InHand Networks

All-in-one, high-performance, rugged rail cellular gateway



InVehicle G814 Series Cellular Gateway

- 5G/LTE-A
- Dual-band Wi-Fi 5
- GNSS + ADR
- TNC + M12

1. Product Overview

The InVehicle G814 is an ITxPT-ready cellular gateway designed for metro, light rail, and train deployments, delivering secure and reliable onboard broadband networking.

Positioning: Rugged all-in-one rail gateway with high-speed WAN, Wi-Fi, GNSS, and edge computing

Key Features:

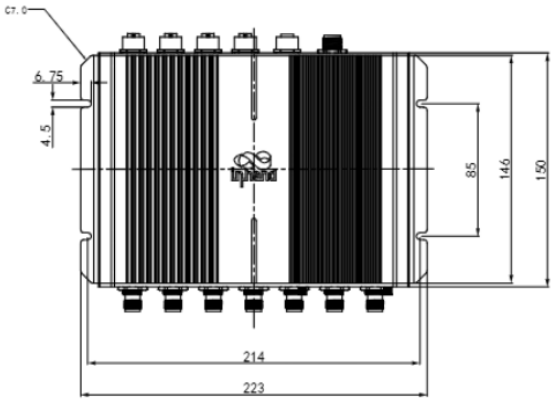
- **Rail-ready hardware:** TNC RF and M12 connectors for vibration and harsh environments
- **High-speed connectivity:** 5G/LTE-A, dual SIM, and link backup for uninterrupted service
- **Global positioning:** Multi-constellation GNSS with ADR and up to 10 Hz update rate
- **Open edge platform:** Supports C/C++, Python, Docker, and cloud SDK integration
- **Fleet operation enablement:** Supports diagnostics collection and OTA lifecycle management

Core Technical Specifications

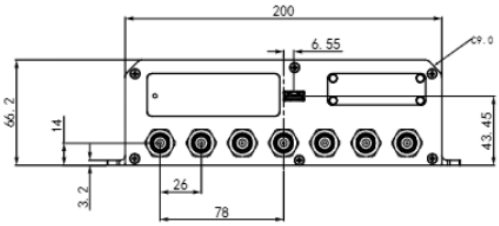
Technical Metric	Specification
Cellular Network	5G SA/NSA (Sub-6) + LTE Cat6/Cat4, dual SIM (2 x Mini SIM)
Positioning	GPS/GLONASS/Galileo/Beidou, 10 Hz, ADR support
Cloud Management	InHand Device Manager for remote O&M
VPN & Security	IPsec/OpenVPN/L2TP/GRE, SPI firewall, ACL, AAA
Network Features	APN/VPDN, static routing/RIP/OSPF/BGP, VRRP, link backup

Technical Metric	Specification
Edge Computing	C/C++, Python, Docker, MQTT/HTTP/TCP FlexAPI
Dimensions	223 x 177.76 x 66.2 mm
Weight	1438 g
Interfaces	4 x Gigabit Ethernet, 2 x RS232, 1 x RS485, 1 x USB 3.0, 2 x CAN, 11DI/4DO
Power Input	9-36 VDC (M12 A-coded)
Operating Environment	-30 C to +70 C; storage -40 C to +85 C; 95% RH @ 40 C
Protection & Structure	IP53, aluminum enclosure, fanless

2. Product Dimensions



Front View



Interface View



Side View

Notes:
1. All dimensions are in millimeters (mm).
2. All dimensions are approximate and **for reference only**.
3. Drawings **must not be used for manufacturing**.
4. Dimensions are subject to part and manufacturing tolerances.
5. Specifications may change without prior notice.

3. Hardware Specifications

Category / Parameter	Specification
Core Platform	
CPU	ARM Cortex-A7 (quad-core)
Frequency	717 MHz
RAM	1 GB DDR3L
Flash	8 GB eMMC
Cellular & Networking	
Cellular	5G SA/NSA (Sub-6), LTE Cat6/Cat4
SIM	2 x Mini SIM (2FF)
Ethernet	4 x Gigabit Ethernet, M12 X-coded female
Antenna Connector	TNC
Satellite Positioning	
GNSS Receiver	GPS, GLONASS, Galileo, Beidou

Category / Parameter	Specification
Dead Reckoning	Built-in accelerometer and gyroscope
Position Accuracy	2.5 m CEP
Tracking Sensitivity	-160 dBm
Update Rate	Max 10 Hz
ADR	2% of distance traveled without GNSS
Vehicle Interfaces	
CAN Bus	1 x CAN 2.0B + 1 x CAN 2.0B (FMS)
Serial	2 x RS232, 1 x RS485
USB	1 x USB 3.0 (Type-A)
I/O	11 x DI, 4 x DO
Wi-Fi	
Frequency	2.4 / 5 GHz dual-band
Protocol	Wi-Fi 5
Maximum Output	2.4G: 17 dBm; 5G: 17 dBm
Working Mode	AP / Client
MIMO	2 x 2 MU-MIMO
Power	
Power Connector	M12 A-coded male
Input Voltage	9-36 VDC
Pin Definition	V+, V-, Ignition, NC (4 pins)
Standby Power	0.006 W (ignition monitoring only)

Category / Parameter	Specification
Operating Power	16.00 W (average, RF full load)
Peak Power	20.0 W (RF full load)
Mechanical & Environment	
Dimensions (W x H x D)	223 x 177.76 x 66.2 mm
Weight	1438 g
Mounting	Wall mounting
Ingress Protection	IP53
Cooling	Fanless cooling
Enclosure	Aluminum
Operating Temperature	-30 C to +70 C
Storage Temperature	-40 C to +85 C
Humidity	95% RH @ 40 C
Compliance & Certifications	
Rail Standard	EN50155, EN50121-3-2, EN61373, EN45545-2
Certification	CE, RoHS, E-Mark, ITxPT

4. Software Specifications

Category / Parameter	Specification
Network Features	
Network Access	APN, VPDN

Category / Parameter	Specification
LAN Protocol	ARP, Ethernet
Access Authentication	CHAP/PAP/MS-CHAP/MS-CHAP V2
VLAN	VIDs: 1-127
IP Application	Ping, Traceroute, DHCP server/relay/client, DNS relay, DDNS, Telnet, SSH, HTTP, HTTPS, MQTT
IP Routing	Static routing, RIP, OSPF, BGP
Security	
Firewall	SPI, DoS defense, multicast/Ping filtering, ACL
NAT	NAT, NAPT, DMZ, port mapping
User Level	Administrator and read-only user
AAA	Local authentication, Radius, TACACS+, LDAP
Certificate	PEM, PKCS12, SCEP, CRL
VPN	IPsec VPN, OpenVPN, L2TP, GRE
Reliability	
Redundancy	Floating static routes, VRRP, interface backup
Link Detection	Configurable target reachability detection for failover
Watchdog	Auto recovery from device faults
Offline Storage	Local storage of key data when network is unavailable
WLAN Features	
Protocol	IEEE 802.11 a/b/g/n/ac
Security	Shared key, WPA/WPA2 Personal/Enterprise

Category / Parameter	Specification
Encryption	WEP/TKIP/AES
Other	Multiple SSIDs, captive portal
Edge Computing & Services	
Programmable	C/C++, Python, Docker
SDK	Python 3 SDK, Docker SDK, Azure IoT Edge SDK
IDE	Visual Studio Code
API	FlexAPI over MQTT/HTTP/TCP
Cloud Integration	Microsoft Azure, AWS IoT, and third-party cloud platforms
Built-in Services	Inventory, time, GNSS, FMStoIP, MQTT broker
Management Platform	InHand Device Manager (cloud deployment and remote operations)

5. Ordering Information

Model Rule

Model code: VG814-<WMNN>-W-G-R

<WMNN>: Cellular Type & Module

Product Models

Model	Region	<WMNN>: Cellular Type & Module
VG814-FS59-W-G-R	Europe, Africa, APAC, Oceania	LTE-FDD: B1/3/5/7/8/18/19/20/26/28A/28B LTE-TDD: B38/39/40/41 TD-SCDMA: B34/B39 UMTS/HSPA+: B1/3/5/6/8 GSM/GPRS/EDGE: 900/1800 MHz
VG814-FQ09-W-G-R	Europe, APAC	LTE-FDD: B1/2/3/4/5/7/8/12/13/14/17/18/19/20/25/26/28/29/30/32/66/71 LTE-TDD: B34/38/39/40/41/42/43/46(LAA)/48(CBRS) WCDMA: B1/2/3/4/5/6/8/19
VG814-NRQ3-W-G-R	Global	5G NSA: n1/2/3/5/7/8/12/20/25/28/38/40/41/48/66/71/77/78/79 5G SA: n1/2/3/5/7/8/12/20/25/28/38/40/41/48/66/71/77/78/79 LTE-FDD: B1/2/3/4/5/7/8/9/12(17)/13/14/18/19/20/25/26/28/29/30/32/66/71 LTE-TDD: B34/38/39/40/41/42/43/48 LAA: B46 WCDMA: B1/2/3/4/5/6/8/19

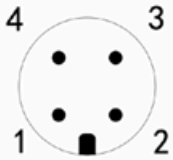
6. Contact Us

- **Website:** [InHand Networks]
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7. Terminal Definition

PWR	PIN	Signal
	1	VIN+
	2	IGT
	3	VIN–
	4	NC

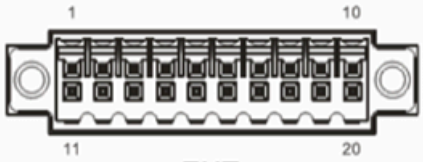
PWR 4 PIN



FMS	PIN	Signal
	1	CAN1_H
	2	CAN1_L
	3	GND
	4	NC

FMS 4 PIN

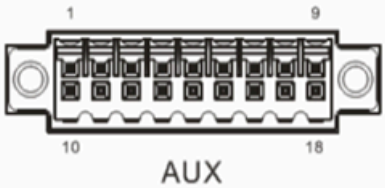




EXT

PIN	1	2	3	4	5	6	7	8	9	10
Signal	GND	DO2	DO4	WHEEL TICK*	GND	RS232_RX1	RS232_RX2	GND	CAN0_L	RS485_A
PIN	11	12	13	14	15	16	17	18	19	20
Signal	GND	DO3	PPS	FWD*	GND	RS232_TX1	RS232_TX2	GND	CAN0_H	RS485_B

* WHEEL TICK and FWD is ADR function reserve PIN, VG814-NRQ3-W-Ga-V is supported.



AUX

PIN	1	2	3	4	5	6	7	8	9
Signal	DI1	DI2	DI3	DI4	DI5	DI6	DI7	DI8	GND
PIN	10	11	12	13	14	15	16	17	18
Signal	GND	GND	GND	GND	DI9	DO1	DI10	DI11	GND