



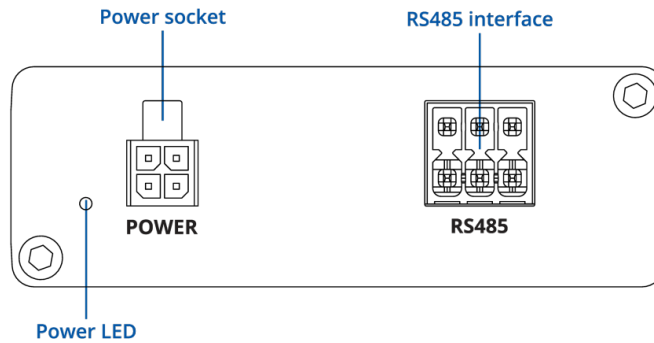
# TRB145

v1.0

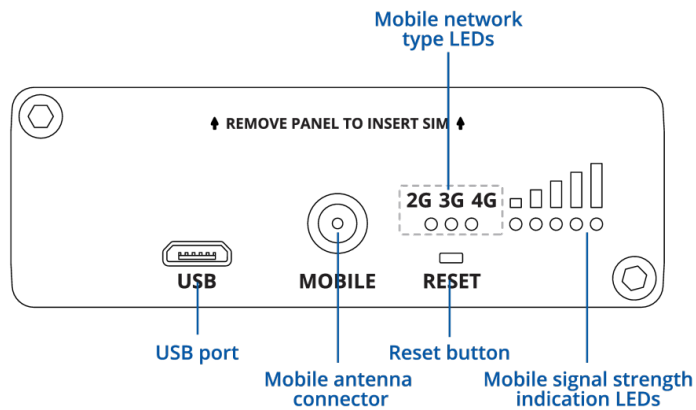


## HARDWARE

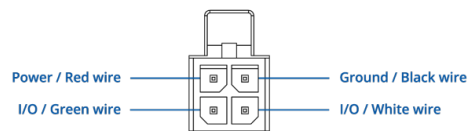
### FRONT VIEW



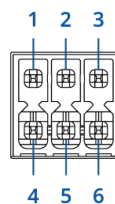
### BACK VIEW



### POWER SOCKET PINOUT



### RS485 CONNECTOR PINOUT



## FEATURES

### Mobile

<b>Mobile module</b>	4G LTE Cat 1 up to 10 DL/5 UL Mbps; 3G up to 384 DL/384 UL kbps; 2G up to 296 DL/236.8 UL kbps
<b>3GPP Release</b>	Release 12
<b>Status</b>	IMSI, ICCID, operator, operator state, data connection state, network type, bandwidth, connected band, signal strength (RSSI), SINR, RSRP, RSRQ, EC/IO, RSCP, data sent/received, LAC, TAC, cell ID, ARFCN, UARFCN, EARFCN, MCC, and MNC
<b>SMS</b>	SMS status, SMS configuration, EMAIL to SMS, SMS to EMAIL, SMS to HTTP, SMS to SMS, scheduled SMS, SMS autoreply, SMPP
<b>USSD</b>	Supports sending and reading Unstructured Supplementary Service Data messages
<b>Block/Allow list</b>	Operator block/allow list (by country or separate operators)
<b>Multiple PDN</b>	Possibility to use different PDNs for multiple network access and services
<b>Band management</b>	Band lock, Used band status display
<b>SIM PIN code management</b>	SIM PIN code management enables setting, changing, or disabling the SIM card's PIN
<b>APN</b>	Auto APN
<b>Bridge</b>	Direct connection (bridge) between mobile ISP and device on LAN
<b>Passthrough</b>	Gateway assigns its mobile WAN IP address to another device on LAN

**Network**

<b>Routing</b>	Static routing
<b>Network protocols</b>	TCP, UDP, IPv4, IPv6, ICMP, NTP, DNS, HTTP, HTTPS, FTP, SMTP, SSL v3, TLS, ARP, VRRP, PPP, PPPoE, UPNP, SSH, DHCP, Telnet, SMPP, SNMP, MQTT
<b>VoIP passthrough support</b>	H.323 and SIP-alg protocol NAT helpers, allowing proper routing of VoIP packets
<b>Connection monitoring</b>	Ping Reboot, Wget Reboot, Periodic Reboot, LCP and ICMP for link inspection
<b>Firewall</b>	Port forward, traffic rules, custom rules, TTL target customisation
<b>Firewall status page</b>	View all your Firewall statistics, rules, and rule counters
<b>Ports management</b>	View device ports, enable and disable each of them, turn auto-configuration on or off, change their transmission speed, and so on
<b>Network topology</b>	Visual representation of your network, showing which devices are connected to which other devices
<b>DHCP</b>	Static and dynamic IP allocation, DHCP relay, DHCP server configuration, status, static leases: MAC with wildcards
<b>QoS / Smart Queue Management (SQM)</b>	Traffic priority queuing by source/destination, service, protocol or port, WMM, 802.11e
<b>DDNS</b>	Supported >25 service providers, others can be configured manually
<b>DNS over HTTPS</b>	DNS over HTTPS proxy enables secure DNS resolution by routing DNS queries over HTTPS
<b>Network backup</b>	Mobile, VRRP, Wired options, each of which can be used as an automatic Failover
<b>SSHFS</b>	Possibility to mount remote file system via SSH protocol
<b>Traffic Management</b>	Real-time monitoring, wireless signal charts, traffic usage history

**Security**

<b>Authentication</b>	Pre-shared key, digital certificates, X.509 certificates, TACACS+, Internal & External RADIUS users authentication, IP & login attempts block, time-based login blocking, built-in random password generator
<b>Firewall</b>	Preconfigured firewall rules can be enabled via WebUI, unlimited firewall configuration via CLI, DMZ, NAT, NAT-T, NAT64
<b>Attack prevention</b>	DDOS prevention (SYN flood protection, SSH attack prevention, HTTP/HTTPS attack prevention), port scan prevention (SYN-FIN, SYN-RST, X-mas, NULL flags, FIN scan attacks)
<b>VLAN</b>	Port and tag-based VLAN separation
<b>Mobile quota control</b>	Mobile data limit, customizable period, start time, warning limit, phone number
<b>WEB filter</b>	Blacklist for blocking out unwanted websites, Whitelist for specifying allowed sites only
<b>Access control</b>	Flexible access control of SSH, Web interface, CLI and Telnet
<b>SSL certificate generation</b>	Let's Encrypt and SCEP certificate generation methods

## VPN

<b>OpenVPN</b>	Multiple clients and a server can run simultaneously, 27 encryption methods
<b>OpenVPN Encryption</b>	DES-CBC 64, RC2-CBC 128, DES-EDE-CBC 128, DES-EDE3-CBC 192, DESX-CBC 192, BF-CBC 128, RC2-40-CBC 40, CAST5-CBC 128, RC2-64-CBC 64, AES-128-CBC 128, AES-128-CFB 128, AES-128-CFB1 128, AES-128-CFB8 128, AES-128-OFB 128, AES-128-GCM 128, AES-192-CFB 192, AES-192-CFB1 192, AES-192-CFB8 192, AES-192-OFB 192, AES-192-CBC 192, AES-192-GCM 192, AES-256-GCM 256, AES-256-CFB 256, AES-256-CFB1 256, AES-256-CFB8 256, AES-256-OFB 256, AES-256-CBC 256
<b>IPsec</b>	XFRM, IKEv1, IKEv2, with 14 encryption methods for IPsec (3DES, DES, AES128, AES192, AES256, AES128GCM8, AES192GCM8, AES256GCM8, AES128GCM12, AES192GCM12, AES256GCM12, AES128GCM16, AES192GCM16, AES256GCM16)
<b>GRE</b>	GRE tunnel, GRE tunnel over IPsec support
<b>PPTP, L2TP</b>	Client/Server instances can run simultaneously, L2TPv3, L2TP over IPsec support
<b>Stunnel</b>	Proxy designed to add TLS encryption functionality to existing clients and servers without any changes in the program's code
<b>DMVPN</b>	Method of building scalable IPsec VPNs, Phase 2 and Phase 3 and Dual Hub support
<b>SSTP</b>	SSTP client instance support
<b>ZeroTier</b>	ZeroTier VPN client support
<b>WireGuard</b>	WireGuard VPN client and server support
<b>Tinc</b>	Tinc offers encryption, authentication and compression in it's tunnels. Client and server support.

