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Ericsson GSM System

RBS 2202
Maintenance Manual

ERICSSON

LZN 302 91 R8C

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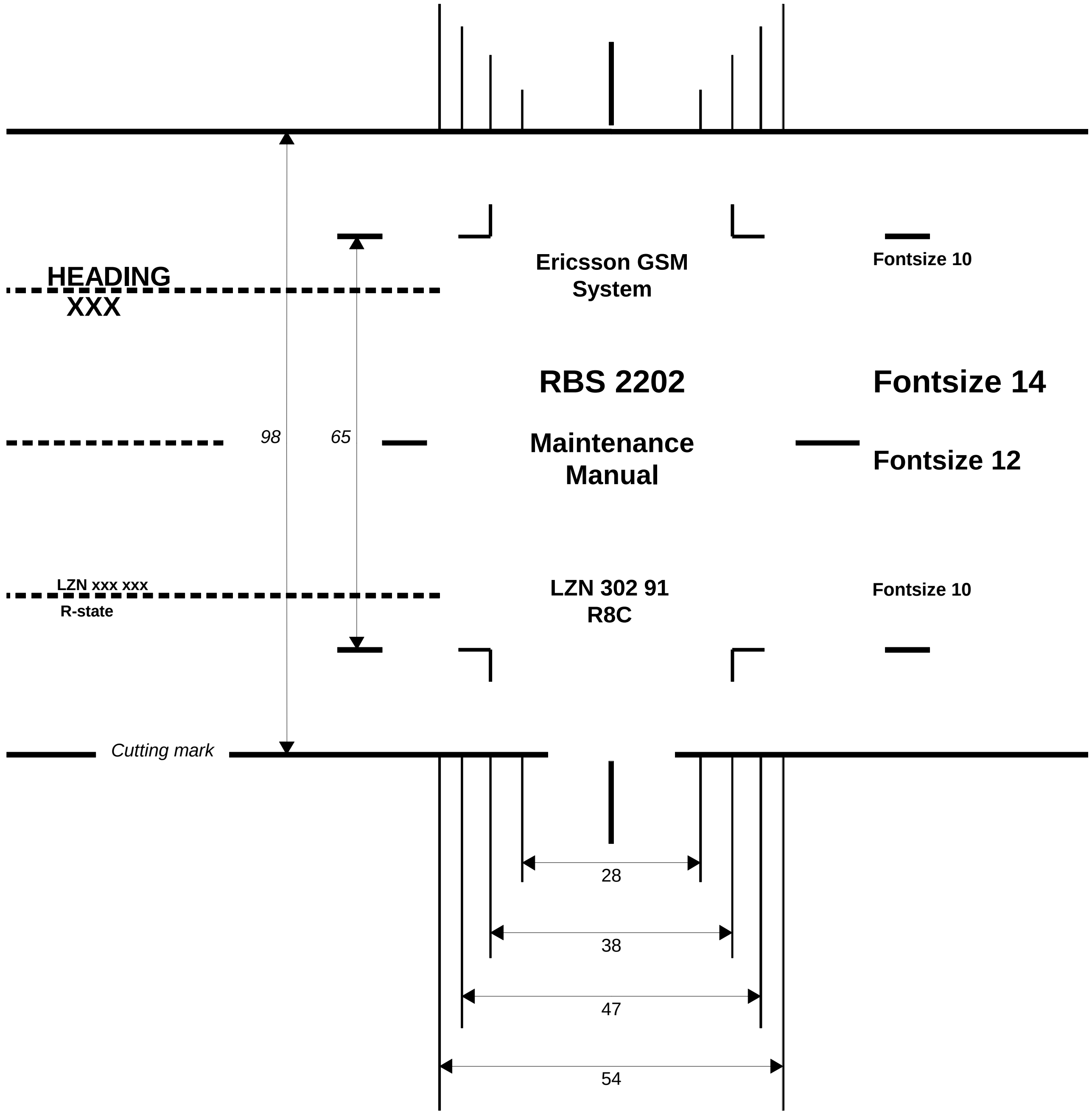

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RBS 2202 Maintenance Manual

Due to continued progress in methodology, design and manufacturing, the contents of this document are subject to revision without notice.

Contents

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1 Introduction

This Maintenance Manual is valid for the Ericsson GSM Base Station System (BSS) from release R7 up to R8.

The purpose of the manual is to provide the information necessary for first line maintenance. First line maintenance includes the following activities:

- Repairs that entail replacement on site. Only Replaceable Units (RUs) are handled.
- Preventive maintenance.

The instructions in this manual apply to a Radio Base Station (RBS) connected to a Base Station Controller (BSC), and it is assumed that the RBS is installed and in operation.

1.1 Product Overview

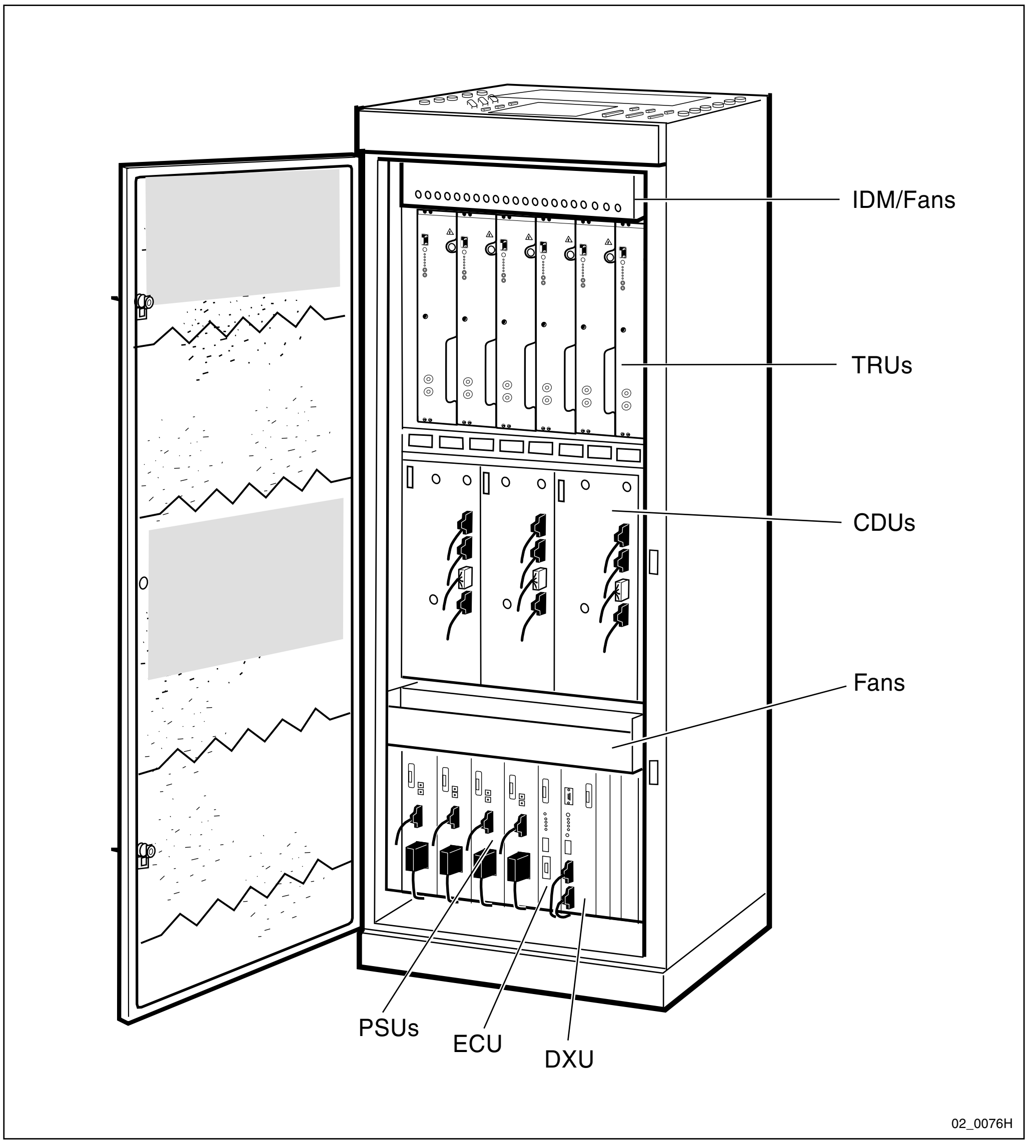

Figure 1 RBS 2202 cabinet overview

This is a brief overview of the RBS 2202. For further information about the RBS 2202, see:

Reference Manual *EN/LZT 720 0001*

The RBS 2202 is a member of the RBS 2000 family of indoor and outdoor RBSs operating in the GSM 900, GSM 1800 and GSM 1900 frequency bands.

The RBS 2202 is designed for indoor installation. See chapter “Positioning of RUs” for more detailed product overview.

Cable entries for feeders, transmission and power cables are concentrated to the top part of the cabinet on connection fields.

1.2 RBS 2000 Library Overview

The user documentation for all RBS 2000 models consists of customer manuals divided to suit different process events. The *Library Overview* contains the following information for each manual:

- A short description
- The recommended target group
- The product number

Library Overview *LZN 302 73*

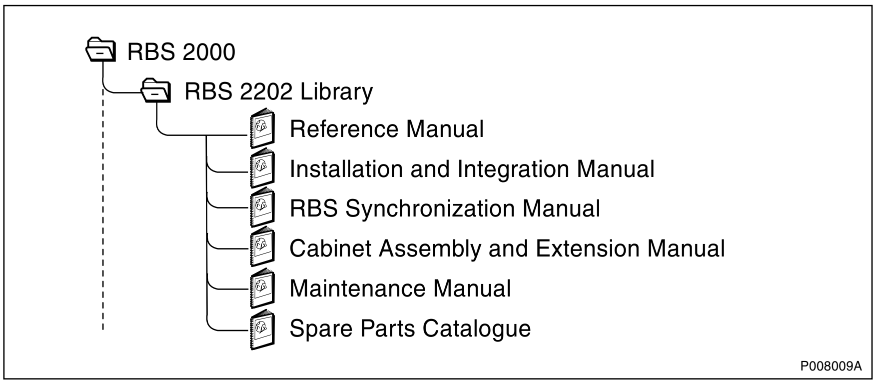

Figure 2 RBS customer documentation library

This manual is part of the RBS customer documentation library shown in the figure above.

1.3 How to Order CPI

CPI can be ordered in the same way as all other Ericsson products using the product number to identify each product. Orders can be placed through any local Ericsson company, or alternatively, on the internet. How operators and customers and Ericsson companies order CPI is described in detail below.

1.3.1 Outside Ericsson

To place an order for CPI, contact any Ericsson company and follow the same procedure as with all other Ericsson products.

The most up-to-date CPI can be downloaded from the extranet by customers and contractors that have obtained access by visiting Ericsson's extranet e-business site. *See access information below*.

How to Obtain Access to the Extranet

Access is granted by the Key Account Manager (KAM) from your local Ericsson company. The extranet address is:

https://ebusiness.ericsson.net/

To be able to access the extranet site you need to ensure that:

☐ your company allows access to secure sites (HTTPS) through its firewall.

☐ your PC has either Microsoft Internet Explorer 4.01 with SP2 or later, or Netscape Navigator 4.61 or later.

☐ your browser has the plug-ins necessary to view or download PDF and Microsoft Office files.

If you are unsure of any of these preconditions, please check with your local IS/IT support or help desks within your company.

The Access Process

- To access the site you must have an individual user name and password. To request access, send an e-mail to the support centre **asq.ex@era.ericsson.se** stating your name, telephone number, email address and with which customer or Ericsson company you work.

  Once your access is set up, a reply with all the details you need will be sent to you.

- The first time you log in to the site, we recommend that read the user instructions.

More information about extranet can be found at the extranet address above. For support on issues related to the Extranet, Tel.: +46 8 585 33085

1.3.2 Inside Ericsson

The intranet is an internal Ericsson web that can only be accessed by Ericsson personnel.

All CPI products are available on the intranet at CPI Store:

http://cpistore.ericsson.se

Ericsson personnel, who may require access to CPI while operating outside Ericsson's firewall, can get more information about extranet access from the following address:

http://inside.ericsson.se/ebusiness/

A Portal Order form can be downloaded from the How to Start menu at this site to make the application process easier.

1.4 Target Group

This manual is written for RBS 2000 field technicians. The sub-section "Fault Analysis from OMC" in the section "Maintenance Process Overview" is written for the Operation and Maintenance Centre (OMC) operators.

Local safety regulations may require that all work (installation, repair, revision and so on) with high-voltage equipment must be done by a qualified or certified electrician only.

The field technician is expected to be experienced in radio and mobile communications, and have a good understanding of technical English. The required knowledge of the equipment can be acquired by following the courses for RBS 2000 field technicians. The courses are:

- GSM System Survey LZU 108 852
- RBS Site Maintenance LZU 108 874

Call an Ericsson Training Centre for a complete training plan.

1.5 Maintenance Process Overview

The purpose of this chapter is to provide an overview of the maintenance process and describe how to perform the correct maintenance procedures.

1.5.1 General

RBS 2000 radio base stations are administered and controlled by the BSC. There is a master/slave relationship between the BSC and the RBS, and the BSC has an overview of the status of the radio network and its resources.

The BSC manages the O&M of the RBS across the Abis Interface. The RBS equipment is seen as an MO by the BSC. This is a way of describing the RBS, in a functional way and as a logical model, in the BSC. All O&M actions are based on this logical model structure created in the BSC. An MO does not necessarily have a one-to-one relationship with a physical unit in the RBS.

The MO, describing RBS 2000 (G12), is divided into two sub-classes: AO and SO. The SO is the abstract sub-class of the MO that owns the hardware. The AO only handles functions.

The RBS can be set in local or remote mode. Local mode means that the RBS has been disconnected and isolated from the BSC, while in remote mode the RBS is controlled by the BSC.

When the RBS is in remote mode, the BSC acts as a master in the BSC-RBS relationship and all RBS maintenance actions are ordered by the BSC. Faults in the RBS are reported to the BSC on an MO basis. All faults reported by the MOs in the RBS are stored in the BSC error log.

Tests on MOs with RBS hardware can be ordered by a BSC operator in order to check the status of the RBS. The operator can also test the connection between the BSC and a TRU in the RBS by ordering a loop test. A test pattern is passed through the loop created between the BSC and one specific time slot in a specified TRU.

The RBS contains test and supervision functions that detect malfunctions and report them to the BSC. Tests and supervision are performed on an MO basis, which means that the different MOs supervise their own equipment.

Statistics are collected on an MO basis in the BSC, for example, the number of call setup attempts, or the number of abnormally terminated calls.

1.5.2 Fault Handling Workflow

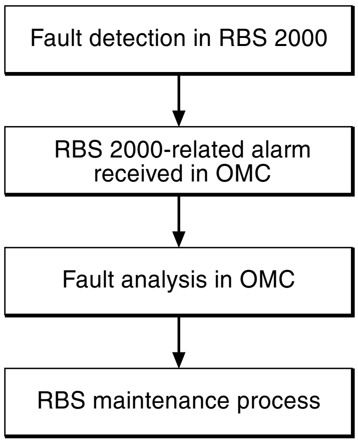

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Figure 3 Fault handling workflow

Steps one and two are automatically performed by the BSS. Step three is performed at the OMC by an operator who handles the RBS alarm with support from OPI. By analysing the fault situation, the OMC operator will be able to choose the appropriate action. At the RBS site, step four is performed by a field technician, who follows the instructions in this manual.

1.5.3 Fault Analysis from OMC

This section very briefly describes a typical fault analysis process, performed from an OMC. It describes procedures that have to be done before sending a field technician to the site.

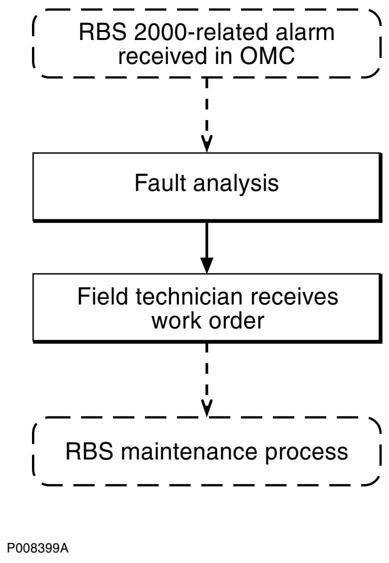

Figure 4 Fault analysis from OMC

Fault analysis

The fault is given in plain text at the BSC. The faults are divided into class 1 and class 2 alarms. Some of the alarms also indicate the suspected faulty HW unit in a, so called, RU map.

Field technician receives work order

Before writing the work order, the following questions are asked to optimise the site visit:

- Is preventive maintenance scheduled at this site in the near future?
- Are there any other faults at this site that have been postponed?
- Are there any other reasons for sending a field technician to the site?

The work order must include information about the following:

- Site location
- How to get to the site
- Cabinet identity
- The suspected RU
- The error log must be included, if a logical RU is suspected to be faulty
- If the fault situation is unclear, site history must be included; for example, whether the same type of fault has been detected and repaired a few weeks earlier

With the information above, the field technician carries out the maintenance work at the site. When the maintenance work is completed, the field technician sends a report back to the MSC.

1.5.4 RBS Maintenance Process

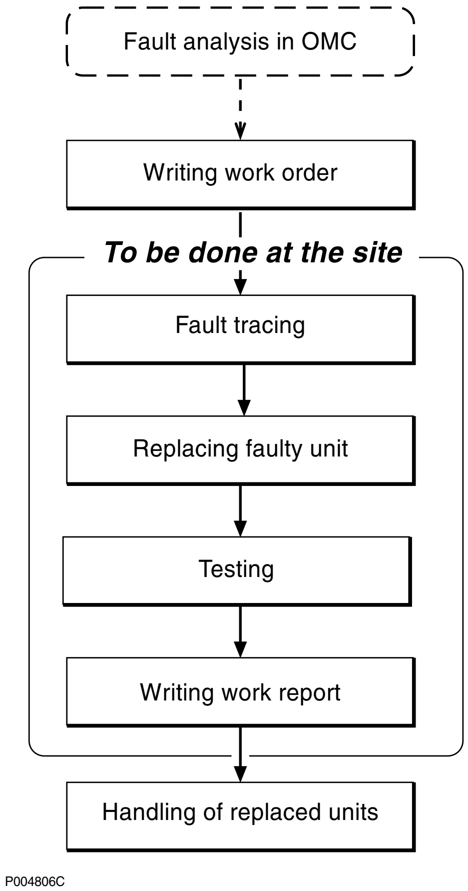

Figure 5 The RBS Maintenance Process

Preparatory Actions

Writing work order

As a result of the fault analysis a work order is written. The work order includes information about site location, how to get to the site, cabinet identity, the suspected RU and site history. An error log is included if the fault is defined as logical.

Note: The chapter *Safety Instructions* must be read through to ensure knowledge of potential risks prior to beginning work on the RBS equipment.

The work order is analysed before personnel are sent to the site. The flowchart(s) in the chapter *Fault Localisation* that concern the faulty unit(s) is read. This providesinformation on:

- Selecting the spare parts and tools required at the RBS site.
- Informing the OMC operator if the site visit requires taking the RBS out of traffic or reduces RBS functions.

To Be Done at the Site

Fault tracing

The chapter *Fault Localisation* provides methods for finding the faulty unit in the RBS that causes the alarm reported to the BSC. For example, when the work order denotes that a TRU is faulty, fault localisation will point out the position of the faulty TRU.

All alarms given in the RU maps correspond to a section in the chapter *Fault Localisation*.

Replacing faulty unit

The chapter *RBS Field Repair* describes how to replace a faulty unit.

Testing

The RBS is tested before the field technician leaves the site. The chapter *Test after Repair* describes how to verify that the RBS is functioning properly.

Writing work report

The chapter *Concluding Routines* provides information on the different administrative routines that must be performed before leaving the site.

After Maintenance

Handling of replaced units

The chapter *Concluding Routines* describes which units are repairable and which are disposable and the different administrative routines connected to both.

1.5.5 Fault Cases

The purpose of this section is to explain the different fault cases that can arise in the RBS 2000. This forms the basis for choosing between different methods when localising a detected fault.

- Unambiguous indication with an indicator and an RU map.
- Unambiguous indication with an RU map only.
- Unit that is unambiguously indicated, but consists of several replaceable parts.
- Logical RU indicated.

Note that the BSS only pinpoints one RU in the RU Map.

Indication with an indicator and an RU Map

Examples of units	DXU, TRU, BFU, PSU, ECU and CDU
Method of localisation	The work order states which unit is affected. When the cabinet is opened, a red Fault indicator will be on in the faulty unit. If this indicator should be defective, only an RBS fault indicator will be on. In this case, the OMT is used to localise the faulty unit.

Indication with an RU Map

Examples of units	RX cables
Method of localisation	The work order states the unit concerned. The Maintenance Manual is used to find out where the unit is located.

Indication of Units that Consist of Several Replaceable Parts

Examples of units	Fan unit
Method of localisation	The work order states which unit is affected. The OMT is used to identify which parts are faulty, for example, which fan is faulty.

Logical RU Indicated

The logical RU is identified when it is not obvious which physical RU is faulty. For example, EPC bus can be indicated, which means that anything connected to it can be faulty.

Examples of units	Local bus, X bus,Timing busand Environment.
Method of localisation	A systematic order of replacement is used to determine the unit that has generated the fault.

The following applies to the logical RU Environment

This logical RU records conditions that cannot be affected from the RBS. The RU is divided into two parts:

- External Power and Climate (condensation, air humidity and temperature). When this RU is identified, the OMC Operator must analyse the fault to determine possible RBS repairs. The OMC Operator must be able to determine whether the reported fault requires maintenance personnel to respond or not.
- In the case of the fault message "Indoor temperature out of safe range", the trouble may cease when local weather conditions change, that is, the sun sets or the temperature changes. Alternatively, in the case of External Power Fault, it is necessary to determine whether or not the cause of the fault is a commercial power failure, prior to dispatching maintenance. If a technician is sent, the work order must include the fault history for the RBS.

1.6 How to Use this Manual

Detailed information about the use of this manual and how to perform maintenance in the correct order, is found in the section "Maintenance Process Overview"in this chapter. A brief description of the contents of each chapter is given below.

Chapter		Brief description
1.	Introduction	Introduces this manual.
2.	Safety Instructions	Describes the risks involved when working with RBS equipment.
3.	Tools and Instruments	Specifices recommended equipment.
4.	Handling of the RBS during Maintenance	Gives important information about requirements before starting a maintenance process on the RBS 2000.
5.	Fault Localisation	Recommends actions for each suggested RU. The purpose is to find the faulty unit so it can be replaced.
6.	RBS Field Repair	Describes actions to be performed as soon as the suspected unit has been localised.
7.	Test after Repair	Describes verification procedures for the RBS.
8.	Concluding Routines	Describes administrative routines resulting from maintenance activity.
9.	Optical Indicators and Switches	Describes optical indicators and switches on all RUs in the RBS.
10.	Preventive Maintenance	Describes recommendations for preventive maintenance activities.
11.	Cable Connections	Provides information about cabling in the RBS.
12.	Positioning of RUs	Gives the positioning of RUs for each RBS model.
13.	Glossary	Explains terms and abbreviations.
Appendix A	Fault List	Gives a brief description of all faults reported across the ABIS interface. Also, provides information about related faults and possible reasons for the faults.
Appendix B	Spare Parts Catalogue	Catalogue of all spare parts of the RBS.

1.7 Denominations of RUs

The names of the various RUs are given in the chapter "Positioning of RUs". Regarding the IDM, different variants exist. In this manual, the following denominations have been used.

IDM

There are two different variants of the IDM for RBS 2202:

Variant	Product no.
IDM with fuses	BMG 980 306/
IDM with circuit breakers	BMG 980 316/1

OVP

There are two different versions of the OVP box. Use the following list to distinguish the different versions from each other:

Version	Product no. / Description
OVP	NTM 201 2040/1 (75 Ohm)
	NTM 201 2041/1 (120 Ohm)
	OVP with possibility of five PCM cables:
	NTM 201 2042/1 (75 Ohm)
	NTM 201 2044/1 (100 Ohm)
	NTM 201 2043 (120 Ohm)
	•OVP is used for PCM connections only. It has two printed circuit boards, each holding two sub-boards with protection modules. This OVP is mounted onto the rear panel behind the ACCU or on the back of the ACCU.
OVP-11	NTM 503 700/1 (75 Ohm)
	NTM 503 701/1 (100 Ohm)
	NTM 503 702/1 (120 Ohm)
	•OVP-11 is used for PCM connection as well as TG synch connection. It has one printed circuit board for the PCM cables and one for the ESB cables (for the TG synch connection). The PCM board holds two sub-boards with protection modules, the ESB board holds three sub-boards with protection modules. This OVP is mounted on the back of the ACCU.

1.8 Release History

1.8.1 Rev R5A to R6A

The following paragraphs describe changes that have been made in between these two versions of the *Maintenance Manual*.

General update of the manual

- The OMT User’s Manual has a new product number.

Update of the chapter "Introduction"

- The following section has been updated:
  - "Customer Documentation Library"

Update of the chapter "Fault Localisation"

- The following section has been added:
  - "PSU DC Cable"
- The following sections have been updated:
  - "Environment"
  - "PSU"

Update of the chapter "RBS Field Repair"

- The following section has been added:
  - "ESB Cable"
  - "PSU DC Cable"
- The following sections have been updated:
  - "DXU"
  - "OVP Box"
  - "PSU"
  - "TRU Backplane"

Update of the chapter "Concluding Routines"

- The following section has been updated:
  - "Repair Delivery Note — Blue Tag"

Update of the chapter "Fault Code List"

- The Fault Code List has been updated according to SW release RBS 2000 R7D.

Update of the chapter "Cable Connections"

- The complete chapter has been updated.

1.8.2 Rev R6A to R7A

The following paragraphs describe changes that have been made in between these two versions of the *Maintenance Manual*.

Update of the chapter "Fault Localisation"

- The following sections have been updated:
  - "BFU"
  - "DXU"
  - "External Alarms"
  - "Local Bus"
  - "Power Communication Loop"

Update of the chapter "RBS Field Repair"

- The following section has been added:
  - "EACU"
- The following sections have been updated:
  - "CDU-D RUs"
  - "DXU/ECU Backplane"
  - "OVP Box"
  - "TRU Sub-Rack"

Update of the chapter "Fault Code List"

- The Fault Code List has been improved according to customer demands. This is the improvement step one.

Update of the chapter "Preventive Maintenance"

- The following sections have been updated:
  - "Preventive Maintenance Intervals"
  - "DXU Maintenance"

Update of the chapter "Cable Connections"

- The following section has been updated.
- "DXU/ECU Backplane"

1.8.3 Rev R7A to R8A

The following paragraphs describe changes that have been made in between these two versions of the *Maintenance Manual*.

General update

- The chapter "Fault Code List" has been moved and renamed to "Fault List".

Update of the chapter "Introduction"

- The following section has been updated:
  - "Customer Documentation Library"

Update of the chapter "Tools and Instruments"

- The following section has been updated:
  - "Test Equipment"
  - "Personal Tool Kit, LTT 601 107/1"

Update of the chapter "Fault List"

- The Fault List has been improved according to customer demands.

Update of the chapter "Fault Localisation"

- General update due to the new OMT software.

Update of the chapter "Optical Indicators"

- The chapter Optical Indicators has been improved.

1.8.4 Rev R8A to R8B

The following paragraphs describe changes that have been made in between these two versions of the *Maintenance Manual*.

Update of the chapter "Tools and Instruments"

- The following sections have been updated:
  - "Personal Tool Kit"
  - "Special Tools"

Update of the chapter "Fault Localisation"

- The following section has been improved:
  - "Local Bus"

Update of the chapter "RBS Field Repair"

- The following sections have been updated:
  - "DXU"
  - "Temperature Sensors"

Update of the chapter "Optical Indicators and Switches"

- The chapter Optical Indicators and Switches has been improved.

1.8.5 Rev R8B to R8C

The following paragraphs describe changes that have been made in between these two versions of the *Maintenance Manual*.

General updates

- The chapter "Preface" has been renamed to chapter "Introduction".
- The chapter "Maintenance Process Overview" has been updated and moved into chapter "Introduction".
- The chapter "Fault List" has been improved and moved to the appendix.
- The chapter "Corrective Action" has been renamed to chapter "RBS Field Repair".
- The chapter "Test after Corrective Action" has been renamed to chapter "Test after Repair".
- The following chapters have been removed from the manual:
  - "Frequency Lists"
  - "Country Codes"

Update of the chapter "Introduction".

- There are three new sections:
  - "Product Overview"
  - "How to order CPI"
  - "Maintenance Process Overview"

Update of the chapter "Fault Localisation"

- The following sections have been improved:
  - "DC/DC Converter"
  - "Local Bus"

Update of the chapter "RBS Field Repair"

- There is a new section called "DC/DC Converter".

Update of the chapter "Test after Repair"

- The section "Before Leaving the Site"has been improved and moved to the chapter "Concluding Routines".

Update of the chapter "Concluding Routines"

- The section "Before Leaving the Site"from the chapter "Test after Repair" has been inserted.
- The following section has been improved:
  - "Repair Delivery Note — Blue Tag"

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2 Safety Instructions

This chapter shows the system used for presenting safety information.

Note: Reduce the risk of accidents by studying all the instructions carefully before starting work. If questions arise regarding the safety instructions, contact the supervisor or the local Ericsson company.

Where local regulations exist, these are to be followed. The safety information in this manual is a supplement to local regulations.

It is the responsibility of the local project manager to make certain that local regulations are known and followed.

The relevant manual (including this safety information) and specific instructions supplied by Ericsson must be followed in any work performed on the Ericsson products or systems. A sufficient knowledge of English or of any of the other languages in which the manuals or instructions are printed is necessary.

The safety information in the relevant manuals presupposes that any person performing work on Ericsson products or systems has the necessary education, training and competence required in order to perform that work correctly. For certain work, additional training or special training may be required. For more precise information on the amount and content of the general and/or special training required for work on Ericsson products or systems, please contact the supervisor or the local Ericsson company.

2.1 Warnings

Warnings are used to indicate hazardous activities. The warnings are preceded by the common hazard symbol.

Figure 6 Hazard symbol

The following three warning levels, shown here in order of urgency, are used:

DANGER

Danger means that an accident may occur if the safety precautions are neglected. This type of accident is likely to be fatal.

WARNING

Warning means that an accident may occur if the safety precautions are neglected. This type of accident may be fatal or cause serious injury. It may also damage the product.

CAUTION

Caution means that an accident may occur if the safety precautions are neglected. This type of accident may cause injury or damage the product.

The following special symbols are used to indicate the risk of radio frequency radiation, electrical hazards and electrostatic discharge:

Figure 7 Radio frequency radiation

Figure 8 Electrical hazard

Figure 9 Electrostatic discharge

Warnings are used throughout this manual to alert the reader to special instructions concerning a particular task or operation that may be hazardous if performed incorrectly or carelessly. Therefore, read the instructions carefully.

Strict compliance with the special instructions while performing a task is the best way of preventing accidents.

2.2 Notes

Note: Notes are used to call the reader’s attention to key points that might otherwise be overlooked.

2.3 Beryllium Oxide (BeO)

WARNING

⚠

Do not handle transistors and components without protection. Beryllium Oxide is highly toxic and may be found in transistors, and other components.

Hazard

Beryllium Oxide dust is created by chafing, filing or breakage. It is very dangerous if inhaled, even for only a few seconds. It can cause injury to skin or mucous membranes severe enough to endanger life or cause permanent injury. Particles penetrating the skin through wounds or abrasions are liable to cause chronic ulcerations.

Symptoms of Poisoning

Symptoms of Beryllium poisoning are respiratory troubles or cyanosis (grey-blue discoloration of the skin). These symptoms may develop within a week, or after a period of several years.

First Aid

- A suspected inhalation of Beryllium Oxide should be treated immediately by a doctor at a hospital.
- Wash the area thoroughly if it is suspected that Beryllium Oxide has been in contact with the skin or entered the skin through cuts or abrasions. This should be followed by a medical examination.

Components Containing Beryllium Oxide

Do not store components and washers loose. Do not file or machine them in any way. Do not apply heat except when the components are clamped in a heat sink application.

Power Transistors, Diodes and Thyristors

WARNING

⚠

Do not carry loose components in pockets, bags or containers, or tamper with them in any way that could cause them to break or disintegrate. Do not apply excessive heat during soldering. Do not break open components for inspection.

Components containing Beryllium Oxide are clearly marked in the manufacturer's packing, and identified by attached information.

- Store components in their original packing and do not mix them with other components.
- Ensure that they do not become mechanically damaged. Use care when replacing defective components.
- Beryllium Oxide is encapsulated and components are safe to handle for normal replacement purposes.

Heat Sink Washers

Note: Not all heat sink washers contain Beryllium. Heat sinks containing Beryllium, are individually packed when new.

WARNING

⚠

Do not store washers loose. Do not file or machine them in any way. Do not apply heat, except when the components are clamped in a heat sink.

- Handle with gloves or cloth when removing heat sink washers from packaging and mounting them into place in the equipment.

Cathode Ray Tubes (CRTs) and Ceramic Applications

WARNING

⚠

Do not handle broken glass with bare fingers. Do not blow on exposed surfaces due to the danger of Beryllium Oxide.

Ceramic cylinders or formers containing Beryllium are marked by blue colorations or black lines. They are safe to handle provided they are not damaged. If they are damaged, take precautions as with other components containing Beryllium.

Disposal

Dispose of defective and/or broken Beryllium components in approved containers. Mark them clearly on the outside of the wrapping "COMPONENTS CONTAIN BERYLLIUM"

WARNING

⚠

Never send defective and/or broken components containing Beryllium Oxide through the mail. Instead, return them to the nearest depot by hand.

2.4 Electrical Hazards

High Voltage

DANGER

High voltage is used in the operation of this equipment. Both direct contact with the mains power and indirect contact via damp items or moisture can be fatal.

- The AC installation must be carried out according to local regulations. These regulations may require the work to be carried out by a qualified and authorized electrician.
- Remove wrist watches, rings, bracelets, etc.
- Switch off the power if the cabinet is damp inside.

- Prevent damp entering the equipment during work in bad weather conditions.

DANGER

Improper electrical installation may cause fire or electrical shock. Approved circuit breakers for the AC mains and the cable's cross sectional areas must always be selected in accordance with local laws and regulations. Only a qualified and authorized electrician is permitted to install or modify the electrical installation.

Cable Markings

CAUTION

Verify that the cable markings correspond before connecting cables.

Faulty Electric Tools

WARNING

Do not repair a faulty electric tool yourself. Hand it over to your supervisor in exchange for a functioning tool.

Drilling

WARNING

Do not drill holes in the Radio Base Station. The drill bit may come into contact with live wires.

- Always use insulated protective gloves, such as the LYB 1032, when drilling where live wires might be hidden.
- Always use eye protectors (goggles) when drilling. Flying chips and dust may get into your eyes.

Thunderstorms

DANGER

Avoid working on electrical installations or towers/masts during thunderstorms.

Thunderstorms create strong electric fields. For that reason, and to avoid direct strokes of lightning, it is essential that the equipment is properly earthed for thunderstorm conditions.

2.4.1 Electrostatic Discharge, ESD

CAUTION

Sensitive components such as Integrated Circuits (IC) can be damaged by discharges of static electricity.

Electrical charges are generated by friction when a body moves, rubs against clothes, slides against a chair, when shoes rub against the floor, and when you handle ordinary plastics, etc. Such charges may remain for a considerable period of time.

Handling of printed board assemblies and IC components

Always use an approved antistatic bracelet to avoid damage to components mounted on printed board assemblies. The ESD wrist strap contains a resistor with an ohmic value greater than 1 MΩ in the cable to protect the operator. The resistance value is low enough to discharge the electrostatic voltage. Never replace the cable with any other cable. The ESD wrist strap must be connected to earth. Ericsson recommends wrist strap LYB 250 01/14.

Storing and Transporting printed board assemblies and IC Components

Use the original packaging. If this is not available, use a conductive material, or a special IC carrier that either short-circuits or insulates all leads of the components.

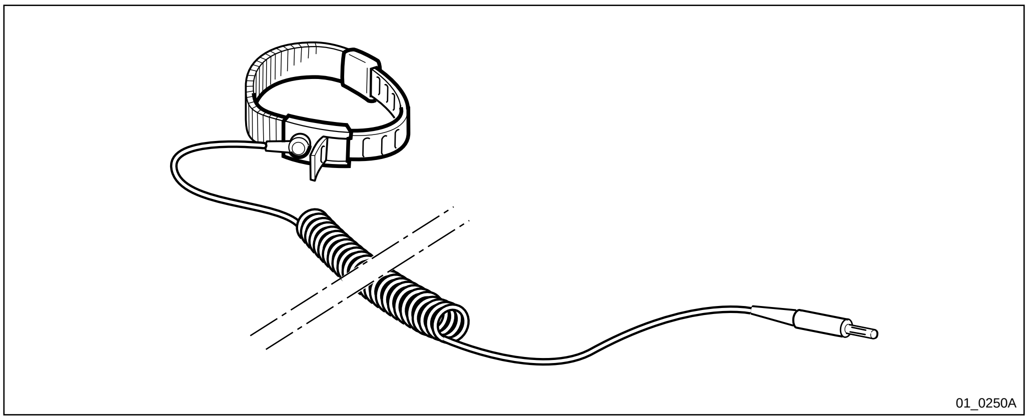

Figure 10 ESD wrist strap LYB 250 01/14

DANGER

To avoid potentially fatal circuits through the body to earth, wrist strap connections must include a resistor of at least 1 MΩ. Test the wrist strap regularly.

2.5 Batteries

Batteries can be hazardous if improperly handled. Special care must be used to prevent short-circuiting batteries, or loss of electrolyte. Electrolyte contains potentially hazardous material.

Work

DANGER

Read Safety Instructions regarding handling and connecting batteries.

General Precautions

When working with batteries:

- Remove wrist watches, rings, bracelets, etc.
- Use insulated tools.
- Make sure that eye wash facilities, or portable eye wash equipment, is available prior to starting work.

Use all the required PPE (Personal Protective Equipment) such as:

- Rubber gloves and aprons.

- Eye protection (goggles or a face shield).

Short-Circuiting of Batteries

CAUTION

⚠

Short circuits can cause injury or damage. Although the battery voltage may be low, the released power can be extremely high.

It is necessary to ensure that no metal object, such as a tool, short-circuits the batteries. If necessary, disconnect or remove the batteries before beginning work.

Explosive Gases

Batteries may give off explosive gases. All battery areas must be adequately ventilated and protected from fire.

CAUTION

⚠

Do not use open cell-lead acid batteries. They give off hazardous gases that may cause an explosion or corrosion of the equipment. The battery must be suitable for horizontal operation.

Overheated Batteries

CAUTION

⚠

Excessive heat can cause the battery casings to become soft and to warp, allowing acid to escape.

If the internal temperature of the cabinet exceeds + 60 °C (140 °F), take the following precautions:

- Check that the batteries have not leaked.
- If the batteries have leaked, see the section Hazardous Waste Material from Leaks.

Hazardous Waste Material from Leaks

Ensure that there are sufficient absorbers or neutralizing materials available on site, in case of spillage of hazardous substances. There is a danger of spillage occurring when installing, removing, replacing or servicing batteries. The absorbers and neutralizing materials must be suitable for the hazardous substances involved.

Table 1 Typical Neutralizers

Typical neutralisers	
Baking soda (bicarbonate)	$NaHCO_3$
Sal soda	$Na_2CO_3IOH_2O$
Soda ash	Na_2CO_3

Consult the battery manufacturers for specific details of absorbers and neutralizing materials. Absorbers and neutralizing products will vary, depending on country and manufacturer.

2.6 Working at Heights

WARNING

Some working areas involve the risk of accidents caused by falling objects.

For example, when working on a mast, tower or a roof, the following precautions must be taken:

- Personnel working at heights must have the appropriate training and medical certificate.
- Full body safety harness and safety helmet must be used.
- Adequate protective clothing is essential in cold weather.
- All lifting devices must be tested and approved.
- During work on a mast, all personnel in the area must wear helmets.

2.6.1 Rules and Advice for the Safe Use of Ladders

- Make sure that the ladder is undamaged and has been approved for use.
- Do not overload the ladder.

The following types of ladders must be guyed or otherwise secured

- Leaning ladder longer than 5m.

- Free-standing ladder with a platform and knee-support, and with over 2 meters height to the platform.
- Any other free-standing ladder longer than 3m.

Positioning the ladder

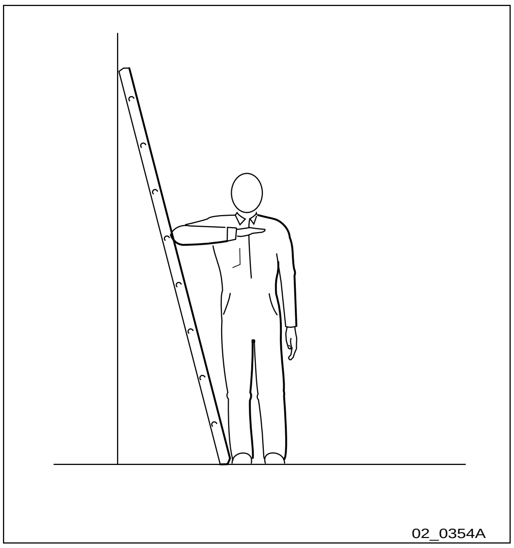

Figure 11 Checking the angle

- The ladder's inclination should be approximately 1:4 (75°). Position the ladder according to its gradation indicator (if there is one) or check the angle with your elbow.
- Use the ladder foot or a ladder support to reduce the risk of tipping over sideways.
- Always attach extension legs to a ladder that is to be used on a sloping base. Never prop up a ladder with boxes, stones or the like.
- Extend the ladder completely.
- Check that all four anti-slipping treads are firmly positioned on the base.

Climbing and using the ladder

Figure 12 Climbing the ladder

- Climb the ladder facing it.
- When you lean sideways, outward from the ladder, your navel should never be outside the edge of the ladder's frame.
- Always keep 3 points of contact (two feet and one hand, two hands one foot) with the ladder when working on it. This will reduce the risk of falling.
- Never climb the topmost four rungs of a ladder. If you have to climb up on a roof, the ladder should extend at least one meter above the eaves.

2.7 Radio Frequency Radiation

CAUTION

Radio frequency (RF) radiation from antenna systems can endanger your health.

Co-ordinate with all mast users to switch off the transmitters when working with, or near, antennas.

2.8 Other Hazards

Handling Heavy Goods

WARNING

⚠

Read the Safety chapter regarding handling of heavy goods.

- Use tested and approved lifting devices only. They must only be used by trained personnel.
- Always check that all parts of the lifting devices are intact.
- Make sure that all lifting devices are properly stabilised or attached to fixed objects such as walls or buildings before lifting.
- Give clear and consistent command signals, for example
  - lift
  - lower
  - stop
- Make sure that there is never an angle of more than 90° between the straps at the point where they are attached to the lifting hook.

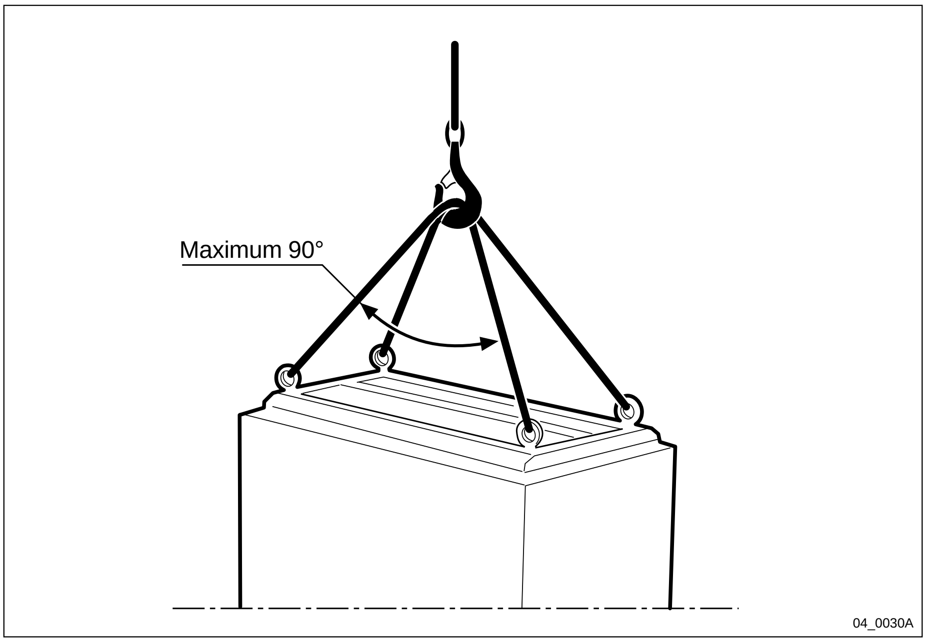

Figure 13 Use long straps

- Too large an angle between the lifting straps increases the strain on them and may cause them to snap. Overloading, or wrong use of lifting devices in other ways, can have catastrophic consequences.

- Never walk under hoisted loads.
- Follow local regulations for safety clothing and safety equipment for hoisting and moving goods.
- Unsecured cabinets have a high centre of gravity. They can easily tip over and harm personnel.

WARNING

⚠

There is a danger of the assembly toppling over, which could cause injury to personnel or damage to the equipment.

Fire

WARNING

⚠

Fire may spread to neighbouring rooms. When working on a radio base station you may have to open cable ducts, channels and access holes, thereby interfering with the fire sectioning of the building.

- Close the cable ducts and fire doors (if applicable) as soon as possible.
- After completing work on cables, seal the cable ducts according to the regulations for the building.
- Minimize the amount of inflammable material.
- Avoid storing empty packaging material on the site.
- Use a powder or carbon dioxide type of fire extinguisher due to the electric nature of the equipment inside the Radio Base Station.

Sharp Edges

WARNING

⚠

Wear protective gloves when handling the equipment. There may be sharp metal edges.

3 Tools and Instruments

This chapter describes tools and instruments required for maintenance activities.

3.1 Test Equipment

Table 2 Test equipment

Product No.	Description	Specification / Remark
FAB 801 0187	TEMS SW TEMS cable User's manual TEMS R320 for both 900 and 1800 MHz (Dual Band) Antenna adapter Click-in-holder, Car kit	TEMS
FAB 801 0194	TEMS SW TEMS cable User's manual TEMS T28 World for both 900 and 1900 MHz Antenna adapter Click-in-holder, Car kit	TEMS
LPK 102 024/2	Digital multimeter	Fluke 79 III
LPK 102 102/1	Frequency counter set (including cables)	Only for DXU-03

3.2 OMT Kit

The OMT is used for installation, testing, site acceptance and maintenance of the RBS 2000 system.

Table 3 OMT Kit

Product No.	Description
NTM 201 2289/1	OMT Kit

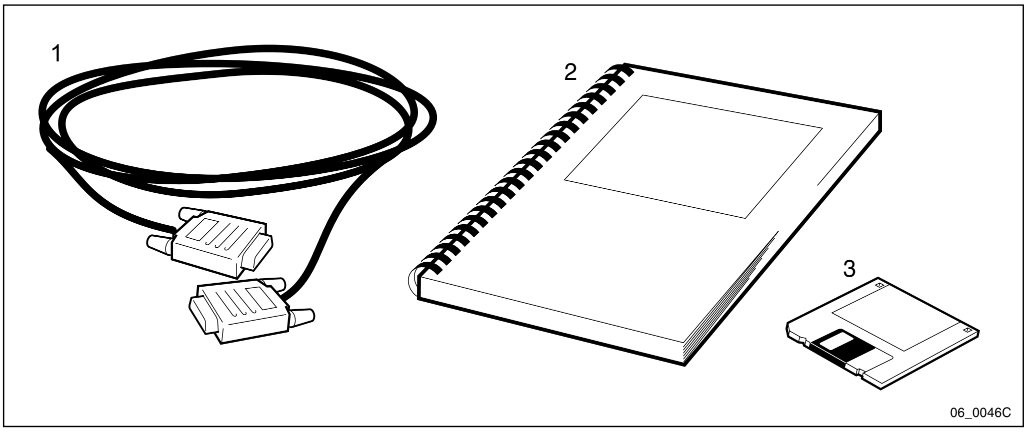

Figure 14 OMT Kit

Table 4 OMT kit specification

Item	Description	Qty	Product No.
1	C1, 9 pin D-sub connector male to female	1	RPM 113 463
2	OMT User's Manual	1	LZN 302 01
3	OMT SW	1	

Note: The OMT require a PC with operating system Win 95, NT 4.0 or later.

3.3 Personal Tool Kit

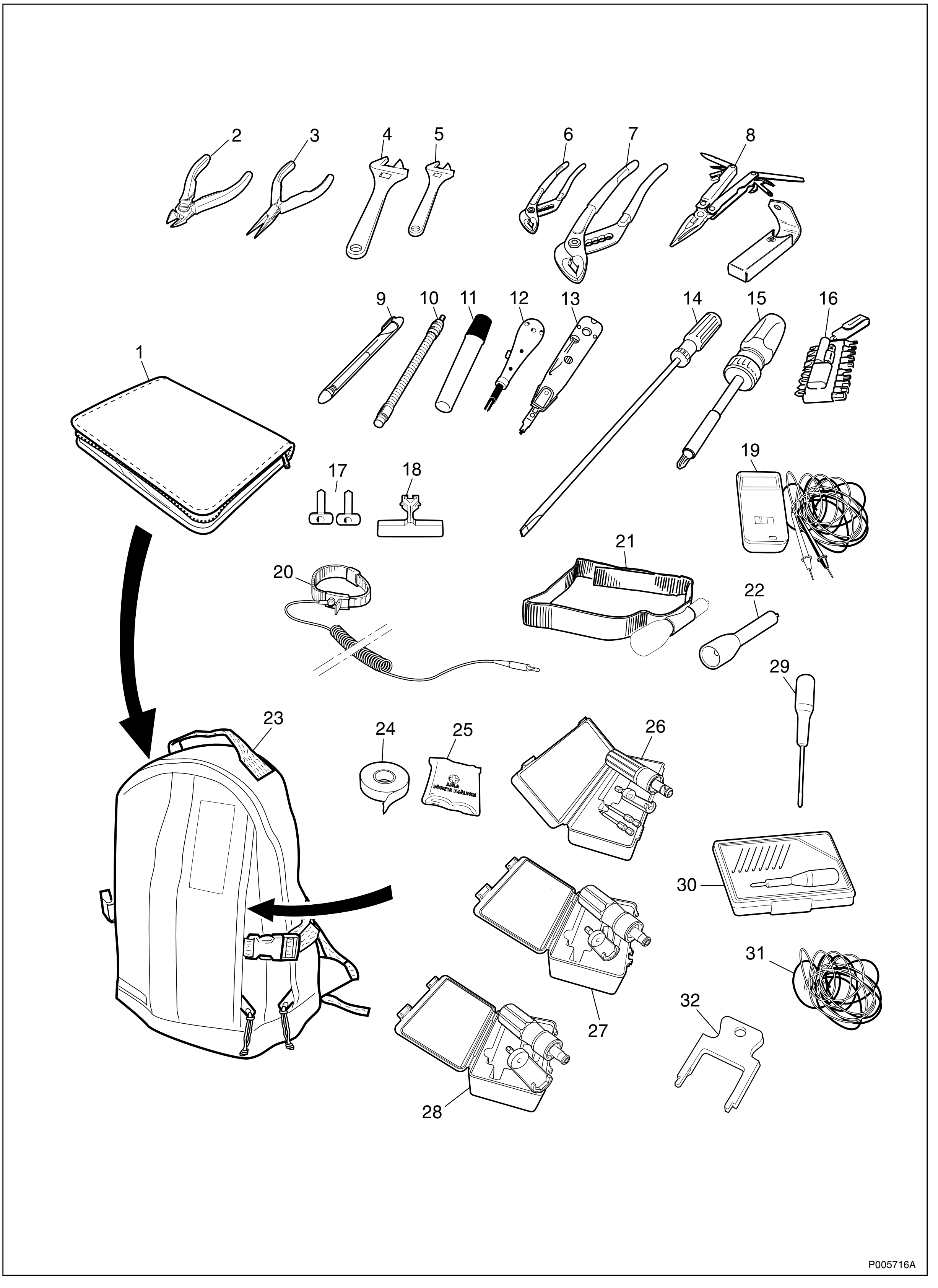

Figure 15 Tool Set, Maintenance Tools

Note: The contents of this kit may be subject to change without notice.

Table 5 Tool Set, Maintenance Tools

Product No.	Description
LTT 601 107/1	Tool Set, Maintenance Tools

Table 6 Tool Set, Maintenance Tools specifications

Pos.	Description	Qty
1	Tool case	1
2	Side cutting pliers	1
3	Snip nose pliers	1
4	Adjustable spanner l=160 mm	1
5	Adjustable spanner l=100 mm	1
6	Slip joint pliers l=125 mm	1
7	Slip joint pliers l= 245 mm	1
8	Pocket survival tool	1
9	Marking pen, gold colour	1
10	Flexible shaft 1/4"	1
11	Marking pen	1
12 [1)]	Termination tool LSY 138 252, supplier: Ericsson	1
13	Termination tool, supplier: Krone	1
14	Screwdriver l=200 mm	1
15	Universal bit holder	1
16	Bits kit	1
17 [1)]	RU-extractor, button 35 mm LTD 117 13	2
18 [1)]	RU-extractor, handle LTD 117 02	1
19	Voltage tester	1
20 [1)]	Static control wrist strap LYB 250 01/14	1
21	Head band for lamp holding	1
22	Penlight, mini	1
23	Tool rucksack	1
24	Electrical tape, white	2
25	First aid kit	1
26 [1)]	Torque wrench kit 0.8 Nm LTT 601 83	1
27 [1)]	Torque wrench kit 1.7 Nm LTT 601 93	1
28 [1)]	Torque wrench kit 2.8 Nm LTT 601 94	1
29	Screwdriver, Torx T8	1
30	Precision screwdriver set	1
31	Jumper wire (2x0.5 mm) l=10 m	1
32	Extractor tool for overvoltage protector covers	1

Note: [1)]This part of the set can be ordered separately.

Tools for antenna feeders

Table 7

Product No	Product name	Function/description
LSB 107 04/1	Tool Set	Slotted socket for 32mm screw joint
LTT 601 115	Tool Set	Mounting torque wrench 32mm (1 1/4

3.4 Special Tools

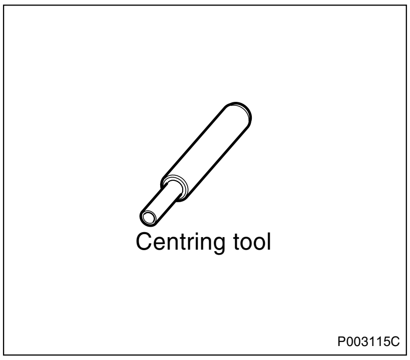

Figure 16 Centring tool

Table 8 Special tool specification

Product No.	Product Name	Function/Description
SXK 107 2300/1	Centring tool	Tool for aligning coaxial pins on TRUs

3.5 References

For information about general cable connections, see*Cabinet Assembly and Extension Manual*.

For product numbers of replaceable units and other spare parts, see*Spare Parts Catalogue, Appendix B.*

Table 9 Product numbers of the Cabinet Assembly and Extension Manual and the Spare Parts Catalogue

Product No.	Description
LZN 302 78	Cabinet Assembly and Extension Manual for RBS 2101, RBS 2102, RBS 2103, RBS 2202
Appendix B	Spare Parts Catalogue for RBS 2202

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4 Handling of the RBS during Maintenance

4.1 Numbering of RUs

Note that the RU numbers always starts from 0 (zero) when they are read from the OMT, while they are starting from 1 (one) in the mechanical positioning system. This means, for example, that TRU 1 is called TRU 0 in the OMT and that PSU 2 is called PSU 1 in the OMT.

This numbering system includes **all** RUs in the RBS, see the chapter "Positioning of RUs".

4.2 Update of IDB

The DXU must be in Local mode before it is possible to update the IDB backup copy from the OMT.

Whenever an RU is replaced, the IDB in the DXU is updated automatically. Every time the IDB changes, save the IDB to the IDB backup disk. The OMT can read the updated IDB from the DXU when the RBS is in either local or remote mode.

For procedures in saving the IDB to backup disk, refer to:

OMT User's Manual	*LZN 302 01*

4.3 Temperature Requirements for an RU

All units included in the RBS have been designed to operate according to specifications in the temperature range of +5°C to +45°C (41°F to 113°F). It is very important to ensure that the temperature of a spare unit is within the specified limits before inserting it into the RBS, otherwise the specified functions of that unit cannot be guaranteed.

4.4 General Instructions for Replacement of an RU

Protection against ESD

CAUTION

Sensitive components such as Integrated Circuits (IC) can be damaged by discharges of static electricity.

To avoid damage due to ESD the use of a wrist strap is required. Wear the wrist strap on the wrist and connect the lead to the earth outlet of the IDM panel, or to the negative outlet if earth is missing. The wrist strap must be worn at all times when handling units.

DANGER

To avoid potentially fatal circuits through the body to earth, wrist strap connections must include a resistor of at least 1 MΩ. Test the wrist strap regularly.

Note that the functionality of the wrist strap must be checked at regular intervals.

Restart of TRU

To be able to restart in a correct way, the TRU must have been out of power for at least three seconds.

Instructions for removal of a magazine-mounted RU

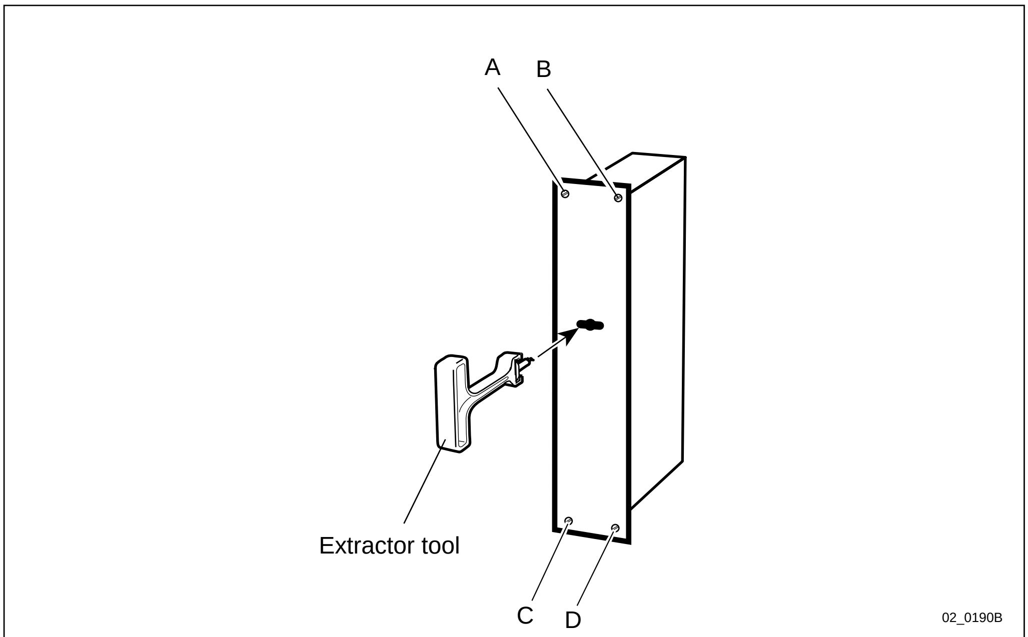

Figure 17 How to handle the extractor tool

1. Put the unit in local mode (TRU and DXU only).
2. Release the associated circuit breaker or pull the associated fuse. The location of either can be found in the chapter "Fault Localisation".
3. Remove all the connections on the front of the unit.
4. Loosen the screws (A - D) that fasten the unit to the magazine.
5. Pull out the unit with the extractor tool.

6. Insert the new unit, and restore in reverse order.

4.5 Cable Connections

The TX and RX cables between the TRU and CDU are connected with SMA connectors. The connectors must be tightened with a torque wrench/spanner 0.8 Nm.

Please note the following when using the torque wrench:

- Grasp the cable to prevent the connector rotating.
- Fit the wrench key to the SMA connector as shown below.
- Rotate the wrench handle clockwise until the wrench clutch begins to slip

This results in the correct torque setting.

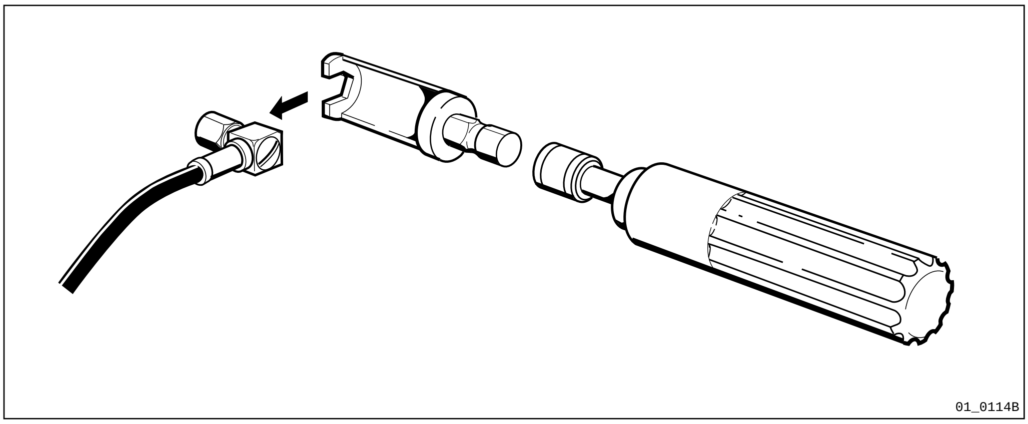

Figure 18 SMA connector and torque wrench (LTT 601 83)

4.6 About the Locking Mechanism

A lock is fitted to the radio sub-cabinet, only.

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5 Fault Localisation

5.1 Introduction

The instructions in this chapter describe how to handle fault situations that arise in the RBS.

The flowcharts in this chapter are for reference only. The text accompanying each flowchart contains more detailed instructions. Maintenance personnel should therefore only use the charts to locate the information in the text.

All subsequent sections provide instructions on how to localise faults in the RBS. Each title of a section corresponds to a fault code in either the SO CF RU map or the SO TRXC RU map. These sections appear in alphabetical order.

5.1.1 Preconditions

Information from the replacement unit map is required as input when reading this chapter.

5.1.2 Work Process for Fault Localisation

The work process for fault localisation is shown below and described in brief.

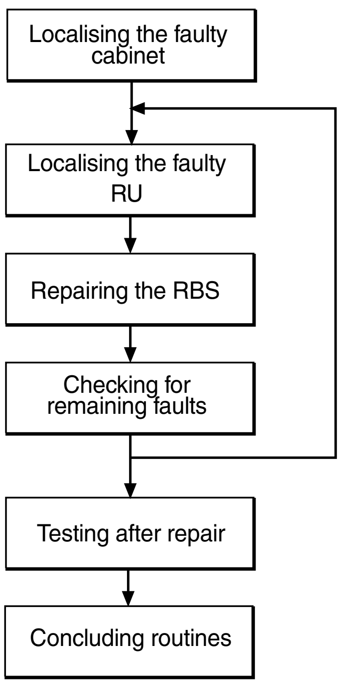

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Figure 19 Work process for fault localisation

Localising the faulty cabinet

The work order from the OMC operator must include information stating which RBS cabinet is faulty. The faulty cabinet is also identified by the yellow BS fault indicator, which is on when there is a fault. The BS fault indicator is located on the DXU.

Localising the faulty RU

The work order from the OMC operator also includes information stating which RU is faulty. The sections below describe the fault localisation processes relating to each faulty RU that is indicated in the fault lists. *See Appendix A, Fault List.*

Most RUs are equipped with a red Fault indicator. This indicator is on if a fault has been detected in the RU. RUs that do not have a Fault indicator, can, if faulty, only be localised by means of the OMT.

Note: Always check for a released circuit breaker on the IDM, where applicable. The very first action must always be to reset a circuit breaker, that has released. If the circuit breaker releases again, the fault localisation procedure shall continue. *See chapter Optical Indicators and Switches* for the positions of all circuit breakers on the IDM.

Repairing the RBS

When the faulty RU has been identified, it shall be handled according to specified procedures. *See chapter RBS Field Repair.*

Checking for remaining faults

When the faulty RU is replaced and the reported fault has ceased, the field technician has to check that there are no faults remaining in the RBS.

If any faults remain in the RBS, these faults have to be localised and rectified. See the sections below in this chapter.

Testing after repair

When all faults in the RBS have been cleared, the RBS has to be tested in order to verify that it is fully functional. *See chapter Test after Repair.*

Concluding routines

Before leaving the site, the field technician has to go through a checklist and fill in the repair delivery note, “Blue tag”. The routines also define how the faulty, replaced RUs shall be treated. *See chapter Concluding Routines.*

5.2 Circuit Breakers and Fuses

DANGER

Improper electrical installation may cause fire or electrical shock. Approved circuit breakers for the AC mains and the cable's cross sectional areas must always be selected in accordance with local laws and regulations. Only a qualified and authorized electrician is permitted to install or modify the electrical installation.

Note: Use only Ericsson recommended fuses of the correct voltage and amperage ratings as replacements.

Use of any other type of fuses could cause serious damage to the RBS, fire or personnel injury and affect RBS product type approvals (such as UL, CSA and so on).

Part numbers for fuses can be found in the RBS *Spare Parts Catalogue, Appendix B.*

When a fault occurs in the RBS, inspect the circuit breaker or fuse corresponding to the unit generating the fault, and reset or replace if necessary. Resetting a released circuit breaker or replacing a blown fuse is not a complete fault-eliminating action. The HW RU corresponding to the released circuit breaker or blown fuse should be replaced. This is necessary to prevent a recurrence of the fault.

This section contains figures showing the location of circuit breaker panels and fuses for the base station. All circuit breakers and most fuses are labelled. Due to varying configurations and unique site requirements, local installation documentation should be consulted if in doubt as to which HW RU a given circuit breaker or fuse corresponds.

5.2.1 Positions of Circuit Breakers and Fuses

RBS 2202 mounted with an IDM with fuses

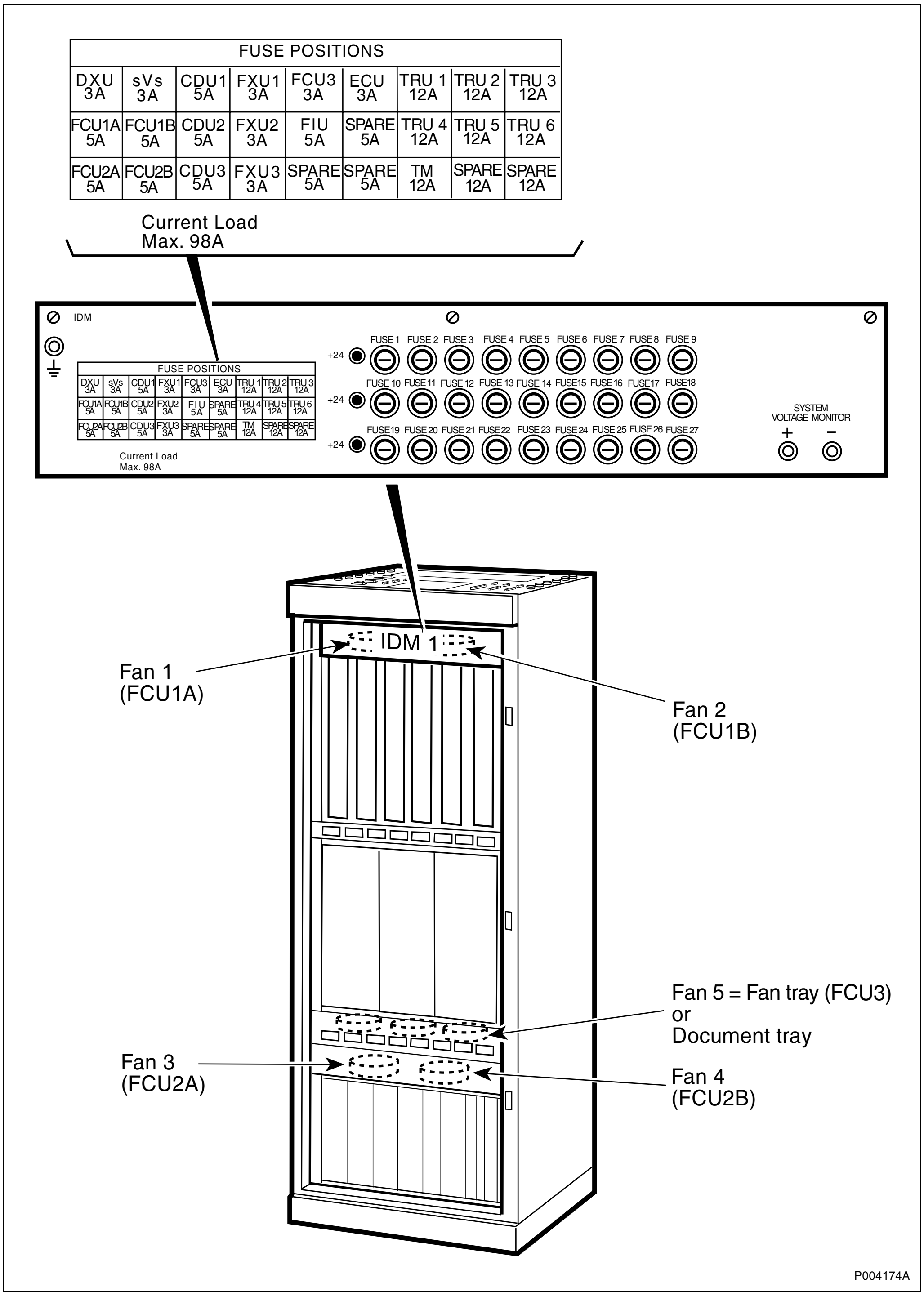


Figure 20 IDM with fuses

RBS 2202 mounted with an IDM with circuit breakers

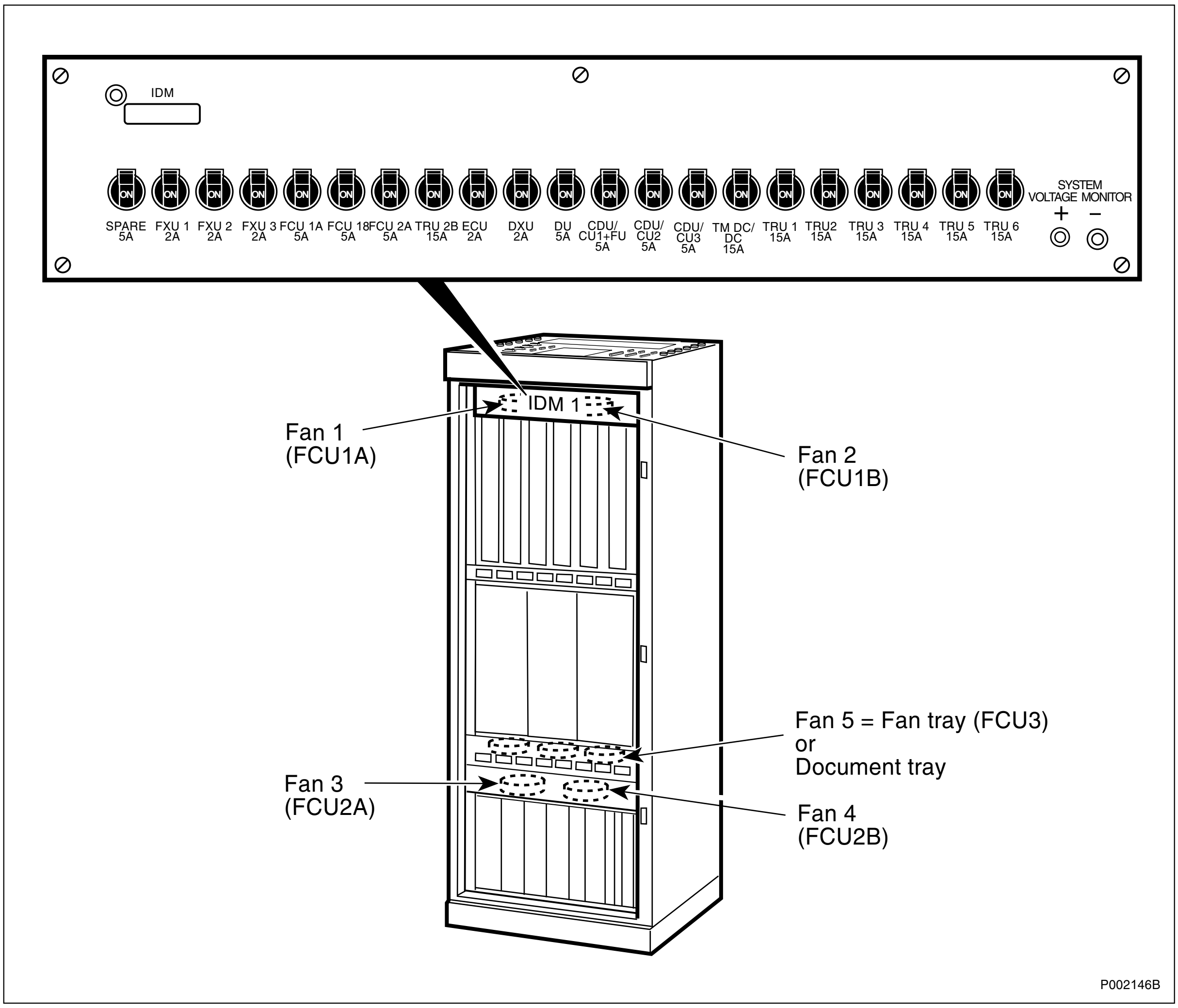


Figure 21 IDM with circuit breakers

5.3 ALNA A, ALNA B, ALNA/TMA A and , ALNA/TMA B

Note: Depending on the on the system software release, the fault code can be either "ALNA A respectively ALNA B" or "ALNA/TMA A respectively ALNA/TMA B". In all cases the procedure below is exactly the same. However, in the text below, only the designation ALNA is used. When a TMA is used, it shall be treated in the same way as the ALNA in the procedure below.

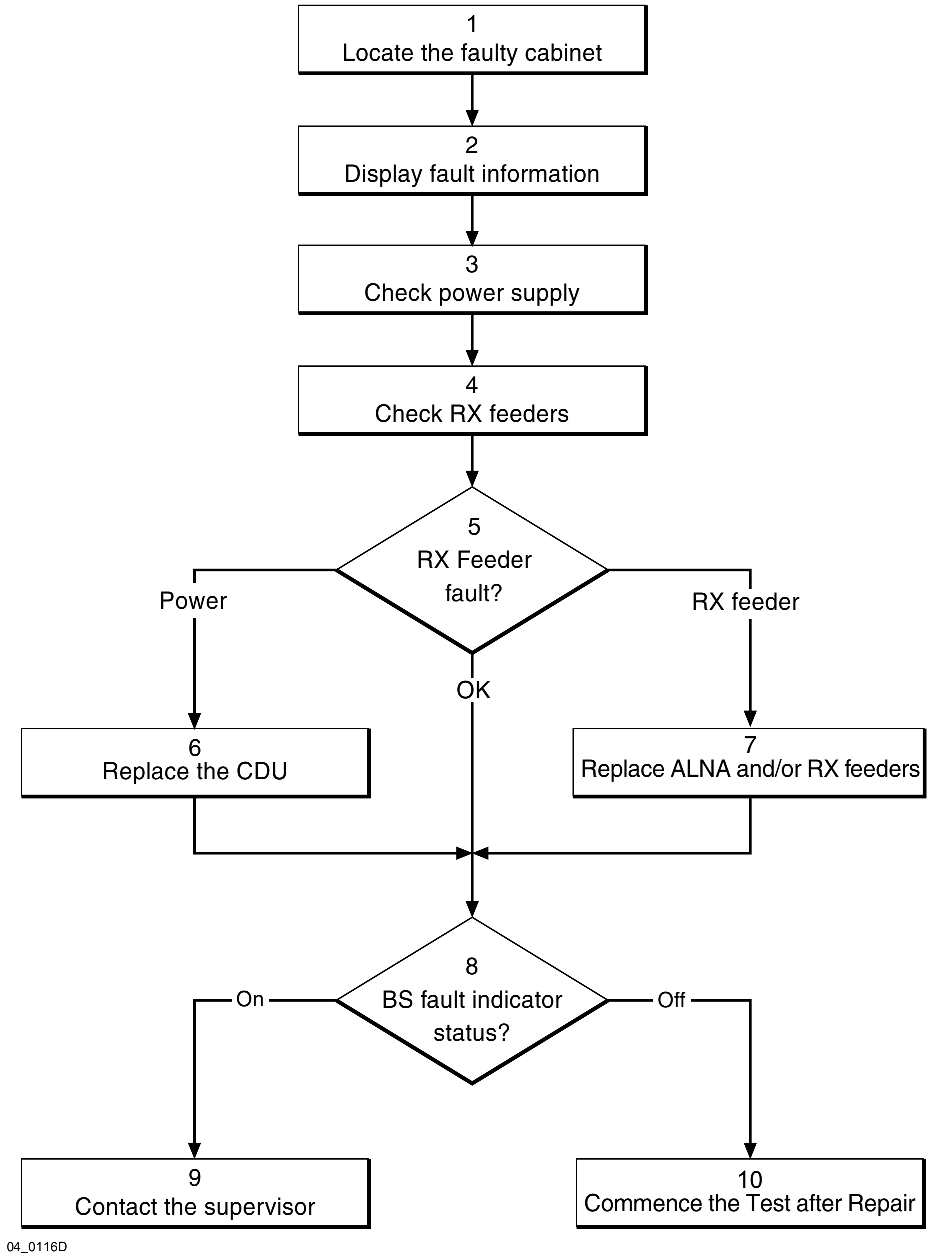


Figure 22 ALNA A and B (part 1 of 2)

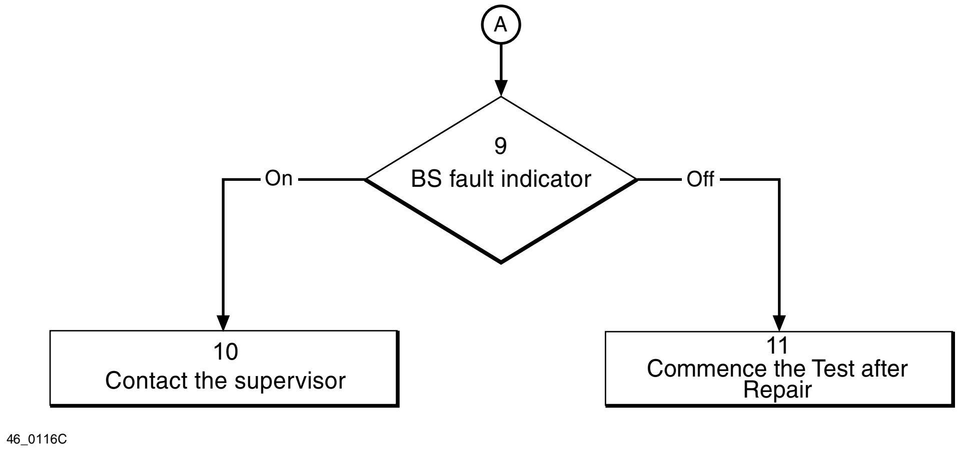


Figure 23 ALNA A and B (part 2 of 2)

Note: Several instructions in this section require the OMT. For further information on the use of OMT, see:

OMT User's Manual *LZN 302 01*

(1) Locate the faulty cabinet

Locate the faulty cabinet according to work order information.

(2) Display fault information

Use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs".

(3) Check power supply

The ALNA is supplied with DC power from the CDU. The feeder is used to connect the DC power between the CDU and the ALNA. The ALNA will be pointed out as faulty if it is not supplied with voltage from the CDU.

The following method is used to measure the DC power from the CDU:

1. With a multimeter, measure the voltage according to the figure below. The correct value is 14 – 16 V DC (the typical current is 80 mA).

2. Measure the other RX feeder inlet on the CDU.

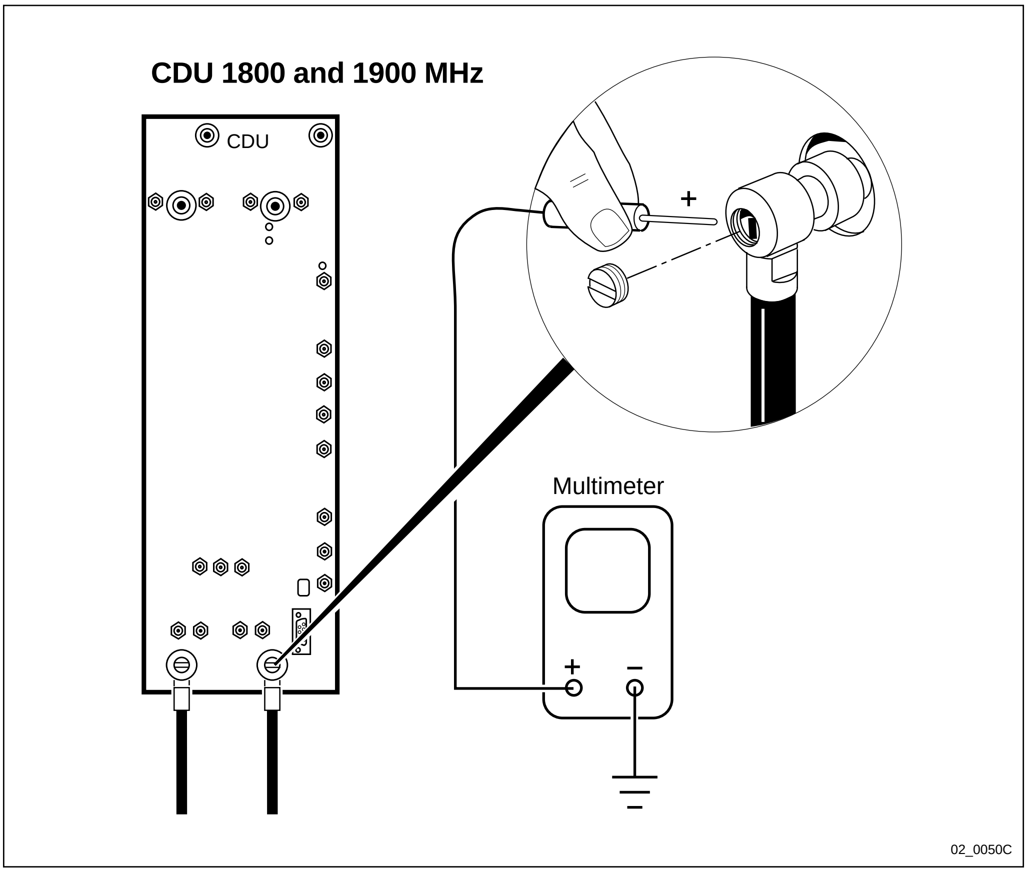


Figure 24 ALNA DC power supply measurement

(4) Check RX feeders

> **CAUTION**
>
> **Radio frequency (RF) radiation from antenna systems can endanger your health.**

Note: To prevent exposure to RF radiation and damage to TRUs, be sure that the Local mode indicator on the TRU has a fixed yellow light before further action is taken.

Put all TRUs connected to the CDU in step (3) into Local mode:

1. Press the Local/remote buttons on the TRUs. The Local mode indicators will start flashing.
2. Wait until the Local mode indicators have a fixed yellow light. This indicates that the TRUs connected to the CDU are in local mode.

Measure the feeder cable resistance:

> **WARNING**
>
> ⚠
>
> **Some working areas involve the risk of accidents caused by falling objects.**

Note: Follow local safety regulations when climbing antenna poles and masts. These regulations will also determine the limitations of working under severe weather conditions. Use all the prescribed PPE while doing maintenance on an antenna tower.

3. Using a multimeter, measure the resistance between the centre conductor and ground. The positive lead should be connected to the centre conductor. The typical resistance will be greater than 1 kΩ.
4. If a reading of less than 1 kΩ is measured, disconnect the feeder cable from the ALNA and measure the resistance again to verify a defective feeder cable.
5. To further isolate a fault with the feeder cable, a TDR measurement may need to be taken. For instructions on how to perform a TDR measurement, refer to:

Installation and Integration Manual

(5) Fault?

- If the power supply measurement is incorrect, proceed to step (6).
- If any of the RX feeders is found defective, proceed to step (7).
- If both checks are OK, power supply and RX feeders, proceed to step (8).

(6) Replace the CDU

Replace the CDU according to the section "CDU" in the chapter "RBS Field Repair".

(7) Replace ALNA and/or RX feeders

Replace the ALNA according to the section "ALNA" in the chapter "RBS Field Repair".

(8) BS fault indicator status?

There are two methods to determine whether the fault has been cleared.

The first method is to inspect the yellow indicator labelled BS fault on the DXU.

BS fault indicator status?

- Off: Proceed to step (10). No fault is detected in the RBS.
- On: Proceed to step (9). One or more faults are detected in the RBS.

The second method is to use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs".

(9) Contact the supervisor

Contact the supervisor or manager who will take further action, for example, to consult an FSC.

(10) Commence the Test after Repair

Take the following actions:

1. After replacing a CDU only: Make a test call according to the section "Test Call" in the chapter "Test after Repair".
2. Proceed to the section "Before Leaving the Site"in the chapter "Concluding Routines".

5.4 Antenna

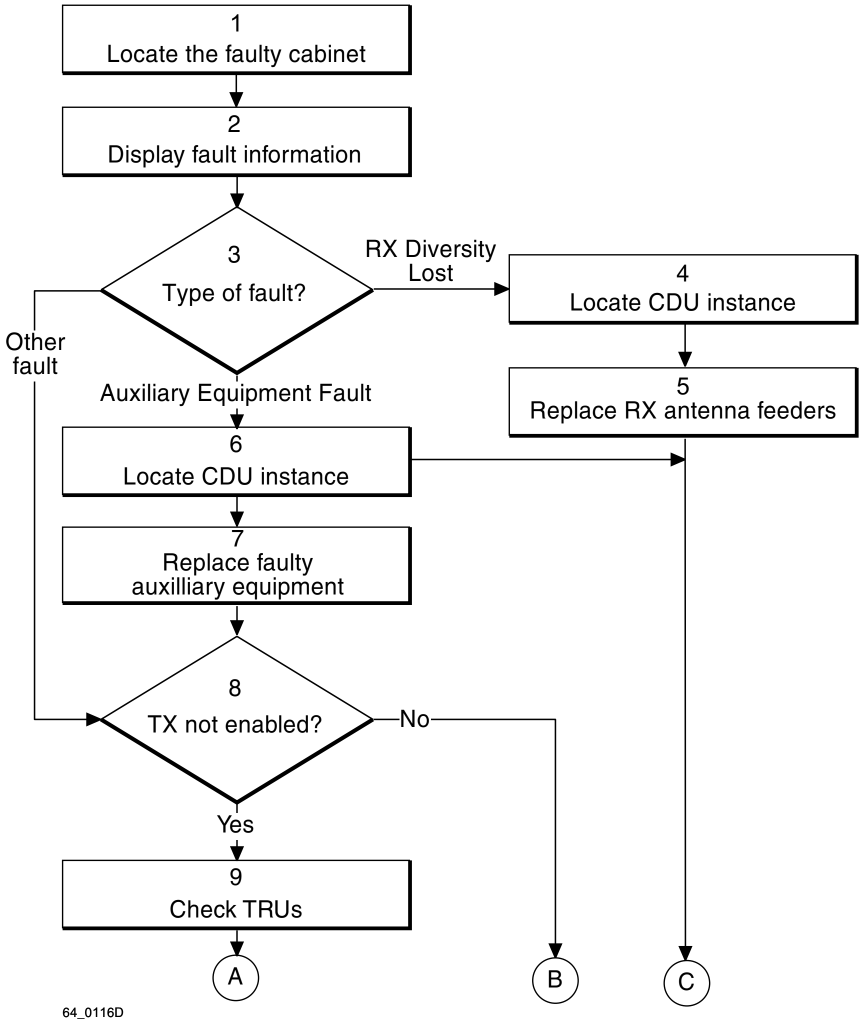


Figure 25 Antenna flowchart (part 1 of 2)

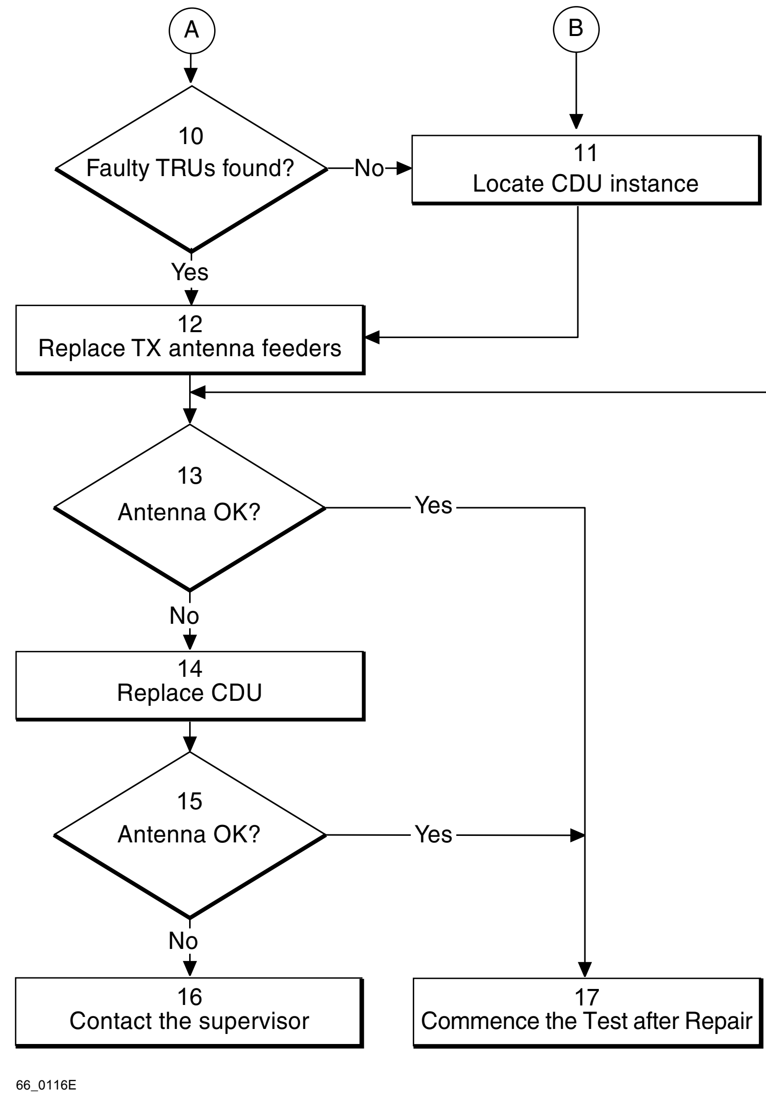


Figure 26 Antenna flowchart (part 2 of 2)

Note: Several instructions in this section require the OMT. For further information on the use of OMT, see:

OMT User's Manual	*LZN 302 01*

(1) Locate the faulty cabinet

Locate the faulty cabinet according to work order information.

(2) Display fault information

1. Use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs".

2. Use the OMT to display the type of fault: Go to the Operation menu and select "Monitor". In the RBS Monitor Setup window, select "Fault Status" and click the "Start Monitor" button.

(3) Type of fault?

Which type of fault was found in step (2)?

- "RX Diversity Lost": Proceed to step (4).
- Other fault: Proceed to step (6).

(4) Locate CDU instance

1. Select "Hardware view" in the OMT.
2. – Tick the check box "Faults".

   – Look for a red line between a CDU-object and an antenna-object.
3. When the faulty antenna instance is found, check which CDU it is connected to. This information indicates which RX antenna feeder to replace in step (5).

(5) Replace RX antenna feeders

The following instruction is valid for CDU-A and CDU-D only:

1. Replace the RXA or RXB feeder according to instructions in the section "RX Antenna Feeder" in the chapter "RBS Field Repair".
2. Proceed to step (13).

The following instructions are valid for CDU-C and CDU-C+ only:

1. Check if the CDUs in the cabinet are cross-connected via the HL connectors. If that is the case, check which outlet the RXA or RXB cable from TRU is connected to.
2. If the RXA or RXB cable is connected to outlet number 1 or outlet number 2 on the CDU, replace the RXA or RXB feeder on the CDU twin according to instructions in the section "RX Antenna Feeder"in the chapter "RBS Field Repair".
3. If the RXA or RXB cable is connected an other outlet than number 1 and number 2, or if no cross-connection is in use, replace the RXA or RXB feeder on the current CDU according to instructions in the section "RX Antenna Feeder" in the chapter "RBS Field Repair".
4. Proceed to step (13).

(6) Locate CDU instance

1. Select “Hardware view” in the OMT.
2. — Tick the check box “Faults”.

   — Look for a red line between a CDU-object and an antenna-object.
3. When the faulty antenna instance is found, check which CDU it is connected to. This information indicates which auxilliary equipment to replace in step (7).

(7) Replace the faulty auxiliary equipment

1. Replace or repair the faulty auxiliary equipment.
2. Proceed to step (13).

(8) TX not enabled?

Check all TRUs in the cabinet(s).

Are any of the "TX not enable" indicators on?

- Yes: Proceed to step (9).
- No: Proceed to step (11).

(9) Check TRUs

1. In the OMT, select "System view" and the object RBS 2000. Go to the Operation menu and select "Monitor".
2. In the RBS Monitor Setup window, select "Fault Status" and click the "Start Monitor"button.
3. Look for the alarm "TX antenna VSWR limits exceeded" in the AOTX map. This will point at which TRU(s) generated the alarm. The indicated TRU(s) should match those indicated in step (8) above.

(10) Faulty TRUs found?

Could the faulty TRU(s) be found by the OMT?

- Yes: Proceed to step (12).
- No: Proceed to step (11).

(11) Locate CDU instance

1. Select "Hardware view" in the OMT.
2. – Tick the check box "Faults".

   – Look for a red line between a CDU-object and an antenna-object.
3. When the faulty antenna instance is found, check which CDU it is connected to. This information indicates which TX antenna feeder to replace in step (10).

(12) Replace the TX antenna feeders

Replace all the TX feeders in the cell according to instructions in the section "RX and TX Antenna Feeder" in the chapter "RBS Field Repair".

(13) Antenna OK?

Use the OMT to display the type of fault: Go to the Operation menu and select "Monitor". In the RBS Monitor Setup window, select "Fault Status" and click the "Start Monitor" button.

- If the fault was "RX Diversity Lost", it will take at least 1h 40m for the fault in the RBS to cease.
- If the fault was "VSWR Limits Exceeded", the TX has to be re-initiated from the BSC.

For further information, see the section "RX and TX Antenna Feeder" in the chapter "RBS Field Repair".

Is the antenna OK?

- Yes: Proceed to step (17).
- No: Proceed to step (14).

(14) Replace the CDU

Replace the CDU according to instructions in the section "CDU"in the chapter "RBS Field Repair".

(15) Antenna OK?

Use the OMT to display the type of fault: Go to the Operation menu and select "Monitor". In the RBS Monitor Setup window, select "Fault Status" and click the "Start Monitor" button.

- If the fault was "RX Diversity Lost", it will take at least 1h 40m for the fault in the RBS to cease.
- If the fault was "VSWR Limits Exceeded", the TX has to be re-initiated from the BSC.

For further information, see the section "RX and TX Antenna Feeder" in the chapter "RBS Field Repair".

Is the antenna OK?

- Yes: Proceed to step (15).
- No: Proceed to step (14).

(16) Contact the supervisor

Contact the supervisor or manager who will take further action, for example, to consult an FSC.

(17) Commence the Test after Repair

Take the following actions:

1. After replacing a CDU only: Make a test call according to the section "Test Call" in the chapter "Test after Repair".
2. Proceed to the section "Before Leaving the Site"in the chapter "Concluding Routines".

5.5 Battery

The Battery fault code can only be given when the external battery back-up system BBS 2202 is connected to the RBS.

5.5.1 External Batteries

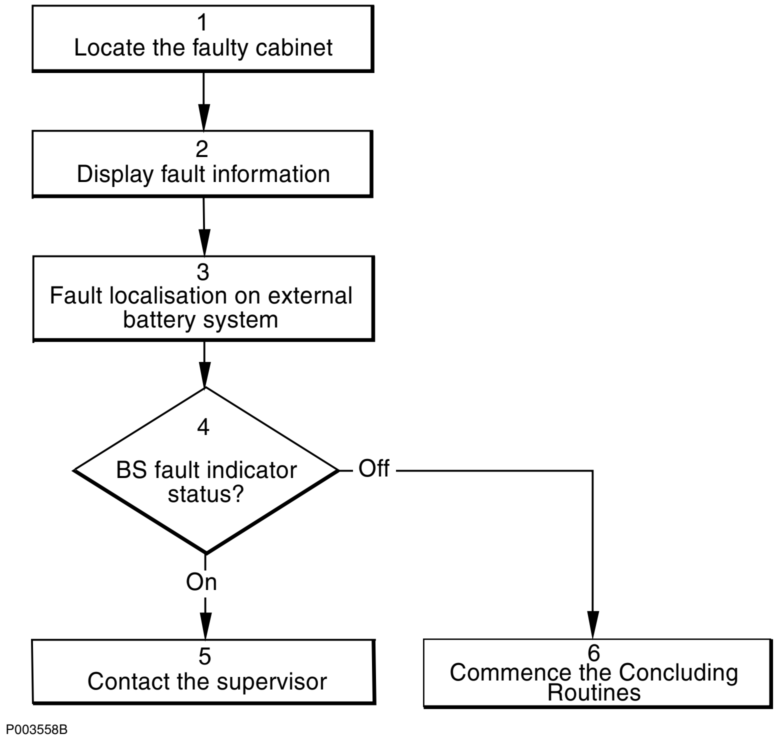


Figure 27 External batteries flowchart

Note: Several instructions in this section require the OMT. For further information on the use of OMT, see:

OMT User’s Manual	*LZN 302 01*

(1) Locate the faulty cabinet

Locate the faulty cabinet according to work order information.

(2) Display fault information

Use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs". The window also shows whether the fault is in the master cabinet, or in an extension cabinet (if connected).

(3) Fault localisation on external battery system

1. Check that the battery cable is properly connected to the RBS.
2. Check the battery cable from the external battery system to the RBS. Replace if needed.
3. Refer to local documentation to perform fault localisation on the external battery system.

(4) BS fault indicator status?

There are two methods to determine whether the fault has been cleared.

The first method is to inspect the yellow indicator labelled BS fault on the DXU.

BS fault indicator status?

- Off: Proceed to step (16). No fault is detected in the RBS.
- On: Proceed to step (15). One or more faults are detected in the RBS.

The second method is to use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs".

(5) Contact the supervisor

Contact the supervisor or manager who will take further action, for example, to consult an FSC.

(6) Commence the Concluding Routines

Proceed to the section "Before Leaving the Site" in the chapter "Concluding Routines".

5.6 BFU

The BFU is installed in the BBS cabinet.

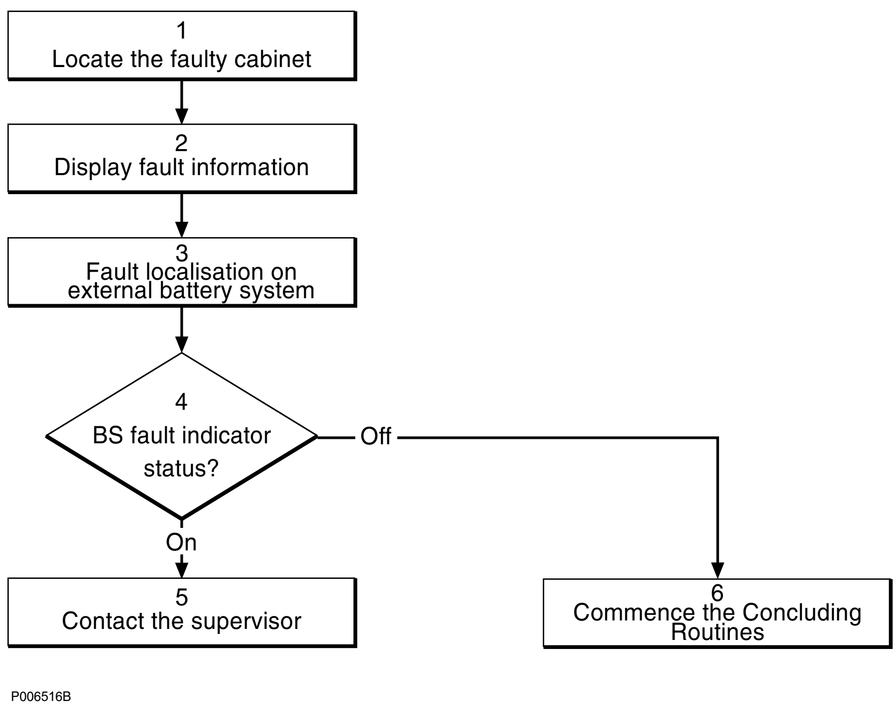


Figure 28 Internal batteries flowchart

Note: Several instructions in this section require the OMT. For further information on the use of OMT, see:

OMT User's Manual *LZN 302 01*

(1) Locate the faulty cabinet

Locate the faulty cabinet according to work order information.

(2) Display fault information

Use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs". The window also shows whether the fault is in the master cabinet, or in an extension cabinet (if connected).

(3) Fault localisation on external battery system

Refer to local documentation to perform fault localisation on the external battery system.

(4) BS fault indicator status?

There are two methods to determine whether the fault has been cleared.

The first method is to inspect the yellow indicator labelled BS fault on the DXU.

BS fault indicator status?

- Off: Proceed to step (6). No fault is detected in the RBS.
- On: Proceed to step (5). One or more faults are detected in the RBS.

The second method is to use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs".

(5) Contact the supervisor

Contact the supervisor or manager who will take further action, for example, to consult an FSC.

(6) Commence the Concluding Routines

Proceed to the section "Before Leaving the Site" in the chapter "Concluding Routines".

5.7 CAB HLIN Cable

Refer to "CDU HLOUT HLIN Cable", Section 5.11 on page 77.

5.8 CDU

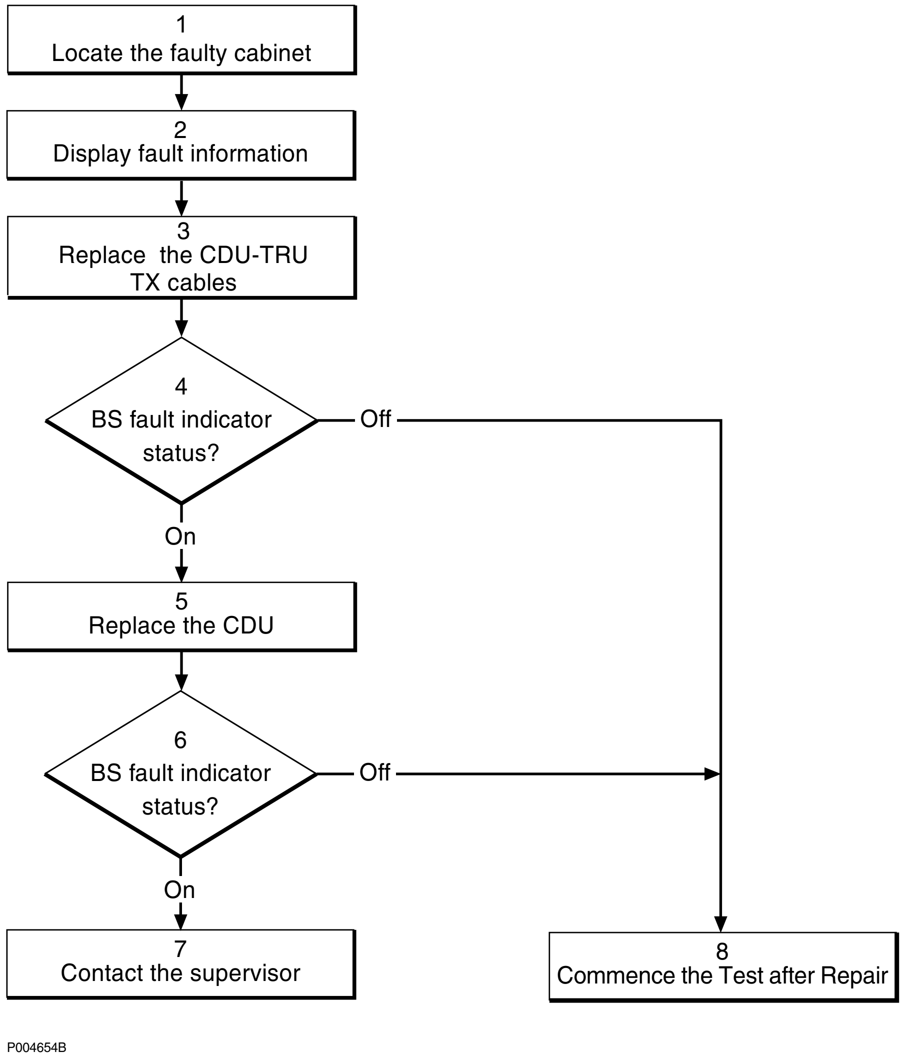


Figure 29 CDU flowchart

Note: Several instructions in this section require the OMT. For further information on the use of OMT, see:

OMT User's Manual	*LZN 302 01*

(1) Locate the faulty cabinet

Locate the faulty cabinet according to work order information.

(2) Display fault information

Use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs". The window also shows whether the fault is in the master cabinet, or in an extension cabinet (if connected).

(3) Replace the CDU-TRU TX cables

Replace one or both CDU-TRU TX cables according to instructions in the section "CDU-TRU TX Cables" in the chapter "RBS Field Repair".

(4) BS fault indicator status?

The red indicator labelled Fault on the CDU indicates the fault status of the unit.

Fault indicator status?

- Off: Proceed to step (8). No fault is detected in the CDU.
- On: Proceed to step (5). One or more faults are detected in the CDU.

There are two additional methods to determine whether the fault has been cleared.

The first method is to inspect the yellow indicator labelled BS fault on the DXU.

BS fault indicator status?

- Off: Proceed to step (8). No fault is detected in the RBS.
- On: Proceed to step (5). One or more faults are detected in the RBS.

The second method is to use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs".

(5) Replace the CDU

Replace the faulty CDU according to instructions in the section "CDU" in the chapter "RBS Field Repair".

(6) BS fault indicator status?

The red indicator labelled Fault on the CDU indicates the fault status of the unit.

Fault indicator status?

- Off: Proceed to step (8). No fault is detected in the CDU.
- On: Proceed to step (7). One or more faults are detected in the CDU.

There are two additional methods to determine whether the fault has been cleared.

The first method is to inspect the yellow indicator labelled BS fault on the DXU.

BS fault indicator status?

- Off: Proceed to step (8). No fault is detected in the RBS.
- On: Proceed to step (7). One or more faults are detected in the RBS.

The second method is to use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs".

(7) Contact the supervisor

Contact the supervisor or manager who will take further action, for example, to consult an FSC.

(8) Commence the Test after Repair

Take the following actions:

1. Make a test call over the CDU concerned according to the section "Test Call" in the chapter "Test after Repair".

2. Proceed to the section "Before Leaving the Site"in the chapter "Concluding Routines".

5.9 CDU Bus

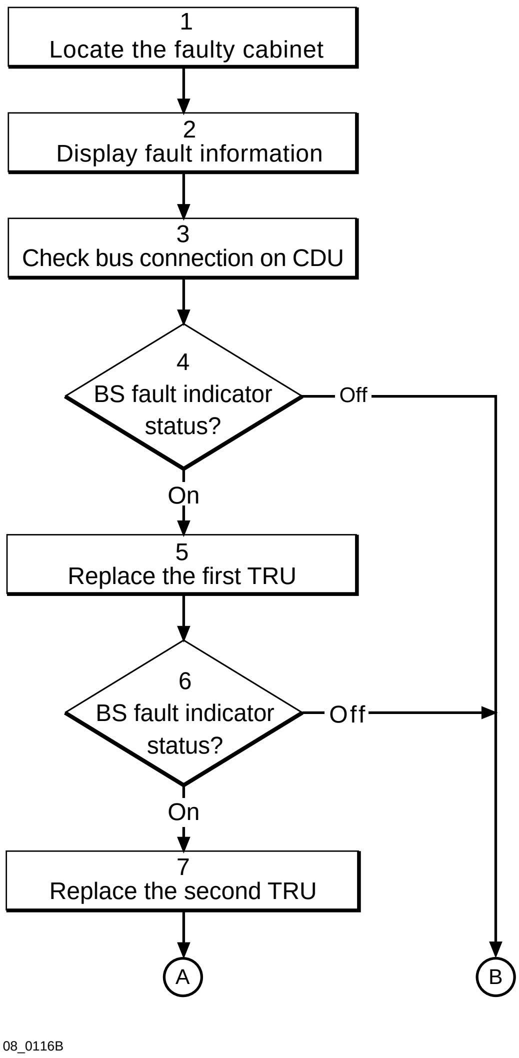


Figure 30 CDU bus flowchart (part 1 of 2)

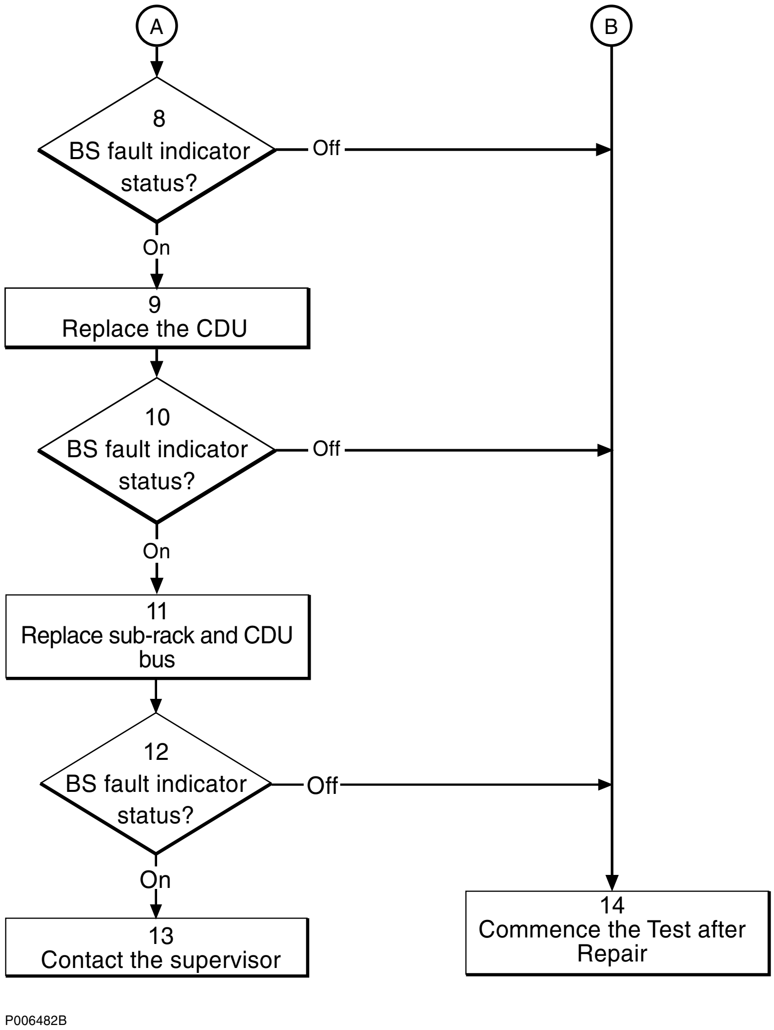


Figure 31 CDU bus flowchart (part 2 of 2)

Note: Several instructions in this section require the OMT. For further information on the use of OMT, see:

OMT User's Manual *LZN 302 01*

(1) Locate the faulty cabinet

Locate the faulty cabinet according to work order information.

(2) Display fault information

Use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs". The window also shows whether the fault is in the master cabinet, or in an extension cabinet (if connected).

Note: When using CDU-C in an extension cabinet with for example a 1+4+1 configuration, one TRU can be connected to two CDUs (cable RPM 513 1396/1). The CDU bus number will then be the same as the lowest numbered CDU.

For example, if TRU 1 is connected to CDU 1 and CDU 2. The CDU bus number then is CDU 1.

- CDU bus 1 is connected to CDU 1.
- CDU bus 2 is connected to CDU 2.
- CDU bus 3 is connected to CDU 3.

(3) Check bus connection on CDU

Check that the connection between the CDU bus and the CDU is OK.

(4) BS fault indicator status?

There are two methods to determine whether the fault has been cleared.

The first method is to inspect the yellow indicator labelled BS fault on the DXU.

BS fault indicator status?

- Off: Proceed to step (14). No fault is detected in the RBS.
- On: Proceed to step (5). One or more faults are detected in the RBS.

The second method is to use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs".

(5) Replace the first TRU

Replace one of the TRUs (that connects to the suspected CDU bus) according to instructions in the section "TRU" in the chapter "RBS Field Repair".

- CDU bus 1 is connected to TRU 1 and TRU 2.
- CDU bus 2 is connected to TRU 3 and TRU 4.
- CDU bus 3 is connected to TRU 5 and TRU 6.

Note: When using CDU-C in an extension cabinet with for example a 1+4+1 configuration, one TRU can be connected to two CDUs (cable RPM 513 1396/1). The CDU bus number will then be the same as the lowest numbered CDU.

For example, if TRU 1 is connected to CDU 1 and CDU 2. The CDU bus number then is CDU 1.

Note: If the unit to be replaced is part of an extension cabinet system, always work in the extension cabinet first, then in the master.

(6) BS fault indicator status?

There are two methods to determine whether the fault has been cleared.

The first method is to inspect the yellow indicator labelled BS fault on the DXU.

BS fault indicator status?

- Off: Proceed to step (7). No fault is detected in the RBS.
- On: Proceed to step (5). One or more faults are detected in the RBS.

The second method is to use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs".

(7) Replace the second TRU

Replace the other TRU (that connects to the suspected CDU bus) according to instructions in the section "TRU" in the chapter "RBS Field Repair".

Note: If the unit to be replaced is part of an extension cabinet system, always work in the extension cabinet first, then in the master.

(8) BS fault indicator status?

There are two methods to determine whether the fault has been cleared.

The first method is to inspect the yellow indicator labelled BS fault on the DXU.

BS fault indicator status?

- Off: Proceed to step (14). No fault is detected in the RBS.
- On: Proceed to step (9). One or more faults are detected in the RBS.

The second method is to use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs".

(9) Replace the CDU

Replace the CDU (that connects to the suspected CDU bus) according to instructions in the section "CDU" in the chapter "RBS Field Repair".

Note: If the unit to be replaced is part of an extension cabinet system, always work in the extension cabinet first, then in the master.

(10) BS fault indicator status?

There are two methods to determine whether the fault has been cleared.

The first method is to inspect the yellow indicator labelled BS fault on the DXU.

BS fault indicator status?

- Off: Proceed to step (14). No fault is detected in the RBS.
- On: Proceed to step (11). One or more faults are detected in the RBS.

The second method is to use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs".

(11) Replace sub-rack and CDU bus

The fault is located in the backplane or in the CDU bus.

Note: If the unit to be replaced is part of an extension cabinet system, always work in the extension cabinet first, then in the master.

1. Replace the TRU sub-rack according to instructions in the section "TRU Sub-Rack" in the chapter "RBS Field Repair".
2. Replace the CDU bus.

(12) BS fault indicator status?

There are two methods to determine whether the fault has been cleared.

The first method is to inspect the yellow indicator labelled BS fault on the DXU.

BS fault indicator status?

- Off: Proceed to step (14). No fault is detected in the RBS.
- On: Proceed to step (13). One or more faults are detected in the RBS.

The second method is to use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs".

(13) Contact the supervisor

Contact the supervisor or manager who will take further action, for example, to consult an FSC.

(14) Commence the Test after Repair

Take the following actions:

1. Make a test call over the CDU that connects to the CDU bus concerned according to instructions in the section "Test Call" in the chapter "Test after Repair".
2. Proceed to the section "Before Leaving the Site"in the chapter "Concluding Routines".

5.10 CDU-D RUs

Note: This procedure is common for the three RUs in the CDU-D: CU, DU and FU (FUd).

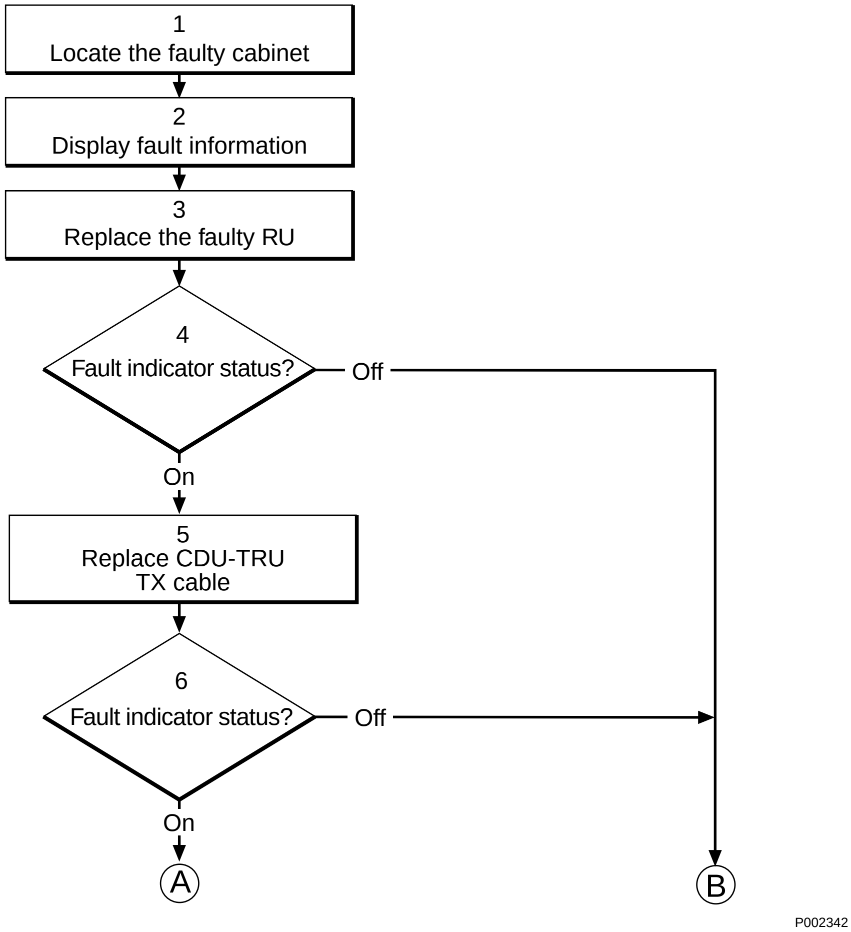


Figure 32 *CDU-D RUs flowchart (part 1of 2)*

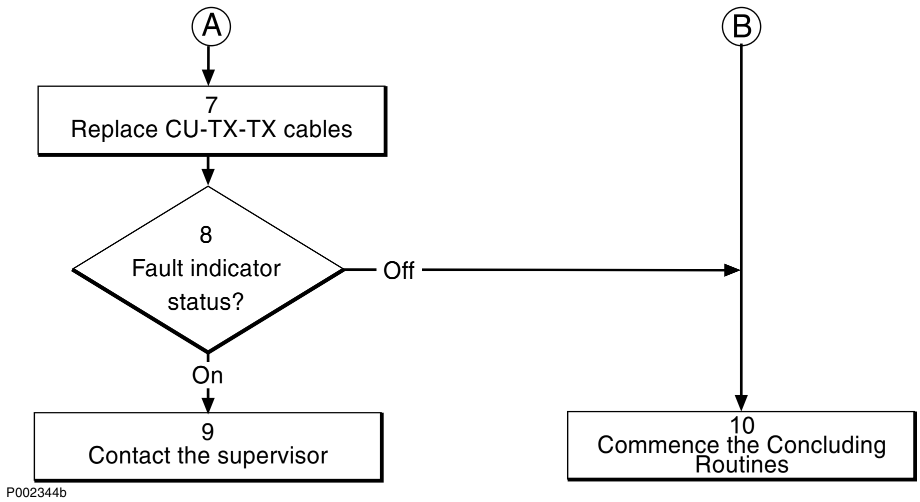
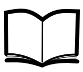


Figure 33 *CDU-D RUs (part 2 of 2)*

Note: Several instructions in this section require the OMT. For further information on the use of OMT, see:



OMT User's Manual *LZN 302 01*

(1) Locate the faulty cabinet

Locate the faulty cabinet according to work order information.

(2) Display fault information

Use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs". The window also shows whether the fault is in the master cabinet, or in an extension cabinet (if connected).

(3) Replace the faulty RU

Replace the faulty RU according to instructions in the section "CDU-D RUs" in the chapter "RBS Field Repair".

Note: If the unit to be replaced is a DU and part of an extension cabinet system using ALNA, always work in the master cabinet first, then in the extension cabinet.

(4) Fault indicator status?

The red indicator labelled Fault on an RU indicates the fault status of the unit.

Fault indicator status?

- Off: Proceed to step (10). No fault is detected in the RU.
- On: Proceed to step (5). One or more faults are detected in the RU.

There are two additional methods to determine whether the fault has been cleared.

The first method is to inspect the yellow indicator labelled BS fault on the DXU.

BS fault indicator status?

- Off: Proceed to step (10). No fault is detected in the RBS.
- On: Proceed to step (5). One or more faults are detected in the RBS.

The second method is to use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs".

(5) Replace CDU-TRU TX cables

Replace one or both CDU-TRU TX cables according to instructions in the section "CDU-TRU TX Cables" in the chapter "RBS Field Repair".

(6) Fault indicator status?

The red indicator labelled Fault on an RU indicates the fault status of the unit.

Fault indicator status?

- Off: Proceed to step (10). No fault is detected in the RU.

- On: Proceed to step (7). One or more faults are detected in the RU.

There are two additional methods to determine whether the fault has been cleared.

The first method is to inspect the yellow indicator labelled BS fault on the DXU.

BS fault indicator status?

- Off: Proceed to step (10). No fault is detected in the RBS.
- On: Proceed to step (7). One or more faults are detected in the RBS.

The second method is to use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs".

(7) Replace CU-TX-TX cables

Replace one or both CU-TX-TX cables according to instructions in the section "CU-TX-TX Cable" in the chapter "RBS Field Repair".

(8) Fault indicator status?

The red indicator labelled Fault on an RU indicates the fault status of the unit.

Fault indicator status?

- Off: Proceed to step (10). No fault is detected in the RU.
- On: Proceed to step (9). One or more faults are detected in the RU.

There are two additional methods to determine whether the fault has been cleared.

The first method is to inspect the yellow indicator labelled BS fault on the DXU.

BS fault indicator status?

- Off: Proceed to step (10). No fault is detected in the RBS.
- On: Proceed to step (9). One or more faults are detected in the RBS.

The second method is to use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs".

(9) Contact the supervisor

Contact the supervisor or manager who will take further action, for example, to consult an FSC.

(10) Commence the Concluding Routines

Proceed to the section "Before Leaving the Site" in the chapter "Concluding Routines".

5.11 CDU HLOUT HLIN Cable

Note: This procedure is common for the two RUs CDU HLOUT HLIN Cable and CAB HLIN Cable. CAB HLIN Cable connects the master and the extension cabinet.

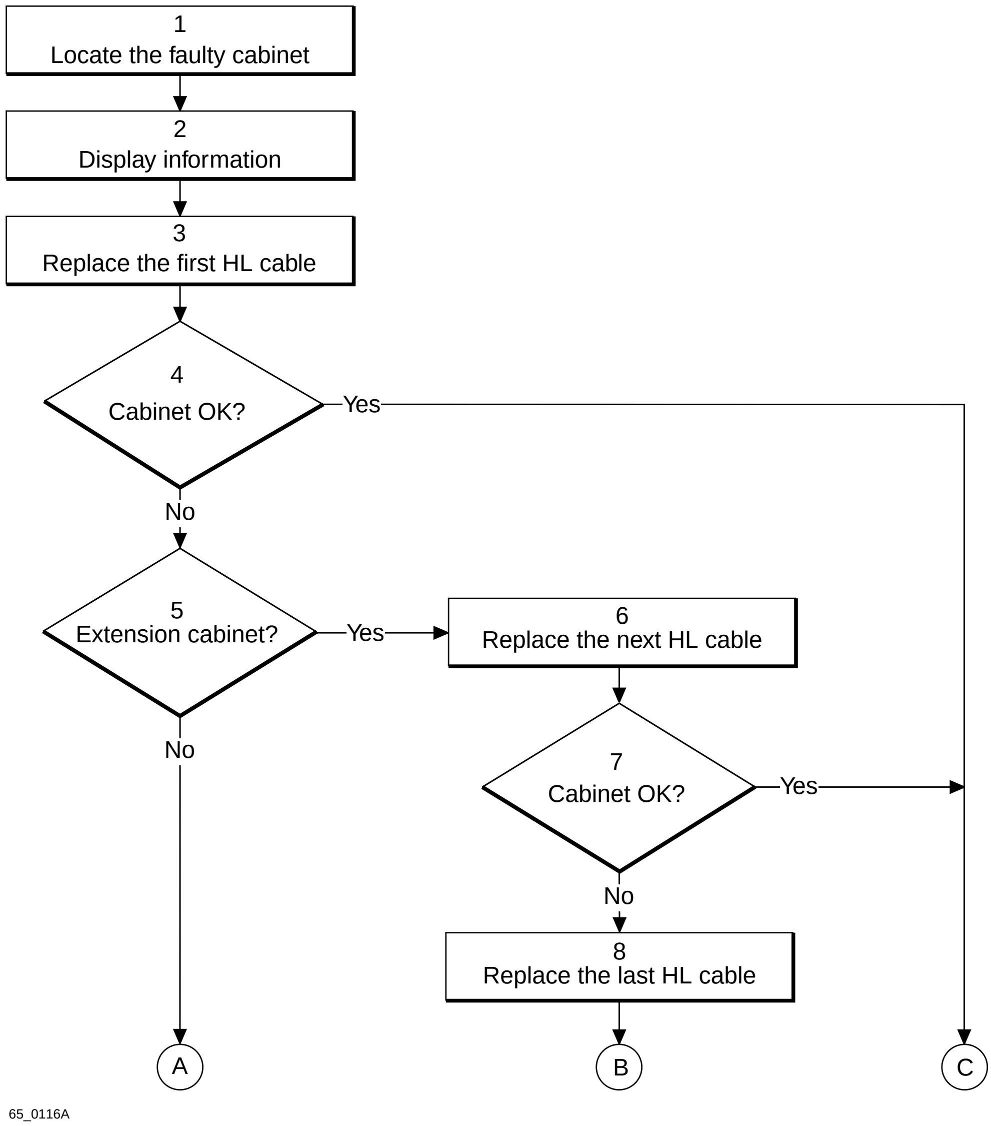


Figure 34 CDU HLOUT HLIN cable flowchart (part 1 of 2)

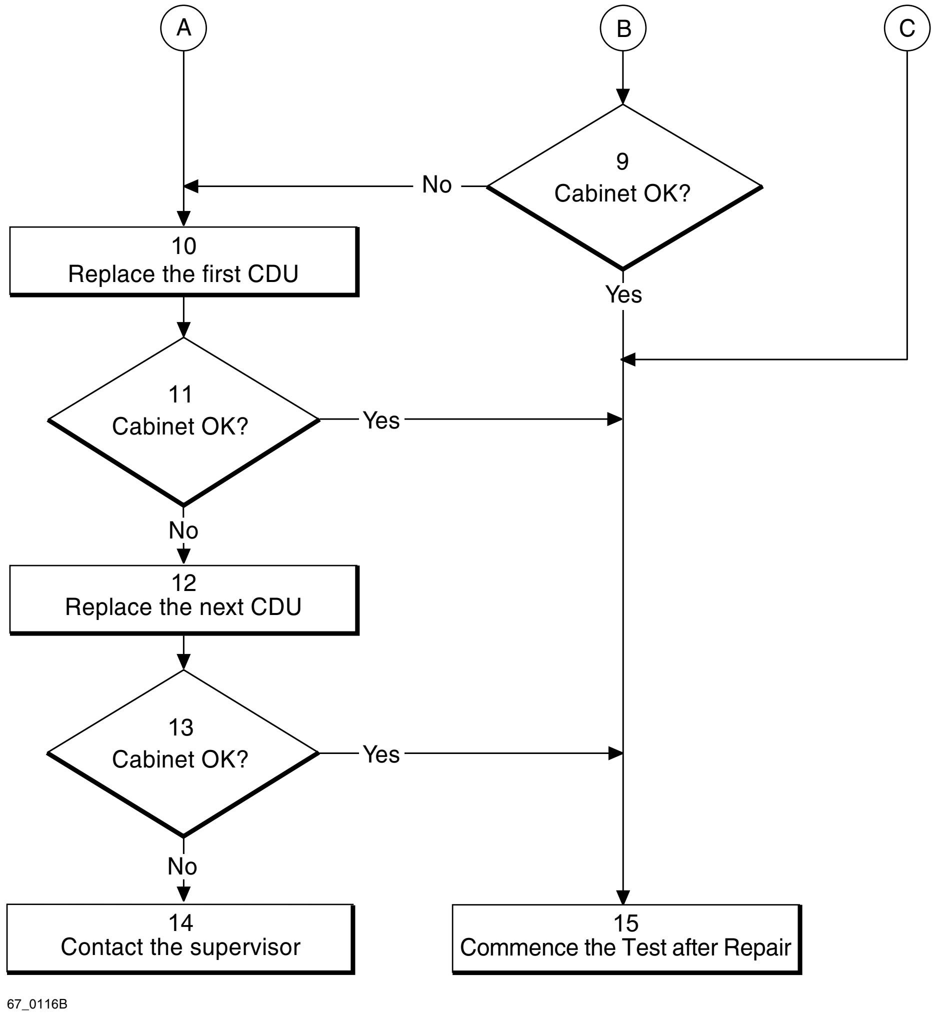


Figure 35 CDU HLOUT HLIN cable flowchart (part 2 of 2)

Note: Several instructions in this section require the OMT. For further information on the use of OMT, see:

OMT User's Manual *LZN 302 01*

(1) Locate the faulty cabinet

Locate the faulty cabinet according to work order information.

(2) Display fault information

1. Use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs". The window also determines whether the fault is in the master cabinet, or in an extension cabinet (if connected).
2. Search for "Fault Status CDU HLOUT HLIN#1". For example, if number 0 is faulty, it means that the faulty cable is connected to the HLOUT connector on CDU 0.

(3) Replace the first HL cable

Replace the faulty HL cable that is connected between the CDUs or between the CDU and the connection field if an extension cabinet is used. See instructions in the section "HLIN and HLOUT Cables" in the chapter "RBS Field Repair".

(4) Cabinet OK?

Use the OMT to list all RUs that are faulty. Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs". Check in particular that the fault "22 CDU HLOUT HLIN cable" has disappeared from the SO CF Replacement Unit Map.

Has the fault disappeared and is the RBS free from other faults?

- No: Proceed to step (5).
- Yes: Proceed to step (15).

(5) Extension cabinet?

Is there an extension cabinet connected?

- No: Proceed to step (10).
- Yes: Proceed to step (6).

(6) Replace the next HL cable

Replace the HL cable that connects the extension cabinet to the master cabinet (CAB HLIN Cable) according to instructions in the section "HLIN and HLOUT Cables" in the chapter "RBS Field Repair".

(7) Cabinet OK?

Use the OMT to list all RUs that are faulty. Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs". Check in particular that the fault "22 CDU HLOUT HLIN cable" has disappeared from the SO CF Replacement Unit Map.

Has the fault disappeared and is the RBS free from other faults?

- No: Proceed to step (8).
- Yes: Proceed to step (15).

(8) Replace the last HL cable

Replace the faulty HL cable that is connected between the CDU and the connection field in the extension cabinet according to instructions in the section "HLIN and HLOUT Cables" in the chapter "RBS Field Repair".

(9) Cabinet OK?

Use the OMT to list all RUs that are faulty. Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs". Check in particular that the fault "22 CDU HLOUT HLIN cable" has disappeared from the SO CF Replacement Unit Map.

Has the fault disappeared and is the RBS free from other faults?

- No: Proceed to step (10).
- Yes: Proceed to step (15).

(10) Replace the first CDU

Replace the CDU with the faulty HL cable according to instructions in the section "CDU" in the chapter "RBS Field Repair".

(11) Cabinet OK?

Use the OMT to list all RUs that are faulty. Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs". Check in particular that the fault "22 CDU HLOUT HLIN cable" has disappeared from the SO CF Replacement Unit Map.

Has the fault disappeared and is the RBS free from other faults?

- No: Proceed to step (12).
- Yes: Proceed to step (15).

(12) Replace the next CDU

Replace the CDU that the other end of the HL cable is connected to according to instructions in the section "CDU" in the chapter "RBS Field Repair".

(13) Cabinet OK?

Use the OMT to list all RUs that are faulty. Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs". Check in particular that the fault "22 CDU HLOUT HLIN cable" has disappeared from the SO CF Replacement Unit Map.

Has the fault disappeared and is the RBS free from other faults?

- No: Proceed to step (14).
- Yes: Proceed to step (15).

(14) Contact the supervisor

Contact the supervisor or manager who will take further action, for example consult an FSC.

(15) Commence the Test after Repair

If the CDU has been replaced, a test call has also to be made. See the section *Test Call* in the chapter *Test after Repair*.

Then proceed to the section *Before Leaving the Site* in the chapter *Concluding Routines*.

5.12 CDU RX in Cable

Note: In configurations with *CDU-C+ and duplexer,* the cable DPX RXIN is, in case of malfunction, also identified as CDU RX in cable in the SO CF, replacement unit map. However, the OMT can distinguish between the two cables. The fault handling procedure is common for the DPX RXIN and CDU RX in cables. See also the section "CDU-C+" in the chapter "Cable Connections".

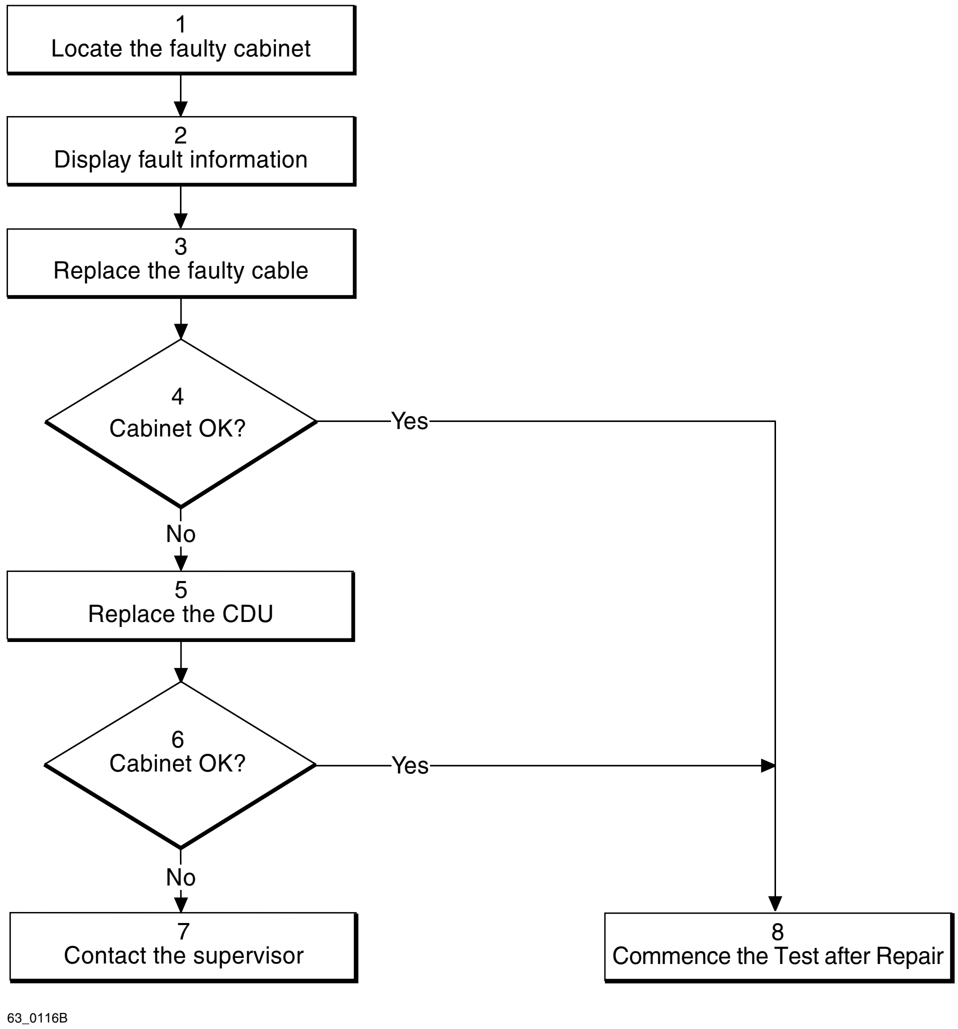


Figure 36 CDU RX in cable flowchart

Note: Several instructions in this section require the OMT. For further information on the use of OMT, see:

OMT User's Manual	*LZN 302 01*

(1) Locate the faulty cabinet

Locate the faulty cabinet according to work order information.

(2) Display fault information

1. Use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs". The window also determines whether the fault is in the master cabinet, or in an extension cabinet (if connected).

2. Search for "Fault Status CDU RX IN #1". For example, if CDU RX IN CABLE 2 is faulty, it means that the faulty cable is located on CDU 2.

(3) Replace the faulty cable

Replace the faulty cable according to instructions in the section "CDU-TRU RX Cables" in the chapter "RBS Field Repair".

(4) Cabinet OK?

Use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs". Check in particular that the fault "23 CDU RX in cable" has disappeared from the SO CF Replacement Unit Map.

Has the fault disappeared and is the RBS free from other faults?

- No: Proceed to step (5).
- Yes: Proceed to step (8).

(5) Replace the CDU

Replace the CDU according to instructions in the section "CDU"in the chapter "RBS Field Repair".

(6) Cabinet OK?

Use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs". Check in particular that the fault "23 CDU RX in cable" has disappeared from the SO CF Replacement Unit Map.

Has the fault disappeared and is the RBS free from other faults?

- No: Proceed to step (7).
- Yes: Proceed to step (8).

(7) Contact the supervisor

Contact the supervisor or manager who will take further action, for example consult an FSC.

(8) Commence the Test after Repair

If the CDU has been replaced, a test call must be performed. See the section *Test Call* in the chapter *Test after Repair*.

Then proceed to the section *Before Leaving the Site* in the chapter *Concluding Routines*.

5.13 CDU-TRU PFWD Cable and CDU-TRU PREFL Cable

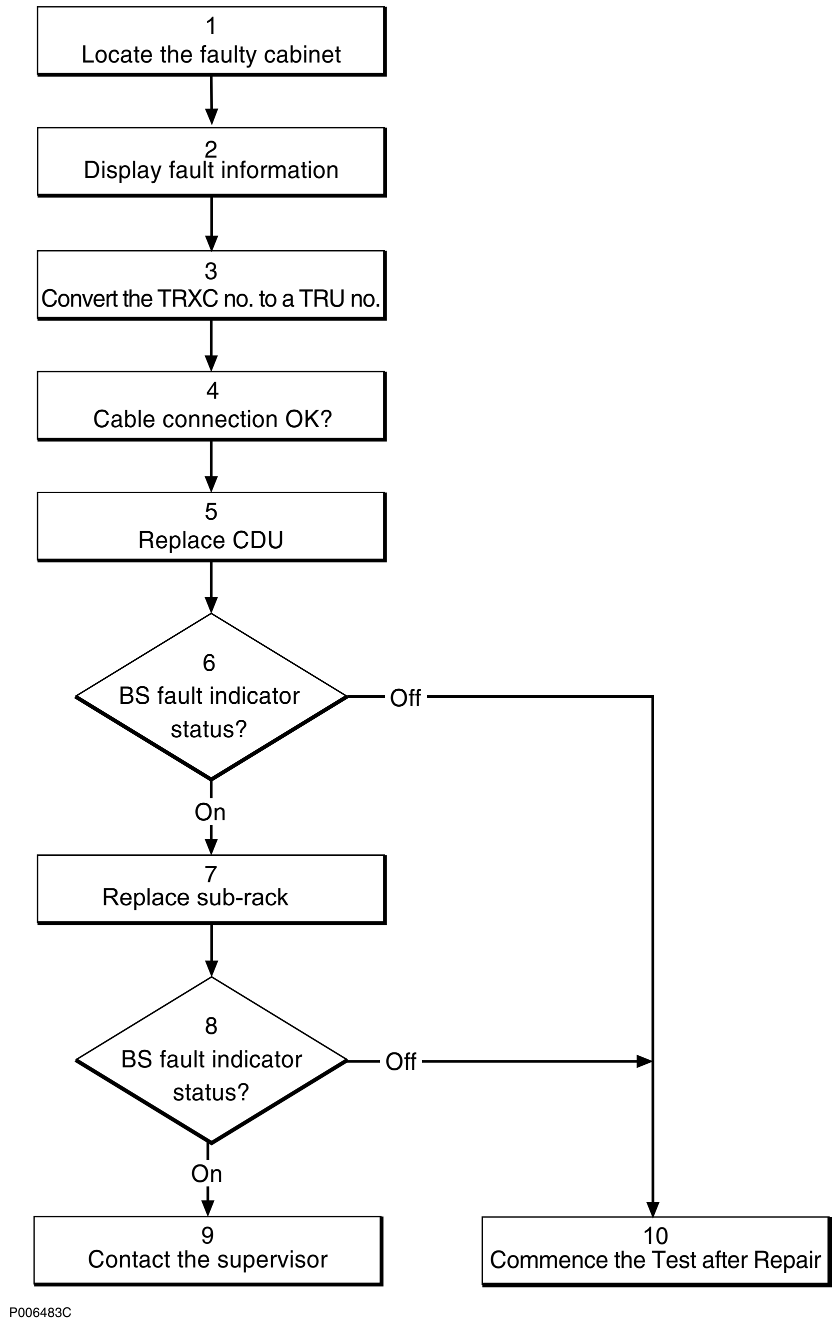


Figure 37 CDU-TRU PFWD and PREFL cable flowchart

Note: Several instructions in this section require the OMT. For further information on the use of OMT, see:

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(1) Locate the faulty cabinet

Locate the faulty cabinet according to work order information.

(2) Display fault information

Use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs". The window also shows whether the fault is in the master cabinet, or in an extension cabinet (if connected).

(3) Convert the TRXC no. to a TRU no.

Read the work order to see which TRXC is reporting the cable as faulty. The TRXC number is converted according to the information below.

- TRXC 0 = TRU 1
- TRXC 1 = TRU 2
- TRXC 2 = TRU 3
- TRXC 3 = TRU 4
- etc.

For further information, see the chapter "Positioning of RUs".

(4) Cable connection OK?

Check that the cable is properly connected to the CDU.

To properly tighten the cable connections, refer to the section "Cable Connections" in the chapter "Handling of RBS during Maintenance".

(5) Replace CDU

If the cable was connected properly, replace the CDU (that connects to the suspected cable) according to instructions in the section "CDU"in the chapter "RBS Field Repair".

Note: If the unit to be replaced is part of an extension cabinet system, always work in the extension cabinet first, then in the master.

(6) BS fault indicator status?

There are two methods to determine whether the fault has been cleared.

The first method is to inspect the yellow indicator labelled BS fault on the DXU.

BS fault indicator status?

- Off: Proceed to step (10). No fault is detected in the RBS.
- On: Proceed to step (7). One or more faults are detected in the RBS.

The second method is to use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs".

(7) Replace sub-rack

Note: If the unit to be replaced is part of an extension cabinet system, always work in the extension cabinet first, then in the master.

1. Replace the TRU sub-rack according to instructions in the section "TRU Sub-Rack" in the chapter "RBS Field Repair".

(8) BS fault indicator status?

There are two methods to determine whether the fault has been cleared.

The first method is to inspect the yellow indicator labelled BS fault on the DXU.

BS fault indicator status?

- Off: Proceed to step (10). No fault is detected in the RBS.
- On: Proceed to step (9). One or more faults are detected in the RBS.

The second method is to use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs".

(9) Contact the supervisor

Contact the supervisor or manager who will take further action, for example, to consult an FSC.

(10) Commence the Test after Repair

1. Make a test call over the TRUs concerned according to instructions in the section "Test Call" in the chapter "Test after Repair". (Over all TRUs, if the sub-rack was replaced. Over TRUs connected to the CDU, if that unit was replaced.)
2. Proceed to the section "Before Leaving the Site"in the chapter "Concluding Routines".

5.14 CDU-TRU RXA Cable and CDU-TRU RXB Cable

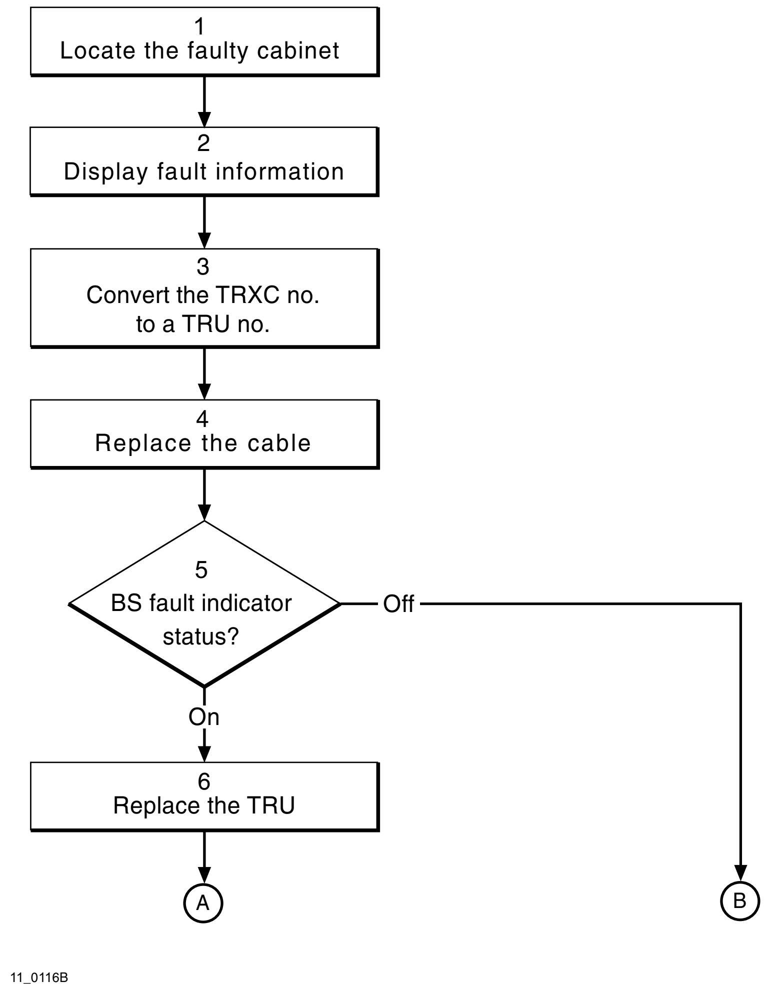

Figure 38 CDU-TRU RXA and RXB cable flowchart (part 1 of 2)

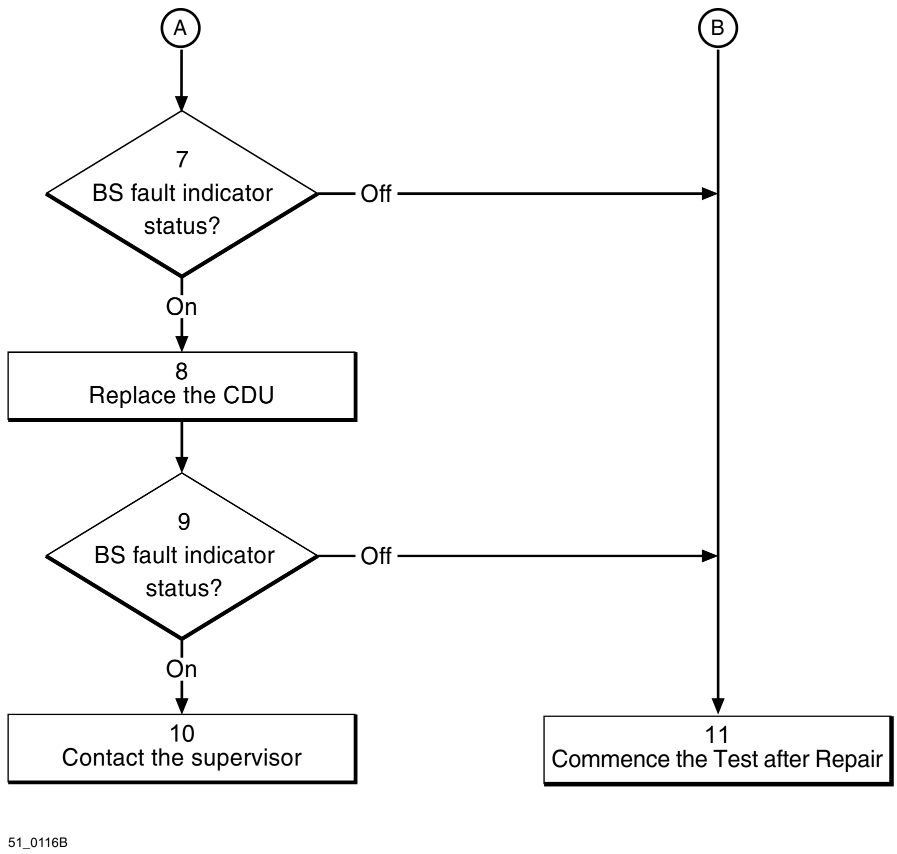

Figure 39 CDU-TRU RXA and RXB cable flowchart (part 2 of 2)

Note: Several instructions in this section require the OMT. For further information on the use of OMT, see:

OMT User’s Manual *LZN 302 01*

(1) Locate the faulty cabinet

Locate the faulty cabinet according to work order information.

(2) Display fault information

Use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs". The window also shows whether the fault is in the master cabinet, or in an extension cabinet (if connected).

(3) Convert the TRXC no. to a TRU no.

Read the work order to see which TRXC is reporting the cable as faulty. The TRXC number is converted according to the information below.

- TRXC 0 = TRU 1
- TRXC 1 = TRU 2
- TRXC 2 = TRU 3

- TRXC 3 = TRU 4

  etc.

For further information, see the chapter "Positioning of RUs".

(4) Replace the cable

Check the connections on the TRU and CDU. If the connections are OK, replace the CDU-TRU RX cable according to instructions in the section "CDU-TRU RX Cables" in the chapter "RBS Field Repair".

(5) BS fault indicator status?

There are two methods to determine whether the fault has been cleared.

The first method is to inspect the yellow indicator labelled BS fault on the DXU.

BS fault indicator status?

- Off: Proceed to step (11). No fault is detected in the RBS.
- On: Proceed to step (6). One or more faults are detected in the RBS.

The second method is to use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs".

(6) Replace the TRU

Replace the TRU (that connects to the suspected cable) according to instructions in the section "TRU" in the chapter "RBS Field Repair".

(7) BS fault indicator status?

There are two methods to determine whether the fault has been cleared.

The first method is to inspect the yellow indicator labelled BS fault on the DXU.

BS fault indicator status?

- Off: Proceed to step (11). No fault is detected in the RBS.
- On: Proceed to step (8). One or more faults are detected in the RBS.

The second method is to use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs".

(8) Replace the CDU

Replace the CDU (that connects to the suspected cable) according to instructions in the section "CDU" in the chapter "RBS Field Repair".

(9) BS fault indicator status?

There are two methods to determine whether the fault has been cleared.

The first method is to inspect the yellow indicator labelled BS fault on the DXU.

BS fault indicator status?

- Off: Proceed to step (11). No fault is detected in the RBS.
- On: Proceed to step (10). One or more faults are detected in the RBS.

The second method is to use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs".

(10) Contact the supervisor

Contact the supervisor or manager who will take further action, for example, to consult an FSC.

(11) Commence the Test after Repair

Take the following actions:

1. Make a test call over the TRU(s) concerned according to the section "Test Call" in the chapter "Test after Repair".
2. Proceed to the section "Before Leaving the Site"in the chapter "Concluding Routines".

5.15 CU

Refer to Section 5.10 CDU-D RUs on page 73.

5.16 DC/DC Converter

This section describes the procedure to be used when there is a fault in the DC/DC converter.

Faults in the DC/DC converter are reported to the network operator via an external alarm.

Note: The DC/DC converter that is used with the RBS 2202 is not fitted in the cabinet itself. It is installed in the BBS instead.

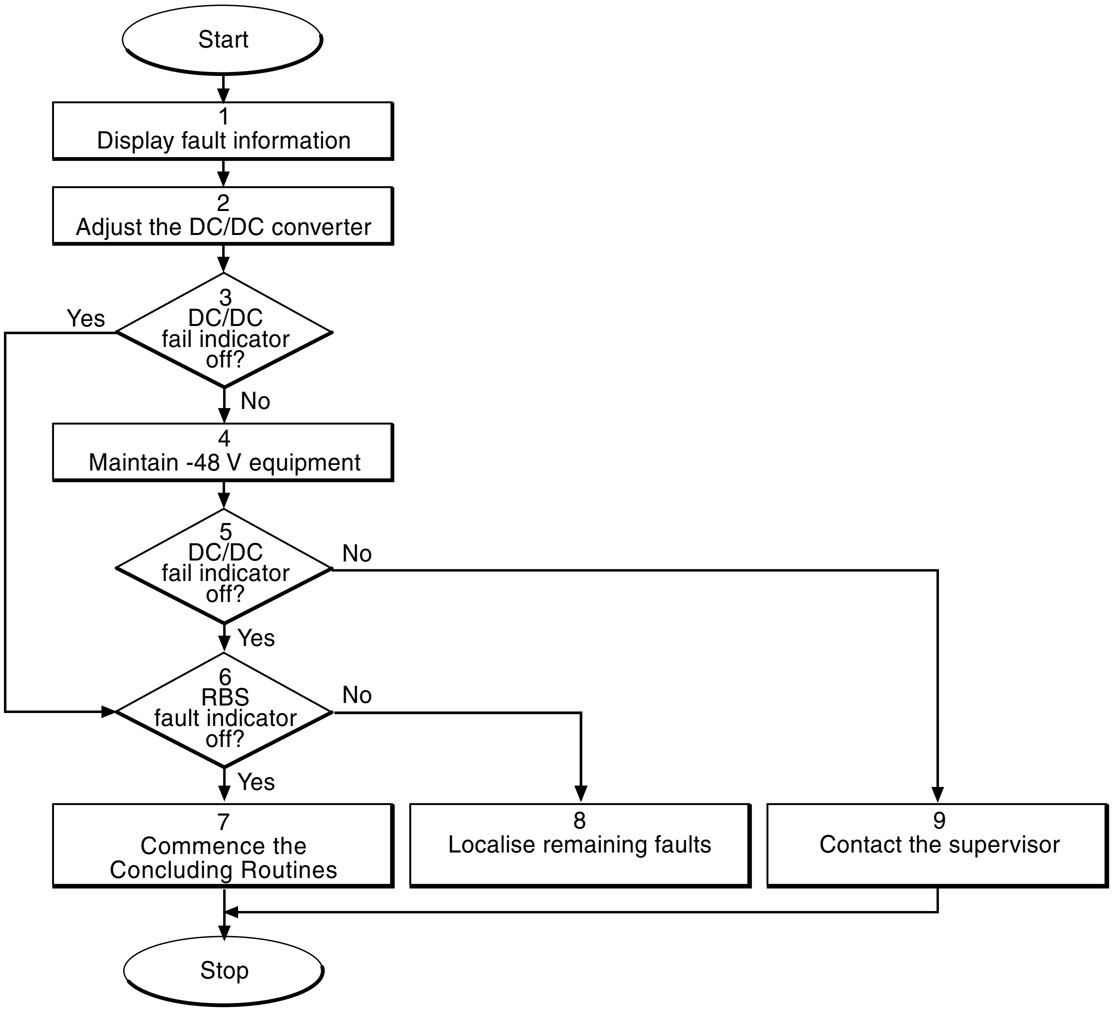

Figure 40 DC/DC converter flowchart

Note: Several instructions in this section require the OMT. For further information on the use of OMT, see:

OMT User's Manual *LZN 302 01*

(1) Display fault information

Use the OMT to list all RUs that are faulty.

3. In the System view, click **RBS 2000**.
4. In the Operation menu, click **Monitor**and **Display Faulty RUs**.

   The window also shows whether the fault is in the master cabinet, or in an extension cabinet (if connected).

(2) Adjust the DC/DC converter

1. Adjust the DC/DC converter according to the instructions in the section *DC/DC Converter* in the chapter *RBS Field Repair*.

(3) DC/DC Fail indicator off?

Check the red Fail indicator on the DC/DC converter.

Is the Fail indicator off?

Answer	Comment	Action
Yes	The output voltage is within limits.	Proceed to step (6)
No	The output voltage is out of alarm limits due to overload, overvoltage or failure.	Proceed to step (4)

(4) Maintain -48 V equipment

Perform maintenance on -48 V equipment supplied from the DC/DC converter.

(5) DC/DC Fail indicator off?

Check the red Fail indicator on the DC/DC converter.

Is the Fail indicator off?

Answer	Comment	Action
Yes	The output voltage is within limits.	Proceed to step (6)
No	The output voltage is out of alarm limits due to overload, overvoltage or failure.	Proceed to step (9)

(6) RBS Fault indicator off?

1. Check that there are no remaining faults in the RBS. The yellow BS Fault indicator is located on the DXU.

   Is the BS Fault indicator off?

Answer	Comment	Action
Yes	There are no faults in the RBS.	Proceed to stage (7)
No	There is still one or more faults in the RBS.	Proceed to stage (8)

The status of the RBS can also be checked with the OMT. Use the monitor "Display Faulty RUs" in the OMT to list all RUs that are faulty.

(7) Commence the Concluding Routines

1. Proceed to section *Before Leaving the Site* in the chapter *Concluding Routines*.

(8) Localise remaining faults

1. Use the monitor **Display Faulty RUs**in the OMT to list all RUs that are faulty.
2. Do fault localisation on the RUs that are listed by the OMT as faulty. See respective section in chapter "Fault Localisation".

(9) Contact the supervisor

1. Contact the supervisor or manager who will take further action, for example, to consult an FSC.

5.17 DPX RXIN Cable

Refer to the section "CDU RX in Cable", Section 5.12 on page 80.

5.18 DU

Refer to the section *Section 5.10 CDU-D RUs on page 73*.

5.19 DXU

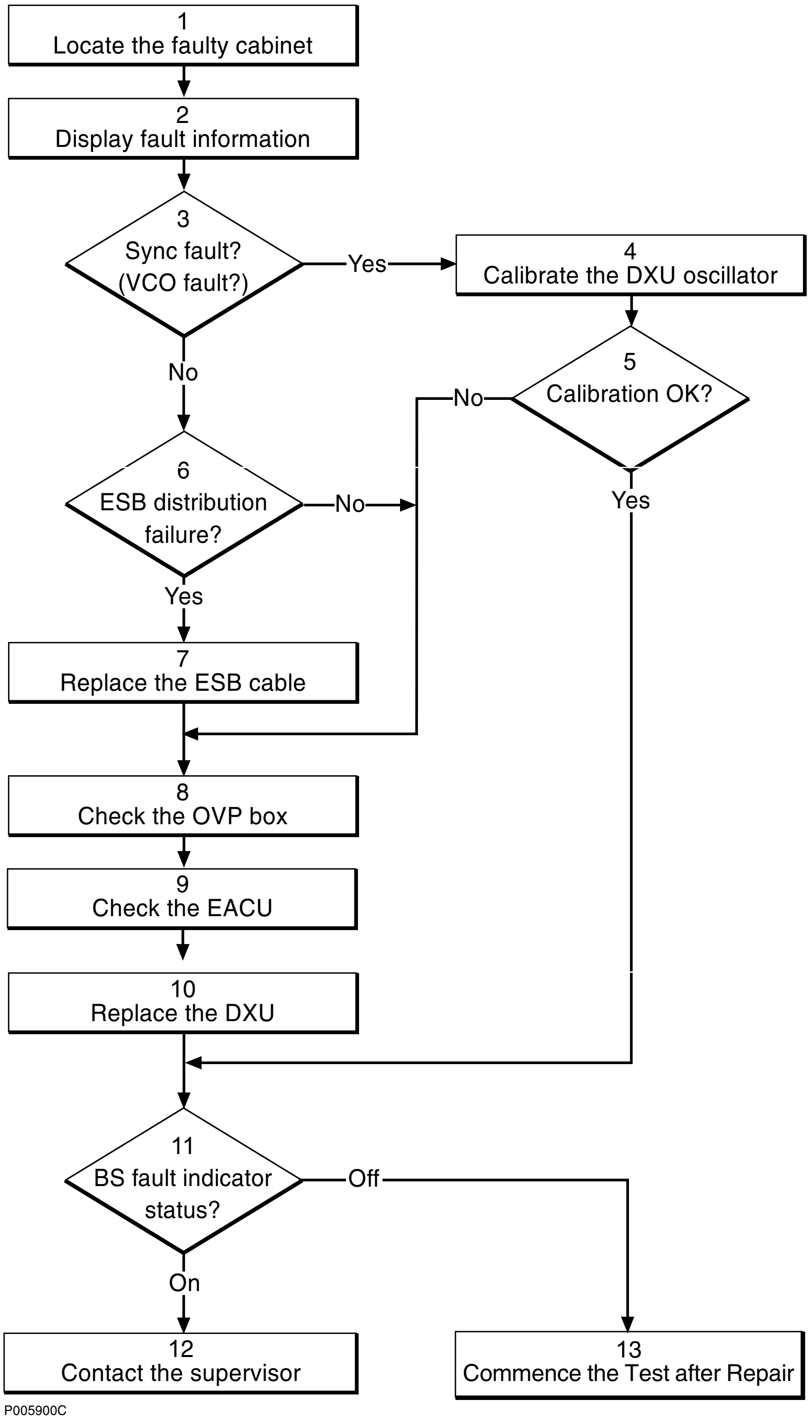

Figure 41 DXU flowchart

Note: Several instructions in this section require the OMT. For further information on the use of OMT, see:

OMT User's Manual *LZN 302 01*

(1) Locate the faulty cabinet

Locate the faulty cabinet according to work order information.

(2) Display fault information

1. Use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs".
2. In the "Cabinet view", select the object DXU.
3. In the Operation menu, select "Display Status" to list faults in the DXU.

(3) Sync fault? (VCO fault?)

Check for any of the following two alarms:

- "Timing unit VCO ageing" in "SO CF Internal Fault Map Class 2A"
- "Timing unit VCO fault" in "SO CF Internal Fault Map Class 1A"

Are any of these faults indicated in the OMT?

- Yes: Proceed to step (4).
- No: Proceed to step (6).

(4) Calibrate the DXU oscillator

Calibrate the DXU oscillator according to instructions in the section "DXU Maintenance" in the chapter "Preventive Maintenance".

(5) Calibration OK?

Was the calibration of the DXU oscillator OK?

- Yes: Proceed to step (11).
- No: Proceed to step (8).

(6) ESB distribution failure?

Is the RBS syncronized with another RBS?

- Yes: Proceed to step (7).
- No: Proceed to step (8).

Check for the fault "ESB distribution failure" in "SO CF Internal Fault Map Class 2A" with the OMT. Is this fault indicated?

- Yes: Proceed to step (7).
- No: Proceed to step (8).

Note: In SW release R7D the alarm is found in "AO TF Internal Fault Map Class 2A".

(7) Replace the ESB cable

Replace the ESB cable according to instructions in the section "ESB cable" in the chapter "RBS Field Repair".

(8) Check the OVP box

Check if the PCM-connection or ESB cable is equipped with an OVP box. Whenever a fault is suspected in the DXU, the gas discharge tubes in the OVP box shall be replaced. Refer to instructions in the section "OVP box" in the chapter "RBS Field Repair".

In case there is no OVP box, proceed directly to step (9).

(9) Check the EACU

Note: If the DXU is faulty due to surges caused by lightning, then the overvoltage arrestors in the EACU are faulty.

Whenever a fault is suspected in the DXU, the overvoltage arrestors in the EACU shall be replaced. Refer to instructions in the section "EACU" in the chapter "RBS Field Repair".

(10) Replace the DXU

Replace the faulty DXU according to instructions in the section "DXU" in the chapter "RBS Field Repair".

(11) BS fault indicator status?

The red indicator labelled Fault on the DXU indicates the fault status of the unit.

Fault indicator status?

- Off: Proceed to step (13). No fault is detected in the DXU.
- On: Proceed to step (12). One or more faults are detected in the DXU.

There are two additional methods to determine whether the fault has been cleared.

The first method is to inspect the yellow indicator labelled BS fault on the DXU.

BS fault indicator status?

- Off: Proceed to step (13). No fault is detected in the RBS.
- On: Proceed to step (12). One or more faults are detected in the RBS.

The second method is to use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs".

(12) Contact the supervisor

Contact the supervisor or manager who will take further action, for example, to consult an FSC.

(13) Commence the Test after Repair

Take the following actions:

1. Make a test call over all TRUs, including those in an extension cabinet (if connected), handled by the DXU according to the section "Test Call" in the chapter "Test after Repair". If the DXU has been changed in a Slave cabinet in a TG-sync configuration, make a test call over the Slave cabinet according to the section "Test Call" in the chapter "Test after Repair".
2. Proceed to the section "Before Leaving the Site"in the chapter "Concluding Routines".

5.20 ECU

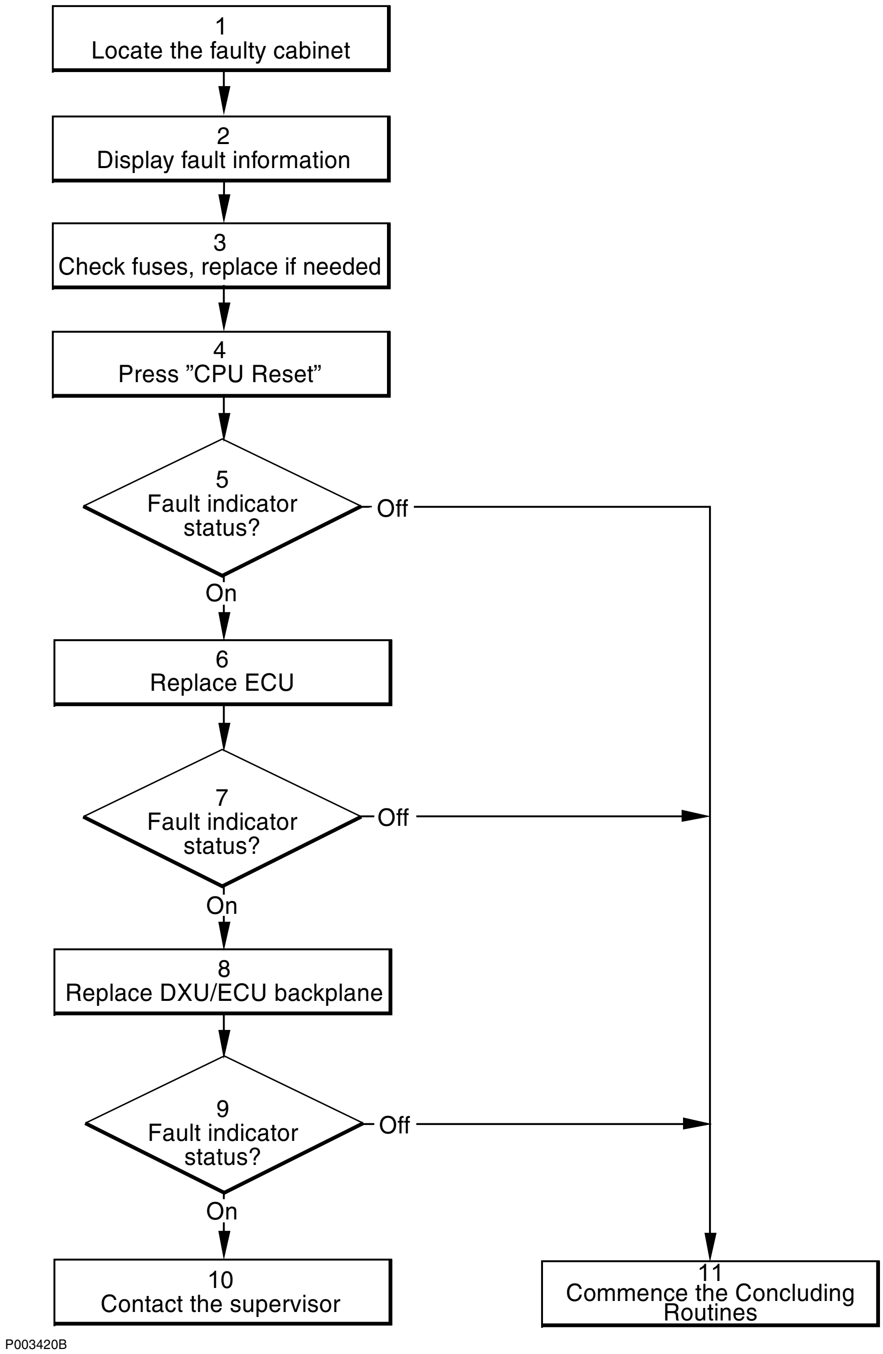

Figure 42 ECU flowchart

Note: Several instructions in this section require the OMT. For further information on the use of OMT, see:

OMT User’s Manual *LZN 302 01*

(1) Locate the faulty cabinet

Locate the faulty cabinet according to work order information.

(2) Display fault information

Use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs". The window also shows whether the fault is in the master cabinet, or in an extension cabinet (if connected).

For further information on the use of the OMT, see the *OMT User's Manual*.

(3) Check fuses, replace if needed

Check the ECU circuit breaker on the IDM according to instructions in the section "IDM" in the chapter "RBS Field Repair".

(4) Press the “CPU Reset”

Press the button labelled "CPU Reset" on the ECU for approximately 3 seconds. Wait at least 30 seconds to allow the ECU to restart.

(5) BS fault indicator status?

The red indicator labelled Fault on the ECU indicates the fault status of the unit.

Fault indicator status?

- Off: Proceed to step (11). No fault is detected in the ECU.
- On: Proceed to step (6). One or more faults are detected in the ECU.
- Flashing: Proceed to step (6). The communication is lost with either the DXU, PSU(s) or BFU(s).

There are two additional methods to determine whether the fault has been cleared.

The first method is to inspect the yellow indicator labelled BS fault on the DXU.

BS fault indicator status?

- Off: Proceed to step (11). No fault is detected in the RBS.
- On: Proceed to step (6). One or more faults are detected in the RBS.

The second method is to use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs".

(6) Replace the ECU

Replace the faulty ECU according to instructions in the section "ECU" in the chapter "RBS Field Repair".

(7) BS fault indicator status?

The red indicator labelled Fault on the ECU indicates the fault status of the unit.

Fault indicator status?

- Off: Proceed to step (11). No fault is detected in the ECU.
- On: Proceed to step (8). One or more faults are detected in the ECU.
- Flashing: Proceed to step (8). The communication is lost with either the DXU, PSU(s) or BFU(s).

There are two additional methods to determine whether the fault has been cleared.

The first method is to inspect the yellow indicator labelled BS fault on the DXU.

BS fault indicator status?

- Off: Proceed to step (11). No fault is detected in the RBS.
- On: Proceed to step (8). One or more faults are detected in the RBS.

The second method is to use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs".

(8) Replace the DXU/ECU backplane

The fault is probably located in the DXU/ECU backplane. Replace the DXU/ECU backplane according to the section "DXU/ECU Backplane" in the chapter "RBS Field Repair".

(9) BS fault indicator status?

The red indicator labelled Fault on the ECU indicates the fault status of the unit.

Fault indicator status?

- Off: Proceed to step (11). No fault is detected in the ECU.
- On: Proceed to step (10). One or more faults are detected in the ECU.
- Flashing: Proceed to step (10). The communication is lost with either the DXU, PSU(s) or BFU(s).

There are two additional methods to determine whether the fault has been cleared.

The first method is to inspect the yellow indicator labelled BS fault on the DXU.

BS fault indicator status?

- Off: Proceed to step (11). No fault is detected in the RBS.
- On: Proceed to step (10). One or more faults are detected in the RBS.

The second method is to use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs".

(10) Contact the supervisor

Contact the supervisor or manager who will take further action, for example, to consult an FSC.

(11) Commence the Concluding Routines

Proceed to the section "Before Leaving the Site" in the chapter "Concluding Routines".

5.21 Environment

This RU records conditions that cannot be affected from the base station. For example, if the temperature in the cabinet is outside the specified range or if the incoming AC mains power is faulty, the RU "Environment" is reported as faulty. The RU "Environment" can be divided into two sub-groups: "Climate" and "Power".

There are two methods to determine whether the fault has been cleared.

The first method is to inspect the yellow indicator labelled BS fault on the DXU.

- BS fault indicator ON means that one or more faults are detected in the RBS.
- BS fault indicator OFF means that no fault is detected in the RBS.

The second method is to use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs". For further information on the use of OMT, see the *OMT User's Manual*.

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The environmental alarms are given in Section 5.21.1 SO CF internal fault map, class 1A on page 100and Section 5.21.2 SO CF internal fault map, class 2A on page 101.

5.21.1 SO CF internal fault map, class 1A

Fault: 10 Indoor Temp Out Of Safe Range

Note: This fault is valid only for master cabinet.

Description

The temperature inside the cabinet is out of permissible range for safe function. An alarm will be sent before the DC is disconnected.

Fault localisation

1 Fan, see Section 5.23 on page 108

2 ECU, see Section 5.20 on page 97

Fault: 12 DC Voltage Out Of Range

Note: This fault is valid only for master cabinet.

Description

The batteries have been discharged so that cut-out will be made. Alarm will be sent to main supervision before the DC supply of the load is disconnected.

Fault localisation

1 PSU, see Section 5.28 on page 122

2 ECU, see Section 5.20 on page 97

5.21.2 SO CF internal fault map, class 2A

Fault: 16 Indoor Temp Out Of Normal Conditional Range

Note: This fault is valid only for master cabinet.

Description

The temperature inside the cabinet is out of permissible range.

Fault localisation

1 Fan, see Section 5.23 on page 108

Fault: 18 DC Voltage Out Of Range

Description

This fault type has two causes:

Overvoltage. A fault report is sent if the DC voltage is above the overvoltage level.

Undervoltage. The RBS is powered from batteries. Therefore, the DC supply will only last for a limited time.

Fault localisation

1 PSU, see Section 5.28 on page 122

2 ECU, see Section 5.20 on page 97

3 Battery, see Section 5.5 on page 63

Fault: 20 External Power Fault

Description

Incoming mains failure. System powered by batteries.

Fault localisation

1 Check incoming power for disturbances.

5.22 External Alarms

This procedure should be used when there is a fault in the external alarm system.

External alarms are customer-defined alarms in the RBS. The alarm detector activates the alarm input by an open or closed external alarm sensor loop. For each alarm inlet it is possible to define and change an alarm set-up with the OMT. The set-up is stored as RBS information in the IDB.

The yellow indicator marked External alarm on the DXU will light up if any external alarms are activated. When a fault in the external alarm system occurs, the OMT should be used to check the alarm status and the alarm set-up.

Two cases are described in the following fault localisation procedure:

- An alarm is active in the BSC, but there should be no alarm. This can happen where an open sensor circuit should indicate an alarm.
- An alarm is not active in the BSC when it should be. This can happen where a closed sensor circuit should indicate an alarm.

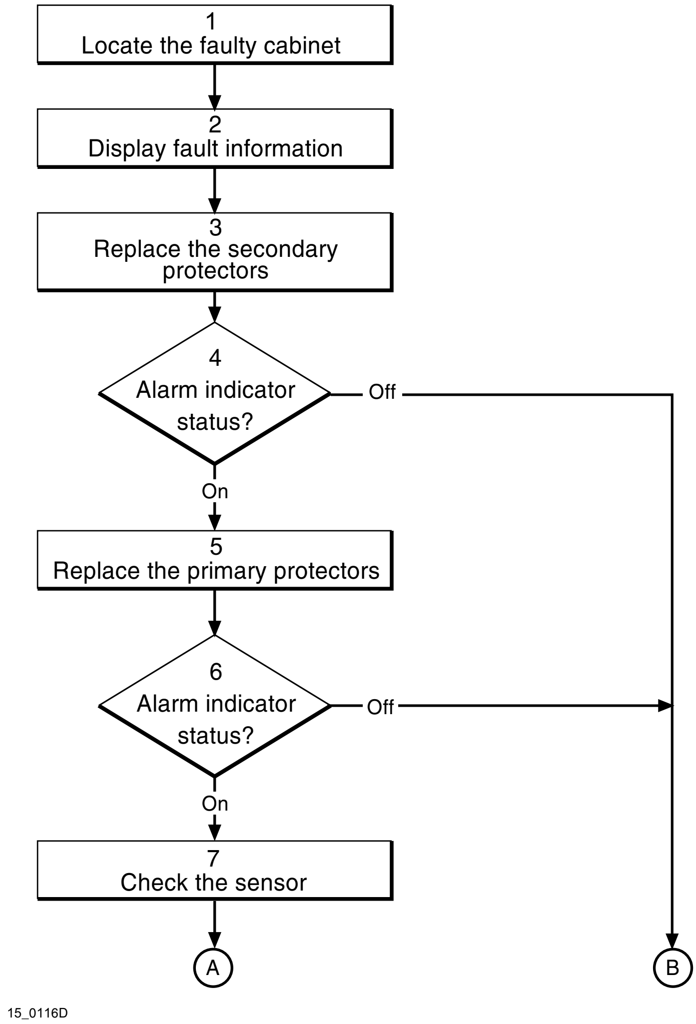

Figure 43 External alarms flowchart (part 1 of 2)

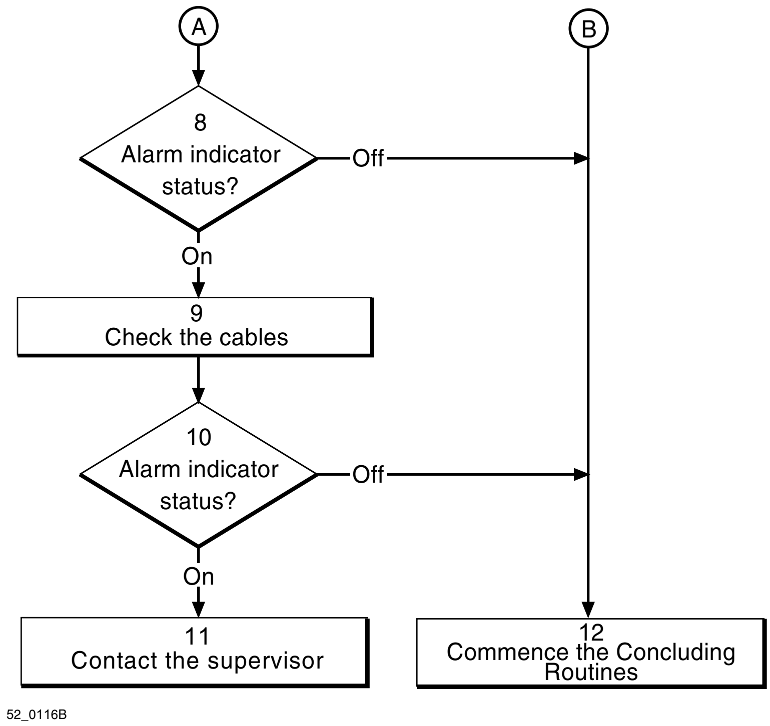

Figure 44 External alarms flowchart (part 2 of 2)

Note: Several instructions in this section require the OMT. For further information on the use of OMT, see:

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(1) Locate the faulty cabinet

Locate the faulty cabinet according to work order information.

(2) Display fault information

Use the OMT to monitor the external alarm that is activated.

Look at the alarm set-up concerned to investigate whether the alarm should be activated by a closed or open sensor circuit. Find out which module number in the EACU the alarm is associated with. This information will be used later in the fault localisation procedure.

(3) Replace the secondary protectors

The secondary protectors are located in the EACU. Replace the secondary protectors according to instructions in the section "EACU" in the chapter "RBS Field Repair"

(4) Alarm indicator status?

The yellow indicator labelled External alarm indicates that one or more alarms are activated. The External alarm indicator is located on the DXU.

External alarm indicator status?

- Off: Proceed to step (12). No external alarms are activated.
- On: Proceed to step (5). One or more alarms are activated.

Additionally, use the OMT to monitor Fault status.

When an open sensor circuit activates the alarm concerned:

- Continue with the fault localisation until the External alarm indicator on the DXU goes off.

When a closed sensor circuit activates the alarm concerned:

- Continue with the fault localisation until the External alarm indicator on the DXU is lit.

(5) Replace the primary protectors

The primary protectors are located in the EACU. Replace the primary protectors according to instructions in the section "EACU" in the chapter "RBS Field Repair"

(6) Alarm indicator status?

The yellow indicator labelled External alarm indicates that one or more alarms are activated. The External alarm indicator is located on the DXU.

External alarm indicator status?

- Off: Proceed to step (12). No external alarms are activated.
- On: Proceed to step (7). One or more alarms are activated.

Additionally, use the OMT to monitor Fault status.

When an open sensor circuit activates the alarm concerned:

- Continue with the fault localisation until the External alarm indicator on the DXU goes off.

When a closed sensor circuit activates the alarm concerned:

- Continue with the fault localisation until the External alarm indicator on the DXU is lit.

(7) Check the sensor

1. Determine whether or not the sensor works. Measure the resistance with a multimeter directly in the connection points where the external alarm sensor cables are connected in the EACU. A closed sensor should have a resistance close to zero and an open sensor should have an infinite resistance.
2. Replace the sensor if it is suspected of being faulty.

(8) Alarm indicator status?

The yellow indicator labelled External alarm indicates that one or more alarms are activated. The External alarm indicator is located on the DXU.

External alarm indicator status?

- Off: Proceed to step (12). No external alarms are activated.
- On: Proceed to step (9). One or more alarms are activated.

Additionally, use the OMT to monitor Fault status.

When an open sensor circuit activates the alarm concerned:

- Continue with the fault localisation until the External alarm indicator on the DXU goes off.

When a closed sensor circuit activates the alarm concerned:

- Continue with the fault localisation until the External alarm indicator on the DXU is lit.

(9) Check the cables

There could be something wrong with the cables to the DXU or the external alarm sensor cables.

Instructions when an open sensor circuit activates the alarm.

1. Strap the connection point for the external alarm concerned, see the figure below. This should be done on the DXU side of the EACU, where the cables to the DXU are connected. If the external alarm indicator on the DXU goes off, there is probably something wrong with the external alarm sensor cables. Otherwise the DXU cables may be faulty.
2. Change the faulty cable(s).
3. Restore the units.

Instructions when a closed sensor circuit activates the alarm.

1. Strap the connection point for the external alarm concerned, see the figure below. This should be done on the external alarm side of the EACU, where the cables from the external alarm are connected. If the external alarm indicator on the DXU lights up, there is probably something wrong with the external alarm sensor cables. Otherwise the DXU cables may be faulty.
2. Change the faulty cable(s).
3. Restore the units.

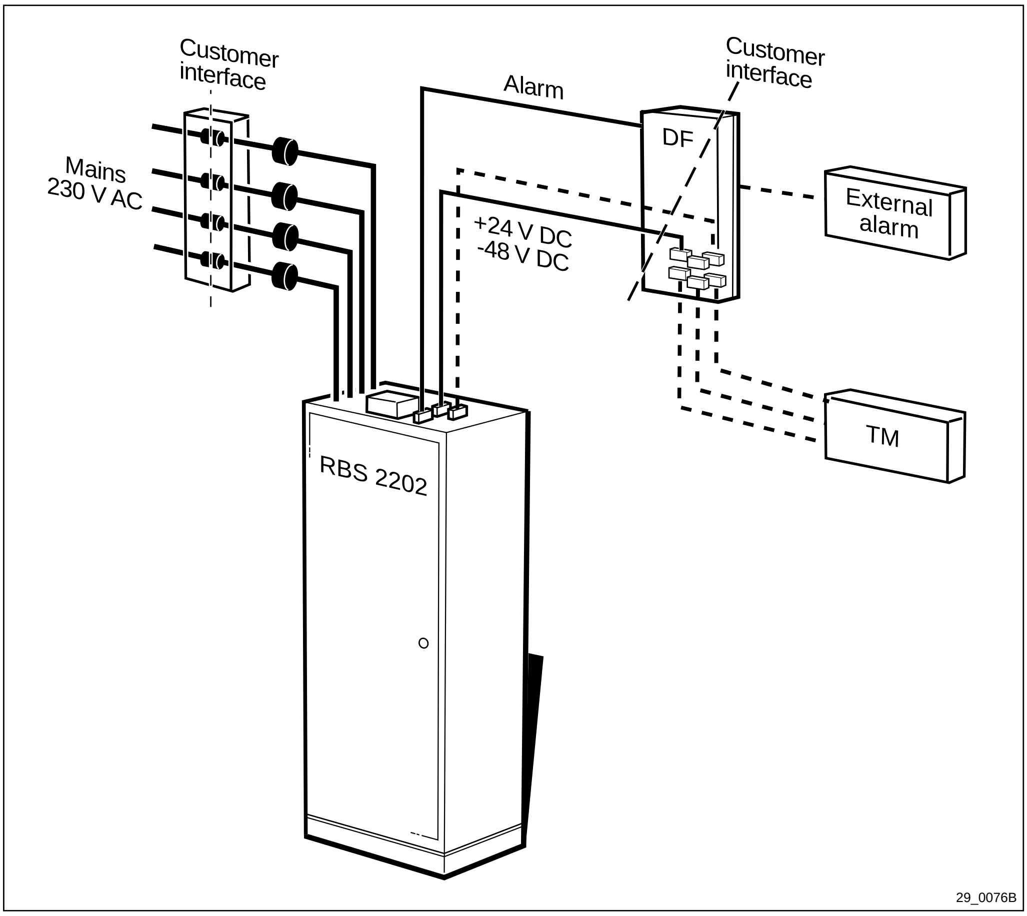


Figure 45 EACU

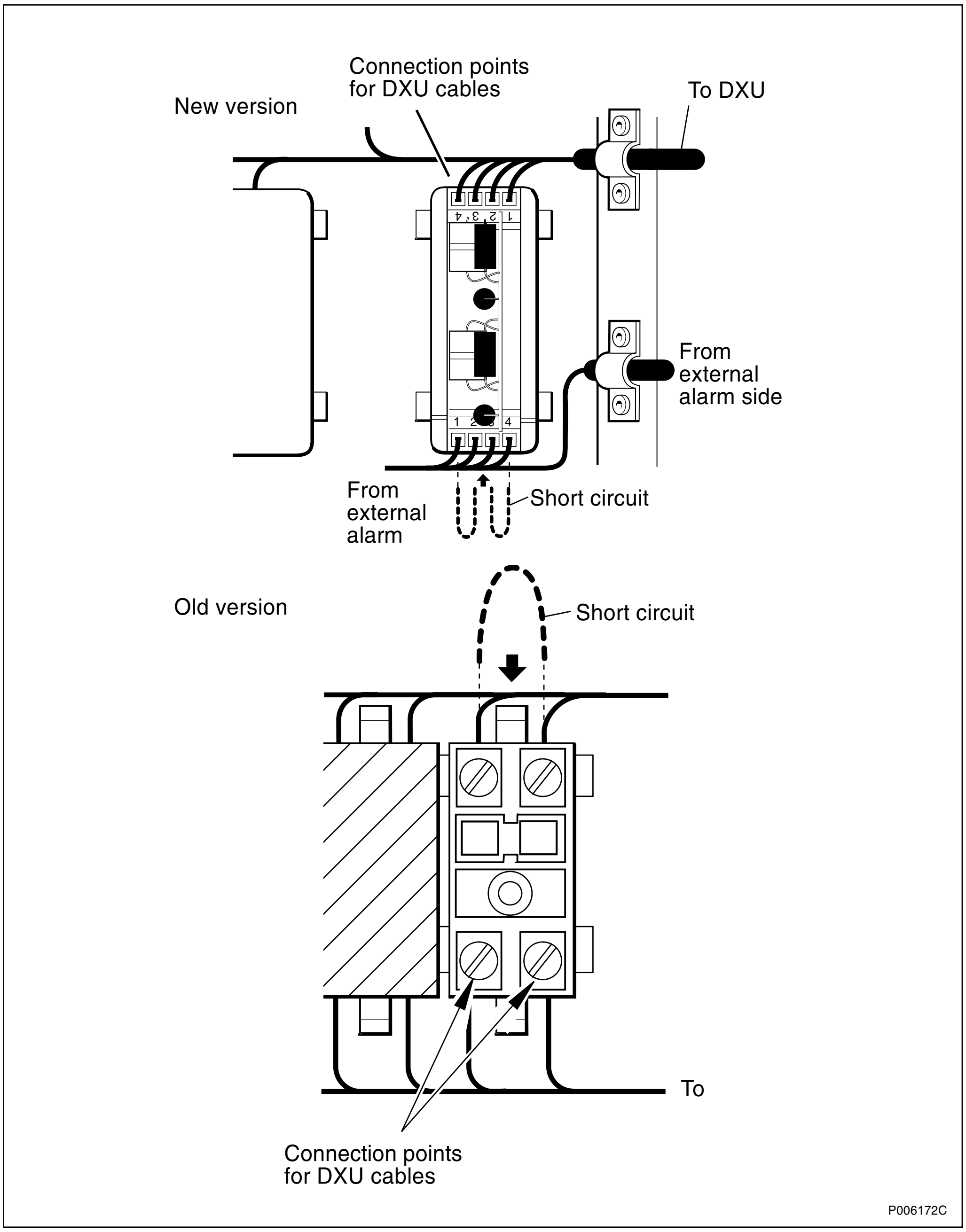


Figure 46 Strapping in a connection point in the EACU

(10) Alarm indicator status?

The yellow indicator labelled External alarm indicates that one or more alarms are activated. The External alarm indicator is located on the DXU.

External alarm indicator status?

- Off: Proceed to step (12). No external alarms are activated.
- On: Proceed to step (11). One or more alarms are activated.

Additionally, use the OMT to monitor Fault status.

When an open sensor circuit activates the alarm concerned:

- Continue with the fault localisation until the External alarm indicator on the DXU goes off.

When a closed sensor circuit activates the alarm concerned:

- Continue with the fault localisation until the External alarm indicator on the DXU is lit.

(11) Contact the supervisor

Contact the supervisor or manager who will take further action, for example, to consult an FSC.

(12) Commence the Concluding Routines

Proceed to the section "Before Leaving the Site" in the chapter "Concluding Routines".

5.23 Fan

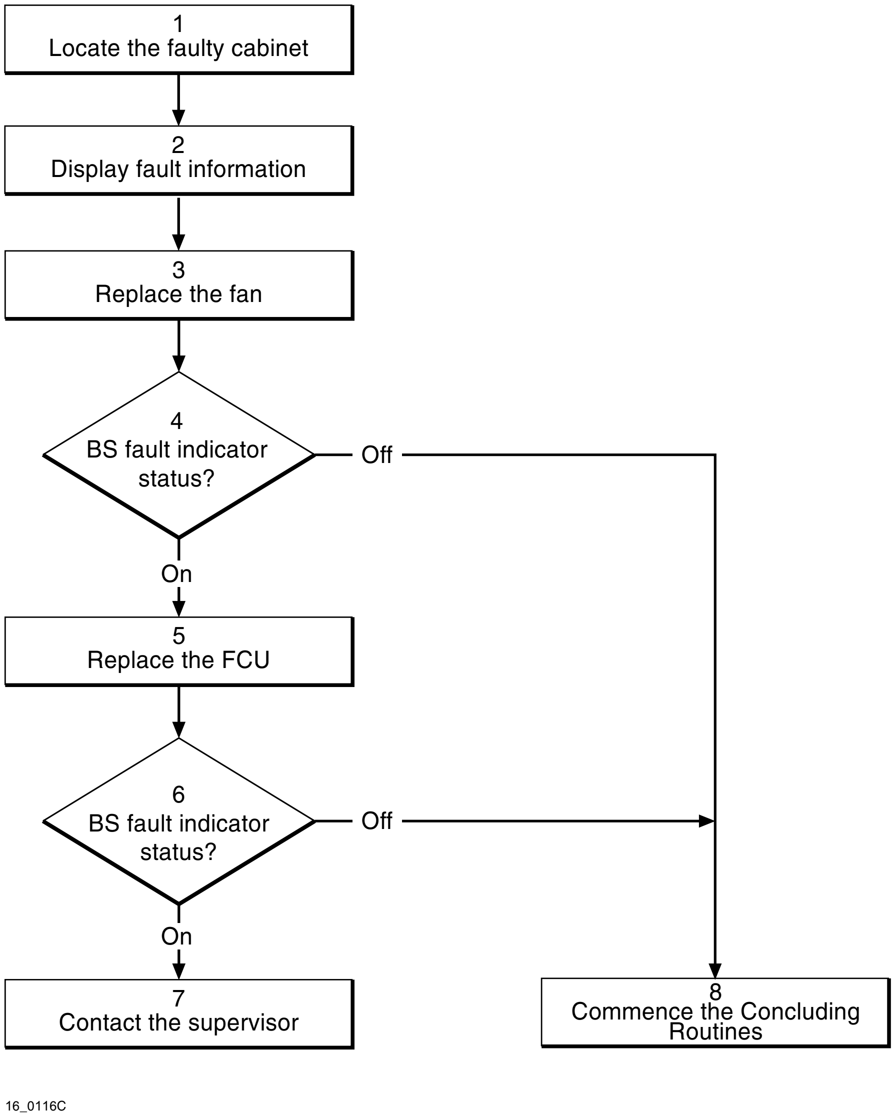


Figure 47 Fans flowchart

Note: Several instructions in this section require the OMT. For further information on the use of OMT, see:

OMT User's Manual *LZN 302 01*

(1) Locate the faulty cabinet

Locate the faulty cabinet according to work order information.

(2) Display fault information

Use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs". The window also shows whether the fault is in the master cabinet, or in an extension cabinet (if connected).

(3) Replace the fan

Replace the faulty fan according to instructions in the section "Fans" in the chapter "RBS Field Repair".

Note: It is not always possible to tell visually if a fan is failing as an alarm is raised when a fan rotates at less than 85 % of its normal speed. Replace the fan if OMT identifies it as faulty, although it appears to operate.

(4) BS fault indicator status?

There are two methods to determine whether the fault has been cleared.

The first method is to inspect the yellow indicator labelled BS fault on the DXU.

BS fault indicator status?

- Off: Proceed to step (8). No fault is detected in the RBS.
- On: Proceed to step (5). One or more faults are detected in the RBS.

The second method is to use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs".

(5) Replace the FCU

Replace the FCU according to instructions in the section "FCU"in the chapter "RBS Field Repair".

(6) BS fault indicator status?

There are two methods to determine whether the fault has been cleared.

The first method is to inspect the yellow indicator labelled BS fault on the DXU.

BS fault indicator status?

- Off: Proceed to step (8). No fault is detected in the RBS.
- On: Proceed to step (7). One or more faults are detected in the RBS.

The second method is to use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs".

(7) Contact the supervisor

Contact the supervisor or manager who will take further action, for example, to consult an FSC.

(8) Commence the Concluding Routines

Proceed to the section "Before Leaving the Site" in the chapter "Concluding Routines".

5.24 FU (FUd)

Refer to Section 5.10 CDU-D RUs on page 73.

5.25 FU CU PFWD Cable and FU CU PREFL Cable

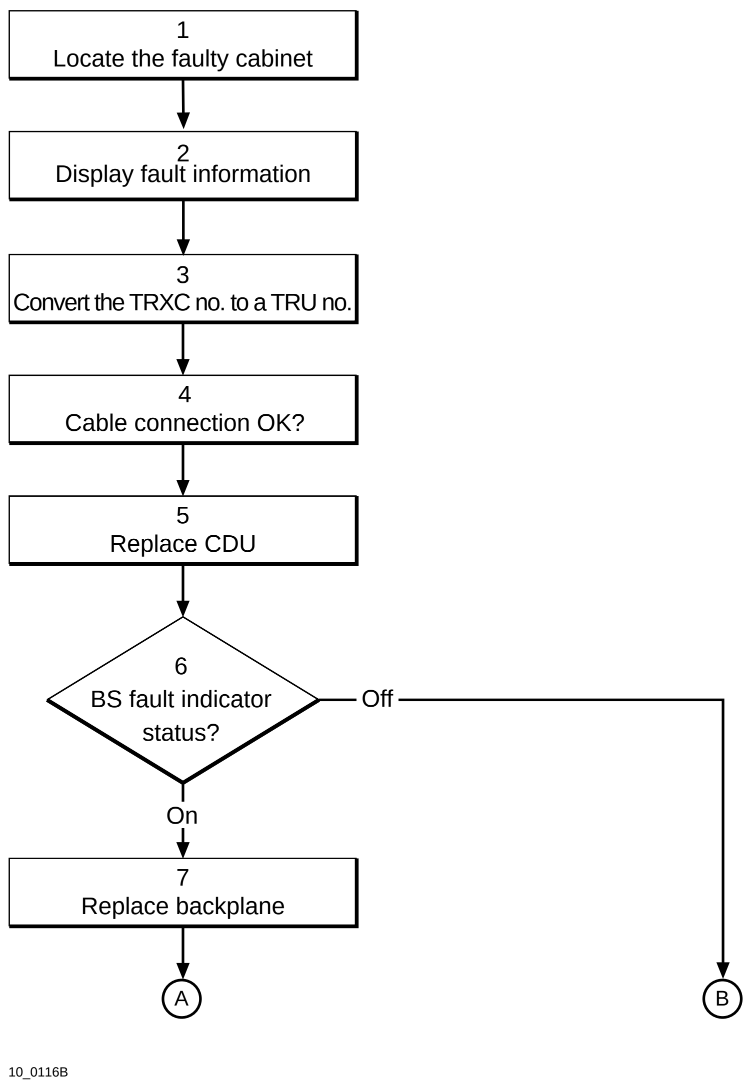


Figure 48 FU CU PFWD and PREFL Cables flowchart (part 1 of 2)

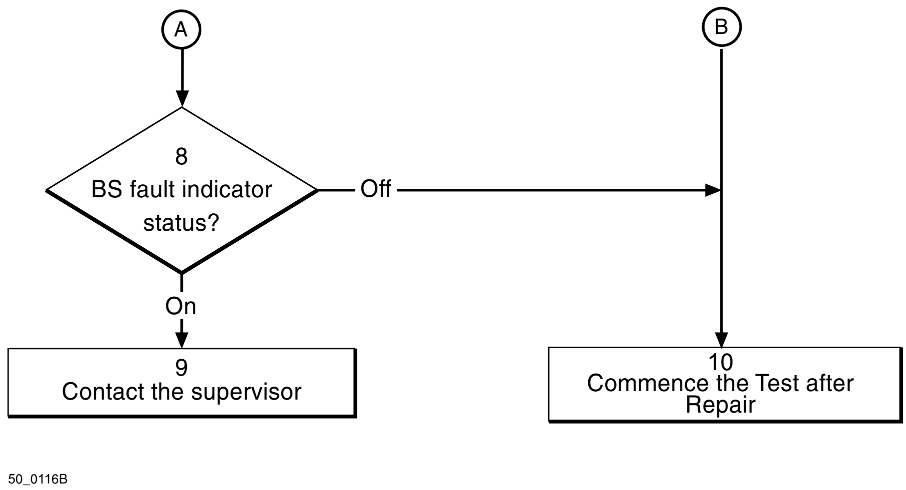


Figure 49   FU CU PFWD and PREFL Cables flowchart (part 2 of 2)

Note: Several instructions in this section require the OMT. For further information on the use of OMT, see:

OMT User's Manual   *LZN 302 01*

(1) Locate the faulty cabinet

Locate the faulty cabinet according to work order information.

(2) Display fault information

Use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs". The window also shows whether the fault is in the master cabinet, or in an extension cabinet (if connected).

(3) Convert the TRXC no. to a TRU no.

Read the work order to see which TRXC is reporting the cable as faulty. The TRXC number is converted according to the information below.

- TRXC 0 = TRU 1
- TRXC 1 = TRU 2
- TRXC 2 = TRU 3
- TRXC 3 = TRU 4
- etc.

For further information, see the chapter "Positioning of RUs".

(4) Cable connection OK?

1. Check that the cable is properly connected to the CDU.

2. To properly tighten the cable connections, refer to the section "Cable Connections" in the chapter "Handling of RBS during Maintenance."
3. If the cable has to be replaced, refer to the section "CDU-D" in the chapter "Cable Connections".

(5) Replace CDU

If the cable was connected properly, replace the CDU (that connects to the suspected cable) according to instructions in the section "CDU"in the chapter "RBS Field Repair".

Note: If the unit to be replaced is part of an extension cabinet system, always work in the extension cabinet first, then in the master.

(6) BS fault indicator status?

There are two methods to determine whether the fault has been cleared.

The first method is to inspect the yellow indicator labelled BS fault on the DXU.

BS fault indicator status?

- Off: Proceed to step (10). No fault is detected in the RBS.
- On: Proceed to step (7). One or more faults are detected in the RBS.

The second method is to use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs".

(7) Replace sub-rack

Note: If the unit to be replaced is part of an extension cabinet system, always work in the extension cabinet first, then in the master.

1. Replace the TRU sub-rack according to instructions in the section "TRU Sub-Rack" in the chapter "RBS Field Repair".

(8) BS fault indicator status?

There are two methods to determine whether the fault has been cleared.

The first method is to inspect the yellow indicator labelled BS fault on the DXU.

BS fault indicator status?

- Off: Proceed to step (10). No fault is detected in the RBS.
- On: Proceed to step (9). One or more faults are detected in the RBS.

The second method is to use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs".

(9) Contact the supervisor

Contact the supervisor or manager who will take further action, for example, to consult an FSC.

(10) Commence the Test after Repair

1. Make a test call over the TRUs concerned according to instructions in the section "Test Call" in the chapter "Test after Repair". (Over all TRUs, if the sub-rack was replaced. Over TRUs connected to the CDU, if that unit was replaced.)
2. Proceed to the section "Before Leaving the Site"in the chapter "Concluding Routines".

5.26 Local Bus

This section describes the procedure to be used when there is a fault on the Local Bus. The sub-sections included are *Primary actions, Secondary actions, The fault is in the RU or in the Backplane* and *If the fault remains*.

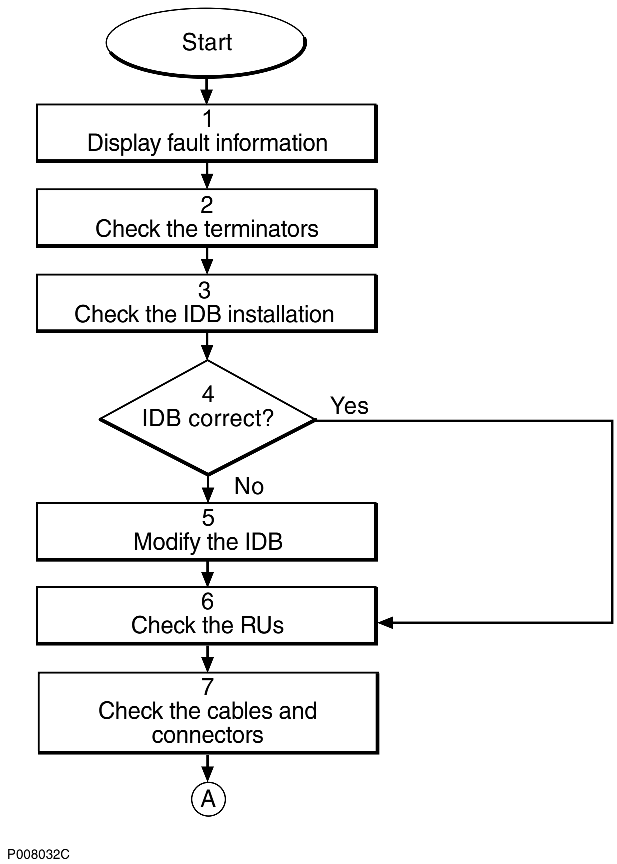


Figure 50 Local bus flowchart (part 1 of 2)

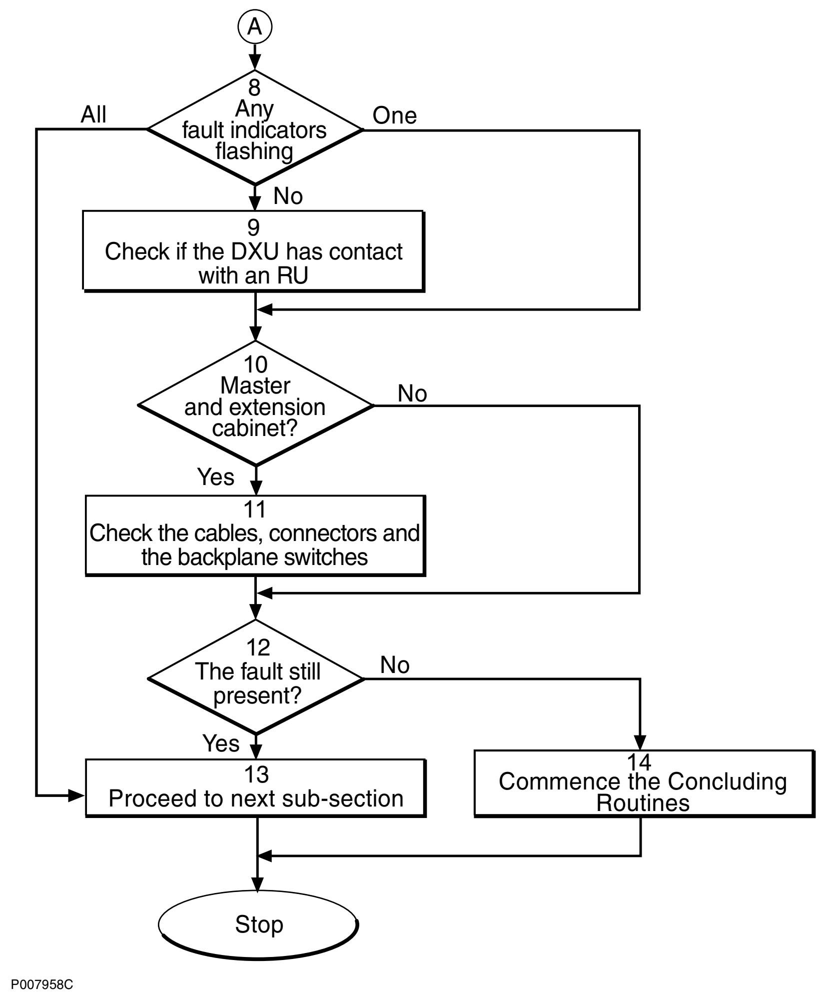


Figure 51 Local bus flowchart (part 2 of 2)

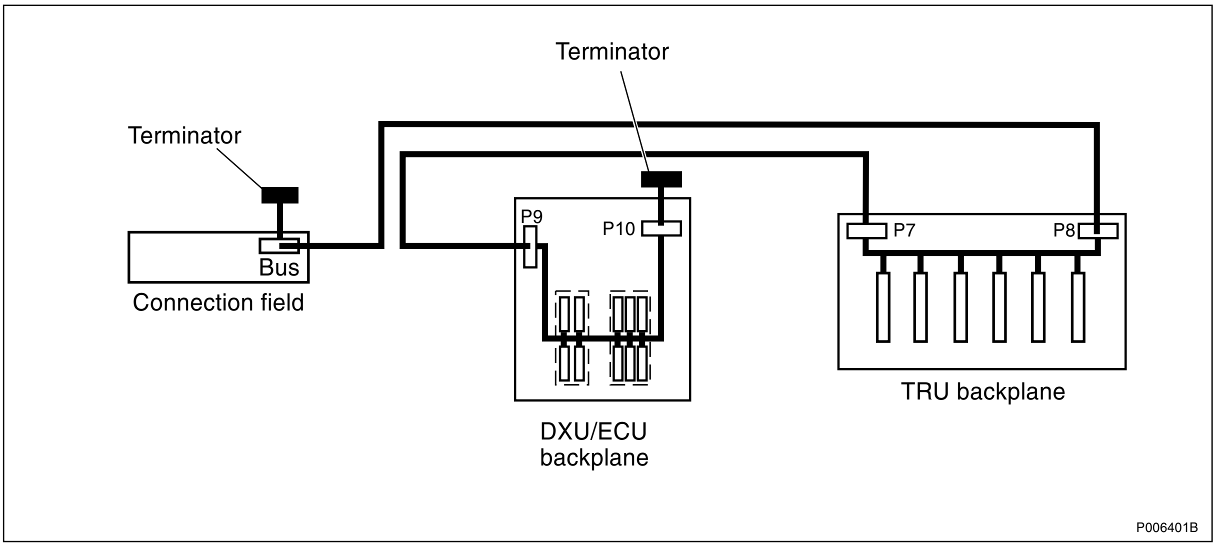


Figure 52 Local bus, new version, in a single cabinet SEB 112 1024/01–02

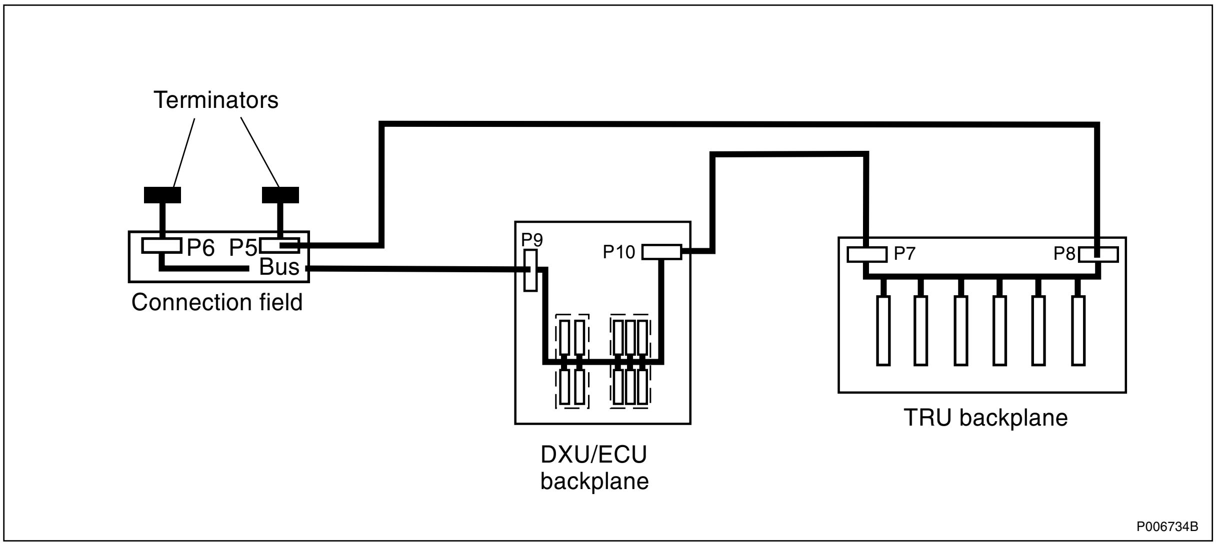


Figure 53 Local bus, old version, in a single cabinet SEB 12 621/01–02

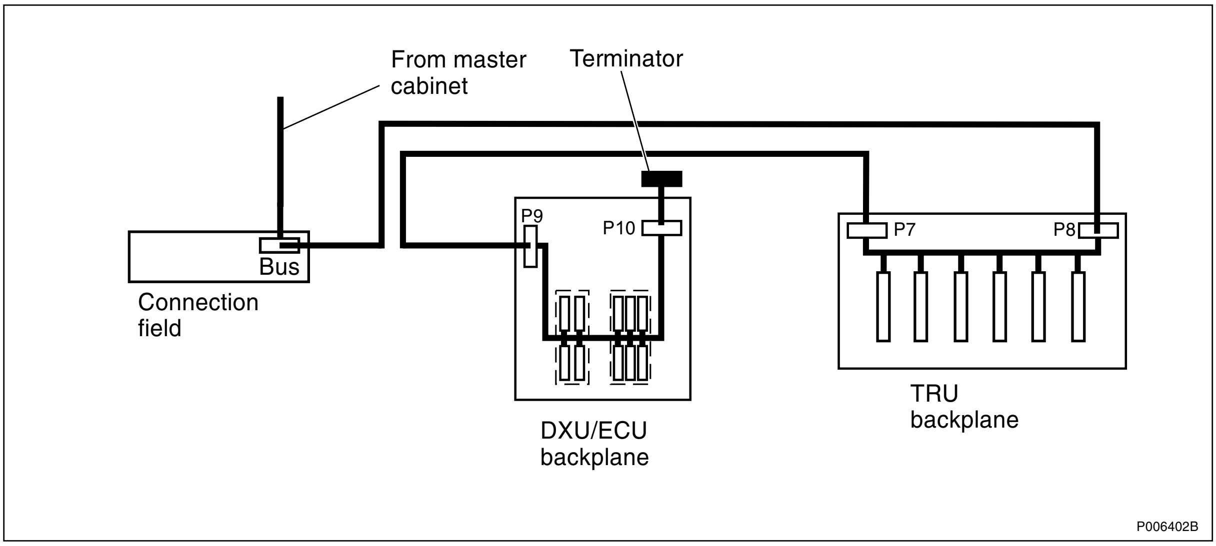


Figure 54 Local bus in an extension cabinet

5.26.1 Primary actions

Simple actions for the most common faults:

(1) Display information

Ust the OMT to see all fault messages and to get status on all RUs:

1. In the System view, click **RBS 2000**.
2. In the Operation menu, click **Monitor**and **Display Faulty RUs.**

(2) Check the terminators

1. Check that the terminators are placed according the figures above.
2. **Local bus, new version, SEB 112 1024/01–02**: Check that the terminator at the connection field has a revision label indicating

product number RPT 403 804/01, revision R2A or higher. If not, change the terminator.

3. **Local bus, old version, SEB 12 621/01–02**: Check that the two terminators at the connection field have a revision label indicating product number RPT 403 804/01. One of the terminators must be of revision R1A and the other R2A or higher.

   The terminators at the connection field must have different revision numbers. If not, change one of the terminators.

(3) Check the IDB installation

To check that the correct IDB is installed:

1. In the **Cabinet view**, check the cabinet type in particular and that the actual TRUs correspond with the TRUs definied in the IDB.

(4) IDB correct?

Is the IDB correct?

- Yes: Proceed to step (6).
- No: Proceed to step (5).

(5) Modify the IDB

1. In the System view, click **Installation Data Base**.
2. In the Operation menu, click **Modify IDB/Define Present RUs** to deactivate the TRUs that are not in use in the cabinet.

(6) Check the RUs

1. Check that the RUs are properly inserted into the backplane and fastened with all screws.

(7) Check the cables and connectors

1. Check the internal local bus cables.
2. Check connector pins on the back of the RUs. Remove the TRUs, the DXU and the ECU to reach the connector pins.
3. Check that the DXU/ECU backplane switches and TRU backplane switches are set correctly. If they are not, set the switches according to the section *DXU/ECU Backplane* and the section *TRU Backplane* in the chapter *RBS Field Repair*.

(8) Any Fault indicators flashing?

Are there any indicators flashing?

- One Fault indicator is flashing, proceed to step (10).
- No Fault indicators are flashing but there still is a local bus alarm, proceed to step (9).
- All Fault indicators are flashing on the TRUs and the ECU, proceed to step (13).

(9) Check if the DXU has contact with an RU

1. In the System view, click **RBS 2000**.
2. In the Operation menu, click **Display Software Versions**. If an RU has the message "Could not start monitor in RBS”, it means that the DXU has no contact with the RU.
3. If there is no contact, check cables and connections between the RU and the DXU.

(10) Master and extension cabinet?

Is there a master with an extension cabinet?

- Yes: Proceed to step (11).
- No: Proceed to step (12).

(11) Check the cables, connectors and the backplane switches,

1. Check the cables between the master and extension cabinet and the internal local bus cables in the extension cabinet.
2. Check connector pins on the back of the RUs in the extension cabinet. Remove the TRUs and the ECU to reach the connector pins (there is no DXU in the extension cabinet).
3. Check that the DXU/ECU backplane switches and the TRU backplane switches in the extension cabinet are set correctly. If they are not, set the switches according to the section *DXU/ECU Backplane* and the section *TRU Backplane* in the chapter *RBS Field Repair*.

(12) The fault still present?

Is the fault still present?

- Yes: Proceed to step (13).
- No: Proceed to step (14).

(13) Proceed to next sub-section

1. If the fault remains, proceed to *Section 5.26.2 Secondary actions on page 117*.

(14) Commence the Concluding Routines

1. Proceed to the section *Before Leaving the Site* in the chapter *Concluding Routines*.

5.26.2 Secondary actions

Note: The instructions in *Section 5.26.1 Primary actions on page 115* must be carried out before continuing on with this section.

Check for additional fault codes received in the OMT and proceed with the relevant instruction below:

SO CF I1A:14 Bus fault (Local bus fault) alarm

1. When the OMT or the BSC shows Fault Class I1A:14 Bus fault (Local bus fault), replace the DXU according to the section *DXU* in the chapter *RBS Field Repair*.
2. If the fault remains, proceed to *Section 5.26.3 The Fault is in the RU or in the backplane on page 118*.

SO CF I2A:41, Lost communication to TRU

1. In the Cabinet view, verify that actual TRUs correspond with the TRUs defined in the IDB.
2. If they do not correspond, In the System view, click the **Installation Data Base** icon.
3. In the Operation menu, click **Modify IDB/Define Present RUs** to inactivate TRUs that are not in use in the cabinet.
4. If the fault remains, proceed to *Section 5.26.3 The Fault is in the RU or in the backplane on page 118*.

SO CF I2A:42, Lost communication to ECU

1. In the Cabinet view, verify that actual TRUs correspond with the TRUs defined in the IDB.
2. If they do not correspond, in the System view, click the **Installation Data Base** icon.
3. In the Operation menu, select **Modify IDB/Define Present RUs** to inactivate the TRUs that are not in use in the cabinet.
4. If the fault remains, proceed to *Section 5.26.3 The Fault is in the RU or in the backplane on page 118*.

5.26.3 The Fault is in the RU or in the backplane

1. Remove one TRU to see if the fault disappears.

   • If the fault disappears, proceed to step 2.

   • If the fault does not disappear, remove each subsequent TRU, the ECU and the DXU, one at the time, until the fault is located.

   • In the extension cabinet, if used, remove each subsequent TRU and the ECU (there is no DXU in the extension cabinet).

2. To see whether the fault is in the TRU or in the backplane, replace the suspected TRU with a functional TRU.

   • If the fault disappears, the fault is in the suspected TRU. Change the TRU.

   • If the fault does not disappear, the fault is in the backplane. Replace the TRU sub-rack according to the section *TRU Sub-Rack*in the chapter *RBS Field Repair*.

5.26.4 If the fault remains

1. Contact the supervisor or manager who will take further action, for example, to consult an FSC.

5.27 Power Communication Loop

The power communication loop is a fibre optic loop used for control and supervision of the power system. When the loop is opened, the power system switches to stand alone mode and the RU "Power Communication Loop"is set in the RU map.

Possible faults are a faulty RU or a faulty fibre optic cable. A indicator on an RU will start flashing when the unit has lost communication with the ECU.

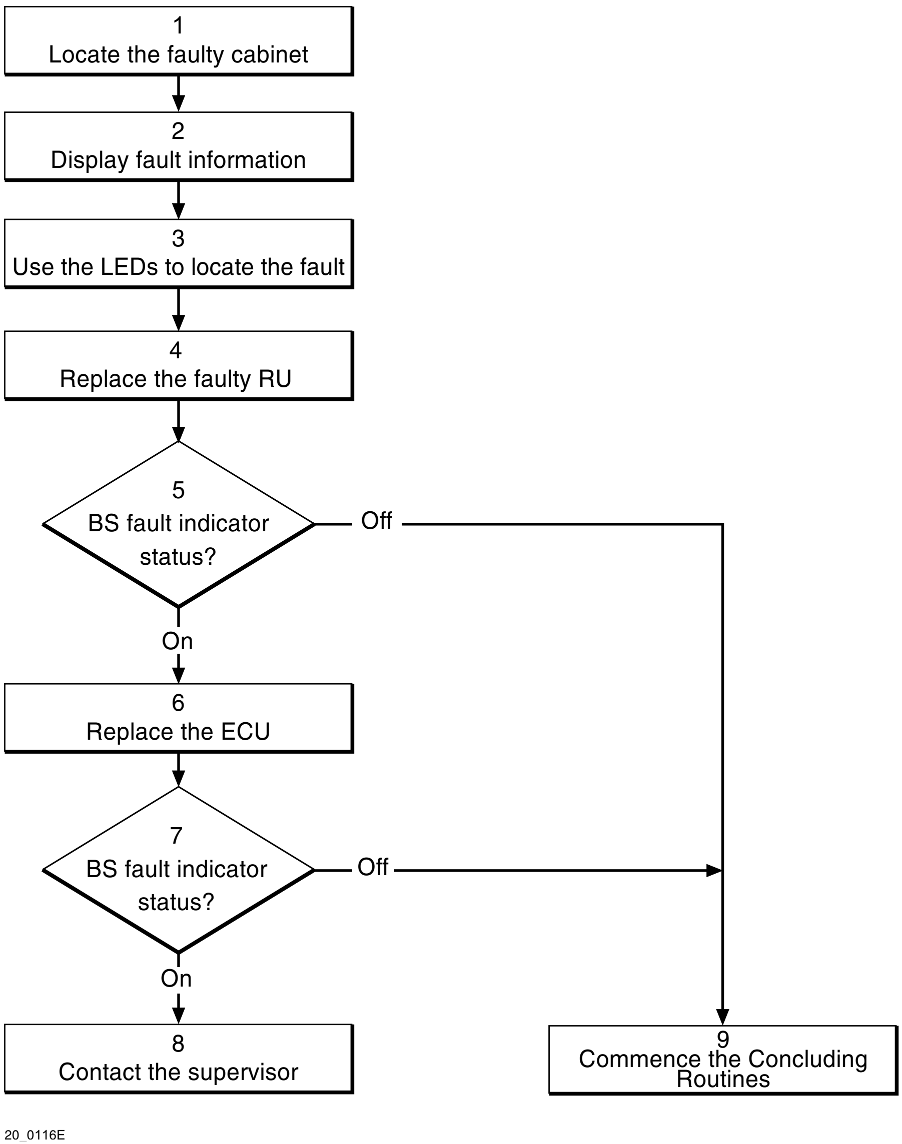


Figure 55 Power communication loop flowchart

Note: Several instructions in this section require the OMT. For further information on the use of OMT, see:

OMT User's Manual LZN 302 01

(1) Locate the faulty cabinet

Locate the faulty cabinet according to work order information.

(2) Display fault information

Use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs". The window also shows whether the fault is in the master cabinet, or in an extension cabinet (if connected).

(3) Use the indicators to locate the fault

To locate the fault, use by-passing of the suspected faulty units in order to get a closed loop, that is when the indicators stop flashing. (By-passing means that, for example, the opto bus cable from TD output on BFU 2 goes directly to RD input on PSU 2. Refer to the figures below.)

Repeat until the faulty RU or cable is identified.

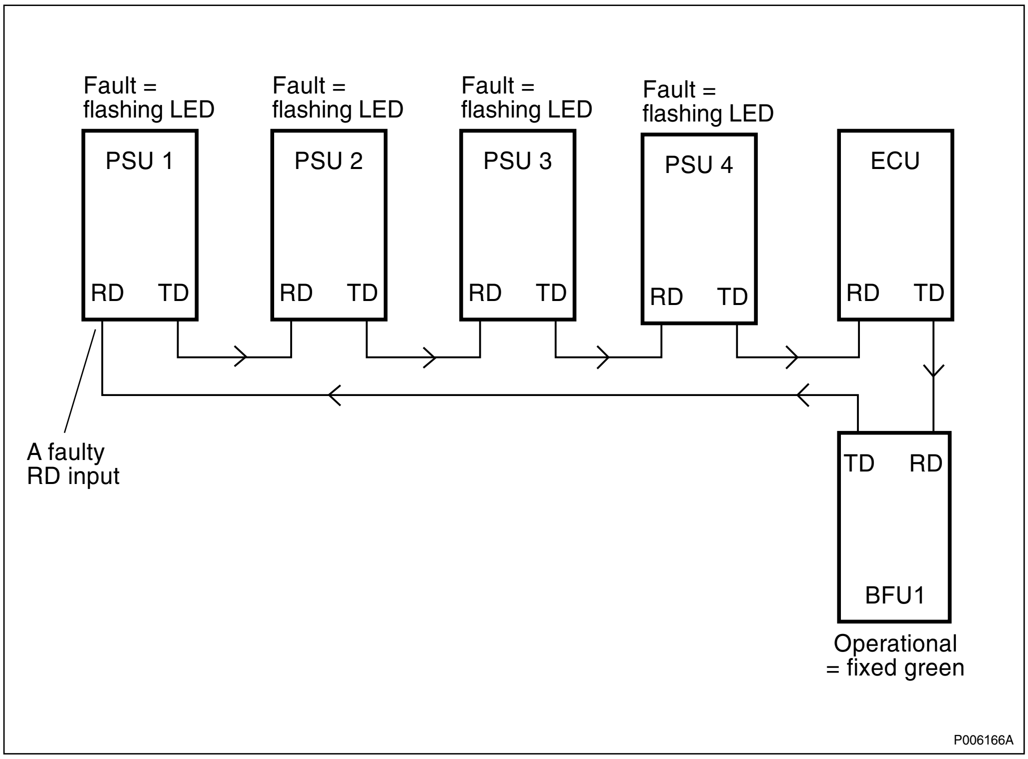


Figure 56 Example of a fault situation in the power communication loop

Flashing behaviour

If a unit gets a faulty RD input, the indicator on that unit and on the following units, starts flashing.

- BFU revision R1A: The green indicator "Operational"will start flashing.

In BFU revision R1A, the green indicator "Operational" on BFU2 will also after some time start flashing if there is a break anywhere in the power communication loop, for example between BFU2 and PSU1. BFU2 will not stop flashing until the power communication loop is fully operational again. This will not happen from BFU revision R2A and on.

- BFU revision R2A or later: The red indicator "Fault"will start flashing.
- PSU revision R3A or earlier: The green indicator "Operational" will start flashing.
- PSU revision R4A or later: The red indicator "Fault"will start flashing.
- A BFU or a PSU that is still in communication with the ECU will show a fixed green "Operational" indicator.

(4) Replace the faulty RU

Replace the faulty RU according to instructions in the section "PSU" and "BFU" in the chapter "RBS Field Repair", or replace the opto bus cable if it is found being faulty.

Note: The opto bus cables must have a bent radius of at least 35 mm.

(5) BS fault indicator status?

There are two methods to determine whether the fault has been cleared.

The first method is to inspect the yellow indicator labelled BS fault on the DXU.

BS fault indicator status?

- Off: Proceed to step (9). No fault is detected in the RBS.
- On: Proceed to step (6). One or more faults are detected in the RBS.

The second method is to use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs".

(6) Replace the ECU

Replace the ECU according to instructions in the section "ECU"in the chapter "RBS Field Repair".

(7) BS fault indicator status?

There are two methods to determine whether the fault has been cleared.

The first method is to inspect the yellow indicator labelled BS fault on the DXU.

BS fault indicator status?

- Off: Proceed to step (9). No fault is detected in the RBS.

- On: Proceed to step (8). One or more faults are detected in the RBS.

The second method is to use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs".

(8) Contact the supervisor

Contact the supervisor or manager who will take further action, for example, to consult an FSC.

(9) Commence the Concluding Routines

Proceed to the section "Before Leaving the Site" in the chapter "Concluding Routines".

5.28 PSU

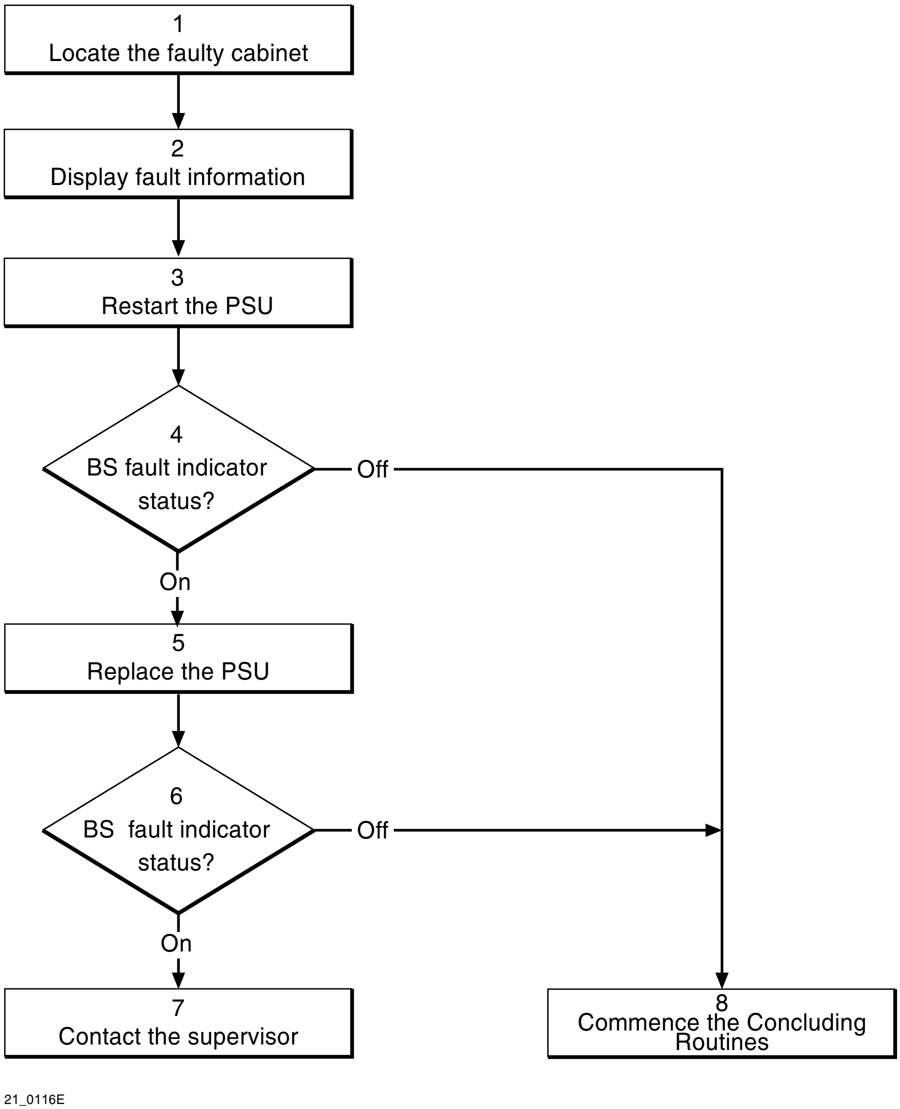


Figure 57 PSU flowchart

Note: Several instructions in this section require the OMT. For further information on the use of OMT, see:

OMT User's Manual *LZN 302 01*

(1) Locate the faulty cabinet

Locate the faulty cabinet according to work order information.

(2) Display fault information

Use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs". The window also shows whether the fault is in the master cabinet, or in an extension cabinet (if connected).

(3) Restart the PSU

Disconnect all cables from the PSU, wait a few seconds and then reconnect the cables again, see the section "PSU" in the chapter "RBS Field Repair". If the PSU is in a so-called "overvoltage stop" condition it will function properly after being disconnected.

(4) BS fault indicator status?

The red indicator labelled Fault on the PSU indicates the fault status of the unit.

Fault indicator status?

- Off: Proceed to step (8). No fault is detected in the PSU.
- On: Proceed to step (5). One or more faults are detected in the PSU.
- *PSU revision R4A or later.*

  Flashing (red Fault indicator): Proceed to step (5). The PSU has lost communication with the ECU.
- *PSU revision R3A or earlier.*

  Flashing (green Operational indicator): Proceed to step (5). The PSU has lost communication with the ECU.

There are two additional methods to determine whether the fault has been cleared.

The first method is to inspect the yellow indicator labelled BS fault on the DXU.

BS fault indicator status?

- Off: Proceed to step (8). No fault is detected in the RBS.
- On: Proceed to step (5). One or more faults are detected in the RBS.

The second method is to use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs".

(5) Replace the PSU

Replace the faulty PSU according to instructions in the section "PSU" in the chapter "RBS Field Repair".

(6) BS fault indicator status?

The red indicator labelled Fault on the PSU indicates the fault status of the unit.

Fault indicator status?

- Off: Proceed to step (8). No fault is detected in the PSU.
- On: Proceed to step (7). One or more faults are detected in the PSU.
- *PSU revision R4A or later.*

  Flashing (red Fault indicator): Proceed to step (7). The PSU has lost communication with the ECU.
- *PSU revision R3A or earlier.*

  Flashing (green Operational indicator): Proceed to step (7). The PSU has lost communication with the ECU.

There are two additional methods to determine whether the fault has been cleared.

The first method is to inspect the yellow indicator labelled BS fault on the DXU.

BS fault indicator status?

- Off: Proceed to step (8). No fault is detected in the RBS.
- On: Proceed to step (7). One or more faults are detected in the RBS.

The second method is to use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs".

(7) Contact the supervisor

Contact the supervisor or manager who will take further action, for example, to consult an FSC.

(8) Commence the Concluding Routines

Proceed to the section "Before Leaving the Site" in the chapter "Concluding Routines".

5.29 PSU DC Cable

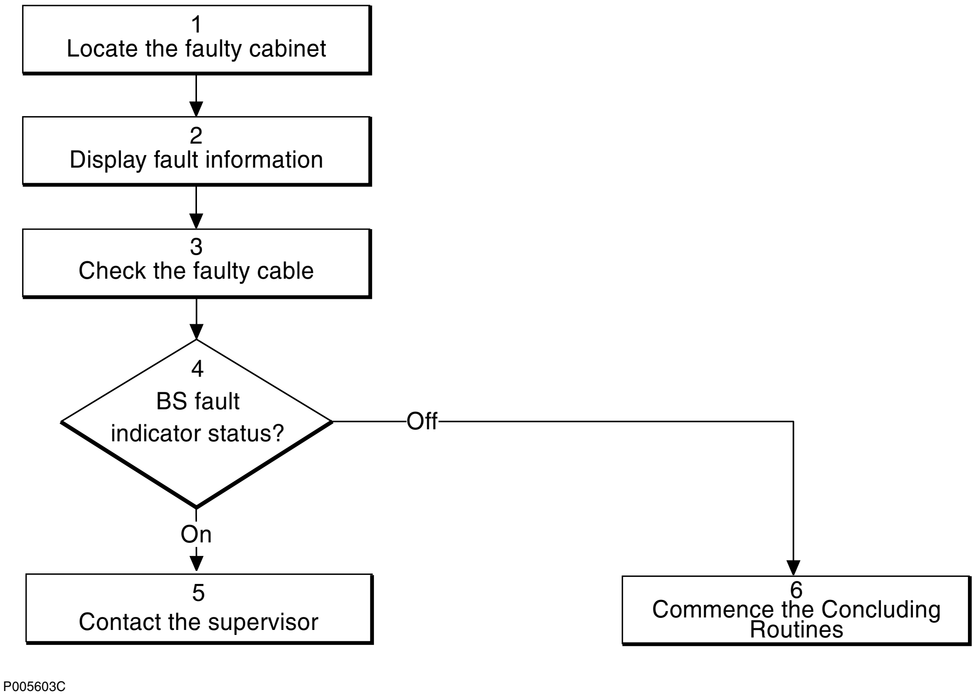


Figure 58 PSU DC cable flowchart

Note: This alarm only applies to a PSU DC cable connected to a PSU 230, not to a PSU –48.

Note: Several instructions in this section require the OMT. For further information on the use of OMT, see:

OMT User's Manual *LZN 302 01*

(1) Locate the faulty cabinet

Locate the faulty cabinet according to work order information.

(2) Display fault information

Use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs". The window also shows whether the fault is in the master cabinet, or in an extension cabinet (if connected).

(3) Check the faulty cable

1. Check that the cable connector is fastened properly to the PSU.
2. Check that the cable connector as well as the matching connector in the PSU is not burned or mechanically damaged.
3. Replace the cable if necessary according to instructions in the section "PSU DC Cable" in the chapter "RBS Field Repair".

(4) BS fault indicator status?

There are two methods to determine whether the fault has been cleared.

Note: It can take up to ten minutes for the alarm to cease.

The first method is to inspect the yellow indicator labelled BS fault on the DXU.

BS fault indicator status?

- Off: Proceed to step (6). No fault is detected in the RBS.
- On: Proceed to step (5). One or more faults are detected in the RBS.

The second method is to use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs".

(5) Contact the supervisor

Contact the supervisor or manager who will take further action, for example, to consult an FSC.

(6) Commence the Concluding Routines

Proceed to the section "Before Leaving the Site" in the chapter "Concluding Routines".

5.30 RBS DB

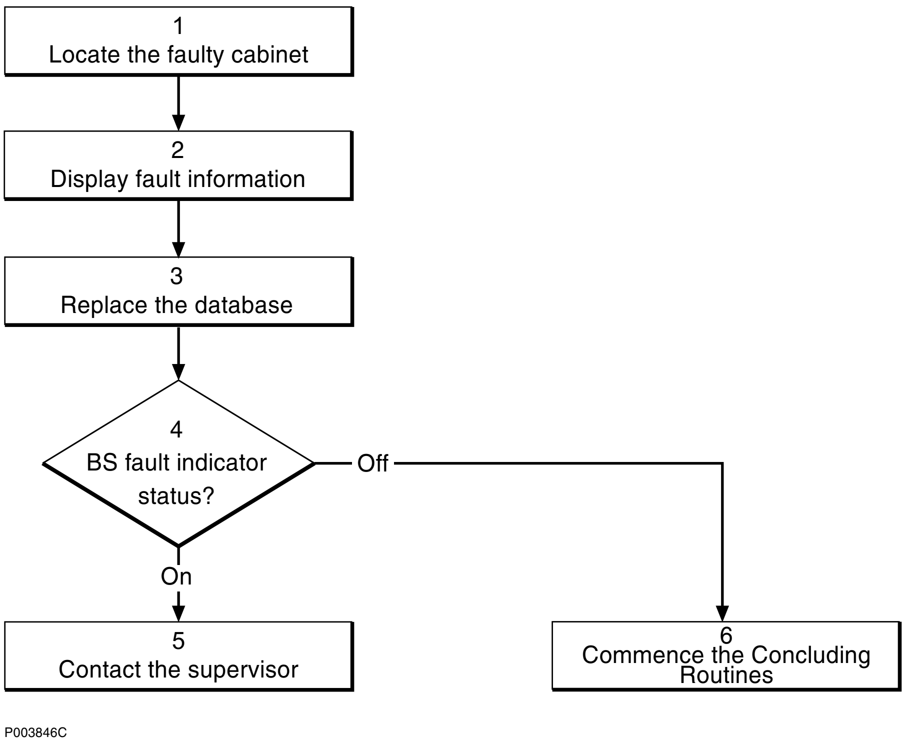


Figure 59 RBS DB flowchart

Note: Several instructions in this section require the OMT. For further information on the use of OMT, see:

OMT User's Manual *LZN 302 01*

(1) Locate the faulty cabinet

Locate the faulty cabinet according to work order information.

(2) Display fault information

Use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs".

(3) Replace the database

Replace the faulty database according to instructions in the section "RBS DB" in the chapter "RBS Field Repair".

(4) BS fault indicator status?

There are two methods to determine whether the fault has been cleared.

The first method is to inspect the yellow indicator labelled BS fault on the DXU.

BS fault indicator status?

- Off: Proceed to step (6). No fault is detected in the RBS.
- On: Proceed to step (5). One or more faults are detected in the RBS.

The second method is to use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs".

(5) Contact the supervisor

Contact the supervisor or manager who will take further action, for example, to consult an FSC.

(6) Commence the Concluding Routines

Proceed to the section "Before Leaving the Site" in the chapter "Concluding Routines".

5.31 Temperature Sensors

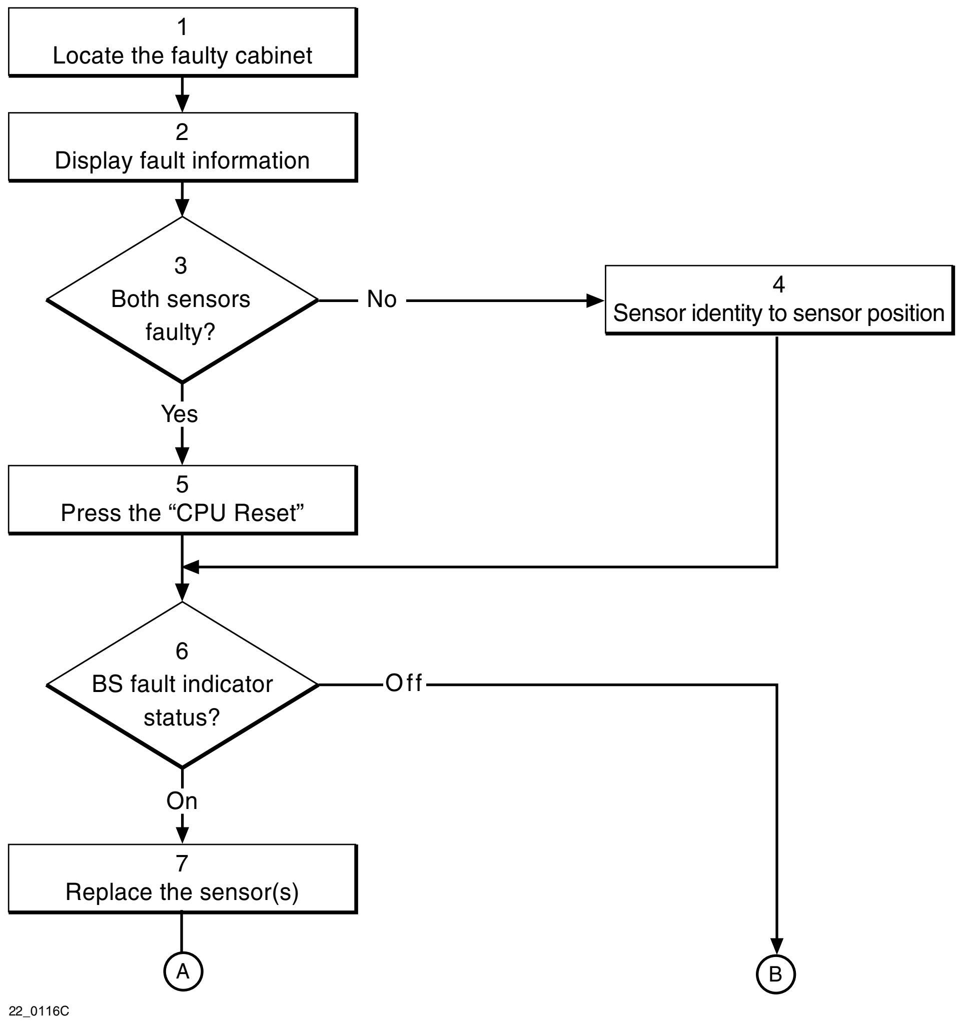


Figure 60 Temperature sensors flowchart (part 1 of 3)

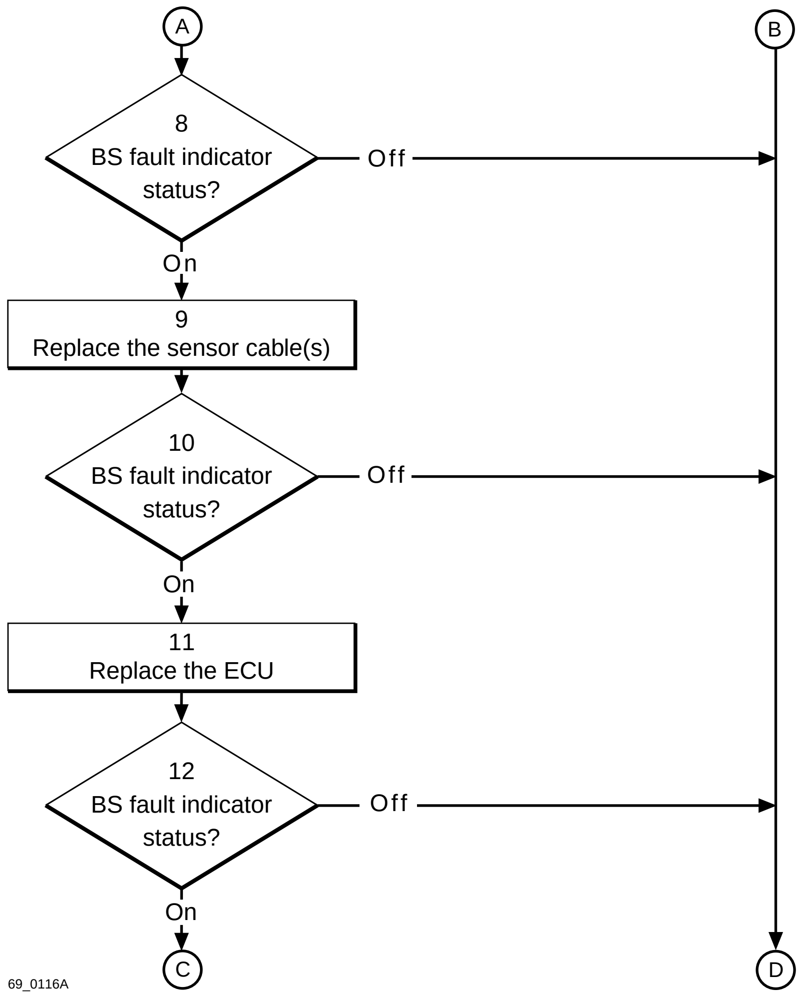


Figure 61 Temperature sensors flowchart (part 2 of 3)

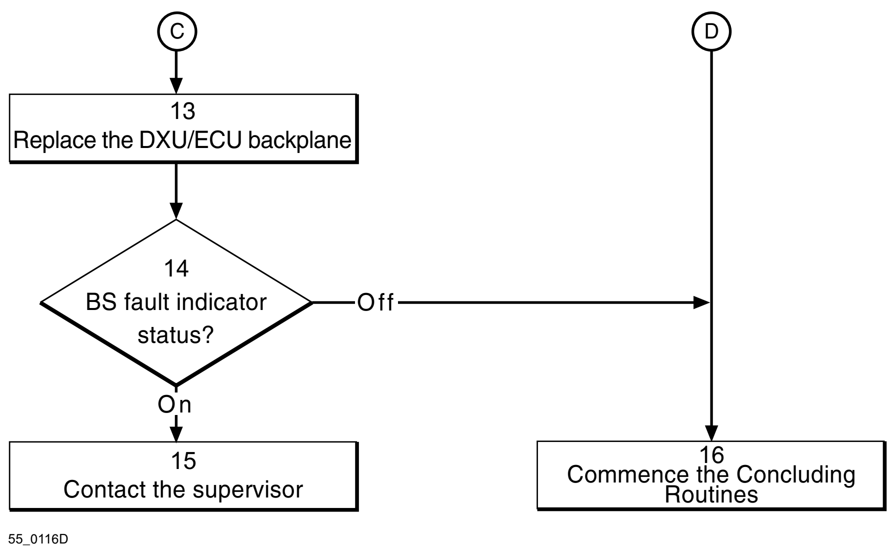


Figure 62 Temperature sensors flowchart (part 3 of 3)

Note: Several instructions in this section require the OMT. For further information on the use of OMT, see:

OMT User's Manual *LZN 302 01*

(1) Locate the faulty cabinet

Locate the faulty cabinet according to work order information.

(2) Display fault information

Use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs". The window also shows whether the fault is in the master cabinet, or in an extension cabinet (if connected).

(3) Both sensors faulty?

Both sensors faulty?

- No: Proceed to step (4). Only one temperature sensor is faulty.
- Yes: Proceed to step (5). Both temperature sensors are faulty.

(4) Sensor identity to sensor position

Convert the sensor identity to a sensor position. For further information, see the chapter "Positioning of RUs".

Proceed to step (6).

(5) Press the “CPU Reset”

Press the button CPU Reset on the ECU for approximately 3 seconds.

After approximately 30 seconds, the system should function without alarm, and the Fault indicator on the ECU should go out.

(6) BS fault indicator status?

There are two methods to determine whether the fault has been cleared.

The first method is to inspect the yellow indicator labelled BS fault on the DXU.

BS fault indicator status?

- Off: Proceed to step (16). No fault is detected in the RBS.
- On: Proceed to step (7). One or more faults are detected in the RBS.

The second method is to use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs".

(7) Replace the sensor(s)

Replace the faulty temperature sensor(s) according to instructions in the section "Temperature Sensors" in the chapter "RBS Field Repair".

(8) BS fault indicator status?

There are two methods to determine whether the fault has been cleared.

The first method is to inspect the yellow indicator labelled BS fault on the DXU.

BS fault indicator status?

- Off: Proceed to step (16). No fault is detected in the RBS.
- On: Proceed to step (9). One or more faults are detected in the RBS.

The second method is to use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs".

(9) Replace the sensor cable(s)

For information about cable connections, refer to the section "DXU/ ECU backplane" in the chapter "Cable Connections".

(10) BS fault indicator status?

There are two methods to determine whether the fault has been cleared.

The first method is to inspect the yellow indicator labelled BS fault on the DXU.

BS fault indicator status?

- Off: Proceed to step (16). No fault is detected in the RBS.
- On: Proceed to step (11). One or more faults are detected in the RBS.

The second method is to use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs".

(11) Replace the ECU

Replace the ECU according to instructions in the section "ECU"in the chapter "RBS Field Repair".

(12) BS fault indicator status?

There are two methods to determine whether the fault has been cleared.

The first method is to inspect the yellow indicator labelled BS fault on the DXU.

BS fault indicator status?

- Off: Proceed to step (16). No fault is detected in the RBS.
- On: Proceed to step (13). One or more faults are detected in the RBS.

The second method is to use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs".

(13) Replace the DXU/ECU backplane

Replace the DXU/ECU backplane according to instructions in the section "DXU/ECU Backplane" in the chapter "RBS Field Repair".

(14) BS fault indicator status?

There are two methods to determine whether the fault has been cleared.

The first method is to inspect the yellow indicator labelled BS fault on the DXU.

BS fault indicator status?

- Off: Proceed to step (16). No fault is detected in the RBS.
- On: Proceed to step (15). One or more faults are detected in the RBS.

The second method is to use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs".

(15) Contact the supervisor

Contact the supervisor or manager who will take further action, for example, to consult an FSC.

(16) Commence the Concluding Routines

Proceed to the section "Before Leaving the Site" in the chapter "Concluding Routines".

5.32 Timing Bus

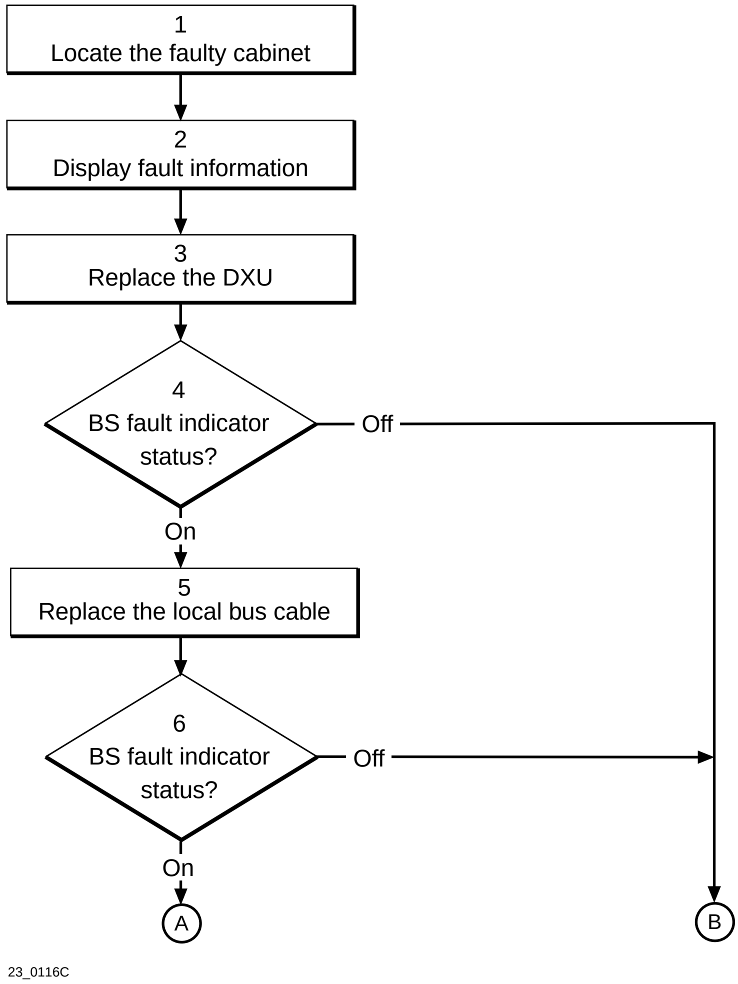


Figure 63 Timing bus flowchart (part 1 of 2)

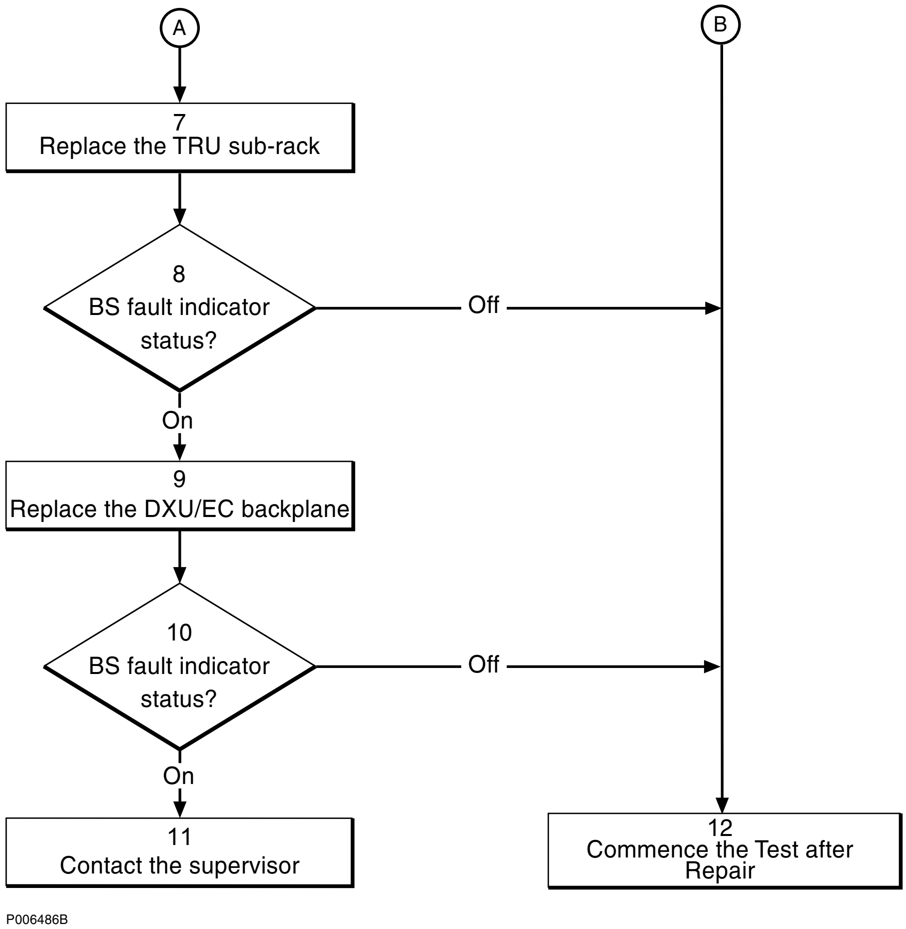


Figure 64 Timing bus flowchart (part 2 of 2)

Note: Several instructions in this section require the OMT. For further information on the use of OMT, see:

OMT User's Manual *LZN 302 01*

(1) Locate the faulty cabinet

Locate the faulty cabinet according to work order information.

(2) Display fault information

Use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs".

(3) Replace DXU

Replace the DXU according to instructions in the section "DXU"in the chapter "RBS Field Repair".

(4) BS fault indicator status?

There are two methods to determine whether the fault has been cleared.

The first method is to inspect the yellow indicator labelled BS fault on the DXU.

BS fault indicator status?

- Off: Proceed to step (12). No fault is detected in the RBS.
- On: Proceed to step (5). One or more faults are detected in the RBS.

The second method is to use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs".

(5) Replace the local bus cable

Note: If the unit to be replaced is part of an extension cabinet system, always work in the extension cabinet first, then in the master.

Replace the local bus cable connecting the DXU/ECU backplane with the TRU backplane. Cable information for backplanes can be found in the chapter "Cable Connections".

(6) BS fault indicator status?

There are two methods to determine whether the fault has been cleared.

The first method is to inspect the yellow indicator labelled BS fault on the DXU.

BS fault indicator status?

- Off: Proceed to step (12). No fault is detected in the RBS.
- On: Proceed to step (7). One or more faults are detected in the RBS.

The second method is to use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs".

(7) Replace TRU sub-rack

Replace the TRU sub-rack according to the section "TRU Sub-Rack"in the chapter "RBS Field Repair". If an extension cabinet is used, replace the TRU sub-rack in the master cabinet first, then in the extension cabinet.

(8) BS fault indicator status?

There are two methods to determine whether the fault has been cleared.

The first method is to inspect the yellow indicator labelled BS fault on the DXU.

BS fault indicator status?

- Off: Proceed to step (12). No fault is detected in the RBS.

- On: Proceed to step (9). One or more faults are detected in the RBS.

The second method is to use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs".

(9) Replace DXU/ECU backplane

Replace the DXU/ECU backplane according to the section "DXU/ECU Backplane" in the chapter "RBS Field Repair". If an extension cabinet is used, replace the DXU/ECU backplane in the master cabinet first, then in the extension cabinet.

(10) BS fault indicator status?

There are two methods to determine whether the fault has been cleared.

The first method is to inspect the yellow indicator labelled BS fault on the DXU.

BS fault indicator status?

- Off: Proceed to step (12). No fault is detected in the RBS.
- On: Proceed to step (11). One or more faults are detected in the RBS.

The second method is to use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs".

(11) Contact the supervisor

Contact the supervisor or manager who will take further action, for example, to consult an FSC.

(12) Commence the Test after Repair

Take the following actions:

1. Make a test call over all TRUs according to the section "Test Call" in the chapter "Test after Repair".
2. Proceed to the section "Before Leaving the Site"in the chapter "Concluding Routines".

5.33 TMA A and TMA B

Refer to the section "ALNA A, ALNA B, ALNA/TMA A and , ALNA/ TMA B" in this chapter.

5.34 TRU

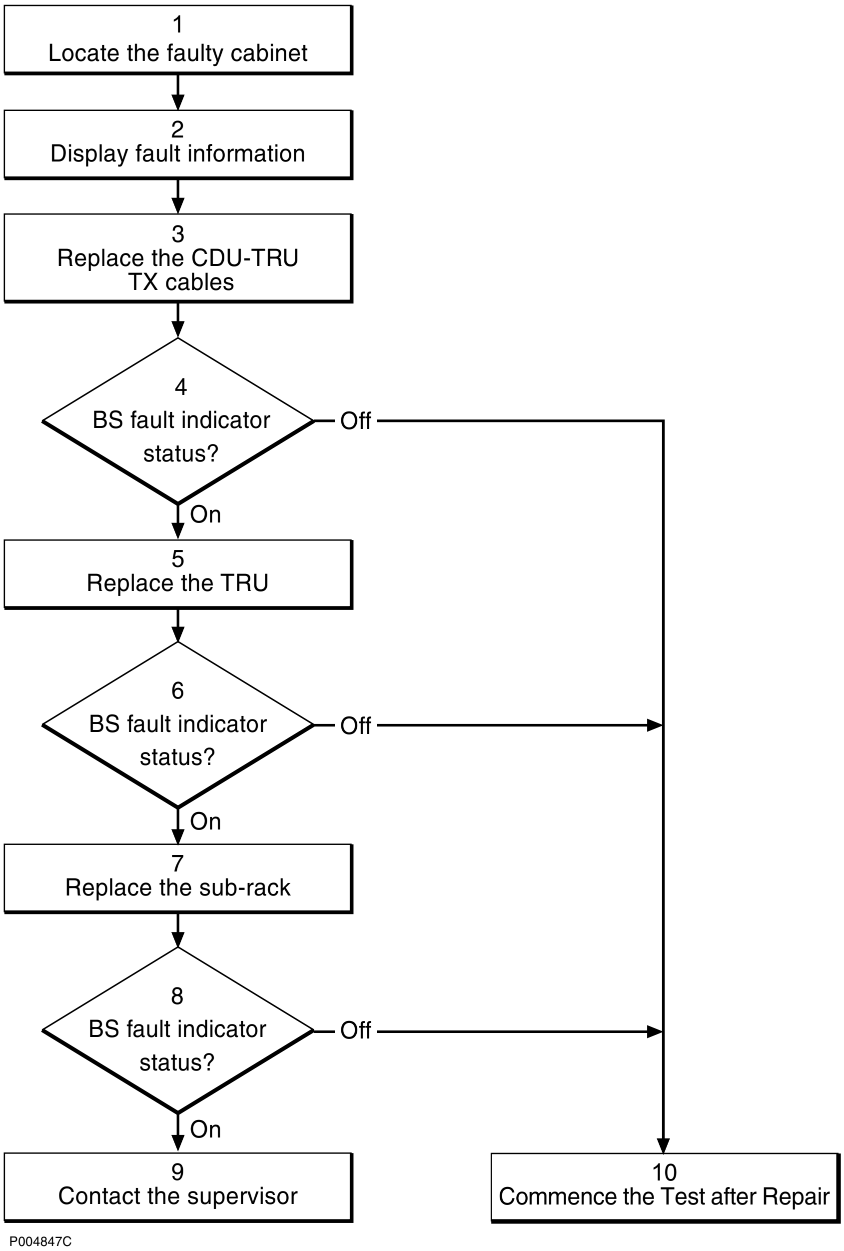


Figure 65 TRU flowchart

Note: Several instructions in this section require the OMT. For further information on the use of OMT, see:

	OMT User's Manual	*LZN 302 01*

(1) Locate the faulty cabinet

Locate the faulty cabinet according to work order information.

(2) Display fault information

Use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs". The window also shows whether the fault is in the master cabinet, or in an extension cabinet (if connected).

(3) Replace the CDU-TRU TX cables

Replace one or both CDU-TRU TX cables according to instructions in the section "CDU-TRU TX Cables" in the chapter "RBS Field Repair".

(4) BS fault indicator status?

The red indicator labelled Fault on the TRU indicates the fault status of the unit.

Fault indicator status?

- Off: Proceed to step (10). No fault is detected in the TRU.
- On: Proceed to step (5). One or more faults are detected in the TRU.

There are two additional methods to determine whether the fault has been cleared.

The first method is to inspect the yellow indicator labelled BS fault on the DXU.

BS fault indicator status?

- Off: Proceed to step (10). No fault is detected in the RBS.
- On: Proceed to step (5). One or more faults are detected in the RBS.

The second method is to use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs".

(5) Replace the TRU

Note: If the unit to be replaced is part of an extension cabinet system, always work in the extension cabinet first, then in the master.

Replace the faulty TRU according to instructions in the section "TRU" in the chapter "RBS Field Repair".

(6) BS fault indicator status?

The red indicator labelled Fault on the TRU indicates the fault status of the unit.

Fault indicator status?

- Off: Proceed to step (10). No fault is detected in the TRU.
- On: Proceed to step (7). One or more faults are detected in the TRU.

There are two additional methods to determine whether the fault has been cleared.

The first method is to inspect the yellow indicator labelled BS fault on the DXU.

BS fault indicator status?

- Off: Proceed to step (10). No fault is detected in the RBS.
- On: Proceed to step (7). One or more faults are detected in the RBS.

The second method is to use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs".

(7) Replace the sub-rack

The fault is probably located in the backplane.

1. Replace the TRU sub-rack according to the section "TRU Sub-Rack" in the chapter "RBS Field Repair".

(8) BS fault indicator status?

The red indicator labelled Fault on the TRU indicates the fault status of the unit.

Fault indicator status?

- Off: Proceed to step (10). No fault is detected in the TRU.
- On: Proceed to step (9). One or more faults are detected in the TRU.

There are two additional methods to determine whether the fault has been cleared.

The first method is to inspect the yellow indicator labelled BS fault on the DXU.

BS fault indicator status?

- Off: Proceed to step (10). No fault is detected in the RBS.
- On: Proceed to step (9). One or more faults are detected in the RBS.

The second method is to use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs".

(9) Contact the supervisor

Contact the supervisor or manager who will take further action, for example, to consult an FSC.

(10) Commence the Test after Repair

Take the following actions:

1. Make a test call:

- If a TRU was replaced, make a test call over just that TRU according to the section "Test Call" in the chapter "Test after Repair".
- If a sub-rack was replaced, make a test call over all TRUs according to the section "Test Call" in the chapter "Test after Repair".

2. Proceed to the section "Before Leaving the Site"in the chapter "Concluding Routines".

5.35 X Bus

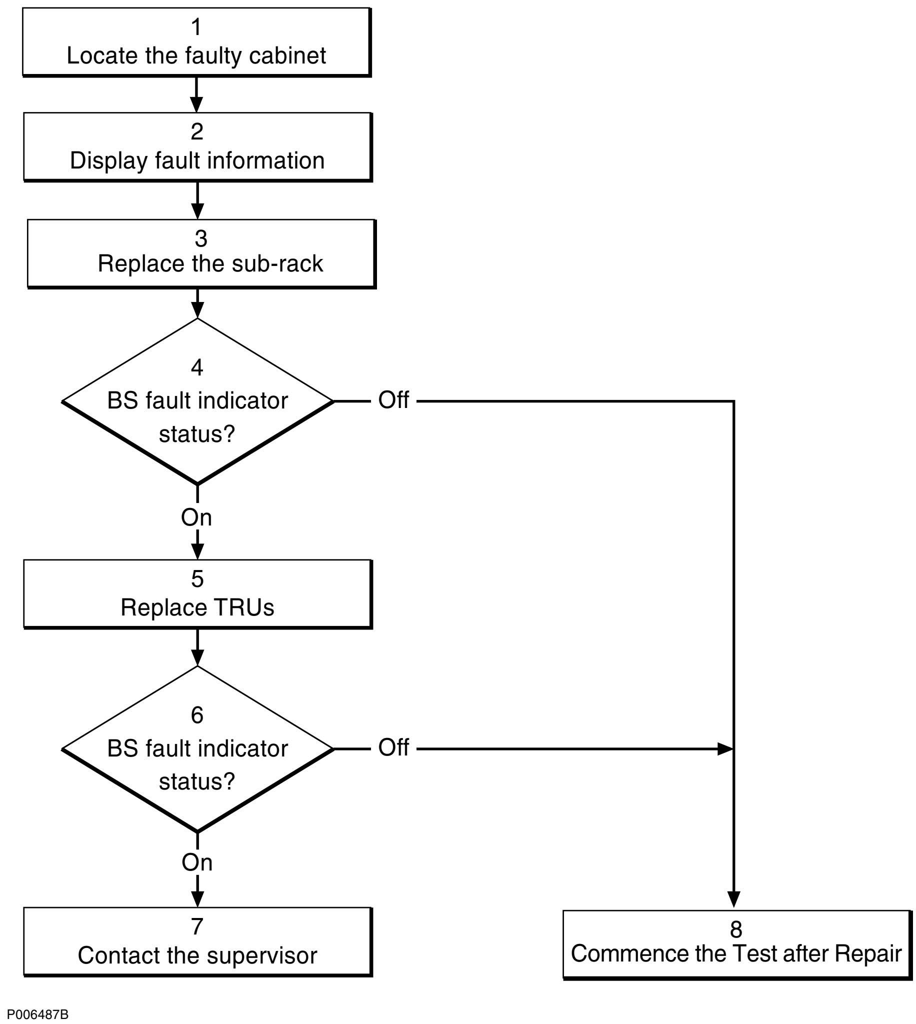


Figure 66 X bus flowchart

Note: Several instructions in this section require the OMT. For further information on the use of OMT, see:

OMT User's Manual	*LZN 302 01*

(1) Locate the faulty cabinet

Locate the faulty cabinet according to work order information.

(2) Display fault information

Use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs". The window also shows whether the fault is in the master cabinet, or in an extension cabinet (if connected).

(3) Replace the sub-rack

The fault is probably located in the backplane.

Note: If the unit to be replaced is part of an extension cabinet system, always work in the extension cabinet first, then in the master.

1. Replace the TRU sub-rack according to the section "TRU Sub-Rack" in the chapter "RBS Field Repair".

(4) BS fault indicator status?

There are two methods to determine whether the fault has been cleared.

The first method is to inspect the yellow indicator labelled BS fault on the DXU.

BS fault indicator status?

- Off: Proceed to step (8). No fault is detected in the RBS.
- On: Proceed to step (5). One or more faults are detected in the RBS.

The second method is to use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs".

(5) Replace TRUs

Note: If the unit to be replaced is part of an extension cabinet system, always work in the extension cabinet first, then in the master.

1. Replace the (first) TRU according to the section "TRU"in the chapter "RBS Field Repair".
2. Put the replacement TRU in remote mode.
3. Make a test call according to one of the following alternatives:

   • If the fault is cleared, the BS fault will be off and test calls over all TRUs according to the section "Test Call" in the chapter "Test after Repair" should be made.

   • If the faulty TRU was not found (BS fault = ON at the DXU), continue to replace the next TRU as described in step 1.

(6) BS fault indicator status?

There are two methods to determine whether the fault has been cleared.

The first method is to inspect the yellow indicator labelled BS fault on the DXU.

BS fault indicator status?

- Off: Proceed to step (8). No fault is detected in the RBS.
- On: Proceed to step (7). One or more faults are detected in the RBS.

The second method is to use the OMT to list all RUs that are faulty: Select the "System view" and the object RBS. In the Operation menu, select "Display Faulty RUs".

(7) Contact the supervisor

Contact the supervisor or manager who will take further action, for example, to consult an FSC.

(8) Commence the Test after Repair

Take the following actions:

1. Make a test call over all TRUs and ATRUs according to the section "Test Call" in the chapter "Test after Repair".
2. Proceed to the section "Before Leaving the Site"in the chapter "Concluding Routines".

6 RBS Field Repair

The instructions in this chapter describe the replacement of RUs and how to put the RBS into operation after a fault has been localised in the RBS.

6.1 Local/remote Mode

The Local/remote button can change RU mode between local and remote control. A Local/remote button is located on the DXU and the TRUs. RUs in local mode do not have communication with the BSC via the Abis interface and are therefore isolated from the BSC.

The Local/remote button is used to isolate the unit from the BSC, for example, when exchanging faulty units in the RBS.

RUs cannot be changed to remote mode until the data base has been downloaded to the DXU.

Below is a brief description of the two different changes of state and how to stop a change of mode to remote.

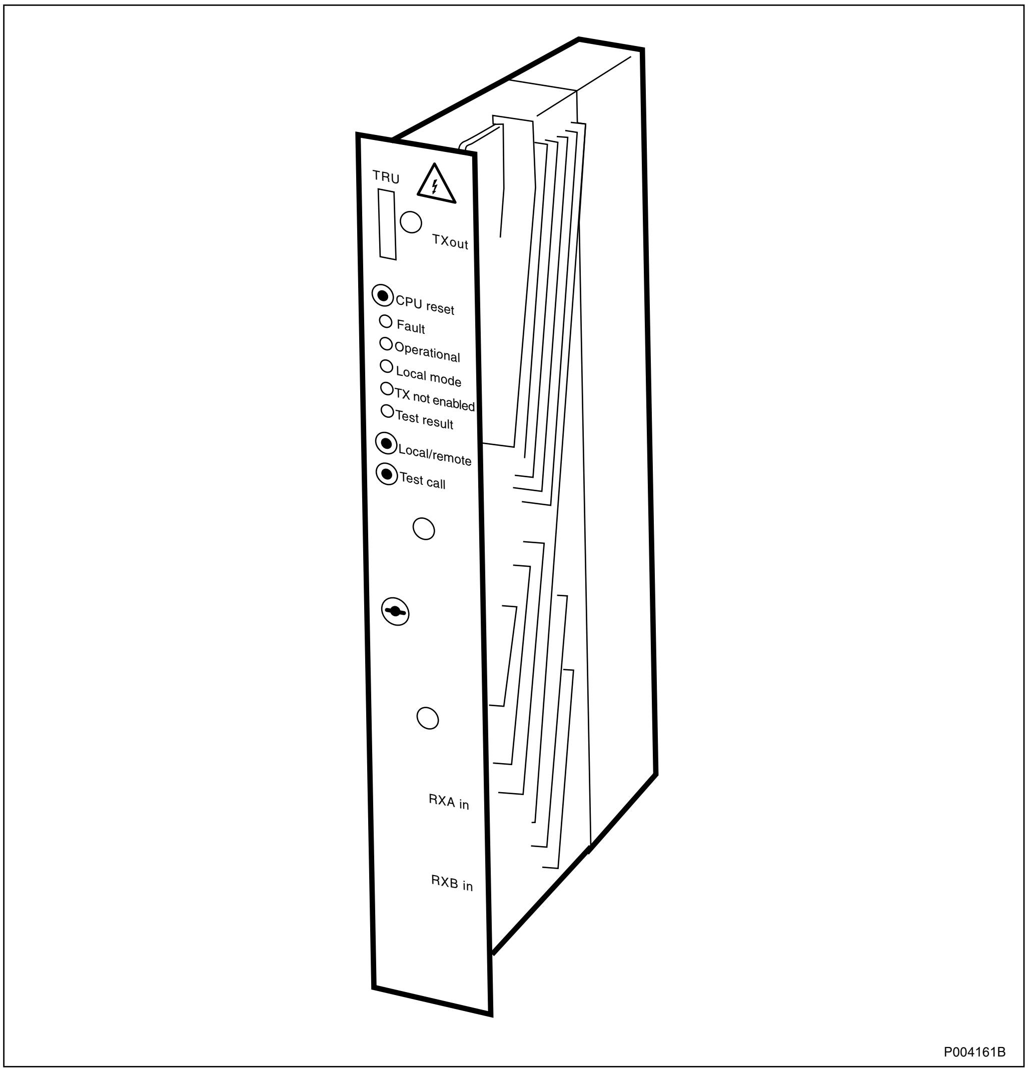


Figure 67 Control panel on TRU

6.1.1 Changing RU Mode from Remote to Local

- The Local/remote button is pressed.
- The Local/remote button is disabled in order to prevent mistakes.
- The Local mode indicator starts flashing to indicate that a change of RU mode to local is in progress.
- The Operational indicator turns off in order to indicate that the RU has been taken out of operation.
- A fault report message is sent to the BSC via the Abis interface. This means that an external condition class 1 alarm will be raised in the BSC.
- The communication link on the Abis interface is disconnected and the RU mode is changed to local.
- The Local mode indicator turns on. The Operational indicator is also turned on if the RU is free from class 1 faults, in order to indicate that the RU is in local operation.
- The Local/remote button is enabled again.

6.1.2 Changing RU Mode from Local to Remote

- The Local/remote button is pressed.
- The Local mode indicator starts flashing to indicate that a change of RU mode to remote is in progress.
- The Operational indicator turns off in order to indicate that the RU has been taken out of operation.
- The communication link on the Abis interface is established by order from BSC. The RU is changed to remote mode immediately after the link towards the BSC has been established.
- The Local mode indicator turns off.
- In order to indicate that the RU is ready to carry traffic the Operational indicator turns on. Note that this will only happen if the RU is considered as operational by the BSC. (For example, the unit may be blocked from BSC.)

6.1.3 Stopping a Change of RU Mode from Local to Remote

If the Local/remote button is pushed while the Local mode indicator is flashing, the change of RU mode to remote is interrupted. Note that this function is only valid during a change of RU mode to remote.

- The Local/remote button is pressed.
- The attempt to enable a connection with the BSC will stop.
- The RU will then remain in local mode with the communication link disconnected and the Local mode indicator on.

6.2 ALNA

This section discribes the replacement of ALNA (Antenna Low Noise Amplifier) and how to put the RBS into operation after the repair.

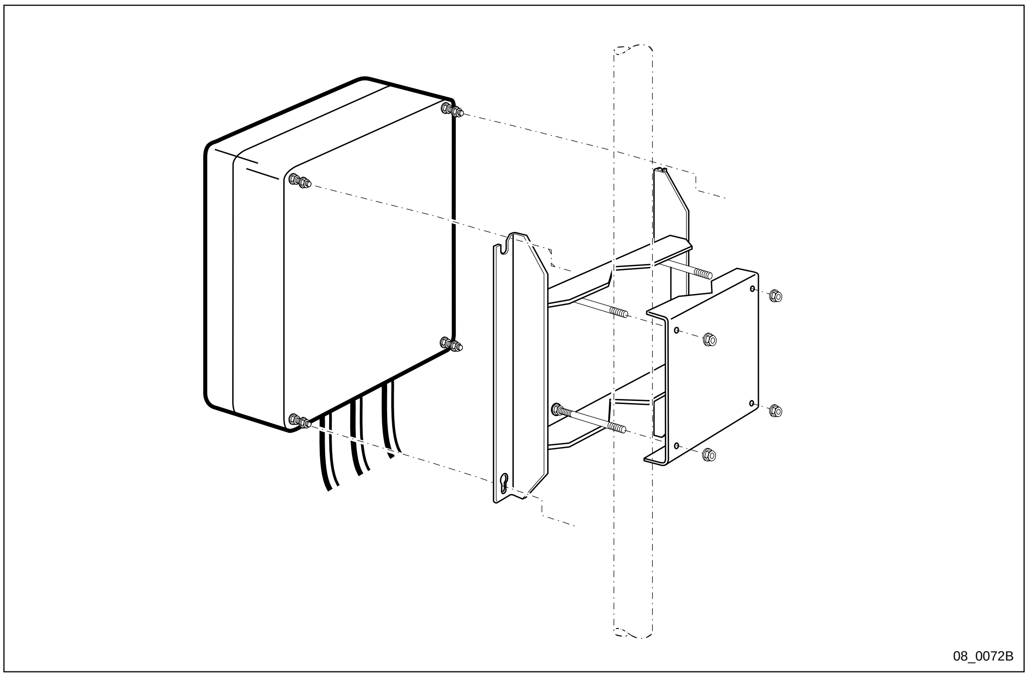


Figure 68 ALNA with mounting bracket

WARNING

Some working areas involve the risk of accidents caused by falling objects.

Note: Follow local safety regulations when climbing antenna poles and masts. These regulations will also determine the limitations of working under severe weather conditions.

Use all the prescribed PPE while doing maintenance on an antenna tower.

Prior to replacement

1. Inform the OMC operator that the RBS will be removed from service temporarily.
2. Press the Local/remote button on the DXU. The Local mode indicator will start flashing.
3. Wait until the Local mode indicator has a fixed yellow light. This indicates that the DXU is in local mode.

Replacement

CAUTION

Radio frequency (RF) radiation from antenna systems can endanger your health.

Note: To prevent exposure to RF radiation and damage to TRUs, be sure that the Local mode indicator on the DXU has a fixed yellow light.

All TRUs connected to the antenna tower where the faulty ALNA is mounted must have their TX not enabled indicator on before further action is taken.

1. At the bottom of the ALNA, disconnect the RF cable to the antenna and the RX and TX cables going to the RBS.
2. Remove the four screws holding the ALNA to the mounting bracket on the pole.
3. Replace the defective ALNA and reconnect the three RF cables.

Note: After replacement, the ALNA must be returned to Ericsson for repair. Maintenance personnel must attach a repair delivery note, LZF 084 64 (Blue Tag), to the ALNA. The repair delivery note shall include a clear description of the fault found. Refer to the chapter "Concluding Routines"for instructions on completing a repair delivery note.

Put into operation

1. Connect the OMT and verify that there is no fault in the ALNA. Mixing the antenna feeder or jumper cables will cause an ALNA fault and damage the ALNA.
2. Press the Local/remote button on the DXU. The Local mode indicator will start flashing.
3. Wait until the Local mode indicator is off. This indicates that the DXU is in remote mode.
4. Carry out the following checks:
   - BS fault on DXU will be off.
   - Operational on DXU will be on.
   - TX not enabled indicator on all TRUs will be off.

Note: The reason why the TX not enabled indicator does not turn off can be that the TRU is not configured and therefore not able to carry traffic.

6.3 Batteries

6.3.1 General

DANGER

⚠

Read Safety Instructions regarding handling and connecting batteries.

The battery temperature alarm is generated when the temperature of the battery is > +60°C (+140°F). When the temperature is > +65°C (+149°F), the BFU disconnects the batteries from the radio equipment to prevent them from becoming damaged. When the battery temperature falls to < +55°C (+131°F), the batteries are reconnected to the radio equipment by the BFU and the alarm ceases.

The battery under-voltage alarm is generated by the BFU to the ECU when the voltage of the batteries drops to 20.5 V DC (BFU R1A) respectively 21.0 V DC (R2A and on). After a delay of approximately 30 seconds, the BFU disconnects the battery from the entire system except the DXU and ECU. With the resulting decrease in load, the voltage rises. If the voltage drops again to 20.5 V DC (BFU R1A) respectively 20.8 V DC (R2A and on), the DXU and ECU are disconnected from the batteries. When the battery voltage returns to 25.0 V DC, the alarm ceases and the batteries are reconnected to the entire system.

The table below shows the output float voltage of the batteries (V DC) in relation to the battery temperature.

Table 10 Float voltage in relation to battery temperature (±0.1 V DC)

°C	°F	V DC	°C	°F	V DC	°C	°F	V DC
±0	+32	28.5	+15	+59	27.7	+30	+86	26.9
+1	+34	28.4	+16	+61	27.7	+31	+88	26.9
+2	+36	28.4	+17	+63	27.6	+32	+90	26.8
+3	+37	28.3	+18	+64	27.6	+33	+91	26.8
+4	+39	28.3	+19	+66	27.5	+34	+93	26.7
+5	+41	28.2	+20	+68	27.5	+35	+95	26.7
+6	+43	28.2	+21	+70	27.4	+36	+97	26.6
+7	+45	28.1	+22	+72	27.4	+37	+99	26.6
+8	+46	28.0	+23	+73	27.3	+38	+100	26.5
+9	+48	28.0	+24	+75	27.2	+39	+102	26.5
+10	+50	28.0	+25	+77	27.2	+40	+104	26.4
+11	+52	27.9	+26	+79	27.2	+41	+106	26.4
+12	+54	27.9	+27	+81	27.1	+42	+108	26.3
+13	+55	27.8	+28	+82	27.0	+43	+109	26.3
+14	+57	27.8	+29	+84	27.0	+44	+111	26.2
						+45	+113	26.2

6.3.2 Replacement Procedure

The batteries are located externally of the base station cabinet.

Note: Unless under contractual warranty, after replacement, the batteries shall be disposed of locally. Do not return the batteries to Ericsson for replacement, repair or disposal.

6.4 BFU

This section discribes the replacement of the Battery Fuse Unit (BFU). The BFU is installed in the BBS cabinet.

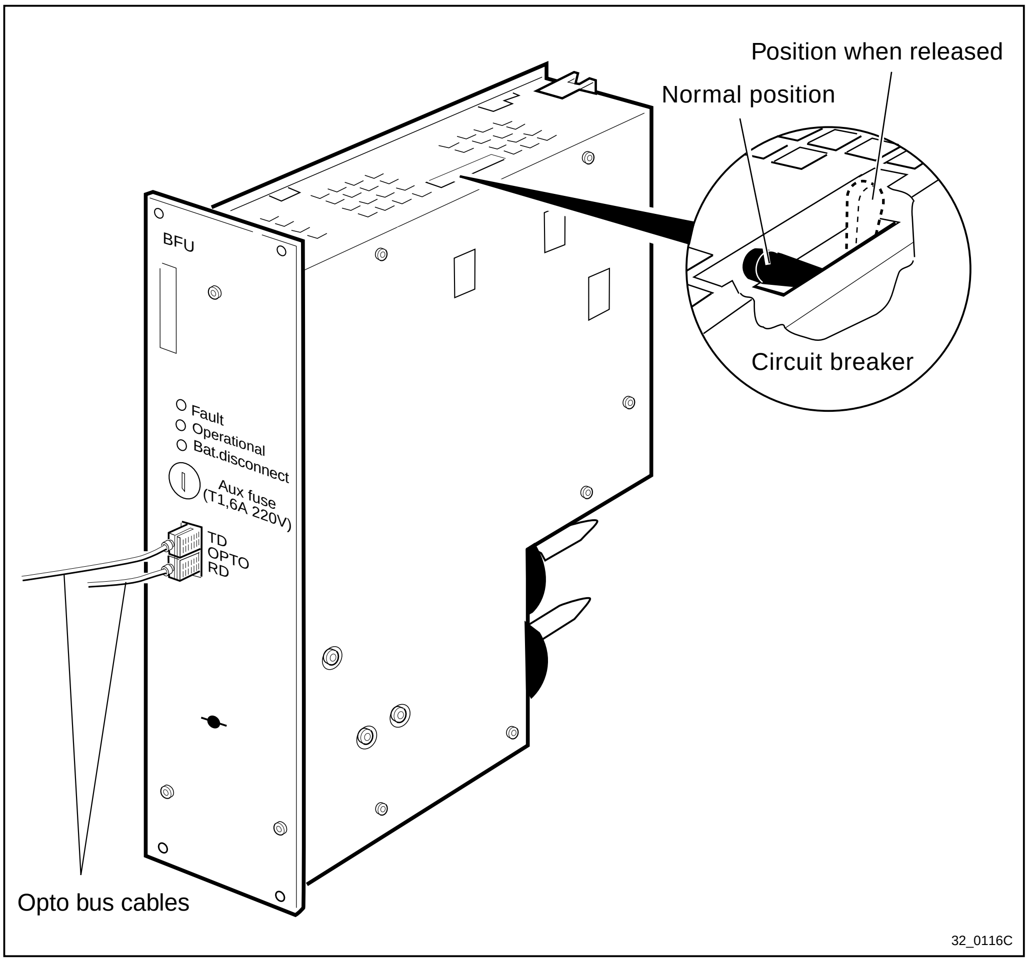


Figure 69 BFU with circuit breaker

Note: The opto bus cables must have a bent radius of at least 35 mm.

Replacement

1. Disconnect the opto bus cables connected to the BFU.
2. Make sure that the circuit breaker is in normal position.
3. Replace the faulty BFU.
4. Reset the ECU by pressing the button labelled CPU Reset on the ECU for approximately 3 seconds. After approximately 30 seconds, the system should function without alarm, and the Fault indicator on the ECU should go out.
5. Connect the opto bus cables.

Note: After replacement, the BFU must be returned to Ericsson for repair. Maintenance personnel must attach a repair delivery note, LZF 084 64 (Blue Tag), to the BFU. The repair delivery note shall include a clear description of the fault found. Refer to the chapter "Concluding Routines"for instructions on completing a repair delivery note.

6.5 CDU

Note: CDUs are marked on the front with a coloured label showing the frequency. Make sure that the appropriate CDU is available.

Further information about colour coding versus frequency and encryption can be found in the *Spare Parts Catalogue, Appendix B.*

Note: If the CDU is faulty, but no replacement unit is available, leave the faulty CDU in the cabinet (do not remove it) and replace it when the new CDU arrives.

If there are sever damages, like burns, on the CDU, remove the faulty CDU and replace it with a dummy CDU.

Empty RU positions can affect the required cooling airflow to units in operation and cause overheating.

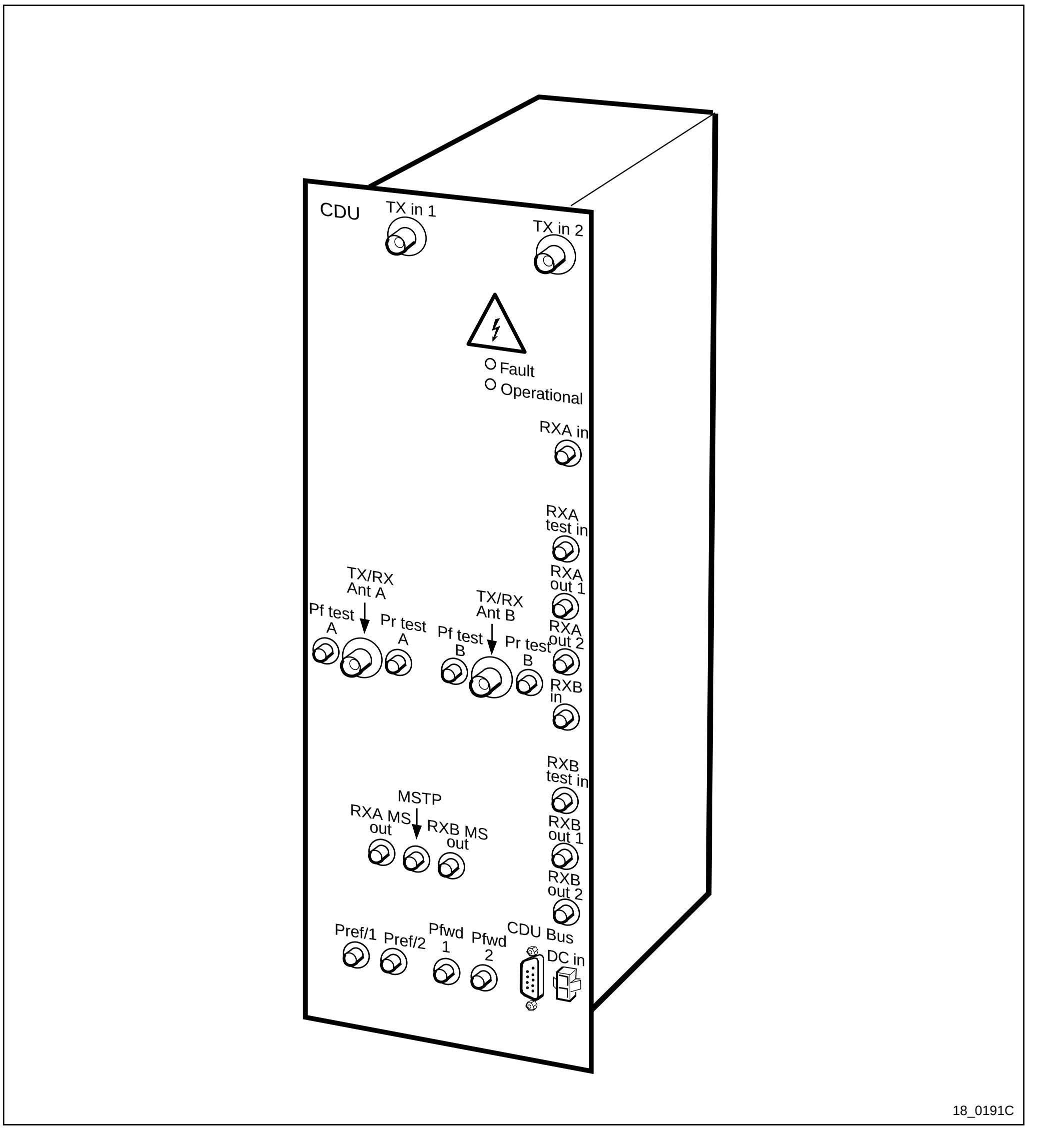


Figure 70 CDU, this example shows a CDU-A

Prior to replacement

Note: During the replacement procedure of the CDU, either the RBS will have reduced traffic handling capability due to the loss of one of the CDUs, or the RBS will be temporarily removed from service if there is only one CDU in the cabinet.

1. Inform the OMC operator that the CDU will be replaced.
2. Press the Local/remote button on the TRUs that are connected to the faulty CDU. The Local mode indicator will start flashing.
3. Wait until the Local mode indicator on the TRU concerned has a fixed yellow light. This indicates that the TRU is in local mode.
4. Switch off the applicable CDU circuit breakers.

Replacement

CAUTION

Radio frequency (RF) radiation from antenna systems can endanger your health.

Note: To prevent damage to TRUs and exposure to RF radiation, be sure that the Local mode indicators on the TRUs that are connected to the faulty CDU, have a fixed yellow light before taking any further actions.

1. Replace the CDU.
2. Switch on the CDU circuit breakers.
3. Press CPU Reset on the DXU. The RU information from the new CDU will then be loaded into the RBS database.

Note: After replacement, the CDU must be returned to Ericsson for repair. Maintenance personnel must attach a repair delivery note, LZF 084 64 (Blue Tag), to the CDU. The repair delivery note shall include a clear description of the fault found. Refer to the chapter "Concluding Routines"for instructions on completing a repair delivery note.

Put into operation

Note: If base band hopping is used, the hopping sequence can only be re-initiated by the BSC/MSC. After placing the TRU(s) in remote mode, contact the BSC/MSC personnel and request they take the required actions.

1. Press the Local/remote buttons on both TRUs that are connected to the new CDU.

2. The Local mode indicators will start flashing.
3. Wait until the Local mode indicators turn off. This indicates that the TRUs are in remote mode.

6.6 CDU Bus

Prior to replacement

1. Inform the OMC operator that the RBS will be removed from service temporarily.
2. Press the Local/remote button on the DXU. The yellow Local mode indicator will start flashing. Wait until it has a fixed yellow light. This indicates that the DXU is in local mode.
3. (If supplied). Isolate the cabinet from the external DC power source.
4. (If supplied). Isolate the cabinet from the AC mains power by removing the four AC mains cables on the connection field located on plate B.
5. (If supplied). Disconnect the battery back-up to the RBS.

Replacement

1. Disconnect all cables connected to the front of the CDU and TRU sub-racks.
2. Remove the CDUs and TRUs from the sub-racks.

Note: Each CDU and TRU is secured by four captive screws; two at the top and two at the bottom of the unit. Do not remove the screws totally as these are designed to be "captivated" in the RU front panel.

3. Remove the eight retaining screws securing the CDU sub-rack and the eight screws securing the TRU sub-rack to the cabinet. Remove the upper screws first.
4. Withdraw the CDU sub-rack from the cabinet.
5. • Unscrew the four IDM screws and draw the IDM forward from the cabinet. Do not disconnect any power cables.

   • Gently ease the IDM forward to allow access to the two Fans.

Note: Care must be taken when handling the IDM to prevent damage to the main DC power cables to the right side and the DC power distribution cables at the back of the IDM.

6. Using a soft pencil, draw a short line down the side of each fan and continue on the top of the top of the TRU sub-rack. This will assist in replacing the fans later. Mark the left-hand fan with the number "1" and the right hand fan with the number "2".
7. Disconnect each fan power cable and remove each fan after first removing the securing clips.

To remove the securing clip; press down, slide to left and lift up. See figure below.

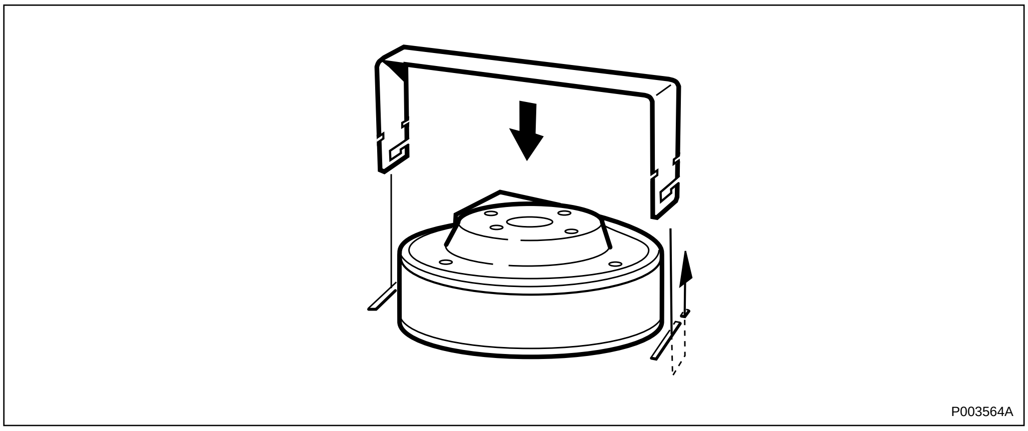


Figure 71 Removing the fan securing clips

8. The fan units are fitted to chimneys in the rear of the cabinet. The chimneys are secured to the fans by means of a push-on clip. Support the chimneys whilst pulling the fans clear. Do not remove the chimneys.

9. The IDM may now be temporarily held clear of the work area before continuing. Use two large tie-wraps to support the left-hand side of the IDM.

10. Remove the four screws securing the air duct immediately below the sub-rack. Remove the air duct whilst supporting the TRU sub-rack.

11. Draw the TRU sub-rack forward to permit access to the rear of the sub-rack. It may be necessary to remove the left-hand DU cable from the TRU backplane PCB.

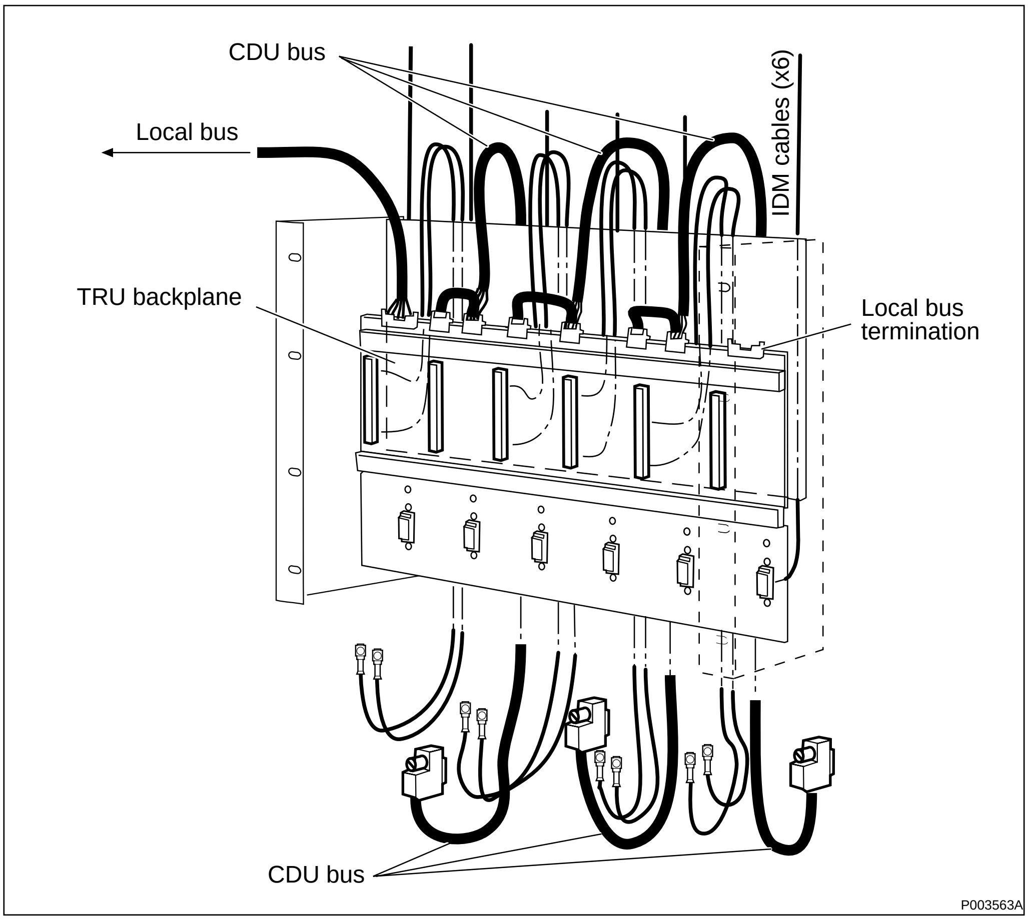


Figure 72 Location of cables inside the TRU sub-rack (viewed from the front)

12. Cut the three tie-wraps on the rear of the TRU sub-rack. These tie-wraps hold the CDU bus cables and subrack cables.

    The TRU sub-rack should now become free and the rear fully accessible.

13. Remove the left-hand CDU cable carefully, pushing the connectors through the rubber seal at the rear of the TRU sub-rack.
14. Cut the tie-wrap on the rear of the cabinet wall. This tie-wrap holds the CDU bus cable and sub-rack cables.
15. Remove the CDU bus cable from the cabinet.
16. Fit the new CDU bus cable to the TRU backplane after carefully pushing the two plugs through the rubber seal of the TRU sub-rack.
17. Fit a tie-wrap to the rear wall of the cabinet to gather all the all the loose cables. Do not tighten the tie-wrap.
18. Remove the centre CDU cable carefully, pushing the connectors through the rubber seal at the rear of the TRU sub-rack.
19. Cut the tie-wrap on the rear of the cabinet wall. This tie-wrap holds the CDU bus cable and sub-rack cables.
20. Remove the CDU bus cable from the cabinet.

21. Fit the new CDU bus cable to the TRU backplane after carefully pushing the two plugs through the rubber seal of the TRU sub-rack.
22. Fit a tie-wrap to the rear wall of the cabinet to gather all the all the loose cables. Do not tighten the tie-wrap.
23. Remove the right-hand CDU cable carefully, pushing the connectors through the rubber seal at the rear of the TRU sub-rack.
24. Cut the tie-wrap on the rear of the cabinet wall. This tie-wrap holds the CDU bus cable and sub-rack cables.
25. Remove the CDU bus cable from the cabinet.
26. Fit the new CDU bus cable to the TRU backplane after carefully pushing the two plugs through the rubber seal of the TRU sub-rack.
27. Fit a tie-wrap to the rear wall of the cabinet to gather all the all the loose cables. Do not tighten the tie-wrap.
28. Refit the Local bus cable to the TRU backplane, if it was removed. Refit the TRU sub-rack to the cabinet ensuring that cables are not trapped.
29. Place the TRU sub-rack on top of the air duct. The two legs to the rear of the air duct will fit into slots at the rear of the cabinet.

    Insert the sub-rack and the duct as a single unit.
30. Secure the air duct before the TRU sub-rack, using the duct to support the TRU sub-rack.

    The securing screws can be tightened from a kneeling position. In this position you can place your shoulder under the air duct and lift during the final tightening. This will gain an extra 1 mm - 2 mm of space under the air duct, making the CDU sub-rack easy to fit.
31. Tighten the three tie-wraps at the rear wall of the cabinet.
32. Refit the fans, ensuring that they are securely clipped to the chimneys behind them. The pencil marks made earlier will assist with alignment. Fan 1 is the left fan, Fan 2 is the right fan.

Note: The task of clipping the fans to the chimneys can be a little tricky. If the fans are rotated anti-clockwise by about 5 degrees then it will be possible to see the clips and the far edge of the fans. Support the chimney with your finger when inserting the fan into the clips.

33. Fix the fans with the securing clips. When properly fitted, the securing clips normally make a loud clicking noise, confirming they are correctly in position.
34. Connect the fans to the DC cable from which they were removed. The connectors are identified by tags labelled FAN 1 and FAN 2.

Note: Ensure that the cables from the IDM are routed between the fans, not trapped beneath them.

35. Refit the IDM to the cabinet and secure it in place using the four retaining screws.

Note: Unless under contractual warranty, after replacement, the CDU bus cables shall be disposed of locally. Do not return the CDU bus cables to Ericsson for replacement, repair or disposal.

Put into operation

1. Reconnect the cabinet to the mains power supply (either AC or DC).
2. (If supplied). Reconnect the external battery backup to the RBS.
3. Check that the Operational indicator on the DXU has a fixed green light and that the BS fault indicator is off.
4. Press the Local/remote button on the DXU. The Local mode indicator will start flashing.
5. Wait until the Local mode indicator on the DXU is off. This indicates that the DXU is in remote mode.

6.7 CDU-D RUs

Note: This procedure is common for the three RUs in the CDU-D: CU, DU and FU (FUd).

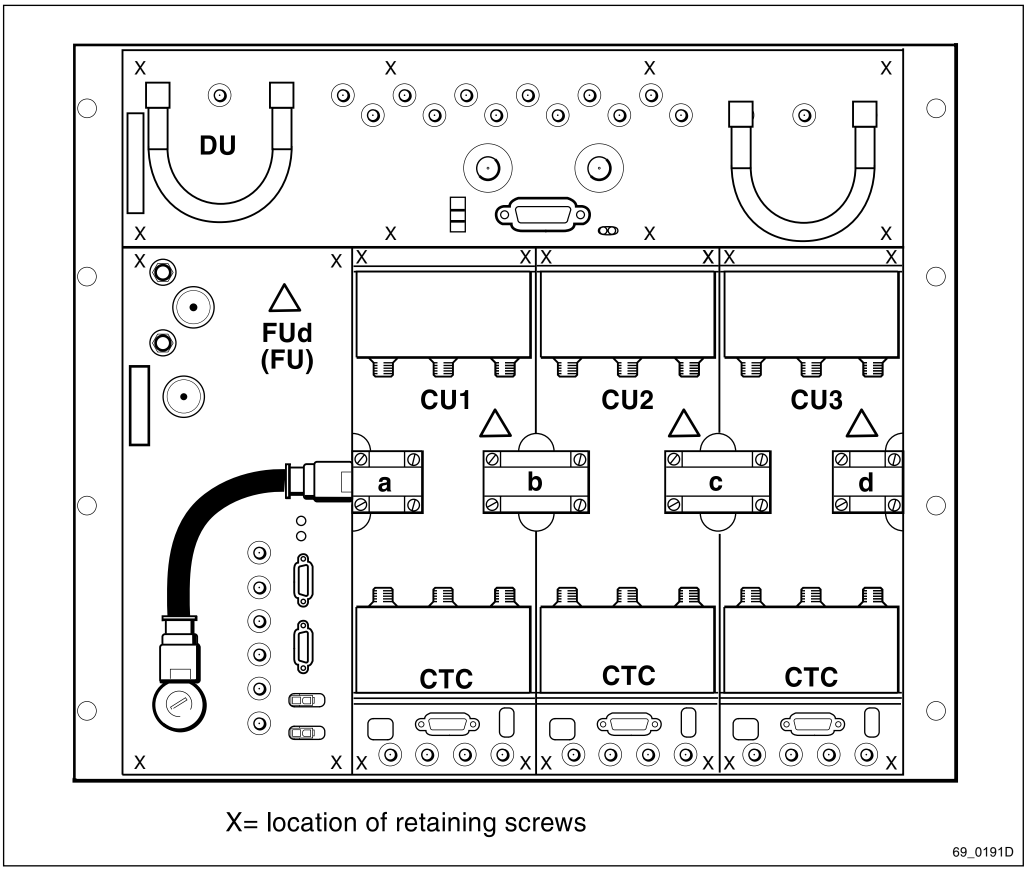


Figure 73 The figure shows a CDU–D 900, front view

Prior to replacement

Note: During the replacement procedure of CDU-D RUs, the RBS will be temporarily removed from service.

1. Inform the OMC operator that a RU is going to be replaced.
2. Press the Local/remote button on all TRUs that are connected to the CDU-D. The Local mode indicator will start flashing on the TRUs.
3. Wait until the Local mode indicator on each TRU concerned has a fixed yellow light. This indicates that the TRU is in local mode.

Replacement

CAUTION

Radio frequency (RF) radiation from antenna systems can endanger your health.

Note: To prevent damage to TRUs and exposure to RF radiation, be sure that the Local mode indicators on the TRUs that are connected to the faulty CDU-D, have a fixed yellow light before taking any further actions.

1. Press once the Local/remote switch on each TRU listed in Table 11 on page 157 to take them out of traffic.

   It is safe to work on the CDU-D when the Local mode indicators on the TRUs are continuously illuminated.

Table 11 TRUs to take out of traffic

CDU-D RU to be replaced	TRUs required in Local mode
DU	1, 2, 3, 4, 5 and 6
FU (FUd)	1, 2, 3, 4, 5 and 6
CU1	1, 2, 3, 4, 5 and 6(1)
CU2	3, 4, 5 and 6(1)
CU3	5 and 6(1)

(1) If the CDU variant uses a single coaxial link, instead of the four separate links a, b, c and d, then **all** TRUs must be put into local mode.

2. Remove all external cables connected to the faulty RU.
3. (CU only). Remove the coaxial links a, b, c and d.

Note: If the CDU variant uses a single coaxial link, instead of the four separate links a, b, c and d, then remove the single link.

4. Loosen the retaining screws securing the faulty RU.

5. Replace the faulty RU.
6. Secure the new RU by tightening the screws.
7. Reconnect all cables.
8. Press again the Local/remote switch on each TRU in local mode to return them to traffic.

Put into operation

Note: If base band hopping is used, the hopping sequence can only be re-initiated by the BSC/MSC. After placing the TRUs in remote mode, contact the BSC/MSC and request that they take the required action.

1. Press the CPU reset button on the DXU and wait approximately 1 minute.
2. Make sure that the TRUs are in remote mode, that is, the Local mode indicator is off.

   If not, press the Local/remote button on the TRUs that are connected to the repaired CDU-D. The Local mode indicator will start flashing.
3. Wait until the Local mode indicators on the TRUs are turned off. This indicates that the TRUs are in remote mode.

Note: After replacement, the CU, DU or FU (FUd) must be returned to Ericsson for repair. Maintenance personnel must attach a repair delivery note, LZF 084 64 (Blue Tag), to the CU, DU or FU (FUd). The repair delivery note shall include a clear description of the fault found. Refer to the chapter "Concluding Routines" for instructions on completing a repair delivery note.

6.8 CDU-TRU RX Cables

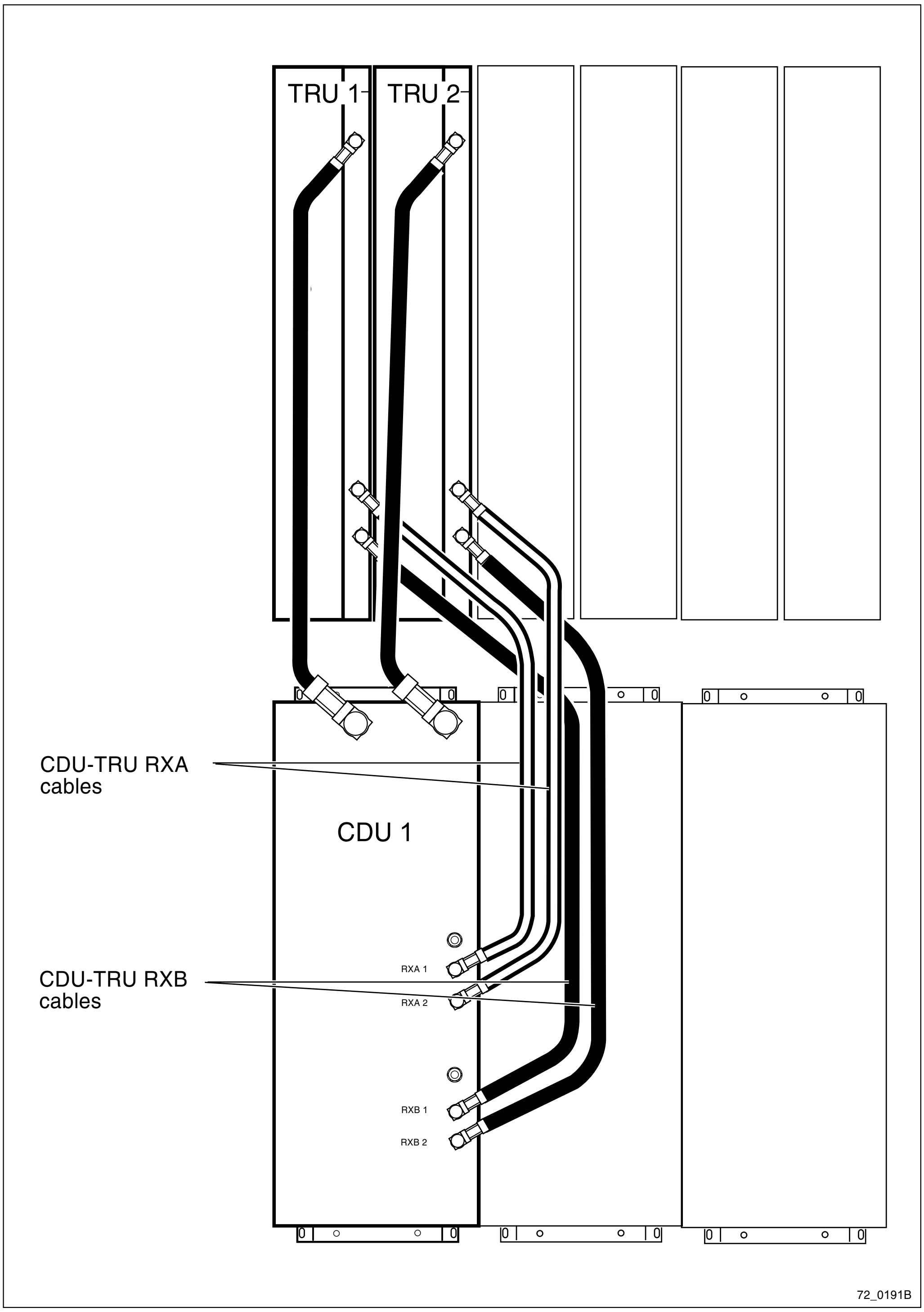


Figure 74 CDU-TRU RXA and RXB cables

Prior to replacement

1. Press the Local/remote button on the TRU that is connected to the faulty cable. This will set the TRU in local mode.
2. Wait until the Local mode indicator has a fixed yellow light.

Replacement

CAUTION

Radio frequency (RF) radiation from antenna systems can endanger your health.

Note: To prevent damage to TRUs and exposure to RF radiation, be sure that the Local mode indicator on the TRU that is connected to the faulty CDU-TRU RX cable has a fixed yellow light before taking any further actions.

1. Replace both the RXA and RXB cables. The fault indicator on the CDU will still be lit.
2. Press the CPU reset button on the TRU.
3. Press the Local/remote button on the TRU that is connected to the new cable(s) and wait until the Local mode indicator turns off. This will set the TRU in remote mode.
4. Check that the BS fault indicator (DXU) is off. This means that there are no active faults in the RBS.

Note: Unless under contractual warranty, after replacement, the cables shall be disposed of locally. Do not return the cables to Ericsson for replacement, repair or disposal.

6.9 CDU-TRU TX Cables

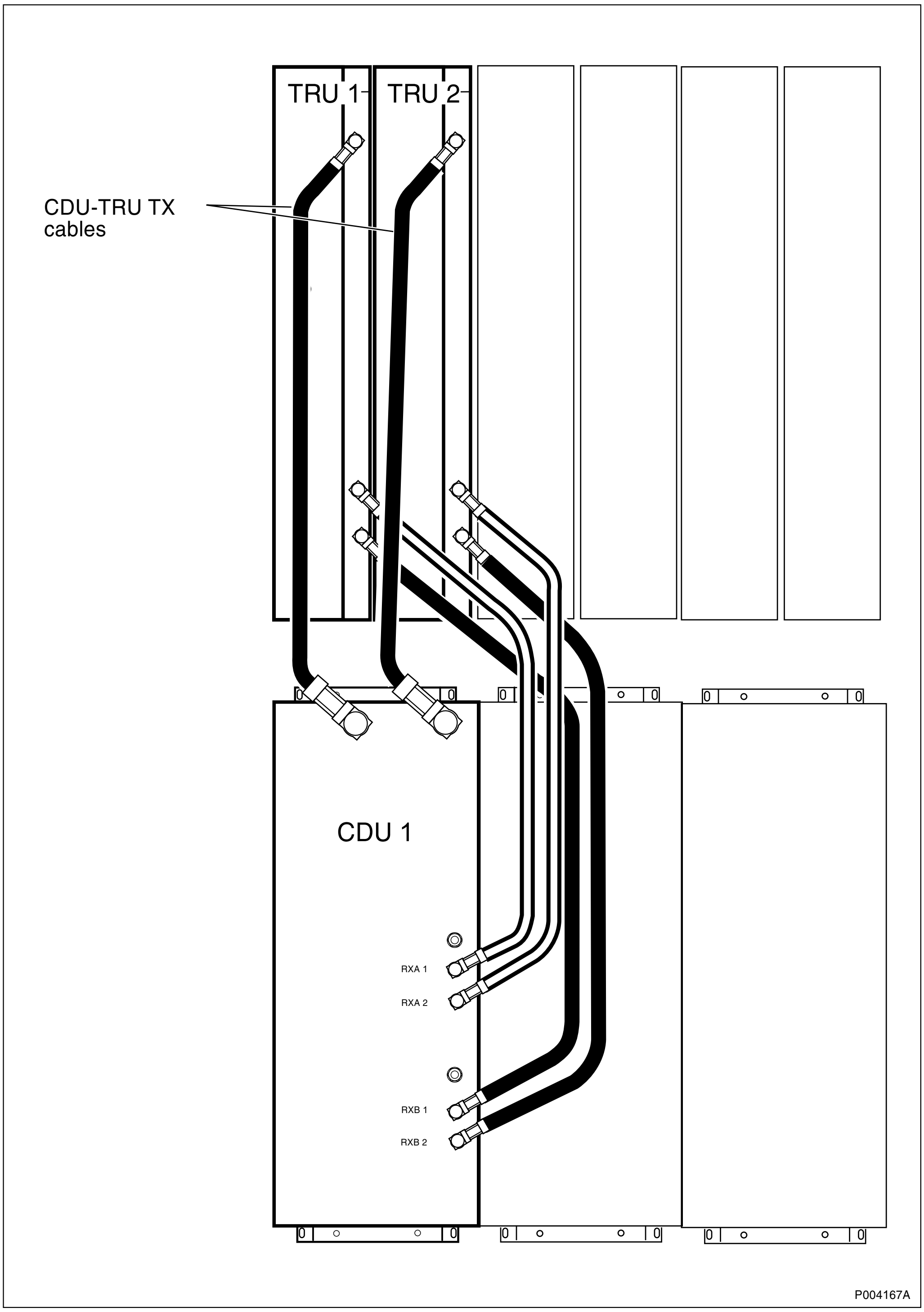


Figure 75 CDU-TRU TX cables

Prior to replacement

1. Press the Local/remote button on the TRU that is connected to the faulty cable. This will set the TRU in local mode.
2. Wait until the Local mode indicator has a fixed yellow light.

Replacement

CAUTION

Radio frequency (RF) radiation from antenna systems can endanger your health.

Note: To prevent damage to TRUs and exposure to RF radiation, be sure that the Local mode indicator on the TRU that is connected to the faulty CDU-TRU TX cable has a fixed yellow light before taking any further actions.

1. Replace the cable. The fault indicator on the CDU will still be lit.
2. Press the CPU reset button on the TRU.
3. Press the Local/remote button on the TRU that is connected to the new cable and wait until the Local mode indicator turns off. This will set the TRU in remote mode.
4. Check that the BS fault indicator (DXU) is off. This means that there are no active faults in the RBS.

Note: Unless under contractual warranty, after replacement, the cables shall be disposed of locally. Do not return the cables to Ericsson for replacement, repair or disposal.

6.10 CU–TX–TX Cable

Prior to replacement

1. Press the Local/remote button on the TRUs that are connected to the CU with the faulty cable. The Local mode indicator will start flashing.
2. Wait until the Local mode indicators have a fixed yellow light. This indicates that the TRUs are in local mode.

Replacement

CAUTION

Radio frequency (RF) radiation from antenna systems can endanger your health.

Note: To prevent damage to TRUs and exposure to RF radiation, be sure that the Local mode indicator on the TRU that is connected to the faulty CU-TX-TX cable has a fixed yellow light before taking any further actions.

1. Replace the cable.
2. Press the CPU reset button on the TRUs that are connected to the CU with the faulty CU-TX-TX cable.

Note: Unless under contractual warranty, after replacement, the CU-TX-TX cable shall be disposed of locally. Do not return the CU-TX-TX cable to Ericsson for replacement, repair or disposal.

Put into operation

1. Press the Local/remote buttons on the TRUs that are connected to the CU with the new cables and wait until the Local mode indicators turn off. This will set the TRU in remote mode.
2. Check that the BS fault indicator (DXU) is off. This means that there are no active faults in the RBS.

6.11 DC/DC Converter

The instructions below describe how to adjust the DC/DC converter.

Note: The DC/DC converter that is used with the RBS 2202 is not fitted in the cabinet itself. It is installed in the BBS instead.

1. Connect a multimeter to the U OUT test point and check the voltage.
   - If the voltage is approximately 0, go to step 2.
   - If the voltage is between –60 V and –37 V, go to step 5.
2. Turn off the DC/DC converter and wait 15 seconds.
3. Adjust the U OUT potentiometer anti clockwise a couple of turns.
4. Turn the DC/DC converter back on and check the voltage again.
   - If the voltage is approximately 0, repeat the steps 2 – 4.
   - If the voltage is between –60 V and –37 V, go to step 5.
5. Adjust the U OUT potentiometer until the multimeter reaches the value –54 ±0.1 V.
6. Connect the multimeter to the STOP TEST input and adjust the stop level with the STOP ADJUST potentiometer to the value 1.78 ±0.2 V.
7. Check the Start level by connecting the multimeter to the START TEST input. The value must be 2.28 ±0.2V.
8. If any of the voltages above cannot be obtained or if the Fail indicator is still on, then replace the DC/DC converter.

Note: Unless under contractual warranty, after replacement, the DC/DC converter shall be disposed of locally. Do not return the DC/DC converter to Ericsson for replacement, repair or disposal.

6.12 DXU

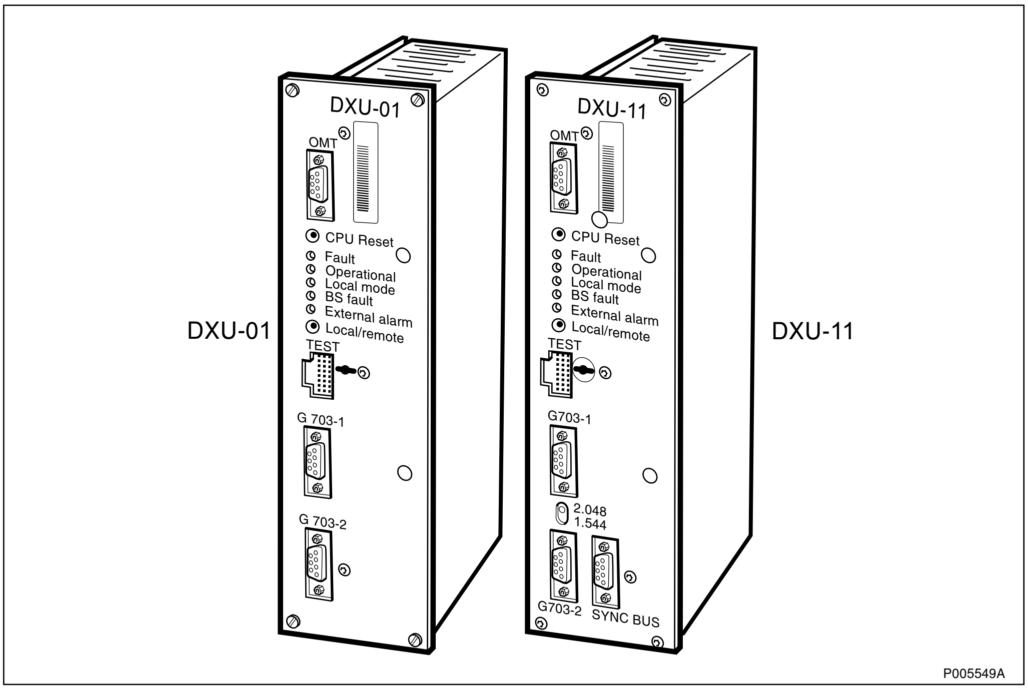


Figure 76 DXU-01 and the new DXU-11

Note: Prior to the installation of the new DXU, update it with the same BTS SW as used in the network.

Note: DXU-11 requires BTS SW R7 or later.

DXU-11 is backwards compatible with DXU-01 if an adapter is used. See figure below.

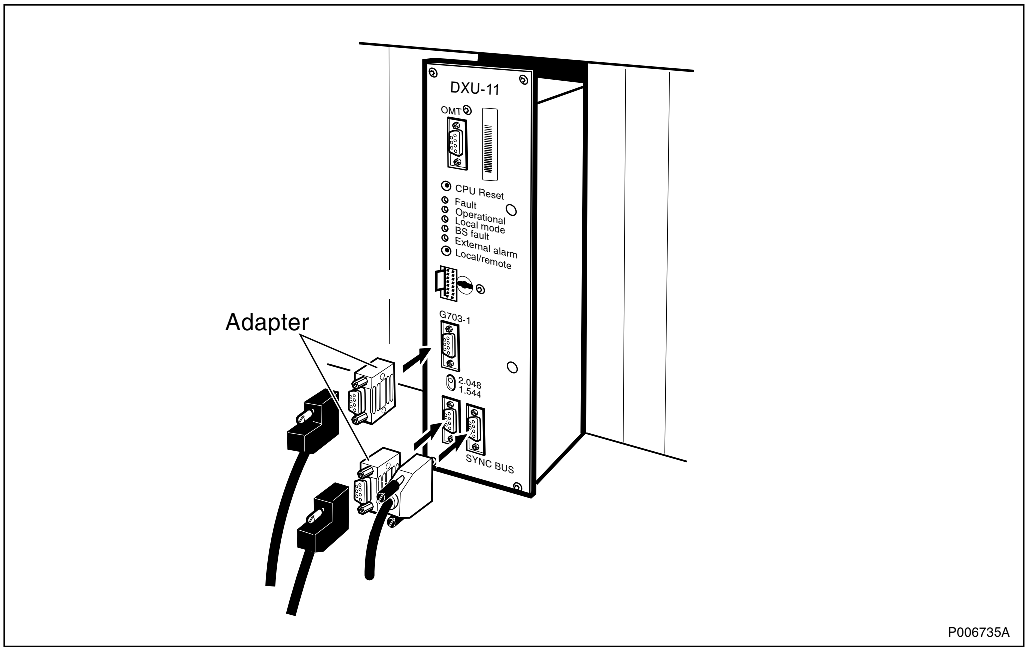


Figure 77 Adapter for the DXU-11

Prior to replacement

1. Inform the OMC operator that the RBS will be removed from service temporarily.
2. Press the Local/remote button on the DXU. The Local mode indicator will start flashing.
3. Wait until the Local mode indicator has a fixed yellow light, indicating that the DXU is in local mode.
4. Connect on the OMT and read the RBS IDB. This may not be possible depending on the nature of the fault in the DXU.

   The alternative is to use the original RBS IDB that was saved on a disk during installation. On outdoor versions the disk is stored inside the cabinet. It is important to remember to verify that the information on the disk is up to date when using this alternative.

Replacement

5. Switch off the DXU circuit breakers.
6. Remove all cables connected to the DXU.
7. Replace the DXU and reconnect the disconnected cables.
8. Switch on the DXU circuit breakers.
9. *(DXU-11 only)* Set the switch labelled 2.048/1.544 to the correct position:
   - Position 2.048 is used for GSM connection.
   - Position 1.544 is used for DS1 connection.
10. *(DXU-11 only)*

Reset the DXU by pressing the button labelled CPU reset on the DXU for approximately three seconds.

Note: The DXU must be reset each time the switch position is changed, otherwise the new position will not take effect.

11. Connect the OMT and download the original RBS IDB into the DXU. There are three alternative ways to do this:

    • Use the database that was acquired when reading the RBS database.

    • Use the database that is stored on a disk. This disk should be stored inside the cabinet.

    • Create a new database.

12. Press the CPU reset button on the DXU. This will distribute the IDB to the RUs.

13. Wait until the Operational indicator on the new DXU has a fixed green light.

Note: After replacement, the DXU must be returned to Ericsson for repair. Maintenance personnel must attach a repair delivery note, LZF 084 64 (Blue Tag), to the DXU. The repair delivery note shall include a clear description of the fault found. See the chapter "Concluding Routines" for instructions on completing a repair delivery note.

Put into operation

14. Check that the TRUs are in remote mode. If not, press the Local/remote button on the respective TRU.

15. Press the Local/remote button on the new DXU. The Local mode indicator will start flashing.

16. Wait until the Local mode indicator is off. This indicates that the new DXU is in remote mode.

17. Make a request to the OMC operator to check that all MOs are operational.

18. Make a request to the OMC operator to activate the cell(s).

19. Carry out the following checks:

    • BS fault indicator on the DXU is off.

    • Operational indicator on the DXU is on.

    • The TX not enabled indicator on each TRU is off.

Note: The reason why the TX not enabled indicator may not turn off is that the TRU is not configured and therefore not able to carry traffic.

6.13 DXU/ECU Backplane

Note: When changing the DXU/ECU backplane, refer to the chapter "Cable Connections". Note the position of RUs within the original sub-rack, so that they can be replaced into the correct position without changing the IDB. Refer to the drawings of switch settings in this section to make sure that replacement DXU/ECU backplane switches are set correctly.

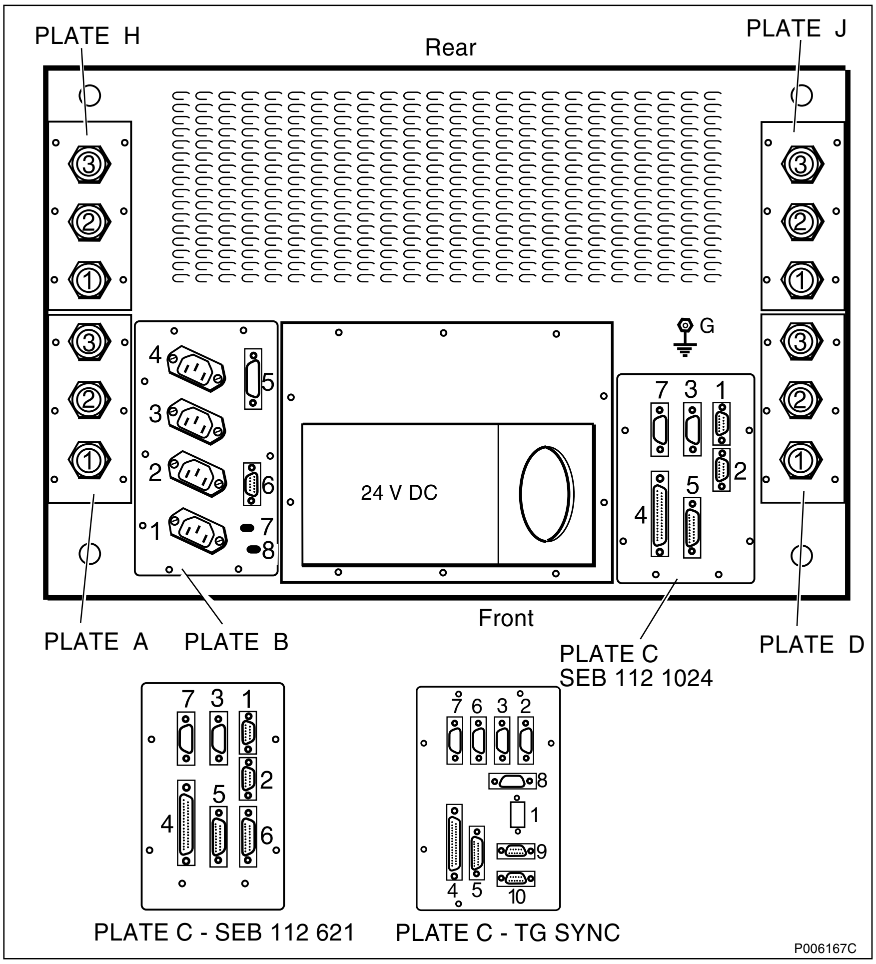


Figure 78 Connection field on top of the cabinet with the AC connections on plate B

Prior to replacement

1. Inform the OMC operator that the RBS will be removed from service temporarily.
2. Press the Local/remote button on the DXU. The yellow Local mode indicator will start flashing. Wait until it has a fixed yellow light. This indicates that the DXU is in local mode.
3. (If supplied) Isolate the cabinet from external battery or DC power at the connection field on top of the cabinet.
4. (If supplied) Isolate the cabinet from the AC mains power at the connection field located on plate B.

Replacement

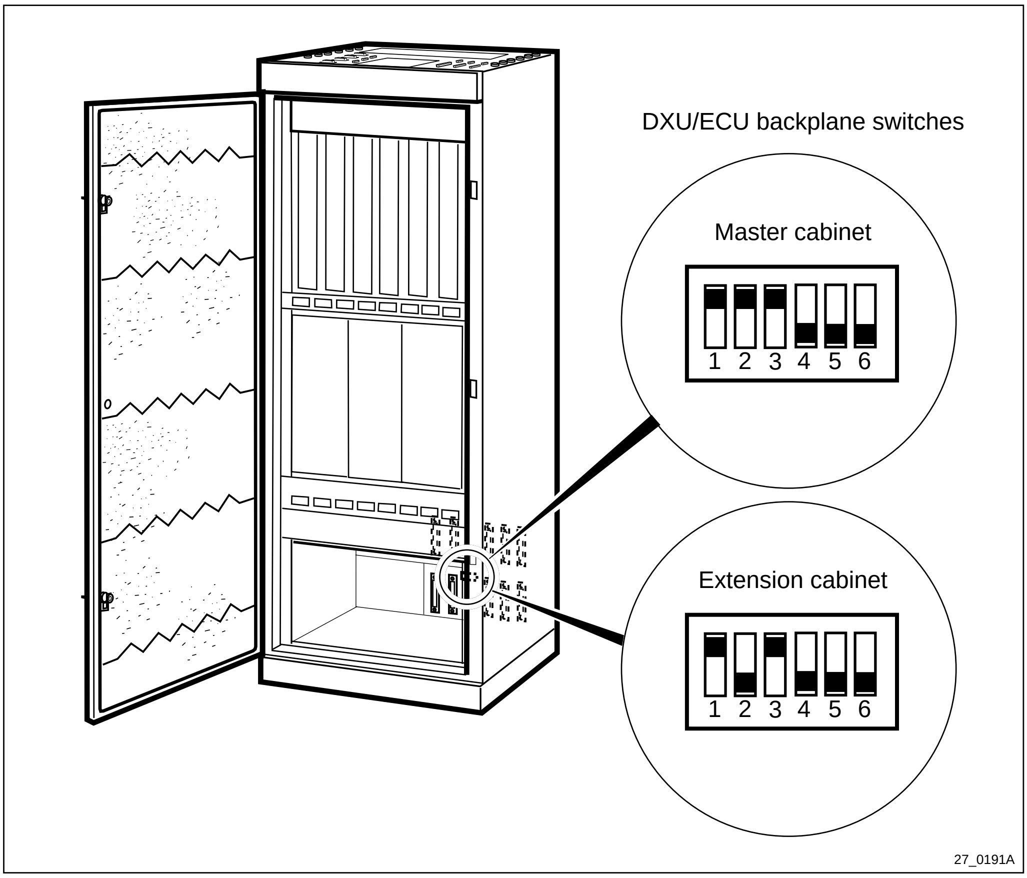


Figure 79 Location and settings of DXU/ECU backplane switches

1. Loosen the panel covering the fans above the PSU sub-rack.
2. Remove the fan clamps that keep the fans in place.
3. Remove the fans and disconnect their cables.
4. Take out the PSUs, the ECU and the DXU.
5. Disconnect all the cables to the DXU/ECU backplane.
6. Loosen the screws that hold the PSU sub-rack.
7. Pull out the PSU sub-rack.
8. Loosen the screws that attach the circuit board to the PSU sub-rack.
9. Put in a new circuit board.
10. Ensure that the switch settings for the replacement part are in accordance with the figure above.
11. Restore in reverse order.

Note: Unless under contractual warranty, after replacement, the DXU/ECU backplane shall be disposed of locally. Do not return the DXU/ECU backplane to Ericsson for replacement, repair or disposal.

Put into operation

1. Reconnect the cabinet to the external power source (either AC or DC).
2. (If supplied). Reconnect the external battery backup to the RBS.
3. Check that the Operational indicator on the DXU has a fixed green light and that the BS fault indicator is off.
4. Press the Local/remote button on the DXU. The Local mode indicator will start flashing.
5. Wait until the Local mode indicator on the DXU is off. This indicates that the DXU is in remote mode.

6.14 EACU

Prior to replacement of the overvoltage arrestors

The primary and secondary protectors are located in the EACU.

The EACU for RBS 2202 is located externally to the RBS. Refer to local documentation for the location of the EACU. The figure below shows how the EACU is connected to the RBS.

1. Find the location of the EACU.
2. Replace the primary and secondary protectors concerned.

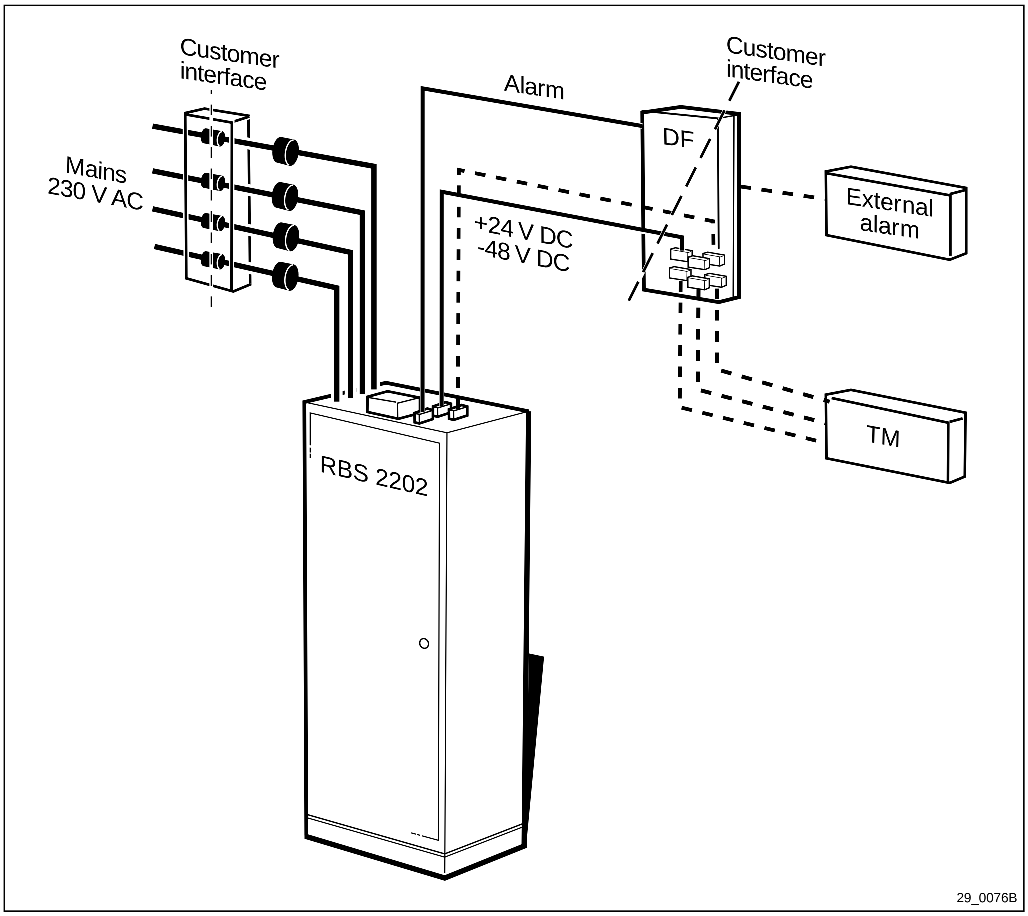


Figure 80 EACU

6.15 ECU

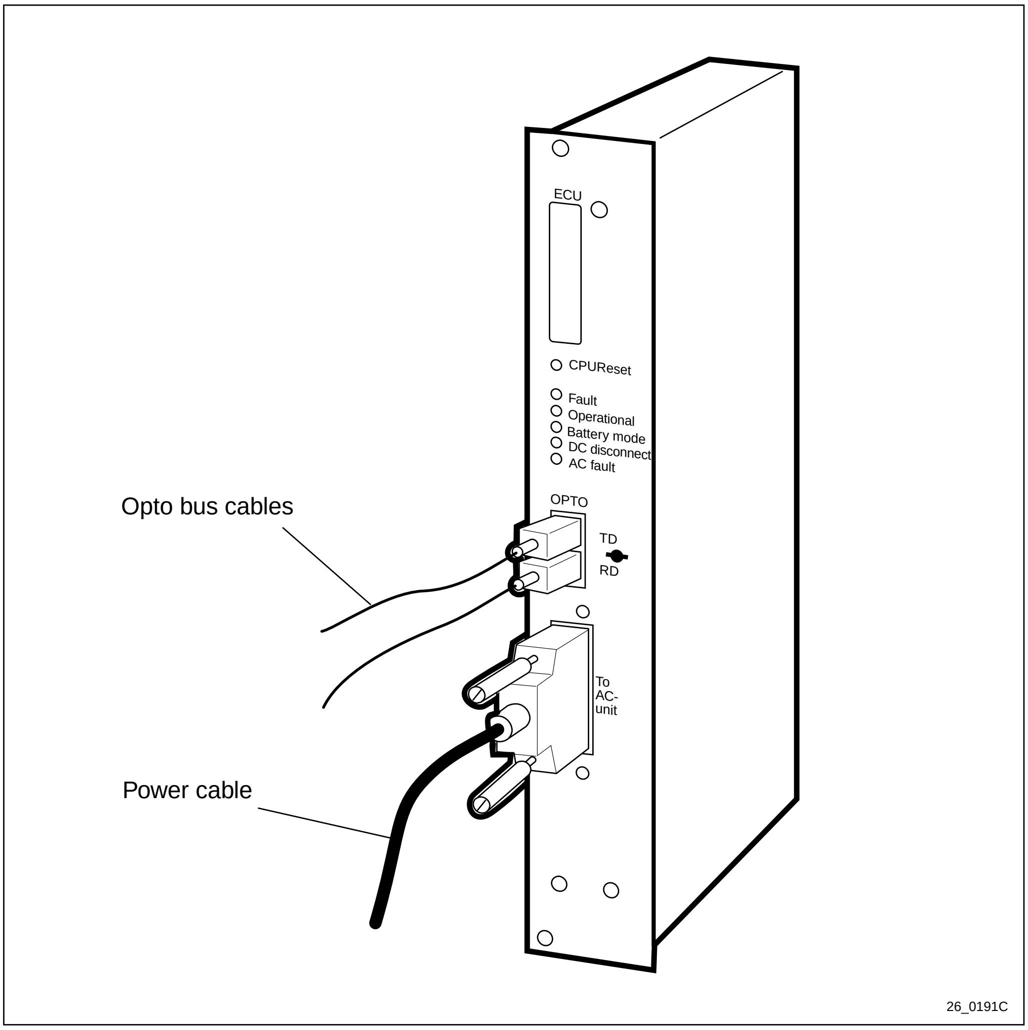


Figure 81 ECU

Note: The opto bus cables must have a bent radius of at least 35 mm.

1. Disconnect the cables connected to the ECU.
2. Replace the faulty ECU.
3. Press the button labelled CPU Reset for approximately 3 seconds. After approximately 30 seconds, the unit should function without alarm.
4. Reconnect the cables.

Note: After replacement, the ECU must be returned to Ericsson for repair. Maintenance personnel must attach a repair delivery note, LZF 084 64 (Blue Tag), to the ECU. The repair delivery note shall include a clear description of the fault found. Refer to the chapter "Concluding Routines"for instructions on completing a repair delivery note.

6.16 ESB Cable

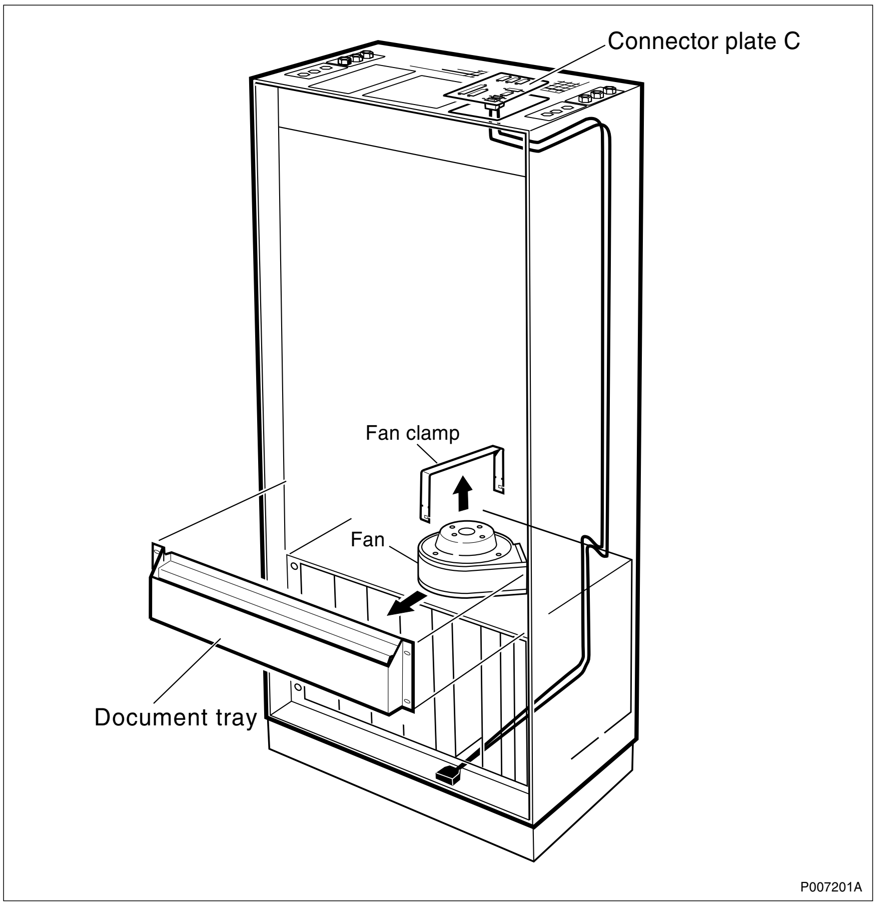


Figure 82 The ESB cable

Replacement

1. Remove the external ESB connectors on top of the connection field. Refer to the section "DXU/ECU Backplane" in the chapter "Cable Connections".

2. Loosen the screws from the connection field, lift it up, then remove the internal ESB connectors.

3. Use the faulty ESB cable as a draw cord to set the new cable in place.

   Cut off the connectors from the faulty ESB cable. Attach the new ESB cable to the old, using electrician′s tape or likewise. Be sure to secure the cables thoroughly and to cover the connector so that it will not get stuck in the cable duct.

4. Remove the DXU from the sub-rack.

5. Pull the faulty ESB cable gently from beneath of the DXU sub-rack until the new cable appears. Remove the faulty ESB cable.

   The document tray and the fans can be removed to make it easier to pull down the cables. See figure above.

6. Attach the ESB connectors to the connection field and fasten the screws to the connection field.

7. Place the DXU in the sub-rack and restore the cables.
8. Reconnect the external ESB cables to the connection field.

6.17 Fans

Note: It is important to replace only one fan at a time because changing the air flow can cause equipment to overheat. A defective fan operating at reduced speed may not be detectable to the naked eye.

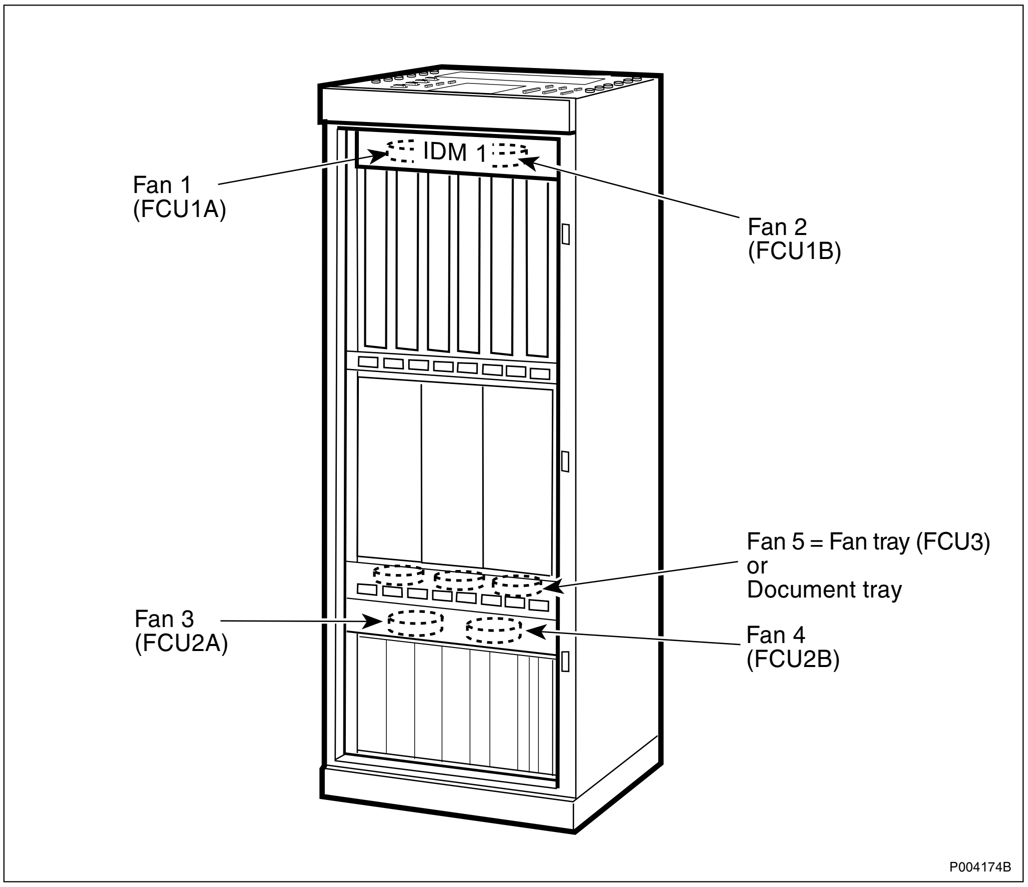


Figure 83 Cabinet fans, IDM version with fuses

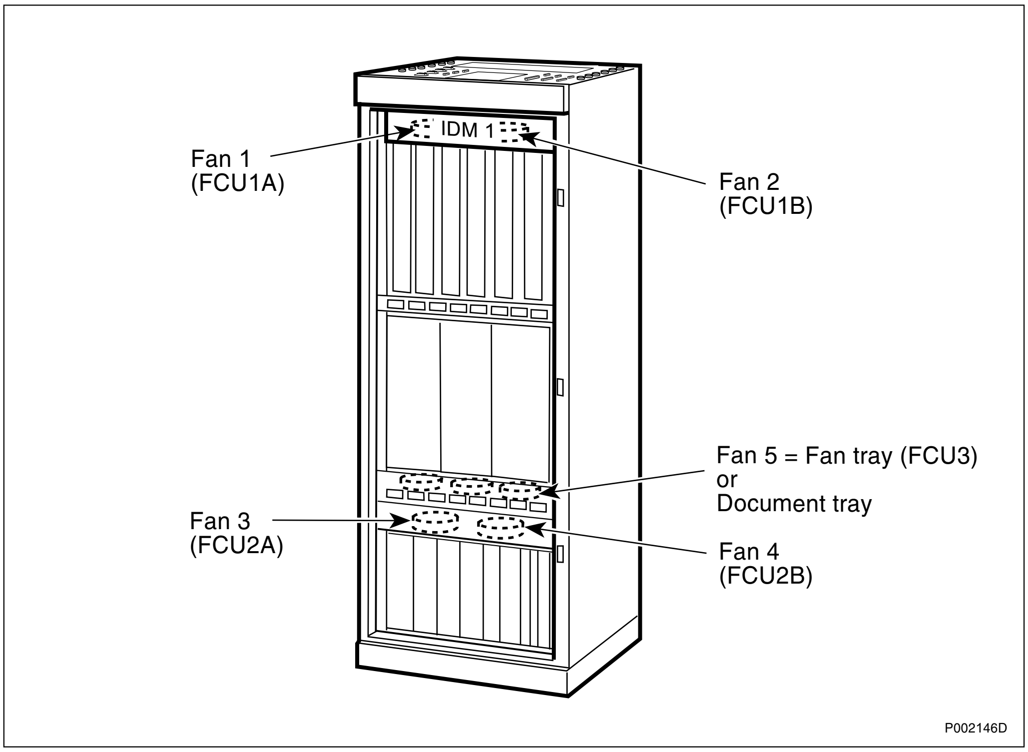


Figure 84 Cabinet fans, IDM version with circuit breakers

Fans 1 and 2

CAUTION

Short circuits can cause injury or damage. Although the battery voltage may be low, the released power can be extremely high.

Note: When the back of the IDM panel is exposed during the following procedure, the 24 V DC connection block is live. Remove all rings, watches and jewellery prior to proceeding.

1. Remove the fuse or release the circuit breaker, depending of the type, for FCU1A or FCU1B, as appropriate, from the IDM.
2. *IDM with fuses*

   Remove the three screws and lower the front plate of the IDM to provide access to FCU 1.

   IDM with circuit breakers

   Proceed to next step.
3. Loosen the four screws (two on each side) of the IDM that hold it in the cabinet.
4. Pull the IDM away from the cabinet to provide access to the fan.

5. Remove the three screws that hold the protective screen in place over the top of the IDM.

6. Unplug the fan from FCU 1.

7. Remove the fan clamp that holds the fan in place.

8. Remove the fan from the cabinet.

9. Replace in the reverse order of the above.

Note: Care must be taken when replacing the IDM to prevent damage to the main DC power cables to the right side, and the DC power distribution cables at the back of the IDM.

Note: Unless under contractual warranty, after replacement, the fan shall be disposed of locally. Do not return the fan to Ericsson for replacement, repair or disposal.

Fans 3 and 4

1. Remove the fuse for FCU2A or FCU2B, as appropriate, from the IDM.

2. Remove the four screws (2 on each side) which hold the panel in front of the fan to the cabinet.

3. Unplug the cable from the fan to the connector on the cable that goes behind the backplanes to FCU 2.

4. Remove the fan clamp that holds the fan in place.

5. Remove the fan from the cabinet.

6. Replacement is the reverse of the above.

Note: Unless under contractual warranty, after replacement, the fan shall be disposed of locally. Do not return the fan to Ericsson for replacement, repair or disposal.

Fan 5

Note: Fan 5 should not be replaced. If the fan is faulty, no action is needed. Leave the fan and the whole tray in the cabinet as removal alters airflow around hardware units which can cause overheating.

6.18 FCU

6.18.1 General

Note: The loss of air flow from the fans during replacement can quickly cause other RUs to overheat. Therefore do not stop the fans more than 1 minute when replacing the FCU.

