Creating Stack, Wall and Pole Configurations

Contents

1 Overview

1.1 Overview of creating stack, wall and pole configurations

Purpose

These instructions show how to

- install Nokia Flexi EDGE BTS modules in a stack, wall or pole, and
- cable the BTS.

The configuration pictures in these instructions show how to create a *1+1 +1/2+2+2 2UD bypass configuration*.

For instructions on other configurations, see in *Hardware Configuration Reference Guide*.

Before you start

Check that you have the needed installation tools available. See *Appendix B Installation tools and torque values.*

Warning

This equipment generates electromagnetic fields. If performing installation or maintenance procedures on a base transceiver station (BTS), make sure that the transmitter is switched off.

Warning

The antenna generates electromagnetic fields at radio frequencies. Do not cross the compliance boundary.

Steps

1. **Unpack and check the delivery.**

   See *Handling the modules and unpacking the delivery.*

   See also *Appendix A Contents of delivery.*

2. **If you are installing the modules on a wall or pole, fix the adapter mechanics to the plinth.**

   See *Fixing adapter mechanics to plinth.*

3. **Install the plinth.**

   See one of the following:
   - *Anchoring the plinth on the floor.*
   - *Mounting the plinth on a wall.*
   - *Mounting the plinth on a pole.*

   You can also pre-assemble the plinth with two modules on the ground first and then lift the entire plinth (this is the easiest method in pole installation). For instructions on lifting the BTS, see *Lifting the stand-alone BTS.*

4. **Ground the plinth to the site main ground.**

   See *Grounding the plinth*.

5. **Install the modules in the casings and install the cable entries.**

   See the following instructions:
   a. If you are using the Power Module (FPMA) or the Power DC/DC 24V Module (FPDA), install the back covers on the casings before installing the modules. See one of the following:
      - *Installing covers in stacked installations*
      - *Installing covers in wall and pole installations*
   b. *Installing transmission sub-module*

c. See one of the following:
   - *Installing modules on the floor (stack)*
   - *Mounting the modules on a wall*
   - *Mounting the modules on a pole*

d. If you are installing any optional modules, see instructions in
   - *Installing Flexi Power Module (FPMA)*
   - *Installing Flexi Power DC/DC Module 24V (FPDA)*
   - *Installing Wideband Combiner Sub-module (EWxA)*
   - *Installing Flexi Mounting Auxiliary Brackets (FMAA)*
   - *Installing Flexi System External Alarm (FSEB)*

     See also Appendix C *FSEB interface signals and connector pin assignments*.

If you are using the optional power modules, see also module installation order in *Optional power modules (FPDA and FPMA) in Flexi EDGE BTS configurations in Hardware Configuration Reference Guide.*

6. Connect the cables.

Review *Cabling principles*, *Appendix D External interfaces* and *Cabling*.

The order to connect the cables is as follows:

a. *Grounding cables*
b. *External power cables*
c. *Dual Duplexer Module cable*
d. *Bus cables*
e. *Internal power cables*
f. *RF cables*
g. *Antenna jumper cables*
h. *Transmission cables*
i. Optional cables, see section *Connecting optional cables.*
   i. *Flexi Power Alarm (FPMA) cables*
   ii. *External alarms and controls (EAC) cables*
   iii. *Synchronisation cables*
   iv. *Connecting Q1 cable*
   v. *Local management port (LMP) cables*
   vi. *Location Management Unit (LMU) cables*

7. In stack or pole installation, install side cable tunnels (optional).

See *Installing optional side cable tunnels.*

8. Install module front covers.

See one of the following:

- *Installing covers in stack installations.*
- *Installing covers in wall and pole installations.*

Further information

Next, commission the BTS. See *Nokia Flexi EDGE BTS Commissioning.*

1.2 Cabling principles

1.2.1 Cabling principles in stacked, wall and pole installation

There are two cable entries in Nokia Flexi EDGE BTS, internal and external. Internal cable entries are located between the modules, and external cable entries are installed on the sides of the modules.

Internal cable entries are used only with RF cabling and only if the configuration is bigger than a 2+2+2. If using internal cable entries, tear off the protective stickers on the internal cable entries before connecting the cables between the modules.

When preparing the external cable entries, cut a slit in the cable entry for the cables.

Caution

Do not overbend cables. The minimum bending diameter for the cables is listed in the Appendix *Bending diameter for cables.*

Cable routing principles

Figure *Cable entry* shows where to route each cable through the external cable entry. The figure also shows which cables are routed via the left and which ones via the right cable entry in stack installation.

Route the following cables through the lower holes of the cable entry on the right side of the System Module (ESMA):

- Transmission
- Q1
- Local management port (LMP)
- Synchronisation
- External alarm and control (EAC)
- Flexi power alarm (FPA)
- Site Support alarms

In wall and pole installation, cables should be routed through the bottom cable entry whenever possible. See figure *Example of routing antenna jumper cables in wall installation* where all the antenna jumper cables are routed from the bottom cable entry.

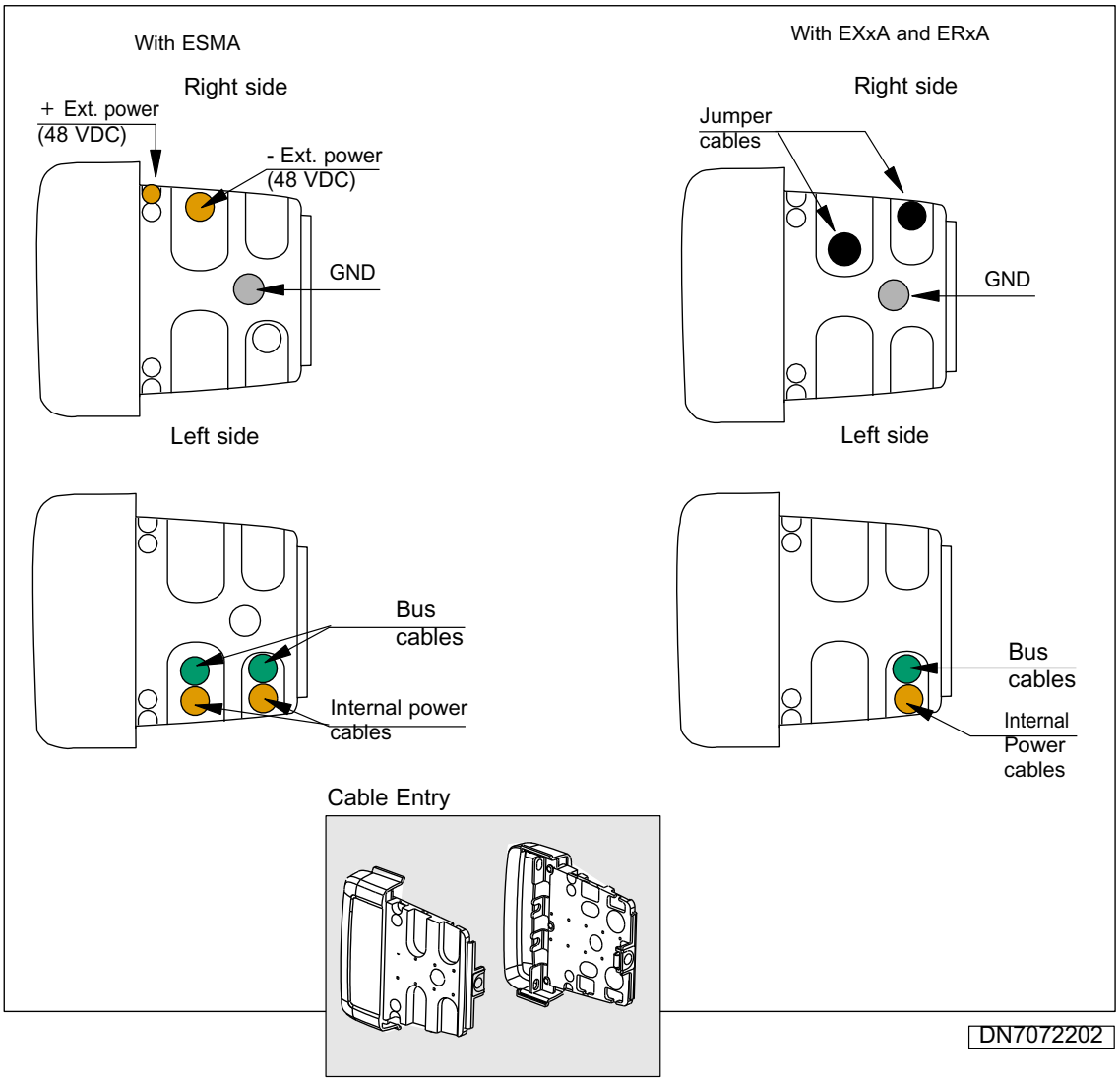


Figure 1. Cable entry

Table 1. Cable routing principles in stack installation

Cable entry	Cables
Internal cable entries	• RF cables

Table 1. Cable routing principles in stack installation (cont.)

Cable entry	Cables

External cable entries (right side)	• External power cables
	• Antenna jumper cables
	• Transmission cables
	• Ground cables
	• Optional cables:
	  • External alarm and control (EAC)
	  • Synchronisation
	  • Site support interface
	  • Flexi power alarm (FPA)
	  • Local management port (LMP)
	  • Location management unit (LMU)

External cable entries (left side)	• Bus cables • Internal power cables • RF cables (routed through the cable entry only if the configuration is 3+3+3 or bigger, and if the Dual TRX Modules in the same sector are not physically located next to each other in a stack).

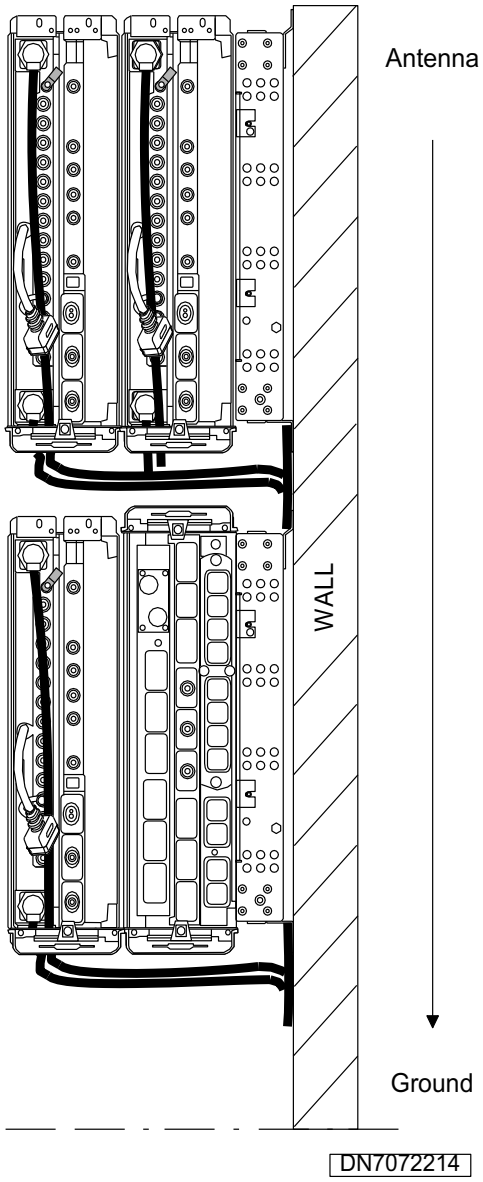


Figure 2. Example of routing antenna jumper cables in wall installation

1.2.2 Cable clamps in stacked, wall and pole installation

The strain relief of cables in stacked floor, wall or pole installation is done with cable clamps attached on the side of the casing.

The cables are fixed with standard cable ties, except for power supply cables. The fixing of power supply cables is done with special isolating cable clamps, which come with the casing delivery.

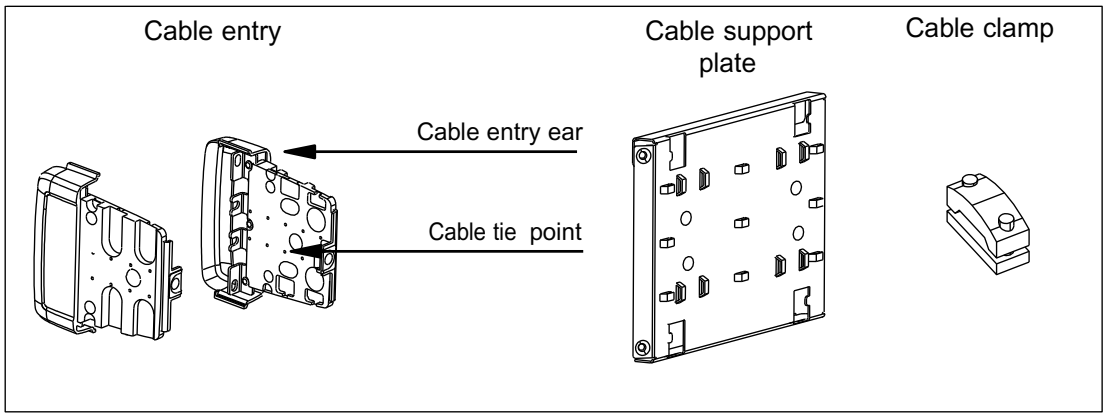


Figure 3. Cable entry, cable support plate and cable clamp

1.2.3 Optional cable tunnels

You can use the optional cable tunnels to hide excess cabling on the side of stack or pole configurations. Cable tunnels are not required for weather protection.

If you are going to use cable tunnels, follow these principles for the cable tunnels to fit properly:

- Route the external cables on the right side of the BTS, and tie all cabling in between the top and bottom square holes on the support plates.
- Route the internal cables on the left side of the BTS, and tie all side cabling as follows, using the square holes on the support plates as guides:
  - For vertical routing, tie the cables in between the beginning of the front hole and beginning of the rear hole.
  - For horizontal routing, tie the cables in between the top and bottom square holes.
  - Do not route internal cables through the back.
- Remove the ears from cable entries before installation.

For installation instructions, see *Installing optional side cable tunnels*.

2 Anchoring the plinth on the floor

Purpose

The plinth is mandatory when the modules are not mounted in an optional cabinet or 19" rack.

Before you start

- When choosing the location for the plinth, take into consideration the required maintenance space. See figure *Anchoring plinth on base with maintenance space in the back* for details.
- If there are more than five modules in a stack, side access to the back is needed for back maintenance.

  See the following figures for clearances and Earthquake Zones 2 and 4 mounting holes.

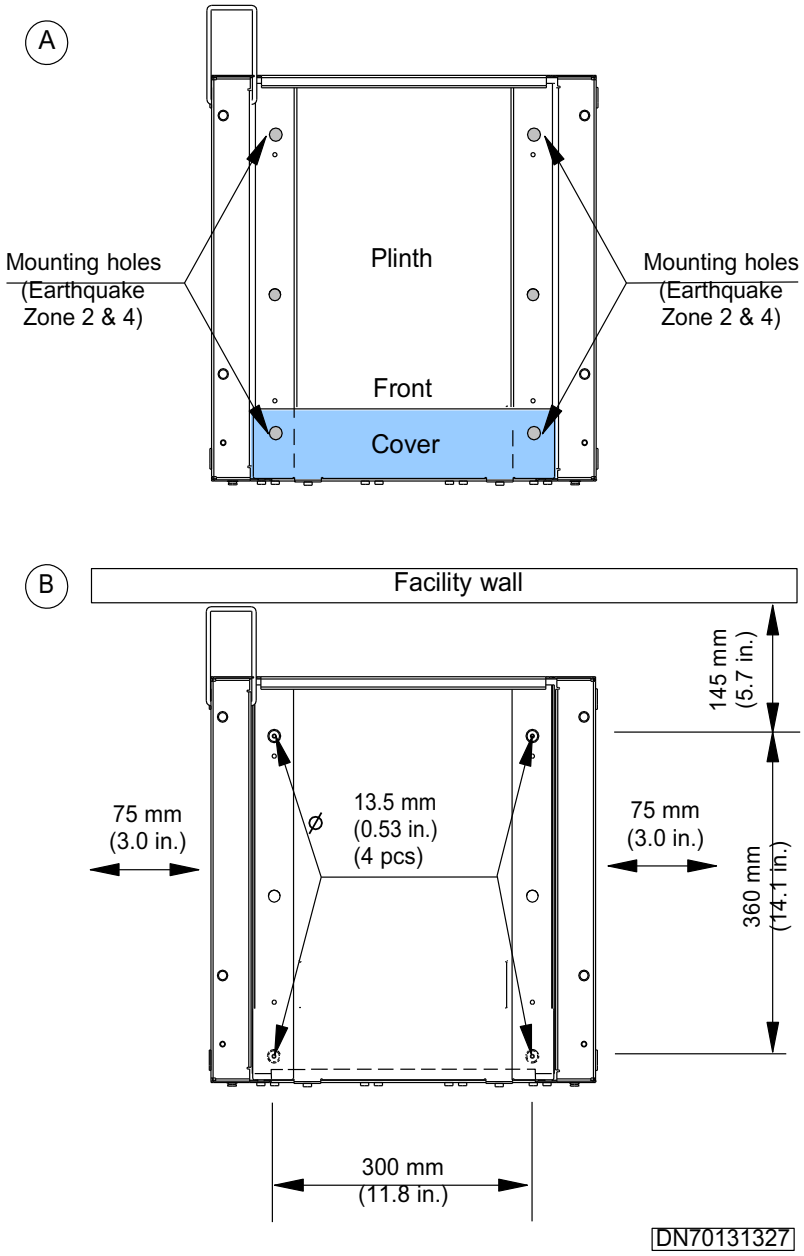
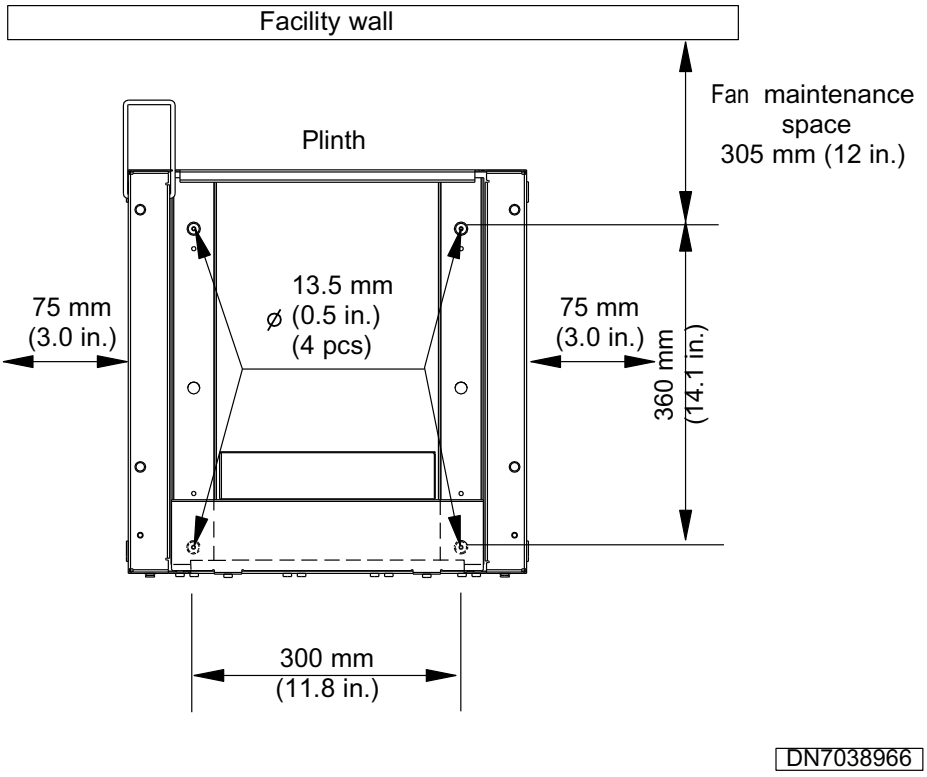


Figure 4. Plinth anchoring points, minimum clearances



The required back space for maintenance is 200 mm (7.9 in.) in a stack with five modules or less, and 500 mm (19.7 in.), in a stack with more than five modules.

Figure 5. Anchoring plinth on base with maintenance space in the back

Steps

1. **Turn the rear stopper.**

2. **Place the plinth on the floor, grounding points facing forward, rear stopper against the wall if back access is not required.**
   a. Remove the front cover of the plinth to access the two front mounting holes.
   b. Remove the six rubber seals.
   c. Check if the floor is level. If the floor is not level, install shims.

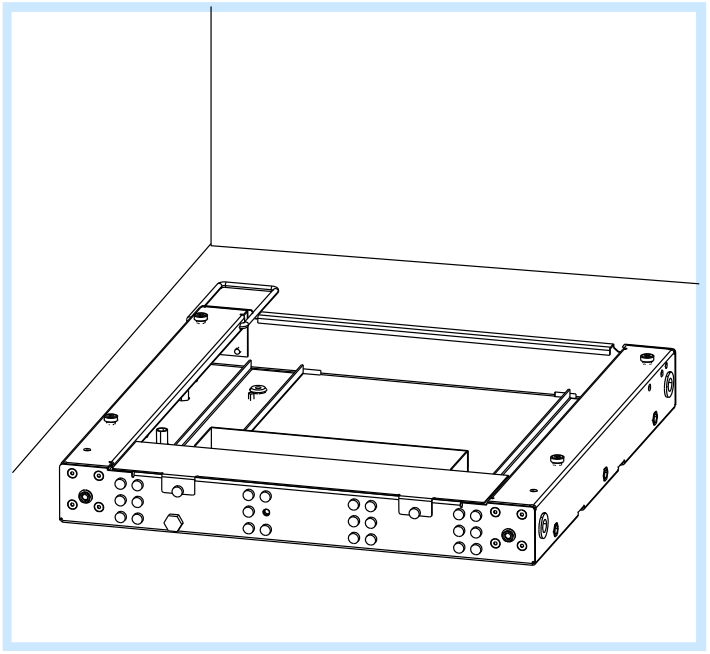


Figure 6. Plinth installation position

3. Anchor the plinth on the floor.

Anchor the plinth on the floor with 4 anchoring bolts, 12 mm (0.47 in.) in diameter, and tighten it to 49 Nm.

Note

The plinth must be fixed to the floor to meet the Earthquake Zone 4 requirement. Make sure that the floor is strong enough.

Further information

Next, ground the plinth to the site main ground.

3 Mounting the plinth on a wall or pole

3.1 Fixing adapter mechanics to plinth

Purpose

Adapter mechanics brackets are installed on the plinth in wall and pole installations.

Summary

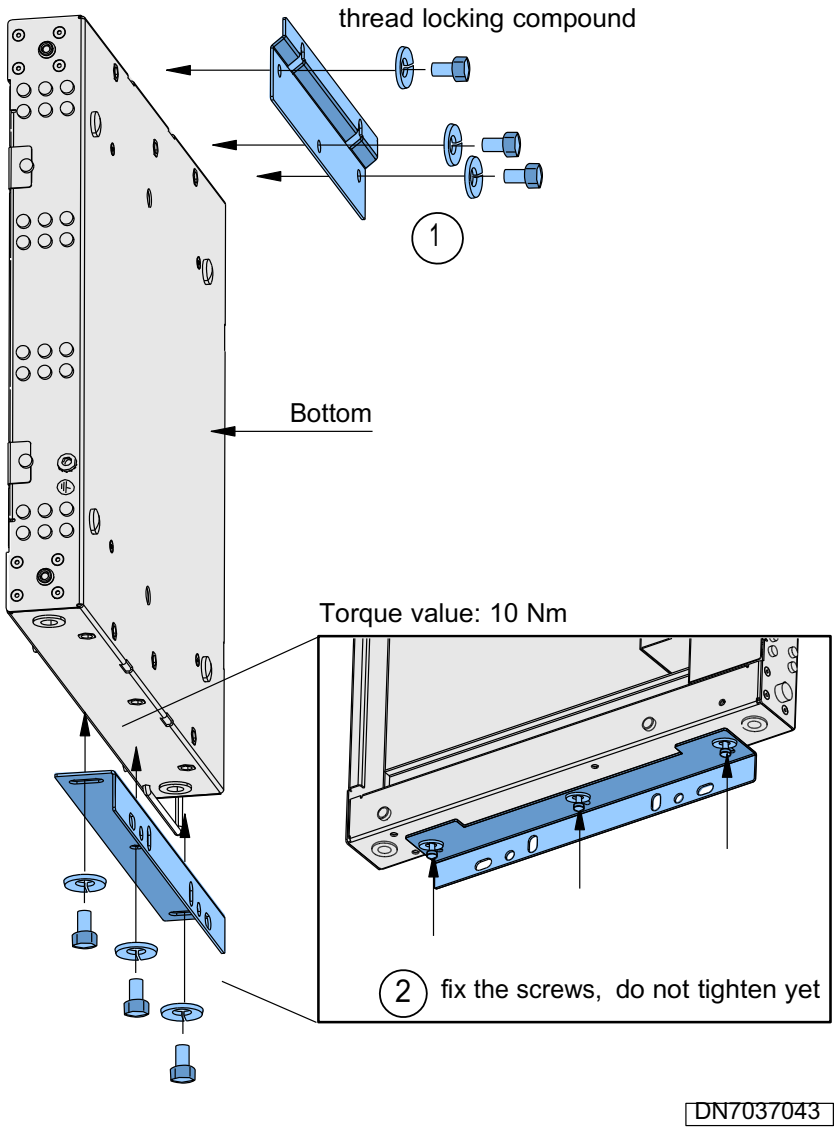


Figure 7. Fixing adapter mechanics to plinth (right-hand installation)

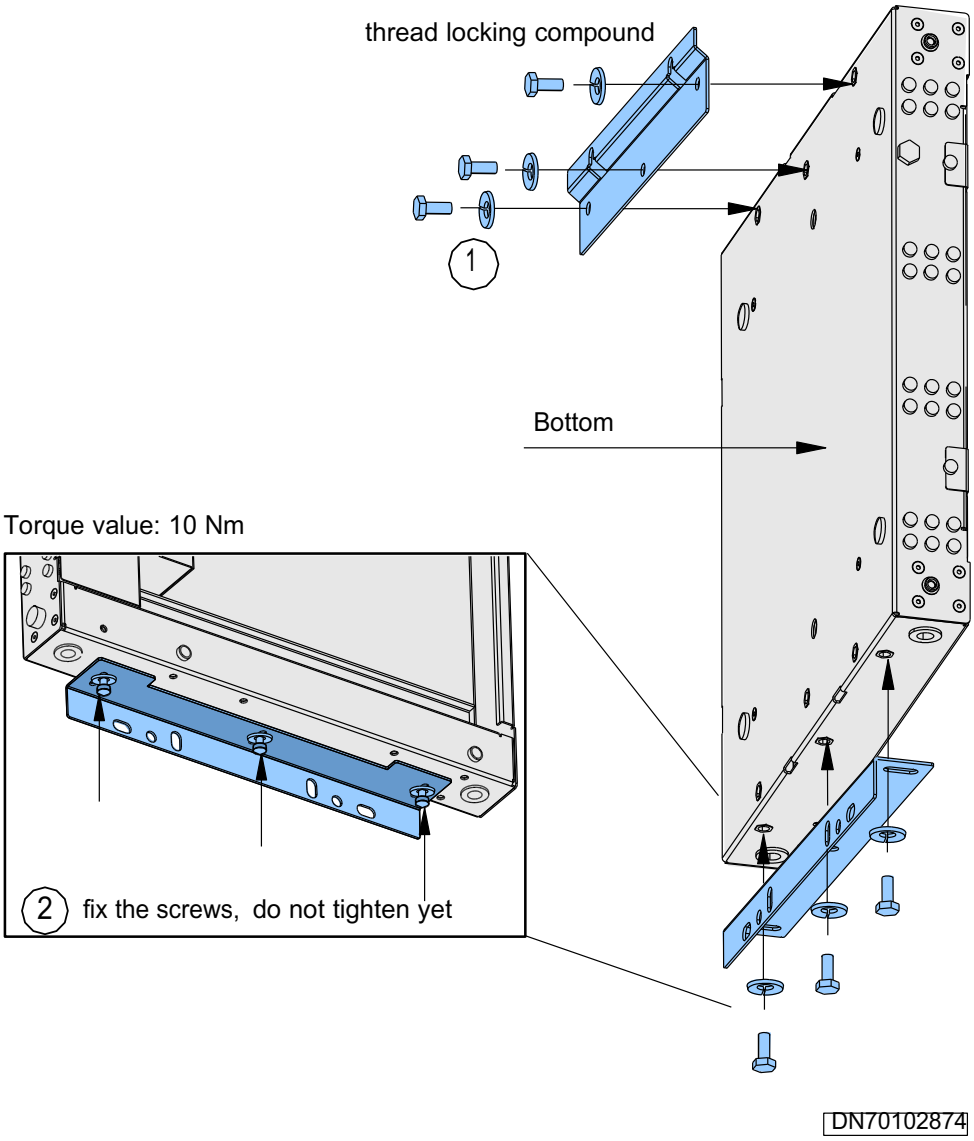


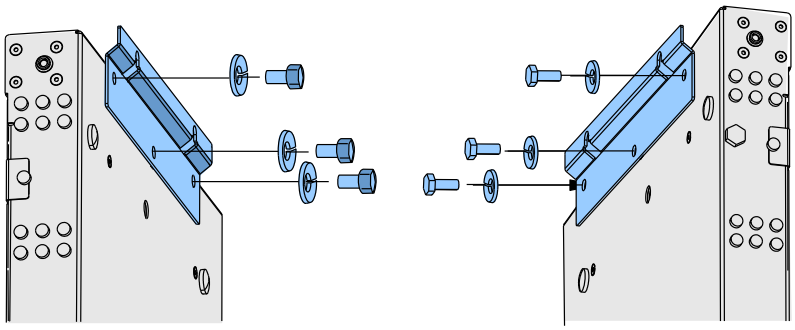
Figure 8. Fixing adapter mechanics to plinth (left-hand installation)

Steps

1. **Fix the upper bracket of the adapter mechanics on the plinth with three screws.**

   Tighten the screws to 10 Nm.

In pole installations, if you are installing modules on both sides of the pole, make sure you install the upper bracket on the opposite side of each plinth so that the plinths are facing the same direction.



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Note

Secure the screws with thread locking compound in pole and wall installations.

2. **Fix the lower bracket of the adapter mechanics on the plinth with three screws. *Do not tighten the screws yet*.**

   When the screws are left loose at this point, it allows the plinth to move slightly and prevents twisting in the installation phase.

3.2 Mounting the plinth on a wall

Purpose

A plinth is required for mounting the modules on a wall.

Before you start

Check that the plinth adapter mechanics are installed as instructed in the *Fixing adapter mechanics to plinth* section.

If installing additional plinths one upon the other, the distance between the upper mounting screw holes in first and second plinth must be 550 mm (21.7 in.) minimum.

Summary

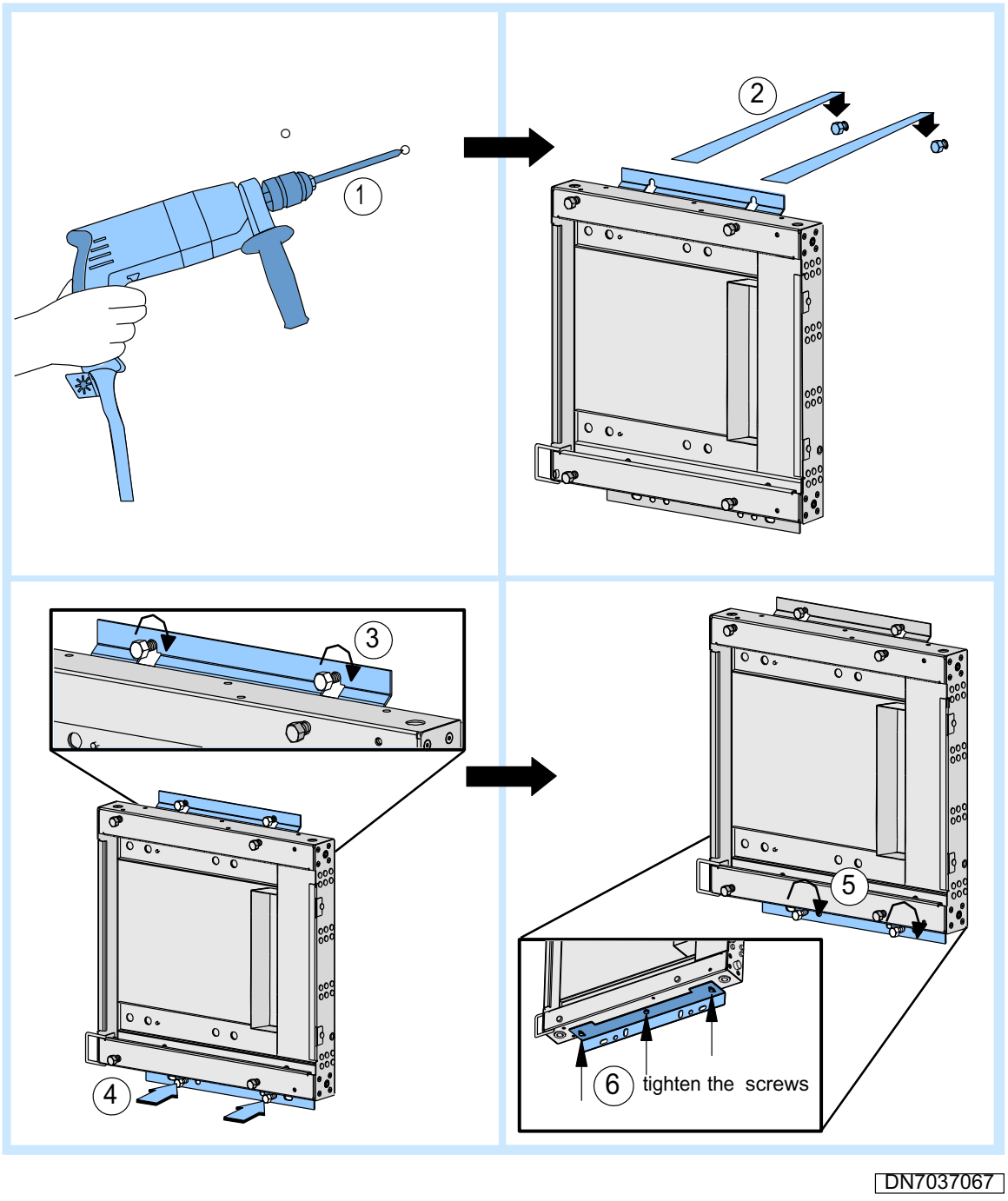


Figure 9. Mounting the plinth on a wall

Steps

1. **Mark the mounting screw locations on the wall and drill the holes for the screws.**

2. **Fix the upper mounting screws to the wall, lift the plinth on the wall and fit it to the mounting screws.**

   Check that the plinth is level.

3. **Tighten the upper mounting screws.**

4. **Insert the lower mounting screws.**

5. **Tighten the lower mounting screws.**

6. **Make sure that the plinth is not twisted.**

   When the plinth is in a correct position, tighten the three screws in the lower bracket of the adapter mechanics.

7. **In case you are installing more than one plinth, repeat steps 1-6 for each plinth.**

   Note that the required space between the plinths is 100 mm.

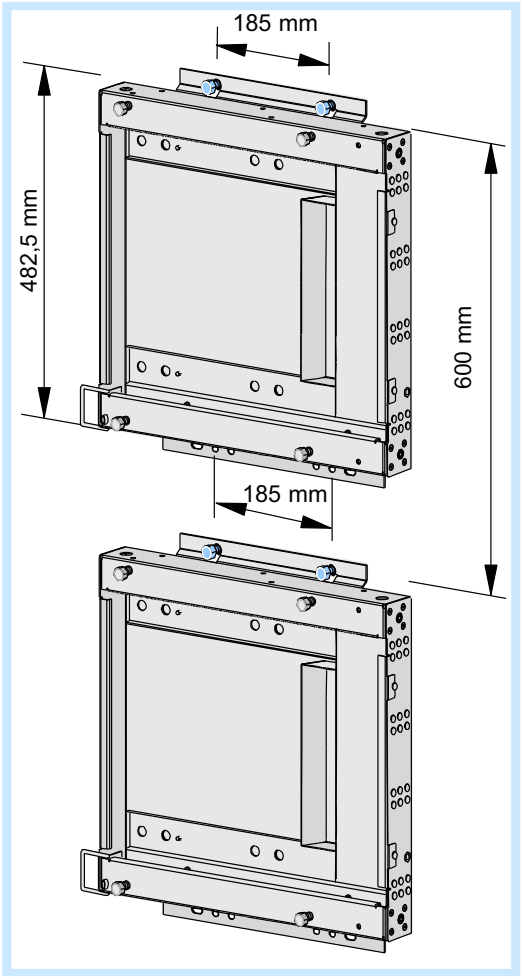


Figure 10. Mounting a second plinth on the wall

Further information

Next, ground the plinth to the site main ground. For more information, see *Grounding the plinth*.

3.3 Mounting the plinth on a pole

Purpose

A plinth and pole mounting kit are required for mounting modules on a pole. In pole installation, one plinth can have maximum two modules installed. If the configuration has more than two modules, additional plinths must be installed. Two plinths can be installed on one pair of mounting brackets (on opposite sides of the pole).

Before you start

Check that the plinth adapter mechanics are installed as instructed in the *Fixing adapter mechanics to plinth* section.

You can pre-assemble the plinth on the ground with two modules, and then mount the entire plinth. For instructions on module installation, see *Mounting the modules on a pole.*

There are three different lengths of bolts available and four places for the bolts in the pole mounting brackets. When attaching the brackets to the pole, use the shortest possible bolts and the holes whose distance is the closest to the pole diameter. See the following table and figure for more details.

Table 2. Pole mounting brackets bolt lengths, hole numbers and torque values

Pole diameter	Bolt length	Hole number*	Torque value
60-90 mm	120 mm	1	29 Nm
95 - 125 mm	120 mm	2	29 Nm
126 - 165	200 mm	1	29 Nm
166 - 210	200 mm	2	29 Nm
211 - 255	300 mm	3	29 Nm
256 - 300	300 mm	4	29 Nm
*Hole numbering is presented in the following figure.			

