

# AWK-3121-RTG Series

## Industrial IEEE 802.11a/b/g wireless AP/client



- > IEEE 802.11a/b/g compliant
- > M12 anti-vibration connectors (AWK-3121-M12-RTG and AWK-3121-M12-HP-RTG)
- > QoS (WMM) and VLAN for efficient network traffic
- > Controller-based Turbo Roaming (handover time < 50 ms @ 3 channels, WPA2) - available only when used with the WAC-1001 or WAC-2004
- > Supports long-distance data transfer (for AWK-3121-M12-HP-RTG)
- > Complies with a portion of EN 50155 specifications
- > -40 to 75°C operating temperature range (T models)



### Introduction

The AWK-3121-RTG 3-in-1 industrial AP/client devices are designed specifically for train-to-ground communication while moving at speeds of up to 120 km/h. The AWK-3121-RTG complies with a portion of EN 50155 specifications, covering operating temperature, power input voltage, surge, ESD, and vibration, making the products suitable for a variety of industrial applications. Installation is easy, with either DIN rail mounting or distribution boxes, and the DIN rail mounting capability, wide operating temperature range, and IP30 housing with LED indicators make the AWK-3121-RTG a convenient yet reliable solution for any rolling stock application.

### Advanced Security

- 64-bit and 128-bit WEP (Wired Equivalent Privacy)
- Enable/disable SSID broadcasts
- WPA/WPA2 (Wi-Fi Protected Access) and 802.11i support
- IEEE802.1X/RADIUS support
- Powerful filters for access control

### Specifications for Train-to-Ground Applications

- Client-based Turbo Roaming handover time
  - < 150 ms @ 1 channel with WPA2
  - < 350 ms @ 3 channels with WPA2
- Controller-based Turbo Roaming handover time (available only when used with the WAC-1001 or WAC-2004)
  - < 50 ms @ 3 channels with WPA2
- Multiple roaming parameters for different installation structures and antenna types

### Specifications

#### WLAN Interface

##### Standards:

IEEE 802.11a/b/g for Wireless LAN  
 IEEE 802.11i for Wireless Security  
 IEEE 802.3 for 10BaseT  
 IEEE 802.3u for 100BaseTX  
 IEEE 802.3af for Power-over-Ethernet

##### Spread Spectrum and Modulation (typical):

- DSSS with DBPSK, DQPSK, CCK
- OFDM with BPSK, QPSK, 16QAM, 64QAM
- 802.11b: CCK @ 11/5.5 Mbps, DQPSK @ 2 Mbps, DBPSK @ 11 Mbps
- 802.11a/g: 64QAM @ 54/48 Mbps, 16QAM @ 36/24 Mbps, QPSK @ 18/12 Mbps, BPSK @ 9/6 Mbps

#### Operating Channels (central frequency):

##### US:

2.412 to 2.462 GHz (11 channels)  
 5.18 to 5.24 GHz (4 channels)  
 5.26 to 5.825 GHz (optional)

##### EU:

2.412 to 2.472 GHz (13 channels)  
 5.18 to 5.24 GHz (4 channels)  
 5.26 to 5.825 GHz (optional)

\*Special band such as 5.9GHz is customizable.

##### Security:

- SSID broadcast enable/disable
- Firewall for MAC/IP/Protocol/Port-based filtering
- 64-bit and 128-bit WEP encryption, WPA /WPA2-Personal and Enterprise (IEEE 802.1X/RADIUS, TKIP and AES)

##### Transmission Rates:

802.11b: 1, 2, 5.5, 11 Mbps  
 802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps

**TX Transmit Power:**

AWK-3121-M12-RTG and AWK-3121-SSC-RTG:

802.11b:

Typ. 23±1.5 dBm @ 1 to 11 Mbps

802.11g:

Typ. 20±1.5 dBm @ 6 to 24 Mbps, Typ. 19±1.5 dBm @ 36 Mbps, Typ. 18±1.5 dBm @ 48 Mbps, Typ. 17±1.5 dBm @ 54 Mbps

802.11a:

Typ. 18±1.5 dBm @ 6 to 24 Mbps, Typ. 16±1.5 dBm @ 36 to 48 Mbps,

Typ. 15±1.5 dBm @ 54 Mbps

AWK-3121-M12-HP-RTG:

802.11b:

Typ. 26±1.5 dBm @ 1 to 11 Mbps

802.11g:

Typ. 26±1.5 dBm @ 6 to 24 Mbps, Typ. 25±1.5 dBm @ 36 Mbps, Typ. 24±1.5 dBm @ 48 Mbps, Typ. 23±1.5 dBm @ 54 Mbps

802.11a:

Typ. 26±1.5 dBm @ 6 to 24 Mbps, Typ. 25±1.5 dBm @ 36 Mbps, Typ. 24±1.5 dBm @ 48 Mbps, Typ. 23±1.5 dBm @ 54 Mbps

**RX Sensitivity:**

802.11b:

-97 dBm @ 1 Mbps, -94 dBm @ 2 Mbps, -92 dBm @ 5.5 Mbps, -90 dBm @ 11 Mbps

802.11g:

-93 dBm @ 6 Mbps, -91 dBm @ 9 Mbps, -90 dBm @ 12 Mbps, -88 dBm @ 18 Mbps, -84 dBm @ 24 Mbps, -80 dBm @ 36 Mbps, -76 dBm @ 48 Mbps, -74 dBm @ 54 Mbps

802.11a:

-90 dBm @ 6 Mbps, -89 dBm @ 9 Mbps, -89 dBm @ 12 Mbps, -85 dBm @ 18 Mbps, -83 dBm @ 24 Mbps, -79 dBm @ 36 Mbps, -75 dBm @ 48 Mbps, -74 dBm @ 54 Mbps

**Protocol Support**

**General Protocols:** Proxy ARP, DNS, HTTP, HTTPS, IP, ICMP, SNMP, TCP, UDP, RADIUS, SNMP, PPPoE, DHCP

**Interface**

**Connector for External Antennas:**

AWK-3121-SSC-RTG: RP-SMA (female)

AWK-3121-M12-RTG and AWK-3121-M12-HP-RTG: QMA (female)

**Fiber Ports:** 1, 100BaseFX port (SC connector, AWK-3121-SSC-RTG only)

**M12 Ports:** 1, 10/100BaseT(X) auto negotiation speed, F/H duplex mode, and auto MDI/MDI-X connection (AWK-3121-M12-RTG and AWK-3121-M12-HP-RTG only)

**Console Port:** RS-232 (RJ45-type)

**LED Indicators:** PWR1, PWR2, PoE\*, FAULT, STATE, signal strength, CLIENT MODE, WLAN, 10/100 (M12 port), 100M (fiber port)

\*PoE is only available for the AWK-3121-M12-RTG and AWK-3121-M12-HP-RTG

**Alarm Contact:** 1 relay output with current carrying capacity of 1 A @ 24 VDC

**Digital Inputs:** 2 electrically isolated inputs

- +13 to +30 V for state "1"
- +3 to -30 V for state "0"
- Max. input current: 8 mA

**Default Antennas\*:**

2 dual-band omni-directional antennas, 2 dBi, RP-SMA (male)

\*Only available with the AWK-3121-SSC-RTG models.

**Optical Fiber\***

	100BaseFX
	Single Mode
Wavelength	1310 nm
Max. TX	0 dBm
Min. TX	-5 dBm
RX Sensitivity	-34 dBm
Link Budget	29 dB
Typical Distance	40 km <sup>a</sup>
Saturation	-3 dBm

\* Only available for AWK-3121-SSC models

**Physical Characteristics**

**Housing:** Metal, providing IP30 protection

**Weight:** 850 g

**Dimensions:** 53.6 x 135 x 105 mm (2.11 x 5.31 x 4.13 in)

**Installation:** DIN-Rail mounting, wall mounting (with optional kit)

**Environmental Limits**

**Operating Temperature:**

Standard Models: -25 to 60°C (-13 to 140°F)

Wide Temp. Models: -40 to 75°C (-40 to 167°F)

**Storage Temperature:** -40 to 85°C (-40 to 185°F)

**Ambient Relative Humidity:** 5% to 95% (non-condensing)

**Power Requirements**

**Input Voltage:** 12 to 48 VDC, redundant dual DC power inputs or 48 VDC Power-over-Ethernet (IEEE 802.3af compliant)\*

\*Compliant with EN 50155 on 24 VDC

**Connector:** 10-pin removable terminal block

**Power Consumption:**

12 to 48 VDC, 0.121 to 0.494 A (max.)

AWK-3121-M12-RTG: Maximum 7.9 watts

AWK-3121-M12-HP-RTG: Maximum 7.9 watts

AWK-3121-SSC-RTG: Maximum 8.1 watts

**Reverse Polarity Protection:** Present

**Standards and Certifications**

**Safety:** UL 60950-1, EN 60950-1

**EMC:** EN 301 489-1/17; FCC Part 15, Subpart B; EN 55022/55024

**Radio:** EN 300 328, EN 301 893, FCC ID SLE-WAPA003 (AWK-3121-M12-RTG), FCC ID SLE-WAPA004 (AWK-3121-M12-HP-RTG)

**Rail Traffic:** EN 50155\*, EN 50121-1/4

Note: Please check Moxa's website for the most up-to-date certification status.

**Reliability**

**MTBF (mean time between failures):**

AWK-3121-M12-RTG: 480,831 hrs

AWK-3121-M12-HP-RTG: 447,861 hrs

AWK-3121-SSC-RTG: 445,913 hrs

**Warranty**

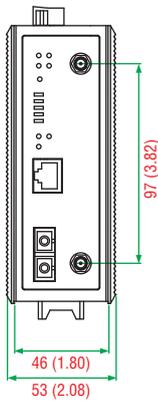
**Warranty Period:** 5 years

**Details:** See www.moxa.com/warranty

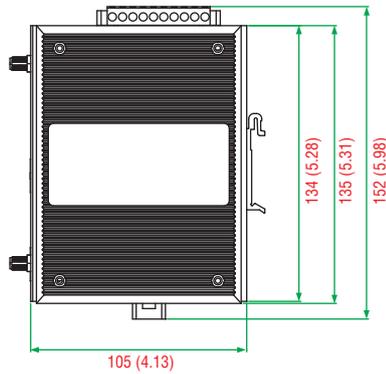
**Dimensions**

Unit: mm (inch)

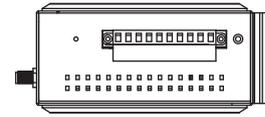
**AWK-3121-SSC-RTG**



Front View

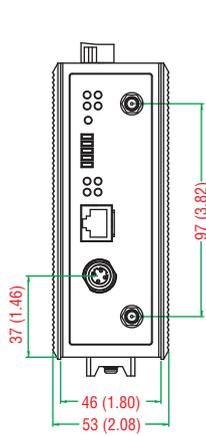


Side View

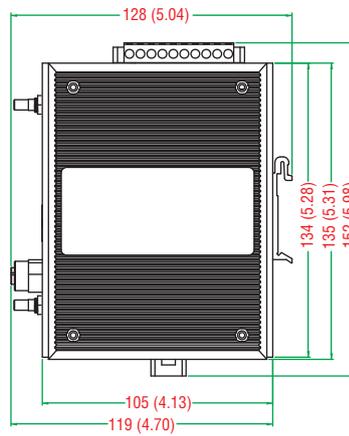


Top View

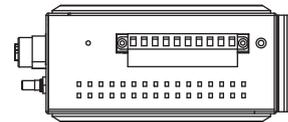
**AWK-3121-M12-RTG and AWK-3121-M12-HP-RTG**



Front View



Side View



Top View

## Ordering Information

Available Models			Port Interface		Antenna Interface		Conformal Coating	High Power
Model Name	Standard Temperature (-25 to 60°C)	Wide Temperature (-40 to 75°C)	PoE, 10/100 BaseT(X)	100BaseFX	RP-SMA	QMA		
			M12 Connector	Single-Mode SC Connector				
<b>AWK-3121-M12-RTG</b>								
AWK-3121-M12-RTG-US	✓	–	✓	–	–	✓	–	–
AWK-3121-M12-RTG-EU	✓	–	✓	–	–	✓	–	–
AWK-3121-M12-RTG-US-T	–	✓	✓	–	–	✓	–	–
AWK-3121-M12-RTG-EU-T	–	✓	✓	–	–	✓	–	–
AWK-3121-M12-RTG-US-CT	✓	–	✓	–	–	✓	✓	–
AWK-3121-M12-RTG-EU-CT	✓	–	✓	–	–	✓	✓	–
AWK-3121-M12-RTG-US-CT-T	–	✓	✓	–	–	✓	✓	–
AWK-3121-M12-RTG-EU-CT-T	–	✓	✓	–	–	✓	✓	–
<b>AWK-3121-M12-HP-RTG</b>								
AWK-3121-M12-HP-RTG-US	✓	–	✓	–	–	✓	–	✓
AWK-3121-M12-HP-RTG-EU	✓	–	✓	–	–	✓	–	✓
AWK-3121-M12-HP-RTG-US-T	–	✓	✓	–	–	✓	–	✓
AWK-3121-M12-HP-RTG-EU-T	–	✓	✓	–	–	✓	–	✓
AWK-3121-M12-HP-RTG-US-CT	✓	–	✓	–	–	✓	✓	✓
AWK-3121-M12-HP-RTG-EU-CT	✓	–	✓	–	–	✓	✓	✓
AWK-3121-M12-HP-RTG-US-CT-T	–	✓	✓	–	–	✓	✓	✓
AWK-3121-M12-HP-RTG-EU-CT-T	–	✓	✓	–	–	✓	✓	✓
<b>AWK-3121-SSC-RTG</b>								
AWK-3121-SSC-RTG-US	✓	–	–	✓	✓	–	–	–
AWK-3121-SSC-RTG-EU	✓	–	–	✓	✓	–	–	–
AWK-3121-SSC-RTG-US-T	–	✓	–	✓	✓	–	–	–
AWK-3121-SSC-RTG-EU-T	–	✓	–	✓	✓	–	–	–

**Note:**

- US: USA band
- EU: Europe band
- HP: high power
- CT: conformal coating

Note: Please visit Moxa's website for a complete list of optional wireless accessories and antennas available for Moxa's wireless products.

### Package Checklist

- AWK-3121-RTG wireless AP/bridge/client
- DIN-rail kit
- 1 plastic RJ45 protective cap for console port
- 1 plastic protective cap for fiber port (AWK-3121-SSC-RTG only)
- Cable holder with one screw
- Documentation and software CD
- Quick installation guide (printed)
- Warranty card

Note: 2 dual-band omni-directional antennas (2 dBi, RP-SMA, 2.4/5 GHz)