

Wireless Area Controller (WAC60)

Installation Instructions

The Daintree WAC60[†] Wireless Area Controller (WAC) is at the heart of the Daintree wireless controls solution for smart buildings. It provides intelligent control across a large area. Using open and interoperable ZigBee[®] standards-based technology, the WAC60 communicates with wireless standards-compliant sensors, switches, lighting and HVAC control devices that are part of the Daintree network.

The WAC60 provides commissioning, control management and communication functions. It creates the mesh network, manages it, and applies the controls defined on the System Controller (SC). After commissioning the system, all the schedules and control strategies are pushed to each WAC. WACs continue to execute the control strategies assigned to zones, and they run schedules even if they lose communication with the SC. The SC initiates device commissioning and houses the application used for ongoing management of the system.

The WAC60 is a low voltage DC powered device. It can be powered using the provided AC power adapter or using PoE (Power over Ethernet) supplied by a PoE adapter (not provided). The WAC60 communicates with the System Controller over Ethernet. An Ethernet hub or switch is required (not provided).



Installation Process

The WAC60 must be installed in accordance with all local, state and national electrical codes and requirements.

Before mounting the WAC60 in its final location:

1. Install and test lighting, control devices and wireless adapters per the instructions provided with the units.
2. Review the **Where to Install the WAC60** section on the next page. Determine the location for the WAC. If power will be supplied by the AC power adapter, be sure there is a receptacle nearby. The Ethernet cable run from the Ethernet hub or PoE switch to the WAC location must be less than 300 feet.
3. Once the location of the WAC60 has been determined, note its location and its IEEE address on the facility floor plan or relay schedule.
4. Make sure the WAC60 has been configured with appropriate network options as described in the facility's commissioning plan and associated worksheets.

Mounting and Connections

1. Remove the cover from the WAC to expose the wiring connectors.
2. Plug the Ethernet cable into the  ① port on the WAC.
3. Plug the power cable from either the AC power adapter or the PoE adapter into the  barrel connector on the WAC. When power is applied, the Status Indicator illuminates.
4. Secure the power cable using the strain relief feature on the WAC60 base.
5. Mount the WAC60, using the four screw mounting holes on the WAC60 base.
6. Secure the Ethernet cable and the 12VDC power plug wire to a stationary point using a tie-wrap.
7. Reattach the cover to the WAC.
8. Use the Daintree web-based application to configure zones and devices.



[†] The WAC60 replaces the WAC50 and WAC51.

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Where to Install the WAC60

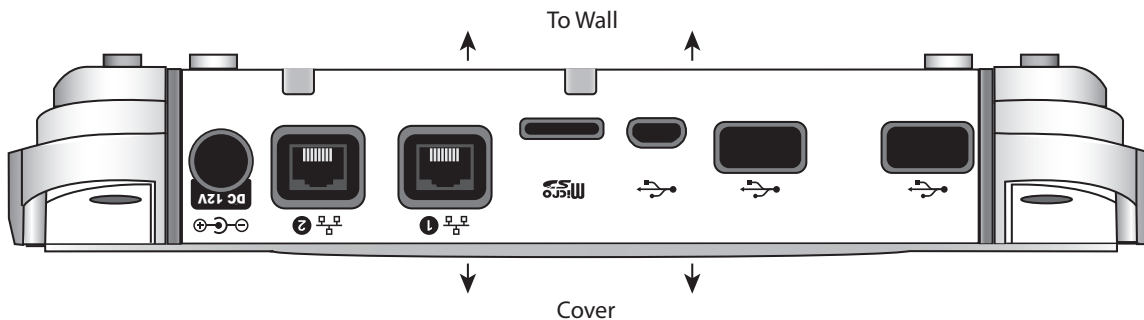
Typically, the WAC60 is mounted high on a wall near the ceiling.

Ideally, the WAC60 is located in an area with good line of sight to nearby wireless devices in the Daintree wireless network.

- Do not locate the WAC60 inside a metal enclosure or where a large metal object completely obstructs the line of sight to all of the wireless network devices.
- Locate the WAC60 so that less than 300' of Ethernet cable is required to connect it to the Daintree system controller or Ethernet switch.
- Try to maintain at least 8'-10' distance from Wi-Fi access points.
- The WAC60 must be able to communicate with at least one other AC-powered wireless device in the network.
- If the AC power adapter will be used to power the WAC60, make sure a power outlet is within reach of the plug-in adapter cord.
- If no power outlet is available, consider powering the WAC60 using a PoE adapter set for 12VDC (not provided).
- For outdoor installations, install in a non-metallic waterproof enclosure.

Wiring Connections

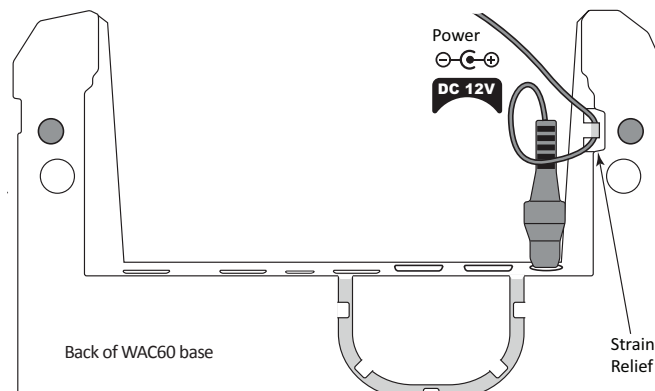
Top view of WAC60 wiring connection area.



Strain Relief

Secure the 12VDC power plug wire to the strain relief tab on the side of the connector area near the barrel connector or in the wire channel on the back of the base.

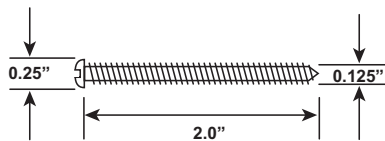
After mounting the WAC, provide external strain relief for the Ethernet cable and the 12VDC power plug wire by securing it to a stationary point using a tie-wrap.



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Mounting the WAC60

Mount the WAC60 using the four screws provided.



Joining the ZigBee Lighting Control Network

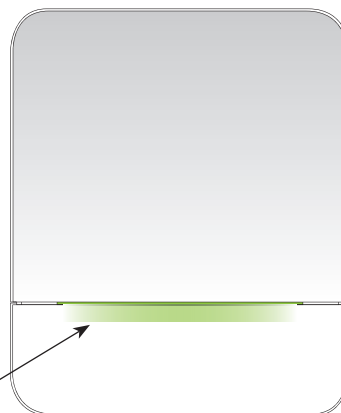
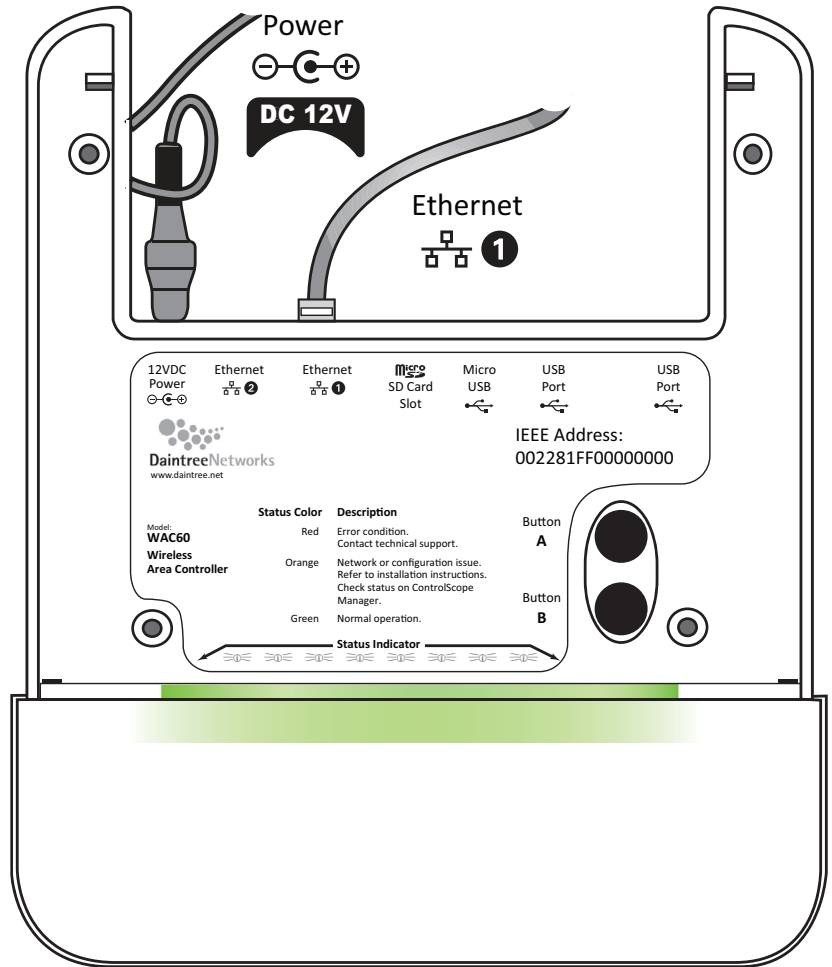
After the installation is complete, the WAC60 is ready to communicate with the Daintree web-based building management user interface.

For more information about configuring the lighting control network, see the instructions and online help provided with the Daintree user interface application.

Status Indicator

The status of the WAC displays through an opening in the cover. A green glow across the width of the opening indicates the unit is operating normally.

See the table in the [Troubleshooting](#) section if there are any other colors or patterns in the status indicator area.



Status Indicator area

Uniform green glow = power on and unit operating normally

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Troubleshooting

Status Indicator	Action Required	Description
Off	Apply power.	The WAC is not powered. Make sure the power adapter is plugged into the appropriate power source and inserted firmly into the 12VDC input on the WAC. Check to be sure plug adapters are connected properly and that circuit power is on.
Solid Green across entire light bar. 	None. WAC is functioning.	Normal function. The device is powered and operating as expected.
Pulsing Green across entire light bar.    	If you are configuring the WAC using "link local" this is normal. When you are finished configuring the WAC web page, power cycle the WAC. If after the WAC restarts the light bar continues to pulse, the WAC cover may be pressing either Button A or B. <ol style="list-style-type: none"> 1) Remove the WAC cover and loosen the mounting screws. 2) Power cycle the WAC. 3) When the WAC finishes starting up (2-5 minutes), the light bar should be solid green all the way across. <ul style="list-style-type: none"> • If the light bar starts pulsing green, contact technical support. • If the light bar is solid green: <ol style="list-style-type: none"> 1) Put the cover on the WAC. If the light bar begins pulsing again, take the cover off and loosen the screws more. 2) Power cycle the WAC. 3) When the WAC finishes starting up (2-5 minutes), the light bar should be solid green all the way across. If so, attach the cover. If the light bar starts pulsing again, remove the cover, loosen the screws more and repeat the power cycle and cover replacement procedure. 4) When the light bar is solid green with the cover attached the problem is solved. If you are unable to stop the pulsing, contact technical support. 	The WAC is in "link local" mode, meaning that Button A or Button B on the WAC has been pressed as the WAC is powering on. This is typically done during the WAC configuration process, to provide local access to the WAC web page.
Green (solid) on both ends of the light bar. Center of the light bar is dark. 	Wait. If a firmware upgrade is NOT in progress and the WAC remains in the mode for more than 10 minutes, power cycle the WAC. If this doesn't clear the problem, contact technical support.	The applications on the WAC are starting, or a firmware upgrade is in progress. If the WAC is starting up, it should be in this mode for less than 2 minutes. If a firmware upgrade is in progress it may be in this mode for 15-25 minutes, depending on the speed of the connection to the SC.
Green pulsing on both ends of the light bar. Center of the light bar is Orange. 	Check Daintree application's web page.	The WAC60 is not communicating with the SC. This could be because of the following reasons: <ul style="list-style-type: none"> • The System Controller is not running. • The WAC60 doesn't have Ethernet link. • The WAC60 is not configured with the correct address for the System Controller.
Solid Red in center of the light bar. 	Contact technical support.	The WAC has had a hardware failure and must be replaced.

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Installation Advisory

Building Ethernet Patch Cables

Standard Ethernet cables are used to connect Wireless Area Controllers (WACs) to each other and to the network where the Daintree System Controller (SC) resides. This Advisory is provided in the event that you elect to build the Ethernet cables for your installation, rather than purchasing pre-fabricated cables.

Many helpful videos on the Internet provide instruction in cable-building techniques and tool use. Following are some examples available at the time this advisory was published:

<http://www.youtube.com/watch?v=k4B4Sep3Qpg> (7.5 minutes) How to terminate cables with regular RJ-45 connectors for EIA/TIA 568A and 568B, keystone jack, crossover cable, patch cable

<http://www.youtube.com/watch?v=-Rxu07WkGew> (2.5 minutes) How to crimp RJ45 connector to Ethernet cable (EIA/TIA 568B)

What You Need

UTP or STP Cable:

Ethernet Cat 5e or Cat 6 plenum-rated, 4-pair.
Conductors may be solid or stranded. Limit cable length to 300' or less.

Modular Connectors 8P8C (aka RJ45 plugs):

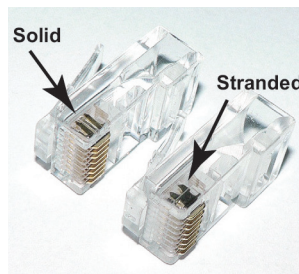
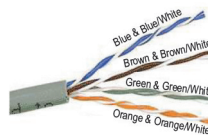
Connector plugs are designed for either solid or stranded wire; be sure to use connectors that match the type of wire in use, because a plug for one wire type might not make reliable contact when crimped to a cable with wires of the other type.

Cable Tester:

Cable Testers are available with a variety of features and in a wide price range (\$2 to \$100 with commonly desired features found in the \$30 to \$40 range). Select a tester with the ability to test Ethernet cables and connectors for continuity and shorts.

Crimper (crimp/cut/strip tool):

This tool is essential for attaching the cable ends to the modular connectors. Most models include wire cutting and insulation-stripping functionality.



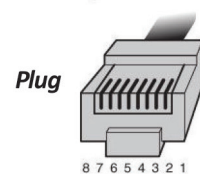
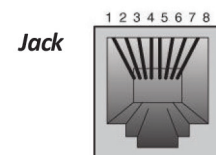
RJ45 pinout diagram

The contact positions are numbered sequentially starting from 1. When viewed head-on with the retention mechanism on the bottom:

Jacks: contact position #1 is on the left.

Plugs: contact position #1 is on the right.

When you turn the plug around to insert it into the jack, pin 1 on the plug aligns with pin 1 on the jack.

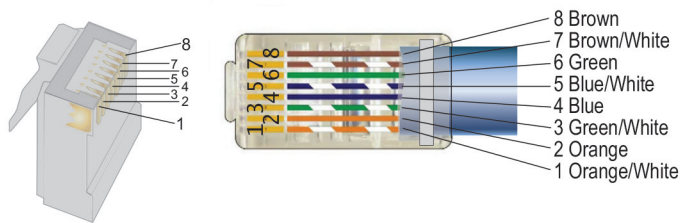
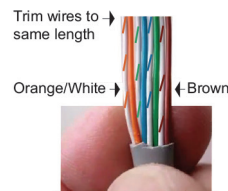


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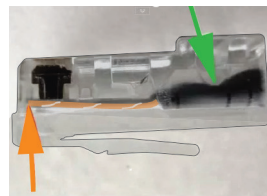
Process

The wire color arrangement shown in this process is EIA/TIA 568B. Either EIA/TIA 568B or 568A can be used to make the cables, but all cables should be of the same type.

1. Strip off about 2 inches of the Ethernet cable sheath.
2. Untwist the exposed part of the wire pairs.
3. Align the colored wires according to their position in the connector. (EIA/TIA 568B arrangement shown.) Straighten and flatten them as much as possible.
4. Trim all the wires to the same length, about 1/2" to 3/4" exposed from the sheath.



5. Insert the wires into the RJ45 plug.
 - A. Make sure each wire is fully inserted to the front of the RJ45 plug (see orange arrow).
 - B. Make sure wires are in the correct order.
 - C. Make sure the sheath of the Ethernet cable extends into the plug by about 1/2" and will be held in place by the crimp (see green arrow).



6. Crimp the plug onto the cable using the crimper tool.
7. Verify the wires ended up in the correct order and that the wires extend to the front of the plug to make a good connection with the metal contacts in the plug.
8. Cut the Ethernet cable to length. Make sure it is more than long enough for your needs.
9. Repeat the above steps for the other end of the cable.

Test the Cable

When you finish crimping both cable ends, test the cable using a Cable Tester according to the instructions provided with the unit.

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FCC Warning Message

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.

Industry Canada (IC) Warning Message

Product 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. CAN ICES-005 B / NMB-005 B

Specifications	Input voltage	12VDC 0.9A (max)
	Power connector	2.1mm barrel connector
	Input/Output connections	10/100 Mbps Ethernet, 2 RJ45 ports USB (host): USB 2.0, 2 ports 1 Modbus/RS485 (via USB interface) Memory card: Micro SD card slot (USB 2.0 micro, not functional)
	Radio properties	2.4 GHz ISM band, 100mW (+20dBm)
	Operating environment	Indoor, dry location (Outdoor: non-metallic waterproof enclosure required) 32°F to 104°F (0°C to 40°C) with provided power adapter
	Compliance	FCC Part 15, ID: S4GEM358L IC ID: 8735A-EM358L, CAN IC
	Mounting	Wall or ceiling surface
	Dimensions	9.4" H x 8.0" W x 1.2" D (238.1mm x 203.2mm x 30mm)
	Distances, maximum	100' between wireless devices (wireless range is clear line of sight) 300' of Ethernet cable between WAC and Ethernet switch or System Controller