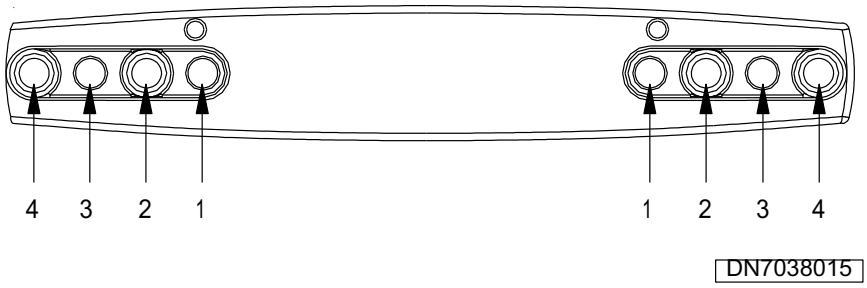


Figure 11. Pole mounting bracket hole numbering

Summary

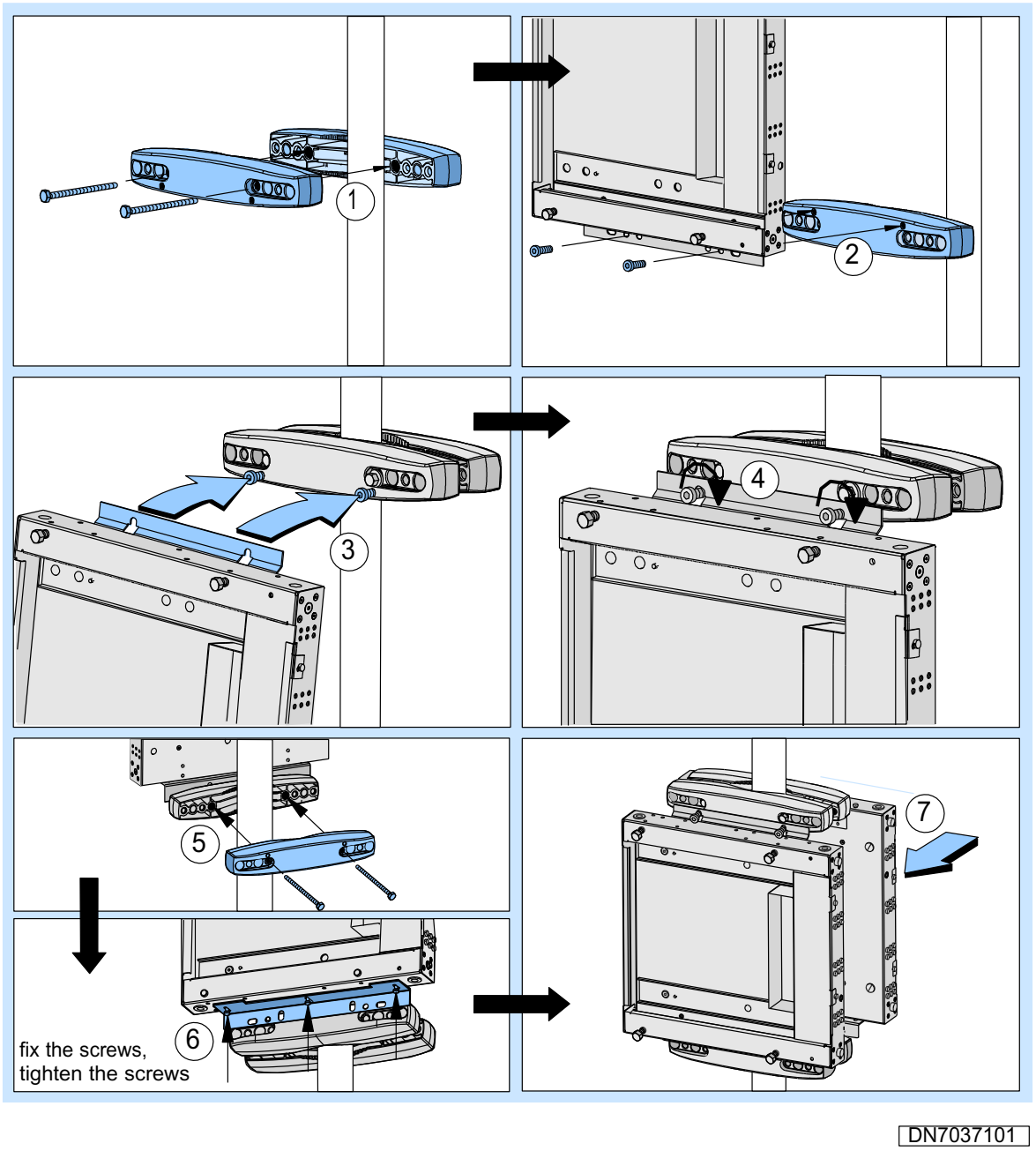


Figure 12. Mounting the plinth on a pole

Steps

1. **Fix the upper pole mounting bracket on the pole and attach the mounting screws on the bracket.**

   Make sure that the mounting screws in the upper pole mounting bracket are on the lower edge of the bracket. Attach the screws loosely at this point.

2. **Fix one half (the one with threads) of the lower pole mounting bracket on the plinth adapter mechanics with the mounting screws.**

   Make sure that the mounting screws in the lower pole mounting bracket are in the upper edge of the bracket.

3. **Lift the plinth on the pole and fit it to the pole mounting bracket's mounting screws.**

   See *Lifting the stand-alone BTS* for lifting instructions.

4. **Tighten the mounting screws.**

5. **Place the counterpart of the lower pole mounting bracket in its place and tighten the screws.**

6. **Make sure that the pole mounting brackets are aligned and the plinth is not twisted.**

   When the plinth is in a correct position, tighten the three screws in the lower bracket of the adapter mechanics.

7. **If a second plinth is required, install it on the other side of the pole mounting bracket (if there is enough space).**
   a. Fix the adapter mechanics on the plinth as described in Step 1 above.
   b. Fix the mounting screws on the upper pole mounting bracket.
   c. Lift the plinth on the pole and fit it to the pole mounting bracket's mounting screws and tighten the screws.
   d. Insert the lower fixing screws to fix the plinth on the lower pole mounting bracket. Tighten the mounting screws.
   e. Make sure that the plinth is not twisted. When the plinth is in a correct position, tighten the two remaining screws in the lower bracket of the adapter mechanics.

Further information

Next, ground the plinth to the site main ground. See *Grounding the plinth*.

4 Grounding the plinth

Purpose

The plinth is grounded to the site main ground. The plinth must be grounded after it is installed.

Summary

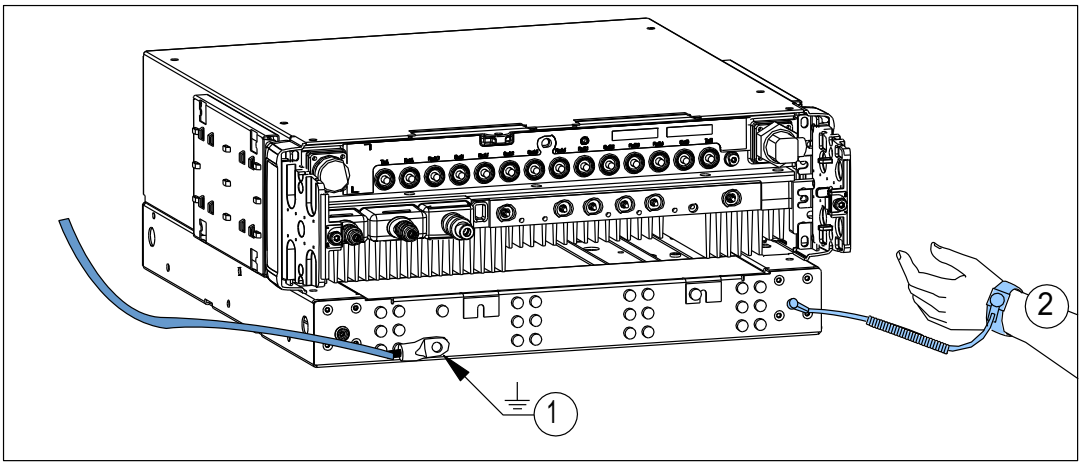


Figure 13. Grounding the plinth

Steps

1. **Ground the plinth to the site main ground.**
2. **Connect the wrist strap.**

5 Handling the modules and unpacking the delivery

Before you start

Caution

Electrostatic discharge (ESD) may damage the modules. Wear an ESD wrist strap or use a corresponding method when handling the modules.

Caution

Modules are vented for ingress protection. Do not puncture the vent hole when handling the modules.

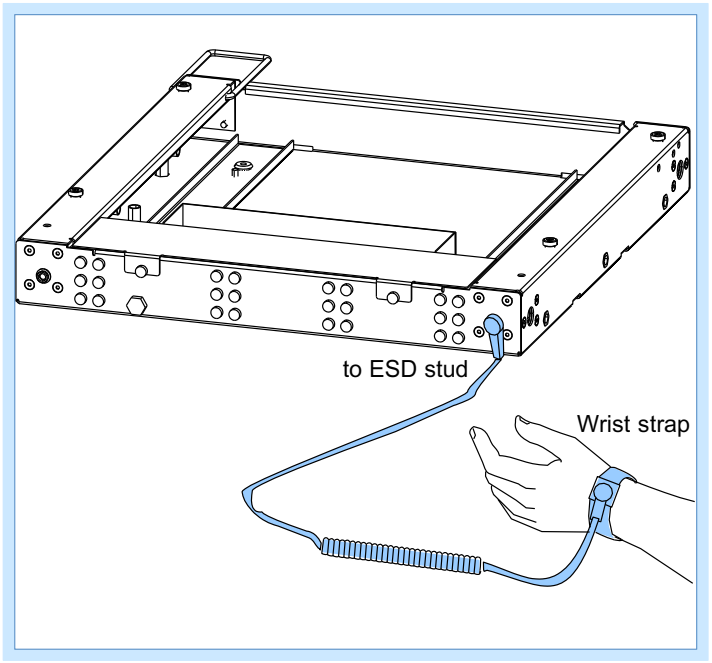


Figure 14. Connecting the antistatic wrist strap

Summary

Unpack and check the delivery carefully before the installation to make sure that all the required items are available and undamaged.

Steps

1. **Carefully check the contents of the delivery.**
2. **Remove the items from the package.**
3. **Check that the delivery is complete and undamaged.**
4. **Recycle the packaging material.**
5. **Proceed to the module installation procedure.**

6 Lifting the stand-alone BTS

Purpose

You can pre-assemble the plinth with two modules on the ground and then lift the entire plinth. This is the easiest method especially in pole installation. You can, however, also lift and mount the plinth first and then install and cable the modules, similarly as in stack installation. When lifting a single module, a lifting bag must be used.

Before you start

Install the plinth and modules as instructed in

- *Mounting the plinth on a wall* or *Mounting the plinth on a pole*
- *Mounting the modules on a wall* or *Mounting the modules on a pole*

Warning

The equipment is heavy. Take care when lifting it.

Caution

The plinth rear stopper is fragile. Do not attempt to lift the plinth using the rear stopper.

Steps

1. **Attach the lifting eye bolts to the attachment points in the plinth.**

   Lifting eye bolts (M12) are not included in the delivery. You can order the LEKA kit separately from your NSN supplier.

2. **Attach the hoisting belt or the rope to the lifting eye bolts.**

Attach the hoisting belt or rope so that the angle between the belt or rope and the plinth is minimum 60°. The distance between the plinth and the belt or rope is minimum 400 mm (15.6 in.).

Note that the weight of two casings with modules can be up to 50 kg (110 lbs.) in a wall or pole configuration.

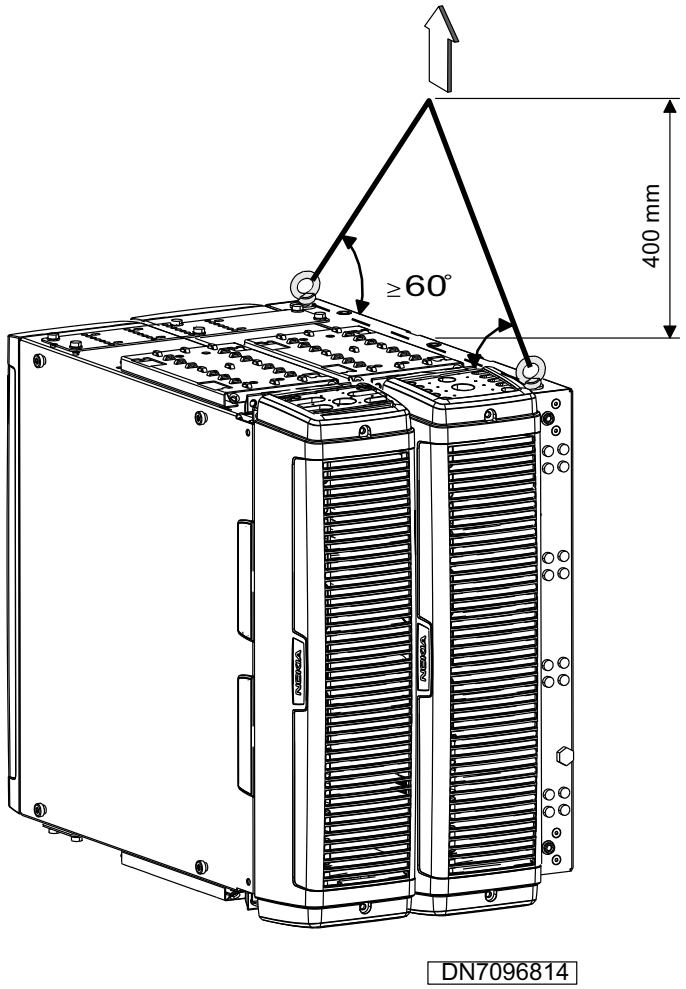


Figure 15. Lifting the stand-alone BTS

3. Lift the BTS carefully to the desired installation height.

4. Mount the BTS.

5. Remove the lifting equipment.

7 Installing the modules

7.1 Installing transmission sub-module

Purpose

Transmission sub-module is installed in the System Module (ESMA). The sub-module is chosen based on the transmission requirements of each site.

Before you start

Caution

Electrostatic discharge (ESD) may damage the modules. Wear an ESD wrist strap or use a corresponding method when handling the modules.

Summary

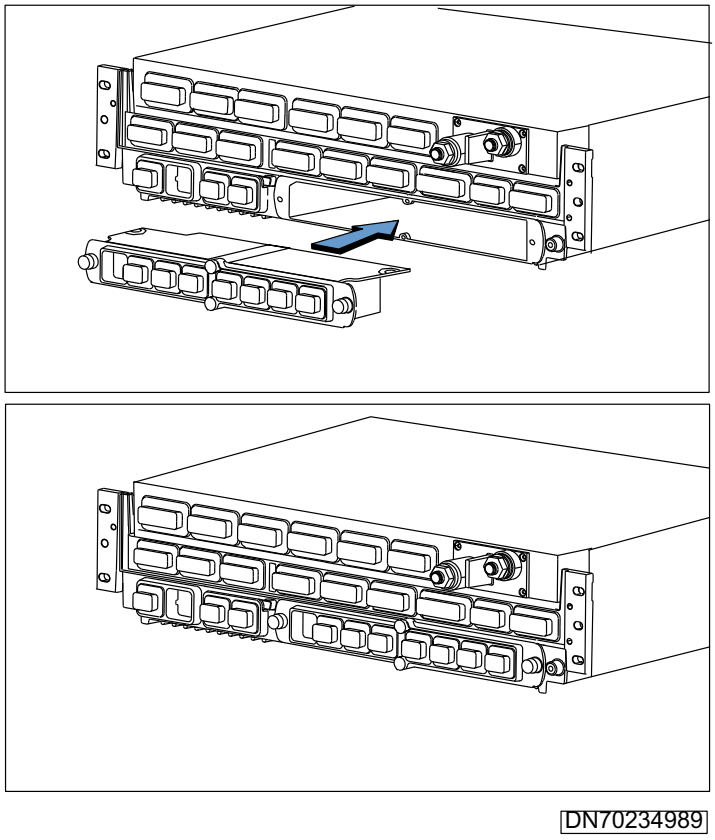


Figure 16. Installing FIPA/FIEA

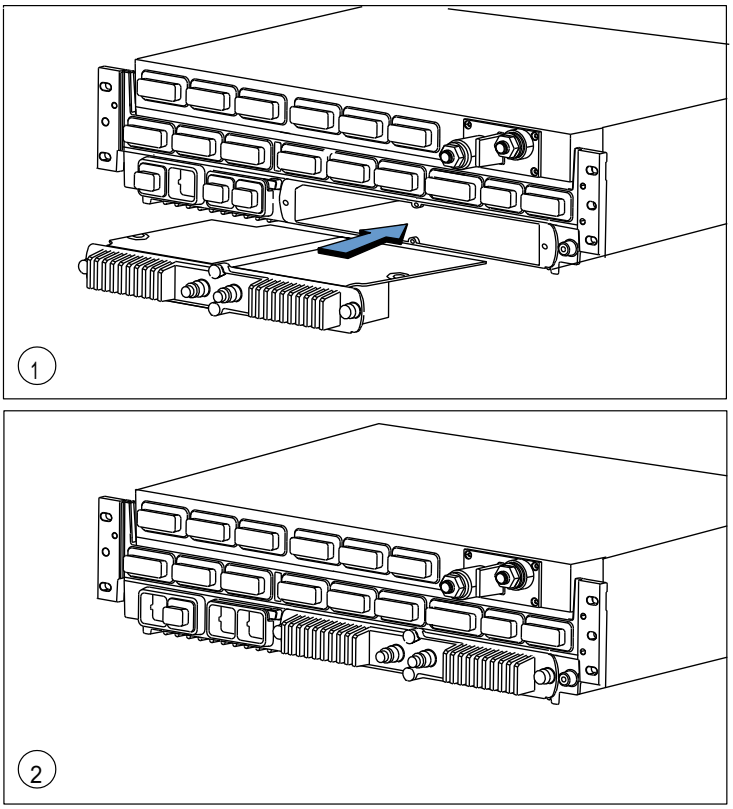


Figure 17. Installing FIFA

Steps

1. **Align the transmission sub-module in the System Module using the slots on the sides. Push the sub-module in place.**

2. **Fix the transmission sub-module with 4 x M5 screws using the TORX head screw.**

   Tighten at 2.0-2.5 Nm (1.5-1.8 ft-lb).

7.2 Installing modules on the floor (stack)

Purpose

Nokia Flexi EDGE BTS modules can be installed on the floor in a stack of up 22 U (1045 mm, 41.1 in.). 22 U is equal to a 4+4+4 2UD 2-Way WBC configuration with 24 VDC power (2 FPDAs).

To meet the earthquake requirement Bellcore GR-63-CORE, Vibrational requirements for earthquake Zone 4, no more than five casings (2U or 3U) can be installed in one stack.

Before you start

Check that:

- the plinth is installed as instructed in the *Anchoring the plinth on the floor* section
- the plinth is grounded as instructed in *Grounding the plinth in stack installation*.

The installation order varies by configuration. The figures below show the installation order for a 1+1+1/2+2+2 stack configuration. For other configurations, see instructions in *Hardware Configuration Reference Guide.*

For a 1+1+1/2+2+2 configuration, you need the following modules:

- one System Module (ESMA)
- one transmission sub-module (FIxA)
- three Dual TRX Modules (EXxA)
- three Dual Duplexer Modules (ERxA)

Always install the Dual TRX Module (ERxA) before the Dual Duplexer Module (ERxA), and the Dual Duplexer Module directly on top of the Dual TRX Module.

Summary

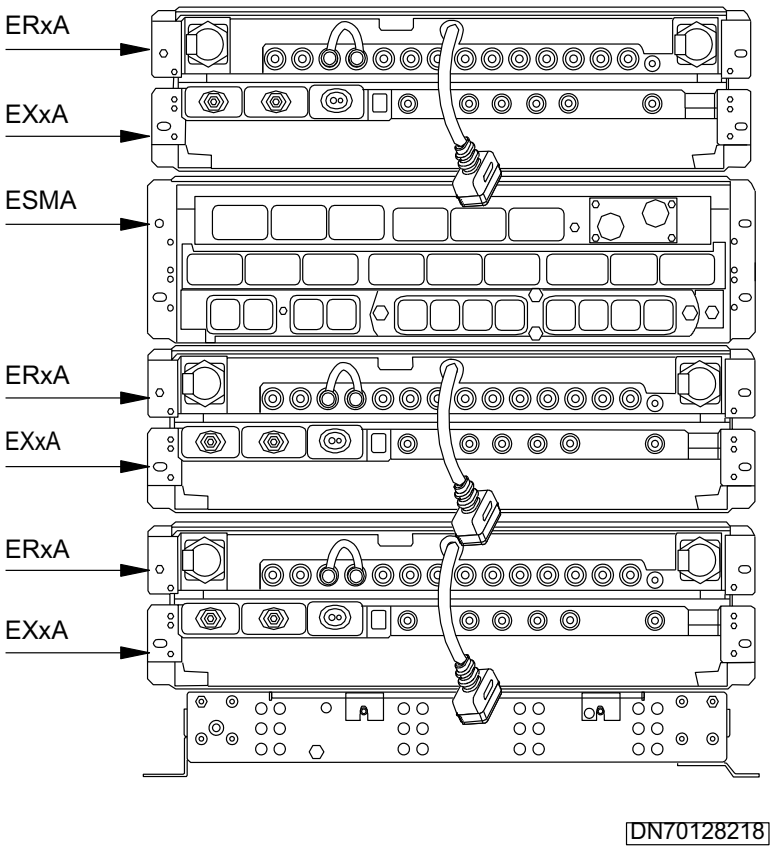


Figure 18. Module installation order in a 1+1+1/2+2+2 stack configuration, optimised for expansion

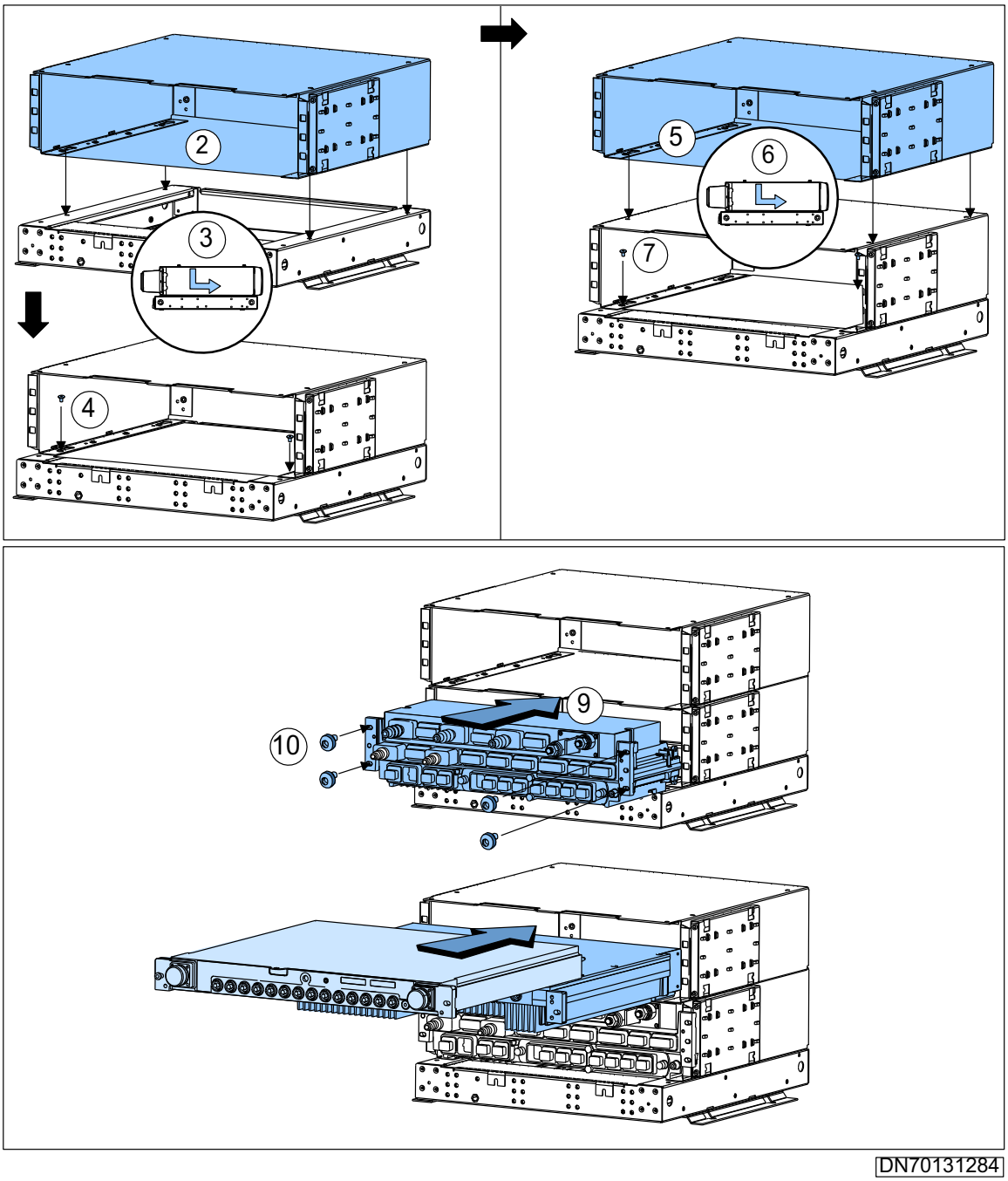


Figure 19. Summary of installing modules in a stack

Steps

1. **If you are installing the Power Module (FPMA) or Power DC/DC 24V Module (FPDA), attach the back covers to the casings.**

   For instructions, see *Installing covers in stacked installations.*

2. **Align the holes of the first casing bottom with the fixing studs on the plinth.**

3. **Push the casing back until it stops.**

4. **Attach the casing to the plinth with M5 x 6 mm (0.2 in.) screws.**

5. **Align the holes of the next casing bottom with the fixing studs from the previous casing.**

6. **Slide the casing back until it stops.**

7. **Attach the casings to each other with M5 x 6 mm (0.2 in.) screws.**

8. **Repeat steps 2-7 for each subsequent casing.**

9. **Slide the module(s) into the casing.**

10. **Attach the module(s) to the casing with M5 x 25 mm (1.0 in.) screws.**

Tip

Align the module in the casing, and tighten the screws diagonally (instead of tightening the screws on one side first).

11. **Repeat steps 9-10 for each subsequent module.**

12. **Attach the cable entries to the casings with two M5 x 6 mm (0.2 in.) screws.**
    a. Fix the screws (do not tighten yet).
    b. Attach the cable entry to the casing.
    c. Tighten the screws.

7.3 Mounting the modules on a wall

Purpose

Flexi EDGE BTS modules can be installed on a wall.

Before you start

Check that:

- the plinth is installed as instructed. See *Mounting the plinth on a wall* for plinth installation instructions
- the plinth is grounded as instructed in *Grounding the plinth*.
- there is one plinth per two modules.
- If you are installing the Power Module (FPMA), connect the AC cable before mounting the FPMA. For instructions, see *Installing Flexi Power Module (FPMA).*

The installation order varies by configuration. The figure below shows the installation order for a 1+1+1/2+2+2 wall configuration. For other configurations, see instructions in *Hardware Configuration Reference Guide.*.

For a 1+1+1/2+2+2 configuration, you need the following modules:

- one System Module (ESMA)
- one transmission sub-module (FIxA)
- three Dual TRX Modules (EXxA)
- three Dual Duplexer Modules (ERxA)

! Caution

Excess torsion damages the casings. In wall and pole installation, do not install more than two modules per plinth.

Caution

Incorrect installation may lead to damage to the modules. The modules must be installed with the front panels facing left or right. Do not install the modules with the front panels facing up or down.

Caution

Leave 100 mm (3.9 in.) space between modules.

Summary

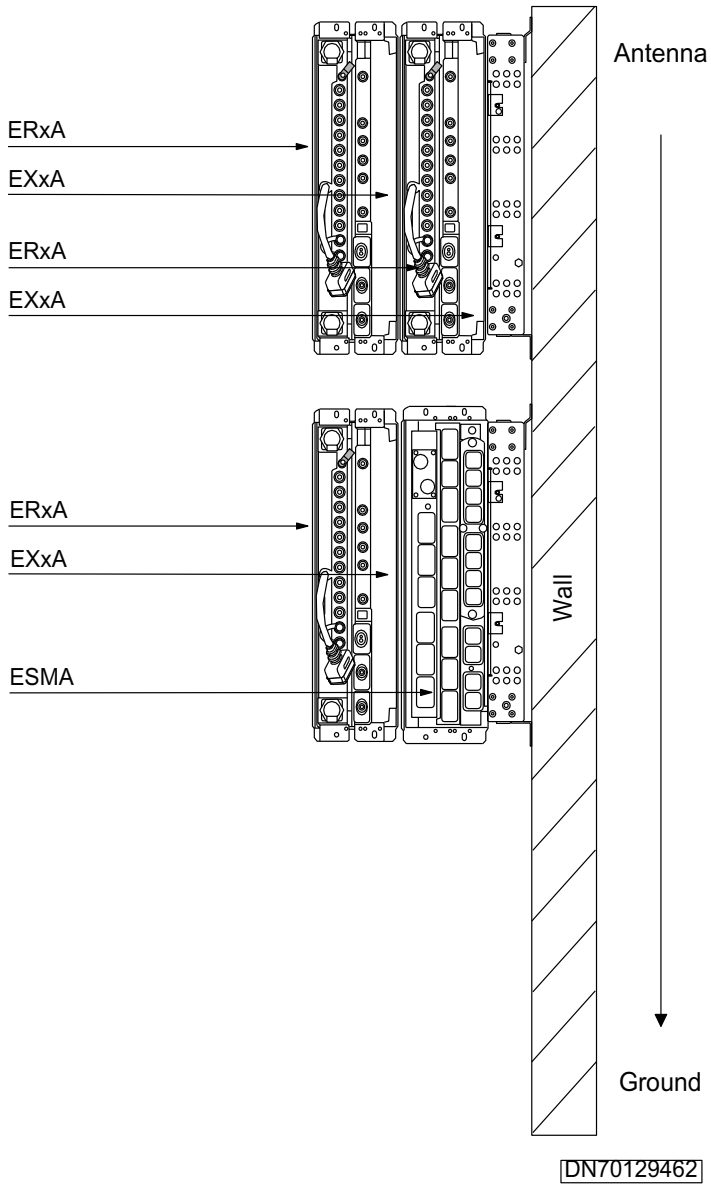


Figure 20. Module installation order in a 1+1+1/2+2+2 wall configuration

Caution

Risk of damage to equipment. If the base transceiver station (BTS) is exposed to weather conditions, install the modules so that the System Module power terminals are facing down, as shown in the figure below.

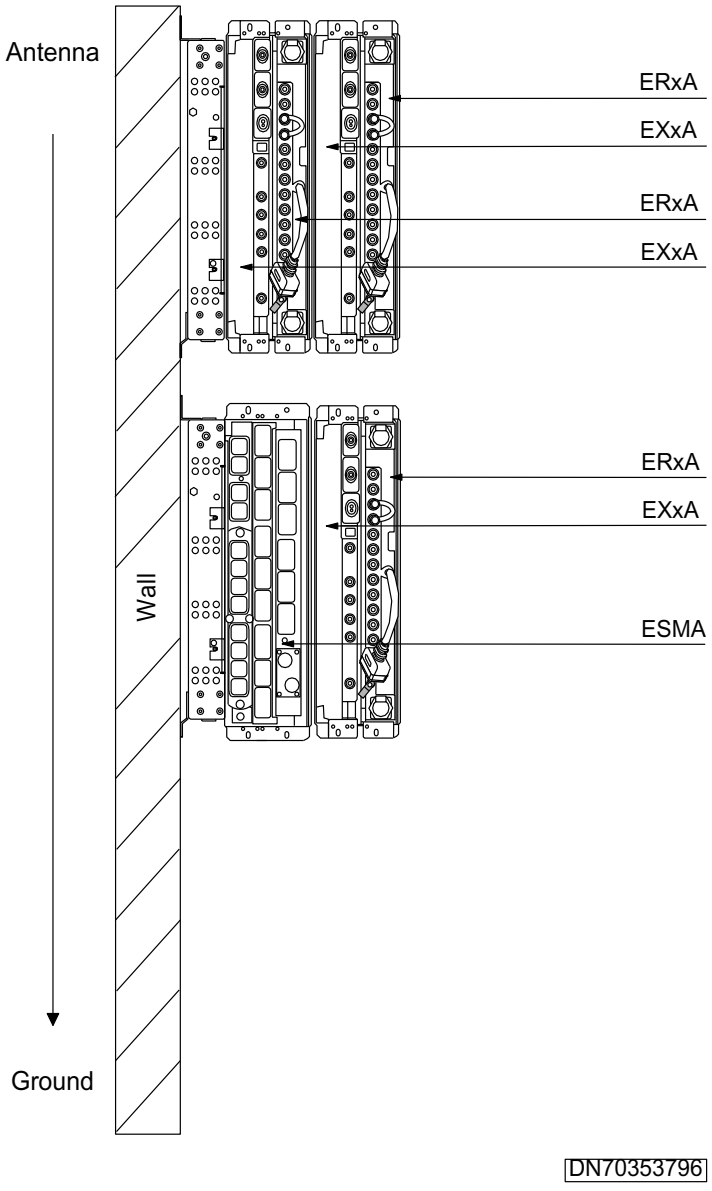


Figure 21. Module installation order in a 1+1+1/2+2+2 wall configuration, System Module power terminals facing down

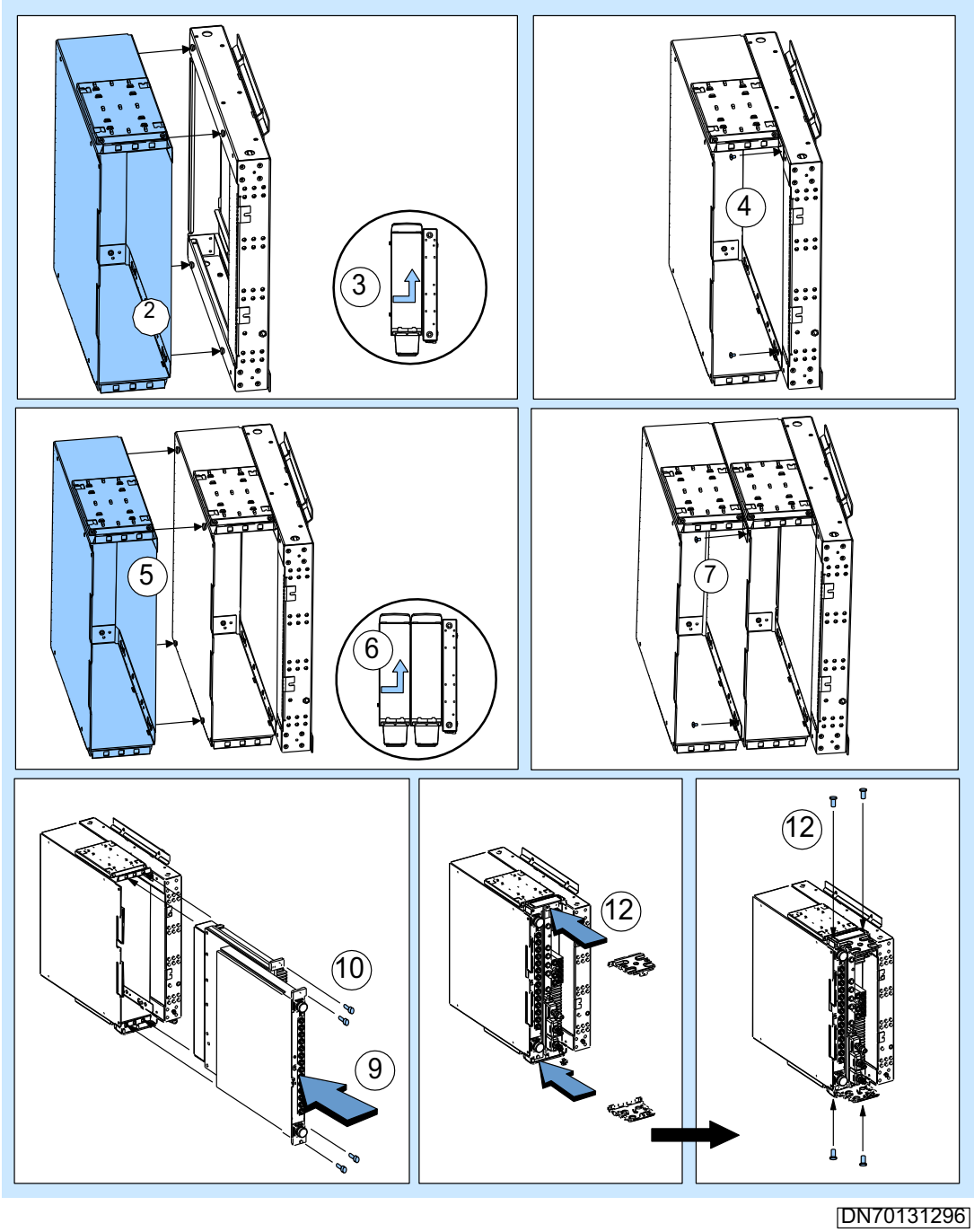


Figure 22. Summary of installing modules on a wall

Steps

1. **If you are installing the Power Module (FPMA) or Power DC/DC 24V Module (FPDA), attach the back covers to the casings.**

   For instructions, see *Installing covers in wall and pole installations.*

Tip

Work from wall out when installing covers.

2. **Align the holes on the first casing's bottom with the fixing studs on the plinth.**
3. **Push the casing back until it stops.**
4. **Attach the casing to the plinth with M5 x 6 mm (0.2 in.) screws using thread-locking compund.**
5. **Align the holes on the second casing's bottom with the fixing studs on the first casing.**
6. **Push the casing back until it stops.**
7. **Attach the casings to each other with M5 x 6 mm (0.2 in.) screws using thread-locking compund.**
8. **Repeat steps 2-7 to install the remaining casings to separate plinths.**
9. **Slide the module(s) into the casing.**
10. **Attach the module(s) to the casing with M5 x 25 mm (1.0 in.) screws.**
11. **Repeat steps 9-10 to install the remaining modules.**
12. **Attach the cable entries to the casings with two M5 x 6 mm (0.2 in.) screws.**
    a. Fix the screws (do not tighten yet).
    b. Attach the cable entry to the casing.
    c. Tighten the screws.

7.4 Mounting the modules on a pole

Purpose

For pole installation, one plinth per two modules, adapter mechanics and pole mounting brackets are needed.

Before you start

- Check that one mounting plinth per two modules is installed on a pole. See *Mounting the plinth on a pole* for plinth installation instructions.
- the plinth is grounded as instructed in *Grounding the plinth*.
- If you are going to use FSEB, install the mounting brackets, which are needed for FSEB installation, before assembling and mounting the casing on the pole. For instructions, see *Installing Flexi Mounting Auxiliary Brackets (FMAA)*.

The installation order varies by configuration. The figure below shows the installation order for a 1+1+1/2+2+2 pole configuration. For other configurations, see instructions in *Hardware Configuration Reference Guide.*.

For a 1+1+1/2+2+2 configuration, you need the following modules:

- one System Module (ESMA)
- one transmission sub-module (FIxA)
- three Dual TRX Modules (EXxA)
- three Dual Duplexer Modules (ERxA)

! Caution

Excess torsion damages the casings. In wall and pole installation, do not install more than two modules per plinth.

Caution

Incorrect installation may lead to damage to the modules. The modules must be installed with the front panels facing left or right. Do not install the modules with the front panels facing up or down.

If the modules are exposed to rain, install the modules so that the DC terminals are facing down.

Tip

Perform the installation as completely as possible before lifting the modules.

Summary

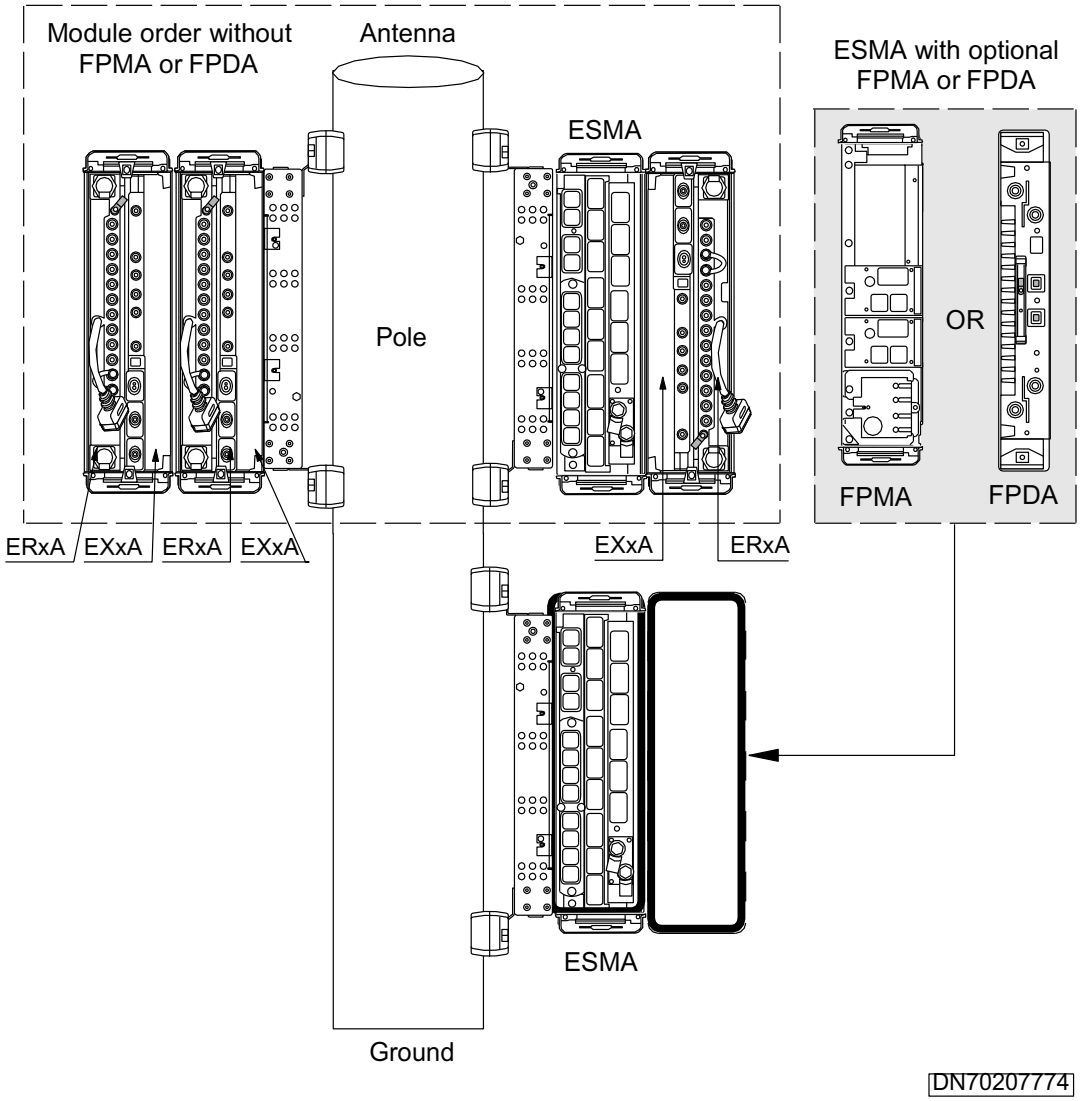


Figure 23. Module installation order in a 1+1+1/2+2+2 pole configuration

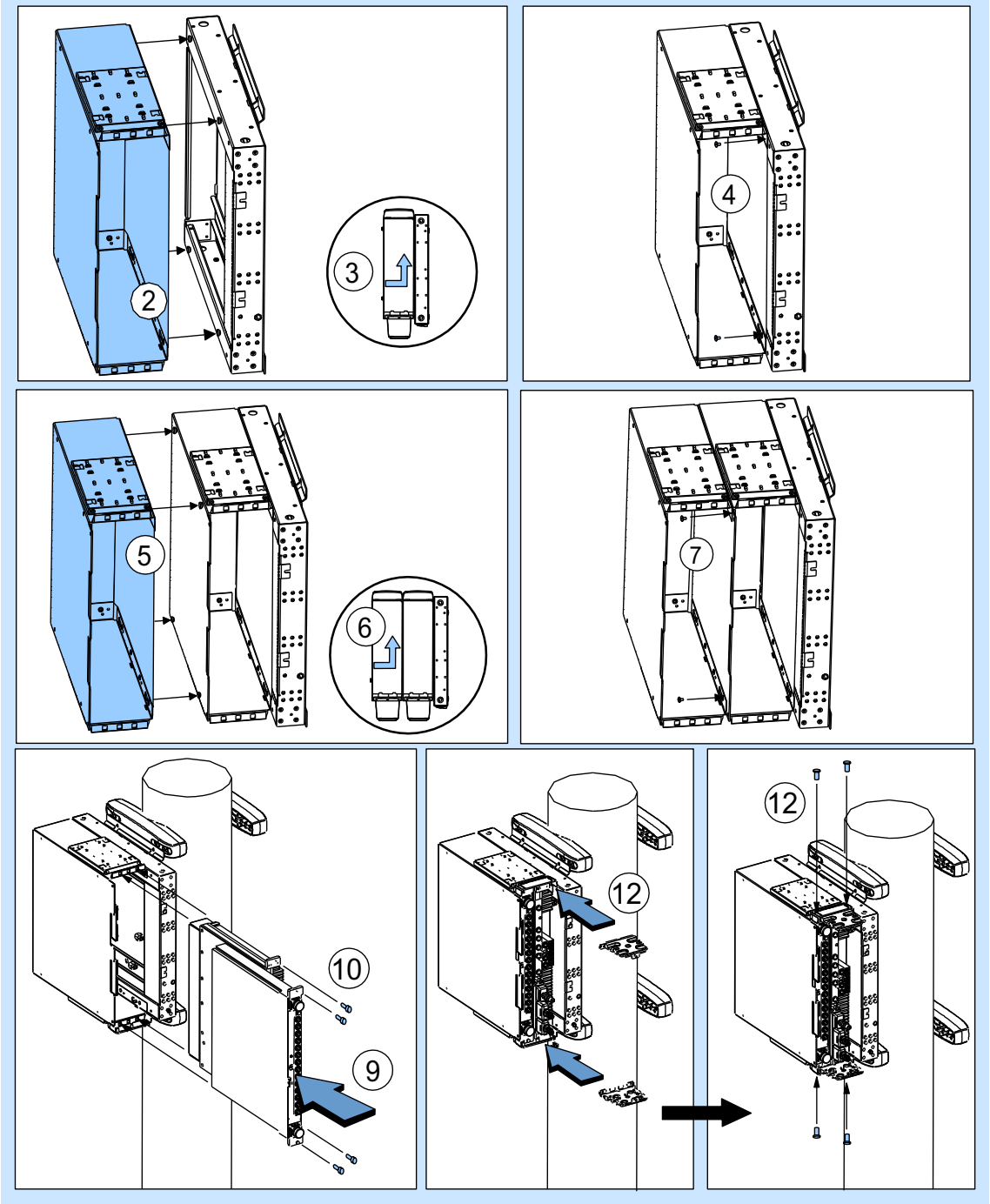


Figure 24. Summary of installing modules on a pole

Steps

1. **If you are installing the Power Module (FPMA) or Power DC/DC 24V Module (FPDA), attach the back covers to the casings.**

   For instructions, see *Installing covers in wall and pole installations.*

2. **Align the holes on the first casing's bottom with the fixing studs on the plinth.**

3. **Push the casing back until it stops.**

4. **Attach the casing to the plinth with M5 x 6 mm (0.2 in.) screws using thread-locking compund.**

5. **Align the holes on the second casing's bottom with the fixing studs on the first casing.**

6. **Push the casing back until it stops.**

7. **Attach the casings to each other with M5 x 6 mm (0.2 in.) screws using thread-locking compund.**

8. **Repeat steps 2-7 to install the remaining casings to separate plinths.**

9. **Slide the module(s) into the casing.**

10. **Attach the module(s) to the casing with M5 x 25 mm (1.0 in.) screws.**

11. **Repeat steps 9-10 to install the remaining modules.**

12. **Attach the cable entries to the casings with two M5 x 6 mm (0.2 in.) screws.**
    a. Fix the screws (do not tighten yet).
    b. Attach the cable entry to the casing.
    c. Tighten the screws.

8 Cabling

8.1 Grounding the modules

Purpose

Each module must be grounded to the plinth. Ground the modules to the plinth after the modules are installed.

Note

If the base transceiver station (BTS) has more than one plinth, for example in a wall or pole installation, connect the main earth (ground) to one of the plinths and earth (ground) all the modules to that plinth. However, it is also possible to earth (ground) the modules to their own plinths first and then earth (ground) the plinths to the plinth that is connected to the main earth (ground).

Summary

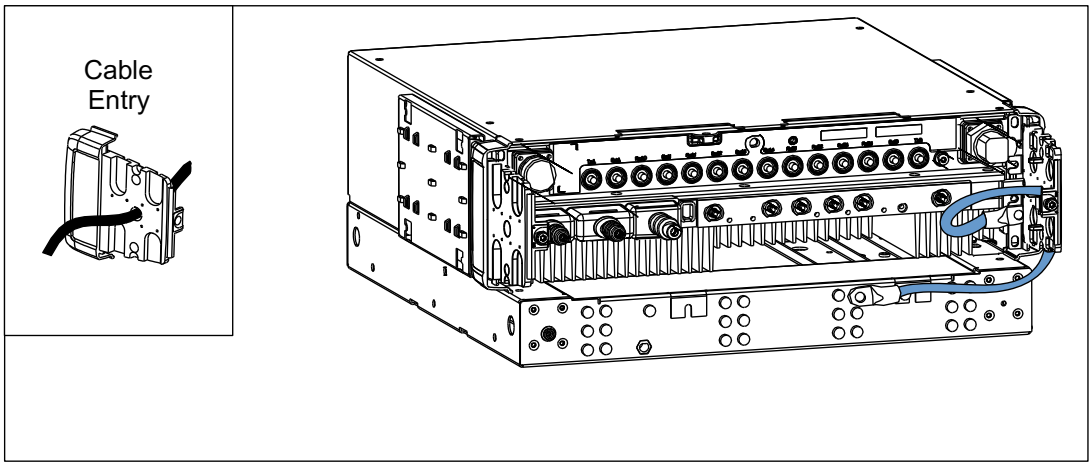


Figure 25. Summary of grounding the modules

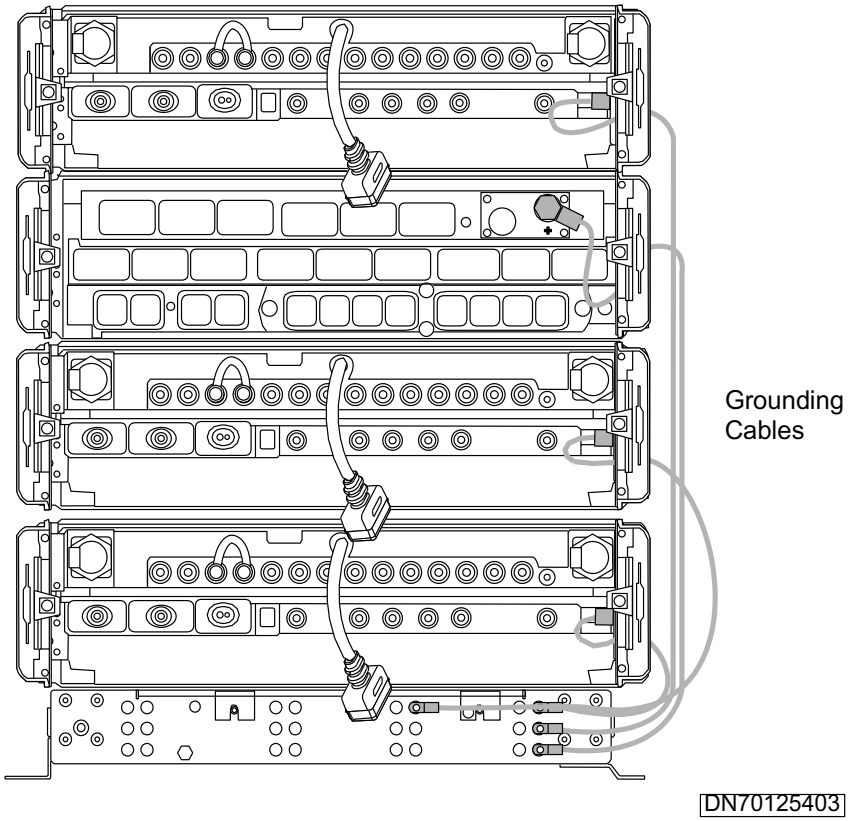


Figure 26. Grounding the modules in 1+1+1/2+2+2 stack configuration

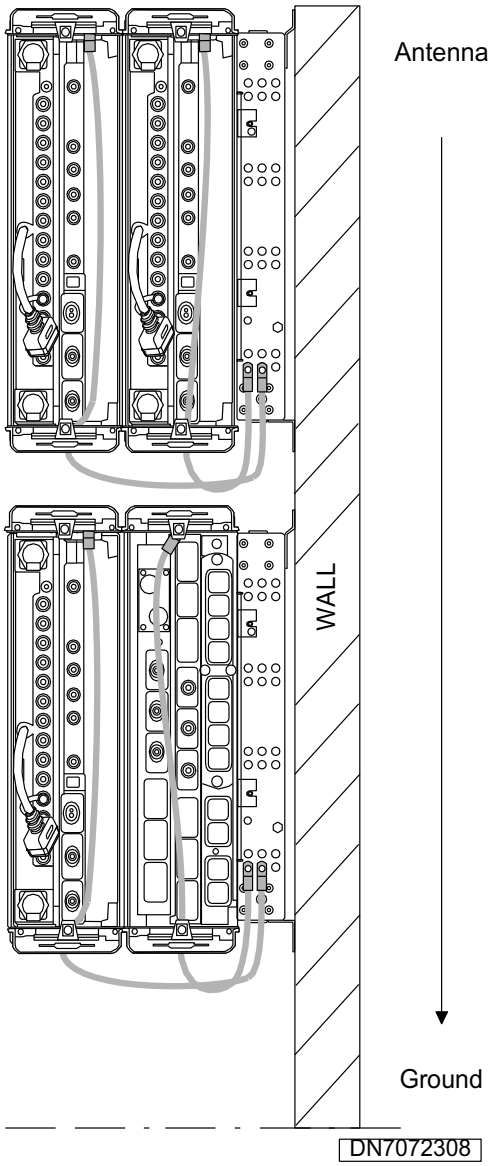


Figure 27. Grounding the modules in 1+1+1/2+2+2 wall configuration

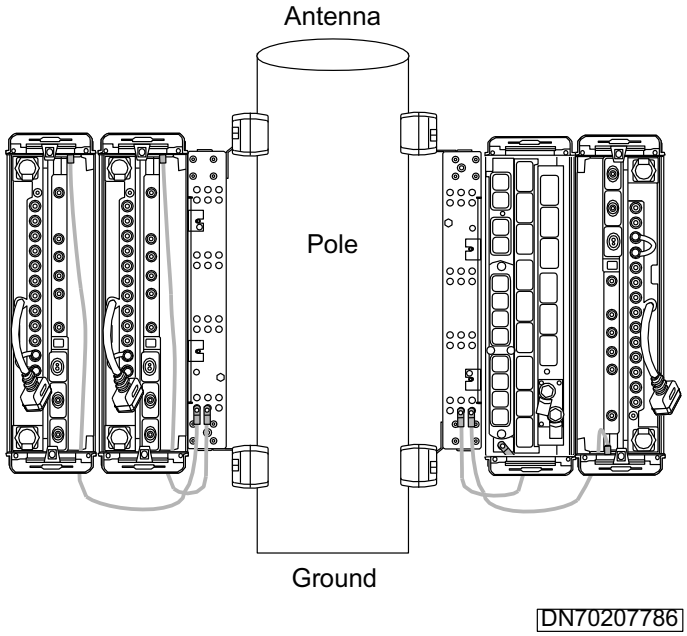


Figure 28. Grounding the modules in 1+1+1/2+2+2 pole configuration

Steps

1. **Connect the grounding cable to the ground connection on the module.**
2. **Route the other end of the grounding cable through the middle hole of the cable entry.**
3. **Connect the other end of the grounding cable to the plinth.**
4. **Secure loose cabling with cable ties.**

8.2 Connecting external power cables

Purpose

Route the external power cables through the white plastic cable clamp, which is on the side of the casing.

The System Module (ESMA) is delivered with boots for 2 or 4 AWG (25 mm^2/0.04 sq. in. or 35 mm^2/0.05 sq. in.).

Before you start

Check that

- the System Module (ESMA) is installed
- Flexi Power Module (FPMA) or Flexi Power DC/DC 24 V Module(s) (FPDA) are installed, if 24 VDC or AC input power is used.
- the mains breaker is off.

Summary

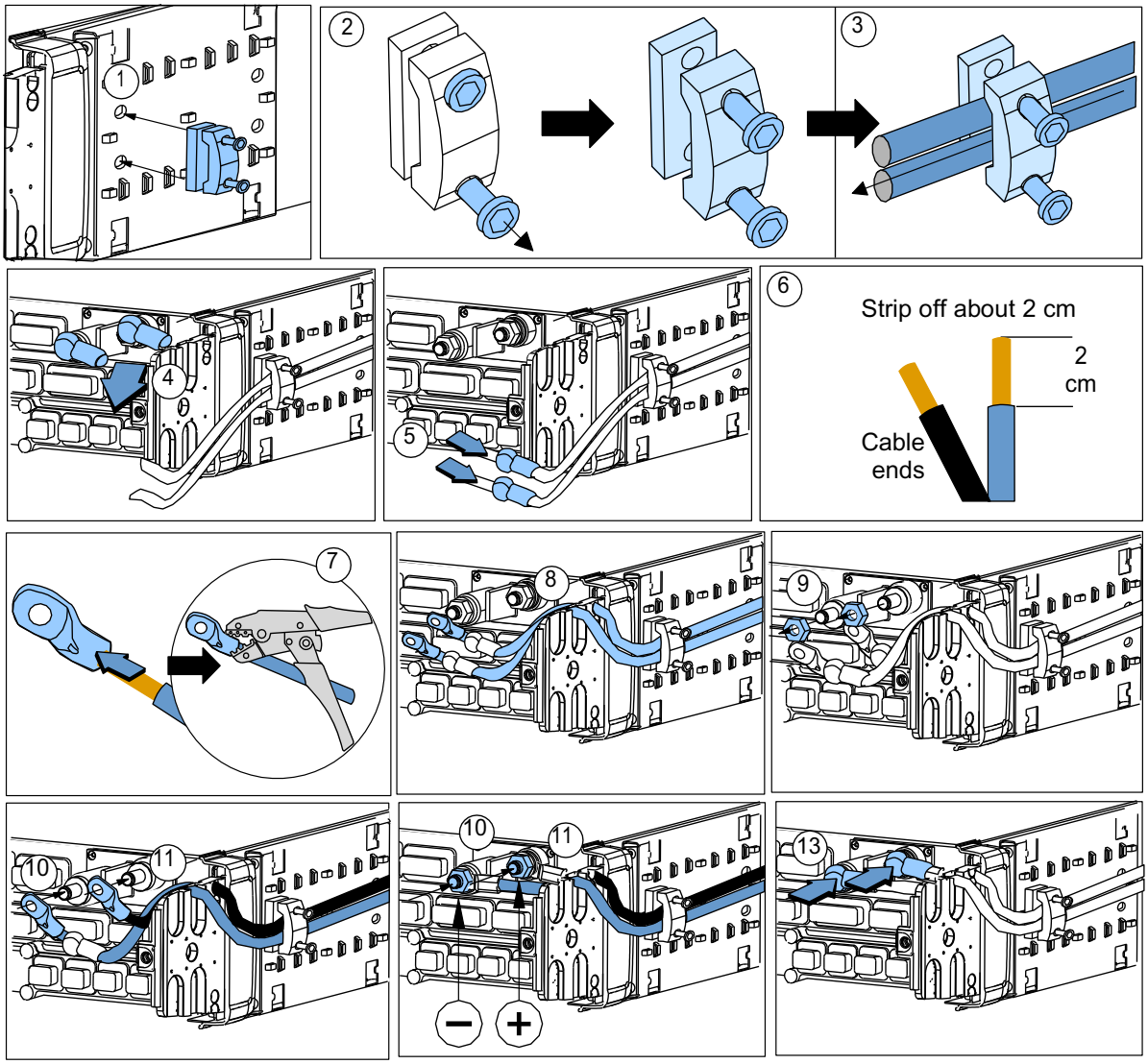


Figure 29. Principle of connecting external power cables

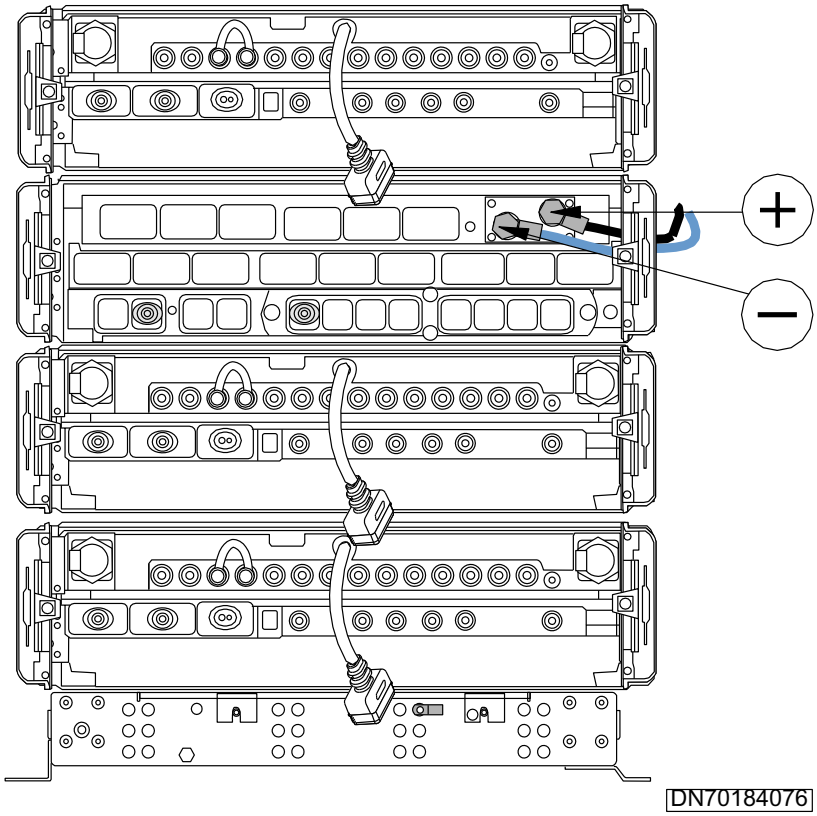


Figure 30. External power cables in 1+1+1/2+2+2 stack configuration

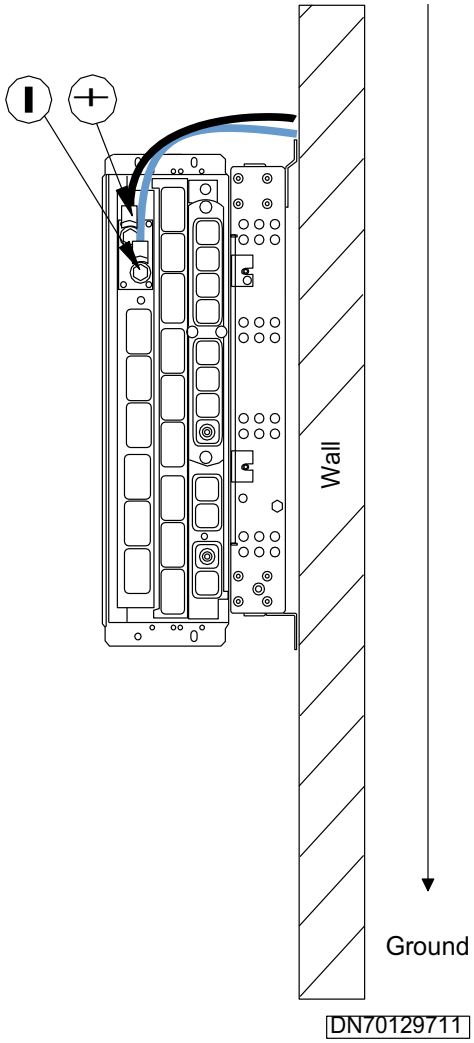


Figure 31. External power cables in 1+1+1/2+2+2 wall configuration

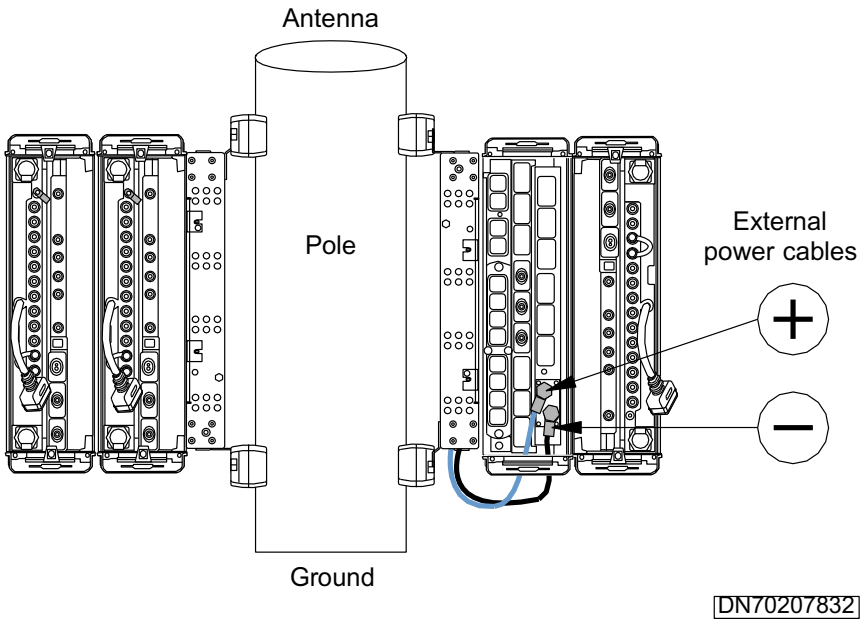


Figure 32. External power cables in 1+1+1/2+2+2 pole configuration

Steps

1. **Install the cable clamp on the side of the casing.**

2. **Loosen the two screws on one of the cable clamps at the side of the casing until there is enough room to route the power cables.**

3. **Route the power cables through the cable clamp and through one of the left cable entries.**

4. **Remove the black rubber boots and, using adjustable wrench, disconnect the cable lugs from the terminals.**

5. **Pull each cable through a rubber boot.**

   If the external DC cables are 35 mm^2 (2 AWG), cut the rubber boots to fit the cable.

6. **Strip about 2 cm (.8 in) of insulation from the (+) and (-) DC cables.**

7. **Insert the stripped end of each cable into a cable lug and crimp.**

8. **Route the cable through the external cable entry.**

9. **Detach the screws on the connectors poles.**

10. **Connect the black (+) crimped wire to the (+) black connector pole and tighten the bolt.**

11. **Connect the blue (-) crimped wire to the (-) blue connector pole and tighten the bolt.**

12. **Torque the 17 mm (0.7 in.) bolts (max 14 Nm).**

13. **Pull the black rubber boots over the lugs.**

14. **Tie-wrap any loose cabling and tighten the cable clamp at the side of the casing with a T10 TORX screwdriver.**

Tip

Make sure the LEDs turn on before tying down the cables.

15. **Connect the mains power.**

8.3 Connecting the ERxA cable

Purpose

The Dual Duplexer Module (ERxA) cable is connected between the Dual Duplexer Module and the Dual TRX Module (EXxA). The cable is pre-installed in the Dual Duplexer Module.

Before you start

Caution

To avoid damage to the cable, do not lift the Dual Duplexer Module by the pre-installed cable.

Summary

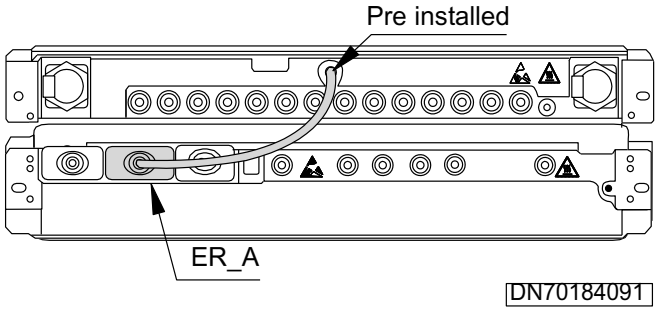


Figure 33. Dual Duplexer Module cable

Steps

1. **Remove the connector seal on the Dual TRX Module to uncover the connector.**
2. **Pull back the connector seal on the cable.**
3. **Connect the Dual Duplexer Module cable to the Dual TRX Module.**

   Push the connector seal firmly in place.
4. **Make sure that all the connector seals are properly in place.**

8.4 Connecting bus cables

Purpose

The bus cables are connected between the System Module (ESMA) and each of the Dual TRX Modules (EXxA) .

In stacked, wall and pole installation, the cable is routed via internal cable entry when the System Module and the Dual TRX Module are installed on the same plinth. If the System Module and Dual TRX Modules are installed on different plinths (for example in wall or pole installations), the cabling between those modules is routed via external cable entries.

Before you start

Caution

If bus cables are looped back to the System Module, ongoing calls may be dropped or a module may freeze until the loop is removed. Do not loop bus cables back to the System Module.

Caution

In outdoor installations, internal bus and power cables should be routed through the bottom cable entries and sloped down from the connectors to help prevent water ingress.

Caution

Do not overbend cables. The minimum bending diameter for the cables is listed in Appendix *Bending diameter for cables.*

Summary

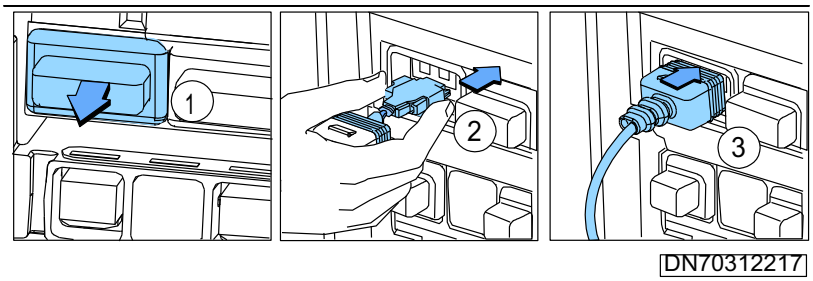


Figure 34. Principle of connecting bus cables

Table 3. Connecting bus cables in 1+1+1/2+2+2 stacked configuration

Number	*Cable*	*From - to*
1	994938	BUS - BUS1

Table 3. Connecting bus cables in 1+1+1/2+2+2 stacked configuration (cont.)

2	994938	BUS - BUS3
3	994938	BUS - BUS5

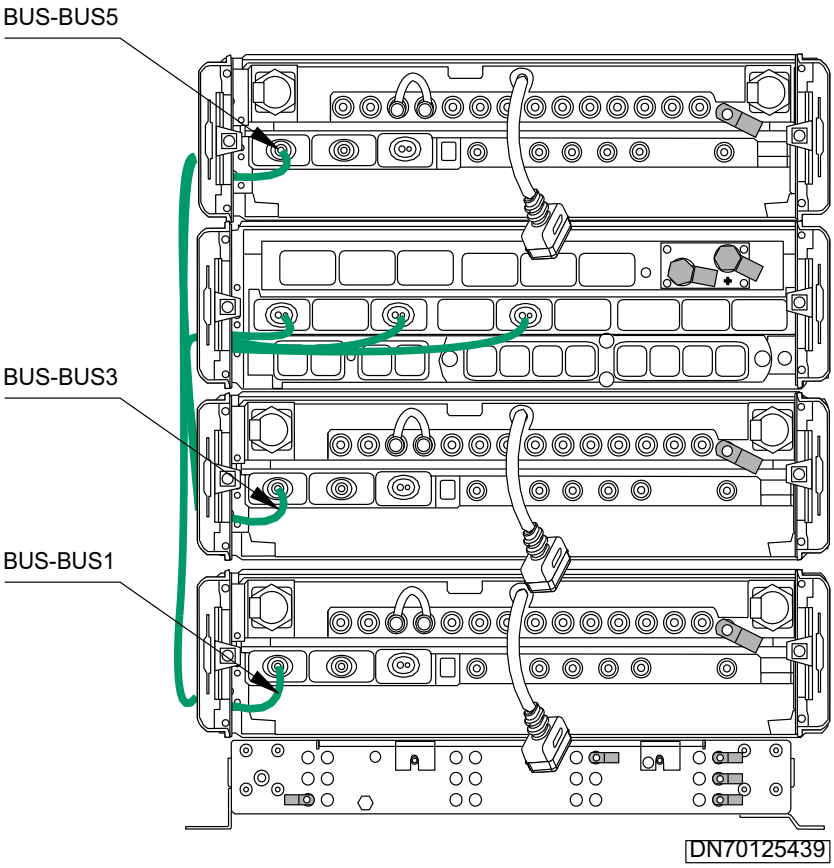


Figure 35. Bus cables in 1+1+1/2+2+2 stack configuration

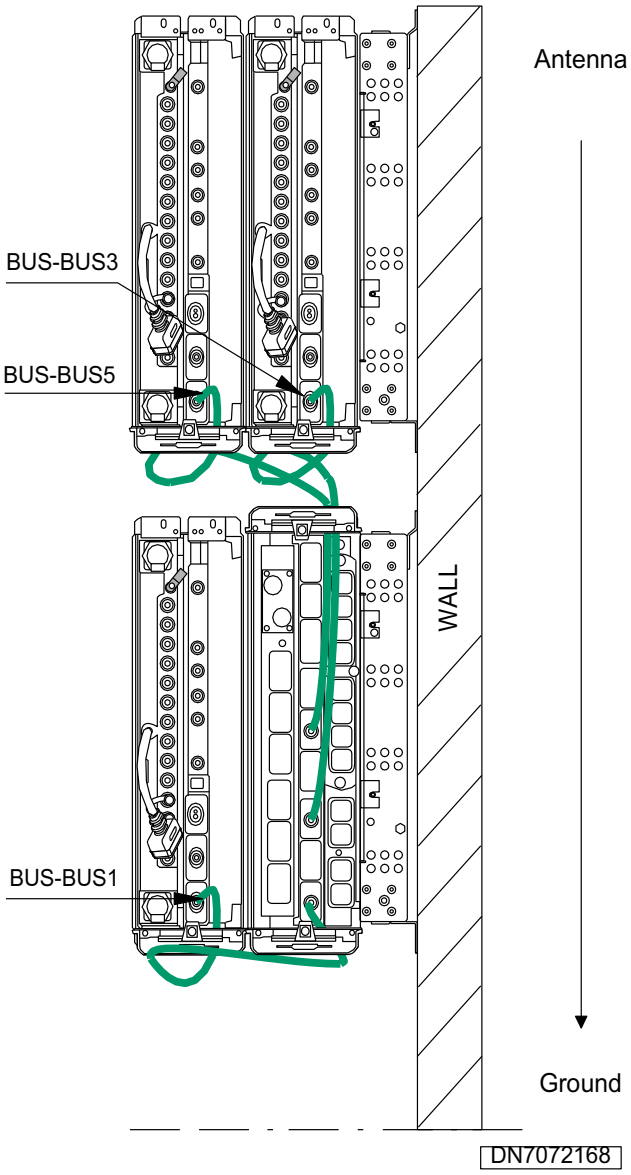


Figure 36. Bus cables in 1+1+1/2+2+2 wall configuration

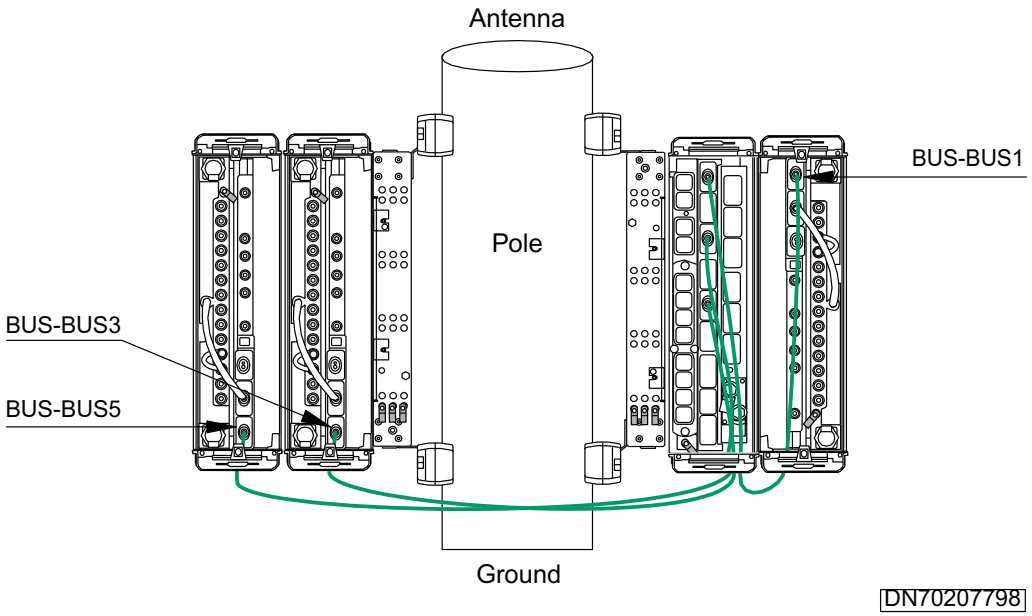


Figure 37. Bus cables in 1+1+1/2+2+2 pole configuration

Steps

1. **Remove the connector seal on the module to uncover the connector.**

   Store the seals for later use.

2. **Pull back the connector seal on the cable.**

3. **Connect the cable to the System Module and the other end to the Dual TRX Module.**

   Push the connector seal firmly in place.

4. **Route the cable through the external cable entry slots.**

5. **Repeat steps 1-4 for each of the Dual TRX Modules in the configuration.**

6. **Make sure that all the connector seals are properly installed.**

7. **Tie loose cabling to the cable clamps on the side of the casings.**

Tip

Make sure that the LEDs turn on before tying down the cables.

8.5 Connecting internal power cables

Purpose

The internal power cables are connected between the System Module (ESMA) and each of the Dual TRX Modules (EXxA), and is used to distribute power to the Dual TRX Modules.

In stack, wall and pole installation, the cable is routed via internal cable entry when the System Module (ESMA) and Dual TRX Module (EXxA) are installed on the same plinth. If the System Module and Dual TRX Modules are installed on different plinths (for example in wall or pole installations), the cabling between those modules is routed via external cable entries.

Before you start

Caution

Do not overbend cables. The minimum bending diameter for the cables is listed in Appendix *Bending diameter for cables.*

Caution

In outdoor installations, internal bus and power cables should be routed through the bottom cable entries and sloped down from the connectors to help prevent water ingress.

Summary

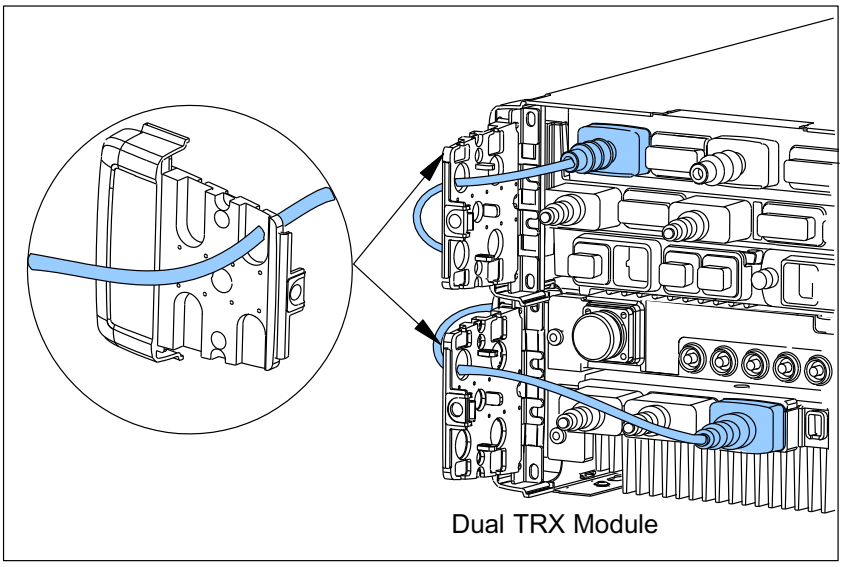


Figure 38. Principle of connecting internal power cables

Table 4. Connecting the internal power cables in 1+1+1/2+2+2 configuration

Number	*Cable*	*From - to*
1	994940	PWR - PWR1
2	994940	PWR - PWR3
3	994940	PWR - PWR5

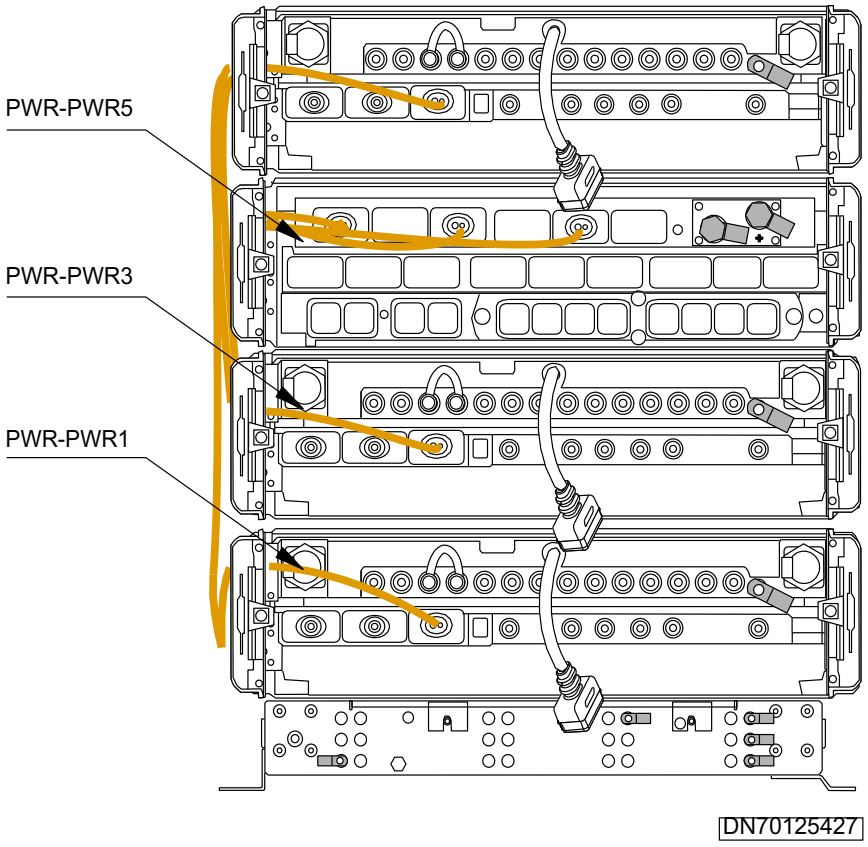


Figure 39. Internal power cables in 1+1+1/2+2+2 stack configuration

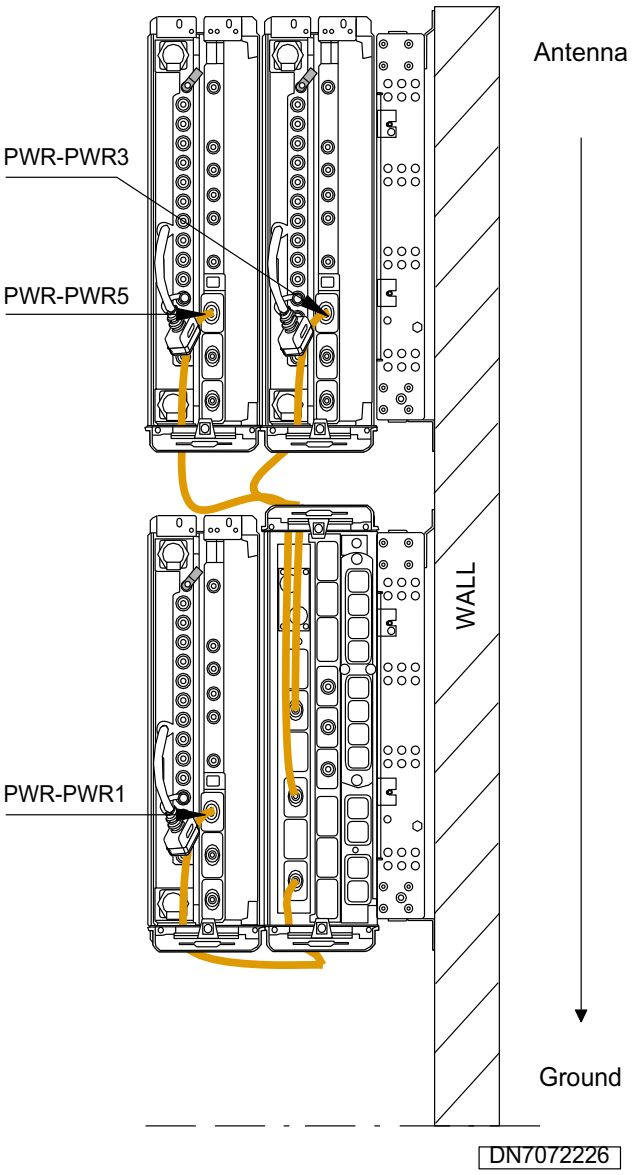


Figure 40. Internal power cables in 1+1+1/2+2+2 wall configuration

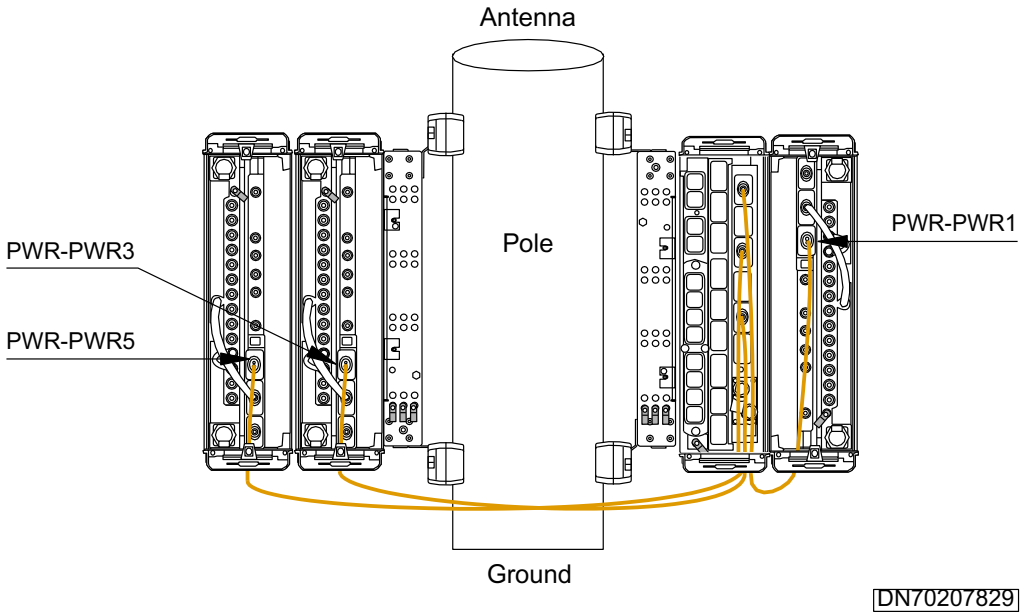


Figure 41. Internal power cables in 1+1+1/2+2+2 pole configuration

Steps

1. **Remove the connector seal on the module to uncover the connector.**

   Store the seals for later use.

2. **Pull back the connector seal on the cable.**

3. **Connect the cable to the System Module and the other end to the Dual TRX Module.**

4. **Connect the internal power cable to the Dual TRX Module.**

5. **Route the cable through the external cable entry slots.**

6. **Repeat steps 1-4 for each of the Dual TRX modules in the configuration.**

7. **Make sure that all the connector seals are properly installed.**

8. **Tie loose cabling to the cable clamps on the side of the casings.**

Tip

Make sure that the LEDs turn on before tying down the cables.

8.6 Connecting RF cables

Before you start

Caution

The modules will be damaged if the radio transmitter (TX) cables are connected to the radio receiver (RX) inputs. Ensure that the RF cables are connected correctly.

TX cables have a red label, and RX cables have a blue label on the module front panel.

All RF cables going to the Wideband Combiner Sub-module (EWxA) are TX cables.

Caution

Do not overbend cables. The minimum bending diameter for the cables is listed in Appendix *Bending diameter for cables.*

Summary

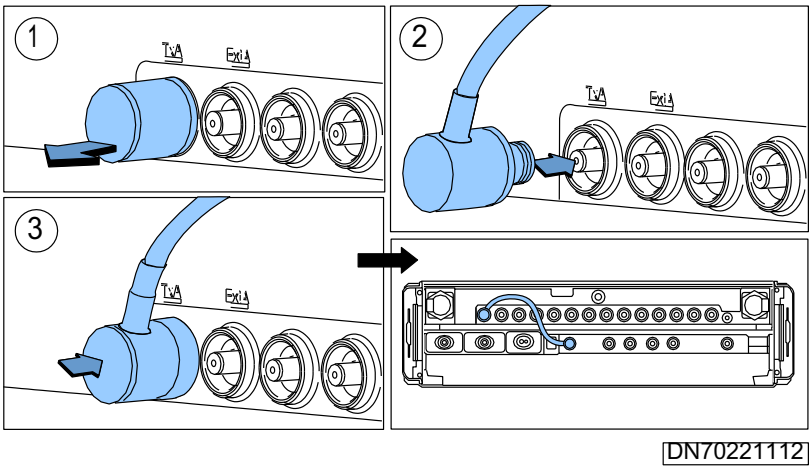


Figure 42. Connecting RF cables

Table 5. Connecting RF cables in 1+1+1/2+2+2 bypass 2UD configuration

Number	*Cable*	*From - to (ERxA - EXxA)*
1	994931	TxA-TxA
2	994931	TxB-TxB
3	994931	RxA1-RxA
4	994931	RxB1-RxB
5	994980	RXAO - RXAI (pre-installed)

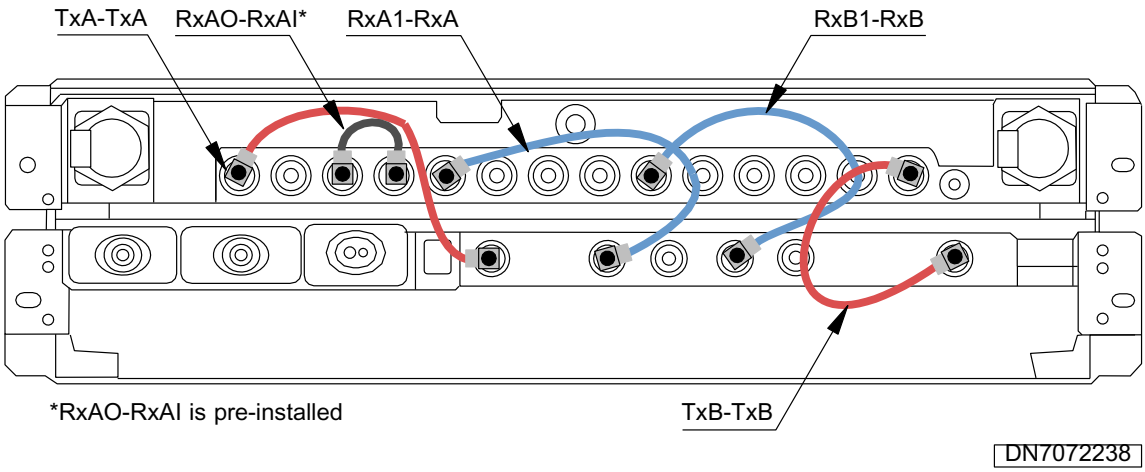


Figure 43. RF cables in 1+1+1/2+2+2 bypass 2UD configuration (one sector; all sectors have identical cabling structure)

Steps

1. **Remove the seals and the caps from the RF connectors. Store the seals for later use.**

Caution

Risk of damage to equipment. The caps are sealed tight to provide adequate weather protection. If the caps cannot be removed by hand, carefully remove the caps with gripping pliers and pull straight back to prevent damage to the connectors, as shown in the figure below.

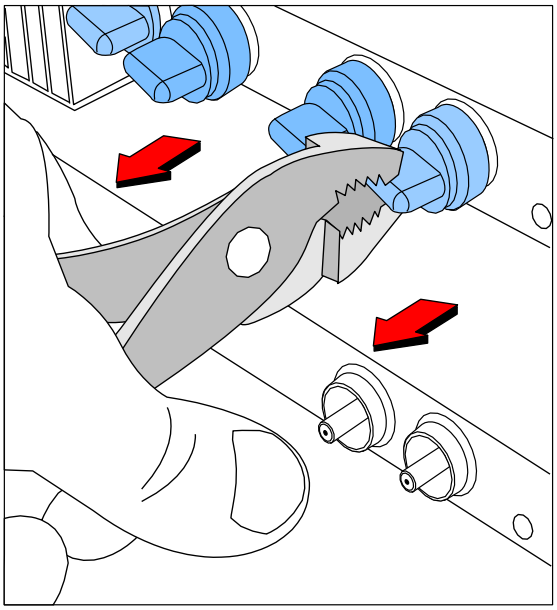


Figure 44. RF cable cap removal with pliers

2. Connect the RF cable to the connector.

Push the top of the connector until you hear a clicking sound. Do not hold the sides of the connector while pushing it.

3. Push the connector seal firmly in place.

4. Check that the pre-installed RXAO - RXAI cable on the Dual Duplexer Module is properly connected.

5. Repeat steps 1-4 for all RF cables required for your configuration.

Before continuing to the next sector, make sure that all cables are correctly installed.

8.7 Connecting antenna jumper cables

Purpose

Antenna cables are connected to the antenna connectors in the front panel of the Dual Duplexer (ERxA) Module. The number of cables used depends on the configuration.

Note

When connecting BTS external cabling in wall or pole installation, the cables should be routed via the lower cable entry when possible.

Tip

Connect the antenna cables starting from the bottom.

Tip

Make sure that the LEDs turn on before tying down loose cables.

Before you start

Antenna jumper cables are not included in the Flexi EDGE BTS product delivery. Follow these guidelines when selecting antenna jumper cables:

- 1/2" or 3/8" antenna jumper cables can be used.

  1/2" antenna cable connectors can be connected directly to the module if a right angle connector is used.
- The length should be determined based on the Flexi EDGE BTS installation option (for example pole, wall, cabinet, 3rd party cabinet) and the distance of the BTS from the antenna feeder line.
- Antenna jumper cables must be IP54-rated or better.

Caution

Do not overbend cables. The minimum bending diameter for the cables is listed in Appendix *Bending diameter for cables.*

Summary

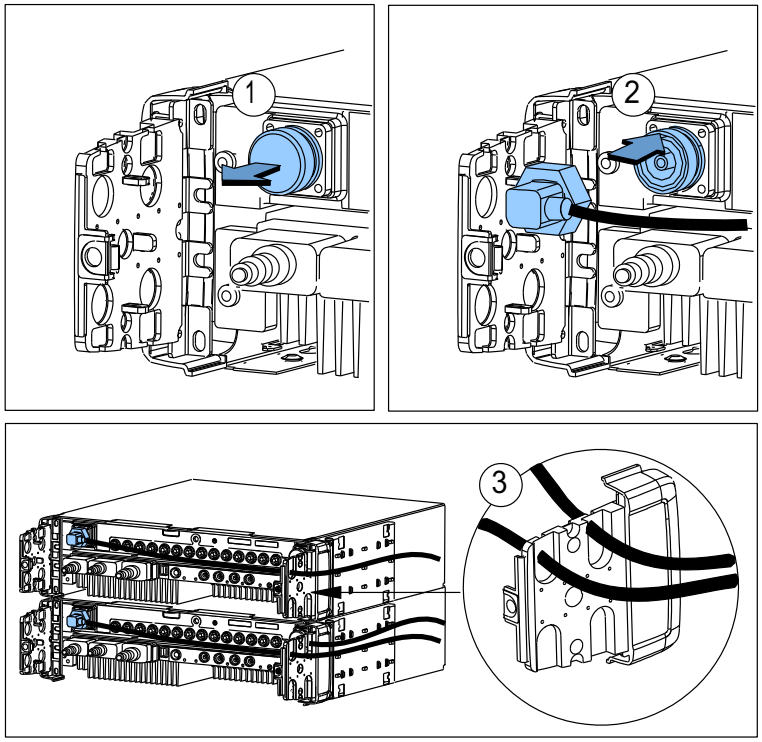


Figure 45. Principle of connecting antenna jumper cables

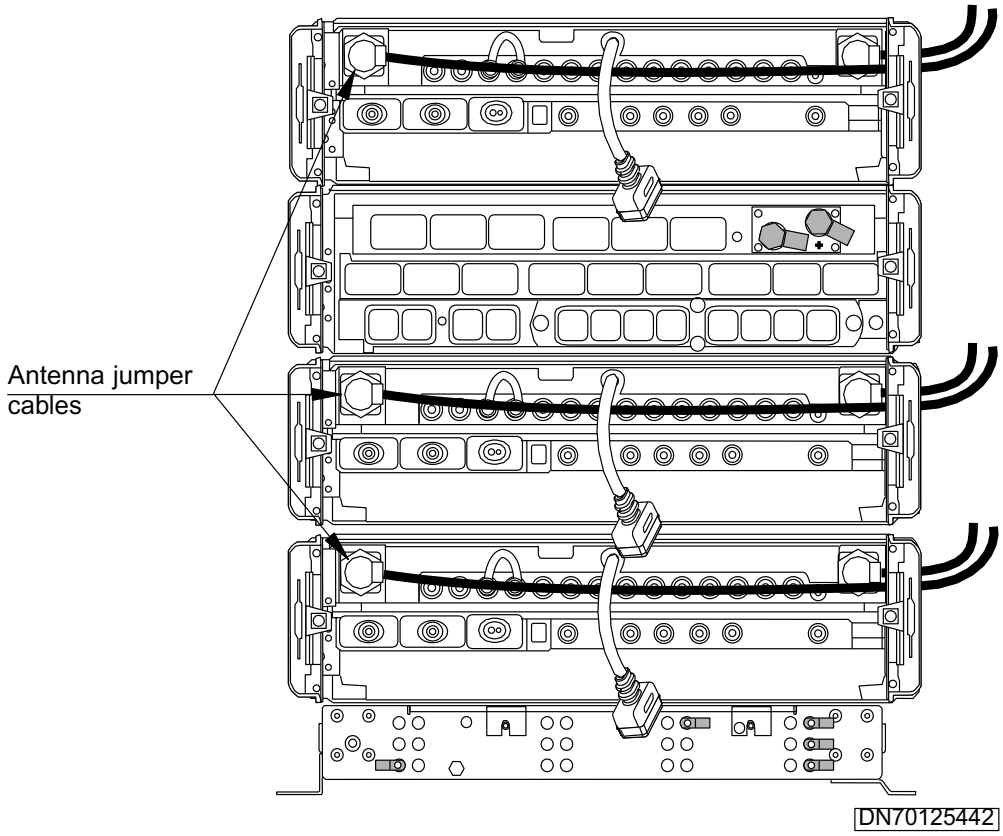


Figure 46. Antenna jumper cables in 1+1+1/2+2+2 stack configuration

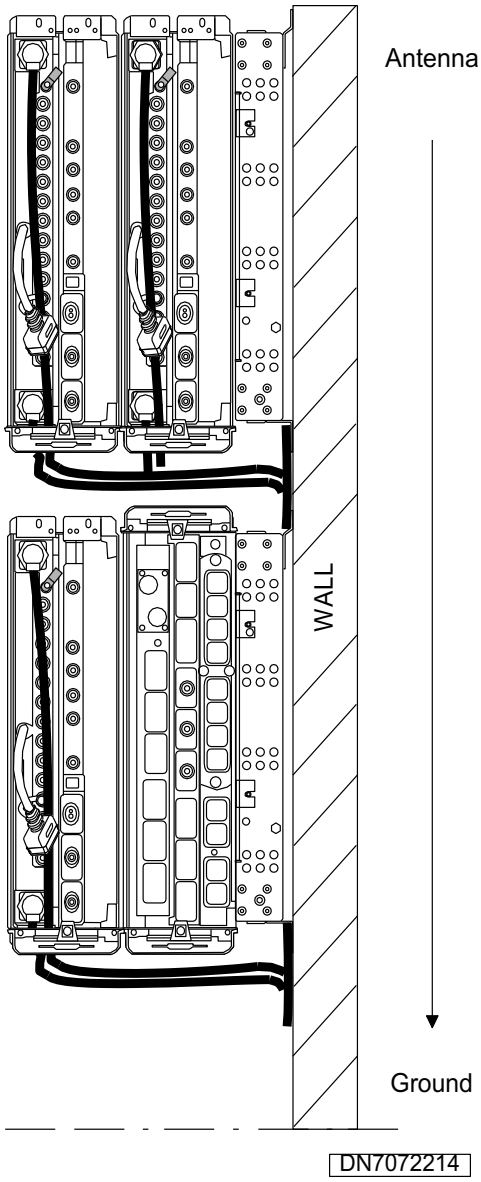


Figure 47. Antenna jumper cables in 1+1+1/2+2+2 wall configuration

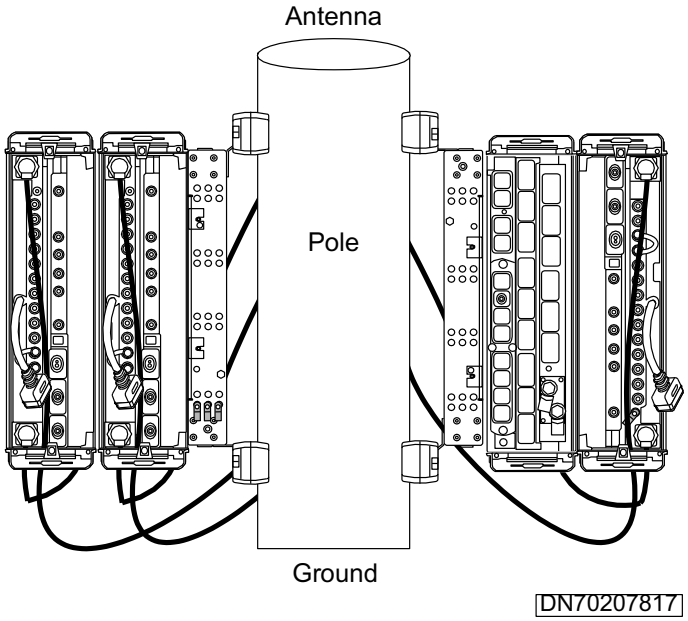


Figure 48. Antenna jumper cables in 1+1+1/2+2+2 pole configuration

Steps

1. **Remove seals from those antenna connectors in the Dual Duplexer Module to which cables will be installed. Store the connector seals for later use.**

Tip

You can store the seals in the plinth cover.

2. **Connect the cable to the Dual Duplexer Module.**
3. **Route the antenna jumper cables through the cable entry.**
4. **Tighten the connector with a torque wrench.**

   See Appendix *Torque values*.

5. **Repeat the previous steps for all the antenna jumper cables required for your configuration.**

6. **Make sure that all unused connectors are protected by a connector seal, and that all the connector seals are properly installed.**

8.8 Connecting transmission cables

8.8.1 Connecting transmission cables

Before you start

The transmission sub-module is installed as instructed in *Installing the transmission sub-module*.

If you are using FIFA transmission sub-module, follow the steps in *Connecting FIFA transmission cables*.

Note that in outdoor installations, Flexi BTS transmission cables with weather-protective boots must be used.

The cabling varies slightly according to which transmission sub-module variant is used.

Caution

Incorrect cables and seals may not provide secured weather protection. In outdoor installations, including the outdoor cabinet, use only tested IP55 class outdoor cables with seals provided by Nokia. This is also recommended for indoor installations.

Caution

Risk of damage to equipment. If modules are exposed to weather conditions, IP caps or boots must be installed at all times (regardless of whether the site is activated or not).

Note

When connecting BTS external cabling in outdoor site wall or pole installation, the cables should be routed via the lower cable entry when possible.

Summary

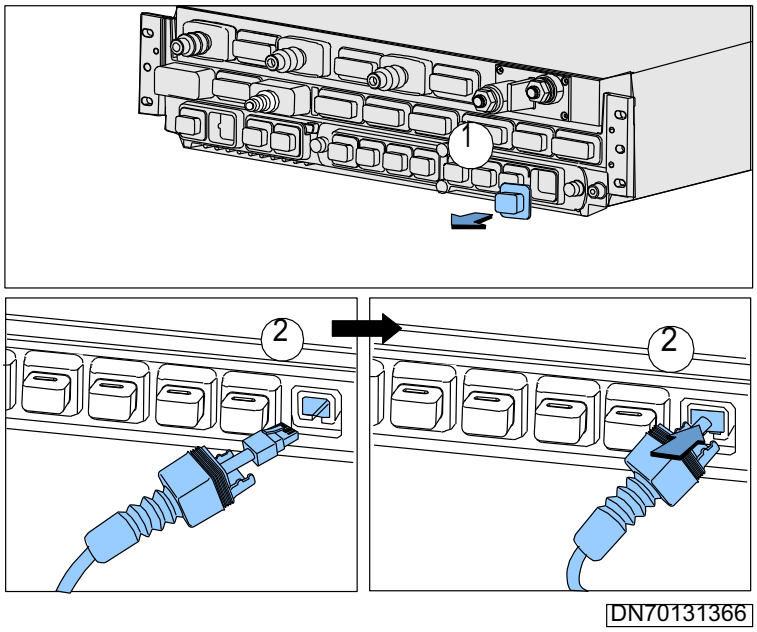


Figure 49. Principle of connecting transmission cables

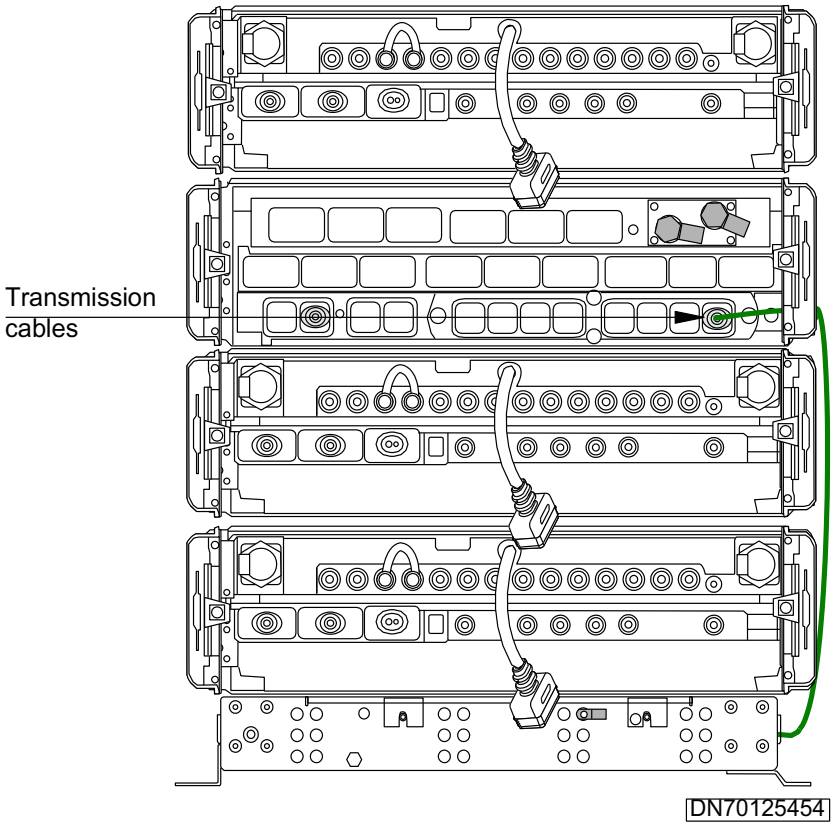


Figure 50. Transmission cables in 1+1+1/2+2+2 stack configuration

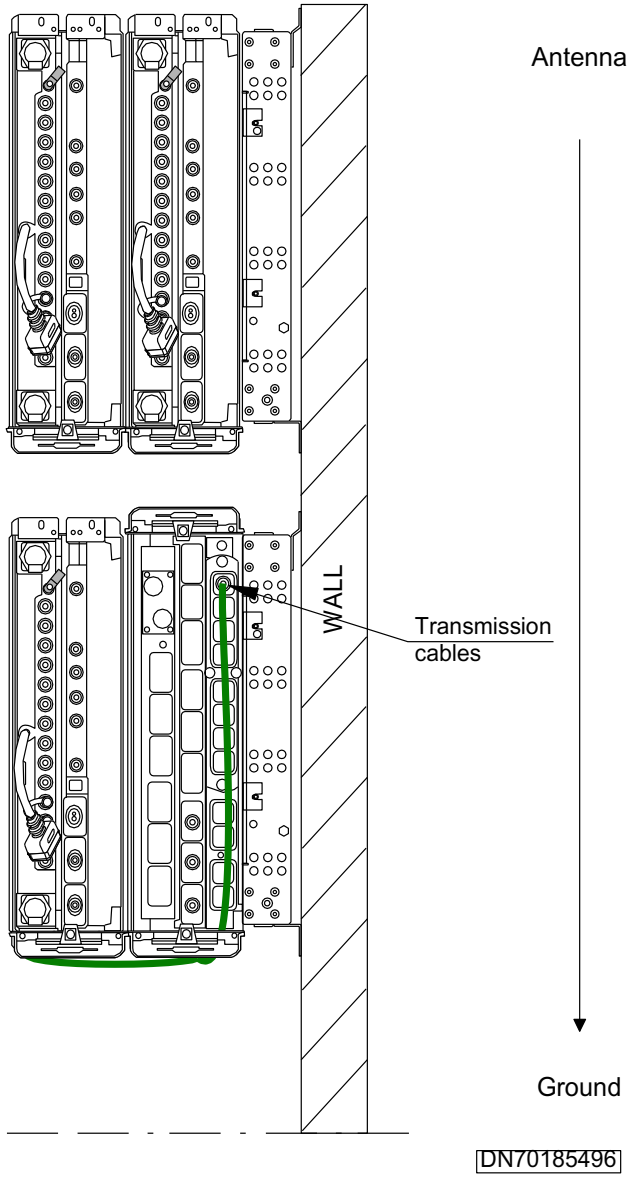


Figure 51. Transmission cables in 1+1+1/2+2+2 wall configuration

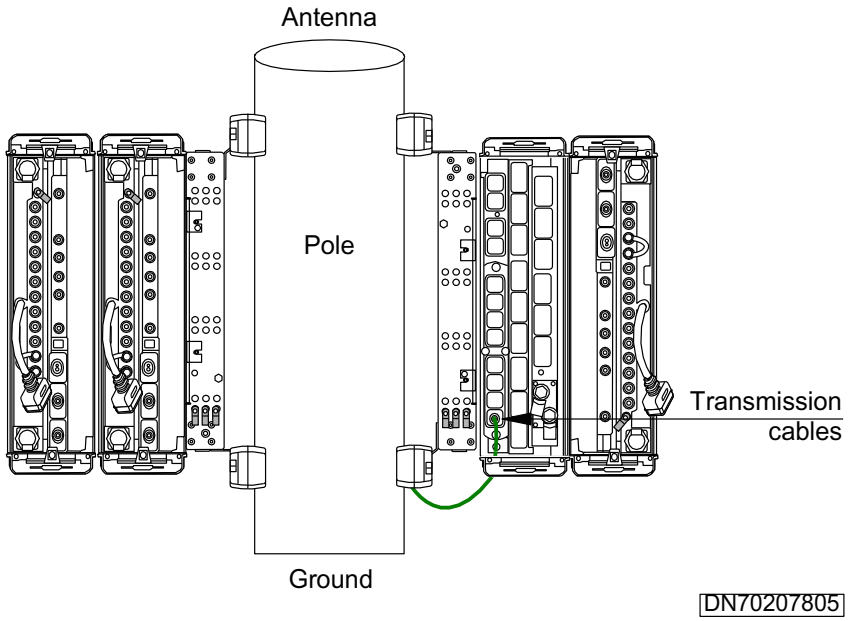


Figure 52. Transmission cables in 1+1+1/2+2+2 pole configuration

Steps

1. **Remove the connector seals from those transmission sub-module connectors to which cables will be installed. Store the seals for later use.**

Tip

Use an adjustable wrench for removing the connector seal.

Tip

You can store the seals in the plinth cover.

2. **Route the transmission cables through the cable entry.**

3. **Pull back the connector seal covering the transmission cable connector (Flexbus connector excluded).**

4. **Connect the cable to the transmission sub-module.**

5. **Push the cable connector seal firmly in place.**

6. **Repeat steps 1-5 for all the transmission cables required for your configuration.**

7. **Make sure that all the connector seals are properly installed.**

8.8.2 Connecting FIFA transmission cables

Before you start

FIFA is installed as instructed in *Installing transmission sub-module*.

Note that you must use a Flexbus Jumper cable to interconnect the FIFA Flexbus interface and the Flexbus cable from the outdoor unit.

Note also that the Flexbus Jumper cable must be ordered separately.

The following figure describes the principle of connecting the transmission cables. Connect the cables according to the procedure below.

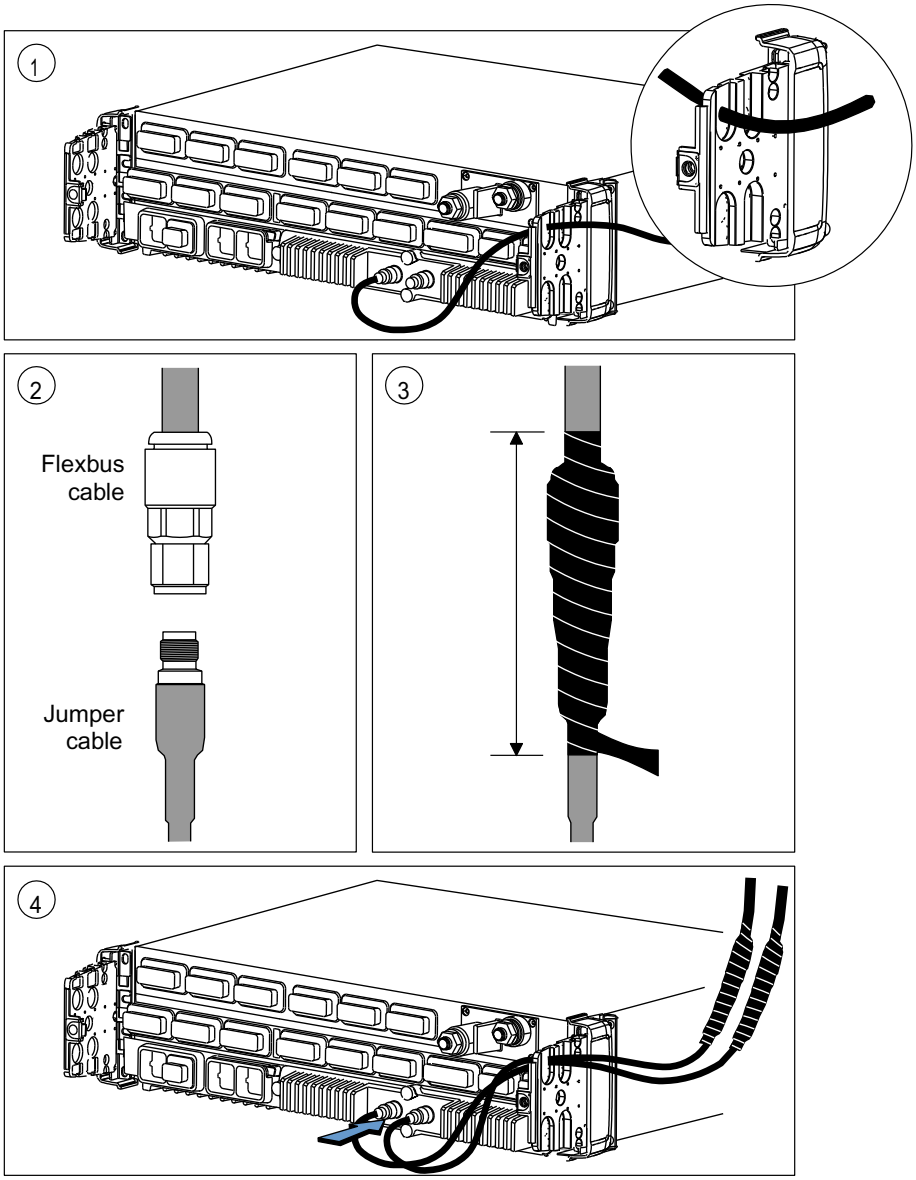


Figure 53. Connecting transmission cables

Note that when connecting BTS external cabling in outdoor site vertical installation, the cables must be routed through the lower cable entry to avoid water leakage.

Steps

1. **Route the Flexbus Jumper cable through the cable entry and connect the Flexbus Jumper cable to FIFA, Flexbus 1 interface.**

2. **Connect the Flexbus Jumper cable to Flexbus cable (from the outdoor unit).**

3. **Add weatherproof protection tape on the Flexbus Jumper Cable and Outdoor Flexbus cable connection.**

   The weatherproof tape should overlap at least 20 mm beyond the connectors, as indicated in the Figure *Connecting transmission cables*, picture 3.

4. **If you have Flexbus 2 in use, repeat the steps and connect the Jumper cable to Flexbus 2 interface.**

9 Installing covers

9.1 Installing covers in stacked installations

Purpose

Module back and front covers provide protection for core modules.

Back covers are pre-installed for all modules except the Flexi Power Module (FPMA) and Flexi Power DC/DC 24V Module (FPDA).

Warning

The front panels of the modules are hot during operation. If Flexi EDGE BTS modules are not installed in a cabinet, front covers must be used during operation for safety reasons and should only be removed temporarily for maintenance.

Warning

Rotating fan blades can cause personal injury. If Flexi EDGE BTS modules are not installed in a cabinet, back covers must be used during operation for safety reasons and should only be removed temporarily for maintenance.

Tip

Install the back covers before installing the modules.

Before you start

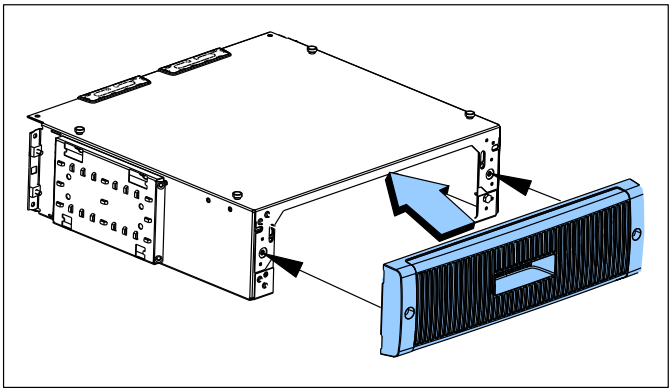
Tip

Make sure that the LEDs turn on before installing the front covers.

Steps

1. **Install the back cover in the rear of the module and fix the screws (Torx T25).**

   Tighten to 2.5 Nm.



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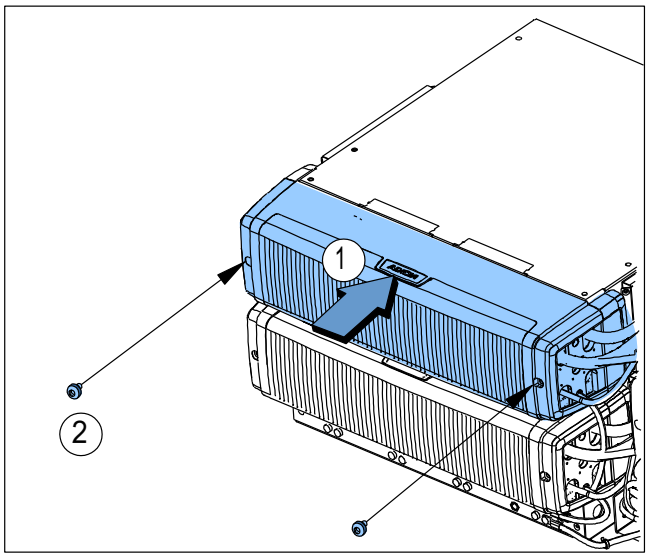
2. **Install the front cover and fix the knurled-head screws as tightly as possible without tools.**



3. Tighten the screws with a Torx T25 screwdriver.

Tighten to 2.5 Nm.

Expected outcome

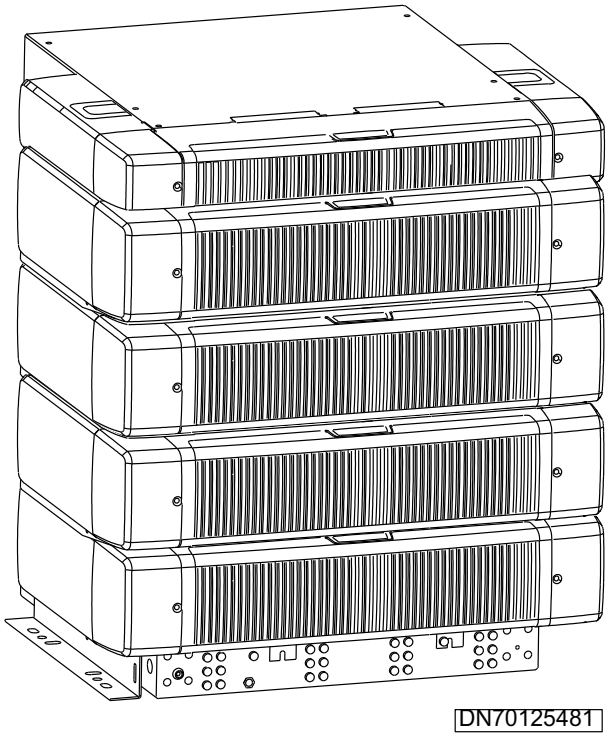


Figure 54. A 1+1+1/2+2+2 stacked configuration (with optional FPDA) with front covers installed

9.2 Installing covers in wall and pole installations

Purpose

Module back and front covers provide protection for core modules.

Warning

The front panels of the modules are hot during operation. If Flexi EDGE BTS modules are not installed in a cabinet, front covers must be used during operation for safety reasons and should only be removed temporarily for maintenance.

Warning

Rotating fan blades can cause personal injury. If Flexi EDGE BTS modules are not installed in a cabinet, back covers must be used during operation for safety reasons and should only be removed temporarily for maintenance.

Before you start

Tip

Make sure that the LEDs turn on before installing the front covers.

Steps

1. **Attach the first and second snap hooks of the safety catch to the back cover.**
2. **Attach the third snap hook of the safety catch to the rear of the casing.**
3. **Install the back cover in the rear of the module and fix the screws (Torx T25).**

   Tighten to 2.5 Nm.

Tip

Install the back covers before installing the modules.

4. **Attach the first and second snap hooks of the safety catch to the front cover.**
5. **Attach the third snap hook of the safety catch to the external cable entry.**
6. **Install the front cover and fix the knurled-head screws as tightly as possible without tools.**
7. **Tighten the screws with a Torx T25 screwdriver.**

   Tighten to 2.5 Nm.

10 Optional items

10.1 Installing optional items

10.1.1 Installing Flexi Power Module (FPMA)

Purpose

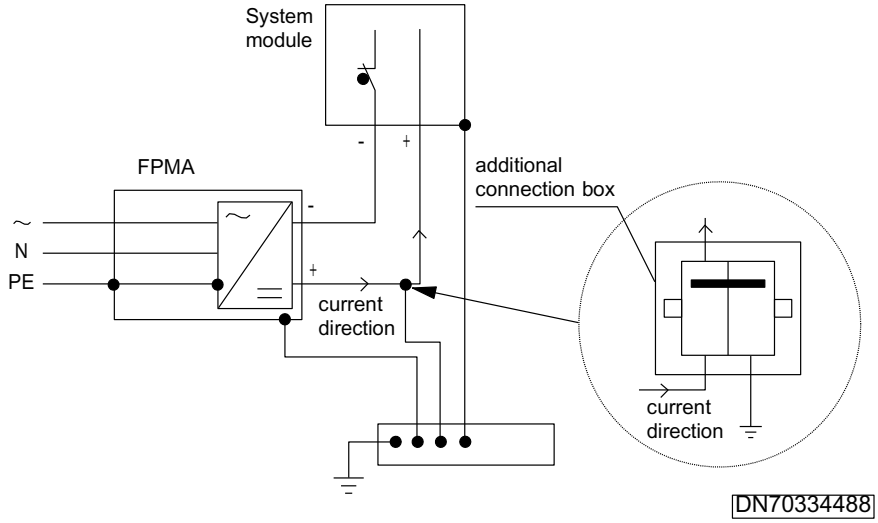
Nokia Flexi EDGE BTS uses 48 VDC power. In a BTS site with AC feed only, a Flexi Power Module (FPMA) is required for converting the AC to DC before feeding the DC power to the System Module.

Flexi Power Module (FPMA) consists of mechanics, AC terminal and four slots for AC/DC sub-module (FPAA) or battery sub-module (FPBA).

The FPMA can include:

- two FPAAs and two FPBAs
- four FPAAs
- one FPAA and three FPBAs
- one FPAA and three free slots for expansion.

By default, the DC output voltage of the FPMA is floating nominal 48 VDC, however, it can also be positive grounded. This can be implemented by using a branch connector in an additional connection box (see the following principle figure). In this solution, the + wire between the FPMA and System Module is cut, and grounding to the BTS site ground bar is done with an additional grounding cable (the cross-section of which must be the same than that of the + wire).



The maximum diameter of the AC power feed cable is 24 mm (0.9 in.). The maximum sizes of conductors that the incoming AC terminals can accommodate are presented in the following table.

Table 6. Maximum sizes of conductors

Rated connecting capacity	Value
Rigid (solid or stranded)	up to 16 mm^2 (6 AWG)
Flexible	up to 10 mm^2 (7 AWG)
Flexible with ferrule (without plastic sleeve)	up to 10 mm^2 (7 AWG)
Flexible with ferrule (with plastic sleeve)	up to 10 mm^2 (7 AWG)
Flexible with TWIN ferrule	up to 6 mm^2 (9 AWG)

Tip

It is recommended that the FPMA be pre-installed before installing it on the plinth.

Before you start

Check that the mains breaker is off.

Steps

1. **Install the Flexi Power Module (FPMA).**
2. **Loosen the two top screws and detach the bottom screw.**

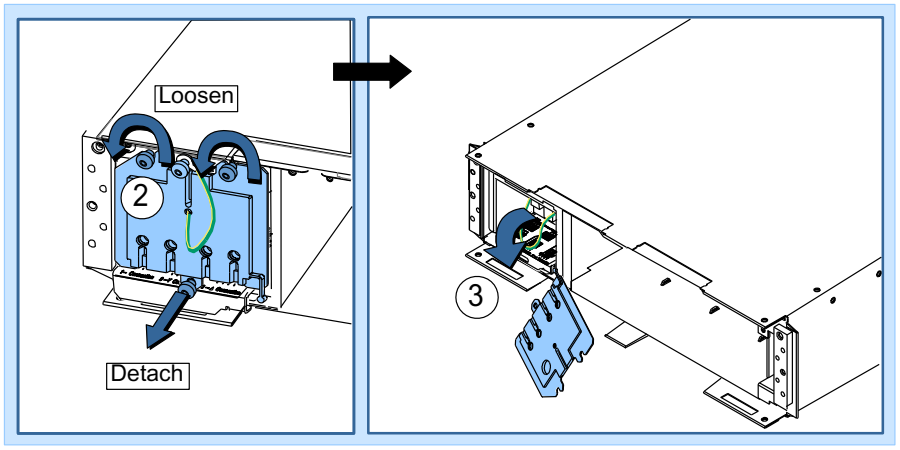


Figure 55. Removing the ingress protection plate

3. **Remove the ingress protection plate from the left-hand side of the FPMA.**
4. **Pull out the AC terminal plate.**

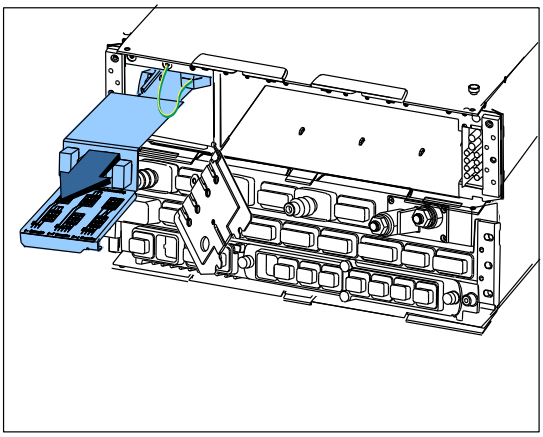


Figure 56. Removing the AC terminal plate

5. Route the cable through the round hole in the top left corner of the ingress protection plate.

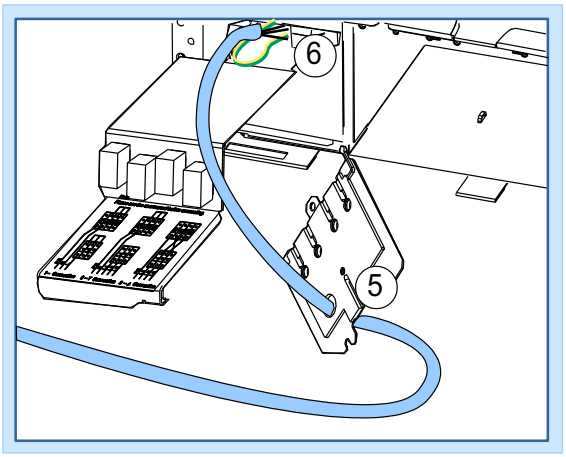


Figure 57. Routing the cable through the ingress protection plate

6. Route the cable through the cable clamp on the AC terminal plate.

7. Make the AC connection.

Tip

Before connecting the AC cable, switch off the AC power breaker.

See the following figures for AC connection alternatives. The colours of the wires may vary depending on the country.

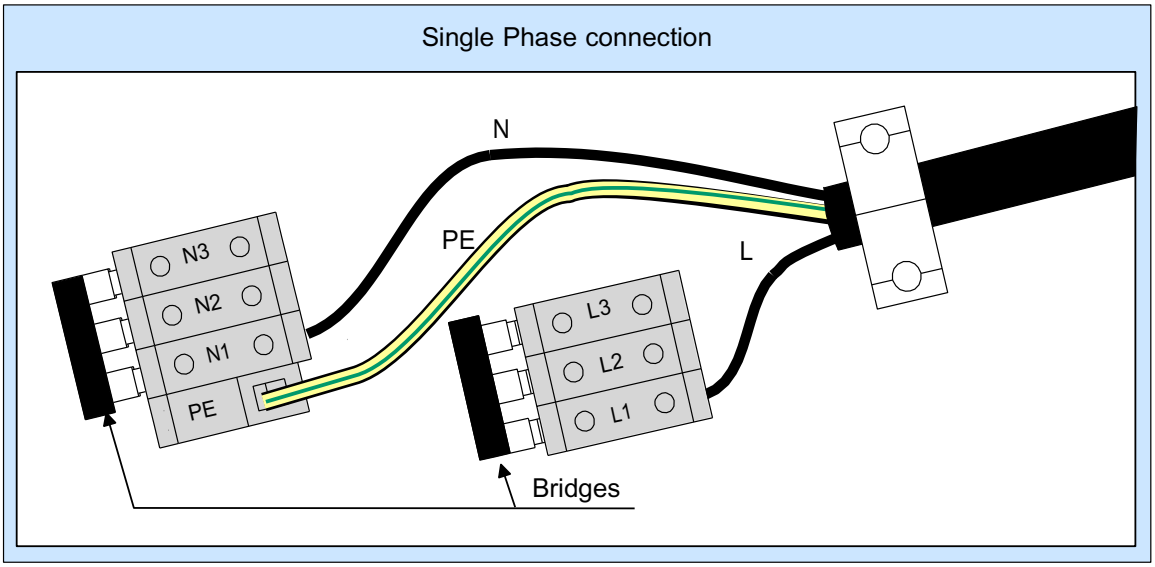


Figure 58. Single phase connection, 230 V AC

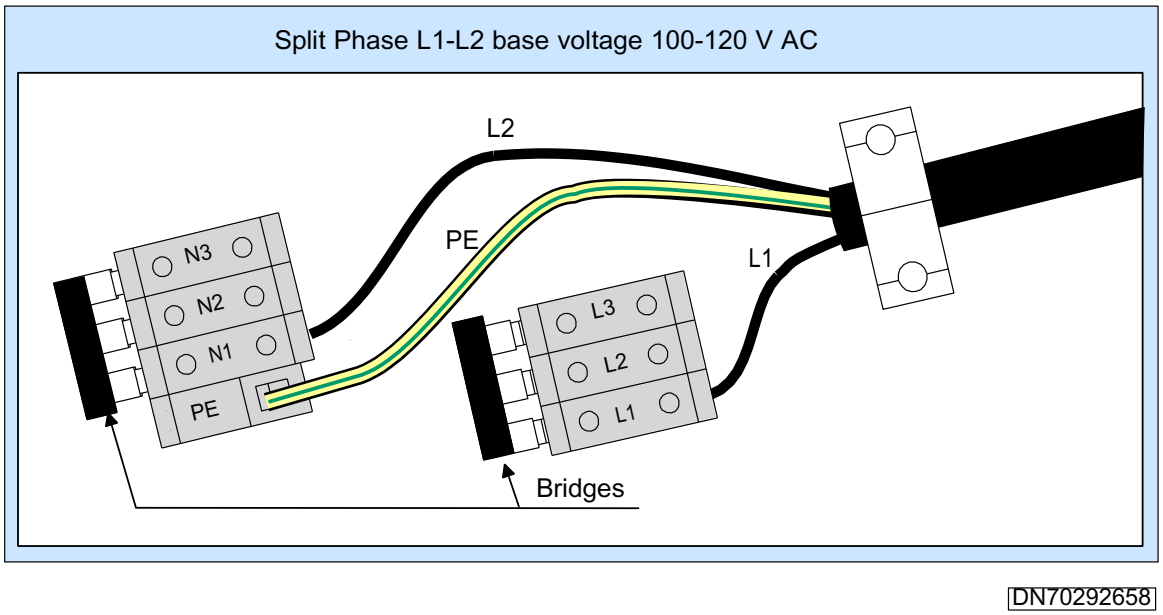


Figure 59. Single phase connection, base voltage 100-120 V AC

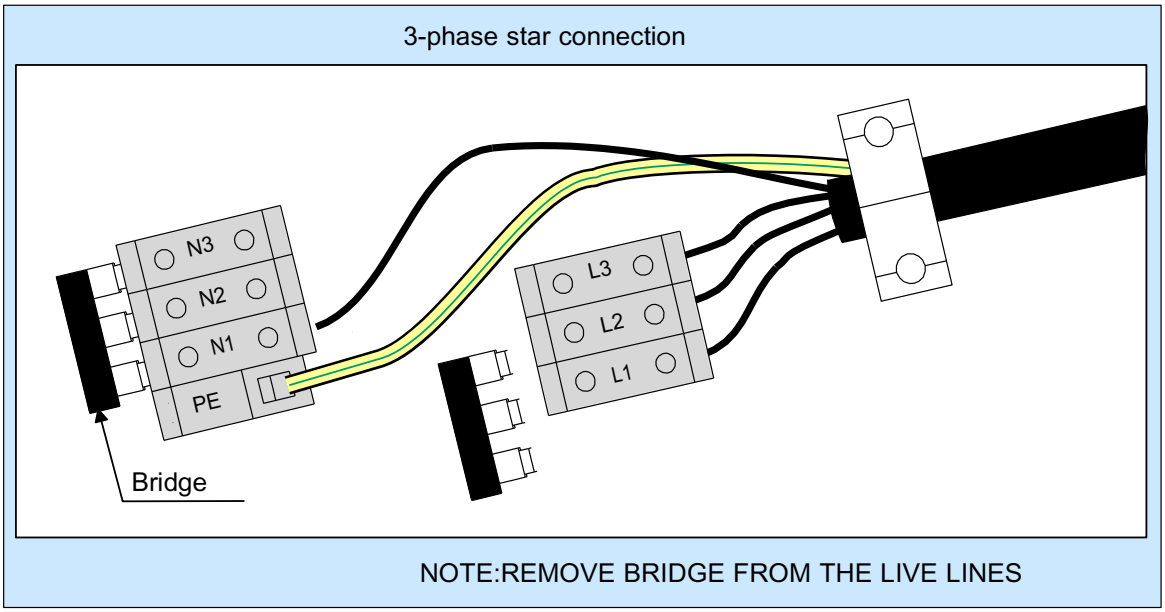


Figure 60. 3-phase star connection, 230 V AC

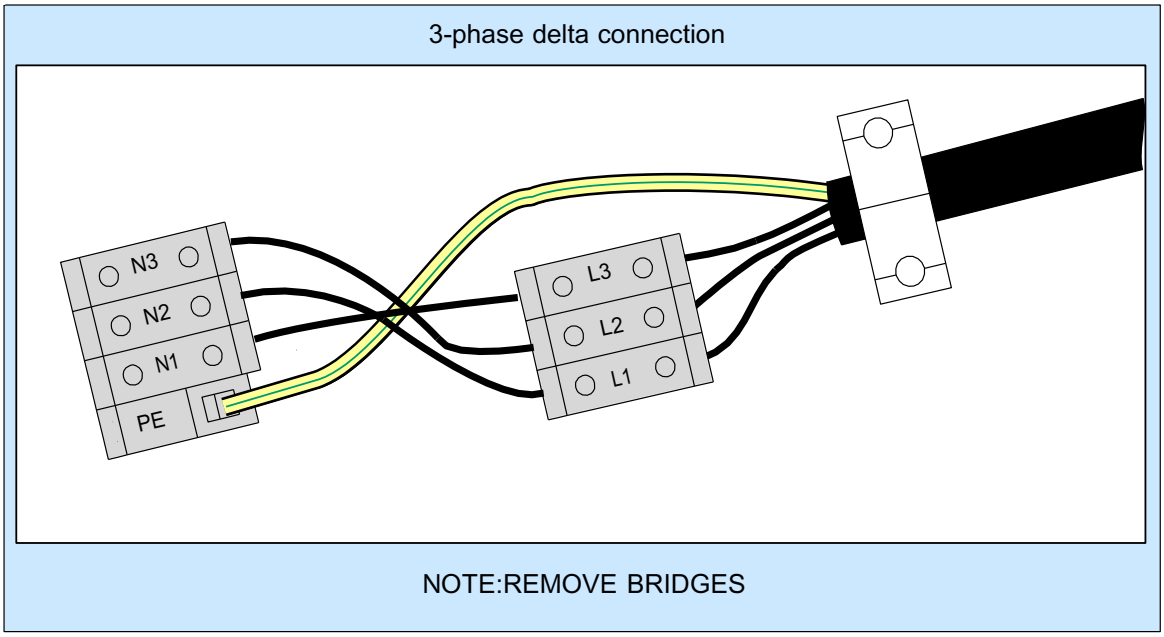


Figure 61. 3-phase delta connection, base voltage 100-120 V AC

8. Push the AC terminal plate halfway back into its slot.

9. Install the FPAA sub-modules required by your configuration.

The first or only FPAA must always be installed in the leftmost module slot. If there are empty slots, they must always be on the right.

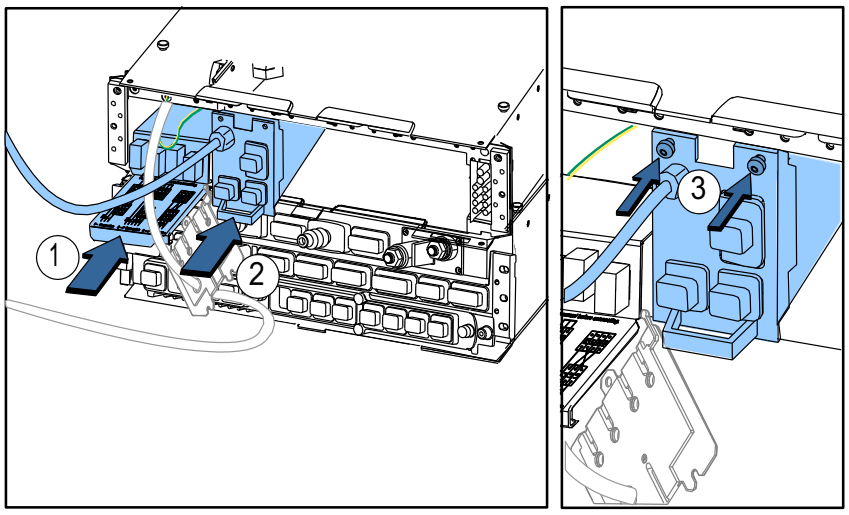


Figure 62. Installing sub-modules

10. Fix the FPAA screws.

11. Connect the AC cable from the FPAA to FPMA.

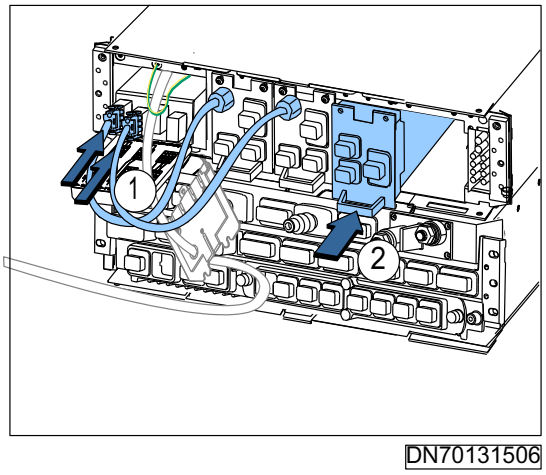


Figure 63. Connecting the AC cable

12. In case you are using battery backup, install the FPBA sub-modules required by your configuration.

Follow the same mechanical procedure as in FPAA installation.

13. In case alarms from the FPMA to the System Module are needed, connect the alarm cables.

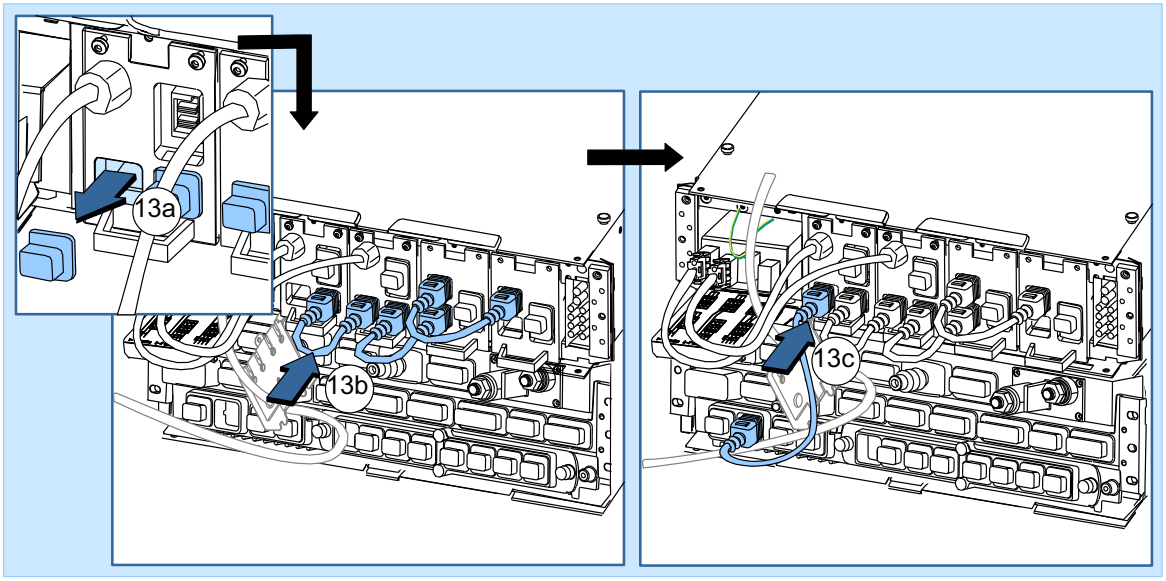


Figure 64. Connecting the alarm cables

a. Remove the ingress protection from the alarm cable connectors in FPAA and FPBA.
b. Chain the sub-modules together with the alarm cable from left to right.
c. Connect the alarm cable from one of the sub-modules to the System Module.

14. Connect the DC cables to all the sub-modules.

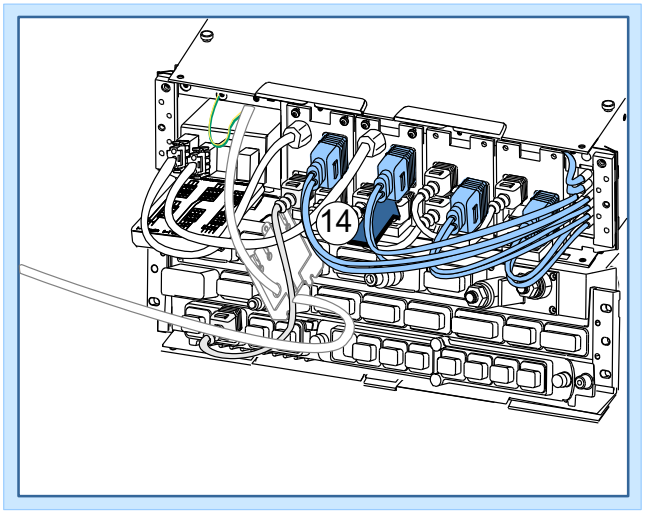


Figure 65. Connecting the DC cables

15. Push the AC terminal plate all the way back into its slot.

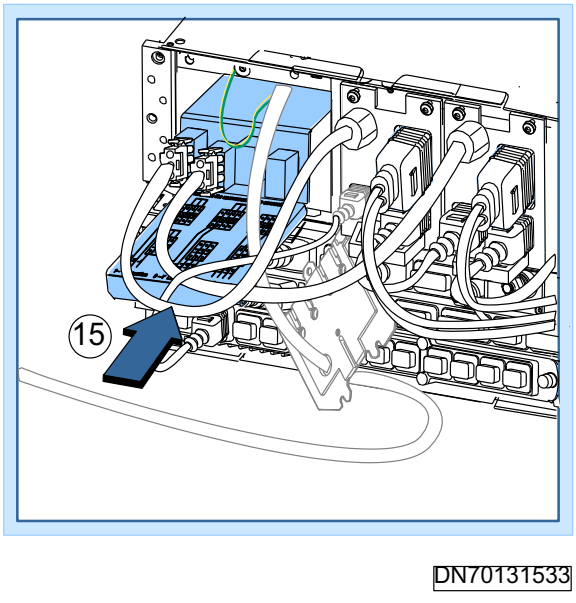


Figure 66. Inserting the AC terminal plate

16. Reinsert the ingress protection plate with cables routed through it.

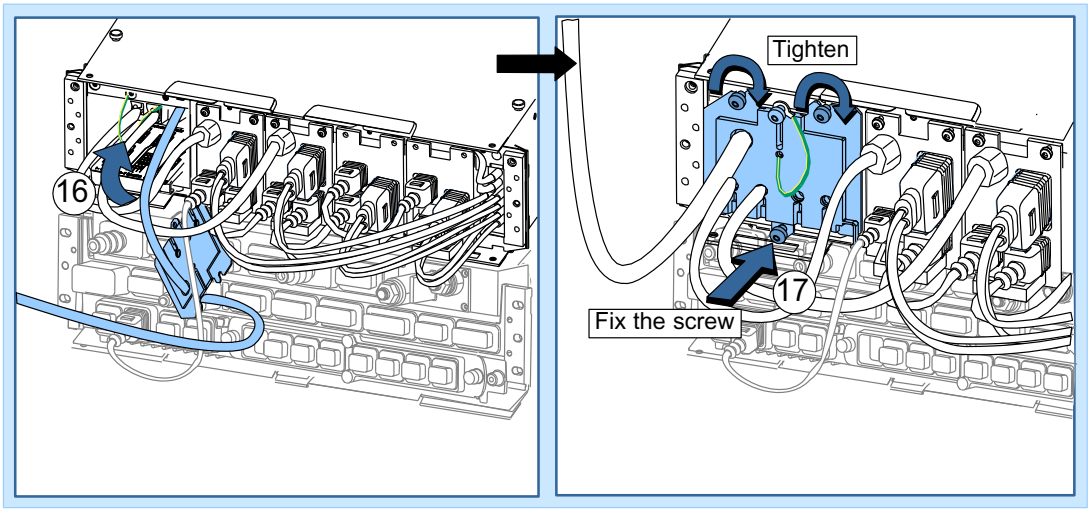


Figure 67. Replacing the ingress protection plate

17. Fix the screw.

18. Install the cable entries.

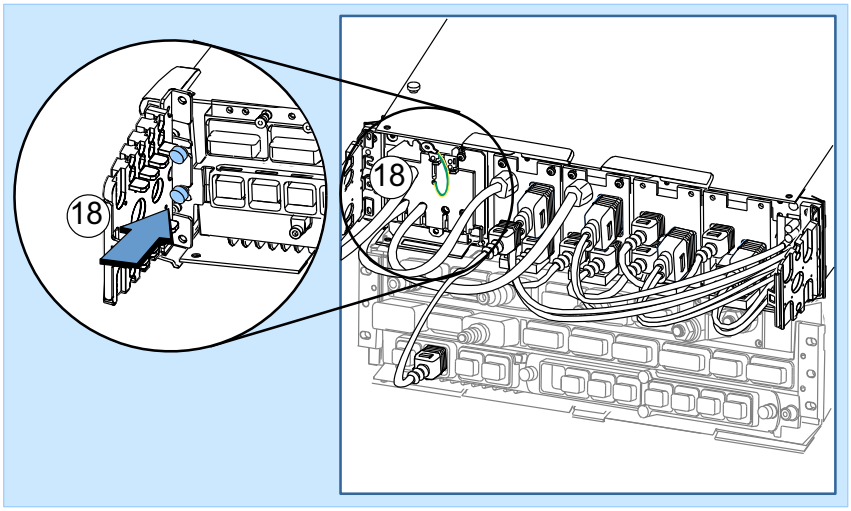


Figure 68. Installing cable entries

19. Route the DC power feed cables through the cable entries and connect them from the FPMA to the System Module.

20. Check that the cable connectors' IP gaskets are firmly in place.

21. Power up the site.

Make sure that the FPAA LED is yellow at this point.

22. Turn on the FPAA and FPBA by pushing the switch.

Make sure that the FPAA LED is stable green and the FPBA LED is green and blinking slowly (charging).

23. Install the FPMA module front panel cover.

24. Connect the mains power.

10.1.2 Installing Flexi Power DC/DC Module 24V (FPDA)

Purpose

The FPDA is an isolated 2U-high DC/DC Power Module that converts nominal 24 V DC input voltage to 48 V DC nominal output voltage. A maximum of two FPDA modules can be connected in parallel.

The FPDA is delivered with two sets of rubber boots: one set accommodates 1/0 AWG (50 mm^2) or 2 AWG (35 mm^2) for 24 V DC input; the other set accommodates 2 AWG (35 mm^2) or 4 AWG (25 mm^2) for 48 V DC output. If 50 mm^2 cables are used, you need to cut the rubber boot to fit the cable.

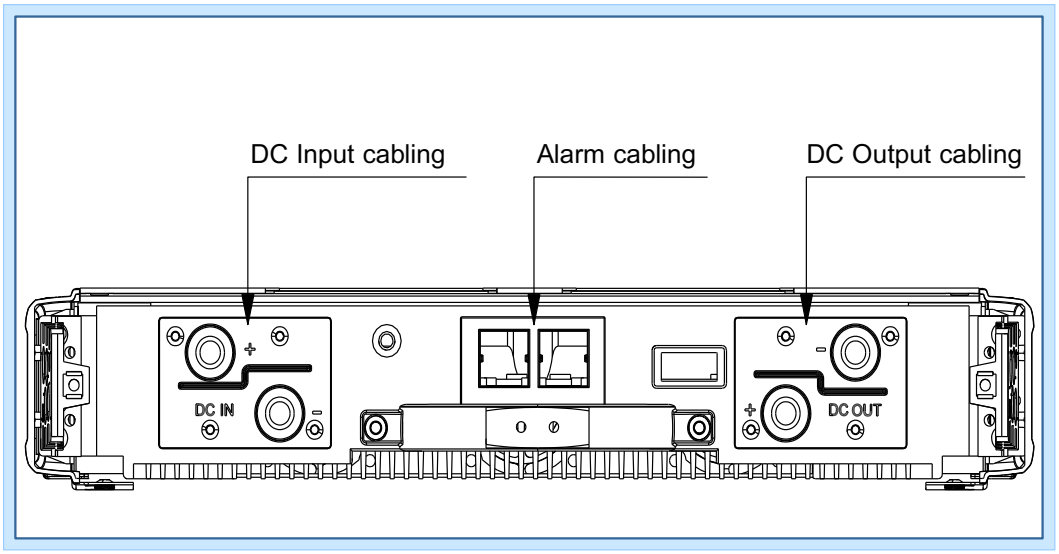


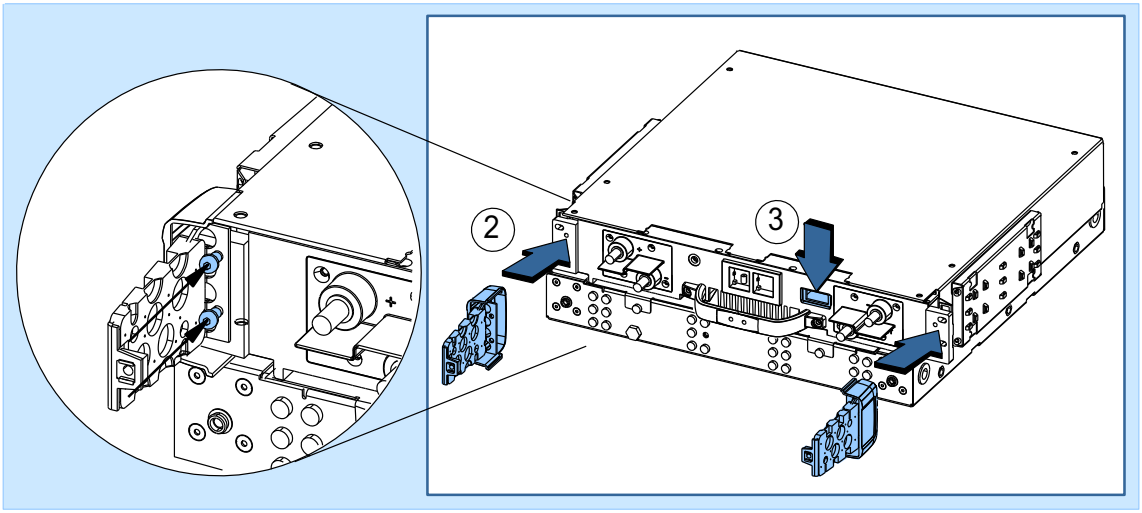
Figure 69. Front panel of the FPDA

Before you start

Check that the mains breaker is off.

Steps

1. **Install the FPDA.**
2. **Attach the cable entries using two screws (in stack, wall and pole installation).**



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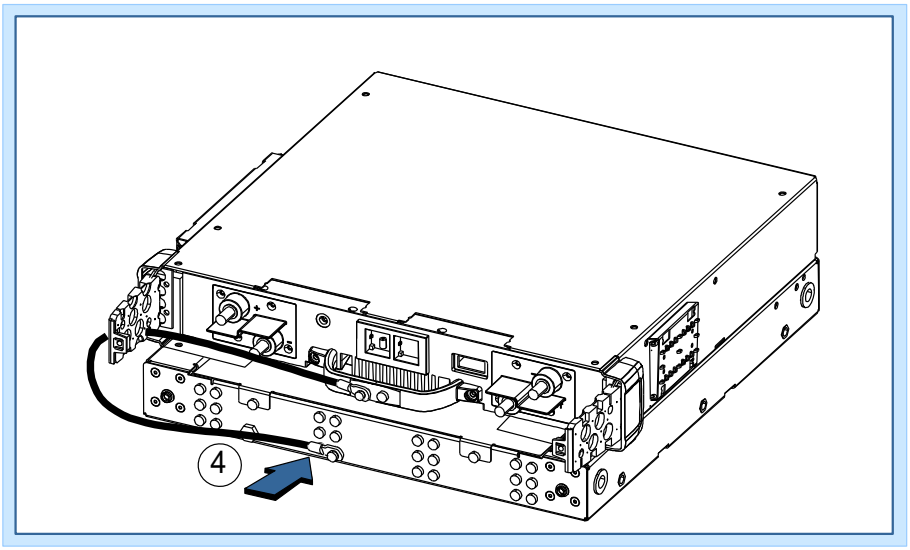
3. **Make sure that the power switch on the front panel is in the stand-by position.**

4. **Connect the grounding cable to the plinth (in stack, wall and pole installation).**



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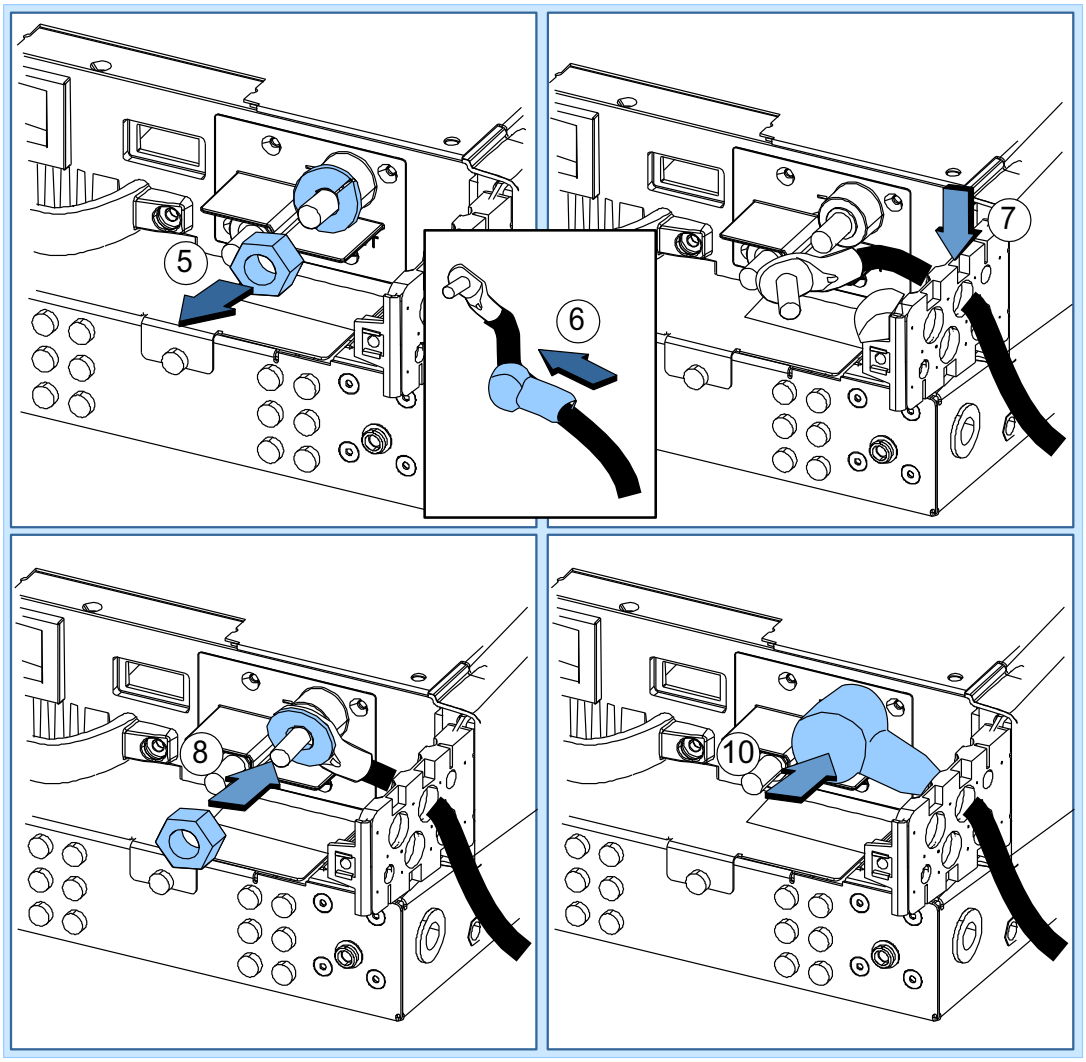
5. Remove the bolts and washers from the DC output terminals.



DN70141102

6. Insert the rubber boots to the DC output cables.

If the cable is 50 mm^2, cut the rubber boot to fit the cable.

7. Route the DC output cables through the cable entry (in stack, wall and pole installation).

Use the top right entry hole for the V48N- cable and bottom right entry hole for the V48RTN+ cable.

8. **Connect the V48N- cable to the minus terminal and V48RTN+ cable to the plus terminal in the FPDA module.**

9. **Tighten the bolts to 13.5-13.9 Nm.**

10. **Pull the rubber boots over the DC output terminals.**

11. **Connect the DC output cables to the System Module.**

12. **Remove one of the alarm connector seals on the front panel of the FPDA and connect the alarm cable.**

    If you are using two FPDAs, chain them together with the alarm cable.

13. **Check that the power switch is still in the stand-by position.**

14. **Make sure that the 24 V DC supply for the FPDA is de-energised and connect the DC input cables similarly as the DC output cables.**

    Connect the minus wire to the minus terminal and the plus wire to the plus terminal.

Note

DC input cables are not included in the delivery. The length and thickness of the DC input cables must be defined based on the distance to the 24 V DC power source. The maximum thickness of a DC input cable that can be installed to the FPDA is 50 mm²/AWG 1/0.

15. **Connect the 24 V DC supply.**

    Make sure the LED is yellow.

16. **Switch on the power by pushing the power switch on the front panel of the FPDA.**

    Make sure the LED is green.

17. **Install the module front cover (in stack, wall and pole installation).**

18. **Connect the mains power.**

10.1.3 Installing Wideband Combiner Sub-module (EWxA)

Purpose

The optional Wideband Combiner Sub-module (EWxA) is installed in the Dual TRX Module (EXxA).

The Wideband Combiner Sub-module can be installed on the left or right side of the slot in the Dual TRX Module. If you are using only one Wideband Combiner Sub-module, the recommended installation location is on the left side.

Summary

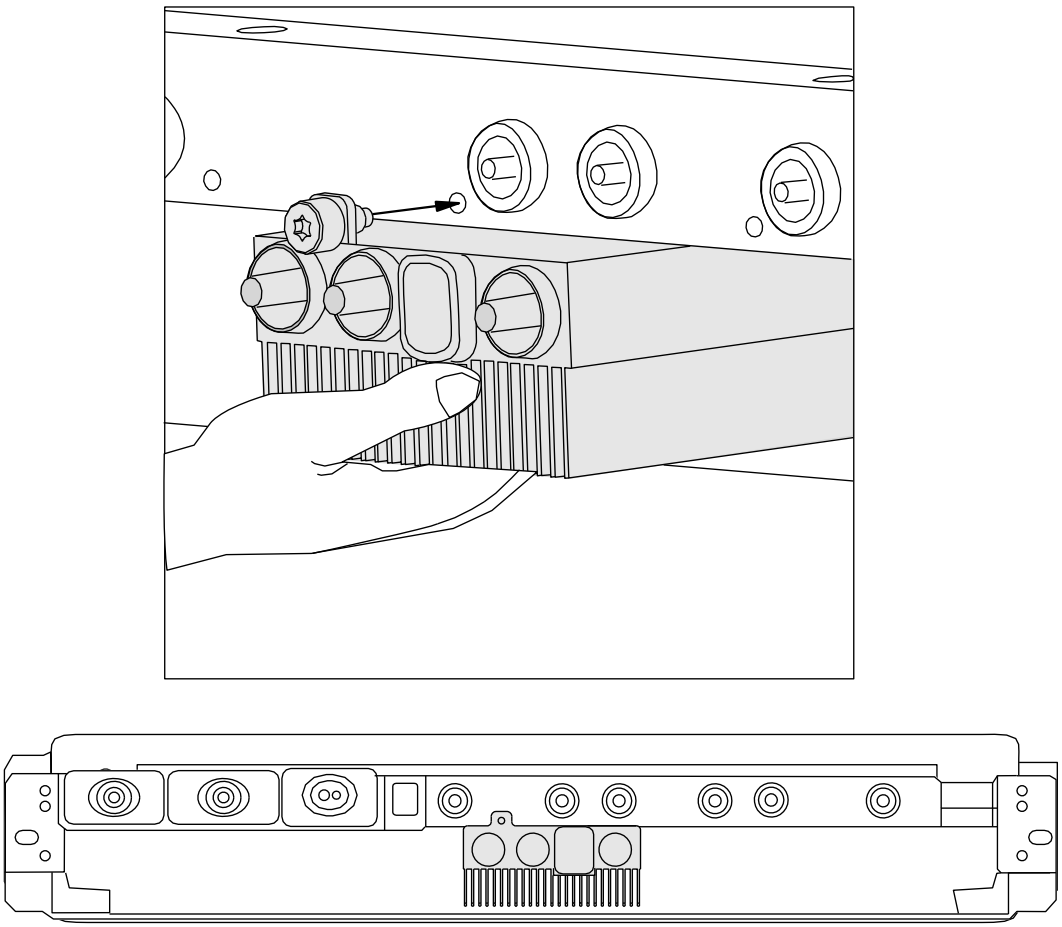


Figure 70. Installing the Wideband Combiner Sub-module

Steps

1. Install the Wideband Combiner Sub-module in the Dual TRX Module.

2. Tighten the screw.

While tightening the screw, hold the module from below to make sure it is aligned correctly.

10.1.4 Installing Flexi Mounting Auxiliary Brackets (FMAA)

Purpose

The Flexi Mounting Auxiliary Brackets (FMAA) can be used to mount auxiliary units on the top or outer casings in pole, wall, and stack configurations. The brackets are mounted on the top or outer casing using the existing connection pin holes.

The FMAA can be used with the following auxiliary units:

- Flexi System External Alarm (FSEB)
- Flexi System External OVP (FSEC)

  Note that the FSEC is currently available for Flexi WCDMA BTS only.
- Location Measurement Unit (LMU)

The mounting holes for each of these units are labelled on the brackets.

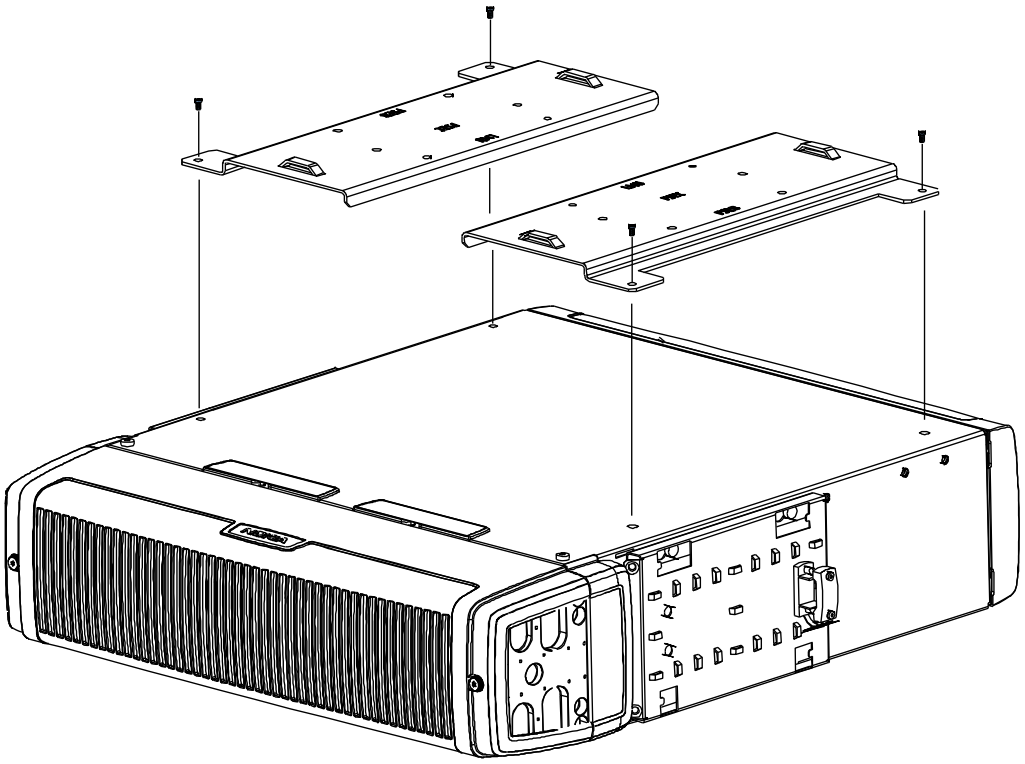


Figure 71. FMAA

Summary

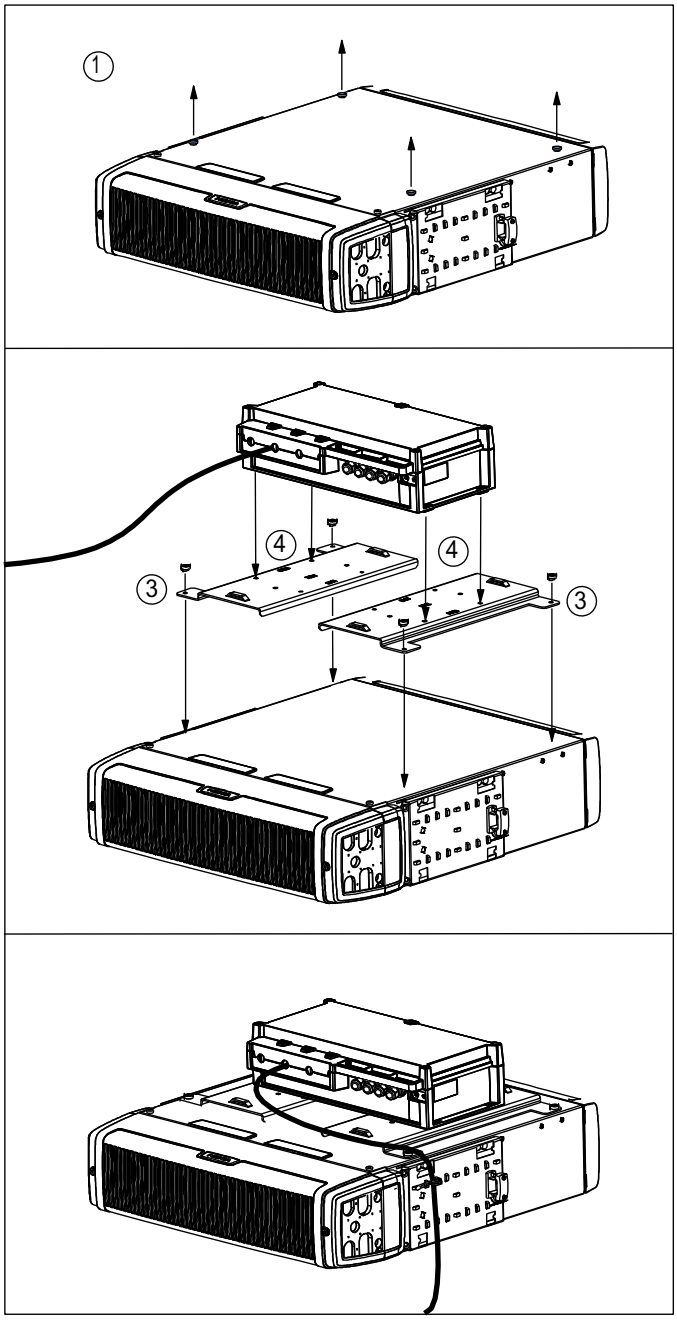


Figure 72. Installing FMAA with FSEB

Steps

1. **Remove the four connection pins from the casing on which the FMAA will be installed.**

2. **Align the outer holes of each bracket with the connection pin holes.**

3. **Use the M5 X 6 screws to mount each bracket to the casing.**

4. **To mount the auxiliary unit on the brackets, see the following installation instructions:**
   - *Installing Flexi System External Alarm (FSEB)*
   - Installing LMU: see *LMU Product Documentation* in NOLS.

10.1.5 Installing Flexi System External Alarm (FSEB)

Purpose

The optional Flexi System External Alarm Module (FSEB) is used when up to 24 external alarm inputs and 6 control outputs need to be supported with Nokia Flexi EDGE BTS. The module also supports Flexi Cabinet Heat detector (FCDA).

The FSEB can be installed in following ways:

- On a wall (vertical or horizontal position)
- On a pole using brackets (horizontal or vertical position)
- On casing in pole, wall, or stack installations using brackets (horizontal or vertical position)
- On the FCIA or FCOA roof (horizontal position only)
- In City Talk cabinets, the FSEB can be installed on top of the stack (depending on working space) or outside of the cabinet. The box cannot be installed on the roof.

See also section *FSEB interface signals and connector pin assignments*.

Before you start

In pole or wall installation, locate the box in the proximity of the System Module. In wall installations, make sure that the mounting surface is flat.

In FCOA installations, use the fixing points on the cabinet roof.

Caution

Electrostatic discharge (ESD) may damage the equipment. Wear an ESD wrist strap when handling the external alarm connection box.

Note that when connecting the cables, make sure that the cable lead-ins that are not used are blocked.

Summary

The FSEB can be installed either horizontally (cable lead-ins on the side) or vertically (cable lead-ins facing downwards). See the following figures for the two installation options.

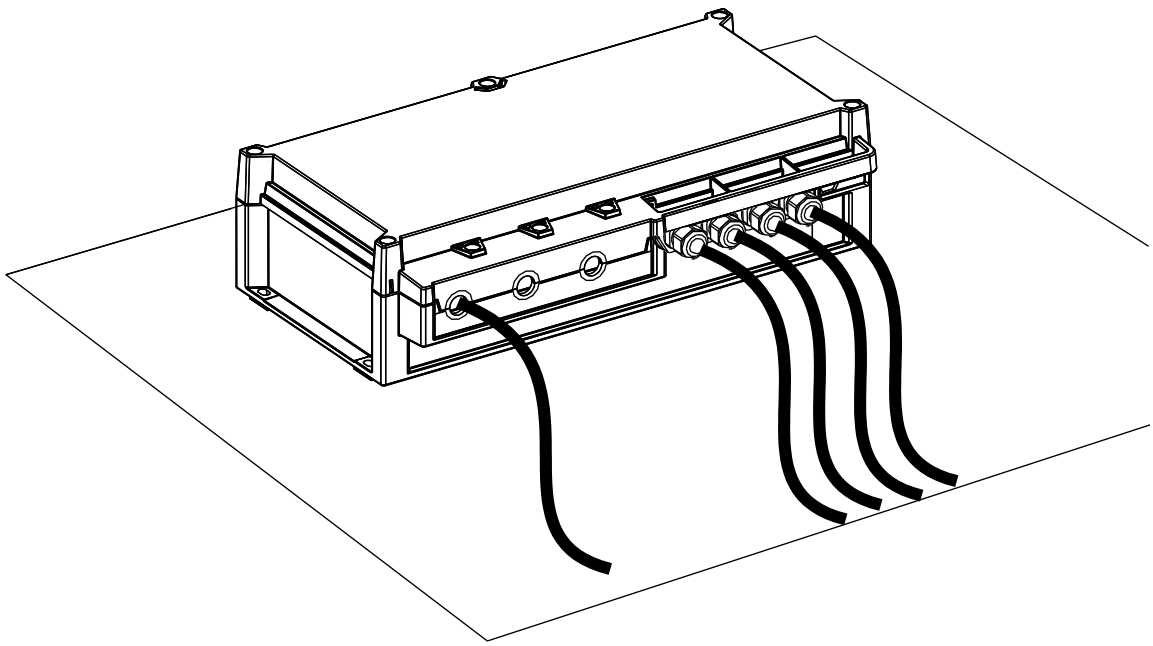


Figure 73. FSEB installed horizontally

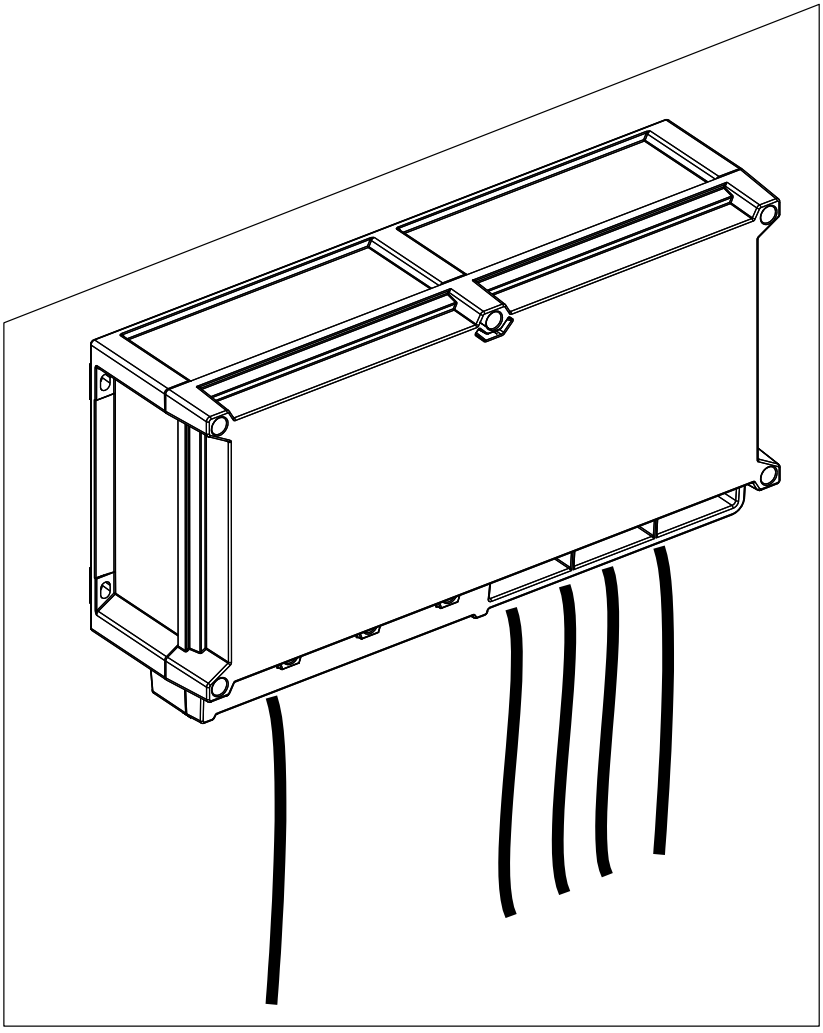


Figure 74. FSEB installed vertically

In outdoor installations, the cable lead-ins must be facing downwards to meet the IP55 standard.

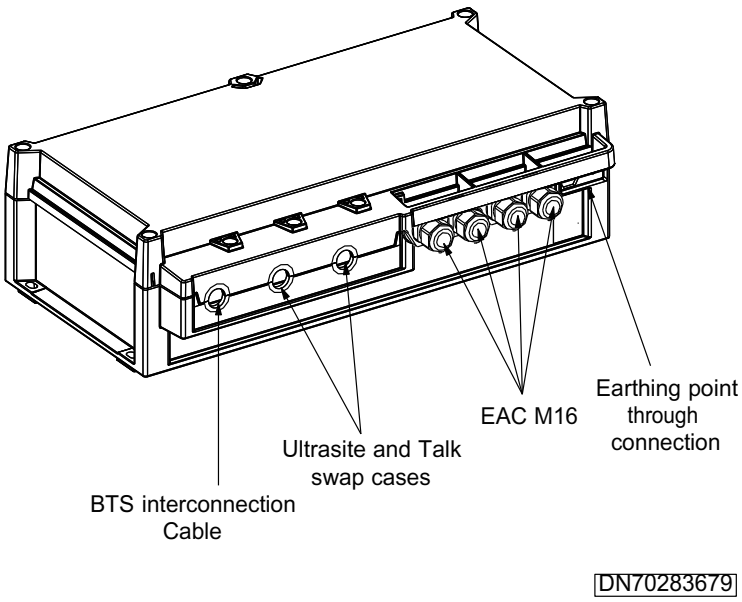


Figure 75. FSEB connectors

Steps

1. Install FSEB with four M5 screws using the fixing holes in the bottom of the box.

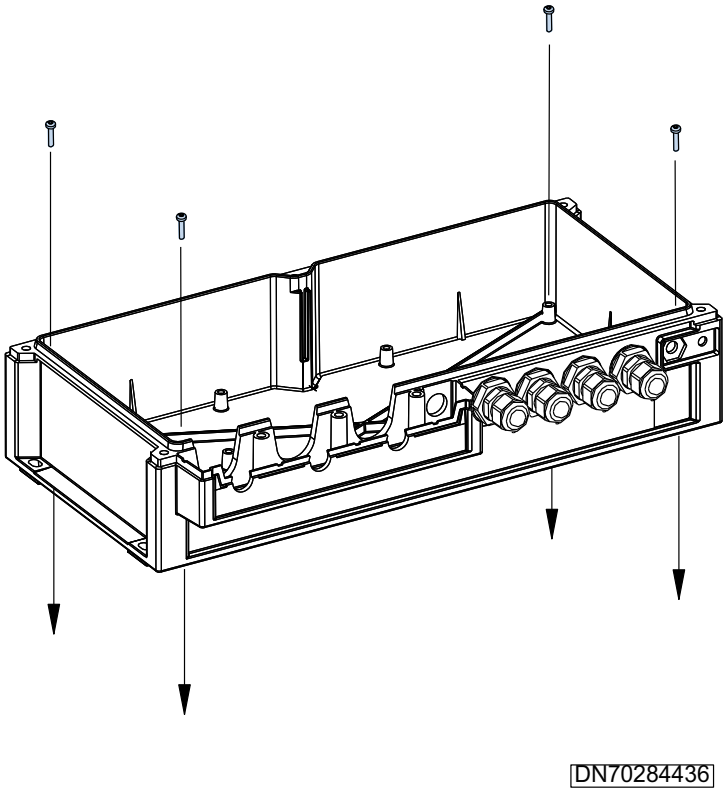


Figure 76. Install FSEB with four M5 screws

In stack, wall or pole installation, install the FSEB using the mounting brackets. See the *Installing Flexi Mounting Auxiliary Brackets (FMAA)* for installation instructions.

2. Connect the grounding cable to the grounding screw on the right side of the FSEB front plate.

Screw the nut tightly.

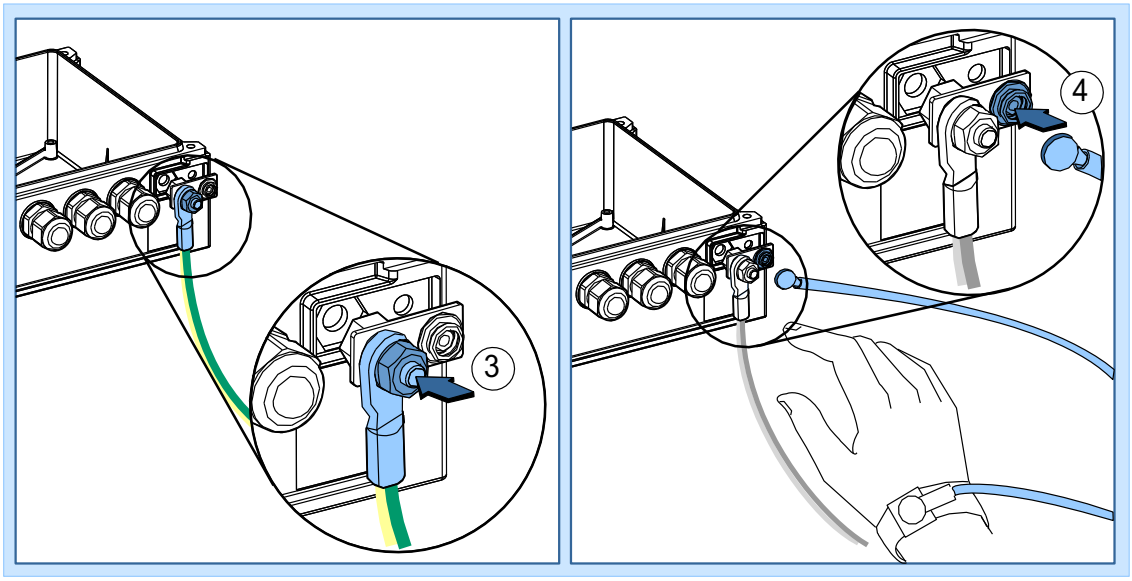


Figure 77. Connect the grounding cable

3. **Connect the ESD wrist strap first to your wrist and then to the grounding clip next to the grounding screw.**

   Make sure that jumper X1103 is set to GSM mode.

4. **Connect the external alarms cable (included in the FSEB delivery) from the FSEB to the System Module.**

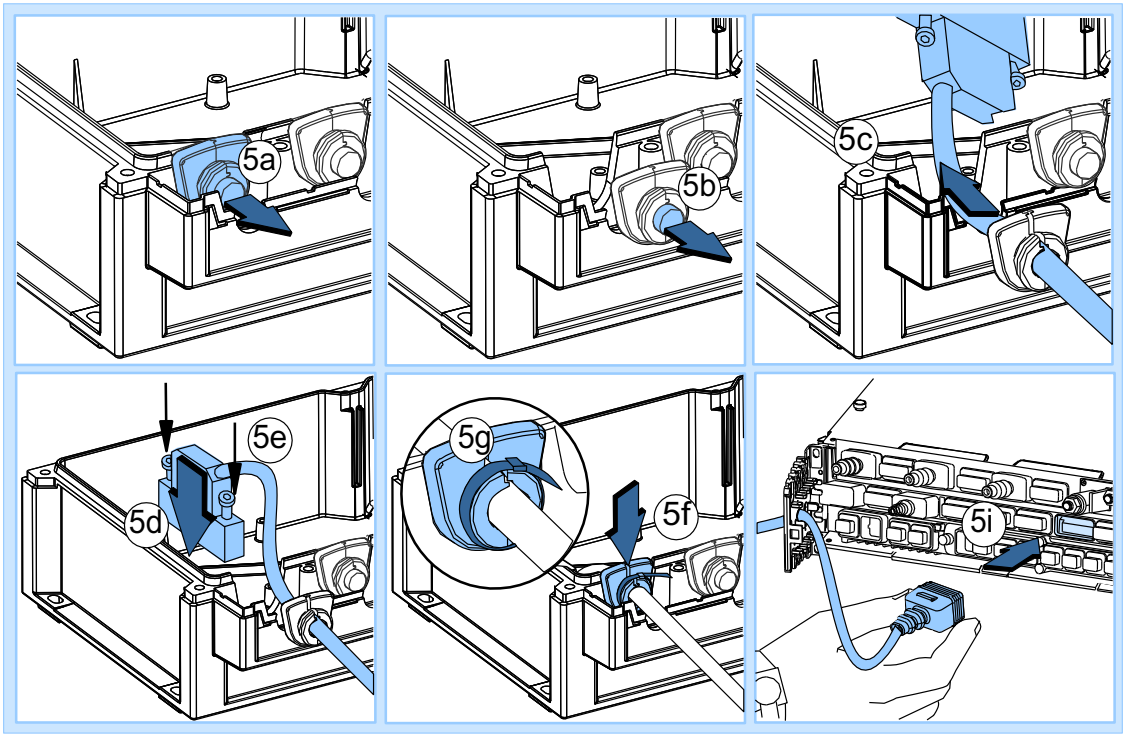


Figure 78. Connect the external alarms cable

a. Pull the left U-shaped cable gland from the FSEB box.
b. Remove the hole closing plug from the cable gland. If the plug is fixed with a cable tie, cut the cable tie first and remove it.
c. Insert the cable in the cable gland. The D-Sub plug must point to the inside of the box.
d. Connect the D-Sub plug to the leftmost D-Sub connector X1101 on the FSEB board.
e. Fix the connector fixing screws.
f. Insert the U-shaped cable gland to the front plate.
g. Insert the cable to the round rubber-seal in front of the U-shaped cable gland.
h. Fix the cable with a cable tie. Make sure that the U-gland fixes the cable tightly.
i. Remove the cover of the EAC connector on the System Module.

j. Insert the other end of the cable with the MDR-36 connector to the EAC connector of the System Module. Make sure that the MDR connector is firmly in place.

k. Push the connector cover over the MDR connector and seal the EAC connector at the System Module with this cover.

l. Route the cable between the FSEB and System Module and fix it with cable ties. The first fixing point must not be further away from the FSEB box than 0.5 m (1.6 ft).

5. If you are using an existing alarm cable with a 37-pole D-Sub connector, connect the cable with a D-Sub connector as follows:

Tip

These two alarm cables can be connected to the EACX-I and EACX-II connectors of the FSEB, respectively. Connect the UltraSite EDGE BTS or CityTalk BTS alarm cables (CS73113.01) 1-12 and 13-24 to EACX-I and EACX-II connectors. Pay attention to connect them to the right EACX connector, otherwise alarm number and alarm description will not match. After the installation configure the alarm and verify the condition using the Flexi EDGE BTS Element Manager.

a. Pull the right U-shaped cable gland from the FSEB box.

b. Cut the cable tie off the cable gland.

c. Remove the hole closing plug from the cable gland.

d. Insert the alarm cable in the cable gland. The D-Sub plug must point to the inside of the box.

e. Attach the D-Sub plug to the right 37-pole D-Sub connector X4101 (EACX-I port).

f. Fix the connector fixing screws.

g. Insert the U-shape cable gland to the front plate.

h. Insert the cable to the round rubber-seal in front of the U-shaped cable gland.

i. Fix the cable with a cable tie. Make sure that the U-gland fixes the cable tightly.

j. Route the cable and fix it with cable ties. The first fixing point must not be further away from the FSEB box than 0.5 m (1.6 ft).

6. If you are using the single alarm cables, connect them to the screw terminals as follows:

a. Insert the alarm cables in the FSEB box by using the cable glands on the right-side half of the FSEB box.
b. Tighten the cable gland nut.
c. Route the alarm cables and fix them with cable ties. The first fixing point must not be further away from the FSEB box than 0.5 m (1.6 ft).
d. Attach alarm lines EXT_AL1 to EXT_AL12 using screw terminal blocks X4106-X4109.
e. For each alarm input connect one wire to the GROUND screw terminal blocks X4107 or X4109 and connect one wire to the selected alarm input on screw terminal blocks X4106 or X4108. The alarm inputs are marked on the FSEB board with "EXT_AL6 ... EXT_AL1" on X4106 and "EXT_AL12 ... EXT_AL7" on X4108.

   Note that if you use alarm inputs on the EACX-I port (D-Sub connector X4101), do not use the same alarm inputs on the screw terminals X4106 and X4108.

7. If you are using the control output cables, connect them as follows:

a. Insert the control output cables in the FSEB box by using the cable glands on the right-side half of the box.
b. Tighten the cable gland nut.
c. Route the control cables and fix them with cable ties. The first fixing point must not be further away from the FSEB box than 0.5 m (1.6 ft).
d. Attach the control lines EXT_CO1 to EXT_CO6 by using the screw terminal blocks X4104 and X4105.
e. For each control output connect one wire to the +5V screw terminal block X4105 and one wire to the selected control output on screw terminal X4104. The control outputs are marked on the FSEB board with "EXT_CO6 ... EXT_CO1" on X4104.

   Note that if you use control outputs on the EACX-I port (D-Sub connector X4101), do not use the same control outputs on the screw terminal X4104.

8. Install the heat detector to the FSEB (optional).

a. Connect the heat detector to the FSEB using a four-wire cable. Two wires are needed for heat detector power supply and two for the heat detector alarm connection.
b. Attach the four wires of the cable to the heat detector relay-base.

c. Insert the other end of the four wire cable through one cable gland at the right half of the FSEB box.

d. Tighten the cable gland nut.

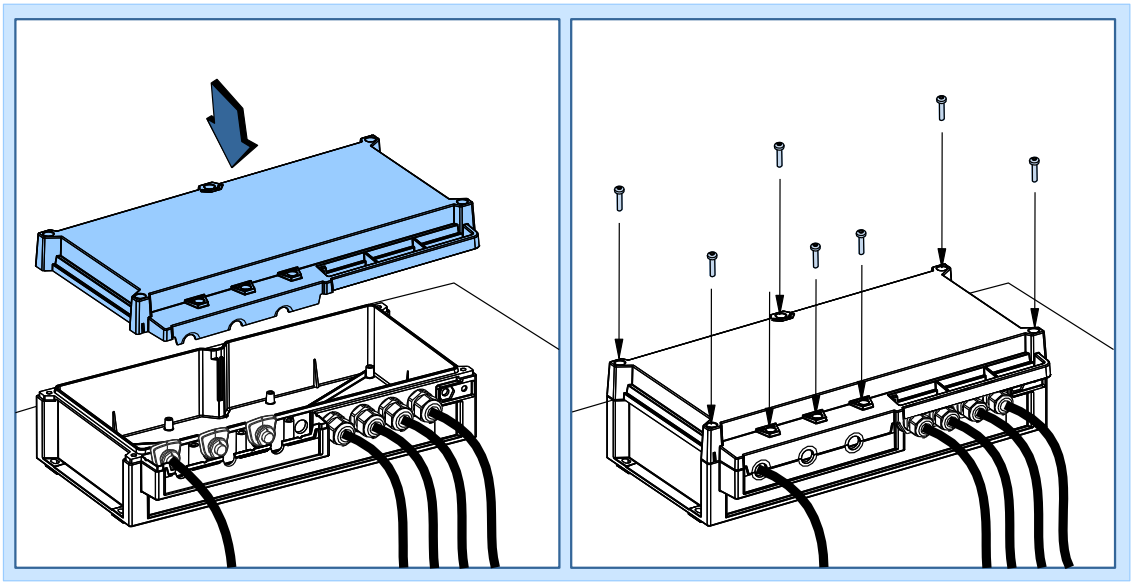
e. Route the cable and fix it with cable ties. The first fixing point must not be further away from the FSEB box than 0.5 m (1.6 ft).

f. Attach the wire marked with + from the heat detector to the leftmost or rightmost opening of the screw terminal X4114.

g. Attach the wire marked with - from the heat detector to one of the four middle openings of the screw terminal X4114 marked with GND.

h. Attach the heat detector alarm wires to one of the alarm inputs "EXT_AL12 ... EXT_AL1".

9. Install the cover of the FSEB box and tighten the eight screws.



DN70285053

Figure 79. Install the cover

10.2 Connecting optional cables

10.2.1 Connecting Power Module alarm cables

Purpose

The Power Module (FPMA) alarm cables are connected between Power Module sub-modules. For more information on the internal cabling of the FPMA, AC/DC 230V Sub-module (FPAA) and Power Battery Sub-module (FPBA), see *Installing Flexi Power Module (FPMA)*.

Caution

Incorrect cables and seals may not provide secured weather protection. In outdoor installations, including the outdoor cabinet, use only tested IP55 class outdoor cables with seals provided by Nokia. This is also recommended for indoor installations.

Steps

1. **Remove the IP seals from the alarm cable connectors in the FPAA and FPBA.**

2. **Chain the sub-modules together with the alarm cable from left to right.**

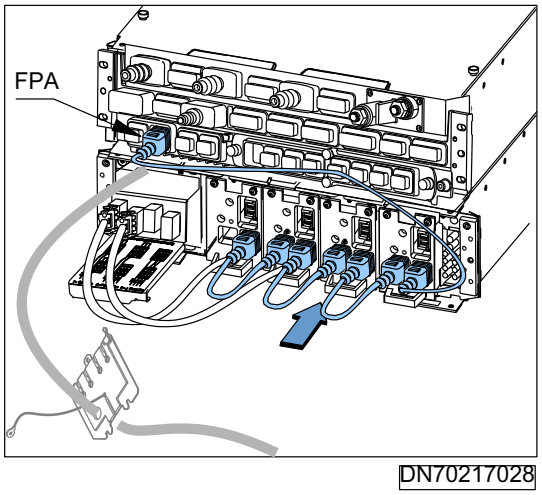


Figure 80. Connecting Power Module alarm cables

3. Connect the alarm cable from one of the sub-modules to the System Module.

The alarm cable is connected to the Site support alarms connector on the System Module.

10.2.2 Connecting external alarms cable

Before you start

The external alarms cable is optional.

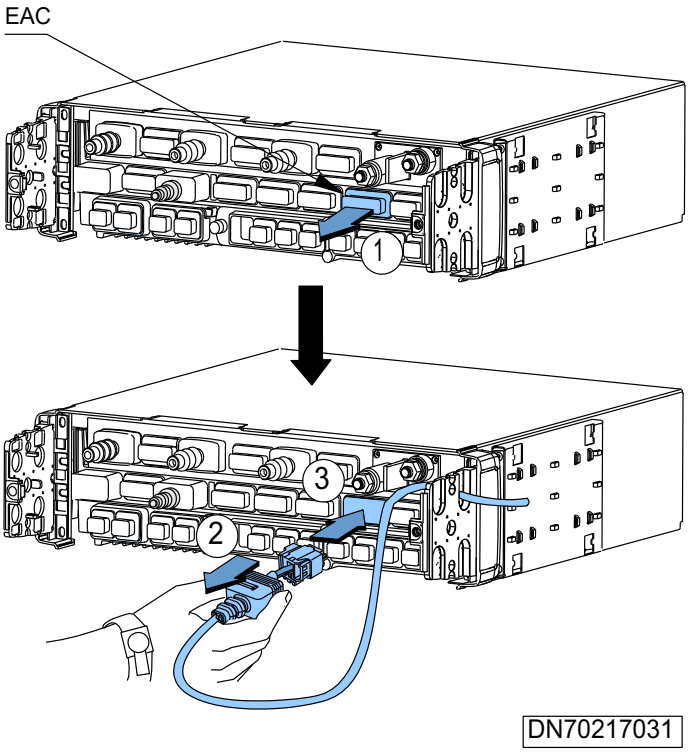
Summary

Caution

Incorrect cables and seals may not provide secured weather protection. In outdoor installations, including the outdoor cabinet, use only tested IP55 class outdoor cables with seals provided by Nokia. This is also recommended for indoor installations.

Note

When connecting BTS external cabling in wall or pole installation at an outdoor site, the cables should be routed via the lower cable entry when possible.



Note that cable entry and cable support plate are not used in cabinet installation.

Figure 81. Connecting external alarms cable

Steps

1. **Remove the connector seal from the external alarms connector in the System Module front panel.**

   Store the seal for later use.

2. **Route the external alarms cable through the cable entry (stack, wall and pole installations).**

3. **Pull back the connector seal covering the external alarms cable connector.**

4. **Connect the cable to the external alarms connector.**

5. **Push the cable connector seal firmly in place.**

6. **Route and connect the other end of the external alarms cable to the external alarms control box or to the distribution frame.**

   See *Installing Flexi System External Alarm (FSEB)* for more details.

10.2.3 Connecting synchronisation cables

Purpose

The synchronisation (Sync OUT, Sync IN) cables are connected between the System Module and an external BTS. The synchronisation cables are also used for syncronising test equipment.

The synchronisation cables are optional.

Summary

Caution

Incorrect cables and seals may not provide secured weather protection. In outdoor installations, including the outdoor cabinet, use only tested IP55 class outdoor cables with seals provided by Nokia. This is also recommended for indoor installations.

Note

When connecting BTS external cabling in wall or pole installation at an outdoor site, the cables should be routed via the lower cable entry when possible.

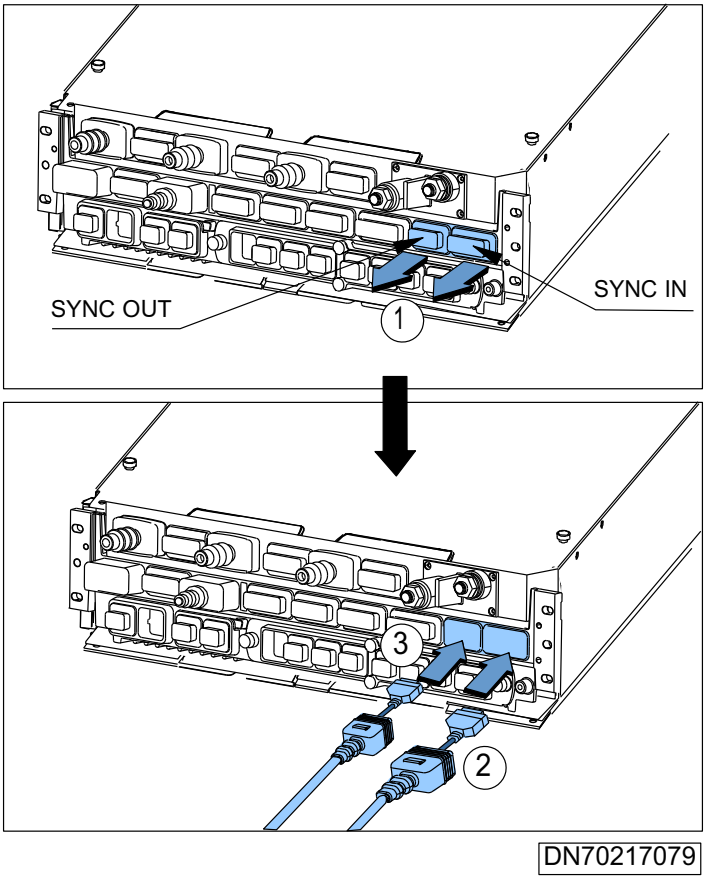


Figure 82. Connecting synchronisation cables

Steps

1. **Remove connector seals from the synchronisation connectors in the System Module front panel.**

   Store the seals for later use.

2. **If this is a stack, wall or pole installation, route the synchronisation cable through the cable entry.**

3. **Pull back the connector seal covering the synchronisation cable connector.**

4. **Connect the cable to the synchronisation connector.**

5. **Push the cable connector seal firmly in place.**

6. **Route and connect the other end of the synchronisation cable to the external BTS.**

10.2.4 Connecting Q1 cable

Purpose

The Q1 cable is connected between the System Module and a legacy Q1 network management system. The Q1 cable is optional.

Summary

Caution

Incorrect cables and seals may not provide secured weather protection. In outdoor installations, including the outdoor cabinet, use only tested IP55 class outdoor cables with seals provided by Nokia. This is also recommended for indoor installations.

Note

When connecting BTS external cabling in wall or pole installation at an outdoor site, the cables should be routed via the lower cable entry when possible.

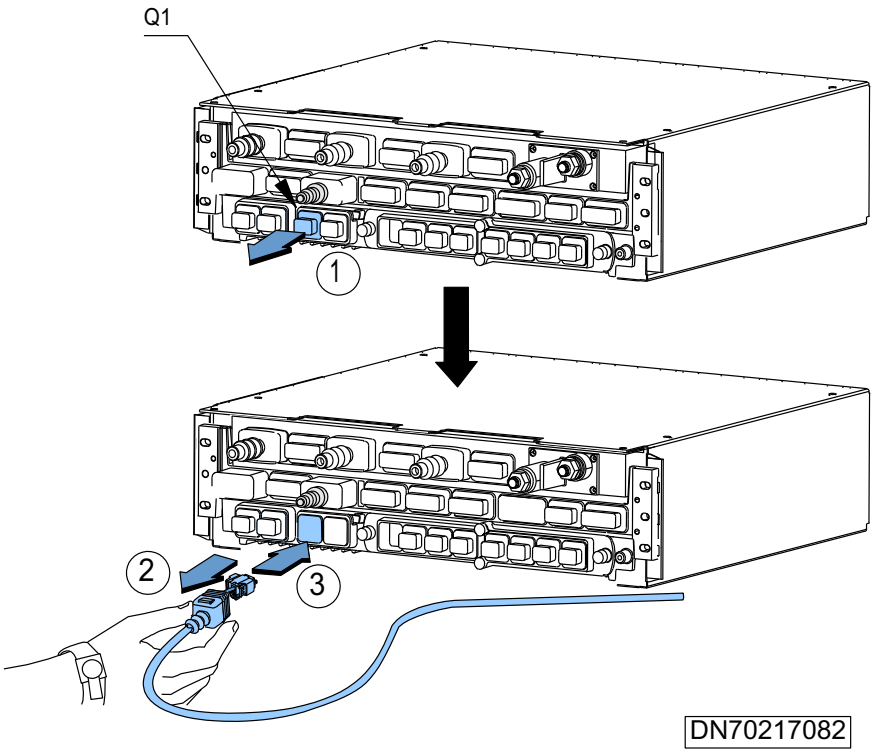


Figure 83. Connecting Q1 cable

Steps

1. **Remove the connector seal from the Q1 connector in the System Module front panel.**

   Store the seal for later use.

2. **If this is a stack, wall or pole installation, route the Q1 cable through the cable entry.**

3. **Pull back the connector seal covering the Q1 cable connector.**

4. **Connect the cable to the Q1 connector.**

5. **Push the cable connector seal firmly in place.**

6. **Route and connect the other end of the Q1 cable to the Q1 network management system.**

10.2.5 Connecting LMP cable

Purpose

The Local management port cable (LMP) is connected between the System Module and a laptop or other computer. The cable is optional.

Summary

Caution

Incorrect cables and seals may not provide secured weather protection. In outdoor installations, including the outdoor cabinet, use only tested IP55 class outdoor cables with seals provided by Nokia. This is also recommended for indoor installations.

Note

When connecting BTS external cabling in wall or pole installation at an outdoor site, the cables should be routed via the lower cable entry when possible.

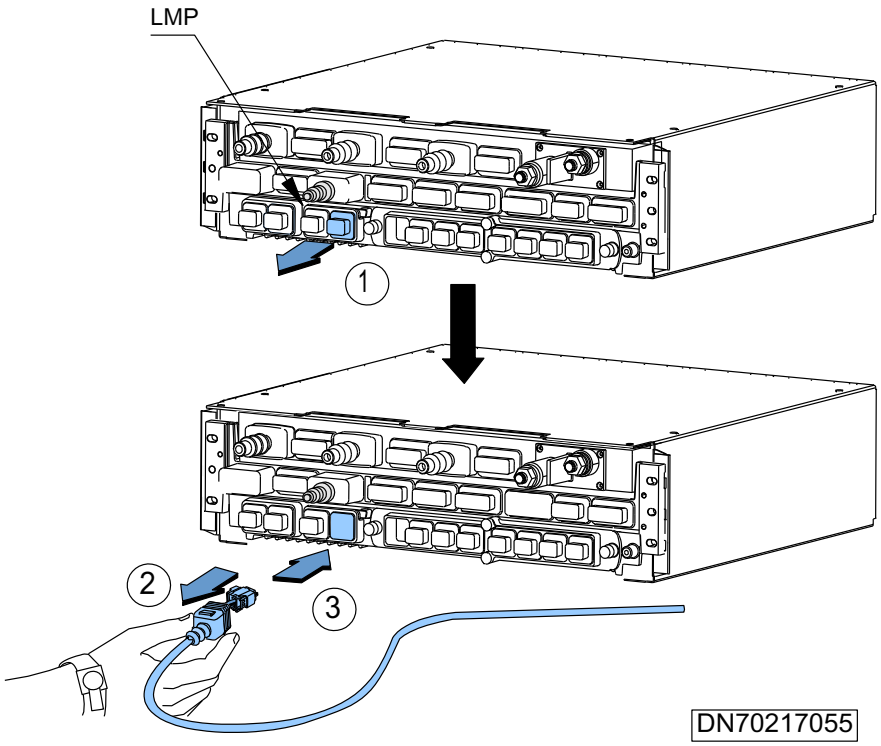


Figure 84. Connecting LMP cable

Steps

1. **Remove connector seal from the LMP connector in the System Module front panel.**

   Store the seal for later use.

2. **If this is a stack, wall or pole installation, route the LMP cable through the cable entry.**

3. **Pull back the connector seal covering the LMP cable connector.**

4. **Connect the cable to the LMP connector.**

5. **Push the cable connector seal firmly in place.**

6. **Route and connect the other end of the LMP cable to the laptop or other computer.**

10.2.6 Connecting LMU cables

Purpose

The Location Measurement Unit (LMU) cables are connected to the SYNC IN and Q1 connectors in the System Module. For instructions on how to connect the cables at the LMU, see *LMU Product Documentation* in NOLS.

Summary

Caution

Incorrect cables and seals may not provide secured weather protection. In outdoor installations, including the outdoor cabinet, use only tested IP55 class outdoor cables with seals provided by Nokia. This is also recommended for indoor installations.

Note

When connecting BTS external cabling in wall or pole installation at an outdoor site, the cables should be routed via the lower cable entry when possible.

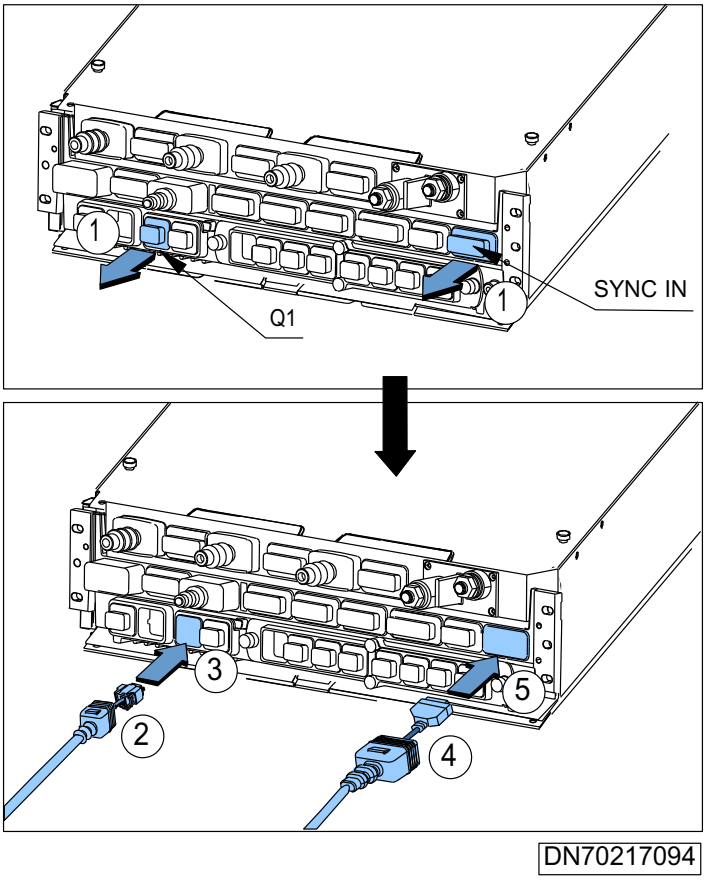


Figure 85. Connecting LMU cables

Steps

1. **Remove the connector seal from the SYNC IN and Q1 connectors in the System Module front panel.**

   Store the seals for later use.

2. **If this is a stack, wall or pole installation, route the cables through the cable entry.**

3. **Pull back the connector seals covering the cable connectors.**

4. **Connect the cables to the SYNC IN and Q1 connectors.**

5. **Push the cable connector seals firmly in place.**

6. Route and connect the other end of the cables to the LMU.

For detailed instructions, see LMU product documentation.

10.3 Installing optional side cable tunnels

Purpose

You can use the optional cable tunnels to hide excess cabling on the side of stack configurations. Cable tunnels are not required for weather protection.

Before you start

Check that

- the cable entries are installed without ears.
- cables are installed and routed as described in *Cable tunnels in stacked installation*.

Summary

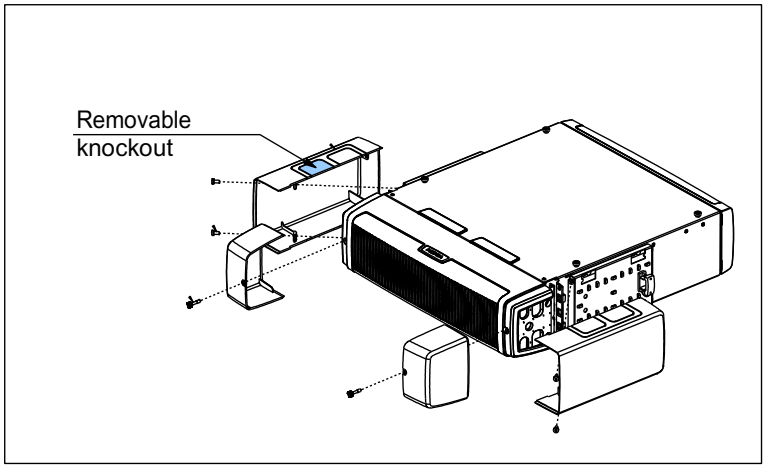


Figure 86. Cable tunnels (3U)

Steps

1. Remove the knockouts from the cable tunnel as required by the position of the tunnel.

- For all external cable tunnels on the right side, remove the back knockout.
- For the top internal cable tunnel on the left side, remove the bottom knockout.
- For the bottom internal cable tunnel on the left side, remove the top knockout.
- For the remaining internal cable tunnels on the left side, remove the top and bottom knockouts.

2. **Pre-thread the M5 X 10 screws into the cable tunnel.**

3. **Position the cable tunnel over the cable support plate so that the cable tunnel screws are aligned with the plate fixing points, and tighten the screws.**

4. **Remove the pre-installed screws from the front cover.**

5. **Position the cable tunnel front pieces over the front cover so that each cable tunnel front piece hole is aligned with the front cover holes.**

6. **Pre-thread M5 screws that came with the site pack through both covers so that the cable tunnel front piece is connected to the front cover.**

Note

The M5 screws that came in the site pack have threading closer to the end of the screw. The M5 screws that came pre-installed on the front covers have threading closer to the middle and will not work with the cable tunnels

7. **Align the front cover screws with the cable entry fixing points and tighten the screws.**

8. **Repeat steps 2-7 for each casing.**

Expected outcome

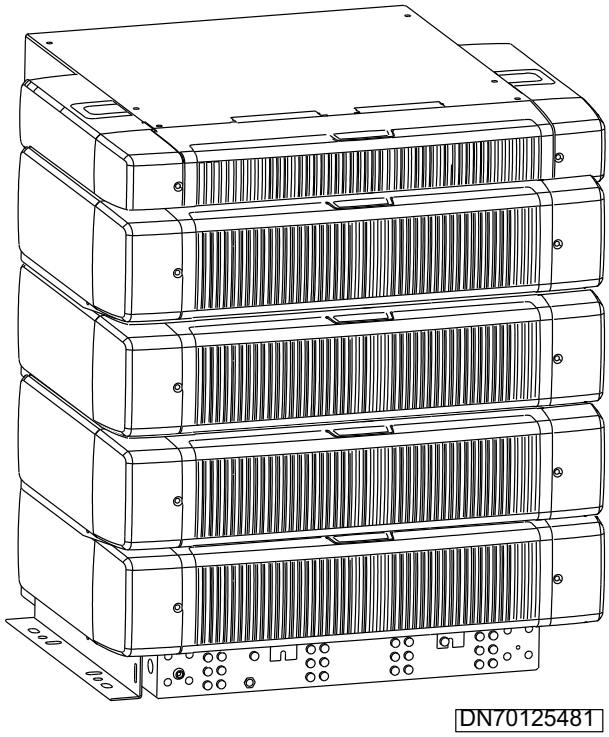


Figure 87. Stack installation with cable tunnels

11 Checklists

11.1 Checklist for installing modules for stack, wall and pole configurations

Work phase	Checked
Delivery is complete and undamaged.	
Minimum clearances are met.	
Adapter mechanics are installed (for wall and pole installation).	
Plinth is installed according to instructions.	
Plinth is grounded.	
Transmission sub-module is installed according to the instructions.	
If power modules (FPDA or FPMA) are used, back covers are installed on them.	
Modules are installed according to instructions.	
Cable entries are installed.	
Cable connectors are connected and cable connector seals are firmly in place.	
Unused connectors are covered with IP seals.	

11.2 Checklist for cabling the modules for stack, wall and pole configurations

Work phase	Checked
Modules are grounded.	

Work phase	Checked
External power cables are connected.	
Dual Duplexer Module cable is connected to the Dual TRX Module.	
Bus cables are connected.	
Internal power cables are connected.	
RF cables are connected.	
Antenna jumper cables are connected.	
Transmission cables and sub-modules are connected.	
Optional cables (EAC, Synchronisation, Site support interface, FPA interface, LMP, LMU cables) are connected.	
BTS external cables or cables between the modules on different plinths are routed via external cable entries.	
Cables between the modules on the same plinth are routed via internal cable entries.	
All boots and caps are properly connected and IP-sealed.	
Only Nokia provided cables are used.	
Module front panel covers are installed.	

Appendix A Contents of delivery

A.1 Contents of the System Module (ESMA) delivery

Table 7. Nokia Flexi EDGE System Module (ESMA) delivery contents

Description	Product code	Quantity
EDGE System Module (ESMA):	470246A	1
• M5 screws		4
• AWG 4 (25 mm^2) connector rubber boots		2

A.2 Contents of the Dual TRX Module (EXxA) delivery

Table 8. Nokia Flexi EDGE Dual TRX Module (EXxA) delivery contents

Description	Product code	Quantity
EDGE Dual TRX Module (EXxA):		1
• EDGE Dual TRX Module 800 MHz (EXTA)	470214A	
• EDGE Dual TRX Module 900 MHz (EXGA)	470215A	
• EDGE Dual TRX Module 1800 MHz (EXDA)	470216A	
• EDGE Dual TRX Module 1900 MHz (EXPA)	470217A	
Dual TRX Module Cable Set:	083309A	1
• Power cable 1188 mm (46.8 in.)	• 994940	1
• Bus cable 1054 mm (41.5 in.)	• 994938	1
• RF cable 172 mm (6.8 in.)	• 994931	4
M5 screws		4

A.3 Contents of the Dual Duplexer Module (ERxA) delivery

Table 9. Nokia Flexi EDGE Dual Duplexer Module (ERxA) delivery contents

Description	Product code	Quantity
EDGE Dual Duplexer Module (ERxA):		1
• EDGE Dual Duplexer Module 800 MHz (ERTA)	• 470249A	
• EDGE Dual Duplexer Module 900 MHz (ERGA)	• 470250A	
• EDGE Dual Duplexer Module 900 MHz SB-J (ERJA)	• 470251A	
• EDGE Dual Duplexer Module 900 MHz SB-H (ERHA)	• 470252A	
• EDGE Dual Duplexer Module 1800 MHz (ERDA)	• 470253A	
• EDGE Dual Duplexer Module 1900 MHz (ERPA)	• 470254A	
M5 screws		2

A.4 Contents of the Wideband Combiner Sub-module (EWxx) delivery

Table 10. Nokia Flexi EDGE Wideband Combiner Sub-module (EWxA) delivery contents

Description	Product code	Quantity
EDGE Wideband Combiner Sub-module (EWxA):		1
• EDGE Wideband Combiner Sub-module 800/900 MHz (EWGA)	470255A	
• EDGE Wideband Combiner Sub-module 1800 MHz (EWDA)	470256A	
• EDGE Wideband Combiner Sub-module 1900 MHz (EWPA)	470257A	
Wideband Combiner Sub-module Cable Set:	083256A	1
• RF cable 275 mm (10.8 in.)	• 994933	1
• DP cable 203 mm (8.0 in.)	• 994969	1
Screw (pre-installed)		1

Table 11. Nokia Flexi EDGE Wideband Combiner Sub-module (EWxB) delivery contents

Description	Product code	Quantity
EDGE Wideband Combiner Sub-module (EWxB):		1
• EDGE Wideband Combiner Sub-module 800/900 MHz (EWGB)	471492A	
• EDGE Wideband Combiner Sub-module 1800 MHz (EWDB)	471493A	
• EDGE Wideband Combiner Sub-module 1900 MHz (EWPB)	471494A	
Wideband Combiner Sub-module Cable Set:	083256A	1
• RF cable 275 mm (10.8 in.)	• 994933	1
Screw (pre-installed)		1

A.5 Contents of the Power Module (FPMA) delivery

The FPMA Power Module is an optional item that has to be ordered separately, when needed.

The Power Module delivery contains the following items:

- Power Module (FPMA) with internal AC and DC cabling and cable support plates
- 2 x Power Module cable entries (identical to EMHA cable entries)
- Alarm cable to the System Module
- 2 x cable clamps
- 4 x M5 screws for fixing cable entries to the casing
- 4 x K30 screws for the cable clamps
- 2 x M5 screws for fixing the casing to another casing or plinth
- 10 x cable ties

See the following figure for more information on the delivery contents.

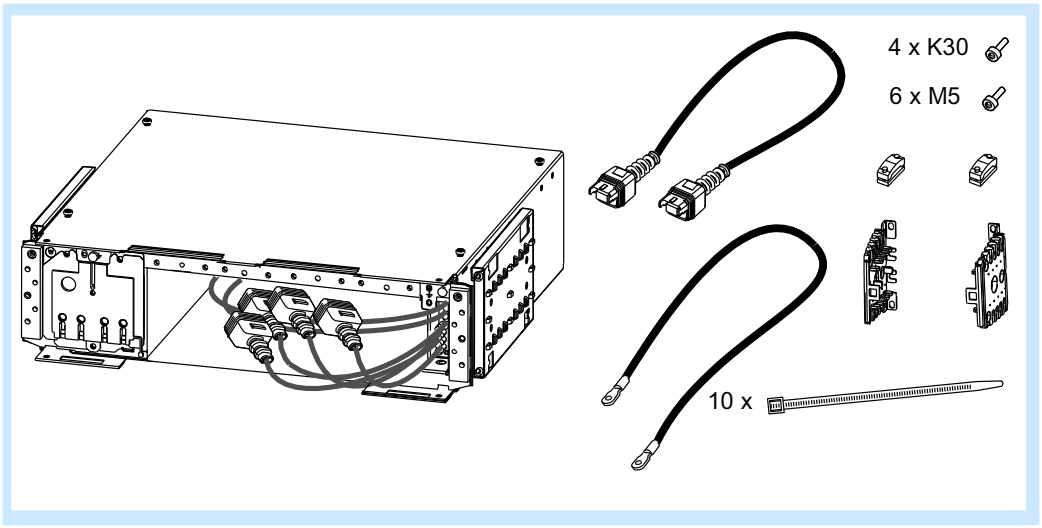


Figure 88. Delivery contents of the FPMA

A.5.1 Contents of the power AC/DC sub-module (FPAA) delivery

The FPAA power sub-module is an optional item that has to be ordered separately, when needed.

The FPAA power sub-module delivery contains the following items:

- Power sub-module (FPAA) with two RJ-45 connector seal caps installed
- Alarm cable
- 2 x M5 screws for fixing the FPAA to FPMA

See the following figure for more information on the delivery contents.

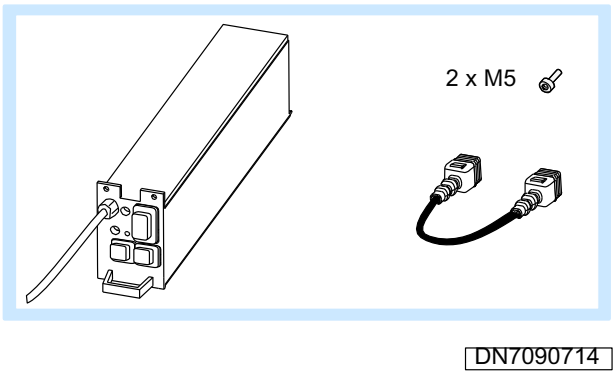


Figure 89. Delivery contents of the FPAA

A.5.2 Contents of the power battery sub-module (FPBA) delivery

The FPBA power battery sub-module is an optional item that has to be ordered separately, when needed.

The FPBA power sub-module delivery contains the following items:

- Power battery sub-module (FPBA) with two RJ-45 connector seal caps installed
- Alarm cable
- 2 x M5 screws for fixing the FPBA to FPMA

See the following figure for more information on the delivery contents.

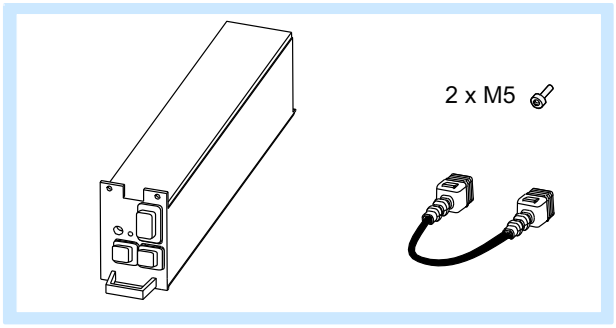


Figure 90. Delivery contents of the FPBA

A.6 Contents of the 24V Power Module (FPDA) delivery

The 24V Power Module (FPDA) is an optional item that has to be ordered separately, when needed.

The 24V Power Module (FPDA) delivery contains the following items:

- DC/DC converter core pre-installed inside a 2U casing with cable support plates and with two RJ-45 connector seal caps installed
- 2 x cable entries
- 2 x DC output power cables
- Alarm cable
- 4 x AWG 4 (25 mm^2) connector single rubber boot
- 2 x AWG 4 (25 mm^2) connector double rubber boot
- 4 x M5 screws for fixing cable entries to the casing and 2 x M5 screws for fixing the casings to each other
- 2 x cable clamps
- 4 x K30 screws for cable clamps

See the following figure for more information on the delivery contents.

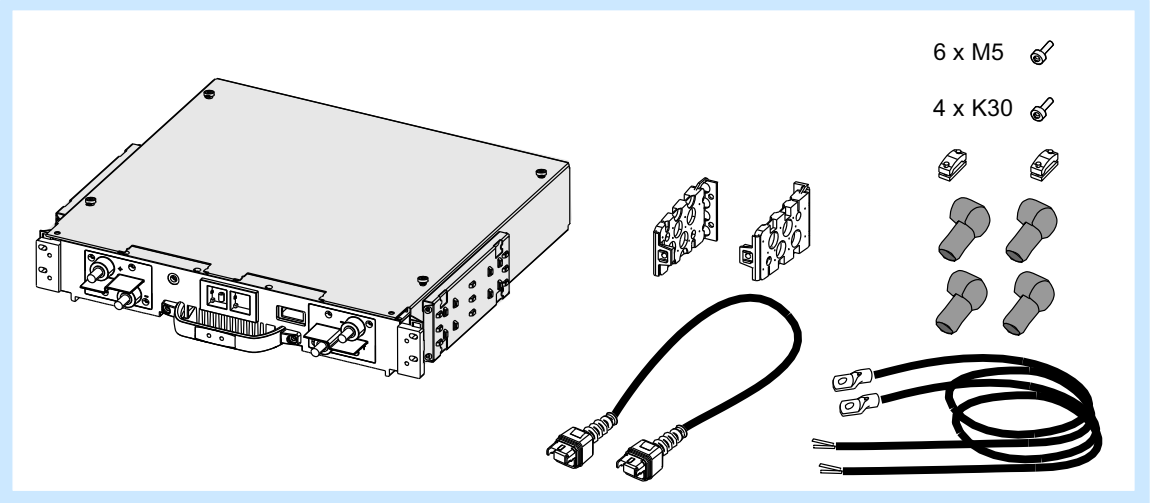


Figure 91. Delivery contents of the FPDA delivery

A.7 Contents of the Flexi System External Alarm Module (FSEB)

Table 12. Nokia Flexi System External Alarm Module (FSEB) delivery contents

Description	Product code	Quantity
Flexi System External Alarm Module (FSEB):	471424A	1
• D37 Cable Assembly		1
• Cable tie, PER31		3

A.8 Contents of the Flexi Mounting Auxiliary Brackets (FMAA)

Table 13. Nokia Flexi Mounting Auxiliary Brackets (FMAA) delivery contents

Description	Product code	Quantity
Flexi Mounting Auxiliary Brackets (FMAA):	471657A	
• Brackets	822962	2
• M5 x 6 screws	6150188	4

A.9 Contents of the transmission interface E1 sub-module (FIEA) delivery

Table 14. Flexi transmission interface E1 asymmetrical sub-module (FIEA) delivery contents

Description	Product code	Quantity
Flexi transmission interface E1 asymmetrical sub-module (FIEA):	470247A	1
• Screws (pre-installed)		4

A.10 Contents of the transmission interface Flexbus sub-module (FIFA) delivery

Table 15. Flexi transmission interface Flexbus sub-module (FIFA) delivery contents

Description	Product code	Quantity
Flexi transmission interface Flexbus sub-module (FIFA):	471007A	1
• Screws (pre-installed)		4

A.11 Contents of the transmission interface E1/T1 sub-module (FIPA) delivery

Table 16. Flexi transmission interface E1/T1 symmetrical sub-module (FIPA) delivery contents

Description	Product code	Quantity
Flexi transmission interface E1/T1 symmetrical sub-module (FIPA):	470248A	1
• Screws (pre-installed)		4

A.12 Contents of the mounting kit for floor, wall and pole (FMFA) delivery

The FMFA mounting kit is an optional item that has to be ordered separately, when needed.

The plinth delivery contains the following items:

- Mounting kit for floor, wall and pole
- Adapter mechanics (used in wall and pole installations only)
- Spring washers (18 pcs for M5 screws and 8 pcs for M8 screws)
- 2 x fixing plate for the casing
- 12 x M5 screws
- 6 x M8 screws

See the following figure for more information on the delivery contents.

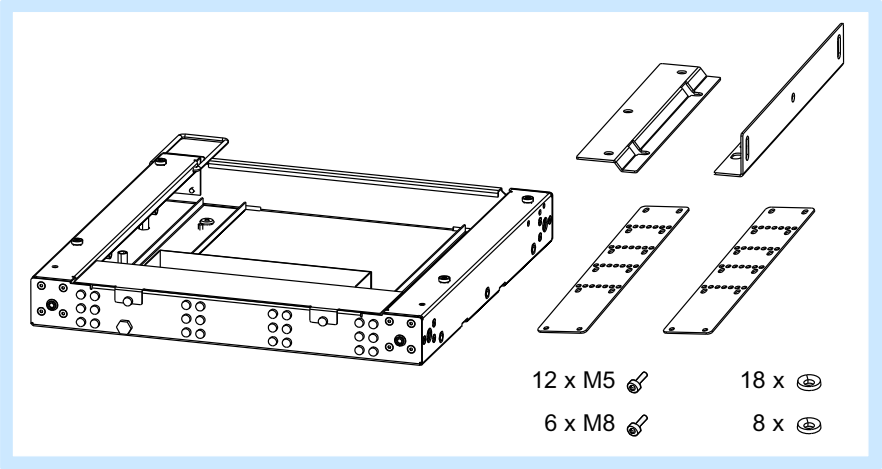


Figure 92. Delivery contents of the plinth

A.13 Contents of the 3 HU Module Casings (EMHA) delivery

Table 17. Nokia Flexi Module Casings for 3 height units (HU) modules (EMHA) delivery contents

Description	Product code	Quantity
3 HU casing (EMHA)	470316A	1
• 3 HU cable entries		2
• 3 HU front cover		1
• 3 HU rear cover		1
• M5 x 10 screws		4
• M5 x 5 screws		6
• Cage nuts		4
• Safety catches		2
• Grounding cable		1

A.14 Contents of the 2 HU Module Casings (EMTA) delivery

Table 18. Nokia Flexi Module Casings for 2 height units (HU) modules (EMTA) delivery contents

Description	Product code	Quantity
2 HU casing (EMTA)	470315A	1
• 2 HU cable entries		2
• 2 HU front cover		1
• 2 HU rear cover		1
• M5 x 10 screws		4
• M5 x 6 screws		6
• Cage nuts		4
• Safety catches		2
• Grounding cable		1

A.15 Contents of the Flexi Mounting Covers Front and Back, 2 HU (FMCB)

Table 19. Nokia Flexi Mounting Covers Front and Back, 2 HU (FMCB), needed with Flexi Power DC/ DC Module 24 V (FPDA)

Description	Product code	Quantity
Flexi Mounting Covers Front and Back, 2 HU (FMCB)	470332A	1
• 2 HU front cover		1
• 2 HU back cover		1

A.16 Contents of the Upgrade Cable Kit (EUCA) delivery

Table 20. Nokia Flexi EDGE Upgrade Cable Kit (EUCA) delivery contents

Description	Product code	Quantity
EDGE Upgrade Cable Kit (EUCA):	470265A	1
• RF cable 1300 mm (51.2 in.)	• 994936	3

A.17 Contents of the Pole Mounting Kit delivery (WMPB)

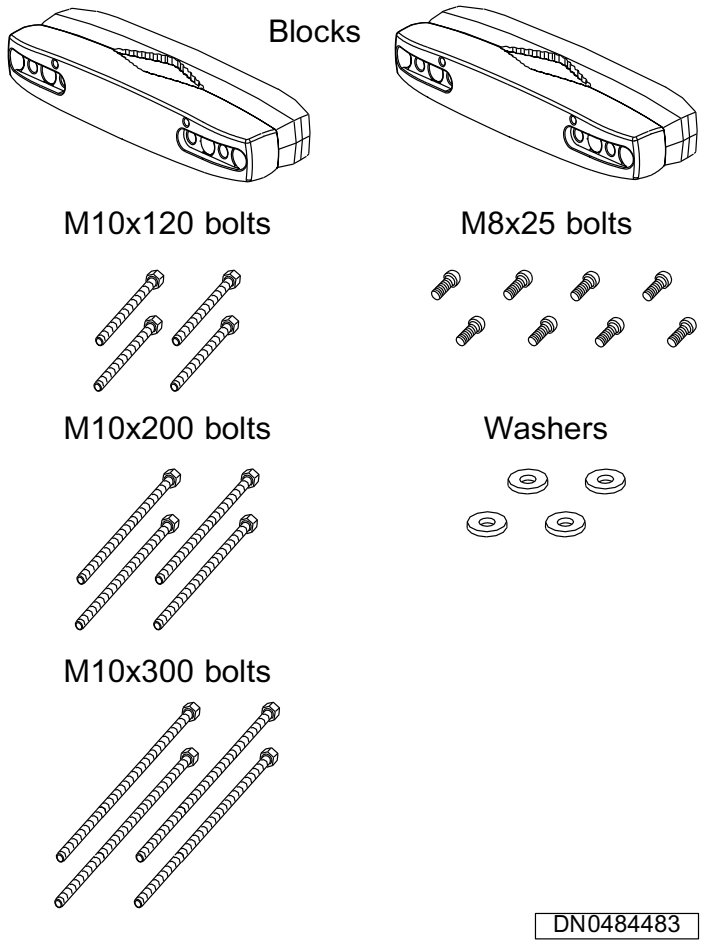


Figure 93. Contents of the Pole Mounting Kit (WMPB) delivery

Table 21. Contents of the Pole Mounting Kit (WMPB) delivery

Description	Product code	Quantity
Pole Mounting Kit (WMPB)	469978A	1
• Block		2
• M10 x 120 bolts		4
• M10 x 200 bolts		4
• M10 x 300 bolts		4
• M8 x 25 bolts		8
• Washers		4

A.18 Contents of the Extension Ethernet and Power Cable Kit (EPCA)

Table 22. Extension Ethernet and Power Cable Kit (EPCA)

Description	Product code	Quantity
Extension Ethernet and Power Cable Kit EPCA:	471460A	1
Bus cable 1554 mm (61.2 in.)	994939	2
Power cable 2000 mm (78.7 in.)	994808	2

A.19 Contents of the transmission cable deliveries (FTCx)

Table 23. FTCA/FTCB transmission cable deliveries (used with the E1/T1 transmission sub-module FIPA)

Description	Product code	Quantity
FTCA OD Cable RJ48C – TQ-M/0 120 ohm 5 m (16.4 ft)	470312A	1
FTCB OD Cable RJ48C 120ohm 15 m (49.2 ft)	470309A	1

Table 24. FTCD/FTCE transmission cable deliveries (used with the E1 transmission sub-module FIEA)

Description	Product code	Quantity
FTCD OD Cable SMB-F/0 - BT43-F/0 75 ohm 5 m (16.4 ft)	470313A	1
FTCE OD Cable SMB-F/0 75 ohm 15 m (49.2 ft)	470310A	1

Table 25. FTCJ transmission delivery (used with the Flexibus transmission sub-module FIFA

Description	Product code	Quantity
FTCJ OD Cable TNC-F/0-TNC-M/0 2.5 m (8.2 ft)	471391A	1

A.20 Contents of the LMP cable delivery (ELCA)

Table 26. LMP cable delivery (ELCA)

Description	Product code	Quantity
LMP cable 50 m (164.0 ft), ELCA	471370A	1

A.21 Contents of the synchronisation cable deliveries (ESxA)

Table 27. Synchronisation cable deliveries (ESUA/ESFA/ESLA)

Description	Product code	Quantity
ESUA synchronisation cable for Flexi Ultra 12 m (39.4 ft)	471372A	1
ESFA synchronisation cable for Flexi 12 m (39.4 ft)	471371A	1
ESLA synchronisation LMU Cable 2 m (6.6 ft)	471377A	1

A.22 Contents of the Q1 cable delivery (EQCA)

Table 28. Q1 cable delivery (EQCA)

Description	Product code	Quantity
EQCA Q1 Cable 3.01 m (9.9 ft)	471384A	1

Appendix B Installation tools and torque values

B.1 Installation tools for Flexi EDGE BTS

Table 29. Tools for installation

Installation tools
ESD wrist strap and cable
TORX screwdriver set: T10, T20, T25
Flathead screwdriver
Wrench: 8 mm (0.31 in.), 11 mm (0.43 in.), 13 mm (0.51 in.), 17 mm (0.67 in.), 19 mm (0.75 in.)
Folding knife
Adjustable wrench
Side cutters
Crimping tool for 25 mm^2 (4 AWG), 35 mm^2 (2 AWG), and 50 mm^2 (1/0 AWG) cables
Crimping tool for 16 mm^2 grounding cable
Torque wrench for antenna cables
Cable ties for routing cables
Tape measure
Flashlight, pocket lamp or torch
Hammer drill
Marker pen or comparable tool
Pliers
Level
Hexagon (Allen) key: 8 mm (0.31 in.). This is required for the Pole Mounting Kit (FMBB).
Allen key: 5 mm (0.20 in.)
Screwdriver slotted for power input connections
Wrench 13 mm (0.51 in.)
Torque wrench for antenna cables: Open spanner end with bended shank 32mm@25 Nm (DIN 7-16 connector)
Socket or open ended spanner set: 11 mm (0.43 in.), 13 mm (0.51 in.), 17 mm (0.67 in.), 18 mm (0.71 in.)
Open ended spanner 22 mm or tongs

B.2 Torque values

Nokia strongly recommends that you tighten to the following torque values. These values assume the use of a lubricated bolt or fastener. Use these values unless stated otherwise.

The torque wrench is presented in the following figure.

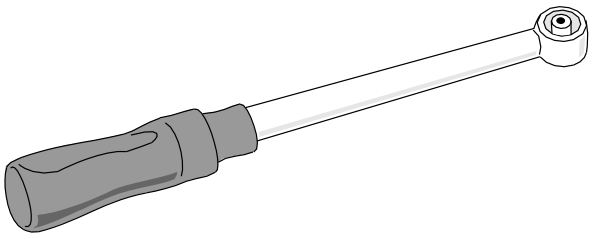


Figure 94. Torque wrench

Table 30. Torque values for the BTS

Bolt/Screw type	Size	Usage	Torque
TORX screw, thumb	M4	Transmission submodules (FIFA, FIEA, FIPA)	2.5 Nm (1.8 ft-lb)
TORX screw, thumb	M4	Wide-band Combiner Sub-module (EWxx)	2.0 - 2.5 Nm (1.5 - 1.8 ft-lb)
TORX screw, pan head	M4	Fan plate assembly	1.2 - 1.6 Nm (0.9 - 1.2 ft-lb)
TORX screw, thumb	M5	Mounting modules on rack or casings (EXxA, ERxA, ESMA, ECxA, FPDA, FPMA)	3.0 Nm (2.2 ft-lb)
TORX screw, thumb	M5	Front covers	2.0 - 2.5 Nm (1.5 - 1.8 ft-lb)
TORX screw, pan head	M5	Cable entry, module/FCIA grounding, locking casings, rear covers, FPAA, FPBA, FPMA AC terminal cover	2.0 - 2.5 Nm (1.5 - 1.8 ft-lb)
Nut	M5	FCOA grounding	3.7 Nm (2.7 ft-lb)
TORX screw, pan head	M8	FCIA grounding	8.0 - 10.0 Nm (5.9 - 7.37 ft lb)

Table 30. Torque values for the BTS (cont.)

Bolt/Screw type	Size	Usage	Torque
Nut	M8	FCOA grounding	8.0 - 10.0 Nm (5.9 - 7.37 ft lb)
DC Power terminal nut	M10	ESMA, FPDA DC power terminals	10.0 - 14.0 Nm (7.0 ft lb - 9.8 ft lb)
Hexagon head screw	M10	Cabinet/plinth fixing (not included in Flexi EDGE delivery)	40.0 Nm (29.0 ft-lb)
Nut	M10	Cabinet/plinth fixing (not included in Flexi EDGE delivery)	40.0 Nm (29.0 ft-lb)
Hexagon head screw	M12	Cabinet/plinth fixing (not included in Flexi EDGE delivery)	49.0 Nm (36.1 ft-lb)
Nut	M12	Cabinet/plinth fixing (not included in Flexi EDGE delivery)	49.0 Nm (36.1 ft-lb)
Antenna connector	7/16"	Antenna jumper cables (not inlcuded in Flexi EDGE delivery)	25 Nm (18.5 ft lb)

Appendix C FSEB interface signals and connector pin assignments

C.1 FSEB interface signals and connector pin assignments

C.1.1 EAC interface

The EAC interface is an interface on the System Module of the BTS and cannot be found on the Flexi System External Alarm (FSEB) itself.

EAC interface signals

Table 31. EAC interface signals

Signal	Function	Technology	Direction
EXT_CO1	External Control 1	TTL	Output, open col.
EXT_CO2	External Control 2	TTL	Output, open col.
EXT_CO3	External Control 3	TTL	Output, open col.
EXT_CO4	External Control 4	TTL	Output, open col.
EXT_CO5	External Control 5	TTL	Output, open col.
EXT_CO6	External Control 6	TTL	Output, open col.
EXT_AL1	External Alarm 1	TTL	Input
EXT_AL2	External Alarm 2	TTL	Input
EXT_AL3	External Alarm 3	TTL	Input
EXT_AL4	External Alarm 4	TTL	Input
EXT_AL5	External Alarm 5	TTL	Input
EXT_AL6	External Alarm 6	TTL	Input
EXT_AL7	External Alarm 7	TTL	Input
EXT_AL8	External Alarm 8	TTL	Input
EXT_AL9	External Alarm 9	TTL	Input
EXT_AL10	External Alarm 10	TTL	Input
EXT_AL11	External Alarm 11	TTL	Input
EXT_AL12	External Alarm 12	TTL	Input
GND	Chassis Ground	-	-
+5V	Power Supply	Power	-
CAN_L	CAN low signal	CAN	IO
CAN_H	CAN high signal	CAN	IO

EAC connector pin assignment

Table 32. EAC connector pin assignment

Signal	Pin	Pin	Signal
EXT_CO1	1	19	+5V/150mA
EXT_CO2	2	20	+5V/150mA
EXT_CO3	3	21	+5V/150mA
EXT_CO4	4	22	+5V/150mA
EXT_CO5	5	23	CAN_L
EXT_CO6	6	24	CAN_H
EXT_AL1	7	25	GND
EXT_AL2	8	26	GND
EXT_AL3	9	27	GND
EXT_AL4	10	28	GND
EXT_AL5	11	29	GND
EXT_AL6	12	30	GND
EXT_AL7	13	31	GND
EXT_AL8	14	32	GND
EXT_AL9	15	33	GND
EXT_AL10	16	34	GND
EXT_AL11	17	35	GND
EXT_AL12	18	36	GND

C.1.2 EACX interface

EACX interface signals

Table 33. EACX interface signals

Signal	Function	Technology	Direction
EXT_CO1	External Control 1	TTL	Output
EXT_CO2	External Control 2	TTL	Output
EXT_CO3	External Control 3	TTL	Output

Table 33. EACX interface signals (cont.)

Signal	Function	Technology	Direction
EXT_CO4	External Control 4	TTL	Output
EXT_CO5	External Control 5	TTL	Output
EXT_CO6	External Control 6	TTL	Output
EXT_AL1	External Alarm 1	TTL	Input
EXT_AL2	External Alarm 2	TTL	Input
EXT_AL3	External Alarm 3	TTL	Input
EXT_AL4	External Alarm 4	TTL	Input
EXT_AL5	External Alarm 5	TTL	Input
EXT_AL6	External Alarm 6	TTL	Input
EXT_AL7	External Alarm 7	TTL	Input
EXT_AL8	External Alarm 8	TTL	Input
EXT_AL9	External Alarm 9	TTL	Input
EXT_AL10	External Alarm 10	TTL	Input
EXT_AL11	External Alarm 11	TTL	Input
EXT_AL12	External Alarm 12	TTL	Input
EXT_AL13	External Alarm 13	TTL	Input
EXT_AL14	External Alarm 14	TTL	Input
EXT_AL15	External Alarm 15	TTL	Input
EXT_AL16	External Alarm 16	TTL	Input
EXT_AL17	External Alarm 17	TTL	Input
EXT_AL18	External Alarm 18	TTL	Input
EXT_AL19	External Alarm 19	TTL	Input
EXT_AL20	External Alarm 20	TTL	Input
EXT_AL21	External Alarm 21	TTL	Input
EXT_AL22	External Alarm 22	TTL	Input
EXT_AL23	External Alarm 23	TTL	Input
EXT_AL24	External Alarm 24	TTL	Input
GND	Chassis Ground	-	-
+5V	External Supply	Power	-

EACX-S interface signals and screw terminal pin assignment

Table 34. EACX-S interface signals and screw terminal pin assignment

Pin	Signal	Screw terminal	Pin	Signal	Screw terminal
1	EXT_CO1	Connector X4104 pin1	31	+5V	Connector X4105 pin1
2	EXT_CO2	Connector X4104 pin 2	32	+5V	Connector X4105 pin 2
3	EXT_CO3	Connector X4104 pin 3	33	+5V	Connector X4105 pin 3
4	EXT_CO4	Connector X4104 pin 4	34	+5V	Connector X4105 pin 4
5	EXT_CO5	Connector X4104 pin 5	35	+5V	Connector X4105 pin 5
6	EXT_CO6	Connector X4104 pin 6	36	+5V	Connector X4105 pin 6
7	EXT_AL1	Connector X4106 pin1	37	GND	Connector X4107 pin1
8	EXT_AL2	Connector X4106 pin 2	38	GND	Connector X4107 pin 2
9	EXT_AL3	Connector X4106 pin 3	39	GND	Connector X4107 pin 3
10	EXT_AL4	Connector X4106 pin 4	40	GND	Connector X4107 pin 4
11	EXT_AL5	Connector X4106 pin 5	41	GND	Connector X4107 pin 5
12	EXT_AL6	Connector X4106 pin 6	42	GND	Connector X4107 pin 6
13	EXT_AL7	Connector X4108 pin1	43	GND	Connector X4109 pin1
14	EXT_AL8	Connector X4108 pin 2	44	GND	Connector X4109 pin 2
15	EXT_AL9	Connector X4108 pin 3	45	GND	Connector X4109 pin 3
16	EXT_AL10	Connector X4108 pin 4	46	GND	Connector X4109 pin 4
17	EXT_AL11	Connector X4108 pin 5	47	GND	Connector X4109 pin 5
18	EXT_AL12	Connector X4108 pin 6	48	GND	Connector X4109 pin 6
19	EXT_AL13	Connector X4110 pin1	49	GND	Connector X4111 pin1

Table 34. EACX-S interface signals and screw terminal pin assignment (cont.)

Pin	Signal	Screw terminal	Pin	Signal	Screw terminal
20	EXT_AL14	Connector X4110 pin 2	50	GND	Connector X4111 pin 2
21	EXT_AL15	Connector X4110 pin 3	51	GND	Connector X4111 pin 3
22	EXT_AL16	Connector X4110 pin 4	52	GND	Connector X4111 pin 4
23	EXT_AL17	Connector X4110 pin 5	53	GND	Connector X4111 pin 5
24	EXT_AL18	Connector X4110 pin 6	54	GND	Connector X4111 pin 6
25	EXT_AL19	Connector X4112 pin1	55	GND	Connector X4113 pin1
26	EXT_AL20	Connector X4112 pin 2	56	GND	Connector X4113 pin 2
27	EXT_AL21	Connector X4112 pin 3	57	GND	Connector X4113 pin 3
28	EXT_AL22	Connector X4112 pin 4	58	GND	Connector X4113 pin 4
29	EXT_AL23	Connector X4112 pin 5	59	GND	Connector X4113 pin 5
30	EXT_AL24	Connector X4112 pin 6	60	GND	Connector X4113 pin 6

EACX connector I pin assignment

Table 35. EACX connector I pin assignment (Sub-D37)

Signal	Pin	Pin	Signal
EXT_CO1	1	19	GND
EXT_CO2	2	20	+5V/30mA
EXT_CO3	3	21	+5V/30mA
EXT_CO4	4	22	+5V/30mA
EXT_CO5	5	23	+5V/30mA
EXT_CO6	6	24	+5V/30mA
EXT_AL1	7	25	+5V/30mA
EXT_AL2	8	26	GND

Table 35. EACX connector I pin assignment (Sub-D37) (cont.)

Signal	Pin	Pin	Signal
EXT_AL3	9	27	GND
EXT_AL4	10	28	GND
EXT_AL5	11	29	GND
EXT_AL6	12	30	GND
EXT_AL7	13	31	GND
EXT_AL8	14	32	GND
EXT_AL9	15	33	GND
EXT_AL10	16	34	GND
EXT_AL11	17	35	GND
EXT_AL12	18	36	GND
-	-	37	GND

EACX connector II pin assignment

Table 36. EACX connector II pin assignment (Sub-D37)

Signal	Pin	Pin	Signal
EXT_AL13	1	19	GND
EXT_AL14	2	20	GND
EXT_AL15	3	21	GND
EXT_AL16	4	22	GND
EXT_AL17	5	23	GND
EXT_AL18	6	24	GND
EXT_AL19	7	25	GND
EXT_AL20	8	26	GND
EXT_AL21	9	27	GND
EXT_AL22	10	28	GND
EXT_AL23	11	29	GND
EXT_AL24	12	30	GND
Not used	13	31	Not used
Not used	14	32	Not used
Not used	15	33	Not used

Table 36. EACX connector II pin assignment (Sub-D37) (cont.)

Signal	Pin	Pin	Signal
Not used	16	34	Not used
Not used	17	35	Not used
Not used	18	36	Not used
		37	Not used

C.1.3 ESM interface

ESM interface signals

Table 37. ESM interface signals

Signal	Function	Technology	Direction
EXT_CO1	External Control 1	TTL	Input
EXT_CO2	External Control 2	TTL	Input
EXT_CO3	External Control 3	TTL	Input
EXT_CO4	External Control 4	TTL	Input
EXT_CO5	External Control 5	TTL	Input
EXT_CO6	External Control 6	TTL	Input
EXT_AL1	External Alarm 1	TTL	Output
EXT_AL2	External Alarm 2	TTL	Output
EXT_AL3	External Alarm 3	TTL	Output
EXT_AL4	External Alarm 4	TTL	Output
EXT_AL5	External Alarm 5	TTL	Output
EXT_AL6	External Alarm 6	TTL	Output
EXT_AL7	External Alarm 7	TTL	Output
EXT_AL8	External Alarm 8	TTL	Output
EXT_AL9	External Alarm 9	TTL	Output
EXT_AL10	External Alarm 10	TTL	Output
EXT_AL11	External Alarm 11	TTL	Output
EXT_AL12	External Alarm 12	TTL	Output
GND	Chassis Ground	-	Output
+5V	External Supply	Power	-

Table 37. ESM interface signals (cont.)

Signal	Function	Technology	Direction
CAN_L	CAN low signal		IO
CAN_H	CAN high signal		IO

ESM connector pin assignment

Table 38. ESM connector pin assignment

Signal	Pin	Pin	Signal
EXT_CO1	1	19	+5V/150mA
EXT_CO2	2	20	+5V/150mA
EXT_CO3	3	21	+5V/150mA
EXT_CO4	4	22	+5V/150mA
EXT_CO5	5	23	CAN_L
EXT_CO6	6	24	CAN_H
EXT_AL1	7	25	GND
EXT_AL2	8	26	GND
EXT_AL3	9	27	GND
EXT_AL4	10	28	GND
EXT_AL5	11	29	GND
EXT_AL6	12	30	GND
EXT_AL7	13	31	GND
EXT_AL8	14	32	GND
EXT_AL9	15	33	GND
EXT_AL10	16	34	GND
EXT_AL11	17	35	GND
EXT_AL12	18	36	GND
-	-	37	Not used

C.1.4 Heat detector power supply interface

Table 39. Heat detector power screw terminal X4114 pin assignment

Pin	Signal
1	+8.55V ... +11.5V
2	Ground
3	Ground
4	Ground
5	Ground
6	+8.55V ... +11.5V

Appendix D External interfaces

D.1 System Module (ESMA) interfaces

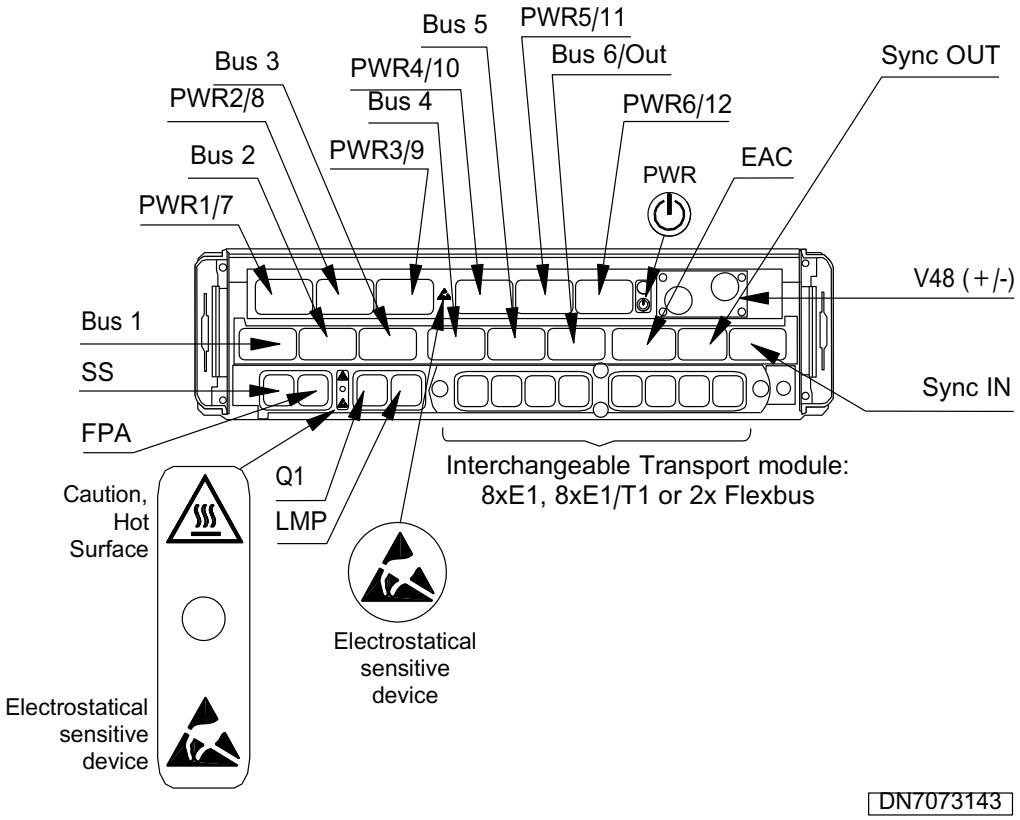


Figure 95. Nokia Flexi EDGE System Module (ESMA) front panel connectors and labels

Table 40. Nokia Flexi EDGE System Module (ESMA) front panel connectors and interfaces

Label name on module	Function	Connector type	Interface(s)
V48N (+/-)	-48 V DC input power for the base station.	M10 terminal bolts	FPMA, FPDA, site support, or other external power supply
PWR 1/7…PWR 6/12	-48 V DC output power with fuse protection to six other modules.	Multi-Beam XL	EXxA, ECxA, FCFA

Table 40. Nokia Flexi EDGE System Module (ESMA) front panel connectors and interfaces (cont.)

Label name on module	Function	Connector type	Interface(s)
BUS 1…BUS 6/OUT	6 x Ethernet (1000 Base-T)	MDR 26 F RA	EXxA, ECxA, ESEA
EAC	External alarm and control interface	MDR 36 F RA	FSEB, FSAA, customer alarm inputs or control outputs
Sync OUT	Base station synchronisation chaining out	MDR 26 F RA	External BTS
Sync IN	Base station synchronisation chaining in	MDR 14 F RA	External BTS, LMUB
SS	Site Support alarm	RJ45	-
FPA	Flexi power alarm	RJ45 shielded	FPAA, FPBA, FPDA
Q1	Q1 management interface	RJ45 shielded	Nokia Q1 managed network elements
LMP	Local management port	RJ45 shielded	Laptop or other computer

Transmission interface E1 sub-module (FIEA) interfaces

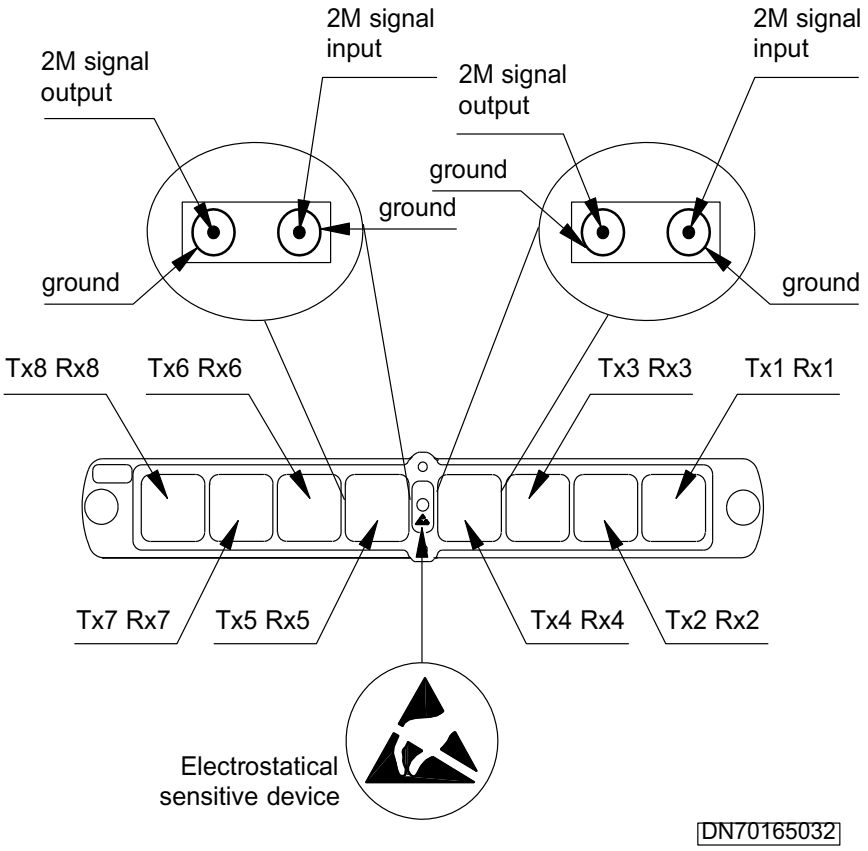


Figure 96. FIEA transmission sub-module front panel connectors and labels

Table 41. FIEA transmission sub-module front panel connectors and interfaces

Label name on module	Description	Connector type	Interface(s)
Tx1 Rx1...Tx8 Rx8	Eight Transmission (Abis) interfaces - unbalanced (coaxial) E1	SMB	External transmission equipment

Transmission interface Flexbus sub-module (FIFA) interfaces

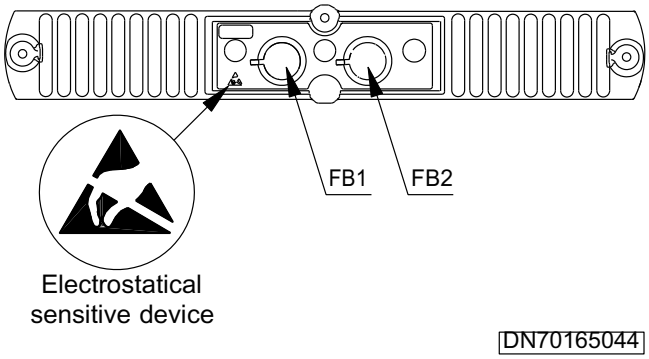


Figure 97. FIFA transmission sub-module front panel connectors and labels

Table 42. FIFA transmission sub-module front panel connectors and interfaces

Label name on module	Description	Connector type	Interface(s)
FB1, FB2	Transmission (Abis) interface - Flexbus (Nokia proprietary PDH radio)	TNC	Nokia FlexiHopper microwave radios

Transmission interface E1/T1 sub-module (FIPA) interfaces

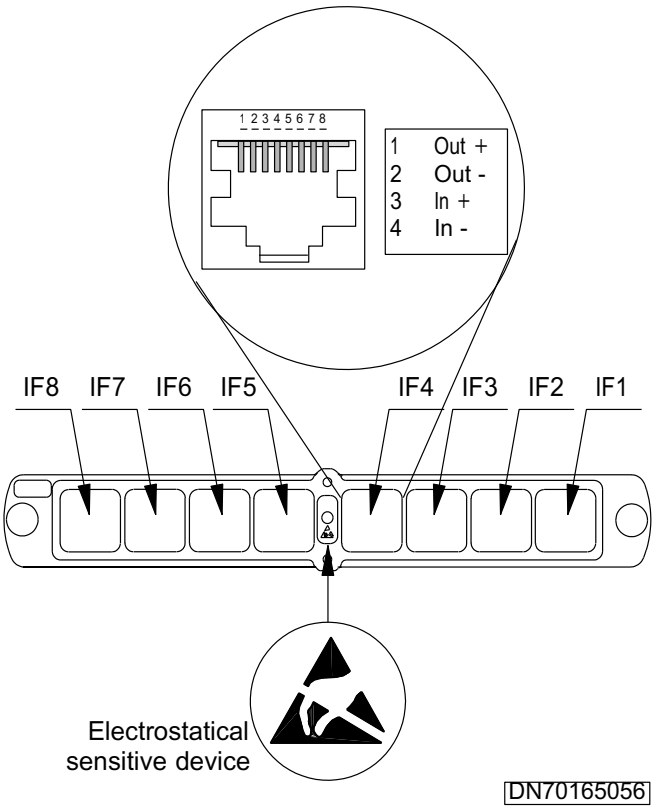


Figure 98. FIPA transmission sub-module front panel connectors and labels

Table 43. FIPA transmission sub-module front panel connectors and interfaces

Label name on module	Description	Connector type	Interface(s)
IF1 ... IF8	Eight transmission (Abis) interfaces - balanced E1/T1	RJ45 shielded	External transmission equipment

D.2 Dual TRX Module (EXxA) interfaces

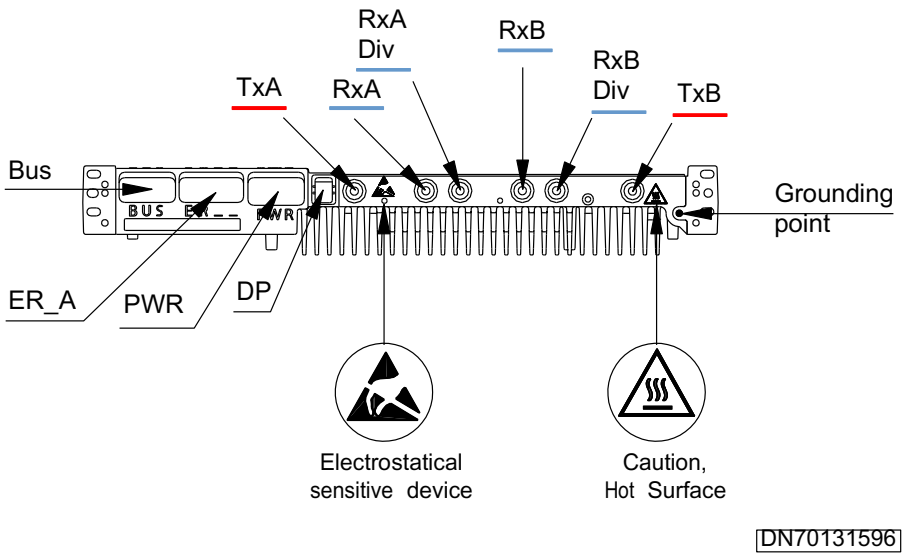


Figure 99. Nokia Flexi EDGE Dual TRX Module (EXxA) front panel connectors and labels

Table 44. Nokia Flexi EDGE Dual TRX Module (EXxA) front panel connectors, cable types and interfaces

Label name on module	Description	Connector type	Cable type	Interface(s)	Signal direction (to/from the module)
BUS	Ethernet (1000 Base-T/100 Base-TX) baseband processing of end user, hopping, synchronisation, and O&M data	MDR 26 (female)	• Bus cable, AWG30 Twinax, MDR 26 (male) • length: 1054/1554 mm (41.5/61.2 in.)	ESMA, ESEA	To and from the module
ER_A	Power and control interface for the ERxA	MDR 36 (female)	• ERxA cable, MDR 36 (male) hard-wired with other end fixed to ER_A • length: 200 mm (7.9 in.)	ERxA	To and from the module

Table 44. Nokia Flexi EDGE Dual TRX Module (EXxA) front panel connectors, cable types and interfaces (cont.)

Label name on module	Description	Connector type	Cable type	Interface(s)	Signal direction (to/from the module)
PWR	-48 VDC input power with fuse protection	Multi-Beam XL (female)	• Power cable, 2 x AWG12, Multi-Beam XL (male) • length: 1188/2000 mm (46.8/78.7 in.)	ESMA, ESEA	To and from the module
DP	Synchronous combining of both transmitters in the module to generate one GSM/EDGE carrier capacity with increased output power	Molex Microfit (male)	• DP cable, 4 x AWG24, Molex Microfit (female) • length: 203 mm (8.0 in.)	EWxA	To and from the module
RxA, RxB (blue)	Receives a digitally modulated GSM/ EDGE RF carrier in accordance with the appropriate telecommunications standard (Rx input)	QMA (female)	• RF cable, SemiFlex 50, QMA (male) • length: 172/275/1300 mm (6.8/10.8/51.2 in.)	ERxA, ECxA	To the module
RxA Div , RxB Div (blue)	Four-way uplink receive diversity (4UD)	QMA (female)	• RF cable, SemiFlex 50, QMA (male) • length: 172/275/1300 mm (6.8/10.8/51.2 in.)	ERxA, ECxA	To the module
TxA, TxB (red)	Transmits a digitally modulated GSM/ EDGE RF carrier in accordance with the appropriate telecommunications standard (Tx output).	QMA (female)	• RF cable, SemiFlex 50, QMA (male) • length: 172/275/1300 mm (6.8/10.8/51.2 in.)	ERxA, EWxA, ECxA	From the module

D.3 Dual Duplexer Module (ERxA) interfaces

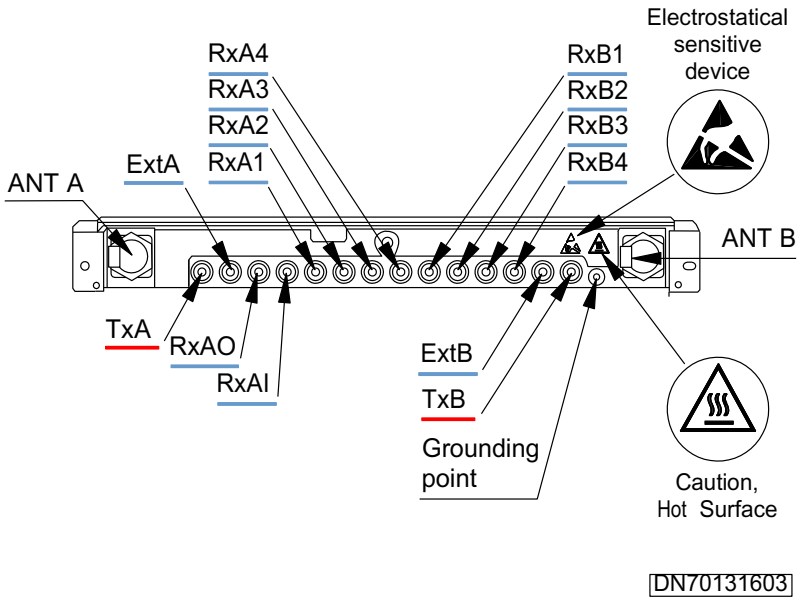


Figure 100. Nokia Flexi EDGE Dual Duplexer Module (ERxA) front panel connectors and labels

Table 45. Nokia Flexi EDGE Dual Duplexer Module (ERxA front panel connectors and interfaces

Label name on module	Description	Connector type	Interface(s)
Ant A, Ant B	Antenna interface	7/16	Antenna jumper or feeder cables
TxA, TxB (red)	2 Tx inputs	QMA	EXxA, EWxA, EWxB
ExtA, ExtB (blue)	2 external Rx outputs	QMA	External receiver
RxAO (blue)	Rx co-siting output	QMA	External BTS cabinet
RxAI (blue)	Rx co-siting input	QMA	External BTS cabinet
RxA1…RxA4 (blue) RxB1…RxB4 (blue)	8 Rx outputs	QMA	EXxA

D.4 Wideband Combiner Sub-module (EWxx) interfaces

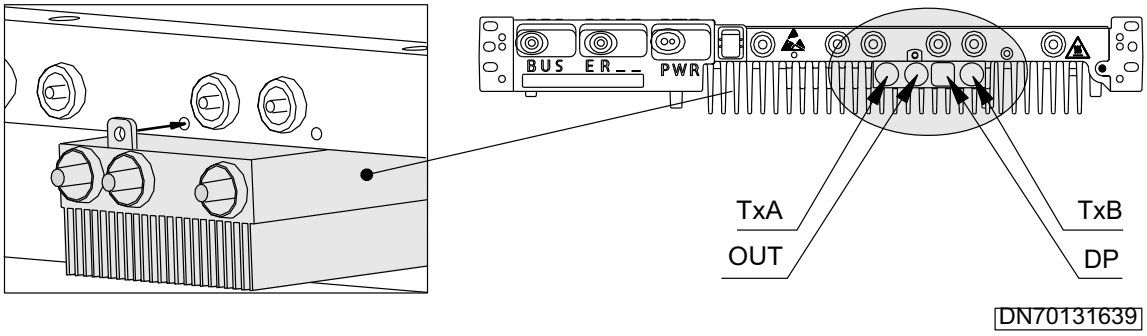


Figure 101. Nokia Flexi EDGE Wideband Combiner Sub-module (EWxA) front panel connectors

Table 46. Nokia Flexi EDGE Wideband Combiner Sub-module (EWxx) front panel connectors and interfaces

Label name on module	Description	Connector type	Interface(s)
TxA, TxB	2 Tx inputs	QMA	EXxA
DP (in EWxA only)	Synchronous combining of both transmitters in the module to generate one GSM/EDGE carrier capacity with increased output power.	4-pin Microfit	EXxA
OUT	Tx output	QMA	ERxA

Note that the EWxB does not have the DP connector as the DPTRX is not supported.

Appendix E Bending diameter for cables

E.1 Bending diameter for cables

The table below shows the minimum bending diameter of Nokia Flexi EDGE BTS cables.

Static bending diameter refers to the allowed bend while the cable is fixed (for example, when the cable is tied to the side of the cabinet). Dynamic bending diameter refers to the allowed bend while the cable is in motion (for example while routing the cable through the cable entry).

For the bending diameter of antenna jumper cables, refer to the cable manufacturer.

Table 47. Bending diameter of Nokia Flexi EDGE BTS cables

Cable		*Static bending diameter*	*Dynamic bending diameter*
Cable name	*Cable code*		
RF cable 172 mm (6.8 in.)	994931	30 mm (1.2 in.)	35 mm (1.4 in.)
RF cable 275 mm (10.8 in.)	994933		
RF cable 1300 mm (51.2 in.)	994936		
RF cable 71 mm (2.8 in.)	994980	18 mm (0.7 in.)	18 mm (0.7 in.)
Bus cable 1054 mm (41.5 in.)	994938	40 mm (1.6 in.)	45 mm (1.8 in.)
Bus cable 1554 mm (61.2 in.)	994939		
Power cable 1188 mm (46.8 in.)	994940	45 mm (1.8 in.)	50 mm (2.0 in.)
DP cable	994969	40 mm (1.6 in.)	45 mm (1.8 in.)
EMCA LMP cable	471370		
Sync cable for Flexi	471371		
Sync cable for UltraSite	471372		
Sync LMU cable	471377		
Q1 cable	471384		
MIBBU EPA alarm cable	471464		
Clock test cable	471521		