Step 9 DC Power Connection

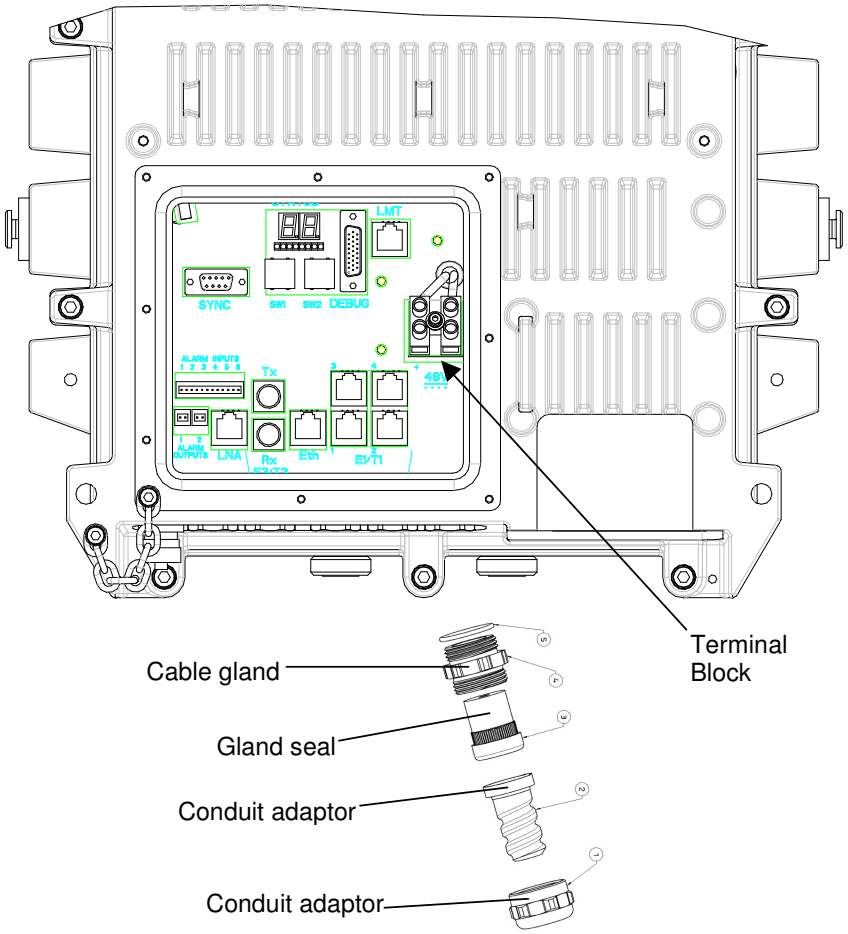
The power supply input must be a nominal -48Vdc input, with maximum 5amps.

The connection of the mains to DC supply is via screw terminals in the mains connection block refer to the figure below. Removal of the protective safety cover (3 screws) is required to gain access to the power terminals.

Below is the sequence to be followed for mains connection.

- Cable preparation - Specification: terminal blocks maximum cable size 8AWG (Ø3.5mm or 8.3mm^2)
- maximum size of outer diameter 7mm for overall screen of 2 core cable
- Remove mains protective cover (3 screws) – see figure above
- Remove blanking plug from right most position – see figure below
- Feed cable thru cable gland nut, seal and cable gland
- Insert cable into terminal block
- Secure cable gland in base of Node B and tighen gland seal nut
- Replace protective cover (3 screws)

Figure 6-14 : Power Connections



Step 10 Backhaul Connections (Iub) to INC

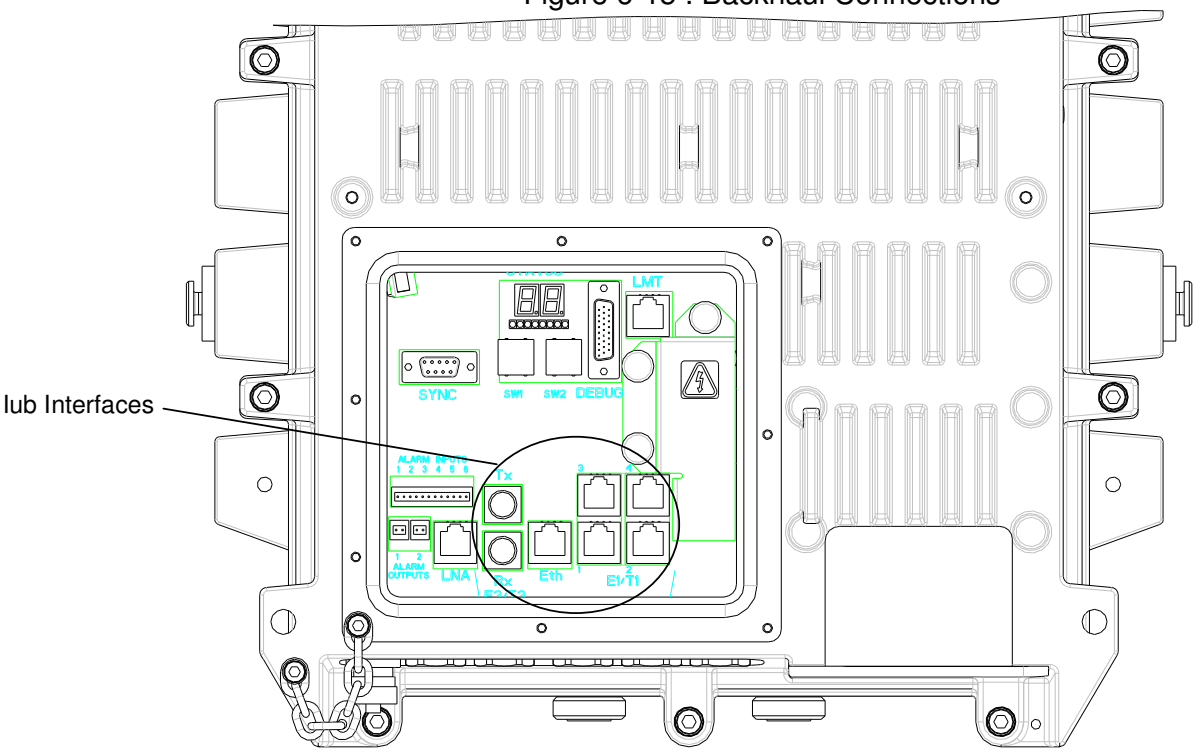
The backhaul connections can be selected from the following interfaces

- 100BaseT
- E3/T3
- E1/T1

The connections are labeled and shown in the figure below. To install any of the cables remove the blanking plug in the appropriate position to align with the interface selected. The cable gland to seal plus strain relief the cable is as illustrated for the power connection above.

Note: If the Node B is in not in the same site location as the serving INC, there must be no greater than a 5 millisecond delay on the backhaul connection. This can be provided by microwave or land based facilities with a very high reliability rate of 99.9995%.

Figure 6-15 : Backhaul Connections



100BaseT Connection - (Eth)

Feed the cables through the cables glands external from the enclosure before feeding the cable through the appropriate gland hole at the base of the Node B.

Terminate the Ethernet cables with RJ45 connectors and secure the cable gland to the Node B. Test the continuity for the Ethernet cables with test equipment consisting of a main and a remote unit.

The termination for these interfaces is specified within the datasheets for the interfaces. The specification for both cables should be CAT5 - 4 pair, screened cable, recommended Alcatel LANmark-5 F2TP or equivalent.

Notes: Points to remember when installing Category 5 cables for the Node B 100Base T Ethernet Backhaul.

1. Do not kink the cable as the pairs are twisted to support 100Mhz operation and splitting the pairs could reduce the performance of the cable.
2. When installing the RJ45 plugs onto the cable ensure pairs are untwisted to the minimum and that the cable sheath is clamped within the connector. Again this is to ensure the performance of the cable is not reduced.

The pin-outs for the external Ethernet interfaces are given in the following table & figure.
Source: http://www.dcbnet.com/notes/9611t1.html

Figure 6-16 : Ethernet Pin-outs using RJ45

1	**RX +**	White w/Green
2	**RX -**	Green
3	**TX +**	White w/Orange
4		Blue
5		White w/Blue
6	**TX -**	Orange
7		White w/Brown
8		Brown

Figure 6-17 : Ethernet Pin-outs using RJ45

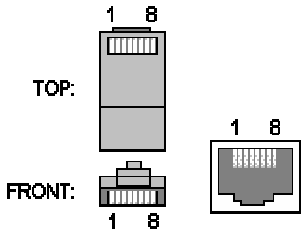


Table 6-5 : T1/E1 Pin-outs

T1 Pinouts		**Cable**	**E1 Pinouts**	
1	Rx (ring)	White w/Green	Rx (ring)	**1**
2	Rx (tip)	Green	Rx (tip)	**2**
3	Not used	White w/Orange	Not used	**3**
4	Tx (ring)	Blue	Tx (ring)	**4**
5	Tx (tip)	White w/Blue	Tx (tip)	**5**
6	Not used	Orange	Not used	**6**
7	Not used	White w/Brown	Not used	**7**
8	Not used	Brown	Not used	**8**

E3/T3 Connections – (Tx + Rx)

Feed the cables through the cables glands external from the enclosure before feeding the cable through the appropriate gland hole at the base of the Node B.

Terminate the E3/T3 cables with BNC connectors and secure the cable gland to the Node B. Test the continuity for the Ethernet cables with test equipment consisting of a main and a remote unit.

The termination for these interfaces is specified within the datasheets for the interfaces. The specification for both cables should be 75Ω.

E1/T1 Connections – (1 to 4)

Feed the 4 E1/T1 cables through the paired cables glands (ie. dual elastomer insert) external from the enclosure before feeding the cable through the appropriate gland hole at the base of the Node B.

Terminate the E1/T1 cables with RJ45 connectors and secure the cable gland to the Node B. Test the continuity for the Ethernet cables with test equipment consisting of a main and a remote unit. The pinouts for this interface are shown in the table above.

The termination for these interfaces is specified within the datasheets for the interfaces. The specification for both cables should be CAT5 - 4 pair, screened cable, recommended Alcatel LANmark-5 F2TP or equivalent.

Step 12 Antenna Cabling - Installation

Antennas and coaxial cable should be available at the site, and are part of the construction checklist and general assumptions.

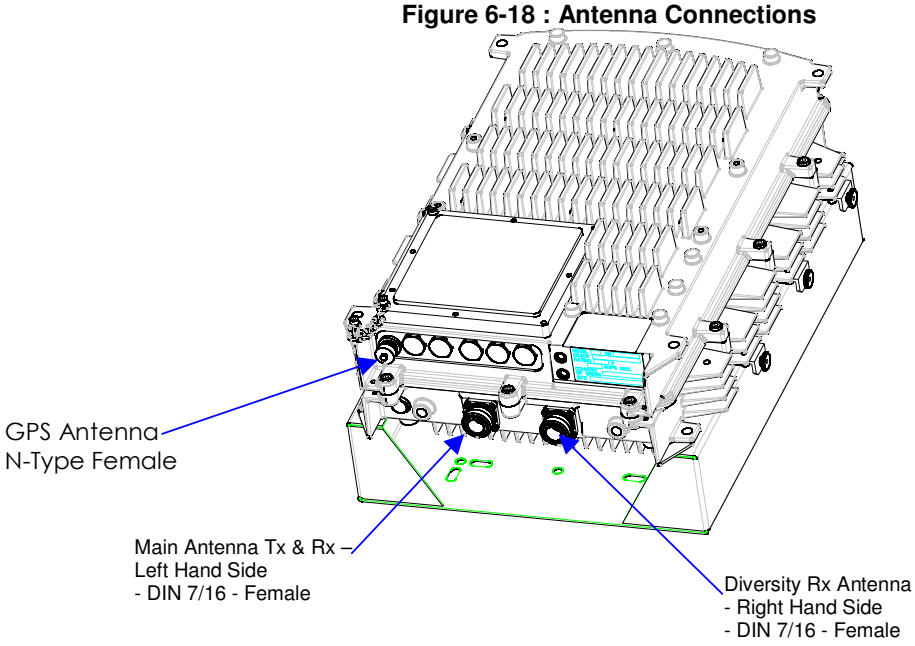
Two antennae per Node B are optimum, allowing receiver diversity, therefore two coaxial cables per Node B are needed in this case. Diversity can be via polarization, in which case two feeder runs to the same antenna are needed, feeding oppositely polarised sectors in the same physical enclosure.

Cables should be properly marked to indicate what antenna the coaxial cables are to be connected to the Node B serving the sector or area.

In the case where only one feeder / antenna is being used, this must be connected to the left hand connector when viewed from the front of the Node B.

The following installation describes the position of the antenna ports and designations.

Figure 6-18 : Antenna Connections



Step 13 Alarm Connections

If local alarms are to be utilised a terminal block has been provided on the Node B termination panel. The specifications for those interface requirements are below:-

External alarm inputs are connected via connector J11 and the door interlock micro-switch is connected via connector J10. Connectors J12 and J13 are used for the external alarm outputs.

The maximum input voltage is restricted to 39V for a 500A 8/20 uS pulse, with a minimum working voltage of 18V. All six input circuits are the same.

Alarm Inputs

The external alarm inputs shall be opto-isolated current loops. The voltage and currents shall be supplied by the external source.

Alarm Outputs

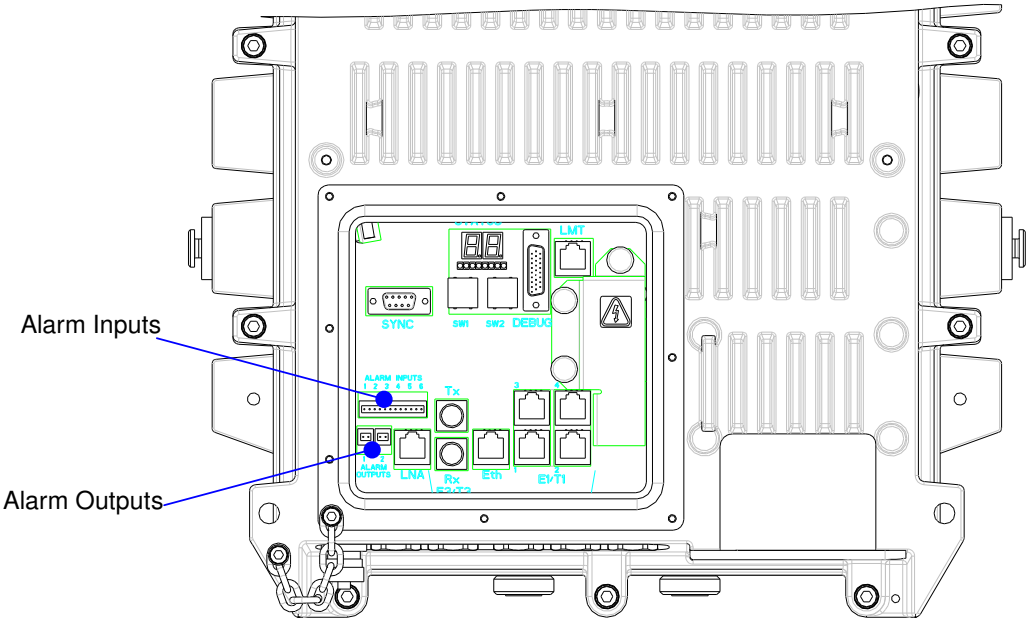
The external alarm outputs shall be isolated normally-open relay contacts capable of switching 100mA DC.

The connectors are 12way (alarm inputs) and 2ways for the alarm outputs, 2.5mm pitch header that mate with the supplied cable mount - tension clamp, provided in a kit with the Node B. There are additional strain relief kits also provided within the alarm kit.

The cable should be fed through the sealing cable glands assembly and the base of the casting. Then the cables should be stripped 5-6mm and inserted into the connector prior to mating with the NodeB. The cable gland to seal plus strain relief the cable is as illustrated for the power connection above.

The signals are paired starting from the right, pin1 is the right-hand-side on each connector.

Figure 6-19 : Alarm Outputs & Inputs



Step 14 GPS Installation & Operation

The Node B has an external/remote GPS antenna and receiver. The connection for the antenna (N-Type) is located on the base of the Node B, refer to the figure above.

The GPS timing signal is used by the Node B for the TDD frame timing, so that all Node B's in a network are synchronized. The GPS signal is also used by the master oscillator for a frequency reference. The Node B can operate for two hours after a loss of GPS timing but a gradual drift of the frame timing will result in system interference and a loss of Node B selection / reselection capability.

A suitable Node B GPS antenna is shipped with every Node B. This antenna should be used with a maximum of 15 metres cable of RG6 type cable plus male N-type connectors at each end. For longer runs, the cable losses will affect signal strength and could impede GPS signal performance.

For proper operation of the GPS receiver, the Node B GPS Antenna must have a clear southern view of the sky. A site survey should be done before Node B installation to verify that the Node B installation location is suitable for GPS reception.

A simple survey method is to take a handheld GPS receiver to the site and verify that GPS lock is obtained in the location of the Node B installation. The handheld GPS should be able to obtain a "locked" condition within 2 minutes of power-on, and should be able to see a minimum of 4 satellites at all times.

The GPS receiver, integral to the Node B, is automatically enabled when the Node B is powered and there are no adjustments or settings to be made by the user.

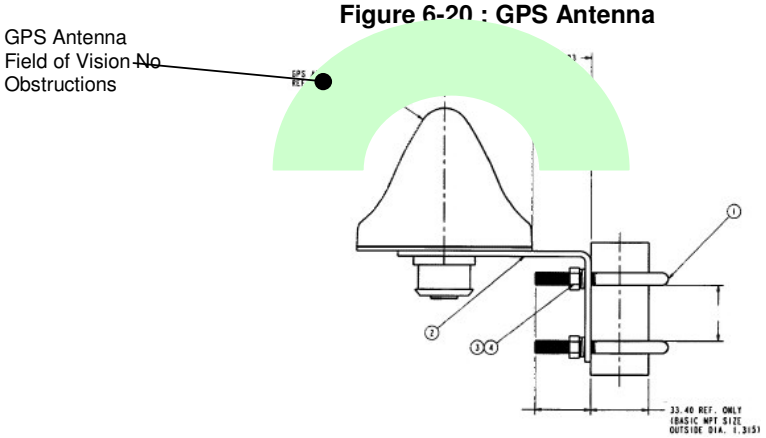
Note: When the Node B is to be installed on or near a tower or building wall, the GPS survey should replicate the configuration exactly.

When tower space is at a premium, or when long cable runs are involved, it may be preferable to use a single GPS antenna to feed multiple Node Bs. It is possible to use one GPS antenna with up to three units, providing that a passive splitter is used.

Caution: It is essential that in a ‘single GPS antenna supporting multi-Node B’ installation only one of the Node B’s is designated and configured to supply the GPS antenna with +5V via the GPS antenna cable as in a standard single installation.

The remaining subordinate Node Bs are provided their GPS signal through a DC block device. Failure to do this may result in damage to the Node B. It should also be noted that in the event of power failure to the DC supplying Node B, GPS reception to all Node B’s will be affected.

Figure 6-20 : GPS Antenna

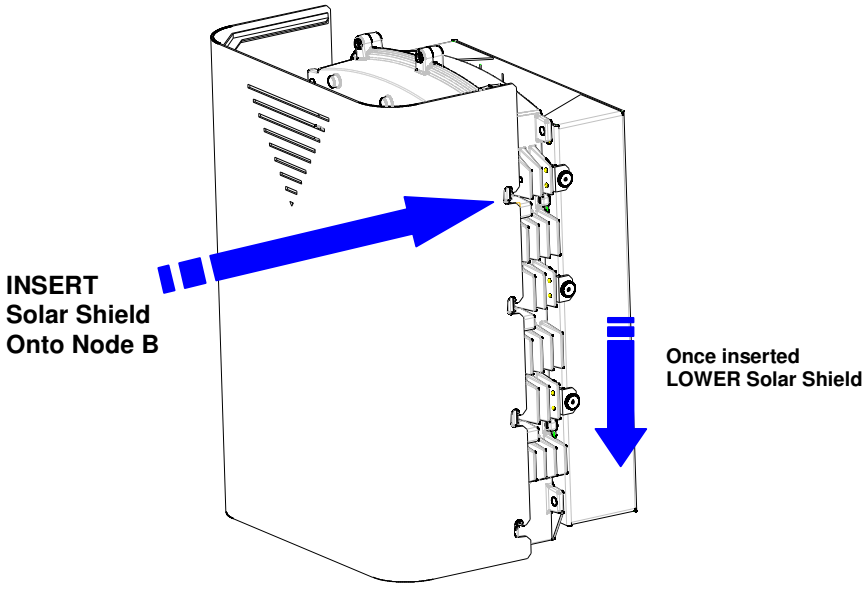


Step 15 Solar Shield Installation

The solar shield is attached to the Node B after all connections and system checks have been done.

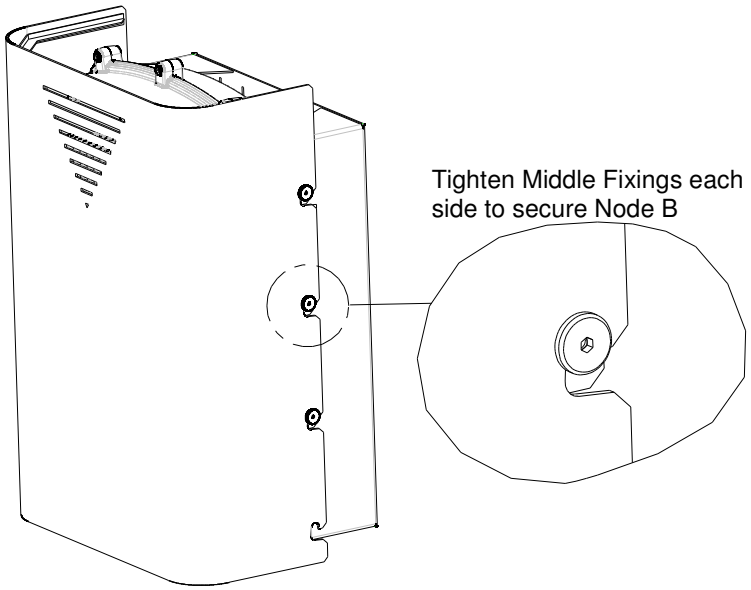
Fitting the solar shield to the Node B as illustrated below.

Figure 6-21 : Solar Shield Fitting



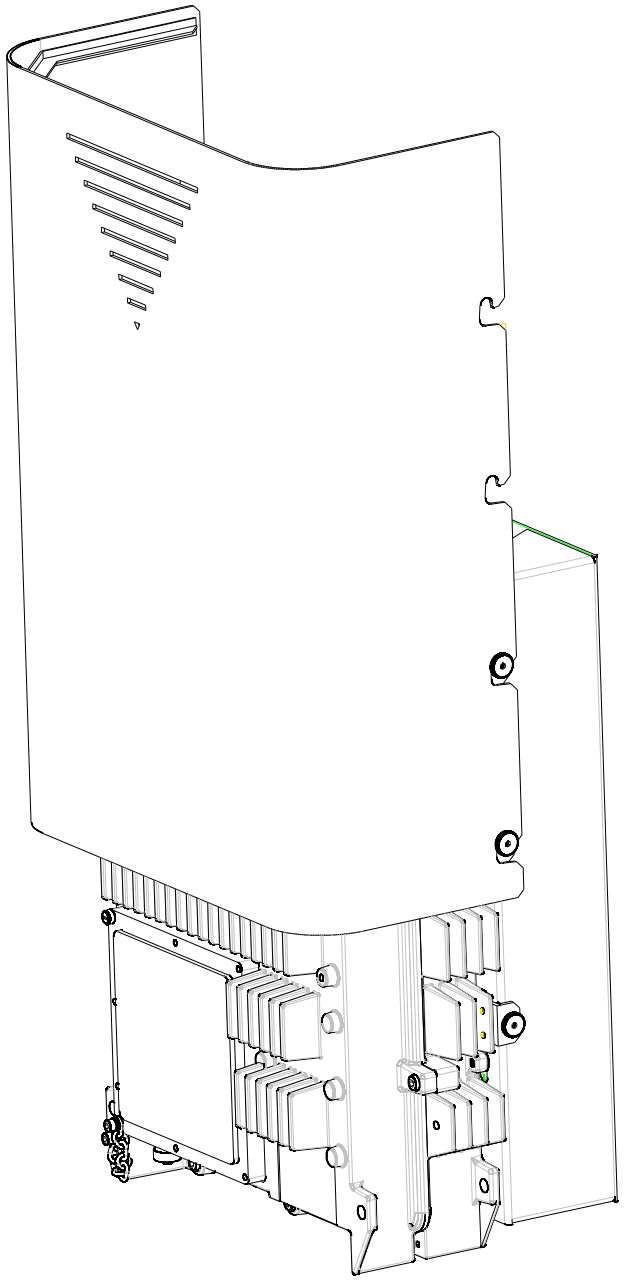
The Node B is locked into position by tightning the middle 2 screws on either side.

Figure 6-22 : Solar Shield Securing



Where the Node B is required to be serviced or during installation, the solar shield may be positioned in the holding position as per figure below, using the top 2 fixing locators on the Node B.

Figure 6-23 : Solar Shield Hooked on Node B



7. APPENDIX

Appendix A - Installation Check Card

Step	Action	Complete	Comment	Page
1	Perform pre-installation site check			
2	Parts shipped/tools required			
3	Site Preparation			
4	Mounting bracket Installations			
5	Install conduit cabling for power and INC connectivity			
6	Node B Installation onto Mounting Bracket			
7	Grounding installation			
8	Service Cover Access			
9	DC Power Connection			
10	Backhaul Connections to INC			
11	Install 100 BaseT connections between INC and NodeB			
12	Antennas Cabling - Installation			
13	Alarm Connections			
14	GPS Installation & Operation			
15	Solar Shield Installation			

Appendix B - Glossary

GLOSSARY	
ADC	Analog to Digital Converter
ARP	Address Resolution Protocol
BTS	Base Transceiver Station
DAC	Digital to Analog Converter
Downlink	From Network to the User Equipment
DSCH	Downlink Shared Channel
ESD	Electro Static Discharge
EM	Element Manager
EIA	Engineering Industry Association
Ethernet	10BaseT or 100baseT
ETSI	European Telecommunications Standardization Institute
FCC	Federal Communication Commission
FPGA	Field Programmable Gate Array
GPS	Global Positioning System
HTTP	Hyper-Text Transfer Protocol
INC	Integrated Network Controller
IP	Internet Protocol
ISP	Internet Service Provider
ITFS	Instructional Television Fi xed Service
IUB	Interface Between the INC & NodeB
LMT	Local Maintenance Terminal
LNA	Low Noise Amplifier
MCP	Multimedia Communications Port
MAC	Media Access Control
Mcps	Mega Chips per Second
MMDS	Multichannel Multipoint Distribution Service
MSPS	Mega Samples Per Second
MTU	Maximum Transmission Unit
Node B	A UMTS Radio Base Station
PDU	Protocol Data Unit
PLL	Phase Locked Loop
QPSK	Quadrature Phase Shift Keying
RAM	Random Access Memory
RLC	Radio Link Control
SRAM	Static RAM
T1/E1	1536kbps/ 2048Kbps pipe
T3/E3	
UE	User Equipment
UMTS	Universal Mobile Telecommunications System

GLOSSARY	
Uplink	From User Equipment to the Network
USB	Universal Serial Bus
USCH	Uplink Shared Channel
UPS	Uninterruptible Power Supply Unit
UTRAN	UMTS Terrestrial Radio Access Network
VSWR	Voltage Standing wave ratio
VCXO	Voltage Controlled Crystal Oscillator

END OF DOCUMENT