## BACNET

<b>Supported modes</b>	Router
<b>Supported connection types</b>	RS485, TCP
<b>Configuration options</b>	Support for multiple BACnet/IP interfaces, Network number assignment, Preconfigured BDT entries for BBMD (BACnet Broadcast Management Device)

## OPC UA

<b>Supported modes</b>	Client, Server
<b>Supported connection types</b>	TCP

## MODBUS

<b>Supported modes</b>	Server, Client
<b>Supported connection types</b>	TCP, RTU (RS485)
<b>Custom registers</b>	MODBUS TCP custom register block requests, which read/write to a file inside the router, and can be used to extend MODBUS TCP Client functionality
<b>Supported data formats</b>	8-bit: INT, UINT; 16-bit: INT, UINT (MSB or LSB first); 32-bit: float, INT, UINT (ABCD (big-endian), DCBA (little-endian), CDAB, BADC), HEX, ASCII

## DATA TO SERVER

<b>Protocol</b>	HTTP(S), MQTT, Azure MQTT
<b>Data to server</b>	Extract parameters from multiple sources and different protocols, and send them all to a single server; Custom LUA scripting, allowing scripts to utilize the router's Data to server feature

## MQTT Gateway

<b>Modbus MQTT Gateway</b>	Allows sending commands and receiving data from MODBUS Server through MQTT broker
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## DNP3

<b>Supported modes</b>	Station, Outstation
<b>Supported connection types</b>	TCP, RTU(RS485)

## DLMS/COSEM

<b>DLMS Support</b>	DLMS - standard protocol for utility meter data exchange
<b>Supported modes</b>	Client
<b>Supported connection types</b>	TCP, RTU(RS485)

## API

<b>Teltonika Networks Web API (beta) support</b>	Expand your device's possibilities by using a set of configurable API endpoints to retrieve or change data. For more information, please refer to this documentation: <a href="https://developers.teltonika-networks.com">https://developers.teltonika-networks.com</a>
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## Monitoring & Management

<b>WEB UI</b>	HTTP/HTTPS, status, configuration, FW update, CLI, troubleshoot, multiple event log servers, firmware update availability notifications, event log, system log, kernel log, Internet status
<b>FOTA</b>	Firmware update from server, automatic notification
<b>SSH</b>	SSH (v1, v2)
<b>SMS</b>	SMS status, SMS configuration
<b>Call</b>	Reboot, Status, Mobile data on/off, Output on/off, answer/hang-up with a timer
<b>TR-069</b>	OpenACS, EasyCwmp, ACSLite, tGem, LibreACS, GenieACS, FreeACS, LibCWMP, Friendly tech, AVSystem
<b>MQTT</b>	MQTT Broker, MQTT publisher
<b>SNMP</b>	SNMP (v1, v2, v3), SNMP Trap, Brute force protection
<b>JSON-RPC</b>	Management API over HTTP/HTTPS
<b>RMS</b>	Teltonika Remote Management System (RMS)

## IoT Platforms

<b>ThingWorx</b>	Allows monitoring of: WAN Type, WAN IP, Mobile Operator Name, Mobile Signal Strength, Mobile Network Type
<b>Cumulocity - Cloud of Things</b>	Allows monitoring of: Device Model, Revision and Serial Number, WAN Type and IP, Mobile Cell ID, ICCID, IMEI, Connection Type, Operator, Signal Strength. Has reboot and firmware upgrade actions
<b>Azure IoT Hub</b>	Can be configured with Data to Server to send all the available parameters to the cloud. Has Direct method support which allows to execute RutOS API calls on the IoT Hub. Also has Plug and Play integration with Device Provisioning Service that allows zero-touch device provisioning to IoT Hubs
<b>AWS IoT Core</b>	Utility to interact with the AWS cloud platform. Jobs Support: Call the device's API using AWS Jobs functionality

## System Characteristics

<b>CPU</b>	ARM Cortex-A7 1.2 GHz
<b>RAM</b>	128 MB, DDR2
<b>FLASH storage</b>	512 MB, SPI Flash



