

## DATA SHEET

# TRO670

## Hybrid Cellular and Broadband Mesh Outdoor Router

The TRO670 outdoor cellular and broadband mesh router provides a reliable and secure connectivity over public and private cellular infrastructures. This advanced networking platform comes with an option to combine cellular communications with Hitachi Energy's patented private broadband mesh network, providing unparalleled flexibility in field area network design.



### Product overview

The TRO670 is a ruggedized outdoor cellular and Wi-Fi broadband mesh router. It is built specifically for utility, oil and gas, mining, and industrial applications that monitor and control field automation endpoints such as intelligent electrical devices, industrial process controllers, and SCADA devices. The router supports applications like video surveillance and other streaming applications, while Ethernet and Serial interfaces support a wide variety of current and legacy protocols.

Security is a common theme throughout hardware and software design. From a secure service port and an integrated Trusted Platform Module (TPM 2.0) to device certificates, an integrated zone-based firewall, and VPN tunnel options, the TRO670 provides critical infrastructure-grade security.

### Business benefits

With the TRO670, you gain an "always-on," highly available, high-performance wireless network, specifically designed to enable utility, oil and gas, mining and smart city applications.

Wireless networks ensure that the optimal level of service can be achieved by providing several options for reliable and resilient communications.

# Product specifications

## Software feature highlights

### Security

- Support for X.509 PKI Certificates
- Encrypted device management interfaces
- Role-based access using centralized RADIUS authentication or local user database
- IKEv2 IPsec VPN (IPv4, IPv6)
- AES-128, AES-256 encryption schemes
- SHA-384, SHA-512 hashing algorithms
- Integrated Zone-based Firewall and MAC address filtering
- 802.1x authentication for Ethernet & Wireless clients

### Provisioning support

- Device management using secure HTTPS web interface
- Central FCAPS, firmware management, low-touch deployment using SuprOS

### Monitoring

- SNMP
- Syslog

### Availability

- Dual boot partitions
- Over-the-air firmware upgrades
- Dual SIMs for failover to alternative cellular network

### Routing and IP services

- IPv4 and IPv6
- Border Gateway Protocol (BGP)
- Generic Routing Encapsulation (GRE, mGRE)
- Network Address Translation (NAT)
- Dynamic Host Configuration Protocol (DHCP) Server
- Access Control Lists (ACL)
- Raw and interpreted serial data encapsulation in IP
- System time from GPS or from built-in NTP Client
- NTP, SNTP server (IPv4, IPv6)
- Port Forwarding

### Ethernet services

Per port untagged and 802.1q VLAN access and trunk modes. Maximum of 32 VLANs.

## Hardware characteristics

### Physical characteristics

Total weight including antennas and mounting accessories:

8.8 kg, 19.4 lb

Additional weight for backup battery: 0.65 kg, 1.43 lb

### Dimensions

Outer dimensions including antennas and mounting accessories: (HxWxD) 66 x 24 x 47 cm, 26 x 9.5 x 18 in

### Environmental specifications

Operating temperature ranges:

- Without backup battery: -40°C to 70°C, -40°F to 158°F
- With backup battery: -40°C to 60°C, -40°F to 140°F

Storage temperature ranges:

- Without backup battery: -40°C to 75°C, -40°F to 167°F
- With backup battery: -40°C to 60°C, -40°F to 140°F

The integrated cellular modems may have operating temperature ranges different from the TRO670. Such deviations are indicated in the cellular options section.

- IP67 rated enclosure: UL579/IEC 60529
- Wind survivability: >100 mph
- ASTM B117 salt, fog, rust resistance compliant
- Shock and vibration: ETSI 300-19-2-4 spec T4, 1E class 4M3
- Transportation: ISTA 2A

### Power

- Input voltage range: 100-240 Volts AC
- Optional Integrated Battery Backup (120 Wh)

### Power Consumption

TRO670 model	IDLE	Typical	High	Max (bootup spike)
Cellular Only models	4.1 W	4.6 W	4.8 W	7.2 W
Cellular + 802.11 models	9.0 W	8.5 W	13.3 W	20 W

Power consumption data excludes backup battery charging (0.2 - 7.0 W), backup battery heating (7.0 W), and 802.3at power delivery (up to 25.5 W)

### Processing environment

- Main CPU: Dual core 1.4 GHz, 32-bit ARM-processor
- Operating Memory: 1 GB DRAM
- Storage: 4 GB Flash, external SD card slot
- Edge Compute ready

