V1200 Series

Arm-based compact rail computers with options for wireless and cellular expansion



Features and Benefits

- Arm Cortex-A53 quad-core 1.6 GHz processor
- Slim, compact design with multiple mounting options
- Integrated 5G Sub-6GHz NR module and Wi-Fi 6 module with dual SIM
- Built-in TPM 2.0 module
- Moxa Industrial Linux built-in for long-term Linux support
- Isolated power with 24 to 110 VDC power supply range
- Complies with all EN 50155 mandatory test items[1]

Certifications

EN 50121-4 CE EN 50155 FC

Introduction

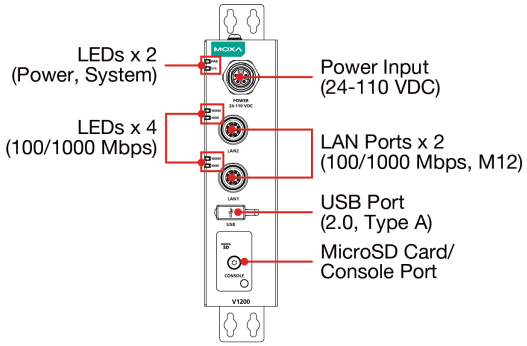
The V1200 computing platform is designed for railway TCMS data-acquisition and train-to-ground applications. The computer comes with dual M12 10/100/1000 Mbps Ethernet ports, built-in 5G and Wi-Fi 6 modules and dual RS-232/422/485 serial ports. The slim, compact design with multiple mounting options reduces installation space and provides flexibility for mounting in various cabinets or onboard locations.

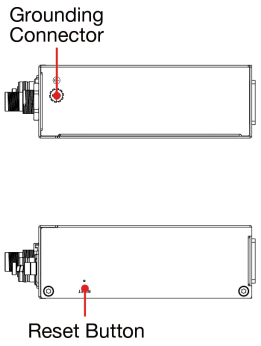
The V1200 comes with Moxa Industrial Linux (MIL) and long-term Linux support and vulnerability patching. A web-based interface is provided for easy configuration of Ethernet and wireless network settings without the need for programming.

The V1200 wireless-enabled models are thoroughly tested in a testing chamber, guaranteeing they meet the EN 50155 mandatory requirements and OT4 operating temperature (-40 to 70°C with cellular and Wi- Fi modules enabled) requirements, making them suitable for wide-temperature applications.