**Firmware / Configuration**

<b>WEB UI</b>	Update FW from file, check FW on server, configuration profiles, configuration backup
<b>FOTA</b>	Update FW
<b>RMS</b>	Update FW/configuration for multiple devices at once
<b>Keep settings</b>	Update FW without losing current configuration
<b>Factory settings reset</b>	A full factory reset restores all system settings, including the IP address, PIN, and user data to the default manufacturer's configuration

**FIRMWARE CUSTOMISATION**

<b>Operating system</b>	RutOS (OpenWrt based Linux OS)
<b>Supported languages</b>	Busybox shell, Lua, C, C++, and Python in Package manager
<b>Development tools</b>	SDK package with build environment provided
<b>GPL customization</b>	You can create your own custom, branded firmware and web page application by changing colours, logos, and other elements in our firmware to fit your or your clients' needs
<b>Package Manager</b>	The Package Manager is a service used to install additional software on the device

**Input / Output**

<b>Configurable I/O</b>	2 x Configurable Inputs/Outputs. Digital input 0 - 5 V detected as logic low, 8 - 30 V detected as logic high. Open collector output, max output 30 V, 300 mA (Configurable Inputs/Outputs are not available in TRB145*2****)
<b>Output control</b>	HTTP POST/GET, Schedule
<b>Events</b>	Email, RMS, SMS
<b>I/O juggler</b>	Allows to set certain I/O conditions to initiate event

**Power**

<b>Connector</b>	4-pin industrial DC power socket
<b>Input voltage range</b>	9 – 30 VDC, reverse polarity protection; surge protection >31 VDC 10us max
<b>Power consumption</b>	< 5 W

**Physical Interfaces**

<b>I/O's</b>	2 x Configurable I/O pins on 4 pin power connector (I/O not available in TRB145*2****)
<b>Status LEDs</b>	3 x connection type status LEDs, 5 x connection strength LEDs, 1 x Power LED
<b>SIM</b>	1 x SIM slot (Mini SIM – 2FF), 1.8 V/3 V
<b>Power</b>	1 x 4-pin power connector
<b>Antennas</b>	1 x SMA for LTE
<b>RS485</b>	1 x 6-pin terminal block for 2-wire or 4-wire interface
<b>Reset</b>	Reboot/User default reset/Factory reset button
<b>USB</b>	1 x Virtual network interface via micro USB

**Physical Specification**

<b>Casing material</b>	Aluminium housing
<b>Dimensions (W x H x D)</b>	74.5 x 25 x 64.4 mm
<b>Weight</b>	130 g
<b>Mounting options</b>	DIN rail, wall mount, flat surface (all require additional kit)

**Operating Environment**

<b>Operating temperature</b>	-40 °C to 75 °C
<b>Operating humidity</b>	10% to 90% non-condensing
<b>Ingress Protection Rating</b>	IP30

**Regulatory & Type Approvals**

<b>Regulatory</b>	CE, UKCA, EAC, UCRF, ANRT, Kenya, ICASA, Anatel, Arcotel, NOM, RCM, Giteki, NTC, E-mark, CB, RoHS, REACH
<b>Operator</b>	Deutsche Telekom AG

**EMC Emissions & Immunity**

<b>Standards</b>	Draft EN 301 489-1 V2.2.0 Draft EN 301 489-52 V1.1.0
<b>ESD</b>	EN 61000-4-2:2009
<b>Radiated Immunity</b>	EN IEC 61000-4-3:2006 + A1:2008 + A2:2010
<b>EFT</b>	EN 61000-4-4:2012
<b>Surge Immunity (AC Mains Power Port)</b>	EN 61000-4-5:2014
<b>CS</b>	EN 61000-4-6:2014
<b>DIP</b>	EN 61000-4-11:2004

**RF**

<b>Standards</b>	EN 301 511 V12.5.1 EN 301 908-1 V13.1.1 EN 301 908-2 V13.1.1 EN 301 908-13 V13.1.1
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**Safety**

