



**IAP-420/-420+ Series
Industrial IEEE 802.11 b/g/n
Wireless Access Point**

User Manual
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Tables of Content

Getting Started.....	3
1.1 About the IAP-420/-420+ Series.....	3
1.2 Software Features	3
1.3 Hardware Features.....	3
 Hardware Overview	 4
2.1 Front Panel.....	4
2.1.1 Ports and Connectors.....	4
2.2 Front Panel LEDs	5
2.3 Rear Panel	5
2.4 Top Panel	6
 Hardware Installation	 7
3.1 DIN-rail Installation	7
3.2 Wall Mounting	8
3.3 Wiring	9
3.3.1 Grounding	9
3.3.2 Dual Power Inputs	9
4.1 Ethernet Cables.....	11
4.2 RJ-45 Pin Assignment.....	11
4.3 Wireless Antenna.....	11
 Management	 13
5.1 Open-Vision Configuration.....	13
5.2 UPnP Equipment	13
5.3 Web Browser Management	15
5.4 Configuration.....	16
5.4.1 Overview.....	16
System Info	16
LAN Info.....	17
Wireless Info	17
5.4.2 Basic Setting	17
System Info Settings	17
LAN Setting	18
Time Setting	20
5.4.3 Wireless Settings	21
Wireless Settings	21
Client Mode.....	28
Bridge Mode.....	30
Wireless Options.....	33
5.4.4 Advanced Settings	35

Filters	35
Misc. Settings	36
5.4.5 Event Warning Settings	37
System Log	37
E-mail	38
SNMP	40
5.4.6 System Status	41
Wireless Link List	41
DHCP Client List	41
Traffic/Port Status	41
System Log	42
5.4.7 Administrator	42
Password	42
Configuration	43
Firmware Upgrade	43
Load Factory Default	44
Restart	44
Technical Specifications	46
Compliance	48

Getting Started

1.1 About the IAP-420/-420+ Series

The IAP-420/IAP-420+ series is a reliable 802.11b/g/n access point with two LAN ports. The series supports 802.1X and MAC filters for security control and can operate in AP/bridge/repeater/AP-client modes. You can configure the device using a WEB interface via wired or wireless connections. The second Ethernet port of the IAP-420+ is P.D. enabled, fully compliant with IEEE802.3af PoE standard

1.2 Software Features

- High speed air connectivity: WLAN interface supports up to 150 Mbps
- Provides high security via WEP/WPA/WPA-PSK(TKIP,AES)/WPA2/WPA2-PSK(TKIP,AES)/802.1X authentication
- Supports X-Roaming < 100 ms
- Supports AP/client/bridge/AP-client modes
- Dual redundant Ethernet ports (Recovery time < 10ms)
- Secured management by HTTPs
- Wireless connection status monitoring
- Event warning by Syslog, e-mail, SNMP trap, relay, and beeper

1.3 Hardware Features

- Two 10/100Base-T(X) Ethernet ports
- Fully compliant with IEEE802.3af (ETH2 port of IAP-420+)
- Redundant power inputs: 12~48 VDC on terminal block
- Operating temperature: -10 to 60°C
- Storage temperature: -40 to 85°C
- Operating humidity: 5% to 95%, non-condensing
- Casing: IP-30
- Dimensions (W x D x H): 41(W)x81(D)x95(H) mm

Hardware Overview

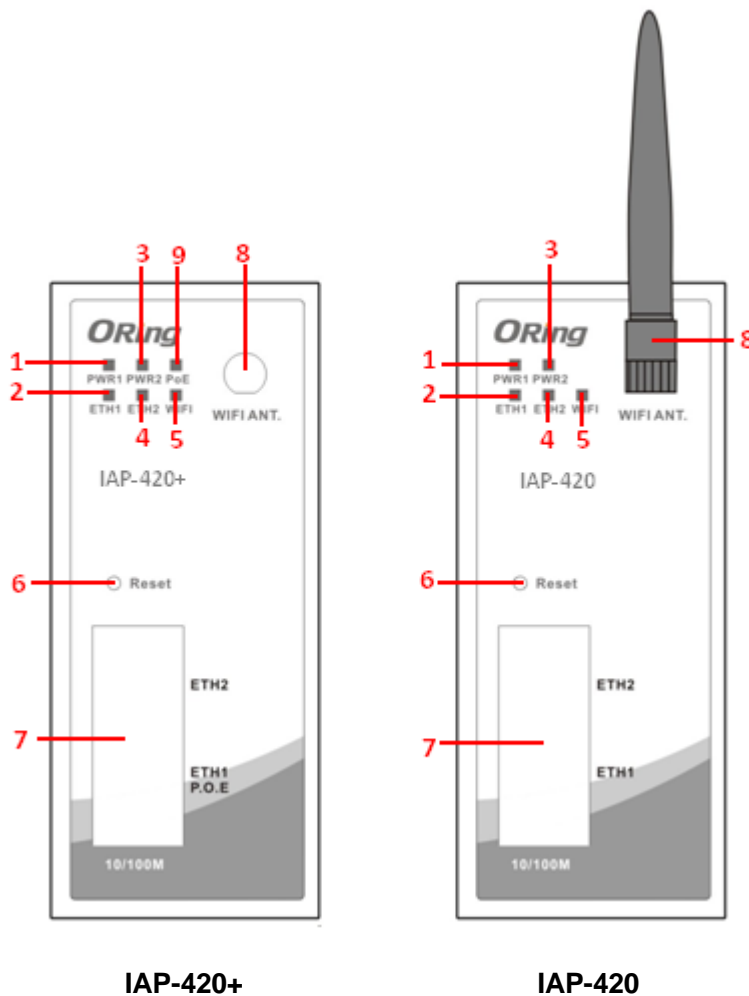
2.1 Front Panel

2.1.1 Ports and Connectors

The device is equipped with the following ports and features on the front panel.

Port	Description
10/100Base-T(X) Fast Ethernet Ports	10/100Base-T(X) RJ-45 fast Ethernet ports supporting auto-negotiation. Default setting including Speed: auto Duplex: auto The ETH1 port of IAP-420+ is PoE-enabled
ANT.	1 x reversed SMA connector for Wi-Fi antennal

*Note: For PoE Ethernet switch options, please refer to information on the ORing IPS series.



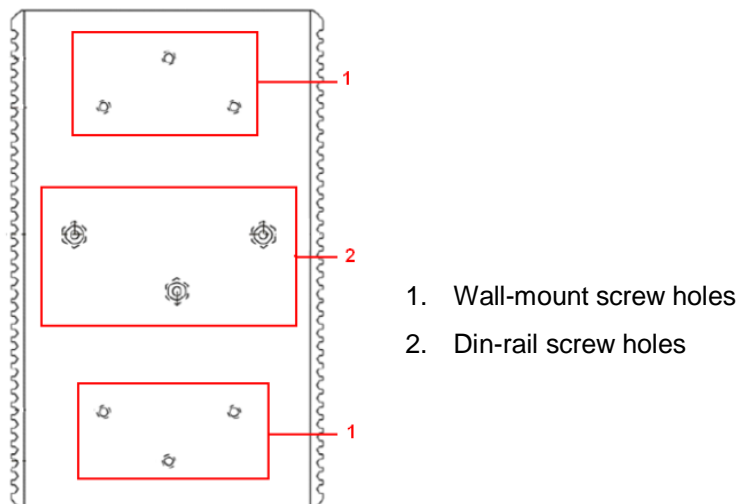
- 1. Power 1 LED
- 2. 1st LAN port LED
- 3. Power 2 LED
- 4. 2nd LAN port LED
- 5. Wi-Fi status LED
- 6. Reset button
- 7. Ethernet ports (ETH1 with PoE function)
- 8. Wi-Fi antenna connector
- 9. PoE indicator

2.2 Front Panel LEDs

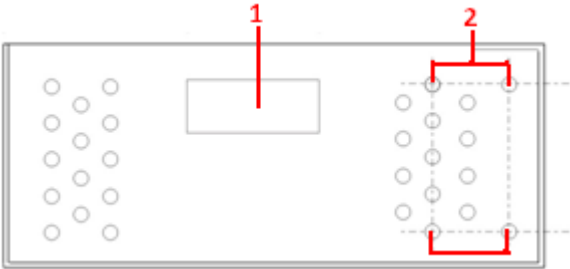
LED	Color	Status	Description
PWR1	Green	On	DC power 1 activated
PWR2	Green	On	DC power 2 activated
PoE	Green	On	Power is supplied over Ethernet cable
ETH1	Green	On	Port is linked and running at 100Mbps
		Blinking	Data being transmitted
ETH2	Green	On	Port is linked and running at 100Mbps
		Blinking	Data being transmitted
WLAN	Green	On	WLAN is activated

2.3 Rear Panel

On the rear panel of the device sit three sets of screw holes. The two sets placed in triangular patterns on both ends of the rear panel are used for wall-mounting (red boxes in the figure below) and the set of four holes in the middle are used for Din-rail installation (blue box in the figure below). For more information on installation, please refer to [3.1 Din-rail Installation](#).



2.4 Top Panel

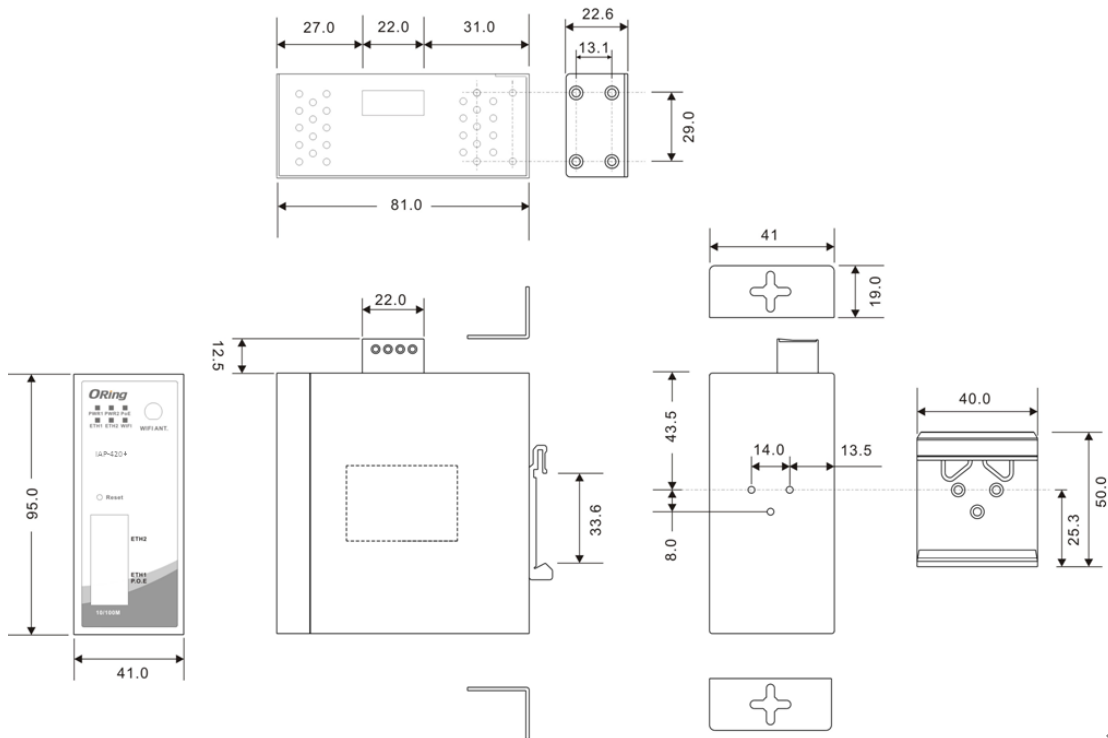


- 1. Terminal block
- 2. Wall-mount screw holes

Hardware Installation

3.1 DIN-rail Installation

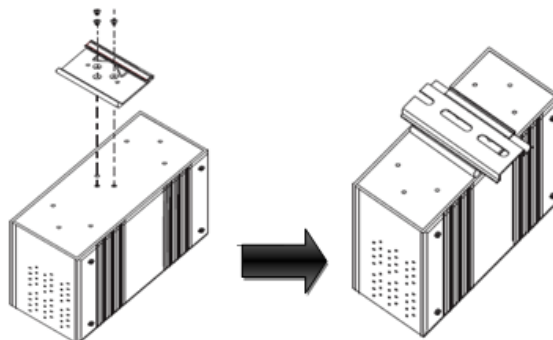
The device comes with a DIN-rail kit to allow you to fasten it to a DIN-rail in any environments.



DIN-rail Kit Measurement (Unit = mm)

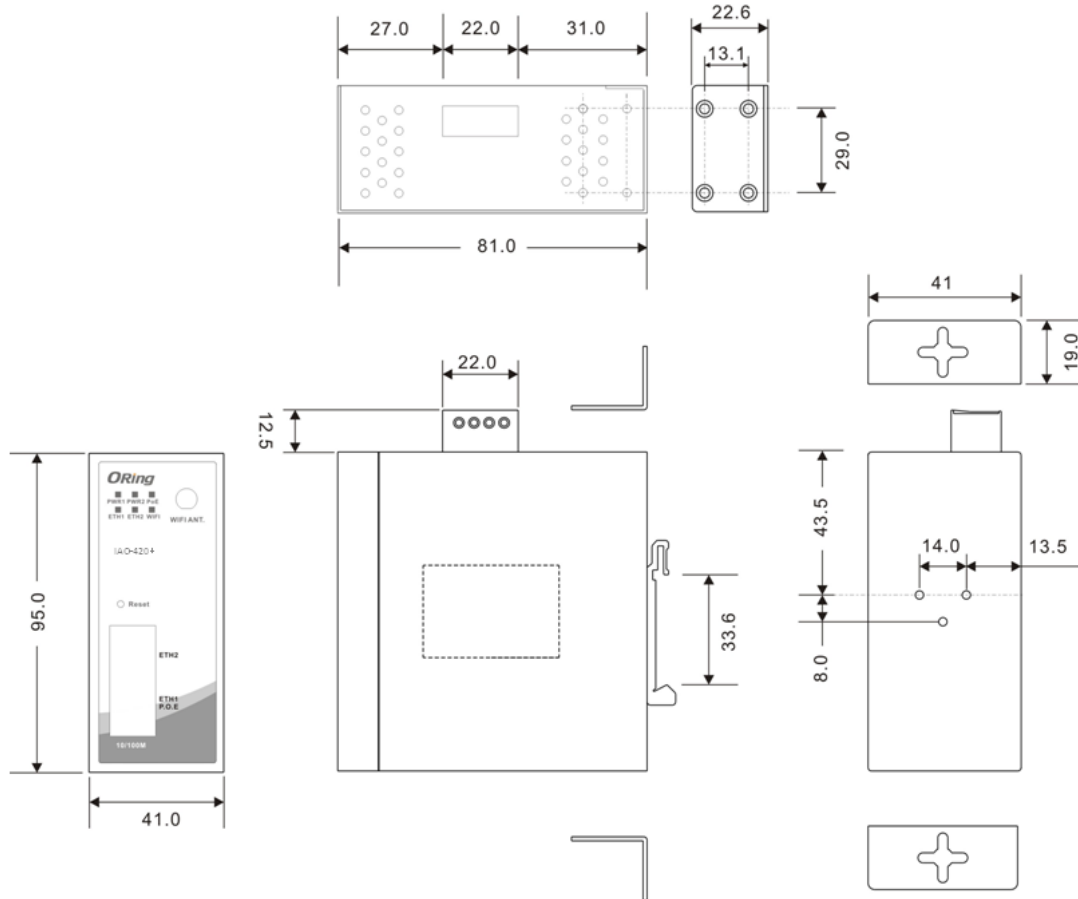
Step 1: Slant the device and screw the Din-rail kit onto the back of the device, right in the middle of the back panel.

Step 2: Slide the device onto a DIN-rail from the Din-rail kit and make sure the device clicks into the rail firmly.



3.2 Wall Mounting

Besides Din-rail, the device can be fixed to the wall via a wall mount panel, which can be found in the package.



Wall-Mount Kit Measurement (Unit = mm)

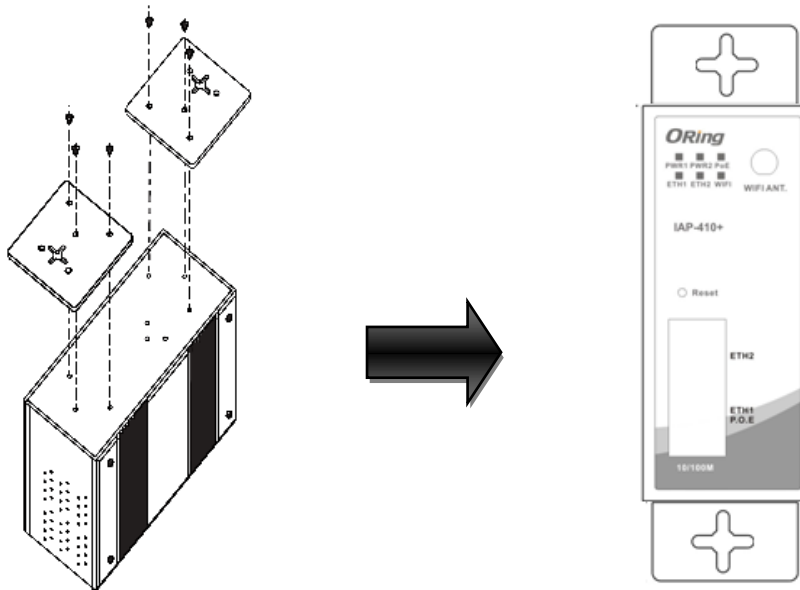
To mount the device onto the wall, follow the steps:

Step 1: Screw the two pieces of wall-mount kits onto both ends of the rear panel of the device.

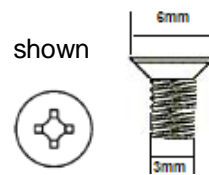
A total of six screws are required, as shown below.

Step 2: Use the device, with wall mount plates attached, as a guide to mark the correct locations of the four screws.

Step 3: Insert four screw heads through the large parts of the keyhole-shaped apertures, and then slide the device downwards. Tighten the four screws for added stability.



The screws should be 6mm diameter head x 3mm diameter thread, as shown below. Note that the screws should not be larger than the size used in the device to prevent damaging the device.



3.3 Wiring



WARNING

Be sure to switch off the power and make sure the area is not hazardous before disconnecting modules or wires. The devices may only be connected to the supply voltage shown on the type plate.

3.3.1 Grounding

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.

3.3.2 Dual Power Inputs

The device has two sets of power inputs, power input 1 and power input 2, on a 4-pin terminal block connector on the top panel. Follow the steps below to wire redundant power inputs.

Step 1: insert the negative/positive DC wires into the V-/V+ terminals, respectively.

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.

Besides power input, the device can also be powered by a PoE PSE such as switch via its PoE-enabled port (ETH2 port).

**ATTENTION**

1. Be sure to disconnect the power cord before installing and/or wiring the device.
 2. 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.
 3. If the current goes above the maximum ratings, the wiring could overheat, causing serious damage to your equipment.
 4. 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.
 5. Do not run signal or communications wiring and power wiring through the same wire conduit. To avoid interference, wires with different signal characteristics should be routed separately.
 6. 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 sharing similar electrical characteristics can be bundled together
 7. You should separate input wiring from output wiring
 8. It is advised to label the wiring to all devices in the system
-

Cables and Antenna

4.1 Ethernet Cables

The device has two 10/100Base-T(X) Ethernet ports. According to the link type, the AP uses CAT 3, 4, 5, 5e, 6 UTP cables to connect to any other network device (PCs, servers, switches, routers, or hubs). Please refer to the following table for cable specifications.

Cable	Type	Max. Length	Connector
10Base-T	Cat. 3, 4, 5 100-ohm	UTP 100 m (328 ft)	RJ45
100Base-T(X)	Cat. 5 100-ohm UTP	UTP 100 m (328 ft)	RJ45

4.2 RJ-45 Pin Assignment

With 10/100Base-T(X) cables, pins 1 and 2 are used for transmitting data, and pins 3 and 6 are used for receiving data.

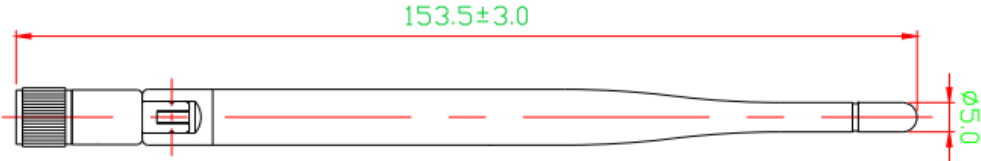
10/100 Base-T(X) RJ-45 Pin Assignments :

Pin Number	Assignment
1	TD+(P.O.E. power input +)
2	TD-(P.O.E. power input +)
3	RD+(P.O.E. power input -)
4	P.O.E. power input +
5	P.O.E. power input +
6	RD-(P.O.E. power input -)
7	P.O.E. power input -
8	P.O.E. power input -

The device also supports auto MDI/MDI-X operation. You can use a straight-through cable to connect PC and the device. The following table below shows the 10/100BASE-T(X) MDI and MDI-X port pin outs.

4.3 Wireless Antenna

The device uses one reversed SMA connector for 2.4GHz antennas. You can also use external RF cables and antennas with the connectors.



Management

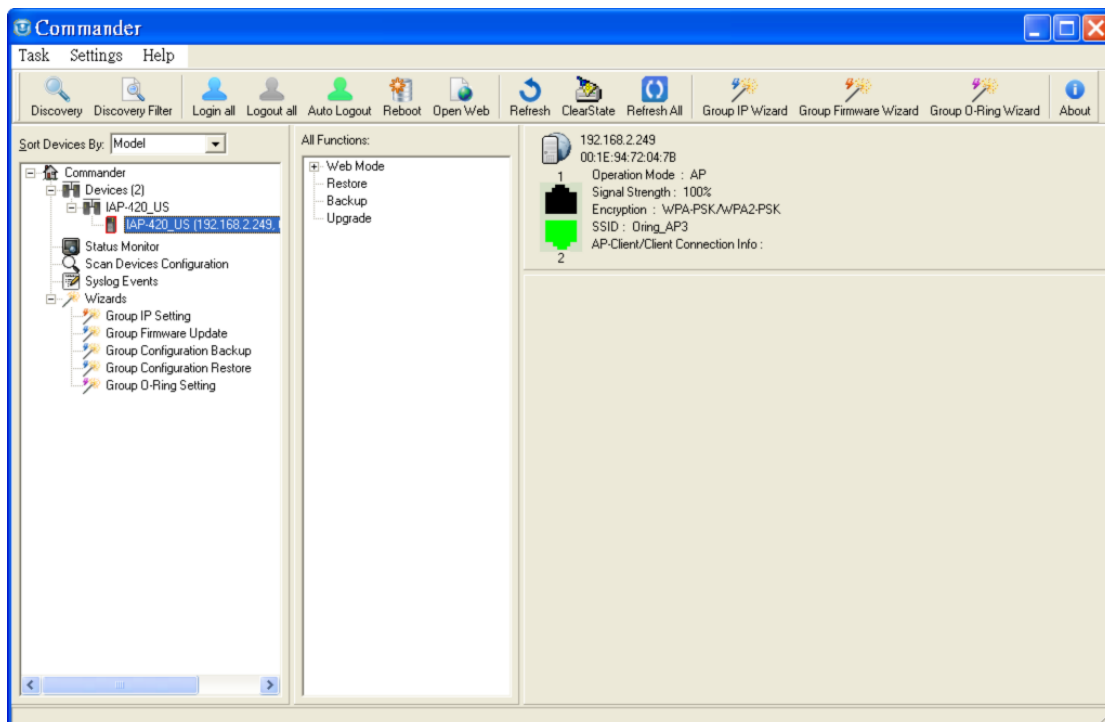
5.1 Open-Vision Configuration

The device can be configured using ORing's proprietary Windows utility Open-Vision. Follow the steps below to set up the device in Open-Vision.

Step 1: Open the commander and click **Discover**, a list of AP devices will be shown.

Step 2: Choose your access point. The functions of the AP will be shown in a tree structure.

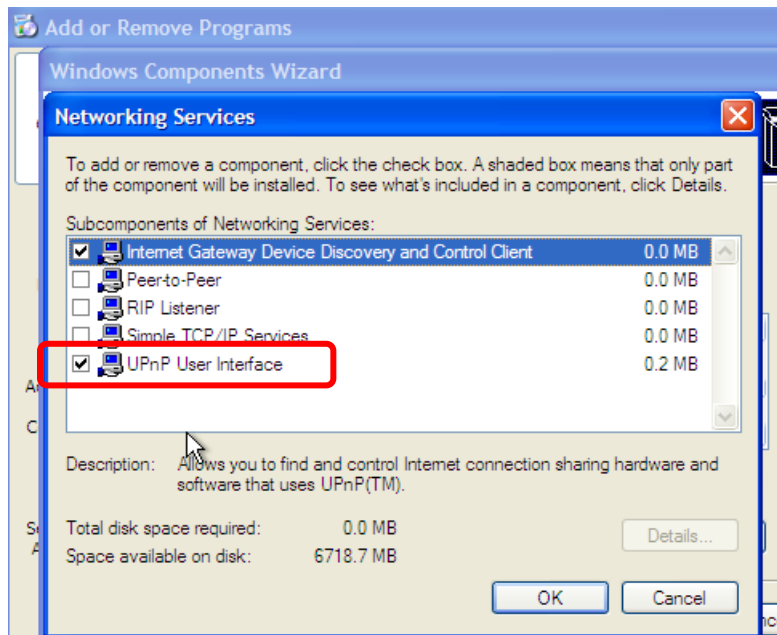
Step 3: Type in the username and password to log in to setup the AP.



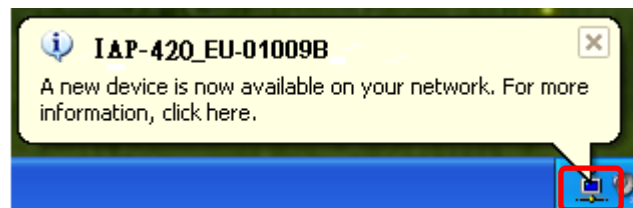
5.2 UPnP Equipment

The device supports UPnP; therefore, when you connect the device to the PC, it will discover the presence of the device automatically. To check the connection of the device to you PC, follow the steps below.

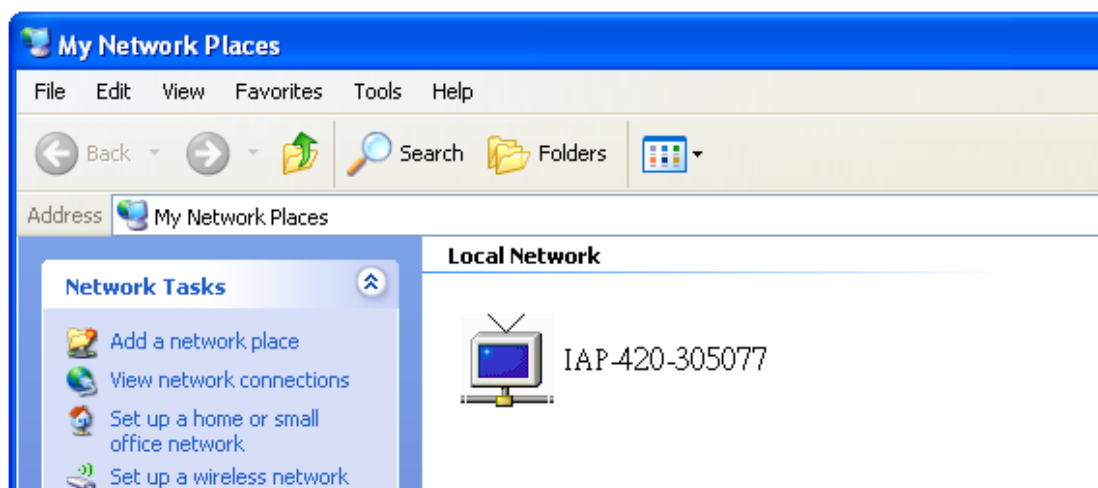
Step 1: Go to **Control Panel > Add or Remove Programs > Windows Components Wizard > Networking Servers > UPnP User Interface** and pitch on the UPnP User Interface.



Step 2: At the right-below corner of the computer, you will find an UPnP icon of the device.



Step 3: Click on the icon and you will find the UPnP device in **My Network Places**.



Step 4: Right click the UPnP device and choose **Properties**, the following picture will be shown.

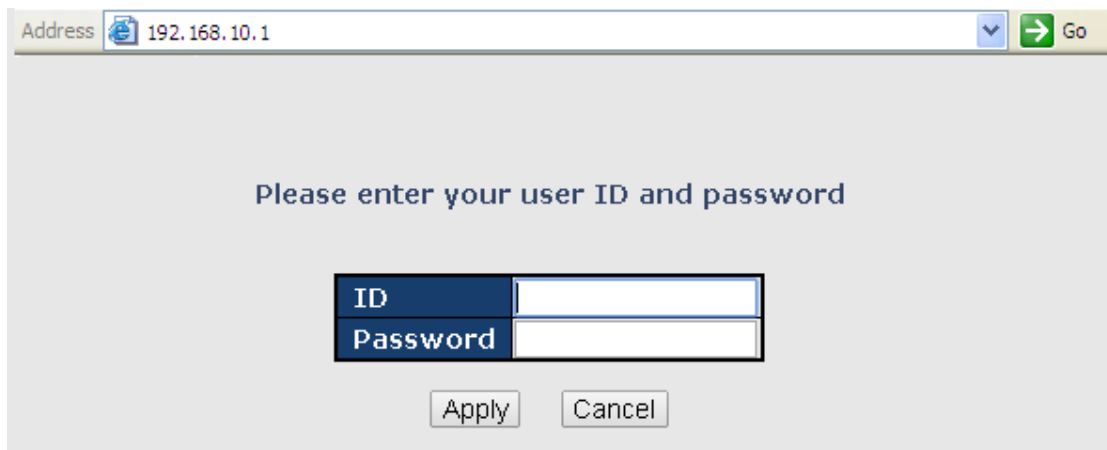
Step 5: Double click the device icon will lead you to the management web page.

5.3 Web Browser Management

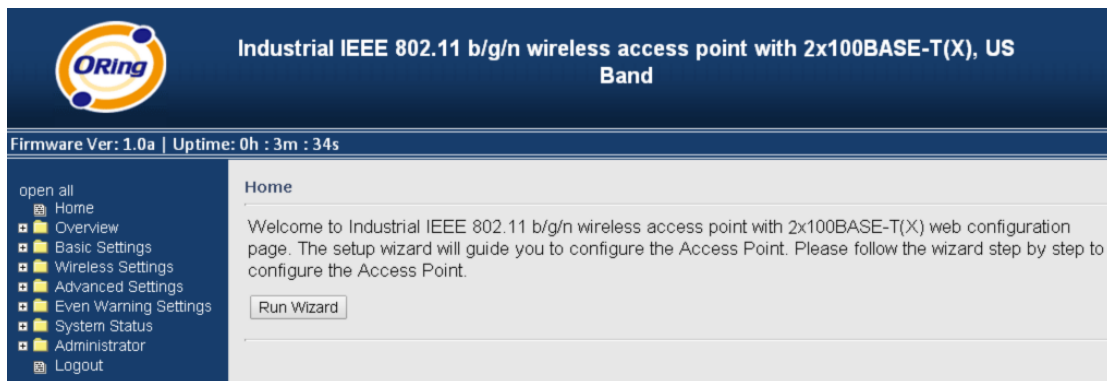
An embedded HTML web site resides in the flash memory of the device. It contains advanced management features which you can manage from anywhere on the network through a standard web browser such as Microsoft Internet Explorer (Internet Explorer 5.0 or later versions). It is based on Java Applets which can reduce network bandwidth consumption, enhance access speed, and provide user-friendly viewing windows.

Note: By default, IE5.0 or later version does not allow Java Applets to open sockets. You need to explicitly modify browser settings in order to enable Java Applets to use network ports.

Open a web browser on your computer and type <http://192.168.10.2> (default gateway IP of the device) in the address box to access the webpage. A login window will pop up where you can enter the default login name admin and password **admin**. For security reasons, we strongly recommend you to change the password. Click on **Administrator > Password** after logging in to change the password.



After you log in successfully, a Web interface will appear, as shown below. On the left hand side of the interface is a list of functions where you can configure the settings. The details of the configurations will be shown on the right screen.



5.4 Configuration

The **Home** screen will appear with a short description of the device. You can click **Run Wizard** on the page for quick configurations of a new password, wireless SSID and channel, and encryption.

On top of the Home screen shows information about the firmware version and uptime.

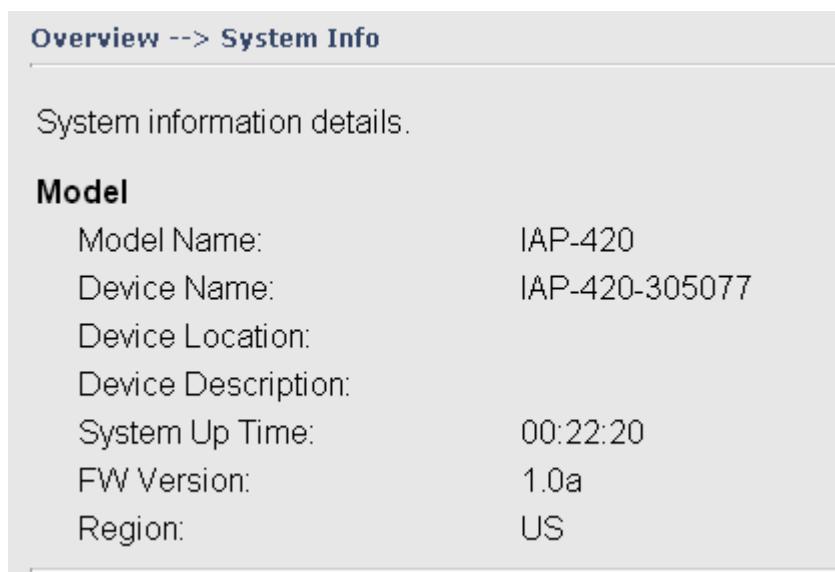


Label	Description
Firmware	Shows the current firmware version
Uptime	Shows the elapsed time since the AP is started

5.4.1 Overview

System Info

This page will show the basic information of the device based on the settings you input in **Basic Settings/System Info Settings**. The information includes model name, device name, location, description, and firmware version.



LAN Info

This page will show the LAN information of the device based on the settings you input in **Basic Settings/LAN Setting**. The information includes including MAC address, IP address, subnet mask, and gateway.

[Overview --> Lan Info](#)

System information details.

Ethernet

MAC Address:	00:0C:43:30:50:77
Static/Dynamic IP Address:	192.168.2.167
Subnet Mask:	255.255.255.0
Gateway:	192.168.2.1

Wireless Info

This page will show the wireless information of the device based on the settings you input in **Wireless Settings**. The information includes MAC address, SSID, peer AP SSID, encryption type, channel number, operation mode, and RF type.

[Overviews --> Wireless Info](#)

System information details.

Wireless

MAC Address:	00:0C:43:30:50:18
SSID:	oring
Peer AP SSID:	----
Encryption Type:	No encryption
Channel:	6
Operation Mode:	AP
RF Type:	BGN Mixed Mode

5.4.2 Basic Setting

System Info Settings

This section allows you to input the basic information for the device.

Basic Settings --> System Info Setting

Device Name:

Device Location:

Device Description:

Label	Description
Device Name	Enter the name for the device
Device Location	Enter the place where the device is located
Device Description	Enter a description for the device

LAN Setting

This page allows you to configure the IP settings of the LAN port for the device. To access the AP normally, a valid IP address of your LAN should be designated to the LAN interface. The default IP setting is DHCP server which will obtain an IP address automatically.

Basic Settings --> LAN Setting

LAN settings of AP.

Obtain an IP address automatically

Use the following IP address

IP Address: . . .

Subnet Mask: . . .

Default Gateway: . . .

Obtain DNS server address automatically

Use the following DNS server addresses

Primary DNS: . . .

Secondary DNS: . . .

Web Protocol: HTTP HTTPS

Port:

Web Access Control: Wired Wireless

The AP can be setup as a DHCP server to distribute IP addresses to the WLAN network.

DHCP Server Enabled Disabled

Options

Starting IP address: . . .

Maximum Number of IPs:

Lease Time: hours

Label	Description
Obtain an IP address automatically	Select this option if you want the IP address to be assigned automatically by the DHCP server in your network.
Use the following IP address	<p>Select this option if you want to assign an IP address to the device manually. You should set up IP address, subnet mask, and default gateway for the device.</p> <p>IP Address: The device comes with default IP address, but you can also input a new IP address.</p> <p>Subnet Mask: 255.255.255.0 is the default value. All devices on the network must have the same subnet mask to communicate on the network.</p> <p>Default Gateway: Enter the IP address of the device in your network.</p>
Obtain DNS server address automatically	Obtains a DNS server address from a DHCP server. If you have chosen to obtain an IP address automatically, this option will be selected accordingly.
Use the following DNS server addresses	Specifies a DNS server address manually. You can enter two addresses as the primary and secondary options.
Web Protocol	You can choose to use HTTP or HTTPS protocols. The latter has a higher security level.
Preferred DNS	Input the IP address of the DNS server you prefer to use
Secondary DNS	Input the IP address of another DNS server

Web Access Control	Choose Wired if you want to connect to the device via wired networks. Choose Wireless if you want to access the network via wireless connections.
---------------------------	---

Time Setting

In this page, you can set the date & time of the device. A correct date and time will help the system log events. You can set up a NTP (Network Time Protocol) client to synchronize date & time to a NTP server on the Internet.

Label	Description
NTP	Enables or disables NTP function
NTP Server 1	The primary NTP server
Time Zone	Select the time zone you are located in
Synchronize	Specify the scheduled time for synchronization
Local Date	Set a local date manually
Local Time	Set a local time manually
Get Current Date & Time from Browser	Click this button, you can set the time from browser.

5.4.3 Wireless Settings

Wireless Settings

In each mode, the device will forward packets between its Ethernet interface and wireless interfaces for wired hosts on the Ethernet side, and wireless hosts on the wireless side.

Wireless Settings --> Wireless Settings

- AP
- AP-Client
- Client
- Bridge

provides Access Point services for other wireless clients.

Basic wireless settings for the AP.

SSID:

Channel:

Security Options

Security Type:

Label	Description
AP	You can set the device to work in AP mode. This is the most common mode for all wireless APs. In this mode, the AP will act as a central connection point which other wireless clients can connect to.
AP-Client	This mode provides a one-to-many MAC address mapping mechanism such that multiple stations behind the AP can transparently connect to the other AP even if they don't support WDS
Client	In this mode, the AP functions as a wireless client to connect your wired devices to a wireless network. This mode provides no access point services but supports 802.1X.
Bridge	This mode provides static LAN-to-LAN bridging functionality. The static LAN-to-LAN bridging function is supported through Wireless Distribution System (WDS).

AP Mode

Wireless Settings --> Wireless Settings

AP

This mode provides Access Point services for other wireless clients.

Basic wireless settings for the AP.

SSID: oring

Channel: 6

Security Options

Security Type:

- None
- None
- WEP
- WPA/WPA2 Personal
- WPA/WPA2 Enterprise
- 802.1X

Apply Save Cancel

Label	Description
SSID	SSID (Service Set Identifier) is a unique name that identifies a network. All devices on the network must be set with the same SSID in order to communicate with each other. Fill in a new SSID in this field if you do not want to use the default value.
Channel	Specify a channel to be used. Channel 6 is the default channel. You can also select a new number from the dropdown list. All devices on the network must be set to the same channel to communicate on the network. (Wireless channel must be the same as the other device in the group)
Security Options	You can choose the security type for your WLAN connection from the following options: None: no encryption WEP: WEP (Wired Equivalent Privacy) is a wireless security protocol for WLAN. WEP will encrypt data

	<p>transmitted on the WLAN.</p> <p>WPA/WPA2 Personal: this will encrypt the link without additional RADIUS server, only an access point and client station that supports WPA-PSK is required.</p> <p>WPA/WPA2 Enterprise: Authentication is achieved via WPA RADIUS Server. You need a RADIUS or other authentication server on the network.</p> <p>802.1x: Authentication through RADIUS server</p>
--	---

When you set security type as **WEP**, the following fields will appear to allow you to configure individual settings.

Security Options

Security Type:

Auth Mode: Open Shared WEPAUTO

WEP Encryption:

Key Type:

Default Key Index:

KEY1:

KEY2:

KEY3:

KEY4:

Label	Description
Auth Mode	Available values include Open , Shared , and WEPAUTO . When choosing Open or Shared , all of the clients must select the same authentication to associate this AP. If select WEPAUTO , the clients do not have to use the same Open or Shared authentication. They can choose any one to authenticate.
WEP Encryption	You can select 64 Bit or 128 Bit .

Key Type	Available values include ASCII and Hex Key Type . ASCII (American Standard Code for Information Interchange) is a code for representing English characters as numbers in the range from 0 to 127. Hex digits uses 0–9 to represent values zero to nine, and characters A-F to represent values ten to fifteen.
Default Key Index	Select one of the keys to be the active key
Key 1 to 4	You can input up to four encryption keys.

When you set security type as **WPA/WPA2 Personal**, the following fields will appear to allow you to configure individual settings.

Security Options

Security Type:

Auth Mode: WPAPSK WPA2PSK WPAPSK/WPA2PSK mix

Encryption Type: TKIP AES TKIP/AES mix

Shared Key: (8~64 characters)

Label	Description
Auth Mode	Available values include WPAPSK , WPA2PSK , and WPAPSK/WPA2PSK mix . WPAPSK and WPA2PSK will encrypt the link without additional RADIUS server, only an access point and client station that supports WPA-PSK is required. For WPA/WPA2, authentication is achieved via WPA RADIUS Server. You need a RADIUS or other authentication server on the network.
Encryption Type	Available values include TKIP , AES , and TKIP/AES mix . WPA-PSK uses TKIP encryption, and WPA2-PSK uses AES encryption. TKIP/AES provides the most reliable security, and is easiest to implement.
Shared Key	Enter a pass phrase in this field. The value must be within 8 to 64 characters

When you set security type as **WPA/WPA2 Enterprise**, the following fields will appear to allow

you to configure individual settings.

Security Options

Security Type:

Auth Mode: WPA WPA2 WPA/WPA2 mix

Encryption Type: TKIP AES TKIP/AES mix

Radius Server IP: . . .

Radius Port:

Shared Secret:

Label	Description
Auth Mode	Available values include WPAPSK , WPA2PSK , and WPAPSK/WPA2PSK mix . WPAPSK and WPA2PSK will encrypt the link without additional RADIUS server, only an access point and client station that supports WPA-PSK is required. For WPA/WPA2, authentication is achieved via WPA RADIUS Server. You need a RADIUS or other authentication server on the network.
Encryption Type	Available values include TKIP , AES , and TKIP/AES mix . WPA-PSK uses TKIP encryption, and WPA2-PSK uses AES encryption. TKIP/AES provides the most reliable security, and is easiest to implement.
Radius Server IP	Enter the IP address of the RADIUS server
Radius Port	Enter the RADIUS port (default is 1812)
Shared Secret	Enter the RADIUS password or key

When you set security type as **802.1x**, the following fields will appear to allow you to configure individual settings.

Security Options

Security Type:

WEP Encryption:

Key Type:

Default Key Index:

KEY1:

KEY2:

KEY3:

KEY4:

Radius Server IP: . . .

Radius Port:

Shared Secret:

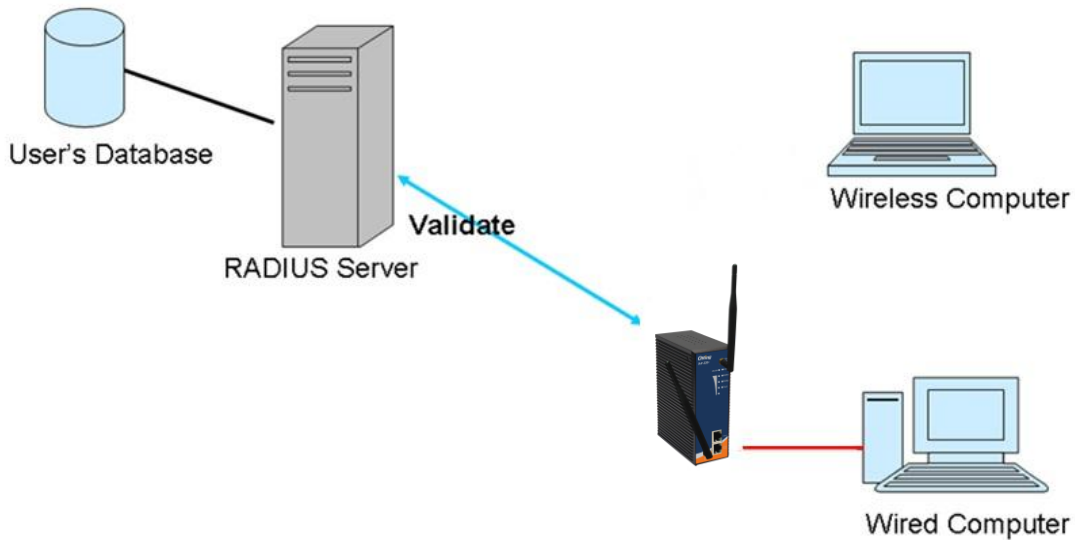
Label	Description
WEP Encryption	You can select 64 Bit or 128 Bit .
Key Type	Available values include ASCII and Hex Key Type . ASCII (American Standard Code for Information Interchange) is a code for representing English characters as numbers in the range from 0 to 127. Hex digits uses 0–9 to represent values zero to nine, and characters A-F to represent values ten to fifteen.
Default Key Index	Select one of the keys to be the active key
Key 1 to 4	Input up to four encryption keys
Radius Server IP	Enter the IP address of the RADIUS server
Radius Port	Enter the RADIUS port (default is 1812)
Shared Secret	Enter the RADIUS password or key

RADIUS (Remote Authentication Dial-In User Service) is a widely deployed protocol that enables companies to authenticate and authorize remote users' access to a system or service from a central network server.

When you configure the remote access server for RADIUS authentication, the credentials of the connection request are passed to the RADIUS server for authentication and authorization. If the request is both authenticated and authorized, the RADIUS server sends an accept

message back to the remote access server and the connection attempt is accepted. If the request is either not authenticated or not authorized, the RADIUS server sends a reject message back to the remote access server and the connection attempt is rejected.

The principle of the Radius server is shown in the following pictures:



AP-Client Mode

This mode provides a one-to-many MAC address mapping mechanism such that multiple stations behind the AP can transparently connect to the other AP even if they don't support WDS.

Wireless Settings --> Wireless Settings

AP-Client ▾

This mode provides a 1-to-N MAC address mapping mechanism such that multiple stations behind the AP can transparently connect to the other AP even they didn't support WDS.

Note: When the device in AP-Client mode, wireless channel must be the same with the other device in group.

Basic wireless settings for the AP.

SSID:

Channel:

Security Options

Security Type:

- None
- None
- WEP
- WPA/WPA2 Personal

AP-Client related settings.

Peer AP SSID:

Peer AP BSSID: Enabled

Security Options

Security Type:

Label	Description
SSID	SSID (Service Set Identifier) is a unique name that identifies a network. All devices on the network must be set with the same SSID in order to communicate with each other. Fill in a new SSID in this field if you do not want to use the default value.
Channel	Specify a channel to be used. Channel 6 is the default channel. You can also select a new number from the dropdown list. All devices on the network must be set to the same channel to communicate on the network. (Wireless channel must be the same as the other device in the group)
Security options	You can choose the security type for your WLAN connection from the following options: None: no encryption WEP: WEP (Wired Equivalent Privacy) is a wireless security protocol for WLAN. WEP will encrypt data transmitted on the WLAN. WPA/WPA2 Personal: uses a pre-shared key for authentication. This pre-shared key is then dynamically sent between the AP and clients. Each authorized computer is given the same pass phrase.
Peer AP SSID	Enter the SSID of the AP you want to connect as a client
Peer AP BSSID	Enter the BSSID (Wireless MAC address) to limit client target
Site Scan	You can scan APs on the network using this mode.
Security Type	Select the security type used by the client you want to connect

Client Mode

In this mode, the AP functions as a wireless client to connect your wired devices to a wireless network. This mode provides no access point services but supports 802.1X.

Wireless Settings --> Wireless Settings

Client

In this mode the AP functions as a wireless client to connect to other AP, thus provides transparent connection between ethernet & wireless port. This mode provides no Access Point services but with 802.1X supported.

Client related settings.

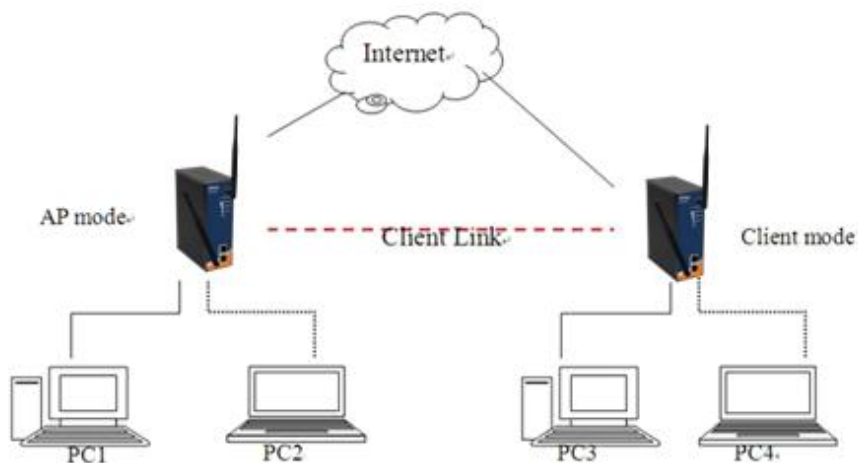
Peer AP SSID:

Peer AP BSSID: Enabled

Security Options

Security Type:

Label	Description
Peer AP SSID	Enter the SSID of the AP you want to connect as a client
Peer AP BSSID	Enter the BSSID (Wireless MAC address) to limit client target
Site Scan	Enables or disables slave mode
Security Type	Select the security type used by the client you want to connect



Result:

1. PC1, PC2 can visit PC3, PC4 and AP Client
2. PC3, PC4 can visit PC1, PC2 and AP
3. AP Client can visit AP

Bridge Mode

The Bridge mode will turn the device into a wireless bridge. When configured as a bridge, the device will link a wireless network to a wired network allowing you to bridge two networks with different infrastructure. Wireless clients will not be able to connect to the access point in this mode.

Wireless Settings --> Wireless Settings

Bridge ▾

This mode provides Static LAN-to-LAN Bridging functionality. The static LAN-to-LAN bridging function is supported through Wireless Distribution System(WDS).

Note: When the device in Bridge mode, wireless channel must be the same with the other device in group.

Operation mode of the AP should be set to "Bridge" mode before these settings changed.

WDS Mode: Bridge Mode ▾

Peer MAC Address 1: Enabled

Peer MAC Address 2: Enabled

Peer MAC Address 3: Enabled

Peer MAC Address 4: Enabled

Please input the wireless MAC Address what you want to connect.

Format example :
Local wireless MAC 00:0C:43:30:50:18

SSID: Channel: 6 ▾

Security Options

Security Type: None ▾

Label	Description
WDS Mode	Enter the SSID of the AP you want to connect as a client
Peer MAC Address 1-4	Enter the MAC address of the peer WLAN Bridge
SSID	Enables or disables slave mode
Channel	Choose a fixed channel from the drop-down list
Security Type	Select the security type used by the client you want to connect

Note: the **channel** and the **security settings** (security type & password) should be identical on the two access points.

Set WDS as Bridge Mode

In the mode, the AP acts as a standard bridge that forwards traffic between WDS links (links connected to other AP/wireless bridges) and an Ethernet port. As a standard bridge, the AP learns MAC addresses of up to 64 wireless or 128 wired and wireless network devices, which are connected to their respective Ethernet ports to limit the amount of forwarded data. Only data destined for stations which are known to reside on the peer Ethernet link, multicast data

or data with unknown destinations need to be forwarded to the peer AP via the WDS link. The peer WDS APs are based on the MAC addresses listed in **Peer Mac Address**.

Basic Setting --> WDS

Operation mode of the AP should be set to "Bridge" mode before these settings changed.

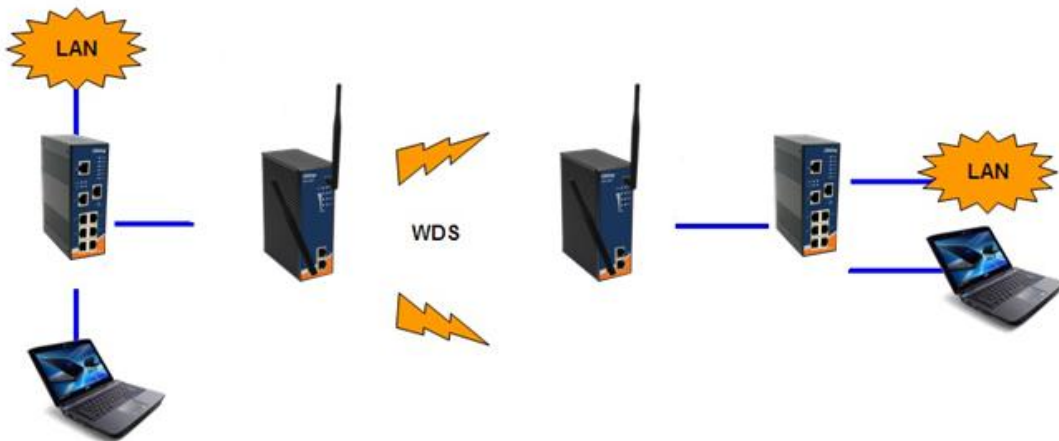
WDS Mode: Bridge Mode

Peer Mac Address 1: Enabled

Peer Mac Address 2: Enabled

Peer Mac Address 3: Enabled

Peer Mac Address 4: Enabled



Bear in mind the following principles when setting the WDS mode to bridge mode:

1. LAN IP address should use a different IP in the same network.
2. Shut down all DHCP server functions of the AP.
3. Enable WDS.
4. Each AP should have the same setting, except **Peer Mac Address** should be set to the other's Mac address.
5. The settings of security and channel must be the same.
6. The distance of the AP should be limited within a certainty area.

Set WDS as Repeater Mode

In this mode, repeater is used to extend the range of the wireless infrastructure by forwarding traffic between associated wireless stations and another repeater or AP connected to the wired LAN. The peer WDS APs are based on the MAC addresses listed in **Peer Mac Address**.

Basic Setting --> WDS

Operation mode of the AP should be set to "Bridge" mode before these settings changed.

WDS Mode: Repeater Mode

Peer Mac Address 1: Enabled

Peer Mac Address 2: Enabled

Peer Mac Address 3: Enabled

Peer Mac Address 4: Enabled



Wireless Options

Wireless Settings --> Wireless Options

Wireless performance tuning.

Beacon Interval: (msec, range:20~999, default:100)

DTIM Interval: (range: 1~255, default:1)

Fragmentation Threshold: (range: 256~2346, default:2346)

RTS Threshold: (range: 1~2347, default:2347)

Xmit Power: % (range: 1~100, default:100)

Max Client Threshold: (range: 1~32, default 10)

Wireless Mode: BG Mixed Mode B Mode G Mode
 GN mixed Mode BGN mixed Mode

Preamble: Long Short

SSID Broadcast: Enabled Disabled

HT Operating Mode: Mixed Mode Green Field

HT Band Width: 20 MHz 20/40 MHz

HT Guard Interval: Long Short

HT MCS: ▼

HT RDG: Disable Enable

HT Extension Channel: ▼

HT Aggregation MSDU: Disable Enable

HT Auto BlockACK: Disable Enable

HT Decline BA Request: Disable Enable

Extra parameters for Client Mode:

X-Roaming: Disabled Standard

Signal Threshold for Roaming: dbm(range: 60~90, default 75)

Label	Description
Beacon Interval	A beacon is a packet sent by a wireless access point to synchronize wireless devices. The beacon interval value indicates the frequency interval of the beacon. Increasing the beacon interval reduces the number of beacons and the overhead associated with them. The default value is 100 , but 50 is recommended when reception is poor.
DTIM Interval	The default value is 1. This value, between 1 and 255 milliseconds, indicates the interval of the Delivery Traffic

	<p>Indication Message (DTIM). A DTIM field is a countdown field informing clients of the next window for listening to broadcast and multicast messages. When the AP has buffered broadcast or multicast messages for associated clients, it sends the next DTIM with a DTIM Interval value. Its clients hear the beacons and awaken to receive the broadcast and multicast messages.</p>
Fragmentation Threshold	<p>The value specifies the maximum size for a packet before data is fragmented into multiple packets. The value should remain at the default 2346 (the range is 256 - 2346 bytes). If you experience a high packet error rate, you may slightly increase the value. Setting the value too low may result in poor network performance. Only minor modifications of this value are recommended.</p>
RTS Threshold	<p>The RTS (Request to Send) Threshold is the amount of time a wireless device, attempting to send, will wait for a recipient to acknowledge that it is ready. Normally, the AP sends a RTS frame to a station and negotiates the sending of data. After receiving the RTS, the station responds with a CTS (Clear to Send) frame to acknowledge the right to begin transmission. To ensure communication, the maximum value should be used, which is the default value 2347 (the range is 0-2347 bytes). If a network packet is smaller than the preset RTS threshold size, the RTS/CTS mechanism will not be enabled.</p>
Xmit Power	<p>Xmit Power allows you to change the power output level. This value ranges from 1 - 100 percent, default value is 100 percent. A safe increase of up to 60 percent would be suitable for most users. Higher power settings are not recommended for users due to excess heat generated by the radio chipset, which can affect the life of the AP.</p>
Max Client Threshold	<p>This is the maximum number of clients for an AP. When the number of clients exceeds the value, the AP will reject the roaming connection. This value is only used on</p>

	AP-mode equipment.
Wireless Mode	You can select single or mixed wireless modes. In mixed mode, the device is able to offer various WiFi network types (B, G and N) at the same time from a single 2.4GHz radio. 802.11n transmission is always embedded in an 802.11a, for 5GHz radios, or 802.11g for 2.4GHz radio transmissions. This is called Mixed Mode Format protection (also known as L-SIG TXOP Protection).
Preamble	Values include Long and Short , and the default value is Long . If your wireless device supports the short preamble and you are having trouble getting it to communicate with other 802.11b devices, make sure that it is set to use the long preamble
SSID Broadcast	When wireless clients survey the local area for wireless networks to associate with, they will detect the SSID broadcasted by the AP. Click Enable if you want to broadcast the AP SSID, otherwise click Disable to inactivate the function.
X-Roaming	Disable: Disable X-Roaming protocol. Standard: Roaming group does not require the same wireless channel, but the speed is slower than using the "fixed channel" mode.
Signal Threshold for Roaming	When signal is lower than the designated value, the AP will roam to another client target with the same SSID, security option and signal strongest within the environment.(This value is only effective on client-mode equipment)

5.4.4 Advanced Settings

Filters

This page allows you to set up MAC filters to allow or deny wireless clients to connect to the AP. You can manually add a MAC address or select a MAC address from the Associated Clients list currently associated with the AP.

Advanced Settings --> Filters

Filters are used to allow or deny Wireless Clients from accessing the AP.

MAC Filters: Enabled Disabled

Options

Only allow MAC address(es) listed below to connect to AP
 Only deny MAC address(es) listed below to connect to AP

Associated Clients: Copy To

MAC Filter Table:

1.	<input type="text"/>	11.	<input type="text"/>	2.	<input type="text"/>
2.	<input type="text"/>	12.	<input type="text"/>	3.	<input type="text"/>
3.	<input type="text"/>	13.	<input type="text"/>	4.	<input type="text"/>
4.	<input type="text"/>	14.	<input type="text"/>	5.	<input type="text"/>
5.	<input type="text"/>	15.	<input type="text"/>	6.	<input type="text"/>
6.	<input type="text"/>	16.	<input type="text"/>	7.	<input type="text"/>
7.	<input type="text"/>	17.	<input type="text"/>	8.	<input type="text"/>
8.	<input type="text"/>	18.	<input type="text"/>	9.	<input type="text"/>
9.	<input type="text"/>	19.	<input type="text"/>	10.	<input type="text"/>
10.	<input type="text"/>	20.	<input type="text"/>	11.	<input type="text"/>
				12.	<input type="text"/>
				13.	<input type="text"/>
				14.	<input type="text"/>
				15.	<input type="text"/>
				16.	<input type="text"/>
				17.	<input type="text"/>
				18.	<input type="text"/>
				19.	<input type="text"/>

Label	Description
MAC Filter	Select Enabled or Disabled to activate or deactivate MAC filters
Options	Select one of the options to allow or deny the MAC address in the list
Associated Clients	Shows the wireless MAC addresses associated with the device
MAC Filter Table	You can edit up to MAC addresses in these fields

Misc. Settings

Advanced Settings --> Misc. Settings

UPnP: Enable Disable

LLDP Protocol: Enable Disable

Label	Description
UPnP	If enabled, you can connect the device via UPnP.
LLDP Protocol	Enable or disable LLDP protocol

5.4.5 Event Warning Settings

System Log

When an error occurs, the device will notify you through system log, e-mail, SNMP, and relay. You can choose the system to issue a notification when specific events occur by checking the box next to the event.

This page shows the recorded events and setting changes of the AP. Rebooting the device will clear the list.

Even Warning Settings --> System Log

Syslog Server Settings

Syslog Server IP:

Syslog Server Port: (0 represents default)

Syslog Event Types

Device Event Notification	
Hardware Reset (Cold Start)	<input type="checkbox"/> Syslog
Software Reset (Warm Start)	<input type="checkbox"/> Syslog
Login Failed	<input type="checkbox"/> Syslog
IP Address Changed	<input type="checkbox"/> Syslog
Password Changed	<input type="checkbox"/> Syslog
Redundant Power Changed	<input type="checkbox"/> Syslog
Eth Link Status Changed	<input type="checkbox"/> Syslog
SNMP Access Failed	<input type="checkbox"/> Syslog
Wireless Client Associated	<input type="checkbox"/> Syslog
Wireless Client Disassociated	<input type="checkbox"/> Syslog
Client Mode Associated	<input type="checkbox"/> Syslog
Client Mode Disassociated	<input type="checkbox"/> Syslog
Client Mode Roaming	<input type="checkbox"/> Syslog

Fault Event Notification	
Power 1 Fault	<input type="checkbox"/> Syslog
Power 2 Fault	<input type="checkbox"/> Syslog
Eth1 Link Down	<input type="checkbox"/> Syslog
Eth2 Link Down	<input type="checkbox"/> Syslog

Label	Description
Syslog Server IP	Enter the IP address of a remote server if you want the logs to be stored remotely. Leave it blank will disable remote syslog.
Syslog Server Port	Specifies the port to be logged remotely. Default port is 514 .

E-mail

Even Warning Settings --> E-mail

E-mail Server Settings

SMTP Server: (optional)

Server Port: (0 represents default)

My Server requires authentication

User Name:

Password:

Sender Address:

E-mail Address 1:

E-mail Address 2:

E-mail Address 3:

E-mail Address 4:

E-mail Event Types

Device Event Notification	
Hardware Reset (Cold Start)	<input type="checkbox"/> SMTP Mail
Software Reset (Warm Start)	<input type="checkbox"/> SMTP Mail
Login Failed	<input type="checkbox"/> SMTP Mail
IP Address Changed	<input type="checkbox"/> SMTP Mail
Password Changed	<input type="checkbox"/> SMTP Mail
Redundant Power Changed	<input type="checkbox"/> SMTP Mail
Eth Link Status Changed	<input type="checkbox"/> SMTP Mail
SNMP Access Failed	<input type="checkbox"/> SMTP Mail
Wireless Client Associated	<input type="checkbox"/> SMTP Mail
Wireless Client Disassociated	<input type="checkbox"/> SMTP Mail
Client Mode Associated	<input type="checkbox"/> SMTP Mail
Client Mode Disassociated	<input type="checkbox"/> SMTP Mail
Client Mode Roaming	<input type="checkbox"/> SMTP Mail
Fault Event Notification	
Power 1 Fault	<input type="checkbox"/> SMTP Mail
Power 2 Fault	<input type="checkbox"/> SMTP Mail
Eth1 Link Down	<input type="checkbox"/> SMTP Mail
Eth2 Link Down	<input type="checkbox"/> SMTP Mail

Label	Description
SMTP Server	Enter a backup host to be used when the primary host is unavailable.
Server Port	Specifies the port where MTA can be contacted via SMTP server
E-mail Address 1-4	Enter the mail address that will receive notifications

SNMP

Even Warning Settings --> SNMP Settings

SNMP Settings

SNMP Agent: Enable Disable

SNMP Trap Server 1:

SNMP Trap Server 2:

SNMP Trap Server 3:

SNMP Trap Server 4:

Community:

SysLocation:

SysContact:

SNMP Event Types

Device Event Notification	
Hardware Reset (Cold Start)	<input type="checkbox"/> SNMP Trap
Software Reset (Warm Start)	<input type="checkbox"/> SNMP Trap
Login Failed	<input type="checkbox"/> SNMP Trap
IP Address Changed	<input type="checkbox"/> SNMP Trap
Password Changed	<input type="checkbox"/> SNMP Trap
Redundant Power Changed	<input type="checkbox"/> SNMP Trap
Eth Link Status Changed	<input type="checkbox"/> SNMP Trap
SNMP Access Failed	<input type="checkbox"/> SNMP Trap
Wireless Client Associated	<input type="checkbox"/> SNMP Trap
Wireless Client Disassociated	<input type="checkbox"/> SNMP Trap
Client Mode Associated	<input type="checkbox"/> SNMP Trap
Client Mode Disassociated	<input type="checkbox"/> SNMP Trap
Client Mode Roaming	<input type="checkbox"/> SNMP Trap
Fault Event Notification	
Power 1 Fault	<input type="checkbox"/> SNMP Trap
Power 2 Fault	<input type="checkbox"/> SNMP Trap
Eth1 Link Down	<input type="checkbox"/> SNMP Trap
Eth2 Link Down	<input type="checkbox"/> SNMP Trap

Label	Description
SNMP Agent	SNMP (Simple Network Management Protocol) Agent is a service

	program that runs on the access point. The agent provides management information to the NMS by keeping track of various operational aspects of the AP system. You can enable or disable the function.
SNMP Trap Server 1-4	Enter the IP address of the SNMP server which will send out traps generated by the AP.
Community	Community is a password to establish trust between managers and agents. Normally, public is used for read-write community.
SysLocation	Specifies sysLocation string
SysContact	Specifies sysContact string

5.4.6 System Status

Wireless Link List

This page displays the information of the wireless clients connected to the device, including their MAC address, data rate, and link types.

System Status --> Wireless Link List

List of connected wireless clients.

Mac Address

DHCP Client List

This page lists the devices on your network that are receiving dynamic IP addresses from the device.

System Status --> DHCP Client List

DHCP Clients List:

Hostname	Mac Address	IP Address	Expires In
NB10018	00:1e:64:5d:33:e8	192.168.10.20	2 days 00:00:00

Traffic/Port Status

This page displays the network traffic statistics for both received and transmitted packets through the Ethernet port and wireless connections associated with the AP. Note that the traffic counter will reset when the device is rebooted.

System Status --> Traffic/Port Status

Traffic status displays received and transmitted packets passing through the AP.

Interface	Send	Receive
Ethernet	5742300 Bytes (7672 Packages)	12889061 Bytes (126972 Packages)
Wireless	0 Bytes (0 Packages)	0 Bytes (0 Packages)

Port status displays the state of all ports in AP.

-->

Port	State
Ethernet Port	forwarding
Wireless AP Port	forwarding
Wireless Client Port	Not Set
Wireless WDS Virtual Port1	Not Set
Wireless WDS Virtual Port2	Not Set
Wireless WDS Virtual Port3	Not Set
Wireless WDS Virtual Port4	Not Set

System Log

The device will constantly log events and activities in System Log and provide the file for you to review. You can click **Refresh** to renew the page or **Clear** to clear all or certain log entries.

System Status --> System Log

System log details.

#	Date Time	Content
---	-----------	---------

5.4.7 Administrator Password

This page allows you to change the username and password. You must type in the new password twice to confirm (the default username and password are **admin**).

Administrator --> Password

Modify web administrator's name and password.

Old Name:

Old Password:

New Name:

New Password:

Confirm New Password:

Configuration

This page allows you to save existing configurations as a backup file or return the device to previous settings.

Administrator --> Configuration

You can backup the configuration file to your computer, and restore a previously saved configuration.

Save configuration to local

Restore a previously saved configuration

未選擇檔案

Label	Description
Download	Click to save the current system settings as a file stored in the local hard drive.
Upload	You can restore configurations to previous status by installing a previous configuration file. To do this, click on Browse to locate the file you want to upload in the local hard drive and click Upload .
Restore Default Settings	Click to reset the device to the factory settings. The device will reboot to validate the default settings.

Firmware Upgrade

ORing launches new firmware constantly to enhance performance and functions. To upgrade

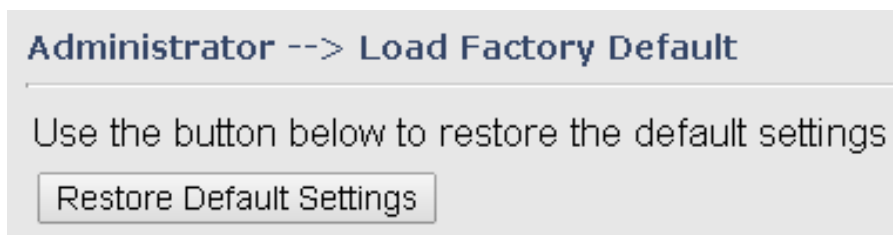
firmware, download new firmware from ORing's website to your PC and install it via Web upgrade. Make sure the firmware file matches the model of your device. It will take several minutes to upload and update the firmware. After upgrade completes successfully, reboot the device.



During firmware upgrading, do not turn off the power of the device or press the reset button.

Load Factory Default

You can use this page to restore the device to factory default settings. Make sure to save the device settings before clicking on this button. All current settings will be lost after you click this button.



Restart

Click the button in this page to restart the device through warm reset.

Administrator --> Restart

Miscellaneous settings.

Click the button below to restart the AP.

Technical Specifications

ORing WLAN Access Point Model	IAP-420	IAP-420+
Physical Ports		
10/100 Base-T(X) Ports in RJ45 Auto MDI/MDIX	2	
PoE P.D. port	-	Present at ETH Fully compliant with IEEE 802.3af Power Device specification Over load & short circuit protection Isolation Voltage: 1000 VDC min. Isolation Resistance : 10 ⁸ ohms min
WLAN interface		
Operating Mode	AP/Bridge/AP-Client	
Antenna Connector	1 x External reverse SMA-type antenna connector	
Radio Frequency Type	DSSS, OFDM	
Modulation	IEEE802.11b: CCK, DQPSK, DBPSK IEEE802.11g/n: OFDM with BPSK, QPSK, 16QAM, 64QAM	
Frequency Band	America / FCC: 2.412~2.462 GHz (11 channels) Europe CE / ETSI: 2.412~2.472 GHz (13 channels)	
Transmission Rate	802.11b: 1/2/5.5/11 Mbps 802.11g: 6/9/12/18/24/36/48/54 Mbps 802.11n(40MHz): UP to 150 Mbps	
Transmit Power	802.11b: 13.5dBm ±1.5dBm 802.11g: 13.5dBm ±1.5dBm 802.11n(2.4G@20MHz): 13.5dBm ±1.5dBm 802.11n(2.4G@40MHz): 13.5dBm ±1.5dBm	
Receiver Sensitivity	802.11b: -90dBm ±2dBm@1Mbps 802.11g: -72dBm ±2dBm@54Mbps 802.11n(2.4G@40MHz,MCS7): -68dBm ±2dBm	
Encryption Security	WEP: (64-bit, 128-bit key supported) WPA/WPA2:802.11i (WEP and AES encryption) WPA-PSK (256-bit key pre-shared key supported) 802.1X Authentication supported TKIP encryption	
Wireless Security	SSID broadcast disable and enable	
Protocol Support		
Protocol	ARP,BOOTP, DHCP, DNS, HTTP, IP, ICMP, SNTP, TCP, UDP, 802.1X, SNMP, STP	
LED indicators		
Power indicator	LED x 3, PWR 1, 2, (PoE): Green On: Power is on and functioning Normally.	
10/100Base-T(X) RJ45 port indicator	LED x 2 , Green for port Link/Act at 100Mbps.	

WLAN LEDs	WLAN Link /ACT: Green: Blinking	
Power		
Redundant Input power	Dual DC inputs. 12~48VDC on 4-pin terminal block	
Power consumption (Typ.)	4watts	
Overload current protection	Present	
Reverse polarity protection	Present	
Physical Characteristic		
Enclosure	IP-30	
Dimension (W x D x H)	41(W)x81(D)x95(H) mm	
Weight (g)	292	297
Environmental		
Storage Temperature	-40 to 85°C (-40 to 185°F)	
Operating Temperature	-10 to 60°C (14 to 140°F)	
Operating Humidity	5% to 95% Non-condensing	
Regulatory approvals		
EMI	FCC Part 15, CISPR (EN55022) class A	
EMS	EN61000-4-2 (ESD), EN61000-4-3 (RS), EN61000-4-4 (EFT), EN61000-4-5 (Surge), EN61000-4-6 (CS), EN61000-4-8, EN61000-4-11	
Shock	IEC60068-2-27	
Free Fall	IEC60068-2-32	
Vibration	IEC60068-2-6	
Safety	EN60950-1	
Warranty	3 years	

Compliance

FCC Statement

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.

RF exposure warning: The equipment complies with RF exposure limits set forth for an uncontrolled environment. The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

You are cautioned that changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment. This device should be operated with minimum distance 20cm between the device and all persons. Operations in the 5.15-5.25GHz band are restricted to indoor usage only.

Industry Canada Statement

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Industry Canada - Class B This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus as set out in the interference-causing equipment standard entitled "Digital Apparatus," ICES-003 of Industry Canada.

Cet appareil numérique respecte les limites de bruits radioélectriques applicables aux appareils numériques de Classe B prescrites dans la norme sur le matériel brouilleur: "Appareils Numériques," NMB-003 édictée par l'Industrie.

Operation is subject to the following two conditions: (1) this device may not cause interference,

and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

L'opération est soumise aux deux conditions suivantes: (1) cet appareil ne peut causer d'interférences, et (2) cet appareil doit accepter toute interférence, y compris celles susceptibles de provoquer fonctionnement du dispositif.

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that permitted for successful communication.

Afin de réduire les interférences radio potentielles pour les autres utilisateurs, le type d'antenne et son gain doivent être choisis que la puissance isotrope rayonnée équivalente (PIRE) est pas plus que celle permise pour une communication réussie

RF exposure warning: The equipment complies with RF exposure limits set forth for an uncontrolled environment. The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Avertissement d'exposition RF: L'équipement est conforme aux limites d'exposition aux RF établies pour un incontrôlé environnement. L'antenne (s) utilisée pour ce transmetteur ne doit pas être co-localisés ou fonctionner en conjonction avec toute autre antenne ou transmetteur.