Appearance

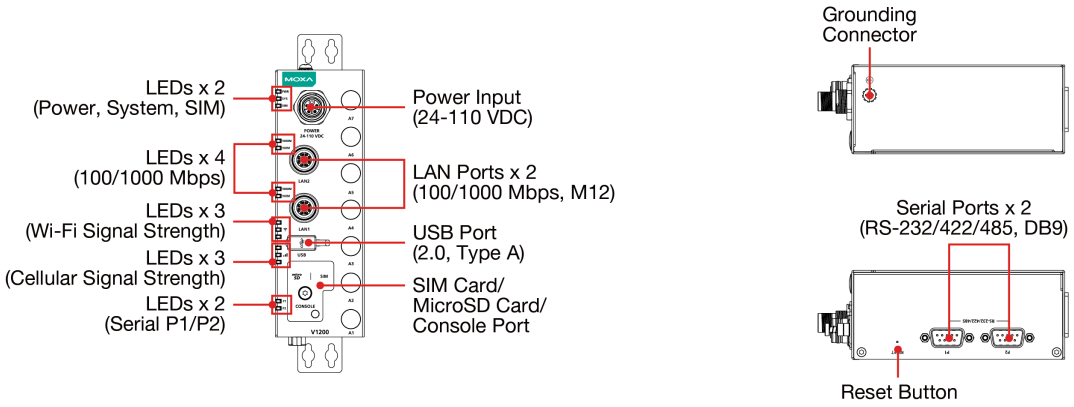
V1202-CT-T Model



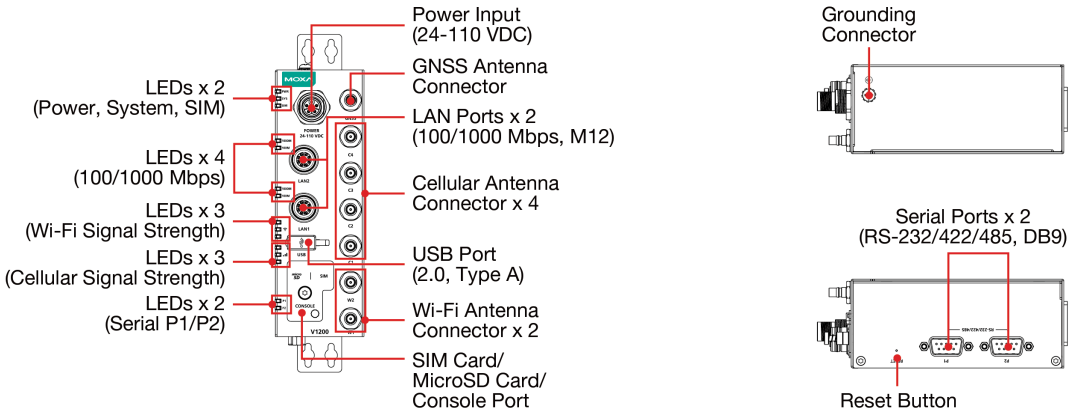


1. This product is suitable for rolling stock railway applications, as defined by the EN 50155 standard. For a more detailed statement, click here: www.moxa.com/doc/specs/EN_50155_Compliance.pdf

V1222-CT-T Model



V1222-W-CT-T Model



Specifications

Computer

CPU	Arm Cortex-A53 quad-core 1.6 GHz
DRAM	4 GB LPDDR4
Supported OS	Moxa Industrial Linux 3 (Debian 11, kernel 5.10), 2031 EOL See www.moxa.com/MIL
Storage Pre-installed	16 GB eMMC
Expansion Slots	microSD socket x 1

Computer Interface

Ethernet Ports	Auto-sensing 10/100/1000 Mbps ports (M12 X-coded) x 2
Serial Ports	V1222-CT-T, V1222-W-CT-T: RS-232/422/485 ports x 2 (software-selectable, DB9 male connector)
USB 2.0	USB 2.0 hosts x 1, type-A connectors
Wi-Fi Antenna Connector	V1222-CT-T, V1222-W-CT-T: QMA x 2
Cellular Antenna Connector	V1222-CT-T, V1222-W-CT-T: QMA x 4
GPS Antenna Connector	V1222-CT-T, V1222-W-CT-T: QMA x 1
Console Port	RS-232 (TxD, RxD, GND), 3-pin header output (115200, n, 8, 1)
Expansion Slots	M.2 E-key slot x1 (for Wi-Fi 6) M.2 B-key slot x1 (for 5G)

	mPCIe slot x1 (for LTE) Note: 5G and LTE cannot be operated at the same time. Note: 5G and LTE cannot be operated at the same time.
SIM Format	V1222-CT-T, V1222-W-CT-T: Nano
Number of SIMs	V1222-CT-T: 2 for 5G or 2 for LTE V1222-W-CT-T: 2 for 5G
Buttons	Reset button
TPM	TPM v2.0

Serial Interface

No. of Ports	V1222-CT-T, V1222-W-CT-T: 2
Baudrate	50 bps to 115.20 kbps
Data Bits	5, 6, 7, 8
Stop Bits	1, 1.5, 2
Parity	None, Even, Odd, Space, Mark
Flow Control	RTS/CTS, XON/XOFF ADDC (automatic data direction control) for RS-485 RTS Toggle (RS-232 only)
Isolation	N/A

Serial Signals

RS-232	TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
RS-422	Tx+, Tx-, Rx+, Rx-, GND
RS-485-2w	Data+, Data-, GND
RS-485-4w	Tx+, Tx-, Rx+, Rx-, GND

Cellular Interface

LTE Bands (LTE module)	Band 1 (2100 MHz), Band 2 (1900 MHz), Band 3 (1800 MHz), Band 4 (1700 MHz), Band 5 (850 MHz), Band 7 (2600 MHz), Band 8 (900 MHz), Band 9 (1800 MHz), Band 12 (700 MHz), Band 13 (700 MHz), Band 14 (700 MHz), Band 18 (850 MHz), Band 19 (850 MHz), Band 20 (800 MHz), Band 25 (1900 MHz), Band 26 (850 MHz), Band 28 (700 MHz)
5G NR Bands (5G module)	NSA and SA bands: n1 (2100 MHz), n2 (1900 MHz), n3 (1800 MHz), n5 (850 MHz), n7 (2600 MHz), n8 (900 MHz), n12 (700 MHz), n13 (700 MHz), n14 (700 MHz), n18 (800 MHz), n20 (800 MHz), n25 (1900 MHz), n26 (850 MHz), n28 (700 MHz), n29 (700 MHz), n30 (2300 MHz), n38 (2600 MHz),n40 (2300 MHz), n41 (2500 MHz), n48 (3600 MHz), n66 (1700 MHz), n71 (600 MHz), n75 (1500 MHz), n77 (3700 MHz), n78 (3500 MHz), n79 (4500 MHz)
UMTS/HSPA Bands (LTE module)	Band 1 (2100 MHz), Band 2 (1900 MHz), Band 4 (1700 MHz), Band 5 (850 MHz), Band 6 (850 MHz), Band 8 (900 MHz), Band 19 (850 MHz)
UMTS/HSPA Bands (5G module)	Band 1 (2100 MHz), Band 2 (1900 MHz), Band 4 (1700 MHz), Band 5 (850 MHz), Band 6 (850 MHz), Band 8 (900 MHz), Band 19 (850 MHz)
LTE Bands (5G module)	B1 (2100 MHz), B2 (1900 MHz), B3 (1800 MHz), B4 (1700 MHz), B5 (850 MHz), B7 (2600 MHz), B8 (900 MHz), B12 (700 MHz), B13 (700 MHz), B14 (700 MHz), B17 (700 MHz), B18 (800 MHz), B19 (800 MHz), B20 (800 MHz), B25 (1900 MHz), B26 (850 MHz), B28 (700 MHz), B29 (700 MHz), B30 (2300 MHz), B32 (1500 MHz), B34 (2000 MHz), B38 (2600 MHz), B39 (1900 MHz), B40 (2300 MHz), B41 (2500 MHz), B42 (3500 MHz), B43 (3600 MHz), B46 (5200 MHz), B48 (3600 MHz), B66 (1700 MHz), B71 (600 MHz)

2G Bands (LTE module)	Band 2 (PCS_1900), Band 3 (DCS_1800), Band 5 (GSM_850), Band 8 (EGSM_900)
Cables	5G module: IPEX MHF4 to QMA cables x 5 (4 for data transition, 1 for GNSS) LTE Module: IPEX MHF to QMA cables x 3 (2 for data transition, 1 for GNSS)

GPS Interface

Frequency Range	5G module: Wide-band GNSS: 1559 to 1606 MHz (recommended) GPS: BW NB GPS 2.046 MHz (centered at 1575.42 MHz) GLONASS: BW 8.3 MHz approx. (1597.05 to 1606 MHz) BeiDou: 4.092 MHz BW (1559.05 to 1563.14 MHz) Galileo: 4.092 MHz BW (centered at 1575.42 MHz) LTE module: Wide-band GNSS: 1559 to 1606 MHz (recommended) State-of-the-art GNSS solution with GPS/GLONASS/BeiDou/Galileo/QZSS
Antenna Types Supported	5G module: Active antenna (default) 7.5 dB < Gain < 26 dB for nominal performance 1.5 dB < Gain < 7.5 dB for nominal performance Configured via AT command Passive antenna: 1.5 dBi < Gain < 3dBi LTE module: Typ. 14 dBi < Gain < 17 dBi (external active antenna with a GNSS pre-filter)
Time to First Fix (TTFF)	5G module: Hot start: 1 s Warm start: 27 s Cold start: 28 s Open Sky, mean TTFF LTE module: Hot start: 1.1s Warm start: 22.1s Cold start: 29.9s GPS + GLONASS simulator test
Sensitivity	5G module: Cold starts: -146 dBm Tracking: -161 dBm Acquisition: -148 dBm LTE module: Cold starts: -145 dBm Tracking: -160 dBm Acquisition: -147 dBm
Update Rate	Minimum 1 Hz

WLAN Interface

WLAN Standards	802.11a/b/g/n/ac/ax
Frequency Band	2.4 GHz / 6 GHz 2.4 GHz / 5 GHz

LED Indicators

System	Power x 1 System x 1 SIM card indicator x 1
LAN	2 ports, 1 per port (10/100/1000 Mbps)
Serial	V1222-CT-T, V1222-W-CT-T: 1 LED per port for 2 serial ports
Wireless Signal Strength	Cellular x 3 Wi-Fi x 3

Power Parameters

No. of Power Inputs	1
Input Voltage	24 to 110 VDC
Input Current	V1202-CT-T: 0.4 A @ 24 VDC, 0.1A @ 110 VDC V1222-CT-T: 0.6 A @ 24 VDC, 0.13A @ 110 VDC V1222-W-CT-T: 0.6 A @ 24 VDC, 0.13A @ 110 VDC
Power Consumption	V1202-CT-T: 7.4 W at 95% CPU loading V1222-W-CT-T: 13.7 W (with 5G & Wi-Fi) at 95% CPU loading
Power Connector	M12 K-code power connector
Reverse Polarity Protection	Supported

Reliability

Automatic Reboot Trigger	External RTC (real-time clock)
Alert Tools	External WDT (watchdog timer)

Physical Characteristics

Housing	Metal SECC
IP Rating	IP40
Dimensions	V1202-CT-T: 150 x 120 x 41 mm (5.90 x 4.72 x 1.61 in) V1222-CT-T / V1222-W-CT-T: 150 x 120 x 50 mm (5.90 x 4.72 x 1.97 in)
Weight	Product only (without mounting ears) V1202-CT-T: 665 g (1.47 lb) V1222-CT-T : 935 g (2.06 lb) V1222-W-CT-T : 1,005 g (2.22 lb)
Installation	Wall mounting (standard) Desk mounting (with optional kit) DIN-rail mounting (with optional kit)

Environmental Limits

Operating Temperature	With Cellular and Wi-Fi: -40 to 70°C (-40 to 158°F)
Storage Temperature (package included)	-40 to 85°C (-40 to 185°F)
Ambient Relative Humidity	5 to 95% (non-condensing)

Standards and Certifications

EMC	EN 55032/35 EN 61000-6-2/-6-4
EMI	CISPR 32, FCC Part 15B Class A
EMS	IEC 61000-4-2 ESD: Contact: 6 kV; Air: 8 kV IEC 61000-4-3 RS: 80 MHz to 1 GHz: 20 V/m IEC 61000-4-4 EFT: Power: 2 kV; Signal: 2 kV IEC 61000-4-5 Surge: Power: line-to-line 2 kV, Signal: line-to-ground 2 kV IEC 61000-4-6 CS: 150 kHz to 80 MHz; Signal: 10 V IEC 61000-4-8 PFMF
Wireless	EN 301 489-1/-17/-19/-52 EN 62311 EN 300 328 (WLAN 2.4G) EN 301 893 (WLAN 5G) EN 303 687 (WLAN 6 GHz) EN 301 908-1

	EN 303 413 FCC UKCA
International Approval	FCC CE UKCA RCM (V1202-CT-T and V1222-CT-T)
Safety	IEC 62368-1 UL 62368-1
Railway Fire Protection	EN 45545-2 NFPA130
Railway	EN 50155: 2021 EN 50121-4
Shock	IEC 60068-2-27 IEC 61373 EN 50155
Vibration	IEC 60068-2-64 IEC 61373 EN 50155
Green Product	RoHS, CRoHS, WEEE

MTBF

Time	V1202-CT-T: 2,755,789 hrs V1222-CT-T: 1,430,568 hrs V1222-W-CT-T: 1,324,329 hrs
Standards	Telcordia Standard SR332, GB

Warranty

Warranty Period	5 years
Details	See www.moxa.com/warranty

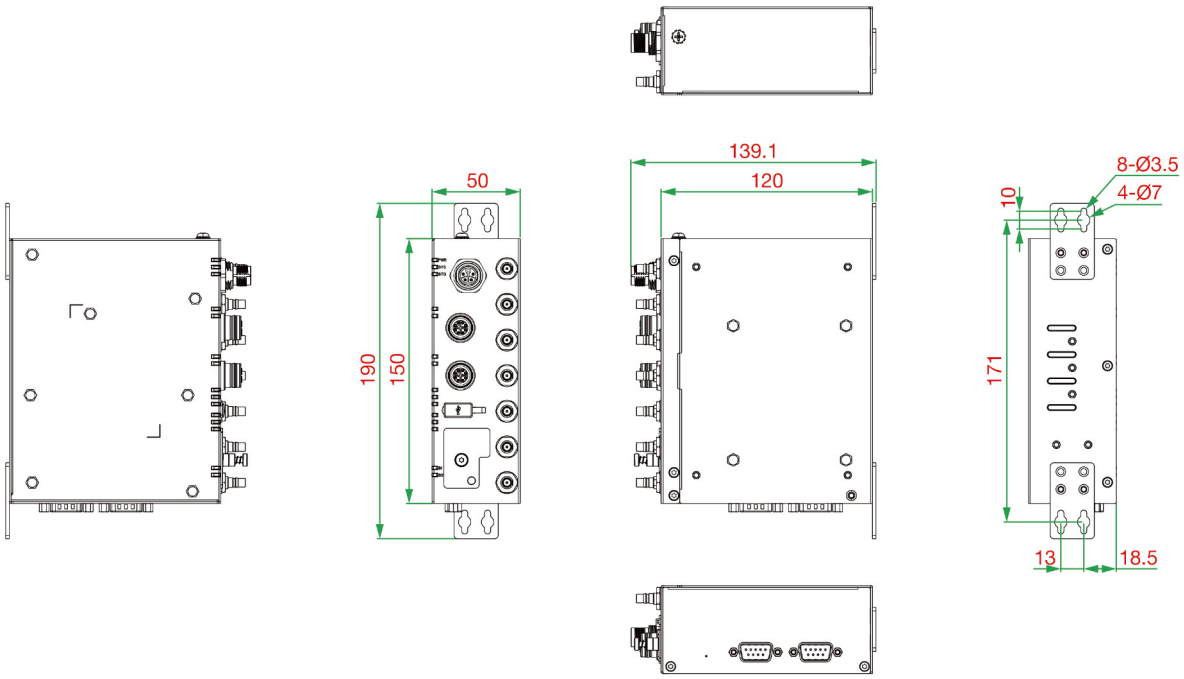
Package Contents

Device	1 x V1200 Series computer
Installation Kit	1 x wall-mounting kit
Documentation	1 x quick installation guide 1 x warranty card