<b>Standards</b>	CE: EN 62368-1:2014 + A11:2017, EN IEC 62232:2017, EN 50385:2017 RCM: AS/NZS 62368.1:2018
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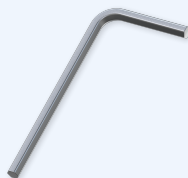
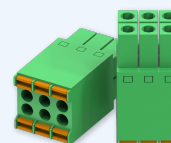
## ORDERING

### STANDARD PACKAGE\*


**TRB145**

**9W PSU**

**1 X MOBILE MAGNETIC SMA ANTENNA**

**MICRO-USB CABLE (0.8M)**

**1 X HEX KEY**

**2X3PIN CONNECTOR**

**QSG (QUICK START GUIDE)**

- TRB145
- [9 W PSU](#)
- 1x [Mobile antenna \(magnetic mount, SMA male, 3 m cable\)](#)
- [Micro-USB cable \(0.8 m\)](#)
- 1x hex key
- [RS485 connector](#)
- QSG (Quick Start Guide)
- Packaging box

\*Standard package contents may differ based on standard order codes.

For more information on all available packaging options – please [contact us](#) directly.

**CLASSIFICATION CODES**
**HS Code:** 851762

**HTS:** 8517.62.00

**AVAILABLE VERSIONS**

TRB145 <b>0*****</b> Europe <sup>1</sup> , The Middle East <sup>1</sup> , Africa, Korea, Thailand, India	<b>4G (LTE-FDD):</b> B1, B3, B7, B8, B20, B28A <b>3G:</b> B1, B8 <b>2G:</b> B3, B8	TRB145003000 / Standard package with EU PSU TRB145004000 / Standard package with UK PSU TRB14500A200 / Standard package with Power cable with 4-way screw terminal TRB14500A000 / Mass packing code
TRB145 <b>1*****</b> South America, Australia, New Zealand, Taiwan	<b>4G (LTE-FDD):</b> B1, B2 <sup>2</sup> , B3, B4, B5, B7, B8, B28 <b>4G (LTE-TDD):</b> B40 <b>3G:</b> B1, B2, B5, B8 <b>2G:</b> B2, B3, B5, B8	TRB145106000 / Standard package with AU PSU TRB145105000 / Standard package with US PSU TRB145103000 / Standard package with EU PSU TRB145109000 / Standard package with Universal PSU TRB14510A000 / Mass packing code
TRB145 <b>4*****</b> Japan	<b>4G (LTE-FDD):</b> B1, B3, B8, B18, B19, B26	TRB14540A300 / Standard package with JP PSU TRB14540A000 / Mass packing code

The price and lead-times for region (operator) specific versions may vary. For more information please [contact us](#).

1 - Regional availability - excluding Russia, Belarus & Iran

2 - LTE-FDD B2 does not support Rx-diversity

**TRB145 SPATIAL MEASUREMENTS**
**PHYSICAL SPECIFICATION**

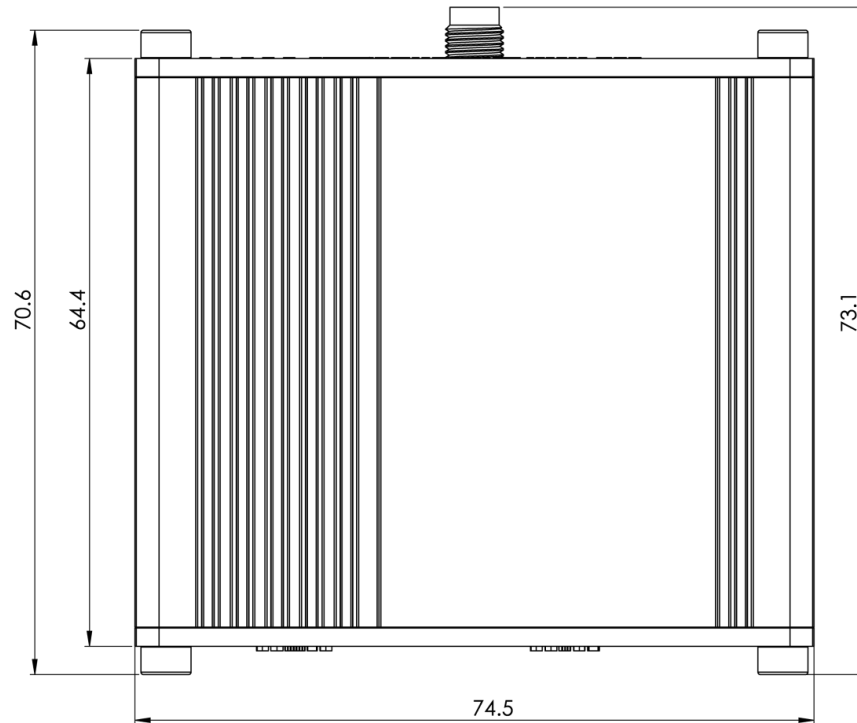
**Device housing\*:** 74.5 x 25 x 64.4 mm

