

AWK-3121

Quick Installation Guide

Moxa AirWorks

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P/N: 1802031210017



Overview

The AWK-3121 Access Point (AP) is ideal for hard-to-wire industrial applications. The AP keeps wireless costs under control and integrates with existing mobile equipment. The AWK-3121 is compliant with the industrial standards and approvals covering operating temperature, power input voltage, surge, ESD, and vibration. Installation is easy with DIN-rail mounting capability for installation in distribution boxes. The DIN-rail mounting capability, wide operating temperature range, and IP30 housing with LED indicators make the AWK-3121 a convenient yet reliable solution for any industrial wireless application.

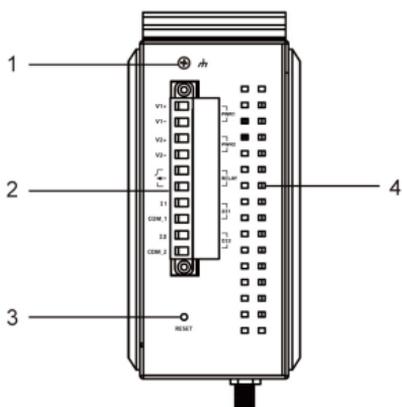
Package Checklist

Moxa's AWK-3121 is shipped with the following items. If any of these items is missing or damaged, please contact your customer service representative for assistance.

- 1 AWK-3121
- 2 Dual-band omni-directional antennas (2 dBi, RP-SMA, 2.4 a 5 GHz)
- 1 Cable holder with a screw
- 2 Protective caps
- Quick installation guide (printed)
- Warranty card

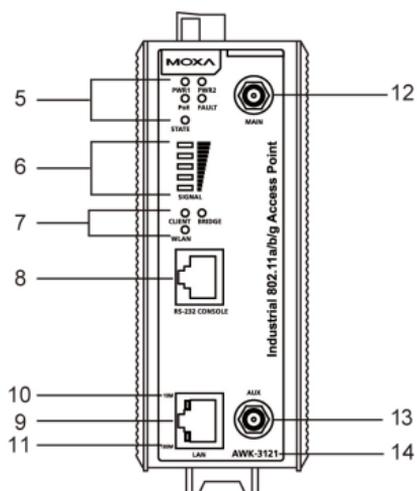
Panel Layout of the AWK-3121

Top Panel View

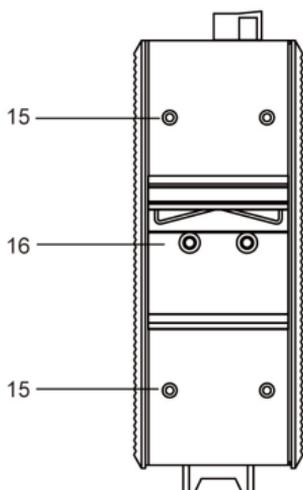


1. Grounding screw
2. Terminal block for PWR1, PWR2, relay, DI1, and DI2
3. Reset button
4. Heat dissipation orifices
5. System LEDs: PWR1, PWR2, PoE (discontinued starting with HW Rev 2.0.0), FAULT, and STATE LEDs
6. LEDs for signal strength
7. WLAN LEDs: CLIENT, BRIDGE, and WLAN LEDs
8. RS-232 console port
9. 10/100BaseT(X) RJ45 Port
10. 10M LED
11. 100M LED
12. MAIN antenna port
13. AUX antenna port
14. Model name
15. Screw hole for wall-mounting kit
16. DIN-rail mounting kit

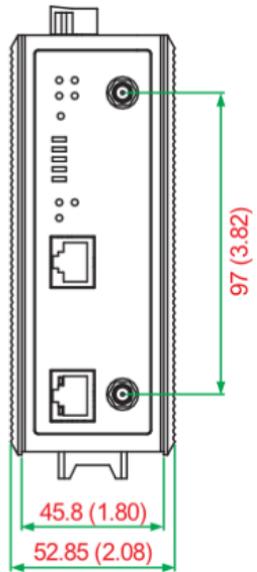
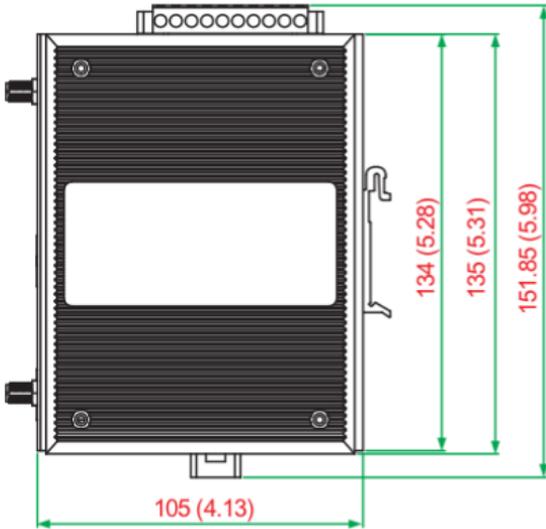
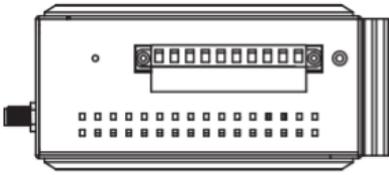
Front Panel View



Rear Panel View



Mounting Dimensions



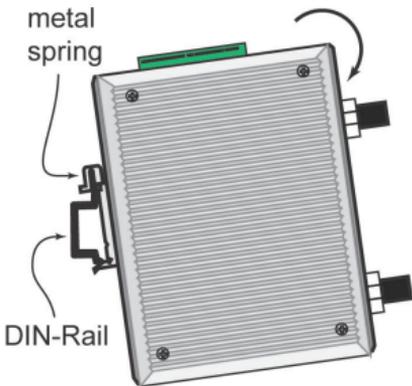
Unit = mm (inch)

DIN-Rail Mounting

The aluminum DIN-rail attachment plate should be fixed to the back panel of the AWK-3121 when you take it out of the box. If you need to reattach the DIN-rail attachment plate to the AWK-3121, make sure the stiff metal spring is situated towards the top, as shown in the figures below.

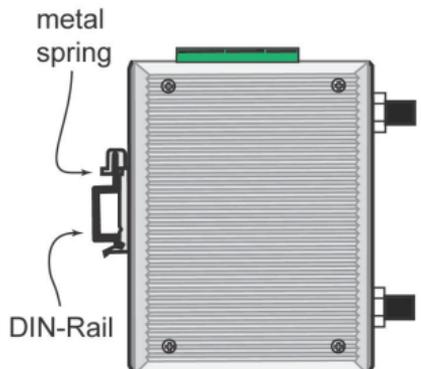
STEP 1:

Insert the top of the DIN rail into the slot just below the stiff metal spring.



STEP 2:

The DIN-rail attachment unit will snap into place as shown below.



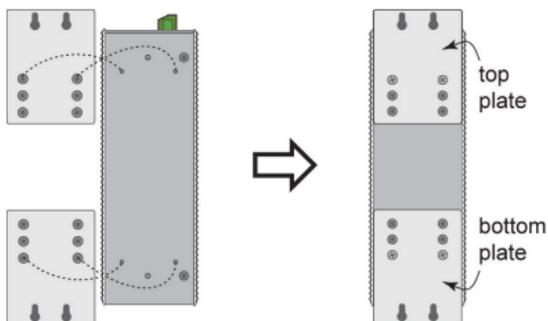
To remove the AWK-3121 from the DIN rail, simply reverse Steps 1 and 2.

Wall Mounting (optional)

For some applications, it may be more convenient to mount the AWK-3121 to a wall, as illustrated below.

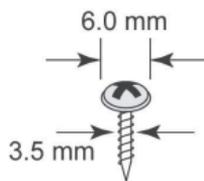
STEP 1:

Remove the aluminum DIN-rail attachment plate from the AWK-3121, and then attach the wall-mounting plates with M3 screws, as shown in the adjacent diagrams.



STEP 2:

Mounting the AWK-3121 to a wall requires 4 screws. Use the AWK-3121 device, with wall-mounting plates attached, as a guide to mark the correct locations of the 4 screws. The heads of the screws should be less than 6.0 mm in diameter, and the shafts should be less than 3.5 mm in diameter, as shown in the figure at the right.

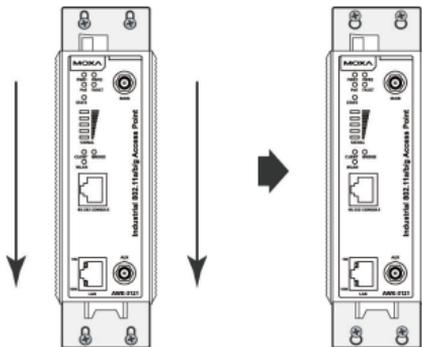


Do not drive the screws in all the way into the wall—leave a space of about 2 mm to allow room for sliding the wall-mounting panel between the wall and the screws.

NOTE Test the screw head and shank size of the screws by inserting the screws into one of the keyhole shaped apertures of the wall-mounting plate before attaching the plate to the wall.

STEP 3:

Once the screws are fixed into the wall, insert the four screw heads through the large opening of the keyhole-shaped apertures, and then slide the AWK-3121 downwards, as indicated to the right. Tighten the four screws for added stability.



Wiring Requirements



WARNING

Safety First!

Be sure to disconnect the power cord before installing and/or wiring your Moxa AWK-3121.



WARNING

Safety First!

Calculate the maximum possible current in each power wire and common wire. Observe all electrical codes dictating the maximum current allowed for each wire size. If the current goes above the maximum ratings, the wiring could overheat, causing serious damage to your equipment.

You should also pay attention to the following items:

- Use separate paths to route wiring for power and devices. If power wiring and device wiring paths must cross, make sure the wires are perpendicular at the intersection point.

NOTE Do not run signal or communications wiring and power wiring in the same wire conduit. To avoid interference, wires with different signal characteristics should be routed separately.

- You can use the type of signal transmitted through a wire to determine which wires should be kept separate. The rule of thumb is that wiring with similar electrical characteristics can be bundled together.
- Keep input wiring and output wiring separate.
- It is strongly advised that you label wiring to all devices in the system when necessary.



ATTENTION

This product is intended to be supplied by a Listed Power Unit marked "Class 2", "LPS" or "Limited Power Source" and rated O/P: 12 to 48 VDC, 0.121 to 0.494 A.

Make sure the external power adapter (includes power cords and plug assemblies) provided with the unit is certified and suitable for use in your country.

Before connecting the AWK to the DC power inputs, make sure that the DC power source voltage is stable.

Grounding the Moxa AWK-3121

Grounding and wire routing help limit the effects of noise due to electromagnetic interference (EMI). Run the ground connection from the ground screw to the grounding surface prior to connecting devices.

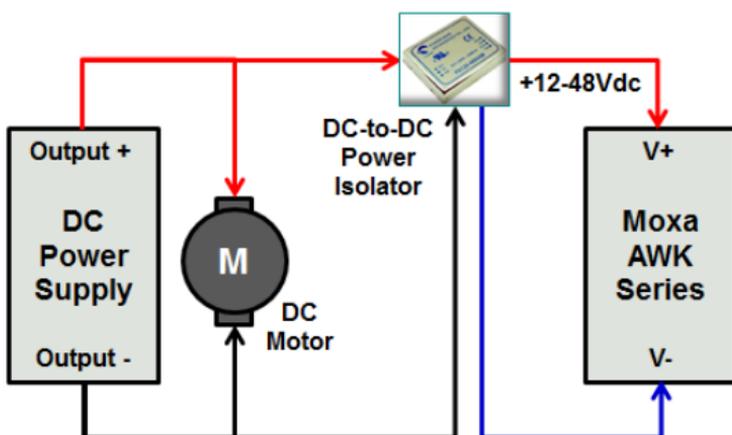


ATTENTION

This product is intended to be mounted on a well-grounded mounting surface, such as a metal panel. There must be no electrical potential difference between any two grounding points; otherwise, there is a risk that it would damage the device.

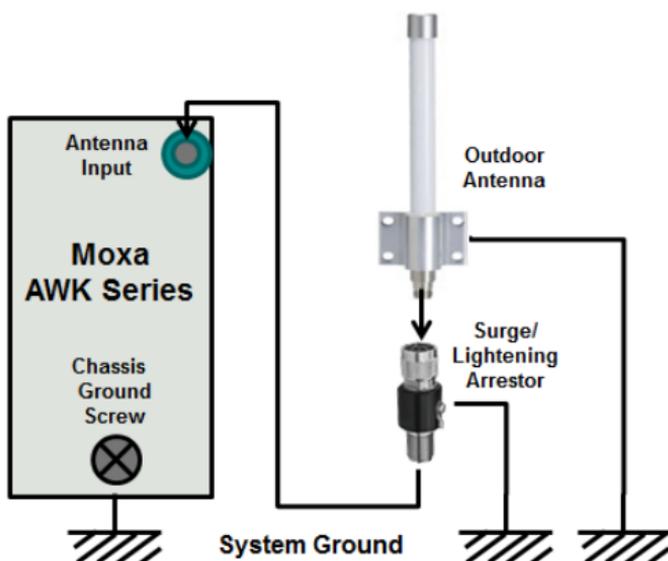
Installations with Unstable Power Inputs

There are cases where the device has to be wired to the same power source as other equipment. In such cases if equipment such as motors that are connected in the circuit draw a large amount of current during operation, the transient voltage drop could potentially cause the AWK to become unstable. Installing a DC/DC power isolator in between the two equipment is recommended to isolate the transient effect and to ensure a stable power input for the AWK.



Installations with Cable Extended Antennas for Outdoor Applications

If the antenna or the AWK device is installed outdoors or in an open-air setting, proper lightning protection is required to prevent direct lightning strikes on the AWK device. In order to prevent coupling currents from nearby lightning strikes, a lightning arrester should be installed as part of your antenna system. Ground the device, antenna, as well as the arrester properly to provide maximum outdoor protection for the device.

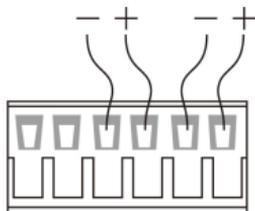


Arrester Accessories

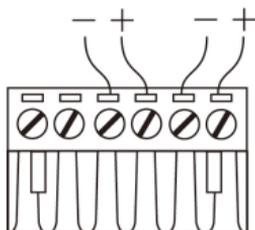
- **SA-NMNF-01:** Surge arrester, N-type (male) to N-type (female)
- **SA-NFNF-01:** Surge arrester, N-type (female) to N-type (female)

Wiring the Redundant Power Inputs

The top two pairs of contacts of the 10-contact terminal block connector on the AWK-3121's top panel are used for the AWK-3121's two DC inputs. Top and front views of the terminal block connector are shown here.



Top View



Front View

STEP 1: Insert the negative/positive DC wires into the V-/V+ terminals.

STEP 2: To keep the DC wires from pulling loose, use a small flat-blade screwdriver to tighten the wire-clamp screws on the front of the terminal block connector.

STEP 3: Insert the plastic terminal block connector prongs into the terminal block receptor, which is located on the AWK-3121's top panel.



ATTENTION

Before connecting the AWK-3121 to the DC power inputs, make sure the DC power source voltage is stable.

Wiring the Relay Contact

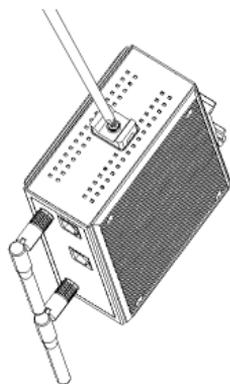
The AWK-3121 has one relay output, which consists of the two contacts of the terminal block on the AWK-3121's top panel. Refer to the previous section for detailed instructions on how to connect the wires to the terminal block connector, and how to attach the terminal block connector to the terminal block receptor. These relay contacts are used to indicate user-configured events. The two wires attached to the Relay contacts form an open circuit when a user-configured event is triggered. If a user-configured event does not occur, the Relay circuit will be closed.

Wiring the Digital Inputs

The AWK-3121 has two sets of digital input—DI1 and DI2. Each DI comprises two contacts of the 10-pin terminal block connector on the AWK-3121's top panel. You can refer to the "Wiring the Redundant Power Inputs" section for detailed instructions on how to connect the wires to the terminal block connector, and how to attach the terminal block connector to the terminal block receptor.

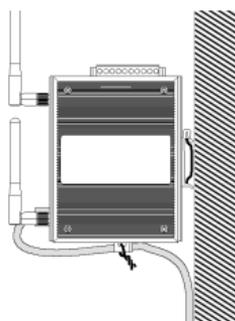
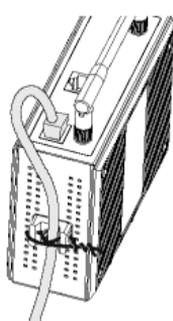
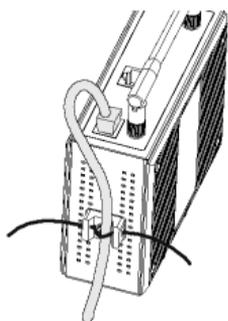
Cable Holder Installation (Optional)

You can attach the cable holder to the bottom of the AWK-3121. This helps to keep cabling neat and avoid accidents that result from untidy cables.



STEP 1: Screw the cable holder onto the bottom of the AWK-3121.

STEP 2: After mounting the AWK-3121 and plugging in the LAN cable, tighten the cable along the device and wall.



Communication Connections

10/100BaseT(X) Ethernet Port Connection

The 10/100BaseT(X) ports located on the AWK-3121's front panel are used to connect to Ethernet-enabled devices.

Below we show pinouts for both MDI (NIC-type) ports and MDI-X (HUB/Switch-type) ports.

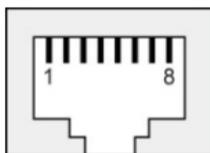
MDI Port Pinouts		MDI-X Port Pinouts		8-pin RJ45
Pin	Signal	Pin	Signal	
1	Tx+	1	Rx+	
2	Tx-	2	Rx-	
3	Rx+	3	Tx+	
6	Rx-	6	Tx-	

RS-232 Connection

The AWK-3121 has one RS-232 (8-pin RJ45) console port located on the front panel. Use either an RJ45-to-DB9 or RJ45-to-DB25 cable to connect the Moxa AWK-3121's console port to your PC's COM port. You may then use a console terminal program to access the AWK-3121 for console configuration.

Console Pinouts for 10-pin or 8-pin RJ45

10-Pin	Description	8-Pin
1	–	
2	DSR	1
3	RTS	2
4	GND	3
5	TxD	4
6	RxD	5
7	DCD	6
8	CTS	7
9	DTR	8
10	–	



- NOTE**
1. The pin numbers for the DB9 and DB25 male connectors, and hole numbers for the DB9 and DB25 female connectors are labeled on the connector strip. However, the numbers are typically quite small, so you may need to use a magnifying glass to see the numbers clearly.
 2. The pin numbers for both 8-pin and 10-pin RJ45 connectors (and ports) are typically not labeled on the connectors (or ports). Refer to the pinout diagram above for details.

ATEX Information



1. DEMKO certification number: 10 ATEX 0902666X
2. Ambient range: $-40^{\circ}\text{C} \leq T_{\text{amb}} \leq 75^{\circ}\text{C}$
3. Certification string: Ex nA IIC T4 Gc
4. Standards covered:
EN60079-0:2006+A11:2013, EN60079-15:2005
5. The conditions of safe usage:
 - The Ethernet Communication Devices are intended for mounting in an IP54 enclosure and used in an area of not more than pollution degree 2 as defined by IEC60664-1.
 - Conductors suitable for use in an ambient temperature greater than 93°C must be used for the Power Supply Terminal.
 - A 4 mm^2 conductor must be used when connection to the external grounding screw is utilized.
 - Cables must be suitable for use in an ambient temperature greater than 93°C .

LED Indicators

The front panel of the Moxa AWK-3121 contains several LED indicators. The function of each LED is described in the table below.

LED	Color	State	Description
Front Panel LED Indicators (System)			
PWR1	Green	On	Power is being supplied from power input 1.
		Off	Power is not being supplied from power input 1.
PWR2	Green	On	Power is being supplied from power input 2.
		Off	Power is not being supplied from power input 2.
PoE (discontinued starting with HW Rev 2.0.0)	Amber	On	Power is being supplied via PoE.
		Off	Power is not being supplied via PoE.
FAULT	Red	Blinking (slow at 1-second intervals)	Cannot get an IP address from the DHCP server
		Blinking (fast at 0.5-second intervals)	IP address conflict
		Off	No error condition exists.
STATE	Green/ Red	Green	System startup is complete and the system is in operation.
		Green Blinking (slow at 1-second intervals)	The device has been located by Wireless Search Utility
		Red	System is booting up.
SIGNAL (5 LEDs)	Green	On	Signal level (for client/slave mode only)
		Off	
BRIDGE	Green	On	WLAN function is in bridge (WDS) mode.
		Off	WLAN is not in bridge (WDS) mode.
CLIENT	Green	On	WLAN function is in client/slave mode and AWK has established a link with an AP.
		Blink	WLAN data communication is run in client/slave mode
		Off	WLAN is not in client mode or AWK has not established a link with an AP.
WLAN	Amber	On	WLAN functions in AP/bridge/master mode.
		Blink	WLAN's data communication is run in AP/bridge/master mode.
		Off	WLAN is not in use or not working properly.

TP Port LED Indicators (Port Interface)

100M	Green	On	TP port's 100 Mbps link is active .
		Blinking	Data is being transmitted at 100 Mbps
		Off	TP port's 100 Mbps link is inactive .
10M	Amber	On	TP port's 10 Mbps link is active .
		Blink	Data is being transmitted at 10 Mbps
		Off	TP port's 10 Mbps link is inactive .

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 100BaseT(X) IEEE 802.3af for Power-over-Ethernet* IEEE 802.1D for Spanning Tree Protocol IEEE 802.1w for Rapid STP *Support for PoE discontinued starting with HW Rev 2.0.0
Spread Spectrum and Modulation (typical)	DSSS with DBPSK, DQPSK, CCK OFDM with BPSK, QPSK, 16QAM, 64QAM 802.11b: <ul style="list-style-type: none"> • CCK @ 11/5.5 Mbps • DQPSK @ 2 Mbps • DBPSK @ 11 Mbps 802.11a/g: <ul style="list-style-type: none"> • 64QAM @ 54/48 Mbps • 16QAM @ 36/24 Mbps • QPSK @ 18/12 Mbps • BPSK @ 9/6 Mbps
Operating Channels (central frequency)	US: <ul style="list-style-type: none"> • 2.412 to 2.462 GHz (11 channels) • 5.18 to 5.24 GHz (4 channels) EU: <ul style="list-style-type: none"> • 2.412 to 2.472 GHz (13 channels) • 5.18 to 5.24 GHz (4 channels) JP: <ul style="list-style-type: none"> • 2.412 to 2.472 GHz (13 channels, OFDM) • 2.412 to 2.484 GHz (14 channels, DSSS) • 5.18 to 5.24 GHz (4 channels for W52)
Security	<ul style="list-style-type: none"> • 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	802.11b: <ul style="list-style-type: none"> • Typ. 23±1.5 dBm @ 1 to 11 Mbps 802.11g: <ul style="list-style-type: none"> • Typ. 20±1.5 dBm @ 6 to 24 Mbps • Typ. 19±1.5 dBm @ 36 Mbps • Typ. 18±1.5 dBm @ 48 Mbps

	<ul style="list-style-type: none"> • Typ. 17±1.5 dBm @ 54 Mbps <p>802.11a:</p> <ul style="list-style-type: none"> • 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
RX Sensitivity	<p>802.11b:</p> <ul style="list-style-type: none"> • -97 dBm @ 1 Mbps • -94 dBm @ 2 Mbps • -92 dBm @ 5.5 Mbps • -90 dBm @ 11 Mbps <p>802.11g:</p> <ul style="list-style-type: none"> • -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 <p>802.11a:</p> <ul style="list-style-type: none"> • -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, SNTP, TCP, UDP, RADIUS, SNMP, PPPoE, DHCP
Interface	
Default Antennas	2 dual-band omni-directional antennas, 2 dBi, RP-SMA (male)
Connector for External Antennas	RP-SMA (female)
RJ45 Ports	1, 10/100BaseT(X) auto negotiation speed, F/H duplex mode, and auto MDI/MDI-X connection
Console Port	RS-232 (RJ45-type)
Reset	Present
LED Indicators	PWR1, PWR2, PoE (discontinued starting with HW Rev 2.0.0), FAULT, STATE, signal strength, CLIENT MODE, BRIDGE MODE, WLAN, 10M, 100M
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
Physical Characteristics	
Housing	Metal, providing IP30 protection
Weight	850 g
Dimensions	54 x 135 x 105 mm (2.14 x 5.4 x 4.14 in)
Installation	DIN rail, wall mount (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) *Discontinued starting with HW Rev 2.0.0
Connector	10-pin removable terminal block
Power Consumption	12 to 48 VDC, 0.121 to 0.494 A
Reverse Polarity Protection	Present
Standards and Certifications	
Safety	UL 60950-1, EN 60950-1
Hazardous Location	UL/cUL Class I Division 2, ATEX Zone 2
EMC	EN 301 489-1/17; FCC Part 15, Subpart B; EN 55022/55024
Radio	EN 300 328, EN 301 893, TELEC, FCC ID SLE-WAPA003
Note: Please check Moxa's website for the most up-to-date certification status.	
Reliability	
MTBF	392,209 hrs.
Warranty	
Warranty Period	5 years
Details	See www.moxa.com/support/warranty.aspx



ATTENTION

- The AWK-3121 is **NOT** a portable mobile device and should be located at least 20 cm away from the human body.
- The AWK-3121 is **NOT** designed for the general public. A well-trained technician is required to deploy the AWK-3121 units and safely establish a wireless network.



ATTENTION

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.



ATTENTION

Do not locate the antenna near overhead power lines or other electric light or power circuits, or where it can come into contact with such circuits. When installing the antenna, take extreme care not to come into contact with such circuits, because they may cause serious injury or death when there is a surge. For instructions on proper installation and grounding of the antenna, refer to national and local codes (for example, U.S.: NFPA 70; National Electrical Code Article 810; and Canada: Canadian Electrical Code, Section 54).

NOTE For installation flexibility, either the MAIN antenna or the AUX antenna may be selected for use. Make sure the antenna connection matches the antennas configured in the AWK-3121 web interface.

To protect the connectors and RF module, all radio ports should be terminated by either an antenna or a terminator. We strongly recommend using resistive terminators for terminating the unused antenna ports.



ATTENTION

For EXPLOSION-PROOF applications, the AWK-3121 is designed based on the ATEX and C1D2 standards, and is certified against these standards. The device must be mounted in a suitable enclosure with ingress rating of at least IP54 and conforming to Pollution Degree 2 standards as defined in EN60529. The device must be used within its electrical and environmental ratings.