Dimensions

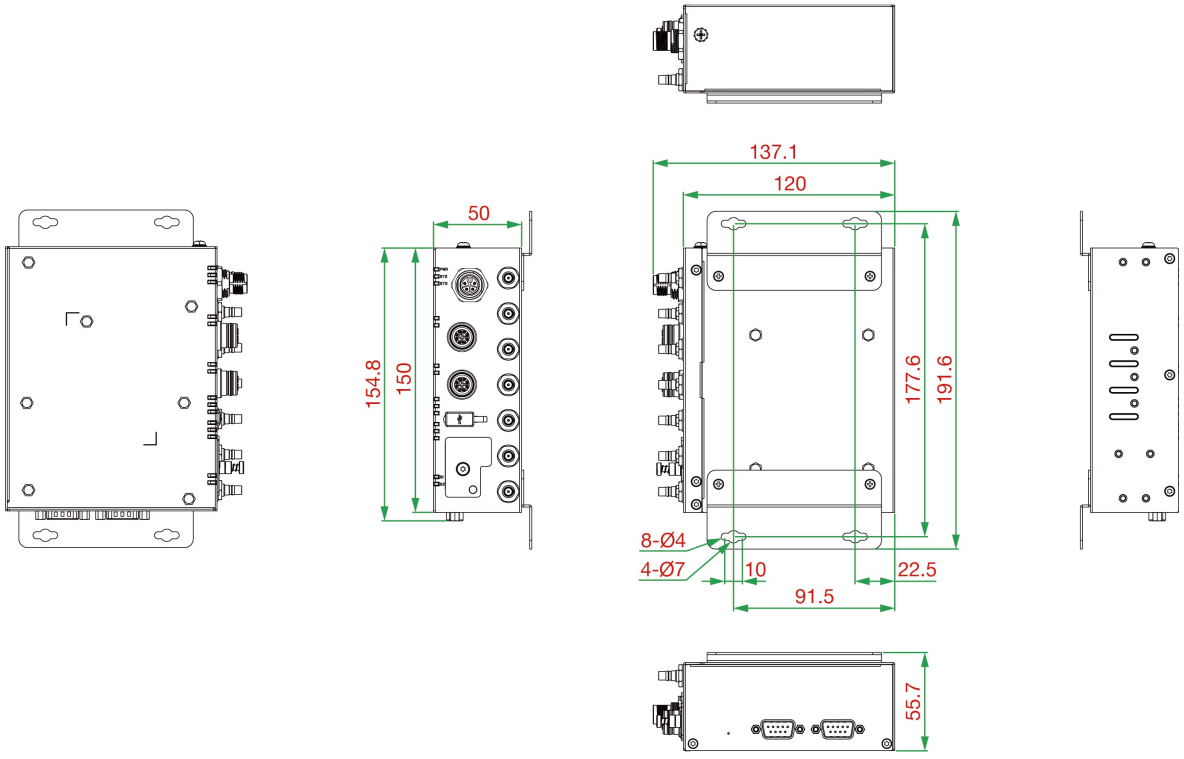
With Standard Wall Mounting Kit

Unit: mm



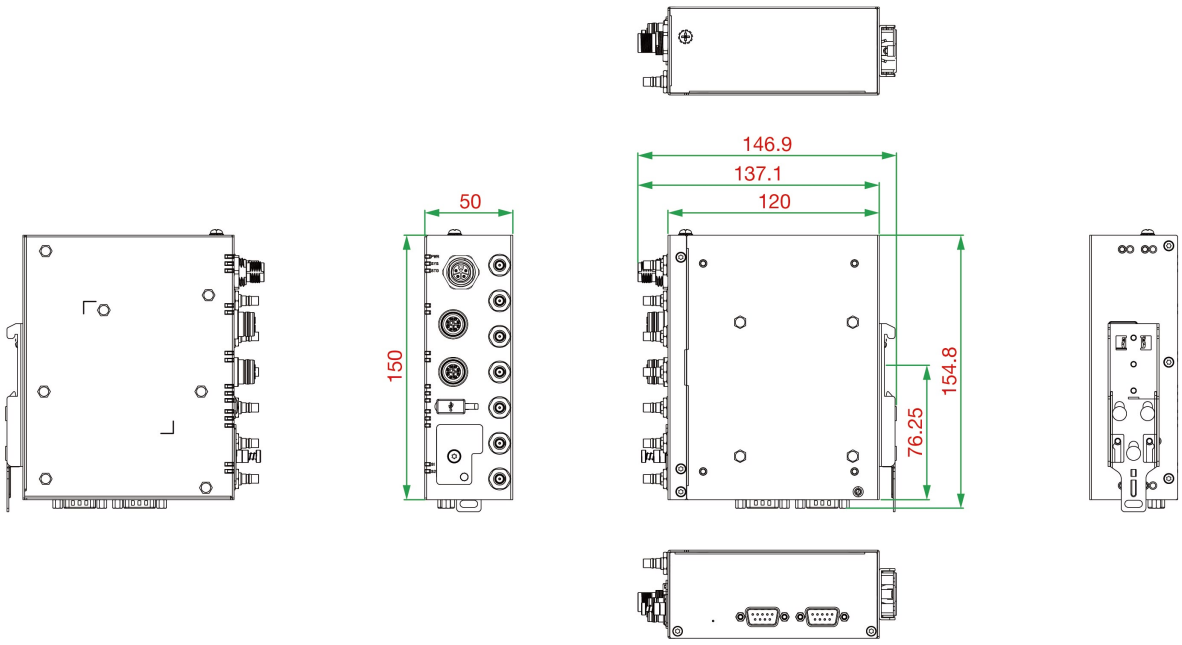
With Optional Desk Mounting Kit

Unit: mm



With Optional DIN-rail Mounting Kit

Unit: mm



Ordering Information

Model Name	CPU	eMMC	LPDDR4	GbE Ports	Serial Ports	Wireless	Operating Temperature	Conformal Coating
V1202-CT-T	Arm Cortex-A53 quad-core 1.6 GHz	16 GB	4 GB	2	N/A	N/A	-40 to 70°C	✓
V1222-CT-T	Arm Cortex-A53 quad-core 16 GHz	16 GB	4 GB	2	2	M.2 Ekey, M.2 Bkey, mPCIe socket reserved for Wi-Fi 6, 5G, or LTE Note: 5G and LTE module can not be enabled simultaneously.	-40 to 70°C	✓
V1222-W-CT-T	Arm Cortex-A53 quad-core 16 GHz	16 GB	4 GB	2	2	5G / Wi-Fi 6 Built-in	-40 to 70°C	✓

Accessories (sold separately)

Wi-Fi Wireless Modules

V1200-LTECat4-GL	Telit LE910C4 LTE Cat. 4 mPCIe card, 3 coaxial cables (I-PEX MHF male connector to QMA female connector), 2 thermal pads, 1 heat sink for the V1200 Series
V1200-5G	Telit FN990A28W 5G module, 5 coaxial cables (I-PEX MHF male connector to QMA female connector), 2 thermal pads, 1 heat sink for the V1200 Series
V1200-WLAN22-AX	Wi-Fi 6 (802.11ax) module, 2 coaxial cables (I-PEX 4 MHF male connector to QMA female connector), 1 thermal pad, 1 heat sink for the V1200 Series

Cables

CBL-M12KFF5POPEN-O-150-IP67	K-coded female M12-to-5-pin open wire power cable, orange, IP67-rated, 1.5 m
CBL-M12XMM8P-Y-300-IP67	X-coded male M12-to-8-pin open wire cable, yellow, IP67-rated, 3 m
CBL-M12XMM8P-Y-100-IP67	X-coded male M12-to-8-pin open wire cable, yellow, IP67-rated, 1 m
CBL-M12XMM8PRJ45-Y-200-IP67	X-coded male M12-to-RJ45 Ethernet cable, yellow, IP67-rated, 2 m

Mounting Kits

V1200 Din-rail Kit	DIN-rail mounting kit with 1 plate, 5 screws (M3 x 4 mm) for the V1200 Series
V1200 Desk-mounting Kit	Desk-mounting kit with 2 plates (44.8 x 99 x 5.7 mm), 4 screws (M3 x 5 mm) for the V1200 Series

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