NOKIA

Cabinet Interfaces and Cables

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Contents

Summary of changes

First Release, 30 June 2000

Second Release, 12 January 2001

1 About this document

Purpose

This document describes the external interface connectors and cables, how to route interface cables, and how to synchronise one or more Nokia UltraSite EDGE Base Stations (BTSs).

Contents

This document contains the following information:

- Chapter 2: Cabinet interface connectors and cables
- Chapter 3: Rotating and relocating cabinet interfaces
- Chapter 4: Installing the bridge kit
- Chapter 5: Connecting power cables
- Chapter 6: Synchronising cabinets

Readership

The following personnel should read *Nokia UltraSite EDGE Cabinet Interfaces and Cables*:

- installation planners
- installation and commissioning personnel
- operation and maintenance (O&M) personnel

Prerequisites

Nokia requires basic knowledge of base station systems and equipment for all personnel performing installation, commissioning, and maintenance tasks.

2 Cabinet interface connectors and cables

This chapter describes the interfaces of the Indoor and Outdoor cabinets and provides instructions on how to route interface cables.

Note

The Q1_1 and Q1_2 interface connectors are external Q1 interfaces suitable for Line Terminal Equipment (LTE). LTE is customer-specific and is not detailed in this document.

Note

Using external synchronisation, external alarms and controls (EAC), and external transmission equipment is optional.

2.1 Cabinet interface connectors and connector types

Table 1 lists the interface connectors and connector types.

Table 1. Nokia UltraSite EDGE BTS interface connectors

Interface connector	Level	Connector type
AC Power input		Phoenix clamp
DC Power input		Phoenix clamp
Earthing (grounding)		Single M8 screw (Europe) Two M5 screws (US and Canada)
TX/RX antenna		7/16 (DIN) female flange mount
Cabinet output	RS485	D15 pin (female)
Cabinet input	RS485	D15 pin (female)
External Alarms input	TTL	D37 pin (female)
External Alarms input/ Control output	TTL	D37 pin (female)
LMP (used for SiteWizard)	RS232	D9 pin (female)
13 MHz test clock	at BOIx	50 Ω SMB (female)
Test FCLK	at BOIx	50 Ω SMB (female)
Test/Monitor interface	LVTTL and RS232	D25 (female)
Q1_1	RS485	D9 pin (female)
Q1_2	RS485	D9 pin (female)
Q1_SSS	RS485	D9 pin (female)
IBBU	RS485	D9 pin (female)

Note

To order the Antenna line, Local Management Port (LMP), Abis adapter, and Flexbus cables, contact your local Nokia representative.

2.2 Indoor cabinet interfaces

Figure 1 illustrates the interfaces of the Indoor cabinet.

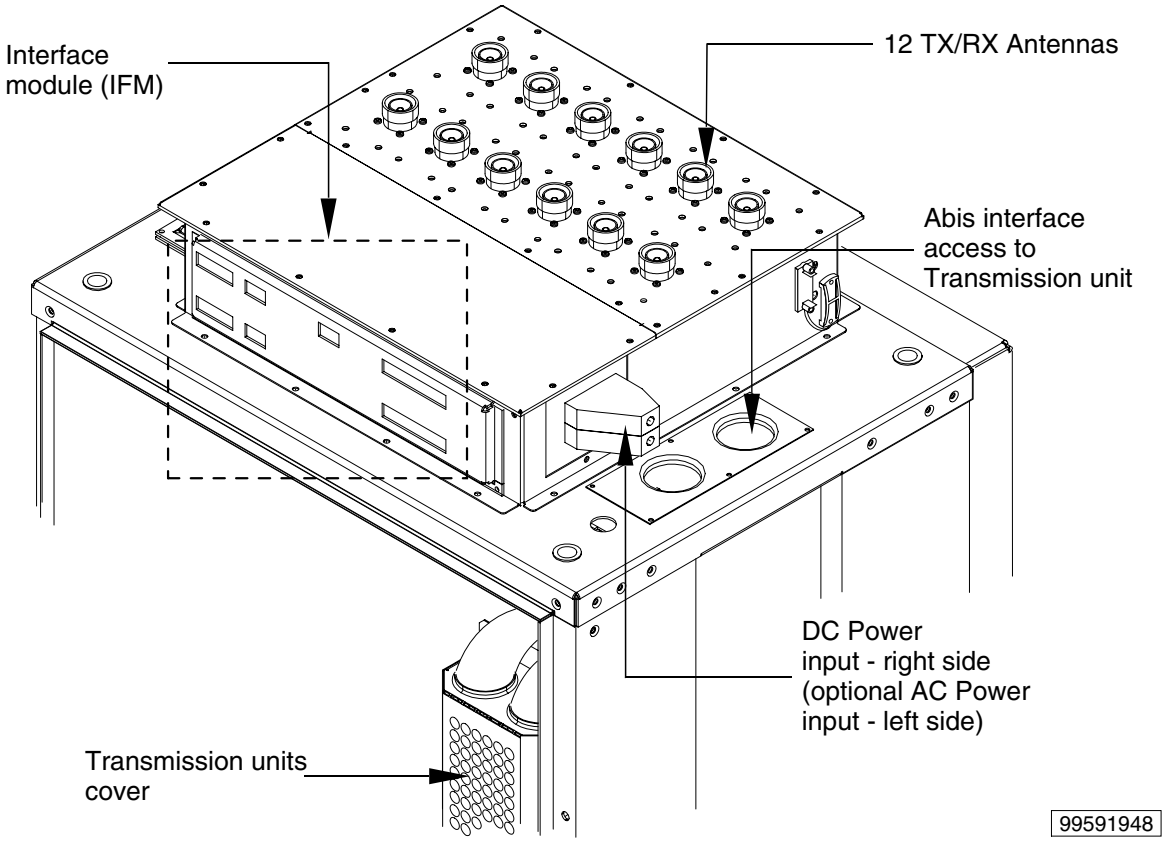

Figure 1. Indoor cabinet interfaces

2.3 Outdoor cabinet interfaces

Nokia recommends using outdoor-rated cables for the Outdoor cabinet.

Figure 2 illustrates the interfaces of the Outdoor cabinet.

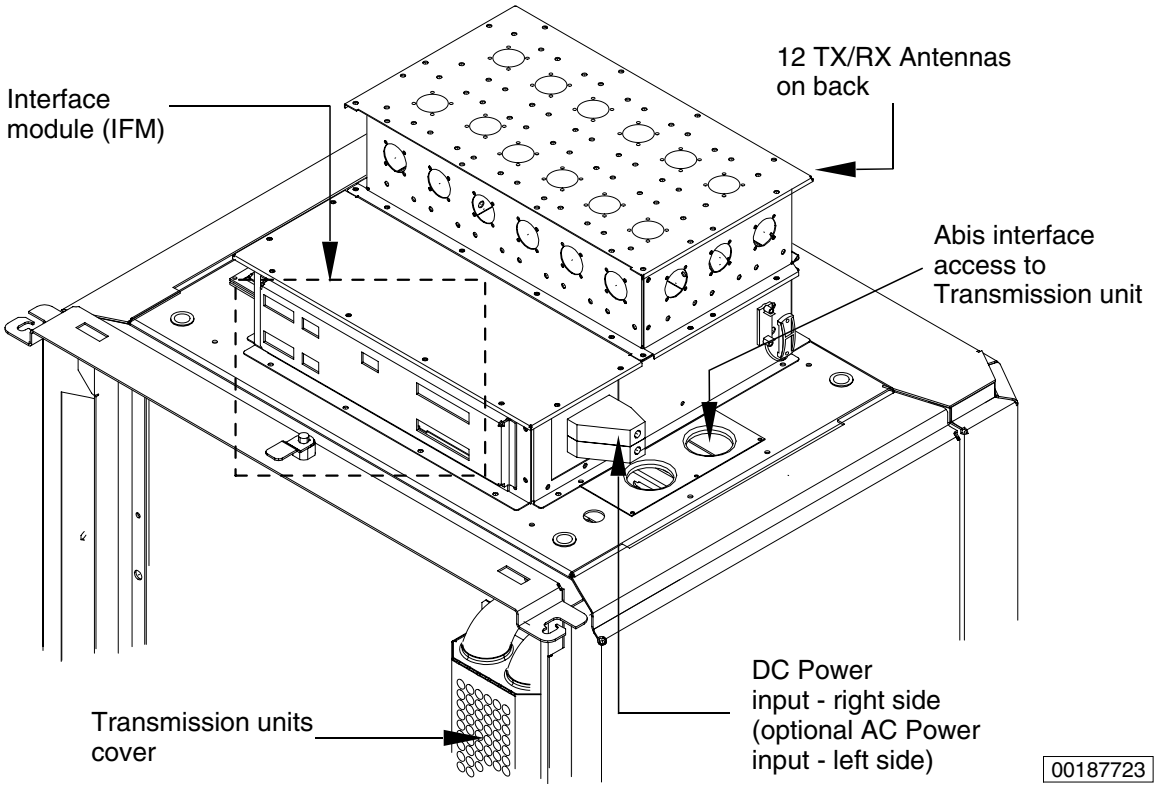

Figure 2. Outdoor cabinet interfaces (OAKx roof and door not shown)

2.4 Front mounted Interface Module board connectors

Figure 3 illustrates the front-mounted connectors of the Interface Module (IFM) board.

Tables 2 through 8 list the pinouts for each of the connectors illustrated in figure 3.

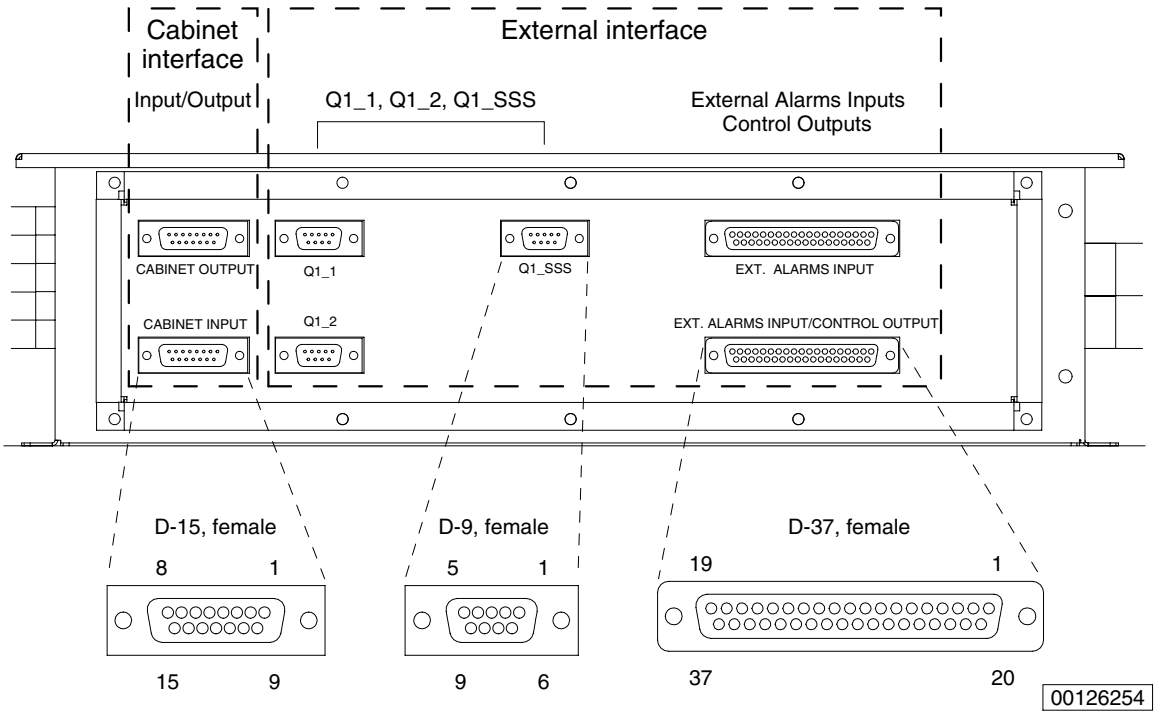

Figure 3. IFM board (front-mounted connectors)

2.4.1 Cabinet output

Type: 15 Position Straight Female Standard D-Sub Reference Designator: X2.

Table 2. Cabinet Output pinout

Pin	Signal	Pin	Signal	Pin	Signal
1	FCKP	6	MAINS_ ALARM_ OUTN	11	CBL_C_OUT
2	FCKN	7	RLY	12	GND

Table 2. Cabinet Output pinout (Continued)

Pin	Signal	Pin	Signal	Pin	Signal
3	FNP	8	RELAY	13	nc
4	FNN	9	SSS_CON_OUTP	14	nc
5	MAINS_ALARM_OUTP	10	SSS_CON_OUTN	15	nc

2.4.2 Cabinet input

Type: 15 Position Straight Female Standard D-Sub Reference Designator: X1.

Table 3. Cabinet Input pinout

Pin	Signal	Pin	Signal	Pin	Signal
1	FCKP	6	MAINS_ALARM_INN	11	CBL_C_IN
2	FCKN	7	RLY	12	GND
3	FNP	8	GND	13	V48N
4	FNN	9	SSS_CON_ INP	14	V48RTN
5	MAINS_ALARM_INP	10	SSS_CON_INN	15	nc

2.4.3 Q1_1

Type: 9 Position Straight Female Standard D-Sub Reference Designator: X3.

Table 4. Q1_1 pinout

Pin	Signal	Pin	Signal	Pin	Signal
1	Q1_EXTD_1P	4	nc	7	nc
2	nc	5	Q1_EXTU_1P	8	nc
3	GND	6	Q1_EXTD_1N	9	Q1_EXTU_1N

2.4.4 Q1_2

Type: 9 Position Straight Female Standard D-Sub Reference Designator: X4.

Table 5. Q1_2 pinout

Pin	Signal	Pin	Signal	Pin	Signal
1	Q1_EXTD_2P	4	nc	7	nc
2	nc	5	Q1_EXTU_2P	8	nc
3	GND	6	Q1_EXTD_2N	9	Q1_EXTU_2N

2.4.5 Q1_SSS

Type: 9 Position Straight Female Standard D-Sub Reference Designator: X7.

Table 6. Q1_SSS pinout

Pin	Signal	Pin	Signal	Pin	Signal
1	Q1_SSS_UP	4	nc	7	nc
2	nc	5	Q1_SSS_DP	8	nc
3	GND	6	Q1_SSS_UN	9	Q1_SSS_DN

2.4.6 External Alarm input

Type: 37 Position Straight Female Standard D-Sub Reference Designator: X8.

Table 7. External Alarm pinout

Pin	Signal	Pin	Signal	Pin	Signal
1	EXT_AL12	14	nc	27	GND
2	EXT_AL13	15	nc	28	GND
3	EXT_AL14	16	nc	29	GND

Table 7. External Alarm pinout (Continued)

Pin	Signal	Pin	Signal	Pin	Signal
4	EXT_AL115	17	nc	30	GND
5	EXT_AL16	18	nc	31	GND
6	EXT_AL17	19	GND	32	nc
7	EXT_AL18	20	GND	33	nc
8	EXT_AL19	21	GND	34	nc
9	EXT_AL20	22	GND	35	nc
10	EXT_AL21	23	GND	36	nc
11	EXT_AL22	24	GND	37	nc
12	EXT_AL23	25	GND		
13	NC	26	GND		

2.4.7 External Alarm input/Control output

Type: 37 Position Straight Female Standard D-Sub Reference Designator: X9.

Table 8. External Alarm Input/Control Output pinout

Pin	Signal	Pin	Signal	Pin	Signal
1	EXT_CO0	14	EXT_AL7	27	GND
2	EXT_CO1	15	EXT_AL8	28	GND
3	EXT_CO2	16	EXT_AL9	29	GND
4	EXT_CO3	17	EXT_AL10	30	GND
5	EXT_CO4	18	EXT_AL11	31	GND
6	EXT_CO5	19	GND	32	GND
7	EXT_AL0	20	V5P	33	GND
8	EXT_AL1	21	V5P	34	GND
9	EXT_AL2	22	V5P	35	GND
10	EXT_AL3	23	V5P	36	GND
11	EXT_AL4	24	V5P	37	GND
12	EXT_AL5	25	V5P		
13	EXT_AL6	26	GND		

2.5 Rear mounted Interface Module board connectors

Figure 4 illustrates the rear-mounted connectors of the Interface Module (IFM) board.

Tables 9 through 11 list the pinouts for each of the connectors illustrated in figure 4.

2.5.1 Common Backplane Interface

Type: 37 Position Straight Female Standard D-Sub Reference Designator: X5.

Table 9. Common Backplane pinout

Pin	Signal	Pin	Signal	Pin	Signal
1	ECO12CD	14	GND	27	GND
2	GND	15	Q1EXTD	28	V5P
3	ECO12CC	16	GND	29	GND
4	GND	17	V5P	30	V48N
5	Q1_SSS_UP	18	GND	31	V48RTN
6	Q1_SSS_UN	19	nc	32	nc
7	Q1_SSS_DP	20	V5P	33	nc
8	Q1_SSS_DN	21	GND	34	nc
9	EXT_FCKP	22	EXT_FNP	35	nc
10	EXT_FCKN	23	EXT_FNN	36	nc
11	nc	24	V3P	37	nc
12	nc	25	GND		
13	Q1EXTU	26	V3P		

2.5.2 Bias Tee Interface Module Interface

Type: 15 Position Straight Female Standard D-Sub Reference Designator: X6.

Table 10. Bias Tee Interface Module pinout

Pin	Signal	Pin	Signal	Pin	Signal
1	VSWR1	6	VSWR6	11	VSWR11
2	VSWR2	7	VSWR7	12	VSWR12
3	VSWR3	8	VSWR8	13	nc
4	VSWR4	9	VSWR9	14	nc
5	VSWR5	10	VSWR10	15	nc

2.5.3 IBBU Interface

Type: 9 Position Straight Female Standard D-Sub Reference Designator: X10.

Table 11. IBBU pinout

Pin	Signal	Pin	Signal	Pin	Signal
1	Q1_SSS_UP	4	nc	7	nc
2	nc	5	Q1_SSS_DP	8	nc
3	GND	6	Q1_SSS_UN	9	Q1_SSS_DN

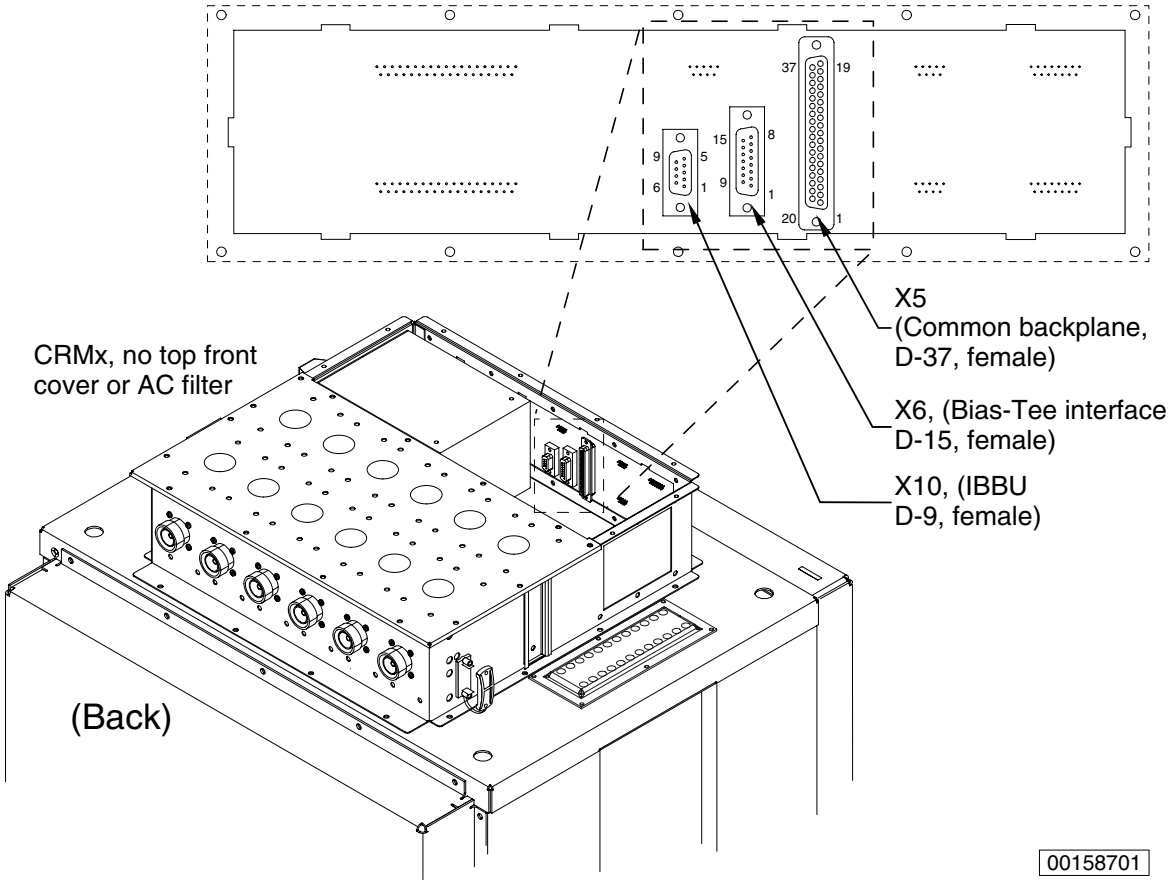

Figure 4. IFM board (rear-mounted connectors)

2.6 Transmission unit connectors and connector types

Table 12. Radio transmission connectors

Transmission unit	Value	Connector type
FXC RRI	Flexbus: up to 16 x 2 Mbit/s	TNC

Table 13. Wireline transmission connectors

Transmission unit	Value	Connector type
FC E1/T1	E1: 2 Mbit/s T1:1.5 Mbit/s	E1: TQ 100/120 Ω or BT-43 female, 75 Ω E1 only T1: TQ 100/120 Ω
FXC E1	E1: 2 Mbit/s	BT-43 female, 75 Ω E1 only
FXC E1/T1	E1: 2 Mbit/s T1: 1.5 Mbit/s	E1: TQ 100/120 Ω T1: TQ 100/120 Ω

3 Rotating and relocating the cabinet interfaces

This chapter describes how to rotate and relocate the cabinet interfaces of the Nokia UltraSite EDGE BTS.

3.1 Rotating the antenna box

Figure 5 illustrates how to rotate the antenna box so that you can route antenna feeder cables to the left, right, or back of the cabinet.

To rotate the antenna box:

1. Remove the 16 screws around the antenna box.
2. Lift the antenna box and rotate the box 90° or 180° clockwise or counter-clockwise as required.
3. Align the antenna box with the 16 securing holes.

Note

To facilitate proper torque it may be necessary to install the Bias Tee units prior to securing the antenna box to the cabinet core. Install Bias Tee units in accordance with proceedures detailed in *Nokia UltraSite EDGE BTS Unit Installation*.

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4. Reinsert the screws into the 16 securing holes, and tighten them until the antenna box is secured to the cabinet core.

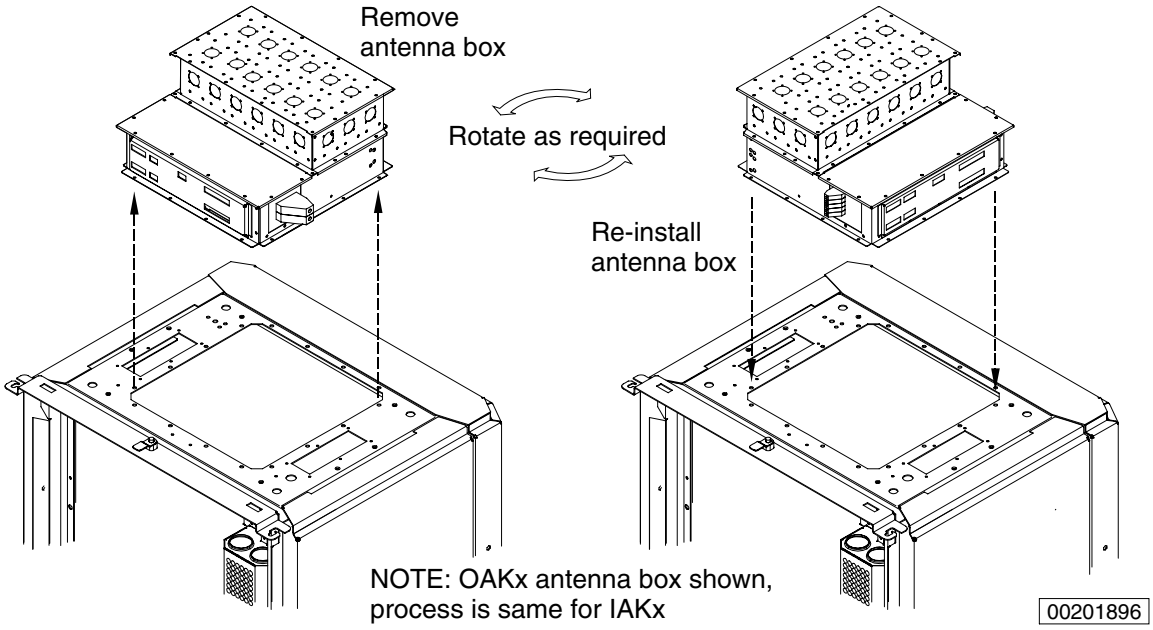

Figure 5. Rotating the Outdoor antenna box (Indoor similar)

3.2 Relocating the Cable Entry Kit

Use the Cable Entry Kit to route antenna, power, ground, and signal cables. The cable entry blocks are made of elastic material and accommodate varying cable diameters.

Figure 6 illustrates the modules of the Cable Entry Kit.

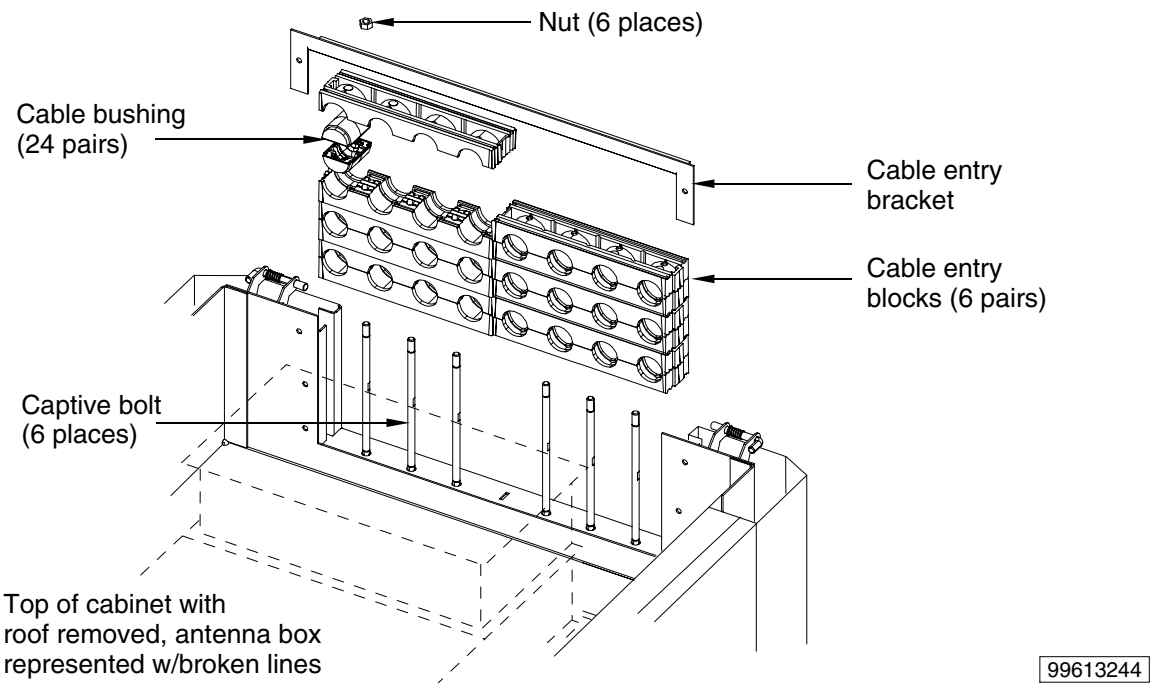

Figure 6. Cable Entry Kit shown at the back of the Outdoor cabinet

The default position of the Cable Entry Kit is in the left side of the OAKx roof assembly. You can remove the cable entry from the default position and install the Cable Entry Kit to the back or right of the Outdoor cabinet.

Figure 7 illustrates how to remove and relocate the cable entry kit in the OAKx roof.

To remove the cable entry block from the default position:

1. Remove the rubber seal from the roof support assembly.
2. Remove the six screws that secure the cable entry block to the roof support assembly.
3. Remove the cable entry block from the default position in the roof support assembly.

To remove the dummy cable entry block from the back or right position:

1. Remove the rubber seal from the roof support assembly.
2. Remove the six screws that secure the dummy cable entry block to the roof support assembly.
3. Remove the dummy cable entry block from the back or right position in the roof support assembly.

To relocate the cable entry block to the back or right position:

1. Insert the cable entry block in the desired cable entry position (back or right).
2. Align the securing holes of the cable entry block bracket with the securing holes in the roof support assembly.
3. Reinsert the six screws and tighten the cable entry block into position in the roof support assembly.
4. Replace the rubber seal on the roof support assembly.

To relocate the dummy cable entry block to the default position:

1. Insert the dummy cable entry block in the default cable entry position.
2. Align the securing holes of the dummy cable entry block with the securing holes in the roof support assembly.
3. Reinsert the six screws and tighten the dummy cable entry block into position in the roof support assembly.
4. Replace the rubber seal on the roof support assembly.

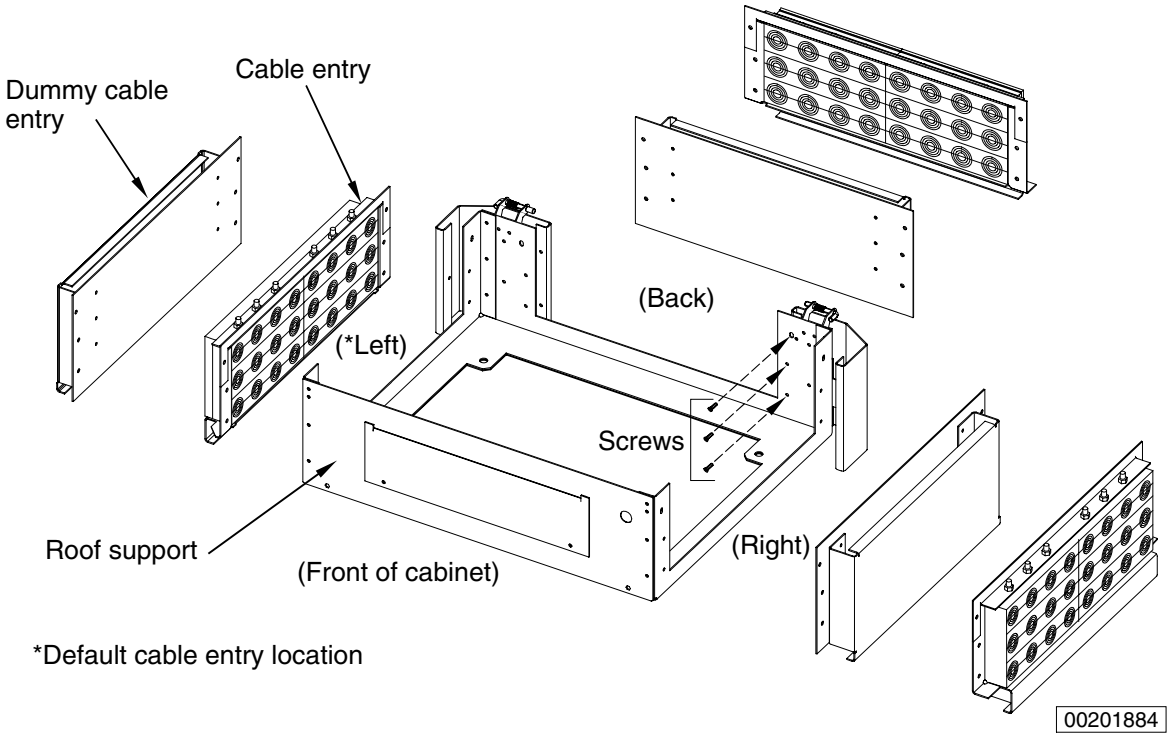

Figure 7. Cable entry block installation options

To route cables through the cable entry kit:

1. Remove the rubber seal from the roof support assembly.
2. Remove the two screws securing the cable entry bracket to the roof support assembly.
3. Remove the six nuts from the exposed ends of the captive bolts.
4. Remove the cable entry bracket from the top of the six cable entry block captive bolts.
5. Remove the cable entry blocks as required, and modify the strain relief to feed cables through the desired cable entry holes.

6. Repeat steps 4 and 5 for additional cable entries.

7. Replace the cable entry blocks over the cables.

8. Slide the cable entry bracket over the top cable entry block, and align it with the captive bolts.

9. Install and tighten the six nuts over the exposed ends of the captive bolts.

10. Install the two screws securing the cable entry bracket to the roof support assembly.

11. Verify that the cable entry bracket is level with the roof support assembly.

12. Replace the rubber seal on the roof support assembly.

4 Installing the bridge kit

The bridge kit provides a protected channel for inter-cabinet cables routed between adjoining UltraSite Outdoor cabinets.

To install the bridge kit:

1. Remove the cabinet roofs of both cabinets.
2. On both cabinets, remove the rubber gasket strip from the top edge of the roof support walls.
3. Remove adjacent dummy cable entry panels from both roof support assemblies (M5 screws, three on each panel end). See Figure 8.
4. Position the bridge and secure with the M5 screws removed in step 3.
5. Remove four M12 screws from adjacent sides of roof assembly.
6. Position the bridge support and secure with the four M12 screws removed.

Note

Route cables before installation of the bridge cover.

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7. Position the bridge cover and secure with the four M12 screws.
8. Replace the rubber gasket strip on the top edge of the roof support walls. See Figure 9.

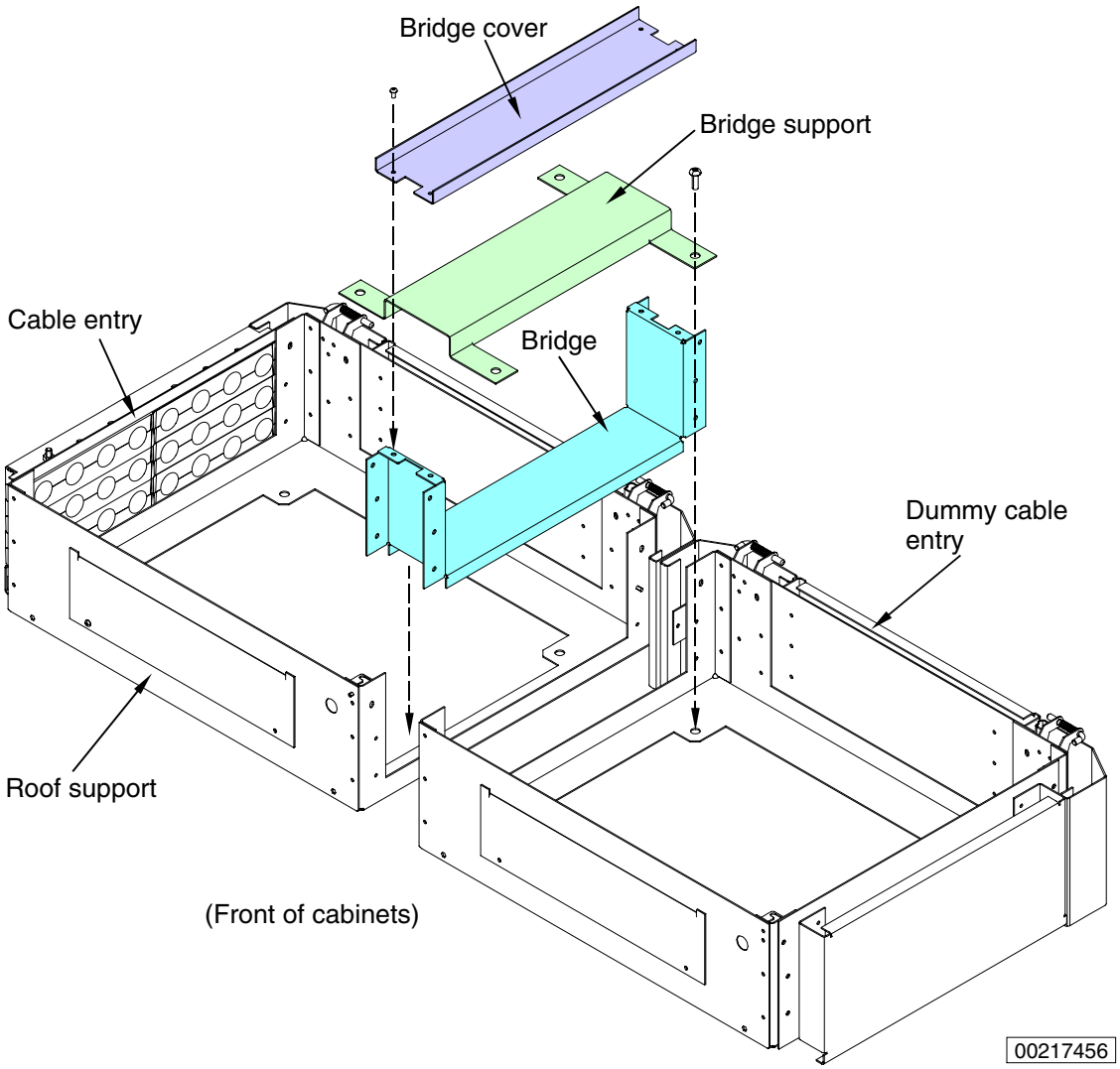


Figure 8. Installing the bridge kit

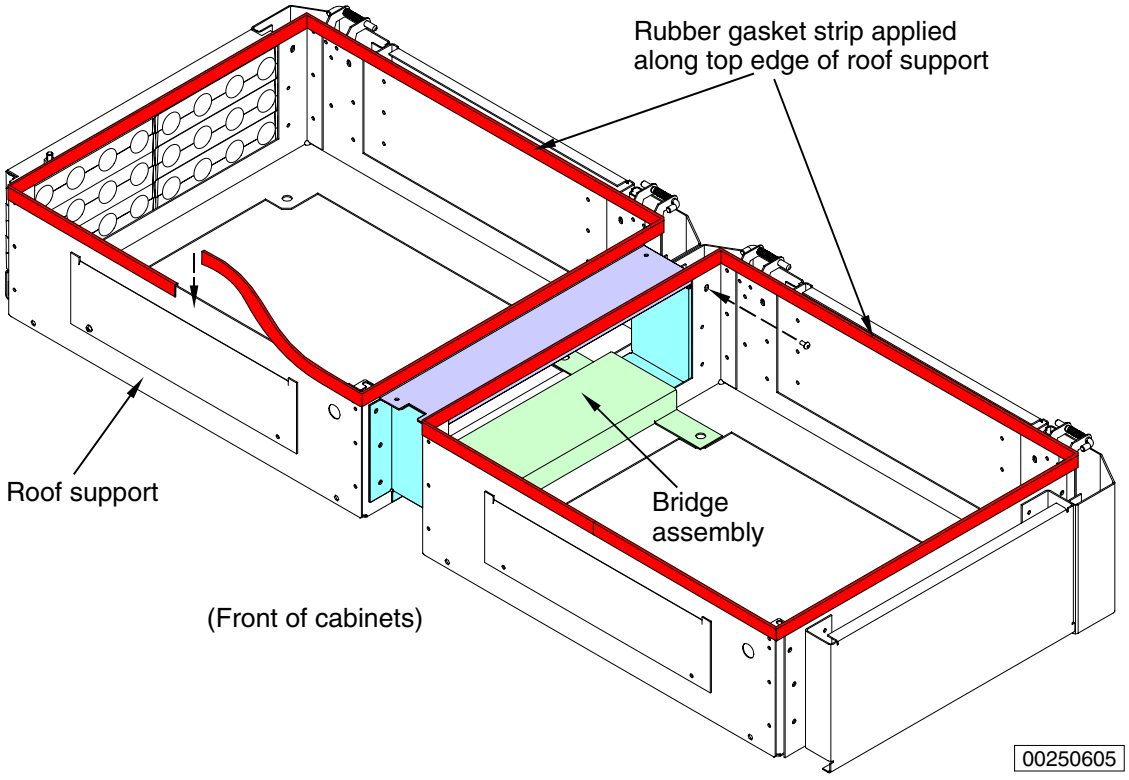


Figure 9. Installing the rubber gasket strip

5 Connecting power cables

This chapter describes how to route and connect power and ground cables for the Nokia UltraSite EDGE BTS.

WARNING

Risk of lethal voltages and electric shock exists when routing power cables. Verify that mains power breaker is OFF and that the cabinet is properly grounded before attempting any connections to the cabinet.

Caution

The cable cross section dimension must meet national, state, and local regulations.

5.1 Routing ground cables

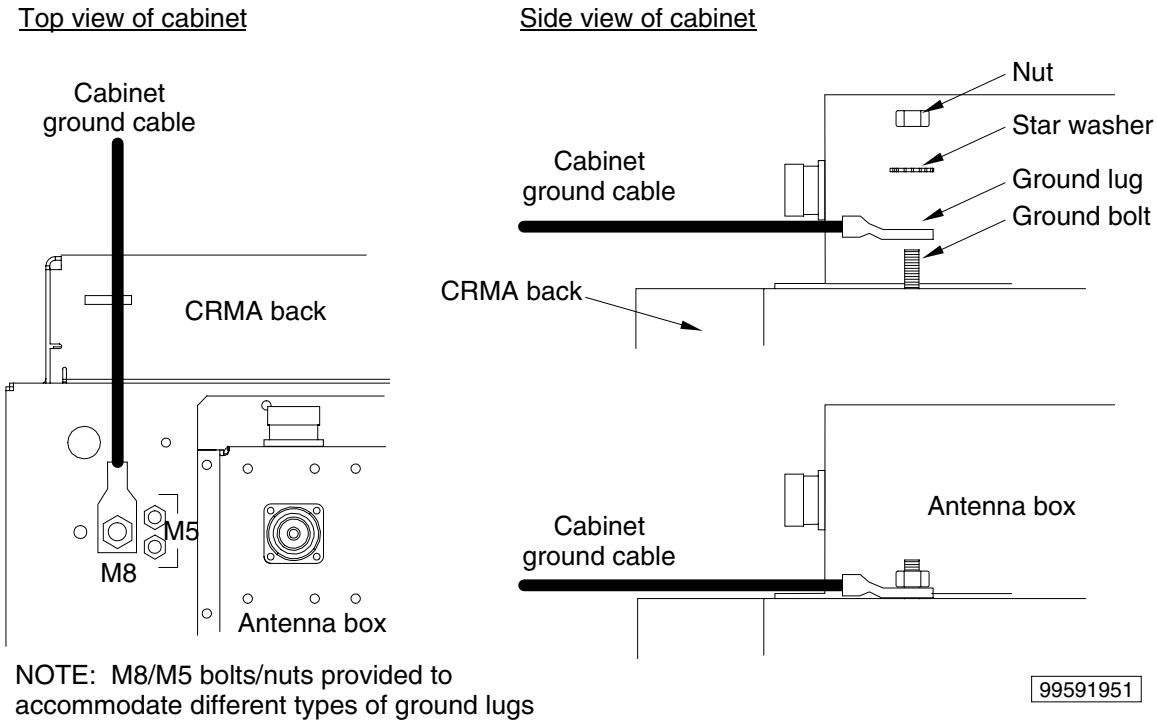
Note

To access cabinet interface connections, you can remove the cabinet roof from the BTS and replace the roof when all work is complete.

Figure 10 illustrates how to ground (earth) the cabinet.

To ground (earth) the cabinet:

1. At the top left of the cabinet, unscrew the nut from the ground (earth) connection.
2. Strip about 2 cm (3/4 in.) of the main ground (earth) cable.
3. Insert the stripped end of the cable into a cable shoe lug and crimp it.
4. Fit the lug end of the ground (earth) cable over the ground (earth) connection.
5. Tighten the ground (earth) nut over the ground (earth) cable.



NOTE: M8/M5 bolts/nuts provided to accommodate different types of ground lugs

Figure 10. Grounding (earthing) the cabinet

5.2 Connecting AC power

The recommended cross section of cable connecting to the AC terminal block is 13.3 mm^2 (flexible stranded #6 AWG). The AC terminal block is rated to accept cable from 10 to 16 mm^2.

Note

The AC Filter unit and the shorting bar are optional. To place an order, contact your local Nokia representative.

Note

Depending on the rotation of the antenna box, it will be necessary to remove the dummy cable entry panel adjacent to the power connector or remove the screws securing the antenna box to the cabinet core and lift the antenna box to access the connector screws.

Figure 11 illustrates how to connect single-phase AC power to the Nokia UltraSite EDGE BTS.

To connect single phase AC power (two wires with ground) to the BTS [USA and Canada]:

1. Verify that the cabinet is properly earthed (grounded).
2. Cut the outer sheath of the AC power cable to expose the three internal wires.
3. Route the power cable though the strain relief on the antenna box.

WARNING

Damage to cabinet components or personel can occur if the power cable is not secure. Ensure the power cable is secure within the strain relief.

4. Strip about 1.25 cm (.5 in.) of the insulation off each of the three exposed wires.

5. Turn the screws to the left to open the L1, L2, L3, N, and PE Phoenix connector terminals.

6. Insert the ground wire into the PE connector. Turn the screw to the right to close the connector.

7. Insert the shorting bar and turn the screw to the right to close the L1 and L2 connectors.

8. Insert one live wire into the L3 connector. Turn the screw to the right to close the connector.

9. Insert the second live wire into the N connector. Turn the screw to the right to close the connector.

To connect single-phase AC power (one wire with neutral and ground) to the BTS [Europe]:

1. Verify that the cabinet is properly earthed (grounded).

2. Cut the outer sheath of the AC power cable to expose the three internal wires.

3. Route the power cable though the strain relief on the antenna box.

WARNING

Damage to cabinet components or personel can occur if the power cable is not secure. Ensure the power cable is secure within the strain relief.

4. Strip about 1.25 cm (.5 in.) of the insulation off each of the three exposed wires.

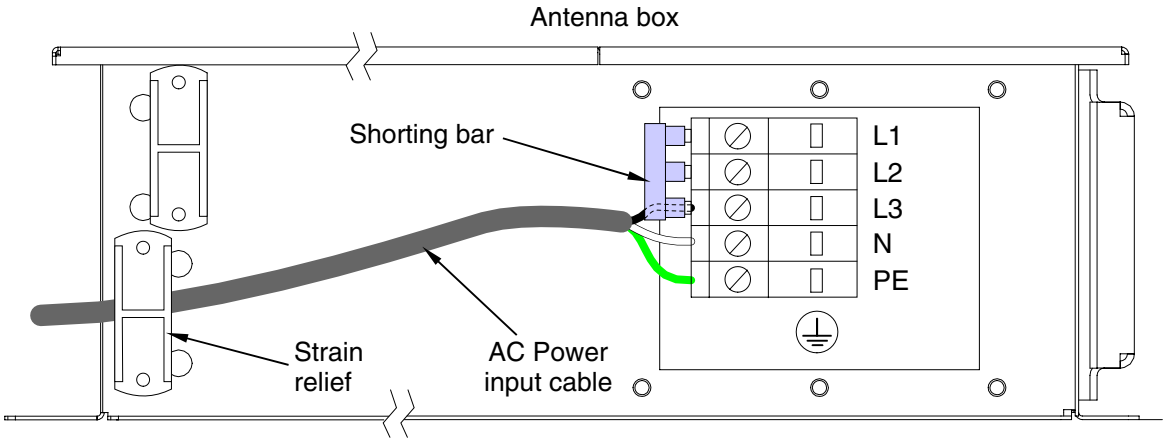
5. Turn the screws to the left to open the L1, L2, L3, N, and PE Phoenix connector terminals.

6. Insert the ground wire into the PE connector. Turn the screw to the right to close the connector.

7. Insert the shorting bar and turn the screw to the right to close the L1 and L2 connectors.

8. Insert the live wire into the L3 connector. Turn the screw to the right to close the connector.

9. Insert the neutral wire into the N connector. Turn the screw to the right to close the connector.



NOTE: Power input wiring must adhere to local codes.
L1, L2, L3 (Shorted), PE = Ground

Figure 11. Connecting single-phase AC power to the BTS

Figure 12 illustrates how to connect three-phase AC power to the Nokia UltraSite EDGE BTS.

To connect three-phase AC power (three wires with neutral and ground) to the BTS [Europe]:

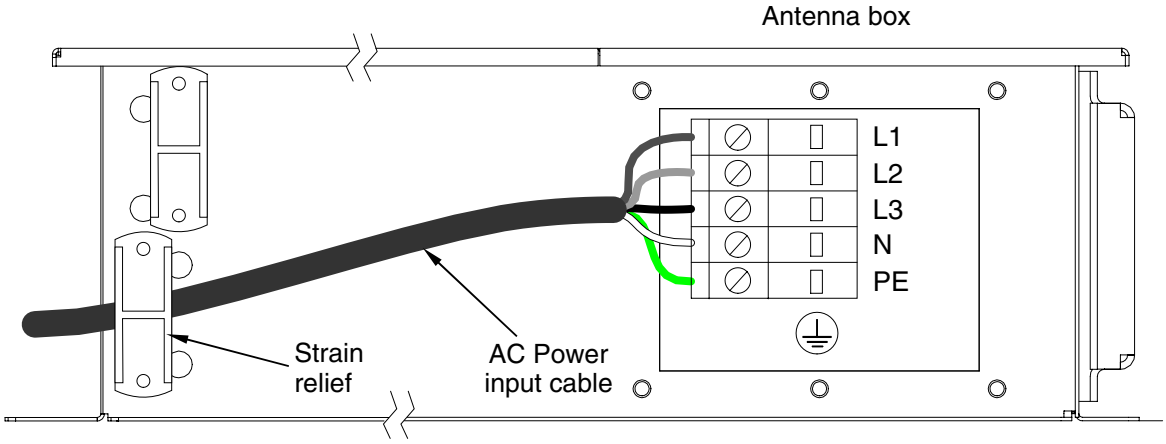
1. Verify the cabinet is properly earthed (grounded).

2. Route the power cable through the strain relief mounted on the antenna box.

WARNING

Damage to cabinet components or personel can occur if the power cable is not secure. Ensure the power cable is secure within the strain relief.

3. Cut the outer sheath of the AC power cable to expose the five internal wires.
4. Strip about 1.25 cm (.5 in.) of the insulation off each of the five exposed wires.
5. Turn the screws to the left to open the L1, L2, L3, N, and PE Phoenix connector terminals.
6. Insert the ground wire into the PE connector. Turn the screw to the right to close the connector.
7. Insert the neutral wire into the N connector. Turn the screw to the right to close the connector.
8. Insert the three live wires into the L1, L2, and L3 connectors. Turn each connector screw to the right to close the connectors.



NOTE: Power input wiring must adhere to local codes.
L1 = Phase 1, L2 = Phase 2, L3 = Phase 3
N = Neutral, PE = Ground

Figure 12. Connecting Three Phase AC power to the BTS

5.3 Connecting DC power

The maximum cross section of cable connecting to the DC terminal block is 50 mm^2. The minimum cable cross section is 33.6 mm^2 (flexible stranded #2 AWG).

For the maximum current, refer to *Nokia UltraSite Base Station Requirements for Installation and Operation*.

Note

Depending on the rotation of the antenna box, it will be necessary to remove the dummy cable entry panel adjacent to the power connector or remove the screws securing the antenna box to the cabinet core and lift the antenna box to access the connector screws.

Figure 13 illustrates how to connect DC power to the Nokia UltraSite EDGE BTS.

To connect DC power to the BTS:

1. Verify that the cabinet is properly earthed (grounded).
2. Cut the outer sheath of the DC power cable to expose the two internal wires.
3. Route power cable through the strain relief mounted on the antenna box.

WARNING

Damage to cabinet components or personel can occur if the power cable is not secure. Ensure the power cable is secure within the strain relief.

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4. Strip about 2.5 cm (1 in.) of the insulation off the (+) and (-) DC wires.
5. Turn the screws to the left to open the (+) V48 RTN and (-) V48 N Phoenix connector terminals.

6. Insert the blue (-) wire into the (-) V48 N connector. Turn the screw to the right to close the connector.

7. Insert the black (+) wire into the V48 RTN connector. Turn the screw to the right to close the connector.

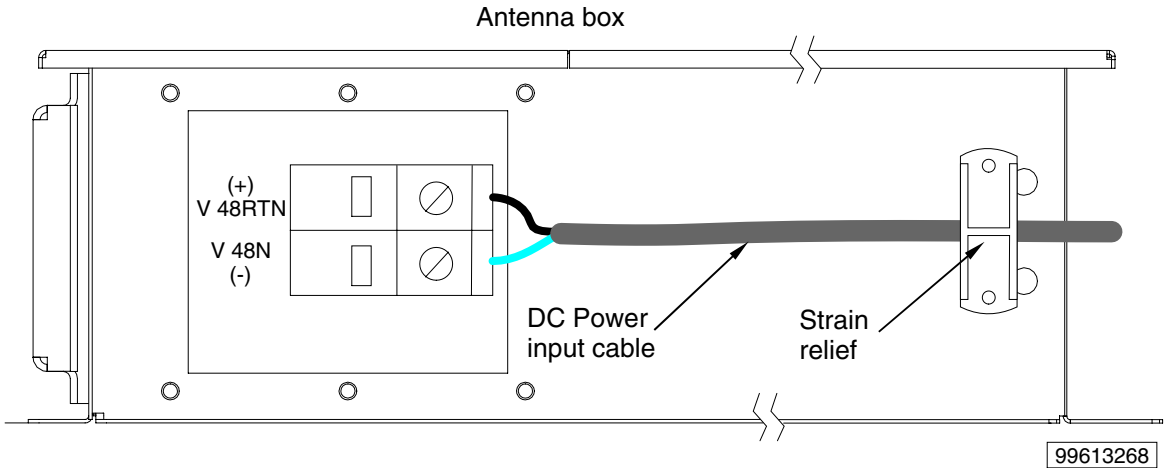

Figure 13. Connecting DC power to the BTS

6 Synchronising cabinets

This chapter describes how to synchronise a Nokia UltraSite EDGE BTS to another Nokia UltraSite EDGE BTS with a synchronisation cable kit.

6.1 Ordering synchronisation cable kits

Table 14 lists specifications for the synchronisation cable kit (070366xx) available for the Nokia UltraSite EDGE BTS.

Table 14. Cabinet-to-cabinet synchronisation cable kit

Cable code	Connector type	From connector	To connector	Cable length
993872xx	D15 (male)	Cabinet output	Cabinet input	Customer specific

6.2 Installing synchronisation cable kits

Figure 14 illustrates how to synchronise multiple cabinets using the synchronisation cable kit. The first cabinet in the synchronisation chain serves as the master and all other cabinets are slaves.

Note

The maximum length of synchronised cables allowed from the first to the last cabinet is 100 m (300 ft.). The maximum number of cabinets that can be chained together is nine including the master.

To synchronise two or more Nokia UltraSite EDGE BTSs:

1. Plug the synchronisation cable of the master cabinet into the connector labelled CABINET OUTPUT.
2. Plug the other end of the synchronisation cable into the destination cabinet connector labelled CABINET INPUT (see Figure).
3. If required, repeat steps 1 and 2 to chain additional slave cabinets.

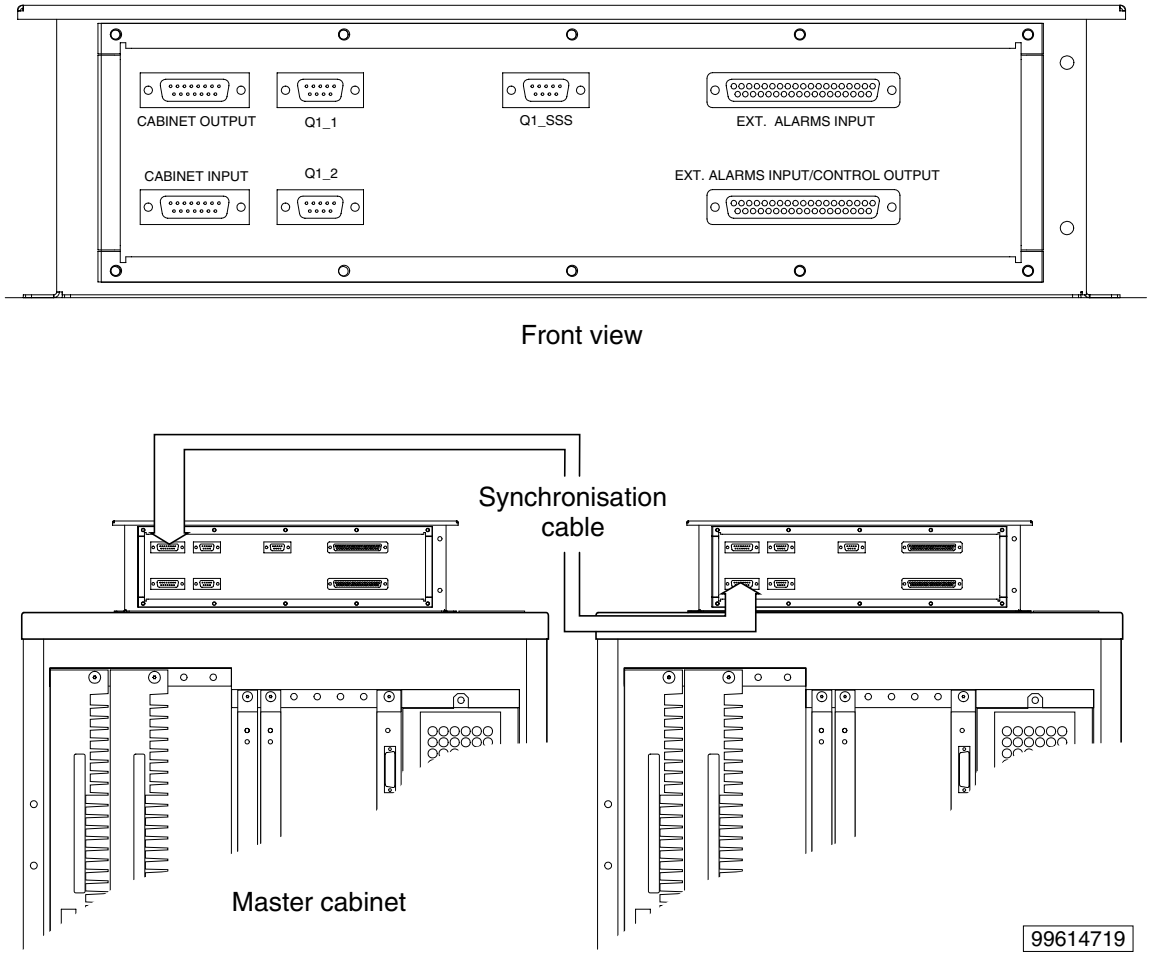

Figure 14. Synchronising multiple cabinets