UGD-D00236 Rev B

Air4Gp
Installation Guide

Copyright

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Human Exposure to Radio Frequencies

The Air4Gp should be installed and operated from a minimum distance of 2 meters from your body.

Radio Interference

This Air4Gp 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 on and off, the technician is encouraged to try to correct the interference by performing one or more of the following measures:

- Re-orientate or relocate the antenna
- Increase separation between the equipment and receiver
- Connect the equipment to an outlet on a circuit different from that to which the power source is connected

Avoiding Radio Interference

Ensure a minimum of 1-meter separation between co-located antennas of Air4Gp units.

Modifications

Any changes and modifications to this device that are not expressly approved by Airspan Networks may void the user's authority to operate the equipment.

General

- Only qualified personnel should be allowed to install, replace, and service the equipment.
- The device cannot be sold retail, to the general public or by mail order. It must be sold to operators.
- Installation must be controlled.
- Installation must be performed by licensed professionals.
- Installation requires special training. The Air4Gp radio and antenna should be installed ONLY by experienced installation professionals who are familiar with local building and safety codes and, wherever applicable, are licensed by the appropriate government regulatory authorities. Failure to do so may void Airspan's WiMAX product warranty and may expose the end user or the service provider to legal and financial liabilities. Airspan and its resellers or distributors are not liable for injury, damage or violation of regulations associated with the installation of outdoor units or antennas.

Safety

1. Read this User Manual and follow all operating and safety instructions.
2. Keep all product information for future reference.
3. This product is supplied with a grounding power plug. Do not defeat this important safety feature.
4. **Warning**: High voltages exist inside the product - do not remove any cover or base: No user serviceable parts inside.
5. Position the power cord to avoid possible damage; do not overload wall outlets.

6. Do not place this product on or near a direct heat source, and avoid placing objects on the terminal.
7. Do not operate this device near water or in a wet location.
8. Use only a damp cloth for cleaning. Do not use liquid or aerosol cleaners. Disconnect the power before cleaning.
9. The units should not be located near power lines or other electrical power circuits.
10. The radio transceiver must be properly grounded to protect against power surges and accumulated static electricity. It is the user's responsibility to install this device in accordance with the local electrical codes.
11. Installation of the Air4Gp must be contracted to a professional installer.
12. Disconnect Device. The socket outlet should be easily accessible in case you have to disconnect the device.
13. When installed in the final configuration, the product must comply with the applicable Safety Standards and regulatory requirements of the country in which it is installed. If necessary, consult with the appropriate regulatory agencies and inspection authorities to ensure compliance.

Warning Symbols

The following symbols may be encountered during installation or troubleshooting. These warning symbols mean danger. Bodily injury may result if you are not aware of the safety hazards involved in working with electrical equipment and radio transmitters. Familiarize yourself with standard safety practices before continuing.

Electro-Magnetic Radiation

High Voltage

Service Information

Refer all repairs to qualified service personnel. Do not remove the covers or modify any part of this device, as this will void the warranty.

Disconnect the power to this product and return it for service if the following conditions apply:

a. The terminal does not function after following the operating instructions outlined in this manual.

b. Liquid has been spilled, a foreign object is inside, or the terminal has been exposed to rain.

c. The product has been dropped or the housing is damaged.

Locate the serial number of the terminal, antenna, and transceiver and record these on your registration card for future reference. Use the space below to affix serial number stickers. Also record the MAC address, located on the back of the terminal.

UL Information

- The equipment must be properly grounded according with NEC and other local safety code requirements.

- Reminder to all the BWA system installers: Attention to Section 820-40 of the NEC which provides guidelines for proper grounding and, in particular, specifies that the cable ground shall be connected to the grounding system of the building, as close to the point of cable entry as is practical.

Lightning Protection

WARNING: The following notes are general recommendations for the system. The wireless equipment should be installed by a qualified professional installer and must follow local and national codes for electrical grounding and safety. Failure to meet safety requirements and/or use of non-standard practices and procedures could result in personal injury and damage to equipment. A direct lightning strike may cause serious damage even if these guidelines are followed.

All outdoor wireless equipment is susceptible to lightning damage from a direct hit or induced current from a near strike. Lightning protection and grounding practices in local and national electrical codes serve to minimize equipment damage, service outages, and serious injury. Reasons for lightning damage are summarized as:

- Poorly grounded tower/antenna sites that can conduct high lightning strike energy into equipment.

- Lack of properly installed lightning protection equipment that can cause equipment failures from lightning induced currents.

A lighting protection system provides a means by which the energy may enter earth without passing through and damaging parts of a structure. A lightning protection system does not prevent lightning from striking; it provides a means for controlling it and preventing damage by providing a low resistance path for the discharge of energy to travel safely to ground. Improperly grounded connections are also a source of noise that can cause sensitive equipment to malfunction.

A good tower grounding system disperses most of the surge energy from a tower strike away from the building and equipment.

To limit the equipment damage due to a lightning strike, the following practices are recommended for the wireless system:

- Provide direct grounding from the antenna mounting bracket, the radio and antenna and the lightning arrestors to the same ground point at the base of the tower or a ground bus on the building. Use the grounding screws on the antenna bracket and the radio and antenna for terminating the ground wires.

- The AC wall outlet ground must be connected to the same grounding system as the BS.

AVERTISSEMENTS ET MISES EN GARDE

Action des radiofréquences sur l'organisme humain

Le Air4Gp sera installé et exploité à une distance minimum de 2.4 mètres de votre corps.

Brouillage radioélectrique

Cet équipement génère, utilise et peut dégager de l'énergie radiofréquence s'il n'est pas installé et utilisé conformément aux instructions. Il est susceptible de provoquer des interférences préjudiciables aux communications radio. Toutefois, nous ne pouvons garantir qu'aucune interférence ne se produira dans le cadre d'une installation particulière. Si cet équipement dégage des interférences préjudiciables à la réception radiophonique ou télévisuelle, qui peuvent être détectées en allumant ou en éteignant l'appareil, l'utilisateur est invité à essayer de corriger le problème en prenant l'une ou l'autre des mesures suivantes :

- Réorientez ou déplacez l'antenne de réception.
- Augmentez la distance entre l'équipement et le récepteur.
- Branchez l'équipement sur une prise différente, de manière à ce que l'équipement et le récepteur soient branchés sur des circuits d'alimentation différents.
- Consultez le distributeur ou un technicien radio/TV expérimenté pour obtenir de l'aide.

Eviter le brouillage radioélectrique

- Cet émetteur ne sera ni co-positionné, ni exploité simultanément avec une autre antenne ou un autre émetteur.
- Prévoyez une séparation minimum de 1 mètre entre les BSR co-positionnés.

Modifications

Tout changement ou modification à ce dispositif, n'étant pas expressément approuvé par Airspan Networks peut entraîner l'arrêt au droit de l'utilisateur à faire fonctionner cet équipement.

Généralités

- Seul du personnel qualifié sera autorisé à installer, remplacer et maintenir cet équipement.
- Le dispositif ne peut être vendu au détail au grand public ou par correspondance. Il doit être vendu aux distributeurs.
- L'installation doit être vérifiée.
- L'installation sera effectuée par un professionnel muni d'une licence.
- L'installation requiert une formation particulière.
- La radio et l'antenne Air4Gp ne seront installées QUE par des professionnels expérimentés, familiarisés avec les normes et règlements de constructions et exigences sécuritaires locaux, si applicable, détenteurs d'une licence délivrée par les autorités de régulation gouvernementales appropriées. Un manquement à ce qui précède pourrait entraîner l'annulation de la garantie attribuée au produit WiMAX d'Airspan et exposer l'utilisateur ou le fournisseur de services à des sanctions légales ou financières. Airspan et ses revendeurs ou distributeurs ne pourront être tenus responsables de toute blessure, endommagement ou violation des règles liées à l'installation des unités ou antennes extérieures.

Clause de non responsabilité du fabricant

Toutes les informations contenues dans ce document sont sujettes à des changements sans préavis et ne constitueront en aucun cas, un engagement de la part du vendeur. Aucune déclaration ne sera faite ou aucune garantie ne sera accordée, qu'elle soit expresse ou tacite

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DECLARATION OF CONFORMITY

European Community, Switzerland, Norway, Iceland, and Liechtenstein

Declaration of Conformity with Regard to the R&TTE Directive 1999/5/EC

English:

This equipment is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.

Deutsch:

Dieses Gerät entspricht den grundlegenden Anforderungen und den weiteren entsprecheneden Vorgaben der Richtlinie 1999/5/EU.

Dansk:

Dette udstyr er i overensstemmelse med de væsentlige krav og andre relevante bestemmelser i Directiv 1999/5/EF.

Español:

Este equipo cumple con los requisitos esenciales asi como con otras disposiciones de la Directive 1999/5/EC.

Greek:

ΜΕ ΤΗΝ ΠΑΡΟΥΣΑ Airspan ΔΗΛΩΝΕΙ ΟΤΙ Ο ΕΞΟΠΛΙΣΜΟΣ ΣΥΜΜΟΡΦΩΝΕΤΑΙ ΠΡΟΣ ΤΙΣ ΟΥΣΙΩΔΕΙΣ ΑΠΑΙΤΗΣΕΙΣ ΚΑΙ ΤΙΣ ΛΟΙΠΕΣ ΣΧΕΤΙΚΕΣ ΔΙΑΤΑΞΕΙΣ ΤΗΣ ΟΔΗΓΙΑΣ 1999/5/ΕΚ.

Français:

Cet appareil est conforme aux exigencies essentialles et aux autres dispositions pertinantes de la Directive 1999/5/EC.

Íslenska:

Þessi búnaður samrýmist lögboðnum kröfum og öðrum ákvæðum tilskipunar 1999/5/ESB.

Italiano:

Questo apparato é conforme ai requisiti essenziali ed agli altri principi sanciti dalla Direttiva 1999/5/EC.

Nederlands:

Deze apparatuur voldoet aan de belangrijkste eisen en andere voorzieningen van richtlijn 1999/5/EC.

Norsk:

Dette utstyret er i samsvar med de grunnleggende krav og andre relevante bestemmelser i EU-directiv 1999/5/EC.

Português:

Este equipamento satisfaz os requisitos essenciais e outras provisões da Directiva 1999/5/EC.

Suomalainen:

Tämä laite täyttää direktiivin 1999/5/EY oleelliset vaatimukset ja on siinä asetettujen muidenkin ehtojen mukainen.

Svenska:

Denna utrustning är i överensstämmelse med de väsentliga kraven och andra relevanta bestämmelser i Direktiv 1999/5/EC.

Román:

Acest echipament este în conformitate cu cerinţele esenţiale şi alte prevederi relevante ale Directivei 1999/5/CE.

The Declaration of Conformity related to this product can be obtained from product_management@Airspan.com

FCC Notice

Federal Communication Commission Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his/her own expense.

Fixed and base stations transmitting a signal with an emission bandwidth greater than 1 MHz must not exceed an ERP of 1000 watts/MHz and an antenna height of 305 m HAAT, except that antenna heights greater than 305 m HAAT are permitted if power levels are reduced below 1000 watts/MHz ERP.

GPS Compliance

The GPS is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC."

The GPS complies with the following EMC Common Regulatory Testing standards:

- EN55022: Radiated and Conducted Emissions
- CISPR 22: Class B
- EN 50081-1: Generic Emissions Class B
- EN 50082-1: Generic Immunity Class B
- EN 61000-4-2: Electrostatic Discharge Immunity
- EN 61000-4-3: Radiated RF EM Field Immunity Test
- EN 61000-4-4: Electrical Fast Transient/Burst Test
- EN 61000-4-6: Conducted Immunity
- EN 61000-4-8: Magnetic Field Immunity

Note: A GPS is required for synchronizing between TDD sectors.

Note: A GPS Lightning/Surge protector is required.

Maximum Output TX Power

Table 1 - Air4Gp FCC Maximum Output TX Power

Frequency Band	FCC		Antenna Gain
	TX	EIRP	
5.725-5.850 GHz	19.48 dBm	35.98 dBm	16.5 dBi

Table 2 - Air4Gp ETSI Maximum Output TX Power

Frequency Band	ETSI		Rest of the World		Antenna Gain
	TX	EIRP	TX	EIRP	
5.47-5.95 GHz	10.5 dBm	27 dBm	28 dBm	44.5 dBm	16.5 dBi

Caution: Do not set maximum output TX power to higher than local regulations.

Power Consumption

Table 3 - Power Consumption

Air4Gp	Watts
5.x	75 Max

Optional External Antenna Types

Table 4 - 5.x GHz Antenna Types - Technical

Type	Frequency range	Gain	Part number
Dual Slant ± 45 degrees 90 Sector	4.9 - 6.1 GHz	16.5dBi	SEC90X-5.X-RC-1

Optional External Antenna Usage

Air4Gp has two (2) RF ports for external antenna usage that can be connected to optional external antenna.

Note: Appropriate mounting kit (included) for the antenna required.

1 About this Guide

This section discusses the purpose, intended audience, conventions, referenced documentation and organization for this guide.

1.1 Purpose

This guide provides the workflow and step-by-step procedures for Installing the Air4Gp. These procedures include:

- Verify Prerequisites
- Install the Air4Gp
- Connect and Manage Cables
- Install and set Power System

1.2 Intended Audience

This guide is intended for persons who are responsible for Installing the Air4Gp. These persons should have a working knowledge of the WiMAX system.

1.3 Conventions

This document uses the following informational conventions.

Icon	Description
	***Checkpoint:*** Marks a point in the workflow where there may be an exit or branch to some other procedure. At each ***Checkpoint*** the reason for an exit or branch is given along with specific directions to locate the entry point in the other procedure.
	***Reference:*** Gives a resource in the workflow that may be needed to complete a procedure along with specific directions to use the resource.
	***Caution:*** Describes a possible risk and how to lessen or avoid the risk.
	***Advice:*** Provides a recommendation based on best practice.
	***Note:*** Provides useful information.

1.4 Referenced Documentation

- Air4Gp Overview Guide
- Air4Gp Product Description

1.5 Organization of this Guide

This guide is organized into the following Sections:

- About this Guide
- Introduction
- Verify Prerequisites
- Install the Air4Gp
- Connect and Manage Cables
- Install and set Power System

- Appendixes [Securing & Connecting the cable, Glossary of Terms, Contact information and Revision history]

2 Introduction

This section provides a descriptive overview of the Air4Gp and its place in the product suite.

2.1 Air4Gp

Air4Gp is a dual protocol compact Base Station: WiMAX (IEEE802.16e) Base Station and simultaneously an LTE eNodeB. The Air4Gp is a Pico base station operating on unlicensed frequency bands and can support up to 4 carriers that can be deployed to cover a single sector or two distinct sectors. It can run either WiMAX or LTE or both WiMAX and LTE. It includes integrated quad transmitters to support four channel diversity and MIMO with an optional integrated dual slant antenna. It is a highly integrated compact base station with all-in-one packaging of RF and base-band components. It is available mounted outside on a pole or wall.
Air4Gp is available in frequencies between 150 MHz and 6 GHz and in numerous channels .
Air4Gp currently operates in the 5.x frequency band and was designed to overcome harsh interference conditions due to its 4x4 MIMO capability. The Tx power of the Air4Gp is limited to 22dBm, or 27dBm (depending on the variant), to meet unlicensed band regulations. Air4Gp can run WiMAX, LTE or WiMAX and LTE simultaneously.
Air4Gp is managed by an SNMP-based network management system (Netspan) using standard and proprietary MIBs. Basic management can be performed using any standard Web browser.

Note: The channel bandwidth describes the maximum bandwidth. Partial bands can also be utilized.

Note: For management refer to Air4Gp Commissioning documentation.

2.1.1 Architecture

A highly flexible and scalable WiMAX Base Station, the Air4Gp is capable of supporting WiMAX profiles across multiple frequency bands.

Note: The following is for illustration only; actual layout may differ as infrastructure is installation-specific.

Note: Air4Gp must be properly grounded according with NEC and other local safety code requirements.

Note: Installation of the GPS Lightning/Surge protector is necessary to protect the GPS antenna.

Example of three (3) sectors is illustrated below:

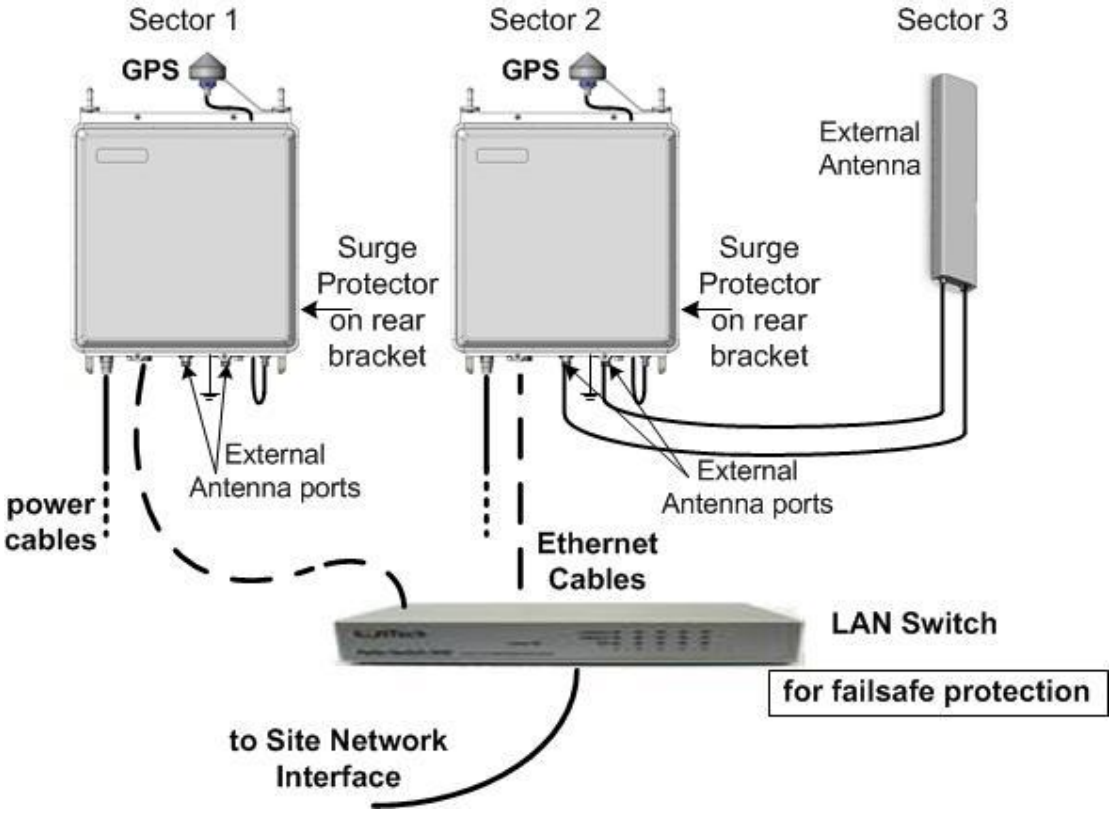


Figure 1 – Air4Gp – network interface

Note: Auto-negotiation must always be enabled on the core network side.

Note: Illustration above displays the GPS connected directly to the top of the units there is also a remote GPS antennae option.

3 Verify Prerequisites

Prior to installing the Air4Gp, verify the required safety, power, tools, parts and components.

3.1 Verify Safety Requirements

Read and follow all warning notices and instructions marked on the product or included in this manual.

When installed in the final configuration, the product must comply with the applicable Safety Standards and regulatory requirements of the country in which it is installed. If necessary, consult with the appropriate regulatory agencies and inspection authorities to ensure compliance.

Ascertain the radiation hazards when working in an environment close to other antennas and Electromagnetic fields, e.g. working on towers with other microwave transmitters etc. and act accordingly.

3.1.1 Warning of Hazardous Voltages

On AC installations, hazardous voltages exist. Use caution when verifying or working with AC power. Remove metal jewelry that could come into contact with AC power.

On DC sections, short circuiting the low voltage, low impedance circuits can cause severe arcing that may result in burns or eye damage. Remove rings, watches etc. to avoid shorting DC circuits.

Note: Airspan products do not contain hazardous substances (as defined in UK Control of Substances Hazardous to Health Regulations 1989 and the Dangerous Substances Regulations 1990). At the end of any Airspan products life cycle, the customer should consult with Airspan to ensure that the product is disposed of in conformance with the relevant regulatory requirements.

Caution: Any modifications to this device not expressly authorized by the manufacturer could void the user's authority to operate this device.

3.2 Verify Installation Requirements

3.2.1 Verify the Tools

Table 5 - Air4Gp installation tools

Tool
Large Crosshead Screw driver Phillips # 3 or Pozidrive # 3
Small flat blade screwdriver
Medium flat blade screwdriver
13mm or 1/2 inch open ended spanner
10mm or 13/32 inch open ended spanner
Wire strippers
Wire cutters
Ring terminals crimp tool
RJ45 crimp tool

3.2.2 Verify the Parts and Kits

Table 6 - Air4Gp installation parts and kits

Air4Gp Base Station parts	Consisting of
1 x Air4Gp unit	Base station unit
1x RJ45 Weatherproof Connector Cover	Weatherproof connector cover for use with standard CAT5e RJ45 network connections.
1 x mains cable 14AWG x2 (ordered separately)	30 meter lead with M17 3 pole plug
1 x Ethernet RJ45 environmental shroud	LTW IP68 or Amphenol environmental connector
There are two (2) options for a POE (Power over Ethernet), either an internal POE or an external POE usage to be determined by field requirements.	
1 x POE	Indoor – AC-PoE100-IDU-Air4Gp
1 x POE	Outdoor – DC-PoE-ODU-Air4Gp / 902-00-270

Air4Gp Base Station parts	Consisting of		
1 x Air4Gp installation Pole/Wall mounting kit (ordered separately)	Tilting panel	402-00-184	1
	1) Interface Bracket - Left	402-00-185	1
	2) Interface Bracket - Right	402-00-186	1
	Back bracket	402-00-188	2
	Screw - M8 x 200 Hex SST AISI 304 – 4		
	Screw - M8 x 20 Hex SEMS SST 304 - 8		
	Flat washer - M8 DIN125 SST 304 - 10		
	Spring washer - M8 DIN 127 SST 304 - 6		
	Nut - M8 Hex DIN127 - 6		
1 x earth kit	1 x M5 screws 1 x M5 washers 1 x M5 spring washers Alternative: SEMS screw (includes 2 washers)		
Type-IC DC Power Cable	Available either in - 10, 15 or 30 meter lengths. Additional lengths available.		
Grounding Cable (required) (not included)	Circular earth braid, 120A current (16 mm²), jacketed or not with cable size = AWG 4 – 6 with lug (terminal) on enclosure side with hole M6		

The following table displays the parts contained in the included GPS Kit and when the parts are required per configuration. See GPS Antenna Assembly

✓= required when applicable for this configuration

X = not required in this configuration

Table 7 - GPS Kit Contents

Part	Description	Air4G	Air4Gp		Air4Gs	Image
			Ext.	Int.		
GPS Antenna	1 x GPS Antenna. An active GPS antenna which, with the appropriate mounting bracket is used with the BS for network synchronization.	✓	✓	✓	✓	
80cm GPS Cable - RG58 TNC-TNC See Optional Cables	For mounting the GPS directly to the top of the BS. Should be used in conjunction with the BS GPS antenna mounting bracket pre-assembled on the BS.	✓	✓	✓	✓	
Remote GPS Antenna Mounting Bracket	Used in conjunction with the long GPS Cable - when mounting GPS remotely. (see optional cables below)	✓	✓	✓	✓	

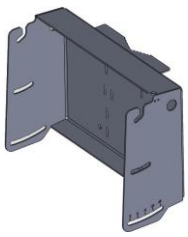
Part	Description	Air4G	Air4Gp		Air4Gs	Image
			Ext.	Int.		
Lightning/Surge protector	Surge Protector designed to protect from lightning strikes. An additional mounting bracket included in the packaging is not required for use.	✓	✓	✓	✓	
30cm Surge to BS Cable	For connecting the Surge protector to the Base Station. (RF cable assy TNC to TNC- RA,30cm,RG58)	✓	✓	✓	✓	
Protector mounting bracket	For mounting the Surge protector to the BS.	✓	X	X	✓	
Protector mounting bracket clamp	For clamping the bracket to the BS. Includes necessary hardware.	✓	X	X	X	

Optional Cables

- 16m GPS Cable - RG58 TNC-TNC - For mounting remotely from the base station unit. Should be used in conjunction with the Remote GPS Antenna Mounting Bracket - P/N CBL-GPS-TNC-16-1
- 40m GPS **Shielded** Cable TNC-TNC for remote GPS mounting option. An optional shielded cable for when excessive interference is detected, such as strong TV transmission interference.– P/N CBL-GPS-TNC-40-1

Note: For additional cable lengths contact your Airspan representative.

Table 8 - Air4Gp Pole/wall mount installation parts

#	Parts	Part no.	Images
1	Tilting panel	402-00-184	
2	Interface Bracket - Left	402-00-185	
3	Interface Bracket - Right	402-00186	

#	Parts	Part no.	Images
4	Back bracket x2	402-00188	
5	GPS Antenna mounting bracket		

Table 9 - Air4Gp additional parts and kits

Additional Common Accessories (not provided by Airspan)
Spare RJ45 connectors
Cable ties
Ring terminal for earth strap. M5 / M6
Earth strap cable (4-6 mm) (yellow and green cable)
Weatherproof / Outdoor mains cable splice kit or termination box.

The Air4Gp power supply (PS) can be installed with various cable lengths according to the site requirements. The cable lengths are determined by the length of the run between the PS and the Air4Gp. Use the following table to determine the required power supply output to ensure proper operation of the Air4Gp.

Table 10 - Input Power for Air4Gp

	Air4Gp (1)
Input Voltage to Air4Gp	-48 VDC to -60 VDC

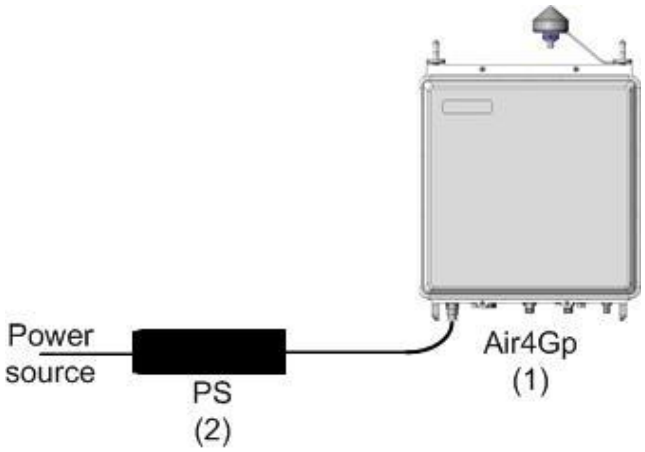


Figure 2 - PS – Air4Gp

3.2.3 Components

Air4Gp is shown below from the front view and bottom view displaying the connections.

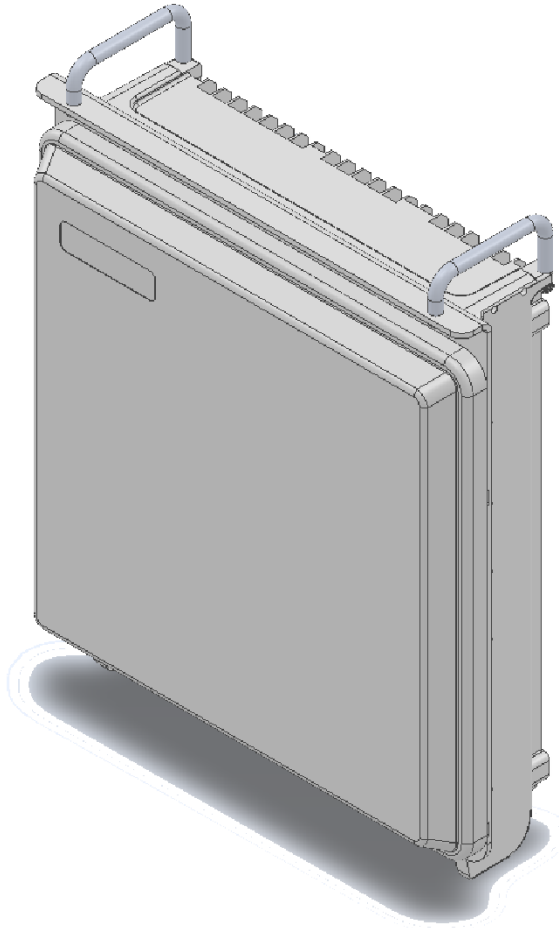


Figure 3 – Air4Gp Base Station Unit

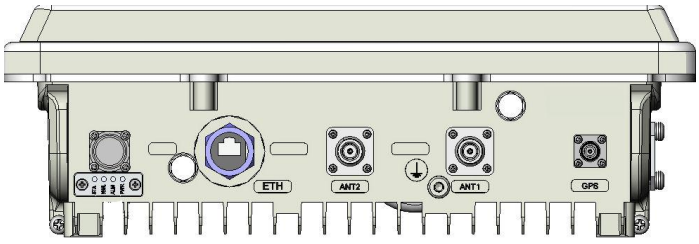


Figure 4 – Air4Gp Base Station Unit, bottom

3.2.3.1 Physical Dimensions

Air4Gp BS is in an all outdoor enclosure.

Table 11 - Air4Gp physical dimensions

Parameter	Value	Comment
Height	394.8 mm (15.54 inches)	The physical dimensions exclude handles and connectors.
Width	371.3 mm (14.62 inches)	
Depth	123.5 mm (4.86 inches)	
Weight	Aprox. 10 kg (2.2 lbs.)	

RF Ports for antenna connections are N-Type Female connectors located on the bottom of the Air4Gp enclosure. Adjacent to these are SMA connectors used for RF monitoring purposes during installation / maintenance. For normal operation, these are covered with a weatherproof cap.

An 80cm, cable connects the GPS directly to the top of Air4Gp. When mounting the GPS antenna remotely from the base station unit, the GPS antenna should be used in conjunction with the Remote GPS Antenna Mounting Bracket (GPS-MNT-1) and either the 16m (CBL-GPS-TNC-16-1) or the 40m (CBL-GPS-TNC-40-1) GPS Cable RG58 TNC-TNC by way of TNC connectors. The cable assembly for the remote GPS antenna is shown below.

Figure 5 – Air4Gp Cable Assembly for GPS Antenna

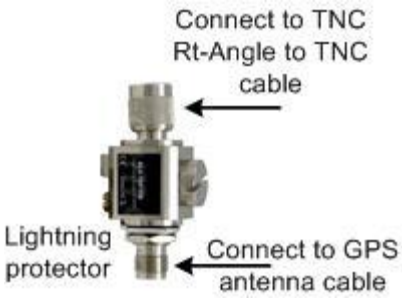


Figure 6 - Lightning/Surge protector (required)

Figure 7 - TNC right angle to TNC cable

4 Install Air4Gp

Install the Air4Gp base station by pole mount or wall mount.

> ***Caution:*** Proper local rigging and hoisting practices should be followed when installing the Air4Gp. The pre-assembled handles are **not** to be used for hanging, attaching or hoisting the unit into place.

4.1 Pole mount configuration

The following image shows the pole mount assembly.

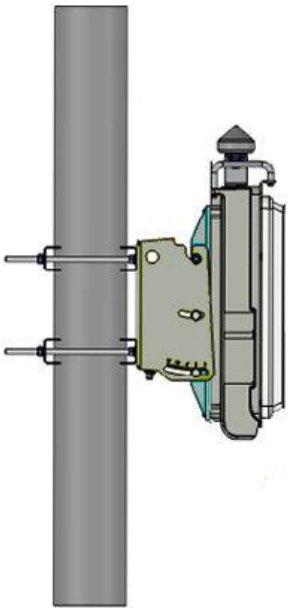


Figure 8 – Pole Mounted Air4Gp Assembly

To mount the Air4Gp on the pole mount configuration, perform the following steps:

1. Assemble the 4 threaded bolts (M8 x 200) onto the Tilting panel and hand-tighten M8 nuts onto the threaded bolts (on the outer side).
2. Assemble the 2 interface brackets (left and right) with their threaded pin facing outwards (in the up position) to the threaded holes on the Air4Gp back.
3. Attach the GPS on to the GPS antenna bracket and attach to the top of the Air4Gp.
4. Assemble the two (2) Back brackets onto the Tilting panel to properly fit on the pole.
5. Align and position each of the 2 back brackets at the proper height to attach the Air4Gp (with the Tilting panels pivot grooves facing up). Adjust the upper bracket and tighten in place. Adjust the lower bracket and hand-tighten.

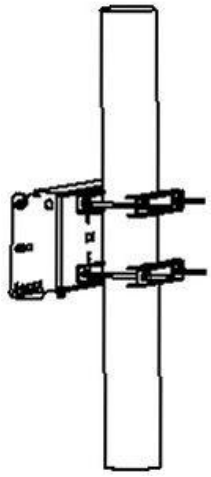


Figure 9 - position mounting assembly on the pole

6. Fasten the surge protector into the provided hole (in the Tilting panel) and hand-tighten.
7. Carefully align and position the Air4Gp unit so that the threaded pins (1 on each the Interface bracket) fit into the notched grooves provided on the Tilting panel and hand tighten. Insert the M8 screws, washers and nuts (supplied) and fasten to the Tilting panel.

Caution: The unit weighs about 10 kg take care when lifting.

8. Adjust the unit to the desired angle.
9. Check and tighten all fixing screws.

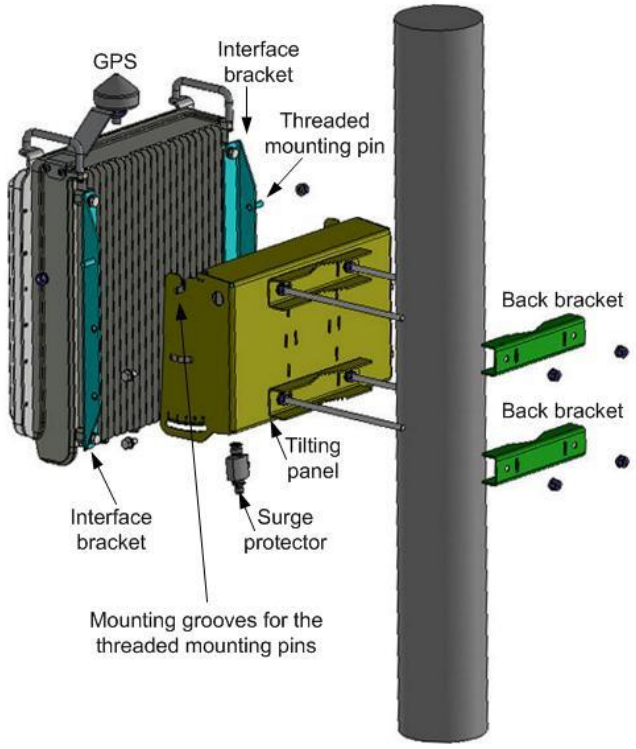


Figure 10 - Air4Gp Pole mounting - exploded view

4.2 Wall mount configuration

The following image shows the wall mount assembly.

Figure 11 – Wall Mounted Air4Gp

To mount the Air4Gp in the wall mount configuration, perform the following steps:

1. Attach the Tilting panel to the wall at the height required to attach the Air4Gp using wall plugs rated for at least 10 Kg.
2. Assemble the 2 interface brackets (left and right) with their threaded pin facing outwards (in the up position) to the threaded holes on the rear side of the Air4Gp.
3. Attach the GPS on to the GPS antenna bracket and attach to the top of the Air4Gp.
4. Fasten the surge protector into the provided hole (in the Tilting panel) and hand-tighten.
5. Carefully align and position the Air4Gp unit so that the threaded pins (1 on each the Interface bracket) fit into the notched grooves provided on the Tilting panel and hand tighten. Insert the M8 screws, washers and nuts (supplied) and fasten to the Tilting panel.

Caution: This unit weighs 10 kg take care when lifting.

6. Adjust the unit to the desired angle.
7. Check and tighten all fixing screws.

4.3 Air4Gp Connections

The following diagram displays the connections on the bottom side of the Air4Gp.

The base station requires a secure ground connection. The cable should also be grounded to the tower which is grounded at the tower base. A grounding screw fitted with a flat washer and lock washer is provided on the bottom of the chassis clearly marked with the universal ground symbol as shown below.

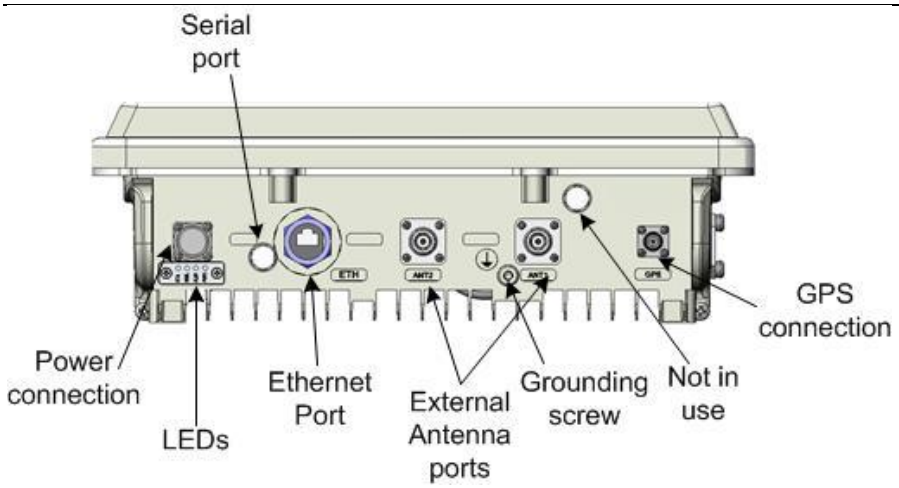


Figure 12 - Air4Gp connections (bottom)

Note: Previous versions had 3 RJ45 (Ethernet) connections.

4.3.1 LED Display

The LED's are a visual display to indicate basic BS status, see LED Display below for a description of the LED display.

4.4 Installing Optional External Antenna

Use this procedure to install optional external antenna for the Air4Gp in the mast mount configuration.

4.4.1 Install Antenna

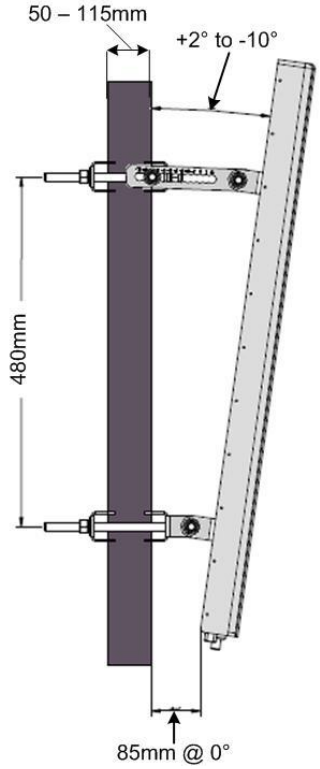


Figure 13 - Air4Gp Antenna (example) Mast Mount Configuration

Note: Mounting kit is included.

To mount the antenna for the Air4Gp in the mast mount configuration, perform the following steps:

1. Attach the Antenna brackets to the top and bottom of the radome.
2. Attach the tilt arm to the top bracket of the radome.
3. Fasten the ends of the adjustable pipe mounts to the top and bottom brackets of the radome.
4. Lift the radome and place the screws through the adjustable pipe mounts and position the radome so that the top mounting holes retain the unit.
5. Screw the bottom two screws and washers into the two standoff fittings at the bottom of the radome assembly.
6. Tighten all fixing screws.
7. Attach, connect and secure antenna RF cable between the antenna and the appropriate Air4Gp Antenna RF connection on the top of the unit.

4.5 Antenna Connections (Optional)

Caution: Antennas must be connected and attached before Air4Gp is powered on.

Caution: Attach the appropriate cable to the antenna and hand-tighten. Torque the N-Type connector to 6.2 - 9.7 in-lbs or 0.7 - 1.1 N-m using either a 19mm or 13/16” open end Torque wrench (depending on coupling type).

Caution: Power down Air4Gp prior to disconnecting antenna.

4.6 GPS Antenna Assembly

The GPS antenna should be installed far from:

- High-voltage power cables.
- Strong radiation area of any TV transmission stations.
- Radiation area of the main lobe of the RF Antenna.
- Radiation area of the microwave antenna.
- Other areas with inter-frequency interference or strong electromagnetic interference.

Cable Fastening Good Practices:

- No more than 5m between cable fastening spaces.
- No more than 1m between cable termination and first fastener.
- Fastenings should be to a robust construction (i.e. mast pole, BS mount…).
- Fasteners should be weather and UV resistant.
- Cables should have some slack for thermal expansion/contraction between fastenings.

4.6.1 Mounting GPS Directly on Air4Gp

To mount the GPS antenna directly on the Air4Gp:

1. Route the RG58 cable through the flat washer and the 2 nuts (supplied).
2. Position the RG58 cable below the mounting hole on the GPS antenna mounting bracket.

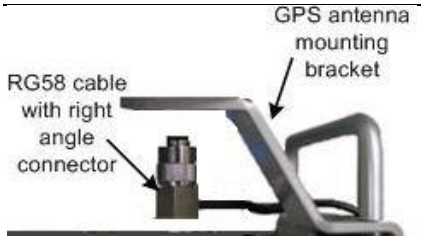


Figure 14 - GPS cable assembly prior to mounting

3. Hand-tighten the RG58 cable TNC (90°) connector to the mating connector on the GPS antenna.

Figure 15 - Attach GPS antenna to RG58 cable

4. Slide the flat washer up to the underside of the mounting bracket, then thread 1 nut onto the GPS antenna threaded base and tightened.
5. The second nut is then secured and tightened against the first nut to create a clamp load against the first nut, as shown below:

Figure 16 - GPS antenna assembled on bracket

6. Connect the RG58 cable attached to the GPS to the Lightning/Surge protector (required) which is connected to the TNC to TNC cable to the GPS connection on the bottom Air4Gp.

Note: Affix cable to the BS to avoid strain on the connections.

7. Verify that the weatherproof cable is in the proper position and hand tighten the cable (using no tools), to prevent water leakage. Apply self-amalgamating insulating tape on all critical connections.

4.6.2 Remote Mounting of GPS Antenna

When mounting the GPS antenna remotely from the base station unit, the GPS antenna should be used in conjunction with the Remote GPS Antenna Mounting Bracket (GPS-MNT-1) and either the 16m (CBL-GPS-TNC-16-1) or the 40m (CBL-GPS-TNC-40-1) GPS Cable RG58 TNC-TNC.

Note: Care should be taken so that the remote installation of the GPS antenna should be distanced from any obstructions that can interfere with “clear sky” conditions.

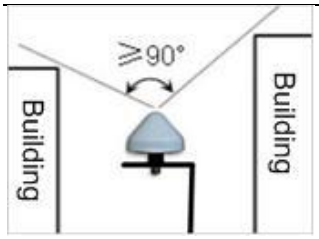


Figure 17 - Clear sky conditions

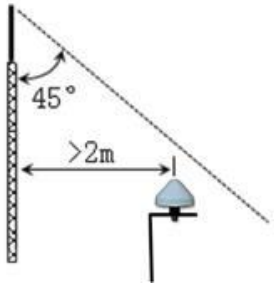


Figure 18 - minimal distance

When interference is present the GPS antenna can be installed in a position lower than the base station using the 40m (CBL-GPS-TNC-40-1) shielded GPS Cable. An example displaying the mounting of the GPS antenna on the tower below the Air4Gp is displayed below:

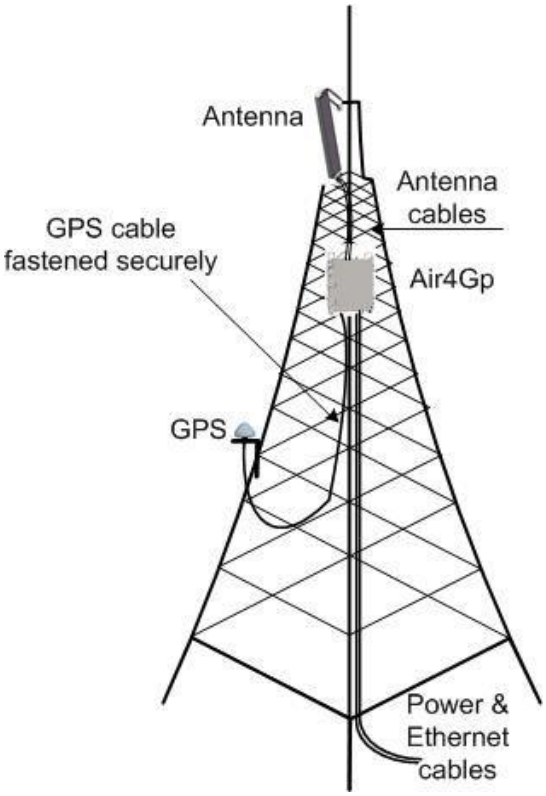


Figure 19 - GPS Remote mounting

Note: All cables should be properly secured to prevent undue strain on any of the cable terminations.

4.7 LED Display

When powering up refer to the following for indication of BS current status:

Table 12 - LED Display

LED	Name	Color	Status	Description
PWR	Power	Green	On	Power on
			Off	Power off
ALM	Alarm	Red	On	Alarm detected
NWL	Network Link	Green	Steady on	Network link detected
			Blinking	Traffic currently flowing
STA	In service	Green	On	Software running

5 Connect and Manage Cables

The Ethernet cable is connected to the Air4Gp using a standard RJ45 connector protected by a harsh environment protective casing.

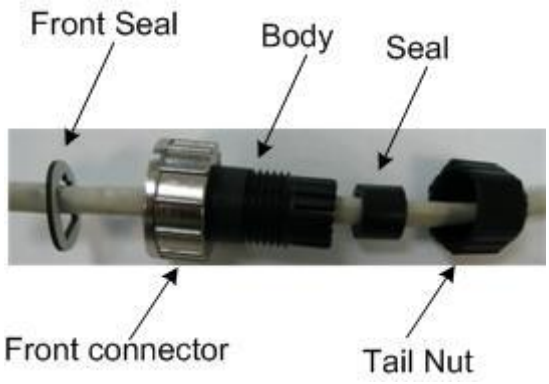


Figure 20 – Ethernet connector cable termination

5.1 Assemble Ethernet Connector

1. Pass the CAT5e cable through the seal, front connector, body and tail nut of the environmental connector casing as shown above.
2. Paste the front seal on the collar of the connector body.
3. Terminate the Ethernet cable with an RJ45 connector plug.
4. Seat the RJ45 connector plug securely into the body cavity.
5. Tighten the tail nut on to the body forcing the seal to compress around the cable.

Figure 21 – Ethernet environmental connector assembly

6 Set Power System

Hazardous voltage! Before working, ensure that the power is removed from the power connection cables. When the system is powered on, ***do not touch the power terminals***.

6.1 Power Input - DC

Each unit is provided with a 3/10/30 meter 48 volt power cable terminated with a female connector at one end to be connected to the Power connector on the bottom panel of the Air4Gp and bare wires at the other.

Caution: It is important that the power connector is attached at the correct end or damage to the connector/equipment will result.

Note: Check Power Supply for proper polarization.

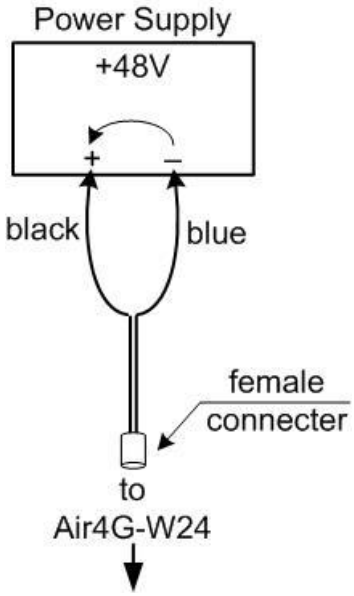


Figure 22 – DC Power connection

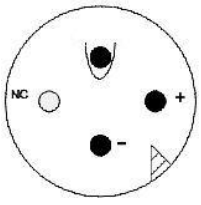


Figure 23 - Power connector – Air4Gp panel

7 POE (outdoor) Installation

7.1 Protection Earth (Ground) Connection

Connect the protection earth (ground) cable to an Earth rod or Earth plate at equipment building entry location. Use suitable “Potential hazard on Removal” warning labels. The protection earth (ground) should always be the first cable connected and the last to be disconnected.

Avoid inducing 50Hz Mains hum into the Ethernet pairs through the protection earth from AC Mains earth. Use of a Building Entry Earth Rod is preferred.

7.2 DC Power Connection

Insert the DC cable through the gland cover and O-ring, Strip back 100mm outer sheath. Strip back 5mm from both inner cores. Solder-Tin the inner cores to stop fray when inserting into terminal block. Insert the DC cable and screw to terminal block J3, adhering to polarity indicated. Lay the cable around (not over) J1.

7.3 PoE Connection

Strip back 60mm of the outdoor CAT5e sheath. Insert the CAT5e pairs through the glands. Punch-down the CAT5e cable-pairs to the IDC connectors using the punch-down-tool, being careful to conform to the coloring scheme. The Punch-down tool is polarised, so use the cutting scissors of the Tool to the ***LEFT*** side of the picture. Shake out all the loose cuttings.

7.4 Network Connection

Strip back 60mm of the outdoor CAT5e sheath. Insert the CAT5e pairs through the glands. Punch-down the CAT5e cable-pairs to the IDC connectors, being careful to conform to the coloring scheme. The Punch-down tool is polarised, so use the cutting scissors of the Tool to the ***RIGHT*** side of the picture.

Do not mix CAT6 for the network and CAT5e for POE, generally stick to all CAT5e or all CAT6.

7.4.1 Shielded Cables

It is preferred to use shielded cable. Connect the two drain wires through a cable sheath and ring crimp them to the alternate earth screw (bottom right).

7.4.2 Attachment

Attach the box using 2 off #6 1” Pan-Pozi Self Tapping screws.

7.4.3 Waterproofing

Tighten all glands for IP66 seal. Use two spanner wrenches to prevent the barrel rotating. Do not over-tighten the barrel to lock-nut which would have been tightened by the factory.

Tighten the Lid for IP66 seal.

7.4.4 AC/DC PSU Attachment

Attach the power supply using 4 off #6 0.5” Pan-Pozi Self Tapping screws.

Figure 24 - DC-PoE-ODU-Air4Gp/902-00-270

Figure 25 - DC-PoE-ODU-Air4Gp – open

Connect the Ethernet CAT5e cables into and from the terminal blocks J1 and J2. See Cable assembly, DC-PoE-ODU-Air4Gp / 902-00-270 below.

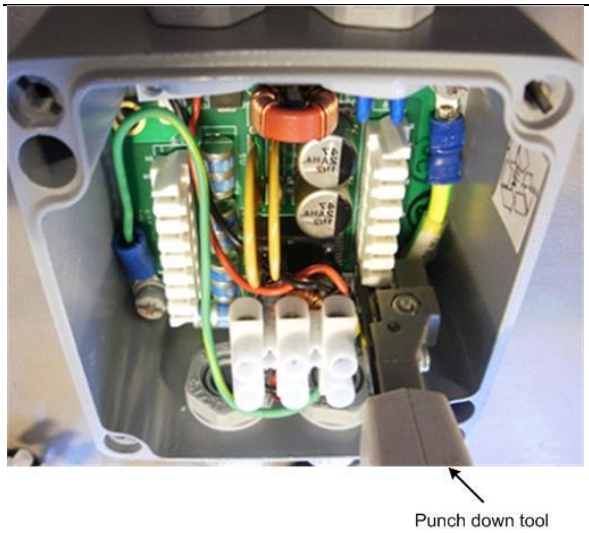
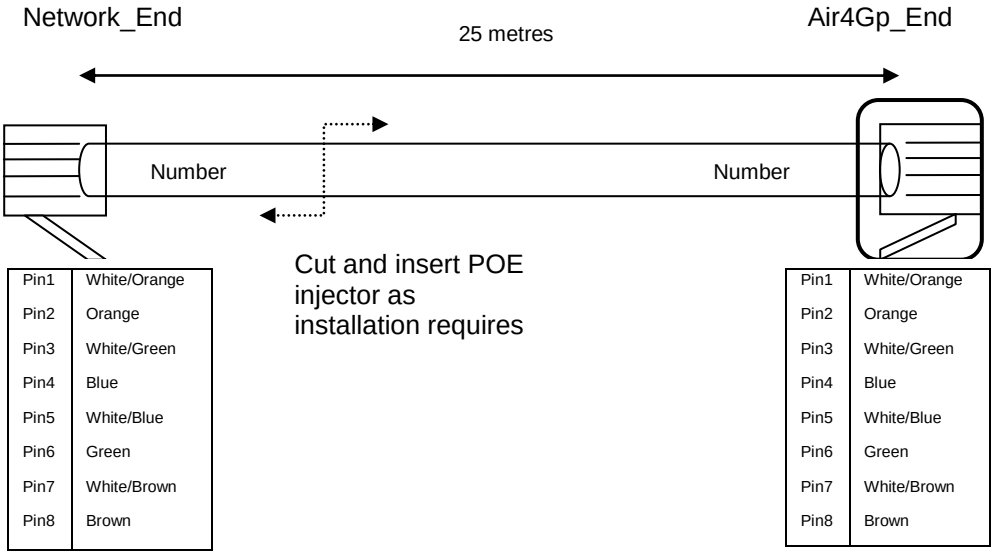


Figure 26 - DC-PoE-ODU-Air4Gp - punch down tool

7.5 Earth (Ground) Cable Assembly, MU687-00-028

- 681-00-029 , Cut 1 meter of (Lapp 4160500, 14AWG, CSA 2.5mm, Green/Yellow, OD 3.7mm)
- Strip Back 6mm of one end.
- 300-60-010. Attach Crimp Ring, Tyco(Amp) 51864-1, #8, M4, OD <=7.9mm, 14AWG, Blue.

8 Cable assembly, DC-PoE-ODU-Air4Gp / 902-00-270



Marketing Product Code = DC-PoE-ODU-Air4Gp

Packaged Item = 902-00-207

Cable assembly = 687-00-033

Drawing = MU68700033

CAT5e Connector = Amphenol ID550-000

CAT5e = Beldin 7918a 20metres cut from 100m reel 68000038.

Qty 2, RJ45 = Molex 449150001 (Cat6 Unscreened Solid)

Qty 2, Label = Panduit S100X225VADY (text="687-00-033") (material=outdoor quality)

9 Initial WEB Configuration

Configure an Air4Gp base station using the built in web based interface. This prepares the equipment for connection to Netspan.

9.1 Initial configuration

To set initial configuration, perform the following:

> ***Caution:*** The GPS antenna should be installed and attached before Air4Gp is powered on.

> ***Caution:*** Wait two minutes before performing other actions.

1. Apply power to the Air4Gp.
2. With the Air4Gp powered-up connect the PC to the Ethernet port.
3. Configure the PC with an IP address in the 192.168.0.xxx range (e.g. 192.168.0.80 subnet 255.255.255.0).
4. In a browser, open web page with address 192.168.0.1 (Air4Gp default IP address).
5. Enter the default username and password:

   Username = air4gweb

   Password = thhr49Key

9.1.1 General Config

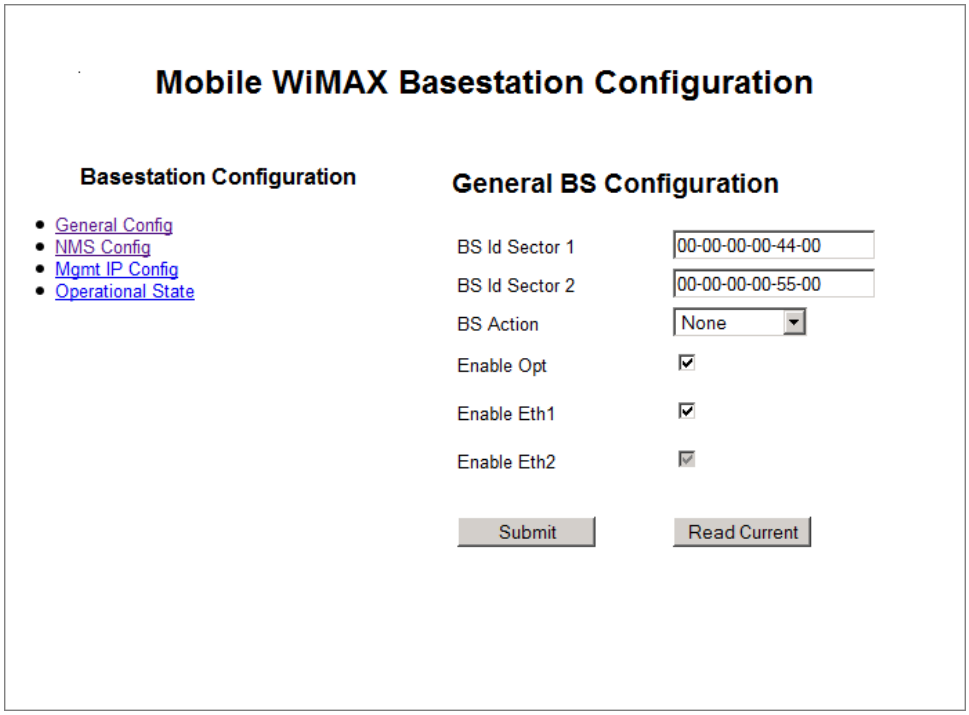


Figure 27 – General BS Configuration Initial

   a. "BS ID Sector 1" is mandatory for single sector or dual sector.

   b. In dual sector: "BS ID Sector 1" is the internal antenna, "BS ID Sector 2" is the external antenna.

6. Enter the **BS ID**

Note: The format of the BS ID is important: NN-NN-NN-nn-nn-nn (where NN-NN-NN is the Operator ID and nn-nn-nn is a unique address ID).

7. Select the **BS Action** from the available list.
8. Leave **NTP Server** as is (blank).
9. Click **Submit**. (Read Current = ignore/no action) (Clear IIB = ignore/no action)

9.1.2 NMS Config

1. Click **NMS Config**, as displayed below:

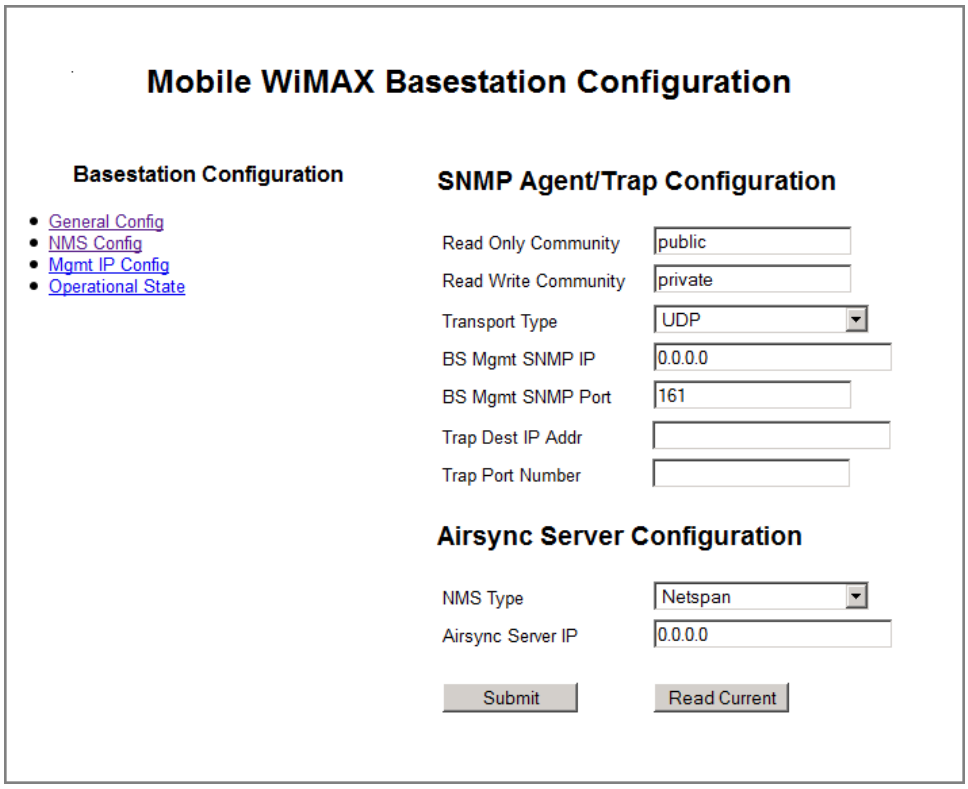


Figure 28 - SNMP Initial Configuration

2. Define **Read Only Community -** SNMP read only community name defined by the BS network provider
3. Define **Read Write Community -** SNMP read/write community name defined by the BS network provider.
4. Leave **Transport Type** as is.
5. Leave **BS Mgmt SNMP IP** as is.
6. Leave the **BS Mgmt SNMP Port** number as is. Default = 161
7. Define the SNMP **Trap Dest IP Addr**. (IP address of Netspan)
8. Set the SNMP **Trap Port Number** (for communications with Netspan) to 162.
9. Click **Submit**. (Read Current = ignore/no action) (Clear IIB = ignore/no action)

9.1.3 Mgmt IP Config

1. Click **Mgmt IP Config**, as displayed below:

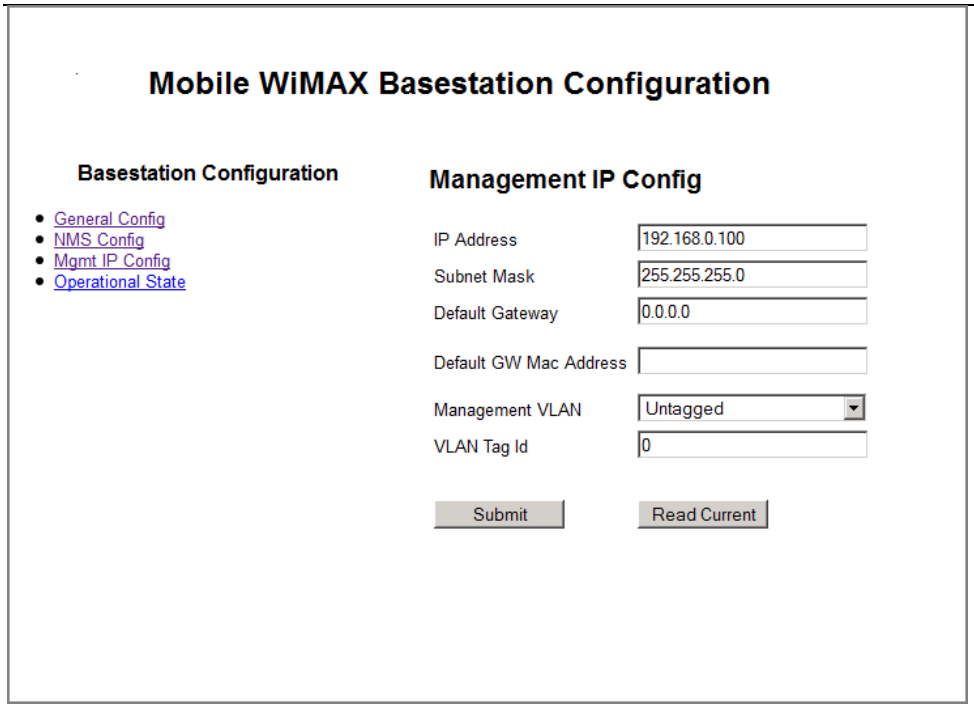


Figure 29 - Management IP Configuration

2. Define the **IP address**.
3. Define the **Subnet Mask**.
4. Define the **Default GW MAC Address**.

Caution: Define Default GW only if required for Network Security. Consult with Provider.

5. Set the **Management VLAN** set to Untagged. Set to Tagged when with VLAN Tag ID. Consult with Provider.
6. Define the **VLAN Tag ID** – only when Management VLAN is set to Tagged. Consult with Provider.
7. Click **Submit**. (Read Current = ignore/no action)

Caution: After **Submit** changes are applied immediately to the BS. Therefore the PC must now be re-configured to the new configuration (IP address and Subnet mask) to re-establish communication.

1. Return to General Config and in the **BS Action**.
2. Select **Reset BS** from the dropdown list.
3. Click **Submit** to perform a reset of the BS.

9.1.4 BS Operational State

Note: Leave settings on BS Operational State as is. No configuration is required.

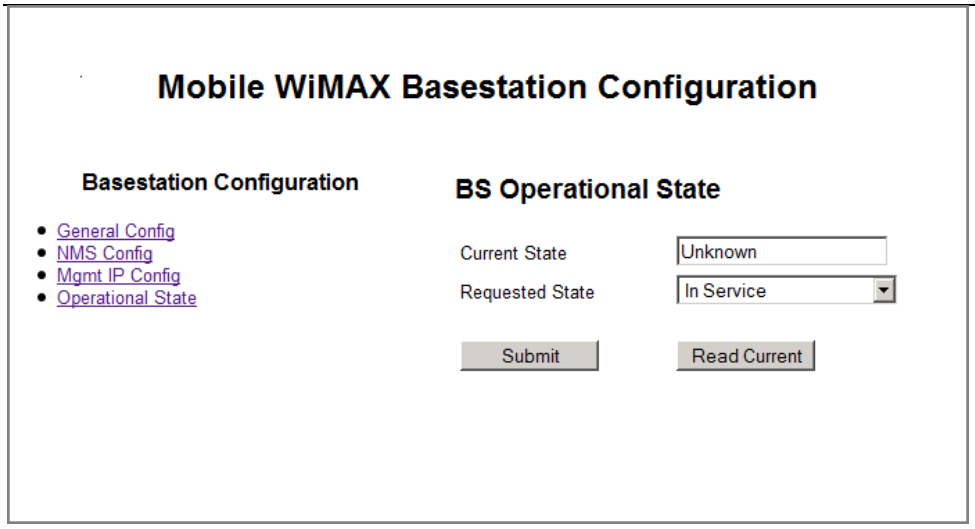


Figure 30 - Operational State

10 Appendix A – Glossary of Terms

AAA	Authentication, Authorization and Accounting
AAS	Advanced Antenna System
AF	Application Function
ARQ	Automatic Repeat reQuest
ASN	Access Service Network
ASN GW	ASN Gateway
ATCA	Advanced Telecommunications Computing Architecture
BS	Base Station
BWA	Broadband Wireless Access
CHAP	Challenge Handshake Authentication Protocol
CPE	Customer Premises Equipment
CQI	Channel Quality Indicator
CSN	Connectivity Service Network
DSM	Digital Surface Model
DTM	Digital Terrain Model
EAP	Extensible Authentication Protocol
FA	Foreign Agent
FBSS	Fast Base Station Switching
GUI	Graphical User Interface
HA	Home Agent
H-ARQ	Hybrid Automatic Repeat reQuest
HO	Handover/Handoff
IMS	IP Multimedia Subsystem
IP	Internet Protocol
IPsec	IP security
LR	Location Register
MAC	Media Access Control
MDH	Macro Diversity Handover
MIMO	Multiple Input Multiple Output
MIP	Mobile IP
MRC	Maximal Ratio Combining
MS	Mobile Station
NAP	Network Access Provider
NAS	Network Access Server
NLOS	Non Line of Sight
NSP	Network Service Provider
NWG	Network Working Group

OBSAI	Open Base Station Standard Initiative
OFDMA	Orthogonal Frequency Division Multiplexing (Multiple Access)
PA	Paging Agent
PAAA	Proxy AAA
PC	Paging Controller
PF	Policy Function
PHY	PHYsical Layer
PMIP	Proxy MIP
PPP	Point-to-Point Protocol
RADIUS	Remote Authentication Dial In User Service
RRA	Radio Resource Agent
RRC	Radio Resource Controller
RRM	Radio Resource Management
SAS	Smart Antenna System
SDR	Software Defined Radio
SFA	Service Flow Authorization
SFM	Service Flow Management
SIM	Subscriber Identity Module
SIP	Session Initiation Protocol
SOFDMA	Scalable Orthogonal Frequency Division Multiplexing (Multiple Access)
STC	Space Time Coding
TDD	Time Division Duplex
VoIP	Voice over IP
X.509	ITU-T standard for PKI digital certificates

11 Appendix B

11.1 Revision History

Revision	Originator	Date	Description
Rev A	M. Falik	06-2012	Initial document
Rev A1	M. Falik	07-2012	Power correction
Rev B	M. Falik	09-2012	Antenna, TX power & GPS kit, DC PoE

11.2 Contact Information

Customer Service Help-Desk for customer service emergency

Airspan Networks have introduced the Airspan Tracker application to enable prompt and efficient Customer Support services.

If you do not have an Airspan Tracker account, please obtain login credentials by filling-in the form in the main page www.airspan.com/Support Register New Account

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www.airspan.com

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