### Location (GNSS) receiver

- Supports GPS (1575.42 MHz), GLONASS (1602 MHz), Beidou (1561.098 MHz), Galileo (1575.42 MHz), QZSS (1575.42 MHz)
- Acquisition time: 32 sec or less (cold start)
- Location reporting accuracy: < 2 m (50%); < 5 m (90%)
- LNA / Antenna connector: N Female LNA included

### Serial

- Raw UDP and TCP IP transport
- Interpreted Terminal, Modbus (RTU, ASCII), DNP3 and Mirrored Bits

### Ethernet ports

- Two RJ45 10/100/1000BASE-T IEEE 802.3
  - Auto-negotiated duplex mode and speed
  - Internal LEDs for link and activity
  - One of the standard ports provides PoE+ 802.3at power
- One 1Gbps SFP port (for backhaul)

### Serial ports

- Speeds: 1200, 2400, 4800, 9600, 19200, 38400, 57600 or 115200 bps
- Parameters: 7 or 8 bits data, Odd/Even/No parity
- One RS-232 port
  - 3-wire interface: TX, RX and GND connections
- One RS-485 port
  - 3-wire interface: +, - and GND connections

### USB service port

Secure service port (not for communication purposes).

## Cellular radio options

The following cellular radios are available for TRO670. Refer to the ordering information section for ordering numbers. Cellular antenna connectors are two N Female. Direct-mount omnidirectional 3-6 dBi antennas are included.

### Option C1 (US market)

- Sierra Wireless EM7511
- 4G LTE Cat-12
  - Supported bands: B1, B2, B3, B4, B5, B7, B8, B9, B12, B13, B14, B18, B19, B20, B26, B29, B30, B32, B41, B42, B43, B46, B48, B66
- 3G HSPA+
  - Supported bands: B1, B2, B4, B5, B6, B8, B9, B19
- Regulatory approvals: FCC, PTCRB, GCF
- Carrier certifications: pending
- Operating temperature range
  - Class A, 3GPP compliant : -30°C to 70°C, -22°F to 158°F
  - Class B, non-3GPP compliant: -40°C to 85°C, -40°F to 185°F

### Option D1 (EU, US markets)

- Telit LE910C4-WWXD
- 4G LTE Cat-4, Rel 10
  - Supported bands: B1, B2, B3, B4, B5, B7, B8, B12, B13, B14, B19, B20, B26, B28, B106
- UMTS
  - Supported bands: B1, B2, B4, B5, B8, B19
- GSM/EDGE
  - Supported bands: B2, B3, B5, B8
- Regulatory approvals: FCC, CE, UKCA, GCF
- Carrier certifications: pending
- Anterix Active ready
- Operating temperature range: -40°C to 85°C, -40°F to 185°F

### Option C5 (multiple markets)

- Sierra Wireless EM7565
- 4G LTE Cat-12
  - Supported bands: B1, B2, B3, B4, B5, B7, B8, B9, B12, B13, B18, B19, B20, B26, B28, B29, B30, B32, B41, B42, B43, B46, B48, B66
- 3G HSPA+ (up to 42 Mbps down, 5.8 Mbps up)
  - Supported bands: B1, B2, B4, B5, B6, B8, B9, B19
- Regulatory approvals: GCF
- Carrier certifications: pending
- Operating temperature range
  - Class A, 3GPP compliant: -30°C to 70°C, -22°F to 158°F
  - Class B, non-3GPP compliant: -40°C to 85°C, -40°F to 185°F

## Option W2: 802.11 radios option

2.4 GHz and 5GHz 802.11 2x2 MIMO radios are available as an option for TRO670. Refer to ordering information section for ordering numbers.

802.11 antenna connectors are four N-Female connectors – two for 2.4 GHz and two for 5 GHz. Omnidirectional antennas are included. Refer to accessories section for alternative antennas, RF surge protectors, and cables.

The information provided below represents the maximum technical capabilities of the radios. Compliance with country-specific regulations may restrict output power; prohibit the use of certain channels, channel widths, and/or bands; and manipulate the DFS functions of both 802.11 radios.

### 2.4 GHz 802.11 radio for Tropos Mesh and Wi-Fi access

- Supported radio technologies:
  - 802.11b with MRC across 2 receivers
  - 802.11g with MRC across 2 receivers
  - 802.11n supporting up to two spatial streams (2x2 MIMO)
- Receiver and transmitter center frequency range: 2.412 – 2.484 GHz
- Channel width options:
  - 5 MHz, 10 MHz (Tropos mesh connections only)
  - 20 MHz, 40 MHz (Tropos mesh connections and Wi-Fi access)
- Maximum transmitted EIRP: 36 dBm total, assuming 7.4dBi antennas
- A country selector function will adjust the maximum transmitted power to comply with regulations.

### 5 GHz 802.11 radio for Tropos Mesh and Wi-Fi access

- Supported radio technologies:
  - 802.11a with MRC across 2 receivers
  - 802.11n supporting up to two spatial streams (2x2 MIMO)
- Receiver and transmitter center frequency ranges:
  - 5.150 – 5.250 GHz (UNII-1)
  - 5.250 – 5.350 GHz (UNII-2A)
  - 5.470 – 5.725 GHz (UNI-2C)
  - 5.725 – 5.875 GHz (UNII-3)
- Minimal center frequency spacing: 5 MHz
- Channel width options:
  - 5 MHz, 10 MHz (Tropos mesh connections only)
  - 20 MHz, 40 MHz (Tropos mesh connections and Wi-Fi access)
- Maximum transmitted EIRP: 36 dBm total, assuming 8 dBi antennas
- A country selector function will adjust the maximum transmitted power to comply with regulations.

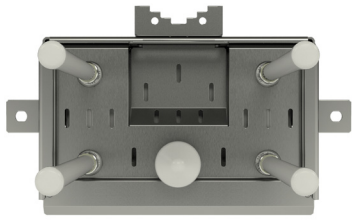
## Certifications and compliance

- Safety:
  - UL 62368-1
  - CSA 22.2 No. 62368-1
  - IEC/EN 62368-1
- EMC - Electromagnetic Compatibility:
  - FCC CFR 47 Part 15
  - Industry Canada RSS 247

Industry and carrier certifications for cellular radios are listed in the cellular radio options section.

# Images and dimensions

## Projections



Top view



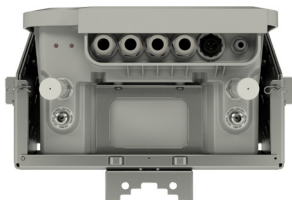
Front view



Right side view

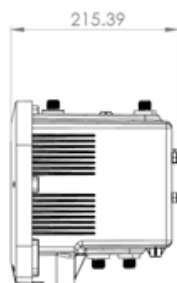
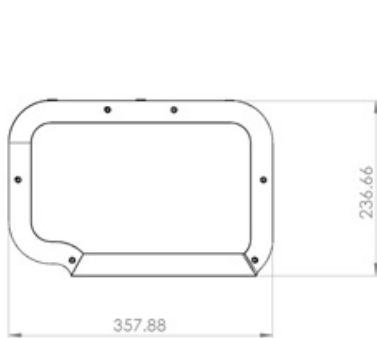


