

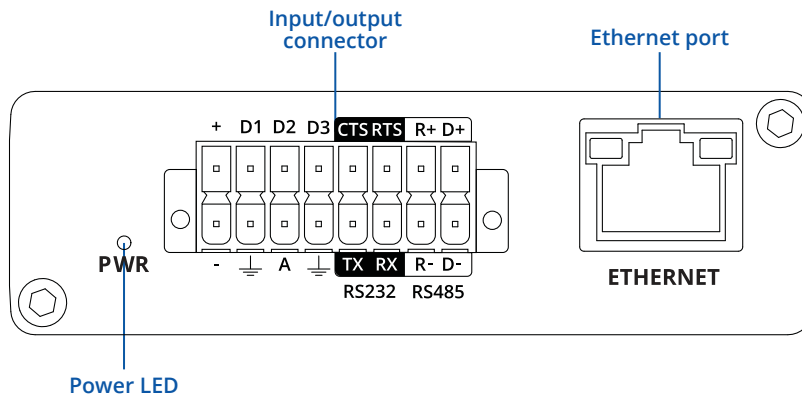


# TRB245

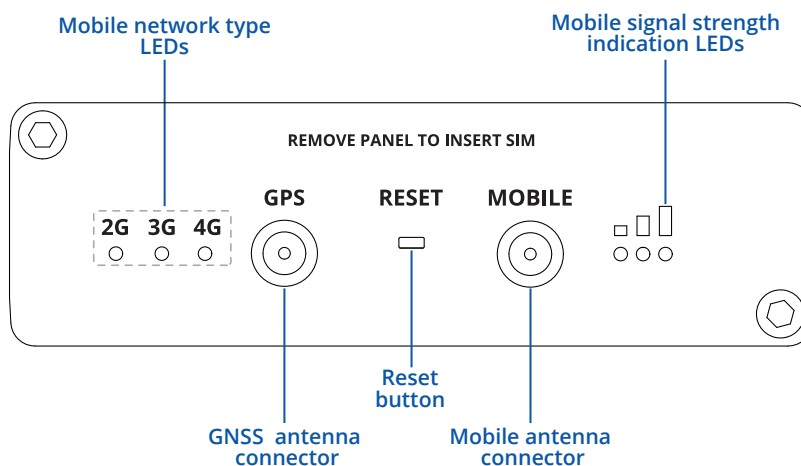


# HARDWARE

## FRONT VIEW

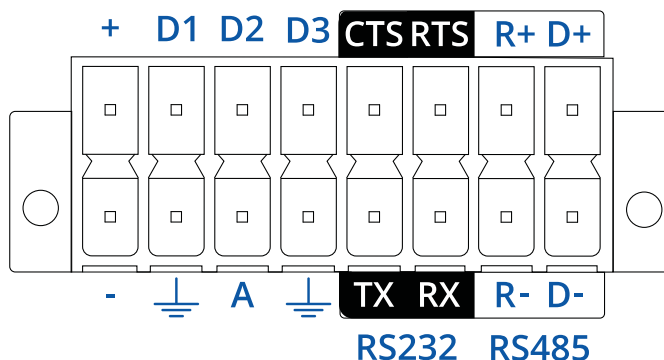


## BACK VIEW



## INPUT/OUTPUT 16 PIN CONNECTOR PINOUT

- D1, D2, D3** - Configurable digital Input/Output pins. Open collector output, max output 30 V, 300 mA or Digital input where 0-6 V detected as logic low and 8-30 V – logic high.
- +** - 9-30 VDC positive power pin
- CTS** - RS232 clear data to send pin (output).
- RTS** - RS232 request data to send pin (input).
- R+** - RS485 receiver positive signal pin.
- D+** - RS485 driver positive signal pin.
- - Negative/ground power pin.
- ⊥** - Ground pins for D1, D2, D3, A, RS232 and RS485.
- A** - Analog input pin. Analog voltage range 0-30 V.
- TX** - RS232 transmitted data (input).
- RX** - RS232 received data (output).
- R-** - RS485 receiver negative signal.
- D-** - RS485 driver negative signal.



