

# Short guide : TU600-x

Version 0.3, January 2020



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NOTE: Model ID TU600-x (LTE Cat M1 /Cat NB1 / 2G)

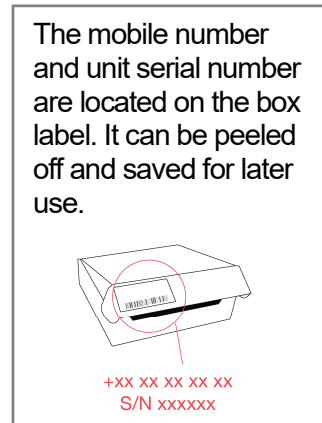
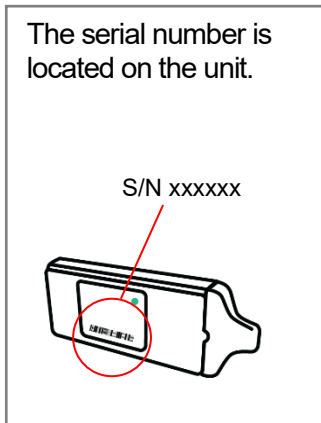
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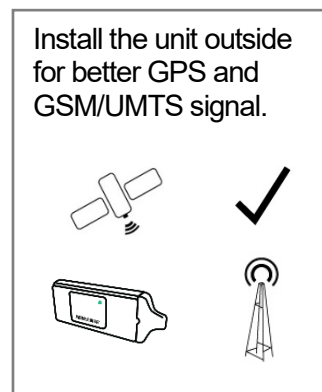
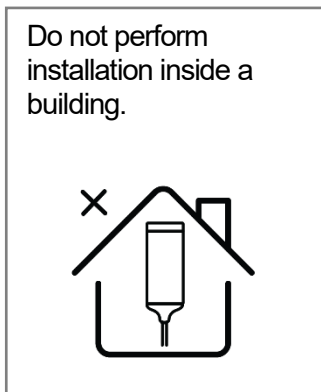
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# Practical Advice

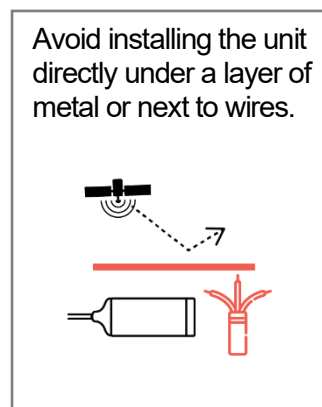
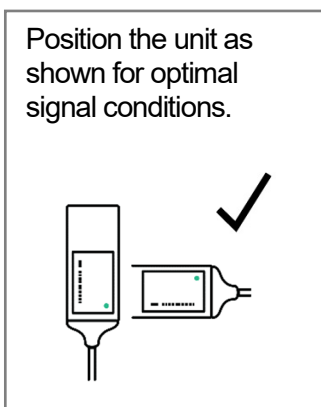
## 1. Save important numbers



## 2. Installation is best done outside



## 3. Correct positioning of the unit



## Machine and vehicle guidelines for correct wiring

| Wire color       | Description   |
|------------------|---|
| Power            | Connect to machine battery through a fuse (mandatory) <sup>1</sup>                |
| Ground           | Connect to ground (mandatory)   |
| Digital input 1  | Can be connected to hour counter. Optional input <sup>2</sup>                     |
| Digital input 2  | Connect to the ignition signal (mandatory for vehicles and machines) <sup>1</sup> |
| Digital input 3  | Optional input <sup>1</sup>   |
| Digital input 4  | Can be used for INFILT function. Optional input <sup>2</sup>                      |
| Digital output 1 | Can be used to control a relay <sup>3/4</sup>                                     |
| CAN High         | Connect to CAN High   |
| CAN Low          | Connect to CAN Low  |
| 1 – Wire input   | M8 connector for access control and temperature sensor                            |

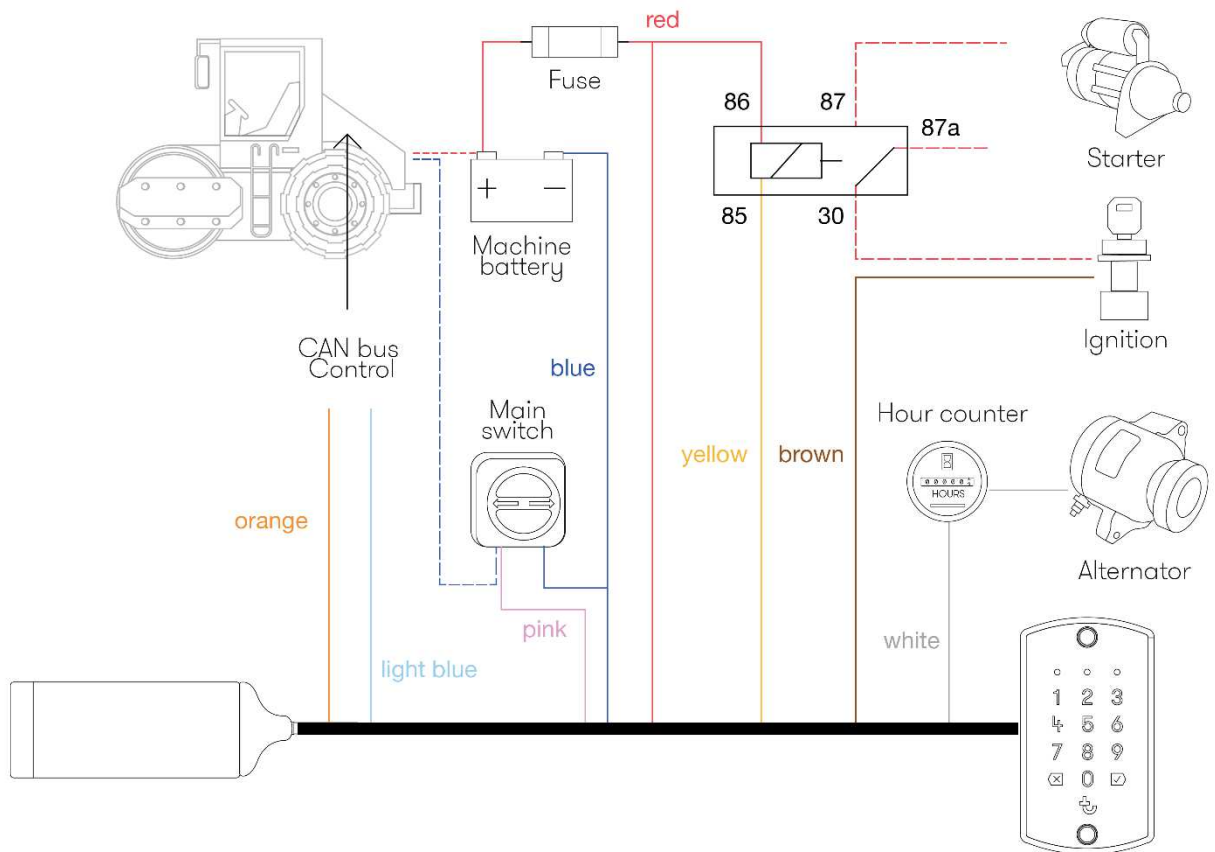
1: Supply voltage range 12–48V

2: Active/high when min. 9,5V DC at input

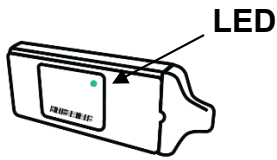
3: Max. load 200 mA




4: Do NOT use this output to switch off vehicles and machines during operation or driving

# Installation example



## Functionality check: LED on the unit



| Status | LED mode   | LED color   | Status indication   |
|--------|--|---|---|
| ✓      | Red flashing light and constant green light in LED |    | - Mobile network is OK and GPS has valid satellite position                       |
| !      | No light in LED                                    |   | - No power supply   |
| !      | Constant red light and no green light in LED       |  | - Power supply is OK, but NO mobile network<br>- GPS has NO satellite position    |
| !      | Red flashing light and no green light in LED       |  | - Mobile network is OK<br>- GPS has NO satellite position                         |
| !      | Constant red and green light in LED                |  | - Power supply is OK, but NO mobile network<br>- GPS has valid satellite position |

## Installation check and update using “Verify my Trackunit”

### Step 1: Login

- Go to <http://verify.trackunit.com>
- Enter user name and password

### Step 2: Find unit

- Enter serial number and then click “Find”

### Step 3: Review status

- Time of last received data
- GPS and mobile signal
- Mobile number
- Power supply voltage
- Internal battery voltage
- Status of inputs 1-4 (on/off)
- Click “Find” again to refresh status

### Step 4: Basic configuration options

- Enter a device name
- Enter engine hours
- Enter start distance
- Select category
- Connect up to multiple groups
- Add a note (visible in Trackunit Manager)

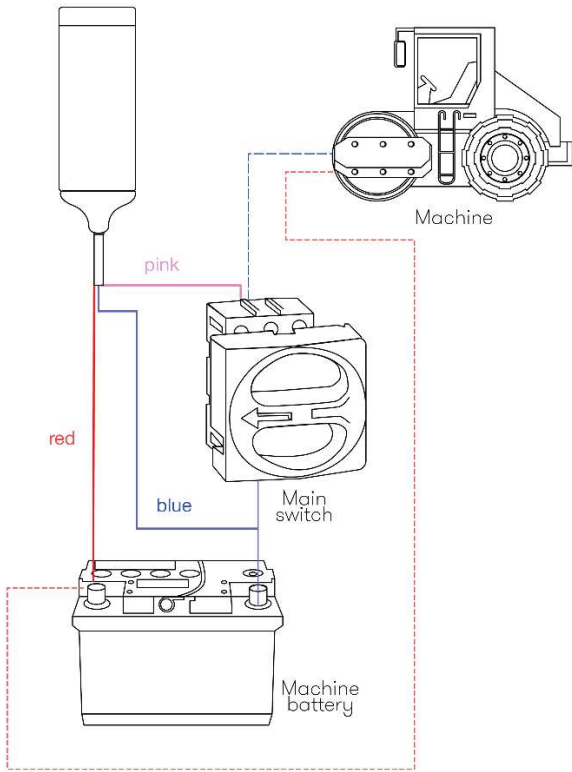
### Step 5: Logout

- Click “Update” to save
- Click “Logout”

### Note

- Prior to verification, make sure the unit is installed and active in an area with sufficient GPS and mobile coverage.

# Input filtering (INFILT)



In case the main breaker is on the negative wire (ground wire from the machine battery), the inputs may register a voltage level and start counting operating hours.

To avoid this situation, the digital input 4 (pink wire) should be connected to the chassis/ground on the machine.

The infiltr function should be activated via “Verify my Trackunit”

### Activation of input filtering

Go to: <http://verify.trackunit.com/>

Input Filtering: Current Status = OFF Click here to change

**NB!** Enabling the filtering function will disable inputs 1 to 3 when input 4 is on/active. This can prevent all digital input alarms. It will also disable the use of any alarm function on digital input 4.



## CAN bus termination resistor

When installing the TU600 on a J1939 CAN-bus, it is very important to determine if the installation is on a “private” CAN-bus directly to the CAN controller, or if the TU600 is to be installed as a stub on a CAN-bus with multiple CAN devices already attached.

### Default setup without 120-ohm bus termination.

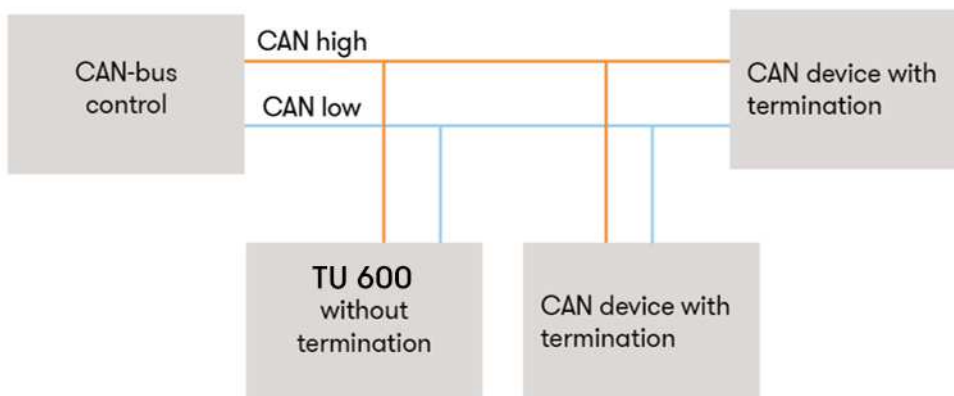
The 120-ohm termination resistor is a software-controlled resistor, so make sure to use and select the correct TU600 CAN-bus profile.

**CAN-bus profile is selected in Trackunit Manager and software controls the resistor setup.**

### With 120-ohm bus termination (directly connected)



### Without 120-ohm bus termination (stub connected)



**NB!** When the unit is stub connected, the wire length must be minimized to avoid CAN-bus noise and error ratio.

## Troubleshooting

| Error description                                   | Possible solutions   |
|---|--|
| No reply on SMS command                             | <ul style="list-style-type: none"> <li>• Verify correct GSM number</li> <li>• Check LED status – see page 6</li> </ul>   |
| No light in LED                                     | <ul style="list-style-type: none"> <li>• Check if the red and blue wires are installed correctly or if the fuse is blown</li> </ul>  |
| Constant red light in LED                           | <ul style="list-style-type: none"> <li>• Verify location of the unit – see page 3</li> <li>• Move machine or vehicle for better GSM signal</li> </ul>  |
| No green light in LED                               | <ul style="list-style-type: none"> <li>• Verify location of the unit – see page 3</li> <li>• Move machine or vehicle for better GPS reception</li> </ul>   |
| Inputs counting operating hours when machine is off | <ul style="list-style-type: none"> <li>• Possibly due to the main breaker being on the negative wire (ground wire from the machine battery). When off, the inputs may register a voltage level and start counting operating hours.</li> <li>• To avoid this situation, the digital input 4 (pink wire) should be connected to the chassis/ground on the machine.</li> <li>• See Input filtering (INFILT) section, page 8.</li> </ul> |

### Technical Assistance

If you experience an issue and cannot find the information you need in the product documentation, please contact Trackunit.

Spare part lists:

- Spare battery PN 4233.0002
- HW shield for harsh environments PN. 7402.9551 and 7402.9552.
- Fuse kits (30V/1A) for 12V-24V operations or (80V/3A) for 12V-48V operation.

Trackunit support: +45 96 73 74 00

Email: [support@trackunit.com](mailto:support@trackunit.com)

The guides can also be downloaded online: [www.trackunit.com/downloads](http://www.trackunit.com/downloads)

**NB!** When contacting technical support, please have the unit serial number ready.

## Product specifications

|   |                                  |
|---|----------------------------------|
| Product   | TU600                            |
| 2G GSM  | Yes                              |
| LTE M1 / NB1 IOT                                | Yes                              |
| Operational voltage<br>(supply voltage)         | 12-48 V DC                       |
| Absolute maximum voltage<br>range               | 8-58 V DC continuous             |
| Standby consumption<br>(GSM-receiver active)    | 10 mA / 7 mA (avg. at 12V/24V)   |
| Consumption during<br>charging an empty battery | 225 mA / 115 mA (max at 12V/24V) |
| Charging time for an empty<br>backup-battery    | 4 hours at 25°C / 77°F)          |
| Digital inputs                                  | 4                                |
| Digital outputs                                 | 1                                |
| CAN inputs (High / Low)                         | 2                                |
| Access control input<br>M8 connector            | 1                                |

## Temperature range

|                               |   |
|-------------------------------|---|
| <b>In active running mode</b> | -20°C to +55°C/60°C<br><br>Limited by the Li-Ion backup battery when the unit is either machinery or battery powered.     |
| <b>Storage</b>                | -40°C to +70°C<br><br>Shorter battery lifetime must be expected when storage and operation occur at extreme temperatures. |

## Mechanical specifications

|                            |   |
|----------------------------|---|
| <b>Length</b>              | 122,3 mm (4.8 in.)  |
| <b>Width</b>               | 45.5 mm (1.8 in.) (50,1 mm incl. cradle) (1.9 in.)                |
| <b>Height</b>              | 17.9 mm (0.7 in.) (22,7 mm incl. cradle) (0.9 in.)                |
| <b>Cable length</b>        | 170 cm (5.6 ft.)  |
| <b>Environmental class</b> | IP67 (With HW Shield IP66k & IP69k – PN. 7402.9551 and 7402.9552) |
| <b>Weight</b>              | 66 g (excluding cable) (2.3 oz.)                                  |





## Regulatory information and precautions

|                             |   |
|-----------------------------|---|
| <b>Use location</b>         | This equipment design applies to commercial or industrial equipment expected to be installed in locations where only adults are normally present  |
| <b>Terms of use</b>         | Use only Trackunit approved accessories and/or batteries. Do not connect incompatible products  |
| <b>New battery</b>          | In case of battery malfunction, expiration or any other situation where a new battery might be needed, replacement batteries can be ordered through <a href="mailto:support@trackunit.com">support@trackunit.com</a>  |
| <b>CE mark</b>              | The TU600 products complies with the essential requirements of the RED Directive 2014/53/EU directive with respect to the EMC requirements, safety and radio spectrum matters   |
| <b>FCC mark</b>             | The TU600 products contains radio transmitters and complies with the essential requirements of Part 2.1091, 15.247, 22, 24, 27 and 90 of the FCC rules, and with RSS-GEN, RSS- 102, RSS-130, RSS-132, RSS-133, RSS-139, and RSS247 of the Industry Canada requirements      |
| <b>Environmental</b>        | The TU600 products complies with the SAE J1455 environmental conditions for heavy trucks when mounted in the vehicles. Additionally, compliance to shock and acceleration by IEC 61373. The product protection covers IP67 (standalone) and IP66k & IP69k (With HW shield). |
| <b>Charging</b>             | The battery will recharge as long as its temperature range is within 0°C to +45°C and the vehicle to which the unit is mounted is running. In case of temperatures outside this range the internal battery will not recharge.   |
| <b>Operating conditions</b> | The internal battery will operate in temperature ranges from -20°C to +60°C. In case of temperatures outside of this range the internal battery will be disabled by the device. Battery lifetime is expected to be 3 years under normal operating conditions.               |

|                         |  |
|-------------------------|--|
| <p><b>Fuse</b></p>      | <p>Recommended fuse holders and fuses for installation up to 48V supply voltages (can be ordered at Trackunit A/S):</p> <ol style="list-style-type: none"> <li>a. Supply voltage 12V/24V (Max 30A)             <ol style="list-style-type: none"> <li>i. ATO blade fuses (Max 32V/1A) used with Littelfuse FHAC0002SXJ fuse holder (standard).</li> <li>ii. ATP blade fuse (Max 32V/1A - ATO style) used with TaiTek FH-006WR-12R-12-U fuse holder (standard).</li> </ol> </li> <li>b. Supply voltage 12V - 48V (Max 30A)             <ol style="list-style-type: none"> <li>i. FKS blade fuse (Max 80V/3A - ATO style) used with Littelfuse FH2 fuse holder (recommended).</li> </ol> </li> </ol>   |
| <p><b>Machinery</b></p> | <p>The TU600 product complies with the essential requirements of the Directive 2006/42/EC and EU regulation 167/2013 when integrated as intended:</p> <ol style="list-style-type: none"> <li>I) ISO 13766-1 Earth-moving machinery and construction machinery</li> <li>II) EN/ISO 14982 Agricultural and forestry machines.</li> <li>III) EN 12895 Industrial trucks – Electromagnetic compatibility.</li> <li>IV) UN regulative ECE R10 EMC rev. 5 in accordance with EU regulation 661/2009 for Electronic Sub-Assembly (ESA).</li> </ol> <p>NOTE: Harmonized standards under the directive 2014/30/EU have been applied.</p> <p><b>Statement for ISO 13849-1:</b></p> <p>The TU600-x are when installed not a vital part in the machine safety system, but it can be used as access control/immobilizer if paired with a keypad (e.g. DualID II) or Ibutton or by Bluetooth LE. This function depends on correct installation (see installation guide) and requires that the output wire is connected to a relay to control the starter motor, see installation diagram. When the emergency stop on the machine is activated, the unit and keypad functions will be disabled. The internal battery ensures that a GPS position still can be acquired on an hourly basis.</p> <p><b>PRECAUTION: Trackunit recommends only mounting Output1 to starter motors through a relay and under no circumstances should Output1 be used to control the engine shutdown during operation or any moving parts on the machinery.</b></p> |

## Approvals and Certifications

|  |   |   |                       |      |           |                       |          |                      |                        |       |           |                        |      |                      |                        |                                   |           |                        |                        |           |                           |   |
|--|---|---|-----------------------|------|-----------|-----------------------|----------|----------------------|------------------------|-------|-----------|------------------------|------|----------------------|------------------------|-----------------------------------|-----------|------------------------|------------------------|-----------|---------------------------|---|
| <p><b>FCC/IC part 15.19 Notice</b></p>                             | <p>This device complies with Part 15 of the FCC Rules and with Industry Canada license-exempt RSS standard(s). 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.</p>  |   |                       |      |           |                       |          |                      |                        |       |           |                        |      |                      |                        |                                   |           |                        |                        |           |                           |   |
| <p><b>IC RSS-GEN Notice</b></p>                                    | <p>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.</p>   |   |                       |      |           |                       |          |                      |                        |       |           |                        |      |                      |                        |                                   |           |                        |                        |           |                           |   |
| <p><b>FCC part 15.21 Notice</b></p>                                | <p>Changes or modifications made to this equipment not expressly approved by Trackunit may void the FCC authorization to operate this equipment.</p>  |   |                       |      |           |                       |          |                      |                        |       |           |                        |      |                      |                        |                                   |           |                        |                        |           |                           |   |
| <p><b>FCC/IC Radiofrequency radiation exposure Information</b></p> | <p>This equipment complies with FCC/IC radiation exposure limits set forth for an uncontrolled environment. This equipment may be installed and operated with minimum distance of 20 cm between the radiator and your body.<br/>This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.</p>  |   |                       |      |           |                       |          |                      |                        |       |           |                        |      |                      |                        |                                   |           |                        |                        |           |                           |   |
| <p><b>Environmental compliance</b></p>                             | <table border="0"> <tr> <td>SAE J1455</td> <td>EN/IEC 60068-2-1:2007</td> <td>Cold</td> </tr> <tr> <td>SAE J1455</td> <td>EN/IEC 60068-2-2:2006</td> <td>Dry Heat</td> </tr> <tr> <td>SAE J1455, IEC 61373</td> <td>EN/IEC 60068-2-27:2010</td> <td>Shock</td> </tr> <tr> <td>SAE J1455</td> <td>EN/IEC 60068-2-31:2008</td> <td>Drop</td> </tr> <tr> <td>SAE J1455, IEC 61373</td> <td>EN/IEC 60068-2-64:2008</td> <td>Random vibration and acceleration</td> </tr> <tr> <td>SAE J1455</td> <td>EN/IEC 60068-2-78:2001</td> <td>Damp heat steady state</td> </tr> <tr> <td>SAE J1455</td> <td>(IEC 60529+A1+A2)CSV:2013</td> <td>Degrees of protection (IPcode): <b>IP67 and With HW shield: IP66k &amp; IP69k</b></td> </tr> </table> <p>NOTE A:<br/>The TU600 is not to be mounted in areas with presence of Motor oil, Gasoline, Diesel fuel, Hydraulic fluid, Brake fluid, Transmission fluid, Glycol and water mixture etc.</p> | SAE J1455   | EN/IEC 60068-2-1:2007 | Cold | SAE J1455 | EN/IEC 60068-2-2:2006 | Dry Heat | SAE J1455, IEC 61373 | EN/IEC 60068-2-27:2010 | Shock | SAE J1455 | EN/IEC 60068-2-31:2008 | Drop | SAE J1455, IEC 61373 | EN/IEC 60068-2-64:2008 | Random vibration and acceleration | SAE J1455 | EN/IEC 60068-2-78:2001 | Damp heat steady state | SAE J1455 | (IEC 60529+A1+A2)CSV:2013 | Degrees of protection (IPcode): <b>IP67 and With HW shield: IP66k &amp; IP69k</b> |
| SAE J1455  | EN/IEC 60068-2-1:2007   | Cold  |                       |      |           |                       |          |                      |                        |       |           |                        |      |                      |                        |                                   |           |                        |                        |           |                           |   |
| SAE J1455  | EN/IEC 60068-2-2:2006   | Dry Heat  |                       |      |           |                       |          |                      |                        |       |           |                        |      |                      |                        |                                   |           |                        |                        |           |                           |   |
| SAE J1455, IEC 61373   | EN/IEC 60068-2-27:2010  | Shock   |                       |      |           |                       |          |                      |                        |       |           |                        |      |                      |                        |                                   |           |                        |                        |           |                           |   |
| SAE J1455  | EN/IEC 60068-2-31:2008  | Drop  |                       |      |           |                       |          |                      |                        |       |           |                        |      |                      |                        |                                   |           |                        |                        |           |                           |   |
| SAE J1455, IEC 61373   | EN/IEC 60068-2-64:2008  | Random vibration and acceleration   |                       |      |           |                       |          |                      |                        |       |           |                        |      |                      |                        |                                   |           |                        |                        |           |                           |   |
| SAE J1455  | EN/IEC 60068-2-78:2001  | Damp heat steady state  |                       |      |           |                       |          |                      |                        |       |           |                        |      |                      |                        |                                   |           |                        |                        |           |                           |   |
| SAE J1455  | (IEC 60529+A1+A2)CSV:2013   | Degrees of protection (IPcode): <b>IP67 and With HW shield: IP66k &amp; IP69k</b> |                       |      |           |                       |          |                      |                        |       |           |                        |      |                      |                        |                                   |           |                        |                        |           |                           |   |

