

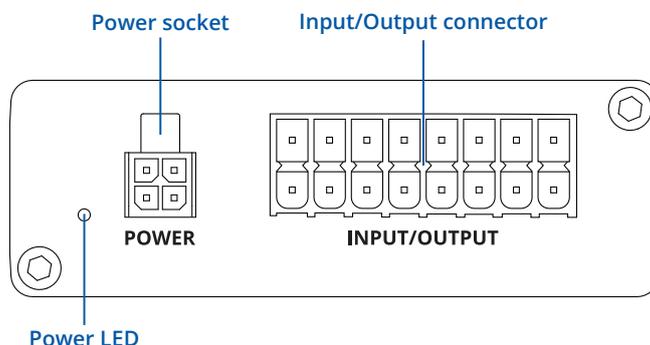


# TRB141

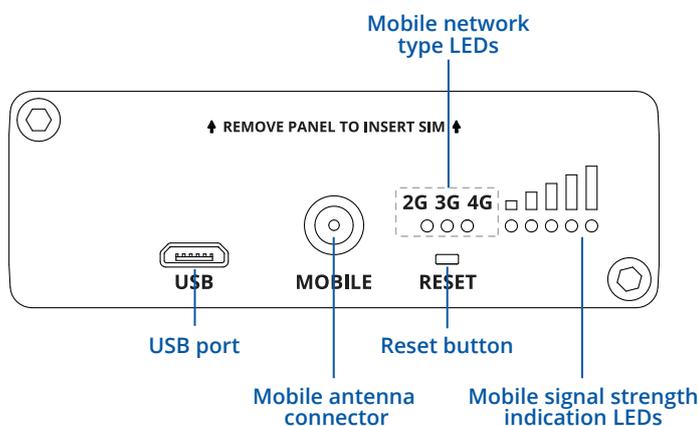


# HARDWARE

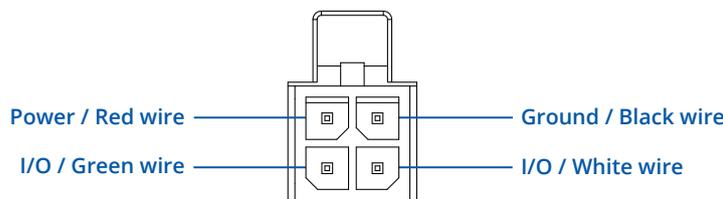
## FRONT VIEW



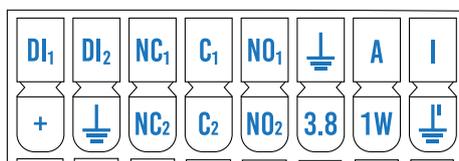
## BACK VIEW



## POWER SOCKET PINOUT



## INPUT/OUTPUT CONNECTOR PINOUT



**DI1** and **DI2** are DRY/WET configurable inputs. WET: 0-1.9 V is detected as logical "0", 1.9-3.8 V is detected as logical "1". DRY: Logical "0" is detected when input is shorted to GND, otherwise input is detected as logical "1".

**NC\***, **C\*** and **NO\*** are respectively Normally Closed, Common and Normally Open contacts of internal Relays 1 and 2. Maximum Relay 1 (Non-latching) ratings: 0.5 A at 60 VDC/70 VAC, 1 A at 30 VDC/VAC. Maximum Relay 2 (Latching) ratings: 0.8 A at 70 VDC, 0.9 A at 70 VAC, 2 A at 30 VDC/VAC.

**DI1** and **DI2** are DRY/WET configurable inputs. WET: 0-1.9 V is detected as logical "0", 1.9-3.8 V is detected as logical "1". DRY: Logical "0" is detected when input is shorted to GND, otherwise input is detected as logical "1".

**A** is ADC input. Analog voltage range 0-30 V. Input can be configured for 4-20mA sensor protocol as current measurement of 0-30 mA.

**I** and **↓** are isolated input contacts. 0-7.3 V is detected as logical "0", 7.3-71 V is detected as logical "1".

**I/O** pins: programmable Input/Output pins (Open Collector output, max 30 V or Digital input where 0-7.3 V is detected as logical "0", 7.3-30 V is detected as logical "1").

