TU600-X

Technical Manual

Version 1.0, December 2019

Content

Corporate Office

Trackunit A/S
Gasvaerksvej 24, 4 sal
9000 Aalborg
Denmark.
www.trackunit.com

Copyright and Trademarks

Release Notice
This document is release 1.0 of the TU600-X, Technical
Manual.

THIS MANUAL IS INTENDED FOR USE BY SYSTEM
INTEGRATORS, SERVICE PROVIDERS AND APPLICATION
DEVELOPERS (COLLECTIVELY, "RESELLERS"). IT IS NOT
INTENDED FOR END-USERS OF THE TU600-X. ANY END-
USER DOCUMENTATION IS TO BE PREPARED AND
FURNISHED BY THE RESELLERS.

The following Product Limited Warranty gives Resellers
specific legal rights. You may have others, which vary from
state/jurisdiction to state/jurisdiction.

Product Limited Warranty
Subject to the terms and conditions set forth herein, Trackunit
A/S (*"Trackunit"*) makes the following warranty only to its
Resellers who purchase the TU600-X hardware product
(*"Product"*) directly from Trackunit: for a period of one (1)
year from the date of shipment from Trackunit, the Product will
substantially conform to Trackunit's standard published
specifications for the Product and the Product hardware will be
substantially free from defects in materials and workmanship.
The foregoing warranty shall not apply to embedded
software/firmware components.

THIS PRODUCT LIMITED WARRANTY IS PROVIDED TO
RESELLERS AND TO RESELLERS ONLY. RESELLER IS
SOLELY RESPONSIBLE FOR ANY AND ALL WARRANTIES
MADE TO ITS CUSTOMERS, AND TRACKUNIT MAKES NO
WARRANTIES, EXPRESS OR IMPLIED, AND SHALL HAVE
NO OBLIGATIONS OR LIABILITY TO RESELLER'S
CUSTOMERS OR END-USERS OF THE PRODUCT.
RESELLER SHALL NOT
MAKE ANY REPRESENTATIONS OR WARRANTIES ON
TRACKUNIT'S BEHALF, AND SHALL FULLY INDEMNIFY,
DEFEND AND HOLD TRACKUNIT HARMLESS FROM ANY
BREACH OF THE FOREGOING. IF RESELLER DISTRIBUTES
PRODUCT TO END-USER CUSTOMERS, RESELLER SHALL
BE SOLELY RESPONSIBLE FOR PREPARING AND
PROVIDING PRODUCT WARRANTIES AND PRODUCT
LITERATURE TO END-USERS.

Warranty Remedies
If the Product fails during the warranty period for reasons
covered by this Product Limited Warranty and Reseller notifies
Trackunit of such failure during the warranty period, Trackunit
at is option will repair OR replace the nonconforming Product,

OR refund the purchase price paid by Reseller for the Product,
provided that Reseller returns the Product to Trackunit in
accordance with Trackunit's standard return material
authorization procedures or as otherwise instructed by
Trackunit.

Warranty Exclusions and Disclaimers
The foregoing Product Limited Warranty shall only apply in the
event and to the extent that (i) the Product is properly and
correctly installed, configured, interfaced, maintained, stored
and operated in accordance with Trackunit's specifications, and
(ii) the Product is not modified or misused. This Product
Limited Warranty shall not apply to, and Trackunit shall not be
responsible for, defects or performance problems resulting from:
(a) the combination or utilization of the Product with hardware
or software products, information, data, systems, interfaces,
services or devices not made, supplied or specified by
Trackunit; (b) the operation of the Product under any
specifications other than, or in addition to, Trackunit's standard
published specifications for the Product; (c) the unauthorized
installation, modification or use of the Product; (d) damage
caused by: accident, lightning or other electrical discharge,
water immersion or spray, or exposure to environmental
conditions for which the Product is not intended; or (e) normal
wear and tear on consumable parts, including by way of
example and without limitation, batteries.

TRACKUNIT DOES NOT WARRANT OR GUARANTEE THE
RESULTS OBTAINED THROUGH THE USE OF THE
PRODUCT. THE FOREGOING TERMS OF THE PRODUCT
LIMITED WARRANTY STATE TRACKUNIT'S ENTIRE
LIABILITY, AND RESELLER'S EXCLUSIVE REMEDIES,
RELATING TO THE USE AND PERFORMANCE OF THE
PRODUCT EXCEPT AS OTHERWISE EXPRESSLY PROVIDED
FOR IN THIS PRODUCT LIMITED WARRANTY, THE
PRODUCT, ACCOMPANYING DOCUMENTATION AND
MATERIALS, AND/OR ANY EMBEDDED
SOFTWARE/FIRMWARE AND UPDATES THERETO ARE
PROVIDED "AS-IS" AND WITHOUT EXPRESS OR IMPLIED
WARRANTIES OF ANY KIND, BY EITHER TRACKUNIT OR
ANYONE WHO HAS BEEN INVOLVED IN ITS CREATION,
PRODUCTION, INSTALLATION OR DISTRIBUTION,
INCLUDING, BUT NOT LIMITED TO, THE IMPLIED
WARRANTIES OF MERCHANTABILITY AND FITNESS FOR
A PARTICULAR PURPOSE, TITLE AND
NONINFRINGEMENT. THE STATED EXPRESS
WARRANTIES ARE IN LIEU OF ALL OBLIGATIONS OR
LIABILITIES ON THE PART OF TRACKUNIT ARISING OUT
OF, OR IN CONNECTION WITH, THE PRODUCT.
WITHOUT LIMITING THE GENERALITY OF THE
FOREGOING:
TRACKUNIT IS NOT RESPONSIBLE FOR THE OPERATION
OR FAILURE OF OPERATION OF GPS SATELLITES OR
WIRELESS SERVICE OR THE AVAILABILITY OF GPS
SATELLITE SIGNALS OR WIRELESS SERVICE. THE
PRODUCT MAY CONTAIN TECHNOLOGY THAT IS NOT
FAULT TOLERANT AND IS NOT DESIGNED,
MANUFACTURED OR INTENDED FOR USE IN
ENVIRONMENTS OR APPLICATIONS IN WHICH THE
FAILURE OF THE PRODUCT WOULD LEAD TO DEATH,
PERSONAL INJURY OR SEVERE PHYSICAL OR
ENVIRONMENTAL DAMAGE OR SEVERE FINANCIAL LOSS.
ANY USE OR DISTRIBUTION BY RESELLER OR ITS
CUSTOMERS IN CONNECTION WITH ANY SUCH
ENVIRONMENT OR APPLICATION SHALL BE AT

RESELLER'S AND ITS CUSTOMERS' SOLE RISK, AND TRACKUNIT SHALL HAVE NO LIABILITY WHATSOEVER IN CONNECTION THEREWITH. RESELLER SHALL INDEMNIFY AND HOLD TRACKUNIT AND ITS SUPPLIERS HARMLESS FROM ANY CLAIM BROUGHT AGAINST TRACKUNIT WHICH ARISES FROM RESELLER'S USE OR DISTRIBUTION OF THE PRODUCT IN CONNECTION WITH SUCH ENVIVRONMENTS OR APPLICATIONS. SOME STATES AND JURISDICTIONS DO NOT ALLOW LIMITATIONS ON DURATION OR THE EXCLUSION OF AN IMPLIED WARRANTY, SO CERTAIN OF THE ABOVE LIMITATIONS MAY NOT APPLY TO EVERY RESELLER.

