

# MOXA AirWorks AWK-3121

---

## Quick Installation Guide

First Edition, July 2008



### **Moxa Inc.**

Tel: +886-2-8919-1230

Fax: +886-2-8919-1231

Web: [www.moxa.com](http://www.moxa.com)

### **MOXA Technical Support**

Worldwide: [support@moxa.com](mailto:support@moxa.com)

The Americas: [support@usa.moxa.com](mailto:support@usa.moxa.com)

P/N: 1802031210000

# Overview

Are your applications hard to wire, or are your wiring costs out of control? Are you already using mobile equipment that connects over a TCP/IP network? If so, then what you need is the AWK-3121 Access Point/Bridge/AP Client. The AWK-3121 is rated to operate at temperatures ranging from 0 to 60°C for standard models and -40 to 75°C for extended temperature models, and is rugged enough for any harsh industrial environment. Installation is easy, with either DIN-Rail mounting or distribution boxes. The DIN-rail mounting ability, 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 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.

- I 1 **Ī** AWK-3121
- I 2 **Ī** Swivel-type antenna (2dBi, RP-SMA, 2.4&5GHz)
- I 1 **Ī** Quick installation guide
- I 1 **Ī** Software CD
- I 1 **Ī** MOXA product warranty booklet
- I 1 **Ī** Cable holder with a screw
- I 2 **Ī** Protective cap

## Installation and Configuration

Before installing AWK-3121, check to make sure that all items in the Package Checklist are in the box. In addition, you will need access to a notebook computer or PC equipped with an Ethernet port. AWK-3121 has a default IP address that you must use when connecting to AWK-3121 for the first time.

### Step 1: Select the Power Source

AWK-3121 can be powered by a DC power input or PoE (Power over Ethernet). AWK-3121 will use the power source that you choose.

### Step 2: Connect AWK-3121 to a notebook or PC

Since AWK-3121 supports MDI/MDI-X auto-sensing, you can use either a straight-through cable or cross-over cable to connect AWK-3121 to the notebook, if the LED on AWK-3121's LAN port lights up, it means the connection is established.

### Step 3: Set up the computer's IP address

Set an IP address on the same subnet as the AWK-3121. Since AWK-3121's default IP address is **192.168.127.253**, and the subnet mask is 255.255.255.0, you should set the IP address of the computer to 192.168.127.xxx.

### Step 4: Use the web-based manager to configure AWK-3121

Open your computer's web browser and then type <http://192.168.127.253> in the address box to access the homepage of the web-based Network Manager. Before the homepage opens, you will need to enter the user name and password as shown in the following figure. For first-time configuration, enter the default user name and password and then click on OK:

User name:           **admin**  
Password:           **root**

---

**NOTE** For security reasons, we strongly recommend changing the password. To do so, open the Network Manager homepage, click on **Maintenance > Password**, and then follow the onscreen instructions.

---

### **Step 5: Select the operation mode for AWK-3121**

By default, AWK-3121's operation mode is set to **AP**. You can change the setting if you would like a Client mode or other operation mode.

---

**NOTE** To make the change effect, you must click **Activate** button after you change the settings.

---

### **Step 6: Test communications**

We describe two test methods. Use the first method if you are using only one AWK-3121, and use the second method if you are using two or more AWK-3121s

#### **Testing Method for one AWK-3121**

If you are only using one AWK-3121, you will need a second notebook computer equipped with a WLAN card. Configure the WLAN card for connecting to AWK-3121 (the default SSID is MOXA), and change the IP address of notebook B so that it is on the same subnet as notebook A. After connecting the WLAN card, connect to AWK-3121 and open a DOS window on notebook B. At the prompt, type

**ping** *IP address of notebook A*

and then press **Enter** key. A "Reply from IP address ..." response means the communication was successful. A "Request timed out." response means the communication failed. In this case, recheck the configuration to make sure the connections are correct.

#### **Testing Method for two or more AWK-3121s**

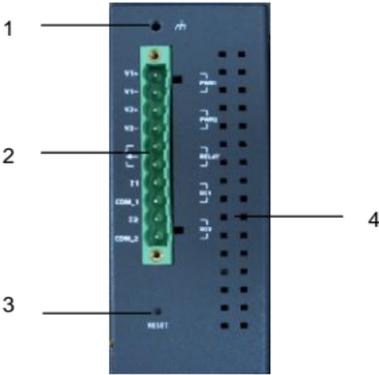
If you have two or more AWK-3121s, you will need a second notebook computer equipped with an Ethernet port. Use the default settings for the first AWK-3121, and change the second or third AWK-3121 to AP Client mode and then configure the notebook and AWK-3121s properly. After setting up the testing environment, open a DOS window on notebook B. At the prompt, type

**ping** *IP address of notebook A*

and then press **Enter** key. A "Reply from IP address ..." response means the communication was successful. A "Request timed out." response means the communications failed. In this case, recheck the configuration to make sure the connections are correct.

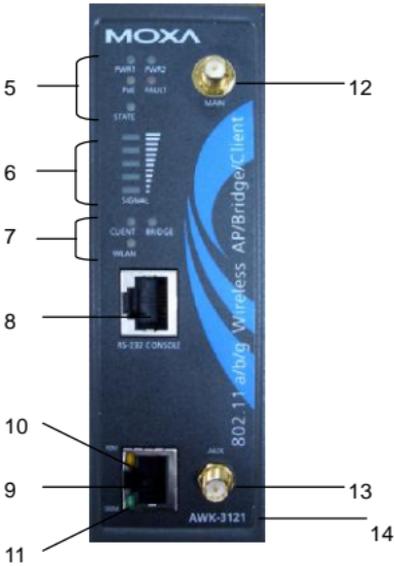
# Panel Layout of AWK-3121

## Top Panel View



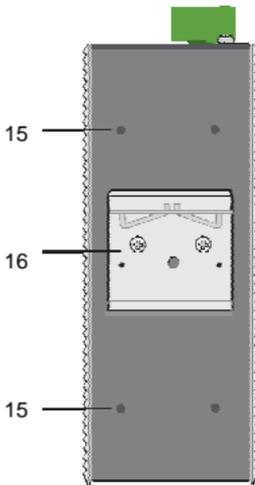
- 1. Grounding screw
- 2. Terminal block for PWR1, PWR2, Relay, DI1 and DI2
- 3. Reset button
- 4. Heat dissipation orifices
- 5. System LEDs: PWR1, PWR2, PoE, FAULT and STATE LEDs

## Front Panel View

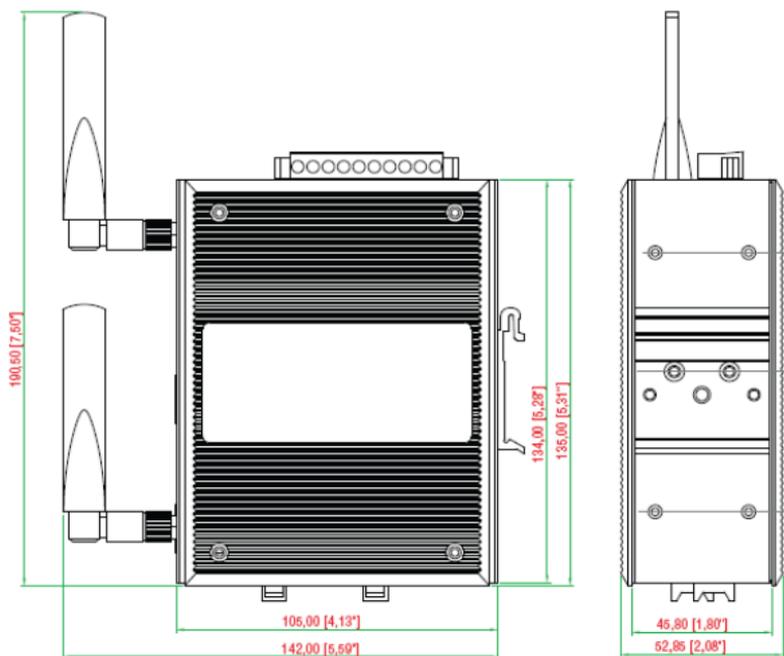


- 5. LEDs for signal strength
- 6. LEDs for signal strength
- 7. WLAN LEDs: CLIENT BRIDGE and WLAN LEDs
- 8. RS-232 console port
- 9. 10/100BaseT(X) RJ45 Port
- 10. 10M LED
- 11. 100M LED
- 12. MAIN antenna port
- 13. AUX antenna port
- 14. Model name
- 15. Screw hole for wall mounting kit
- 16. DIN-Rail mounting kit

## Rear Panel View

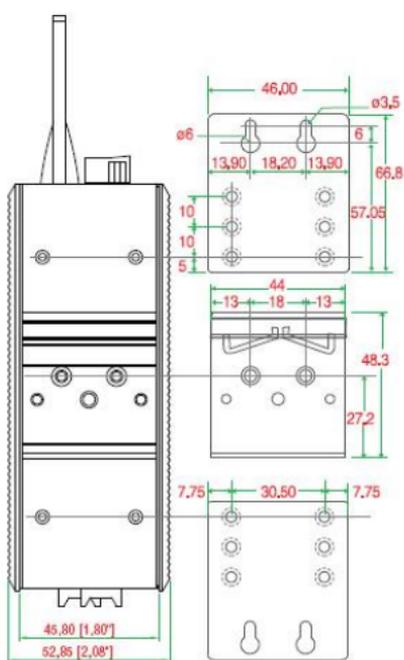


# Mounting Dimensions (unit=mm)



Side View

Rear View



Rear View

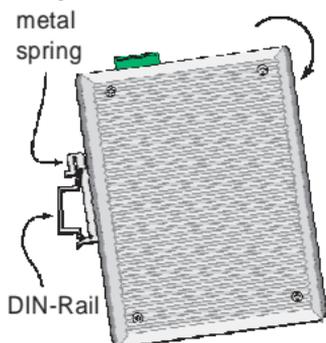
Panel Mounting Kit

# DIN-Rail Mounting

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

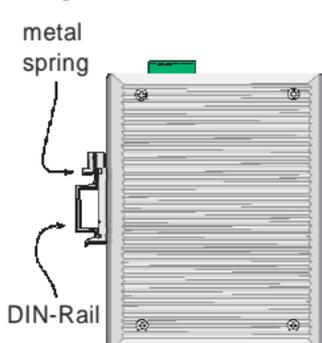
## STEP 1:

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.



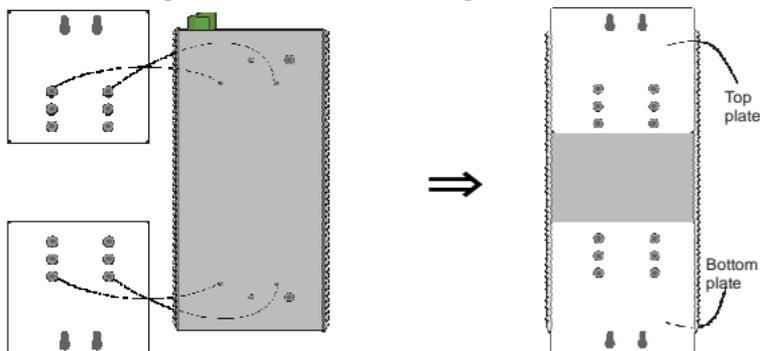
To remove AWK-3121 from the DIN-Rail, simply reverse Steps 1 and 2 above.

# Wall Mounting (Optional)

For some applications, you will find it convenient to mount AWK-3121 on the wall, as illustrated below.

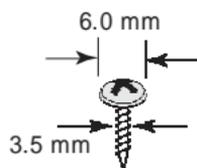
## STEP 1:

Remove the aluminum DIN-Rail attachment plate from AWK-3121, and then attach the wall mount plates, as shown in the diagrams below.



## STEP 2:

Mounting AWK-3121 on the wall requires 4 screws. Use the AWK-3121, with wall mount 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.

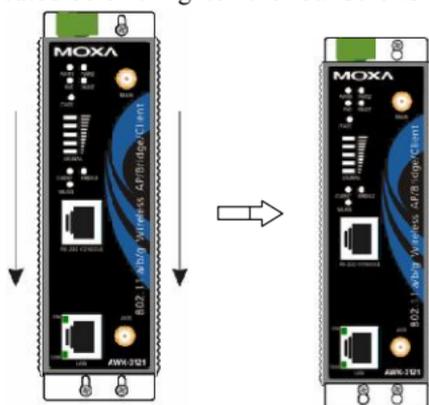


Do not screw the screws in all the way—leave a space of about 2 mm to allow room for sliding the wall mount panel between the wall and the screws.

**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 in the wall, insert the four screw heads through the large parts of the keyhole-shaped apertures, and then slide AWK-3121 downwards, as indicated below. Tighten the four screws for added stability.



## Wiring Requirements

**ATTENTION**



**Safety First!**

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

**ATTENTION**



**Safety First!**

Calculate the maximum possible current in each power wire and common wire. Observe all electrical codes dictating the maximum current allowable 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 points:

§ 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 that shares similar electrical characteristics can be bundled together.

§ Keep input wiring and output wiring separated.

§ It is strongly advised that you label wiring to all devices in the system when necessary.

# Grounding 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**

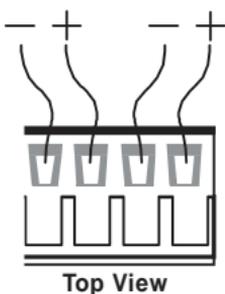
This product is intended to be mounted to a well-grounded mounting surface such as a metal panel.



---

## Wiring the Redundant Power Inputs

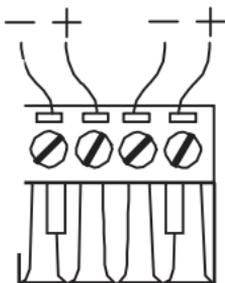
The top two pairs of contacts of the 10-contact terminal block connector on AWK-3121's top panel are used for AWK-3121's two DC inputs. Top and front views of one of the terminal block connectors are shown here.



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 AWK-3121's top panel.

---

**ATTENTION**

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



---

## Wiring the Relay Contact

AWK-3121 has one relay output, which consists of the two contacts of the terminal block on 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. This relay contacts are used to detect user-configured events. The two wires attached to the Fault contacts form an open circuit when a user-configured event is triggered. If a user-configured event does not occur, the Fault circuit will be closed.

# Wiring the Digital Inputs

AWK-3121 has two sets of digital input—DI1 and DI2. Each DI comprises two contacts of the 10-pin terminal block connector on AWK-3121's top panel. You can refer to the section **Wiring the Redundant Power Inputs** 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.

## Communication Connections

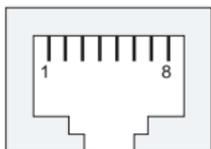
### 10/100BaseT(X) Ethernet Port Connection

The 10/100BaseT(X) ports located on 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.

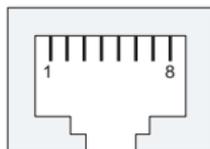
#### RJ45 (8-pin, MDI) Port Pinouts

Pin	Signal
1	Tx+
2	Tx-
3	Rx+
6	Rx-



#### RJ45 (8-pin, MDI-X) Port Pinouts

Pin	Signal
1	Rx+
2	Rx-
3	Tx+
6	Tx-

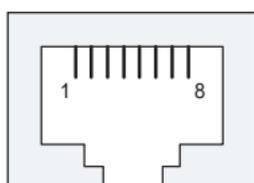


### RS-232 Connection

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

#### Console Pinouts for 10-pin or 8-pin RJ45

10-Pin	Description	8-Pin
1	-----	
2	DSR	1
3	-----	2
4	GND	3
5	TxD	4
6	RxD	5
7	GND	6
8	-----	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 below to see how RJ45 pins are numbered.

# LED Indicators

The front panel of MOXA AWK-3121 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	On	Relay is on.
		Blink	Cannot get an IP address from the DHCP server (interval: 1 sec)
		Off	Relay is off.
<b>STATE</b>	Green/Red	Green	Software Ready
		Red	Bootling error condition
<b>SIGNAL (5 LEDs)</b>	Green	On	Signal level (for <b>Client</b> mode used only)
		Off	
<b>BRIDGE MODE</b>	Green	On	AWK functions in <b>Bridge</b> Mode.
		Off	AWK is not in <b>Bridge</b> Mode.
<b>CLIENT MODE</b>	Green	On	AWK functions in <b>Client</b> Mode.
		Off	AWK is not in <b>Client</b> Mode.
<b>WLAN</b>	Amber	On	WLAN is in used
		Off	WLAN is <b>not</b> in used
<b>TP Port LED Indicators (Port Interface)</b>			
<b>100M</b>	Green	On	TP port's 100Mbps link is <b>active</b> .
		Blink	Data is being transmitted at 100 Mbps
		Off	TP port's 100Mbps link is <b>inactive</b> .
<b>10M</b>	Yellow	On	TP port's 10Mbps link is <b>active</b> .
		Blink	Data is being transmitted at 10 Mbps
		Off	TP port's 10Mbps link is <b>inactive</b> .

# Cable Holder Installation (Optional)

You can attach cable holder on the bottom of MOXA AWK-3121. It can make cabling neat and avoid accident that results from untidy cables.



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

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



## Specifications

### WLAN

Standards	IEEE 802.11a/g/b for Wireless LAN IEEE 802.3u 10/100BaseT(X) for Ethernet LAN IEEE 802.3af for Power-over-Ethernet IEEE 802.1D/w STP/RSTP
Frequency Range	802.11b: DBPSK, DQPSK, CCK 802.11g: OFDM with BPSK, QPSK, 16QAM, 64QAM 802.11a: OFDM with BPSK, QPSK, 16QAM, 64QAM
Data Rate & Modulation	OFDM@54Mbps, CCK@11/5.5Mbps, DQPSK@2Mbps and DBSK@1Mbps
Operating Channels	US: 2.412 to 2.462 GHz (11 channels) 5.18 to 5.24, 5.745 to 5.825 GHz (12 channels) EU: 2.412 to 2.472 GHz (13 channels) 5.15 to 5.35 GHz (8 channels) 5.47 to 5.725 GHz (11 channels) JP: 2.412 to 2.472 GHz (13 channels, OFDM) 2.412 to 2.484 GHz (14 channels, CCK) 5.15 to 5.35 GHz (8 channels for W52, W53) 5.47 to 5.725 GHz (11 channels for W56)
Security	64-bit and 128-bit WEP encryption, WPA /WPA2 (IEEE 802.1X/ RADIUS and TKIP)

Data Rates	802.11b: 1, 2, 5.5, 11 Mbps 802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps
Transmit Power	<u>802.11b:</u> 1 to 11 Mbps: Typ. 18±1.5 dBm <u>802.11g:</u> 6 to 24 Mbps: Typ. 18±1.5 dBm 36 to 48 Mbps: Typ. 16±1.5 dBm 54 Mbps: Typ. 15±1.5 dBm <u>802.11a:</u> 6 to 24 Mbps: Typ. 16±1.5 dBm 36 to 48 Mbps: Typ. 14±1.5 dBm 54 Mbps: Typ. 13±1.5 dBm ≥ 17dBm

Receiver Sensitivity	<u>802.11b:</u> -92 dBm @ 1 Mbps, -90 dBm @ 2 Mbps, -88 dBm @ 5.5 Mbps, -84dBm @ 11 Mbps <u>802.11g:</u> -87 dBm @ 6 Mbps, -86 dBm @ 9 Mbps, -85 dBm @ 12 Mbps, -82dBm @ 18 Mbps, -80 dBm @ 24 Mbps, -76 dBm @ 36 Mbps, -72dBm @ 48 Mbps, -70 dBm @ 54 Mbps <u>802.11a:</u> -87 dBm @ 6 Mbps, -86 dBm @ 9 Mbps, -85 dBm @ 12 Mbps, -82dBm @ 18 Mbps, -80 dBm @ 24 Mbps, -76 dBm @ 36 Mbps, -72dBm @ 48 Mbps, -70 dBm @ 54 Mbps
----------------------	--

## Interface

Antenna	2dBi dual-band, Omni-directional antenna
Antenna Connector	RP-SMA (female)
Connection	10-pin Removable Terminal Block
Alarm Contact	1 relay output (capacity: 1A @24VDC)
Digital Input	2 electrically-isolated inputs <ul style="list-style-type: none"> <li>• 0 to 3.3V for state "0" (OFF)</li> <li>• 10 to 48V for state "0" (ON)</li> <li>• Max. input current: 8 mA</li> </ul>
Console	RS-232 (RJ45 type)
LAN Port	10/100BaseT(X) auto negotiation speed
LED Indicators	PWR1, PWR2, PoE, FAULT, STATE, CLIENT MODE, BRIDGE MODE, WLAN, 10M, 100M

## Power

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

Input Current (@24V) 0.3A  
Overload Current Protection 1.6A  
Reverse Polarity Protection Present

### Mechanical

Casing IP30 protection, aluminum case  
Installation DIN-Rail or wall mounting  
Dimensions 53.6 x 135 x 105 mm (2.11 x 5.31 x 4.13 in)  
Weight 850 g

### Environmental

Operating Temperature Standard models: 0 to 60°C (32 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)

### Regulatory Approvals

Radio EN300 328  
EMC EN301 489-1/-17  
EMI FCC Part 15

**WARRANTY** 5 years

## MOXA Internet Services

Customer satisfaction is our number one concern, and to ensure that customers receive the full benefit of our products, Moxa Internet Services has been set up to provide technical support, driver updates, product information, and user's manual updates.

The following services are provided:

E-mail for technical support: [support@moxa.com](mailto:support@moxa.com)

World Wide Web site for product information: <http://www.moxa.com>

## **FEDERAL COMMUNICATIONS COMMISSION INTERFERENCE STATEMENT**

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

### **CAUTION:**

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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.

### **FCC RF Radiation Exposure Statement**

This equipment must be installed and operated in accordance with provided instructions and the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. End-users and installers must be provide with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.

Outdoor operations in the 5.15-5.25GHz band is prohibited.