AIG-302 Series

Advanced IIoT gateways with Arm® Cortex™-A7 dual-core 1 GHz processor, Azure IoT Edge software, -40 to 70°C operating temperature

Features and Benefits

- Supports generic MQTT client to facilitate MQTT connections via built-in device SDKs tailored for Azure cloud integration
- Supports Modbus RTU/ASCII/TCP client
- Supports Modbus TCP server
- Supports Azure IoT Edge
- Built-in network traffic monitoring and diagnostic tool for easy troubleshooting
- Provides robust OTA function to prevent system failure during software upgrades
- Equipped with Secure Boot to prevent malicious software-injection attacks
- -40 to 70°C operating temperature range
- LTE Cat. 4 US, EU, and APAC models available

Certifications

Introduction

The AIG-302 Series advanced IIoT gateways connect Modbus RTU/ASCII/TCP devices to platforms such as Azure cloud and MQTT. The gateways support the Modbus TCP server mode, enabling simultaneous transmission of data to cloud platforms and your local SCADA system.

Boost Edge Computing Capabilities With Azure IoT Edge

AIG-302 supports Azure IoT Edge to bring in a multitude of benefits, including edge computing capabilities, reduced bandwidth costs, flexibility and scalability, seamless integration with Azure services, and ease of management and update. Specifically, with the AIG-302 processing data locally, it not only offers rapid responses and low latency but also effectively reduces network bandwidth usage, thereby cutting costs. Additionally, the modular design of the AIG-302 and Azure IoT Edge support make your system both flexible and easily expandable. At the same time, its seamless integration with Azure cloud services allows you to effortlessly extend cloud capabilities to edge devices.

Built-in Ready-to-use Data Preprocessing Functions, No Coding Required

Energy Management Systems collect energy data such as average power generation and energy efficiency. This data is then used to display on-site conditions, observe the energy trend, and optimize energy usage. Most energy management systems require meaningful data and hence edge gateways are expected to preprocess data collected at field sites before transfer to cloud applications. Some applications may require certain actions to be performed within a short time frame on the preprocessed data. AIG-302 ready-to-run IIoT gateways come with value-added functions and an intuitive UI that simplify data preprocessing and distributed device management to just a few clicks.

Secure Remote Access Reduces Maintenance Costs

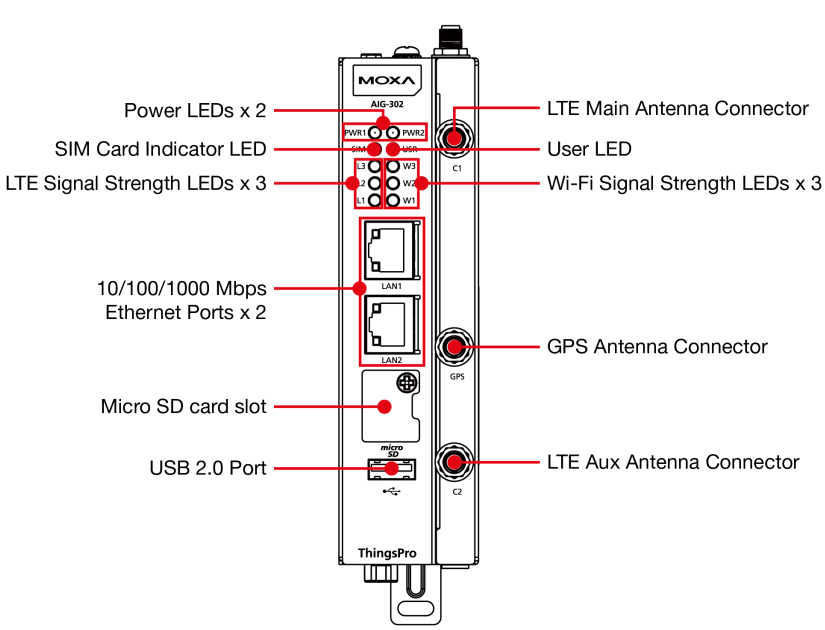
The AIG-302 comes with powerful troubleshooting tools to diagnose issues with protocol statuses and capture and analyze traffic packets, enabling engineers to identify the root cause of issues and quickly bring the operation back to normal. Moreover, AIG-302 provides secure remote access allowing maintenance engineers to fix issues remotely, saving time and effort as well as reducing the downtime in energy management systems. External connections can be encrypted using OpenVPN or TLS, ensuring secure communication.

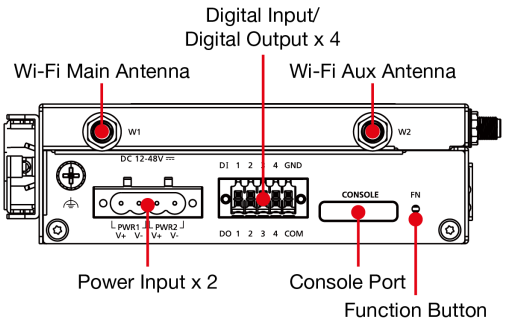
Security Dashboard Optimized for Detecting Security Issues

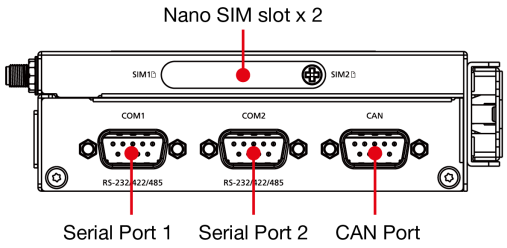
A security dashboard utilizes device scans to identify potential cybersecurity threats from multiple angles, such as during account settings management, application networking, application resource usage monitoring, product certificates deployment, service settings modifications, and system status checks. Upon detecting threats, a mitigation plan is recommended to resolve issues.

Appearance

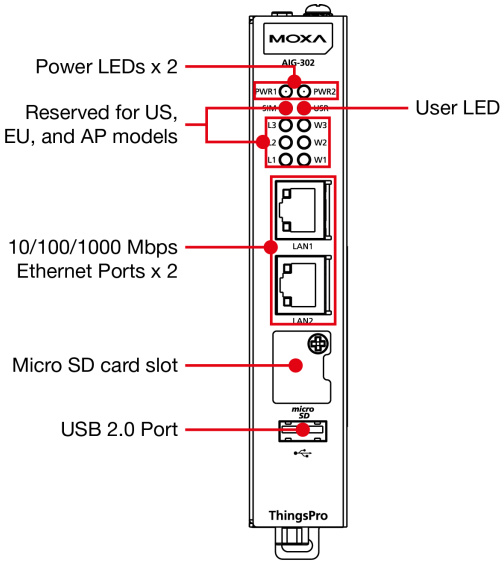
AIG-302-T US, EU, AP Models

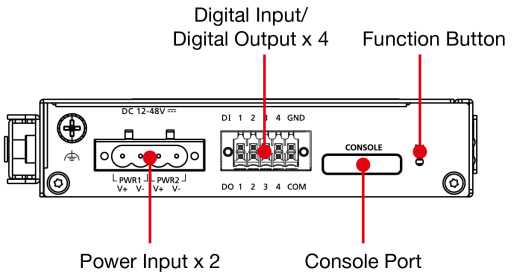


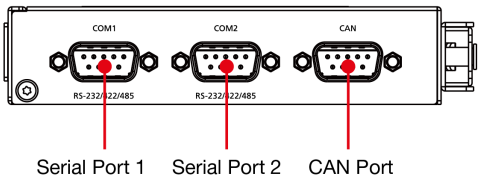




AIG-302-T-AZU-LX







Specifications

Computer

CPU	Armv7 Cortex-A7 dual-core 1 GHz
DRAM	2 GB DDR3L
Storage Pre-installed	32 GB eMMC
Pre-installed OS	Moxa Industrial Linux (Debian 11, kernel 5.10.x)
No. of Tags Supported	3000

Computer Interface

Ethernet Ports	Auto-sensing 10/100/1000 Mbps ports (RJ45 connector) x 2
Serial Channels	RS-232/422/485 ports x 2 (software-selectable, DB9 male connector)

CAN Ports	CAN 2.0 A/B x 1 (DB9 male)
Digital Input	DIs x 4
Digital Output	DOs x 4
USB 2.0	USB 2.0 hosts x 1, type-A connectors
Wi-Fi Antenna Connector	RP-SMA x 2 (excluding AIG-302-T-AZU-LX)
Cellular Antenna Connector	SMA x 2 (excluding AIG-302-T-AZU-LX)
GPS Antenna Connector	SMA x 1 (excluding AIG-302-T-AZU-LX)
Expansion Slots	mPCIe slots x 1 (excluding AIG-302-T-AZU-LX)
SIM Format	Nano (excluding AIG-302-T-AZU-LX)
Number of SIMs	2
Buttons	Reset button Reset to factory default
TPM	TPM v2.0

Ethernet Interface

Magnetic Isolation Protection	1.5 kV (built-in)
10/100/1000BaseT(X) Ports (RJ45 connector)	2

Ethernet Software Features

Industrial Protocols	Modbus TCP Client / Server Generic MQTT Azure IoT Device Azure IoT Edge
Configuration Options	Web Console (HTTPS) RESTful APIs AIG QuickON
Time Management	NTP Client GPS
Security	OpenVPN Client, SSH HTTPS/SSL TLS Firewall

Serial Interface

No. of Ports	2
Connector	DB9 male
Baudrate	300 bps to 921.6 kbps
Data Bits	7, 8
Stop Bits	1, 2
Parity	None, Even, Odd, Space, Mark
Flow Control	RTS/CTS, XON/XOFF
Console Port	1 x 4-pin header

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

Serial Software Features

Industrial Protocols	Modbus RTU/ASCII Master

CAN Interface

No. of Ports	1
Connector	DB9 male
Baudrate	10 to 1000 kbps
Industrial Protocols	CAN 2.0A CAN 2.0B
Signals	CAN_H, CAN_L, CAN_GND, CAN_SHLD, CAN_V+, GND
Isolation	2 kV (built-in)

Digital Inputs

Connector	Spring-type Euroblock terminal
Sensor Type	Wet contact (NPN) Dry contact
Dry Contact	Off: open On: short to GND
Wet Contact (DI to COM)	On: 10 to 30 VDC Off: 0 to 3 VDC
Isolation	3K VDC

Digital Outputs

Connector	Spring-type Euroblock terminal
Current Rating	200 mA per channel
I/O Type	Sink
Voltage	24 VDC nominal, open collector to 30 VDC

Cellular Interface

Cellular Standards	LTE Cat. 4
Band Options (US)	4G: Band 2 (1900 MHz)/ Band 4 (1700 MHz)/ Band 5 (850 MHz)/ Band 12 (700 MHz)/ Band 13 (700 MHz)/ Band 14 (700 MHz)/ Band 66 (1700 MHz)/ Band 71 (600 MHz) 3G: Band 2 (1900 MHz)/ Band 4 (1700 MHz)/ Band 5 (850 MHz) Carrier Approvals: Verizon, AT&T

Band Options (EU)	4G: Band 1 (2100 MHz)/ Band 3 (1800 MHz)/ Band 7 (2600 MHz)/ Band 8 (900 MHz)/ Band 20 (800 MHz)/ Band 28A (700 MHz) 3G: Band 1 (2100 MHz)/ Band 3 (1800 MHz)/ Band 8 (900 MHz)
Band Options (APAC)	4G: Band 1 (2100 MHz)/Band Band 3 (1800 MHz)/ Band 5 (850 MHz)/ Band 8 (900 MHz)/ Band 9 (1800 MHz)/ Band 18 (850 MHz)/Band 19 (850 MHz)/ Band 26 (850 MHz)/ Band 28 (700 MHz) 3G: Band 1 (2100 MHz)/ Band 5 (850 MHz)/ Band 6 (850 MHz)/ Band 8 (900 MHz)/ Band 19 (850 MHz)

GPS Interface

Receiver Types	GPS/GLONASS/BeiDou/Galileo/QZSS
Accuracy	Position: 2.0 m @CEP50
Time to First Fix (TTFF)	Hot start: 1.1 s Warm start: 22.1 s Cold start: 29.9 s
Sensitivity	Cold starts: -145 dBm Acquisition: -147.0 dBm Tracking: -160 dBm
Update Rate	1 Hz

Azure IoT Edge

Versions Supported	v1.4.20
Authentication Methods	Manual / Connection String DPS / Symmetric Encryption DPS / X.509 Certificate DPS / TPM
Azure Direct Methods	Reboot Software Upgrade Remote API Invocation
Azure Module Twin	Device Configuration
Moxa Functions	Custom Payload Message Group

Generic MQTT Client

Versions Supported	v3.1.1 v3.1
QoS Levels	0, 1, 2
Authentication Methods	Username and password
Secure Transmission	TLS 1.0 TLS 1.1 TLS 1.2
Native Capabilities	Keep Alive Retain Message Clean Session Will and Testament
Moxa Functions	Store and Forward Custom Payload Remote API Invocation

Azure IoT Device

Connection Protocols Supported	MQTT MQTT over WebSockets AMQP AMQP over WebSockets
Authentication Methods	Symmetric Key X.509 Certificate
Azure Direct Methods	Reboot Software Upgrade Remote API Invocation

Modbus RTU/ASCII

Mode	Client (Master)
Functions Supported	1, 2, 3, 4, 5, 6, 15, 16, 23
Max. No. of Commands	256 per port
Max. No of Connected Devices	62

Modbus TCP

Mode	Client/Server
Functions Supported	1, 2, 3, 4, 5, 6, 15, 16, 23
Max. No. of Server Connections	64
Max. No. of Client Connections	4
Max. No. of Commands	3000

LED Indicators

System	Power x 2 User x 1 SIM card indicator x 1
LAN	2 per port (10/100/1000 Mbps)
Wireless Signal Strength	Cellular/Wi-Fi x 6

Power Parameters

No. of Power Inputs	Redundant dual inputs
Input Voltage	12 to 48 VDC
Input Current	1 A @ 12 VDC
Power Consumption	12 W
Power Connector	4-pin terminal block

Reliability

Automatic Reboot Trigger	External WDT (watchdog timer)

Physical Characteristics

Housing	Metal SECC
IP Rating	IP30
Weight	AIG-302-T-AZU-LX: 560 g (1.23 lb) All other models: 750 g (1.65 lb)

Dimensions	AIG-302-T-AZU-LX: 141.5 x 120 x 27 mm (5.7 x 4.72 x 1.06 in) All other models: 141.5 x 120 x 39 mm (5.7 x 4.72 x 1.54 in)
Installation	DIN-rail mounting Wall mounting (with optional kit)

Environmental Limits

Operating Temperature	AIG-302-T-AZU-LX: –40 to 85°C (-40 to 185°F) All other models: -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)
Shock	IEC 60068-2-27
Vibration	2 Grms @ IEC 60068-2-64, random wave, 5 to 500 Hz, 1 hr per axis (without USB devices attached)

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: 4 kV; Air: 8 kV IEC 61000-4-3 RS: 80 MHz to 1 GHz: 10 V/m IEC 61000-4-4 EFT: Power: 2 kV; Signal: 1 kV IEC 61000-4-5 Surge: Power: 1 kV; Signal: 1 kV IEC 61000-4-6 CS: 10 V IEC 61000-4-8 PFMF
Cybersecurity	EN 18031-1
Hazardous Locations	Class I Division 2, ATEX
Safety	UL 62368-1 EN 62368-1
Radio	NCC KC RCM TELEC
Carrier Approvals	AT&T Verizon PTCRB
RED	EN 301 489-1/19/52 EN 301 908-1 EN 303 413 EN 62311
Green Product	RoHS, CRoHS, WEEE

MTBF

Time	AIG-302-T-AZU-LX: 1,772,745 All other models: 1,403,998
Standards	Telcordia (Bellcore) Standard TR/SR

Warranty

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

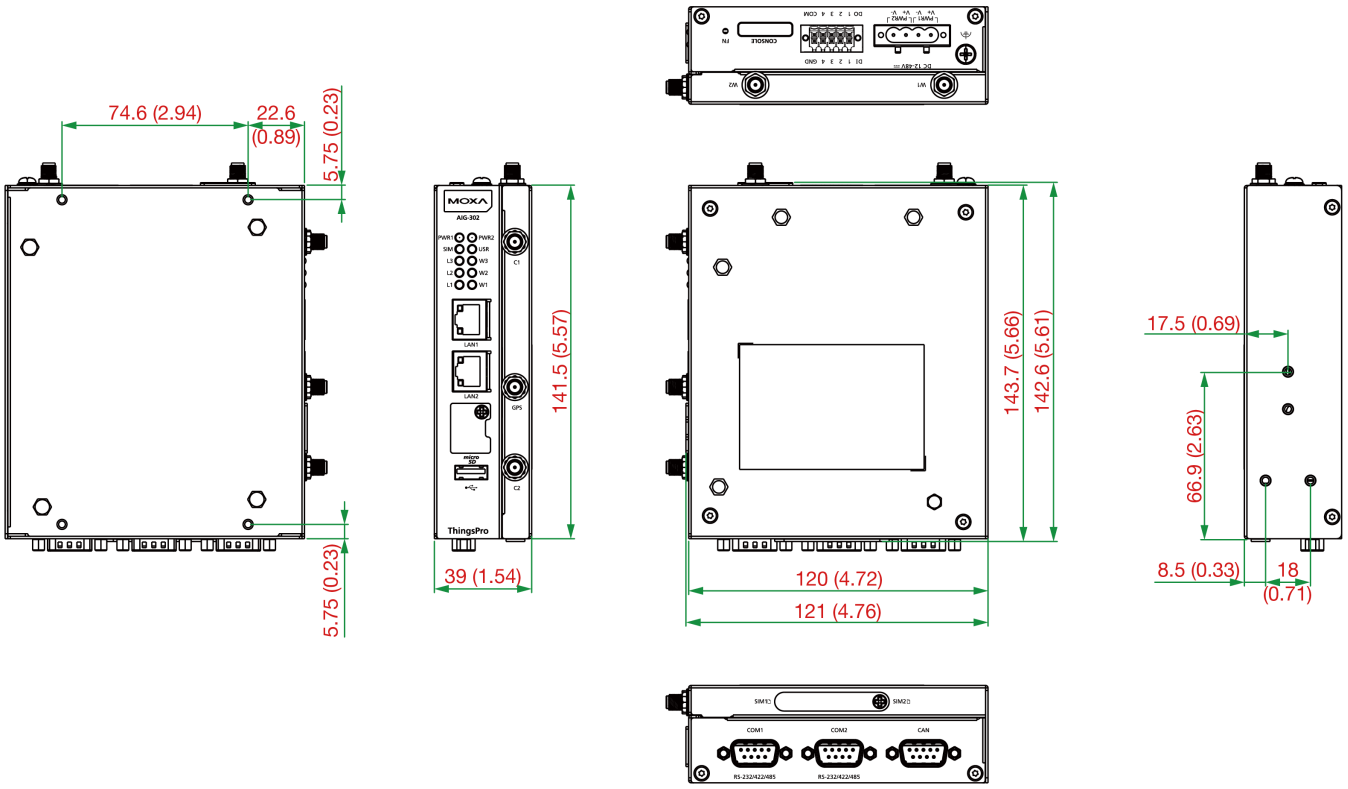
Package Contents

Device	1 x AIG-302 Series advanced IIoT gateway
Cable	1 x terminal block to power jack converter
Installation Kit	1 x DIN-rail kit
Documentation	1 x quick installation guide 1 x warranty card