**Box:** 173 x 71 x 148 mm

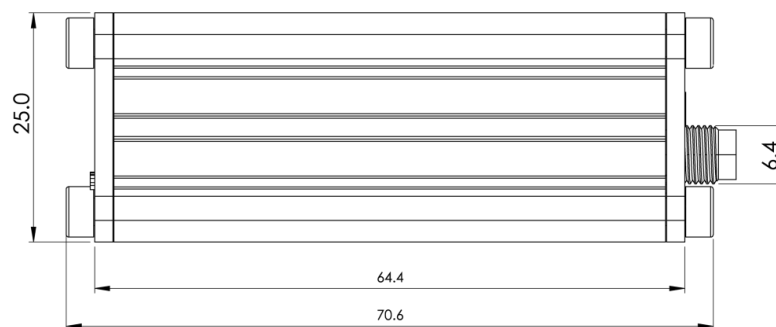
\*Housing measurements are presented without antenna connectors and screws; for measurements of other device elements look to the sections below.

**TOP VIEW**

The figure below depicts the measurements of device and its components as seen from the top:

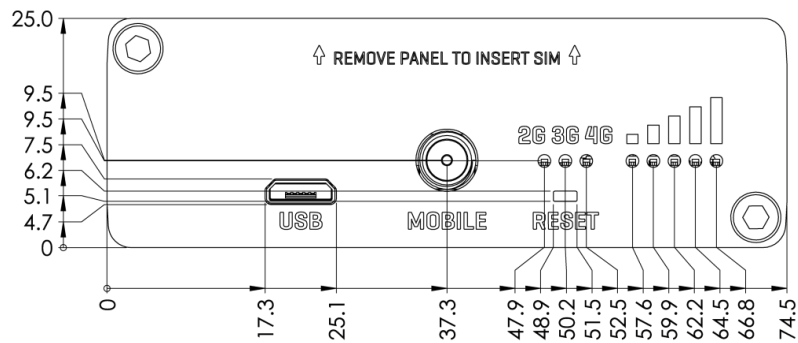

**RIGHT VIEW**

The figure below depicts the measurements of device and its components as seen from the right:



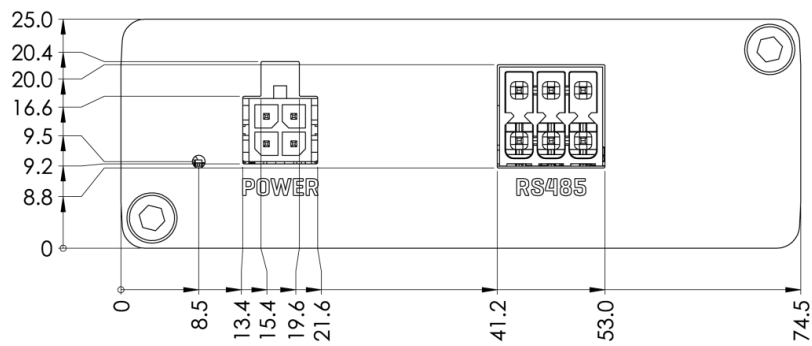
## REAR VIEW

The figure below depicts the measurements of device and its components as seen from the back panel side:



## FRONT VIEW

The figure below depicts the measurements of device and its components as seen from the front panel side:



### **MOUNTING SPACE REQUIREMENTS**

The figure below depicts an approximation of the device's dimensions when cables and antennas are attached:

