NOKIA

Installing BSC and TCSM2

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Summary of changes

Summary of changes

Changes between document issues are cumulative. Therefore, the latest document issue contains all changes made to previous issues.

Changes made between issues 10-1 and 10-0

S11.5 update. References to TCSM2A-C removed.

Changes made between issues 10-0 and 9-1

S11.5 update. Information on PCU2-U and WDW73 added.

Minor structural and editorial changes.

Changes made between issues 9-1 and 9-0

Minor editorial changes.

Changes made between issue 9–0 and 8–4

S11 update. Information on the CPLAN-S, LAN connection options, the MO device and new ET plug-in units added.

Changes made between issue 8–4 and 8–3

BSC and TCSM2 installation overview

Section *Documents needed for installation* has been updated.

Installing the rack on floor rails

Sections *Installing the floor rails* and *Installing the racks frames on rails* have been updated.

Figure 4 has been replaced. Figure 5 has been updated.

BSC and TC2E cartridges and plug-in units

A new figure: Rack equipment of the DX 200 BSC2i (S10.5, LAN cabling included but not connected at the plug-in unit end.) has been added.

Equipping the cartridges with plug-in units

In table 34. Jumper settings (principal) for plug-in units (first deliveries) PCU(-S) has been modified to PCU, PCU-S, PCU-T. The section has been updated accordingly.

WDW36, WDW18-S, WDW18 have been added to Table 37. *Naming of the mass memory (storage device) items (first deliveries). The product names in older deliveries may be different.*

Cabling to environment

Figure 77 has been replaced with a new figure.

PCU(-S) has been modified to PCU, PCU-S, PCU-T.

Changes made between issue 8–3 and 8–2

No contents changes were made.

Changes made between issue 8–2 and 8–1

Structural changes, online modifications and other corrections were made.

Chapter 17 was modified.

Chapter 8 was modified.

1 BSC and TCSM2 installation overview

This section gives an overview of the steps to be taken in the installation of the Base Station Controller, BSC, and Transcoder and Submultiplexer, TCSM2. Each step gives instructions for performing the installation efficiently, from the preparatory procedures up to the point when the network element is ready for commissioning.

These are the work phases for installing the rack and cartridge mechanics of the BSC and TCSM2, in the order they should be performed:

1. Preparing for *installation of BSC and TCSM2 network elements*

    - Checking that you have all the necessary *documents* needed in the installation.
    - Checking that you have all the necessary *tools* needed in the installation.
    - Checking the *conversion factors*

2. Preparing the equipment room

    - *Checking the installation site*
    - *Unpacking the equipment*
    - Checking the *equipment to be installed*
    - Installing the racks either *on their own feet* or *on floor rails*
    - *Grounding the racks*
    - *Installing side plates and other structures*
    - *Connecting the power supply cables*

3. *Connecting interconnection cabling*

4. *Equipping cartridges with plug-in units*

5. *Connecting external cables*

6. Installing the *doors DS196 and DS198* or the *doors DS196E and DS198E*

7. *Attaching Network Element identification stickers and marking labels*

8. *Installing the lamp panel*

9. *Finishing off the installation*

Installing BSC and TCSM2 does not, however, include the installation instructions for the station power supply equipment or the PCM and distribution frames.

Use of BSC and PCU related terms

BSC-related acronyms are explained in Table *Nokia DX 200 BSC product family* . When the information in the text is only applicable to one of the variants, the name of that specific variant is used.

Table 1.   Nokia DX 200 BSC product family

General name	Product name	Explanation
BSCE	BSCE	first generation Nokia DX 200 BSC
BSCi	BSCi	High Capacity (upgraded and improved) version of the first generation Nokia DX 200 BSC
BSC2	BSC2A	American National Standards Institute (ANSI) version of the second generation Nokia DX 200 BSC2
BSC2	BSC2E	European Telecommunications Standards Institute (ETSI) version of the second generation Nokia DX 200 BSC2
BSC2i	BSC2i, ANSI version	American National Standards Institute (ANSI) High Capacity version of the Nokia DX 200 BSC2
BSC2i	BSC2i, ETSI version	European Telecommunications Standards Institute (ETSI) High Capacity version of the Nokia DX 200 BSC2
BSC3i	BSC3i, ANSI version	American National Standards Institute (ANSI) High Capacity version of the Nokia DX 200 BSC3i
BSC3i	BSC3i, ETSI version	European Telecommunications Standards Institute (ETSI) High Capacity version of the Nokia DX 200 BSC3i

PCU, Packet Control Unit, is a general term for all Nokia GSM/EDGE PCU versions. The PCU variants are listed in the table below.

Table 2.   Nokia GSM/EDGE PCU product family

General name	Product variant name	Explanation
Nokia First Generation Packet Control Unit - PCU1	PCU PCU-S PCU-T	First generation PCU for BSCE, BSC2E/A, BSCi and BSC2i
	PCU-B	First generation PCU for BSC3i, includes two logical PCUs
Nokia Second Generation Packet Control Unit - PCU2	PCU2-U	Second generation PCU for BSCE, BSC2E/A, BSCi and BSC2i
	PCU2-D	Second generation PCU for BSC3i, includes two logical PCUs

Use of TSCM2-related terms

TSCM2 is the general term for the Nokia DX 200 second generation Transcoder and Submultiplexer. TCSM2E stands for the ETSI (European) version and TCSM2A for the ANSI (US) version of the transcoder. The name TCSM2 is used in this document as a general term referring to *any* version of the second generation transcoder, TCSM2E and TCSM2A.

When the information in the text is only applicable to one variant of the Transcoder, the name of that specific variant is used.

Note that each one of the names TCSM2, TCSM2E abd TCSM2A is used in two ways:

·   The TCSM2, TCSM2E or TCSM2A unit: the unit (group of cartridges and their plug-in units) responsible for transcoding and submultiplexing the traffic channels carried by a single PCM (E1 or T1) circuit between the BSC and the transcoding site.

·   TCSM2, TCSM2E or TCSM2A equipment: the assembly of racks housing the TCSM2A units of one or more BSCs.

TCSM2 units are functional units of the Base Station Controller (BSC), but can be physically located either on the BSC site or the Mobile Switching Center (MSC) site.

Use of product names

Note that the product names in this manual are normally without the variant designation, which may be S, T or V. For example, AS7 is used instead of AS7-V. After each TR12 (or TR16) plug-in unit name in an equipment list there may be a letter, for example, S or T, meaning the variant of the plug-in unit.

2 Installation of BSC and TCSM2 network elements

This section describes the fundamentals of the hardware installation procedure for the Nokia DX BSC (Base Station Controller) and TCSM2 (Transcoder and Submultiplexer) in the premises provided for them. It lists the necessary documents and tools to be used, as well as the conversion tables for metric and imperial units. For an overview of the installation process, see *BSC and TCSM2 installation overview* .

The amount of detailed information on the network element applications, for example, their configuration, hardware architecture or the exact installation positions for their various hardware components, has deliberately been kept to a minimum in order to keep its structure as simple and easy to follow as possible.

2.1 Documents needed for installation

To become familiar with all the necessary steps, read through all the documentation before the installation. The following documents are needed for installation:

- *Equipment list, Site Documents*

- *Interconnection cables, Site Documents*

- *(Despatch Note) Hardware type list, Site Documents*

- *Jumper settings of the plug-in units , Site Documents*

- *Hardware Revisions List* in the system release (only for system level updates)

- *Customer specific software control list, Release Binder* (only for system level updates)

- *Instructions for replacing plug-in units* (only for system level updates), *Maintenance Manual* (BSC2)

- *Packing lists*

- *Commissioning Manual* (only for system level updates)

- *Engineering for BSC* and *Engineering for TCSM2*

- *Connection of alarms, Site Documents* (x)

- *Cabling of trunk lines, Site Documents* (x)

(x) delivered on request

In addition, instructions for installing NEBS Upgrade Kit in network elements using M92 mechanics are in *Installing the NEBS Upgrade Kit in BSC2(i) and TCSM2, Site Documents* .

In addition to the documentation, it is also necessary to make sure that all the needed equipment, tools, and instructions are available. To become familiar with the necessary steps, this documentation should be read through before the installation.

The documents mentioned above are in *NOLS* , with the exception of Site Documents, which are delived in the *Release Binder* .

⚠ Warning

For safety reasons, the installation of the Nokia DX 200 network elements must be carried out by at least two qualified persons who have the basic skills to operate and maintain the DX 200 equipment. The installers must also be familiar with the installation tools and competent in using them.

Due to the heavy weight of the racks, additional personnel or lifting equipment may be needed when the racks are moved, unpacked or lined up, depending on the local regulations.

△ Caution

Any modifications to this device not expressly authorised by Nokia could void the user's authority to operate this device.

2.2 Tools needed for installation

Table *Tools needed for installation* lists the tools needed.

Table 3.   Tools needed for installation

Name	Nokia Code
Pocket Tape Measure	
Cable Stripper	
Allen Key Set, Ball Head 9 pcs 1.5-10 mm	
Side Cutters	
Screwdriver Set	
Drill (optional)	
Multimeter	
Grounding Wrist Belt	CS 77559.01
Antistatic Bed	CS 77559.02

In addition to the tools listed above, 1.5 m (5") high safety ladders are needed at the installation site.

The installers must be familiar with the tools listed above and competent in using them.

2.3 Conversion factors

The following conversion factors should be used when installing Nokia's DX 200 and associated equipment:

Table 4.   Conversion factors

Metric		American
1 kilogram (kg)	=	2.2046 lb

Table 4.   Conversion factors (cont.)

Metric		American
1 meter (m)	=	3.2808 ft
2.54 centimeters (cm)	=	1 inch

Table *Conversions from decimals to fractions* can be used for converting decimals to fractions. The first column gives the number of inches in decimals and the second column contains the corresponding number of inches in fractional form. The third column gives the number of feet in decimals, and the fourth column gives the corresponding number inches in fractional form.

Table 5.   Conversions from decimals to fractions

Decimals (inches)	Fractions (Inches)		Decimals (feet)	Fractions (Inches)
.1250	1/8		.1	1 13/64
.2500	1/4		.2	2 13/32
.3750	3/8		.3	4 39/64
.4370	7/16		.4	5 51/64
.5	1/2		.5	6
.6250	5/8		.6	7 13/64
.6875	11/16		.7	8 13/32
.8125	13/16		.8	9 39/64
.8750	7/8		.9	10 51/64
1.0	1		1.0	12

Note

For the purposes of installation and construction, an allowance of 1/16th of an inch is tolerated between the physical conditions found on any particular site and the Blue Print drawings provided with the installation instructions. Also, an allowance of 1/16th of an inch will be permitted when converting directly from metric measurement to the imperial standard feet and inches.

2.4 Customer information exhibit for FCC Rule Part 15

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of the equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Caution

Any modifications to this device not expressly authorised by Nokia Networks Inc. could void the user's authority to operate this device.

The FCC label is located outside of the front part of the rack, above the left door, on the dark gray plate.

2.5 Customer information exhibit for FCC Rule Part 68

This equipment complies with Part 68 of the FCC Rules. The FCC Part 68 label is located on the front panel of the ET2A plug in unit (see section *Attaching Network Element identification stickers and marking labels*).

The label contains the FCC registration number and the ringer equivalence number (REN) for this equipment, when applicable. The serial number of the ET2A card can also be found on the other label, on the ET2A front panel. The following information is provided:

Service Order Code:	T1 Line 6.0F Facility
	Interface Code (FIC). The code depends on the card configuration.
T1 Line:	04DU9-BN T1/SF/No Line Power
	04DU9-DN T1/SF/B8ZS/No Line Power
	04DU9-DN T1/SF/B8ZS/No Line Power
	04DU9-1SN T1/ESF/B8ZS/No Line Power
Ringer Equivalence Number (REN):	T1 Line N/A
USOC Connectors:	USOC Connectors

2.6   The Industry Canada Ringer Equivalence Number Notice

The Canadian Department of Communications label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements. The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above condition may not prevent degradation of service in some situations.

Repairs to some certified equipment should be made by an authorised maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the ground connections of the power utility, telephone lines and internal metallic water pipe system, are connected together. This precaution may be particularly important in rural areas.

⚠ Caution

Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

3 The BSC and TCSM2 equipment to be installed

Items installed at the factory

The tables show the products (items) which are installed at the factory and delivered as a package to the installation site.

Table 6.   BSC2(i)/BSCi equipment mounted at the factory

Item	Name	ID	Note
R196A-S *R196A-T*	Rack Frame	C23708 C28990	Two sets for one rack
UFS61-S *UFS61*	Upper Frame Structure	C28570 C19878	Mounted on top of the rack
PSCG5	Power Supply Block	C22074	Mounted on top of the rack
PSA20-T *PSA20*	Power Supply Adapter	C29336 C22839	Two sets for one rack
PSFP-T *PSFP*	Power Supply Fuse Panel	C29337 C19748	Two sets for one rack
CSS60	Cable Support Set	C22960	Four sets for one rack
CSS62	Cable Support Set	C19876	One set for one rack
CS6A-T	Cartridge Shelf	C23696	Four/five sets for one rack
CLAC	Cartridge	C08643	Mounted on shelf
CLAC-S	Cartridge	C08634	Mounted on shelf
CLOC	Cartridge	C08706	Mounted on shelf

Table 6.   BSC2(i)/BSCi equipment mounted at the factory (cont.)

Item	Name	ID	Note
CPLAN-S	Panel	C102952	Mounted in place of the top plate in the M92 rack of BSCE, BSCi and BSC2A/E
ET5C	Cartridge	C08764	Mounted on shelf
MC1C	Cartridge	C08680	Mounted on shelf
SW1C	Cartridge	C08668	Mounted on shelf
WDDC	Cartridge	C08662	Mounted on shelf
SD3C-S	Mass memory cartridge		

Table 7.   TCSM2 equipment mounted at the factory

Item	Name	ID	Note
R198A-T	Rack Frame	C23707	Two sets for one rack
UFS81-S *UFS81*	Upper Frame Structure	C28580 C19877	Mounted on top of the rack
PSCG5	Power Supply Block	C22074	Mounted on top of the rack
PSA20-T *PSA20*	Power Supply Adapter	C29336 C22839	Two sets for one rack
PSFP-T *PSFP*	Power Supply Fuse Panel	C29337 C19748	Two sets for one rack
CSS80	Cable Support Set	C22762	Four sets for one rack
CSS82	Cable Support Set	C19874	One set for one rack
CS8A-T	Cartridge Shelf	C23696	Five sets for one rack
ET1TC	Cartridge	C8787	Mounted on shelf
TC1C	Cartridge	C8783	Mounted on shelf

Additional items

The following items are always needed for the rack assembly but they have to be ordered and delivered separately.

Table 8.   Parts delivered separately packed for the BSC2

Item	Name	ID	Description	Note
DS196 *DS196E*	Door Set for BSC2	C22226	Two doors, hinges, accessories	Two sets for one rack (R196A-T)
SP19A-S *SP19A-T*	Side Plate Assembly	C22228	Two plates, accessories	For one rack or rack row
SP01A	Side Cover Plates	C22281	Two plates + accessories	For UFS61-S
Label sets for BSC2A		C29465	Marking and warning labels	For one (two) rack(s)
Label sets for BSC2E		C29468	Marking and warning labels	For one (two) rack(s)

Table 9.   Parts delivered separately packed for the TCSM2

Item	Name	ID	Description	Note
DS198 *DS198E*	Door Set for TCSM2	C22227	Two doors, hinges, accessories	Two sets for one rack (R198A-T)
SP19A-S *SP19A-T*	Side Plate Assembly	C23711	Two plates, accessories	For one rack or rack row
SP01A	Side Cover Plates	C22281	Two plates + accessories	For UFS61-S
Label sets for TCSM2A		C29465	Marking and warning labels	For one (two) rack(s)
Label sets for TCSM2E		C28493	Marking and warning labels	For one (two) rack(s)

Optional items

Table *Optional items ordered and delivered separately for the BSC2 and TCSM2* lists the optional items. The number of items required depends on the installation. The items are designed for both the BSC2 and TCSM2.

Table 10.   Optional items ordered and delivered separately for the BSC2 and TCSM2

Item	Name	ID	Description	Note
R2A1-S	Cabling Rack Assembly	C23709	Rack assembly with cable supports, grounding elements	For raised floor installation; (WxD: 200 x 450 mm)
DS192	Door Set	C23515	Two doors, hinges, accessories	For Cabling Rack R2A1-S
CC19V	Cabling Conduit	C23517	One door, hinges, accessories	For raised floor installation; (W = 140 mm)
USS1A	Upper Support Set for Racks	C23002	Two supports, accessories	To support the rack to wall or ceiling

Dimensions of the BSC2 and TCSM2 racks

Table *Dimensions of the BSC2 and TCSM2* lists the net dimensions of the BSC2 and TCSM2 racks. The Metric units are given in millimetres and the American units (in brackets) in inches or feet.

Table 11.   Dimensions of the BSC2 and TCSM2 racks

	Equipment racks		Cable rack/conduit	
	BSC2	*TCSM2*	*R2A1-S*	*CC19V*
Height, frame	1880 mm (6.17 ft)	1880 mm (6.17 ft)	1880mm (6.17 ft)	1880 mm (6.17 ft)
Top structure	90 mm (3.6 in)	90 mm (3.6 in)	90 mm (3.6 in)	-
Adjustable feet*	50 mm (2.0 in)	50 mm (2.0 in)	50 mm (2.0 in)	-
Height, total	2020 mm (6.63	2020 mm (6.63 ft)	2020 mm (6.63 ft)	1880 mm

Table 11.   Dimensions of the BSC2 and TCSM2 racks (cont.)

	Equipment racks		Cable rack/conduit	
	ft)			(6.17 ft)
Width	600 mm (23.6 in)	800 mm (31.5 in)	200 mm (7.9 in)	140 mm (5.5 in)
Depth	450 mm (17.7 in)	450 mm (17.7 in)	450 mm (17.7 in)	450 mm (17.7 in)
* Recommended installation height				

Rack row dimensions:

The rear and front doors add 50 mm (2 in) to the depth, and the length of the rack row increases by 80 mm (3.2 in) when the side panels are installed.

Total height of racks:

The total height - 2020 mm (6.62 ft) - of the BSC2 and TCSM2 racks consists of the following:

1.   net height of the rack frame 1880 mm (6.17 ft)

2.   50 mm (2.0 in) for its adjustable mounts

3.   90 mm (3.54 in) for the upper structure on top of the rack.

For more information, see *Installation overview* .

You can continue with *Installing the racks on their own feet* or *Installing the racks on floor rails* .

4 Checking the BSC and TCSM2 installation site and unpacking the equipment

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Note

Use the check list in *Installation Work Check List, Generic BSC and TCSM2 Installation* for recording your progress in the installation work. Once you have finished with a procedure, mark it immediately as completed in the list.

Before you begin with the actual installation, check the installation site and its facilities, and unpack and inspect the equipment following the instrcutions for checking below. This way you can minimise the risk of any failure which might delay the completion of the installation, commissioning or integration of the network element.

4.1 Checking the installation site

Ensure that the equipment room is prepared so that it complies with the requirements in *Installation Site Requirements for BSC and TCSM2* following the steps below.

Steps

1. **Ensure that all basic work such as installation of lighting, fire extinguishing and air conditioning equipment has been completed**

2. **Check against the floor plan for the site that all cable shelves and gratings separate from the equipment itself are ready**

3. **Ensure that the site power supply system has been properly installed and that it is ready for use**

4. **Ensure that the ventilation equipment has been properly installed and that the temperature in the equipment room is within the limits allowed for the DX 200 equipment**

5. **Ensure that the premises are properly cleaned**

6. **If you find any defects in the site itself or the facilities, notify the party responsible and ensure that corrective actions will be taken immediately**

7. **Cover the gangways in the equipment room with protective material for the duration of the installation work**

4.2 Unpacking and checking the equipment

The equipment to be installed at the site, that is, rack frames of the DX 200 BSC network element, side plates and cable conduits are transported in separate containers, as well as the plug-in units, interconnecting cables, external cables and wiring connectors.

⚠ Caution

When removed from the transportation containers, the equipment must be kept in a place which fulfils the environmental requirements for stationary use, as stated in *Installation Site Requirements for BSC and TCSM2* .

Steps

1. **Visually check the shipping containers for any external damage**

    Record any damage you find in the containers.

2. **Unpack the rack frames**

    After unpacking, either place the racks standing up or leave them lying in a horizontal position on the bases of their containers.

3. **Unpack the containers for side plates, cable conduits, plug-in units, cables and wiring connector**

After unpacking, keep the components in their inner packages until the actual installation. Keep the transport packages of the peripheral devices, especially those of the disk drives, in storage for service transportation.

4. **Visually check the equipment for any external or internal damage**

   Record any damage you find in the equipment.

5. **Check that the delivery includes everything on the Packing list**

   Record any deficiencies.

6. **If there are any problems with the shipment, notify the Nokia Customer Service Center in your area immediately**

   Expected outcome

   Now you are ready to proceed to *installing free-standing racks* or *racks on floor rails* .

5 Installing free-standing racks for BSC and TCSM2

These instructions help you to install the racks on the adjustable feet.

For free-standing installations, the racks do not need any installation accessories.

Note

If you are going to install the racks on floor rails, you can skip these instructions and proceed to *Installing racks on floor rails* .

Note

For more information on the installation instructions of NEBS doors, see *Installing the NEBS Upgrade Kit in BSC2(i) and TCSM2* in Site Documents binder.

Steps

1. **Before lifting the frame into the final position, adjust the four feet of each rack to an initial height of about 50 mm (2 in) (see Figure *Adjustable rack foot*)**

HEXAGON RECESS No 5   RACK FRAME

15
0.6"

WELDED NUT

LOCK NUT

50
2"

WRENCH GAP 8 mm

DN9860113
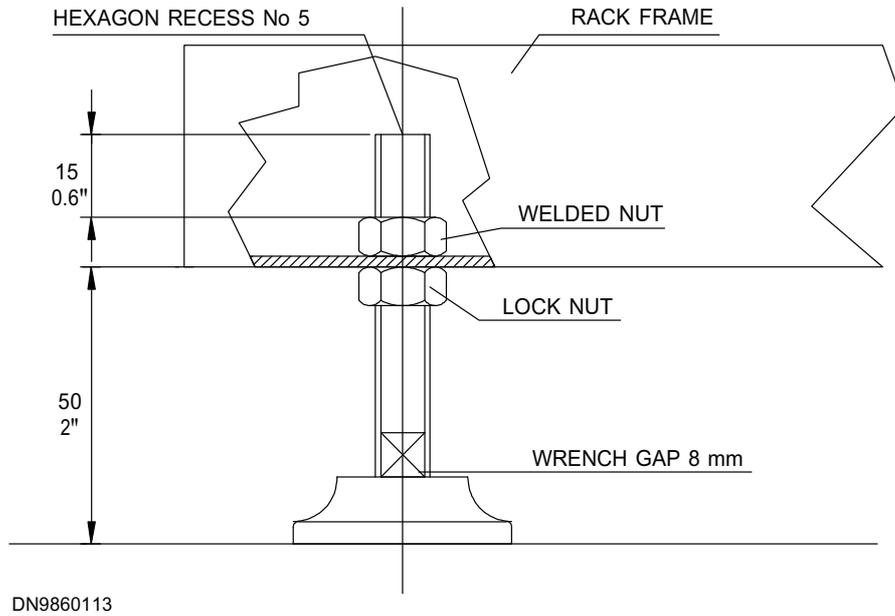
Figure 1.   Adjustable rack foot

2.   When you have placed the racks in their final positions, attach the rack frames to one another with the mounting plates

3.   Adjust the rows horizontally and vertically using a spirit level within the adjustment range of the feet (±15 mm or ±0.59 in)

At the same time, check the distance between the front edges of the rack rows to ±1 mm (0.04 in) tolerance (see Figure *Connecting the rack frames*).

ANOTHER RACK FRAME
OR SIDE PLATE SP19 A
OF RACK ROW END.

4 ANGLES PER JOINT
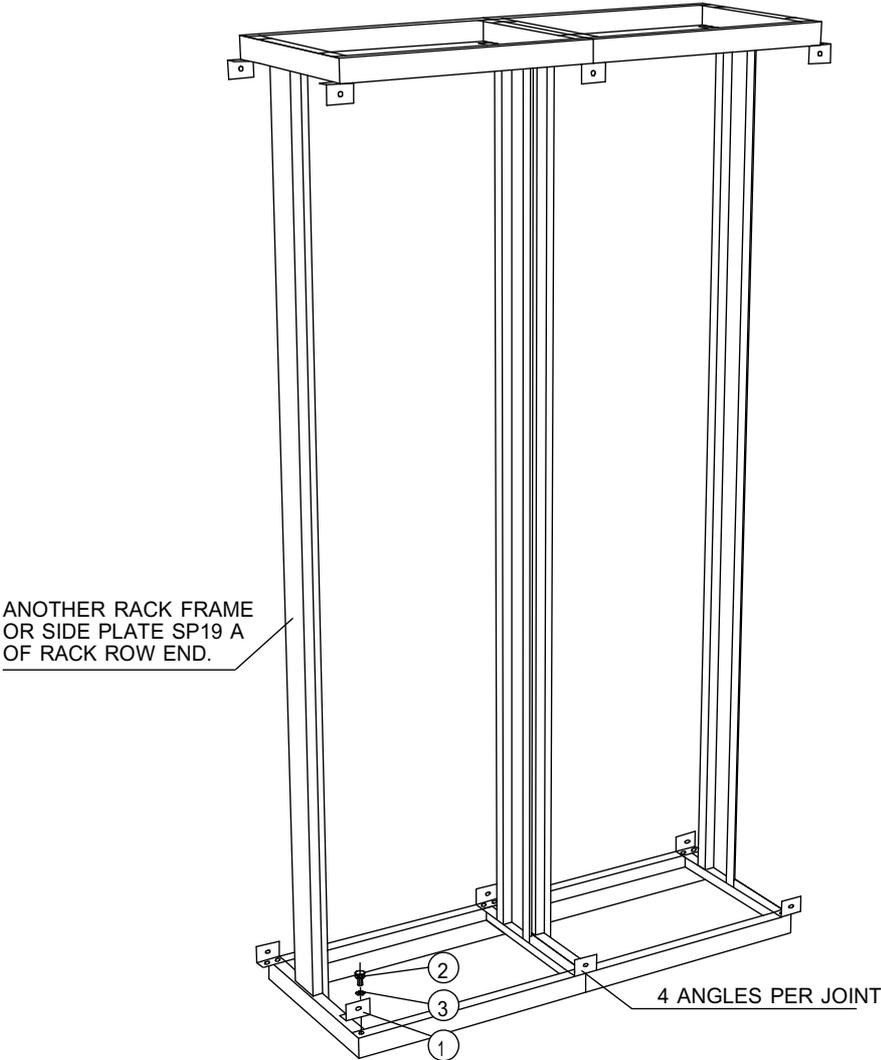
DN9860125

Figure 2.   Connecting the rack frames

Expected outcome

The racks are now in place and you are ready to *ground the racks* .

6 Installing the racks on floor rails for BSC and TCSM2

Note

If you are going to install (or have already installed) the racks on their own feet, you can skip these instructions and proceed to *Grounding the racks* .

These instructions describe how the racks are installed on floor rails. The procedure comprises of the following phases:

- Installing the rails

- Preparing the racks for installation

- Mounting the first rack on the rails

- Installing the other racks

6.1 Installing the floor rails

The rails are delivered cut to length. Attach them to the floor at about 300...600 mm (2 ft) intervals using wedge anchors (to concrete only) or lag screws (see Figures *An example showing the dimensioning and attachment to the floor of the floor rails* and *Attachment of floor rails*). The attachment points should be as close to a joint of two adjacent racks as possible.

The distance from the center line of the floor rail to the front edge of the frame is 50 mm (2 in) and from the front edge of the rail 20 mm (0.8 in). The length of the rail is the length of the rack row minus 10 mm (0.4 in). Tolerance of 1 mm (0.04 in) is allowed to all distance dimensions.

RAILS L = 400mm
2 pcs

RAILS L = SUM(NOMINAL RACKWIDTHS)-10mm
2 pcs

350

ATTACHMENT POINTS AT 600mm
ACCORDING TO HOLES IN RAILS
IN 400mm RAILS

1800

60

20

THE REFERENCE MEASUREMENT LINE IS THE FRONT
EDGE OF THE RACK FRAME OF THE FIRST ROW
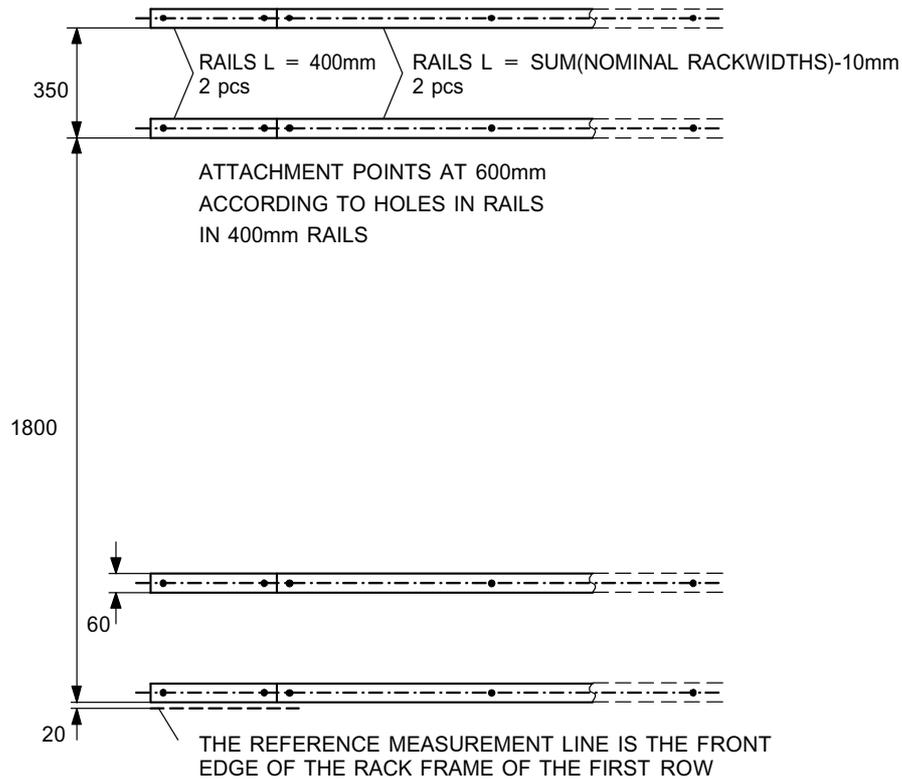
DN9860137

Figure 3.   An example showing the dimensioning and attachment to the floor of
the floor rails

Install the rails following the steps below, using Figure *Attachment of floor rails*
as a reference.

Steps

1.   **Determine the insertion points on the floor for the attachment screws
for the first rail. In normal installations, the intervals are c. 600 mm (2
ft), and in earthquake installations, the intervals are c. 300 mm (1 ft).
The attachment points should be as close to a joint of two adjacent
racks as possible.**

See Figure *An example showing the dimensioning and attachment to the
floor of the floor rails* .

2.   **Drill the holes for the screws**

When drilling holes in the floor, vacuum the dust off simultaneously beside the drill bit.

3.   Lodge a wedge anchor in each hole

4.   Repeat steps 1-3 for the other rail

5.   Place the rails where you are going to install them

6.   Level the rails off by inserting 0.5 mm (0.02 in), 1.0 mm (0.04 in) or 2.0 mm (0.08 in) shims between the floor and the rails

Use a spirit level to check that each rail is level as such, and that the two rails are level in relation to one another.

7.   Mount the insulation tube in the first hole, followed by the insulation washer, the washer cad and the attachment screw

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Note

The grounding methods referred to are Insulated Bonding Network (IBN) and Common Bonding network (CBN). In the IBN installation, the installation rails should be insulated from the floor structures, but in the CBN installation no insulation is needed.

For wooden floors, use lag screws (6 x 50), and for concrete floors, wedge anchors (M10, DOKKA 8.8 bolt with RAWL M10 anchor or respective) for fastening.

Fasten the screw loosely.

ATTACHMENT POINTS
AT 300-600 mm INTERVALS

WASHER

INSULATION WASHER (IBN)

SHIM AS NEEDED

RAIL

DN98617674

INSULATION TUBE (IBN)

WEDGE ANCHOR
M10 x 25L

80

16

DN98617674
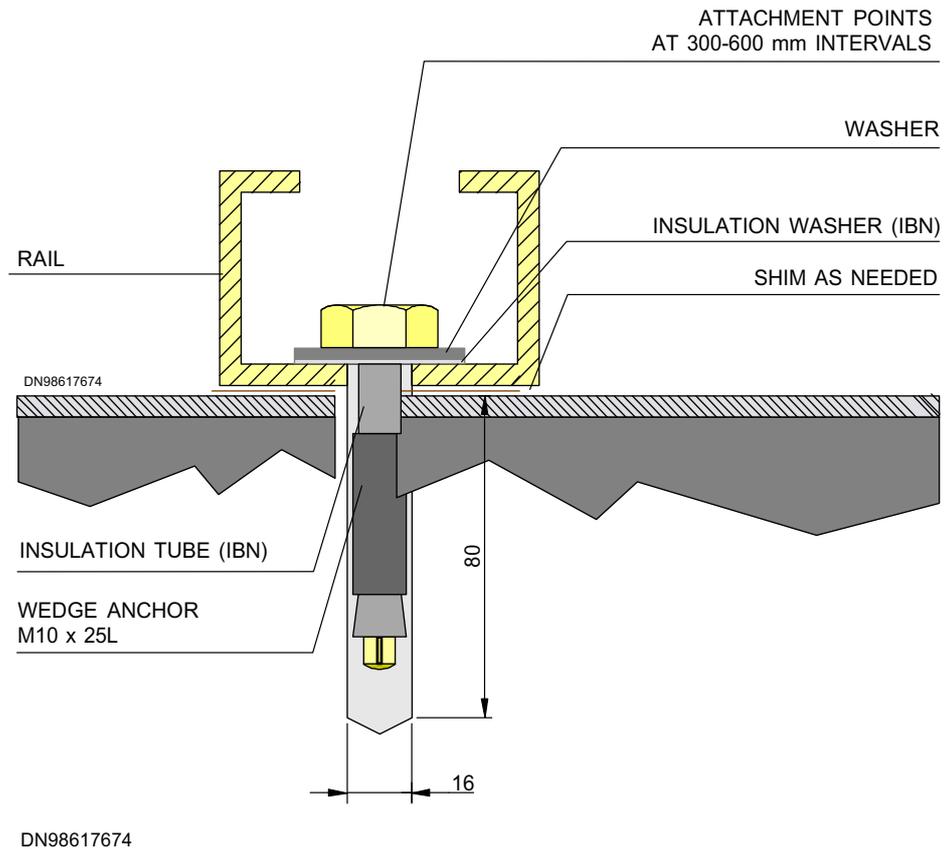
Figure 4.   Attachment of floor rails

8.   Repeat steps 6 and 7 to all attachment points for each rail

9.   After attaching all screws, tighten them

10.   Check that the attachment screws are not electrically connected to the rail

Note

In IBN installations only.

Measure the total leak resistance of all floor rails to the main grounding busbar using an ohmmeter. The resistance must be 100 kΩ at minimum.

If the resistance is lower than 100 kΩ, locate the screw causing the leakage and take the appropriate steps to insulate it.

6.2   Installing the rack frames on rails

Place the rack frames in their planned positions and attach them to one another.

Steps

1.   **Remove the adjustable feet**

2.   **Mount the rack frames on the floor rails**

See Figures *Mounting the racks on floor rails* and *Overhang of rack* . Use 0.5 mm (0.02 in) shims to achieve straightness.

Note

The end of the first (and the last) rack of the row should stretch over the rail for about 5 mm (0.2 in).

---

3.   **Lift the next rack onto the rails**

You can do this after you have attached the first rack of a rack row to the rails.

Leave enough space on both sides for installing the mounting pieces. Screw the attachment screws in loosely, push the rack tightly against the first rack, and tighten the screws enough to prevent the racks from moving. Repeat the steps with the next racks of the row.

4.   **Tighten the rack attachment screws**

You can do this once the racks have been attached to one another and the upper support structure has been completed.

FOUR ATTACHMENT POINTS
PER RACK

HEX SCREW
M8x25

TOOTHED LOCK
WASHER

A8,4

MOUNTING PIECE

END PLATE (GLUED)

RACK

0.5mm
SHIM AS
REQUIRED

NOTE!
MAX 2 SHIMS IN
THE SAME PLACE

FLOOR

FRONT EDGE
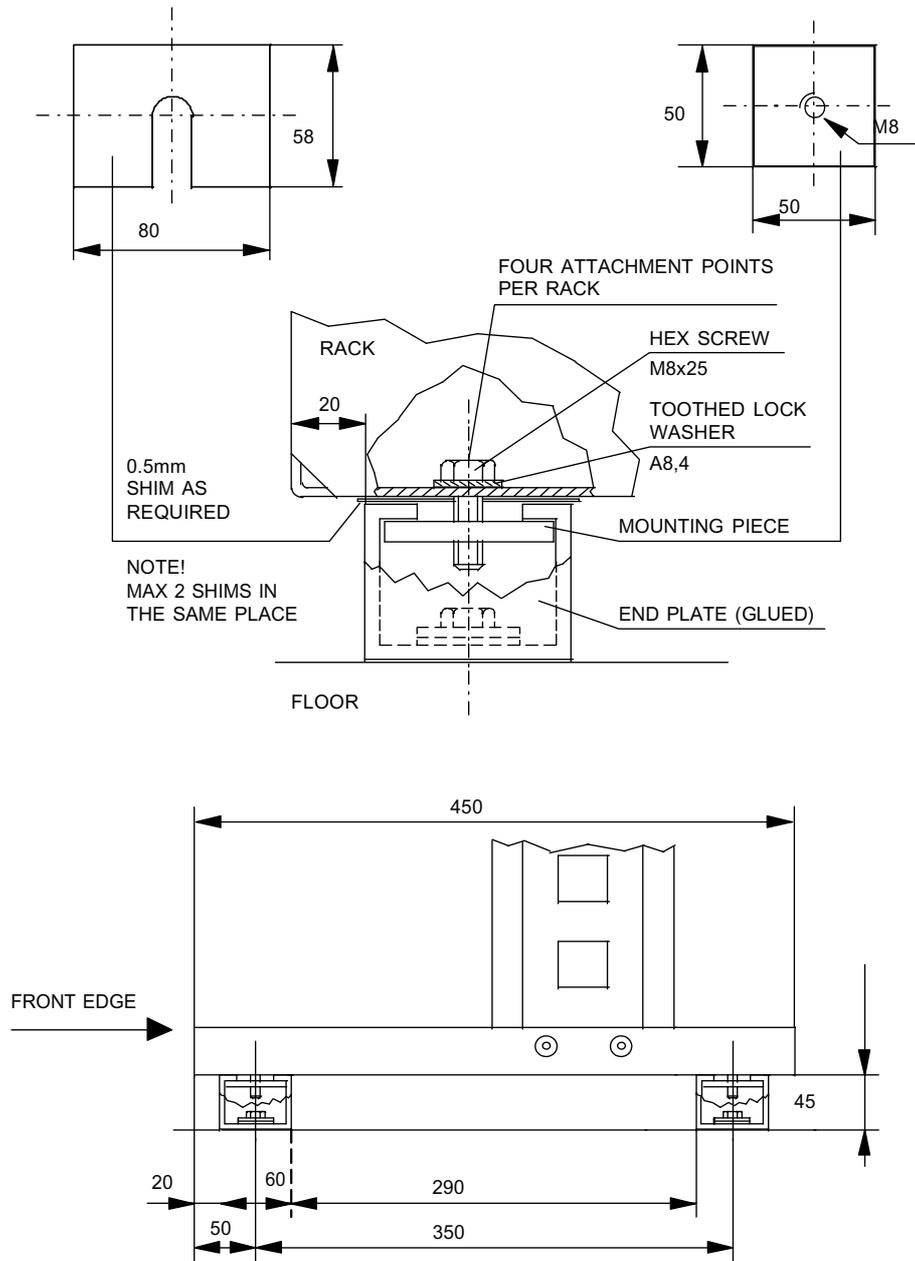
DN9860164

Figure 5.   Mounting the racks on floor rails
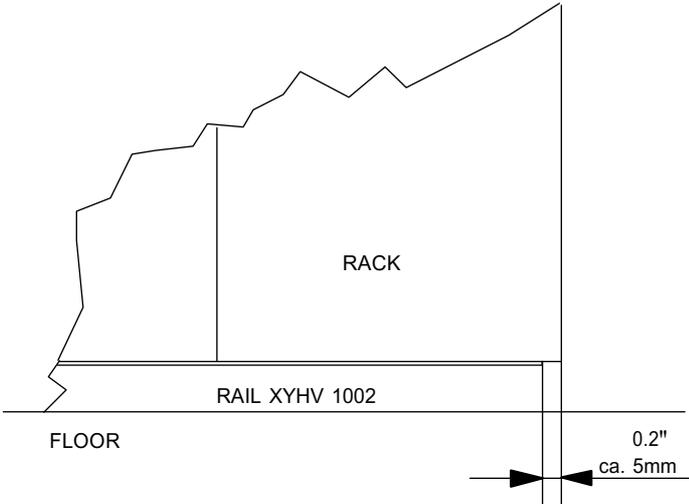
DN9860152

Figure 6.   Overhang of rack

Expected outcome

The racks are installed on the floor rails and you are ready for *Grounding the racks* .

7 Grounding the racks for BSC and TCSM2

These instructions describe how to connect the racks to the ground bar of the site. For grounding principles of the DX 200 site, see *Engineering for BSC* and *Engineering for TCSM2* .