|  |  |   |            |   |            |   |            |
|--|--|---|------------|---|------------|---|------------|
|  | <p>NOTE B:<br/>The housing not designed to withstand high pressure cleaning. Only use the TU600 when mounted inside the designated Trackunit protection cap (7402.9551 and 7402.9552 Trackunit Raw – Hardware Shield, can be ordered at Trackunit A/S) in mounting areas where high pressure cleaning is common procedure.</p>   |   |            |   |            |   |            |
| <p>Regulatory labeling</p>   | <p>The TU600-x product family are regulatory compliant to the following regulation:</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>10R - 05 8766</p> </div> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p>FCC ID: ZMF-TU600<br/>IC: 9746A-TU600</p> </div> <div style="display: flex; justify-content: space-between; align-items: center; margin-top: 10px;"> <div style="text-align: center;">  <table border="1" style="font-size: small;"> <tr><td>T</td><td>D180034003</td></tr> <tr><td>R</td><td>003-180062</td></tr> <tr><td>R</td><td>209-J00306</td></tr> </table> </div> <div style="border: 1px solid blue; padding: 5px; text-align: center;"> <p>Este equipo cumple con la Resolución No 403 de 2008, de la Subsecretaria de telecomunicaciones, relativa a radiaciones electromagnéticas</p> </div> </div> | T | D180034003 | R | 003-180062 | R | 209-J00306 |
| T  | D180034003   |   |            |   |            |   |            |
| R  | 003-180062   |   |            |   |            |   |            |
| R  | 209-J00306   |   |            |   |            |   |            |
| <p>PTCRB certification for interoperability with mobile networks</p> | <p>Selected variants of the TU600 products series under FCC ID: ZMF-TU600 and IC: 9746A-TU600 are certified for PTCRB interoperability with mobile networks:</p> <p>#77390: Trackunit TU600-5, HW 1.000, SW 60.012, SVN 7</p>  |   |            |   |            |   |            |
| <p>Japan</p>   | <p>The TU600-x model is certified for Japan under ID n°: <b>[R] 003-180062, [R] 209-J00306, [T] D180034003</b></p> <p>This device is granted pursuant to the Japanese Radio Law (電波法)<br/>=当該機器には電波法に基づく、技術基準適合証明等を受けた特定無線設備を装着している</p> <p>This device should not be modified (otherwise the granted designation number will become invalid)</p> <p>本製品の改造は禁止されています。(適合証明番号などが無効となります。)</p>  |   |            |   |            |   |            |
| <p>Chile</p>   | <p>Este equipo cumple con la Resolución No 403 de 2008, de la Subsecretaria de telecomunicaciones, relativa a radiaciones electromagnéticas.</p>   |   |            |   |            |   |            |
| <p>Regulatory accessed countries</p>                                 | <p>The regulatory accessed countries are countries without local registrations or approvals. A manufacturer declaration of conformity assessment to the national rules are applied for:</p>  |   |            |   |            |   |            |



|                            |  |
|----------------------------|--|
|                            | Americas: <b>Chile</b> (Regulatory label)<br>Asia: <b>Myanmar</b>  |
| <b>Certified countries</b> | <p>The TU600-5 model is additionally certified for countries that has no regulatory label requirements:</p> <p><b>India, Kuwait, Qatar, Saudi Arabia.</b></p> <p>The certificates can be requested at Trackunit A/S for use for import declarations.</p> |