Embedded Software/Firmware
The Product and associated tools, if any, may contain embedded software/firmware, which is licensed, not sold, and is only for use within the Product as an integral part thereof. Such embedded software/firmware (which includes all updates thereto) contains valuable trade secrets and is proprietary to Trackunit and its suppliers. To the greatest extent permitted by law, such embedded software/firmware may not be modified, copied, disassembled, decompiled or reverse engineered. Trackunit reserves all other rights.

Limitation of Liability
TRACKUNIT'S ENTIRE LIABILITY REGARDING THE PRODUCT SHALL BE LIMITED TO THE AMOUNT ACTUALLY PAID BY RESELLER FOR THE PRODUCT. TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, IN NO EVENT SHALL TRACKUNIT OR ITS SUPPLIERS BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES WHATSOEVER UNDER ANY CIRCUMSTANCE OR LEGAL THEORY RELATING IN ANY WAY TO THE PRODUCTS, ACCOMPANYING DOCUMENTATION AND MATERIALS, AND ANY EMBEDDED SOFTWARE/FIRMWARE AND UPDATES THERETO (INCLUDING, WITHOUT LIMITATION, DAMAGES FOR LOSS OF BUSINESS PROFITS, BUSINESS INTERRUPTION, LOSS OF DATA OR ANY OTHER PECUNIARY LOSS), REGARDLESS OF WHETHER TRACKUNIT HAS BEEN ADVISED OF THE POSSIBILITY OF ANY SUCH LOSS AND REGARDLESS OF THE COURSE OF DEALING BETWEEN TRACKUNIT AND RESELLER. BECAUSE SOME STATES AND JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF LIABILITY FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES, THE ABOVE LIMITATION MAY NOT APPLY TO EVERY RESELLER.

Notices
Class B Statement – Notice to Users. 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 communication. 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 the receiver.
– Consult the dealer or an experienced radio/TV technician for help.
Changes and modifications not expressly approved by the manufacturer or registrant of this equipment can void your authority to operate this equipment under Federal Communications Commission rules.

Regulatory Approvals

CE
The TU600-X product comply with the essential requirements of the RED Directive 2014/53/EU as stated by the Declaration of Conformity (CE). The TU600-X product comply with the European Telecommunications Standards Institute Specifications EN 301 489-1, EN 301489-17 (Bluetooth LE), EN 301 489-19 (GPSS/GNSS) and EN 301 489-52 (EMC for GPS, GSM 900MHz/1800MHz and LTE M1/NB IoT 700MHz/800MHz/1800MHz/2100MHz Radio Equipment and Systems).

EC/ International
The TU600-X product comply with the essential requirements of the UN regulative ECE R10 EMC rev5 clause 6.5, 6.6, 6.8 and 6.9,
The TU600-X product comply with the essential requirements of the Directive 2006/42/EC, EU regulation 167/2013 and the Directive 2014/30/EU;
The TU600-X product comply with the EU/international standards ISO-13766-1, -2 and EN ISO-14982, for tractors, forest and agricultural machinery, moving machinery and construction machinery.
The TU600-X complies with the essential requirements of the 2011/65/EC directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

FCC
The TU600-X product comply with the FCC Part 15, Part 22, Part 24, and the Industry Canada requirements RSS-102, RSS-132, RSS-133.
The TU600-X product comply with Part 15 of the FCC rules and 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.
For fixed mounted operations the TU600-X must be installed to provide a separation distance of at least 20 cm from all persons.

MIC (Japan)
The TU600-X product complies with the Japanese Telecommunication Business Act for radio terminal equipment supporting LTE M1 / NB IoT at 800, 1800, 2100 MHz (Band B18/B19, B3, B1) and optional Bluetooth LE (2402 – 2480 MHz).

[R] 003-180062 [T] D180034003 – without Bluetooth option installed

[R] 003-180062 [R] 209-J00306 [T] D180034003 - with Bluetooth option installed

US and Canada certificates:
FCC ID: ZMF-TU600
IC: 9746A-TU600

EU certificate:
CE mark by EU-Tec certificate: T818625L-01-TEC

Australia/New Zealand SDOC approval:
RCM mark

Introduction

This document contains the installation guide for the (GSM/LTE M1/NB IOT/GNSS) product type series TU600-X units. This manual is intended for use by system integrators, service providers and application developers (collectively, "Resellers"). It is not intended for end-users of the TU600-X. Any end-user documentation is to be prepared and furnished by the resellers.

This manual covers the TU600-X with 60.012 and later firmware operating on:
- 2.5G bands [850 MHz, 900 MHz, 1800 MHz and 1900 MHz] Global System for Mobile communication (GSM) networks.
- LTE bands [700 MHz, 800 MHz, 850 MHz, 900 MHz, 1700 MHz, 1800 MHz, 1900 MHz, 2100 MHz] LTE M1/NB IOT networks.
- Data and Event Reporting support is by Short Message Service (SMS), General Packet Radio Service (GPRS), or both.

This manual describes how to set up, configure, install, operate, and troubleshoot the product. Even if you have used other GSM, LTE M1/NB IOT or Global Positioning System (GPS) products before, Trackunit recommends that you spend some time reading this manual to learn about the special features of this product.

Trackunit assumes that you are familiar with Microsoft Windows.

Related Information

The Trackunit web site is found at **www.trackunit.com**. This site links to the fleet management system from Trackunit A/S called Trackunit Manager. TU600-X devices are integrated to Trackunit but can also be used together with third part system providers.

Safety first

Simple Guidelines

Please follow these guidelines when configuring, using or recycling the TU600-X. Violating these guidelines may be dangerous, illegal or otherwise detrimental. Further detailed information is provided in this manual.

Do Not Operate Where Prohibited

Do not allow the TU600-X unit to operate wherever wireless phone use is prohibited or when doing so may cause interference or danger. The TU600-X cannot be turned off after installation, so any vehicle, moving machinery, construction machinery using TU600-X etc. must not enter areas where it is prohibited to operate wireless phones as the device periodically turns on the transmitter in a short period of time to perform tracking reporting.

Examples include but are not limited to operation in hospitals, aircrafts, near blasting sites or wherever operation can cause interference.

Interference

Like all wireless devices, the TU600-X may encounter electrical interference that may affect its performance.

Avoid Body Contact with Device during Operation

Do not operate the TU600-X in direct contact with your body. Maintain at least 8 inches (20 cm) separation between the device and any parts of your body.

Qualified Service

Except for batteries and Subscriber Identification Module (SIM) card, the TU600-X contains no user serviceable or replaceable parts. Non-functioning units must be returned to an authorized service center for repair or replacement.

Accessories and Batteries

Use only Trackunit approved accessories or batteries. Do not connect incompatible products.

The battery package is a Trackunit design, no other battery designs are compatible with the battery holder of the TU600-X. There is risk of explosion or fire if an incorrect type replacement battery is forced into the battery holder as contact may generate a short circuit. Additionally, the battery holder will be destroyed.

Do not exceed the temperature ranges or other environmental conditions specified by the battery manufacturer, see battery safety chapter below. Dispose of used batteries according to the instructions provided with the batteries.

Water-Resistance

The TU600-X series is water-resistant according to the IP-68 standard. It is however recommended that it is be used where it is relatively dry and not subjected to either water streams or submersion.

Detailed Safety Information

Exposure to Radio Frequency Signals

The TU600-X unit is a low power radio transmitter and receiver. Periodically the TU600-X wakes up either due to activity or by a timer. When it is ON, it receives and sends out radio frequency (RF) signals for a short period of time when awake.

> **The TU600-X unit cannot be turned off after installation; however, the unit is mostly asleep waiting for either the wake-up timer or activity on the acceleration sensor.**
>
> **The unit operation can continue for approximately 3 to 4 days depending on the charging state of the backup battery.**

The TU600-X unit is designed for vehicular use only.

Electronic Devices

Most modern electronic equipment is shielded from RF signals. However, certain electronic equipment may not be shielded against the RF signals generated by the TU600-X unit.

Pacemakers

The Health Industry Manufacturers Association recommends that a minimum separation of six (6") inches be maintained between a handheld wireless phone and a pacemaker to avoid potential interference with the pacemaker. The following precautions apply:

- The TU600-X unit is not intended for handheld use or to be worn on the body.
- It is always recommended that a minimum separation of 8" inches (20 cm) to be maintained between the TU600-X unit and any persons' body after end user installation.

Other Medical Devices

If any other personal medical devices are used in the vicinity of a TU600-X unit, consult the manufacturers of the medical devices to determine if they are adequately shielded from external RF energy. Physicians may be able to assist in obtaining this information.

The TU600-X unit cannot be turned off after installation, so any vehicle, moving machinery, construction machinery installed with the TU600-X etc. must not operate near health care facilities when any regulations posted in these areas prohibit the use of wireless phones or two-way radios. Hospitals and health care facilities may be using equipment that could be sensitive to external RF energy.

Vehicles

RF signals may affect improperly installed or inadequately shielded electronic systems in motor vehicles. Check with the manufacturer or its representative regarding the vehicle. Also consult the manufacturer of any equipment that has been added to the vehicle.

Posted Facilities

The TU600-X unit cannot be turned off after installation, so any vehicle, moving machinery, construction machinery installed with the TU600-X etc. must not enter any facility where posted notices prohibit the use of wireless phones or two-way radios.

Aircrafts

FCC and FAA regulations prohibit using wireless phones while in the air. Do not carry the TU600-X unit aboard an aircraft as it cannot be turned off.

Potentially Explosive Atmospheres

The TU600-X unit cannot be turned off after installation, so any vehicle, moving machinery, construction machinery installed with TU600-X etc. must not enter any area with a potentially explosive atmosphere and obey all signs and instructions. Sparks in such areas could cause an explosion or fire resulting in bodily injury or even death.

Additionally, the TU600-X must not enter or in areas posted "turn off two-way radio" to avoid interfering with blasting operations. Obey all signs and instructions.

Areas with a potentially explosive atmosphere are often, but not always marked clearly. Potential areas may include: fueling areas (such as gasoline stations); below deck on boats; fuel or chemical transfer or storage facilities; vehicles using liquefied petroleum gas (such as propane or butane); areas where the air contains chemicals or particles (such as grain, dust, or metal powders); and any other area where it would normally be advisable to turn off motor vehicle engines it is not allowed to enter with a vehicle, moving machinery, construction machinery installed with the TU600-X.

For Vehicles Equipped with an Airbag

An airbag inflates with great force. DO NOT place objects, including the TU600-X unit, in the area over the airbag or in the airbag deployment area. If in vehicle wireless equipment is improperly installed and the air bag inflates, serious injury could result.

Specific Human Absorption Rates (SAR)

THE TU600-X UNIT IS NOT DESIGNED TO BE WORN ON A PERSON'S BODY.
AS SUCH, BODY WORN TEST POSITIONS FOR THE TU600-X UNIT
ARE NOT REQUIRED BY EITHER THE IEC 62311 FOR GSM 900/1800 MHz BANDS, LTE M1/NB IOT 800/900/1800/2100 MHz BANDS OR FCC/IEEE/ICNIRP REQUIREMENTS FOR GSM 850/1900 MHz BANDS, LTE M1/NB IOT 700/850/1700/1900 MHz bands.

The TU600-X unit is not intended for handheld use or to be worn on the body. A minimum separation of ten (8") inches (20 cm) is to be maintained between the TU600-X and any persons' body. Additional information on Specific Absorption Rates (SAR) can be found on the Cellular Telecommunications & Internet Association (CTIA) Web site at www.ctia.org.

Battery Safety Information

Adhere to the following guidelines to avoid the risk of fire or explosion:

1. Dispose of the used battery according to the instructions provided with the battery.
2. Do not drop, puncture, disassemble, mutilate, or incinerate the battery.
3. Touching both terminals of a battery with a metal object will short circuit the battery. Do not carry batteries loosely if the contacts may touch coins, keys, and other metal objects (such as in pockets or bags).
4. Do not stack batteries taken out of the carry case.
5. Do not heat the batteries to try to rejuvenate their charge.
6. Do not exceed the temperature ranges or other environmental conditions specified by the battery manufacturer when handling replacement batteries.
7. Never install and use the TU600-X without the battery cover installed.
8. The TU600-X can operate solely on the vehicle's battery without the internal backup battery installed. It is recommended to remove the battery under long term exposure to extreme environmental conditions above +60°C and below -20°C.

Automatic battery safety during operation

For operational safety the battery inside the TU600-X is under constant environmental temperature control providing the following automatic battery safety.

➢ The battery can only be charged within the specified temperature range 0°C to +45°C. For temperatures outside the range 0°C to 45°C, the battery charging circuit is disabled.
➢ The TU600-X operates solely from the internal backup battery supply voltage when the external supply voltages is turned off or experiencing failure. The internal backup battery is limited to operate in the temperature range from -20°C to 60°C. If the temperature is outside this range the battery is disabled.
➢ When TU600-X is operated from an external supply voltage the battery is put into storage from temperatures above +45°C and below -20°C.
➢ If the battery is fully charged and the temperature is within 0°C to 45°C a maintenance charging is applied.
➢ For long term storage in extreme temperatures below -20°C and above +50°C it is recommended to remove the battery from TU600-X. The battery safety ensures that there is no risk* associated with the battery in the temperature range from -40°C to +70°C but the battery lifetime can be seriously affected or even lead to internal permanent damage of the battery.

* The risks are: No leakage, No venting, No disassembly, No rupture or No fire.

Delivered standard content

The delivered standard package content includes the following items:

   1 x (GSM/LTE M1/NB IOT/GPS)-unit of the model type TU600-X

   1 x Mounting cradle.

   1 x Li-ion Battery PN 4233.0002 (May already be mounted inside the TU600-X unit)

   Optional content for generic installation:
   1 x Fuse with fuse holder for installation up to 24V DC/ (Max 1A) for TU600-X units delivered
      with open cable ends. For installation in systems with higher voltages than 24V it is
      recommended to use a fuse and fuse holder rated for the specific supply voltage range, see
      service chapter for compliant fuse holders.

   NOTE: Fuse and fuse holder is not included in packages where the TU600-X is fitted with a
            customer required connector from factory.

   NOTE: In case the unit is delivered with SIM card from the factory (Either US, EU SIM card or
            E-SIM as indicated on the product label), then the GSM/LTE M1/NB IOT number will
            be indicated on the delivery note as well as on the package itself.

   NOTE: In case the SIM card is delivered from factory it is mounted inside the TU600-X unit.

Ready-to-Use, No Custom Programming Required

Simply connect the unit to supply voltage (12V/24V/48V DC). In its default configuration, reports
are sent nominally at 15-minute intervals or faster whenever there is motion.

Upon powering up, the device will self-initialize anywhere in the world and start transmitting if an
authorized GSM network is available. While a basic understanding of the different TU600-X
operational states is helpful, configuring the TU600-X unit does not require a highly skilled software
programmer or technician.

Cost-effective, Universally Available Communications

The TU600-X unit takes advantage of the near universal availability of GSM/LTE M1/NB IOT SMS
text messaging while also leveraging cost-effective GPRS data rate plans.
Typical SMS plans offer very extensive inter-network roaming capabilities, both within a host
country and internationally.

SMS plans also tend to be too pricey for applications requiring more than a few reports per day.
GPRS data plans, on the other hand, typically allow for lower recurring communication costs
although GPRS coverage and roaming can be restricted in some areas.

The TU600-X unit takes advantage of both technologies by automatically selecting GPRS
wherever such service is available, while relying upon SMS text messages for configuration
purpose only. This helps minimize recurring communication costs while allowing the greatest
coverage possible.

Installing the unit

Use location - Children not likely to be present

This equipment design typically applies to commercial or industrial equipment expected to be installed in locations where only adults are normally present.

Practical installation advice

- **It is very important to be careful when installing the unit, as incorrect installation will reduce the quality of the GPS position reports (Ex. could be a jump in position or showing speed while parking) or in the worst case scenario will prevent the unit performing any position reporting at all.**

  > **The unit must NOT be installed beneath metal plates or inside closed metal compartments. Incorrect installation will also reduce the standby time of the battery inside the unit**

- The unit must be mounted either horizontally or vertically (sideways) using either screws or strips. The unit **must not** be installed with the interface/supply cable hanging down, as this will reduce the GPS sensitivity.
  Optimize the placement of the unit to increase the aerial view (through windows etc.) as much as possible. For hiding the unit, make sure it is only mounted beneath plastic parts or similar parts (wood), but not beneath metal parts.

- To reduce hum and noise in the FM radio it is recommended to place the unit at a minimum distance of 20 inches (50 cm) from the radio or the loudspeakers.

Installation for insurance and anti-theft purpose

For an installation of the TU600-X with respect to insurance coverage of equipment/items/vehicles etc. in your country/region please contact your nearest sales office for support as the TU600-X installation must be registered and documented for the local insurance company, the associated local alarm center.

The installation position in multiple equipment/items/vehicles etc. of the same type must be insured to be random to increase the theft protection.

It is needed to sign up a different subscription for each installed TU600-X unit under insurance coverage that covers the local alarm center administration of the units.

The local sales office will be able to inform you about the obligations that you have in relation to the insurance company and how to act in relation to the alarm center while the units are covered by the insurance.

Connections

The connections depend on the type of vehicles / machines etc. in which the (GSM/LTE M1/NB IOT)/GPS unit is to be installed.

Different variants of the TU600-X device will have only a subset of the connections shown in the table below. Please contact your nearest sales office, distributor or "Reseller" for further information about the availability of other variants in your area.

Wire (color code)	TU600-X function
Red	Supply voltage +12V / +24V
White	Digital input 1
Brown	Digital input 2 (Ignition)
Grey	Digital input 3
Yellow	Digital output 1
Green	1-Wire input (M8 Connector)
Pink	Digital input 4
Orange	CAN HI (Optional)
Light Blue	CAN LO (Optional)
Blue	Common ground

Power supply

The unit **must** be connected to either +12V, +24V battery voltage through a 1A/32V fuse or +36V, +48V battery through 3A/80V fuse. The use of a fused supply wire is important for not damaging the wires related to the unit in case of a short circuit etc.

Digital inputs

The activation of a digital input requires a minimum high-level voltage of 9,5V.

Digital output

The digital output has the type indication" LO-side switch", that connects the output to 0V "ground", when the output is active. This output can be used to control a relay powered from an external DC supply voltage. The maximum current drawn from the output is 200mA.

The output is protected against short circuits, overload and is also protected against over voltage. For further information about connection possibilities of the digital output, see chapters about installation later in this manual.

Motion/acceleration sensor

The unit has a built-in 3 axis acceleration sensor that can activate the unit if it, as a consequence of disconnected supply voltage, is in stand-by mode (theft protection), log accelerometer data (for analyzing shock and machine behavior) or configured as a tilt-sensor.

CAN interface

TU600 is equipped with a built-in CAN Controller.
Protocols supported: SAE J1939 and CANopen. The CAN interface is Fully Compliant with CAN 2.0 Part A and 2.0 Part B. 8 independent message objects (mailboxes) are implemented, and

Controller supports Bit Rates up to 1 Mbit/s.
Physical Interface specification as referred to by ISO/11898-2. 120R CAN termination optional: Mounted, Not Mounted or controlled by Firmware (CAN configuration).

The CAN Interface is only operational when supply voltage (12V / 24V / 48V) is present. Interface cannot operate on internal battery alone.

M8 Connector: 1-Wire input
The M8 3 pole connector contains 3 signals: 1-wire bus, 5V and Ground.
The 1-wire is designed to communicate with Maxim 1-wire parts. Ex. Digital Thermometer (Temperature logging) or Maxim iButton Keys/tags (Access Control).

The 1-wire input is only operational when supply voltage (12V / 24V / 48V) is present. Interface cannot operate on internal battery alone.

Installing the TU600-X as to surpass the main switch on the machine.
In case the main switch on the machine will break the negative wire (Ground wire), 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. Then send the following SMS to the unit (phone number) to activate the filtering:

Function	Send SMS	Return-SMS from the unit
Activate filter function on inputs.	MT INFILT ON	MTC ACK (SERIAL No.) INFILT ON

NOTE: Enabling the filtering function will disable the use of the digital input 4 as a normal input.

NOTE: It is recommended always to connect digital input 2 to the ignition signal of the vehicle or machine.

NOTE: For the "Send SMS" it is of no importance if small or capital letters are used in the command string, or a mixture hereof.

