> </li> </ul>

**8 OPTIONAL ACCESSORIES & SPARE PARTS**

The Banlaw On-Board is a *non-serviceable* product. Should the Banlaw On-Board malfunction, promptly contact Banlaw or your nearest Banlaw Distributor. Visit [www.banlaw.com](http://www.banlaw.com) for warranty details and a full list of distributors near your area to source replacement parts.

Item	Banlaw Part Number
BOBD unit - T356 Wi-Fi (No GSM) OBDII GPS Tracker	BRTBOBD
Enclosure, 115x65x40, Polycarbonate, IP65, with flanges, for BOBD	BRTBOB.003
Fuse, Automotive, 1A, 32VDC, Black (Pack of 10)	001199



Banlaw does not recommend nor endorse the use of non-genuine replacement (spare) parts. The use of spare parts not endorsed by the product OEM is likely to void a product warranty and may jeopardise the safety, performance/function, reliability and regulatory certifications/approvals of the product.



Banlaw makes no guarantees and assumes no liability for circumstances arising out of the accuracy and completeness of third-party product specifications included within this document. The verification, validation and publishing of specifications for any product remain the responsibility of the product OEM.

END OF DOCUMENT



## BANLAW – Liquid Asset Intelligence

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