**+** is power output connected directly to gateway's power supply input pin. This Output can be used for powering external 4-20 mA current sensor.

**3.8** is 3.8V power output which can be used to power 1-Wire sensors when needed.

**1W** 1-Wire protocol input/output.

**Power** pin: +9 ... +30 VDC positive power input..

**Ground** pin: negative/ground connection from power supply.

**↓** is GND contact.

## FEATURES

### MOBILE

|                  |   |
|------------------|---|
| Mobile module    | 4G (LTE) – Cat 1 up to 10 Mbps, 3G – Up to 42 Mbps, 2G – Up to 236.8 kbps   |
| 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  | Band lock, Used band status display   |
| APN              | Auto APN  |
| Bridge           | Direct connection (bridge) between mobile ISP and device on LAN   |
| Passthrough      | Gateway assigns its mobile WAN IP address to another device on LAN  |
| Multiple PDN     | Possibility to use different PDNs for multiple network access and services  |

### NETWORK

|  |  |
|--|--|
| Network protocols                            | TCP, UDP, IPv4, IPv6, ICMP, NTP, DNS, HTTP, HTTPS, SMTP, SSL v3, TLS, PPP, SSH, DHCP, SNMP, MQTT |
| Connection monitoring                        | Ping Reboot, Wget Reboot, Periodic Reboot, LCP and ICMP for link inspection                      |
| Firewall                                     | Port forwards, traffic rules, custom rules   |
| DHCP   | Static and dynamic IP allocation   |
| QoS / Smart Queue Management (SQM) (planned) | Traffic priority queuing by source/destination, service, protocol or port                        |
| 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 the WebUI, unlimited firewall configuration via CLI; 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) |
| Mobile quota control | Set up custom data limits for SIM card  |
| WEB filter           | 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 a server can run 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, supports up to 5 x VPN IPsec tunnels (instances), with 5 encryption methods (DES, 3DES, AES128, AES192, AES256)           |
| GRE                | GRE tunnel  |
| PPTP, L2TP         | Client/Server services can run simultaneously, L2TPv3 support   |
| ZeroTier           | ZeroTier VPN  |
| WireGuard          | WireGuard VPN client and server support   |

### 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 |

## MQTT GATEWAY

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

## DATA TO SERVER

|          |                                    |
|----------|------------------------------------|
| Protocol | HTTP(S), MQTT, Azure MQTT, Kinesis |
|----------|------------------------------------|

## MONITORING & MANAGEMENT

|          |   |
|----------|---|
| WEB UI   | HTTP/HTTPS, status, configuration, FW update, CLI, troubleshoot, system log, kernel log         |
| FOTA     | Firmware update from sever, 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   |
| JSON-RPC | Management API over HTTP/HTTPS  |
| MODBUS   | MODBUS TCP status/control   |
| RMS      | Teltonika Remote Management System (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           | ARM Cortex-A7 1.2 GHz CPU               |
| RAM           | 128 MB (50 MB available for userspace)  |
| FLASH storage | 512 MB (200 MB available for userspace) |

## 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 |

## INPUT/OUTPUT

|                  |   |
|------------------|---|
| Input            | 2 x Digital inputs (configurable passive or active), 1 x Isolated input, 1 x Analog input ( with 4-20 mA capability)  |
| Output           | 2 x Relay outputs (latching and non latching)   |
| Configurable I/O | 2 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 |
| 1-Wire           | 1-Wire communication interface  |
| Output control   | HTTP POST/GET, Schedule   |
| Events           | SMS, EMAIL  |
| I/O juggler      | Allows to set certain I/O conditions to initiate event  |

**POWER**

|                     |  |
|---------------------|--|
| Connector           | 4 pin industrial DC power socket   |
| Input voltage range | 9 – 30 VDC (4 pin industrial socket), reverse polarity protection, surge protection >33 VDC 10us max |
| Power consumption   | < 5 W  |

