



## **Project: TCU Bundle 4**

# **Installation Instructions for Telematics Control Unit (FB40-ND1 TCU)**



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## **1.0 INTRODUCTION**

The Telematics Control Unit (TCU) integrates an on-board cellular communication module with a WiFi hotspot functionality and interacts with remote call/data centers to provide valuable services to the vehicle customer.

### **1.1 PURPOSE AND SCOPE**

This conditions document is to provide installation instruction to OEM to insure safe use of the device.

#### **1.1.1 TCU Functionality**

The TCU allows customers in to connect to their car from their phone or PC to issue commands, retrieve information, and receive alerts for important information about their car.

For FB40-ND1 customers this means the ability to remotely control charging, receive alerts about their charging activities and warm / cool their cabin on demand.

In addition, customers can perform lock and unlock remotely, locate and track their vehicle and receive alerts on their phone or email if the vehicle alarm is activated.

Depending upon the level of technology supported, the customer may also be able to access services via voice or transfer data at high speeds.

FB40-ND1 offers WiFi Hotspot functionality. WiFi and Cellular transmissions will happen simultaneously. The WiFi and Cellular antennas are not collocated: WiFi antenna is inside the TCU while the cellular antennas are on the roof top of the vehicle.



## 2.0 ELECTRICAL HARDWARE DESCRIPTION

### 2.1 POWER & GROUNDING

The TCU is designed to operate via an unfiltered 5 A fused input from the vehicle battery: Vbatt  
Ground return is through a single ground pin: GND

#### 2.1.1 Power – Operating Voltage

Operating voltage range is provided in the following table.

**Table 3.1.1 TCU Operating Voltage Conditions**

<b>VOLTAGE RANGE (Vdc)</b>	<b>SUBSYSTEM OPERATING CONDITIONS</b>
9.0 < V <sub>BATT</sub> < 16.0	Normal operation. TCU is fully functional

##### 2.1.1.1 Start/Stop Voltage Conditions

In addition to the normal operating voltage ranges listed above, the TCU must also remain operational during engine start/stop events.

#### 2.1.2 TCU Interface to External Cellular Antennas

The TCU has FAKRA connectors to which external LTE/GSM antennas may be connected. TCU operates with external cellular antennas having cable length of at least 25 cm or longer. Purple RF connector is for the primary TX/RX operation and beige connector is for RX diversity only.

## 2.2 WIFI

The TCU supports IEEE 802.11a/b/g/n/ac 2.4/5GHz WiFi. TCU operates as a Personal Access Point. Signal Specifications

Within the coverage areas, the WiFi signal from the TCU has a speed up to 20 Mbps with a bit error rate of less than 2%. All coverage areas assume that the packaging guidelines referenced in this document have been adhered to.

#### 2.2.1 WiFi internal Antenna

The TCU contains integrated pcb type F dual band antenna with the following maximum gain

<b>Frequency</b>	<b>MAX Gain</b>
2442 MHz	3.14 dBi



5220 MHz 0.68 dBi  
5785 MHz 1.94 dBi

### 2.3 TCU LABELING

TCU labeling shall comply with the regulatory homologation compliance mark(s) that are required by law in the country.