## FEATURES

### MOBILE

|                  |   |
|------------------|---|
| Mobile module    | 4G (LTE) – Cat 4 up to 150 Mbps, 3G – Up to 42 Mbps, 2G – Up to 236.8 kbps  |
| SIM switch       | 2 SIM cards, auto-switch cases: weak signal, data limit, SMS limit, on roaming, no network, network denied, data connection fail                                  |
| Status           | Signal strength (RSSI), SINR, RSRP, RSRQ, EC/IO, RSCP Bytes sent/received, connected band, IMSI, ICCID.   |
| SMS/Call         | SMS status, SMS configuration, send/read SMS via HTTP POST/GET, EMAIL to SMS, SMS to EMAIL, SMS to HTTP, SMS to SMS, scheduled SMS, SMS autoreply, Call utilities |
| USSD             | Supports sending and reading Unstructured Supplementary Service Data messages   |
| Black/White list | Operator black/white list   |
| Band management  | Used band status display, Band lock   |
| APN              | Auto APN  |
| Bridge           | Direct connection (bridge) between mobile ISP and device on LAN   |
| Multiple PDN     | Possibility to use different PDNs for multiple network access and services  |

### ETHERNET

|     |   |
|-----|---|
| LAN | 1 x LAN port 10/100 Mbps, comply IEEE 802.3, IEEE 802.3u standards, supports auto MDI/MDIX crossover (Configurable to work as WAN port) |
|-----|---|

### NETWORK

|  |   |
|--|---|
| Routing                                      | Static routing, Dynamic routing (BGP, OSPF v2, RIP v1/v2) (planned)   |
| Network protocols                            | TCP, UDP, IPv4, IPv6, ICMP, NTP, DNS, HTTP, HTTPS, FTP, SMTP, SSL v3, TLS, ARP, PPP, SSH, DHCP, Telnet, MQTT, Wake On Lan (WOL) |
| VoIP passthrough support (planned)           | H.323 and SIP-alg protocol NAT helpers, allowing proper routing of VoIP packets   |
| Connection monitoring                        | Ping Reboot, Periodic Reboot, LCP and ICMP for link inspection  |
| Firewall                                     | Port forward, traffic rules, custom rules   |
| QoS / Smart Queue Management (SQM) (planned) | Traffic priority queuing by source/destination, service, protocol or port, WMM, 802.11e   |
| DDNS   | Supported >25 service providers, others can be configured manually  |
| SSHFS  | Possibility to mount remote file system via SSH protocol  |

### SECURITY

|                      |   |
|----------------------|---|
| Authentication       | Pre-shared key, digital certificates, X.509 certificates  |
| Firewall             | Pre-configured firewall rules can be enabled via WebUI, unlimited firewall configuration via CLI; DMZ; NAT; NAT-T   |
| Attack prevention    | 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) |
| VLAN (planned)       | Tag based VLAN separation   |
| Mobile quota control | Custom data limits for both SIM cards   |
| WEB filter (planned) | Blacklist for blocking out unwanted websites, Whitelist for specifying allowed sites only   |
| Access control       | Flexible access control of TCP, UDP, ICMP packets, MAC address filter   |

### VPN

|                    |   |
|--------------------|---|
| OpenVPN            | Multiple clients and server can be running simultaneously, 12 encryption methods  |
| OpenVPN Encryption | DES-CBC, RC2-CBC, DES-EDE-CBC, DES-EDE3-CBC, DESX-CBC, BF-CBC, RC2-40-CBC, CAST5-CBC, RC2-64-CBC, AES-128-CBC, AES-192-CBC, AES-256-CBC |
| IPSec              | IKEv1, IKEv2, with 5 encryption methods (DES, 3DES, AES128, AES192, AES256)   |
| GRE                | GRE tunnel  |
| Stunnel (planned)  | Proxy designed to add TLS encryption functionality to existing clients and servers without any changes in the program's code            |
| PPTP, L2TP         | Client/Server services can run simultaneously, L2TPv3 support   |
| DMVPN (planned)    | Method of building scalable IPsec VPNs  |
| SSTP (planned)     | SSTP client instance support  |
| ZeroTier           | ZeroTier VPN client support   |
| WireGuard          | WireGuard VPN client and server support   |

**SERIAL COMMUNICATION MODES**

Modes Console, OverIP, Modem (Full or Partial control), MODBUS RTU master, MODBUS gateway, NTRIP client (planned)

**MODBUS TCP SLAVE**

|                     |  |
|---------------------|--|
| ID filtering        | Respond to one ID in range [1;255] or any  |
| Allow remote access | Allow access through WAN   |
| Custom registers    | MODBUS TCP custom register block, which allows to read/write to a file inside the router, and can be used to extend MODBUS TCP slave functionality |

**MODBUS TCP MASTER**

|                        |  |
|------------------------|--|
| Supported functions    | 01, 02, 03, 04, 05, 06, 15, 16   |
| Supported data formats | 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 |

**MODBUS RTU MASTER**

|                        |  |
|------------------------|--|
| Supported baud rates   | From 300 to 3000000  |
| Supported functions    | 01, 02, 03, 04, 05, 06, 15, 16   |
| Supported data formats | 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 |
| Number of data bits    | 7 or 8   |
| Number of stop bits    | 1 or 2   |
| Parity bits            | None, Even, Odd  |

**MQTT GATEWAY**

Gateway Allows sending commands and receiving data from MODBUS Master through MQTT broker

**DATA TO SERVER**

Protocols HTTP(S), MQTT, Azure MQTT, Kinesis

**MONITORING & MANAGEMENT**

|          |  |
|----------|--|
| WEB UI   | HTTP/HTTPS, status, configuration, FW update, CLI, troubleshoot, event log, system log, kernel log |
| FOTA     | Firmware update from server, automatic notification  |
| SSH      | SSH (v1, v2)   |
| SMS      | SMS status, SMS configuration, send/read SMS via HTTP POST/GET                                     |
| Call     | Reboot, Status, Mobile data on/off, Output on/off, answer/hang-up with a timer                     |
| TR-069   | OpenACS, EasyCwmp, ACSLite, tGem, LibreACS, GenieACS, FreeACS, LibCWMP, Friendly tech, AVSystem    |
| MQTT     | MQTT Broker, MQTT publisher  |
| SNMP     | SNMP (v1, v2, v3), SNMP Trap   |
| JSON-RPC | Management API over HTTP/HTTPS   |
| MODBUS   | MODBUS TCP status/control  |
| RMS      | Teltonika Remote Management Systems (RMS)  |

**IoT PLATFORMS**

|                 |  |
|-----------------|--|
| Cloud of Things | Allows monitoring of: Device data, Mobile data, Network info, Availability   |
| ThingWorx       | Allows monitoring of: WAN Type, WAN IP Mobile Operator Name, Mobile Signal Strength, Mobile Network Type   |
| Cumulocity      | Allows monitoring of: Device Model, Revision and Serial Number, Mobile Cell ID, ICCID, IMEI, Connection Type, Operator, Signal Strength, WAN Type and IP   |
| Azure IoT Hub   | Can send device IP, Number of bytes send/received/ 3G connection state, Network link state, IMEI, ICCID, Model, Manufacturer, Serial, Revision, IMSI, Sim State, PIN state, GSM signal, WCDMA RSCP, WCDMA EC/IO, LTE RSRP, LTE SINR, LTE RSRQ, CELL ID, Operator, Operator number, Connection type, Temperature, PIN count to Azure IoT Hub server |

## SYSTEM CHARACTERISTICS

|               |  |
|---------------|--|
| CPU           | Qualcomm QCA9531, MIPS 24kc, 650 MHz     |
| RAM           | 64 MB, DDR2                              |
| Flash storage | 16MB SPI Flash (4 MB available for user) |

## FIRMWARE / CONFIGURATION

|               |   |
|---------------|---|
| WEB UI        | Update FW from file, check FW on server, configuration profiles, configuration backup |
| FOTA          | Update FW/configuration from server   |
| RMS           | Update FW/configuration for multiple devices  |
| Keep settings | Update FW without losing current configuration  |

## FIRMWARE CUSTOMIZATION

|                     |   |
|---------------------|---|
| Operating system    | RutOS (OpenWrt based Linux OS)              |
| Supported languages | Busybox shell, Lua, C, C++                  |
| Development tools   | SDK package with build environment provided |

## LOCATION TRACKING

|                 |  |
|-----------------|--|
| GNSS            | GPS, GLONASS, BeiDou, Galileo and QZSS                             |
| Coordinates     | GNSS coordinates via WebUI, SMS, TAVL, RMS                         |
| NMEA            | NMEA 0183  |
| NTRIP (planned) | NTRIP protocol (Networked Transport of RTCM via Internet Protocol) |
| Server software | Supported server software TAVL, RMS                                |
| Geofencing      | Configurable multiple geofence zones                               |

## INPUT/OUTPUT

|                  |   |
|------------------|---|
| Configurable I/O | 3 x Configurable Inputs/Outputs. Digital input 0 - 6 V detected as logic low, 8 - 30 V detected as logic high. Open collector output, max output 30 V, 300 mA |
| Analog input     | 1 x Analog input (0 - 30 V)   |
| Output control   | HTTP POST/GET, Schedule   |
| Events           | SMS, Email  |
| I/O juggler      | Allows to set certain I/O conditions to initiate event  |

## SERIAL

|                      |  |
|----------------------|--|
| RS232                | Terminal block connector: TX, RX, RTS, CTS                       |
| RS485                | Terminal block connector: D+, D-, R+, R- (2 or 4 wire interface) |
| Supported baud rates | From 300 to 3000000  |
| Number of data bits  | 7 or 8   |
| Number of stop bits  | 1 or 2   |
| Parity               | None, Even, Odd  |
| Flow control         | None, RTS/CTS (only for RS232 interface), Xon/Xoff               |