Back view

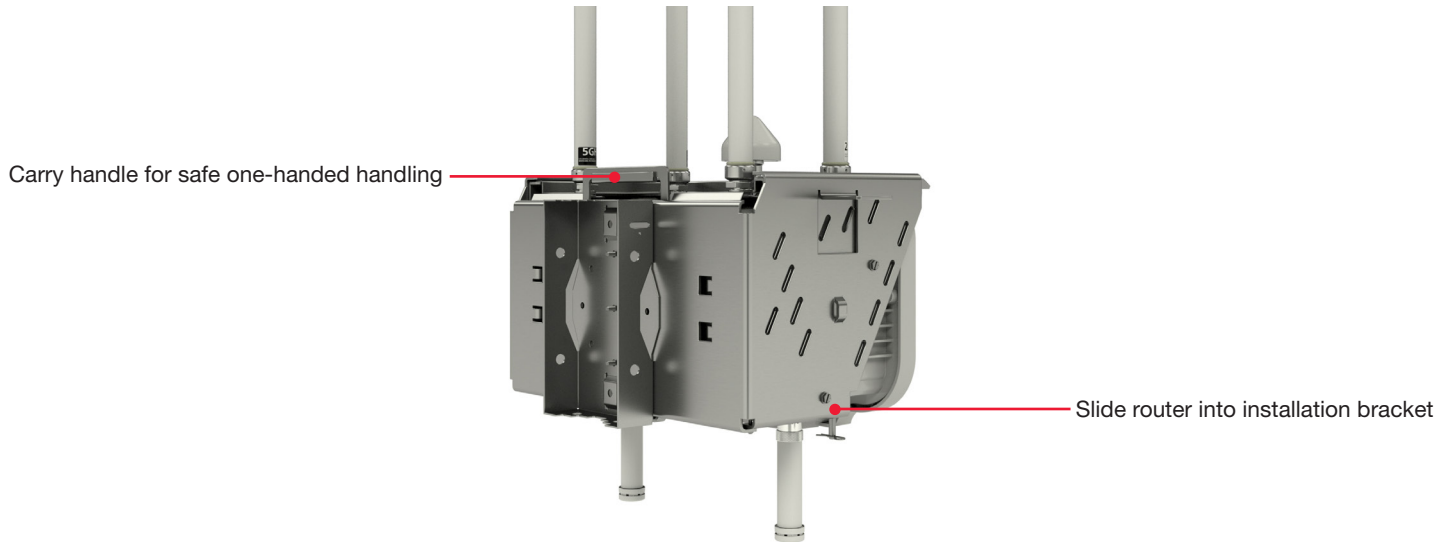
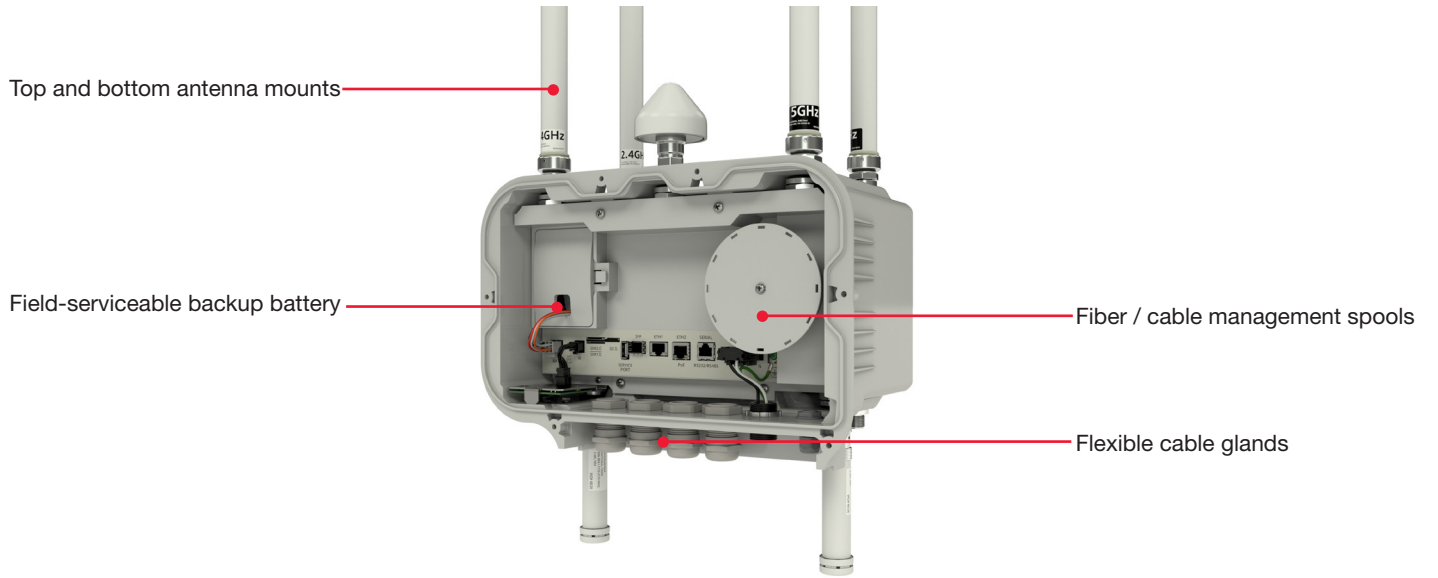


Bottom view

## Outer dimensions, excluding antennas and mounting accessories



## Installation support highlights



# Ordering information

## TRO670 Models

Product number	Product description
T6700C100A101010	TRO670 Cellular Outdoor Router, Cat-12 LTE (US), AC Power
T6700D100A100010	TRO670 Cellular Outdoor Router, Cat-4 LTE (US, EU, Anterix), AC Power
T6700C500A100010	TRO670 Cellular Outdoor Router, Cat-12 LTE (multiple markets), AC Power
T67W2C100A101010	TRO670 Cellular and Mesh Outdoor Router, 2.4GHz, 5GHz, Cat-12 LTE (US), AC Power
T67W2D100A100010	TRO670 Cellular and Mesh Outdoor Router, 2.4GHz, 5GHz, Cat-4 LTE (US, Anterix), AC Power
T67W2C500A100010	TRO670 Cellular and Mesh Outdoor Router, 2.4GHz, 5GHz, Cat-12 LTE (multiple markets), AC Power
T67W20000A100010	TRO670 Mesh Outdoor Router, 2.4GHz, 5GHz (US), AC Power

