TCU EBOX

Telematics Control Unit

Description

Compact, reliable solution to provide mid-range connectivity and eCAll compliance to automotive , motorcycle and other vehicles types.
LTE CAT-4 connectivity will provide enough bandwidth for most applications, providing connectivity to the rest of the vehicle with a comprehensive set of telematic services and compliance with worldwide emergency call regulations.
Flexible platform capable of including Wi-Fi, Bluetooth(BR/EDR/BLE), UWB, CAN-FD, USB 2.0, Ethernet, Back -Up battery and regulation eCALL.

Supported Services

- **Multi FOTA**
- **Self-FOTA**
- **Vehicle Status**
- **TCU Status**
- **Internal Battery Monitor**
- **Collision Monitor**
- **Movement Monitor**
- **Real Time Location**
- **eCall service**
- **Digital Key***
- **Journey Monitor***
- **Stationary Monitor***
- **Distance Monitor***
- **Heading Monitor***
- **Analytics***

Features

• Compact 4G LTE CAT4 Telematic unit
• Modular concept (optional HW blocks)
• CAN-FDx3, USB 2.0
• LIN
• Wi-Fi / Bluetooth Classic/EDR + BLE
• Embedded SIM (eUICC)
• Optional flash memory (EMMC): 8GB to 64GB
• NAD RAM: 512 MB
• 2 Telephony, GNSS, UWB, Wi-Fi and Bluetooth integrated omnidirectional antennas
• IMU (Accelerometer + Gyroscope)
• Volumetric omnidirectional internal antennas
• High flexibility for vehicle integration
• Backup Battery
o TCU is designed to be supplied continuously by external VBAT.
o BuB is intended to be used sporadically; it is not designed for frequent use of discharging cycles. Some use cases are for instance: eCall, Stolen Vehicle Tracking, Battery disconnection Notification...
• Wake-Up by CAN, HW I/O, Accelerometer, BLE or Network
• Ethernet 100Base T1
• eCall support
• UWB chipset

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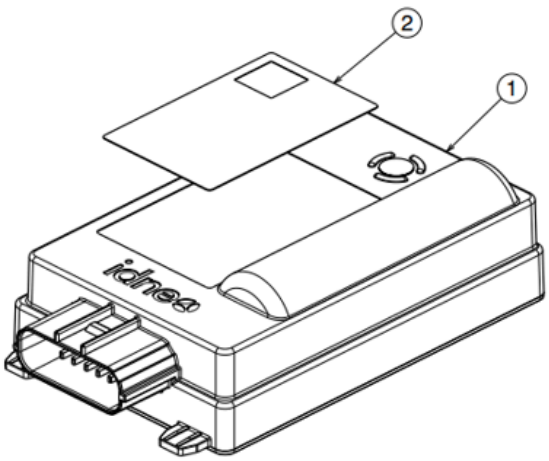
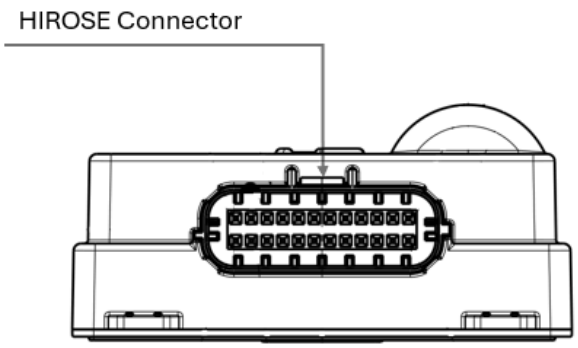
Connections

TCU shall be connected to the vehicle using the connector detailed below which contains all the pinout that serves as an interface for power and communication purposes.

TCU is designed to be powered through an electrical protection circuitry that provides a nominal voltage of 12V.

This product is designed for building-in installation.





CONNECTOR PINOUT	
PIN Nº	DESCRIPTION
1	LED Backlight
2	LED Red
3	LED Green
4	KL15 IGN (Alt CAN3H)
5	IO OUTPUT (Alt CAN3L)
6	MIC GND
7	CANFD2-H
8	CANFD2-L (Alt LIN)
9	eCALL_SW
10	GND
11	VBAT
12	CANFD1-H
13	USB VCC (Alt MUTE OUT)
14	USB DATA- (Alt ETH-)
15	USB DATA+ (Alt ETH+)
16	USB GND
17	AIRBAG IN
18	SPK-
19	SPK+
20	GND HMI
21	MIC-
22	MIC+
23	MIC VCC
24	CANFD1-L

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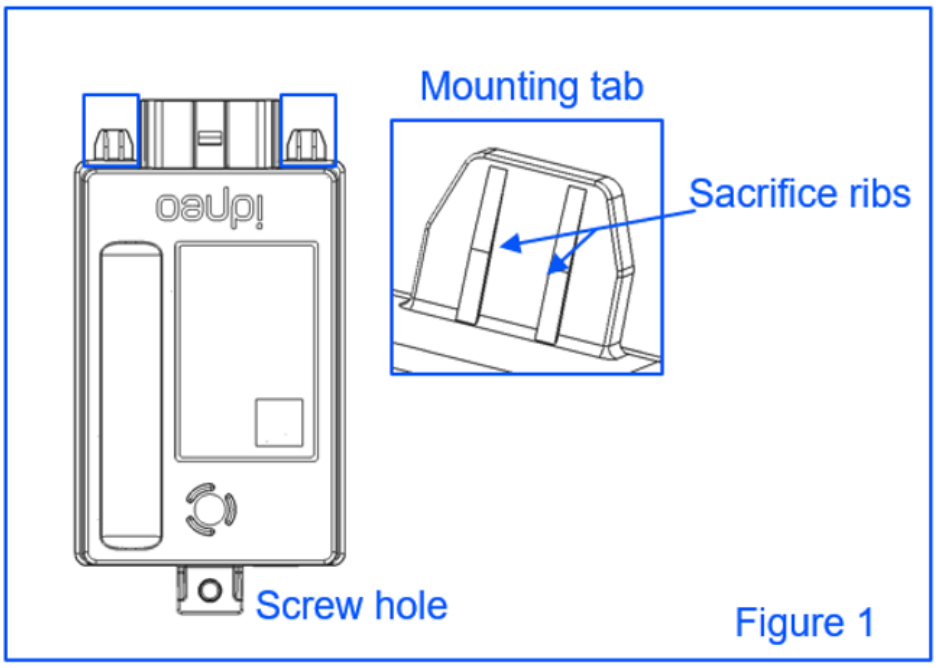
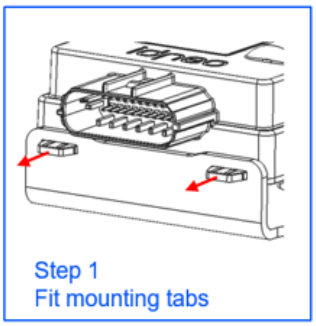
TCU Fixation

Mounting instructions

1. TCU EBOX has 3 mounting points as shown in figure 1, 2x mounting tabs and 1x through hole.
2. As detailed in Step 1, first is required to assemble mounting tabs into the bracket. Each mounting tab includes 2x sacrifice ribs that hold the TCU to the bracket. (Bracket not defined, just for information)
3. A screw M5 is required and shall be fastened to the TCU Housing (red in Step 2) applying a torque of 7,1 in-lbs +-25% (0.8 Nm +- 25%) This TCU will not be detachable.





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Recommendations of use

I.- TRANSPORT-STORAGE	RISK
Do not expose the containers to bad weather conditions	Pollution of the systems, degradation of the aspect, or functional damages
Unit shall be connected to an external power supply to recharge internal battery 16 weeks maximum after shipment	Internal BUB damage due to excessive self discharge.
Do not apply weight over the packing	Breaking or deformation of a part of the delivery
Keep the containers in horizontal position	Displacements of parts within container. Parts might be damaged

II.- HANDLING-CONDITIONING	
Do not to apply extreme force on the product Do not hold the units using a delicate part (i.e. connectors) Use firm and rigid parts for holding the units (i.e. box) Do not pile them, ones on the others	Functional internal elements may be damaged, due to efforts applied from the outside.
Parts should not be exposed to shocks, falls at the time of handling. In case of falling, THE PART MUST BE DISCARDED.	Internal components may be damaged, even though the external appearance is still OK
Do not use of sharp or aggressive instruments in contact with the system.	Functional elements of the system can be twisted, broken, or folded, and generate dysfunctions. Strange particles may enter inside the unit, causing different damages
Protection measures against ESD (Electro Static Discharges) are advisable, even though the part is protected against ESD of a reasonable magnitude Avoid touching the connectors with the fingers or metallic objects	Deterioration of the internal electronic components. Even with the unit completely closed (i.e. ESD may cause damages through the external pins)
	Telematic control unit could be hot and should not be touched without tanking care

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Recommendations of use

III.- PREPARATION AND ASSEMBLY

Handling of the electronic components with care	Connections between different parts may be deteriorated and ESD may damage the electronic components
Electrical integration test should check that connector pinout of the vehicle matches with the TCU pinout	In case of any change, the TCU or the vehicle might have an unexpected behavior
There should not be the same kind of connectors in other vehicle devices near the TCU unit. If this is not possible, they should be clearly identified.	In case of having the same type of connectors, the operator might wrongly connect them (specially if they are not clearly identified), leading to an unpredictable behavior
The power supply connected to the TCU should be limited to 15W	Electrical fire in case a short circuit in the power line is produced

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Recommendations of use

IV.- MAINTENANCE

The TCU should not be completely covered (or painted) by any metallic material during its operation	The performance of the antenna may be affected
No maintenance operations can be performed on the unit. In case battery useful life is exhausted, the whole telematic unit shall be replaced. Unit should not be open.	Risk of damaging sensitive electronic components in case of manipulation of unit interior electronics
Parts with batteries should not be left without connection during a long period of time. Battery shall be fully charged every 21 weeks assuming an average temperature of 25 ºC. Once the battery connects to the TCU, the battery will be charged automatically. If storage temperature exceeds an average of 25ºC of temperature, then these maximum time periods will be shorter. If the TCU temperature is above this profile, then the period indicated above will be significantly decreased, and the battery should be charged before the indicated period, in order to avoid a deep discharge which would decrease battery performance.	Batteries might go into a deep discharged state, causing battery degrading, affecting battery performance.

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Recommendations of use

V.- DANGEROUS MATERIALS

Certain variants contain a rechargeable battery (Li-ion). Handling and storage of such batteries imply certain risks that have to be considered:	
Health Hazard (Acute and Chronic) / Toxicological information These chemicals are contained in a sealed Al foil. Risk of exposure occurs only if the battery is mechanically or electrically abused. Contact of electrolyte with skin and eyes should be avoided.	Skin will be itchy when contaminated with electrolyte. In contact with electrolyte can cause severe irritation and chemical burns. Inhalation of electrolyte vapors may cause irritation of the upper respiratory tract and lungs.
First Aid Procedures General information The following first aid measures are required only in case of exposure to interior battery components after damage of the external battery casing. Undamaged, closed cells do not represent a danger to the health. After inhalation: Ensure of fresh air. Consult a physician. After contact with skin: In case of contact with skin wash off immediately with plenty of water. Consult a physician. After contact with eyes: Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Seek medical treatment by eye specialist. After ingestion: Drink plenty of water. Call a physician immediately. If electrolyte comes into contact with eyes, wash with copious amounts of water for fifteen (15) minutes and contact a physician.	

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Recommendations of use

Unusual Fire and Explosion Hazards Do not dispose of battery in fire Do not short-circuit battery	Battery may explode. Battery may cause burns.
Extinguishing Media Cold water and dry powder in large amounts are applicable. Use metal fire extinction powder or dry sand if only few cells are involved. Special hazards arising from the chemical may form hydrofluoric acid if electrolyte comes into contact with water. In case of fire, the formation of the following flue gasses cannot be excluded: Hydrogen fluoride (HF), Carbon monoxide and carbon dioxide. Protective equipment and precautions for firefighters Wear self-contained breathing apparatus and protective suits. Additional information: If possible, remove cell(s) from fire fighting area. If heated above 125°C, cell(s) can explode/vent. Cell is not flammable but internal organic material will burn if the cell is incinerated.	
Steps to Be Taken in Case Material is Released or Spilled Batteries with leakage should be handled with rubber gloves. Avoid direct contact with electrolyte. Wear protective clothing.	

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Recommendations of use

Safe handling and storage advice Batteries should be handled and stored carefully to avoid short circuits. Do not store in disorderly fashion or allow metal objects to be mixed with stored batteries. Never disassemble a battery. Do not breathe cell vapors or touch internal material with bare hands. The cells and batteries shall not be stored in high temperatures. Otherwise, the cells may have leakage and can result in shortened cycle life.	
For further information, related to battery risks, here are manufacturer contact details: Name: EVE Energy Co., Ltd Address: EVE Industrial Park, NO.38, HuiFeng 7th Road, Zhongkai Hi-Tech Zone, HuiZhou, Guangdong, China Post Code: 516006 Tel: 0752-2606966 Fax: 0752-2606033	

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IFCC/ISED Regulatory Notices

Modification Statement

Idneo Technologies has not approved any changes or modifications to this device by the user. Any changes or modifications could void the user's authority to operate the equipment.
Idneo Technologies *n'approuve aucune modification apportée à l'appareil par l'utilisateur, quelle qu'en soit la nature. Tout changement ou modification peuvent annuler le droit d'utilisation de l'appareil par l'utilisateur.*

Interference Statement

This device complies with Part 15 of the FCC Rules and Industry 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'Industrie 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.

Wireless Notice

This device complies with FCC/ISED radiation exposure limits set forth for an uncontrolled environment and meets the FCC radio frequency (RF) Exposure Guidelines and RSS-102 of the ISED radio frequency (RF) Exposure rules. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. The antenna should be installed and operated with a minimum distance of 20 cm between the radiator and your body.
Le présent appareil est conforme à l'exposition aux radiations FCC / ISED définies pour un environnement non contrôlé et répond aux directives d'exposition de la fréquence de la FCC radiofréquence (RF) et RSS-102 de la fréquence radio (RF) ISED règles d'exposition. L'émetteur ne doit pas être colocalisé ni fonctionner conjointement avec à autre antenne ou autre émetteur.
L'antenne doit être installée de façon à garder une distance minimale de 20 centimètres entre la source de rayonnements et votre corps.

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IFCC/ISED Regulatory Notices

FCC Class B Digital Device Notice

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.

CAN ICES-3 (B) / NMB-3 (B)

This Class B digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de classe B est conforme à la norme canadienne ICES-003.

Summary of the Specific Operational Use Conditions

RF EXPOSURE SAFETY

This product is a radio transmitter and receiver. The antenna must be installed and operated with a minimum distance of 20 cm between the radiator and your body. It is designed not to exceed the emission limits for exposure to radio frequency (RC) energy set by the FCC radio frequency (RF) Exposure Guidelines and RSS-102 of the ISED radio frequency (REF) Exposure rules. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

IFCC/ISED Regulatory Notices

Ultra Wide Band

- This equipment is approved under Part 15.519 for handheld use.
- The use of antennas mounted on outdoor structures. e.g. antennas mounted on the outside of a building or on a telephone pole, or any fixed outdoors infrastructure is prohibited.
- UWB equipment may not be employed for the operation of toys.
- Operation onboard an aircraft, a ship, or a satellite is prohibited.

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Specifications

	Mechanical and Electrical specifications
Dimensions	70 (W) x 105 (L) x 26-32.9 (H) mm (excluding bracket)
Operating Temp	-40ºC to +85ºC
Weight	<250gr
Casing	Polybutylene terephthalate (PBT)
Connectors	HIROSE ZE064W-24DP-HU/R(B)
Power supply	12 VDC (Nominal)
Current consumption	250 mA
	Telephony specifications
Telephony Frequencies	AG35-E: LTE FDD:B1/B3/B5/B7/B8/B20/B28 LTE TDD: B38/B40 WCDMA:B1/B5/B8 GSM: GSM900/GSM1800 AG35-NA: LTE FDD:B2/B4/B5/B7/B12/B13 WCDMA:B2/B4/B5 GSM: GSM850/GSM1900 AG35-J: LTE FDD:B1/B3/B5//B8/B9/B19/B21/B28 LTE TDD: B41 WCDMA:B1/B3/B5/B6/B8/B19
Telephony Maximum Output Power	Class 4 (33dBm±2dB) for GSM850 Class 4 (33dBm±2dB) for EGSM900 Class 1 (30dBm±2dB) for DCS1800 Class 1 (30dBm±2dB) for PCS1900 Class E2 (27dBm±3dB) for GSM850 8-PSK Class E2 (27dBm±3dB) for EGSM900 8-PSK Class E2 (26dBm±3dB) for DCS1800 8-PSK Class E2 (26dBm±3dB) for PCS1900 8-PSK Class 3 (24dBm+1/-3dB) for WCDMA bands Class 3 (23dBm±2dB) for LTE-FDD bands Class 3 (23dBm±2dB) for LTE-TDD bands
SIM	eSIM
Telephony Antennas	Main and secondary integrated antennas

	GNSS Specifications
GNSS bands	L1 band (GPS, GLONASS, BEIDOU, GALILEO) and SBAS
GNSS Antenna	Internal
	Bluetooth Specifications
Bluetooth type	Bluetooth 5.0 (Low Energy)
Bluetooth Low Energy output power EIRP (dBm)	3
Antenna	Internal antenna
	Wi-Fi/Bluetooth specifications
Bluetooth type	Bluetooth 5.0 (Low Energy), Basic rate and Enhanced data rate – Internal antenna
Wi-Fi bands	2.4 GHz ;2.412 GHz-2.472 GHz 5GHz: 5.180 GHz-5.825 GHz
Wi-Fi data Transmission data rates	802.11b: 1 Mbps, 2 Mbps, 5.5 Mbps, 11 Mbps 802.11g: 6 Mbps, 9 Mbps, 12 Mbps, 18 Mbps, 24 Mbps, 36 Mbps, 48 Mbps, 54 Mbps 802.11n (20 MHz): 6.5 Mbps, 13 Mbps, 19.5 Mbps, 26 Mbps, 39 Mbps, 52 Mbps, 58.5 Mbps, 65 Mbps 802.11n (40 MHz): 13.5 Mbps, 27 Mbps, 40.5 Mbps, 54 Mbps, 81 Mbps, 108 Mbps, 121.5 Mbps, 135 Mbps 802.11a: 6 Mbps, 9 Mbps, 12 Mbps, 18 Mbps, 24 Mbps, 36 Mbps, 48 Mbps, 54 Mbps 802.11ac: VHT20 (MCS 0–8), VHT40 (MCS 0–9), VHT80 (MCS 0–9)
Wi-Fi/BT Antenna	Internal antenna
Wi-Fi Transmitting Power	2.4 GHz: 802.11b/11Mbps: 16 dBm ±2.5 dB 802.11g/54Mbps: 14 dBm ±2.5 dB 802.11n/HT20 MCS7: 13 dBm ±2.5 dB 802.11n/HT40 MCS7: 13 dBm ±2.5 dB 5 GHz: 802.11a/54Mbps: 11 dBm ±2.5 dB 802.11n/HT20 MCS7: 9 dBm ±2.5 dB 802.11n/HT40 MCS7: 8 dBm ±2.5 dB 802.11ac/VHT20 MCS8: 9 dBm ±2.5 dB 802.11ac/VHT40 MCS9: 8 dBm ±2.5 dB 802.11ac/VHT80 MCS9: 7 dBm ±2.5 dB
	Ultra Wide Band
Main UWB specs	-IEEE 802.15.4 HRP UWB PHY compliant

	-Supports SHF UWB bands from 6.0 GHz to 8.5 GHz for worldwide use -Center Frequency from 6.5 GHz to 8.0 GHz -Data rates of 110 kbps (BPRF), 850 kbps (BRRF), 6.8 Mbps (BPRF), 7.8 Mbps (HPRF) -Internal antenna
Ethernet	-Ethernet 100 Base T1