

TG-400 Series

Industrial Gateway Datasheet

The TG-400 Series industrial gateways are independently developed and manufactured by Tespro. They integrate Wi-Fi 6 (AX3000), 4G/5G cellular connectivity, Gigabit Ethernet, and multiple industrial interfaces to provide stable, secure, and efficient connectivity for remote monitoring and data transmission. Powered by TesproOS with an intuitive Web interface, they enable easy configuration, real-time monitoring, and integrated management of devices, networks, protocols, and remote maintenance.

The TG-400 Series features 1×RS232 and 2×RS485 interfaces, with Modbus/BACnet gateways, energy management, VPN encryption, and an industrial firewall. It delivers reliable edge computing and communication for industrial automation, remote monitoring, and IoT data acquisition in harsh environments.



Global Network Adaptation
2G / 3G / 4G / 5G



1*WAN + 1*LAN
10/100/1000Mbps



Wi-Fi 4: 802.11b/g/n
Wi-Fi 6: 802.11a/b/g/n/ac/ax



1*RS232/2*RS485
4*GPIO

Typical application scenarios



Applied Topology



Core Advantages



2G/3G/4G/5G cellular networks

Supports 2G/3G/4G/5G cellular networks, with Cat.1/Cat.4/Cat.6 for 4G access. 5G NR supports eMBB / RedCap.
Dual SIM and dual eSIM enable flexible network switching and link redundancy.



100M Ethernet Interface + Wi-Fi

Equipped with Gigabit Ethernet supporting WAN/LAN auto-sensing and Wi-Fi 4 (2.4GHz) /Wi-Fi 6(2.4GHz/5GHz), it provides high-speed wired and wireless connectivity for industrial equipment, data transmission, and on-site networking.



Integrated serial and GPIO interfaces

An integrated design featuring serial ports (1 × RS232 + 2 × RS485) and four sets of GPIO interfaces facilitates the connection of industrial equipment and enables control of digital (on/off) inputs and outputs.



TesproOS System with an Extensive Protocol Library

Powered by TesproOS, the device supports major industrial protocols including Modbus, BACnet, OPC UA, PROFINET, EtherNet/IP, and MQTT, with flexible private protocol customization.



Remote O&M

Based on TesproOS, the device supports real-time monitoring, remote configuration, fault diagnosis, and batch OTA firmware upgrades, reducing on-site maintenance and troubleshooting costs.



Excellent weather resistance

Operates reliably from -40°C to +75°C with 5%–95% RH non-condensing humidity. Designed for harsh industrial environments, including high-altitude and extreme operating conditions.

Features

Performance & Hardware

- Dual-core Cortex-A53 processor, 1.3GHz clock speed, high-throughput routing performance.
- 4GB LPDDR4X / 8GB LPDDR4X; 8GB RAM comes standard
- 8GB / 16GB / 32GB / 64GB eMMC; 32GB flash storage included as standard
- Standard MiniPCIe and M.2 slots; compatible with global 4G/5G cellular networks
- MicroSD card slot supporting up to 128 GB storage expansion (optional)

Interfaces & Connectivity

- Two 100 Mbps Ethernet ports (1 LAN + 1 WAN)
- Built-in lightning protection with 3 kV electromagnetic isolation
- Dual-band Wi-Fi: 2.4GHz (up to 574Mbps) + 5GHz (up to 2402Mbps),

Supports AP / Client modes

- 3 serial ports: 1 × RS232 + 2 × RS485, with high-voltage isolation
- 4 × GPIOs, configurable as DI/DO
- Cellular/Wi-Fi/Ethernet link backup with ICMP detection

Protocols & Applications

- Modbus RTU/TCP gateway with MQTT/TCP/UDP/HTTP northbound communication
- BACnet gateway supporting BACnet/IP and BACnet MS/TP southbound data acquisition
- IPsec, OpenVPN, GRE, L2TP, PPTP, DMVPN and WireGuard

Security & Networking

- Built-in TesproOS, enabling secure remote access, O&M, protocol management, and rapid mobile configuration
- Industrial-grade firewall with zone-based security policies
- Application-layer traffic identification (NetCtrl/DPI engine)
- Supports network functions such as DDNS, VRRP, DHCP Server, and IP Passthrough
- Event alert methods: SMS, Email, DO, SNMP Trap

Reliability & Protection

- Automatic network disconnection detection with auto-reboot upon dial-up failure or on a scheduled basis
- OTA — Multiple remote firmware upgrade methods
- 12–36 VDC / 3 A with automatic over-voltage cutoff protection
- Reverse polarity, surge and ESD protection

Management & Development

- proprietary TesproOS (Linux) and provides support for SDK and app development.
- Web management interface with support for switching between dark and light themes

TesproOS

TesproOS System

Connect industrial field devices to TesproOS platform with reliable edge computing, secure transmission and simplified management.



MQTT Cloud Integration

Support MQTT v3.1.1 / v5.0, QoS 0/1/2, custom Topics, JSON data and TLS/SSL encryption.



TCP Client & Server

Support TCP client/server modes, long or short connections, heartbeat mechanisms and concurrent client access.



UDP Communication

Support UDP unicast, broadcast and multicast for low-overhead real-time transmission.



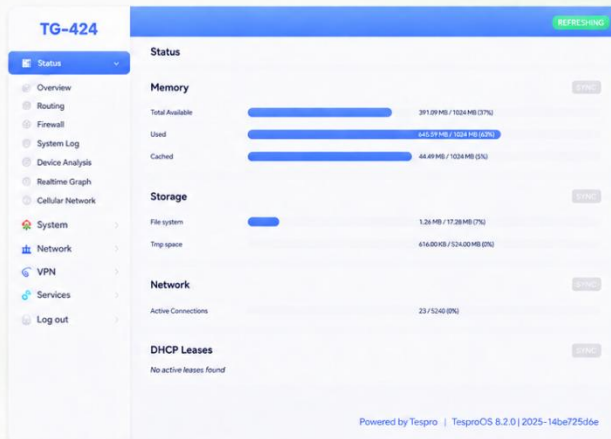
HTTP / HTTPS Reporting

Support GET and POST requests, custom HTTP headers, JSON/XML formats and SSL/TLS encryption.



Edge Data Processing

Support local filtering, calculation, protocol conversion, alarm decisions, scheduled reporting and breakpoint recovery.



Cloud Remote Management



Easy Configuration



Efficient Debugging



Rich Industrial Protocols



Cellular & WiFi All-in-One



Secure Transmission



Seamless Cloud Integration

Protocol Support

Protocol Support

Comprehensive Connectivity for Industrial Data Collection, Edge Computing and System Integration



1 Network Transmission Protocols

- MQTT
- UDP
- TCP
- HTTP / HTTPS



2 Industrial Serial Protocols

- Bidirectional Transparent Transmission
- IEC62056-21 / IEC1107
- Modbus RTU
- DLMS
- DL/T 645



3 Industrial Equipment Communication Protocols

- Siemens S7 (S7comm / S7comm+)
- PROFINET
- Mitsubishi MC Protocol
- CAN
- Omron FINS
- OPC / OPC UA
- Ethernet/IP
- HSR / PRP Redundant Networking
- EtherCAT



Rich Protocol Library
Extensive protocol support to meet diverse industrial application needs.



Flexible Integration
Seamless integration with various devices, systems and platforms.



Reliable Industrial Communication
Stable, secure and efficient data transmission.



Multi-System Connectivity
Connects OT and IT systems for smarter operations.



Hardware Specifications

Category	TG-420	TG-424	TG-425
Hardware System			
CPU	Dual-core Cortex-A53 processor, clocked at 1.3GHz		
RAM	4GB LPDDR4X / 8GB LPDDR4X, 8GB is standard		
FLASH	8G / 16G / 32GB / 64GB eMMC, 32GB is standard		
Network Interfaces			
Ethernet Ports	2 x 10/100/1000 Mbps Ethernet ports		
Cellular Network	/	4G LTE: Cat1/Cat4/Cat6	5G NR: eMBB/RedCap
WAN	1 x WAN 10/100/1000 Mbps		
LAN	1 x LAN 10 / 100 / 1000 Mbps		
SIM Card Slot	/	Dual SIM / Dual eSIM / 1 x SIM + 1 x eSIM	
AI Port	2 analog inputs (AI), supporting various sensor signal inputs.		
Antenna	SMA male (plug); antenna ports: 6		
USB	USB 3.0		
Physical Interfaces			
Grounding Terminal	1 × Grounding Screw		
Status LEDs	6		
Reset Button	1		
Industrial Interfaces			
Serial Ports	2 x RS485 + 1 x RS232, 3 kV high-voltage isolation		
I/O Interfaces	Supports 4 x I/O, configurable as DI/DO		
Wi-Fi / WLAN			
Wi-Fi Frequency	2.4GHz, 5GHz		
Protocol Standards	Wi-Fi 4: 802.11b/g/n, Wi-Fi 6: 802.11a/b/g/n/ac/ax		
Maximum Transmission Rate	AX3000		
Data Rate	802.11b/g/n: up to574 Mbps; 802.11a/b/g/n/ac/ax: up to 2402 Mbps		
Transmit Power	802.11b: 16 dBm +/-2 dBm (11 Mbps); 802.11g: 16 dBm +/-2 dBm (54 Mbps); 802.11n@2.4 GHz: 16 dBm +/-2 dBm (HT20 MCS7); 802.11n@2.4 GHz: 16 dBm +/-2 dBm (HT40 MCS7)		
Transmission Distance	Line-of-sight <= 100 m (actual transmission distance depends on the site environment)		
Power Supply			
Power Connector	1 x DC power connector (DC 2.1)		
Input Voltage Range	DC input: 12-36 V; reverse-polarity protection supported		
Standby Power	5W		
Operating Power	6-10W		
Peak Power	20W		

Hardware Specifications

Category	TG-420	TG-424	TG-425
Environmental Conditions			
Operating Temperature	-40°C ~ +75°C		
Operating Humidity	5% to 95% (non-condensing)		
Storage Temperature	-40°C ~ +80°C		
Mechanical Characteristics			
Dimensions	125 x 108 x 50 mm (including antenna connectors)		
Protection Rating	IP30		
Enclosure	Metal enclosure panel		
Installation	DIN-rail / Wall-mounted		
Cooling Method	Fanless cooling		
Product Weight	550 g		
Reliability			
Shock	IEC60068-2-27		
Vibration	IEC60068-2-6		
Drop	IEC60068-2-32		
Certifications & Standards			
Regulatory Certifications	CE, RCM, UKCA, RoHS, Kenya		
EMC Standards	EN 55032; EN 55035; EN IEC 61000-6-3:2021; EN IEC 610000-6-1:2019; EN 301489-1; EN 301489-17; EN 301 489-52		
RF Standards	EN300328; EN301893; EN301511; EN301908-1/-2/-13		
SAR+Safety	EN50665; EN IEC62368-1		
Cybersecurity	EN18031-1; EN18031-2		
Electrostatic Discharge (ESD)	EN 61000-4-2:2009		
Radiated Immunity	EN IEC 61000-4-3:2020		
Electrical Fast Transient/Burst (EFT)	EN 61000-4-4:2012		
Surge Immunity	EN 61000-4-5:2014 + A1:2017 (Ethernet ports)		
Conducted Immunity	EN 61000-4-6:2014		
Ring Wave Immunity	EN61000-4-12, level 3		
Power-Frequency Magnetic Field Immunity	EN61000-4-8, horizontal/vertical 400 A/m (> level 2)		

Software Specifications

Category	TG-420	TG-424	TG-425
Industrial Protocols & Data Capabilities			
Industrial Protocols	Includes Modbus RTU, Modbus TCP, BACnet, M-Bus, OPC UA, and other protocols		
Modbus	Modbus RTU, Modbus TCP		
Industrial Device Protocols	PROFINET, EtherCAT, EtherNet (optional)		
BACnet	BACnet		
OPC UA	OPC UA		
Meter Protocols	DLT 645-2007, IEC 1107, IEC 61850, IEC 62056-21, DLMS		
DNP3	Supported modes: Station, Outstation; connection: TCP		
DLMS/COSEM	DLMS		
Custom Modbus Registers	Custom Modbus TCP register block requests; supports reading/writing files in the router, extending Modbus TCP client functionality		
Supported Data Formats	INT/UINT (8/16/32-bit), 32-bit Float, HEX, ASCII; supports MSB/LSB and byte-order conversion (ABCD/DCBA/CDAB/BADC)		
DTU Functions	Supports TCP/UDP transparent transmission; Modbus RTU-to-Modbus TCP conversion; DCTCP/DCUDP modes		
Data to Server	Supports HTTP(S)/MQTT/Azure MQTT; multi-source data aggregation and reporting; customizable acquisition interval (minimum 1 s); supports custom Lua script extensions		
Modbus / MQTT Gateway	Allows commands to be sent to a Modbus Server via an MQTT Broker and data to be received		
API / Web API	Supports Web API; API endpoints are used to retrieve or modify data		
Network Capabilities			
Network Access	2G / 3G / 4G / 5G cellular networks (or VPDN private network)		
Access Authentication	Supports CHAP / PAP authentication		
LAN Protocols	ARP, Ethernet		
WAN Protocols	PPP, PPPoE, DHCP		
Network Protocols	TCP, UDP, IPv4, IPv6, ICMP, NTP, DNS, HTTP, HTTPS, SFTP, FTP, SMTP, SSL/TLS, ARP, VRRP, PPP, PPPoE, UPNP, SSH, DHCP, Telnet, SMPP, SNMP, MQTT		
Routing	Static routing, OSPF dynamic routing		
NAT	DMZ, NAT, NAT-T, NAT64 (listed under Firewall)		
DHCP	Static and dynamic IP assignment, DHCP relay, DHCP server configuration/status, and static leases; supports wildcard MAC addresses		
Network Backup / Failover	Wi-Fi WAN, VRRP, and wired connection options can all be used for automatic failover		
QoS	Traffic priority queuing based on source/destination, service, protocol, or port; WMM, 802.11e		
IP Applications	Supports Ping, Trace, DHCP Server, DHCP Relay, DHCP Client, DNS relay, DDNS, Telnet		
DNS / DDNS	Supports DoH (DNS over HTTPS), multiple DDNS provider configurations, and manual customization		

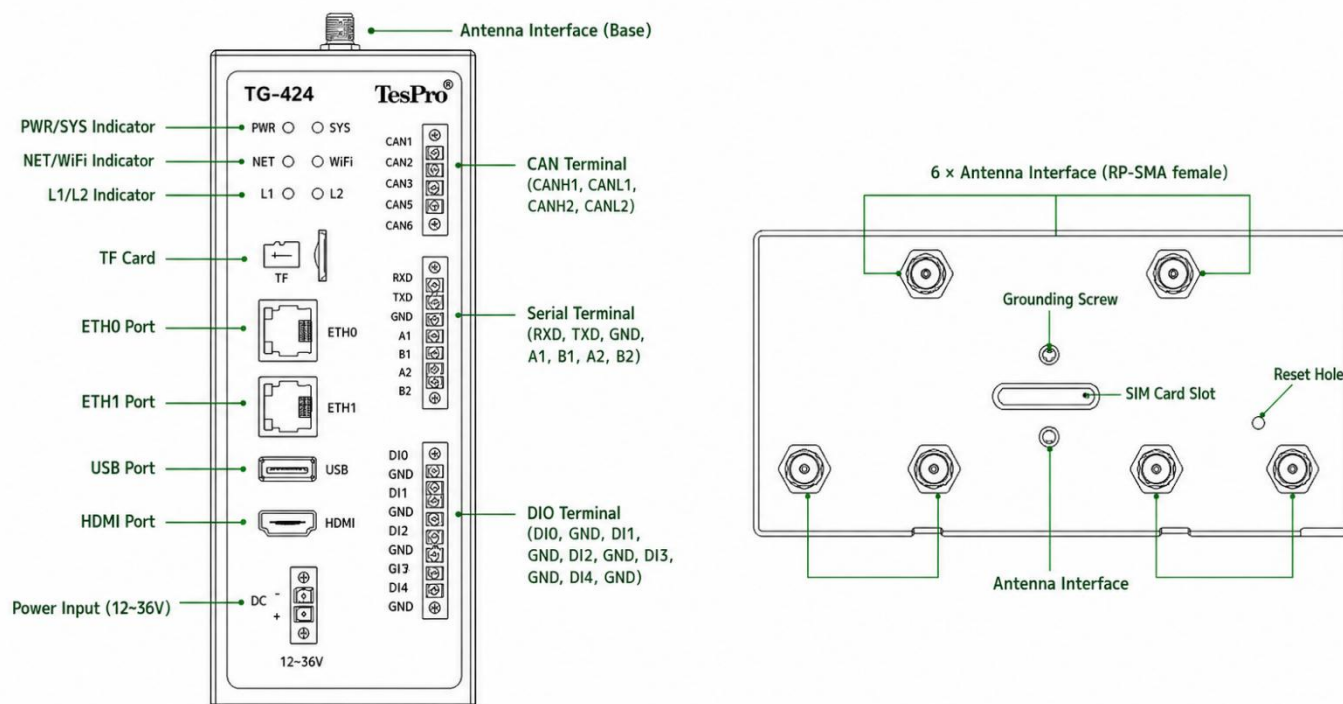
Software Specifications

Category	TG-420	TG-424	TG-425
Wi-Fi			
Wireless Mode	Wi-Fi 4: 802.11b/g/n, Wi-Fi 6: 802.11a/b/g/n/ac/ax, Access Point(AP), Station(STA)		
Wi-Fi Security	WPA2-Enterprise/PSK, WPA-EAP/PSK, WPA3-SAE/EAP, OWE; AES-CCMP, TKIP, client separation, EAP-TLS, 802.11w PMF, etc.		
Wi-Fi Users	Wi-Fi 4: up to 30 simultaneous connections; Wi-Fi 6: up to 256 simultaneous connections		
Hotspot Relay	Forwards the Wi-Fi hotspot login page to downstream connected devices		
SSID / ESSID	SSID stealth mode; MAC-address-based access control		
Operating Modes	Supports AP, Client, and WDS modes		
Security Features	Open System, Shared Key, WPA/WPA2 authentication; WEP/TKIP/AES encryption		
Network Security & VPN			
Network Protection	Port forwarding / traffic rules / custom TTL; WebUI / CLI firewall configuration; DMZ, NAT / NAT-T / NAT64		
Data Protection	Supports PPTP, L2TP, GRE, IPsec VPN, DMVPN, OpenVPN, WireGuard, and other VPN functions; supports digital certificate CA		
Authentication	Pre-shared key / X.509 digital certificates, TACACS+, built-in / external RADIUS authentication, IP/time/login-attempt blocking, random password generator		
Attack Protection	DDoS protection (SYN flood, SSH, HTTP/HTTPS attack protection); port-scan protection (SYN-FIN, SYN-RST, X-mas, NULL flags, FIN scan attacks)		
VLAN	Port- and tag-based VLAN isolation		
Access Control	Flexible access control for SSH, Web interface, CLI, and Telnet		
Web Filter	Blacklist for unwanted websites; whitelist for allowed websites only		
Certificate Management	Certificate generation tool for creating CA, server, client, Let's Encrypt, and SCEP certificates		
OpenVPN	Supports multiple clients and one server running simultaneously; supports 27 encryption methods		
IPsec	XFRM, IKEv1, IKEv2; 14 encryption methods for IPsec: 3DES, DES, AES128, AES192, AES256, AES128/192/256GCM8/12/16		
WireGuard	Supports WireGuard VPN client and server		
GRE	Supports GRE tunnels and GRE over IPsec tunnels		
PPTP / L2TP	Client/Server instances can run simultaneously; supports L2TPv3 and L2TP over IPsec		
DMVPN	Scalable IPsec VPN supporting Phase 2, Phase 3, and Dual Hub		
SSTP	Supports SSTP client instances		
ZeroTier	Supports ZeroTier VPN client		
Stunnel	Proxy adds TLS encryption to existing clients and servers		
Tinc	Encryption, authentication, and compression within tunnels; supports client and server modes		
EoIP	Ethernet over IP tunnel based on GRE RFC 1701		

