

# **AWK-3131**

## **Hardware Installation Guide**

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**Moxa AirWorks**

**Second Edition, June 2014**

**MOXA<sup>®</sup>**

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**P/N: 1802031310011**

## Overview

Moxa's new AWK-3131 3-in-1 industrial wireless Access Point meets the growing need for faster data transmission speeds and wider coverage by supporting IEEE 802.11n technology with a net data rate of up to 300 Mbps. The AWK-3131 combines two adjacent 20 MHz channels into a single 40 MHz channel to deliver a potent combination of greater reliability and more bandwidth. The two redundant DC power inputs increase the reliability of the power supply, and the AWK-3131 can be powered via PoE to make deployment easier. The AWK-3131 can operate on either the 2.4 or 5 GHz bands and is backward-compatible with existing 802.11a/b/g deployments to future-proof your wireless investments.

## Package Checklist

Moxa's AWK-3131 is shipped with the following items. If any of these items is missing or damaged, please contact your customer service representative for assistance.

- AWK-3131
- 2 dual-band omni-directional antennas (2dBi, RP-SMA, 2.4/5 GHz)
- Cable holder with one screw
- 2 plastic RJ45 protective caps
- 1 plastic SFP protective cap
- DIN-rail kit
- Documentation and software CD
- Quick installation guide (printed)
- Warranty card

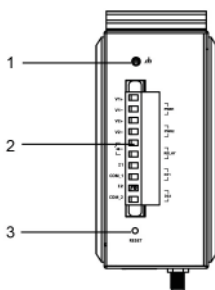
## Recommended SFP Accessories

### SFP-1G series

- SFP-1GSXLC:  
Small form factor pluggable transceiver with 1000BaseSX, LC, 0.5 km, 0 to 60°C
- SFP-1GSXLC-T:  
Small form factor pluggable transceiver with 1000BaseSX, LC, 0.5 km, -20 to 75°C
- SFP-1GLSXLC:  
Small form factor pluggable transceiver with 1000BaseLSX, LC, 2 km, 0 to 60°C
- SFP-1GLSXLC-T:  
Small form factor pluggable transceiver with 1000BaseLSX, LC, 2 km, -40 to 85°C
- SFP-1GLXLC:  
Small form factor pluggable transceiver with 1000BaseLX, LC, 10 km, 0 to 60°C
- SFP-1GLXLC-T:  
Small form factor pluggable transceiver with 1000BaseLX, LC, 10 km, -40 to 85°C
- SFP-1GLHLC:  
Small form factor pluggable transceiver with 1000BaseLH, LC, 30 km, 0 to 60°C
- SFP-1GLHLC-T:  
Small form factor pluggable transceiver with 1000BaseLH, LC, 30 km, -40 to 85°C
- SFP-1GLHXLC:  
Small form factor pluggable transceiver with 1000BaseLHX, LC, 40 km, 0 to 60°C
- SFP-1GLHXLC-T:  
Small form factor pluggable transceiver with 1000BaseLHX, LC, 40 km, -40 to 85°C
- SFP-1GZXLC:  
Small form factor pluggable transceiver with 1000BaseZX, LC, 80 km, 0 to 60°C
- SFP-1GZXLC-T:  
Small form factor pluggable transceiver with 1000BaseZX, LC, 80 km, -40 to 85°C
- SFP-1GEZXLC:  
Small form factor pluggable transceiver with 1000BaseEZX, LC, 110 km, 0 to 60°C
- SFP-1GEZXLC-120:  
Small form factor pluggable transceiver with 1000BaseEZX, LC, 120 km, 0 to 60°C

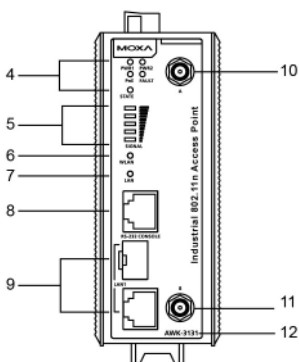
## Panel Layout of the AWK-3131

Top Panel View

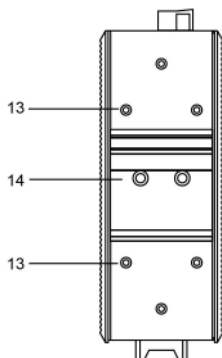


1. Grounding screw (M3)
2. Terminal block for PWR1,PWR2, relay, DI1, and DI2
3. Reset button
4. System LEDs: PWR1, PWR2, PoE, FAULT, and STATE LEDs
5. LEDs for signal strength
6. WLAN LED
7. Ethernet or Fiber LED
8. RS-232 console port
9. LANs: 10/100/1000 BaseT(X) RJ45 Port or 1000Base SFP
10. Main Antenna A
11. Main Antenna B
12. Model name
13. Screw hole for wall mounting Kit
14. DIN-Rail mounting kit

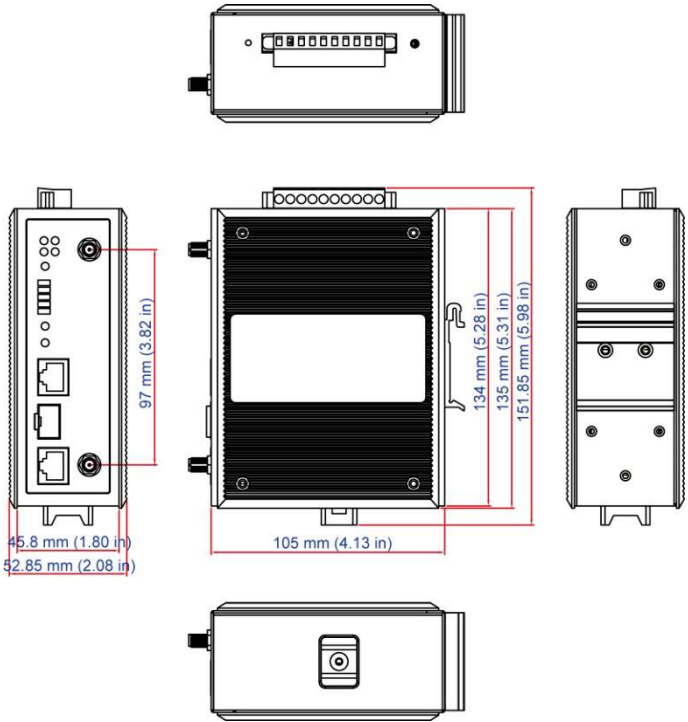
Front Panel View



Rear Panel View



## Mounting Dimensions (unit = mm)

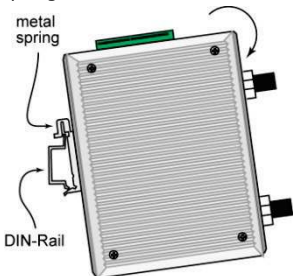


## DIN-Rail Mounting

The aluminum DIN-Rail attachment plate should be fixed to the back panel of the AWK-3131 when you take it out of the box. If you need to reattach the DIN-Rail attachment plate to the AWK-3131, make sure the stiff metal spring is situated towards the top, as shown in the figures below.

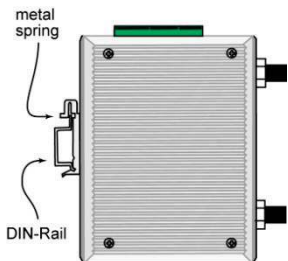
### STEP 1:

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.



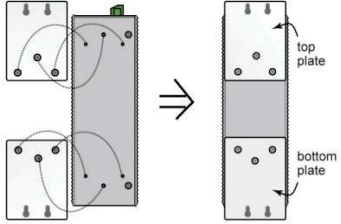
To remove the AWK-3131 from the DIN-Rail, simply reverse Steps 1 and 2.

## Wall Mounting (optional)

For transportation applications that require an EN 50155 certification report, we strongly recommend the purchase of the optional AWK-3131 wallmount kit, which has passed EN 50155 testing. This wallmount kit is also convenient for other applications that require mounting the AWK-3131 to a wall.

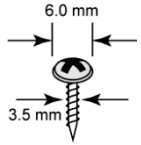
### STEP 1:

Remove the aluminum DIN-Rail attachment plate from the AWK-3131, and then attach the wall mount plates with M3 screws, as shown in the adjacent diagrams.



### STEP 2:

Mounting the AWK-3131 to a wall requires 3 screws. Use the AWK-3131 device, with wall mount plates attached, as a guide to mark the correct locations of the 3 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.

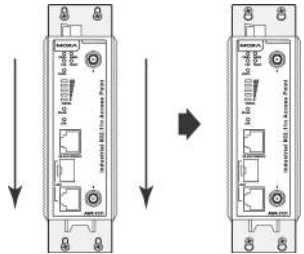


Do not screw the screws in all the way—leave a space of about 2 mm to allow room for sliding the wall mount panel between the wall and the screws.

**NOTE** Test the screw head and shank size by inserting the screw into one of the keyhole shaped apertures of the Wall Mounting Plates before it is screwed into 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-3131 downwards, as indicated to the right. Tighten the three screws for added stability.





## WARNING

- This equipment is intended to be used in a Restricted Access Location, such as a dedicated computer room. Access can only be gained by SERVICE PERSONS or by USERS who have been instructed about the fact that the metal chassis of the equipment is extremely hot and may cause burns.
- Service persons or users have to pay special attention and take special precaution before handling the equipment.
- Access is to be controlled through the use of a lock and key or a security identity system, controlled by the authority responsible for the location. Only authorized, well-trained professionals are allowed to access the restricted access location.
- External metal parts are hot!! Pay special attention or use special protection before handling.

## Wiring Requirements



### WARNING

#### **Safety First!**

Be sure to disconnect the power cord before installing and/or wiring your Moxa AWK-3131.



### 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" or "LPS" and rated O/P: 8.5W, 12 to 48 VDC, 700mA (max.), 25°C.



## ATTENTION

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



## ATTENTION

Do not use the PoE Injector. Instead, please use an IEEE802.3af or IEEE802.3at compliant PSE (Power Sourcing Equipment) for PoE (Power over Ethernet) device.

## Grounding the Moxa AWK-3131

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.

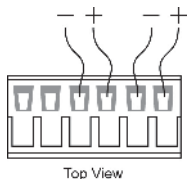


## ATTENTION

This product is intended to be mounted to a well-grounded mounting surface, such as a metal panel.

## Wiring the Redundant Power Inputs

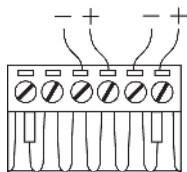
The top two pairs of contacts of the 10-contact terminal block connector on the AWK-3131's top panel are used for the AWK-3131's two DC inputs. Top and front views of the terminal block connector are shown below.



Top 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.



Front View

**STEP 3:** Insert the plastic terminal block connector prongs into the terminal block receptor, which is located on the AWK-3131's top panel.





## ATTENTION

Before connecting the AWK-3131 to the DC power inputs, make sure the DC power source voltage is stable.

### Wiring the Relay Contact

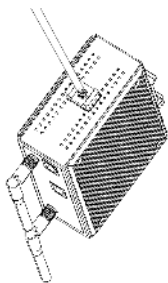
The AWK-3131 has one relay output, which consists of the two contacts of the terminal block on the AWK-3131's top panel. Refer to the previous section for detailed instructions on how to connect the wires to the terminal block connector, and how to attach the terminal block connector to the terminal 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-3131 has two sets of digital input—DI1 and DI2. Each DI comprises two contacts of the 10-pin terminal block connector on the AWK-3131'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.

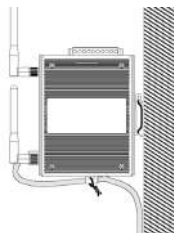
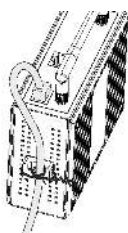
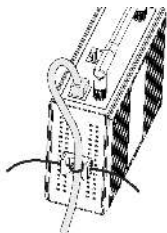
### Cable Holder Installation

You can attach the cable holder to the bottom of the AWK-3131. 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-3131.

**STEP 2:** After mounting the AWK-3131 and plugging in the LAN cable, tighten the cable along the device and wall.



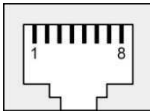
## Communication Connections

### 10/100BaseT(X) Ethernet Port Connection

The 10/100BaseT(X) ports located on the AWK-3131'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-	

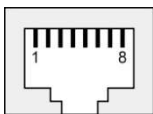


### 1000BaseT Ethernet Port Connection

1000BaseT data is transmitted on differential TRD+/- signal pairs over copper wires.

#### MDI/MDI-X Port Pinouts

Pin	Signal
1	TRD(0)+
2	TRD(0)-
3	TRD(1)+
4	TRD(2)+
5	TRD(2)-
6	TRD(1)-
7	TRD(3)+
8	TRD(3)-

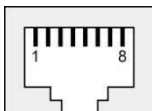


### RS-232 Connection

The AWK-3131 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-3131's console port to your PC's COM port. You may then use a console terminal program to access the AWK-3131 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 male DB9 and DB25 connectors, and hole numbers for female DB9 and DB25 connectors are labeled on the connector. 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 connector (or port). Refer to the Pinout diagram above to see how RJ45 pins are numbered.

## LED Indicators

The front panel of the Moxa AWK-3131 contains several LED indicators. The function of each LED is described in the table below.

LED	Color	State	Description
<b>Front Panel LED Indicators (System)</b>			
<b>PWR1</b>	Green	On	Power is being supplied from power input 1.
		Off	Power is <b>not</b> being supplied from power input 1.
<b>PWR2</b>	Green	On	Power is being supplied from power input 2.
		Off	Power is <b>not</b> being supplied from power input 2.
<b>PoE</b>	Amber	On	Power is being supplied via PoE.
		Off	Power is <b>not</b> being supplied via PoE.
<b>FAULT</b>	Red	Blink (slow)	Cannot get an IP address from the DHCP server (interval: 1 sec)
		Blink (fast)	IP address conflict (interval: 0.5 sec)
		Off	Error condition does not exist.
<b>STATE</b>	Green/ Red	Green	Software Ready
		Green Blink	The AWK has been located by AWK Search Utility. (interval: 1sec)
		Red	Booting error condition
<b>SIGNAL (5 LEDs)</b>	Green	On	Signal level(for Client/Slave mode only)
		Off	
<b>WLAN</b>	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.
	Amber	On	WLAN functions in AP/Master mode.
		Blink	WLAN's data communication is run in AP/Master mode
		Off	WLAN is not in use or not working properly
<b>LAN</b>	Green	On	LAN port's 1000 Mbps link is <b>active</b>
		Blink	Data is being transmitted at 1000 Mbps
		Off	LAN port's 1000 Mbps link is <b>inactive</b>
	Amber	On	LAN port's 10/100 Mbps link is <b>active</b>
		Blink	Data is being transmitted at 10/100 Mbps
		Off	LAN port's 10/100 Mbps link is <b>inactive</b>

## Specifications

WLAN Interface	
Standards	IEEE 802.11a/b/g/n for Wireless LAN IEEE 802.11i for Wireless Security IEEE 802.3 for 10BaseT IEEE 802.3u for 100BaseTX IEEE 802.3ab for 1000BaseT IEEE 802.3af for Power-over-Ethernet IEEE 802.1D for Spanning Tree Protocol IEEE 802.1w for Rapid STP IEEE 802.1Q VLAN
Spread Spectrum and Modulation (typical)	DSSS with DBPSK, DQPSK, CCK OFDM with BPSK, QPSK, 16QAM, 64QAM 802.11b: <ul style="list-style-type: none"> <li>• CCK @ 11/5.5 Mbps</li> <li>• DQPSK @ 2 Mbps</li> <li>• DBPSK @ 1 Mbps</li> </ul> 802.11a/g: <ul style="list-style-type: none"> <li>• 64QAM @ 54/48 Mbps</li> <li>• 16QAM @ 36/24 Mbps</li> <li>• QPSK @ 18/12 Mbps</li> <li>• BPSK @ 9/6 Mbps</li> </ul> 802.11n: <ul style="list-style-type: none"> <li>• 64QAM @ 300 bps to BPSK @ 6.5 Mbps (multiple rates supported)</li> </ul>
Operating Channels (central frequency)	US: <ul style="list-style-type: none"> <li>• 2.412 to 2.462 GHz (11 channels)</li> <li>• 5.18 to 5.24 GHz (4 channels)</li> </ul> EU: <ul style="list-style-type: none"> <li>• 2.412 to 2.472 GHz (13 channels)</li> <li>• 5.18 to 5.24 GHz (4 channels)</li> </ul> JP: <ul style="list-style-type: none"> <li>• 2.412 to 2.484 GHz (14 channels, channel 14 only support DSSS)</li> <li>• 5.18 to 5.24 GHz (4 channels for W52)</li> </ul>
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 802.11n: 6 to 300 Mbps (multiple rates supported)
TX Transmit Power	2.4GHz 802.11b: <ul style="list-style-type: none"> <li>• Typ. 18±1.5 dBm @ 1 to 11 Mbps</li> </ul> 802.11g: <ul style="list-style-type: none"> <li>• Typ. 18±1.5 dBm @ 6 to 24 Mbps</li> <li>• Typ. 17±1.5 dBm @ 36 to 48 Mbps</li> <li>• Typ. 15±1.5 dBm @ 54 Mbps</li> </ul> 802.11n: <ul style="list-style-type: none"> <li>• MCS15 20 MHz: Typ. 14 dBm (± 1.5 dBm)</li> <li>• MCS15 40 MHz: Typ. 13 dBm (± -1.5 dBm)</li> </ul>

	<p>5GHz</p> <p>802.11a:</p> <ul style="list-style-type: none"> <li>• Typ. 17±1.5 dBm @ 6 to 24 Mbps</li> <li>• Typ. 16±1.5 dBm @ 36 to 48 Mbps</li> <li>• Typ. 14±1.5 dBm @ 54 Mbps</li> </ul> <p>802.11n:</p> <ul style="list-style-type: none"> <li>• MCS15 20 MHz: Typ. 13 dBm (± 1.5 dBm)</li> <li>• MCS15 40 MHz: Typ. 12 dBm (± 1.5 dBm)</li> </ul>
RX Sensitivity	<p>2.4GHz</p> <p>802.11b:</p> <ul style="list-style-type: none"> <li>• -92 dBm @ 1 Mbps</li> <li>• -90 dBm @ 2 Mbps</li> <li>• -88 dBm @ 5.5 Mbps</li> <li>• -84 dBm @ 11 Mbps</li> </ul> <p>802.11g:</p> <ul style="list-style-type: none"> <li>• -87 dBm @ 6 Mbps</li> <li>• -86 dBm @ 9 Mbps</li> <li>• -85 dBm @ 12 Mbps</li> <li>• -82 dBm @ 18 Mbps</li> <li>• -80 dBm @ 24 Mbps</li> <li>• -76 dBm @ 36 Mbps</li> <li>• -72 dBm @ 48 Mbps</li> <li>• -70 dBm @ 54 Mbps</li> </ul> <p>802.11n:</p> <ul style="list-style-type: none"> <li>• -68 dBm @ MCS15 40 MHz</li> <li>• -70 dBm @ MCS7 40 MHz</li> <li>• -69 dBm @ MCS15 20 MHz,</li> <li>• -71 dBm @ MCS7 20 MHz</li> </ul> <p>802.11a:</p> <ul style="list-style-type: none"> <li>• -87 dBm @ 6 Mbps</li> <li>• -86 dBm @ 9 Mbps</li> <li>• -85 dBm @ 12 Mbps</li> <li>• -82 dBm @ 18 Mbps</li> <li>• -80 dBm @ 24 Mbps</li> <li>• -76 dBm @ 36 Mbps</li> <li>• -72 dBm @ 48 Mbps</li> <li>• -70 dBm @ 54 Mbps</li> </ul> <p>802.11n:</p> <ul style="list-style-type: none"> <li>• -68 dBm @ MCS15 40 MHz</li> <li>• -70 dBm @ MCS7 40 MHz</li> <li>• -69 dBm @ MCS15 20 MHz</li> <li>• -71 dBm @ MCS7 20 MHz</li> </ul>
<b>Protocol Support</b>	
General Protocols	Proxy ARP, DNS, HTTP, HTTPS, IP, ICMP, SNMP, TCP, UDP, RADIUS, SNMP, PPPoE, DHCP,LLDP
AP-only Protocols	ARP, BOOTP, DHCP, STP/RSTP (IEEE 802.1D/w)
<b>Interface</b>	
Default Antennas	2 dual-band omni-directional antennas, 2 dBi, RP-SMA (male)
Connector for External Antennas	RP-SMA (female)
RJ45 Ports	1, 10/100/1000BaseT(X), auto negotiation speed

	(RJ45-type)
Fiber Ports	1, 1000BaseSFP slot
Console Port	RS-232 (RJ45-type)
Reset	Present
LED Indicators	PWR1, PWR2, PoE, FAULT, STATE, SIGNAL, WLAN, LAN
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
<b>Physical Characteristics</b>	
Housing	Metal, providing IP30 protection
Weight	970 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)
<b>Environmental Limits</b>	
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)
<b>Power Requirements</b>	
Input Voltage	12 to 48 VDC, redundant dual DC power inputs or 48 VDC Power-over-Ethernet (IEEE 802.3af compliant)
Connector	10-pin removable terminal block
Power Consumption	12 to 48 VDC, 700mA (max.)
Reverse Polarity Protection	Present
<b>Standards and Certifications</b>	
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
<b>Note: Check Moxa's website for the most up-to-date certification status.</b>	
<b>Reliability</b>	
MTBF	388,581 hrs
<b>Warranty</b>	
Warranty Period	5 years
Details	See <a href="http://www.moxa.com/support/warranty.aspx">www.moxa.com/support/warranty.aspx</a>



## **ATTENTION**

The AWK-3131 is **NOT** a portable mobile device and should be located at least 20 cm away from the human body. The AWK-3131 is **NOT** designed for the general public. To deploy AWK-3131s and establish a wireless network safely, a well-trained technician is required for installation.



## **ATTENTION**

Use the antennas correctly: The 2.4 GHz antennas are needed when the AWK-3131 operates in IEEE 802.11b/g/n. The 5 GHz antennas are needed for IEEE802.11a/n. Make sure your antenna installation is within a safety area, which is covered by a lightning protection or surge arrest system.



## **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, and
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. For proper installation and grounding of the antenna. please refer to national and local codes (for example, U.S.:NFPA 70, National Electrical Code, Artical810, Canada: Canadian Electrical Code, Section 54).

**NOTE** For installation flexibility, either the A antenna or the B antenna may be selected for use. Make sure the antenna connection matches the antenna configured in the AWK-3131 interface. To protect the connectors and RF module, all radio ports should be terminated by either an antenna or a terminator. The use of the resistive terminator for terminating the unused antenna port is strongly recommended.



## ATTENTION

For EXPLOSION-PROOF application, model AWK-3131 are designed and certified to meet ATEX, and C1D2, and shall be mounted in a suitable enclosure rate to at least IP54 and Pollution Degree 2 as defined in EN60529 and used within its rated electrical and environmental ratings.

This device complies with Part 15 of the FCC rules.



Contains FCC ID : SLE-WAPN001

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