Dimensions

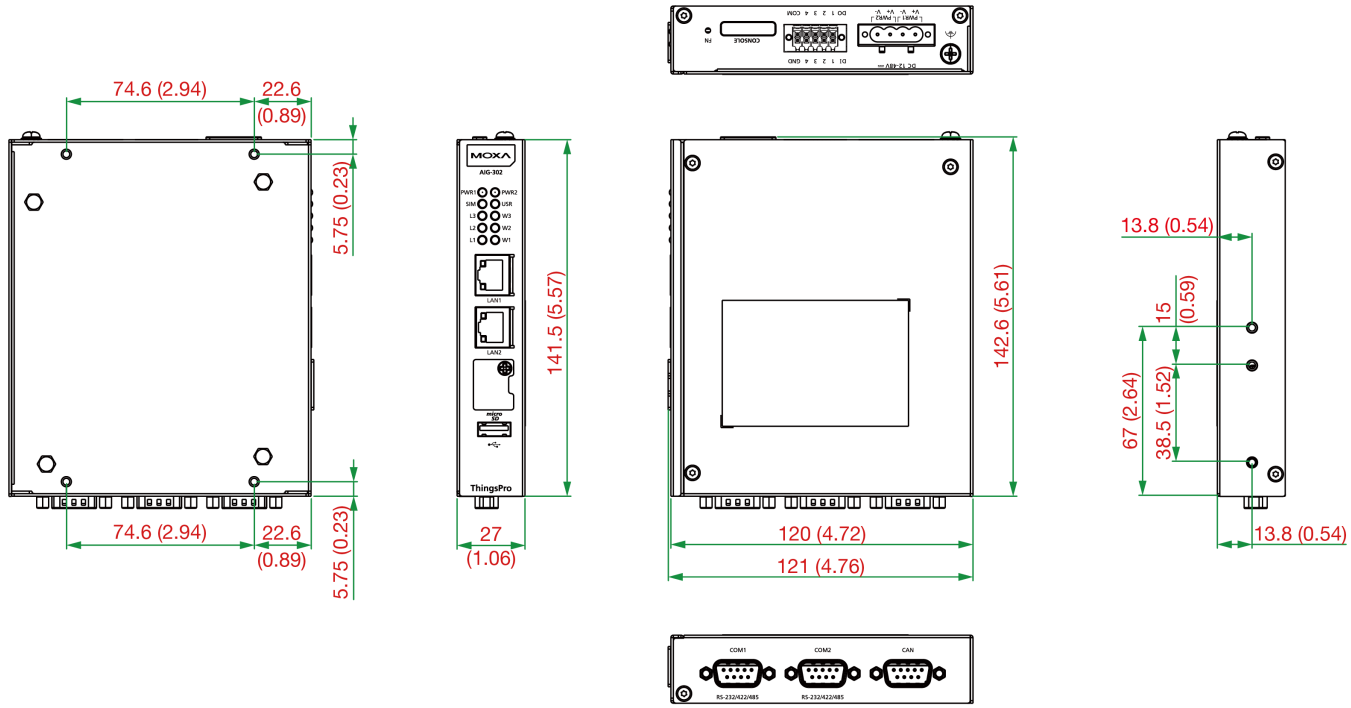
AIG-302 US, EU, and AP Models

Unit: mm (inch)



AIG-302-T-AZU-LX

Unit: mm (inch)



Ordering Information

Model Name	mPCIe Slot 1 for LTE Module	mPCIe Slot 2 for Wi-Fi Module	Operating Temperature
AIG-302-T-AZU-LX	–	–	-40 to 85°C
AIG-302-T-US-AZU-LX	US region LTE module preinstalled	Reserved	-40 to 70°C
AIG-302-T-EU-AZU-LX	Europe region LTE module preinstalled	Reserved	-40 to 70°C
AIG-302-T-AP-AZU-LX	APAC region LTE module preinstalled	Reserved	-40 to 70°C

Accessories (sold separately)

Power Wiring

CBL-PJTB-10	Non-locking barrel plug to bare-wire cable
Mini DB9F-to-TB	DB9 female to terminal block connector

Cables

CBL-F9DPF1x4-BK-100	Console cable with 4-pin connector, 1 m

Wi-Fi Wireless Modules

UC-8200-WLAN22-AC	Wireless package for UC-8200 V2.0 or later with Wi-Fi module, 2 screws, 2 spacers, 1 heat sink, 1 pad

Antennas

ANT-LTEUS-ASM-01	GSM/GPRS/EDGE/UMTS/HSPA/LTE, 1 dBi, omnidirectional rubber-duck antenna
ANT-5G-OSM-04	4 dBi LTE/5G NR dipole antenna with SMA (male) connector
ANT-LTE-OSM-03-3m BK	700-2700 MHz, multiband antenna, specifically designed for 2G, 3G, and 4G applications, 3 m cable
ANT-LTE-ASM-05 BK	704-960/1710-2620 MHz, LTE stick antenna, 5 dBi
ANT-LTE-OSM-06-3m BK MIMO	Multiband antenna with screw-fastened mounting option for 700-2700/2400-2500/5150-5850 MHz frequencies

ANT-WDB-ARM-0202	2 dBi at 2.4 GHz or 2 dBi at 5 GHz, RP-SMA (male), dual-band, omnidirectional antenna

Wall-Mounting Kits

UC-8200 Wall-mounting Kit	Wall-mounting kit for UC-8200 with 4 M3 screws