**PHYSICAL INTERFACES (PORTS, LEADS, ANTENNAS, BUTTONS, SIM)**

|             |   |
|-------------|---|
| I/Os        | 3 x Digital Inputs, 1 x Analog input, 2 x Relays on 16 pin connector, 2 x I/O pins on 4 pin power connector |
| 1-Wire      | 1 x 1-Wire interface on 16 pin connector  |
| USB         | 1 x Virtual network interface via micro USB   |
| Status LEDs | 3 x connection type status LEDs, 5 x connection strength LEDs, 1 x Power LED                                |
| SIM         | 1 x SIM slot (Mini SIM – 2FF), 1.8 V/3 V  |
| Power       | 1 x 4 pin power connector   |
| Antenna     | 1 x SMA for LTE   |
| Reset       | Reboot/User default reset/Factory reset button  |

**PHYSICAL SPECIFICATION**

|                        |  |
|------------------------|--|
| Casing material        | Aluminum housing                           |
| Dimensions (W x H x D) | 74.5 x 25 x 64.4 mm                        |
| Weight                 | 136 g                                      |
| Mounting options       | Bottom and sideways DIN rail, Flat surface |

**OPERATING ENVIRONMENT**

|                           |                             |
|---------------------------|-----------------------------|
| Operating temperature     | -40 °C to 75 °C             |
| Operating humidity        | 10 % to 90 % non-condensing |
| Ingress Protection Rating | IP30                        |

**REGULATORY & TYPE APPROVALS**

|            |                         |
|------------|-------------------------|
| Regulatory | CE/RED, EAC, RoHS, WEEE |
|------------|-------------------------|

**EMI**

|                  |   |
|------------------|---|
| Standards        | Draft ETSI EN 301 489-1 V2.2.0, Draft EN 301 489-19 V2.1.0, Draft ETSI EN 301 489-52 V1.1.0 |
| ESD              | EN 61000-4-2:2009   |
| RS               | EN 61000-4-3:2006 + A1:2008 + A2:2010   |
| EFT              | EN 61000-4-4:2012   |
| Surge protection | EN 61000-4-5:2014   |
| CS               | EN 61000-4-6:2014   |
| DIP              | EN 61000-4-11:2004  |

**RF**

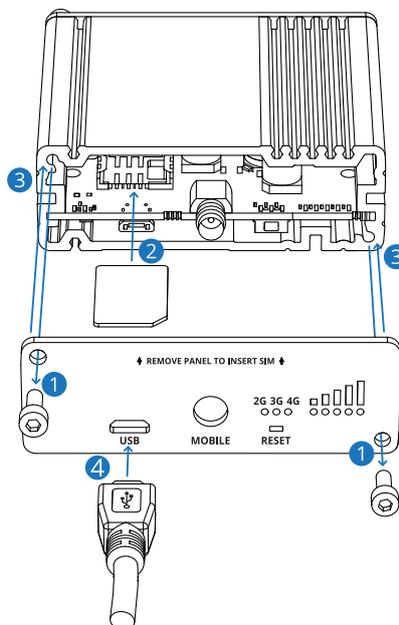
|           |  |
|-----------|--|
| Standards | EN 300 511 V12.5.1, ETSI EN 301 908-1 V11.1.1, ETSI EN 301 908-2 V11.1.2, ETSI EN 301 908-13 V11.1.2 |
|-----------|--|

**SAFETY**

|           |  |
|-----------|--|
| Standards | IEC 62368-1:2014(Second Edition), EN 62368-1:2014+A11:2017<br>EN 50385:2017<br>EN 62232:2017 |
|-----------|--|

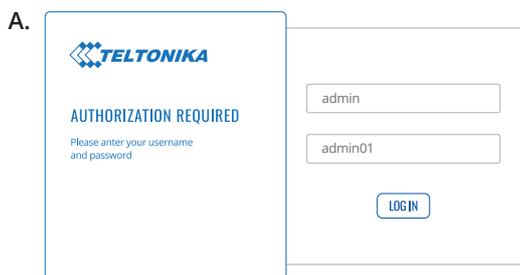
# HARDWARE INSTALLATION

1. Unscrew two back panel hex bolts and remove the back panel.
2. Insert your SIM card into the SIM socket.
3. Attach the panel and tighten the hex bolts.
4. Attach the mobile antenna (max torque 0.4 N·m / 3.5 lbf·in) and connect the USB cable.



