



UGD-D00181 Rev E

**MacroMAXe 3x05
Installation Guide**

Software Release 9.0





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Warnings and Cautions

Human Exposure to Radio Frequencies

The MacroMAXe should be installed and operated from a minimum distance of 2.4 meters from your body.

Radio Interference

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 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 receiving antenna
- Increase separation between the equipment and receiver
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected

Avoiding Radio Interference

- This transmitter must not be co-located or operating in conjunction with any antenna or transmitter.
- Ensure a minimum of 1-meter separation between co-located BSRs.

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 dealers.
- Installation must be controlled.
- Installation must be performed by licensed professionals.
- Installation requires special training. The MacroMAXe 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 the lid or base: No user serviceable parts inside.

5. **CAUTION: DOUBLE POLE/NEUTRAL FUSING** - Always replace the fuse with the correct type and current rating.
6. Position the power cord to avoid possible damage; do not overload wall outlets.
7. Do not place this product on or near a direct heat source, and avoid placing objects on the terminal.
8. Do not operate this device near water or in a wet location.
9. Use only a damp cloth for cleaning. Do not use liquid or aerosol cleaners. Disconnect the power before cleaning.
10. Protect the terminal by disconnecting the power if not used for long periods.
11. Mount the terminal in a Telco rack on a stable horizontal surface.
12. The radio antenna units must not be located near power lines or other electrical power circuits.
13. 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: correct installation procedures for grounding of the transceiver unit, mast, lead-in wire and discharge unit, location of discharge unit, size of grounding conductors and connection requirements for grounding electrodes.
14. Installation of the transceiver must be contracted to a professional installer.
15. Disconnect Device. The socket outlet shall be installed near the equipment, easily accessible and will act as the disconnect for the device.
16. 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 lightning 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. The remaining energy on the RF cable shield and center conductor can be directed safely to ground by using a lightning arrester in series with the RF cable.

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. "Norway and Sweden: Grounding for unit considered on additional earth, not earth of buildings".
- Install one RF lightning protector between the radio and antenna in series with the RF cable.
- A lightning arrester in series with the RF cable at the point of entry to the building.
- Laser Class I product use. Internal lasers comply with standards IEC 60 825-1, IEC 60 825-2, 21 CFR 1040.10, and CDRH.
- Install a lightning arrester in series with the IF cable at the transceiver on the tower/mast.



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- The AC wall outlet ground must be connected to the same grounding system as the radio and antenna lightning protectors.

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 entsprechenden Vorgaben der Richtlinie 1999/5/EU.

Dansk:

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

Español:

Este equipo cumple con los requisitos esenciales así como con otras disposiciones de la Directiva 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 exigences essentielles et aux autres dispositions pertinentes 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-direktiv 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.



MacroMAXe Installation Guide



Svenska:

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

Român:

Acest echipament este în conformitate cu cerințele esențiale și 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/FDD sectors.

Maximum Output TX Power

Frequency Band	ETSI		FCC		Rest of the World		Antenna Gain
	TX	EIRP	TX	EIRP	TX	EIRP	
3650-3675MHz	37dBm	39dBm	36.88	38.88	37dBm	39dBm	2 dBi

Figure 1 - MacroMAXe Maximum Output TX Power



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

Antenna Types

Table 1 - Antenna Types - Technical

Type	Frequency range	Gain	Manufacturer	Model number
+/-45° Polarized 90° Sector Antenna - Quad Port Fixed Tilt	3.3 - 3.8 GHz	17.0 dBi	Alpha Wireless	AW3035
Manual Tilt Panel Antenna, Dual Slant ± 45°	3.3 - 3.8 GHz	18.0 dBi	Argus Technologies Pty Ltd.	SSPX310M
9dBi Omni Directional Antenna	3.3 - 3.8 GHz	9 dBi	MTI Wireless Edge Ltd.	MT-402005/N
Omni Directional Base Station Antenna	3.3-3.8 GHz	9.5 dBi	MARS Antennas & RF Systems Ltd.	MA-WO36-10N
8.5dBi Omni directional Antenna	3.4-3.7GHz	8.5 dBi	MTI Wireless Edge Ltd.	MT-402009/N/A
10.5dBi Omni Directional Antenna	3.3-3.8GHz	10.5 dBi	MTI Wireless Edge Ltd.	MT-403017/N
Double Dual Slant - Base Station Antenna - 65°	3.3 – 3.8 GHz	17.5 dBi	MTI Wireless Edge Ltd.	MT - 404081/ND
BLADE ANTENNA	3.6-4.0 GHz	2.0 dBi	EUROPEAN ANTENNAS LTD.	SBA-3800-D1/1040

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 MacroMAXe. These procedures include:






- Verify Prerequisites
- Install the MacroMAXe
- Connect and Manage Cables
- Set Power System

1.2 Intended Audience

This guide is intended for persons who are responsible for Installing the MacroMAXe. 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

- MacroMAXe Product Description
- Job Sheet

1.5 Organization of this Guide

This guide is organized into the following Sections:



MacroMAXe Installation Guide



-
- About this Guide
 - Introduction
 - Get Started
 - Verify Prerequisites
 - Install the MacroMAXe
 - Connect and Manage Cables
 - Set Power System
 - Appendixes [Sample Job Specification, Troubleshooting, Glossary of Terms, Installation Checklist, Contact information and Revision history]

2 Introduction

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

2.1 MacroMAXe

MacroMAXe is a highly integrated macro-cell base station with all-in-one packaging of RF and base-band components. MacroMAXe includes integrated Quad receiver / Dual transmitter to support two channel diversity and MIMO. It is available as an all outdoor solution for Mobile WiMAX applications to minimize physical footprint and operator expense.

MacroMAXe is an outdoor radio that is mounted outside on a pole or wall. MacroMAXe is available in numerous frequency bands and in numerous channels see: [MacroMAXe Frequency Ranges](#).

MacroMAXe 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: For management refer to MacroMAXe Commissioning documentation.

2.2 MacroMAXe Frequency Ranges

The table below lists the frequency range of MacroMAXe variants currently available. This table will grow as more variants become available.

Table 2 - MacroMAXe frequency ranges

Band	Region	Lower Frequency	Upper Frequency	Channel Bandwidth	Duplex
3.6 GHz	Generic	3650 MHz	3675 MHz	➤ 5MHz	TDD
				➤ 7MHz	
				➤ 10MHz	

2.2.1 Architecture

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



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



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

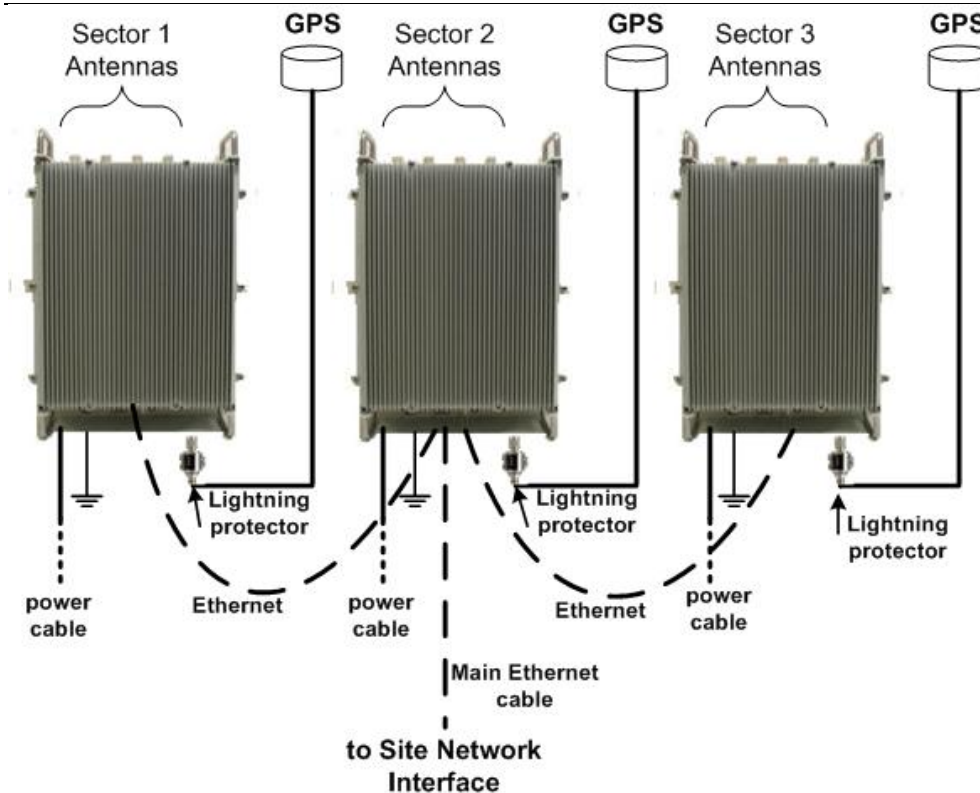





Figure 2 – MacroMAXe Hardware Components

- 
Note: MacroMAXe can also be connected via a LAN Switch for greater Failsafe protection.

- 
Note: Illustration above is of single Ethernet cable for connection.

- 
Note: Illustration above displays remote GPS antennae option.

The MacroMAXe is a fully integrated all outdoor base station sector that contains all RF, Baseband, GPS Synchronization and 3-sector aggregation functionality. In one box it comprises the following functional elements:

- Quad Receiver / Dual Transmitter
- SDR Card
- Ethernet Switch
- GPS

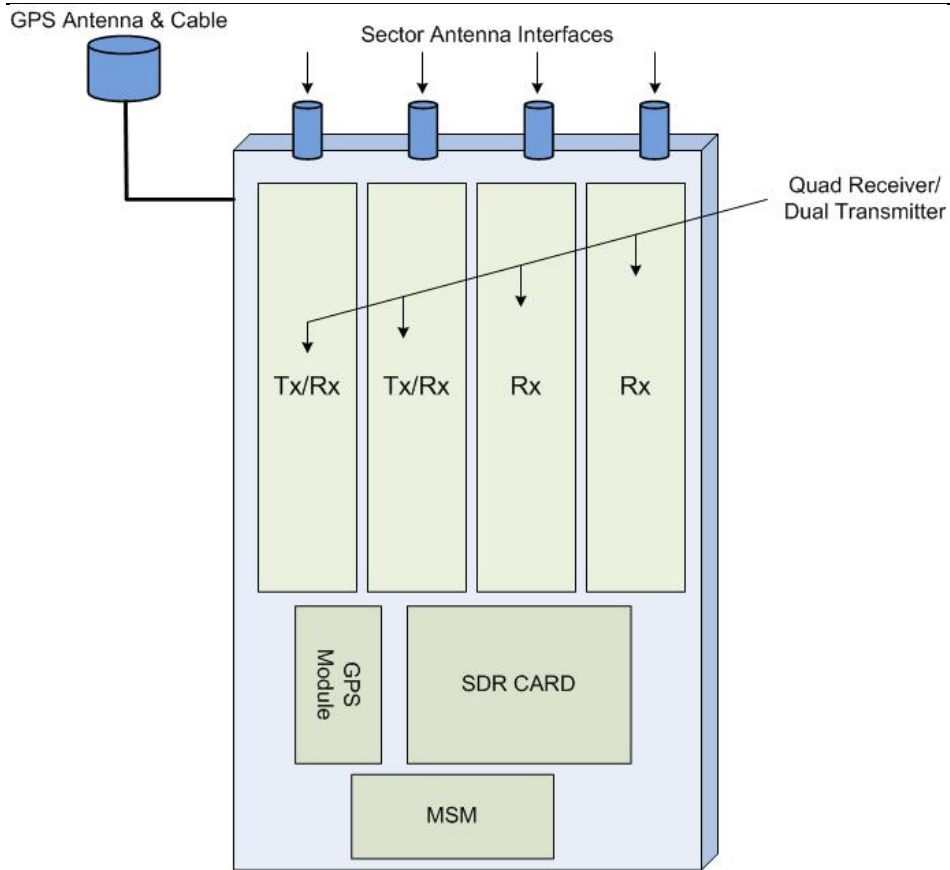


Figure 3 – MacroMAXe Functional Components

3 Getting Started

3.1 Workflow of Installation

The Workflow to install the MacroMAXe is shown in the following diagram:

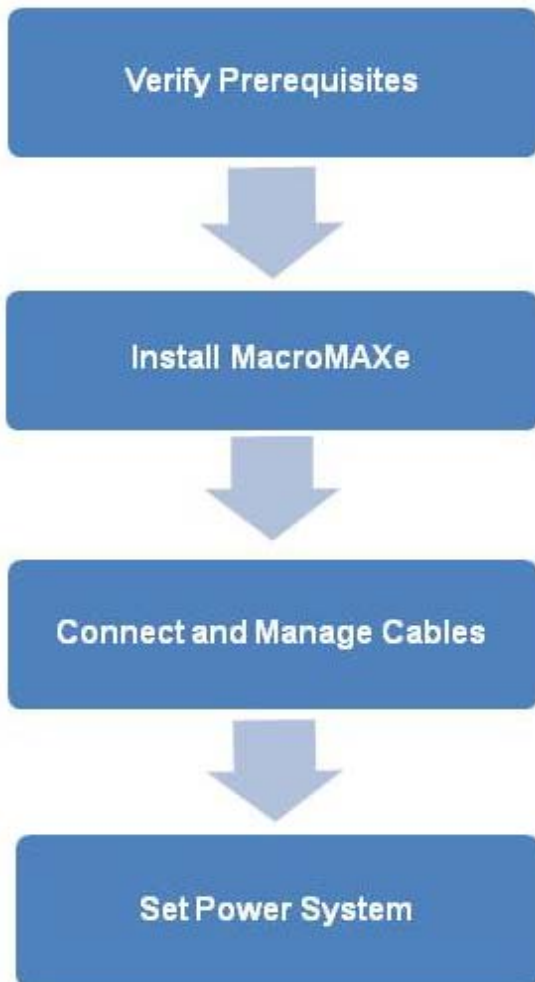


Figure 4 – Workflow of Installation



3.2 MacroMAXe Installation Checklist

Plan the installation of the MacroMAXe by using the Installation Checklist, which you can find as a removable job aid in Appendix A for this guide.

4 Verify Prerequisites

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



Reference: Set up requirements for the installation are detailed in the *Job Sheet*. To see the suggested contents of a *Job Sheet* for a site, see Appendix A for this guide

4.1 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.

4.1.1 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 users authority to operate this device.

4.2 Verify Installation Requirements

4.2.1 Verify the 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




Table 3 – MacroMAXe installation tools

4.2.2 Verify the Parts and Kits

MacroMAXe Base Station parts	Consisting of
1 x MacroMAXe unit	Base station unit
3 x RJ45 Weatherproof Connector Covers	Weatherproof connector covers for use with standard cat 5 RJ45 network connections.
1 x mains cable 14AWG x2 (ordered separately)	30 meter lead with M17 3 pole plug
When distance from outdoor Power supply to Base Station is over 30 meters additional power cable must be connected via a junction box (ordered separately) for total distance of up to 130 meters.	
	14AWG x2 (ordered separately) – up to 40 meters
	12AWG x6 (ordered separately) – up to 100 meters
1 x Ethernet RJ45 environmental shroud	LTW IP68 or Amphenol environmental connector
1 x Sunshield fixing kit (optional) (ordered separately)	4 x M6 screws 4 x M6 plain washers 4 x M6 spring washers

MacroMAXe Base Station parts	Consisting of
1 x MacroMAXe installation mount kit (ordered separately)	<p>8 x male-male threaded studs M8</p> <p>24 x M8 plain washers</p> <p>16 x M8 spring washers</p> <p>8 x M8 nuts</p>
1 x earth kit	<p>1 x M6 screws</p> <p>1 x M6 washers</p> <p>1 x M6 spring washers</p> <p>1 x M6 nut</p>
1 x GPS antenna kit (ordered separately)	<p>1x GPS Antenna. An active GPS antenna which, by using the appropriate mounting bracket, can be used with MacroMAXe for network synchronization.</p> <p>For mounting directly to the top of MacroMAXe, this GPS Antenna should be used in conjunction with MacroMAXe GPS Antenna Top Mounting Kit.</p> <p>When mounting remotely from the base station units, this antenna should be used in conjunction with the Remote GPS Antenna Mounting Bracket & 5m or 16m GPS Cable RG58 TNC-TNC.</p> <p>30cm or 16m Cable Assembly. 30cm or 16m RG58 cable. Connects remote mounted GPS Antenna (GPS-ANT-1) to the MacroMAXe via TNC connectors.</p>

Table 4 – MacroMAXe installation parts and kits

Parts		Images
1	Wall Plate	
2	Top Hanger	
3	Lower Hanger	



Parts		Images
4	GPS Antenna mounting bracket	
5	Handle	

Table 5 – MacroMAXe wall mount installation parts




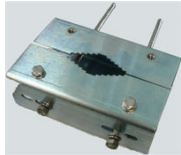






Parts		Images
 Note: Additional to Wall mounting kit.		
1	Top & Lower Pole Strap (x2) for 120 > 230 MM	
 Note: Additional to Wall mounting kit.		
2	Pole bracket for 60 > 120 MM	

Table 6 – MacroMAXe pole mount installation parts

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.

Table 7 – MacroMAXe additional parts and kits

Optional Junction Box	Consisting of
1 x Junction box (ordered separately)	Junction box

Optional Junction Box	Consisting of
1 x PG11 Weatherproof gland (connector), included with junction box	Weatherproof connector 
1 x PG16 Weatherproof gland (connector) , included with junction box	Weatherproof connector 
1 x PG29 Weatherproof gland (connector) , included with junction box	Weatherproof connector 
Additional power cable	14AWG x2 (ordered separately) – up to 40 meters
	12AWG x6 (ordered separately) – up to 100 meters
2x mounting bracket(s) for pole and wall mounting	Bracket (x2) 
2x pole bands (stainless steel), as required, supplied.	60 – 80 mm (2 ¼") 
2x pole bands (stainless steel), as required, supplied.	80 – 100 mm (3 1/2") 
Mounting screws – for mounting brackets to junction box.	EJOT WN1412 – K50 x 12 – 4 supplied.
Wall mounting fasteners	Hole size = 7 mm (not supplied - customer responsibility)

Optional Junction Box	Consisting of
Sufficient cable wires ties, as required	(not supplied - customer responsibility)

Table 8 - Junction box (optional)

4.2.3 Verify Components

MacroMAXe is in an all outdoor enclosure that measures 52.7 cm in height, 34.7 cm in width, 15.6 cm in depth and weighs about 17kg. The unit is shown below from the Ethernet termination and RF port end views respectively.



Figure 5 – MacroMAXe Base Station Unit, Ethernet termination



Figure 6 – MacroMAXe Base Station Unit, RF ports

RF Ports for antenna connections are N-Type Female connectors located on the top of the MacroMAXe 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.

A 80cm or 16 m RG58 cable connects a remote mounted GPS Antenna to the MacroMAXe by way of TNC connectors. The cable assembly for the remote GPS antenna is shown below.



Figure 7 – MacroMAXe Cable Assembly for GPS Antenna

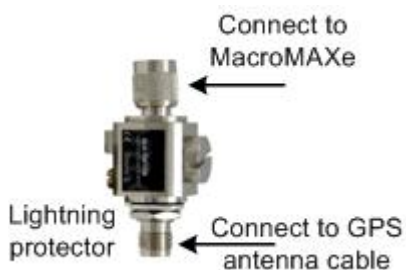


Figure 8 - Lightning/Surge protector

4.2.3.1 Junction Box (Optional)

The Junction box (optional) is an outdoor enclosure that measures 152 mm in height, 170 mm in width and 95 mm in depth. The unit is shown below with the pole mounting bands assembled. The Junction box is required when the distance from the outdoor Power supply to Base Station is **over 30** meters for total distance of up to 130 meters.



Note: If – 48 volt DC can be verified and guaranteed the Junction box may not be required. Contact customer support to determine.

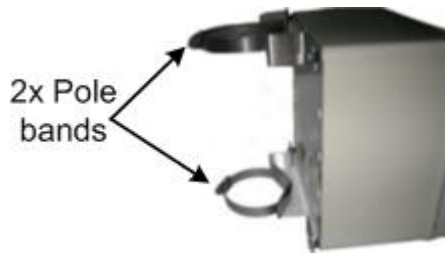


Figure 9 - Junction box with pole assembly

5 Install MacroMAXe

Install the MacroMAXe base station by pole mount, wall mount, or single point. The MacroMAXe can be deployed as a remote radio head (RRH) connected to a pair of single (usually vertically polarized) or single dual independently mounted antennas via standard RF coaxial cables. Antennas are positioned with up to 10 wavelengths horizontal separation to give optimal Downlink and Uplink MIMO performance.

5.1 Pole mount configuration

The following image shows the pole mount assembly.

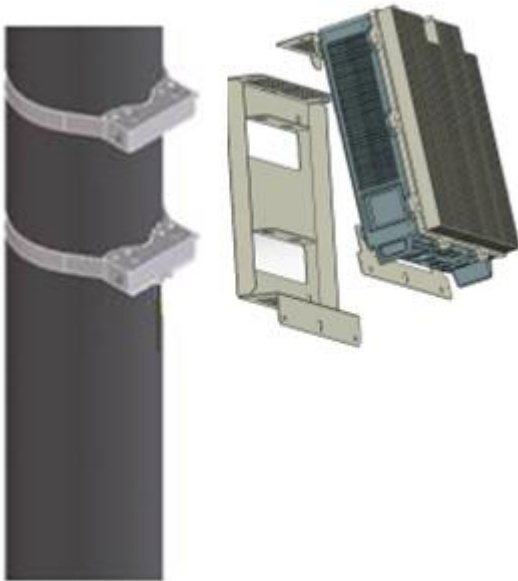


Figure 10 – Pole Mounted MacroMAXe Assembly

To mount the MacroMAXe in the pole mount configuration (for poles 120 > 230 mm), perform the following steps:

1. Attach the two (2) PM-323 pole straps to the pole at the heights required to attach the MacroMAXe.
2. Fasten the mounting brackets to the pole straps; position the tabbed strap lower on the pole with the tab facing down.
3. Lift the enclosure and place the screws through the head clearance holes and position the unit so that the top mounting holes retain the unit.



Caution: This unit weighs 17 kg, take care when lifting.

4. Screw the bottom two the M8 screws and washers into the two standoff fittings at the bottom of the MacroMAXe enclosure.
5. Attach Base Station and loosely tighten all screws.
6. Tighten all fixing screws.



Figure 11 – Pole Mounted MacroMAXe

To mount the MacroMAXe in the pole mount configuration (for poles 60 > 120 mm), perform the following steps:

1. Attach the two (2) pole brackets (shown above) to the pole (with the threaded holes facing up) at the heights required to attach the MacroMAXe.
2. Tighten upper pole bracket and hand tighten (loosely) the lower pole bracket for later adjustment.



Caution: This unit weighs 17 kg, take care when lifting.

3. Lift and align the MacroMAXe unit and place the screws through the head clearance holes and position the unit so that the top mounting holes retain the unit and loosely tighten all screws.
4. Tighten all fixing screws.

5.2 Wall mount configuration

The following image shows the wall mount assembly.

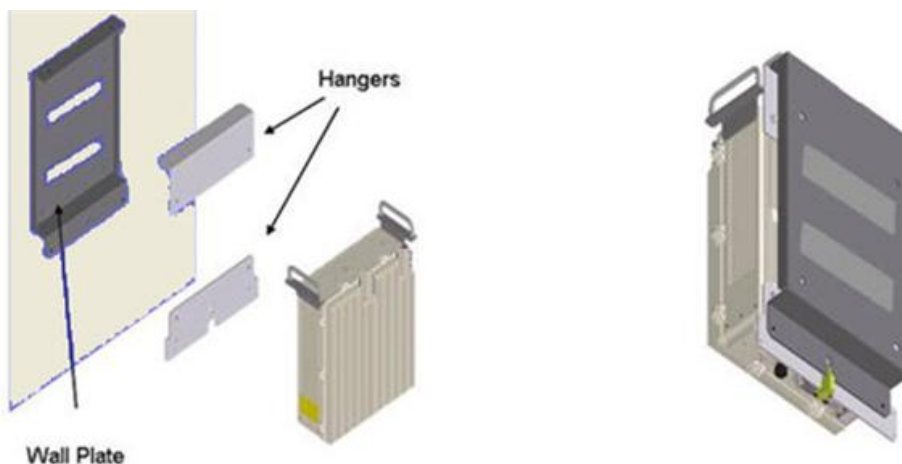


Figure 12 – Wall Mounted MacroMAXe

The following diagram depicts the Wall Plate Details.

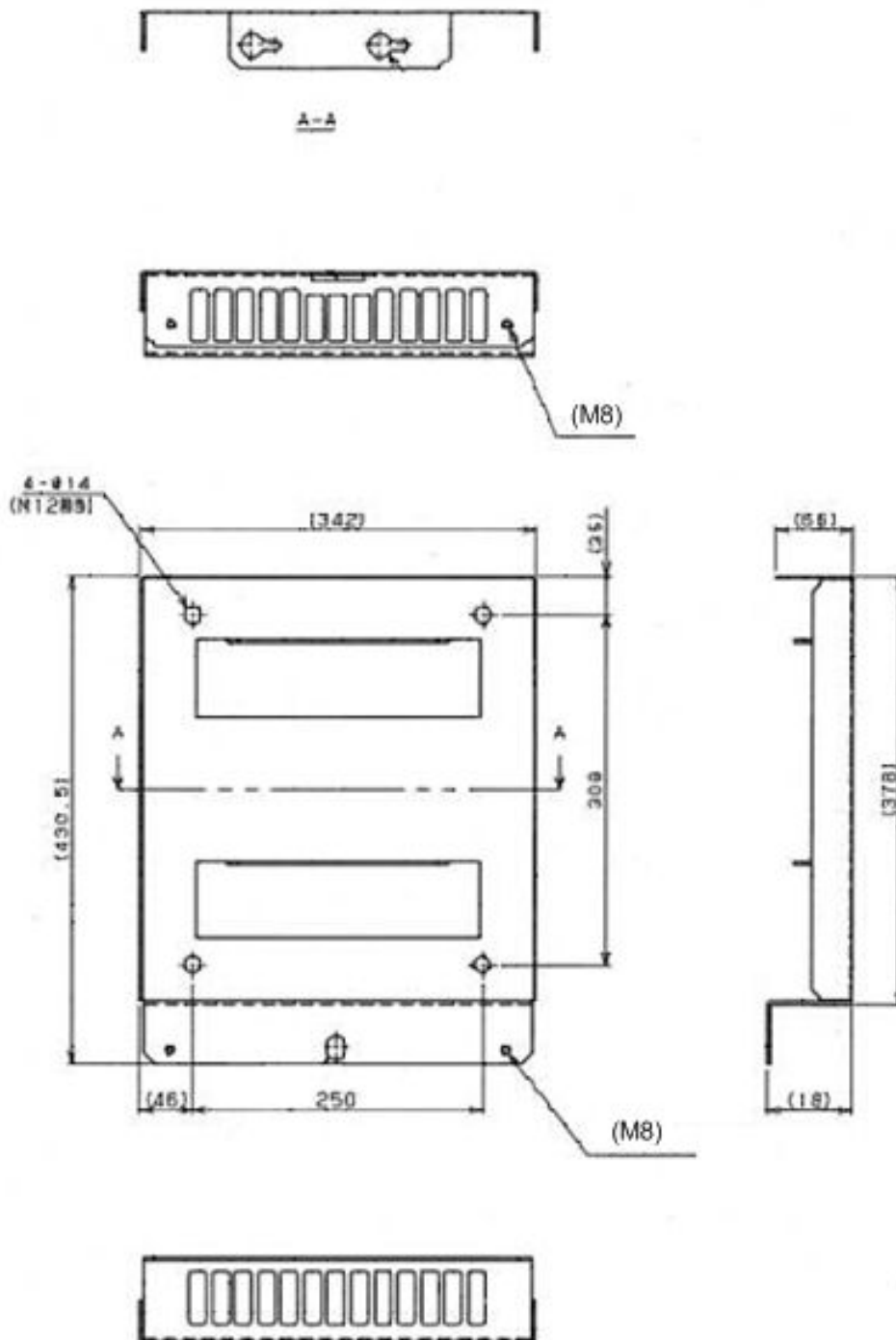


Figure 13 – Wall Mounted MacroMAXe Wall Plate Details

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

1. Attach the Wall Plate to the wall at the height required to attach the MacroMAXe.
2. Fasten the Hangars to the rear side of the MacroMAXe enclosure, position the niched Hangar so it is lower on the wall with the niche facing down.
3. Lift the enclosure and place the screws through the head clearance holes and position the unit so that the top mounting holes retain the unit.



Caution: This unit weighs 17 kg, take care when lifting.

4. Screw the bottom two screws and washers into the two standoff fittings at the bottom of the MacroMAXe enclosure.
5. Tighten all fixing screws.

5.3 Install MacroMAXe Antennas

Use this procedure to install a linear dual slant antenna for the MacroMAXe in the mast mount configuration.



Figure 14 – MacroMAXe External Antenna Configuration



Note: Separate Antenna distance according to RF planning.

5.3.1 Install Dual Slant Antenna



Figure 15 - MacroMAXe Antenna Dual Slant Mast Mount Configuration

To mount the dual slant antenna for the MacroMAXe 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 MacroMAXe Antenna RF connection on the top of the unit.

5.3.2 Install Quad Slant Antenna



Figure 16 – MacroMAXe Antenna Quad Slant Mast Mount Configuration

To mount the Quad slant antenna for the MacroMAXe in the mast mount configuration, perform the following steps:

1. Attach the Antenna brackets to the top and bottom of the radome.
2. Attach 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 MacroMAXe Antenna RF connection on the top of the unit.

5.3.3 Antenna Mounting Clamps for Dual and Quad Slant Antennae

The following are some adjustable antenna mounting clamp options for both Dual and Quad Slant antenna scenarios.

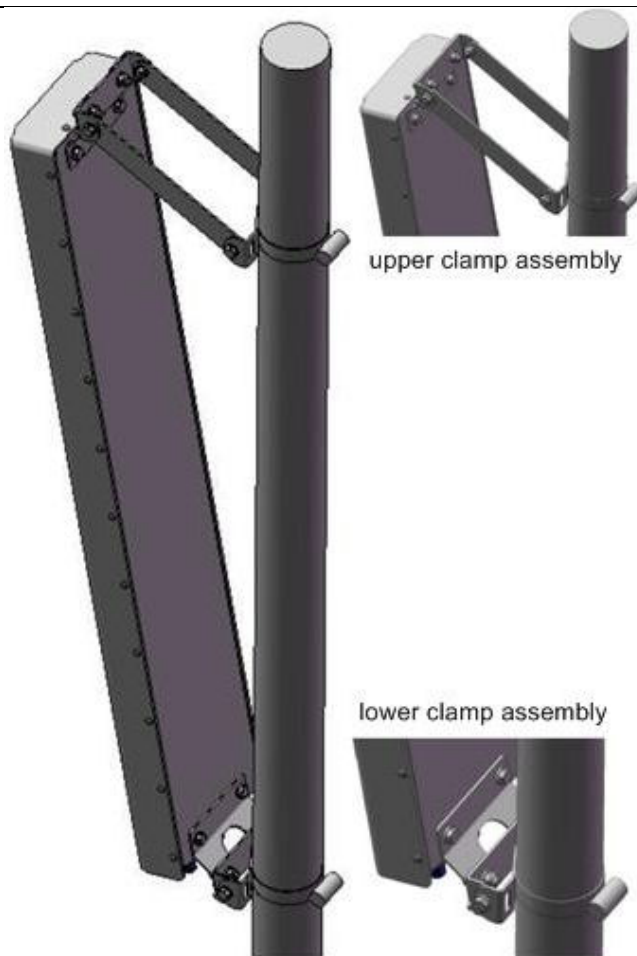


Figure 17 - Adjustable Mounting Kit, with Snaplock Stainless Steel Bands



Figure 18 - Adjustable Mounting Kit, with 'V' Blocks

5.4 Optional Mounting Antenna on MacroMAXe

Either Antenna shown can be mounted on the MacroMAXe unit or mast mounted.



Note: The sunshield kit is required for this type of assembly. Contact your supplier to order.

5.4.1 Variable Tilt Antenna

There is a Variable Tilt Antenna available for mounting on the MacroMAXe. The antenna maybe connected directly to the MacroMAXe with no need for physical tilting of the antenna. The Manual Electric Tilt (MET) antenna has a rotating nut that adjusts a threaded rod which moves in and out while displaying a tilt scale, as shown below.

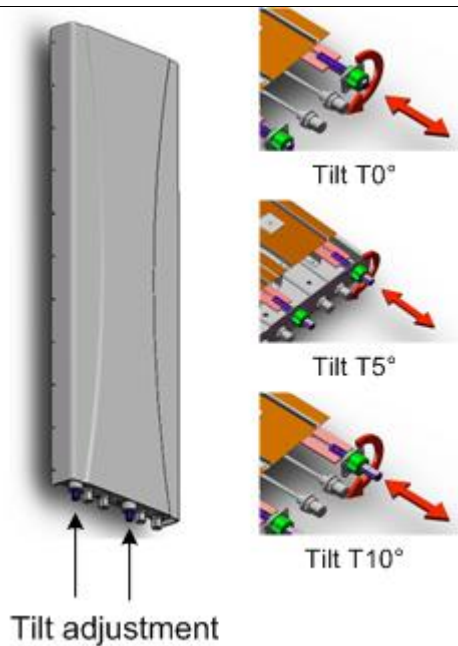


Figure 19 - Variable tilt antenna

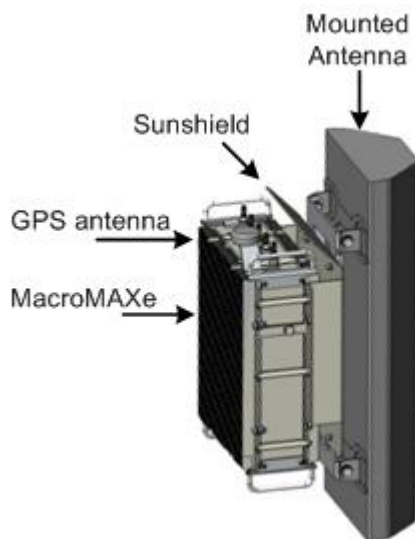


Figure 20 - Antenna mounted on MacroMAXe

5.5 GPS Antenna Assembly

To mount the GPS antenna directly on the MacroMAXe:

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, as shown below:

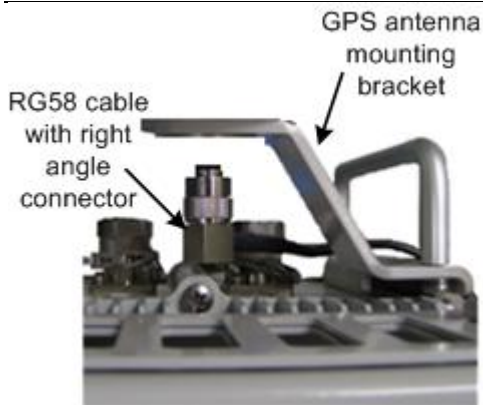


Figure 21 - GPS cable assembly prior to mounting

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

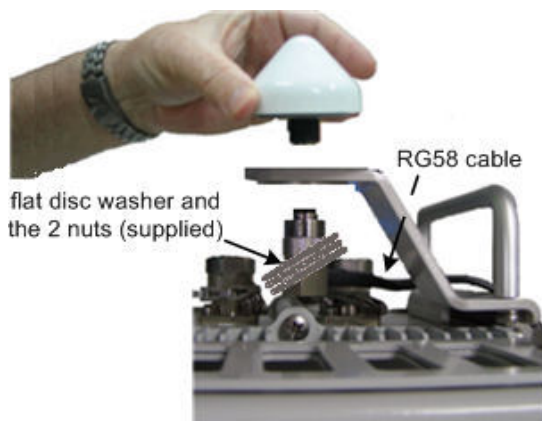


Figure 22 - Attach GPS antenna to RG58 cable

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:

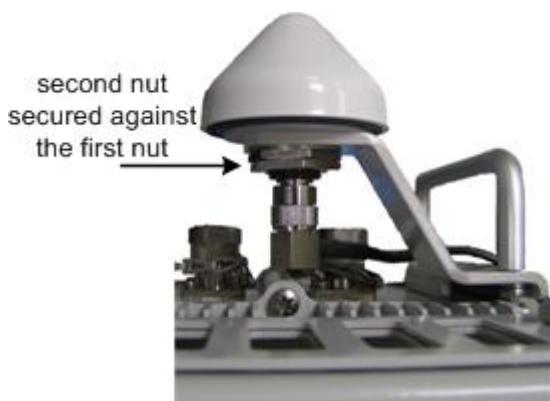


Figure 23 - GPS antenna assembled on bracket

5.6 Install Junction Box (Optional)



Note: Contact Airspan customer-service to determine whether junction box installation is required. Installation may be required, depending on the distance between the external power-supply and the BS, as well as the minimum voltage supplied by the power-supply.

The Junction box (optional) can be pole-mounted or wall-mounted.



Warning: Mount the junction box in an orientation such that the cable ports (located on the bottom) face downwards. This prevents rain water from settling on the ports, and thereby, avoiding damage.

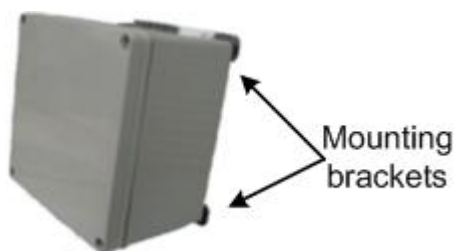


Figure 24 - Junction box with mounting brackets assembled

For either mounting method, the mounting bracket provides mounting holes (displayed below):

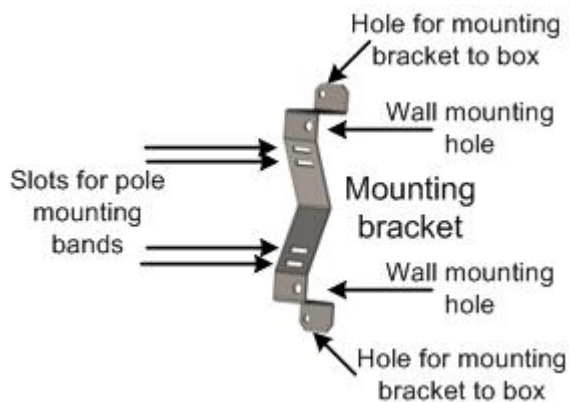


Figure 25 - mounting bracket (2 required)

5.6.1 Junction Box Installation

To install the junction box:

1. Prior to installation connect the 2 mounting brackets to the back of the junction box fastening to the provided holes. The wall mounting hole orientation should be towards the outer edges of the junction box.
2. Remove the junction box's cover, leaving the rubber gasket in place.
3. Prepare the cables for connection by performing the following:
 - a. Strip about 25.4 mm (1 inch) of the outer jacket of the cable to expose the wires.
 - b. Using a wire-stripping tool, expose about 6.3 mm (0.25 inch) of each of the wires by stripping the wires' insulation.

-
4. Determine which cable entry holes are to be used and remove the appropriate plug.

Cable Entry hole determination
Gland hole PG11 (M18) for cable terminating at MicroMAXe
Gland hole PG29 (M36) for cable 12AWG x6
Gland hole PG16 (M22) for cable 14AWG x2



Note: Save the rubber grommets from the plugs to be used on the weatherproof glands (connectors).

-
- Remove the nut on the weatherproof connector and slide the rubber grommet onto the threaded shaft.
 - Set the weatherproof connector into the hole and from inside the box, thread the included nut onto the shaft until tight.
 - Insert the exposed wires into the relevant screw-type terminal block (+ to + and – to –) and then secure them in place by tightening the screw of each terminal.
 - Fasten the Junction box onto the pole or wall as required within the required distance of the MacroMAXe enclosure.
 - Perform the same procedure (steps 3-7) with the cable terminating in the in the MacroMAXe enclosure.
 - Open the connector clamp collar and feed about 101.6 mm (4 inches) of cable from the MacroMAXe through it and into the box. Tighten the collar around the cable, forcing the seal to compress around the cable.
 - Replace the cover by using the four (4) screws, ensuring the gasket (for weatherproofing) is firmly in place on the rim of the cover.



Note: It is important to provide strain relief and drip loop for the cables. Create a drip loop and strain relief using cable tie, to tie cable to pole, as displayed in the figure below:



Figure 26 - MacroMAXe assembly with optional junction box

6 Connect and Manage Cables

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

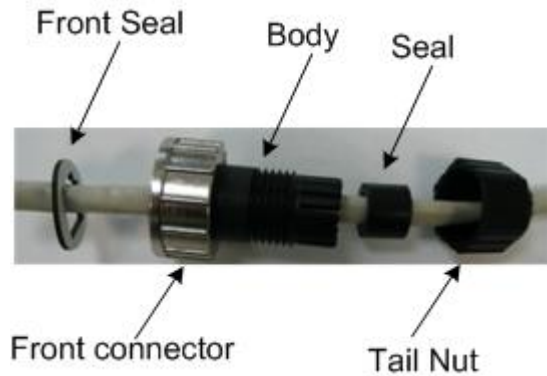


Figure 27 – Ethernet connector cable termination

6.1 Assemble Ethernet Connector

1. Pass the Cat 5 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 28 – Ethernet environmental connector assembly

7 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.**

7.1 Power Input - DC

Each unit is provided with a 3/10/30 meter 48 volt power cable terminated with a male connector at one end and a female connector at the other.

Connection	Color
Neutral (Cold)	Blue
Live (Hot)	Brown

Table 9 - DC Power input



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



Figure 29 – DC Power connector cable

8 Appendix A

8.1 Review Job Sheet

The *Job Sheet* should include the following information:

- **BS location and identity.**
- Whether the system is required to be locked to a GPS timing reference.
- **A BSID is required for each BS TRx.** This should be in a format xxxxxx:xxxxxx where x is a decimal digit.
- Network configuration information for the BS TRx.
 - **Traffic Port:** Not applicable.
 - **IP Address:** Should only be set if Management IP Mode is set to Static IP Address. See below for Management IP Mode parameter.
 - **Netmask:** Should only be set if Management IP Mode is set to Static IP Address. See below for Management IP Mode parameter.
 - **Default Gateway:** Should only be set if Management IP Mode is set to Static IP Address. See below for Management IP Mode parameter.
 - **Management VLAN:** Specified as either Untagged or Tagged
 - **Management VLAN Tag:** Should only be set if Management VLAN is set to Tagged
 - **Management IP Mode:** Specified as Static IP Address or Obtain IP Address via DHCP
 - **Ethernet Mode:** Specified as Auto-negotiate or Fixed
 - **Ethernet Rate:** Need only be configured if Ethernet Mode is set to Fixed, specified as 10M or 100M.
 - **Ethernet Duplex:** Need only be configured if Ethernet Mode is set to Fixed, specified as Full or Half.
- **SNMP configuration information.** This will allow events from the BS to arrive at the specified Netspan server. This will include the following information:
 - **Read Only Community:** This should be specified to the same value as in Netspan Discovery Parameters (found under Server on Netspan left hand panel).
 - **Read Write Community:** This should be specified to the same value as in Netspan Discovery Parameters (found under "Server" on Netspan left hand panel).
 - **SNMP Port Number:** This should be specified to the same value as in Netspan Discovery Parameters (found under "Server" on Netspan left hand panel).
 - **IP Address:** This specifies Netspan IP address (found under Server Global Configuration, which is under Server on Netspan left hand panel).
 - **Community:** Normally specified to the same value as for Read Only Community.
 - **Port Number:** Normally specified to a value of 9023.
- Whether the Primary Master or the Secondary Master manages the GPS module.
- **NTP configuration.** This specifies a list of NTP servers.

9 Appendix C – 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
FDD	Frequency Division Duplex
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



MacroMAXe Installation Guide



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



10 Appendix D – Installation Checklist

The Checklist below gives the high-level steps in the Workflow for this procedure. Detach or print this page to use as a job-aid for completing the actions this procedure requires.

Procedure	Actions	Outcome
1. Verify Prerequisites	Verify safety requirements Verify installation requirements	All requirements are in place for a successful commissioning of MacroMAXe.
2. Install MacroMAXe	Pole mount configuration Wall mount configuration Install MacroMAXe antennas	
3. Connect and manage cables	Assemble Ethernet connector <i>or</i> Disassemble Ethernet connector, <i>then</i> Assemble LTW Ethernet connector	
4. Set power system	Power input Power output	

Table 10 – Checklist for Procedure



11 Appendix E

11.1 Revision History

Revision	Originator	Date	Description
Draft 1	D. Cann	2-2009	Initial document
Draft B	M. Falik	3-2009	Additional content & template changes
Rev A	M. Falik	10-2009	Additional content
Rev B	M. Falik	10-2009	Corrected Graphics + Additional content
Rev C	M. Falik	12-2009	Added Junction box data
Rev D	M. Falik	12-2009	Additional content
Rev E	M. Falik	02-2010	Frequency ranges and latest support

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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