## POWER

|                     |   |
|---------------------|---|
| Connector           | 2 pins in 16 pin industrial terminal block                                  |
| Input voltage range | 9 – 30 VDC, reverse polarity protection, surge protection +/-1 kV 50 µs max |
| Power consumption   | Idle: <1.2 W, Max: <5 W   |

## PHYSICAL SPECIFICATION

|                        |  |
|------------------------|--|
| Casing material        | Aluminium housing with DIN rail mounting option                          |
| Dimensions (W x H x D) | 83 x 25 x 74.2 mm  |
| Weight                 | 165 g  |
| Mounting options       | DIN rail, wall mounting (additional kits needed), flat surface placement |

**PHYSICAL INTERFACES (PORTS, LEDS, ANTENNAS, BUTTON, SIM)**

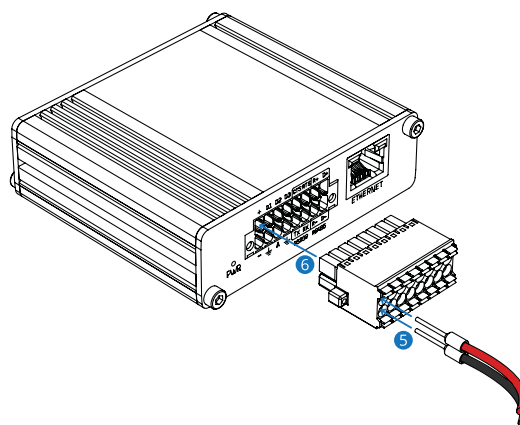
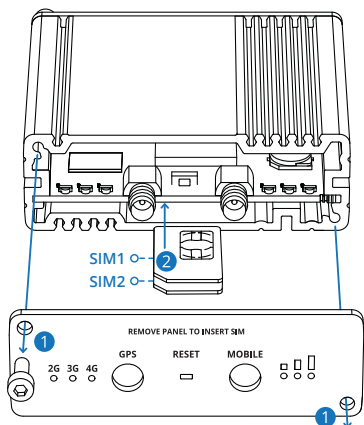
|             |  |
|-------------|--|
| Ethernet    | 1 x RJ45 port, 10/100 Mbps   |
| I/O's       | 3 x Configurable I/O, 1 x Analog input in 16 pin terminal block                                  |
| Status LEDs | 3 x connection status LEDs, 3 x connection strength LEDs, 1 x power LED, 1 x Eth port status LED |
| SIM         | 2 x SIM slots (Mini SIM - 2FF), 1.8 V/3 V, double stacked SIM tray                               |
| Power       | 2 pins in 16 pin terminal block  |
| Antennas    | 1 x SMA connector for LTE, 1 x SMA connector for GNSS  |
| RS232       | 4 pins in 16 pin terminal block (TX, RX, RTS, CTS)   |
| RS485       | 4 pins in 16 pin terminal block (D+, D-, R+, R-)   |
| Reset       | Reboot/User default reset/Factory reset button   |

**OPERATING ENVIRONMENT**

|                       |                           |
|-----------------------|---------------------------|
| Operating temperature | -40 C to 75 C             |
| Operating humidity    | 10% to 90% non-condensing |

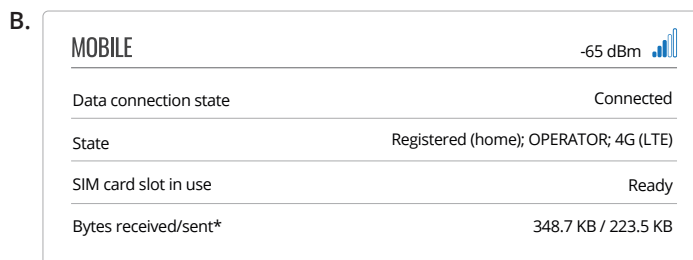
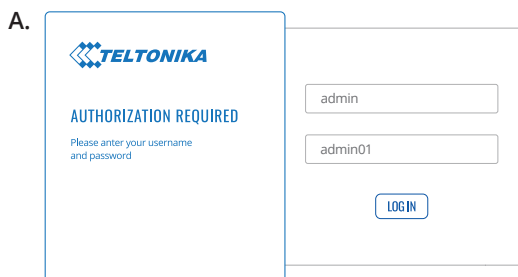
## HARDWARE INSTALLATION

1. Unscrew two back panel hex bolts and remove the back panel.
2. Insert your SIM card(s) into the SIM socket(s), which are located on the bottom side of PCB.
3. Attach the panel and tighten the hex bolts.
4. Attach the mobile antenna (max torque 0.4 N·m / 3.5 lbf·in).
5. Connect open PSU leads to 16 pin terminal block:
  - a) red wire to top row first contact (+);
  - b) black wire to bottom row first contact (-).
6. Connect the 16 pin terminal block to gateway 16 pin connector and plug other end of the power adapter into a power outlet.



## LOGIN TO DEVICE

1. Power on the device and connect the Ethernet cable to your computer.
2. Allow the gateway to boot up. This might take up t
3. To enter the gateway Web interface (WebUI), type <http://192.168.1.1> into the URL field of your Internet browser.
4. Use login information shown in image A when prompted for authentication.
5. After you log in, you will be prompted to change your password for security reasons. The new password must contain at least 8 characters, including at least one uppercase letter, one lowercase letter and one digit. This step is mandatory, and you will not be able to interact with the gateway WebUI until you change the password.
6. When you change the the gateway password, the Configuration Wizard will start. The Configuration Wizard is a tool used to set up some of the gateway main operating parameters.
7. Go to the Overview page and pay attention to the Signal Strength indication (image B). To maximize the cellular performance try adjusting the antennas or changing the location of your device to achieve the best signal conditions.



## TECHNICAL INFORMATION

| Radio specifications                |   |
|-------------------------------------|---|
| RF technologies                     | 2G, 3G, 4G, GNSS  |
| Max RF power                        | 33 dBm@GSM, 24 dBm@WCDMA, 23 dBm@LTE  |
| Bundled accessories specifications* |   |
| Power adapter                       | Input: 0.4 A@100-240 VAC, output: 9 VDC, 1 A, connected to 16 pin terminal block                    |
| Mobile antenna                      | 698~960 / 1710~2690 MHz, 50 Ω, VSWR < 3, gain** 3 dBi, omnidirectional, SMA male connector          |
| GNSS antenna                        | 1575.42~1602 MHz, 2.2~5 VDC, VSWR < 1.5, gain** 28 dB (typ.), RHCP polarization, SMA male connector |

\*Order code dependent.








\*\*Higher gain antenna can be connected to compensate for cable attenuation when a cable is used. The user is responsible for the compliance with the legal regulations.

## WHAT'S IN THE BOX?

### STANDARD PACKAGE CONTAINS\*

- TRB245
- 9 W PSU
- 1 x LTE antenna (swivel, SMA male)
- 1 x GNSS antenna (adhesive, SMA male, 3 m cable)
- 16 pin terminal block
- 1 x hex key
- Ethernet cable (1.5 m)
- QSG (Quick Start Guide)
- RMS Flyer
- Packaging box



|   |   |   |
|---|---|---|
|  <p><b>TRB245</b></p>   |  <p><b>9 W PSU</b></p>                |  <p><b>1 X LTE ANTENNA (SWIVEL, SMA MALE)</b></p> |
|  <p><b>1X GNSS ANTENNA (ADHESIVE, SMA MALE, 3 M CABLE)</b></p> |  <p><b>16 PIN TERMINAL BLOCK</b></p> |  <p><b>1 X HEX KEY</b></p>                       |
|  <p><b>ETHERNET CABLE (1.5 M)</b></p>                          |   |   |

\* For all standard order codes standard package contents are the same, except for PSU.



## STANDARD ORDER CODES

| PRODUCT CODE  | HS CODE | HTS CODE   | PACKAGE CONTAINS               |
|---------------|---------|------------|--------------------------------|
| TRB245 000000 | 851762  | 8517.62.00 | Standard Package with Euro PSU |
| TRB245 100100 | 851762  | 8517.62.00 | Standard Package with US PSU   |

For more information on all available packaging options – please contact us directly.

## AVAILABLE VERSIONS

| PRODUCT CODE  | REGION (OPERATOR)                         | FREQUENCY  |
|---------------|---|--|
| TRB245 0***** | Europe, the Middle East, Africa, Thailand | <ul style="list-style-type: none"> <li>● 4G (LTE-FDD): B1, B3, B7, B8, B20, B28A</li> <li>● 4G (LTE-TDD): B38, B40, B41</li> <li>● 3G: B1, B8</li> <li>● 2G: B3, B8</li> </ul>   |
| TRB245 1***** | North America                             | <ul style="list-style-type: none"> <li>● 4G (LTE-FDD): B2, B4, B5, B12, B13, B14, B66, B71</li> <li>● 3G: B2, B4, B5</li> </ul>  |
| TRB245 2***** | Latin America, Australia, New Zealand     | <ul style="list-style-type: none"> <li>● 4G (LTE-FDD): B1, B2<sup>1</sup>, B3, B4, B5, B7, B8, B28</li> <li>● 4G (LTE-TDD): B40</li> <li>● 3G: B1, B2, B5, B8</li> <li>● 2G: B2, B3, B5, B8</li> </ul>                                   |
| TRB245 3***** | China                                     | <ul style="list-style-type: none"> <li>● 4G (LTE-FDD): B1, B3</li> <li>● 4G (LTE-TDD): B38, B39, B40, B41</li> <li>● 3G (TDSCDMA): B34, B39</li> <li>● 3G (WCDMA): B1</li> <li>● 3G (CDMA 1x/EVDO): BC0</li> <li>● 2G: B3, B8</li> </ul> |

The price and lead-times for region (operator) specific versions may vary. For more information please contact us.  
 1 - LTE-FDD B2 does not support Rx-diversity.

## MOUNTING OPTIONS

### DIN RAIL KIT

| Parameter         | Value                                   |
|-------------------|---|
| Mounting standard | 35mm DIN Rail                           |
| Material          | Low carbon steel                        |
| Weight            | 57g                                     |
| Screws included   | Philips Pan Head screw #6-32×3/16, 2pcs |
| Dimensions        | 82 mm x 46 mm x 20 mm                   |
| RoHS Compliant    | V                                       |



#### DIN RAIL KIT

- DIN Rail adapter
- Philips Pan Head screw #6-32×3/16, 2pcs for RUT2xx/RUT9xx

#### ORDER CODE

PR5MEC00

#### HS CODE

73269098

#### HTS CODE

7326.90.98

For more information on all available packaging options – please contact us directly.

### COMPACT DIN RAIL KIT

| Parameter         | Value                                   |
|-------------------|---|
| Mounting standard | 35mm DIN Rail                           |
| Material          | ABS + PC plastic                        |
| Weight            | 6.5 g                                   |
| Screws included   | Philips Pan Head screw #6-32×3/16, 2pcs |
| Dimensions        | 70 mm x 25 mm x 14,5 mm                 |
| RoHS Compliant    | V                                       |



#### DIN RAIL KIT

- Compact plastic DIN Rail adapter (70x25x14,5mm)
- Philips Pan Head screw #6-32×3/16, 2pcs

#### ORDER CODE

PR5MEC11

#### HS CODE

73269098

#### HTS CODE

7326.90.98

For more information on all available packaging options – please contact us directly.

### SURFACE MOUNTING KIT

| Parameter         | Value                                   |
|-------------------|---|
| Mounting standard | Flat surface mount                      |
| Material          | ABS + PC plastic                        |
| Weight            | 2x5 g                                   |
| Screws included   | Philips Pan Head screw #6-32×3/16, 2pcs |
| Dimensions        | 25 mm x 48 mm x 7.5 mm                  |
| RoHS Compliant    | V                                       |



#### DIN RAIL KIT

- Surface mounting kit
- Philips Pan Head screw #6-32×3/16, 2pcs

#### ORDER CODE

PR5MEC12

#### HS CODE

73269098

#### HTS CODE

7326.90.98

For more information on all available packaging options – please contact us directly.

## TRB245 SPATIAL MEASUREMENTS & WEIGHT

### MAIN MEASUREMENTS

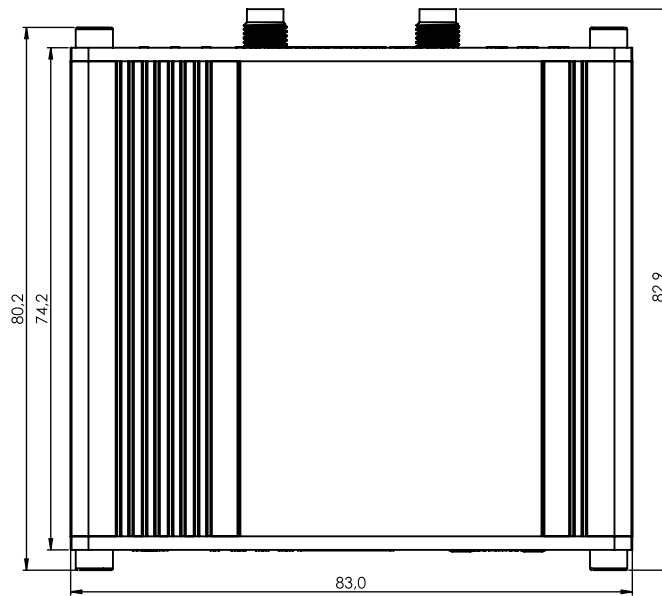
W x H x D dimensions for TRB245:

|                  |                |
|------------------|----------------|
| Device housing*: | 83 x 25 x 74.2 |
| Box:             | 173 x 71 x 148 |

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

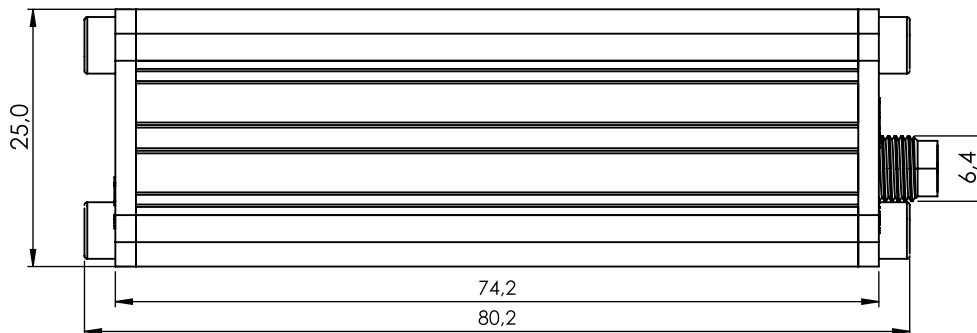
### TOP VIEW

The figure below depicts the measurements of TRB245 and its components as seen from the top:



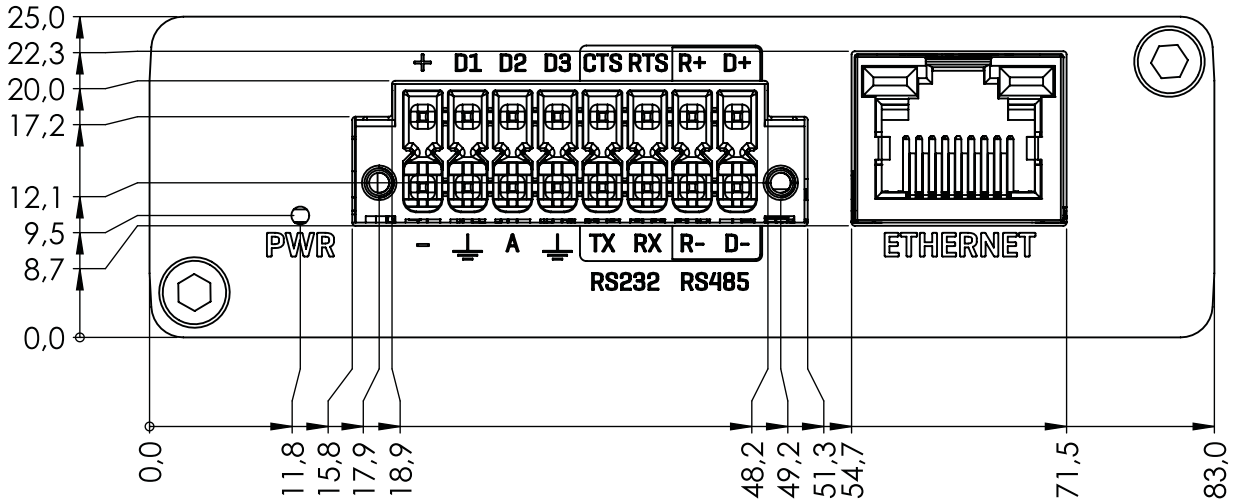
### RIGHT VIEW

The figure below depicts the measurements of TRB245 and its components as seen from the right side:



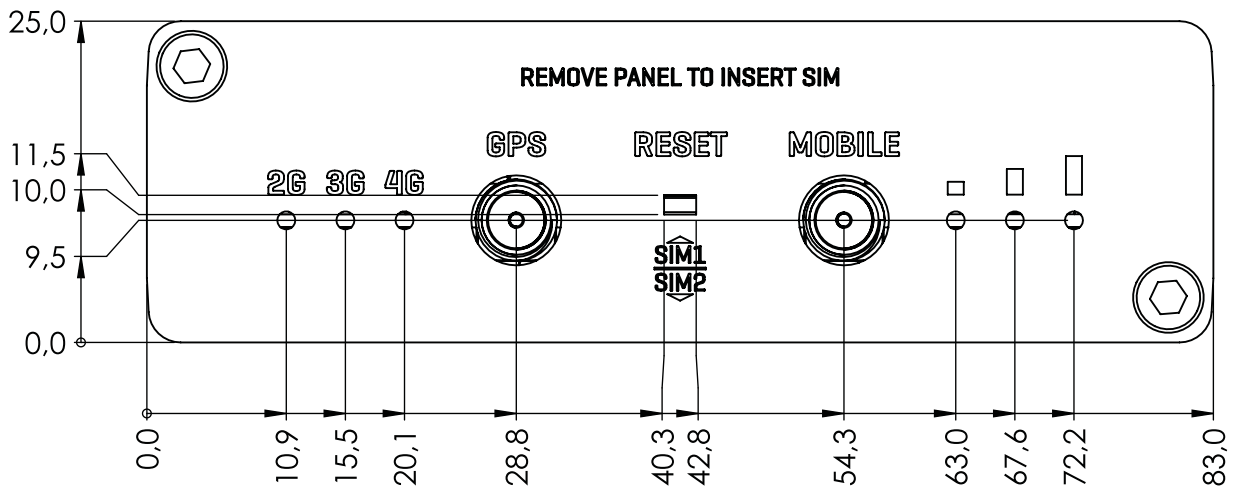
**FRONT VIEW**

The figure below depicts the measurements of TRB245 and its components as seen from the front panel side:



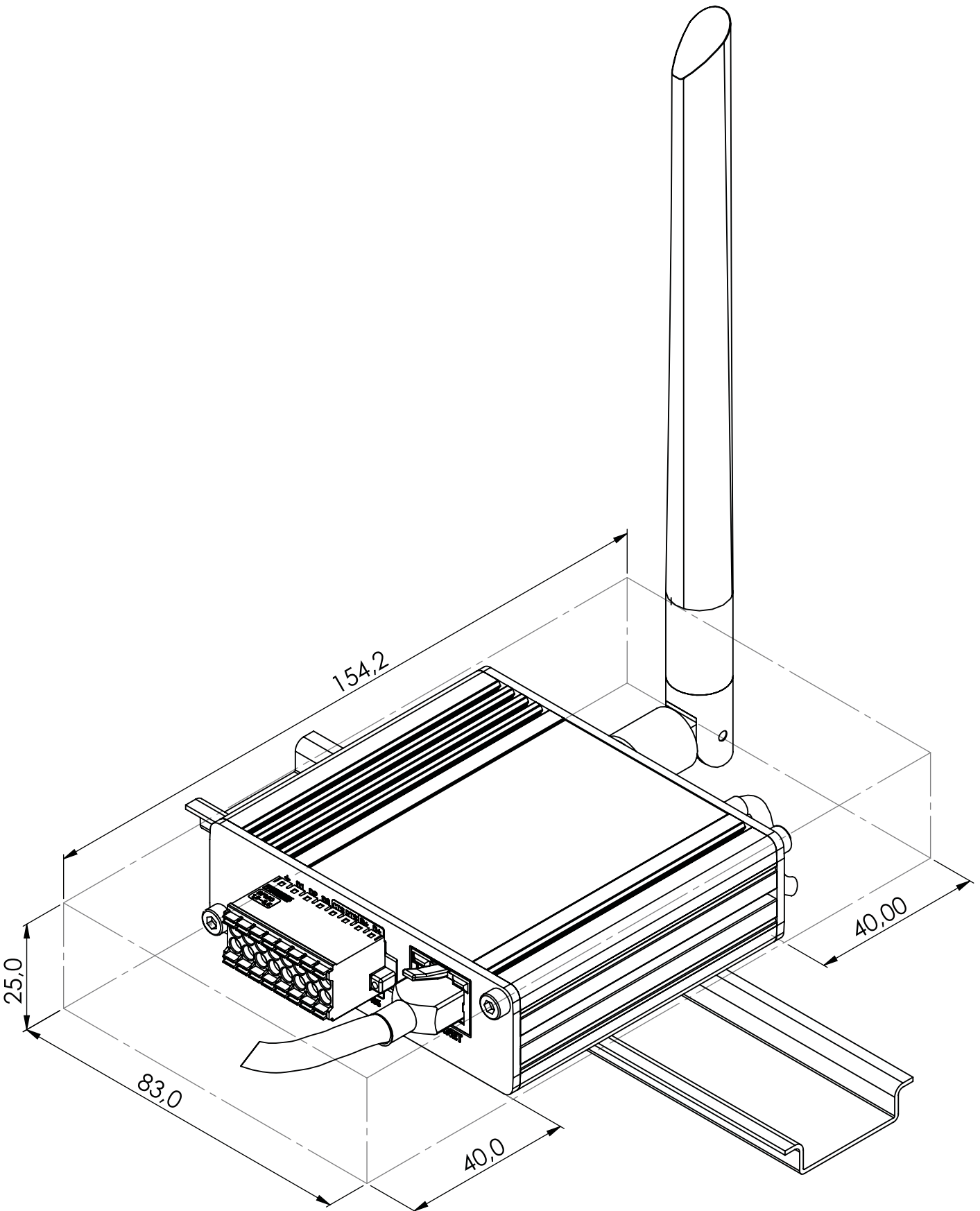
**REAR VIEW**

The figure below depicts the measurements of TRB245 and its components as seen from the back panel side:



**MOUNTING SPACE REQUIREMENTS**

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



DIN RAIL

The scheme below depicts protrusion measurements of an attached DIN Rail:

