

产品说明书

制造商：树根互联股份有限公司

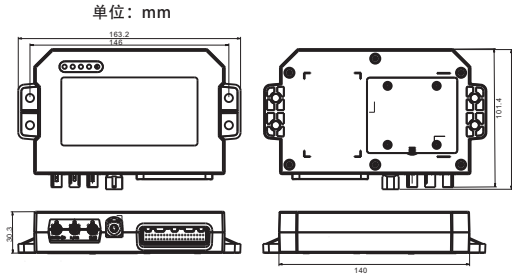
地址：广州市海珠区华洲路190号8栋

1. 产品概述

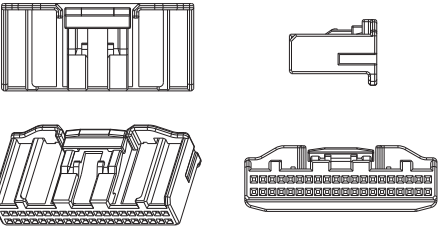
本产品为针对当前工程机械、运输车队以及设备分时租赁等移动设备和离散工业节点，提供的一款高防护、低功耗、多功能车载VBOX平台产品。

2. 整机规格

2.1 外形尺寸



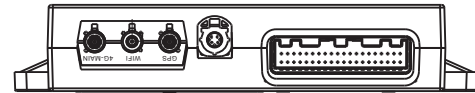
2.2 工业连接器



品牌：TE 型号：1318389-1 线径：20#AWG

3. 产品接口

3.1 接口图



3.1 接口说明

3.2.1 USB接口



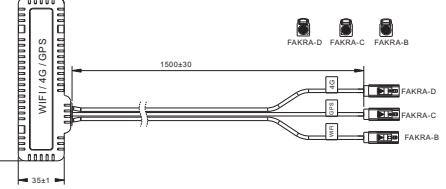
| 序号 | 定义  |
|----|-----|
| ①  | D-  |
| ②  | GND |
| ③  | D+  |
| ④  | +5V |

3.2.2 指示灯



| 名称       | 颜色 | 定义说明    | 闪烁               | 常亮      | 常灭        |
|----------|----|---------|------------------|---------|-----------|
| 1 (4G)   | 绿色 | 4G状态灯   | 连接中              | 4G网络正常  | 4G网络异常    |
| 2 (CAN)  | 绿色 | CAN状态灯  | 总线有数据传输          | 无       | 总线无数据传输   |
| 3 (GPS)  | 绿色 | GPS状态灯  | 连接中              | GPS定位正常 | GPS无线异常   |
| 4 (WIFI) | 绿色 | WIFI状态灯 | /                | WIFI已连接 | WIFI未连接   |
| 5 (PWR)  | 红色 | 系统指示灯   | 与OpenIO SPI 连接建立 | 正常      | 电源异常或系统异常 |

3.2.3 天线



| 序号 | 项目 | 说明                               |
|----|----|----------------------------------|
| 1  | 天线 | GPS+4G+WIFI 三合一有源天线              |
| 2  | 长度 | 1.5米 (标配) /3米/5米                 |
| 3  | 增益 | GPS(28±3dB); 4G(-0.95 ~ 2.84dBi) |
| 4  | 阻抗 | 50Ω                              |

3.2.4 主接口



| 管脚号 | 定义            | 车辆连接     | 说明                                |
|-----|---------------|----------|-----------------------------------|
| 1   | BUS_ACC       | ON/H     | 通断电开关                             |
| 2   | DI_IN_01      | 充电唤醒     | 高电平有效 (禁止启动自动补电)                  |
| 3   | GND           | 地        | 车载充电电源负极                          |
| 4   | DI_IN_02      |          | 开关量2                              |
| 5   | DO_24V_PWM_02 |          | 驱动输出2/PWM1, DC24V电流0.5A           |
| 6   | DO_24V_PWM_03 |          | 驱动输出3/PWM2, DC24V电流0.5A           |
| 7   | DI_IN_03      |          | 开关量3                              |
| 8   | AI_V_ADC_07   |          | 模拟量输入1 (温度传感器)                    |
| 9   | DO_24V_04     |          | 驱动输出4, DC24V电流0.5A                |
| 10  | AI_V_ADC_08   |          | 模拟量输入2 (温度传感器)                    |
| 11  | DI_PWM_04     |          | 开关量4/脉冲捕获, 正反转转速, 外接传感器转速脚, 兼容D输入 |
| 12  | DI_IN_05      |          | 开关量5                              |
| 13  | DO_24V_05     |          | 驱动输出5, DC24V电流0.5A                |
| 14  | RS232_RX1     | RS232_RX | RS232_RX                          |
| 15  | MX2_N         |          | 以太网端子第6脚                          |
| 16  | MX1_N         |          | 以太网端子第2脚                          |
| 17  | CAN3_H        |          | CAN3, 符合 CAN2.0B 规范, 选配CAN唤醒      |
| 18  | CAN2_L        | ICAN-L   | CAN2, 符合 CAN2.0B 规范, 选配CAN唤醒      |
| 19  | CAN1_H        | PCAN-H   | CAN1, 符合 CAN2.0B 规范, 选配CAN唤醒      |
| 20  | VBAT+         | 常电       | 车载常电电源正极                          |

|    |             |          |                                   |
|----|-------------|----------|-----------------------------------|
| 21 | AI_V_ADC_01 |          | 模拟量输入1 (温度传感器)                    |
| 22 | DI_WKUP_06  |          | 开关量6, 充电信号, 高唤醒                   |
| 23 | DI_IN_07    | 锁脚1      | 开关量7                              |
| 24 | GND         |          | ADC接地                             |
| 25 | AI_V_ADC_02 |          | 模拟量输入2 (温度传感器)                    |
| 26 | AI_V_ADC_03 |          | 模拟量输入3 (温度传感器)                    |
| 27 | AI_V_ADC_04 |          | 模拟量输入4 (温度传感器)                    |
| 28 | AI_V_ADC_05 |          | 模拟量输入5 (温度传感器)                    |
| 29 | AI_V_ADC_06 |          | 模拟量输入6 (温度传感器)                    |
| 30 | DI_IN_08    | 气缸松开反馈   | 开关量8                              |
| 31 | DI_PWM_09   | 连接器到位反馈  | 开关量9/脉冲捕获, 正反转信号, 外接传感器信号脚, 兼容D输入 |
| 32 | DI_IN_10    |          | 开关量10                             |
| 33 | DO_24V_06   | VC40     | 12V/24V可控输出                       |
| 34 | RS232_TX1   | RS232_TX | RS232_TX                          |
| 35 | MX2_P       |          | 以太网端子第3脚                          |
| 36 | MX1_P       |          | 以太网端子第1脚                          |
| 37 | CAN3_L      |          | CAN3, 符合 CAN2.0B 规范, 选配CAN唤醒      |
| 38 | CAN2_H      | ICAN-H   | CAN2, 符合 CAN2.0B 规范, 选配CAN唤醒      |
| 39 | CAN1_L      | PCAN-L   | CAN1, 符合 CAN2.0B 规范, 选配CAN唤醒      |
| 40 | VBAT-       | GND      | 车载常电电源负极                          |

四、功能清单

| 功能名称  | 标识符   | 描述                                                                          |
|-------|-------|-----------------------------------------------------------------------------|
| 时间与日期 | 时间/日期 | 可提供车辆所在地时间与日期 (精确到毫秒)                                                       |
|       | 自动校时  | 可自动校时, 使24小时内时间误差在±55内                                                      |
|       | 授时    | 从云平台, 获取时间并授时                                                               |
| 定位服务  | GNSS  | 通过CAN网络, 对ECU授时 (需要车厂协议支持)                                                  |
|       | 天线检测  | 支持GPS/BD定位; 首次定位时间≤32s; 定位精度≤2.5m (CEP50)                                   |
|       | 定位精度  | 支持GPS天线检测及天线保护                                                              |
| 网络通信  | 运行轨迹  | 水平定位精度: < 2.5 m CEP50                                                       |
|       |       | 过滤算法去除无效数据, 不良数据, 使运行轨迹准确                                                   |
|       |       | LTE FDD: B1/ B2/ B3/ B4/ B5/ B7/ B8/ B12/ B13/ B18/ B19/ B20/ B25/ B26/ B28 |
| 通信    |       | LTE TDD: B38/ B39/ B40/ B41                                                 |
|       |       | WCDMA: B1/ B2/ B4/ B5/ B8/ B6/ B19                                          |
|       |       | GSM: 850/900/1800/1900MHz                                                   |
| SIM卡  |       | 支持全球通信                                                                      |
|       |       | 支持4G LTE                                                                    |
|       |       | 支持5G                                                                        |
| 多中心接入 |       | 支持同时连接两个以上的平台 (最大4个平台)                                                      |
|       |       | 支持向不同平台发送不同数据内容                                                             |
|       |       | 2.4GHz Wi-Fi                                                                |
| WIFI  |       | 支持IEEE 802.11 b/g/n标准                                                       |
|       |       | 工作模式AP/STA                                                                  |
|       |       | 以太网 (选配) 1路百兆以太网 RJ45接口                                                     |

|           |                                                   |                                                                               |
|-----------|---------------------------------------------------|-------------------------------------------------------------------------------|
| 数据采集      | CAN                                               | 标配2路 (250Kbps/500Kbps), 最高支持3路高速CAN通信接口                                       |
|           | RS232                                             | 支持1路RS232实现数据交互                                                               |
|           | RS485 (选配)                                        | 支持1路RS485实现数据交互                                                               |
| 数据量输出     | 数字量采集                                             | 支持10路DI输入                                                                     |
|           | 电压采集                                              | 支持6路DO输出, DC24V电流0.5A                                                         |
|           | 模拟量采集                                             | 支持采集与1路整定蓄电池电压和备用电池电量                                                         |
| 实时数据存储    | 数据上传                                              | 支持8路ADC输入, 例如温度传感器应用                                                          |
|           | 数据上传                                              | 支持大容量EMMC存储, 默认32GB, 可扩展                                                      |
|           | 数据上传                                              | 数据上传及下发双向认证                                                                   |
| 数据补发      | 数据上传                                              | 支持远程数据/指令下发控制                                                                 |
|           | 数据上传                                              | 支持断点续传                                                                        |
|           | 数据上传                                              | 通信异常时, 设备将采集的实时数据存储到本地存储介质中, 等待通信恢复正常后进行实时数据的补发                               |
| 数据加密 (选配) | 支持ECC/RSA/3DES/AES/SHA/SM1/SM2/SM3/SM4/SM9等常用加密算法 | 具有安全等级要求的信息在传输或存储时进行加密处理                                                      |
|           | 符合HJ11239信息安全要求                                   |                                                                               |
|           | CAN交互: 支持通过CAN总线与车身交互                             |                                                                               |
| 数据交互      | RS232交互: 支持通过RS232串口配置参数 (选配)                     |                                                                               |
|           | DC直流 9~36V                                        |                                                                               |
| 电源管理      | 额定功率                                              | 正常工作: <100mA@24V                                                              |
|           | 待机功率                                              | 待机状态: <10mA@24V (支持ACC, CAN, RTC唤醒)                                           |
|           | 工作模式                                              | 休眠状态 (选配): <20uA@24V (仅支持ACC, RTC唤醒)                                          |
| 独立运行      |                                                   | 设备至少存在2种工作模式: 工作模式、待机模式                                                       |
|           |                                                   | 休眠状态根据客户需求选配                                                                  |
|           |                                                   | 设备在外部供电异常断开后, 仍可以独立运行, 外部供电断开前存储的数据须全部上传至企业平台, 且至少能保障外部供电断开后 10min 的数据上传到企业平台 |
| OTA       |                                                   | 支持对车内其他ECU升级, 具体方案需与ECU厂家确                                                    |
|           |                                                   | 融合重卡车辆, 完成对车内其他ECU的OTA功能                                                      |
|           |                                                   | 支持远程PIC编程 (仅适配网口版本)                                                           |
| 终端控制      |                                                   | 设备支持远程 / 本地程序升级、参数设置、参数查询等功能                                                  |
|           |                                                   | 通过移动网络, 支持远程解/锁车                                                              |
|           |                                                   | 设备可通过CAN协议与控制器互握手协议, 达到协议防拆                                                   |
| 设备防拆      |                                                   | 支持同时连接两个以上的平台 (最大4个平台)                                                        |
|           |                                                   | 支持向不同平台发送不同数据内容                                                               |
|           |                                                   | 2.4GHz Wi-Fi                                                                  |
| 自检        |                                                   | 支持IEEE 802.11 b/g/n标准                                                         |
|           |                                                   | 工作模式AP/STA                                                                    |
|           |                                                   | 以太网 (选配) 1路百兆以太网 RJ45接口                                                       |
| 换电功能      |                                                   | 基于wifi完成VBOX与换电站之间的交互, 实现车辆的智能换电功能                                            |
|           |                                                   |                                                                               |
|           |                                                   |                                                                               |

五、软件规格

- 支持基于CAN2.0B的车控制器工况数据采集。
- 支持通过云平台进行车载控制器指令下发。
- 支持数据传输断线续传, 本地数据存储。
- 支持远程OTA升级, 本地U盘升级。
- 支持GPS位置信息采集。
- 支持驾驶行为分析。

六、随机附件

| 名称              | 数量 | 单位 | 备注  |
|-----------------|----|----|-----|
| V-BOX主机         | 1  | 台  | 标配  |
| 主机电源&信号连接端子线    | 1  | 条  | 选配  |
| LTE+GPS+WIFI 天线 | 1  | 条  | 三合一 |
| 包装盒             | 1  | 套  | 标配  |

七、认证



Model: LN1526-DC-T-BAT-GL

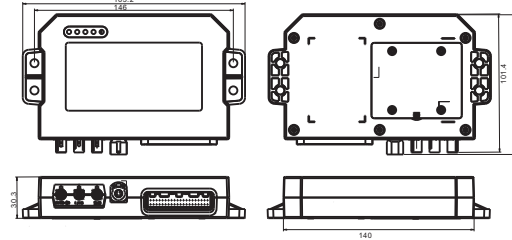
1.Description

This product is a high-protection, low-power consumption, and multifunctional vehicle-mounted VBOX platform designed for current construction machinery, transportation fleets, and equipment rental for the sharing economy, as well as for mobile devices and discrete industrial nodes.

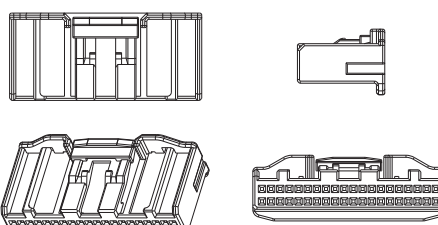
2.Specifications

2.1 Dimensions

unit: mm



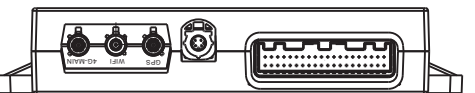
2.2 Connector (Optional)



Brand: TE Type: 1318389-1 Wire: 20#AWG

3.Interface

3.1 Interface diagram



3.2 Interface description

3.2.1 USB interface



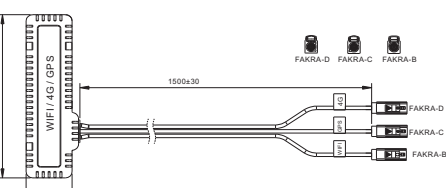
| NUM | DEFINE |
|-----|--------|
| ①   | D-     |
| ②   | GND    |
| ③   | D+     |
| ④   | +5V    |

3.2.2 Indicator light



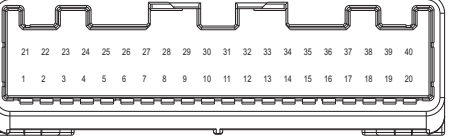
| Num      | Color | Definition              | Flashing | Steady                     | On                          |
|----------|-------|-------------------------|----------|----------------------------|-----------------------------|
| 1 (4G)   | Green | 4G Status Indicator     | Flashing | 4G network is normal       | 4G network is abnormal      |
| 2 (CAN)  | Green | CAN Status Indicator    | Flashing | None                       | None                        |
| 3 (GPS)  | Green | GPS Status Indicator    | Flashing | GPS positioning is normal  | GPS positioning is abnormal |
| 4 (WIFI) | Green | WIFI Status Indicator   | Flashing | WIFI is connected          | WIFI is not connected       |
| 5 (PWR)  | Red   | System Status Indicator | Flashing | System is running normally | Power or system is abnormal |

3.2.3 antenna



| Number | Item      | Explanation                                    |
|--------|-----------|------------------------------------------------|
| 1      | Antenna   | Active GPS, 4G, and WIFI triple antenna in one |
| 2      | Length    | 1.5m (standard) /3m/5m                         |
| 3      | Gain      | GPS (28±3dB); 4G (-0.95~2.84dBi)               |
| 4      | Impedance | 50 Ω                                           |

3.2.4 main interface



| NUM | Define        | Terminal Connection                                                                                     | Description                                                     |
|-----|---------------|---------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|
| 1   | BUS_ACC       | ON power                                                                                                | Turn-on switch                                                  |
| 2   | DI_IN_01      |                                                                                                         | High level effective (Prohibition of starting auto charging)    |
| 3   | GND           | Ground                                                                                                  | Car constant power supply negative                              |
| 4   | DI_IN_02      | Switch 2                                                                                                |                                                                 |
| 5   | DO_24V_PWM_02 | Drive output 2/PWM1, DC24V current 0.5A                                                                 |                                                                 |
| 6   | DO_24V_PWM_03 | Drive output 3/PWM2, DC24V current 0.5A                                                                 |                                                                 |
| 7   | DI_IN_03      | Switch 3                                                                                                |                                                                 |
| 8   | AI_V_ADC_07   | Analogue input 7 (temperature sensor)                                                                   |                                                                 |
| 9   | DO_24V_04     | Drive output 4, DC24V current 0.5A                                                                      |                                                                 |
| 10  | AI_V_ADC_08   | Analogue input 8 (temperature sensor)                                                                   |                                                                 |
| 11  | DI_PWM_04     | Switch 4/Pulse capture, Forward and reverse speed, External sensor speed foot, Compatible with DI input |                                                                 |
| 12  | DI_IN_05      | Switch 5                                                                                                |                                                                 |
| 13  | DO_24V_05     | Drive output 5, DC24V current 0.5A                                                                      |                                                                 |
| 14  | RS232_RX1     | RS232_RX                                                                                                | RS232_RX                                                        |
| 15  | MX2_N         | Ethernet terminal pin 6                                                                                 |                                                                 |
| 16  | MX1_N         | Ethernet terminal pin 2                                                                                 |                                                                 |
| 17  | CAN3_H        | CAN3, Complies with CAN2.0B specification, Optional CAN wake-up                                         |                                                                 |
| 18  | CAN2_L        | ICAN-L                                                                                                  | CAN2, Complies with CAN2.0B specification, Optional CAN wake-up |
| 19  | CAN1_H        | PCAN-H                                                                                                  | CAN1, Complies with CAN2.0B specification, Optional CAN wake-up |
| 20  | VBAT+         | Constant electric power                                                                                 | Car constant power supply positive                              |

|    |             |                                                                 |                                                                                                           |
|----|-------------|-----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| 21 | AI_V_ADC_01 | Analog input 1 (temperature sensor)                             |                                                                                                           |
| 22 | DI_WKUP_06  | Switch 6, Charging signal, High wake-up                         |                                                                                                           |
| 23 | DI_IN_07    | Lock 1                                                          | Switch 7                                                                                                  |
| 24 | GND         | ADC ground                                                      |                                                                                                           |
| 25 | AI_V_ADC_02 | Analog input 2 (temperature sensor)                             |                                                                                                           |
| 26 | AI_V_ADC_03 | Analog input 3 (temperature sensor)                             |                                                                                                           |
| 27 | AI_V_ADC_04 | Analog input 4 (temperature sensor)                             |                                                                                                           |
| 28 | AI_V_ADC_05 | Analog input 5 (temperature sensor)                             |                                                                                                           |
| 29 | AI_V_ADC_06 | Analog input 6 (temperature sensor)                             |                                                                                                           |
| 30 | DI_IN_08    | Cylinder release feedback                                       | Switch 8                                                                                                  |
| 31 | DI_PWM_09   | Connector in place feedback                                     | Switch 9/Pulse capture, Forward and reverse signal, External sensor signal foot, Compatible with DI input |
| 32 | DI_IN_10    | Switch 10                                                       |                                                                                                           |
| 33 | DO_24V_06   | VC40                                                            | 12V/24V controllable output                                                                               |
| 34 | RS232_TX1   | RS232_TX                                                        | RS232_TX                                                                                                  |
| 35 | MX2_P       | Ethernet terminal pin 3                                         |                                                                                                           |
| 36 | MX1_P       | Ethernet terminal pin 1                                         |                                                                                                           |
| 37 | CAN3_L      | CAN3, Complies with CAN2.0B specification, Optional CAN wake-up |                                                                                                           |
| 38 | CAN2_H      | ICAN-H                                                          | CAN2, Complies with CAN2.0B specification, Optional CAN wake-up                                           |
| 39 | CAN1_L      | PCAN-L                                                          | CAN1, Complies with CAN2.0B specification, Optional CAN wake-up                                           |
| 40 | VBAT-       | GND                                                             | Car constant power supply negative                                                                        |

4.Feature list

| Function                                                        | Definition            | Description                                                                                      |
|-----------------------------------------------------------------|-----------------------|--------------------------------------------------------------------------------------------------|
| Time and Date                                                   | Time and Date         | Provide local time and date of the vehicle (accurate to milliseconds)                            |
|                                                                 | Automatic Calibration | Can automatically calibrate the time, ensuring that the time error is within ±55 within 24 hours |
|                                                                 | Time synchronization  | Obtains time from cloud platform and synchronizes it                                             |
| Location Service                                                | Positioning           | Can synchronize time with ECU through CAN network (requires support for factory protocol).       |
|                                                                 | GNSS                  | Support GPS/BD, first positioning time <32s, positioning accuracy <2.5m (CEP50)                  |
|                                                                 | Antenna Detection     | Supports GPS antenna disconnection detection and antenna protection                              |
| Running Track                                                   | Locating Accuracy     | Horizontal positioning accuracy: <2.5m CEP50                                                     |
|                                                                 |                       | Filter algorithm removes invalid and poor data to ensure accurate running track                  |
|                                                                 |                       | LTE FDD: B1/ B2/ B3/ B4/ B5/ B7/ B8/ B12/ B13/ B18/ B19/ B20/ B25/ B26/ B28                      |
| Network Communication                                           |                       | LTE TDD: B38/ B39/ B40/ B41                                                                      |
|                                                                 |                       | WCDMA: B1/ B2/ B4/ B5/ B8/ B6/ B19                                                               |
|                                                                 |                       | GSM: 850/900/1800/1900MHz                                                                        |
| SIM Card Multi-center Access                                    |                       | Supports global communication                                                                    |
|                                                                 |                       | Surface-mount WGM SIM card                                                                       |
|                                                                 |                       | Can simultaneously connect to more than two platforms (maximum of 4 platforms)                   |
| Supports sending different data content to different platforms. |                       |                                                                                                  |
|                                                                 |                       |                                                                                                  |
|                                                                 |                       |                                                                                                  |
| Wi-Fi                                                           |                       | 2.4GHz Wi-Fi                                                                                     |
|                                                                 |                       | Supports IEEE 802.11b/g/n standards                                                              |
|                                                                 |                       | WIFI/STA work mode                                                                               |
| Ethernet (optional)                                             |                       | Due 100 Mbps Ethernet RJ45 interface                                                             |
|                                                                 |                       |                                                                                                  |
|                                                                 |                       |                                                                                                  |

|                       |                                   |                                                                                                                                                                                                                                                                                                                          |
|-----------------------|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data Acquisition      | CAN                               | Two channels (250Kbps/500Kbps) are standard, with a maximum support of three high-speed CAN communication interfaces                                                                                                                                                                                                     |
|                       | RS232                             | Supports one RS232 channel for data exchange.                                                                                                                                                                                                                                                                            |
|                       | RS485 (optional)                  | Supports one RS485 channel for data exchange.                                                                                                                                                                                                                                                                            |
|                       | Digital Input                     | Collection of 10 DI inputs.                                                                                                                                                                                                                                                                                              |
|                       | Digital Output                    | Six DO outputs, DC24V current 0.5A.                                                                                                                                                                                                                                                                                      |
| Data Processing       | Voltage Collection                | Can collect and report the voltage of the vehicle's battery and backup battery.                                                                                                                                                                                                                                          |
|                       | Analog Input                      | Supports 8 ADC inputs, such as temperature sensor applications.                                                                                                                                                                                                                                                          |
|                       | Real-time data storage            | Expands EMMC storage capacity, default 32GB, expandable                                                                                                                                                                                                                                                                  |
|                       | Data Upload                       | Bi-directional authentication for data upload and download.                                                                                                                                                                                                                                                              |
|                       | Data Download                     | Supports remote data/command download control.                                                                                                                                                                                                                                                                           |
| Data Security         | Supports breakpoint continuation. |                                                                                                                                                                                                                                                                                                                          |
|                       | Data Redelivery (optional)        | In case of communication abnormalities, the device stores the collected real-time data in local storage media and waits for communication to resume before redelivering real-time data.                                                                                                                                  |
|                       | Data Encryption (optional)        | Supports common encryption algorithms such as ECC/RSA/3DES/AES/SHA/SM1/SM2/SM3/SM4/SM9.                                                                                                                                                                                                                                  |
|                       |                                   | Information with security level requirements will be encrypted during transmission or storage.                                                                                                                                                                                                                           |
|                       |                                   | Complies with HJ1239 information security requirements.                                                                                                                                                                                                                                                                  |
| Terminal Management   | Data Exchange                     | CAN interaction: Supports interaction with the vehicle through the CAN bus.                                                                                                                                                                                                                                              |
|                       |                                   | RS232 interaction: Supports parameter configuration via RS232 serial port (optional).                                                                                                                                                                                                                                    |
|                       | Input Voltage                     | DC 9~36V                                                                                                                                                                                                                                                                                                                 |
|                       | Rated Power                       | Normal operation: <100mA@24V<br>Standby: <10mA@24V (supports ACC, CAN, RTC wake-up)                                                                                                                                                                                                                                      |
|                       | Work mode                         | Sleep Mode (optional): <20uA@24V (Only supports ACC, RTC wake-up)<br>The device has at least two work modes: work mode and standby mode.<br>Sleep mode can be optional based on customer requirements.                                                                                                                   |
| Independent Operation |                                   | The device can still operate independently after external power is disconnected abnormally. The data before the external power is disconnected must be uploaded to the enterprise platform, and the data after the external power is disconnected should be uploaded to the enterprise platform for at least 10 minutes. |
|                       | OTA                               | Support firmware upgrading for other ECUs in the vehicle. The specific scheme needs to be confirmed with the ECU manufacturer.                                                                                                                                                                                           |
|                       | OPENVPN                           | Supports remote P2P network connection (only applicable for versions with Ethernet port).                                                                                                                                                                                                                                |
|                       |                                   | The device supports remote/local program upgrade, parameter setting, and parameter query functions.                                                                                                                                                                                                                      |
|                       | Terminal Control                  | Remote Unlocking                                                                                                                                                                                                                                                                                                         |
| Self-Protection       | Device Anti-tamper                | The device can exchange handshake protocols with the controller through the CAN protocol to achieve anti-tampering.                                                                                                                                                                                                      |
|                       | Self-check                        | The device will automatically detect the GPS, NET, and other statuses and display status information through indicator lights and booting and user-based Wi-Fi, completing the interaction between TBOX and the battery swap station to realize the vehicle's intelligent driving function.                              |
|                       | Battery Swap                      |                                                                                                                                                                                                                                                                                                                          |

## ISED RSS warning

This device complies with Innovation, Science and Economic Development Canada licence-exempt RSS standard (s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Innovation, la science et le développement économique Canada applicables aux appareils radio exempts de licence.

L'exploitation est autorisée aux deux conditions suivantes:

- (1) l'appareil ne doit pas produire de brouillage, et
- (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

## ISED Radiation Exposure Statement:

This equipment complies with ISED RF radiation exposure limits set forth for an uncontrolled environment.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

This equipment should be installed and operated with minimum distance 20cm between the radiator & your body. Cet appareil est

conforme aux limites d'exposition de rayonnement RF ISED établies pour un environnement non contrôlé. Cet émetteur ne doit pas être co-implanté ou fonctionner en conjonction avec toute autre antenne ou transmetteur.

Cet équipement doit être installé et utilisé avec une distance minimale de 20cm entre le radiateur & votre corps.

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Tous les changements ou modifications non expressément approuvée par le responsable de la conformité pourrait vider l'utilisateur est habilité à exploiter l'équipement.

- (1) This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

## FCC Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.