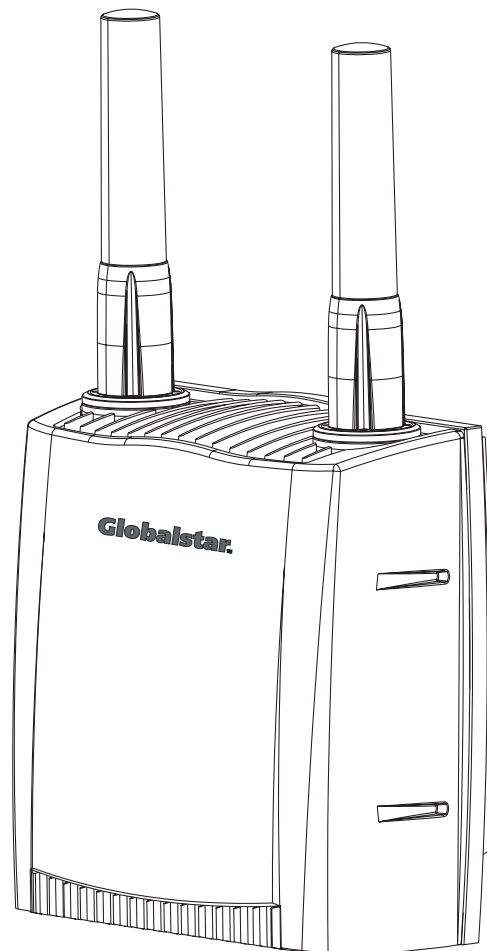




Fixed Access Unit (FAU) for Globalstar Systems



FAU200 SAT

Installation Handbook


REF. PART NUMBER FAU-200-GUIDE

Globalstar FAU-200 Package Contents

Thank you for purchasing the Globalstar FAU-200 fixed access unit. The FAU-200 enables an end user to make and receive telephone calls via the Globalstar satellite network.

Your FAU-200 package should contain the following items.

- 1 FAU Module complete with two 16 mm bolts
- 1 EF-I200 Installation Kit (Kit includes a power supply, AC power cord, 1 FAU power connector, and 1 FAU telephone connector)
- 1 50 Foot Power Cable
- 1 Telephone Interface (NID) Box
- 1 NTM201 2279 Mounting Kit
- 1 LZT 123 5327 User Documentation Package
- 1 TX Antenna and O Ring
- 1 RX Antenna and O Ring
- 2 Rear Sunshields
- 1 FAU-200-Guide Installation Handbook

 The product described in this manual conforms to the 98/13/EC Telecommunications Terminal Equipment (TTE) and Satellite Earth Station Equipment (SESE) Directive, the 89/336/EEC EMC Directive and the 73/23/EEC Low Voltage Directive.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

First Edition: April 2000

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Publication number: EN/LZT 123 5050 R2

SAFETY



DANGER:
EARTH LEAKAGE CURRENTS
Under no circumstances should the FAU be operated without a protective earthing conductor.



DANGER:
HAZARDOUS VOLTAGES
Hazardous voltages will be present within the FAU once power has been applied.



DANGER:
HAZARDOUS VOLTAGES
Avoid electrical contact with the telephone wires, hazardous voltages may be present.

Warnings



WARNING:
DANGER TO PERSONNEL
The FAU may fall down if it is incorrectly mounted on pole.



WARNING:
HOT COMPONENTS
The FAU case will become hot when working and care must be taken when handling a unit that has just been switched off.



WARNING:
DANGER TO PERSONNEL
Ensure the FAU is securely mounted before powering-up.

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Additional Cable Information and Typical Installation Details
Additional Specifications for Cables and Connectors
Typical Wall and Pole Mounting of the FAU

General

The FAU is a device to enable the end user to make and receive telephone calls via the Globalstar satellite network. This handbook describes how to plan the installation, fit the FAU and prepare it for use. Please read the safety information carefully. This issue covers the residential and PABX versions of the FAU only.

Definitions and Abbreviations

AC	Alternating Current
ACB	All Circuits Busy
ANSI	American National Standards Institute
AWG	American Wire Gauge
BTS	Base Transmitting Station
CHS	Circular Hollow Section
dB	Decibels
dB/K	Decibels per degree Kelvin
dBm	Decibel referred to 1 mW
DC	Direct Current
DTMF	Dual Tone Multi-Frequency
EIA	Electronic Industries Association
EIRP	Effective Isotropic Radiated Power
FAU	Fixed Access Unit for Globalstar network
GAI	Globalstar Air Interface
Hz	Hertz
IP	Ingress Protection
ITU	International Telecommunications Union
LEO	Low Earth Orbit
LNA	Low Noise Amplifier
Nm	Newton-metres
P(A)BX	Private (Automatic) Branch Exchange
PDI	Production & Development Interface
PIN	Personal Identity Number
PSTN	Public Switched Telephone Network
REN	Ringer Equivalence Number
RMS	Root Mean Square
SIM	Subscriber Identity Module
TIA	Telecommunications Industry Association
TTE	Telecommunications Terminal Equipment
WM2	A PC-based Windows software tool for testing and configuring the FAU

Product Description

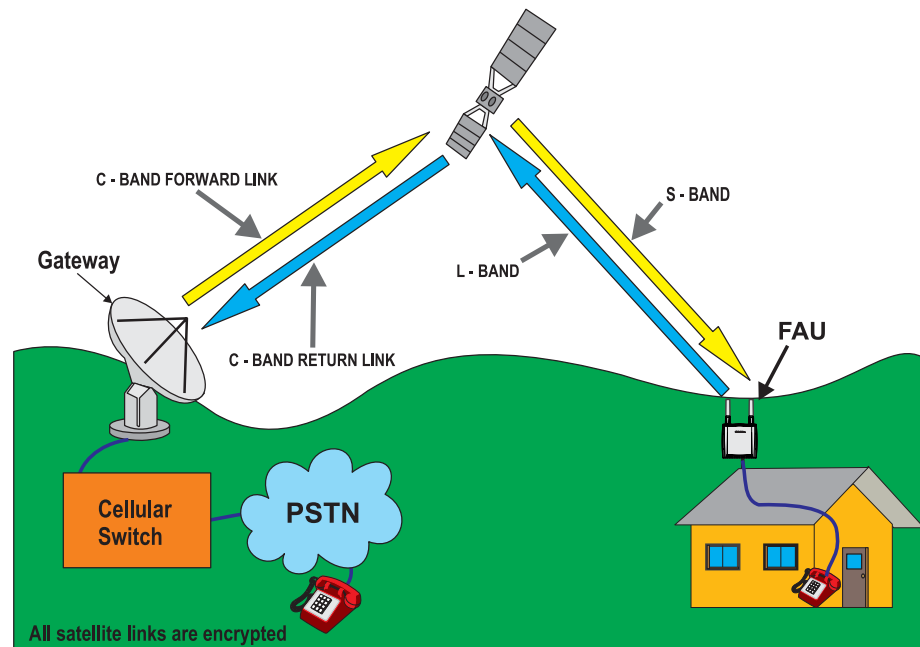
Globalstar System

Globalstar is a low earth orbit (LEO) satellite-based telecommunications network offering wireless telephone services worldwide. The Fixed Access Unit (FAU) provides an interface for the end-user to access the Globalstar satellite network.

The FAU communicates using the Globalstar Air Interface (GAI) via the satellite constellation to a number of groundstations or Gateways.

The gateway interconnects the Globalstar satellite network through a Cellular Switch directly into the local Public Switched Telephone Network (PSTN). A diagram of the Globalstar network is shown below.

The FAU is installed outdoors to provide an unobstructed view of the orbiting satellite constellation, and cabling is run from the unit to a conventional telephone socket mounted indoors, for easy connection of a telephone.



Typical Satellite Link

Fixed Access Unit (FAU)

The FAU comprises a single unit formed from a die-cast aluminium case enclosed on four sides by moulded polycarbonate sunshields. Access to the single circuit board contained within the aluminium case, is via the removable aluminium backplate. The plate is secured using tamper-proof fixings.

Twin antennas - transmit and receive - attach to the top of the case using captive screw fixings. The receive antenna incorporates a Low Noise Amplifier (LNA).

The mechanical design of the FAU is common to two applications and provides the end user with an interface for connecting a standard telephone:

- Residential FAU - allowing connection of a telephone.
- PABX FAU - allowing connection of a range of PABXs.

Pre-Installation

The following activities will need to be carried out, before installation and commissioning of the FAU at the subscriber's site:

- Pre-installation Planning.
- Preparatory Field Engineering Work.
- Preparation and configuration of the FAU at the Engineering Depot.

Pre-Installation Planning

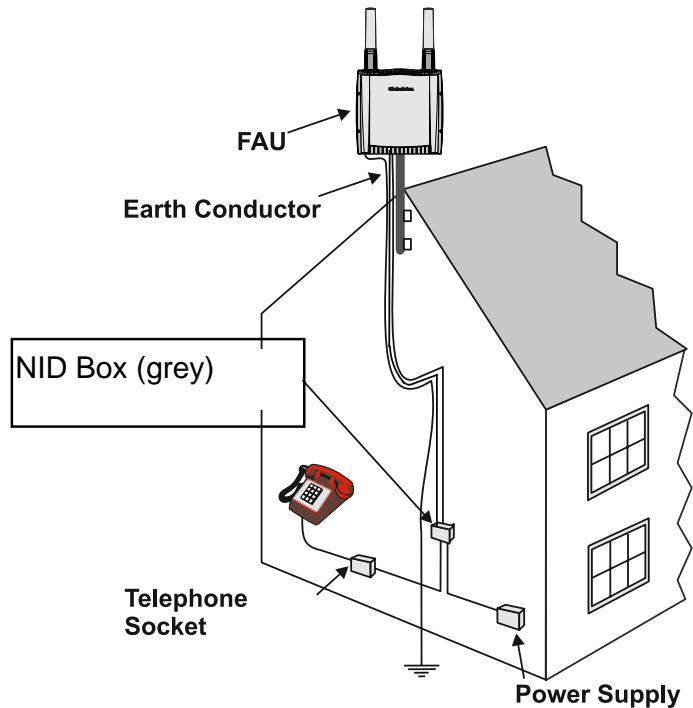
Pre-installation planning activities may include:

- Survey of subscriber location, address and mains voltage.
- Identify mounting location for FAU and type of pole/mast/wall fixing.
- Confirm position of the FAU is acceptable with customer/service provider.
- Identify position of possible interfering transmissions. This could be fixed service microwave transmissions, radar pulses or a cellular base station.
- Identify position for FAU safety earthing system.
- Identify location for 48 V DC power supply.
- Identify position of any NID/junction box and telephone socket.
- Determine and gain appropriate planning approval for the following cable routes:

FAU - subscribers premises.

FAU - power supply.

NOTE: For all maritime customer applications. If the FAU-200 is to be used in a maritime environment (i.e. on board a ship or vessel) where it will be subjected to salt water spray and waves, the FAU module must be mounted in a dry or sheltered area.

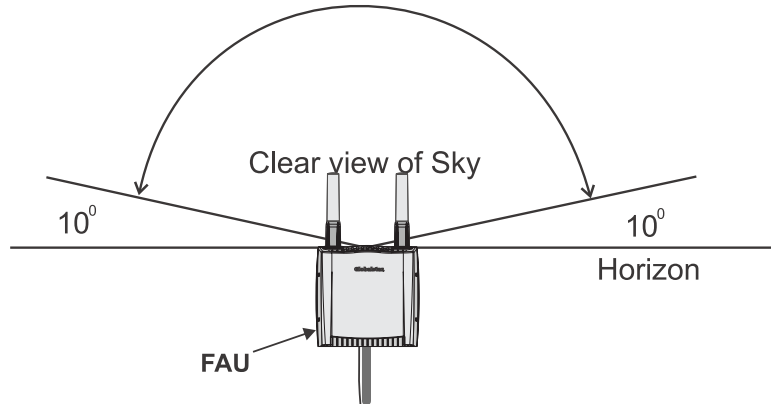


Typical FAU installation

Planning the Location for the FAU

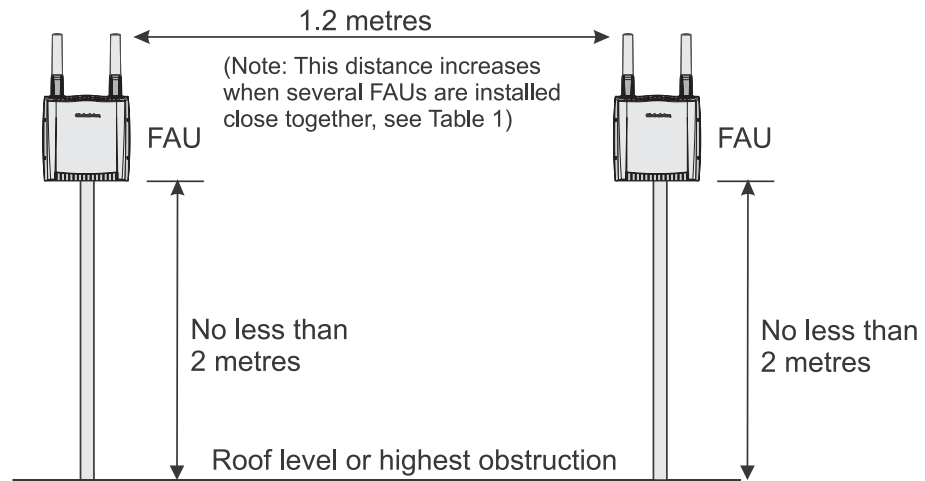
When deciding on the location for the FAU attention should be paid to the following planning recommendations:

- The FAU should be mounted to have a clear view of the sky, away from any interfering sources or obstructions, see Figure below.
- The installation must be planned to place all equipment, cables, etc., out of reach of the general public.



Clear View for Satellite Communication

- If the FAU is mounted on a building it must be at a minimum height of 2 metres above the top of buildings with a clear view of the sky.
- Where two or three FAUs are to be mounted in the same area, they should be separated by at least 1.2 metres. When there are more than three FAUs in the same area, refer to Table 1 for recommended separation distances.



FAU Spacing and Clearance

Table 1: FAU Separation Distances

Number of FAUs	Distance from Nearest FAU
2	1.2 m
3	1.2 m
4	1.5 m
5	2.1 m
6	2.1 m
7	2.7 m
8	3.4 m
9	3.9 m
10	4.5 m
11	5.1 m
12	6.0 m

Radio Interference Sources (for Guidance Only)

In general the FAU will be unaffected by radio transmissions operating in the vicinity of an installation. However, there are a small number of situations close to radio transmitters where care should be taken in assessing the suitability of the site for installing an FAU. If due care is not taken possible mis-operation of the FAU may result or, in extreme cases, even damage.

NOTE: The information given is for guidance only. Worst case conditions have been assumed throughout.

General Radar

An FAU may suffer **damage** if placed closer than:

- **250 m** of a general radar station operating near to the FAU receive band.
- **150 m** of a general radar station operating in the 5 GHz region.

Fixed Radio Services Operating in the FAU Receive Band

An FAU may be rendered **inoperable** if placed closer than:

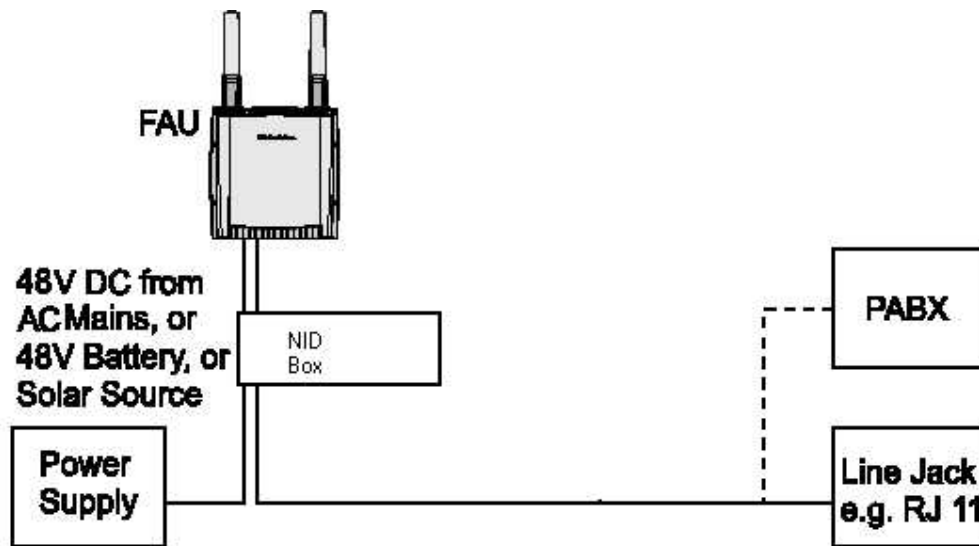
- **150 m** from the centre boresight of a digital point-to-point microwave radio link.
- **700 m** of a digital point-to-multipoint base station using an omni-directional antenna.

Cable Routing

The recommended cable types for use with the FAU allow the following maximum separations:

Cable between FAU and DC Power Supply

For all applications, the cable between the FAU and its DC power supply should be kept as short as possible, up to a maximum separation of 50 metres using standard power cable. See Technical Data - Cables, for recommended cable types. Refer to “Power Cable Lengths” on page 24 for relationship between cable gauge and maximum length.



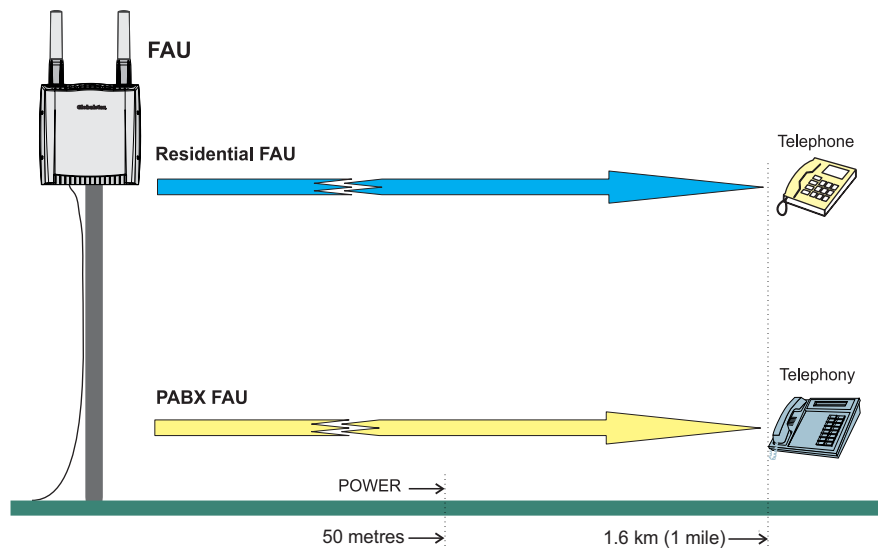
FAU Block Diagram

Cable between FAU and Telecommunication Terminal Apparatus

Residential applications <1.6 km (voice only).

PABX applications <1.6 km (voice only).

NOTE: This is the total length for all cabling to telephones including extensions.



FAU Applications

Lightning Protection

Consideration **MUST** be given to protecting all external power and telecommunication cabling against lightning especially where long lengths of overhead cable will be run from the FAU to terminal apparatus.

Where lightning protection is considered necessary all protective devices should be fitted in accordance with local regulations.

Switched DC Power Supply

The unit must incorporate a disconnection device to allow the unit to be isolated from the primary power source.

It is recommended that the DC power supply unit incorporates its own ON/OFF switch to allow the FAU to be powered ON and OFF remotely.

Pole Mounting

The FAU can be mounted on a standard pole, see Technical Data and Appendix.

The following maximum stub pole free lengths are supported subject to the local in-country regulations.

- 1.5 metres maximum for nominal 50 mm diameter stub pole.
- 3 metres maximum for nominal 100 mm diameter stub pole.

NOTE: Since the FAU should be mounted at least 2m above the roof level or highest obstruction (see “Planning the Location for the FAU” on page 4) the 50mm diameter stub pole should only be used as a “jockey pole”, i.e. fitted to a mast. See “Typical Wall and Pole Mounting of the FAU” on page 26 for an example.

Preparatory Field Engineering Work

The following checklist details some of the main engineering field activities, which may need to have been completed before installing the FAU:

- Erection of mast / pole.
- Installation of the NID box and line-jack socket(s) at the subscribers premises/PABX installation.
- Cabling of AC mains supply to DC Power Supply Unit, if applicable.
- Installation of DC Power Supply Unit and any stand-by power supply.
- Installation of telephony cabling from FAU to building.
- Installation of power supply cabling from FAU to DC power supply unit.
- Provision of earthing system for FAU.

Preparation and Configuration of the FAU

Preparation and configuration of the FAU at the installer’s depot is essential before field installation can take place.

The following checklist details the pre-requisite activities to be carried out for each FAU:

- Unpack the FAU and check all packaged contents, refer to check list enclosed in packaging.

Installation

Check the unit for transit damage and verify that the rear cover is secure. Cross check that the FAU identity number (IMEI number) on the base of the unit, is the one allocated to the subscriber.



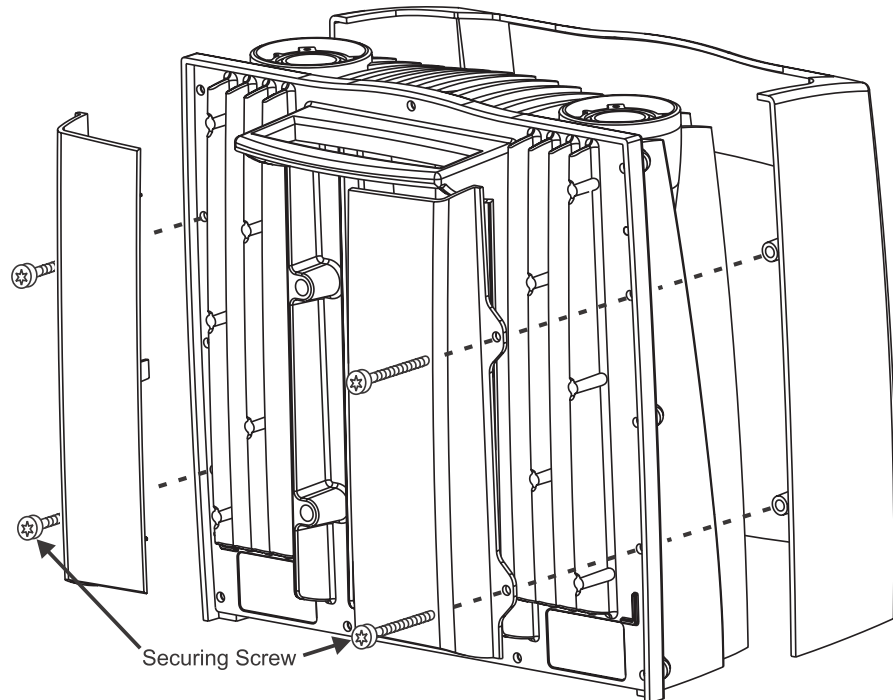
FAU Label

Assembling the FAU

Sun shields and antennas must be fitted to the FAU housing before fitting the unit to a pole.

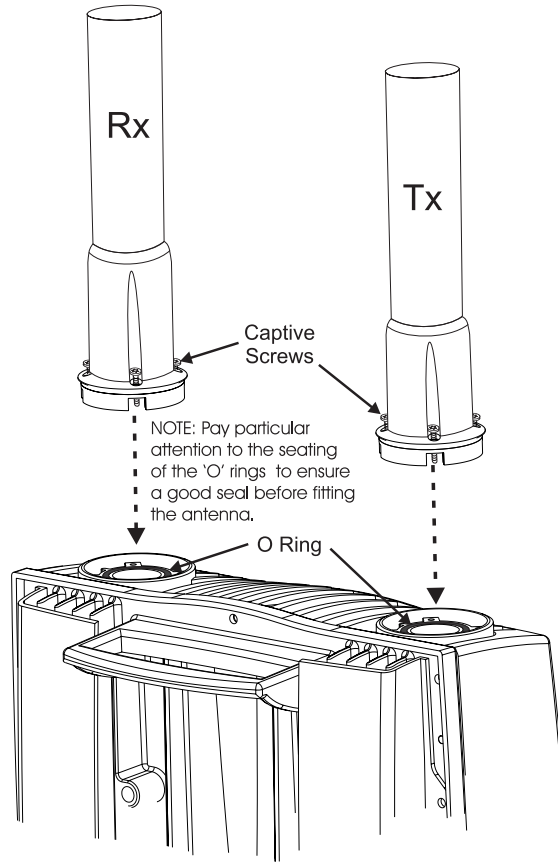
NOTE: Both front and rear sun shields must always be fitted.

1. Place the front sun shield in position on housing ensuring it locates correctly with screw holes.
2. Position the rear sun shields and insert four screws through rear sun shield and housing into front sun shield.
3. Tighten screws in turn to 0.8-1.0 Nm torque. Do not overtighten these screws or the sun shields could be damaged.



Fitting Sun Shields

4. Insert sealing 'O' rings into antenna sockets of main housing.
5. Place both antennas in position; they are keyed to ensure correct location of each antenna and mating of antenna connectors.
6. Secure the antennas using the captive screws and tighten to 0.8-1.0 Nm torque.



Fitting the Antenna

Fitting the FAU

The installer will first need to decide the appropriate method for installing the FAU, see Pre-Installation.



WARNING:

DANGER TO PERSONNEL

Do not install the FAU during a lightning storm.



WARNING:

HAZARDOUS VOLTAGES

Use caution when installing or modifying telephone lines as hazardous voltages may be present.

1. Where conditions allow, mount the FAU on a pre-installed stub pole or mast, by using the handle provided on the FAU. Typically, these situations will arise only where the top of the pole can be reached safely and easily. Connection of cables will then be possible after the FAU has been secured in position.

2. In situations where the top of the pole cannot be reached safely; FAU mounting may be better achieved by mounting the FAU to the stub pole, connecting all cables *and then* erecting and securing to the mast with the FAU in position.



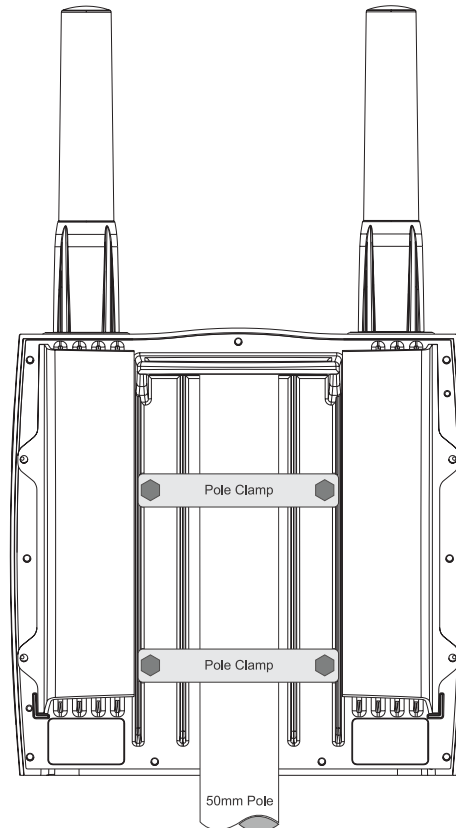
WARNING:
DANGER TO PERSONNEL
The FAU may fall down if it is incorrectly mounted on pole.

The following procedure may need to be adapted to suit the chosen method of installation:

1. Prepare the FAU for mounting at the top of the pole by loosely fitting the two pole-clamps on the back of the FAU. The screw length will depend on the diameter of the pole, e.g. a nominal 100 mm pole uses an 80 mm long screw, and a nominal 50 mm pole uses a 25 mm long screw.
2. Lift the FAU over the top of the pole passing the pole through both brackets until the top of the pole butts fully against the FAU handle/stop-plate, see below.
3. Secure the FAU to the pole by tightening the clamp bolts to 3 ± 0.5 Nm torque.



WARNING:
DANGER TO PERSONNEL
Ensure the FAU is securely mounted before powering-up.

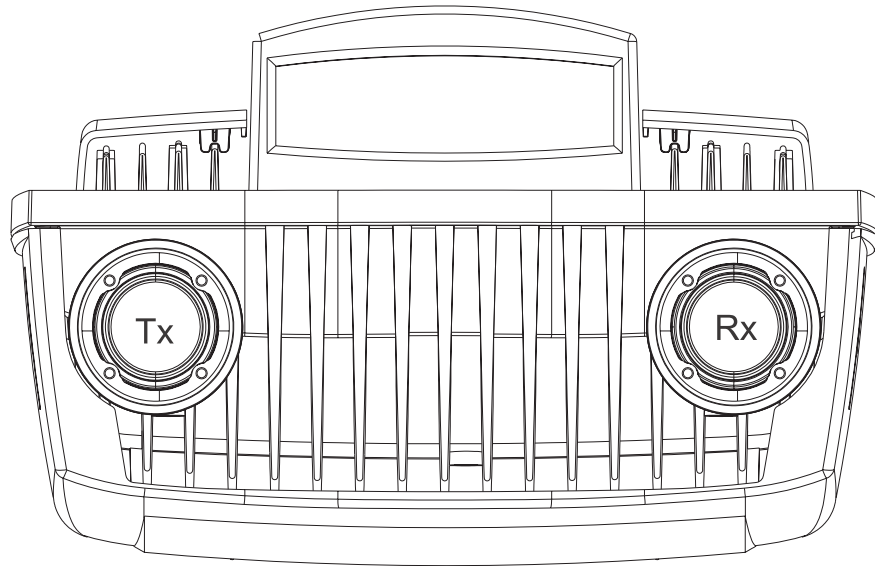


FAU Pole Mounting

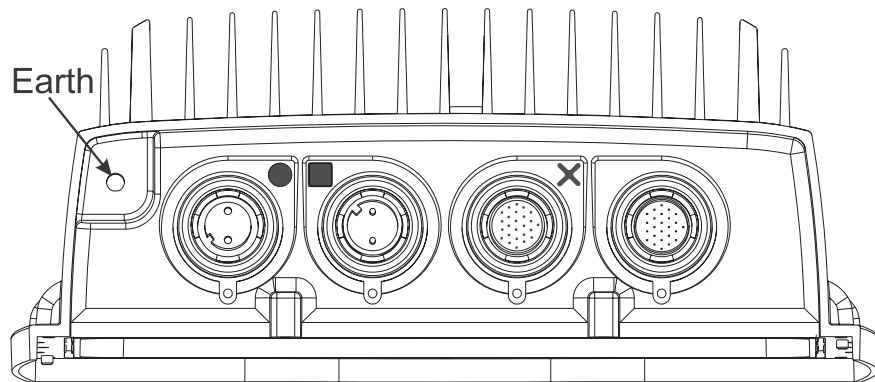
FAU Connections

Each FAU has seven external Connections:

- Antenna Rx.
- Antenna Tx.
- Bolt - Earthing cable.
- Connector - 2-wire telephony cable.
- Connector - 2-wire DC power feed.
- Connector - PDI cable for configuration and commissioning.



TOP (with Sun Shields)



BOTTOM (without Sun Shields)

Symbols used: ● = Power ■ = Tel X = PDI

FAU Connections

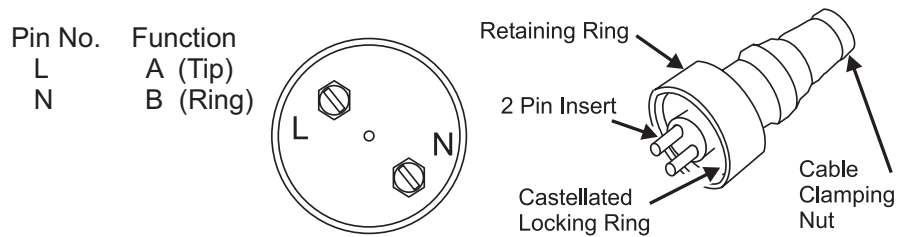
Table 2: Cable Connectors
Manufacturer: Bulgin Type: Buccaneer sealed

Connector	No of ways required	Bulk head Connector	Cable Connector - Flex Mounting (not supplied)
PDI	25-way	Panel Plug - fitted with 25-way crimp pin insert.	Socket - fitted with 25-way crimp pin insert.
Power	2-way	Panel Plug - fitted with 2-way screw type terminal.	Socket - fitted with 2-way screw type terminal.
Telephone Line (A & B lines)	2-way	Panel Socket - fitted with 2-way screw type terminal.	Plug - fitted with 2-way screw type terminal.

Telephone (■)

The drawing below shows the pin connections of the socket.

1. Unscrew the castellated locking ring on connector to remove the 2-pin insert.
(You can use the dust cover as a wrench to unscrew the locking ring.)
2. Slacken the cable-clamping nut and insert the cable into the connector.
3. Connect the appropriate wires to pins L and N of the 2-pin insert, and then tighten the securing screws.
4. Replace the insert and then tighten the castellated locking ring and cable clamp.
5. Plug into the FAU and tighten the retaining ring.



Telephone Line Connections

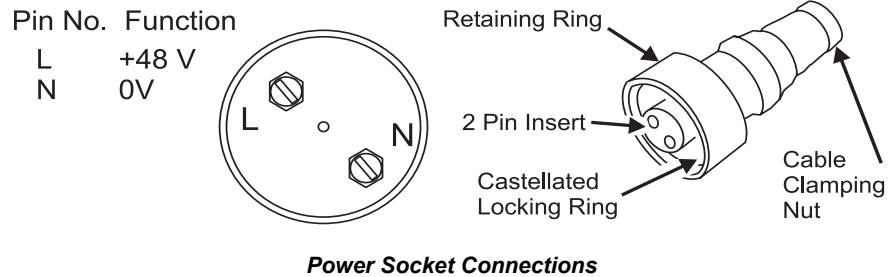
The telephone cable should be supported at regular intervals along its route according to local regulations. Typically, a fixing every 300 mm or so is common. P-Clips or All Weather Ty-wraps are generally used for this but whatever supports are chosen must be suitable for the cable diameter and chosen to suit the surface or surfaces at that particular site. Waterproof sealant should be used to seal and weather-proof the point of entry of the cable into the building following local installation standards. Ensure the installation is aesthetically pleasing.

Power (●)

The drawing below shows the pin connections of the power socket. Refer to “Power Cable Lengths” on page 24 for the relationship between the cable gauge and the maximum length.

1. Unscrew the castellated locking ring on connector to remove the 2-pin insert.
(You can use the dust cover as a wrench to unscrew the locking ring.)
2. Slacken the the cable-clamping nut and insert the cable into the connector.
3. Connect the appropriate wires to sockets L and N and tighten the securing screws.

4. Replace the insert and then tighten the castellated locking ring and cable clamp.
 5. Plug into the FAU and tighten the retaining ring.
- The power source should provide +48 volts DC with respect to the FAU case. The power cable should be supported at regular intervals along its route according to local regulations. Waterproof sealant should be used to seal and weatherproof the point of entry of the cable into the building following local installation standards.



PDI (✖)

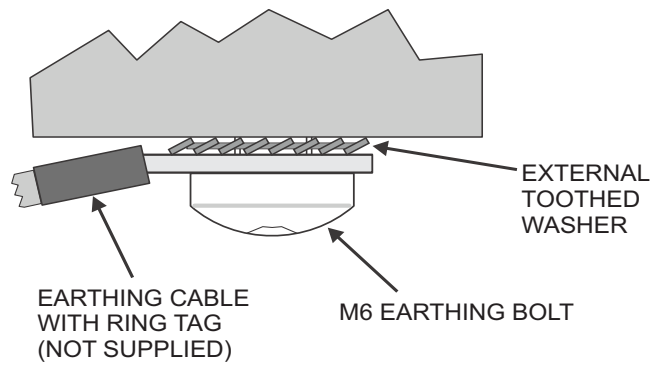
The PDI cable enters a socket at the base of the FAU. When the socket is not in use, ensure that the dust cap is securely fitted to protect the FAU from dust and moisture ingress.

NOTE: There is no supplementary surge protection on the PDI port in addition to that normally provided on an RS232 port.

SAFETY - Earth/Ground

DANGER:
EARTH LEAKAGE CURRENTS
 Under no circumstances shall the FAU be operated without a protective copper earthing conductor.

The FAU enclosure must be connected to a single protective earth. A separate copper earth cable must be installed from the FAU to an earth / ground, in accordance with local regulations.



Ensure the earthing conductor is attached to the housing as shown above using toothed washer to provide good contact.

Install the junction box



Service provider access closed

Note

The outside screw on the junction box cover disables the locking mechanism. If the junction box is not locked, you can open the junction box by pressing the tab located on the opposite side and lift the cover.

Warning

Run indoor wiring from the junction box directly into the structure in the shortest distance practical. Wires from the junction box to the building interior should enter the building almost immediately after exiting the junction box.

Warning

Do not run RAU or junction box ground cables inside a building. The junction box is the interface between the outside cables and the inside cables. The junction box must be located on the outside of the building immediately at the point where the indoor cables reach the outside of the building.

When properly grounded, the junction box minimizes damage to the telephone and lowers the risk of injury to the user in the event the RAU or its cabling are struck by lightning in an electrical storm.

The junction box may not adequately protect the user if the RAU or its cabling are struck by lightning while the phone is in use.

Warning

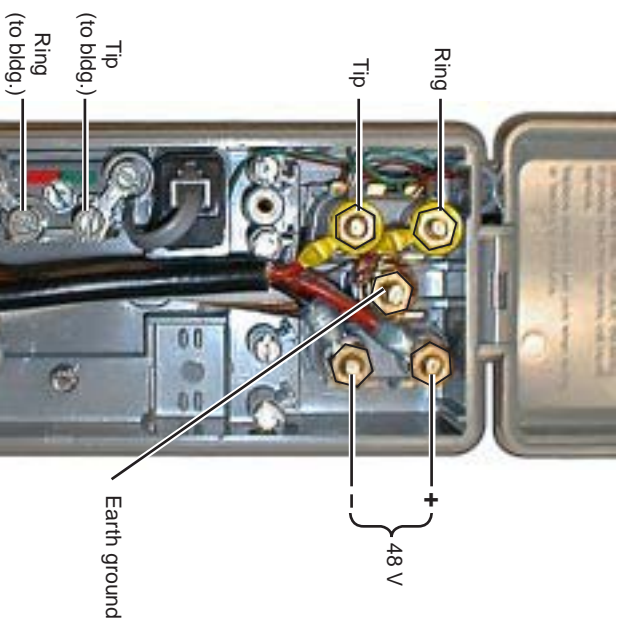
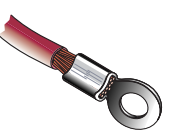
Even though the FSP includes grounding and circuitry to protect equipment, facilities, and personnel from nearby lightning, lightning is a highly unpredictable and dangerous phenomenon. It is impossible to completely protect equipment and personnel from lightning.

Install the junction box

1. The junction box is the interface between the outside and the inside cabling. The junction box must be located on the outside of the building immediately at the point where the indoor cables reach the outside of the building.
2. With appropriate screws (not included), mount the junction box upright on the outside of the building so that the cables exit from the bottom of the junction box. This position ensures that the junction box components are not harmed by weather, especially rain. (See Table 9 on page 20 for recommended materials for mounting on a wall.)

Note

CRIMP RINGS. Use crimp rings to connect wires to a terminal or other screw. Crimp rings are not required, but can be used to keep the wires under control while making a good connection.

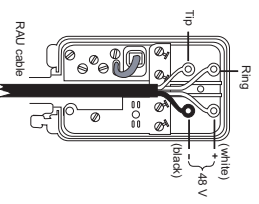


Service provider access open

- To use crimp rings:
- Strip 1.27 cm (0.5 inch) of covering from the wires.
 - Slide crimp ring over wire ends, ensuring you cover the bare wires. Note that the crimp ring can not be removed easily after crimping.
 - Using a crimping tool, crimp the ring over the wires so it forms a unit with the wires.
 - Connect the wires to screw posts using the rounded metal end. (See Figure 20.)

Install the junction box

3. Connect the RAU cable to the junction box as shown and Table 11.



RAU cable, wire colors may vary

Table 11. Wiring from RAU to junction box

Wire	Signal
Black	+V return
White	+V source
	Ring
	Tip

4. Secure all outdoor cables to stationary objects using cable ties (not included) to ensure that the cables are secured to the building and cannot be damaged by wind, animals, or vandals.
5. Close the cover to protect the contents from weather and vandals.

Step 8. Run indoor wiring for the telephone and data



Note

If there is no wiring in the building, the installer needs to prepare the building for telephone service. Interior wiring should meet local standards.

Except for connecting to the junction box, the wiring instructions given here are all accomplished inside the building. Do not run wires designed for inside use on the outside of the building.

Connect interior wiring to jacks and telephones

1. Run all inside wiring before connecting the wires to the junction box. Wire telephones using standard telco wire.
2. Connect telco wire to interior jacks as described in Table 12.

Table 12. Wiring from interior to junction box

Signal	Color	RJ-11 Jack (6 pin)
Tip	Green	Pin 4
Ring	Red	Pin 3

Connect interior wiring to the junction box

1. Run standard telco wire (not provided) from the interior rooms where the telephones will be located to the junction box.



Note

For best voice quality, avoid running the telephone wiring in close proximity to power lines or appliances.

2. After all wiring is complete, connect the telephones to the interior wired RJ-11 jacks.
3. With the power to the RAU off, connect the short phone cable inside the junction box to the RJ-11 receptacle. (See Figure 23.)

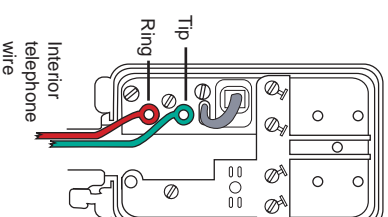


Figure 22. Indoor connection

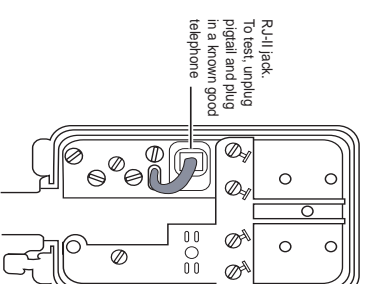


Figure 23. Jack

Commissioning

The following instructions enable the installation engineer to ensure the system is working correctly before leaving the installation.

After checking that the installation is complete, correct and that all earth connections are good the system must be tested.

Power-Up



DANGER:
HAZARDOUS VOLTAGES

Hazardous voltages will be present within the FAU once power has been applied.



DANGER:
HAZARDOUS VOLTAGES

Avoid electrical contact with the telephone wires, hazardous voltages may be present.

Switch on the DC power supply to power up the FAU and wait one minute for system registration.

If the ambient temperature is between -15°C and -30°C allow the unit approximately 10 minutes to warm up and switch on. The actual time taken depends upon the temperature and the exact voltage to the FAU; the higher the voltage, the lower the time required. (10 minutes is the expected warm-up time at -30°C with a nominal voltage of 48V.) If you attempt to make a test call before the unit has warmed up, no tone will be heard.

Making a test call

- Lift the telephone handset.
- The Dial Tone should be heard. If you hear the ACB tone, replace the handset and retry after 1 minute. If you still get the ACB tone after 3 attempts, switch off the FAU and repeat the power-up sequence. If the ACB tone persists, see “Fault Finding” on page 21, and follow the instructions in the flowchart.
- Dial the test call telephone number and finish with the ‘#’ key. If the Equipment Engaged (Busy) tone is heard, replace the handset and try again later.
- When the call is answered, talk for a short period to ensure you can hear and be heard. Press down a button on the telephone keypad. Ensure that the called party hears a clear tone. Ask them to press a button so you can check for a clear tone as well.
- Arrange for the called party to dial the FAU to test incoming calls.
- Hang-up to terminate the call.

Receiving an Incoming Test Call

When the telephone rings, wait for about 3 seconds before picking up the phone. This confirms the ringing circuits of the FAU are OK. Talk for a short period, ensure that you can hear, and can be heard, then hang-up.

Reset Functions

Auto Reset

The FAU will reset itself after there are 6 consecutive call attempts without satellite contact in a 15 minute period.

Hook Flash

The FAU reset itself after 6 consecutive breaks are made on the hook switch of the telephone in a 15 minute period.

NOTE:

Once an Auto Reset or Hook Flash Reset has occurred, both features are then unavailable for a period of 15 minutes. This is necessary to avoid accidental operation of the reset and to give the FAU sufficient time to re-register in extreme situations.

Power Reset

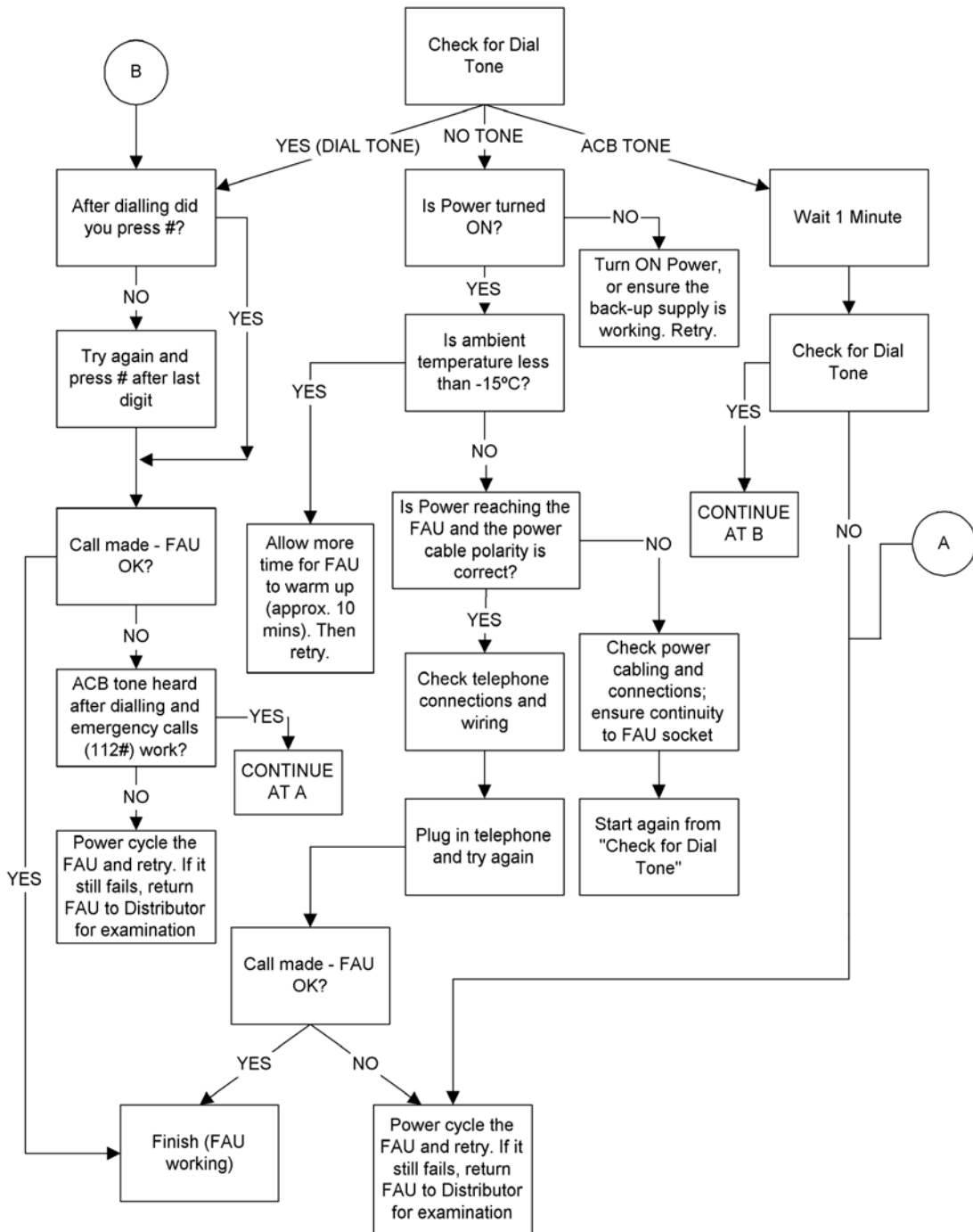
Turning the power to the FAU off and on again will cause a reset.

A power reset may be completed at any time.

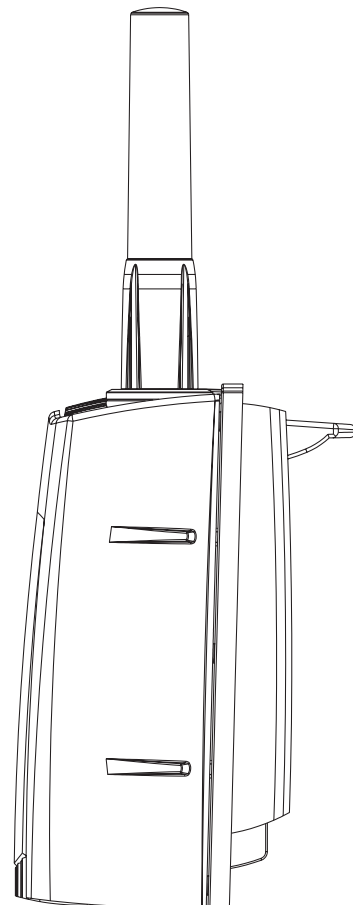
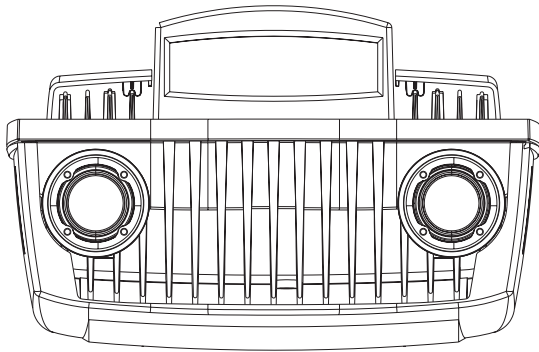
Fault Finding

The following chart will help in finding simple faults when making a test call. Any other faults should be reported to the service provider and the unit returned for internal checking.

Fault Finding Chart



Technical Data - FAU



FAU Outline Drawing

Physical

Colour	Light grey.
Dimensions	
Including antennas	W 300 x D 175 x H 525 mm.
Excluding antennas	W 300 x D 175 x H 300 mm.
Weight	7.3 kg.
Degree of ingress protection	EN 60529 IP55.

Power requirements

Supply voltage	+48 V DC nominal, +44 to +54 V DC.
Supply ripple	200 mVrms maximum.
Input current	1.0 A maximum.
Power consumption	50 W maximum.

Environmental

Storage temperature	-30 to +70° C.
Transportation temperature	-30 to +70° C.
Operating temperature	-30 to +60° C with 1120W/m ² solar radiation.
Relative humidity	Up to 90%.
Altitude	Sea level to 5000 m.

Interfaces

Telephone port	Analogue subscriber line. UK standard, 600 ohms (resistive). (other country standards are available). DTMF ITU-T Q.23. Supports terminal equipment up to REN=3. Loop calling unguarded clearing. Line reversal. Clear backward.
Data port	Not currently supported.
PDI port	Connector for configuration and commissioning tool RS232 levels.

Air interface

Standards	Globalstar Air Interface (GAI).
Transmit frequency	1610.0 to 1626.5MHz.
Receive frequency	2483.5 to 2500.0MHz.
Transmit power	+37dBm EIRP maximum.
Receiver G/T ratio	-24.4 dB/K minimum -80 to +80 degrees. -23.5 dB/K minimum -75 to +75 degrees.

Installation

On stub pole	With mounting kit supplied for pole diameters 47.8 - 48.8 mm or 100.6 - 102.6 mm.
Cable connectors	Bulgin 'Buccaneer' Flexmount range (not supplied).
Power	Socket - 2-way screw type terminal.
Telephone	Plug - 2-way screw type terminal.
PDI	Socket - 25-way crimp or solder socket.

For more details on cable connectors, see "Bulgin Buccaneer Flexmount Connectors - Summary" on page 24.

Standards

Safety	
European Union	EN 60215, EN 60950.
EMC	
European Union	EN 300 733, EN 300 831.
US	FCC CFR 47 Part 15B.
Environmental	ETS 300 019 Classes 1.2, 2.3 and 4.1 with exceptions.

Technical Data - Cables

NOTE: All cables should meet local regulations in the country of installation. This section gives recommended values.

Cable between FAU and PSU

Number of wires	2 conductor.
Length	50 M, 165' maximum.
Wire type	Solid or stranded.
Wire diameter	20 AWG or equivalent for up to 50 metres length.
Outer cable diameter	6.0 mm minimum, 8.1 mm maximum.
Insulation material	PVC or PE.

Insulation between wires	must withstand 750 Vrms during 1 minute.
Temperature	-40 to +80° C (where local conditions allow a lower specification cable may be selected).
Working voltage	100 Vrms.

Cable between FAU and cross-connect

Number of wires	2 core twisted pair.
Length	1609 M, 5280' maximum. (total length of all cabling to telephones including extensions).
Wire type	Solid or stranded.
Wire diameter	0.4 mm minimum (26 AWG).
Outer cable diameter	5.5 mm nominal.
Insulation material	PVC or PE.
Insulation between wires	Must withstand 750 Vrms during 1 minute.
Temperature	-40 to +80° C (where local conditions allow a lower specification cable may be selected).
Working voltage	100 Vrms.

CAUTION: To reduce the risk of fire use only 26 AWG or larger telecommunication line cord.

Protective Earth Cable (typical)

Wire type	Stranded.
Wire diameter	12 AWG Copper.
Colour	Green or yellow.

Additional Information

RF (Radio Frequency) Safety

The FAU200 SAT has been tested in accordance with RF safety guidelines on human exposure to RF fields. When installed using the procedures described in this Handbook the FAU200 SAT produces RF exposures well below international safety limits and conforms to the recommendations of the ICNIRP (International Commission on Non-Ionising Radiation Protection) and to international exposure standards, such as:

- CENELEC European Pre-standard ENV50166-2.
- US standard ANSI/IEEE C95.1-1992.

Maintenance work on the FAU200 SAT antenna during operation will not generate RF exposure levels exceeding the safety limits.

Patents

This product is manufactured under licence to one or more of the patents of Qualcomm Incorporated, other patents pending.

Table 3: Patents

4,901,307	5,416,797	5,566,357	5,627,857
5,056,109	5,426,392	5,568,483	5,629,955
5,099,204	5,442,627	5,572,172	5,629,975
5,101,501	5,452,473	5,574,773	5,633,881
5,103,459	5,461,639	5,576,662	5,638,412
5,107,225	5,469,115	5,577,022	5,640,414
5,109,390	5,475,870	5,577,025	5,642,398
5,228,054	5,479,475	5,581,575	5,644,591
5,257,283	5,485,486	5,588,043	5,644,596
5,265,119	5,487,175	5,590,069	5,646,991
5,267,261	5,490,165	5,590,406	5,652,599
5,267,262	5,497,395	5,590,408	5,654,979
5,283,536	5,499,280	5,592,481	5,655,220
5,289,527	5,504,773	5,592,548	5,657,420
5,307,405	5,506,865	5,594,718	5,666,122
5,309,474	5,509,015	5,596,570	5,673,259
5,339,046	5,511,067	5,600,754	5,675,644
5,341,456	5,511,073	5,602,833	5,687,229
5,373,259	5,528,593	5,603,096	5,689,557
5,383,219	5,544,196	5,604,730	5,691,974
5,392,287	5,546,459	5,617,060	5,692,006
5,396,516	5,561,618	5,621,784	
5,408,697	5,566,000	5,621,853	
5,414,796	5,566,206	5,625,876	

Limitations of Use

This product cannot be used for data messaging and position determination services over the Globalstar system servicing fleets of motor vehicles, rail cars and/or vessels in the transportation industry, private fleets (i.e. fleets of motor vehicles, rail cars and/or vessels which a person or entity utilises to provide repair, installation or service to its customers) and any systems which provide data communications, monitoring and control between a remote fixed site and a central point.

APPENDIX

Additional Cable Information and Typical Installation Details

This appendix gives the following information:

- Additional specifications for cables and connectors, including part numbers and pin-outs where appropriate.
- Some drawings showing typical wall and pole mounting of the FAU using a stub pole.

The diagrams given in this appendix are listed below:

- Bulgin Buccaneer Flexmount Connectors - Summary.
- Power Cable Lengths.

- Typical Wall Mounting of FAU on Stub Pole.
- Typical Pole Mounting of FAU using a Jockey Pole.
- Typical Jockey Pole Mounting: Detail.

Additional Specifications for Cables and Connectors

Bulgin Buccaneer Flexmount Connectors - Summary

Cable Connector Type		Bulgin	
		-20°C to +70 °C Operation	-45°C to +70°C Operation
Power Connector	2-way socket	PX0736/S	QX3164
Telephone Connector	2-way plug	PX0736/P	QX3163

When buying from Bulgin, connectors may be bought with different glands to accept cables of various outside diameters. The glands may also be purchased separately.

Cable Acceptance		Bulgin Part Number
Bulgin Part Number	Cable Outside Diameter	To Order Glands Separately
As fitted, for 2-way connectors	∅ 6 - 8mm	12023 (Black)
/04	∅ 3.5 - 5mm	12023/5 (Grey)
/05	∅ 5 - 7mm	12023/1 (White)
/07 (as fitted for 25-way connector)	∅ 7 - 9mm	12023/2 (Yellow)
For example, to order an FAU Power Connector fitted with a White ∅5-7mm gland, order part PX0736/S/05 (for -20°C operation) or QX3164/05 (for -45°C operation)		

Part Numbers correct at time of printing.

Please note that minimum order quantities may apply to Bulgin connectors and accessories, particularly to QX part numbers.

Power Cable Lengths

The table below details the relationship between cable gauge and maximum possible length in metres. The table has been prepared using the following assumptions.

- The minimum voltage at the FAU terminals is 44V.
- The power source has a 48V output or greater.
- The maximum permissible voltage drop is 4V at a maximum current of 0.8A.
- The maximum loop resistance of the power cable is 5Ω.
- A 20% tolerance allowed for variation in temperature.

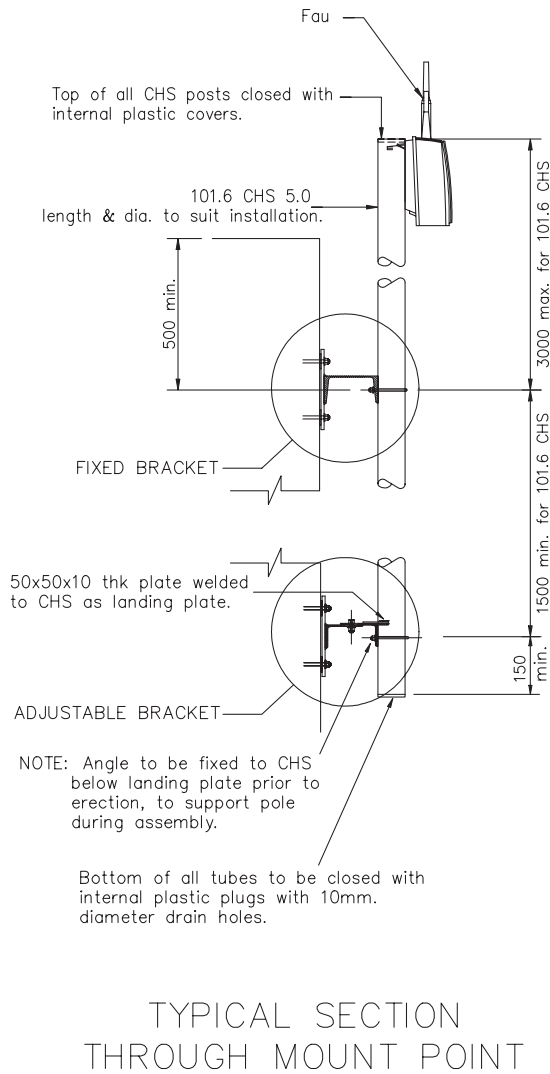
AWG	Copper Resistivity Ωm ⁻¹	Maximum Cable Length in Metres									
		5	10	15	20	25	30	35	40	45	50
18	0.0209	*	*	*	*	*	*	*	*	*	*
20	0.0333	*	*	*	*	*	*	*	*	*	*
22	0.0530	*	*	*	*	*	*	*			
24	0.0842	*	*	*	*						
26	0.1339	*	*								
28	0.2129	*									

This table shows the acceptable cable lengths (*) against wire gauge at 25°C.

Typical Wall and Pole Mounting of the FAU

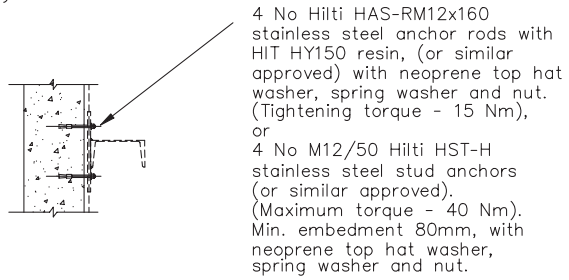
Typical Wall Mounting of FAU on Stub Pole

To assist in the installation of the FAU200 SAT in various locations, the following pages give typical installation details. These include mounting on the end wall of a building or on top of a pole. In all cases ensure the FAU has a clear view of the sky.

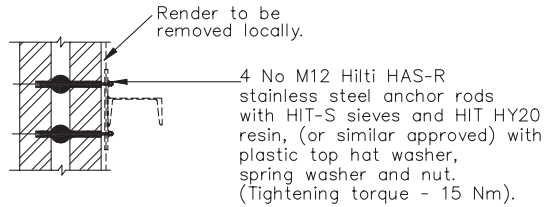


NOTES.

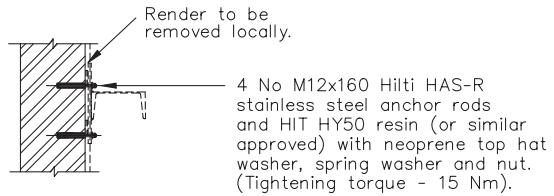
1. Do not scale.
2. All dimensions are in millimetres unless noted otherwise.
3. Minimum fillet welds to be 6mm. unless noted otherwise, except sealing welds.
4. All steelwork to be galvanised.
5. All steelwork to be grade S275 (FE430, grade 43) to BSEN 10025.
6. Drawing relates to essential design criteria and not specific site design requirements. Stability and suitability of substrate to be determined to suit each installation by others.



ANCHORAGE DETAIL FOR CONCRETE WALL



ANCHORAGE DETAIL FOR CAVITY WALL



ANCHORAGE DETAIL FOR BRICK WALL

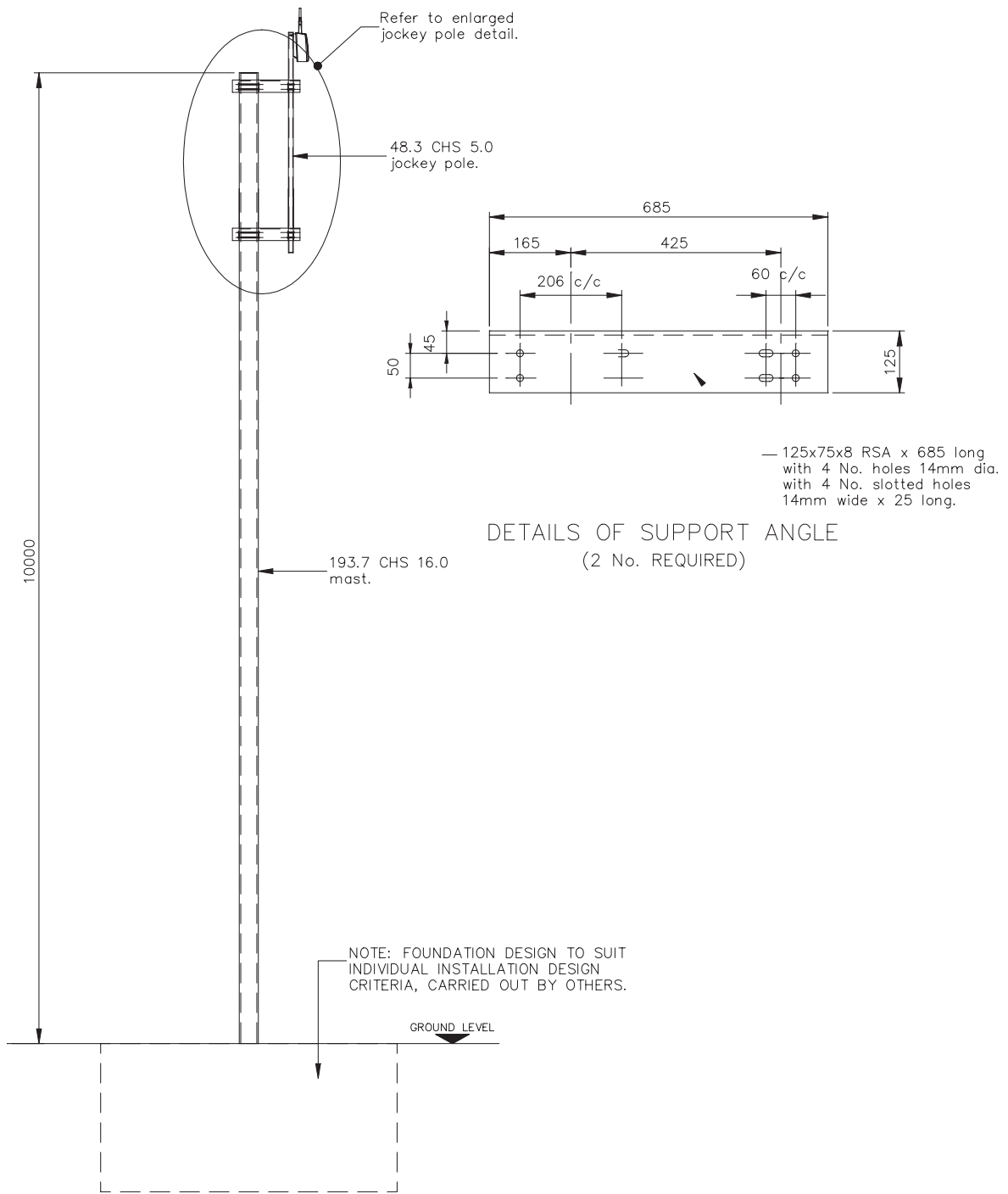
NOTE

Tightening torque for M12 U-Bolts to be 40 Nm

NOTATION

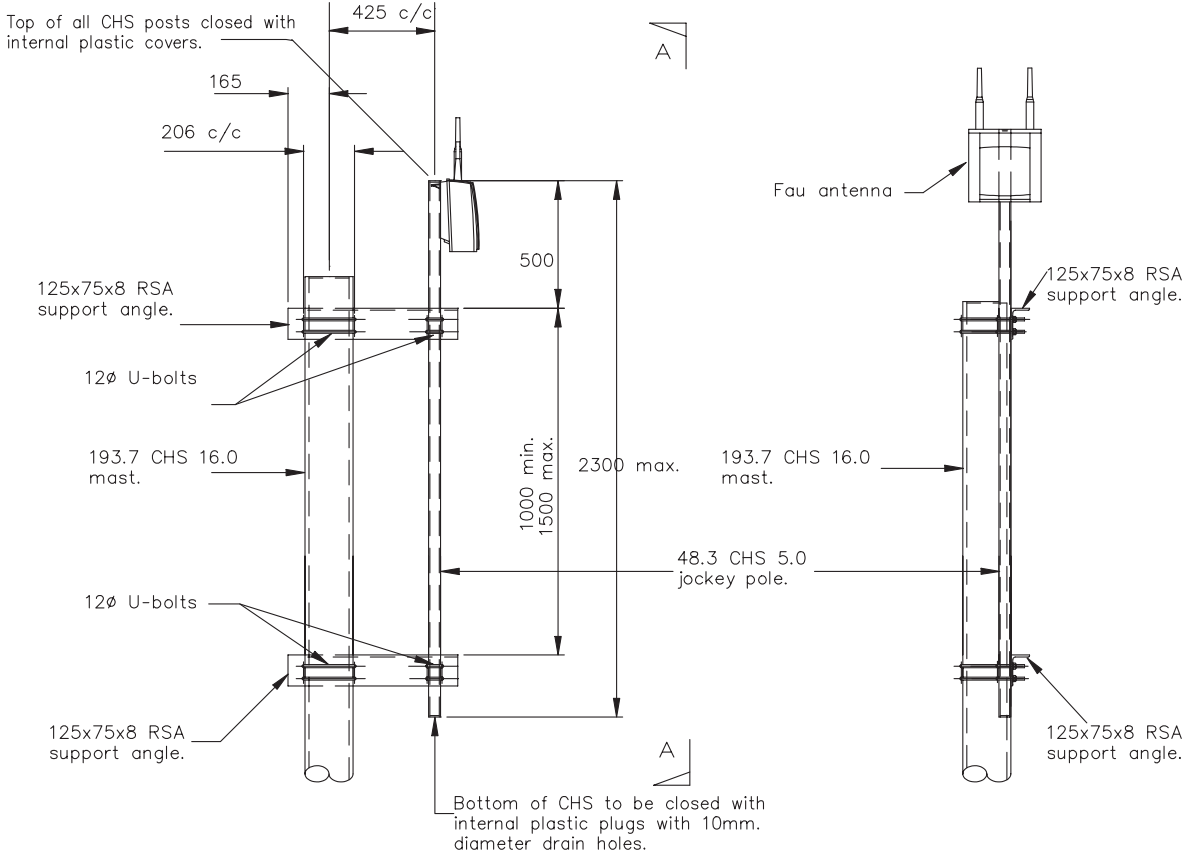
- RSA - ROLLED STEEL ANGLE
- RSC - ROLLED STEEL CHANNEL
- CHS - CIRCULAR HOLLOW SECTION
- 6 PFW - 6mm FULL PROFILE FILLET WELD

Typical Pole Mounting of FAU using a Jockey Pole



TYPICAL ELEVATION ON CHS MAST

Typical Jockey Pole Mounting: Detail



DETAILS OF JOCKEY POLE SUPPORT FOR EQUIPMENT

NOTES.

1. Do not scale.
2. All dimensions are in millimetres unless noted otherwise.
3. Minimum fillet welds to be 6mm. unless noted otherwise, except sealing welds.
4. All steelwork to be galvanised.
5. All steelwork to be grade S275 (FE430, grade 43) to BSEN 10025.
6. All M12 bolts to have a tightening torque of 40 Nm.

NOTATION

- RSA - ROLLED STEEL ANGLE
 RSC - ROLLED STEEL CHANNEL
 CHS - CIRCULAR HOLLOW SECTION
 6 PFW - 6mm FULL PROFILE FILLET WELD



FAU200 SAT Installation Handbook