Wireless connectivity: Bluetooth LE
The TU600 can operate in Bluetooth LE band for access control, device configuration and assert tracking.
The TU600 will operate on a BT LE radio wave system when assessed by a paired unit i.e. cellphone. When connected the cellphone can be used as a mean for access control to the vehicles, machinery etc. on which the TU600 is physically installed.
In addition to the use case described above the TU600 can also be requested to passive scan for BLE advertisements and thereby enable assert tracking.

Functionality check

Functionality Check
LED status indication

Status	LED mode	LED color	Status indication
✓	Red flashing light and constant green light in LED	● ● ● ▬	- Mobile network is OK - GPS has valid satellite position
✗	No light in LED		- No power supply
✗	Constant red light and no green light in LED	▬▬▬	- NO mobile network - GPS has NO satellite position
✗	Red flashing light and no green light in LED	● ● ●	- Mobile network is OK - GPS has NO satellite position
✗	Constant red light and green light in LED	▬▬▬ ▬▬▬	- NO mobile network - GPS has satellite position

LED

"Verify my Trackunit"

In order to control if the installation of the TU600-X unit has been done correctly, it is possible to use the "Verify my Trackunit" tool.

Installation Check & Update
Using "Verify my Trackunit"

1. Login
• Go to verify.trackunit.com
• Enter user name and password

2. Find unit
• Enter serial number
• Click "Find"

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

4. Basic configuration options
• Enter:
    A name of the device
    Engine hours - start
    Start distance
• Select "Category"
• Connect up to multiple groups
• Add a note (will be visible for the device in Trackunit Manager)

5. Logout
• Click "Update" to save
• Click "Logout"

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

Troubleshooting

Various error situations are listed below along with some possible solutions.

Error code	Error description	Possible solutions
F1	The unit does not answer the SMS command send to it.	♦ Verify if the SMS messages are sent to the correct GSM/LTE M1/NB IOT phone number. ♦ Check LED status; See the "Functionality check" chapter in this manual. ♦ If the TU600-X unit has been delivered with the SIM card mounted. Contact Trackunit support. ○ Or contact the mobile operator to verify if there is any problem with the SIM card. ♦ Verify if the SIM card is correctly mounted in the unit.
F2	The LED in the unit is off, thus no power on the unit.	♦ Check if the installation is performed correctly according to the guidelines of this manual.
F3	The LED is constant red; thus the unit is not attached to the GSM / LTE network	♦ If the TU600-X unit has been delivered with the SIM card mounted. Contact Trackunit support. ○ Or contact the mobile operator to verify if there is any problem with the SIM card. ♦ Verify if the SIM card is correctly mounted in the unit. ♦ Verify if the PIN code has been disabled from the SIM card before it was inserted in the unit
F4	The unit send reply messages but there is no GPS signal	♦ Verify if the unit is mounted according to the instructions laid out in this manual with respect to the aerial view; see "Installing the unit" chapter. ♦ If the machine/vehicles are located inside a building, please move the machine/vehicle outside a try again.

Installation of the digital output

According to the E1 certificate of the TU600-X unit, it is prohibited under any circumstances to use this output to control any equipment that may influence the safety of the construction machinery and earth moving machines/vehicle operation and driving. The output must only be used to control comfort equipment.

The example shows a 12V relay function with a 12V DC supply voltage. It is also possible to use a 24V relay with a 24V DC supply voltage etc. The current consumption of the relay must not exceed 200 mA (DC current) and the relay contacts must be specified to withstand the load that needs to be controlled.

Installation Example With Access Control
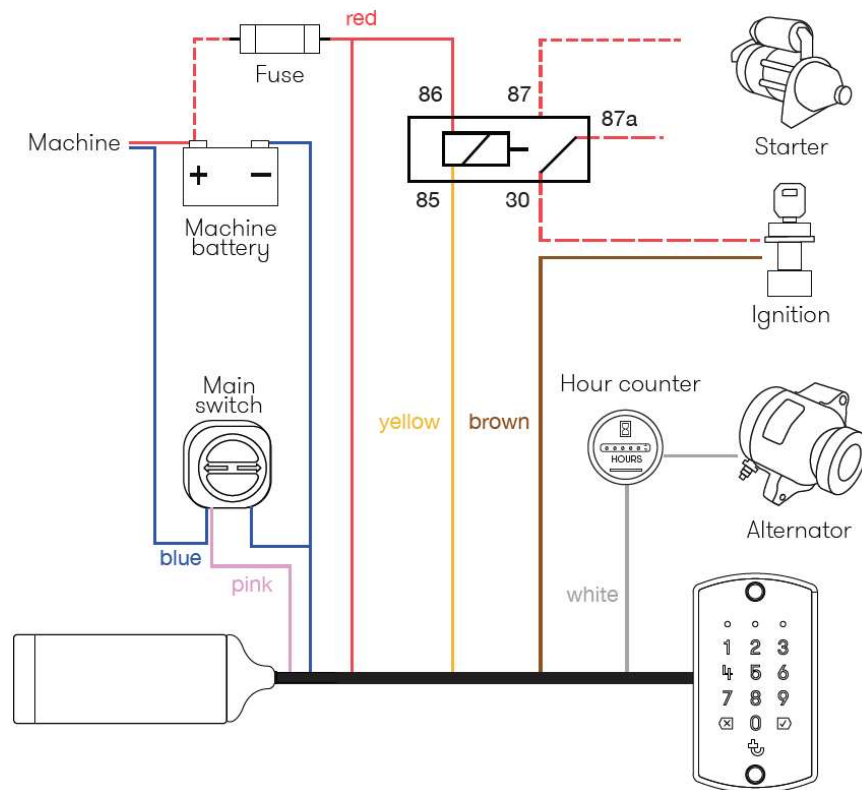
NOTE: The output can only handle DC and **not** AC voltage. It is necessary to only use a DC power supply for the relay.

Important! The power supply connected to the TU600-X (GSM/LTE M1/NB IoT)/GPS unit and the supply voltage for the relay mounted on the digital output must have a common ground connection.

One application example for the "Usable contact function controlled by the TU600-X" signals shown in the figure above could be a "Start Relay", blocking function, for preventing unauthorized use of the moving machinery and construction machine or vehicle outside normal working hours etc.

SMS commands for output control

Function	Send SMS	Return SMS	Description
Activation of the output	MT OUT1=ON	MTC ACK (SERIAL No.) OUT1 ON	With this command the output is activated permanently. The output can be de-activated again using the "OFF" command.
Deactivation of the output	MT OUT1=OFF	MTC ACK (SERIAL No.) OUT1 OFF	With this command the output is deactivated.

NOTE: For the "Send SMS" it is of no importance if small or capital letters are used in the command string, or a mixture hereof.

Safety precautions

The use of the digital output is restricted to signals/systems/components related to comfort applications in the vehicles.

Under no circumstances must it be used for purposes, which can influence the safety of the vehicle when driving.

Trackunit holds no liability for any damages occurred to persons, vehicles, moving machines, construction machines etc. caused by wrong installation and/or faulty use of the digital output.

Warranty

Trackunit A/S products are covered by a limited manufacturer warranty. The Trackunit A/S warranty is limited to the warranty rules and legislation present in each country. The warranty only covers manufacturing faults.

The warranty does not cover misuse, wrong installation or damage due to a faulty installation or wrong maintenance.

The invoice act as the proof of warranty, so please keep it as reference for any warranty complaints.

Technical Assistance/Support and spare parts

Trackunit A/S offers technical assistance to all our customers about the use, installation, insurance and spare parts:

- If you have a problem and cannot find the information you need in the product documentation, please contact Trackunit A/S.

- For replacement batteries Trackunit model PN 4233.0002 must be used, please order at Trackunit A/S.

 For mounting the Trackunit TU600-x in harsh environment, not covered by the compliance statements or areas where pressure cleaning is required the Trackunit HW shield PN 7402.9551 is required for protective mounting. Please order at Trackunit A/S.

 Recommended fuse holders and fuses up to 48V supply voltages (Can be ordered at Trackunit A/S):
  a. Supply voltage 12V/24V (Max 30A)
      i. ATO blade fuses (Max 32V/1A) used with Littelfuse FHAC0002SXJ fuse holder (Standard).
      ii. ATP blade fuse (Max 32V/1A - ATO style) used with TaiTek FH-006WR-12R-12-U fuse holder (Standard).
  b. Supply voltage 12V - 48V (Max 30A)
      i. FKS blade fuse (Max 80V/3A - ATO style) used with Littelfuse FH2 fuse holder. (Recommended)

Trackunit A/S
Gasvaerksvej 24, 4 sal
Dk-9000 Aalborg
Tel: +45 9973 0020   E-mail: **support@trackunit.com**
Fax: +45 9673 7407   Web: **www.trackunit.com**

When contacting technical support, please be prepared to provide the information listed below:

Minimum Information Required for Technical Assistance

If you or a user reports difficulty with a TU600-X unit (i.e. no GPS fixes, not communicating, LED not working, etc.), it is helpful to retrieve directly from the unit all current configuration settings and the message log data etc., that is accessible by the technical support when they receive the following information about the unit.

1. Unit Serial number

Return Merchandise Authorization - RMA

1. If you experience defects in your product, please contact our customer support at:

support@trackunit.com or phone **+45 96 73 74 00**

Your inquiry will be processed by our support team and a support ticket number will be created in our system. You will receive your ticket number by email.

2. In case your hardware needs to be sent to us you will receive an RMA form by email from our support team that you must fill out.

   Print out the RMA and pack it together with the faulty product and send both to the following address:

   Trackunit A/S
   Gasvaerksvej 24, 4 sal
   DK-9000 Aalborg
   Denmark
   Attention: Service

Specifications

The product specifications are described below.

Product specifications

The TU600-X unit is a (GSM/GPRS quad-band-unit and a combined LTE M1 / NB IoT multiband unit) with GPS, integrated antennas, acceleration sensor, 2Mbyte SPI flash and a backup battery

Connections:

Operational voltage (supply voltage):	12 - 48 V DC
Absolute maximum voltage range:	8 - 58 V DC continuous
Standby consumption (GSM/LTE M1/NB IOT-receiver active)	20 mA / 10 mA (average at 12V / 24V)
Consumption during charging on an empty battery	225 mA / 115 mA (max at 12V / 24V)
Standby time on the backup-battery	2-4 days
Charging time for an empty backup-battery	3 hours at 25 ºC
Expected lifetime of the backup-battery	3 years
Digital inputs	4
Digital outputs	1
1-Wire interface	Optional
CAN interface	Optional
Bluetooth 5 LE (wireless)	Optional

Internal temperature ranges:

Charging or maintenance charging (With external DC supply voltage) (If the temperature exceeds this range the charging is disabled, and the battery put into internal storage mode)	0ºC to +45ºC
In active running mode (Without external DC supply voltage) (If the temperature exceeds this range the battery supply voltage is disabled, and the battery put into internal storage mode. Due to a small internal self-heating during operation this may occur at external temperatures between 55°C - 60°C.)	-20ºC to +60ºC

Internal storage without loss of battery performance (Specified by battery cell vendor. This range apply for the TU600-X operated from an external DC supply voltage outside the charging temperature range.)	-20ºC to +50ºC
Internal storage with loss of battery performance (Within battery safety limits) (According to the MSDS, UN38.3 and IEC62133:2012 testing, it is safe to keep the battery in storage for shorter periods above +50ºC or below -20ºC. For longer exposures to extreme temperatures it is recommended to remove the battery from the TU600-X).	-40ºC to +70ºC

External temperature ranges:

Recommended operational temperature range (External/Internal DC supply) (See internal temperature ranges for details)	-20ºC to +55ºC/+60ºC
Internal Storage (Warning: Battery life time and performance not guaranteed for temperatures from -40ºC to -20ºC or from +50ºC to +70ºC) (See internal temperature ranges for details).	-40ºC to +70ºC

GSM/GPRS-specifications:

Supporting EGSM/GPRS/EGPRS 900/1800/850/1900 with maximum output power:

at EGSM-GPRS/EGPRS 900 MHz:	2.0W
at GSM-GPRS/EGPRS 850 MHz:	2.0W
at GSM-GPRS/EGPRS 1800/1900 MHz:	1.0W

Additionally, supports GPRS/EGPRS - Multislot class 33, CS 1–4 and MCS 1-9

LTE M1/NB IOT/WCDMA-specifications:

Supporting LTE M1 / NB IoT band 700/800/900/1800/2100/850/1700/1900 with maximum output power:

P_{max} = 0.5W

TU600-X supports band:
LTE-FDD B1 / B2 / B3 / B4 / B5 / B8 / B12 / B13 / B18 / B19 / B20 / B26 / B28:
- B1: TX 1920-1980 MHz, RX 2110-2170 MHz
- **B2 / (GSM1900):** TX 1850-1910 MHz, RX 1930-1990 MHz
- **B3 / (GSM1800):** TX 1710-1785 MHz, RX 1805-1880 MHz
- B4: TX 1710-1755 MHz, RX 2110-2155 MHz
- **B5 / (GSM850):** TX 824-849 MHz, RX 869-894 MHz
- **B8 / (GSM900):** TX 880-915 MHz, RX 924-960 MHz
- B12: TX 699-716 MHz, RX 728-746 MHz
- B13: TX 777-787 MHz, RX 746-757 MHz
- B18: TX 815-829.9 MHz, RX 860-874.9 MHz
- B19: TX 830-844.9 MHz, RX 875-889.9 MHz
- B20: TX 832-862 MHz, RX 791-821 MHz.
- B26: TX 814-848.9 MHz, RX 859-893.9 MHz
- B28: TX 703-748 MHz, RX 758-803 MHz

LTE-TDD B39:

- B39: TX 1880-1920 MHz, RX 1180-1920 MHz

The marked bands B12/B13 are denoted LTE 700 MHz band lower and upper part. The bands B18/B19 are denoted LTE 800 band lower and upper part for Japan.

Mechanical specifications

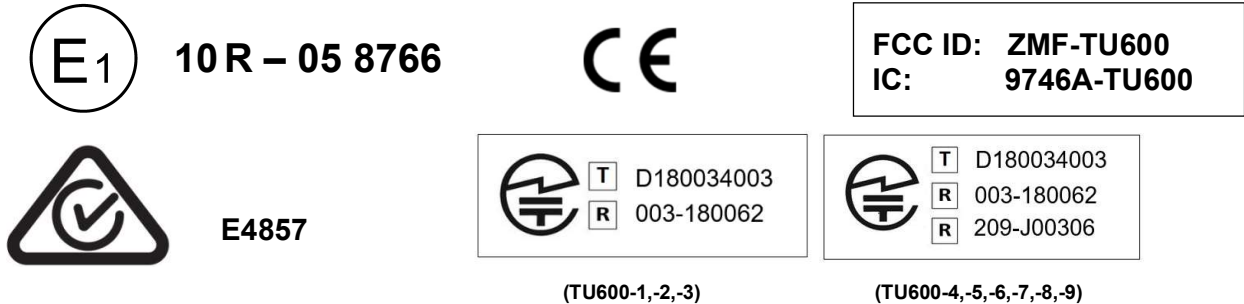Dimensions: Length: 122.1 mm
            Width: 45.65 mm (49 mm incl. mounting cradle)
            Height: 18 mm (23 mm incl. mounting cradle)
            Cable length: 170 - 180 cm

Environmental class: IP68

Enclosure material: Non-flammable PP casing and ABS cable connector lid.

Weight: 65 g (excluding the cable)

Approvals and certificates

The TU600-X product is certified according to KBA (E1 mark), EU (CE mark), FCC, ISED, ACMA/NZ (RCM mark), JATE/MIC ID (GITEKI mark):

E_1 **10 R – 05 8766**   CE

	FCC ID: ZMF-TU600
	IC: 9746A-TU600

E4857

T	D180034003
R	003-180062

(TU600-1,-2,-3)

T	D180034003
R	003-180062
R	209-J00306

(TU600-4,-5,-6,-7,-8,-9)

FCC and IC certification statements

The TU600-X product contains radio transmitters that comply with CFR 47 Part 15, Part 15.247, Part 22, Part 24 and Part 27 of the FCC rules and with RSS-GEN, RSS-102, RSS-130, RSS-132, RSS-133, RSS-139 and RSS-247 of Industry Canada requirements.

Statements according to CFR 47 Part 15.19 / RSS-GEN:

The TU600-X product complies with Part 15 of the FCC rules and with Industry Canada license exempt 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.

Déclarations selon le CFR 47 section 15.19 / RSS-GEN:

Le présent TU600-X 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.

Statements according to CFR 47 Part 15.21:

Changes or modifications made to this equipment not expressly approved by Trackunit may void the FCC authorization to operate this equipment.

Statements according to CFR 47 Part 2.1091 and OET bulletin 65 / RSS-102:

With respect to radiofrequency radiation exposure Information it is declared that this equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

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

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

Déclarations selon le CFR 47 Sections 2.1091 et bulletin OET 65 / RSS-102 :
Respectant les informations relatives à l'exposition aux radiations de fréquences radio, on déclare que cet équipement respecte les limites d'exposition aux radiations de la FCC aux conditions prévues pour un environnement non contrôlé.

Cet équipement doit être installé et fonctionner à une distance minimale de 20 cm entre l'appareil irradiant et votre corps.

Cet émetteur ne doit pas être installé ou utilisé en conjonction avec d'autres antennes ou d'autres émetteurs.

Automotive, off-road vehicles, machinery etc.
- UN regulative ECE R10 EMC rev. 05/01 in accordance with EU regulation 661/2009.
  - Tested by ECE R10 rev05/01, EN ISO 14982, ISO 13766-1, -2, EN 13309, DIN EN 12895, see below.
- The TU600-X product complies with the essential requirements of the Directive 2006/42/EC and EU regulation 167/2013.
  - Tested by harmonized standard EN 14982, EN 13309, EN 12895, see below

EU regulations and directives
- The TU600-X product complies with the essential requirements of the Automotive Directive
- The TU600-X product complies with the essential requirements of the RED Directive 2014/53/EU directive with respect to the EMC requirements, safety, vehicles transients and radio spectrum and the council recommendation 1999/519/EC on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz), when used as intended.
  - The TU600-X product also complies with the essential requirements of the Directive 2014/30/EU for the use of harmonized standards for machinery and vehicles EMC: EN ISO 14982, EN 13309, EN 12895 and ISO 13766-1, -2
- The TU600-X product complies with the essential and environmental requirements of the Interoperability of trans-European conventional rail system 2001/16/EC and 2004/50/EC directives, when used as intended on rolling stock.
- *The TU600-X complies with the essential requirements of the 2011/65/EC directive with the amendment 2015/863/EU directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment (ROHS).*
- *The TU600-X complies with the essential requirements of the 1999/45/EC directive as amended by EC 1907/2006 regulation concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH).*
- *The TU600-X complies with the requirements of the 2012/19/EU directive on waste electrical and electronic equipment (WEEE).*

Australia and New Zealand
- The TU600-X product complies with the requirements of the relevant ACMA Standards made under the Radiocommunications Act 1992 and the Telecommunications Act 1997, by the Supplier's Declaration of Conformity (SDOC). These Standards are referenced in

notices made under section 182 of the Radiocommunications Act and 407 of the Telecommunications Act.

- The TU600-X product complies with the requirements of the relevant standards under Section 134 (1) (g) of the New Zealand Radiocommunications Act 1989, by the Supplier's Declaration of Conformity (SDOC)

Japan

- The TU601-1, TU600-2, TU600-3 product family is approved in Japan with the certificate ID n°: [R] 003-180062,   [T] D180034003
- The TU601-4, TU600-5, TU600-6, TU600-7, TU600-8, TU600-9 product family is approved in Japan with the certificate ID n°: [R] 003-180062, [R] 209-J00306, [T] D180034003

This device is granted pursuant to the Japanese Radio Law (電波法)
=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

- This device should not be modified (otherwise the granted designation number will become invalid)
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。）

> **Translated (For information only):**
> This device is granted pursuant to the Japanese Radio Law (Radio Act)
> = The equipment is equipped with specified wireless equipment that has received a certificate of conformity with technical standards based on the Radio Law.
> This device should not be modified (otherwise the granted designation number will become invalid)
> Modification of this product is prohibited (Compliance certification number etc. become invalid.)

Countries that are exempted for certification

- The TU601-x products can be placed on the market in:
  Myanmar
  Chile
  based on a manufacturer declaration for conformity assessment. The declarations are available upon request to Trackunit A/S.
- For Chile a label must be applied in the user manual for compliance with the radio and EMC law:

> Este equipo cumple con la Resolución No 403 de 2008, de la Subsecretaria de telecomunicaciones, relativa a radiaciones electromagnéticas

Including:

Standard	Version	Description
ISO 13766-1, ISO 13766-2	**2018**	Earth-moving machinery and Construction machinery
EN 13309	**2010**	Construction machinery (Expire 2021-06-30)
EN/ISO 14982	**2010**	Agricultural and forestry machines
EN 12895, DIN EN 12895	**2015**	Industrial trucks - Electromagnetic compatibility
(EN/IEC 62368-1 + AC/3, A11)	**2014, 2015, 2017**	Information and communication technology equipment safety
EN/IEC 62133 {Ed2}	**2012**	Safety requirements for portable sealed secondary cells, and for batteries made from them.

Environmental compliance

The TU600-x are designed for compliance to the following environmental standards related to the intended use of the product:

| Standard	Version	Description [A, B]
SAEJ1455:2012, EN/IEC 60068-2-1	**2007**	Cold
SAEJ1455:2012, EN/IEC 60068-2-2	**2006**	Dry Heat
SAEJ1455:2012, EN/IEC 60068-2-27	**2010**	Shock
SAEJ1455:2012, EN/IEC 60068-2-31	**2008**	Drop, free fall
SAEJ1455:2012, EN/IEC 60068-2-64	**2008**	Random vibration
SAEJ1455:2012, EN/IEC 60068-2-78	**2001**	Damp heat steady state
SAEJ1455:2012, IEC 60529 + A1 + A2 (CSV) {Ed2.4}	**2013**	IP67 - Degrees of protection without HW shield IP69K & IP66K mounted inside HW shield.

NOTE A: 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.

NOTE B: The housing not designed to withstand high pressure cleaning. Only use the TU600 when mounted inside the designated Trackunit protection cap (Can be ordered at Trackunit A/S) in mounting areas where high pressure cleaning is common procedure.

Environmental protection without HW shield:

	TU600-x standalone	Requirements
Temperature Soak	-40°C - +85°C, 48h	SAE J1455, IEC 60068-2-1, IEC 60068-2-2
Humidity	+45°C to -30°C, RH95%, 8h	SAE J1455, IEC 60068-2-78
Salt Spray	-	SAE J1455, IEC 61701
Immersion of water	IPX7	SAE J1455, IEC 60529 IPX7
Splash of water	-	SAE J1455, IEC 60529 IPX6
Chemicals /oils (Motor oil, Motor oil, Gasoline, Diesel fuel, Hydraulic fluid, Brake fluid, Transmission fluid , Glycol and water mixture)	-	SAE J1455 (Add for 24h + clean)
Steam cleaning / pressure washing	-	SAE J1455, IEC 60529 up to IPx9K
Fungus	-	
Dust/wire	IP6X, Ø1	SAE J1455, ISO 5011, IEC 60529 IP6X, Ø1
Sand and Gravel Bombardment	-	SAE J1455, ISO 5011
Altitude	700 hPa	IEC 60721-2-3 (700 hPa - 3000 meter)
Vibration (3 axis)	30 m/s^2 at 5Hz – 2kHz, 8h	SAE J1455, IEC 60068-2-64 category 1, 2a, 2b, 2c
Acceleration (3 axis)	$1 \text{ m/s}^2 – 7 \text{ m/s}^2$, 8h	SAE J1455, IEC 60068-2-64 category 1a
Shock (3 axis)	30 m/s^2, 8h	SAE J1455, IEC 60068-2-27
Drop	1m	SAE J1455, IEC 60068-2-31
UV	-	ASTM D4329/D5870/SAE J2020 exposure/index (no cracking)
Application	SAE J1455	Applicable standards

Environmental protection with use of HW shield:
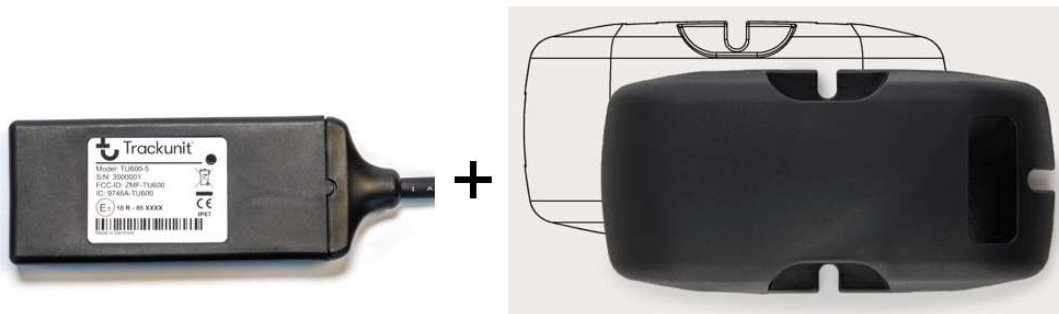
		TU600-x inside HW shield	Requirements
Temperature Soak		-40°C - +85°C, 48h	SAE J1455, IEC 60068-2-1, IEC 60068-2-2
Humidity		+45°C to -30°C, RH95%, 8h	SAE J1455, IEC 60068-2-78
Salt Spray		5%, +35°C, 96h	SAE J1455, IEC 61701
Immersion of water		IPX7	SAE J1455, IEC 60529 IPX7
Splash of water		IPX6K	SAE J1455, IEC 60529 IPX6
Chemicals /oils (Motor oil, Motor oil, Gasoline, Diesel fuel, Hydraulic fluid, Brake fluid, Transmission fluid , Glycol and water mixture)		Wipe and clean after 5 min	SAE J1455 (Add for 24h + clean)
Steam cleaning / pressure washing		IPX9K	SAE J1455, IEC 60529 up to IPx9K
Fungus		-	
Dust/wire		IP6X, Ø1	SAE J1455, ISO 5011, IEC 60529 IP6X, Ø1
Sand and Gravel Bombardment		-	SAE J1455, ISO 5011
Altitude		-	IEC 60721-2-3 (700 hPa - 3000 meter)
Vibration (3 axis)		30 m/s^2 at 5Hz – 2kHz, 8h	SAE J1455, IEC 60068-2-64 category 1, 2a, 2b, 2c
Acceleration (3 axis)		$1 \text{ m/s}^2 – 7 \text{ m/s}^2$, 8h	SAE J1455, IEC 60068-2-64 category 1a
Shock (3 axis)		30 m/s^2, 8h	SAE J1455, IEC 60068-2-27
Drop		1m	SAE J1455, IEC 60068-2-31
UV		UV resistant plastic selected	ASTM D4329/D5870/SAE J2020 exposure/index (no cracking)
Application		SAE J1455	Applicable standards

CE marking

We, Trackunit A/S hereby declare that the TU600-X product complies with the essential requirements of the RED Directive 2014/53/EU as stated by the EU Declaration of Conformity.

EU Certificate and Declaration of conformity (DOC) statements can be downloaded from the Trackunit website:

http://www.trackunit.com/en/trackunit/approvals/approvals.htm

PTCRB certification for interoperability with mobile networks.

All variants of the TU600-X products series under FCC ID: ZMF-TU600 and IC: 9746A-TU600 are certified for PTCRB interoperability with mobile networks. Specific Trackunit model design certificates have been obtained for:

#77390:   Trackunit TU600-5, HW 1.000, SW 60.012, SVN 7