TRO670 includes mounting accessories (bracket, cleat, clamps, screws) and the relevant subset of the following antennas for direct antenna mount installation:

- One GNSS receiver antenna (all variants)
- Two cellular multiband antennas, 2 dBi omnidirectional, N-male connectors (cellular variants C1, D1, C5)
- Two 802.11 2.4 GHz antennas, 7.4 dBi omnidirectional, N-male connectors (mesh variants W2)
- Two 802.11 5 GHz antennas, 8 dBi omnidirectional, N-male connectors (mesh variants W2)

AC power cable, backup battery, external surge protection devices, and all remote antenna installation accessories shall be ordered separately.

## Accessories

### Antennas

Product number	Product description
AN02LTE	Set of two cellular multiband antennas, 2 dBi omnidirectional, N-male connectors
AN06CBRS	Set of two CBRS band antennas, 6 dBi omnidirectional, N-male connectors
AN06P2LTE	Cellular multiband antenna, 6/8 dBi directional panel, two N-female connectors, articulating mounting kit
100244-01	One 802.11 2.4 GHz antenna, 7.4 dBi omnidirectional, N-male connector
153088-00	One 802.11 5 GHz antenna, 8 dBi omnidirectional, N-male connector
ANGPS001	GNSS active antenna for GPS, Galileo, QZSS, GLONASS, Beidou, 5dBi (antenna), 40dBi (LNA), half-sphere directivity, one N-male connector

### Remote Antenna Mounting Brackets

Product number	Product description
MBKIT004	Antenna mounting bracket kit, 2 holes, includes pole mount cleat, two hose clamps 1 7/8 to 5 Inch, two hex slotted machine screws
MBKIT005	Antenna mounting bracket kit, 3 holes, includes pole mount cleat, two hose clamps 1 7/8 to 5 Inch, two hex slotted machine screws

### External Surge Protection Devices

Product number	Product description
SURGPRO140	Outdoor Surge Protection Device for one ethernet connection. RJ45 to RJ45. Requires MBSURG and MBCLEAT for installation
SURGPRORF245	0-6GHz Surge Protection Device for one RF connection. N-female to N-female Bulkhead Mount
MBSURG	Mounting bracket for SURGPRO140. Supports one or two surge protectors attached to MBCLEAT pole mount kit
MBCLEAT	Pole mount cleat kit, includes pole mount cleat, two hose clamps 1 7/8 to 5 Inch

## Power Cables

Product number	Product description
PT021004	Pwr Cable, 4ft, 2-wire, Photo-Cell
PT021020	Pwr Cable, 20ft, 2-wire, Photo-Cell
PT031006P	Pwr Cable, 6ft, 3-wire, Watertight Plug
PT031030P	Pwr Cable, 30ft, 3-wire, Watertight Plug
PT031060P	Pwr Cable, 60ft, 3-wire, Watertight Plug

## RF Cables

Product number	Product description
RC0064010	LMR 400 Coax cable kit, 2 10 ft N-male to N-male
RC0064025	LMR 400 Coax cable kit, 2 25 ft N-male to N-male
RC0064030	LMR 400 Coax cable kit, 2 30 ft N-male to N-male
RC0064100	LMR 400 Single coax cable, 100 ft N-male to N-male

## Service Parts

Product number	Product description
153393-00	TRO670 Front Panel
153444-00	Gasket, TRO670 Front Panel
BB0640120	Backup Battery, 120 Wh
153441-00	Door, Backup Battery

### Hardware and software warranty

Hardware warranty up to five years from the date of shipment of the hardware; return to point of purchase.

Software warranty 90 days from the date of shipment of the hardware.

For additional details on hardware and software warranty, and how to submit a warranty claim, refer to Hitachi Energy Wireless standard hardware and software support agreement.

### Complete care maintenance plans

Complete care maintenance plans for software and hardware available.

For additional details on complete care maintenance plans, refer to Hitachi Energy Wireless standard hardware and software support agreement