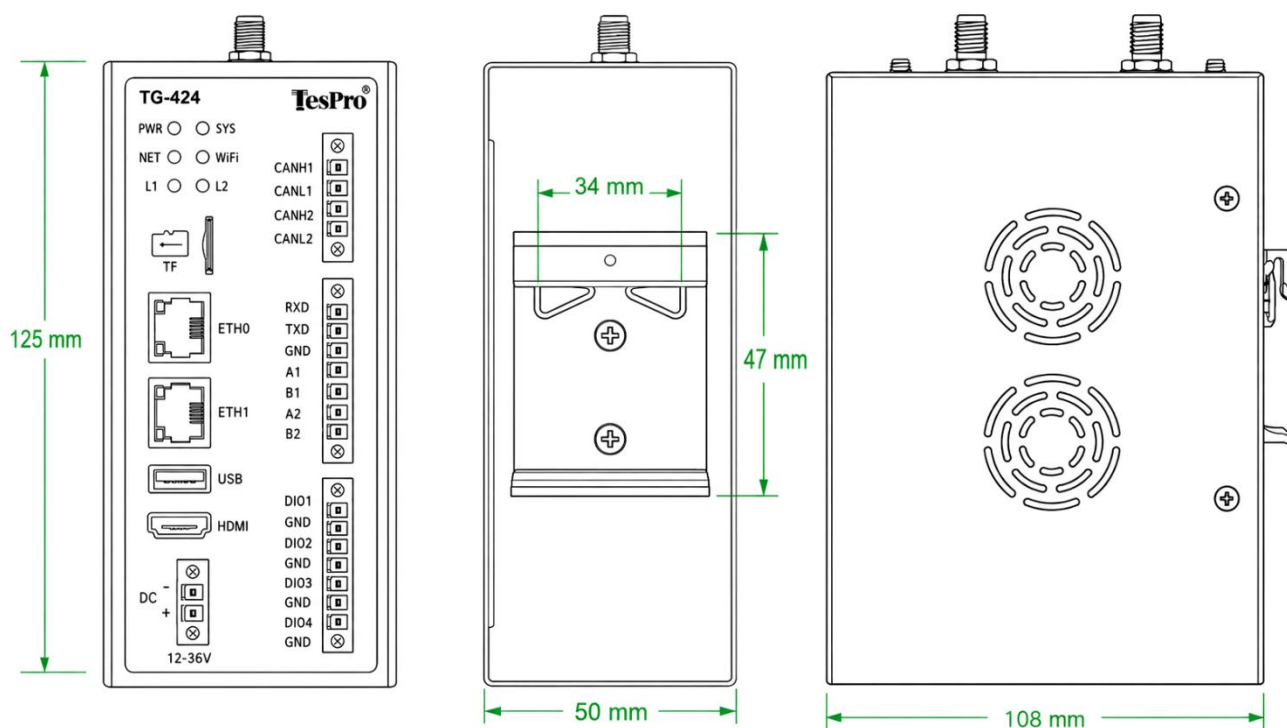
Software Specifications

Category	TG-420	TG-424	TG-425
Management & Platform			
Configuration Methods	Web UI, CLI, SSH, JSON-RPC, TesproOS, etc.		
Cloud & IoT Platform Integration	Supports major global platforms: Google, Huawei, Amazon, Microsoft Cloud, iStarOS, Azure IoT Hub, other third-party cloud platforms, and custom clouds		
FOTA	Firmware updates from server with automatic notifications		
SNMP	SNMP (v1, v2, v3), SNMP Trap		
MQTT	MQTT Broker, MQTT Publisher		
JSON-RPC	HTTP/HTTPS-based management API		
SSH	SSH (v1, v2)		
Upgrade Methods	FOTA; Web UI		
Logging	Event logs, system logs, kernel logs		
Alarm Functions	Email message status alerts		
On-Demand Dialing / Activation	On-demand dialing, data activation, SMS activation		
Email	Receives email message status alerts from various services		
Software System			
Operating System	TesproOS (Linux)		
Supported Languages	BusyBox shell, Lua, C, C++, Python		
Development Tools	SDK package including build environment		
Custom Firmware / GPL Customization	Supports custom-branded firmware and Web page applications (colors, logo, etc.)		
Package Management	Supports installation of additional software packages		
Firmware & Configuration			
Web UI Upgrade	Update firmware from file; check firmware on server; configuration files; configuration backup		
FOTA Upgrade	Firmware update		
Cloud Batch Upgrade	Supports updating firmware/configuration on multiple devices at once through TesproOS		
Upgrade While Retaining Configuration	Updates firmware without losing the current configuration		
Factory Reset	Full factory reset, restoring all system settings including IP address, PIN code, and user data		
Environment & Reliability			
Hot Standby / VRRP	VRRP (listed under Network Backup)		
Link Connectivity Detection	Heartbeat detection; automatic reconnection after link disconnection		