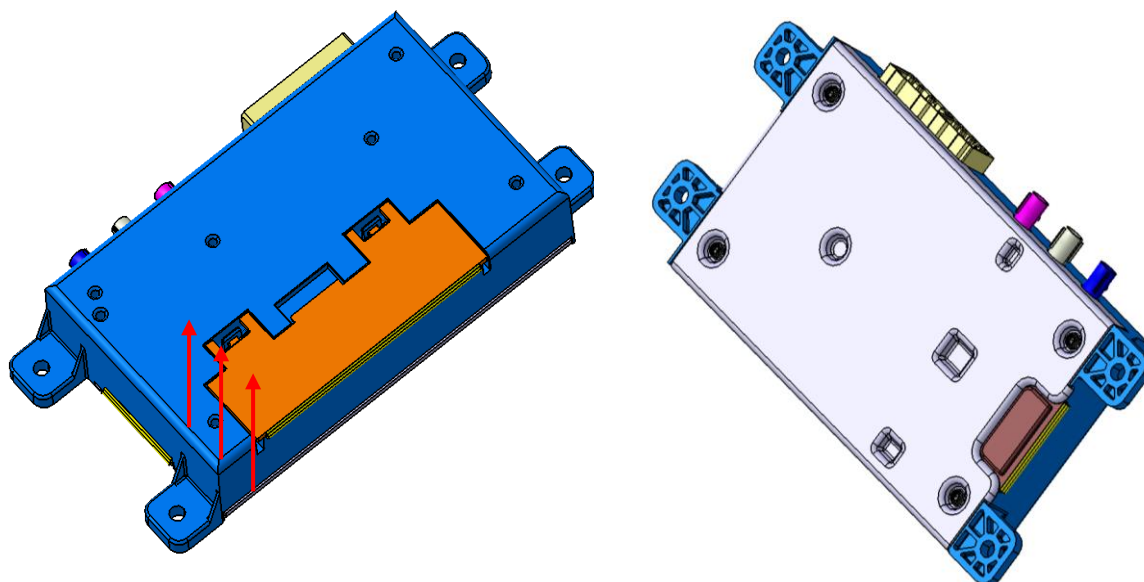


#### 2.3.1 Automotive OEM Labeling Conditions

The module is marked with the Automotive OEM company trademark, engineering part number, and supplier code.

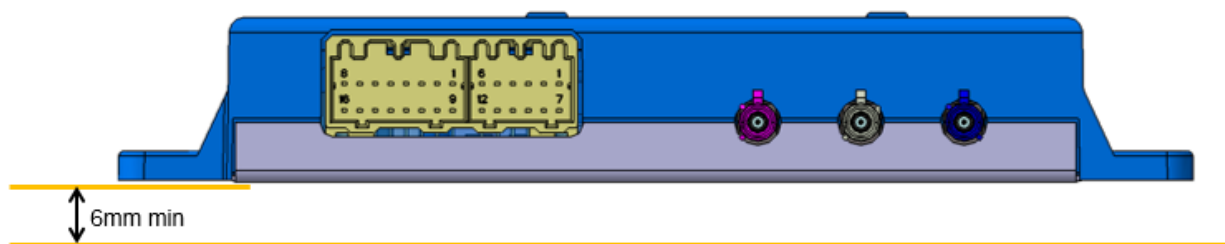
### 2.4 WIFI TCU ANTENNA TRANSMIT AREA

The TCU is designed to allow the Wi-Fi antenna signal to propagate out of the top, bottom, and sides of the module, as shown in the figure below.



### 3.0 VEHICLE INSTALLATION GUIDELINES

The sheet metal cover is designed to be a heat sink. A gap between the heat sink and the mounting surface is recommended to facilitate heat transfer out of the module. Exceptions can be made if the module is mounted to a surface that can help facilitate heat transfer such as a large aluminum body panel.



The device does not have sealed connectors.

It is designed to meet Class I water intrusion conditions (no drip test required), so it should not be placed in area that can get wet.

Continental recommends that the automotive OEM uses the mating harness supplier's recommendations for the keep out zone around the connectors to ensure proper mating of each connector.

The device is limited to installation in mobile applications, according to Part 2.1091(b). No other operation configurations are allowed.

Changes or modifications to this system by other than a facility authorized by Continental could void authorization to use this equipment.

The device and its antennas must be installed to provide a separation distance of at least 25 cm from all persons and must not be co-located or operate in conjunction with any other antenna or transmitter.

### 4.0 REGULATORY COMPLIANCE NOTES

#### FCC:

This device complies with Part 15, Part 22(H), Part 24(E) and Part 27 of the FCC Rules. The FCC ID for this device is LHJ-FB40ND1. It also contains a certified module with FCC ID: LHJ-BL28NA003. Part 15 operation (WiFi) is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.



### **Industry of Canada:**

This device complies with Industry Canada's license-exempt RSSs. 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. »

### **México**

La operación de este dispositivo está sujeta a las siguientes dos condiciones:

- (1) Este equipo o dispositivo no deberá ocasionar interferencias perjudiciales.
- (2) Este equipo o dispositivo debe aceptar cualquier interferencia recibida, incluidas aquellas que pudieran causar un funcionamiento no deseado.

## **5.0 EXTERNAL ANTENNA REQUIREMENTS FOR USE WITH FB40-ND1 TCU**

The FB40-ND1 device is for use with external antennas ONLY, except for WiFi which uses an internal antenna.

For all LTE/WCDMA/GSM operating bands the maximum antenna gain including cable loss shall not exceed the following values:

- GSM 850: 1 dBi
- GSM 1900: 1 dBi
- WCDMA Band 2: 1 dBi
- WCDMA Band 4: 5 dBi
- WCDMA Band 5: 1 dBi
- LTE Band 2: 1 dBi
- LTE Band 4: 5 dBi
- LTE Band 5: 1 dBi
- LTE Band 7: 5 dBi
- LTE Band 12: 5 dBi

## **6.0 INSTRUCTIONS TO OEMS**

The OEM must inform the end-user (i.e. the owner / driver of the car with this device installed) that “The installation of TCU FB40-ND1 with its radio transmitters and antennas is in compliance with the U.S. and CANADA RF Exposure Regulations”. This text, or similar, must be included into the car manual.