Before you start: Grounding cable

The grounding cables should meet the requirements of the UL 1459 standard and the National Electrical Code ANSI/NFPA No.70. Strain relief is required for the main cable before it can be connected to the BSC2/TCSM2 racks. See Figure *Grounding of BSC racks* .

TO MAIN GROUND
BUSBAR

GROUND STRAP "B"
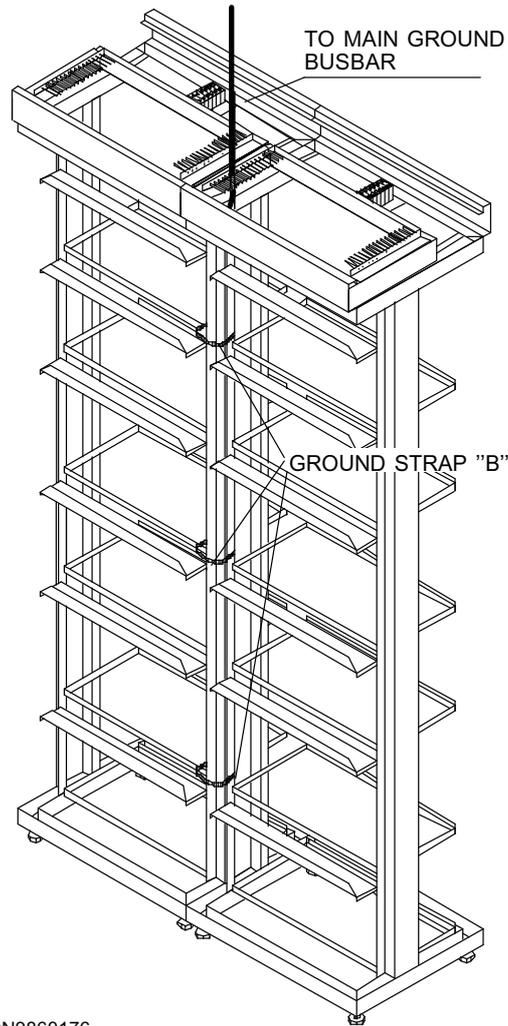
DN9860176

Figure 7.   Grounding of BSC racks

7.1   Connecting grounding cables

Steps

1.   **Connect the insulated 25 mm^2 (AWG2) grounding cable to the 6 mm bolt at the vertical busbar of the first rack in the row (type BCBE in the BSC2)**

Use round terminals (not two legged spades; see Figure *An example of connecting the grounding cable to the rack (connecting screw at top of grounding busbars of racks*). Connect the other end of the cable to the ground bar of the site.

2.   Establish a galvanic connection between the grounding cable and the main grounding busbar of the rack at the grounding element at the top of the rack

Strip the cable jacket and press the grounding tapes firmly against the bare cable. See information on the grounding of cables in section *Cabling to environment* .

Note

When the rack is equipped with side panels, the racks are grouped in groups of two with cabling racks between the groups. Without side panels the racks form a single row without intermittent cabling racks.

3.   Connect the ground potentials of the first rack and the adjacent rack

Use 3 prefabricated ground straps (referred to as "B" in Figure *Grounding of BSC racks*) for the connection.

The main grounding point is marked with a label on the rack as shown in Figure *An example of connecting the grounding cable to the rack (connecting screw at top of grounding busbars of racks*). Repeat steps 1-3 above with the other racks of the row if it contains more racks.

GROUNDING BUSBAR

HEXAGON SOCKET
SCREW M6 x 14

GROUNDING CABLE

GROUNDING LABEL
(LABEL 12)
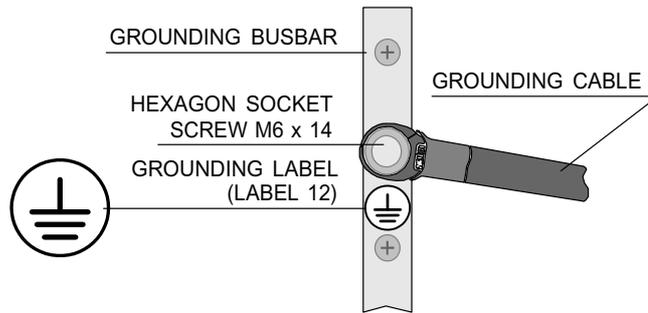
DN9860188

Figure 8.   An example of connecting the grounding cable to the rack
(connecting screw at top of grounding busbars of racks)

Expected outcome

The racks are grounded and you are ready to *install the side plates, cable racks and other structures* .

8 Installing side plates and other structures in BSC and TCSM2

When the rack rows have been assembled and grounded, the top structures, side plates and other structures are installed as described in these instructions.

8.1 Installing the upper frame structures of the rack

The upper frame structures of the racks (UFS61-S or UFS81) are normally preinstalled at the factory, except for the top covers. If the upper frame structures, however, are installed at the site (for instance, due to lack of space), it must be done after the erection of the racks, in accordance with Figure *Parts of the upper frame structures of the rack* , in the following order:

*   mounting plate (1) and side plate (4)

*   cover plate (2) and side plate (3)

*   supports (5) and (7).

Figure *Parts of the upper frame structures of the rack* shows the upper frame structure parts and Table *Names of top structure parts* shows their names.
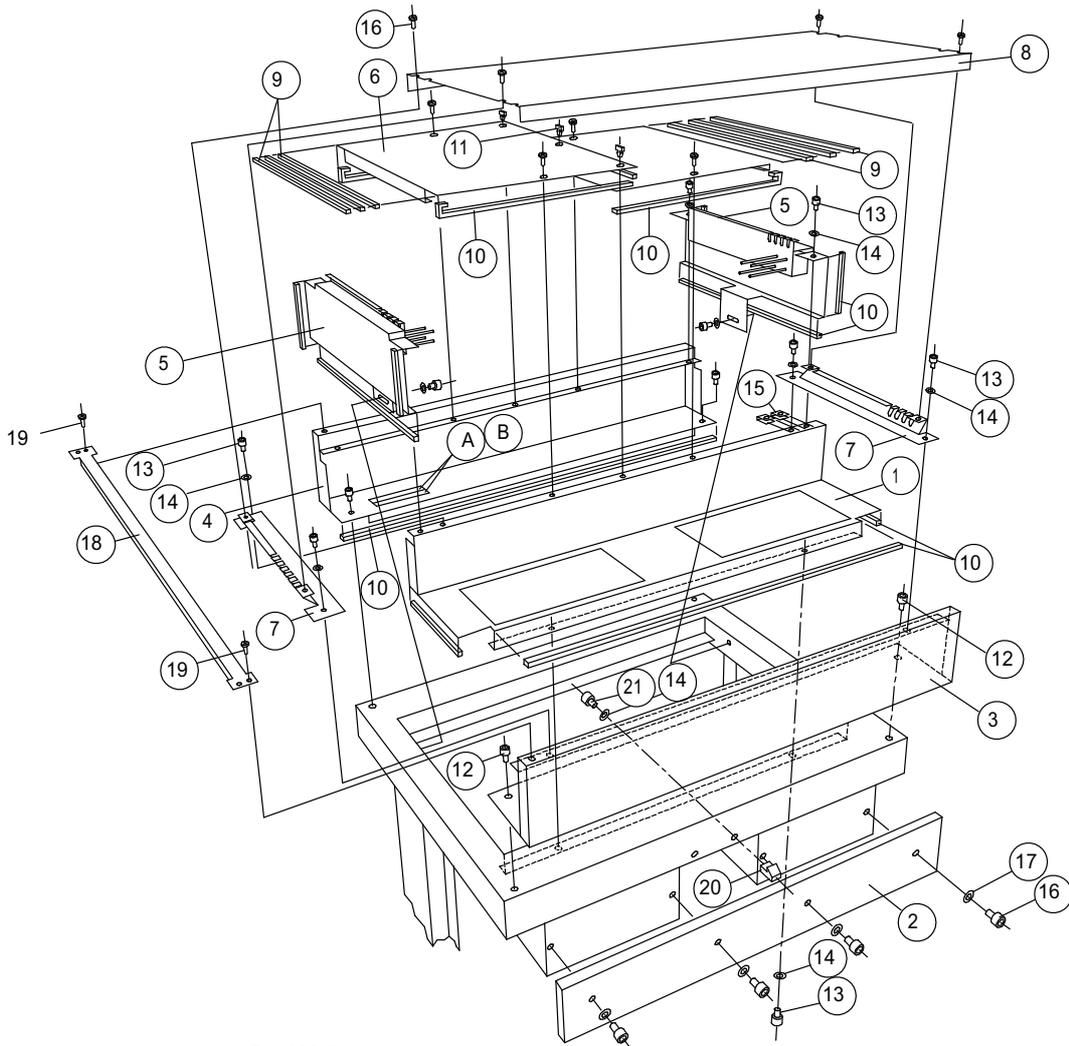
DN9860191

Figure 9.   Parts of the upper frame structures of the rack

Table 12.   Names of top structure parts

Part No.	Part
A,B	Label
1	Mounting plate
2	Filler plate

Table 12.   Names of top structure parts (cont.)

Part No.	Part
3	Side plate 61E / 81E *)
4	Side plate 61T / 81T *)
5	Bracket 21
6	Top plate 61 / 81 *) (rear-side plates)
7	Support
8	Protective plate 61 / 81 *) (front-side plate)
9	Gasket tape 9.53 x 12.7 mm
10	Gasket tape 6.35 x 6.65 mm
11	Fastening pin (plastic)
12	Rec hex socket screw M 10 x 12
13	Rec hex socket screw M 6 x 16
14	Washer A6.4
15	Plate nut M6
16	Cross-recessed head screw M 4 x 8
17	Washer 4.3 PA
18	Support
19	Tapping screw AB4.2 x 9.5
20	Lock pin
21	Rex hex socket screw M6 x 10

*) 61 for BSC2, 81 for TCSM2

Steps

1.   **Make sure that the conductive gasket tape is in good condition, in order to achieve proper shielding**

2. **Install the cover plates (8) later, together with the hinged beams**

Mount the hinges before installing the beams.

8.2 Installing the LAN panels, CPLAN-S

When option *Integrated LAN connections* is implemented, CPLAN-S LAN connector panels for LAN (Ethernet) cables are installed in place of the top plates in the M92 rack of BSCE, BSCi, BSC2A/E and BSC2i. In BSC2i, the CPLAN-S LAN connector panels have been installed in first deliveries starting from the S10.5 release.
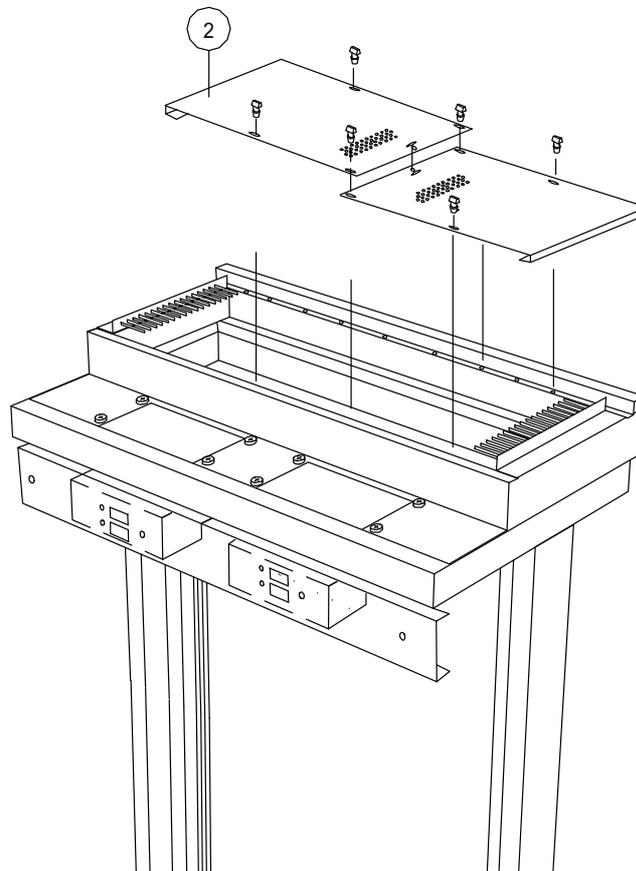
DN03487823

Figure 10. Installing the 24-port LAN-panel CPLAN-S

Steps

1. **Remove the existing top plates from the rack**

   Remove the existing top plates by turning the locking pegs sideways (no screws are used in the installation).

2. **Install the LAN panels in place of the blank panels**

   Check the orientation of the panels. The left hand panel and right hand panel are mounted 180 degrees clockwise to a different position. Each main rack and extension rack is provided with a left-hand and a right-hand panel.

3. **Secure the panels with locking pegs**

Expected outcome

The CPLAN-S LAN connector panels are now ready for LAN cabling.

8.3 Installing the side plates SP19A-S of the rack

The Side Plate SP19A-S is used with the Door Set DS196 (BSC2) or DS198 (TCSM2) in the rack.

Figure *Installing the SP19A-S side plates* shows how to install the SP19A side plates after the top structures have been installed, and Table *Names of side plate parts* presents the mounting parts.
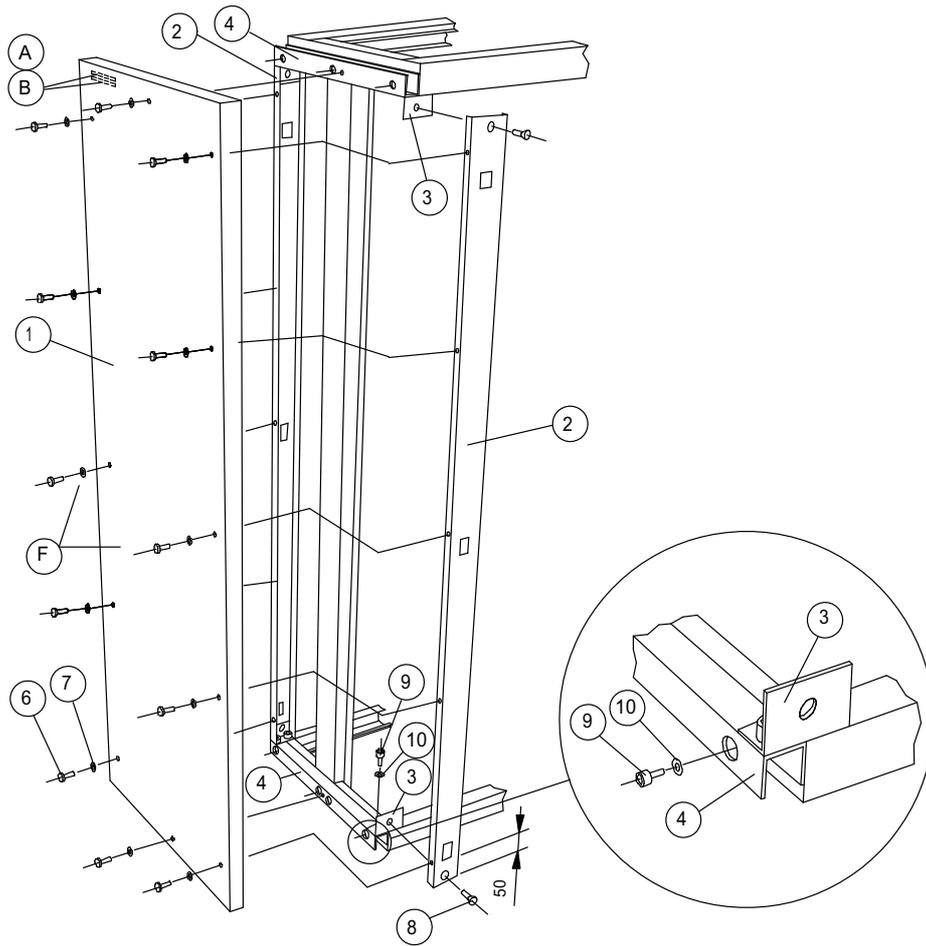
DN9860207

Figure 11.   Installing the SP19A-S side plates

Table 13.   Names of side plate parts

Part No.	Part
A, B	Label
1	Side plate SP19A-S
2	Hinged beam

Table 13.   Names of side plate parts (cont.)

Part No.	Part
3	Bracket
4	Rail
6	Tapping screw AB 4.2x9.5
7	Washer 4.3
8	Rex hex socket screw M8x20
9	Rex hex socket screw M6x16
10	Spring washer B6

Steps

1.   **Attach the mounting rails (4) to the upper and lower beams by screwing (8) them together with the fastening plates (3)**

2.   **Install the girders (2) to the fastening plates (3) with hex socket screws (8)**

3.   **Install the side plates with 12 screws**

    To facilitate the proper aligning of the side plate, tighten the screws in the middle of the side plate first (marked with F in Figure *Installing the SP1A-S side plates*).

8.4   Installing the side plates SP1A-T

The side plates are used with the door set DS196E (BSC2) or DS198E (TCSM2).

Figure *Installing the SP1A-T side plates* shows how to install the plates.

DN98168276
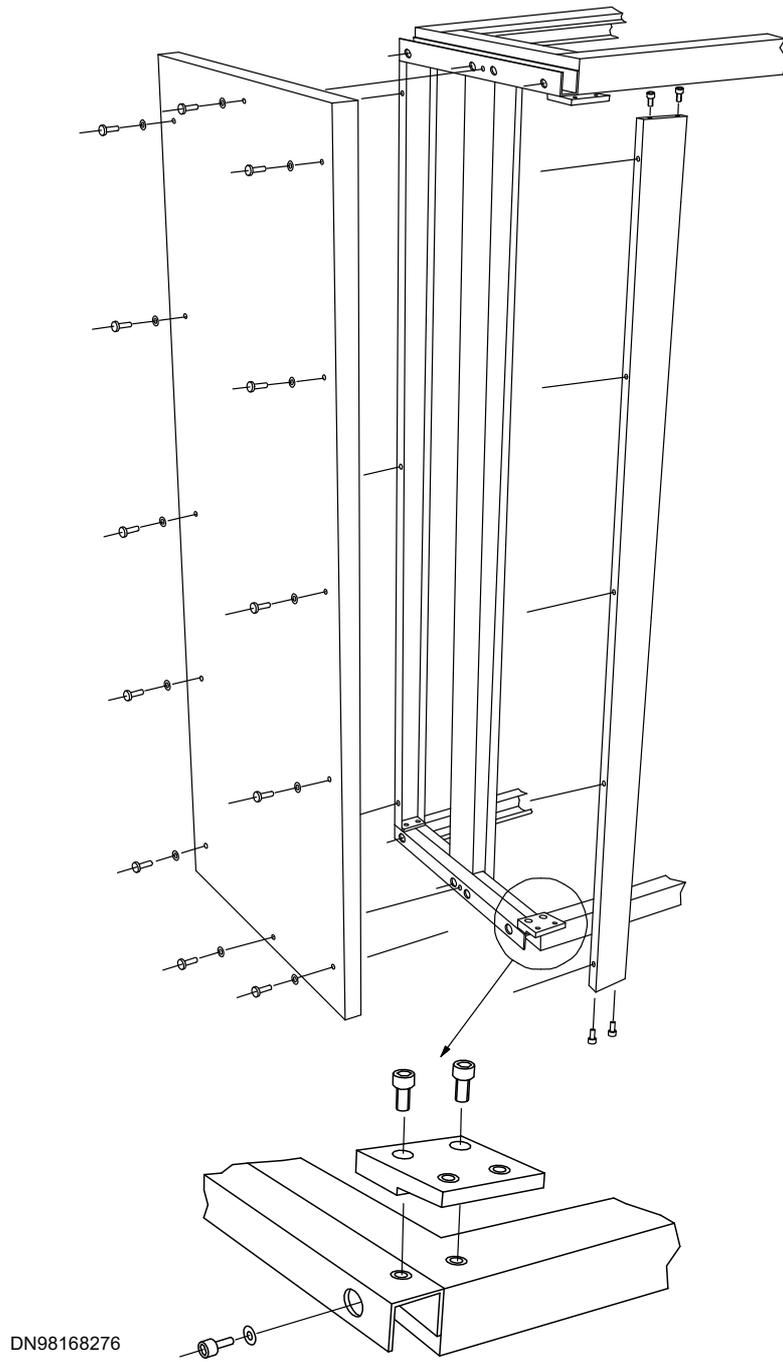
Figure 12.　Installing the SP1A-T side plates

Steps

1. **Make sure that the sealings are clean and undamaged**

2. **Install the NEBS plates with the aid of hinge beams and rails as shown in Figure *Installing the SP1A-T side plates***

8.5   External cabling

The external cables of the equipment can either be placed on cable shelves above the rack rows or, if the equipment room has raised flooring, underneath the floor. For more information, see *Engineering for BSC* and *Engineering for TCSM2* .

Figure *Cabling options offered by the use of a cable conduit or a cable rack* shows the options available.
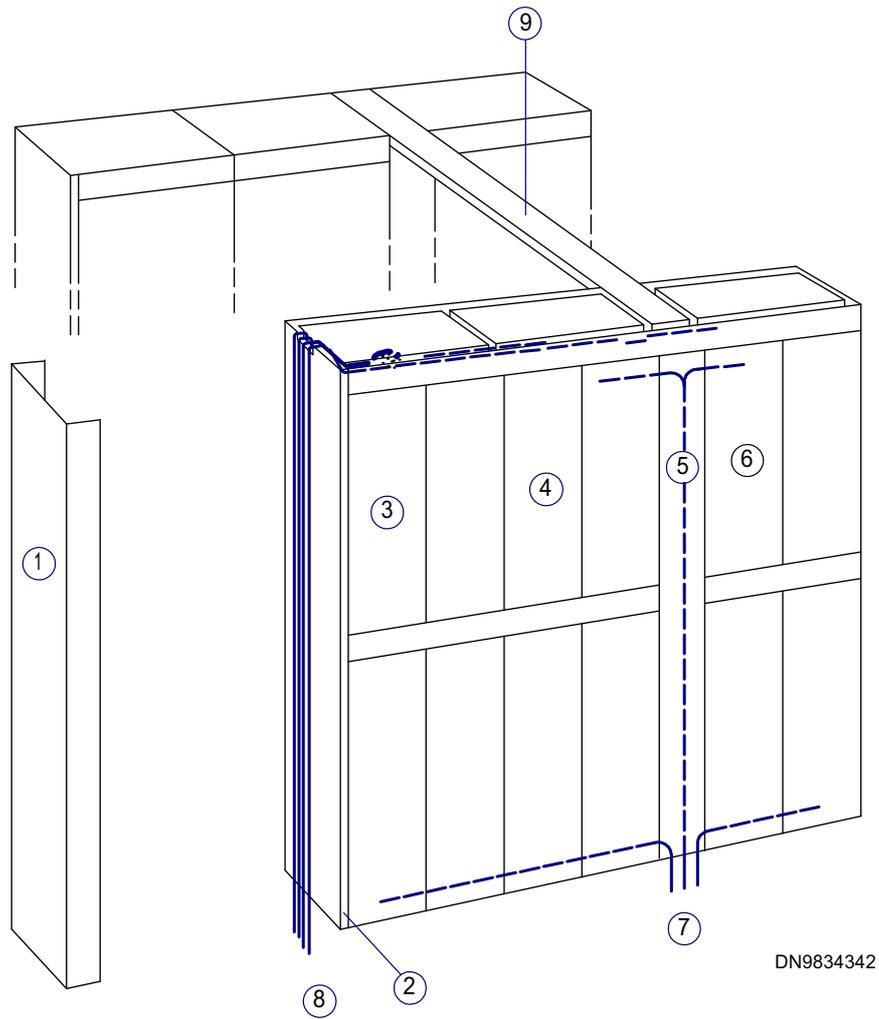
Figure 13.   Cabling options offered by the use of a cable conduit or a cable rack

Table 14.   Names of cabling parts

Part No.	Part
1	Cable conduit CC19V
2	Side plate SP19A
3	Rack 1
4	Rack 2

Table 14.   Names of cabling parts (cont.)

Part No.	Part
5	Trunk cables in raised floor installations
6	Rack 3
7	R2A1-S/-T rack with grounding equipment ("comb"), bottom part
8	Power supply cables in raised floor installations
9	Cable conduit CC132 (optional)

Steps

1.   **Choose the option required and do the cabling according to the instructions**

Detailed installation instructions are available in procedures *Installing the cable conduit CC19V* , *Installing the cable rack R2A1-S* , *Installing the cabling rack R2A1-T* , *Installing the horizontal cable conduits and side cover strip* , and *Installing the optional support rail USS1A* .

8.6   Installing the cable conduit CC19V

These instructions help you to install the cable conduit CC19V. If there is a raised floor in the equipment room, the power cables are brought in through the vertical cable conduit CC19V and all other types of external cables through cabling rack R2A1-S. The width of the cable conduit is 140 mm (5.5 in) and the width of the cable rack 200 mm (7.9 in).

Figure *Use of CC19V conduit for raised floor installations* shows the mechanical structure of the vertical cable conduit. The corresponding part list is shown in Table *Names of cable conduit parts* .

POWER
SUPPLY
CABLES

HOLE IN THE FLOOR
FOR CABLES
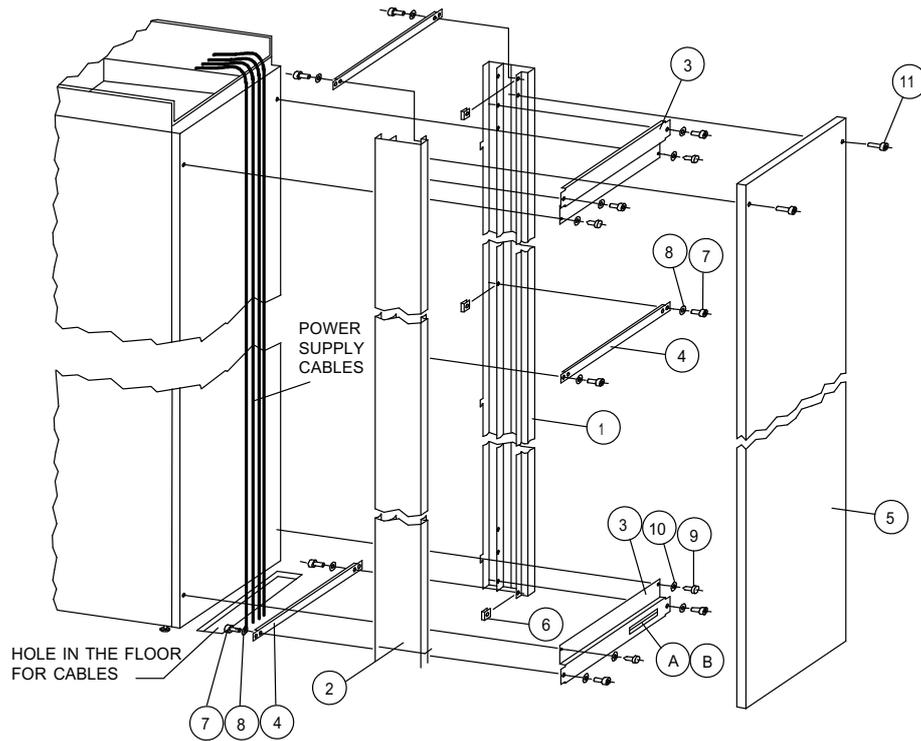
DN9860222

Figure 14.   Use of CC19V conduit for raised floor installations

Note

Here, the PCM cables are also brought in through the conduit.

Table 15.   Names of cable conduit parts

Part No.	Part
A,B	Label
1	Girder, right

Table 15.   Names of cable conduit parts (cont.)

Part No.	Part
2	Girder, left
3	Fastener
4	Bracket
5	Door CC19V
6	Nut M6
7	Rec hex socket screw M6 x 12
8	Washer A6.4
9	Tapping screw AB4.2 x 16
9	Cross head screw M4x12
10	Washer A4.3
11	Rec hex socket screw M6 x 16

Steps

1.   **Install according to Figure** *Use of CC19V conduit for raised floor installations*

8.7   Installing the cable rack R2A1-S

Figure *Cabling options offered by the use of a cable conduit or a cable rack* shows the solution in which the cabling is taken through the R2A1-S rack, placed at the end of the rack row. It can also be placed anywhere in the middle of the row. The corresponding part list is shown in the table below. The width of the cable rack is 200 mm (7.9 in).
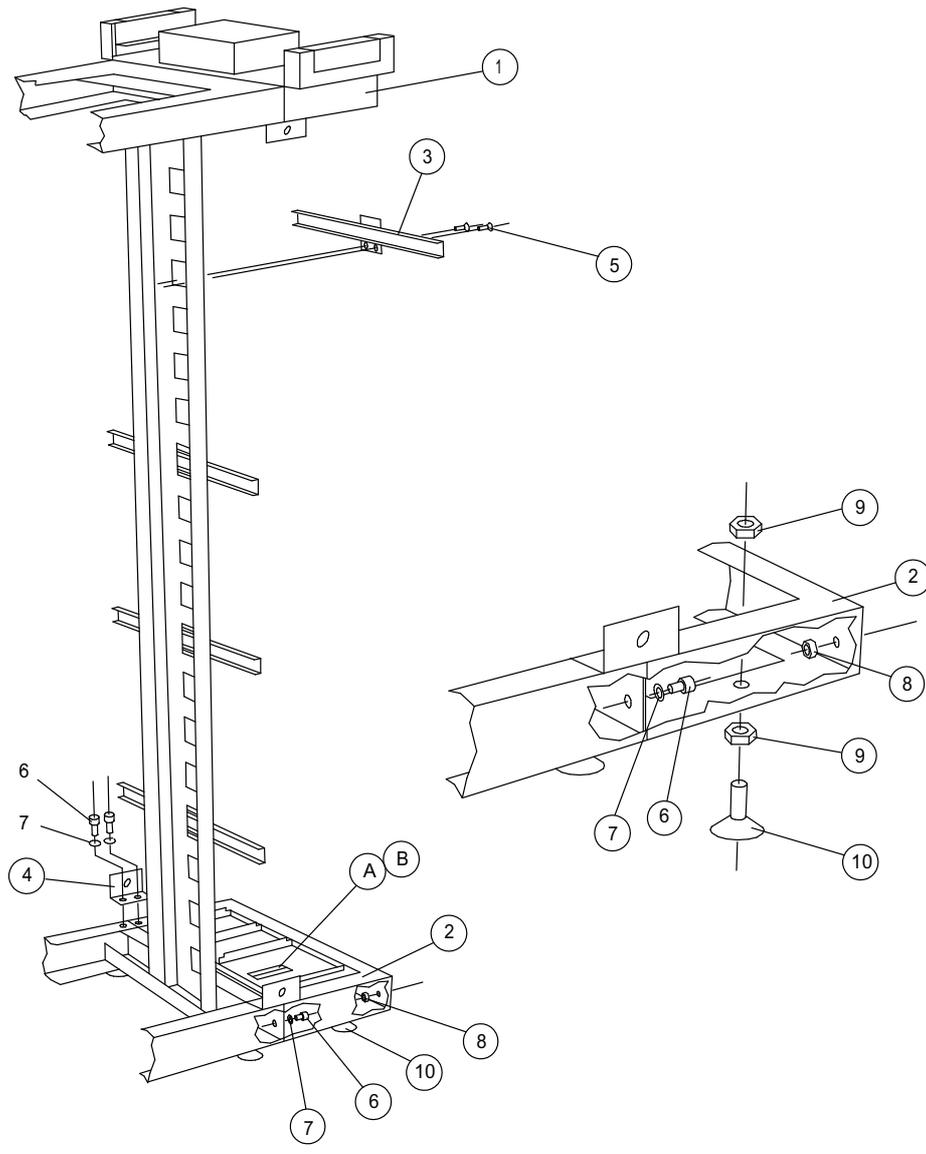
DN9860234

Figure 15.   Mounting of R2A1-S rack

Table 16.   Parts for R2A1-S rack

Part No.	Part
A,B	Label
1	Upper frame R2A1-S
2	Lower frame R2A1-S
3	Bracket 02
4	Support angle
5	Rec hex socket screw M5 x 20
6	Rec hex socket screw M6 x 16
7	Washer A6.4
8	Hexagon nut M6
9	Hexagon nut M10
10	Foot M10 x 60 adjustable

Steps

1.   **Install the R2A1-S rack**

Figure *Mounting of R2A1-S rack* shows the detailed installation instructions.

8.8   Installing the cabling rack R2A1-T

The cabling rack R2A1-T is used when the doors DS196E and DS198E are installed. The R2A1-T can be installed to one side of a rack when the site cables are drawn under the floor in raised floor installations. The site cables here mean all the cables which must be grounded at the grounding elements, such as trunk (PCM) cables and modem cables. The power supply cables must be routed through the cable conduit CC19V-S. The cabling racks are similar for BSC2(i) and TCSM2 applications.

Install the cabling rack as described in the installation procedure and shown in the Figure *Mounting the cabling rack R2A1-T* .

NOKIA
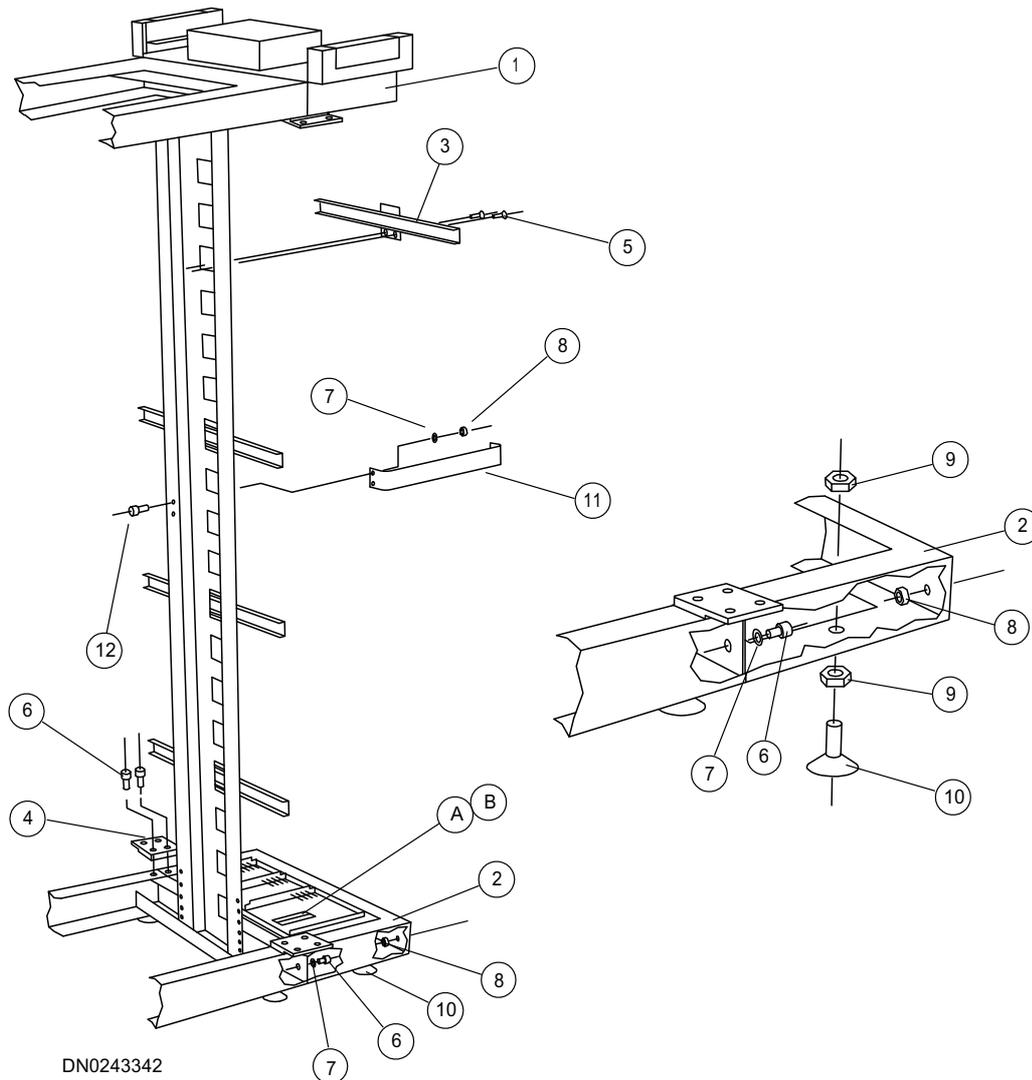
DN0243342

Figure 16.   Mounting the cabling rack R2A1-S/-T

Steps

1.   **Attach the upper frame to the rack body**

Attach the upper frame (1) to the rack body through the holes with hexagonal socket head screws and washers (6, 7) (2 + 2 screws).

2.   **Attach the lower frame to the rack body through the holes**

Attach the lower frame (2) to the rack body through the holes with hexagonal socket head screws and washers (6, 7) (2 + 2 screws).

3.   **Attach the adjustable foot at the front and at the rear side**

Attach the adjustable foot (10) at the front and at the rear side with two hexagonal socket head nuts.

4.   **Attach the four mounting plates to the lower and upper frame bars**

Attach the four mounting plates (4) to the lower and upper frame bars with hexagonal socket head screws (6). These mounting plates (4 + 4) are also used for the rack door installation.

5.   **Attach the hinge beams**

Attach the hinge beams (2) (four altogether), as shown in Figure *Mounting the cabling rack R2A1-T* (6), to the mounting plates (4) with hexagonal socket head screws; two screws at both ends.

6.   **Attach the four mounting brackets**

Attach the four mounting brackets (3) with hexagonal socket head screws (5), two screws for each bracket.

7.   **If the cabling rack R2A1-T is installed between two BSC2/TCSM2 racks, install the grounding strip**

If the cabling rack R2A1-T is installed between two BSC2/TCSM2 racks, install the grounding strip (11) with hexagonal socket head screws (12) and nuts (8) and washers (7). One screw at each rack. If the cabling rack R2A1-T is at the end of the equipment row, do not install the grounding strip.

8.9   Installing the horizontal cable conduits and side cover strip

An optional horizontal cable conduit CC132 can be used in special cases to combine the internal cabling and support the rack rows. It is always used together with the cable rack R2A1-S/-T. Figure *Use of R2A1-S/-T rack for cabling below raised floor and to support cable conduit between the rack rows* also shows the installation of cabling conduits between the rack rows and the side panel strip at the end of the rack row.
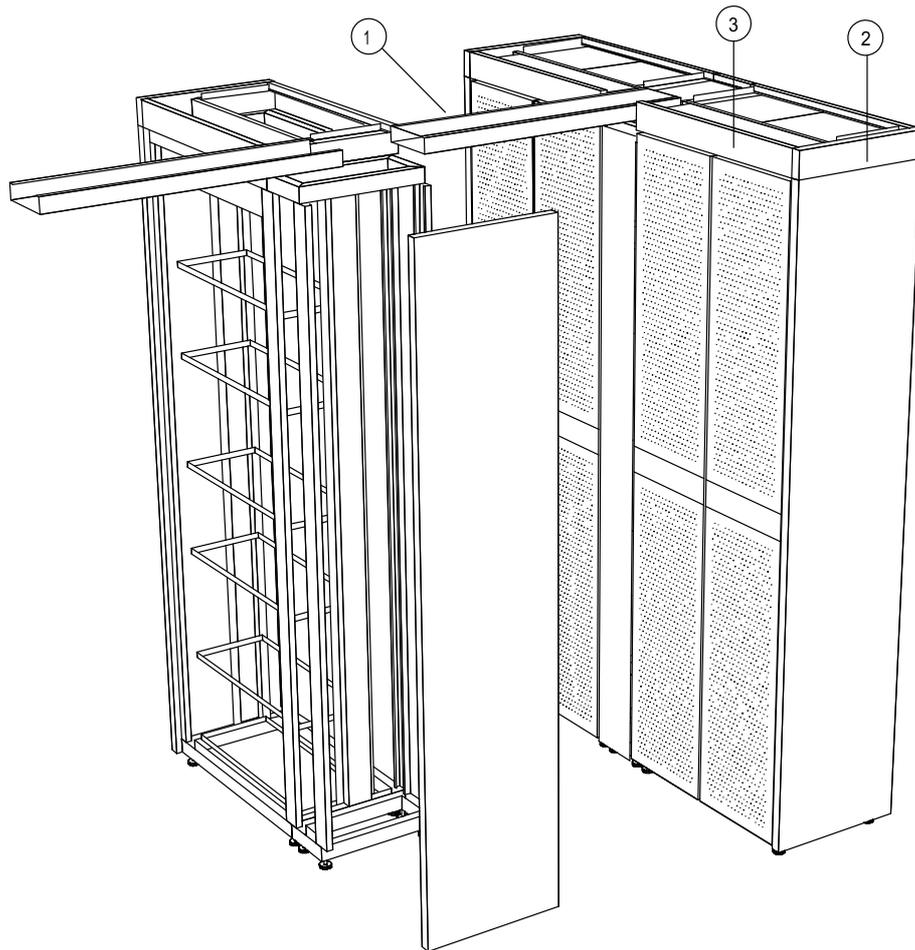
DN9860246

Figure 17.   Use of R2A1-S/-T rack for cabling below raised floor and to support
cable conduit between the rack rows

Table 17.   Parts of the cable conduit set

Number in the figure	Set	Parts
1	CC132	Cable conduit, row space 1350 mm
		Top plate
		Mounting accessories

Table 17.   Parts of the cable conduit set (cont.)

Number in the figure	Set	Parts
2	SP01A	Side panel strip
3	UFS61/81	Upper frame assembly

Steps

1. **Install the Cable conduit set**

   Install the Cable conduit set as shown in Figure *Use of R2A1-S rack for cabling below raised floor and to support cable conduit between the rack rows* .

2. **Install the Side panel strip**

   The side panel strip SP01A (2 in Figure *Use of R2A1-S/-T rack for cabling below raised floor and to support cable conduit between the rack rows*) fits in the upper frame assembly UFS61/81 (3 in the same figure) at the rack row ends. Install as shown in Figure *Use of R2A1-S rack for cabling below raised floor and to support cable conduit between the rack rows* .

8.10   Installing the optional support rail USS1A

If the upper part of the rack row must be supported to a wall, replace the upper rail (Part no. 4 in Figure *Installing the side plates*) with USS1A to permit fastening of a support rail in the racks (see Figure *Mounting the support rail USS1A*).

REPLACE RAIL CHD 19479
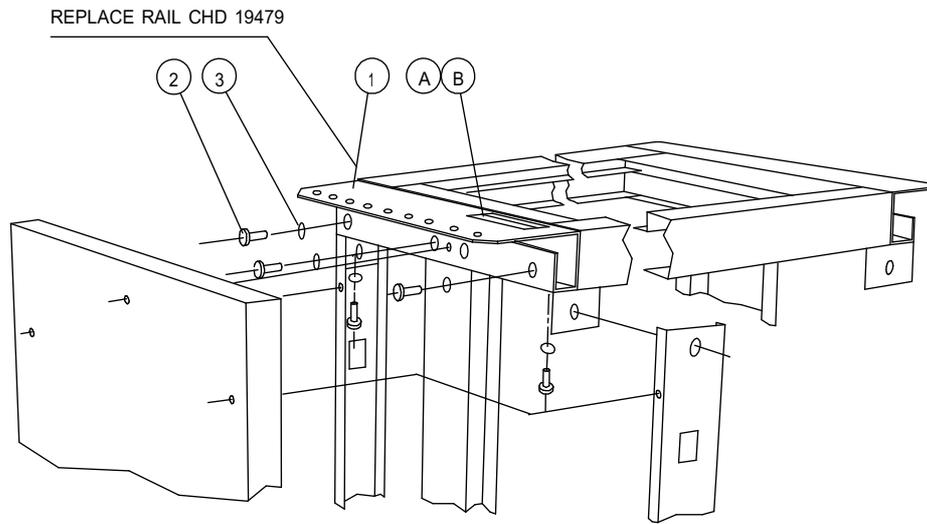
DN9860258

Figure 18.   Mounting the support rail USS1A

Table 18.   Names of side plate USS1A parts

No.	Part
A,B	Label
1	Support USS1A
2	Rec hex socket screw M6 x 16
3	Washer A6.4

Steps

1.   **Install the USS1A as shown in Figure** *Mounting the support rail USS1A*

8.11 Mounting the cartridges

The plug-in units are housed in cartridges mounted on cartridge shelves. The width of the cartridges shelves is 730 mm (28.7 in). When delivered from the factory, the racks are equipped with all the cartridges needed in a maximum equipment configuration.

The mechanical structure of a single cartridge is presented in Figure *Mounting of a cartridge, example* . Note that the cartridges are grounded to the rack with special grounding parts (referred to as number 6 in the figure).

⚠ Caution

Use a grounded wrist band when installing the plug-in units.
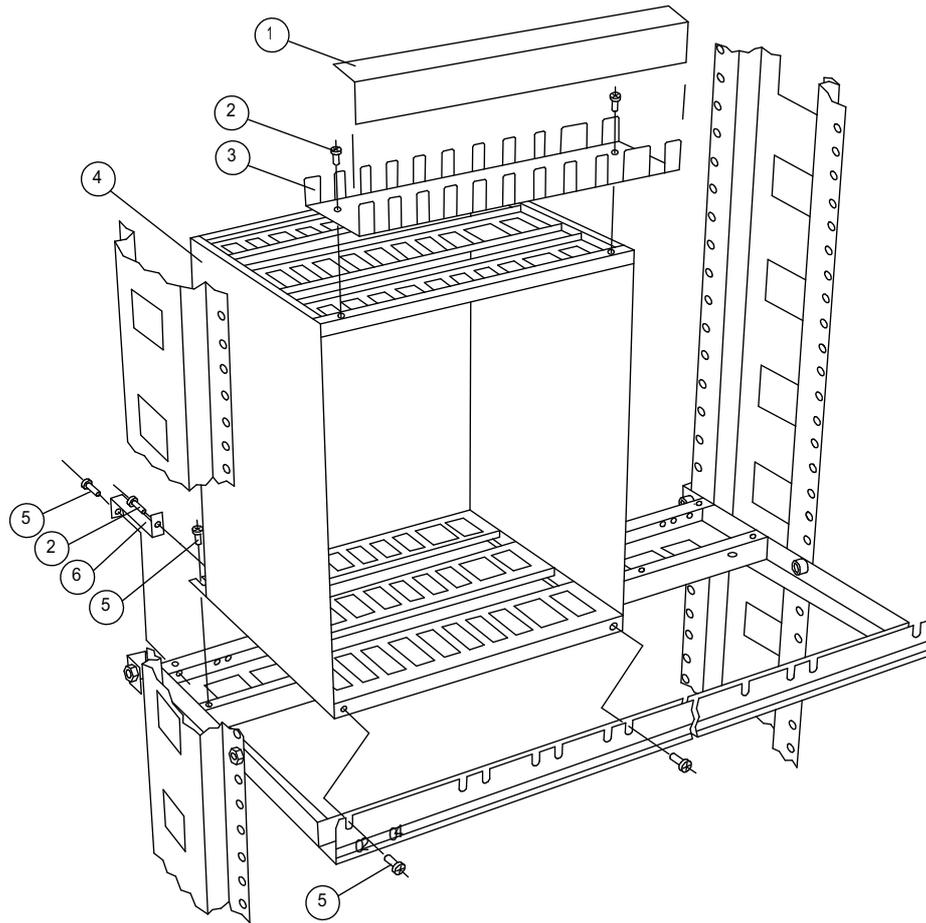
DN9860261

Figure 19.   Mounting of a cartridge, example

Table 19.   Cartridge mounting parts

Part No.	Name
1	Cover plate
2	Screw 2.9 x 9.5
3	Cable trough

Table 19.   Cartridge mounting parts (cont.)

Part No.	Name
4	Cartridge
5	Allen screw 4 x 12
6	Grounding part

Steps

1.   **See for more information in Figure *Mounting of a cartridge, example***

The shelves are shown in the figure.

2.   **Mount the cartridges onto the catridge shelves**

Expected outcome

The side plates and other structures are installed and you are ready to *connect the power supply* .

9 Site power supply in BSC and TCSM2

This section describes the external power supply cabling, for example, the cabling from the site power supply to the racks. It also describes the power supply equipment of the racks, which include a Power Supply Adapter assembly (PSA20) and two Power Supply Fuse Panels (PSFP).

Note

The internal power supply cabling of the BSC2 and TCSM2 racks is discussed in *Interconnection cabling for the BSC and TCSM2* .

9.1 Power supply cables

The TCSM2 and BSC2 racks are powered from the site power distribution equipment (-48V or -60 V). Each rack requires two insulated, solid twin cables from the site power supply. The cross section of the cables can vary from $16\ mm^2$ (AWG4) to $50\ mm^2$ (AWG1/0), so that voltage drop from the power supply to the BSC2 or TCSM2 does not exceed 1.5 V. For further information on cable dimensioning, see *BSC* and *TCSM2Engineering Descriptions* .

The maximum lengths for various site supply cables are:

- 25 meters for $16\ mm^2$ (27.3 yds. for AWG4)

- 35 meters for $25\ mm^2$ (43.7 yds. for AWG2)

- 48 meters for $50\ mm^2$ (87.5 yds. for AWG1/0)

The rack-specific fuses are located in the power distribution centre of the equipment room. The rack-specific supply cables are led from there to the power supply connectors of the racks. The allowable maximum value for the fuse is 63 A (Europe) or 70 A (U.S.), due to the use of 16 mm^2 (AWG4) wires in the rack power feed between the input connector (PSCG) and the circuit breakers (PSA20).

When calculating how many racks one fuse is able to feed, the following values were used: 40 V as the voltage value and 0.7 V as a derating parameter for the fuse. The total load can be supplied through a single cable in case the other cable should fail. The power supply should have a capacity large enough to feed a fully equipped system.

Table *Rack combinations* shows the maximum combinations for various racks supplied through the 63/70 A fuses. (The minimum combination, one BSC, requires 32 A fuse.)

Table 20.   Rack combinations

Rack	Number of racks supplied by a cable pair (fuse 63/70 A)		
BCBE	2	1	0
BCEE	2	1	0
TC2E	0	1	2

Note

The cables should meet the requirements of the UL 1459 standard and also the National Electrical Code ANSI/NFPA No.70. Strain relief is required before the cables can be connected to the rack.

Power supply cable connections

The power supply cables coming from the site power supply are connected to the screw connector (PSCG) on the top structure of the rack

The (-) cables are connected to screws 1 and 7 and the (+) cables to screws 3 and 5.

See Figure *Connector PSCG for site supply* for instructions. The power cabling can be chained to the other rack from the opposite side of the screw connector.

The circuit breaker is 20 A in the PSA20.

INPUT 0 (-UB) FROM SITE POWER SUPPLY OR PREVIOUS RACK → OUTPUT 0 (-UB) TO NEXT RACK

OUTPUT 0 (-UB) TO PSA 0 → OUTPUT 0 (-UB) TO PSA 1

INPUT 0 (+B) FROM SITE POWER SUPPLY OR PREVIOUS RACK → OUTPUT 0 (+B) TO NEXT RACK

OUTPUT (+B) TO PSA 0 → OUTPUT (+B) TO PSA 1

INPUT 0 (+B) FROM SITE POWER SUPPLY OR PREVIOUS RACK → OUTPUT 1 (+B) TO NEXT RACK

OUTPUT 1 (-UB) TO PSA 0 → OUTPUT 1 (-UB) TO PSA 1

INPUT 1 (-UB) FROM SITE POWER SUPPLY OR PREVIOUS RACK → OUTPUT 1 (-UB) TO NEXT RACK

DN9860273

Figure 20.   Connector PSCG for site supply

9.2   Power Supply Adapter PSA 20

Each TCSM2 and BSC2 rack is provided with two PSA 20 units which have a common front panel (see Figure *Two PSFPs connected to the top rear structure of a rack*). Each PSA has two separate power inputs, with both the first and second inputs connected together as separate pairs. All have 20 A circuit breakers. Each PSA 20 is provided with a filter unit, which is connected to the circuit breakers by means of diodes.

The central battery voltage is brought in from the power connector (PSCG) on the top structure of the rack to PSA20 units 0 and 1 using power cables (-UB and +UB), as shown in Figure *Connector PSCG for site supply* .

One cable pair from PSA20 to PSFP is marked with (+) and (-) wires.

9.3 Power Supply Fuse Panel, PSFP

The equipment rack houses two Power Supply Fuse Panels (PSFP). The PSFP distributes the power supply from the PSA 20 unit via 10 A fuses (F0 to F11) to various cartridges in the rack. The cartridges are cabled to connectors (P0 to P11). (See the Figure *Two PSFPs connected to the top rear structure of a rack* .
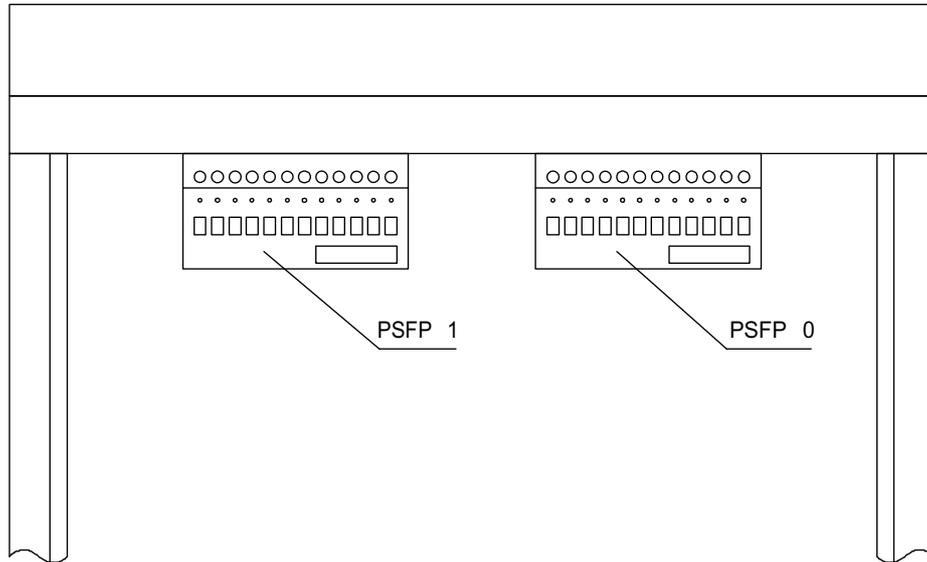
Figure 21.   Two PSFPs connected to the top rear structure of a rack

Expected outcome

The racks are powered up and you are ready to *install the internal cables* .

10 Interconnection cabling for BSC and TCSM2

This section describes the positions and routing of the cabling located inside the BSC and TC2E racks.

Interconnection cables are used for cabling between cartridges and racks (for a list of the cable types and the quantities used, see the Tables *Example of an interconnection cables list (BSC)* and *Example of an interconnection cables list (TC2E)* below for an example of an interconnection cables list). The cables are prefabricated to the appropriate length and have connectors at both ends. The connectors have a sequence number complying with the *Interconnection cables list*, and either the cable or the casing of one of the connectors carries an identification label.

For one-rack configurations, the cables are installed completely at the factory. For two-rack configurations (BCBE and BCEE), the cables connecting these two racks are partially installed at the factory, with one end mounted on the connectors of the extension rack (BCEE) and the other left unconnected.

The cables should be placed so that there are no sharp edges and so that they are not pulled too tight. Place them evenly in the supporters behind the racks, so that they will not hamper the installation of the back doors and their girders later.

10.1 Internal cabling instructions for the TC2E

Figure *Interconnection cabling example seen from the rear of the rack* and Table *(TC2E) Example of an interconnection cables list* below show the principles of cabling. The cable abbreviations (in bold type) refer to the following figure and table which lists all the cables.

Note that

1. Alarm cables CEA are available (not in use in this application) for linking the wired alarms between TC1C cartridges.

2. Data cables CEF are used for linking the data signals (data, clock alarm) between TRCO plug-in unit and ET plug-in units.

3. Power supply cables 1 (in Figure *Interconnection cabling example seen from the rear of the TC2E rack)* from PSA20 to PSFP.

4. Power supply cables CVK from PSFP to ET1TC cartridge. PSFP0 outputs 0 to 3, connected to ET1TC-0 to ET1TC-3, upper part PSFP1 outputs 0 to 3, connected to ET1TC-0 to ET1TC-3, lower part

5. Power supply cables CVK (in Figure *Interconnection cabling example seen from the rear of the TC2E rack)*) from PSFP to TC1C cartridge.

    PSFP0 outputs 4 to 7 connected to TC1C-0, 2, 4, 6

    PSFP1 outputs 4 to 7 connected to TC1C-1, 3, 5, 7

6. Rack power supply alarm cable CFB from PSFP to ET1TC cartridge.

7. Rack power supply alarm cables CYN and CFB from PSAs to PSFP0, and PSFP1 to PSFP0.

Note

The cable marked with 2 in Figure *Interconnection cabling example seen from the rear of the TC2E rack)* is an external alarm cable, and it is described in section *Cabling to environment* .
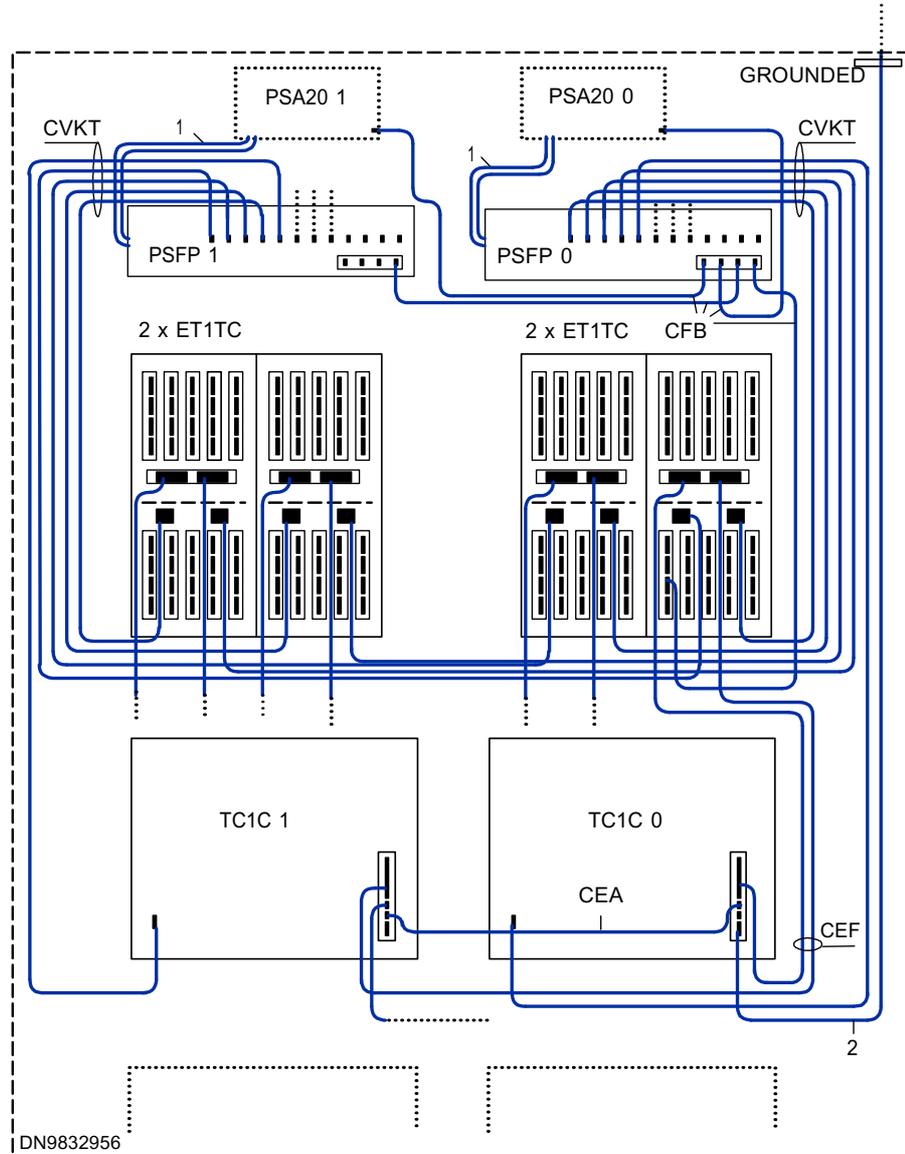
Figure 22.   Interconnection cabling example seen from the rear of the TC2E rack

10.2   Examples of internal cabling

Interconnection Cables lists all internal cables of the BSC and the TC2E (see Tables *Example of an interconnection cables list (BSC)* and *Example of an interconnection cables list (TC2E)* below for an example of an interconnection cables list.). Each cable has an individual number. This number and the location of both ends of the cable are given in the tables. Both the name of the functional entity to which the end of the cable connects to and its co-ordinate are given in the tables. The tables have nine columns which contain the following information:

- The first column (No.) shows the identification number of the cable. Both ends of the cable are marked with a label with this number on it.

- The second column (RACK) shows the name of the rack where the first end of the cable is connected.

- The third column (FE) shows the name of the Functional Entity where the first end of the cable is connected.

- The fourth column shows the co-ordinate of the connector where the first end of the cable is connected. The structure of the co-ordinate is explained below.

- The fifth, sixth and seventh columns show the same information about the other end of the cable as the second, third and fourth columns.

- The eighth column shows the type number of the cable. The type of the cable and connectors are coded in the first three letters and the length of the cable is shown in the following three numbers. The length is given in centimetres if there is a letter C after the three numbers and in decimetres if there is no letter after the three numbers.

- The ninth column shows the use of the cable.

Structure of the co-ordinate

The co-ordinate is a group of eight, nine or ten digits, which are divided into three subgroups.

The first subgroup is a vertical co-ordinate of three numbers. It shows the height of the functional entity in the rack. Eight different heights are used in the BSC. Six of these are used for shelves where cartridges are located and two for power distribution units at the top of the rack. Vertical co-ordinates and their meanings are explained in the table below.

Table 21.   Co-ordinates and their meanings

Co-ordinate	Meaning
002	= the lowest shelf
030	= the second lowest shelf
058	= the third lowest shelf
088	= the fourth lowest shelf
120	= the fifth lowest shelf
148	= PSFP at the top of the rack
152	= PSA20 at the top of the rack

The second subgroup is a horizontal co-ordinate of two numbers and one letter. The two numbers indicate the horizontal position of the functional entity on the shelf and the letter shows whether the connector where the cable will be connected is located in the back (B) or in the front (F) of the subrack. The horizontal co-ordinates used in the BSC are:

- 01, 03 = the rightmost cartridge, PSFP or PSA20 on the shelf 13, 19 = the middle cartridge on the shelf

- 25, 27, 33, 37 = the leftmost cartridge, PSFP or PSA20 on the shelf

The third subgroup states the exact position of the connector, inside the functional entity. The position is always marked on the functional entity by a label. The number of digits in this subgroup depends on the type of the functional unit and the use of the cable:

- Two digits, the letter P and one number, are used for power distribution connectors of PSFP.

- Three digits, the letters PL and one number are used for power distribution connectors in different cartridges for cables coming from PSFP.

- Three or four digits, the letters LL and one or two numbers are used for connectors for the power distribution cables between two cartridges.

- Three digits, the numbers 01 and one number separated by a dash, are used for alarm connectors in PSFP and PSA20.

- Four digits, two numbers and the letter R or S followed by one number, are used for all other connectors. The letter shows the vertical co-ordinate inside a cartridge and the first two numbers show the horizontal co-ordinate inside a cartridge. The last number states in which of the eight possible positions inside a Euroconnector the cable is located.

Table 22.   Example of an interconnection cables list (BSC)

No.	Rack	FE	Conn.	Rack	FE	Conn.	Type	Use
1.1	BCBE	PSFP 0	148.03B P0	BCBE	SW1C 0	120.01B _PL1	CVK-T008	POW-ER
1.2	BCBE	PSFP 0	148.03B P1	BCBE	CLOC	120.37B _PL1	CVK-T011	POW-ER
1.3	BCBE	PSFP 0	148.03B P2	BCBE	MCMU 0	088.01B _PL1	CVK-T013	POW-ER
1.4	BCBE	PSFP 0	148.03B P3	BCBE	WDDC 1	058.01B _PL3	CVK-T015	POW-ER

Table 23.   Example of an interconnection cables list (TC2E)

No	Rack	FE	Conn.	Rack	FE	Conn.	Name	Use
1.1	TC2E	PSFP 0	148.07B P0	TC2E	ET1TC 0	120.01B _PL1	CVK-T008	POW-ER
1.2	TC2E	PSFP 0	148.07B P1	TC2E	ET1TC 1	120.13B _PL1	CVK-T009	POW-ER
1.3	TC2E	PSFP 0	148.07B P2	TC2E	ET1TC 2	120.49B _PL1	CVK-T013	POW-ER
1.4	TC2E	PSFP 0	148.07B P3	TC2E	ET1TC 3	120.61B _PL1	CVK-T014	POW-ER

Figure *Identification of interconnection cables* shows the identification of interconnection cables.
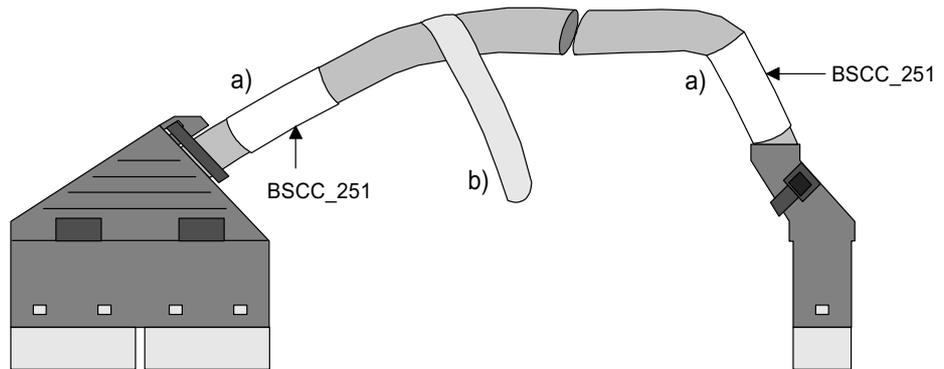
a) SEQUENTIAL NUMBER OF CABLE, E.G | BSCC_251 |

Sequential number

b) CABLE IDENTIFICATION LABEL

Example   CFB024   ITEM NAME: C22284 .... A 01   LOT ID: 3G9901

Alias name
Fixed length (dm)*
Item identifier
Separators
Interchangeability
Version
Factory symbol
Year / Week

*) In some cases, there is the letter 'C'after the number indicating the length of the cable.
   It denotes that the length is given in centimeters (cm), instead of decimeters (dm).

DN03485397

Figure 23.   Identification of interconnection cables

Figure *Equipping of the Euroconnector with 1/8, 1/4 and 1/2 connectors* shows the equipping of the Euroconnector.

1/8   1/4   1/2

LATCH

NUMBER OF PINS: 1/8 (3x3),   1/4 (3x7), 1/2 (3x14)

EUROCONNECTOR

DN98617911
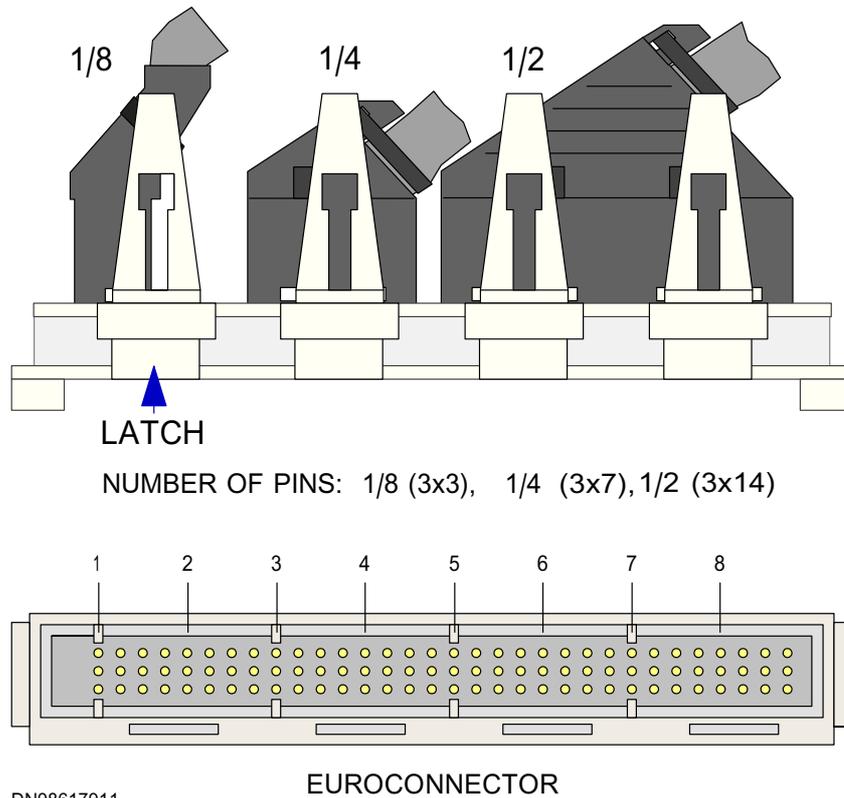
Figure 24.   Equipping of the Euroconnector with 1/8, 1/4 and 1/2 connectors

PCU, PCU-S, PCU-T, PCU2-U

In the BSCs, one PCU, PCU-S, PCU-T, or PCU2-U plug-in unit implements optional GPRS packet control functions. The PCU, PCU-S, PCU-T, or PCU2-U plug-in unit is housed in the BCSU (MC1C) cartridge.

Figures *PCM cabling of the PCU in the BSCi* and *PCM cabling in the BSC2i* show the PCM cabling of the PCU, PCU-S, PCU-T and PCU2-U plug-in unit in the BSCi and BSC2i (GPRS/EDGE option).

BSCi
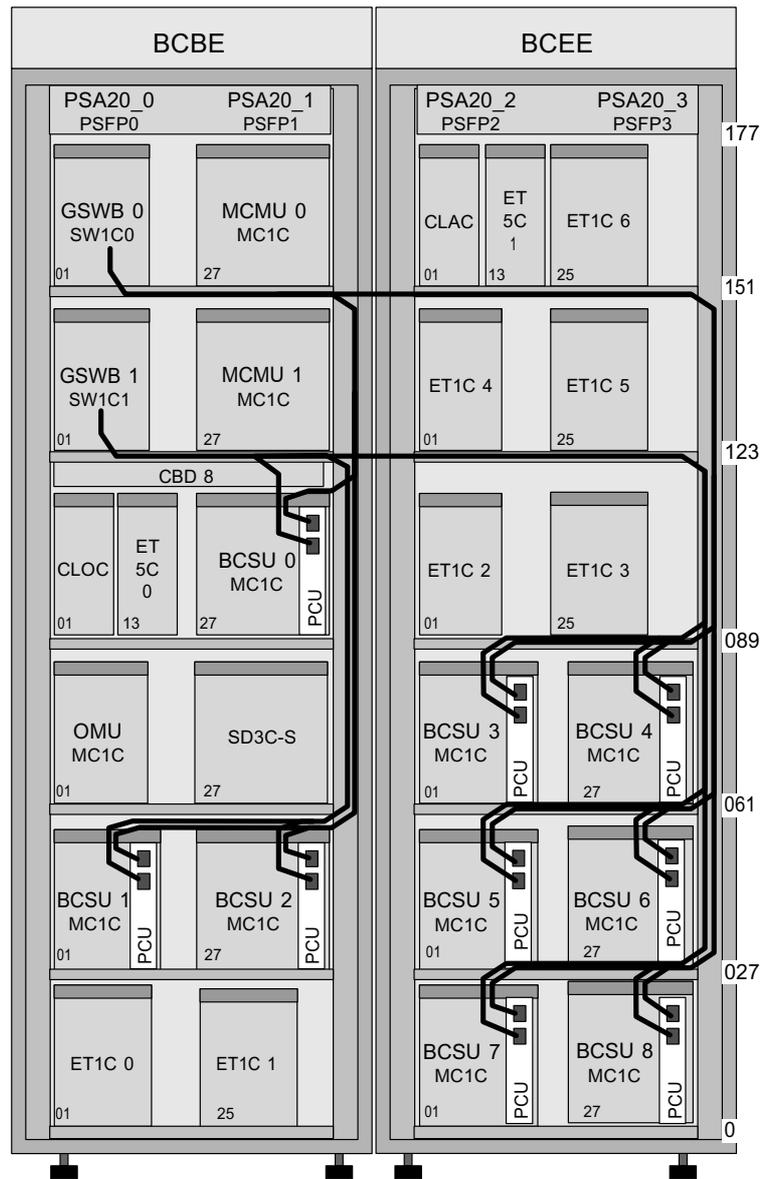
DN99573381

Figure 25.   PCM cabling of the PCU in the BSCi
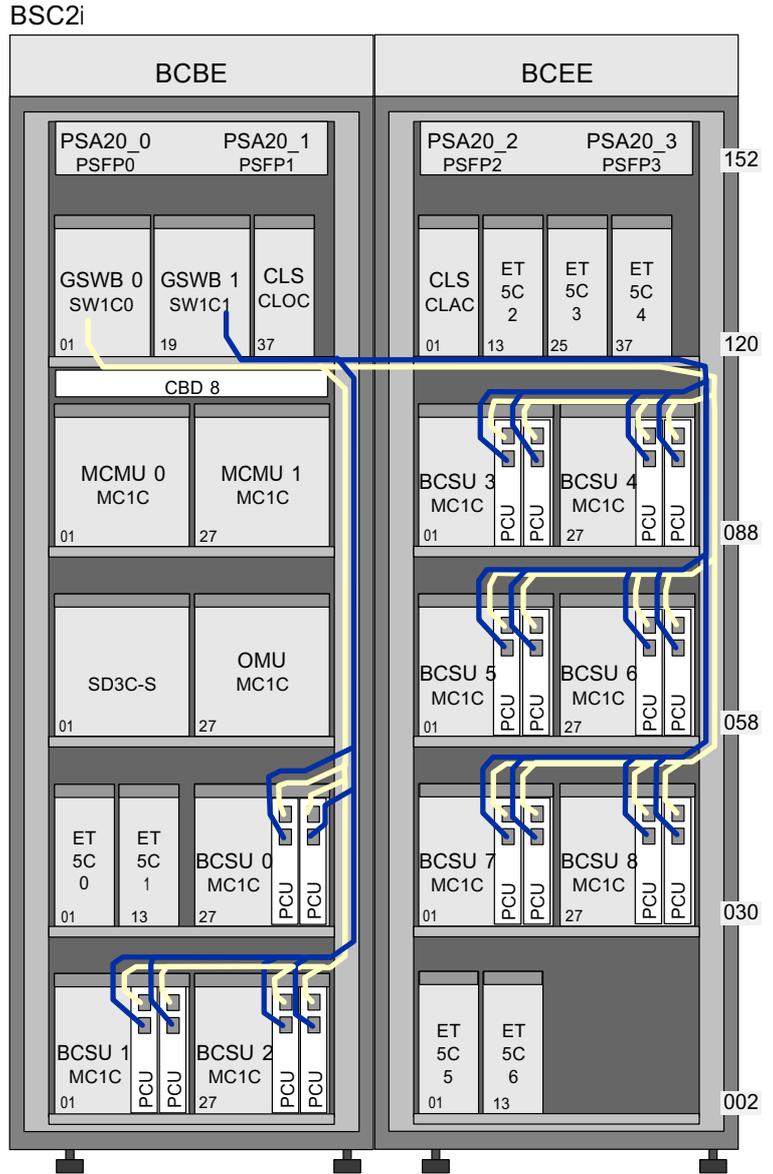
BSC2i

DN02237567

Figure 26.   PCM cabling in the BSC2i

In the BSC2A/Es and BSC2is, two PCU, PCU-S or PCU-T, or PCU2-U plug-in units implement optional GPRS/EDGE function. The PCU, PCU-S, PCU-T, and PCU2-U plug-in units are housed in the BCSU (MC1C) cartridge, see the table below.

Network element	GPRS	Second PCU for GPRS/EDGE
BSC2A/E	Slot 09	Slot 07
BSC2i	Slot 09	Slot 08

10.3   Internal power cabling

The power distribution diagrams of BSC and TCSM2 are presented in *Engineering for BSC* and *Engineering for TCSM2* .

Each rack contains two Power Supply Fuse Panels (PSFP). The PSFPs distribute the power from the PSA 20 unit via 10 A fuses (F0 to F11) to the cartridges in the rack (see Tables *Power supply to BSC2 and BSC2i cartridges* and *Power supply to the TC2E cartridges* . The cartridges are cabled to connectors (P0 to P11). (See Figure *Front view of the PSFP* .)
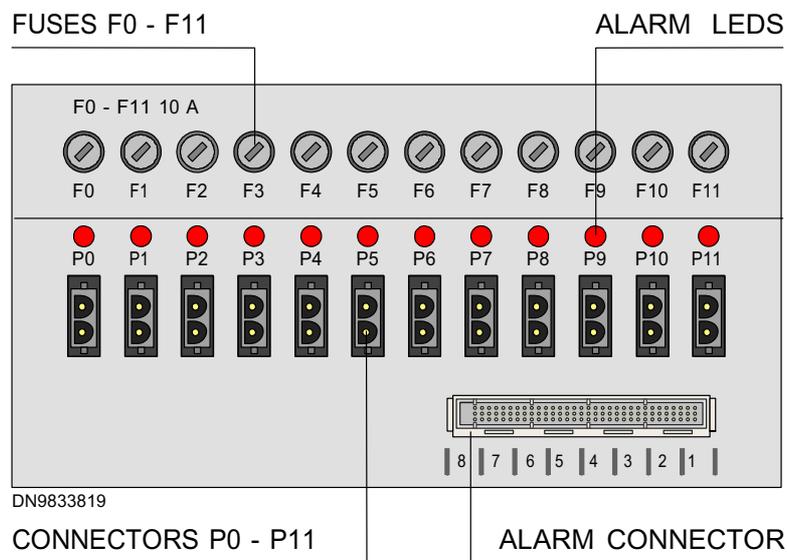
Figure 27.   Front view of the PSFP

Table 24.   Power supply to BSC2 and BSC2i cartridges

Rack	PSFP no.	Fuse no./ connector	Unit (Cartridge)
BCBE	PSFP 0	F0/ P0	SW1C 0
		F1/ P1	CLOC
		F2/ P2	MCMU 0
		F3/ P3	WDDC 1 /SD3C-S
		F4/ P4	WDDC 0
		F5/ P5	OMU
		F6/ P6	ET5C 0
		F7/ P7	ET5C 1
		F8/ P8	BCSU 1
BCBE	PSFP 1	F0/ P0	SW1C 1
		F1/ P1	CLOC
		F2/ P2	MCMU 1
		F3/ P3	WDDC 1 /SD3C-S
		F4/ P4	WDDC 0
		F5/ P5	BCSU 0
		F6/ P6	ET5C 0
		F7/ P7	ET5C 1
		F8/ P8	BCSU 2
BCEE	PSFP 2	F0/ P0	CLAC
		F1/ P1	ET5C 2
		F2/ P2	ET5C 3
		F3/ P3	BCSU 3
		F4/ P4	BCSU 5

Table 24.   Power supply to BSC2 and BSC2i cartridges (cont.)

Rack	PSFP no.	Fuse no./ connector	Unit (Cartridge)
		F5/ P5	BCSU 7
		F6/ P6	ET5C 4
		F7/ P7	ET5C 5
		F8/ P8	ET5C 6
BCEE	PSFP 3	F0/ P0	CLAC
		F1/ P1	ET5C 2
		F2/ P2	ET5C 3
		F3/ P3	BCSU 4
		F4/ P4	BCSU 6
		F5/ P5	BCSU 8
		F6/ P6	ET5C 4
		F7/ P7	ET5C 5
		F8/ P8	ET5C 6
		F9/P9	ET5C 7
		F10/P10	ET5C 8

Table 25.   Power supply to the TC2E cartridges

Rack	PSFP no.	Connector/ Fuse no.	Cartridge
TC2E	PSFP 0	P0/F0	ET1TC 0 upper part
		P1/F1	ET1TC 1 upper part
		P2/F2	ET1TC 2 upper part
		P3/F3	ET1TC 3 upper part
		P4/F4	TC1C0
		P5/F5	TC1C2

Table 25. Power supply to the TC2E cartridges (cont.)

Rack	PSFP no.	Connector/ Fuse no.	Cartridge
		P6/F6	TC1C4
		P7/F7	TC1C6
	PSFP 1	P0/F0	ET1TC 0 lower part
		P1/F1	ET1TC 1 lower part
		P2/F2	ET1TC 2 lower part
		P3/F3	ET1TC 3 lower part
		P4/F4	TC1C1
		P5/F5	TC1C3
		P6/F6	TC1C5
		P7/F7	TC1C7

⚠ Caution

Do not use the unused fused outputs for supplying external devices; this might ruin the EMC protection of the BSC.

10.4 Power supply alarms

Power supply units can generate four alarms in the racks: the PSA20s and the PSFPs can each generate two alarms. These alarms are collected into one cable connector in the PSFP0 of each rack (BCBE and BCEE). After this, they are transferred as alarm input via a single cable to some external equipment through a single cable (to the CLOC cartridge of the BCBE rack and the CLAC of cartridge of the BCEE rack). The alarm condition appears as a defined voltage level on the wire. (See Table *Alarm signals available at the PSFP 0 alarm connector* .)

The alarm signals available at the PSFP0 alarm connector are shown in Table *Alarm signals available at the PSFP 0 alarm connector*, and their cabling from connector to connector is described in *Interconnection Cables* in the *BSC Site Documents* and in Figure *Interconnection cabling example seen from the rear of the TC2E rack*.

Table 26.   Alarm signals available at the PSFP 0 alarm connector

Pin	C	B	A	Notes
1				
2				—>
3				Alarms from PSFP 0
4				to ET1TC 0
5				(or alarms from
6				PSFP 1 to PSFP0)
7	AL1 (PSFP 1)	AL0 (PSFP 0)	ALTST	
8	AL3 (PSA 1)	AL2 (PSA 0)	D0V	
9				
10	D0V			
11	ALTST	AL1 (PSFP 1)		<—
12				Alarms from PSFP 1:
13				
14				
15		AL1 (PSFP 1)	ALTST	
16			D0V	
17				
18	D0V			
19	AL2 (PSA 0)		ALTST	<—
20				Alarms from PSA 0

Table 26. Alarm signals available at the PSFP 0 alarm connector (cont.)

Pin	C	B	A	Notes
21				
22				
23	ALTST		AL2 (PSA 0)	
24			D0V	
25				
26	D0V			
27	AL3 (PSA 1)		ALTST	<—
28				Alarms from PSA 1
29				
30				
31	ALTST		AL3 (PSA 1)	
32			D0V	

For more information, see sections *BSC and TC2E cartridges and plug-in units* and *Equipping the cartridges with plug-in units* .

11 Equipping the cartridges with plug-in units in BSC and TCSM2

This section describes the equipping of the BSC rack with cartridges and equipping both the BSC and the T2CE racks with plug-in units. Before installing the plug-in units, check that they have the right PROM versions and interchangeability codes, and that the hardware settings, wirings and jumperings are correct.

11.1 Preliminary checks before the installation

Prior to plug-in unit installation, check the following details in the plug-in units and cartridges, to ensure that their settings match the system level required, and that they are correct for the application they will be installed in:

- PROM versions of the plug-in units

- Interchangeability codes of the plug-in units

- Jumper connectors on the plug-in units

- Jumper and wiring connectors on the cartridges (only in connection with system expansions).

The instructions for performing these steps are given in the steps that follow.

Steps

1. **Check the PROM versions of the plug-in units**

    Check that the plug-in units of the types listed below have the correct PROM names and versions. The locations of the PROMs in the units are shown in the appropriate document in the *Release Binder* .

Table 27.   PROM versions to be checked

Plug-in unit	Items to be checked
CP4C32	Name and version
CP4HX	Name and version
CP4HL	Name and version
CP6LX/CP6MX	Name and version
AFS-T	Name and version
AC25-S	Name and version
ET2E/-S/-SC/-T/-TC and ET2A/	Name and version
SERO-T	Name and version
SWCOP-S	Name and version
CLxTG	Name and version
CLAB	Name and version
TRCO	Name and version

2.   Check the interchangeability codes of the plug-in units

All the cartridges and plug-in units should be checked for the correct
interchangeability before installation. The interchangeability codes are
listed in the *Hardware Revisions Lists* delivered in NOLS. For placing the
identification stickers in the plug-in units (containing, among other
information, the interchangeability code), see Figures *Positions of the
plug-in unit identification labels in older items* and *Positions of the plug-in
identification labels in new items* .

PLUG-IN UNIT

Ⓑ

Ⓐ

STICKER B   STICKER A

| DPCM | C1234 | GHJKL | 02 | 3G | 9745 | 12345 |

| C1234 | ||||||||||||||||||||||||||||||||||| |

NAME OF PLUG-IN UNIT
IDENTIFICATION CODE
INTERCHANGEABILITY
VERSION

IDENTIFICATION ✶
INFORMATION IN
BAR CODE

IDENTIFICATION
CODE

Item
Identifier

FACTORY SYMBOL
✶ Serial   YEAR AND WEEK OF MANUFACTURE
Number   CONSECUTIVE NUMBER

DN03493232
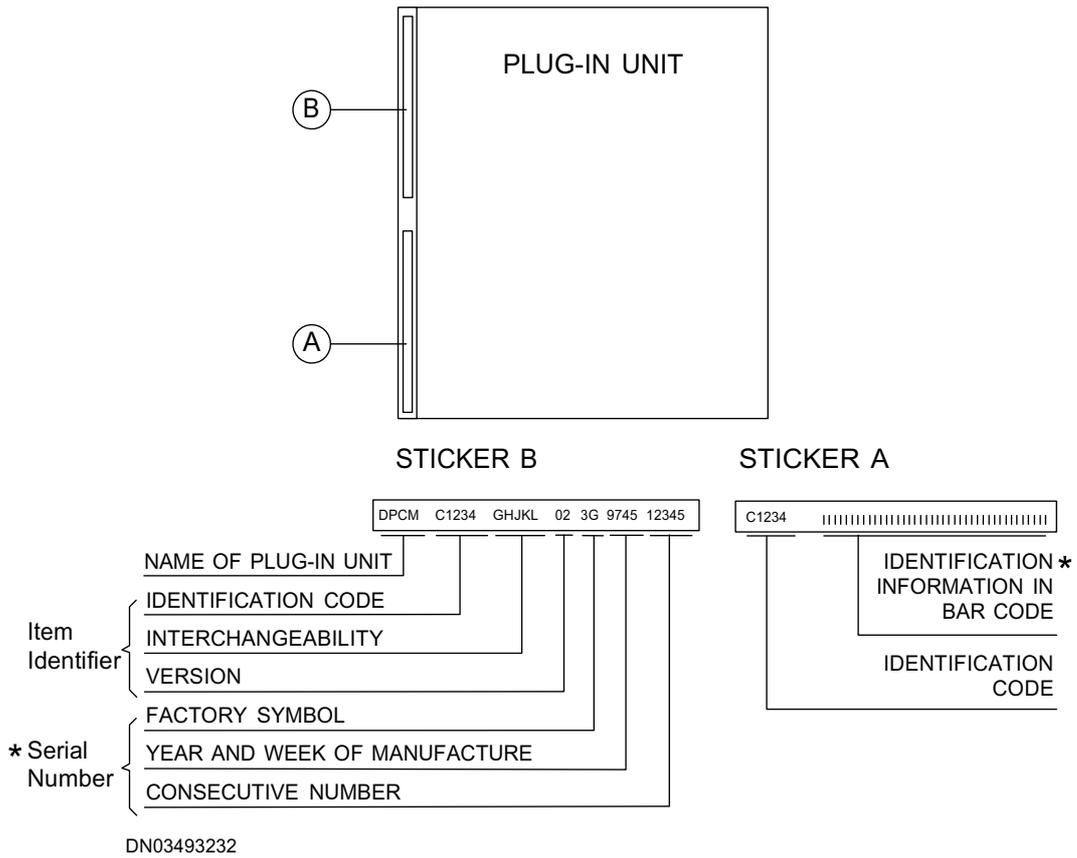
Figure 28.   Positions of the plug-in unit identification labels in older items

PCI UNIT

NON-PCI UNIT

COMPONENT SIDE

COMPONENT SIDE

INTERCHANGEABILITY CODE

IDENTIFICATION CODE

VERSION
NUMBER

BAR CODE FOR ELECTRONIC
REGISTRATION

B   MBIF-A   1C889146 ... A01

A   MBIF-A   SERIAL NO: 1F 984401267

UNIT NAME

1F   9844   01267

SERIAL NUMBER (FIVE DIGITS)

YEAR AND WEEK OF MANUFACTURE

PLACE OF MANUFACTURING

DN98618513
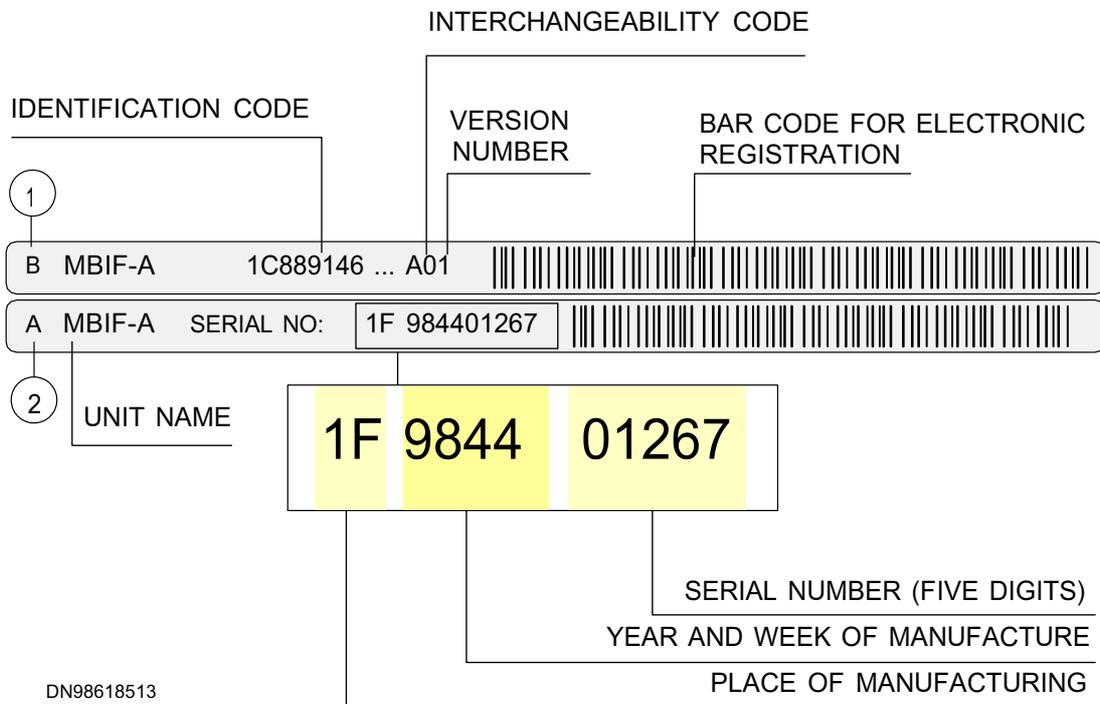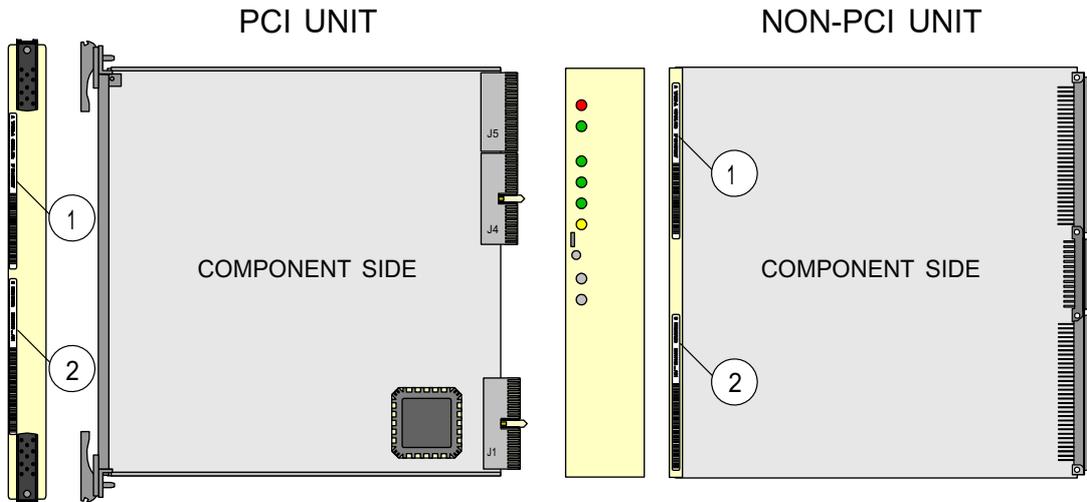
Figure 29.   Positions of the plug-in unit identification labels in new items

3.   Check the hardware settings, jumpers and wirings

Any additional connector and jumper settings (strappings) needed in connection with the installation or commissioning work of the BSC system are briefly described here.

The additional wirings needed in the cartridges and plug-in units are completed at the factory before the final inspection of the equipment. At the operating location any wiring or jumper additions or modifications are only needed in connection with installation or commissioning of system extensions.

Steps

a.   **Check the jumper connectors on plug-in units**

The jumper settings of the plug-in units are delivery-specific, and the necessary jumper settings (strappings) are described in *BSC and TCSM2, Jumper Setting Instructions of the Plug-in Units* and delivered in the site documents, and in the *Plug-in Unit Description* of the unit concerned. Plug-in units that require checking are listed in Table *Jumper settings (principal) for plug-in units (first deliveries)* .

Table 28.   Jumper settings (principal) for plug-in units

Unit	Used in		Main settings to check
	BSC2	**BSCi/BSC2i**	
AC25-S	X	X	HDLC, interfaces, ic code
AS7(-U, -US)	X	X	Base address, ic code
AS7-V		X	
AS7-VA	X	X	
AS7-X	-	X	
CLxTG	X	X	VXCO, memory size, ic code
CP4HL / CP4HX	X	-	Memory size
CP6LX	-	X	MBIF, ic code
CP6MX	—	X	
CLAB	X	X	Timing supervision, ic code

Table 28.   Jumper settings (principal) for plug-in units (cont.)

Unit	Used in		Main settings to check
	BSC2	**BSCi/BSC2i**	
COCEN	X	-	Base address, ic code
ET2A	X	X	Ic code
ET2E, ET2E-C			
ET2E(-S, -SC)	X	X	CRC, T0 use, grounding, ic code
ET2E-T, ET2E-TC, ET2A-T	X	X	Ic code, echo cancellation mode, watchdog
HWAT	X	X	Ic code
MBIF(-T, -UA)	X	X	Only standard settings
PCU, PCU-S, PCU-T	X	X	Base address, ic code, PCM line configuration
PCU2-U			Base address, ic code, emulator, watchdog, debugging, 4M or 8M PCM mode
SCSIF	X	-	Ic code
SERO-T	-	X	Base address, interfaces, ic code
SW64B	X	X	Only standard settings
SWCOP-S	X	X	Ic code
FDD-S	X	X	Power, address, parity
WDW4/9-S	X	X	Power, spin-up, address
DAT12	X	X	Power, address
DDAD, CTAD, WDAD, WDAD-S	X	X	Position control, power supply
WDW73, WDW36, WDW18, WDW18-S	X	X	Power, spin-up, SCSI address

dn9815167
Issue 10-1 en

ic code = interchangeability code

Note that in S11.5, there are no first deliveries for the M92 mechanics BSCs.

Note that with S10, there are no first deliveries for the BSC2.

b.   Check the jumper connectors on cartridges

The jumper settings of various cartridges are delivery-specific, and the necessary jumper settings (strappings) are described in *Overview of BSC, Jumper Settings for the Cartridges* and the *BSC Site Documents* . (See Table *Jumper settings for cartridges (first deliveries)* .)

There are no jumpers (strappings) of the cartridges to be set during the installation of the TC2E rack.

Table 29.   Jumper settings for cartridges (first deliveries)

Cartridge	Main settings to check
CLAC	HDLC, interfaces, ic code
CLOC	Base address, ic code
ET5C	VXCO, memory size, ic code

c.   Check the wiring connectors on cartridges

The setting (additional wiring) connectors needed in the plug-in units and cartridges are mounted at the factory before the final inspection of the equipment. At the operating location, additional wiring connectors must be checked in connection with the installation or commissioning of the BSC2(i).

These jumper connectors provide various hardware settings. The connectors are jumpered for each application at the factory, and they are plugged into their position according to the *Equipment List* in the BSC Site Documents. The additional jumper connector types and their use are listed in Table *Additional wiring connectors* .

Table 30. Additional wiring connectors

Name	Type	Use
AWM00	1/4 module	CLAC0 cartridge additional wires
AWM01	1/4 module	CLAC1 cartridge additional wires
AWM02	1/4 module	CLAC bus termination
SWADD02	1/4 module	SW1C cartridge additional wires
SWADD01	1/4 module	MCMU active side selection
MBADD00	1/4 module	OMU0 cartridge MB address
MBADD01	1/4 module	OMU1 cartridge MB address
MBADD04	1/4 module	MCMU0 cartridge MB address
MBADD05	1/4 module	MCMU1 cartridge MB address
MBADD30	1/4 module	BCSU0 cartridge MB address
MBADD31	1/4 module	BCSU1 cartridge MB address
MBADD32	1/4 module	BCSU2 cartridge MB address
MBADD33	1/4 module	BCSU3 cartridge MB address
MBADD34	1/4 module	BCSU4 cartridge MB address
MBADD35	1/4 module	BCSU5 cartridge MB address
MBADD36	1/4 module	BCSU6 cartridge MB address
MBADD37	1/4 module	BCSU7 cartridge MB address
MBADD38	1/4 module	BCSU8 cartridge MB address
MBFRE02	1/4 module	OMU, MCMU, BCSU MB baudrate
CSADD00	1/4 module	OMU, BCSU active side selection
CSADD01	1/4 module	MCMU0 active side selection
CSADD02	1/4 module	MCMU1 active side selection
DMCT2-S	1/1 module	DMC bus terminators, BSC2i

Table 30.   Additional wiring connectors (cont.)

Name	Type	Use
PCMCO00	1/1 module	OMU PCM cross connection
PCMCO01	1/1 module	BCSU0-BCSU8 PCM cross connection
PCMCO05	1/1 module	OMU PCM cross connection, BSC2i

11.2   Fitting Mass memory cartridge (WDDC)

A Winchester Disk Drive Cartridge (WDDC) is equipped with power supply units and possible Winchester disk drives (WDU / WDD), floppy disk drives (FDU / FDD), and compact tape units (CTU/CTD) by using appropriate disk drive adapters (WDAD, FDAD, CTAD). (See Figure *Cartridges WDDC (0 and 1) with power supplies, Hard Disk, Floppy Disk and DAT drive assemblies installed* and Table *Naming of the mass memory (storage device) items (first deliveries)* .)

Before equipping the disk drives, check the jumper settings (strappings) in the units. The SCSI-bus connector pin numbering may vary for different manufacturers.

DN9834257
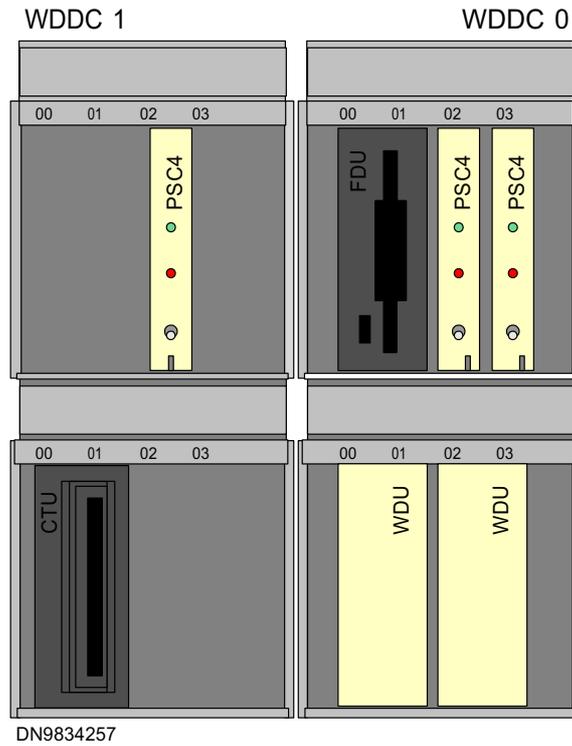
Figure 30.   Cartridges WDDC (0 and 1) with power supplies, Hard Disk, Floppy Disk and DAT drive assemblies installed.

Note that the WDU may be different in the first deliveries.

Table 31.   Naming of the mass memory (storage device) items

Cartridge	Unit name	Drive name	Product name	Adapter
WDDC	WDU	WDD	WDW73, WDW36, WDW18–S, WDW18; WDW9-S, WDAD-S; WDW4 or older	WDAD
WDDC	FDU	FDD	FDD-S	FDAD
WDDC	CTU	CTD	DAT12-S*) DAT12G	CTAD

*) Not included in S9 first deliveries

Note that the product names in older deliveries may be different.

11.2.1 Mounting the WDU on WDAD

Before connecting the Winchester Disk Unit (WDU) to the Winchester Disk Drive (WDDC), connect the WDU first to the Winchester Disk Adapter (WDAD) according to the following instructions:

See Figure *Installing the hard disk drive WDU on WDAD adapter* and Table *Parts for hard disk (WDU) and floppy disk (FDU) and DAT drive (CTU) installations* .
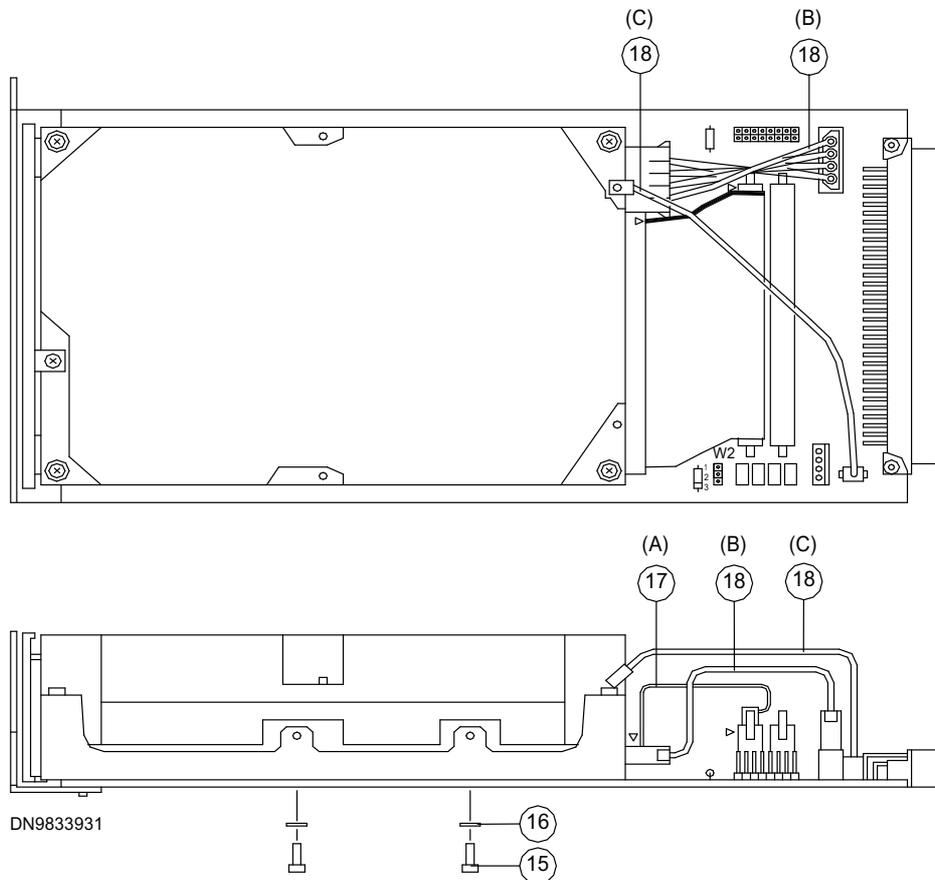
Figure 31. Installing the hard disk drive WDU on WDAD adapter

Table 32.   Parts for hard disk (WDU) and floppy disk
(FDU) and DAT drive (CTU) installations

Part No.	Part name
15	Screw
16	Washer
(A) 17	SCSI - bus cable
(B) 18	Power cable
(C) 18	Ground cable, if used

Steps

1. **Check that the jumper settings in the WDU drive are correct**

    Also check the location of the first pin of the SCSI bus connector (varies
    according to the manufacturer). Check the jumpers according to *BSC and
    TCSM2, Jumper Settings for the Plug-in Units* , where the item can be
    found by its product name.

2. **Fasten the WDU to the WDAD**

    Use four 3 x 6 mm screws (included) or four 6 - 32 x 1/4 inch screws.

3. **Install the SCSI bus cable (A)**

    The D marking on the connectors and the colour stripe on the cable should
    be connected to pin 1 in the bus connector. (The WDAD has two bus
    connectors which are at a 180 degree angle in relation to each other; pin 1
    is also printed on the circuit board).

4. **Install the power supply cable (B)**

5. **If the WDU is equipped with a connector for grounding the frame,
    connect the grounding cable (C)**

6. **Set the jumpers for the card control loop (W1) so that the WDU to be
    installed in cartridge 0 is set at 0**

    If a WDU located in another cartridge is connected to the same SCSI bus,
    the jumpers are set so that the second WDU becomes 1.

7. **Set the jumpers (W2) for the power supply of the terminal resistor unit**

   Set the jumpers at 1-2 when the WDU has a diode connected in series with the power supply. If the unit contains no diode, the jumper setting is 2-3, which connects the diode in the WDAD.

8. **Set the jumper connectors**

   Set the jumper connectors according to the *BSC and TCSM2, Jumper Settings for the Plug-in Units* .

9. **Insert the hard disk drive assembly in the unit slots (F00.S and F02.S in WDDC0)**

   Secure the assembly with the front panel screw.

10. **Install the power supply units (PSC4) in both cartridges WDDC0 and WDDC1**

11.2.2   Mounting the WDU on WDAD-S

Before connecting the Winchester Disk Unit (WDU) to the Winchester Disk Drive (WDDC), connect the WDU first to the Winchester Disk Adapter (WDAD-S) according to the following instructions:

Note

WDAD-S can be used with WDW4 or a later WDW unit.

See Figure *Installing the hard disk drive WDU on WDAD-S adapter* and Table *Parts for hard disk (WDU) when mounted on WDAD-S adapter* .
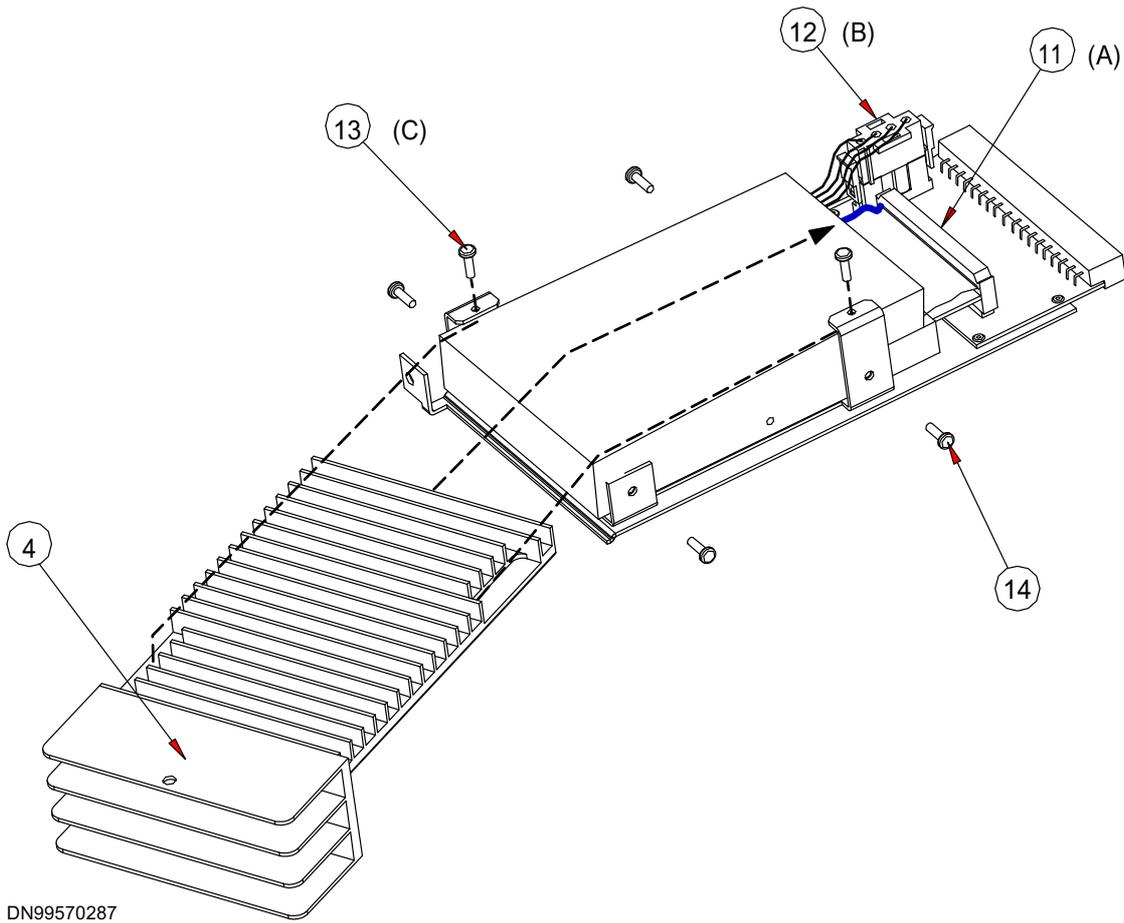
DN99570287

Figure 32.   Installing the hard disk drive WDU on WDAD-S adapter

Table 33.   Parts for hard disk (WDU) when
            mounted on WDAD-S adapter

No.	Part name
4	Cooling profile
13	Screw, M3 x 6
14	Screw, #6 32 UNC
(A) 11	SCSI - bus cable
(B) 12	Power cable

Steps

1. **Check that the jumper settings in the WDU drive are correct**

   Also check the location of the first pin of the SCSI bus connector (the location varies according to the manufacturer). Check the jumpers according to *BSC and TCSM2, Jumper Settings for the Plug-in Units* , where the item can be found by its product name.

2. **Fasten the WDU with four 6 - 32 UNC screws to the WDAD-S**

3. **Install the SCSI bus cable (A)**

   Install the bus cable so that the D marking on the connectors and the colour stripe on the cable are connected to pin 1 in the bus connector.

4. **Install the power supply cable (B)**

5. **Set the jumper connectors**

   Set the jumper connectors according to the *BSC and TCSM2, Jumper Settings for the Plug-in Units* .

6. **Install the cooling profile**

   Install the cooling profile as shown in the figure below and fasten it using two M3x6 screws (C).

7. **Insert the hard disk drive assembly in the unit slots**

   Insert the assembly in the unit slots (F00.S and F02.S in WDDC0) and secure it with the front panel screw.

8. **Install the power supply units**

   Install the units (PSC4) in both cartridges WDDC0 and WDDC1.

11.2.3 Mounting procedure for the FDU on FDAD

Before connecting the floppy disk drive unit (FDU) to the Winchester disk drive cartridge (WDDC), connect the FDU to the floppy disk adapter (FDAD) according to the following instructions:

See Figure *Installing the floppy disk drive FDU* .
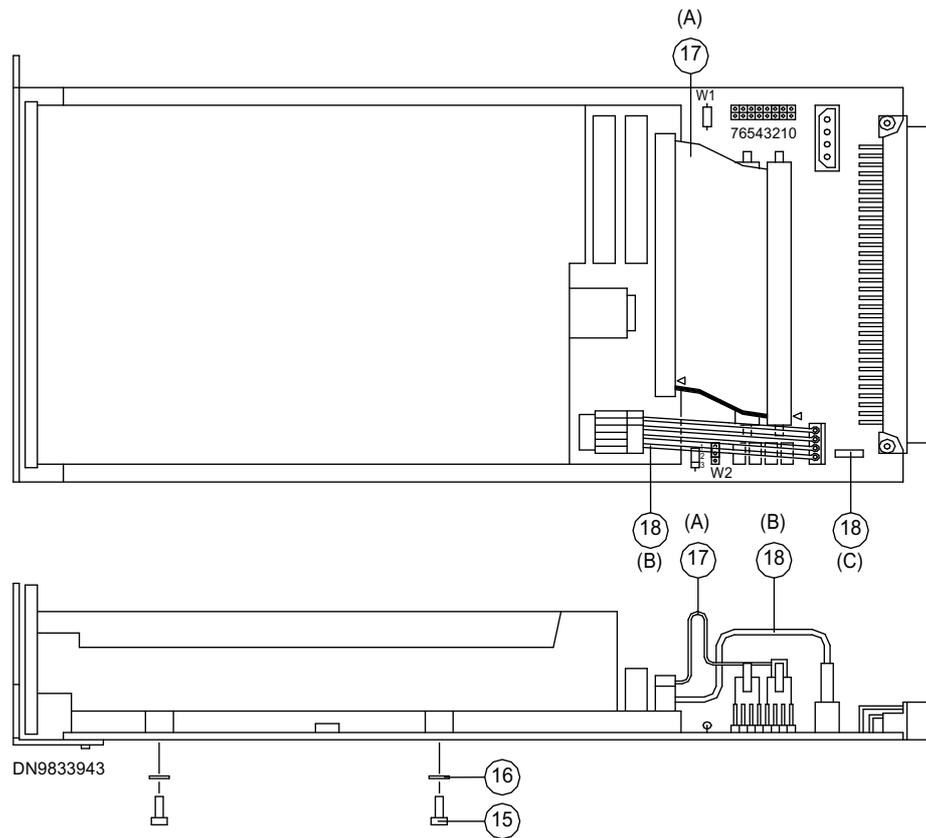
Figure 33.   Installing the floppy disk drive FDU

Table 34.   Parts for hard disk (WDU) and floppy disk
(FDU) and DAT drive (CTU) installations

Part No.	Part name
15	Screw
16	Washer
(A) 17	SCSI - bus cable
(B) 18	Power cable
(C) 18	Ground cable, if used

Steps

1. **Check that the jumper settings in the FDU drive are correct**

   Check also the location of the first pin of the SCSI bus connector (the location varies according to the manufacturer). Check the jumpers according to *BSC and TCSM2, Jumper Settings for the Plug-in Units* , where the item can be found by its product name.

2. **Fasten the unit to the FDAD**

   Use 3 x 6 mm screws (included) or four 6-32 x 1/4 inch screws.

3. **Install the SCSI bus cable**

   Install the SCSI bus cable (A) so that the D marking on the connectors, and the colour stripe on the cable, are connected to pin 1 in the bus connector. (The FDAD has two bus connectors which are at a 180 degree angle in relation to each other; pin 1 is also printed on the circuit board).

4. **Install the power supply cable (B)**

5. **If the FDU is equipped with a connector for grounding the body, connect the grounding cable (C)**

6. **Set the jumpers for the card control loop**

   Set the jumpers for the card control loop (W1) always at 2 in the FDU.

7. **Set the jumpers for the power supply of the terminal resistor unit**

   Set the jumpers at 1-2 (in W2) for the power supply of the terminal resistor unit when the FDU has a diode connected in series with the power supply. If the unit contains no diode, the jumper setting is 2-3, which connects the diode in the FDAD.

8. **Check the jumper connectors**

   Check the jumper connectors according to *BSC and TCSM2, Jumper Settings for the Plug-in Units* .

9. **Insert the FDU drive assembly in the unit slot (F00.R in WDDC0)**

   Secure the assembly using the front panel screw.

11.2.4   Mounting procedure for the CTU on CTAD

Before connecting the compact (cartridge) tape unit CTU to the Winchester Disk Drive (WDDC_1), first connect the CTU to the compact tape adapter CTAD according to the following instructions:
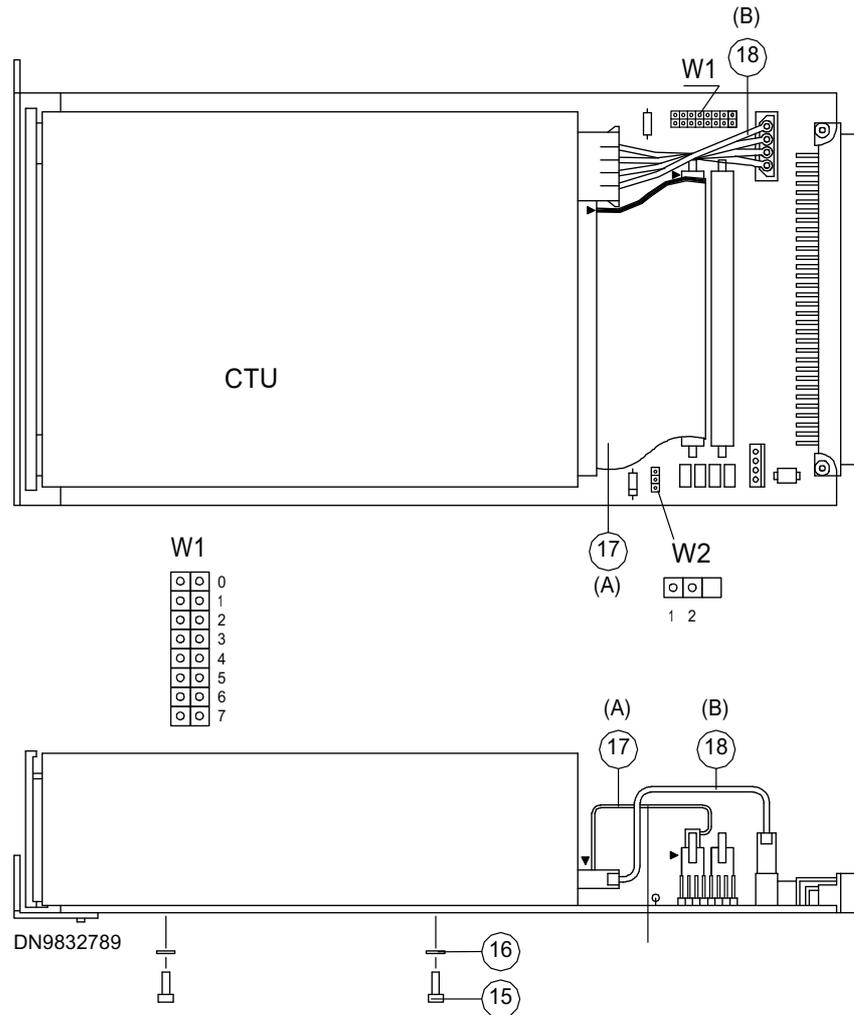
Figure 34.   Installing the cartridge tape drive CTU

Table 35. Parts for hard disk (WDU) and floppy disk (FDU) and DAT drive (CTU) installations

Part No.	Part name
15	Screw
16	Washer
(A) 17	SCSI - bus cable
(B) 18	Power cable
(C) 18	Ground cable, if used

Steps

1. **Check that the jumper setting in the CTU drive is correct**

   Also check the location of the first pin of the SCSI bus connector (the location varies according to the manufacturer). Check the jumpers according to *BSC and TCSM2, Jumper Settings for the Plug-in Units* , where the item can be found by its product name.

2. **Fasten the CTU**

   Use 3 x 6 mm screws (included) or four 6-32 x 1/4 inch screws.

3. **Install the SCSI bus cable**

   Install the SCSI bus cable (A) so that the D marking on the connectors and the colour stripe on the cable are connected to pin 1 in the bus connector. (The CTAD has two bus connectors which are at a 180 degree angle in relation to each other; pin 1 is also printed on the circuit board).

4. **Install the power supply cable (B)**

5. **Set the jumpers for the card control loop**

   Set the jumpers for the card control loop (W1) always at 3 for the CTU.

6. **Set the jumpers for the power supply to the terminal resistor unit**

Set the jumpers at 1-2 (in W2) for the power supply to the terminal resistor unit when the CTU has a diode connected in series with the power supply. If the unit contains no diode, the jumper setting is 2-3, which connects the diode in the CTAD.

7.   Check the jumper connectors

Check the jumper connectors according to *BSC and TCSM2, Jumper Settings for the Plug-in Units* .

8.   Insert the CTU (DAT) drive assembly in the unit slot

Insert the assembly in the unit slot (F00.S in WDDC1) and secure it using the front panel screw.

11.2.5   Mounting Power supply units

When installing the power supply plug-in units, ensure that the power switch is in the position "OFF".

When mounting the power supplies, do the following:

Steps

1.   Install the power supply units (PSC4) in two unit slots F02.S and F03.S in the WDDC0 cartridge

Secure them with the front panel screws.

2.   Install the power supply unit (PSC4) in unit slot F02.S in the WDDC1 cartridge

Secure the power supply unit with the front panel screw.

11.2.6   Cabling the WDDC cartridges

When delivered from the factory, the racks in first BSC2E/A deliveries are equipped with two WDDC cartridges and those internal cables (SCSI, power supply) shown in Figure *Cabling the WDDC cartridges when the OMU is provided with CP4HL in BSC2E and BSC2A applications* .

 Equipping List and *Interconnection Cables* in the *BSC Site Documents* show the positions of the cartridges and the cables installed.
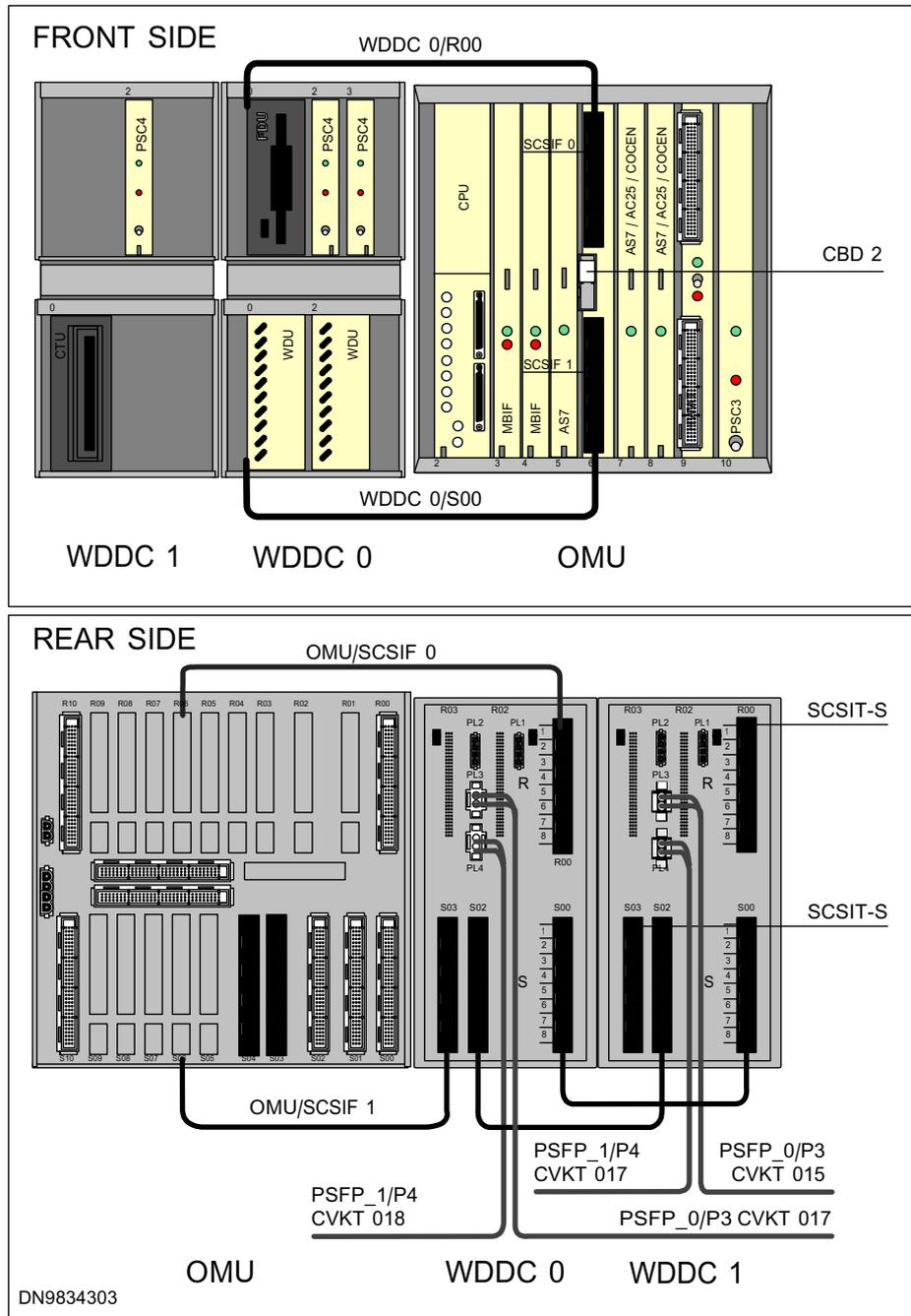
Figure 35.   Cabling the WDDC cartridges when the OMU is provided with
              CP4HL in BSC2E and BSC2A applications

Steps

1. **Install as shown in Figure *Cabling the WDDC cartridges when the OMU is provided with CP4HL in BSC2E and BSC2A applications***

11.2.7 Cabling the WDDC cartridges in upgrades

When BSC2A or BSC2E applications are upgraded to BSC2i applications, the OMU can be equipped with the central processor CP6LX but still retain the two WDDC cartridges already provided. The cabling must be changed as shown Figure *Cabling the WDDC cartridges when the OMU is provided with CP6LX in BSCi and BSC2i applications* .

Equipping List and *Interconnection Cables* in the *BSC Site Documents* show the positions of the cartridges and the cables installed.
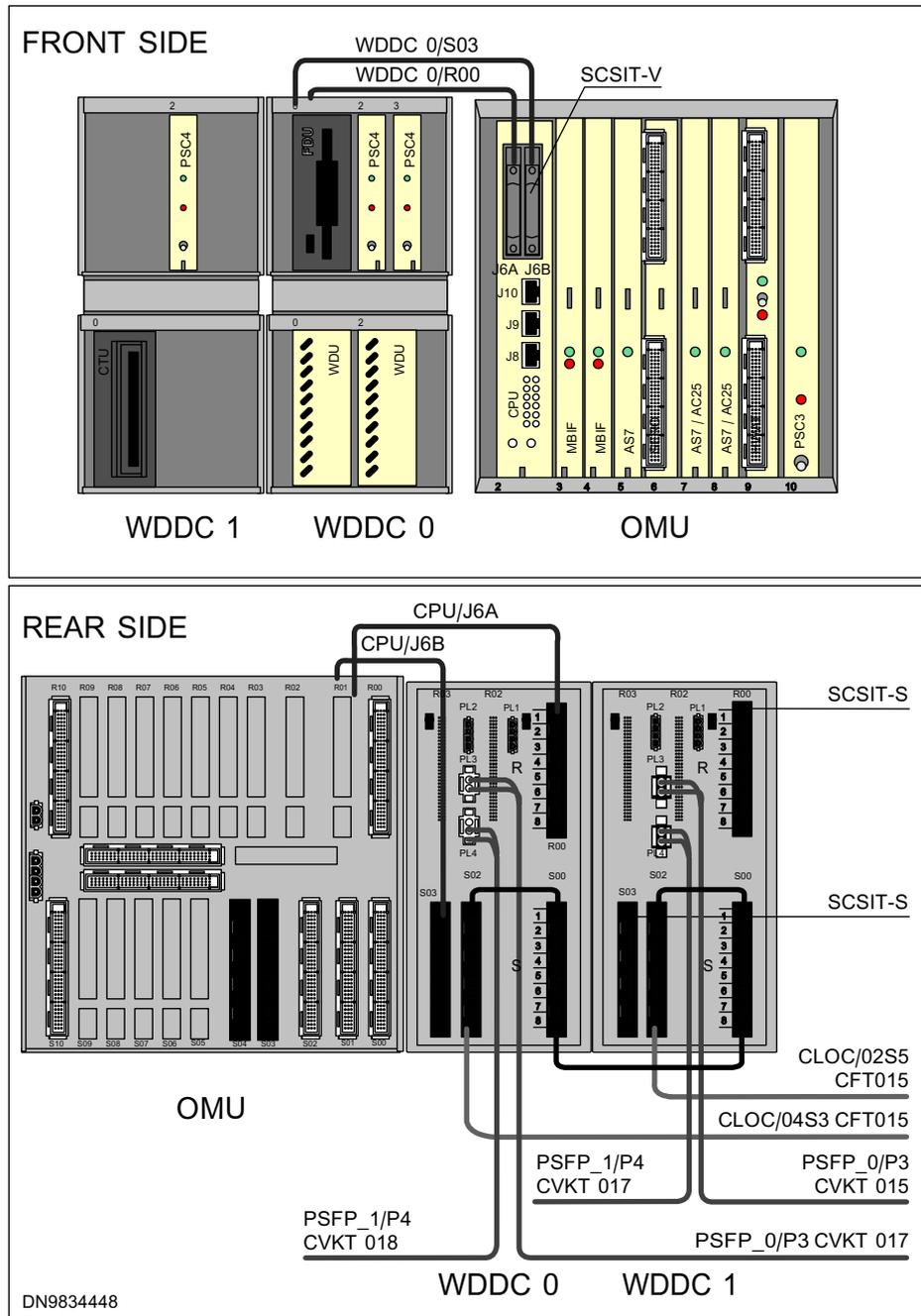
Figure 36.   Cabling the WDDC cartridges when the OMU is provided with
             CP6LX in BSCi and BSC2i applications

Steps

1. **Install as shown in Figure *Cabling the WDDC cartridges when the OMU is provided with CP6LX in BSCi and BSC2i applications***

11.3 Storage Device Cartridge (SD3C-S)

When delivered from the factory the racks in new BSC2i deliveries are equipped with SD3C-S cartridges and internal cables (SCSI, power supply) needed. The BSC(E) applications can be upgraded to BSCi by replacing the current WDDC cartridges with the SD3C-S cartridge and required drives. For more information, see *Installing CTU* .

The *Equipping List* in the *BSC Site Documents* shows the positions of the cartridges with vertical and horizontal co-ordinates.

Before mounting, the SD3C-S cartridge accepts the following plug-in units (drives):

- Hard Disk (WDU / WDD)

- Floppy Disk (FDU / FDD) and DAT (CTU / CTD) drive plug-in units with installation adapters (HDAD-A for Hard Disk

- FDAD-A for Floppy Disk and CTAD-A for DAT drive)

Moreover, two CDAD-A adapters must be mounted in the cartridge as shown in Figure *Cartridge SD3C-S with power supplies and drive assemblies installed* . (See also table *Cartridge SD3C-S with power supplies and drive assemblies installed* .)

Equipping of the optional magneto-optical disk drive is possible in BSC to the SD3C-S mass memory cartridge (only in BSCi and BSC2i). In BSC2is with a WDDC mass memory cartridge (BSC2E or BSC2A upgraded to BSC2i) equipping of magneto-optical device is possible only if the mass memory cartridge is first upgraded to SD3C-A.
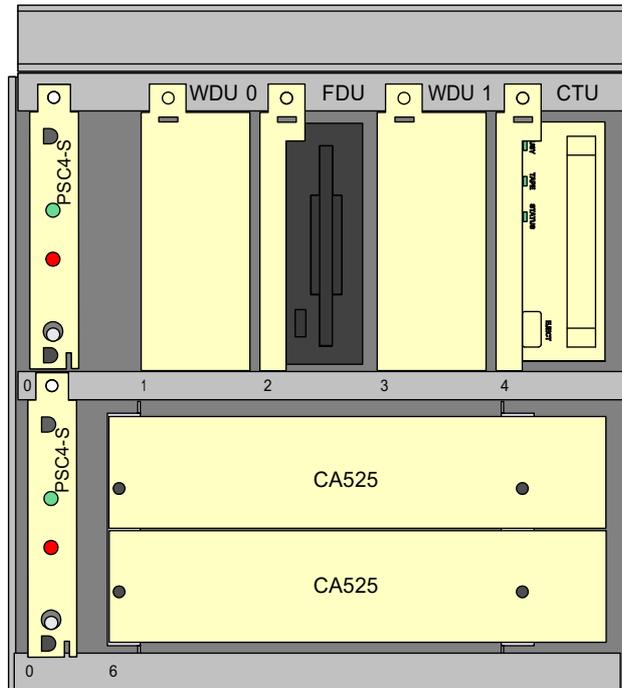
DN9832929

Figure 37.   Cartridge SD3C-S with power supplies and drive assemblies installed

Note

Since S10 first deliveries (BSC2i), CDAD-A has been replaced with CA525.

Table 36.   Naming of the storage device (mass memory) items (first deliveries)

Used in	Unit name	Drive name	Product name	Adapter
SD3C-S	WDU	WDD	WDW73, WDW36, WDW18-S, WDW18, WDW4, WDW9-S	HDAD2-A
SD3C-S	FDU	FDD	FDD-S	FDAD-A

Table 36. Naming of the storage device (mass memory) items (first deliveries) (cont.)

Used in	Unit name	Drive name	Product name	Adapter
SD3C-S	CTU	CTD	DAT12G	CTAD-A
SD3C-S	-	-	-	CA525 / CDAD-A

Note that the product names in older deliveries may be different.

11.3.1 Mounting the CTU

Before connecting the Cartridge Tape Unit (CTU) to the Storage Device Cartridge (SD3C-S), connect the CTU (DAT12G or DAT12-S) first to the Cartridge Tape Adapter (CTAD-A) according to the following instructions:

See Figure *Installing the CTU drive* and Table *Parts for WDU, FDU and CTU drive installations* .

DN98617877
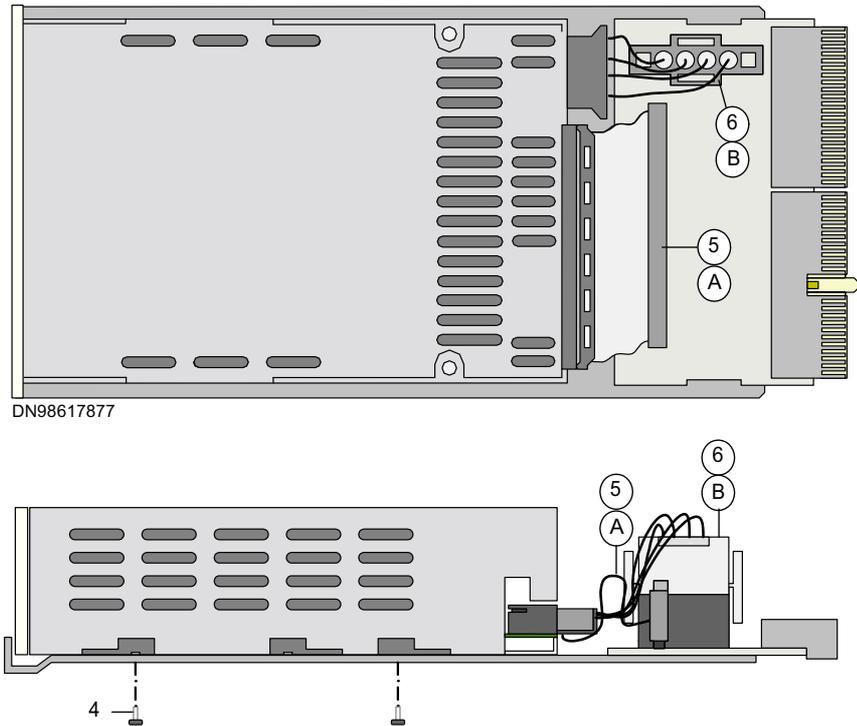
Figure 38.   Installing the CTU drive

Table 37.   Parts for WDU, FDU and CTU
            drive installations

Part No.	Part name
4	Screw
(A) 5	SCSI - bus cable
(B) 6	Power cable

Steps

1.   Check that the jumper settings in the CTU drive are correct

Check the jumpers according to *BSC and TCSM2, Jumper Settings for the Plug-in Units* , where the item can be found by its product name.

2. **Fasten the CTU with four M3 x 6 (4) screws to the (CTAD-A)**

3. **Install the SCSI bus cable**

   Install the SCSI bus cable (A) so that the colour stripe on the cable are connected to pin 1 in the bus connector (P1), pin 1 is also printed on the circuit board).

4. **Install the power supply cable (B)**

5. **Insert the CTU drive assembly in the unit slots 04 (in SD3C-S)**

   Secure with the front panel screw.

11.3.2 Mounting procedure for the FDU on FDAD-A

Before connecting the Floppy Drive Unit (FDU) to the Storage Device Cartridge (SD3C-S), connect the FDU (FDD-S) first to the Floppy Drive Adapter (FDAD-A) according to the following instructions:

See Figure *Installing the FDU drive* .
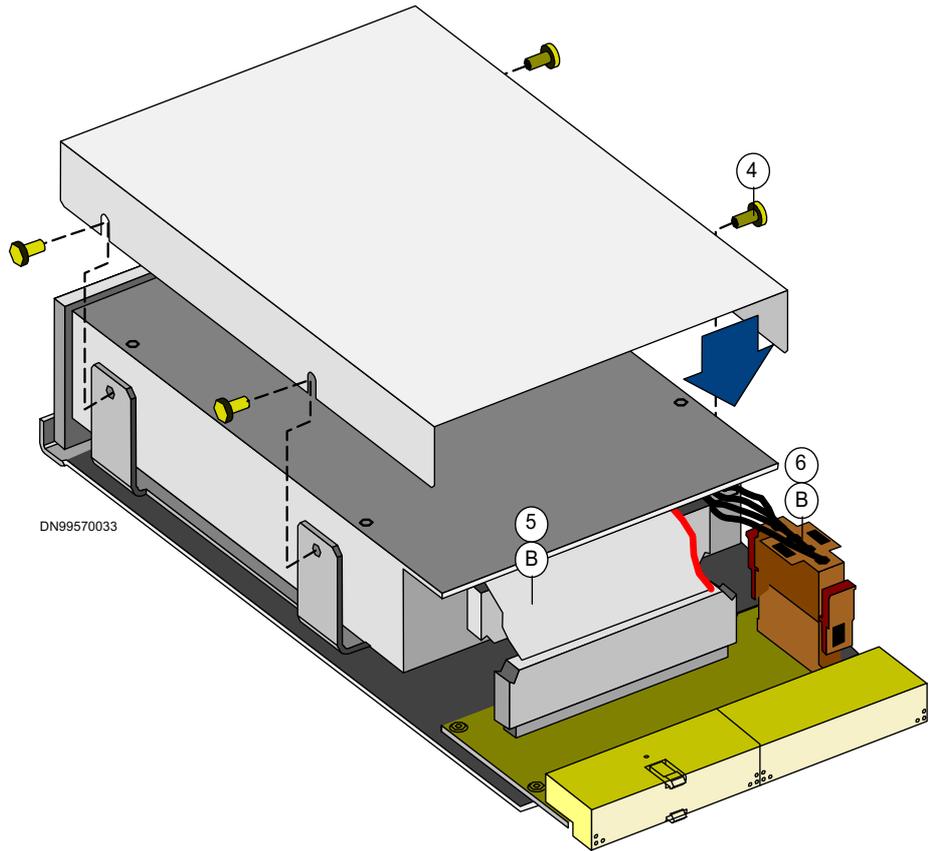
Figure 39.　Installing the FDU drive

Steps

1.　**Check that the jumper settings in the FDU (FDD-S) drive are correct**

　　Check the jumpers according to *BSC and TCSM2, Jumper Settings for the Plug-in Units* , where the item can be found by its product name.

2.　**Fasten the FDU with four M3 x 6 (4) screws to the adapter (FDAD-A)**

Note

The drive may be mounted upside down on the adapter version B02.

Install the cover plate over the drive and fasten using the four screws (4) provided.

3. **Install the SCSI bus cable (A) so that the colour stripe on the cable are connected to pin 1 in the bus connector (P1), pin 1 is also printed on the circuit board**

4. **Install the power supply cable (B)**

5. **Insert the FDU drive assembly in the unit slots 02 (in SD3C-S) and secure it with the front panel screw**

11.3.3 Installing the Magneto Optical Device MO91

The prerequisite for selecting this option is that SD3C-S mass memory cartridge option has been selected and equipped during the network element upgrade: BSC2 to BSC2i and BSCE to BSCi.

When the optional Magneto Optical device MO91 is equipped in the SD3C-S mass memory cartridge, the following additional hardware products are needed:

- the ODAD-A, optical disk adapter for equipping the MO91 to the SD3C-S cartridge

- the SCBC, SCSI bus connector, for leading the SCSI bus 1 to the back connector of the SD3C-S cartridge where SCSI bus terminators are located

- two cover adapters CA350.

Before connecting the Magneto Optical Disk Unit (FDU) to the Storage Device Cartridge (SD3C-S), connect the MO91 first to the Optical Disk Adapter (ODAD-A) according to the following instructions:

DN01101472
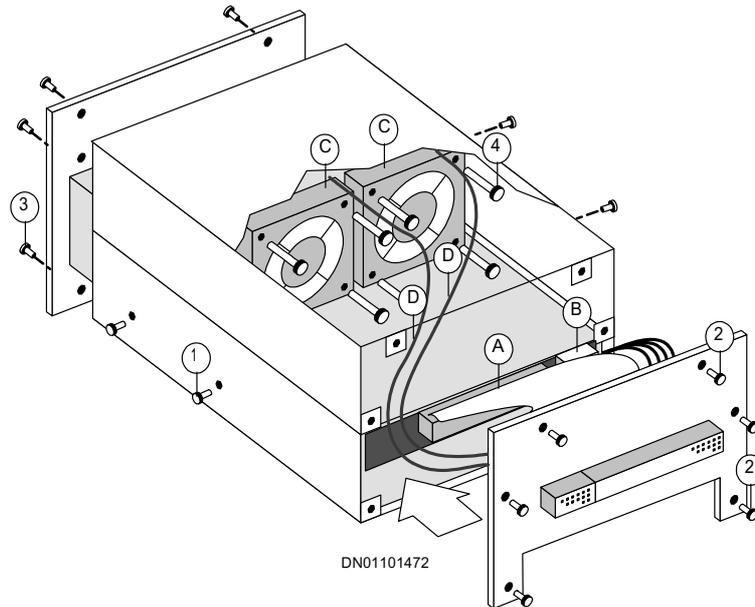
Figure 40.   Installing the FDU drive (Magneto Optical Disk Drive and ODAD-A)

Note

This information is also included in *Installing the i-series Network Elements* .

Steps

1. **Check that the jumper and optional switch settings in the MO91 are correct**

    Check the jumper and optional switch settings according to the document *Jumper Settings of the Plug-in Units* .

2. **Insert the MO91 into the adapter (ODAD-A) and fasten it from the sides with four screws (1)**

3. **Install the SCSI bus cable (A) so that the colour stripe on the cable is connected to pin 1 in the bus connector (P1), pin 1 is also printed on the circuit board**

4. **Install the power supply cable (B)**

5. **Secure the back cover of the adapter with screws (2)**

6. **Insert the FDU drive assembly and secure it**

Insert the FDU drive assembly into the unit slot concerned and secure it with the front panel screws (3). One adapter (ODAD-A) takes up both 5.25" slots.

7. **If the FDU drive assembly is not installed at all, install two CA525 adapters into the slots instead**

8. **Install the SCSI bus connectors (SCBC) in their positions**

9. **Install the blank panels CA350 in their positions when the MO91 is installed**

11.3.4 Mounting the WDU on HDAD2-A

Before connecting the Hard (Winchester) Disk Unit (WDU) to the Storage Device Cartridge (SD3C-S), connect the WDU first to the Hard Disk Adapter (HDAD2-A) according to the following instructions:

See Figure *Installing the WDU drive* .

DN99570057
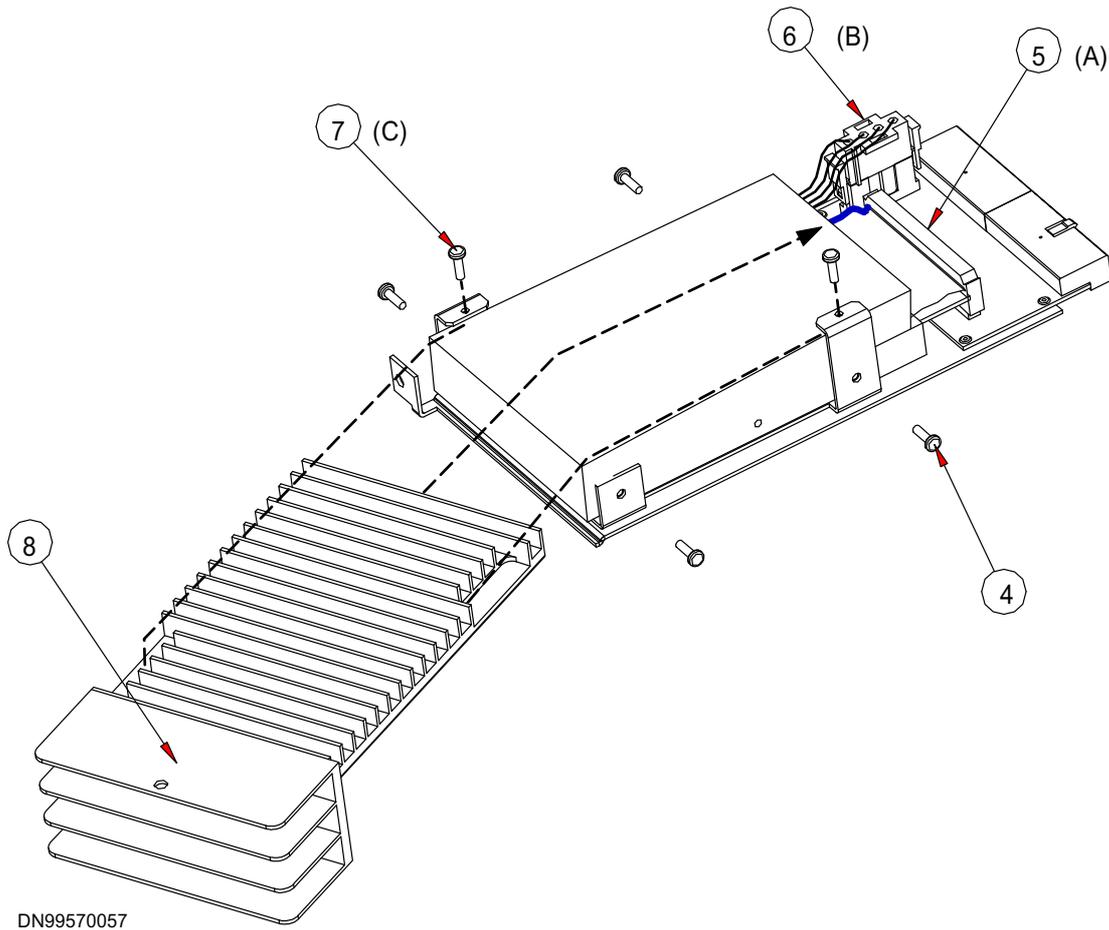
Figure 41.   Installing the WDU drive

Steps

1.   **Check that the jumper settings in the WDU drive are correct**

      Check the jumpers according to *BSC and TCSM2, Jumper Settings for the Plug-in Units* , where the item can be found by its product name.

2.   **Fasten the WDU with four 6 - 32 x 1/4 inch (4) screws to the HDAD2-A**

3.   **Install the SCSI bus cable (A) so that the colour stripe on the cable are connected to pin 1 in the bus connector (J3)**

4.   **Install the power supply cable (B)**

5.   **Install the cooling profile**

Fasten it using two M3x6 (7) screws (C).

6.   **Insert the hard disk drive assemblies in the unit slots 01 and 03 (in SD3C-S)**

Secure the assemblies with the front panel screws.

7.   **If the WDU is not used, install the adapter without the drive**

11.3.5   Mounting other units

When installing the power supply plug-in units, ensure that the power switch is in the position "OFF". When mounting other units, do the following:

Steps

1.   **Install the power supply units (PSC4) in two unit slots 00 and 05 (in SD3C-S)**

Secure the assemblies with the front panel screws.

2.   **Install the two CDAD-A adapters in two unit slots 06 and 07**

Secure the assemblies with the front panel screws.

3.   **Install the two blank cover panels in two unit slots 06 and 07**

Secure them with the front panel screws.

11.3.6   Cabling the SD3C-S cartridge

When delivered from the factory the racks in new BSC2i deliveries are equipped with SD3C-S cartridges and the internal cables (SCSI, power supply, alarm) shown in Figure *Cabling of the SD3C-S cartridge* .

See *Equipping List* and *Interconnection Cables* in the *BSC Site Documents* for the positions of the cartridges and the cables.

⚠ Caution

Do not use the PSC4 plug-in units in the SD3C-S. Use the PSC4-S plug-in units instead.

Table *Devices the PSC4-S power supplies feed* shows how the other devices are fed in the SD3C-S.

Table 38.   Devices the PSC4-S power supplies feed

Device	Bus	SD3C-S slot
Power 0	0	00
WDU	0	01
FDU	0	02
WDU	1	03
CTU	1	04
Power 1	1	05
5.25" 0	0	06 upper
5.25" 1	1	07 lower

See Figure *Cabling of the SD3C-S cartridge* .
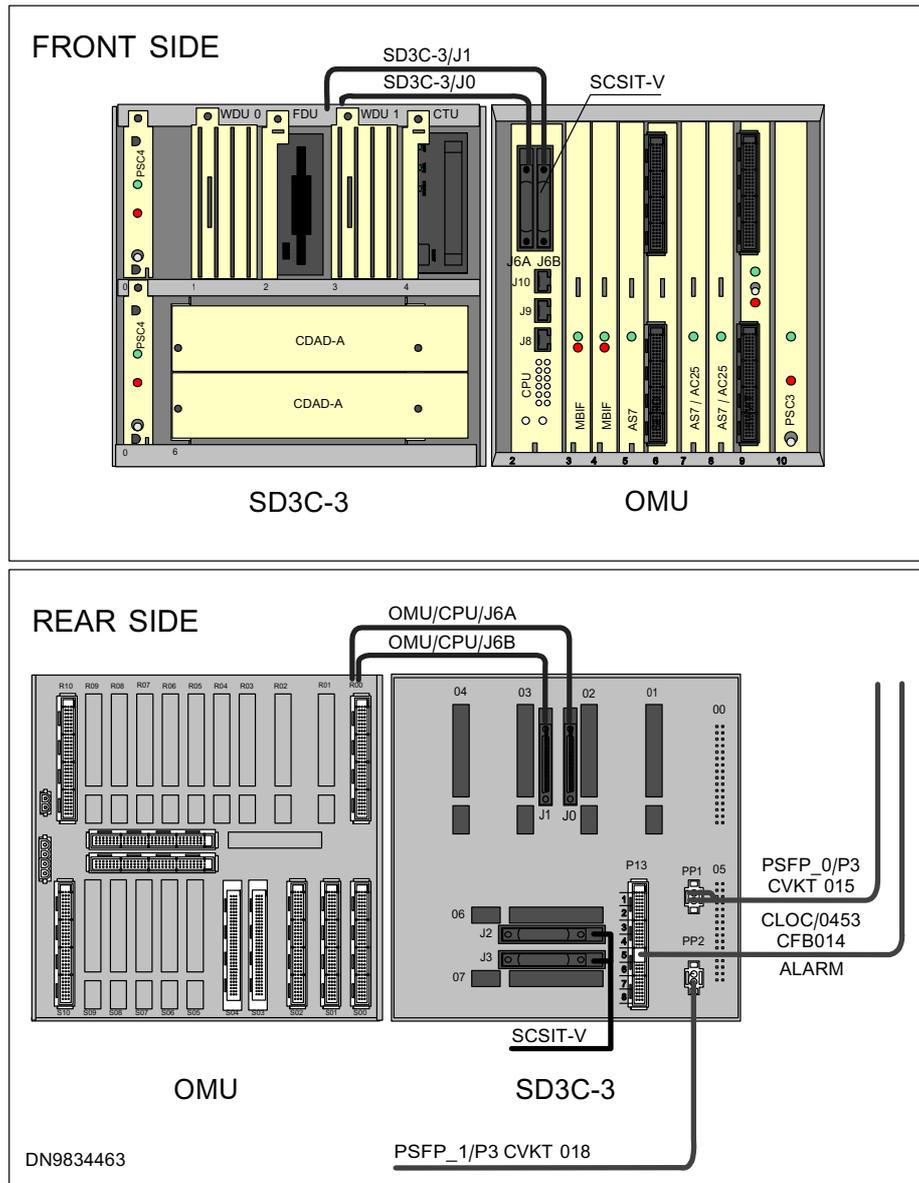
Figure 42.   Cabling of the SD3C-S cartridge

Steps

1.   **Install as shown in Figure *Cabling of the SD3C-S cartridge***

11.4 Installing the CBD8 panel

When delivered from the factory, the racks in new BSC2i deliveries are equipped with CBD8 panel and required cables for peripheral connections. The BSC(E), BSC2E and BSC2A applications can be upgraded to BSCi and BSC2i by replacing the current CBD2 panel with the CBD8 panel.

Steps

1. **Remove the CBD2 panel**

2. **Install the CBD8 panel**

   See *Equipping List* and *Interconnection Cables* in the *BSC Site Documents* for the positions of the cartridges and the cables.

   See Figure *Installing and cabling the CBD8 panel* .
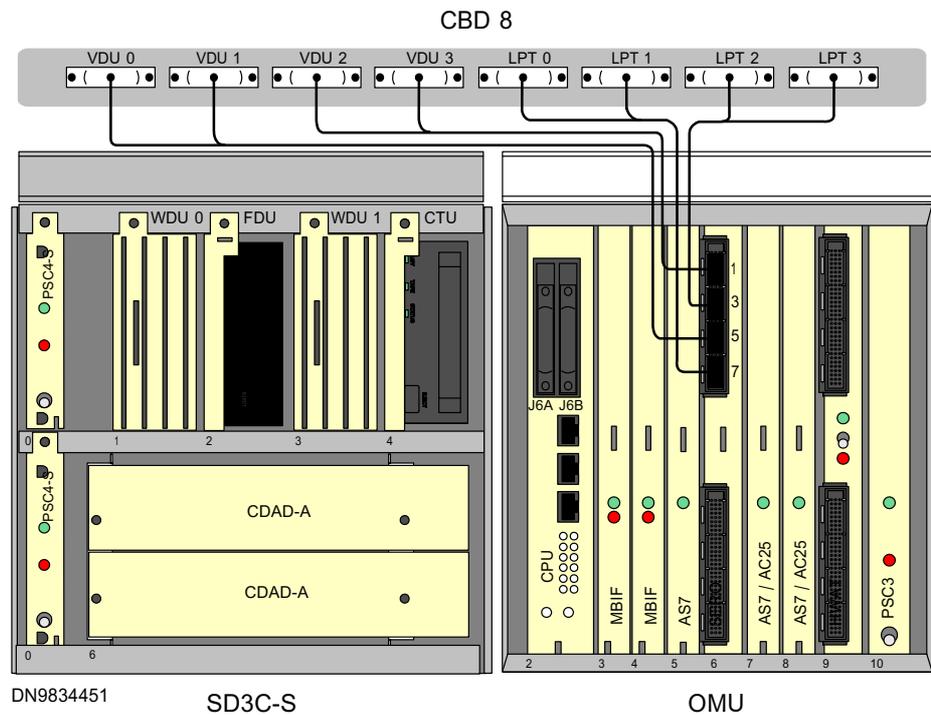
Figure 43.   Installing and cabling the CBD8 panel

11.5 Installing plug-in units in the cartridges

Before you start

Electrostatic discharge and incorrect installation and uninstallation can damage circuits or shorten their lifetime. To ensure proper functioning of the plug-in units during their usual lifetime, take the following precautions before handling them:

- Before touching integrated circuits, ensure that you are working in an electrostatic free environment.

- Ensure that each plug-in unit is only used in a cartridge and slot designed for it.

- In case of a power supply or other malfunction, refer to the *Plug-in Unit Description* of the unit concerned.

Note

When installing the Power Supply plug-in units (PSCx-x), ensure that the power switch is in the position "OFF" in each unit.

Steps

1. **Bring the plug-in units in their packages close to the cabinets and place them on an ESD-protected surface near the racks they will be installed in**

2. **Connect your ESD wrist strap to the earth bonding point in the rack you are working on**

3. **Select the appropriate plug-in unit**

   Make the selection according to the *Equipment List* delivered in the *Site Documents* binder.

4. **Install the plug-in unit using the handles, if such exist**

Note

Placing a unit in the wrong slot may cause damage to the unit after power-up.

5.   Repeat the steps above to all plug-in units in the exchange

6.   Secure the plug-in units to the cartridges

Install the required dummy panels (if available) in front of the empty slots.

Marking system

The co-ordinate system allows all the parts of the exchange system, for example the racks, cartridges, plug-in units and cable connectors, to be located in an unambiguous and exact manner (see Figure *Principle of the co-ordinate system)* .

The rack rows and racks are marked on the shell structures of the racks at the installation stage by means of sticker labels.

The height co-ordinate markings of the rack have been formed on the vertical beams of the rack bodies. The horizontal co-ordinate sticker is attached to the front edge of the cartridge shelf at the factory.

The cartridge connectors are marked horizontally with a sticker on the front edge of the cartridge at the factory. The corresponding markings as well as the height of the connector point (R, S,...) and the division markings of the cable connector (1...8) have been printed on the motherboard.

FRONT OF RACK

FRONT OF CARTRIDGE

MARKING STRIP

CONNECTOR
POINTS/
TRACK NUMBERS

00 01 02 03 04 05 06 07 08 09 10 11 12 13 14

125

37

HORIZONTAL
COORDINATES
OF RACK SHELF

HEIGHT
COORDINATES
OF RACK

000

EXAMPLE OF MARKINGS: 1C125.37F08

RACK ROW
RACK
SHELF VERTICAL (1/4 U)
CARTRIDGE HORIZONTAL (20mm)
CARTRIDGE FRONT (F)/BACK (B)
CONNECTOR POINT ( ) HORIZONTAL

BACK OF CARTRIDGE

R

X

S

14   04   00

EXAMPLE OF MARKINGS: 1C125. 37B04S3

RACK ROW
RACK
SHELF VERTICAL (1/4 U)
CARTRIDGE HORIZONTAL (20mm)
CARTRIDGE FRONT (F)/BACK (B)
CONNECTOR POINT HORIZONTAL
CONNECTOR POINT VERTICAL
LOCATION OF CABLE IN CONNECTOR

DN9833885

Figure 44.   Principle of the co-ordinate system

Expected outcome:

All of the plug-in units are installed and you are ready to *install the external cables* .

12   Cabling BSC and TCSM2 to environment

This section describes the positions and routing of the external cabling inside the BSC and TCSM2 racks, that is, cabling from rack to environment, usually through the data distribution frame (DDF). For more information on cabling, see *Engineering for BSC* and *Engineering for TCSM2* .

After installing the external cabling, you can move on to *Installing the doors DS196 and DS198* or *Installing the doors DS196E and DS198E* .

Note

CPLAN-S LAN connector panel for LAN (Ethernet) cables is installed in place of the top plate in the M92 rack of BSCE, BSCi and BSC2A/E. The CPLAN-S is pre-installed in new deliveries (BSC2i), optional in others.

External cables inside the BSC rack

The external cables inside the BSC rack include:

- Trunk cables which are connected to the front connectors of the ET2 plug-in units, with the other end connected to the digital distribution frame (DDF)

- Alarm cables from the HWAT front panel connector

- External synchronisation cable(s), at the rear of the CLOC cartridge

- Peripheral cables (RS 232) from the panels CDB2 or CDB8

- LAN (Ethernet) cable, RJ45 connector at the CP6LX or CP6MX front panel in BSCi and BSC2i applications

- LAN (Ethernet) cable, RJ45 connector at the PCU, PCU-S PCU-T, or PCU2-U

- LAN (Ethernet) cable from the COCEN, whose connector may be of type: 15-contact D connector, coaxial 50-ohm BNC connector, or RJ45 connector (TPI) in BSC, BSC2E and BSC2A applications

- Cables for X.25 connections (NetAct - BSC) from the AC25-S front panel connector:

  - V.35 cable from BSC to Modem
  - V.35 cable from BSC to NetAct
  - X.21 cable from BSC to Modem
  - V.24 cable from BSC to Modem

- Power distribution cables from the power plant to the BSC racks

- Grounding cable for the racks

External cables inside the TCSM2 rack

The external cables inside the TCSM2 rack include:

- Trunk cables which are connected to the front connectors of the ET2 plug-in units, with the other end connected to the digital distribution frame (DDF)

- Alarm and power supply cables

  Alarm cables for the power supply run in a TC2E rack row directly from one rack to another on a cable self behind the rack row.

- Power distribution cables from the site power supply to the TC2E rack

The system also includes horizontal cable conduits installed at the top of the rack rows. The conduits contain outgoing cables, trunk circuit cables, and grounding cables in so far as they run immediately above the racks.

12.1   Grounding the metal sheaths of cables

The metal sheaths (aluminium or copper) of all the cables leaving the network element are grounded to the frame of the network element with specific grounding elements.

1. Strip the metal sheath of each cable for about 40 mm or 1.57 in (see Figure *Grounding of aluminium sheath of cables to environment*) and insert the stripped part into a slot in the grounding element after a conductive sealing strip (10 x 15 mm or 0.39 in x 0.59 in) designed for the purpose has been placed at the bottom of the slot. A maximum of three cables can be placed in one slot. Always insert a sealing at both sides of the cable.

2. When the slots have been filled as evenly as possible, that is, with the same amount of cable, install the top plate (61 or 81). The cover plate is designed so that its edge presses the cables and the sealing strips tightly together. To achieve proper tightness in case there are only a few cables running to the environment, add some more sealing strip.

3. After finishing with the grounding element, attach the cables to the support bracket beneath the grounding slot using a cable tie (see Figure *Cable grounding element*).
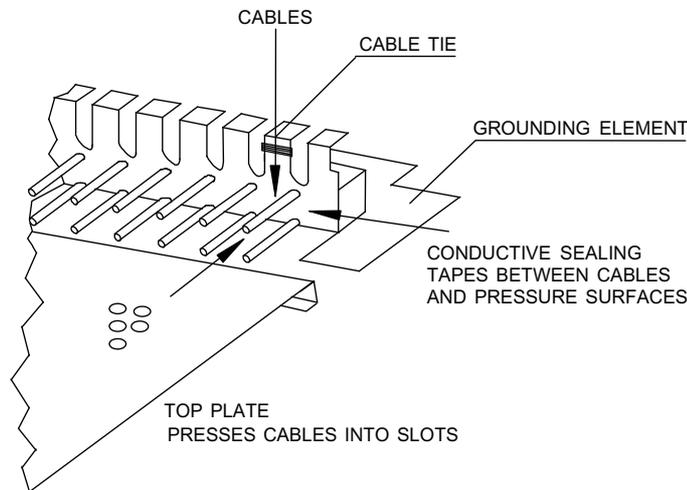
DN9860304

Figure 45. Cable grounding element

Note that a similar grounding element is provided on the bottom plate of the R2A1-S/-T rack used as a cable conduit.

ENVIRONMENT

CABLE TIE

CONDUCTIVE SEALING
TAPE AROUND CABLES

TOP COVER PLATE

GROUNDING UNIT

EXPOSED ALUMINIUM BAND;
PLASTIC SHEATH AND OUTERMOST
ALUMINIUM SHEATH STRIPPED
FOR APPROX. 40 mm

EQUIPMENT

CABLE TIE

CONDUCTIVE SEALING TAPE
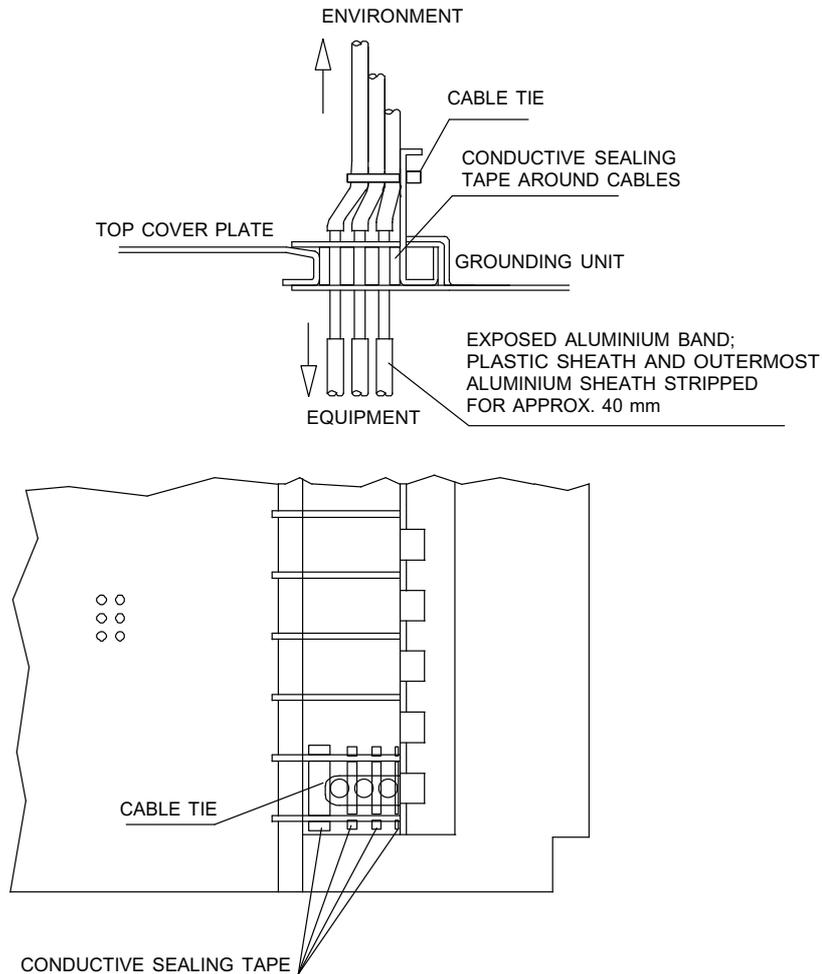
Figure 46.   Grounding of aluminium sheath of cables to environment

12.2   Routing of external cables to environment

If the equipment premises have a *raised floor* and the cables are drawn under the
floor, the power supply and LAN cables are routed through the cable conduit
CC19V-S and the other cables through the cable rack R2A1-S/-T. The power
supply cables are not grounded in any way and they are connected to the power
connector at the top of the rack. The cables routed out of a rack and to the
environment through the cable rack (R2A1-S/-T) must be grounded at the
grounding element located at the bottom of the cable rack.

Figures *Example of recommended route for cables within racks with the raised floor installation* , *Example of recommended route for cables within racks BSC2E/A* and *Recommended route for cables within racks BSC2i* show the general routing principles according to which the cables are connected to the front connectors of the plug-in units. The cables are drawn out of the rack through the grounding element which is located at the top of the same rack or in the cable rack (R2A1-S/-T).
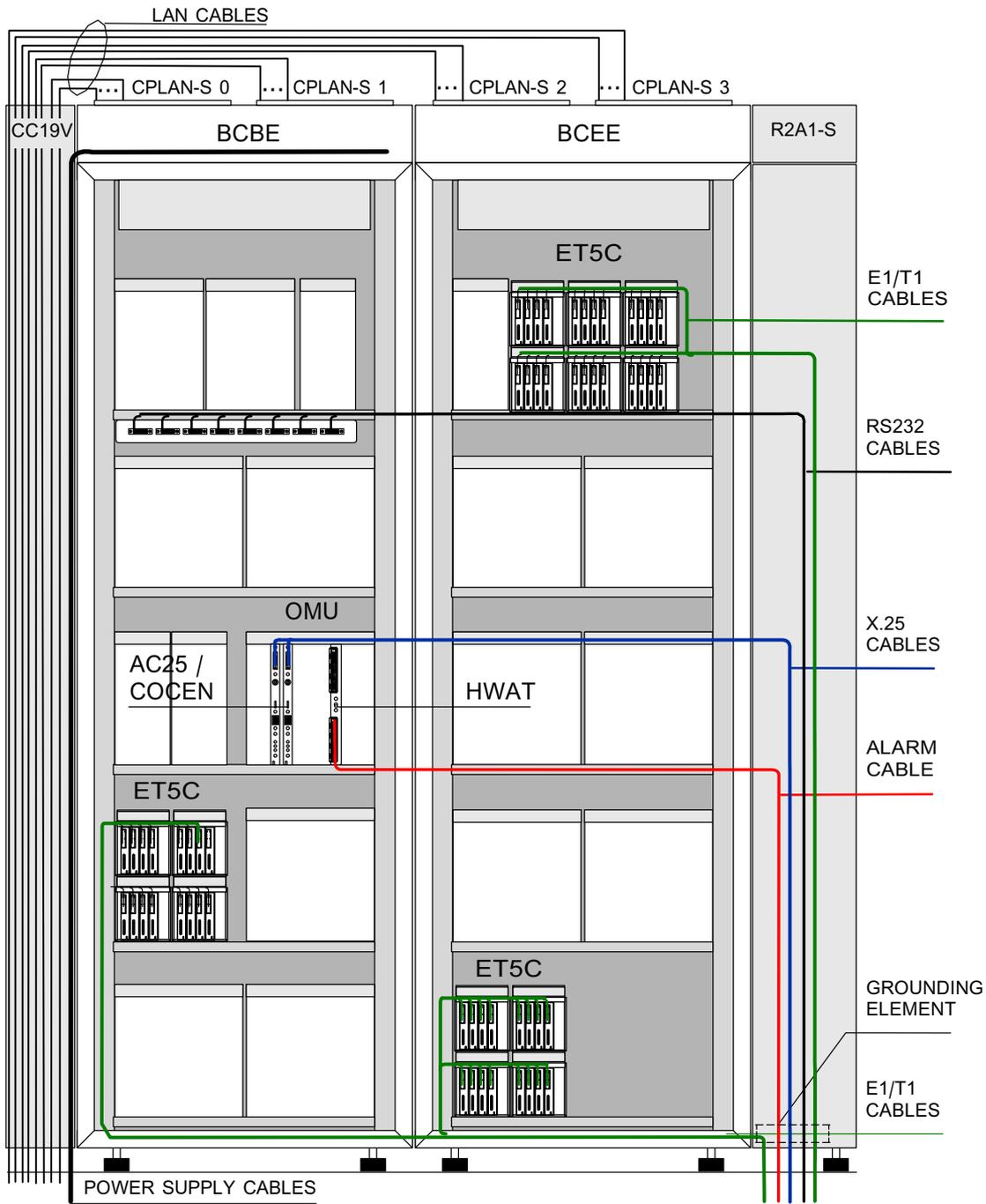
Figure 47. Example of recommended route for cables within racks with the raised floor installation
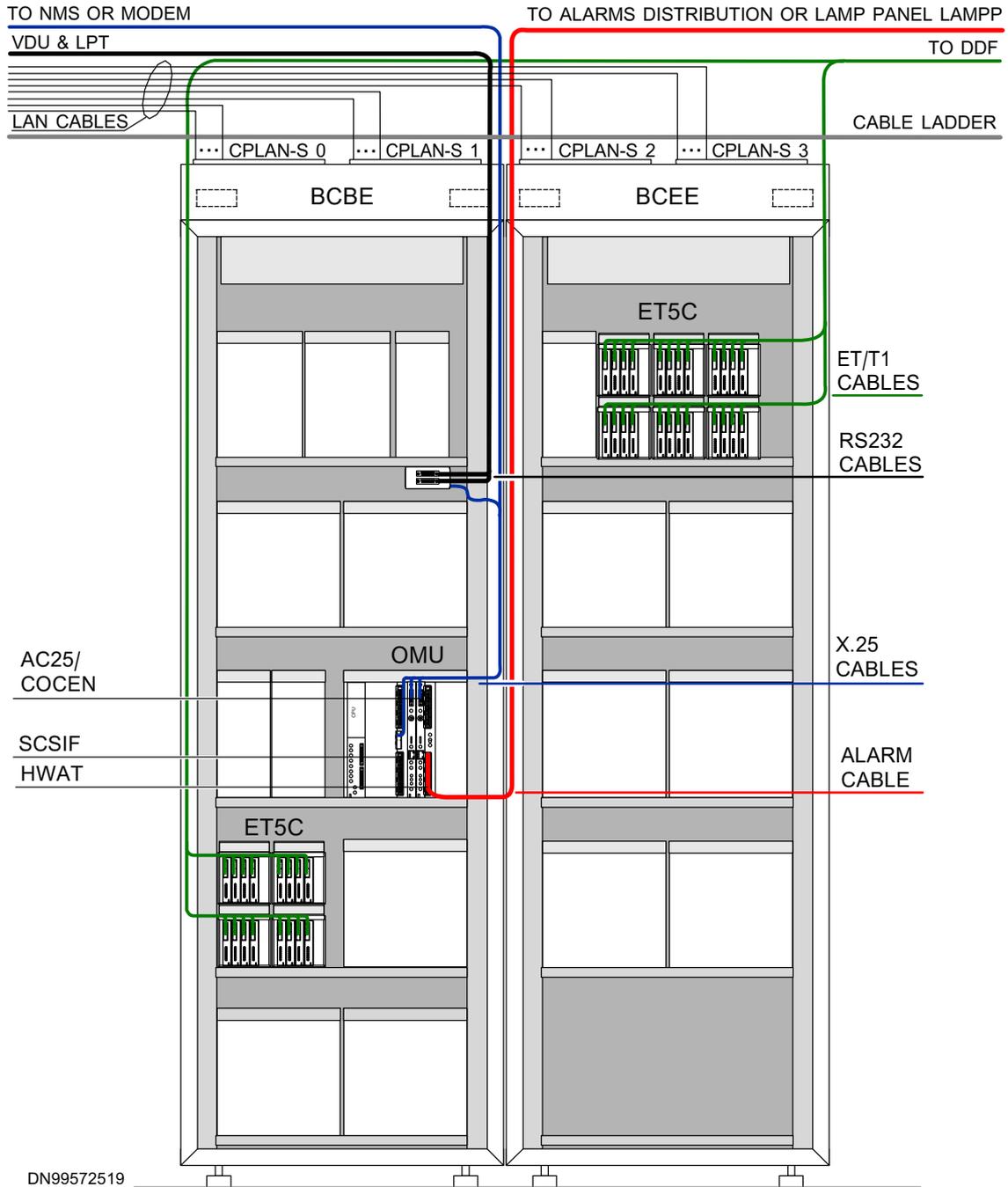
Figure 48.   Example of recommended route for cables within racks BSC2E/A
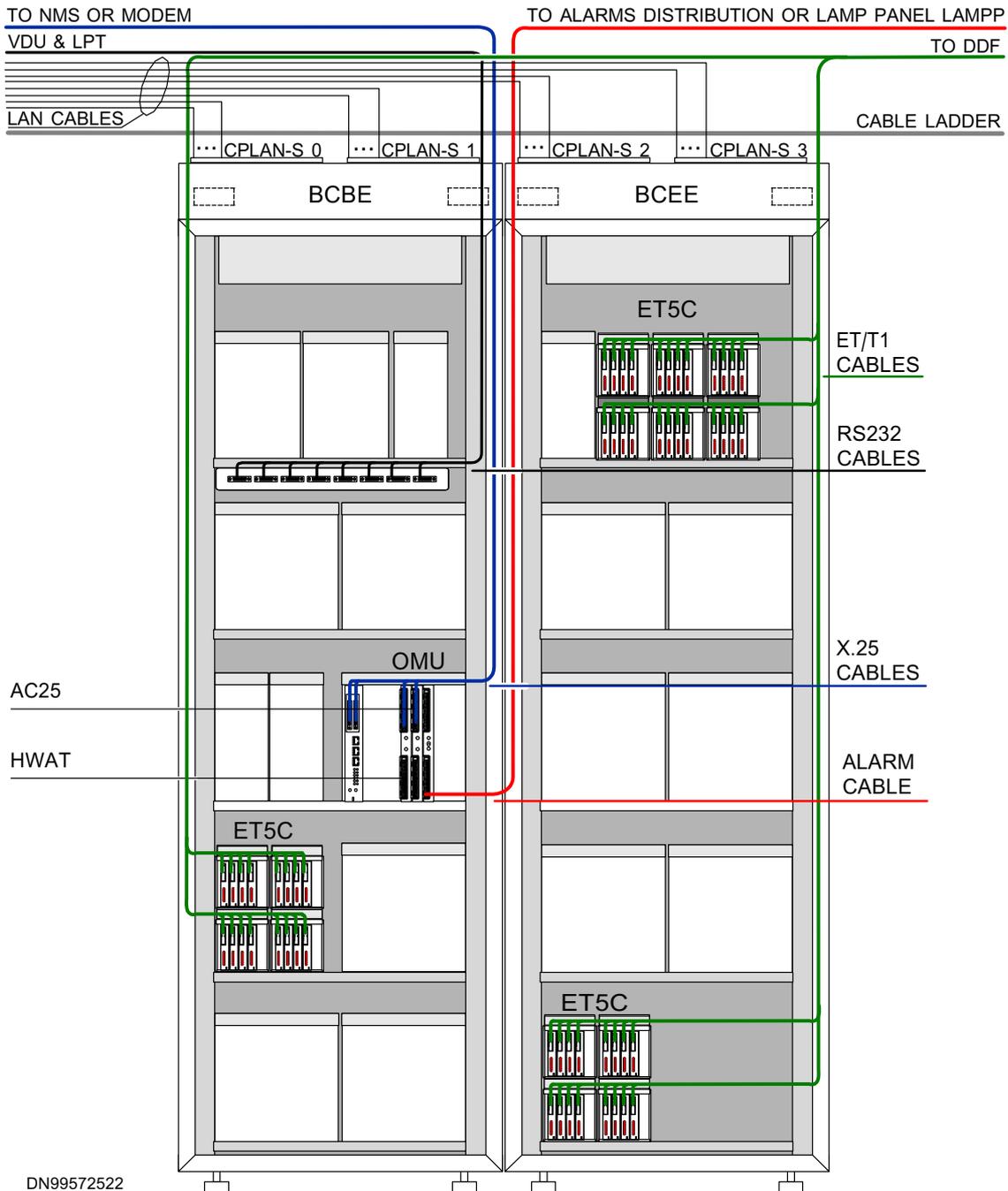
Figure 49.   Recommended route for cables within racks BSC2i

12.3 Trunk cabling instructions

The E1/T1 trunk (PCM) cables are supplied either as completed cut-to-length cables or as cable materials for assembly on site. The trunk cables are connected to the connectors in the front of the ET2A and/or ET2E plug-in units, as shown in Figure *Connections of trunk cables from the TCSM2E and TCSM2A to environment, as seen from the front of the TC2E rack* . The other ends of the trunk cables are not provided with connectors, as they are to be connected to the distribution frame.

The cables from the ET1TC cartridges travel up via the rack on both sides. If the rack is the last one in a rack row, the cables will travel up between the side plate and the frame beam at the rear of the rack.

Each ET2A/-T plug-in unit provides two balanced T1 interfaces (0 and 1), and thus accepts two T1 cables.

The ET1TC cartridge of the TCSM2E accepts two types of Exchange Terminal units: ET2E/ET2E-S/-T with Euroconnectors (1/2) and ET2E-C/ET2E-SC/-TC with coaxial SMB connectors. Each ET2E plug-in unit provides two E1 interfaces (0 and 1).

Note that the marking plates provided for the ET1TC front side should not be installed prior to connecting the cables; they should be installed afterwards to secure the cables to their positions and to the cartridge cable rail.

The E1/T1 cable connections are shown and the cable type used are defined in Sections *Routing of external cables to environment* , *Trunk cabling instructions* and *Trunk interfaces* .

The E1/T1 trunk cables are grounded as described in Section *Grounding the metal sheaths of cables* .

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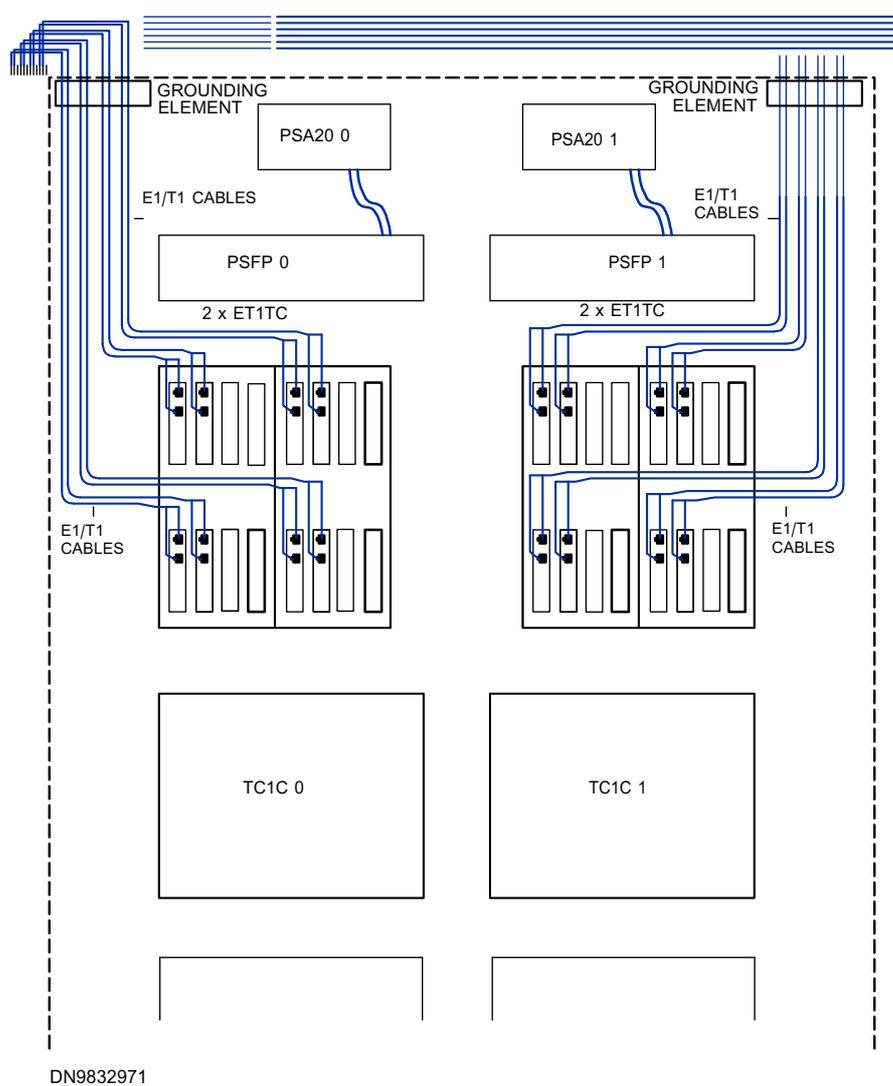
Figure 50.   Connections of trunk cables from the TCSM2E and TCSM2A to
environment, as seen from the front of the TC2E rack

12.4   E1 PCM trunk interfaces (balanced)

The balanced (symmetrical) PCM trunk circuit interfaces are cabled from the front connector (Euroconnectors) of the ETSI ET2 plug-in unit by using, for example, the pair-protected CPK cable. The cable has four connectors that can be connected to two ETSI ET2 plug-in units, which means four PCM interfaces. The branches of the cable are marked, and the "1" branches are connected to the first plug-in unit.

The group sheath of the cable must be grounded via the grounding element of the rack. The sheath should be grounded at the exchange end only.

See the tables below.

Table 39.   E1 (PCM) trunk cable

Cable type:	KLVMAAM 8x(2x0.4+0.4)+0.4 (Nokia type: CPK)
Cable connector:	Euroconnector C3x7 female IDC AWG26-24 casing for 1/4 Euroconnector

Table 40.   Pin configuration of one 1/4 Euroconnector connected to the E1 (PCM) trunk cable CPK

Connection of conductors	Pin	Signal	Colour	Pairs of the cable
Incoming E1 (PCM) direction	b2	RISxB	White	Odd cable pair
	b3	RISxA	Blue	(1,3,5,7)
	a3	SG0	Screen	
Outgoing E1 (PCM) direction	b5	TISxB	White	Even cable pair
	b6	TISxA	Blue	(2,4,6,8)
	a6	TSG0	Screen	

x = Interface 0 or 1

See Figure *Construction of multipair cable and orientation of two 1/4 Euroconnectors when mounted on an ETSI ET2 plug-in unit* .
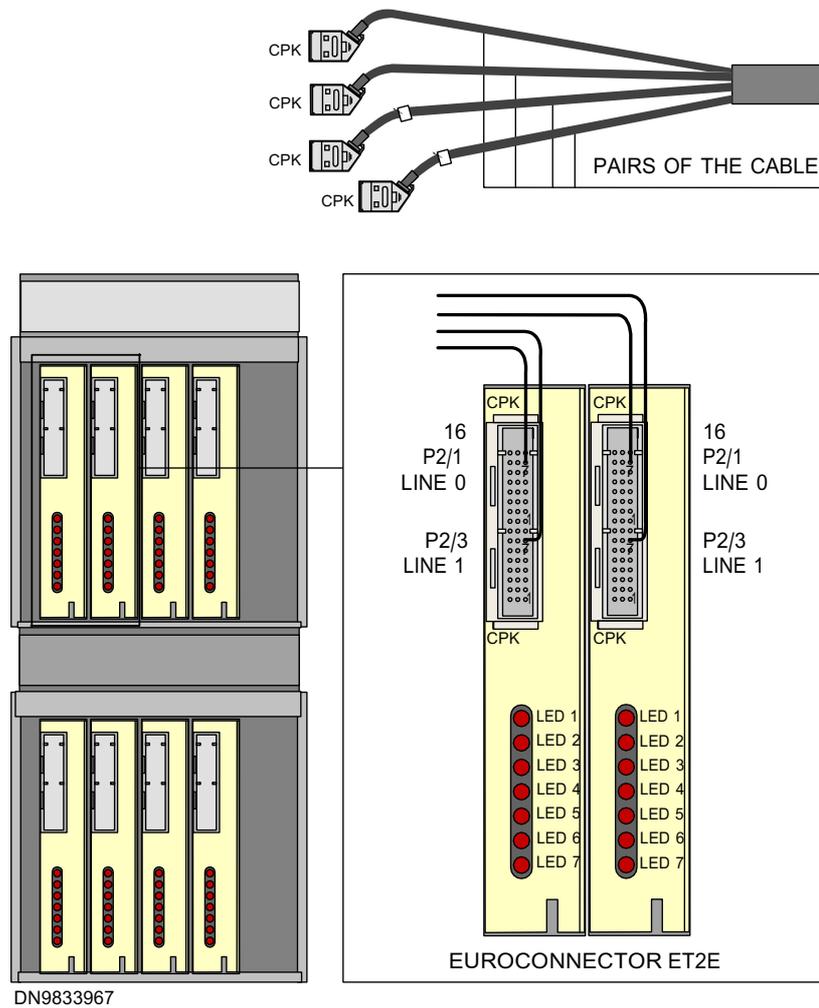
Figure 51. Construction of multipair cable and orientation of two 1/4 Euroconnectors when mounted on an ETSI ET2 plug-in unit

12.5 E1 PCM coaxial trunk interfaces (unbalanced)

The unbalanced (asymmetrical) PCM trunk circuit interfaces are cabled using coaxial cable and SMB connectors from the front connectors of the ETSI ET2 plug-in units. The applicable cable types and SMB connectors related to the ETSI ET2 are described in the Tables *E1 (PCM) coaxial trunk cable* and *Connecting the cables of a multicoaxial cable to two ETSI ET2 units* .

Table 41.   E1 (PCM) coaxial trunk cable

Cable type:	**Coaxial cable BT3002, RG 179 B/U, or respective**
	Multicoaxial cables are preferred
Cable connector:	Coaxial connector (SMB/50 ohm/straight type) for BT3002, RG 187/ 179 B/U cables.
	(Rosenberger 59K101-1V6E3, Radiall R114082000, or respective)
Crimping tool:	Suhner 3.25 or 76-0-0-15/PU-A, or Crimpex DCC 0908 Nokia code for crimping tool set: CS 77550.04. The set contains two Crimpex DCC 0908 plier tools with tips: 1.0, 3.25, 3.65, 4.52 and 0.7, 1.46, 4.3, 4.95.

Table 42.   Connecting the cables of a multicoaxial cable to two ETSI ET2 units

Direction	Interface	Cables
Outgoing	Tx	Odd cables (1, 3, 5, 7)
Incoming	Rx	Even cables (2, 4, 6, 8)

Connecting the coaxial cable to the SMB connector is presented in Figure *Connecting the coaxial cable to the SMB connector, and the structure of multicoaxial cable (4/8 cable type)* .
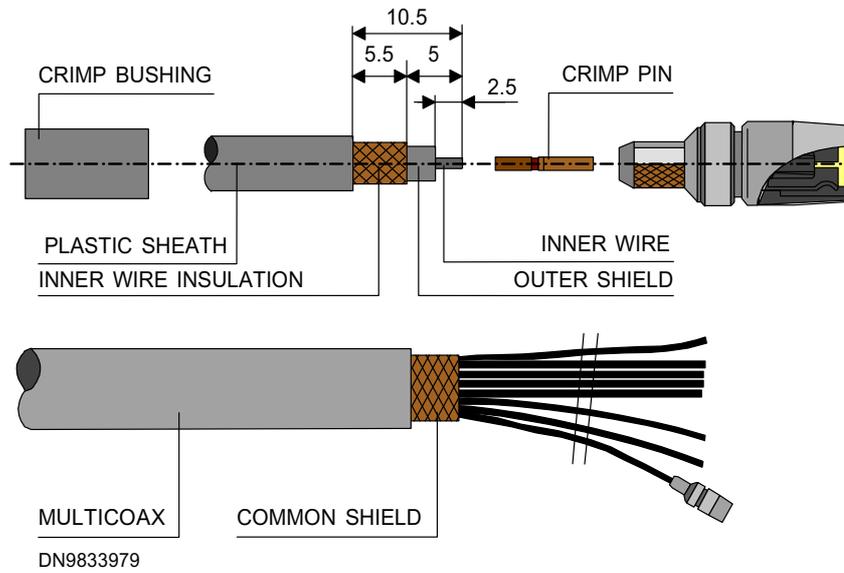
Figure 52.   Connecting the coaxial cable to the SMB connector, and the structure of multicoaxial cable (4/8 cable type)

The front panels and the trunk cable connectors of the ET2E-C and ET2E-SC are shown in Figure *SMB/50 E1 trunk cable connectors of the ET2E-C and ET2E-SC plug-in unit* .

LINE 0 — (Tx) (Rx)

LINE 1 — (Tx) (Rx)

LED 1
LED 2
LED 3
LED 4
LED 5
LED 6
LED 7

ET2E-SC   ET2E-TC

SMB MODULAR CONNECTORS
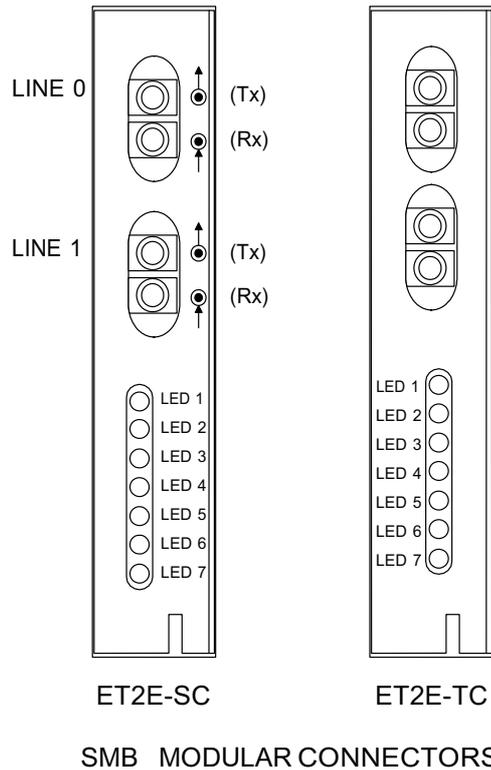
DN0190144

Figure 53.   SMB/50 E1 trunk cable connectors of the ET2E-C and ET2E-SC
plug-in unit

Grounding the cables

Multicoaxial cable is recommended, and only the common shield must be
grounded in the grounding element of the rack. The DDF end connectors depend
on the type of DDF used. The coaxial cables are marked using marking rings
provided for cable diameters 3.25 to 4.5 mm so that the cable of the outgoing
transmission direction only is provided with the horizontal co-ordinate number of
the plug-in unit.

Removing the cables with coaxial connectors

To make the removal of the cables with straight coaxial connectors easier and
safer, an extractor tool SMBCT2 is available. The order code of a plastic bag with
two tools is C 72546 (717254600). During the removal and installation, wear an
ESD wrist strap. (See Figure *Removing the cables with coaxial connectors* .)
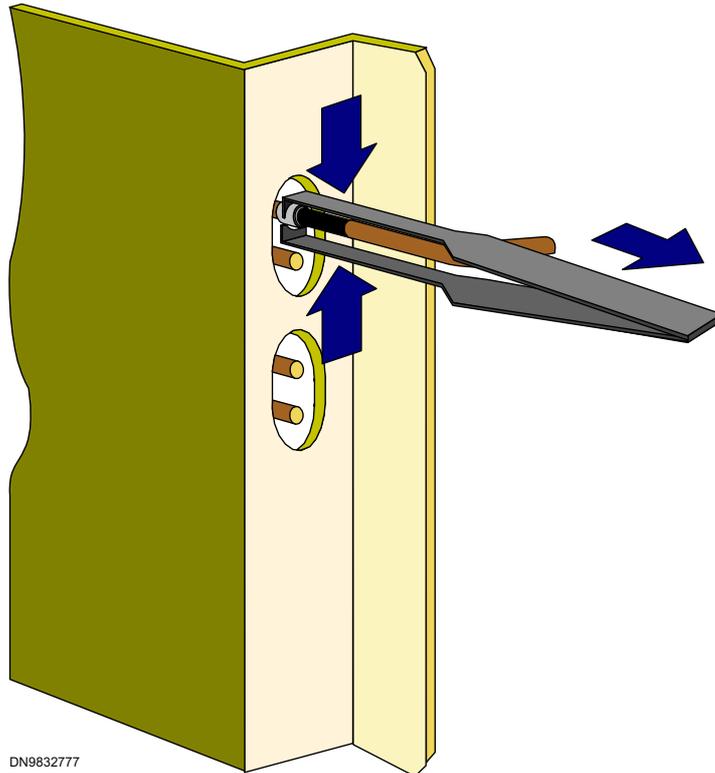
DN9832777

Figure 54.   Removing the cables with coaxial connectors

12.6   T1 PCM trunk interfaces

The balanced T1 PCM trunk circuit interfaces are cabled from the front connector (RJ45) of the ET2A/-T plug-in unit by using the shielded cables similar to one described in *Table T1 (PCM) trunk cable* .

The cable must be grounded at the rack's grounding element.

Table 43.   T1 (PCM) trunk cable

Cable type:	4 insulated pairs, twisted, shielded, cross section 0.4 mm^2 ; for example Category 5 cable
Connector type:	RJ45 modular connector (8-pole)

The cable and the connector should meet the requirements of the UL 1459 standard or the National Electrical Code ANSI/NFPA No.70. The connector should also meet the requirements of the FCC Part 68. (See Table *T1 trunk cable connector, pin configuration* .)

Table 44.   T1 trunk cable connector, pin configuration

Pin	Signal	Colour	Remarks
1	R1		Incoming direction
2	T1		Incoming direction
3			
4	R		Outgoing direction
5	T		Outgoing direction
6			
7			
8			

Connecting a PCM trunk cable to a connector is shown in Figure *Connecting a PCM trunk cable to a RJ45 connector* .

IDENTIFICATION
STICKER

CABLE

SLEEVE

MODULAR CONNECTOR

8   1

DN9833994
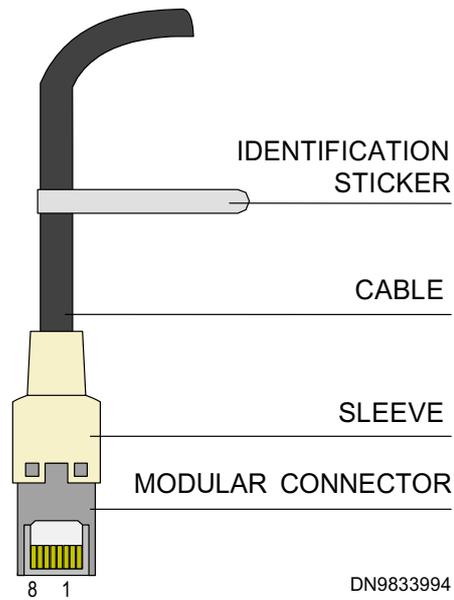
Figure 55.   Connecting a PCM trunk cable to a RJ45 connector

RJ45 connectors of the ET2A/-T plug-in unit are shown in Figure *RJ45 connectors of the ET2A plug-in unit.*

DN9834003

RJ48C MODULAR CONNECTORS ET2A
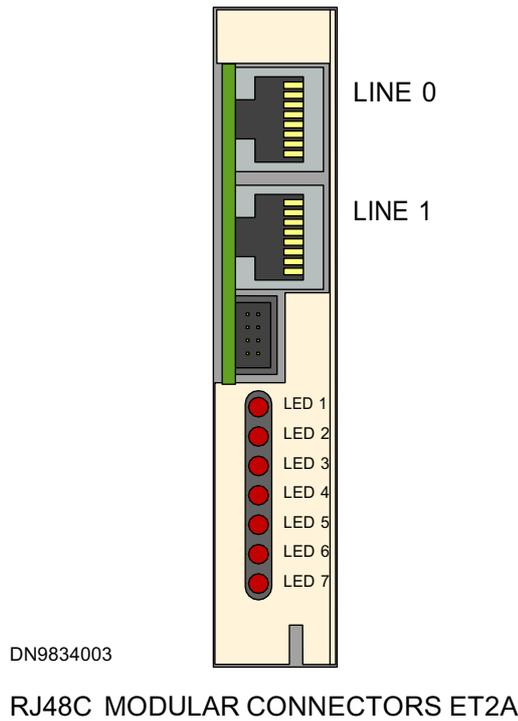
Figure 56.   RJ45 connectors of the ET2A plug-in unit

12.7   Alarm cabling instructions for the BSC rack

The alarm cable is used to connect the incoming and outgoing wired alarms from the HWAT plug-in unit to the distribution frame.

The cable must be grounded at the rack's grounding element.

Table 45.   Alarm cable

Cable type:	20 pairs, insulated, twisted, shielded, cross section 0.4 mm^2
Cable connector:	Euroconnector 2 x C3 x 7 female, casing 1/2 (Nokia type: CYK)

The cable and the connector should meet the requirements of the UL 1459 standard or the National Electrical Code ANSI/NFPA No.70.

Figure *Connection of alarm cable (CYK)* shows how the cable (CYK) is connected to the connector and what colours are used on the circuits. In the figure the wire colours apply to cable type: MMHS 4x8x2x0.4+0.4.

OUTPUT AEO00 - AEO15

BLOCK	PAIR	WIRE	C	B	WIRE	PAIR	BLOCK	A	WIRE	PAIR	BLOCK
		0V	C	B	AEO14		AEO15	A			
		SHIELD	1	1	GREY	5	2 BR	1	WHITE	5	4 BR
4 BR	3	WHITE	2	2	BROWN	4		2	WHITE	4	
	2	ORANGE	3	3	WHITE	2		3	GREEN	3	
3 GR	5	WHITE	4	4	BLUE	1		4	WHITE	1	
	4	BROWN	5	5	WHITE	4	3 GR	5	GREY	5	3 GR
	2	WHITE	6	6	GREEN	3		6	WHITE	3	
	1	BLUE	7	7	WHITE	1		7	ORANGE	2	
		AEI20			AEI21			AEI22			

INPUT AEI00 - AEI23

BLOCK	PAIR	WIRE	C	B	WIRE	PAIR	BLOCK	A	WIRE	PAIR	BLOCK
		0V	C	B	AEI18		AEI19	A			
		RED	1	1	GREY	5	2 OR	1	WHITE	5	2 OR
2 OR	3	WHITE	2	2	BROWN	4		2	WHITE	4	
	2	ORANGE	3	3	WHITE	2		3	GREEN	3	
1 BL	5	WHITE	4	4	BLUE	1		4	WHITE	1	
	4	BROWN	5	5	WHITE	4	1 BL	5	GREY	5	1 BL
	2	WHITE	6	6	GREEN	3		6	WHITE	3	
	1	BLUE	7	7	WHITE	1		7	ORANGE	2	
		AEI00			AEI01			AEI02			

DN98617986   1 | 1 | 2 |

Figure 57.   Connection of alarm cable (CYK)

		A	B	C
	32			
	31	0V	AEO14	AEO15
	30	AEO11	AEO12	AEO13
	29	AEO08	AEO09	AEO10
	28	AEO05	AEO06	AEO07
	27	AEO02	AEO03	AEO04
	26	AEI23	AEO00	AEO01
	25	AEI20	AEI21	AEI22
	24			
	23	0V	AEI18	AEI19
	22	AEI15	AEI16	AEI17
	21	AEI12	AEI13	AEI14
	20	AEI09	AEI10	AEI11
	19	AEI06	AEI07	AEI08
	18	AEI03	AEI04	AEI05
	17	AEI00	AEI01	AEI02
	16			

AEI 00-23 = EXTERNAL ALARMS IN
AEO 00-15 = EXTERNAL ALARMS OUT

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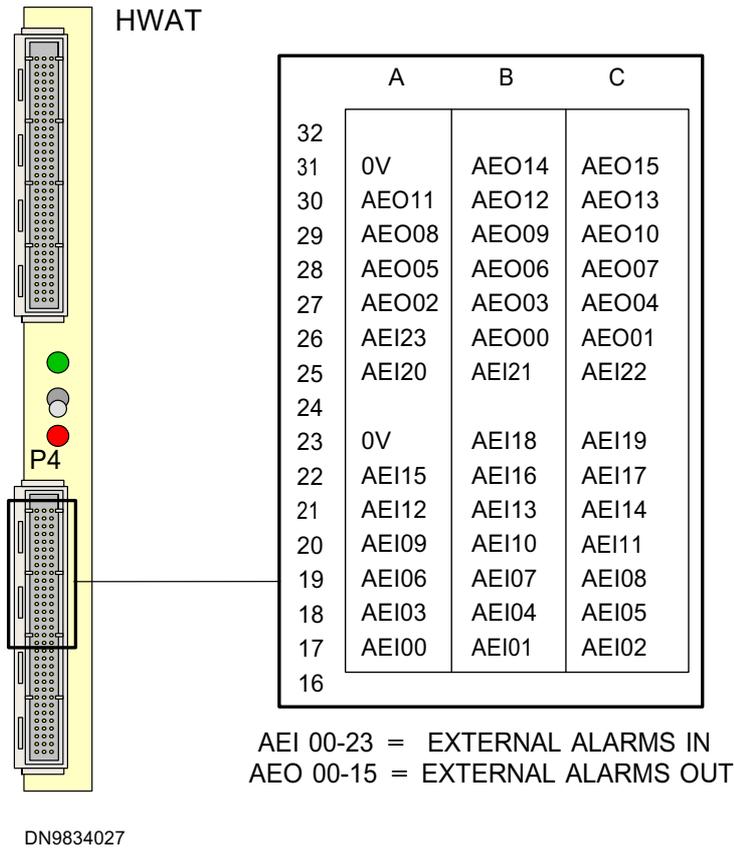
Figure 58.   Signals in connector P4 in HWAT plug-in unit

Cabling to environment

12.8   Alarm and power supply cabling instructions for the TCSM2 rack

The external alarm and power supply cables are delivered either as ready to use cut-to-length cables or as cable materials to be assembled on site. The alarm cables are connected to the connectors at the rear of the ET1C and TC1C cartridges as shown in the figures below.

- Power supply cables from the site battery to the PSGC connector at the rack top structures (PSGC - PSA20), straight or chained, as described in *Connecting the power supply cabling* .

- Rack power supply alarm cabling is arranged as follows and as shown in in Figures *Interconnection cabling example seen from the rear of the TC2E rack* and *External alarm cabling seen from the rear of TC2E rack* .

  - Racks are divided into groups of up to seven racks, out of which one (TC2E0 in the figure) is selected to collect the alarms from the other racks. Cables CFB are routed inside the rack row between PSFP0 panels of other racks and the ET1TC backplane of this (first) rack.
  - One cable is used to carry the collected alarms from this ET1TC to external alarm inputs provided by some other equipment, for example, MSC. The cable type for this purpose must be selected case by case. The ET1TC end accepts, for example, cable type CEB.
  - The cables between PSFP0 and ET1TC in other racks must be left unconnected (see section *Interconnection cabling*), except for the first (collecting) rack.

- The TC1C cartridge backplane accepts external alarm inputs (number 2 in the figure below). The cable type can be CEB, for example. However, the connection of this cable to the device producing the alarm must be determined case by case.

GROUNDED

PSA20 1

PSA20 0

CVKT

1

1

CVKT

PSFP 1

PSFP 0

2 x ET1TC

2 x ET1TC   CFB

TC1C 1

TC1C 0

CEA

CEF

2

DN9832956
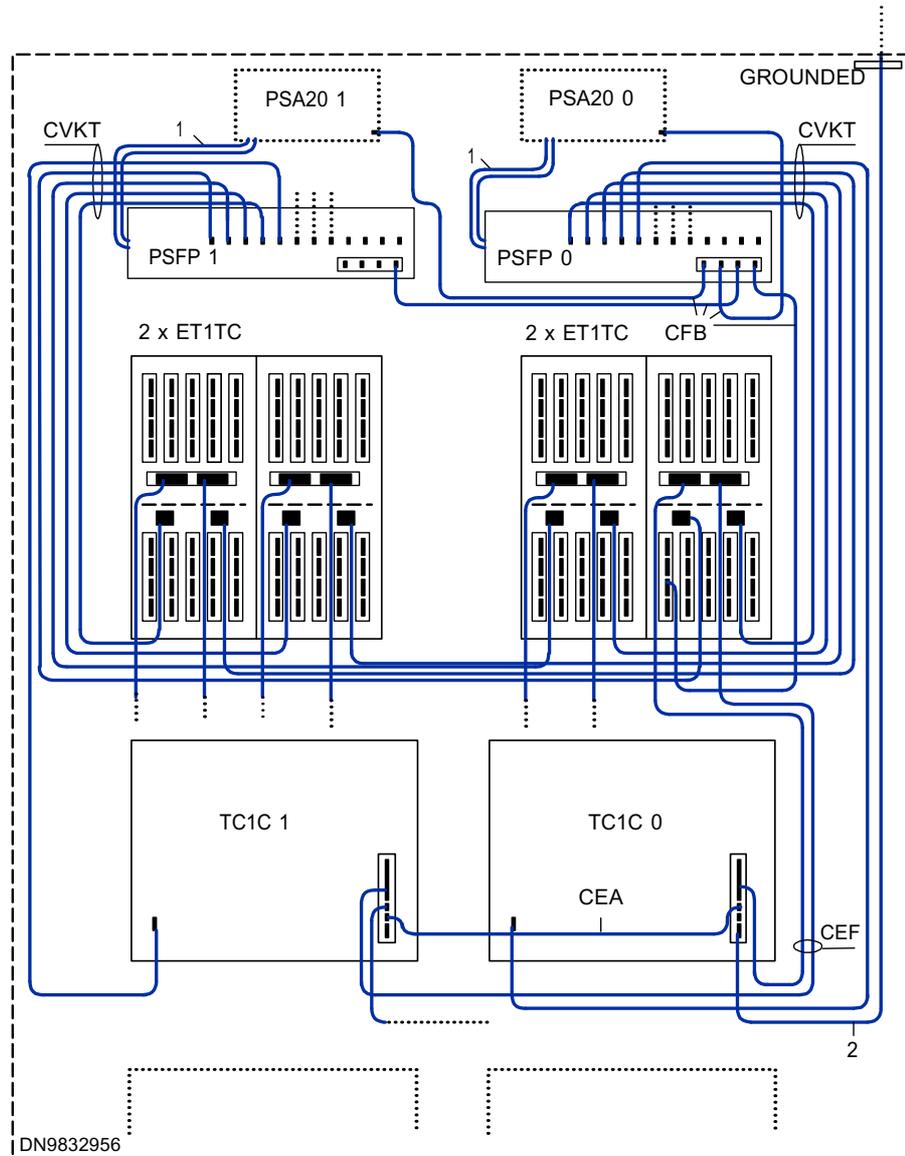
Figure 59.   Interconnection cabling example seen from the rear of the TC2E
rack
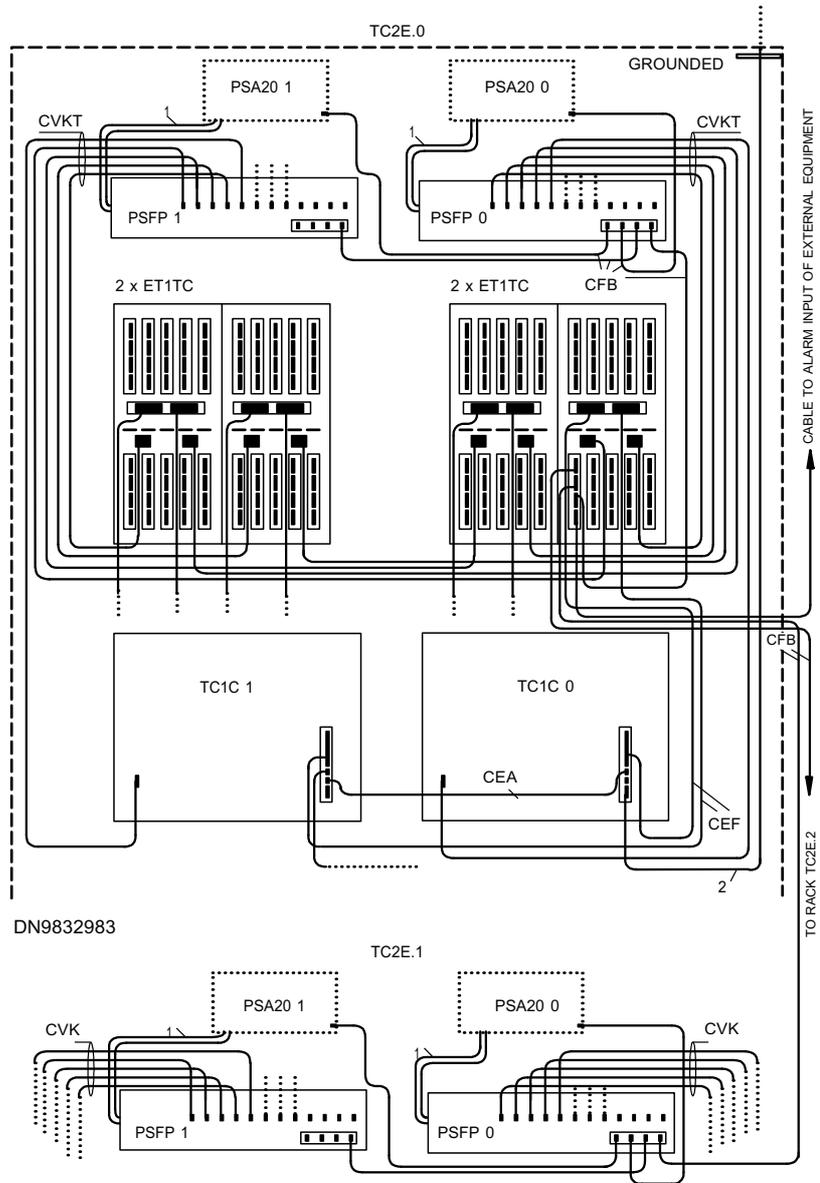
Figure 60.   External alarm cabling seen from the rear of TC2E rack

Table 46.   Connector and pin arrangement for the power supply alarm
              collection on the ET1TC cartridge (connectors R04 and S04)

Signal function	Input connector position	Pin no. (in 1/1-Euroconn.)	Output conn. position	Pin no. (in 1/1-Euroconn.)
Alarm	R04-1	7b, 7c, 8b, 8c	S04-7	26c
Alarm	R04-3	15b, 15c, 16b, 16c	S04-7	26b
Alarm	R04-5	23b, 23c, 24b, 24c	S04-7	26a
Alarm	R04-7	31b, 31c, 32b, 32c	S04-7	27c
Alarm	S04-1	7b, 7c, 8b, 8c	S04-7	27b
Alarm	S04-3	15b, 15c, 16b, 16c	S04-7	27a
Alarm	S04-5	23b, 23c, 24b, 24c	S04-7	28c
Alarm test	R04-x S04-x	7a, 15a, 23a, 31a 7a, 15a, 23a	S04-7 S04-7	28b 28b
Ground	0 V from cartridge	-	S04-7	32a

12.9   Peripheral cables

Peripheral devices (displays and printers) are normally cabled to the connectors
of the interface panel (CBD2 or CBD8) installed inside the BCBE rack on top of
the OMU. From these panels the peripheral (V.24 / V.28 / RS232) interfaces are
cabled through the grounding elements. The CLQS cable is available for this
purpose. The SCSIF or SERO-T interface plug-in units are cabled to the interface
panel already at the factory. The pin configurations of the SERO-T and SCSIF
units are in the appendices.

The cables must be grounded at the rack's grounding element. (See Tables *Use of
the connector panels* and *Peripheral cable (RS 232, V24)* .)

Table 47.   Use of the connector panels

Interface plug-in unit	Connector/ position	Panel/Connector
SCSIF	P5/1	CDB2 / VDU
	P5/1	CDB2 / LPT
SERO-T	P2/5	CDB8 / VDU 0
	P2/5	CDB8 / VDU 1
	P2/1	CDB8 / VDU 2
	P2/1	CDB8 / VDU 3
	P2/7	CDB8 / LPT 0
	P2/7	CDB8 / LPT 1
	P2/3	CDB8 / LPT 2
	P2/3	CDB8 / LPT 3

Table 48.   Peripheral cable (RS 232, V24)

Cable type:	KJOSM 6 x 2 x 0.15 and HKSK 6x2x0.14. / Insulated twisted pairs, shielded, cross section 0.15 mm^2
Cable connector:	Canon DB 25 P or DB 25 S / RS232 connectors

The cable and the connector should meet the requirements of the UL 1459 standard or the National Electrical Code ANSI/NFPA No.70.

If the cables are going to be installed permanently, they must be be grounded at the rack's grounding element.

In Figure *Connection of peripheral cables* , the wire colours apply to the cable types: KJOSM 6x2x0.15 and HKSK 6x2x0.14.
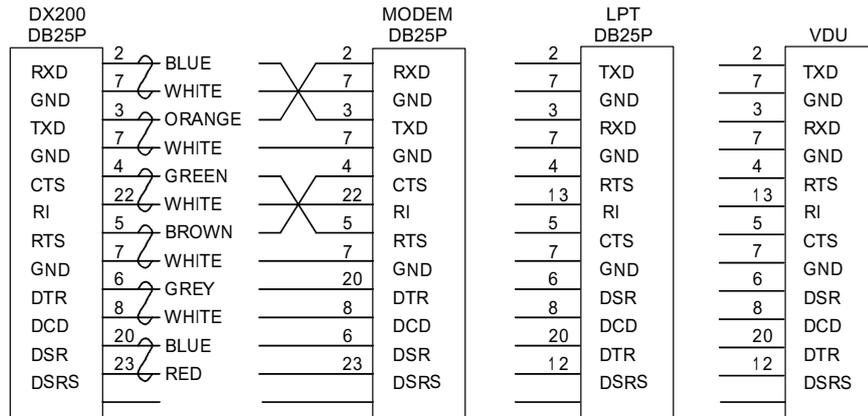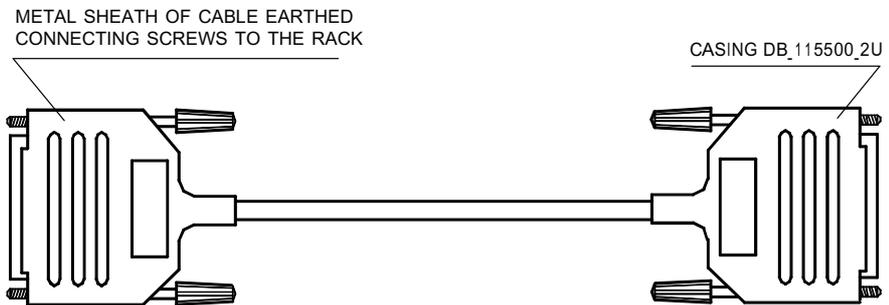
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Figure 61.   Connection of peripheral cables

12.10   X.25 interfaces (BSC - NetAct)

There are several possibilities for making the analog X.25 connection between the NetAct and BSC. The connection used depends on national standards and on the location of the network elements.

If a packet network is used, connections are made using V.35 or V.24 from the BSC to a modem. In practice, V.35 allows longer cables and fast transmission.

If the BSC and NetAct are co-located, X.21 is preferred.

Table *The X.25 interface locations for different interface types* presents the different cables which are used to connect various X.25 interface cable types. These cables are routed out of the rack through the grounding elements and connected to the interface cable concerned. The cables must be grounded at the rack's grounding element.

Table 49.   The X.25 interface locations for different interface types

Interface plug-in unit	Interface type	Cable type
AC25-S	V.24	CLS cable
	V.24 restricted	CLS cable
	X.21	CLT cable
	V.35	CLR cable

The standard cables delivered with the BSC depend on the physical connection used. The connection is always duplicated for redundancy and the alternatives are:

- CLR026 = V.35 cable from AC25-S plug-in unit to environment through the rack's grounding element. Length = 260 cm, 8.6 ft.

- CLS026 = V.24 cable from AC25-S plug-in unit to environment through the rack's grounding element. Length = 260 cm, 8.6 ft.

- CLT026 = X.21 cable from AC25-S plug in unit to environment through the rack's grounding element. Length = 260 cm, 8.6 ft.

Note that the rack's grounding element may be at the top of the rack or at the bottom of the cable rack when the raised floor is used.

Figures *Connections of V.35 modem cable* , *Connections of the CLRW cable* , *Connections of the X.21 cable* and *Connections of the V.24 cable* show connections of cables which can be used to interconnect the BSC and NetAct or a modem.

V.35 cable from BSC to modem

V.35 cable for modem is shown in Table *V.35 cable for modem* .

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Table 50.   V.35 cable for modem

Cable type:	8 twisted pairs, protected, conductor diameter 0.4 mm; for example: MMHS 8x2x0.4+0.4 /10 pairs, twisted, shielded, cross section 0.4 mm^2
Connector type:	34-pin M block connector (male)

Connect the V.35 cable to the CLR cable which is routed out of the rack. The colours of the conductors are the same as for cable type MMHS 8x2x0.4+0.4.

The cable and the connector should meet the requirements of the UL1459 standard or the National Electrical Code ANSI/NFPA No.70.

The cable must be grounded at the rack's grounding element.

In Figure *Connections of V.35 modem cable* , the wire colours apply to cable type: MMHS 8x2x0.4+0.4.

CLR CABLE					V.35 MODEM
P	P	BLU	TXDA	P	P
S	S	BLU-WHT	TXDB	S	S
Y	Y	OR	TXCA	Y	Y
AA	AA	OR-WHT	TXCB	AA	AA
V	V	GRN	RXCA	V	V
X	X	GRN-WHT	RXCB	X	X
R	R	BRN	RXDA	R	R
T	T	BRN-WHT	RXDB	T	T
H	H	GRY	DTR	H	H
C	C	GRY-WHT	RTS	C	C
F	F	BLU	DCD	F	F
NN	NN	BLU-BLK	TI	NN	NN
D	D	OR	CTS	D	D
E	E	OR-BLK	DSR	E	E
N	N	GRN	RL	N	N
L	L	GRN-BLK	LL	L	L
J	J	RED	CI	J	J
B	B	SCREEN	GND	B	B

FEMALE   34-PIN M-BLOCK CONNECTORS (MALE)   FEMALE

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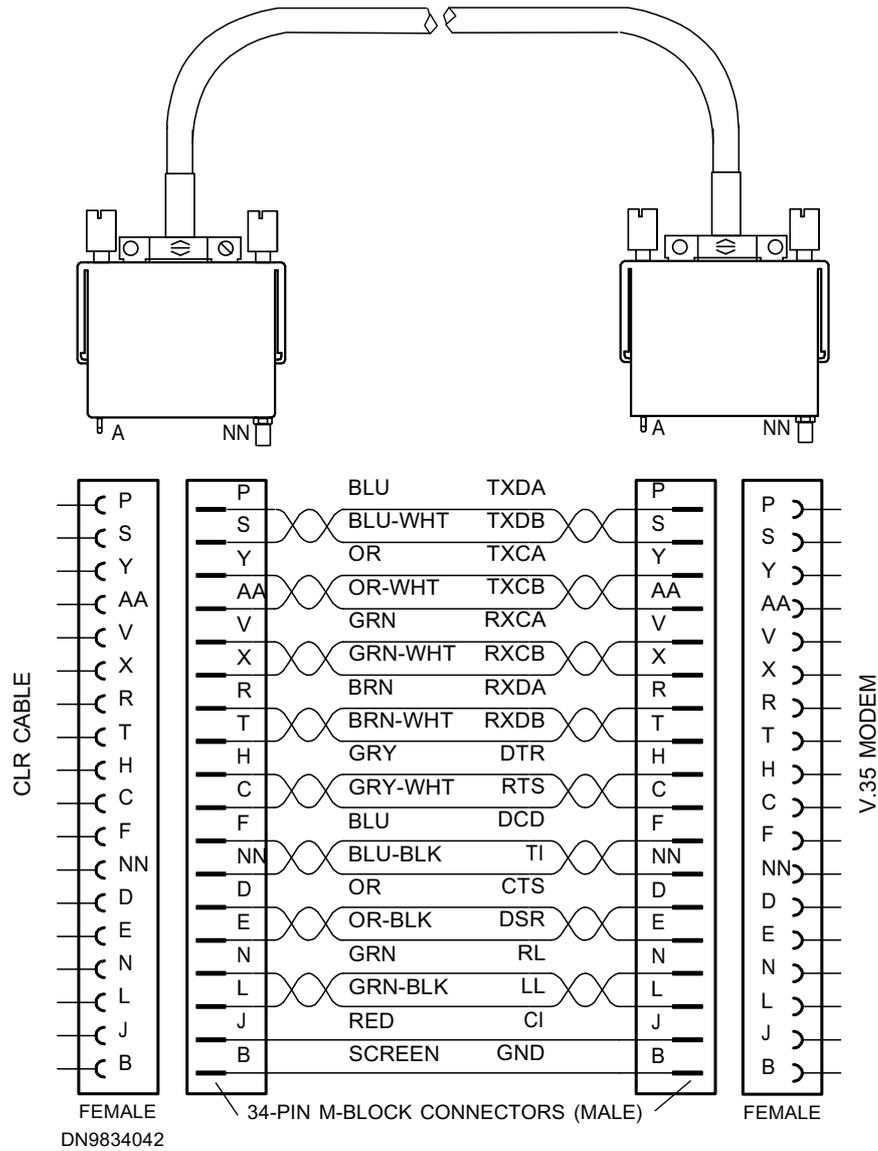
Figure 62.   Connections of V.35 modem cable

V.35 cable from BSC to NetAct

The CLRW cable is used between CLR cable and NetAct (see Table *V.35 cable CLRW*).

Table 51.   V.35 cable CLRW

Cable type:	8 pairs, twisted, shielded, cross section 0,22 mm^2
Connector type:	34-pin M block connector (male)/CLR
	62-pin D connector (male) / NetAct

Connect the (V.35) CLRW cable to the CLR cable which is routed out of the rack. The colours of the conductors are the same as for cable type HKSK 8x2x0.22.

The cable and the connector should meet the requirements of the UL 1459 standard or the National Electrical Code ANSI/NFPA No.70.

The cable must be grounded at the rack's grounding element.

In Figure *Connections of the CLRW cable* , the wire colours apply to cable type: HKSK 8x2x0.22

CABLE HKSK 8x2x0,22 OR OTHER SHIELDED
TWISTED PAIR CABLE

SIGNALS

P TXD	BLACK 20
S TXD	BLUE 41
U EX_TXC	BLACK 18
W EX_TXC	ORANGE 39
V RXC	BLACK 19
X RXC	GREEN 40
R RXD	BLACK 21
T RXD	BROWN 42
B GND	BLACK 9
E DSR	GREY 58
F DCD	BLUE 6
D CTS	WHITE 57
H DTR	BLUE 46
C RTS	ORANGE 4

22, 23, 24,
25, 26, 27,
31, 32, 47,
50, 52

34-PIN M-BLOCK
CONNECTOR
MALE
REAR VIEW

METAL SHEAT OF CABLE EARTHED WITH
CONNECTING SCREW OF PDE RACK

D62 CONNECTOR
MALE
REAR VIEW
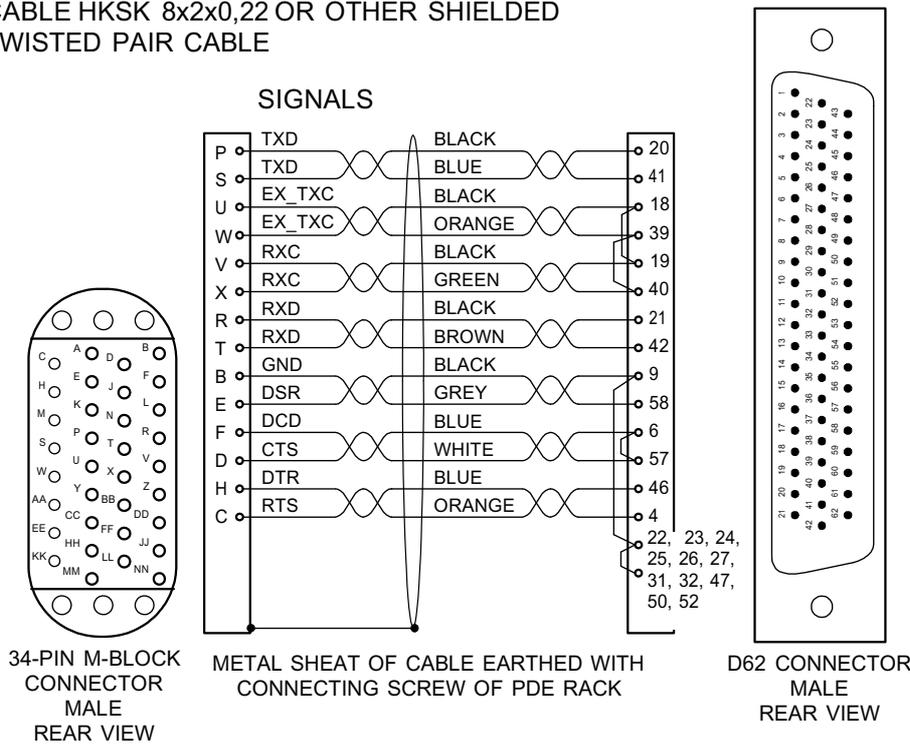
CONNECTORS:
MALE 34 PIN M-SERIE AMP (213300-2)
PIN HOUSING (PIN: AMP 163090-2)
62 PIN MALE D-CONNECTOR,
AMP 748333-4 CON., 748367-1 FRAME

NOTES:
PINS 6.57, 18-19, AND 39-40 ARE LOOPED
PINS 22, 23, 24, 25, 26, 27, 31, 32, 47, 50 AND 52
ARE TIED TO PIN 9 (SIGNAL GROUND)

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Figure 63.   Connections of the CLRW cable

X.21 cable from BSC to Modem

X.21 cable from BSC to Modem is shown in Table *X.21 cable* .

Table 52.   X.21 cable

Cable type:	6 pairs, twisted, shielded, cross section 0,4 mm^2 ; for example: MHS 8 x 2 x 0.4+0.4
Connector type:	15-pin D connector (male)

Connect the X.21 cable to the CLT cable which is routed out of the rack. The recommended maximum length for the cable is 1200 meters, and the maximum transmission speed is 2.2 Mbit/s. The colours of the conductors are the same as for the cable type MMHS 8x2x0.4+0.4.

The cable and the connector should meet the requirements of the UL 1459 standard or the National Electrical Code ANSI/NFPA No.70.

The cable must be grounded at the rack's grounding element.

In Figure *Connections of the X.21 cable* , the wire colours apply to cable type: MMHS 8x2x0.4+0.4.
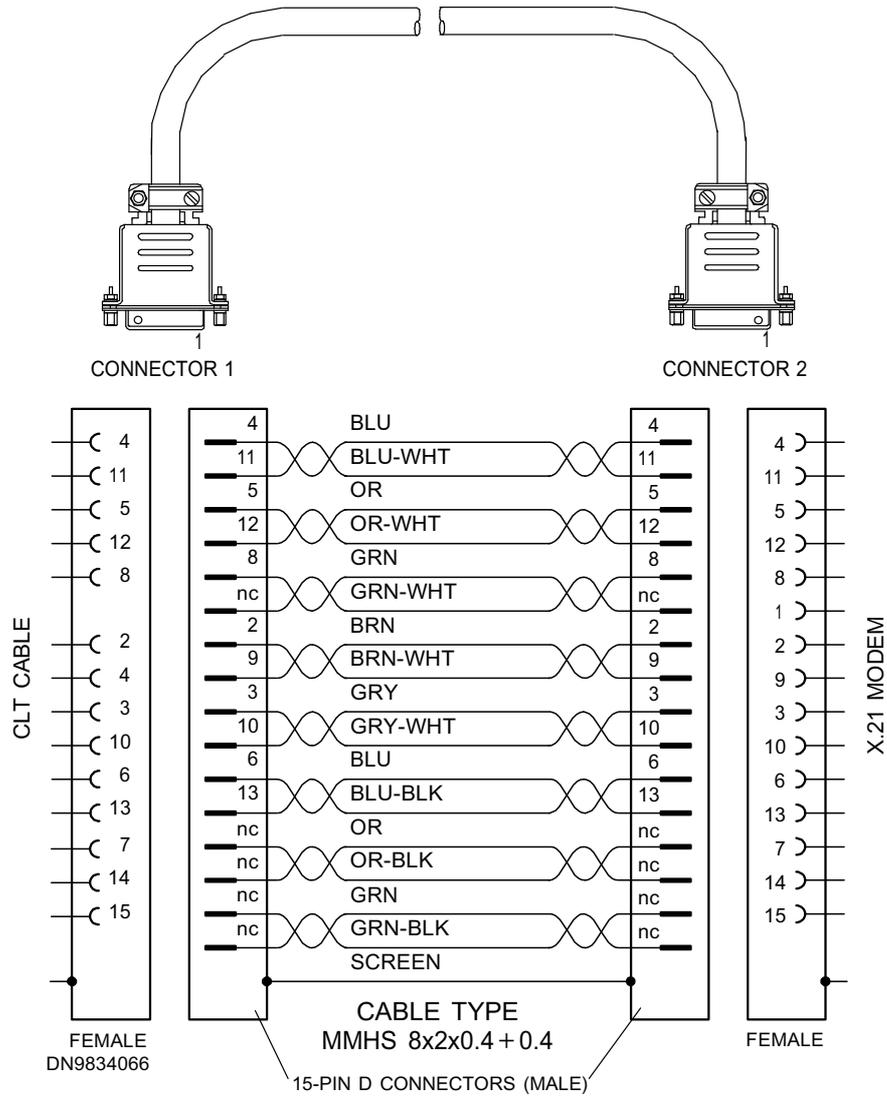
Figure 64.   Connections of the X.21 cable

V.24 cable from BSC to Modem

V.24 cable from BSC to Modem is shown in Table *V.24 cable* .

Table 53.   V.24 cable

Cable type:	8 pairs, twisted, shielded, conductor cross section 0.4 mm^2 ; for example: MMHS 8 x 2 x 0.4+0.4

Table 53.   V.24 cable (cont.)

Connector type:	25-pin D connector (male)

Connect the V.24 cable to the CLS cable which is routed out of the rack. The same cable can also be connected to the restricted V.24 interface.

The cable and the connector should meet the requirements of the UL 1459 standard or the National Electrical Code ANSI/NFPA No.70.

The cable must be grounded at the rack's grounding element.

In Figure *Connections of the V.24 cable* , the wire colours apply to cable type: MMHS 8x2x0.4+0.4.
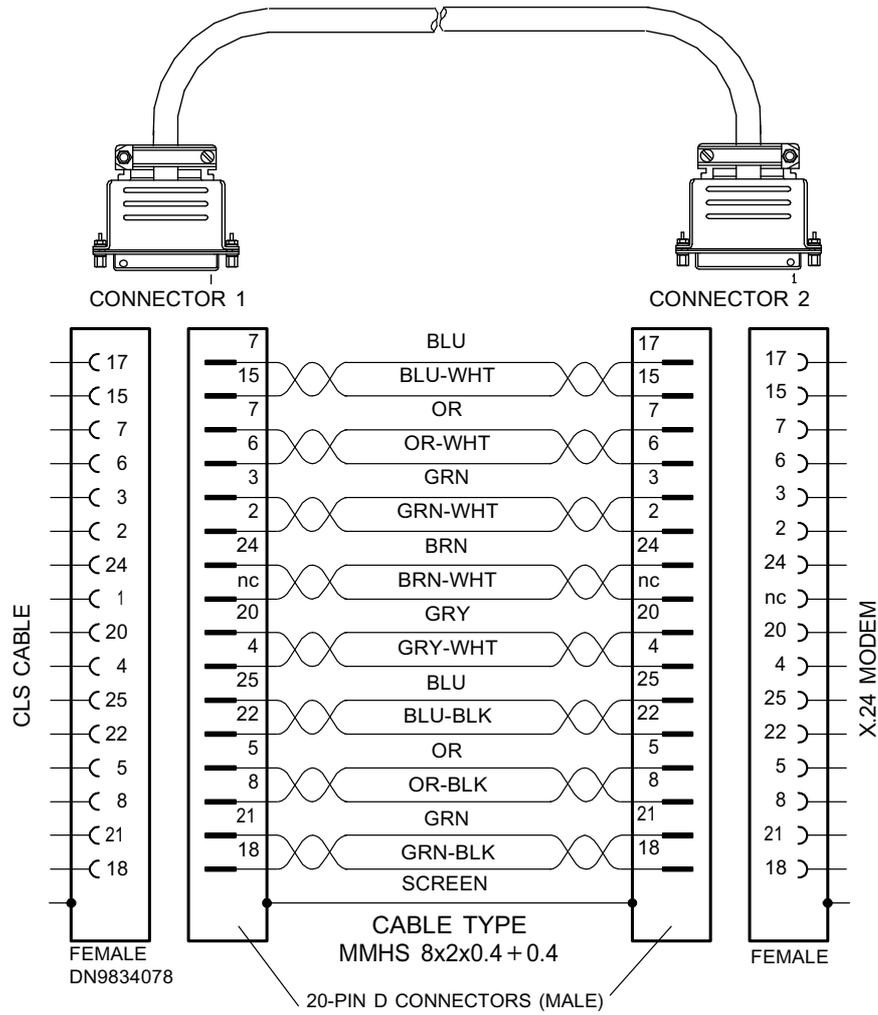
Figure 65. Connections of the V.24 cable

12.11   Attachment Unit Interface (AUI)

The AUI interface is cabled starting from the AUI connector (J1) of the COCEN plug-in unit.The connector is a 15-pin D female connector.

The cable must be grounded at the rack's grounding element.

See Tables *AUI cable (J1)* and *AUI cable connector (D15), pin configuration* .

Table 54.   AUI cable (J1)

Cable type:	Twisted, shielded, pair cable; for example:MMHS 8x2x0.4+0.4
Connector type:	15-pin D connector (male)

Table 55.   AUI cable connector (D15), pin configuration

Pin	Signal
1	CI_S
2	CI_A
3	DO_A
4	DI_S
5	DI_A
6	VC
7	
8	
9	CI_B
10	DO_S
11	DO_B
12	DI_S
13	VP
14	VS
15	

12.12 Coaxial Interface (COAX)

The COAX interface is cabled through the COAX connectors at the COCEN front panel. The incoming direction of the cable is connected to one connector, and the outgoing direction to the other.

The cable must be grounded at the rack's grounding element.

See Table *COAX cable* .

Table 56.   COAX cable

Cable type:	Coaxial cable, 50 ohm (d=4.65 mm), for example Belden 9907
Cable connector:	Coaxial connector (BNC/50 ohm / straight type, crimp)
Crimping tool:	Suhner 3.25 or 76-0-0-15/PU-A or Crimpex DCC 0908

12.13 Twisted Pair Interface (TPI)

The TPI interface is cabled starting from the TPI connector (J3) of the COCEN plug-in unit.

The cable must be grounded at the rack's grounding element.

See Tables *TPI cable (J3)* and *TPI cable connector, pin configuration (CGT or CKQ)* .

Table 57.   TPI cable (J3)

Cable type:	2 insulated pairs, twisted, shielded, cross section 0.4 mm^2 ; for example: MMHS 2x2x0.4
Connector type:	RJ45 modular connector (8-pole) CKG: shielded connector CGT: unshielded connector

Table 58. TPI cable connector, pin configuration (CGT or CKQ)

Pin	Signal	Colour	Remarks
1	TD+	Blue	Outgoing direction
2	TD-	Blue / White	Outgoing direction
3	RD+	Orange	Incoming direction
4			
5			
6	RD-	Orange / White	Incoming direction
7			
8			

12.14 LAN (Ethernet) interfaces of the COCEN plug-in unit in BSC2

The communication controller for Ethernet is the COCEN plug-in unit that provides three LAN interfaces complying with the IEEE 802.3 standard for Ethernet serial interfaces: 10Base5 (AUI), 10Base2 (COAX) and 10BaseT (TPI).

The cables and the connectors should meet the requirements of the UL 1459 standard or the National Electrical Code ANSI/NFPA No.70. The connector should also meet the requirements of the FCC Part 68.

The cable must be grounded at the rack's grounding element.

12.15 LAN interface of the CP6LX plug-in unit

CP6LX plug-in unit provides one LAN interface complying with the IEEE 802.3 standard for Ethernet serial interfaces, 10/100BaseT.

The cables and the connectors should meet the requirements of the UL 1459 standard or the National Electrical Code ANSI/NFPA No.70. The connector should also meet the requirements of the FCC Part 68.

The cable must be grounded at the rack's grounding element.

See the tables below for more information.

Table 59.   LAN (Ethernet) cable (CNI)

Cable type:	Category 5, S-FTP (shielded, foil, twisted pair), AWG24/26 (0.51 mm^2 /0.4 mm^2)
Connector type:	Shielded RJ45 connectors (8-pole) at both ends, category 5

Table 60.   LAN (Ethernet) cable connector RJ45, pin configuration

Pin	Signal	Colour	Remarks
1	TX+	White/orange	Incoming direction
2	TX-	Orange	Incoming direction
3	RX+	White/green	Outgoing direction
4		Blue	
5		White/blue	
6	RX-	Green	Outgoing direction
7		White/brown	
8		Brown	

12.16   LAN interfaces of the CP6MX plug-in unit

There are two Ethernet interfaces on the CP6MX front panel. The implementations of these two interfaces are identical.

The cable type and cable connector are presented in Table *LAN (Ethernet) cable (CNI)* .

Table 61.   LAN (Ethernet) cable (CNI)

Cable type:	4 pairs, twisted, shielded (S-FTP), AWAG24/26, category 5,
Cable connector:	Shielded RJ45 modular connector (8-pole) at both ends, category 5

The shielded RJ45-type connectors have the same pinout, given in Table *Ethernet Connector Pin Out* .

Table 62.   Ethernet Connector Pin Out

Pin	Signal Description	I/O	Name
1	Transmit positive	Out	TX+
2	Transmit negative	Out	TX-
3	Receive positive	In	RX+
4	Not connected	–	N/C
5	Not connected	–	N/C
6	Receive negative	In	RX-
7	Not connected	–	N/C
8	Not connected	–	N/C

12.17   LAN connection on CPLAN-S panels

Two CPLAN-S panels with 24 RJ45 connectors are mounted on top of the BCBE and BCEE racks in BSC2i deliveries. CNI-type LAN cables between the CPLAN-S panels and the LAN ports of PCU (PCU, PCU-S, PCU-T, PCU2-U) and CPU plug-in units are also installed. However, the LAN cables are not connected at the plug-in unit end in S10.5
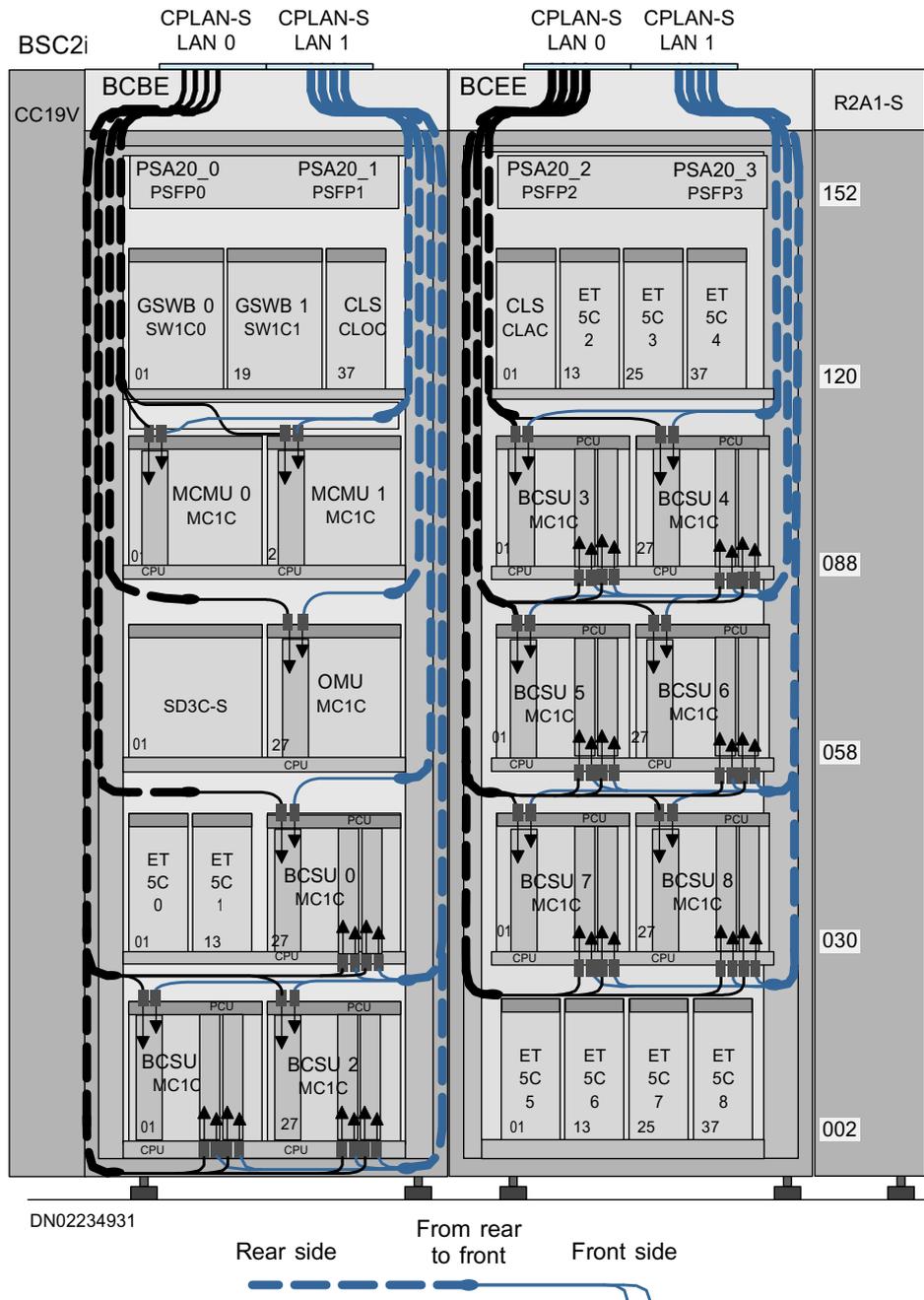
Figure 66.   LAN cabling in BSC2i (S10.5, LAN cabling included but not connected at the plug-in unit end)

In S11, an integrated LAN connection option is available for BSCE; BSCi, BSC2A and BCS2E; BSC2i upgraded from BSC2A or BCS2E, prior to BSC2i first delivery as delivered before S10.5. The LAN cables are connected to the PCUs.

The cabling used is a CNI-type LAN cable intended for external LAN cabling between the CPLAN-S panel port and an external LAN switch or router port.

BSCi

CPLAN-S LAN 0   CPLAN-S LAN 1   CPLAN-S LAN 0   CPLAN-S LAN 1

| CC22V | | | | BCBE | | | | | | BCEE | | R2A1-S |

PSA20_3 PSFP3   PSA20_2 PSFP2   PSA20_1 PSFP1   PSA20_0 PSFP0   177

SW1C0   MCMU 0 MC1C   CLAC ET 5C 1 ET1C 6   151

SW1C1   MCMU 1 MC1C   ET1C 4   ET1C 5   123

CBD 8

CLOC ET 5C 0 BCSU 0 MC1C   ET1C 2   ET1C 3   089

OMU MC1C   SD3C-S   BCSU 3 MC1C   BCSU 4 MC1C   061

BCSU 1 MC1C   BCSU 2 MC1C   BCSU 5 MC1C   BCSU 6 MC1C   027

ET1C 0   ET1C 1   BCSU 7 MC1C   BCSU 8 MC1C   0

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From rear to front

Rear side   Front side

From LAN 1
From LAN 0

CPU   PCU

Figure 67.   LAN cabling in BSCi

12.18 External synchronisation

The CLS functional unit (Clock Cartridge) of a BSC receives external synchronisation signals via CNB cable and transmits them to the CLxTG plug-in unit. The cabling associated with the CLxTG is connected to the connector points at the rear of the CLOC cartridge.

The synchronisation signals from the external frequency standard are connected to connector points B01S5 (FS1A, FS1B) and B01S6 (FS2A, FS2B) when using the CLxTG .

13 Installing the doors DS196 (BSC2) and DS198 (TCSM2)

The doors DS196 (BSC2) and DS198 (TCSM2) are the last mechanical parts to be mounted to the racks. Note that the stability test of the network element is begun only after they have been properly mounted.

The doors (DS196 / C22226 and DS198 / C22227) are provided with cooling vents (see Figure *Mounting of doors DS196 and DS198* and Table *Door mounting parts*).
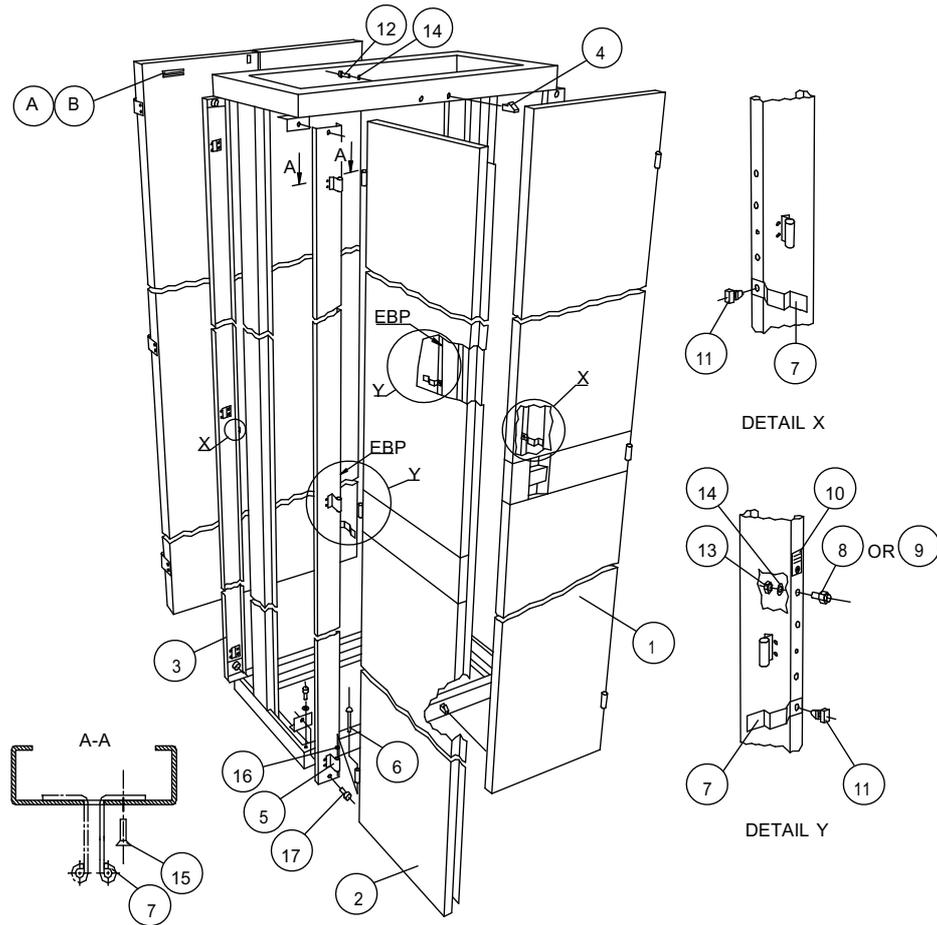
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Figure 68.   Mounting of doors DS196 and DS198

Table 63.   Door mounting parts

Part No.	Name
A,B	Label
1	Door 193R (BSC2), 194R (TCSM2)
2	Door 193L (BSC2), 194L (TCSM2)

Table 63.   Door mounting parts (cont.)

Part No.	Name
3	Girder 19
4	Pin
5	Hinge A
6	Hinge pin
7	Restrictor
8	EBP (Earth Bonding Point) connector 7, or
9	EBP (Earth Bonding Point) connector 10
10	EBP (Earth Bonding Point) sticker
11	Fastening pin
12	Rec hex socket screw M6x10
13	Hexagon nut M6
14	Washer A6.4
15	Crosshead screw M4x10
16	Washer 4.3
17	Rec hex socket screw M8x20

Steps

1. **Fix the hinges to the girders**

   Make sure that the door with a handle will always open to the right.

2. **Install the girders with hex socket screws**

3. **Mount the door lock pins**

   Mount the door lock pins for both the top and bottom edges after you have installed the girders.

4. **When mounting the door, place the topmost hinge pin first**

Install also the plastic washer.

5.   Install the doors and latches

The doors and their latches should fit without any special adjustment.

Expected outcome

After installing the doors, you are ready to *attach the network element identification stickers and labels* .

14 Installing the doors DS196E (BSC2) and DS198E (TCSM2)

Install doors DS196E (BSC2) and DS198E (TCSM2) before the stability test. Handle the doors with great care when removing them from the packages and during installation. The conductive (EMC) sealings attached to the edges of the doors should not get damaged or dirty.

Steps

1. **Attach the hinge beams and the upper and lower strips with the mounting plates to the rack body**

   See Figure *Mounting of doors DS196E and DS198E* , point X.

EMC- SEALING

POINT X

POINT Y

A-A

X

EBP

Y

EBP

Y

A   A

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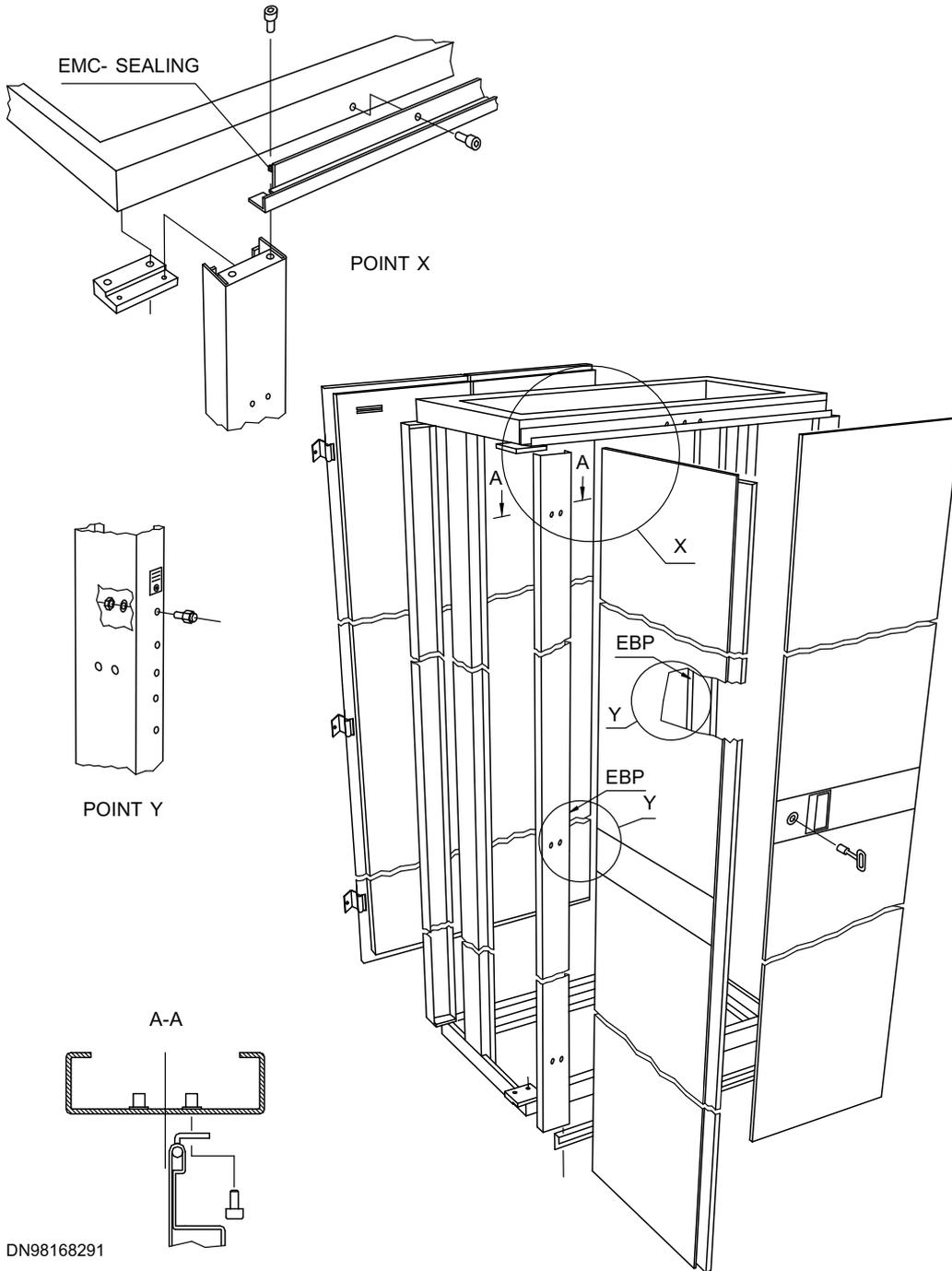
Figure 69.   Mounting of doors DS196E and DS198E

2.   **Fasten the doors by the fixed hinges to the hinge beams**

Use hexagonal socket head screws. Make sure that the door equipped with a handle and a lock comes to the right-hand side.

3.   **Leave the screws a bit loose at first and close the doors**

The doors close best when closed simultaneously.

4.   **Move the doors slightly**

This helps the sealing strips to force the doors straight and into the correct position.

5.   **Tighten the hexagonal socket head screws through the holes by the hinges**

Tighten the screws when the doors are properly in place and closed.

6.   **Test that the doors open and close properly**

Note

The disturbance protection sealing requires a certain amount of pressure to be able to work efficiently, and you are supposed to feel some resistance when closing the doors.

7.   **Test that the doors can be locked using the key**

8.   **Check that the sealings are clean and undamaged**

9.   **Check that the doors are in a linear position**

The gap between the doors should be equally large both at the top and at the bottom.

10.   **If necessary, adjust the doors again**

11.   **Add the EBP connectors and the stickers to the left hinge beam, both at the front and the rear of the rack**

See Figure *Mounting of doors DS196E and DS198E* , point Y.

Expected outcome

After installing the doors you are ready to *attach the network element identification stickers and labels* .

15 Attaching Network Element identification stickers and marking labels in BSC and TCSM2

This section describes the positions where the marking and warning labels are attached in the BSC and TCSM2 racks and other structures. The labels are delivered as complete sets in separate bags. Table *Examples of BSC2 and TCSM2 marking and warning label sets* lists the manufacturer codes of the label sets for different BSC2 and TCSM2 variants.

Table 64.   Examples of BSC2 and TCSM2 marking and warning label sets

Product	Manufacturer code
BSC2A, TCSM2A	C29465
BSC2E	C28368
TCSM2E	C28483

15.1 Stickers attached using a transfer foil

The marking labels indicating the name and number of the rack of the TC2E, BCBE and BCEE racks are attached with the help of a transfer foil. The sticker text is between a transfer foil and a base paper. The transfer foil helps to guide the text into the correct position on the door, and no other accessories are needed. (See figure *An example: placing of the name label transfer foil on the door* .)

TOP RIGHT EDGE OF DOOR

x)

x)

2 "

TC2E

TRANSFER PRINT FOIL
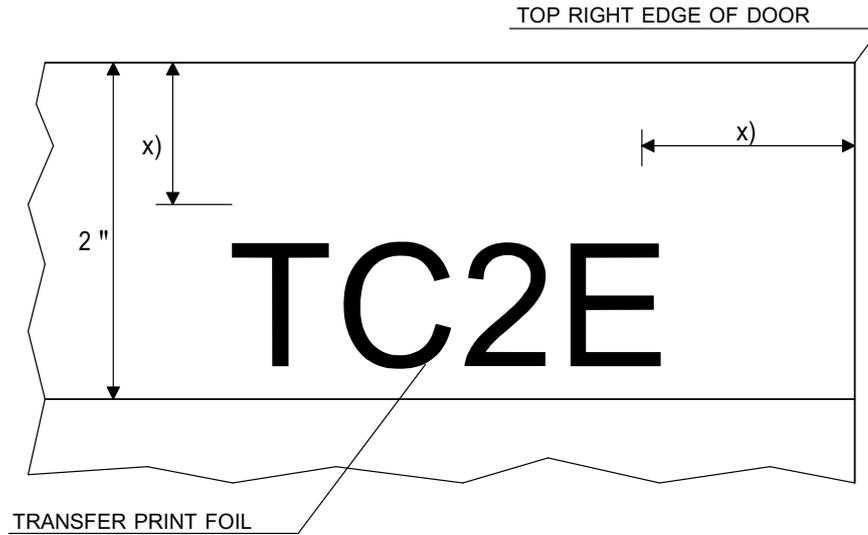
x) STANDARD DIMENSIONS IN TRANSFER

DN9860331

Figure 70.   Example: placing of the name label transfer foil on the door

Attaching a sticker with transfer foil:

Steps

1.   **Attach the sticker to a dry surface cleaned with spirits**

2.   **Before detaching the base paper, press the label against a hard, smooth surface so that the text is attached firmly to the transfer foil**

3.   **Place the transfer foil levelly in the position indicated by the drawing, starting from the right-hand edge**

4.   **Press the text firmly. Remove the transfer foil by pulling it off at a 180° angle to the surface**

5.   **Remove any air bubbles**

      Expected outcome

The text will be permanently attached within 24 hours.

15.2   Attaching ordinary stickers

The following instructions help you to attach ordinary label stickers:

Steps

1.   **Attach the sticker to a dry surface cleaned with spirits**

2.   **Place the sticker levelly in the desired position, starting from the right-hand edge. Press the sticker firmly**

3.   **Remove any air bubbles**

     Expected outcome

     The sticker will be permanently attached immediately.

15.3   Positioning of the labels

The positions where the marking and warning labels are attached are described in *Attaching labels on front doors and front side upper structures* , *Attaching rack top cover plate warning label* , *Attaching labels inside the racks – front side* and *Attaching labels inside the racks – rear side* .

15.3.1   Attaching labels on the front doors and front side upper structures

Note

Labels 1, 2a and 2b are for the ANSI version products only.

Steps

1.   **Attach labels 1 (manufacturer info), 2a (FCC Rules info) and 2b (UL1459 label) to the the top front plate at the front of each rack**

     Attach the labels to the positions shown in Figure *Attaching the rack top front plate labels and the rack name and number labels* .
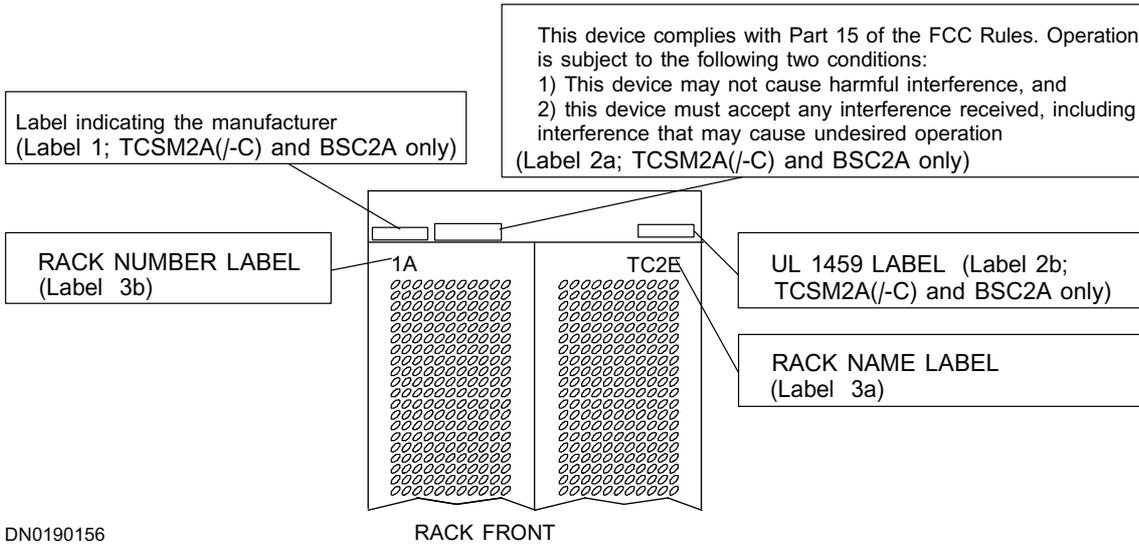
Figure 71. Attaching the rack top front plate labels and the rack name and
            number labels

2. **Attach the rack name transfer foil (label 3a) to the top right-hand
    corner of the right-hand side front door of the rack and the rack
    number transfer foil (label 3b) to the top left-hand corner of the left-
    hand side front door of the rack**

    See Figure *The rack top cover plate label (label 4)* .

Figure 72. The rack top cover plate label (label 4)

15.3.2 Attaching rack top cover plate warning label

Steps

1. **Attach label 4**

   Label 4 has the text 'Energy hazard exists below this cover...'.

2. **Fasten the label on the top plate of the rack**

   For a sample figure, see *The rack top cover plate label (label 4)* .

15.3.3 Attaching labels inside the racks - front side

Note

The grounding labels are supplied as two alternative versions: a larger one with a circular line around the grounding symbol and a smaller one without the circular line. Use either type of these according to your preferences.

Steps

1. **Attach label 8 (indicating the earth bonding point) to both the left and right-hand rack door hinge support beams inside the rack**

2. **Attach label 12 (indicating the termination of grounding cable) to the upper end of the grounding busbar**

   See Figure *Placement of the rack door attention and warning labels, the cartridge shelf labels, the grounding label, the earth bonding point label and the labels behind the rack top cover plate*

3. **Attach label 9 to the inside surface of the right-hand side front door of each rack**

   Being the electrostatic sensitive devices attention label, label 9 indicates rack door attention. Attach it as shown in Figure *Placement of the rack door attention and warning labels, the cartridge shelf labels, the grounding label, the earth bonding point label and the labels behind the rack top cover plate* .

4.   **Attach one piece of label 10 (the rack door hinge support beam attention label) to both the left- and the right-hand side rack door hinge support beams**

The positions are shown in the figure below.

MAX 70 A TIME-DELAY FUSE
OR CIRCUIT BREAKER
REQUIRED IN POWER SOURCE.

(LABEL 5)

- 48 V ⎓ ; 12 A

(LABEL 6)

HAZARDOUS
ENERGY LEVEL:
600 VA

(LABEL 7)

EARTH
BONDING
POINT

(LABEL 8)

ATTENTION
OBSERVE PRECAUTIONS
FOR HANDLING
ELECTROSTATIC
SENSITIVE
DEVICES

(LABEL 9)

(LABEL 10)

(LABEL 11)

GROUNDING BUSBAR

GROUNDING CABLE

GROUNDING
LABEL

(LABEL 12)
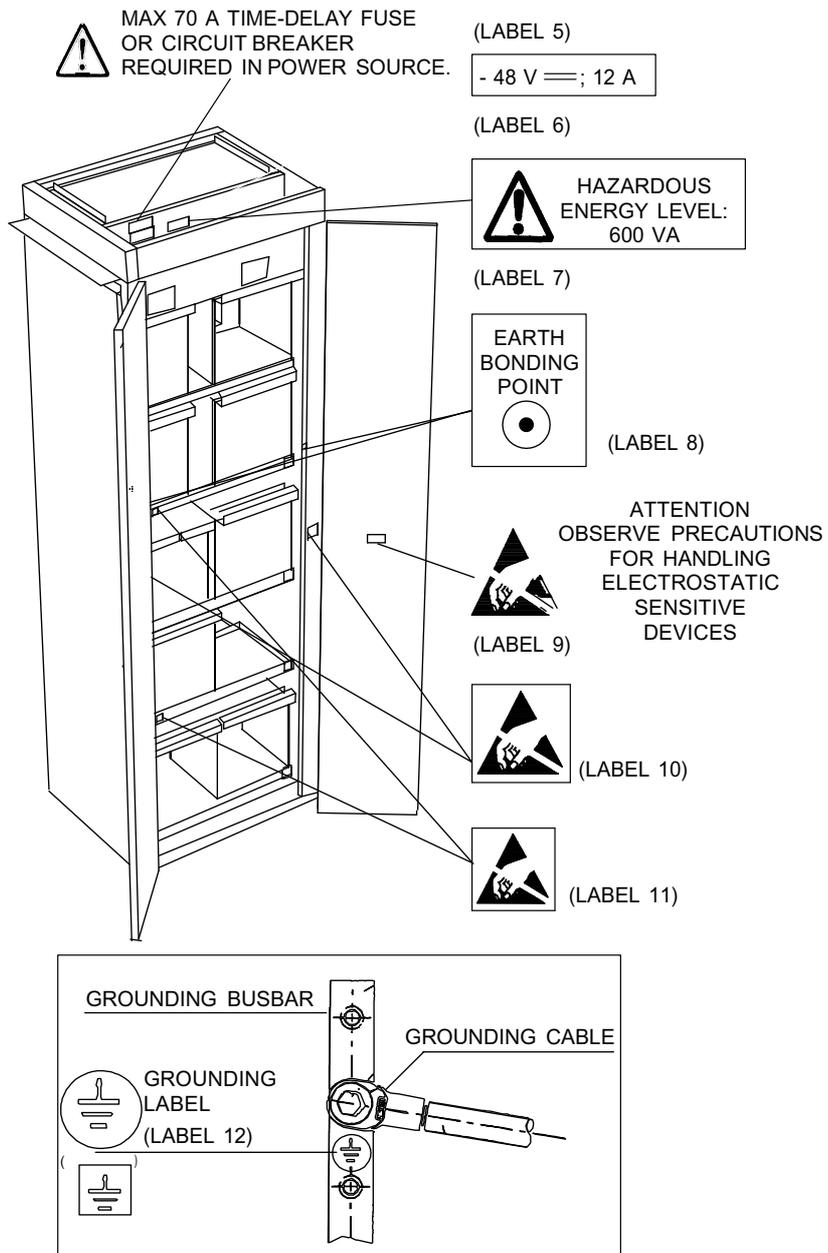
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Figure 73.   Placement of the rack door attention and warning labels, the
cartridge shelf labels, the grounding label, the earth bonding point
label and the labels behind the rack top cover plate

5. **Ensure that the electrostatic sensitive devices attention labels are in their proper places**

Each TCSM2 rack is delivered from the factory with an electrostatic sensitive devices attention label (label 11; the cartridge shelf attention label) attached to the left-hand end of each cartridge shelf. The proper places are shown in Figure *Placement of the rack door attention and warning labels, the cartridge shelf labels, the grounding label, the earth bonding point label and the labels behind the rack top cover plate* . In case any of them is missing, attach a new one.

Note

Labels 10 and 11 are similar in appearance, except for the size. Label 11 is the smaller one of the two.

15.3.4   Attaching labels inside the racks - rear side

Note

Each BSC2 and TCSM2 cartridge is provided with a marking label indicating, for example, the cartridge name, the PCM interface number, functional unit number or plug-in unit names, depending on the cartridge and its function. The labels are filled in at the factory, except for labels for the ET1TC and ET5C cartridges

Due to the multiple plug-in unit configuration and allocation options offered, the labels for the ET1TC and ET5C cartridges have been left partially blank; the only details shown are the name of the cartridge and the positions of the plug-in units. The boxes left blank are filled in at the site in accordance with the equipment configuration installed into each cartridge.

```
┌─────────────────────────────────────────────────────┐
│ SW1C0                                                 │
│        ┌──────────────────────────────────────────┐  │
│        │ SW64B │ SW64B │ SW64B │ SW64B │ PSC  1    │  │
│        └──────────────────────────────────────────┘  │
└─────────────────────────────────────────────────────┘

┌─────────────────────────────────────────────────────┐
│ ET5C                                                  │
│        ┌──────┬──────┬──────┬──────┐                  │
│        │      │      │      │      │                  │
│        ├──────┼──────┼──────┼──────┤                  │
│        │      │      │      │      │                  │
│        └──────┴──────┴──────┴──────┘                  │
└─────────────────────────────────────────────────────┘
```
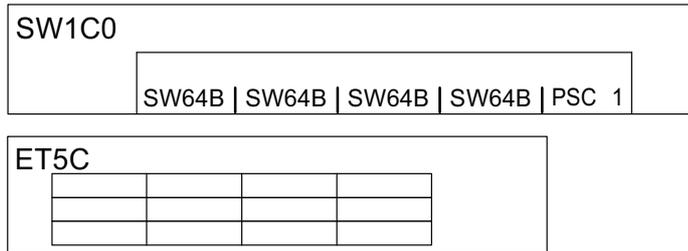
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Figure 74.   Identification labels mounted at the top of the ET5C and SW1C0
              cartridges of the BSC2 (example)

Note

The plug-in units of the BSC2 and TCSM2 are delivered from the factory with an
attention label for Electrostatic Sensitive Devices and two identification labels
attached to the front panel. For further information, see *Equipping the cartridges
with plug-in units* .

In addition, each ET2A plug-in unit of the BSC2A and TCSM2A is provided
with an FCC Rules Part 68 label, which is described in Figure *Sample of the FCC
Rules Part 68 label and its position in the ET2A plug-in unit* – the plug-in unit
and cartridge labels.

COMPLIES WITH PART 68, FCC RULES

Registration number: 5H9FNL-40090-WC-N   Ringer equivalence Number: N/A
Made in Nokia NOKIA Networks, Finland   **Use USOC jack:** RJ48C
Model Number: C8781
Applicant's Name: NOKIA Networks , Finland

PLACEMENT OF THE FCC PART 68 LABEL
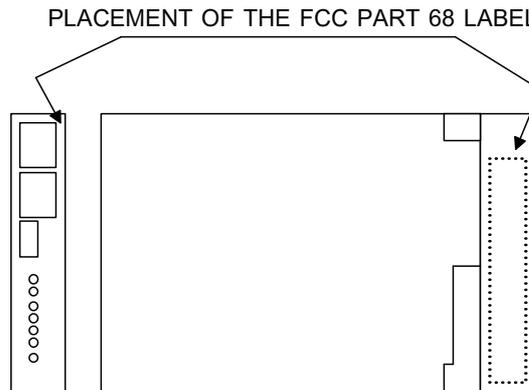
DN0190168   ET2A FRONT   ET2A ROTATED TO LEFT

Figure 75.   Sample of the FCC Rules Part 68 label and its position in the ET2A
plug-in unit

Steps

1.   **Attach label 9 on the inside surface of the right-hand side rear door of
each rack**

Attach label 9 (electrostatic sensitive devices attention label – door
attention label) to the position shown in Figure *Placement of the rack door
attention and warning labels, the cartridge shelf labels, the grounding
label, the earth bonding point label and the labels behind the rack top
cover plate* .

2.   **Attach label 8 to both the left and right-hand rack door hinge support
beams inside the rack**

Attach label 8 (which indicates the earth bonding point – earth bonding
point labelt) to the position shown in Figure *Placement of the rack door
attention and warning labels, the cartridge shelf labels, the grounding
label, the earth bonding point label and the labels behind the rack top
cover plate* .

3.   **Place a number sticker (10 x 10 mm or 0.4 in x 0.4 in) on the BSC2 and TCSM2 end connector housings of all the cables going to the environment**

The number in the sticker label refers to the plug-in unit position of the subrack which the cable starts from. The marking materials are included in the installation accessories. Mark the cables in a similar manner at the other end as well – marking outgoing cables.

4.   **Place a number sticker (10 x 10 mm or 0.4 in x 0.4 in) on the BSC2 and TCSM2 end connector housings of all the cables going to the environment**

The number in the sticker label refers to the plug-in unit position of the subrack which the cable starts from. The marking materials are included in the installation accessories. Mark the cables in a similar manner at the other end as well – marking interconnection cables. See Figure *Interconnection cabling example seen from the rear of the TC2E rack* .

Expected outcome

After all of the stickers and labels are attached, you can proceed to *installing the lamp panel* and *finishing off the installation* .

16 Installing the lamp panel in BSC

These procedures give instructions on the positions of control devices and connections for the external alarm cabling.

A special lamp panel (LAMPP) is employed for the indication of alarms. The panel incorporates eight alarm-receiving relays, each of which yields alarm information to be transmitted further. An indicator light has been connected to five of the relays.
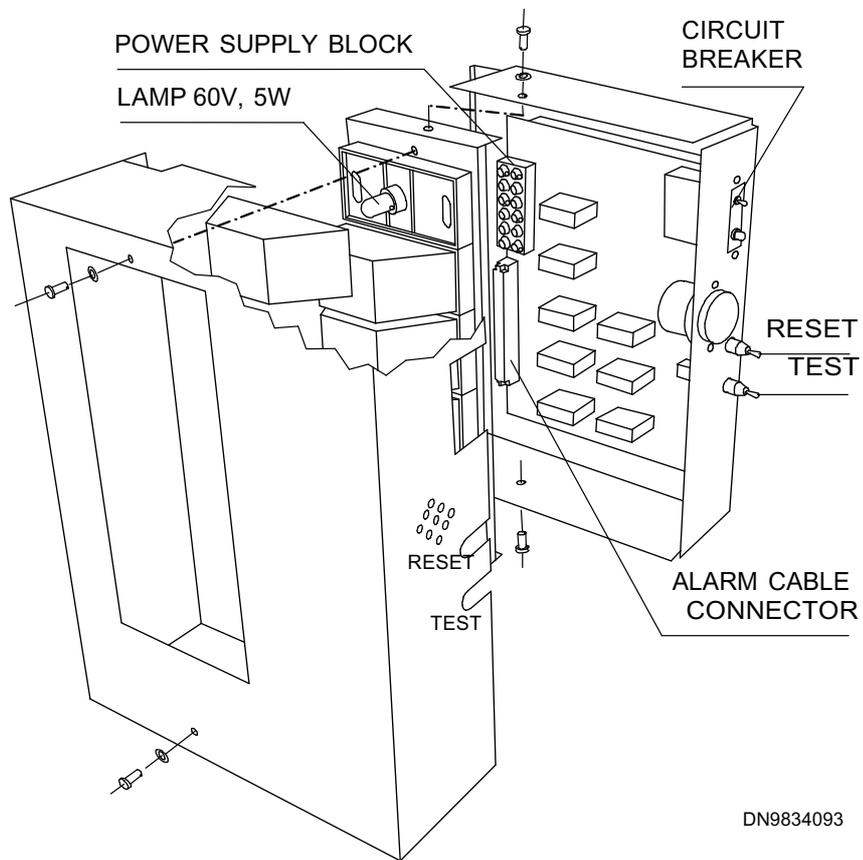
Figure 76.   Lamp panel (LAMPP 4207)

The lamp panel contains a resettable buzzer (RESET), a lamp test button (TEST), and an automatic fuse. The 48 V (60 V) power supply for the panel can be taken from the rectifier. The power supply must be protected using a fuse with the maximum value of 20A.

Table *Colours of alarm signals* lists the texts and colours of the indicator lights:

Table 65.   Colours of alarm signals

Alarm type	Alarm	Colour	Position
SWITCH	(AL0)	Red	uppermost
TRANSM	(AL1)	Yellow	
POWER	(AL2)	White	
O and M	(AL3)	Green	
EXTERN	(AL4)	Blue	lowermost

16.1   Mounting the lamp panel

Mount the lamp panel rigidly on a concrete wall using four screws and plastic plugs, or on a dry wall using appropriate fasteners, for example screws and wedge anchors.
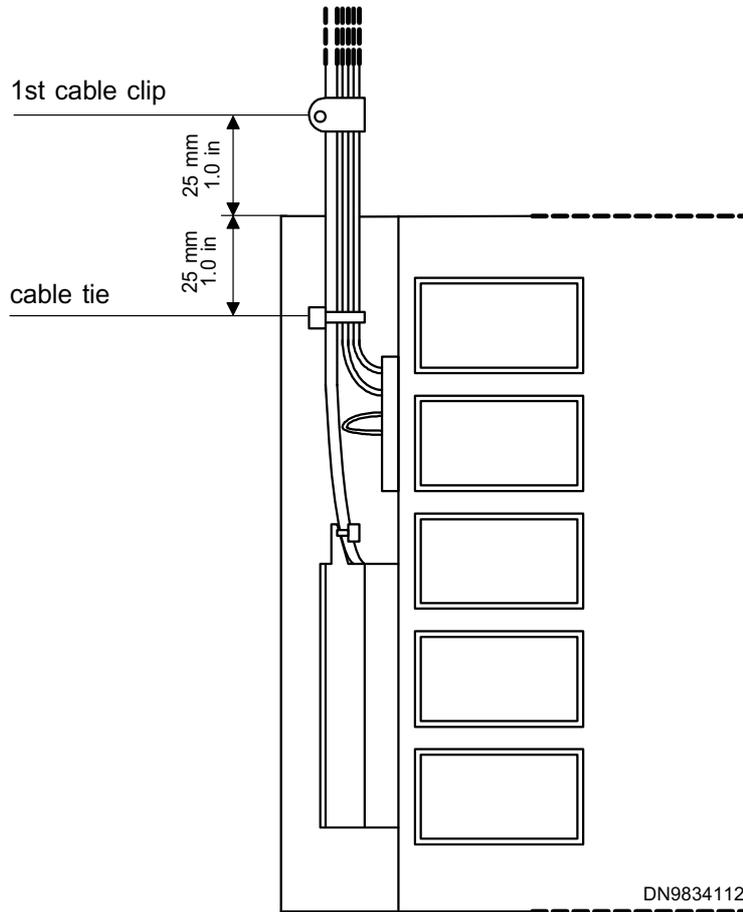
Figure 77.   Securing the lamp panel cables

Steps

1.   **Unscrew the two cover retaining screws and remove the cover from the lamp panel box**

See Figure *Lamp panel (LAMPP 4207)* .

2.   **Check that the jumpering/strapping settings are correct**

3.   **Drill four holes in the wall and insert a plastic plug (or a wedge anchor) into each hole**

The distances for the holes are given in Figure *Mounting the lamp panel on a wall* .

240 mm (9.45")

165 mm (6.5")

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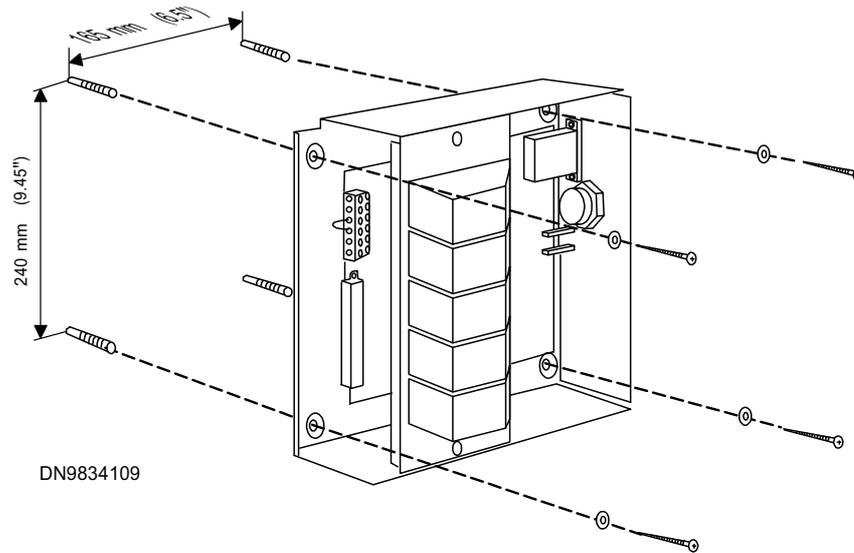
Figure 78.   Mounting the lamp panel on a wall

4.   Mount the panel box on the wall using four screws

Use four screws (min. diameter 5.0 mm or 0.2 in, length 30.0 mm or 1.2 in, as shown in Figure *Mounting the lamp panel on a wall* .

5.   Connect the power supply wires to the power supply strip and check that the power supply jumper settings (strappings) are correct

6.   Connect the alarm cable following the instructions given in the chapter below

7.   Strap the alarm and power supply cables together

Use a cable tie, as shown in Figure *Securing the lamp panel cables* .

8.   Secure the alarm and power supply cables

Screw or nail the cable clips into the wall, with the first clip approximately 25.0 mm (1.0 in) above the wire aperture at the top end of the lamp panel, as shown in Figure *Securing the lamp panel cables* . Cover the cable, if required, with suitable panels or tubes.

9.   Affix the cover to the lamp panel box

16.2　Connecting the alarm wires

Steps

1.　**Connect the alarm wires**

　　Connect the alarm wires to the lamp panel with a 64-pin Euroconnector

2.　**Lead the cable from the connecting intermediate distribution frame, if necessary**

　　The cable can be led from the intermediate distribution frame that connects the alarm cables coming from the BSC.

Further information:

If only control of the indicator lights is required (signals AL0 to AL4), the CYL cable (see Figure *CYL cable*) can be used to connect the alarms from the MDF. The cable is available complete (lengths 5, 10, 35 and 55 m). The maximum distance between the lamp panel and the exchange equipment it is connected to is 55m (180ft.).

The alarms can be cabled straight from the front connector of the HWAT plug-in unit using the CYL cable.

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CONNECTOR 1　　　　　　CONNECTOR 2

CYL = Connectors 1 (LAMPP) + 2 (OMU/HWAT)
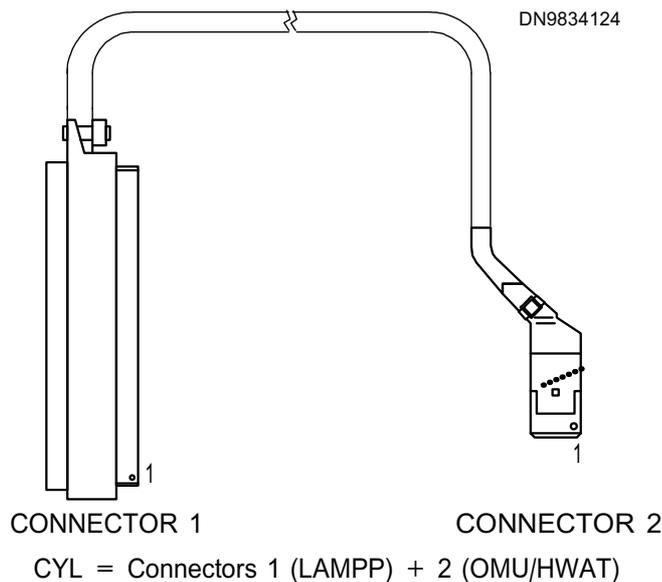
Figure 79.　CYL cable

Note

The alarm cables entering BSC2 rack must be grounded (earthed) at the grounding elements (for more information, see *Grounding the metal sheaths of cables.*

Figure *Connection of lamp panel cable and power supply strip* shows the contacts of the alarm relays in the idle position. The maximum allowed contact voltage is 60 V and the maximum allowed contact power on resistive load is 30 W or 50 VA.

Lamp panel alarm cable CYL:

Table 66.   CYL cable

Cable type:	MMHS 4x2x0.4+0.4 (CYLS/CYL)	
Cable connectors	CYL:	1 Euroconnector C2 x 32F, casing 1/1
		2 Euroconnector C3 x 7F, casing 1/8

Table 67.   Connection of CYL cable

Lamp Panel Lamp	CYL cable Connector 1	Colour	Signal	Connector 2
Red	4a	blue	AL0	
Yellow	7a	blue-white	AL1	
White	10a	orange	AL2	
Green	13a	orange-white	AL3	
Blue	16a	green	AL4	
	19a	green-white	AL5	

Table 67.   Connection of CYL cable (cont.)

Lamp Panel Lamp	CYL cable Connector 1	Colour	Signal	Connector 2
	25a	brown	AL6	
	26a	brown-white	AL7	
		sheath *)	0 V	
*) Grounded to the grounding element of the rack				

The cables from the OMU to the lamp panel can also be led through the distribution panel (MDF) using two CYL cables, one from the OMU to the MDF and one from MDF to the lamp panel.

The following abbreviations are used in Figure *Connection of lamp panel cable and power supply strip* :

AL0 to AL7   Alarm relay control points (control voltage +5 V, R = 5 kOhm)

-SE, +SE   Connection points for the external buzzer reset button

Vr1 to Vr4   Pins of circuit breaker alarm contacts (contact in operating position)
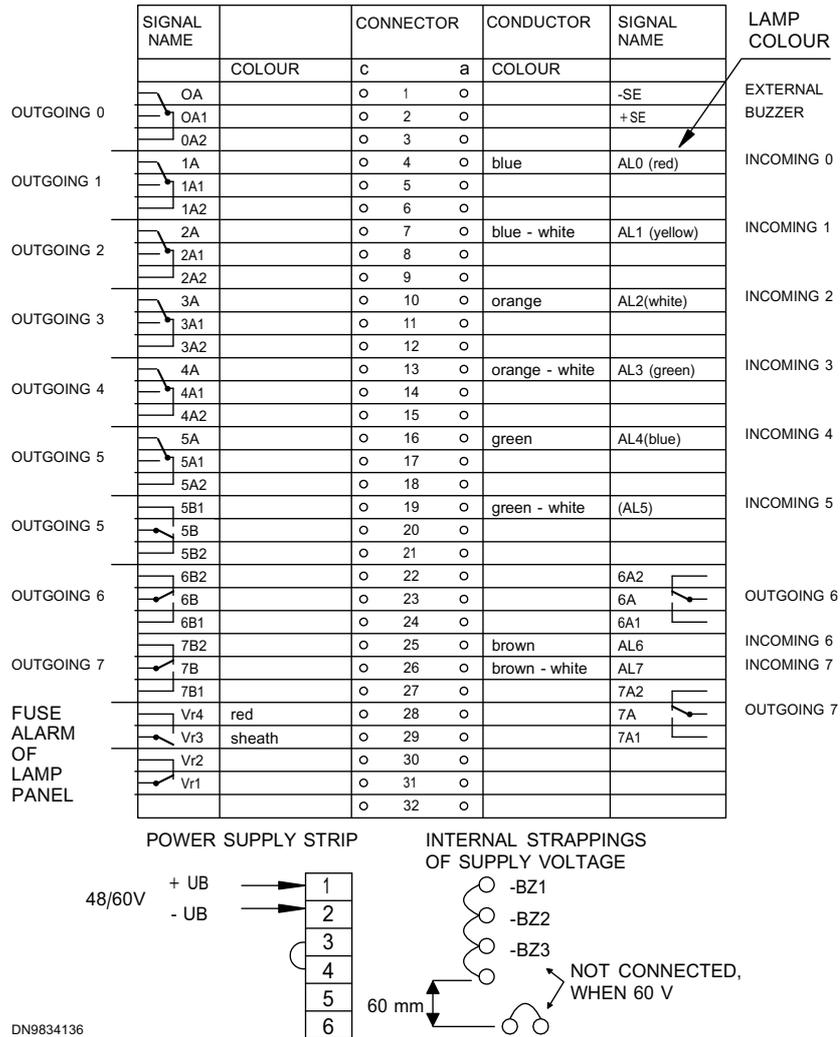
SIGNAL NAME	COLOUR	CONNECTOR c		a	CONDUCTOR COLOUR	SIGNAL NAME	LAMP COLOUR
OUTGOING 0 — OA		o	1	o		-SE	EXTERNAL BUZZER
OA1		o	2	o		+SE	
0A2		o	3	o			
OUTGOING 1 — 1A		o	4	o	blue	AL0 (red)	INCOMING 0
1A1		o	5	o			
1A2		o	6	o			
OUTGOING 2 — 2A		o	7	o	blue - white	AL1 (yellow)	INCOMING 1
2A1		o	8	o			
2A2		o	9	o			
OUTGOING 3 — 3A		o	10	o	orange	AL2(white)	INCOMING 2
3A1		o	11	o			
3A2		o	12	o			
OUTGOING 4 — 4A		o	13	o	orange - white	AL3 (green)	INCOMING 3
4A1		o	14	o			
4A2		o	15	o			
OUTGOING 5 — 5A		o	16	o	green	AL4(blue)	INCOMING 4
5A1		o	17	o			
5A2		o	18	o			
OUTGOING 5 — 5B1		o	19	o	green - white	(AL5)	INCOMING 5
5B		o	20	o			
5B2		o	21	o			
OUTGOING 6 — 6B2		o	22	o		6A2	
6B		o	23	o		6A	OUTGOING 6
6B1		o	24	o		6A1	
OUTGOING 7 — 7B2		o	25	o	brown	AL6	INCOMING 6
7B		o	26	o	brown - white	AL7	INCOMING 7
7B1		o	27	o		7A2	
FUSE ALARM OF LAMP PANEL — Vr4	red	o	28	o		7A	OUTGOING 7
Vr3	sheath	o	29	o		7A1	
Vr2		o	30	o			
Vr1		o	31	o			
		o	32	o			

POWER SUPPLY STRIP

INTERNAL STRAPPINGS OF SUPPLY VOLTAGE

48/60V + UB → 1 — -BZ1
        - UB → 2 — -BZ2
               3 — -BZ3
               4   NOT CONNECTED, WHEN 60 V
               5 60 mm
               6

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Figure 80.   Connection of lamp panel cable and power supply strip

17 Finishing off BSC and TCSM2 installation

The last steps in the actual installation process are the final check of the installation and reinstallation of the doors, after which the network element is ready for commissioning.

Steps

1. **Verify the completion of installation**

    Verify against the *Check list* in *Installation Work Check List, Generic BSC and TCSM2 Installation* that you have completed all the necessary steps for the installation.

    Visually check the installation.

2. **Fill in the Completion form**

    Fill in the Installation Certificate of Completion form in *Installation Work Check List, Generic BSC and TCSM2 Installation* .