Dual-SIM Link Switching	Supports dual-SIM or dual-eSIM link switching		
Embedded Watchdog	Device operation self-check with automatic fault recovery		

Interface Diagram



External dimensions



Accessories and Packaging



TG-400 Series Industrial Gateway
1 pc



Power Adapter
1 pc



Cellular Antenna
1 pc



Wi-Fi Antenna
1 pc



Ethernet Cable (RJ45)
1 pc



Quick Start Guide
1 pc



Overall Dimensions

380 × 280 × 200 mm

Made of eco-friendly recyclable packaging materials, meeting green environmental requirements.

Product Selection

Product Model	Cellular Networks and Frequency Bands	Ethernet interface	Wi-Fi	S: Serial port
TG-420	No cellular network	1*WAN + 1*LAN 10/100/1000Mbps	Wi-Fi 4: 802.11b/g/n Wi-Fi 6: 802.11a/b/g/n/ac/ax	1*RS232+2*RS485
TG-424	4G LTE Cat.1 / Cat.4 / Cat.6 LTE FDD: B1/3/5/7/8/20/28/71/66 LTE TDD: B38/40/41 WCDMA: B1/3/5/8			
TG-425	5G NR / RedCap: n1/3/5/7/8/20/28/38/40/41/71/77/78/66 LTE FDD: B1/3/5/7/8/20/28/71/66 LTE TDD: B38/40/41			

About Tespro

Tespro is an industrial IoT manufacturer with 25 years of experience, specializing in AI computing, industrial IoT, power communication equipment, and software. Its products include industrial gateways, routers, DTUs, optical probes, testing instruments, and management platforms for energy, automation, smart buildings, and commercial applications. With branches in the U.S., U.K., Singapore, Hong Kong, and Zhuhai, Tespro serves 150+ countries and partners with Fortune Global 500 companies.

Global Office Locations

USA: 39 S Hayman Ave, Colorado Springs, CO 80910, US
UK: Flat 601 Ontario Tower, 4 Fairmont Avenue, London, UK, E14 9JA
Australia: 43 Tribeca Cct, North Lakes QLD, Australia 4509
Singapore: 3 Gambas Crescent, #04-01, Nordcom One, Singapore 757088
Hong Kong: Flat 602, 6/F, No. 2C Argyle Street, Mong Kok, Kowloon, HK
China: 2nd Floor, Liti Technology Building, No. 184 Bailian Road, Jida, Zhuhai City