## LOGIN TO DEVICE

1. Power on the device and connect the USB cable to your computer.
2. Allow the gateway to boot up. This might take up to 30 seconds.
3. Your computer's OS should detect the USB device and install the driver.
4. To enter the gateway's Web interface (WebUI), type <http://192.168.2.1> into the URL field of your Internet browser.
5. Use login information shown in image A when prompted for authentication.
6. After logging in pay attention to the Signal Strength indication displayed in the Mobile widget (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   |
| 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, 0.5 A, 4-pin plug                               |
| Mobile antenna                      | 698~960 / 1710~2690 MHz, 50 Ω, VSWR<2, gain** 2 dBi, omnidirectional, 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\*

- TRB141
- 4.5 W PSU
- 1 x LTE antenna (magnetic mount, SMA male, 3 m cable)
- Micro-USB cable (0.8 m)
- 1 x hex key
- I/O connector
- QSG (Quick Start Guide)
- RMS Flyer
- Packaging box



|  |  |   |
|--|--|---|
|  <p>TRB141</p>                   |  <p>4.5 W PSU</p>    |  <p>1 X LTE ANTENNA (MAGNETIC MOUNT, SMA MALE, 3 M CABLE)</p> |
|  <p>MICRO-USB CABLE (0.8 M)</p> |  <p>1 X HEX KEY</p> |  <p>I/O CONNECTOR</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 |
|---------------|---------|------------|------------------|
| TRB141 003000 | 851762  | 8517.62.00 | Standard Package |

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

## AVAILABLE VERSIONS

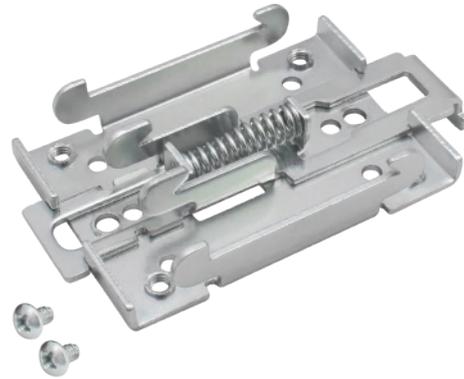
| PRODUCT CODE  | REGION (OPERATOR)                                       | FREQUENCY  |
|---------------|---|--|
| TRB141 0***** | Europe, the Middle East, Africa, Korea, Thailand, India | <ul style="list-style-type: none"> <li>● 4G (LTE-FDD): B1, B3, B7, B8, B20, B28A</li> <li>● 3G: B1, B8</li> <li>● 2G: B3, B8</li> </ul>  |
| TRB141 1***** | South America, Australia, New Zealand, Taiwan           | <ul style="list-style-type: none"> <li>● 4G (LTE-FDD): B1, B2, 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> |

The price and lead-times for region (operator) specific versions may vary. For more information please contact us.  
 \* - Versions for other regions are under development.

## 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.

# TRB141 SPATIAL MEASUREMENTS & WEIGHT

## MAIN MEASUREMENTS

W x H x D dimensions for TRB141

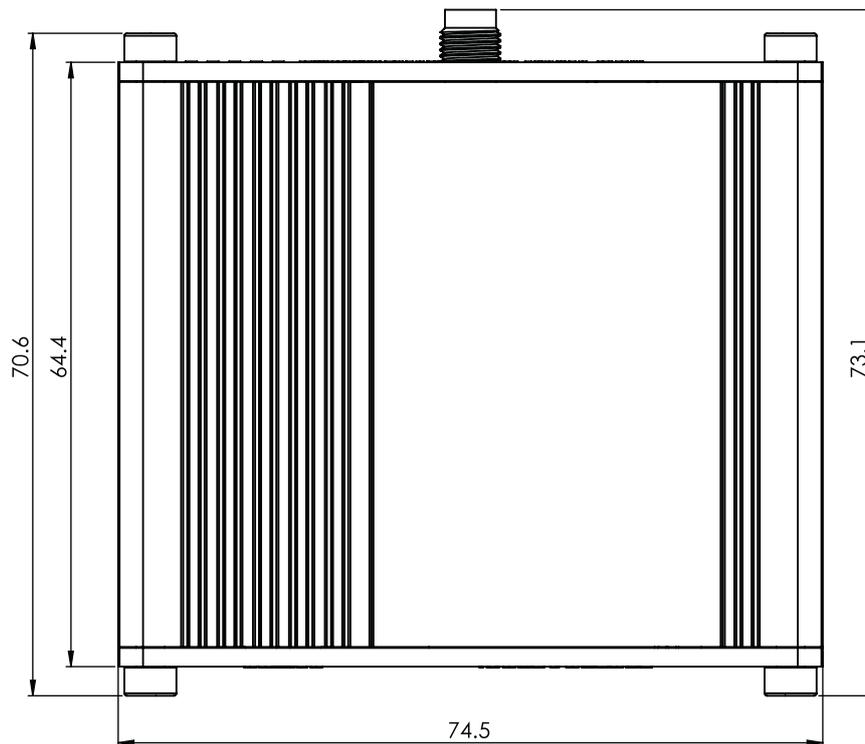
Device housing\*: 74.5 x 25 x 64.4

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.

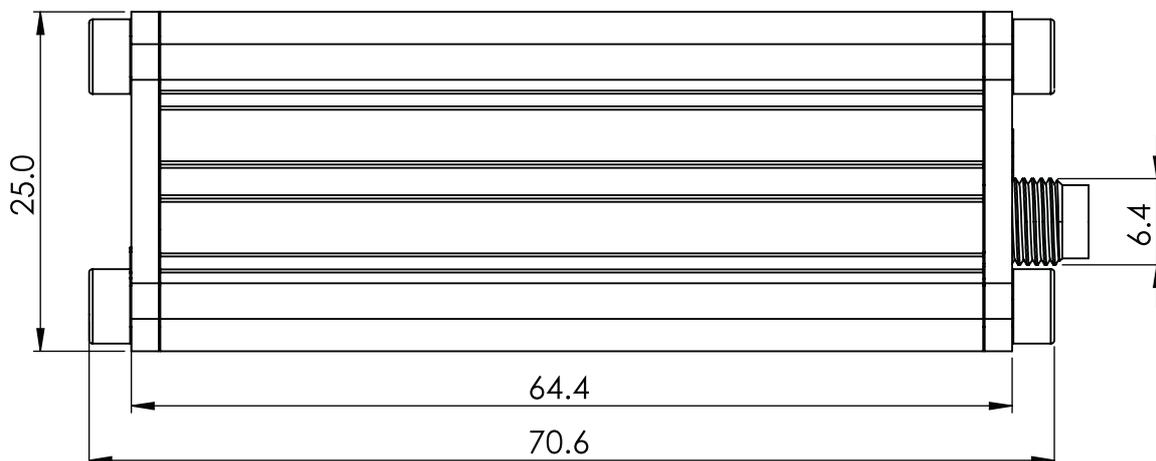
## TOP VIEW

The figure below depicts the measurements of TRB141 and its components as seen from the top:



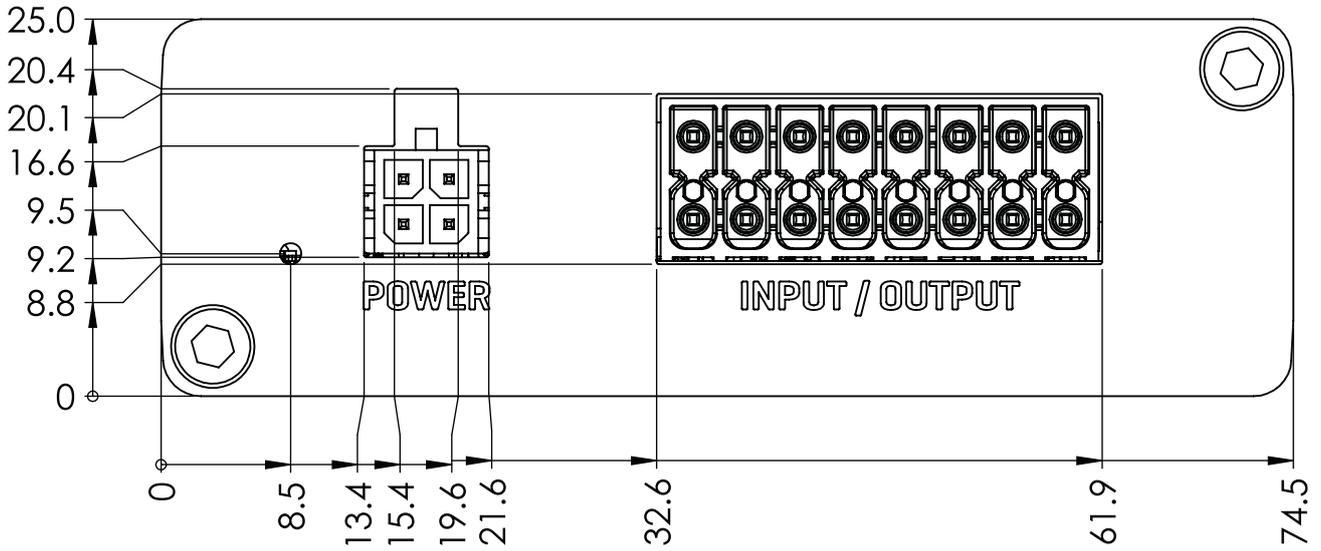
## RIGHT VIEW

The figure below depicts the measurements of TRB141 and its components as seen from the right side:



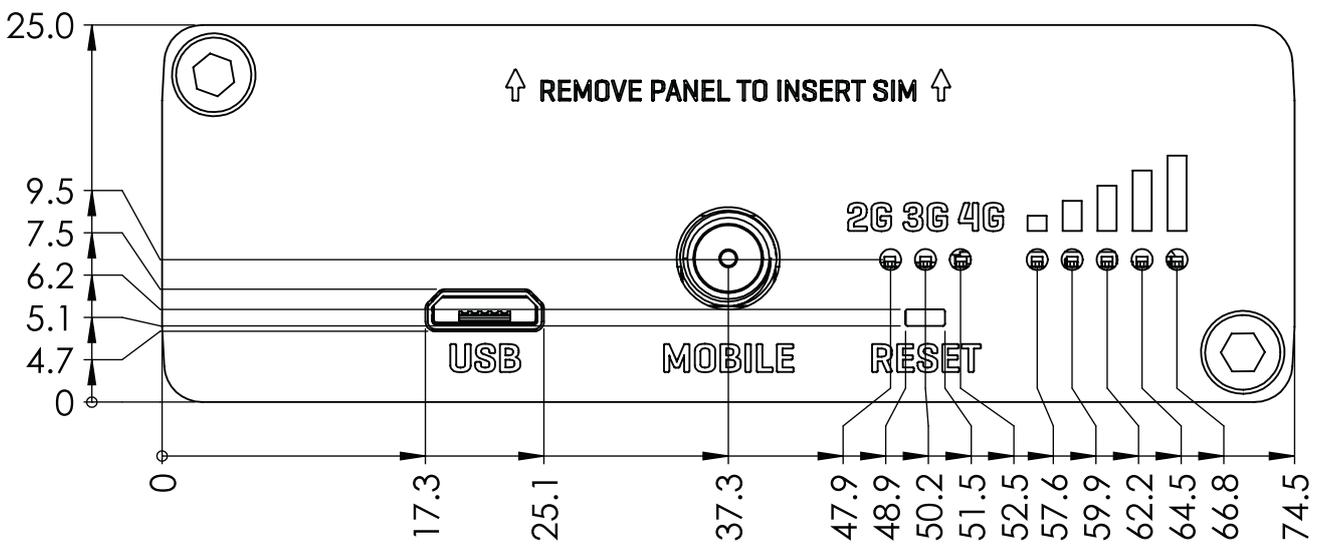
FRONT VIEW

The figure below depicts the measurements of TRB141 and its components as seen from the front:



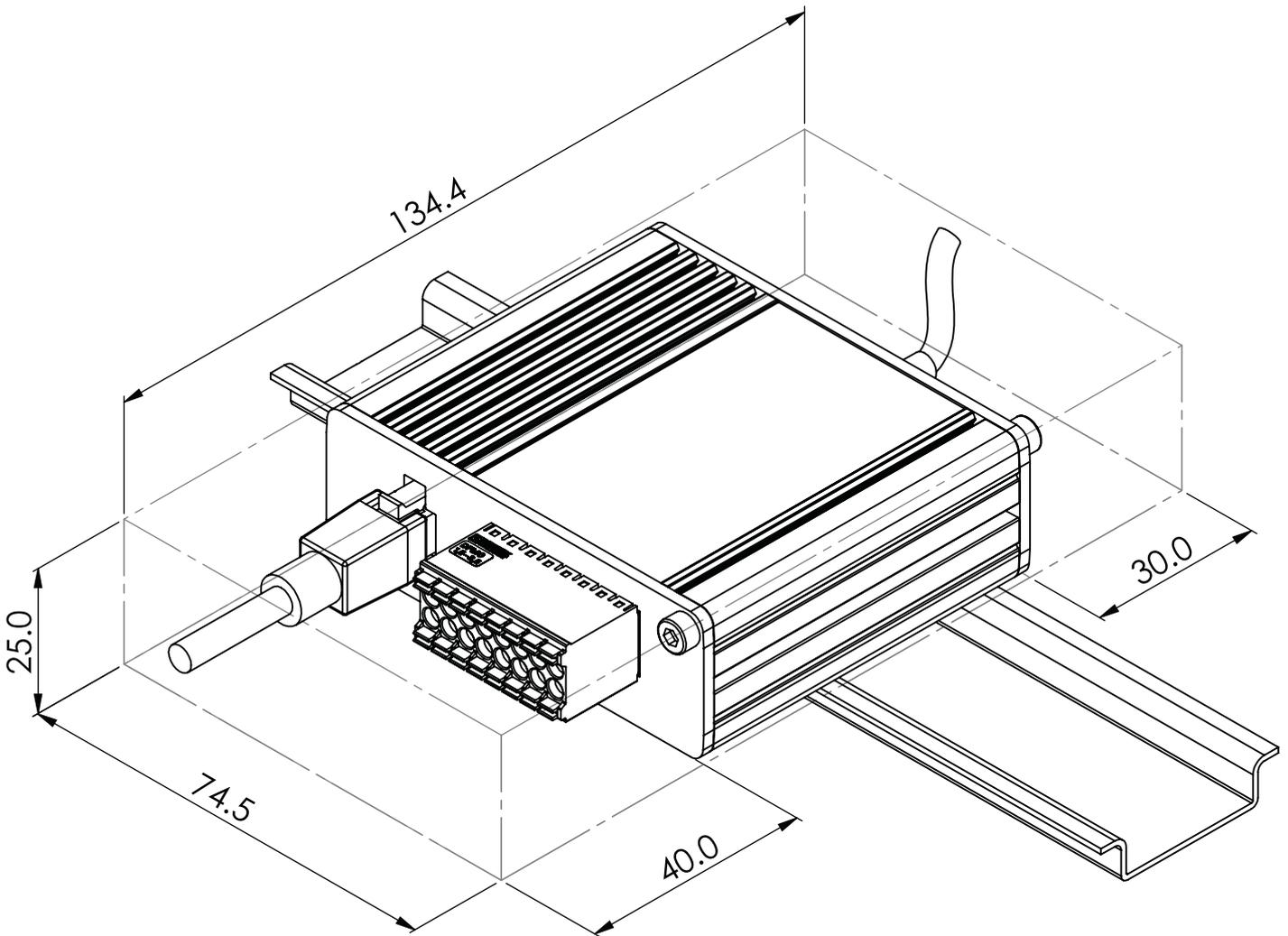
REAR VIEW

The figure below depicts the measurements of TRB141 and its components as seen from the back:



**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:

