



User's Manual



HAO15SIP

**Hi-Gain™ WiFi 15dBi Outdoor
Omni-Directional Antenna**

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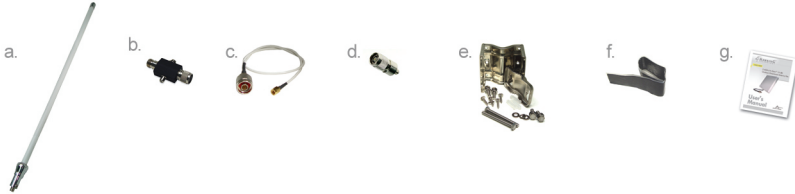


OVERVIEW

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Hi-Gain™ 15dBi Outdoor Omni-Directional Antenna

Package Contents



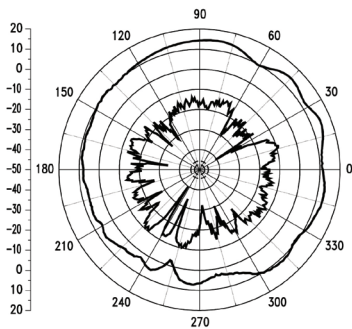
- a. One Hi-Gain Outdoor Antenna (HAO15SIP)
- b. Surge Protector (N-Plug to N-Jack)
- c. 50cm Extension Cable (N-Plug to SMA)
- d. Adaptor (RP. SMA Jack- RP.TNC Plug)

- e. Wall Mounting Kit
- f. Waterproof Tape
- g. Quick Installation Guide

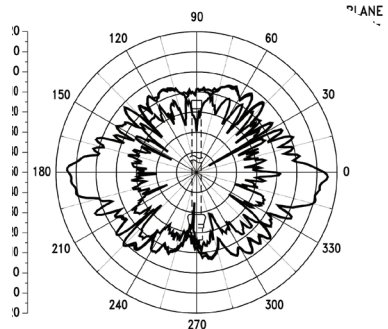
System Requirements

- One Wireless Device with an External Antenna Connector
- Connector Type: Reverse SMA Jack or Reverse TNC (Linksys or Cisco Devices) One

Signal Patterns



Horizontal



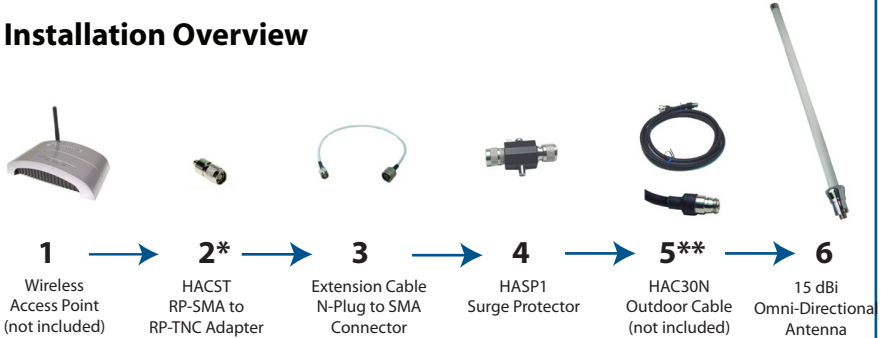
Vertical

INSTALLATION

Hi-Gain™ 15dBi Outdoor Omni-Directional Antenna

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Installation Overview



*The HACST cable is only required for Access Point or router with TNC Connector (i.e. Linksys or Cisco Brand).

**The outdoor cable is required and must be purchased separately

INSTALLATION

Step 1 Determine the extra cable length necessary for your application. Measure the distance between the location you wish to mount your Outdoor Antenna and the location of your Wireless Access Point. (If you have not yet purchased your extension cable, please do so from your nearest Hawking Hi-Gain Antenna provider. Hawking 30ft N-Plug Low Loss Extension Cable.

Step 2 Locate the antenna connector on your access point (usually it is in the back), remove the original antenna from your Wireless Access Point, and replace the antenna with the Extension Cable (apply the smaller connector (SMA) to the Access Point.



Antenna connector
N-Type Female



Connector of Cable Assembly
N-Type Male

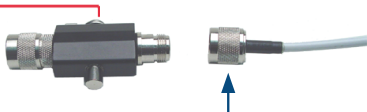


INSTALLATION

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Hi-Gain™ 15dBi Outdoor Omni-Directional Antenna

Step 3 After you have attached the Extension cable to your Wireless Access Point, install the Surge Protector to the N-Plug at the opposite end of the cable.

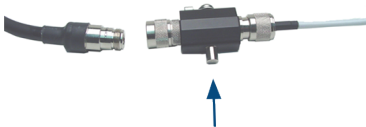


Twist the N-Plug clockwise to fasten it onto the connector of the N-Plug Extension Cable.

The Surge Protector (HASP1) protects your sensitive WLAN devices from high voltage surges created by outdoor lightning strikes or a sudden fluctuation in electric current. The Surge Protector must be grounded in order to operate properly.

Grounding: To properly ground the Surge Protector you must use standard copper wire and strip one end. Fasten the stripped end to the Surge Protector using a screw driver. Take the opposite end of the copper wire and mount it to a sturdy metal object using a screw or nut. The metal object must have direct contact with the copper of the wire. Please contact techsupport@hawkingtech.com if you have any questions regarding this step.

Step 4 Once you have successfully grounded your Surge Protector, connect the other end to the N-Plug Extension cable (HAC10N or HAC30N [Black] are sold separately).



Twist the N-Plug clockwise to fasten it onto the connector of the N-Plug Extension Cable



INSTALLATION

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Hi-Gain™ 15dBi Outdoor Omni-Directional Antenna

STEP 5

Mounting on a pole or a door.

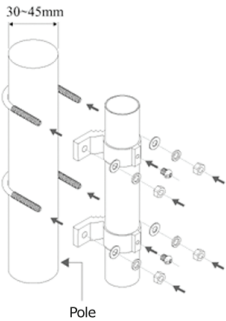


Figure 2
(Combine Process)

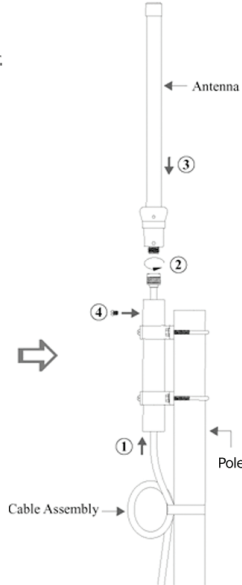


Figure 3
(Install Procedure: ①→②→③→④)



Figure 4

Tape up the Connectors

When your antenna has been mounted correctly, please take the Water-Proof Tape from your kit and tape the metal connectors that are exposed to outdoor weather. Be sure to completely cover and protect the connectors to prevent any damage from weather.





SPECIFICATIONS

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Hi-Gain™ 15dBi Outdoor Omni-Directional Antenna

Hi-Gain™ 15dBi Omni-Directional Antenna

Electrical Properties	1) Impedance	50 ohm
	2) Frequency Range	0~6 GHz
	3) V. S. W.R.	1.5 (Max.)
	4) Working Voltage	≤ 1000 Vrms
	5) Dielectric Withstanding	≤ 2500 Vrms
	6) Voltage Insulation Resistance	≥ 5000Megohm
	7) Contact Resistance	Center contact: 1.0 Milliohm (Max.) Outer contact: 0.2 Milliohm (Max.)
	8) Insertion Loss(2.4GHz)	0.3 dB

Mechanical Properties	1) Recommended coupling nut torque	6.0 in.lbs.~10.0 in.lbs.
	2) Coupling nut retention force	≥ 100 lbs.
	3) Contact captivation axial	≥ 6.2 lbs.

Environmental Ratings	1) Operating Temperature	-65°C ~ +165°C
	2) Thermal Shock	MIL-STD-202, Method 107, Condition B
	3) Corrosion	MIL-STD-202, Method 101, Condition B
	4) Vibration	MIL-STD-202, Method 204, Condition B
	5) Moisture Resistance	MIL-STD-202, Method 106

Material Specifications		Material	Plating
		1) Body	Brass
2) Pin	Phosphor Bronze	Gold	
3) Insulator	Teflon or Delrin		

Specifications are subject to change without prior notice.





HOW DOES THE ANTENNA WORK?

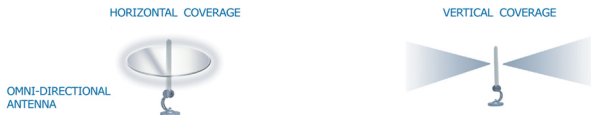
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Hi-Gain™ 15dBi Outdoor Omni-Directional Antenna

I. ANTENNA TERMINOLOGY

dB (decibel): Used as a measurement unit for antenna strength. The standard factory antenna strength for 802.11b/g wireless products is 2dBi. A higher dBi level from the antenna signifies a more powerful wireless signal.

Omni-Directional Antenna: The antenna covers a 360° radius on plane level or a flat surface. It emits stronger signal in a slightly smaller angle (vertically) comparing to the Directional Antenna. The Omni-Directional is great for Wireless Access Points that serve multiple computers in different locations.



Directional Antenna: The Antenna emits a direct signal, approximately 80° angle on a flat surface, but wider coverage vertically. Directional Antenna are very effective on both Access Points and Network Adapters (such as, Wireless Bridges, PC Cards, USB Network Adapters etc...). Normally, it is recommended to install two directional antennas to optimize the performance. The extended range may reach up to 2750 ft.



Reverse SMA Plug: Standard connector for Access Points and Routers come with detachable antennas. Reverse SMA plug is on the end of antenna connector that screws into the wireless device.

Reverse SMA Jack: Connector on the wireless device side (Access Point, Router, PCI Card) Reverse SMA Plug screws into the Reverse SMA Jack.

RP-SMA Plug (male) RP-SMA Jack (female)



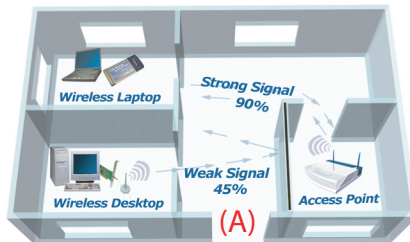
HOW DOES THE ANTENNA WORK?

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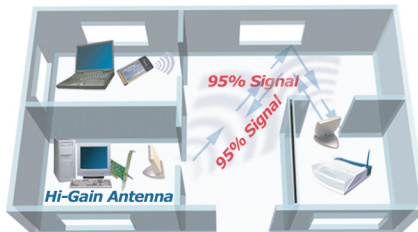
Hi-Gain™ 15dBi Outdoor Omni-Directional Antenna

II. BASIC SETUP AND OPERATION

Below digram is an example of a basic wireless Network.



Radio frequencies lose significant signal strength when travelling through concrete and especially metal walls. Because of the wall in front of the Wireless Desktop room, the wireless signal is weak (A) and can not reach the room with a wireless desktop. To solve this problem a Hi-Gain Indoor Directional Antenna is set up to direct wireless signals out the door towards the opposite wall, then bounce the signal to room with the desktop.





HOW DOES THE ANTENNA WORK?

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Hi-Gain™ 15dBi Outdoor Omni-Directional Antenna

III. OBTAINING OPTIMAL ANTENNA PERFORMANCE

Obtaining one antenna or two antennas?

Depending on your wireless application, you may need two antennas, one on each end to optimize the signal. If you have an Access Point in a small environment, i.e. home, with multiple users in different locations, it is more cost effective for you to use one Omni-Directional Antenna. However, in areas that receive poor coverage, you may need a Directional Antenna to amplify the signal from the receiving end, i.e. Client side.

For extended wireless range, it is recommended that you use two Directional Antennas facing each other. If only one Hi-Gain Antenna applies to one end and a normal (manufacture standard) antenna on the other end, the result may not be as great as using two antennas. The Hi-Gain side may send out a signal quickly, however, the other end (manufacture standard side), may not have the strength to send back the signal instantaneously.

Server Side: HAI8DD connected to a Wireless Access Point

Client Side: HWU8DD connected to laptop or desktop





HOW DOES THE ANTENNA WORK?

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Hi-Gain™ 15dBi Outdoor Omni-Directional Antenna

III. OBTAINING OPTIMAL ANTENNA PERFORMANCE (Con'd)

HAO14SD: Hi-Gain 14dBi Directional Antenna



To obtain optimal distances, the two antennas must be directly facing one another with little or no obstructions interfering with the signal (if possible a clear sight from one end to another).

NOTE: Many factors in the environment may affect your wireless range. Different wireless devices may have stronger signals than others which may derive varying performance results. For example, the wireless output power on Access Points may vary from one brand to the next, which would create different results. These published results were obtained using HAWKING TECHNOLOGY wireless devices that are tested to obtain the highest performances with HAWKING TECHNOLOGY Hi-Gain Antennas.

Caution: This equipment complies with FCC radiation exposure set forth for an uncontrolled environment. In order to avoid the possibility of exceeding the FCC radio frequency exposure limits, human proximity to the antenna shall not be less than 1 foot during normal operation.





HOW DOES THE ANTENNA WORK?

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Hi-Gain™ 15dBi Outdoor Omni-Directional Antenna

IV. REMOVING YOUR ORIGINAL ANTENNA

It is very easy to remove your original antenna. Simply, take your wireless device, whether it be an Access Point, Bridge, Wireless PCI Card, USB Adapter etc., and check to see if it has a removable antenna. To determine whether your original antenna is removable, examine the base of the antenna to see if it is a "screw on" type or a non-removable type.



Non-Removable



Removable

Do not try to force an antenna off. If you are still not sure whether your antenna is removable please contact the manufacturer or contact techsupport@hawkingtech.com

To remove your original antenna, hold it by its base and unscrew firmly by turning it counter-clockwise until the antenna is separated from the connector. After it has been removed, take your Hawking Hi-Gain Antenna connector and screw it (clockwise) onto your wireless device.



Unscrew Counter-Clockwise



Reverse SMA Plug

After you have firmly attached your Hi-Gain Antenna, place it in a location where it will achieve optimal performance.





HOW DOES THE ANTENNA WORK?



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Hi-Gain™ 15dBi Outdoor Omni-Directional Antenna

V. CABLE LOSS

Cable loss is the loss in signal strength (dBi) due to the length of your antenna cable. Different types of Hi-Gain antenna cables have different rates of cable loss. However, in all cases, the longer your antenna cable is, the more signal strength (dBi) you will lose. This table lists the specific antenna model, its cable type and the amount of dBi lost per meter of cable:

MODEL	DESCRIPTIONS	CABLE TYPE	CABLE LOSS/ METER
HAI7SD(P/A)	7dBi Indoor Directional	RG316	2.5 dBi/m
HAI7MD	7dBi Directional Antenna	RG316	2.5 dBi/m
HAI8DD	8dB Indoor Directional	RG316	2.5 dBi/m
HAO9S(IP/DP)	9dBi Outdoor Omni & Directional	HDF400 (Using the HAC10N)	0.26 dBi/m
HAO14SDP	14dBi Outdoor Directional	HDF400 (Using the HAC30N)	0.26 dBi/m
HACNT	N-Plug to TNC Jumper Cable	ULA 198	0.82 dBi/m
HACST	SMA to TNC Jumper Cable	ULA 316	0.82 dBi/m

As you can see from the chart, depending on the type of cable, there is a varying range of cable loss per meter.

Measuring exact dB loss due to cable: (3.28 ft = 1 meter) Conversion rate HAC10N is 10ft long. It has a cable loss of 0.26 dBi per meter.

Simple conversion shows that the use of this cable will result in: 10 ft (Cable length) / 3.28 (conversion rate) = 3.05 meters 3.05 meters x 0.26 (cable loss per meter) = 0.79 dBi

Therefore, when attached to an 9dBi Outdoor antenna, the actual signal strength will be 6.32 dBi (Calculation: 9.0 - 0.79 = 8.21) The HAC30N is a 30ft cable and would result in a cable loss of three times the amount the HAC10N. (0.79 x 3 = 2.37 dBi cable loss)

When attached to the same 9dBi Outdoor Antenna the resulting actual dBi is 6.63 dBi. This is a significant difference.

Please be sure to check the amount of cable you need and use the shortest length possible to keep your signal strength at the highest level.





HI-GAIN RANGE EXTENDING PRODUCTS

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Hi-Gain™ 15dBi Outdoor Omni-Directional Antenna

INDOOR ANTENNAS



HA17SIP

7dBi Omni-Directional Antenna



HA115SC

15dBi Corner Antenna



HA18DD

8dBi Directional Dish Antenna



HA17MD

7dBi Directional Antenna

OUTDOOR ANTENNAS



HA09SIP

9dBi Omni-Directional Antenna



HA09SDP

9dBi Directional Antenna



HA014SDP

14dBi Directional Antenna

SIGNAL BOOSTERS AND RANGE EXTENDERS



HSB2

WiFi Signal Booster



HWREG1

Wifi Range Extender

ACCESSORIES



HAC30N

30ft N-Plug Extension Cable

(visit the hawking website for more antenna accessories)





CERTIFICATIONS AND WARRANTY

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Hi-Gain™ 15dBi Outdoor Omni-Directional Antenna

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Hawking Technology guarantees that every Hi-Gain 24 Series Antenna and Accessory is free from physical defects in material and workmanship under normal use for one (1) year from the date of purchase. If the product proves defective during this one-year warranty period, call Hawking Customer Service in order to obtain a Return Authorization number. Warranty is for repair or replacement only. Hawking Technology does not issue any refunds. **BE SURE TO HAVE YOUR PROOF OF PURCHASE. RETURN REQUESTS CAN NOT BE PROCESSED WITHOUT PROOF OF PURCHASE.** When returning a product, mark the Return Authorization number clearly on the outside of the package and include your original proof of purchase. **IN NO EVENT SHALL HAWKING TECHNOLOGY'S LIABILITY EXCEED THE PRICE PAID FOR THE PRODUCT FROM DIRECT, INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM THE USE OF THE PRODUCT, ITS ACCOMPANYING SOFTWARE OR ITS DOCUMENTATION.** Hawking Technology makes no warranty or representation, expressed, implied or statutory, with respect to its products or the contents or use of this documentation and all accompanying software, and specifically disclaims its quality, performance, merchantability, or fitness for any particular purpose. Hawking Technology reserves the right to revise or update its products, software, or documentation without obligation to notify any individual or entity. Please direct all inquiries to: techsupport@hawkingtech.com

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