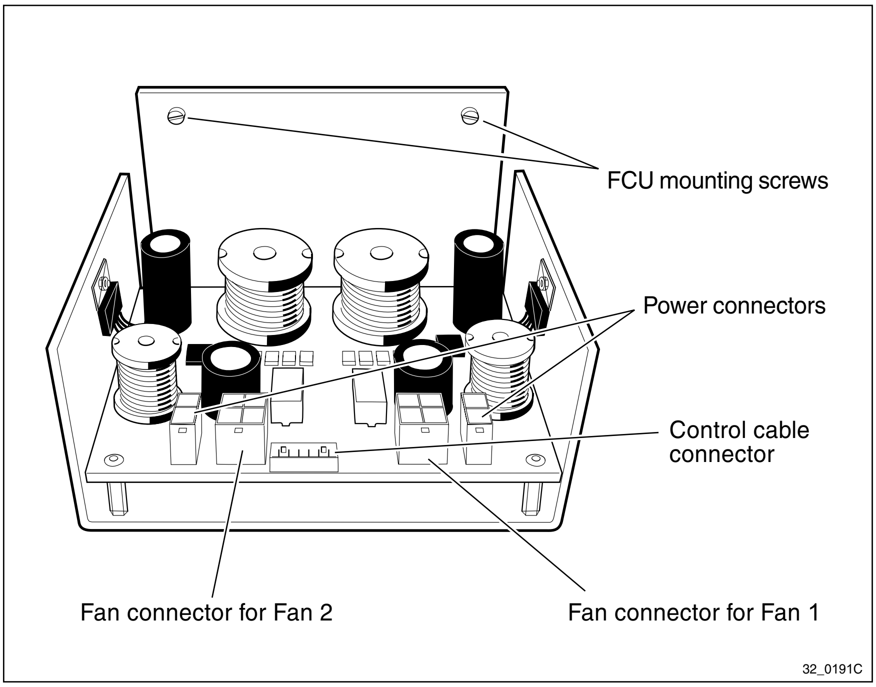


Figure 85 FCU

Note: During these procedures, DC power is still connected to the FCU. Therefore, the unit must be handled carefully.

6.18.2 Replacement

FCUs 1 and 2, IDM with fuses

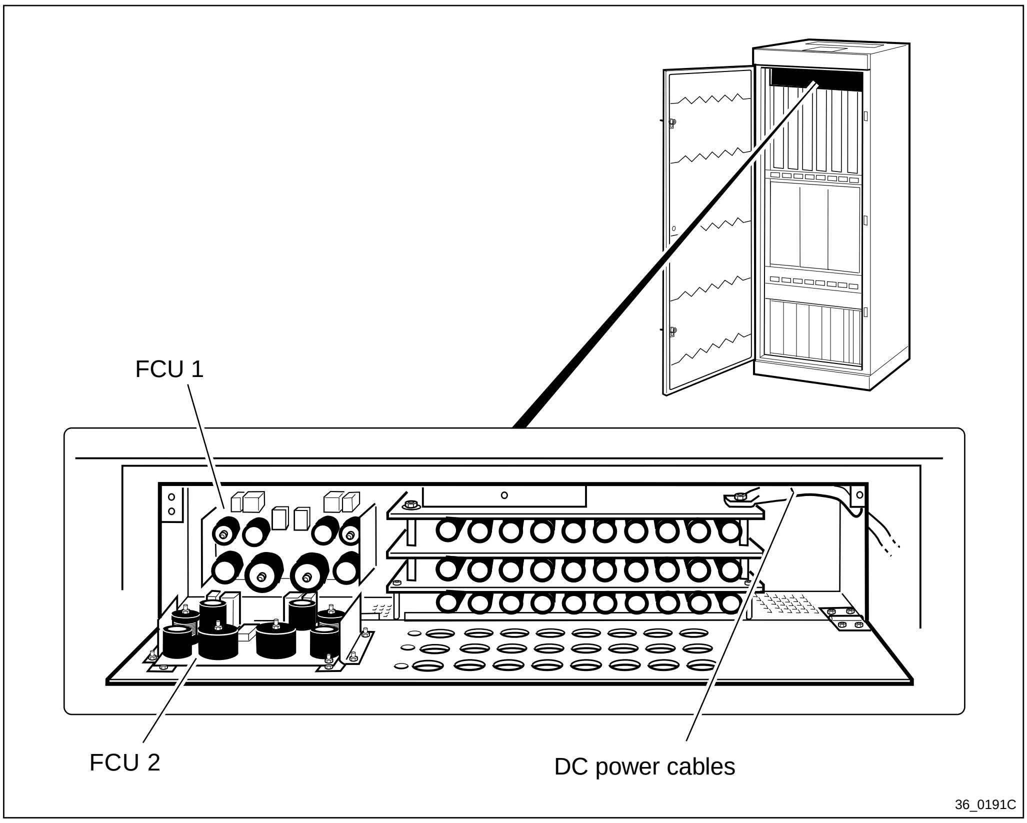


Figure 86 FCU 1 and FCU 2, IDM with fuses

CAUTION

⚠

Short circuits can cause injury or damage. Although the battery voltage may be low, the released power can be extremely high.

Note: When the IDM panel is lowered during the following procedure, the 24 V DC is live. Remove all rings, watches and jewellery prior to proceeding.

1. Lower the front panel of the IDM to access the FCUs.
2. Remove the four nuts holding the defective FCU in the IDM panel.
3. Install the replacement FCU on the IDM panel.
4. Disconnect the control cable connector from the defective unit and attach it to the replacement unit.

5. Move the power and fan connectors (for one fan at a time) from the defective FCU to the replacement FCU. This allows enough airflow so that the RBS will not overheat.

6. Replace the IDM panel.

Note: Unless under contractual warranty, after replacement, the FCU shall be disposed of locally. Do not return the FCU to Ericsson for replacement, repair or disposal.

FCUs 1 and 2, IDM with circuit breakers

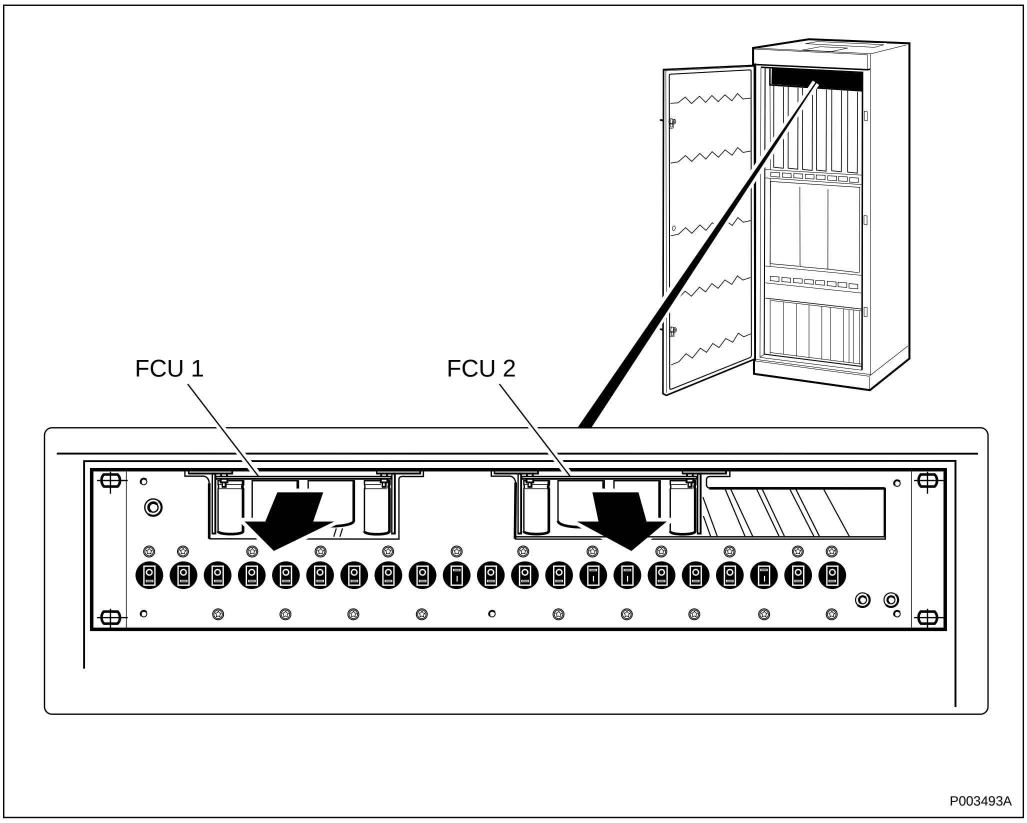


Figure 87 FCU 1 and FCU 2, IDM with circuit breakers

CAUTION

⚠

Short circuits can cause injury or damage. Although the battery voltage may be low, the released power can be extremely high.

Note: When the IDM panel is removed during the following procedure, the 24 V DC is live. Remove all rings, watches and jewellery prior to proceeding.

1. Remove the five screws holding the IDM panel in order to access the FCUs.

2. Pull out the defective FCU from the IDM.
3. Disconnect the control cable connector from the defective FCU and attach it to the replacement FCU.
4. Move the power and fan connectors (for one fan at a time) from the defective FCU to the replacement FCU. This allows enough airflow so that the RBS will not overheat.
5. Install the replacement FCU in the IDM.
6. Mount the IDM panel with the five screws.

Note: Unless under contractual warranty, after replacement, the FCU shall be disposed of locally. Do not return the FCU to Ericsson for replacement, repair or disposal.

FCU 3

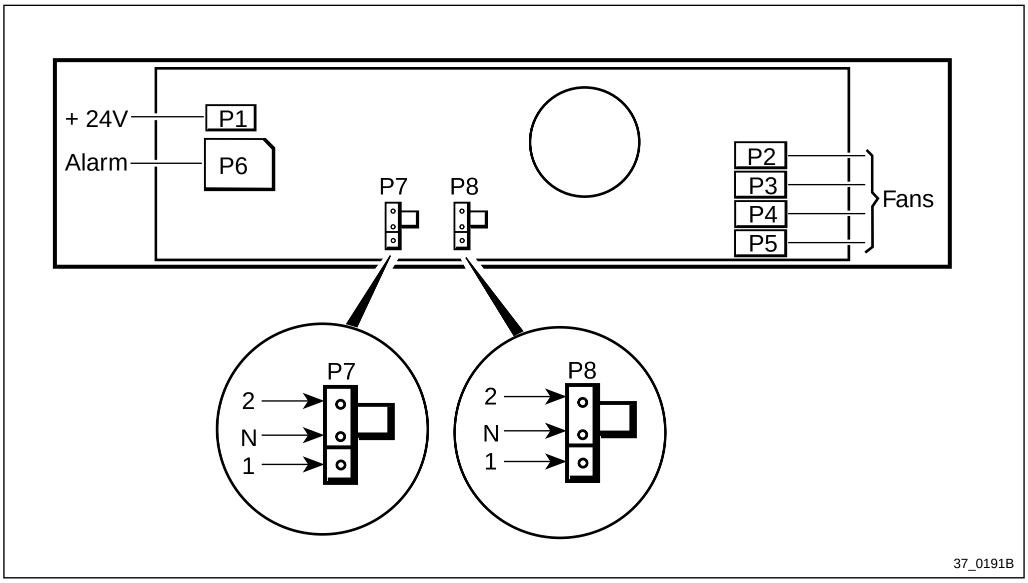


Figure 88 FCU 3, strapping connectors P7 and P8

1. Loosen the four screws, two on each side, which hold the fan tray in the cabinet.
2. Pull the fan tray out gently and unplug the power connector from P1.
3. Unplug the alarm cable that goes from P6 to the FIU card mounted next to the FCU.
4. Remove the two nuts holding the FCU to the fan tray.
5. Mount the replacement FCU to the fan tray.
6. Referring to the figure above, strap connector P7 between "2" and "N" and P8 between "N" and "1".
7. Move the fan cables from the defective FCU to the replacement FCU.
8. Replace the alarm and power connectors on the replacement FCU.

9. Return the fan tray to the cabinet and attach it with the four screws removed in step number 1.

Note: Unless under contractual warranty, after replacement, the FCU shall be disposed of locally. Do not return the FCU to Ericsson for replacement, repair or disposal.

6.19 HLIN and HLOUT Cables

This section is divided into the following sub-sections:

- "HL Cable between Two CDUs"
- "HL Cable between the CDU and the Connection Field"
- "CAB HLIN Cable, connects the Master Cabinet and the Extension Cabinet"

6.19.1 HL Cable between Two CDUs

Replacement

1. Remove carefully the faulty HL cable that is connected between the HL-out connector on the CDU (that was pinpointed by OMT) and its CDU twin.

Note: Unless under contractual warranty, after replacement, the HL cable shall be disposed of locally. Do not return the HL cable to Ericsson for replacement, repair or disposal.

2. Carefully connect the new HL cable between the two CDUs.
3. Tighten the cable connectors in both ends of the HL cable with a torque of 0.6 – 0.8 Nm

6.19.2 HL Cable between the CDU and the Connection Field

Replacement

1. Remove the faulty HL cable that is connected between the HL-out connector on the CDU (that was pinpointed by OMT) and the connection field.

Note: Unless under contractual warranty, after replacement, the HL cable shall be disposed of locally. Do not return the HL cable to Ericsson for replacement, repair or disposal.

2. Carefully connect the new HL cable between the CDU and the connection field.
3. Tighten the cable connector in the CDU end of the HL cable with a torque of 0.6 – 0.8 Nm.

6.19.3 CAB HLIN cable

Replacement

1. Remove the faulty HL cable that is connected between the master and extension cabinets.

Note: Unless under contractual warranty, after replacement, the HL cable shall be disposed of locally. Do not return the HL cable to Ericsson for replacement, repair or disposal.

2. Connect the new HL cable between the connection fields of the master and extension cabinets.

6.20 IDM

The only replacement part within the IDM is the FCU.

- For replacement of the FCU, refer to the section "FCU" of this chapter.
- There are two different versions of the IDM. One with fuses and one with circuit breakers. Choose the appropriate instructions below for replacement of the IDM.

6.20.1 Prior to replacement

1. Inform the OMC operator that the RBS will be removed from service temporarily.
2. Press the Local/remote button on the DXU. The yellow Local mode indicator will start flashing. Wait until it has a fixed yellow light. This indicates that the DXU is in local mode.
3. (If supplied) Isolate the cabinet from external battery or DC power at the connection field on top of the cabinet.
4. Isolate the cabinet from AC mains at the connection field on top of the cabinet.
5. Proceed with one of two following sub-sections:

   • Section 6.20.2 Replacement of IDM with fuses on page 180

   • Section 6.20.3 Replacement of IDM with circuit breakers on page 182

6.20.2 Replacement of IDM with fuses

Note: Instructions in the Section 6.20.1 Prior to replacement on page 180 must be carried out before replacement.

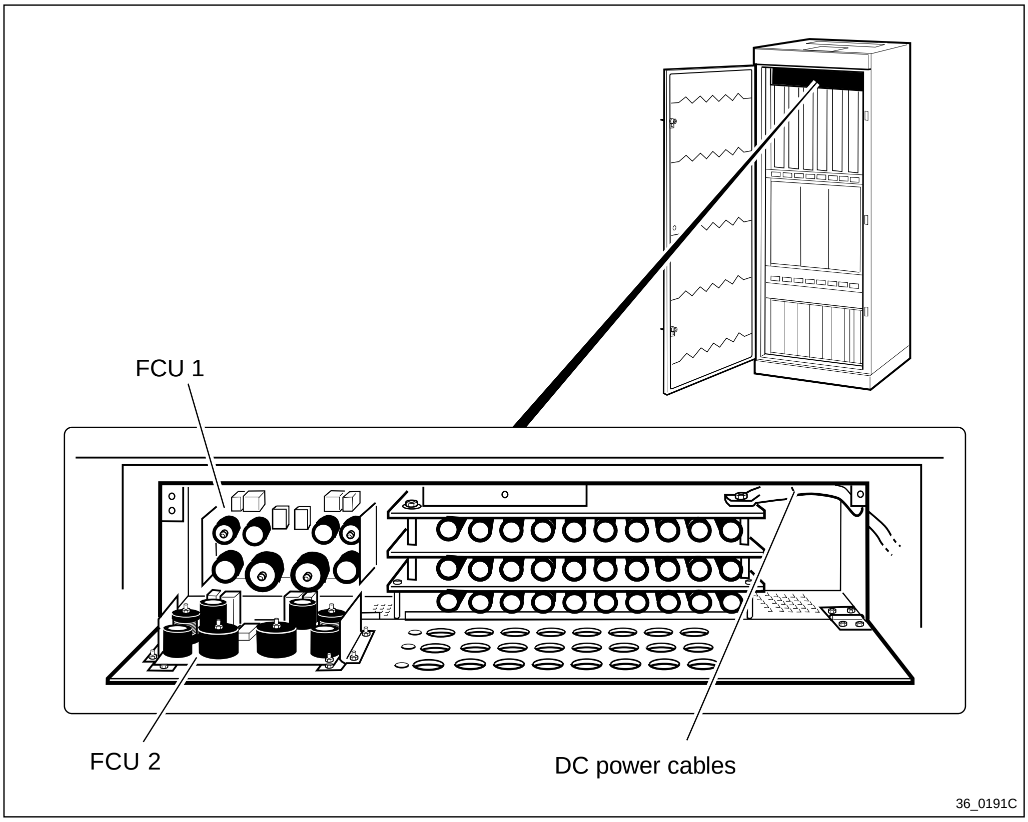


Figure 89 IDM with fuses

Note: Care must be taken when replacing the IDM to prevent damage to the main DC power cables to the right side and the DC power distribution cables at the back of the IDM.

1. Remove the three screws from the IDM panel and lower it.
2. Disconnect the connectors from both FCUs.
3. Disconnect the DC power cables.
4. Remove the four screws holding the IDM and lift it out of the cabinet.
5. Disconnect all external wires to the back of the IDM and connect them to the replacement IDM. Refer to the section "IDM" in the chapter "Cable Connections" for information on the wiring connections.
6. Mount the replacement IDM in the cabinet and fasten it with the four screws.
7. Connect the DC power cables to the replacement IDM and tighten them to 5 Nm.
8. Connect all connectors to both FCUs. Refer to the section "IDM" in the chapter "Cable Connections".
9. Fasten the IDM panel with the three screws.
10. Proceed with the sub-section Section 6.20.4 Take into operation on page 183.

Note: Unless under contractual warranty, after replacement, the IDM shall be disposed of locally. Do not return the IDM to Ericsson for replacement, repair or disposal.

6.20.3 Replacement of IDM with circuit breakers

Note: Instructions in the Section 6.20.1 Prior to replacement on page 180 must be carried out before replacement.

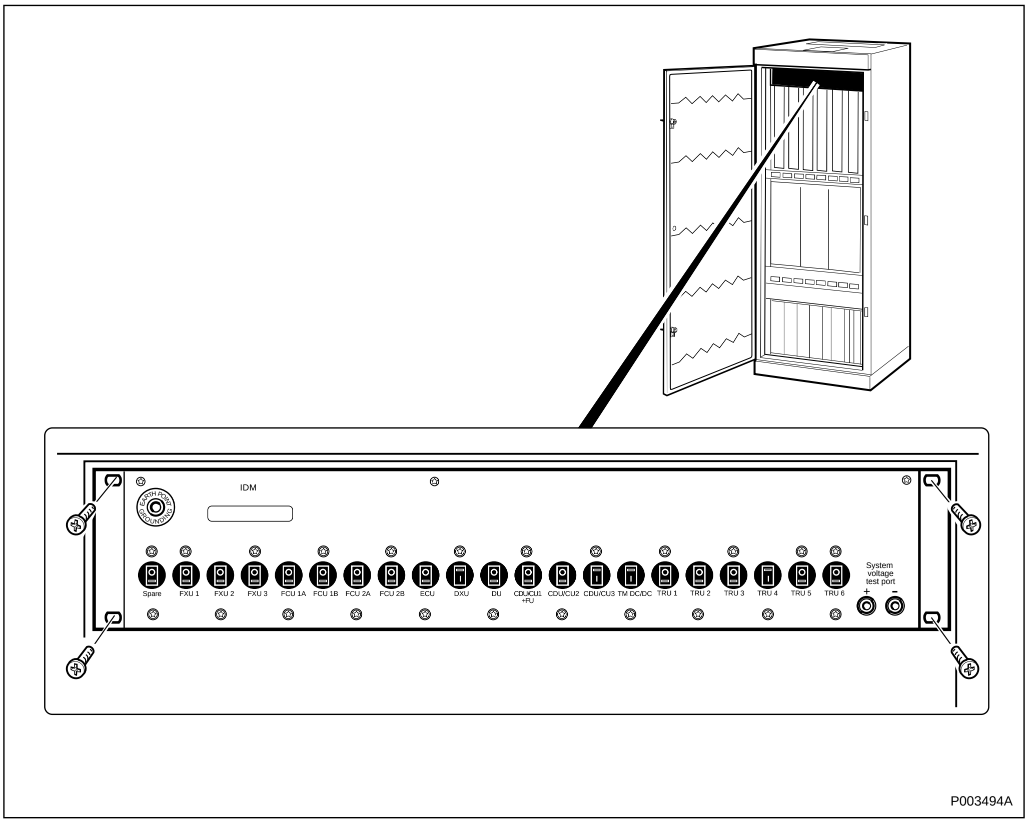


Figure 90 IDM with circuit breakers

Note: Care must be taken when replacing the IDM to prevent damage to the main DC power cables to the right side and the DC power distribution cables at the back of the IDM.

1. Remove the four screws holding the IDM and lift it out of the cabinet.
2. Disconnect all external wires from the back of the IDM.
3. Disconnect the DC power cables.
4. Connect the DC power cables to the replacement IDM and tighten them to 5 Nm.
5. Connect all external wires to the replacement IDM. Refer to the section "IDM" in the chapter "Cable Connections"for information on the wiring connections.
6. Mount the replacement IDM in the cabinet and fasten it with the four screws.

7. Proceed with the sub-section Section 6.20.4 Take into operation on page 183.

Note: Unless under contractual warranty, after replacement, the IDM shall be disposed of locally. Do not return the IDM to Ericsson for replacement, repair or disposal.

6.20.4 Take into operation

Note: The opto bus cables must have a bent radius of at least 35 mm.

1. (If supplied). Connect the external DC power, or battery backup, at the connection field on top of the cabinet.
2. Connect the AC mains to the connection field on top of the cabinet.
3. Press the Local/remote button on the DXU. The Local mode indicator will start flashing.
4. Wait until the Local mode indicator on the DXU is off. This indicates that the DXU is in remote mode.

6.21 OVP Box

Note: The OVP box is mounted outside the RBS cabinet, for example on the wall behind.

Note: There are two different versions of the OVP box:

• OVP-11 is used for PCM connection as well as TG synch connection. It has one printed circuit board for the PCM cables and one for the ESB cables (for the TG synch connection).The PCM board holds two sub-boards with protection modules, the ESB board holds three sub-boards with protection modules.

• OVP is used for PCM connections only. It has two printed circuit boards, each holding two sub-boards with protection modules.

This procedure describes the replacement of the sub-boards with protection modules only.

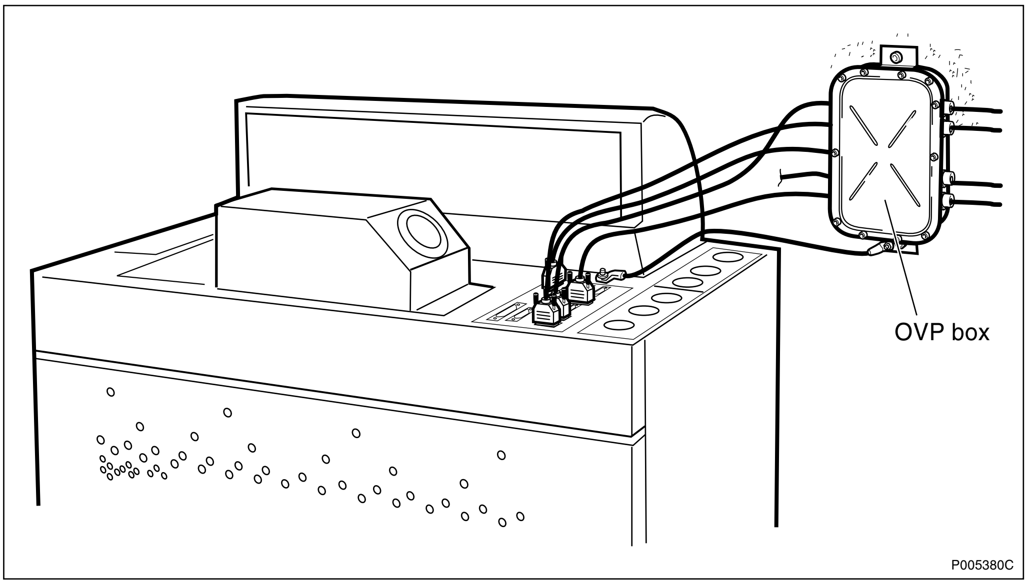


Figure 91 OVP box connected to RBS 2202

Replacement of protection modules

1. Open the lid of the OVP box by removing the nine screws on top of the box.
2. Inspect the OVP box for possible damages. Look for burns in printed circuit boards and cables. If any damages are found, it is recommended that the complete OVP box is exchanged. If there are damages on cables, these must be exchanged too.
3. If there are no visible damages, proceed to the next step.
4. Locate the correct connection for the actual RBS inside the OVP box.
5. Disconnect the sub-boards with protection modules and replace them with new sub-boards. Ensure to get the right version of OVP. See the following figure.

   • On top of the OVP-11, there is a product number starting with NTM 503.

   • On top of the OVP, there is a product number starting with NTM 201.

Note: New sub-boards can be taken from the spare part "Overvoltage arrester board" of the OVP box.

It is **not** recommended to change the overvoltage arrester board since this is more complicated and time consuming.

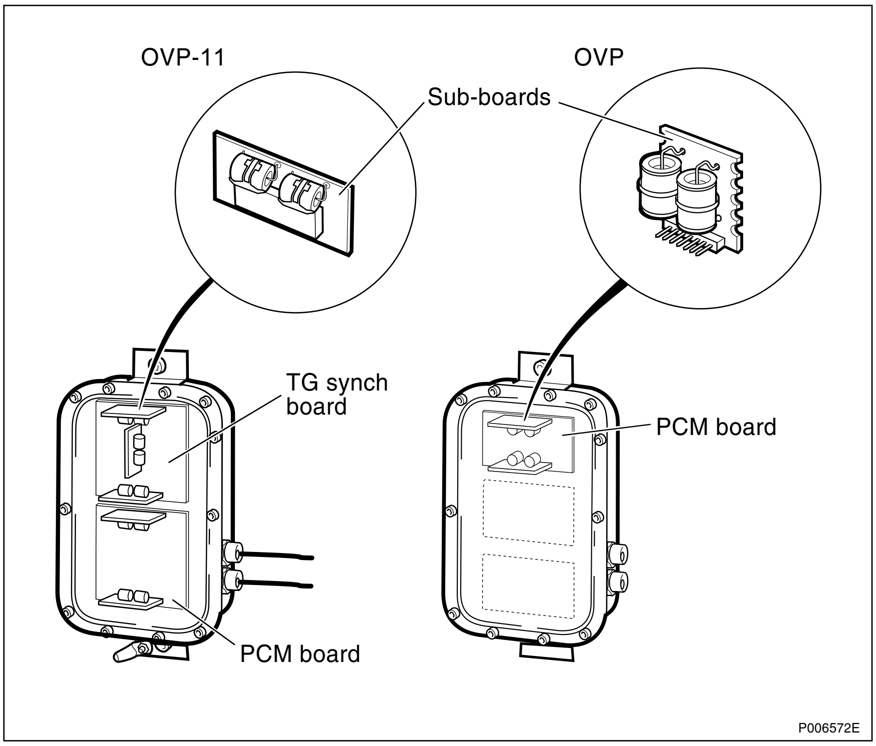


Figure 92 OVP box — sub-boards with protection modules.

6. Put back the lid of the OVP box and replace all nine screws.

Note: Unless under contractual warranty, after replacement, the OVP box, the "Overvoltage arrester board"or the sub-boards with protection modules shall be disposed of locally. Do not return any of these items to Ericsson for replacement, repair or disposal.

6.22 PSU

Note: The opto bus cables for the power communication loop must have a bend radius of at least 35 mm.

Note: If the cabinet, from which the PSU is being removed, has either internal or external battery backup, the DC cable will be live when disconnecting it from the PSU.

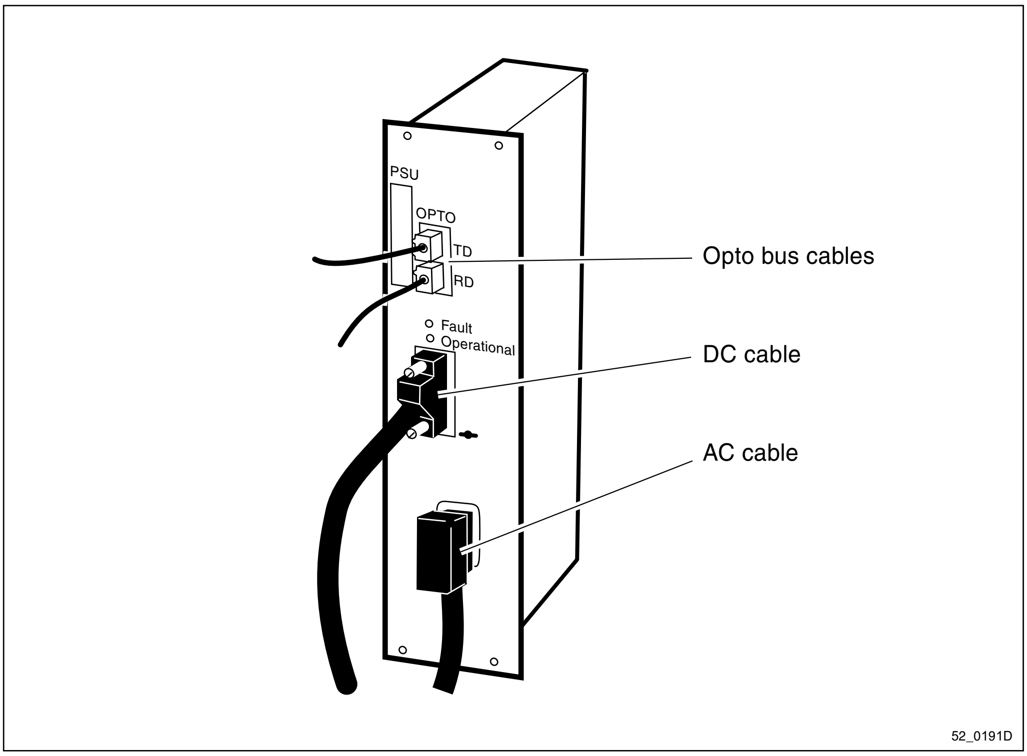


Figure 93 PSU

Note: If the PSU is faulty, but no replacement unit is available, leave the faulty PSU in the cabinet (do not remove it) and replace it when the new PSU arrives.

If there are sever damages, like burns, on the PSU, remove the faulty PSU and replace it with a dummy PSU.

Empty RU positions can affect the required cooling airflow to units in operation and cause overheating.

Replacement

1. Disconnect the opto bus cables.
2. Disconnect the AC cable.
3. Disconnect the DC cable.
4. Replace the faulty PSU.
5. Connect the AC cable.
6. Connect the DC cable and the opto bus cables.
7. Reset the ECU by pressing the button labelled CPU Reset on the ECU for approximately 3 seconds. After approximately 30 seconds, the system should function without alarm, and the Fault indicator on the ECU should go out.

Note: After replacement, the PSU must be returned to Ericsson for repair. Maintenance personnel must attach a repair delivery note, LZF 084 64 (Blue Tag), to the PSU. The repair delivery note shall include a clear description of the fault found. Refer to the chapter "Concluding Routines"for instructions on completing a repair delivery note.

6.23 PSU DC Cable

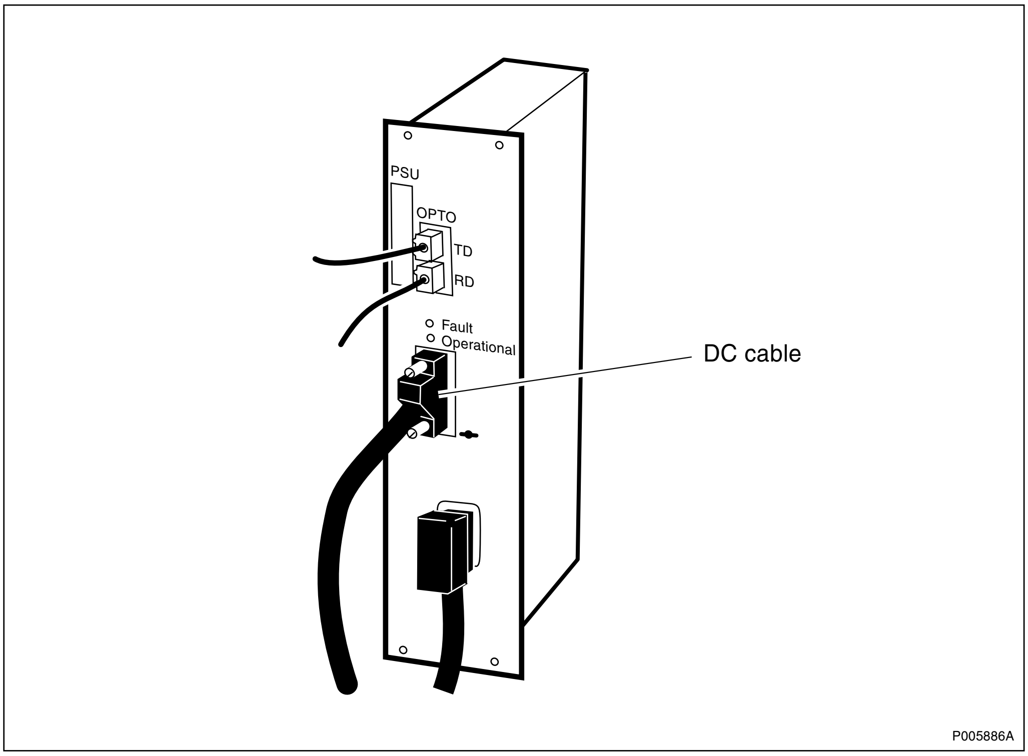


Figure 94 PSU DC cable

Prior to replacement

Note: The opto bus cables must have a bent radius of at least 35 mm.

1. Inform the OMC operator that the RBS will be removed from service temporarily.
2. Press the Local/remote button on the DXU. The yellow Local mode indicator will start flashing. Wait until it has a fixed yellow light. This indicates that the DXU is in local mode.
3. Switch off the mains power to the cabinet.
4. Disconnect the opto bus cables connected to the BFU(s).
5. (If supplied) Switch off the external battery power.

Replacement

The PSU DC cable is connected to the bus bar to the right of the DXU sub-rack.

1. Remove the DXU sub-rack.
2. Remove the faulty PSU DC cable.
3. Replacement is the reverse of above.

4. Restart the RBS.

6.24 RBS DB

Use the OMT to install a new IDB. For further information on the use of OMT, see:

OMT User's Manual	*LZN 302 01*

6.25 RX Antenna Feeder

Note: When changing antenna feeders, refer also to the chapter "Cable Connections".

Prior to replacement

CAUTION

Radio frequency (RF) radiation from antenna systems can endanger your health.

Note: To prevent exposure to RF radiation and damage to TRU(s), check before taking any further actions, that the TRU(s) that are connected to the CDU with the faulty RX antenna feeder have Local mode indicators with a fixed yellow light.

These instructions are valid when a CDU-C or a CDU-C+ is used only:

1. Press the Local/remote button on all TRU(s) that are transmitting on the faulty RX cable. The Local mode indicators will start flashing.
2. Wait until the Local mode indicators have fixed yellow lights. This indicates that the TRUs are in local mode.

Replacement

Note: After replacement it will take at least 100 minutes for the system to cease the alarm.

1. Remove the tie-wrap cable fasteners fixing the antenna feeders to the sides of the cabinet.
2. Unscrew the torx screws securing plate A or plate D on the top of the cabinet.
3. Remove the faulty antenna feeder that connects the CDU to the Connection plate by unscrewing it carefully at both ends.
4. Attach the new cable to the CDU with a torque of 8 Nm ±1 Nm and to the connection plate with a torque of 15 Nm ±1 Nm.

5. Refit the plate to the top of the cabinet and secure it with the torx screws.
6. Fix all antenna feeders to the sides of the cabinet using new tie-wraps.

Note: Unless under contractual warranty, after replacement, the antenna feeder shall be disposed of locally. Do not return the antenna feeder to Ericsson for replacement, repair or disposal.

Put into operation (only if CDU-C or CDU-C+ is used)

Note: If base band hopping or mixed hopping was used, the hopping sequence can only be re-initiated by the BSC or MSC. After placing the TRU(s) in remote mode, contact the BSC or MSC and request they take the required actions.

1. Press the "Local/remote" button on the concerned TRU(s). The "Local mode" indicator will start flashing.
2. Block the following MOs from the BSC in the given order: RX, TS, TX, TRX.

   Use the MML command RXBLI.
3. Deblock the following MOs from the BSC in the given order: TRX, TX, TS, RX.

   Use the MML command RXBLE.
4. Wait until the "Local mode" indicators turn off. This indicates that the TRU(s) are in remote mode.

6.26 Temperature Sensors

There are two temperature sensors for internal temperature mesurement. The sub-sections below describe their positions and the replacement procedure.

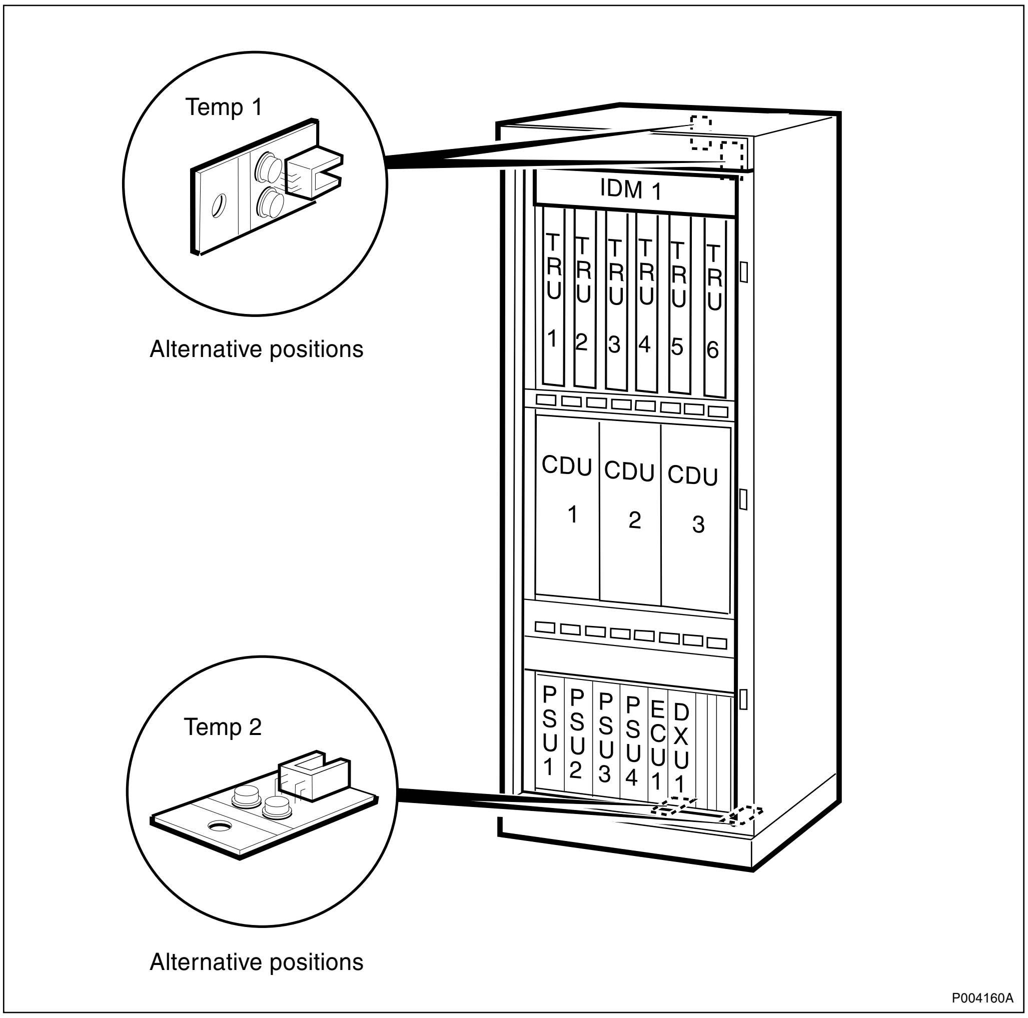


Figure 95 Temperature sensors

Replacing Temperature Sensor 1

CAUTION

⚠

Short circuits can cause injury or damage. Although the battery voltage may be low, the released power can be extremely high.

Temperature sensor 1 has two alternative locations:

1. It can be placed behind the IDM panel, between the fans, and can be reached from the roof of the cabinet.

   • Loosen the four screws holding the plate with the temperature sensor to the cabinet roof and lift it up.

   • Disconnect the cable to the temperature sensor.

   • Replacement is the reverse of the above.

2. It can also be placed to the right of the IDM, on the inner wall of the cabinet.

Note: Remove the IDM according to the section "IDM" in the chapter "RBS Field Repair" if it is difficult to reach the temperature sensor otherwise.

- Disconnect the cable attached to the faulty temperature sensor.
- Loosen the screw holdning the temperature sensor to the cabinet and remove the defective part.
- Replacement is the reverse of the above.

Note: Unless under contractual warranty, after replacement, the temperature sensor shall be disposed of locally. Do not return the temperature sensor to Ericsson for replacement, repair or disposal.

Replacing Temperature Sensor 2

There are two alternative positions for the temperature sensor 2. It is placed either under the ECU and the DXU or to the right of the DXU, on the inner wall of the cabinet.

1. Disconnect the cable to the temperature sensor.
2. Remove the screw holding the temperature sensor to the cabinet and remove the defective part.
3. Replacement is the reverse of the above.

Note: Unless under contractual warranty, after replacement, the temperature sensor shall be disposed of locally. Do not return the temperature sensor to Ericsson for replacement, repair or disposal.

6.27 TRU

Note: TRUs will successively be marked on the front with a coloured label showing frequency and encryption. To simplify identification, different frequencies have different colours. Be sure to have the appropriate TRU.

Further information about colour coding versus frequency and encryption can be found in the *Spare Parts Catalogue, Appendix B.*

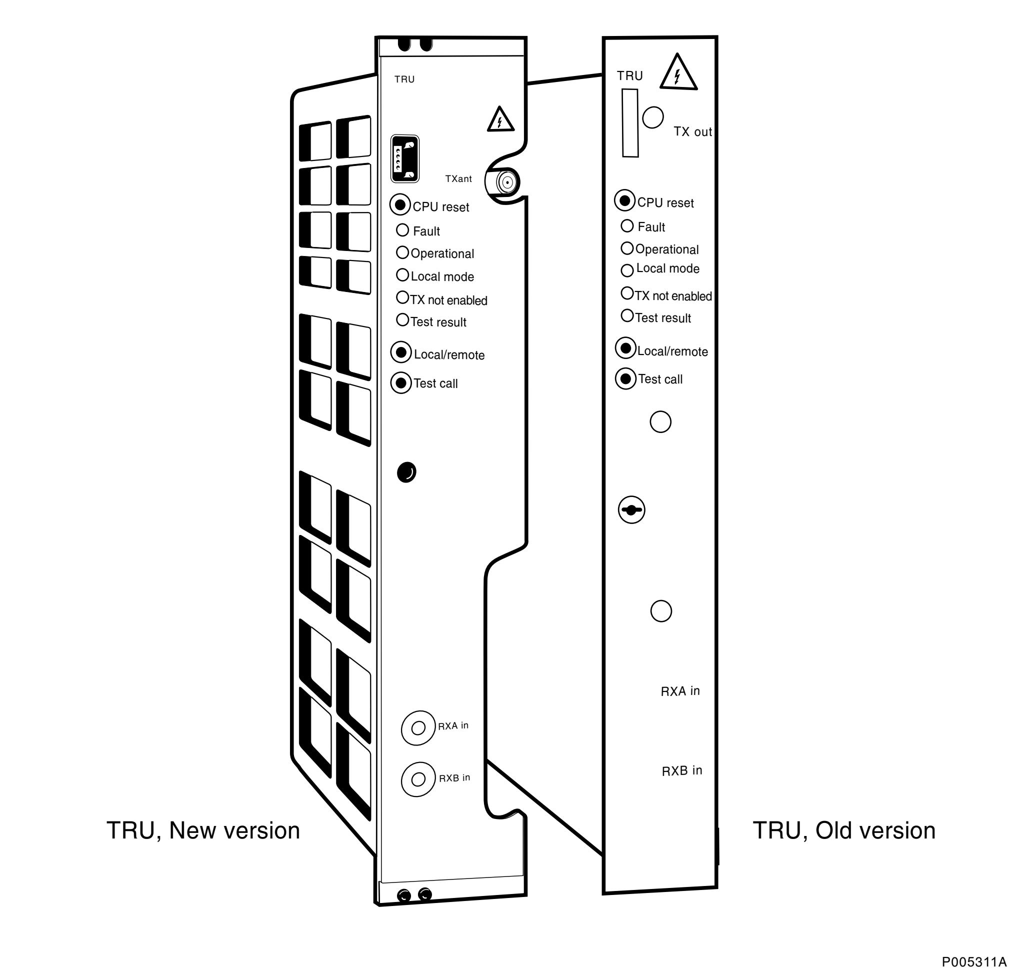


Figure 96 TRU, new version and old version

Note: If the TRU is faulty, but no replacement unit is available, leave the faulty TRU in the cabinet (do not remove it) and replace it when the new TRU arrives.

If there are sever damages, like burns, on the TRU, remove the faulty TRU and replace it with a dummy TRU.

Empty RU positions can affect the required cooling airflow to units in operation and cause overheating.

Replacement

1. Press the Local/remote button on the TRU. The Local mode indicator will start flashing.
2. Wait until the Local mode indicator has a fixed yellow light. This indicates that the TRU is in local mode.
3. Switch off the applicable TRU circuit breakers (or remove the fuse) on the IDM.
4. Remove all cables connected to the TRU.
5. Replace the TRU.

Make sure that the coaxial pins in the connector on the replacement TRU are centered in order not to damage the backplane. See figure below. If the coaxial pins are OK and the TRU slides easily into the sub-rack, proceed with step 6 otherwise proceed with step 5.

6. Some TRUs do not fit in the sub-rack. The main cause for this problem is that the coaxial pins in the TRU connector are not centered.

   a) Make sure that the coaxial pins in the backplane are not damaged.

   b) Use the centring tool, part no. SXK 107 2300/1, to gently align the TRU coaxial pins. See figure below.

   c) With care, try to fit the TRU into the sub-rack. The TRU should slide in to its position without need of extreme force.

Note: If the TRU can not be installed do not apply extra force since this will destroy the coaxial pins in the backplane.

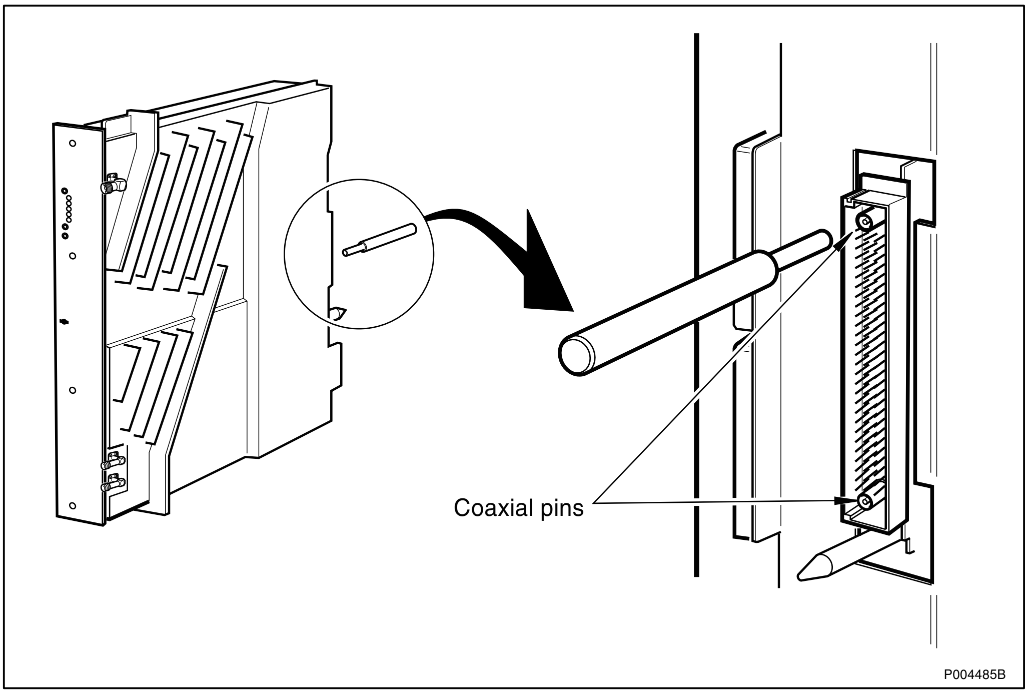


Figure 97 Aligning the TRU coaxial pins

7. Reconnect the disconnected cables.

8. Switch on the TRU circuit breakers (or replace the fuse) on the IDM.

9. Wait until the Operational indicator has a fixed green light. If the new TRU contains an old software version the DXU will automatically download the correct version. The software-download procedure is indicated by a flashing Operational indicator and may take some time (up to 10 minutes).

Note: After replacement, the TRU must be returned to Ericsson for repair. Maintenance personnel must attach a repair delivery note, LZF 084 64 (Blue Tag), to the TRU. The repair delivery note shall include a clear description of the fault found. Refer to the chapter "Concluding Routines"for instructions on completing a repair delivery note.

Attach the repair delivery note with a string to the antenna plug on the TRU. Tape should not be used.

Put into operation

Note: If base band hopping is used, the hopping sequence can only be re-initiated by the BSC/MSC. After placing the TRU(s) in remote mode, contact them and request they take the required actions.

1. Press the Local/remote button on the new TRU. The Local mode indicator will start flashing.
2. Wait until the Local mode indicator is off. This indicates that the new TRU is in remote mode.

6.28 TRU Sub-Rack

Note: When changing the TRU sub-rack, refer to the chapter "Cable Connections". Note the position of RUs within the original TRU sub-rack, so that they can be replaced into the correct position without changing the IDB. Refer to the drawings of switch settings in this section to make sure that the backplane switches in the replacement TRU sub-rack are set correctly.

Note: It is always recommended to change the complete TRU sub-rack and not only the TRU backplane. This is due to problems to adjust the backplane correctly within the sub-rack. An incorrectly fitted backplane can cause damages both to the TRUs and to the backplane itself.

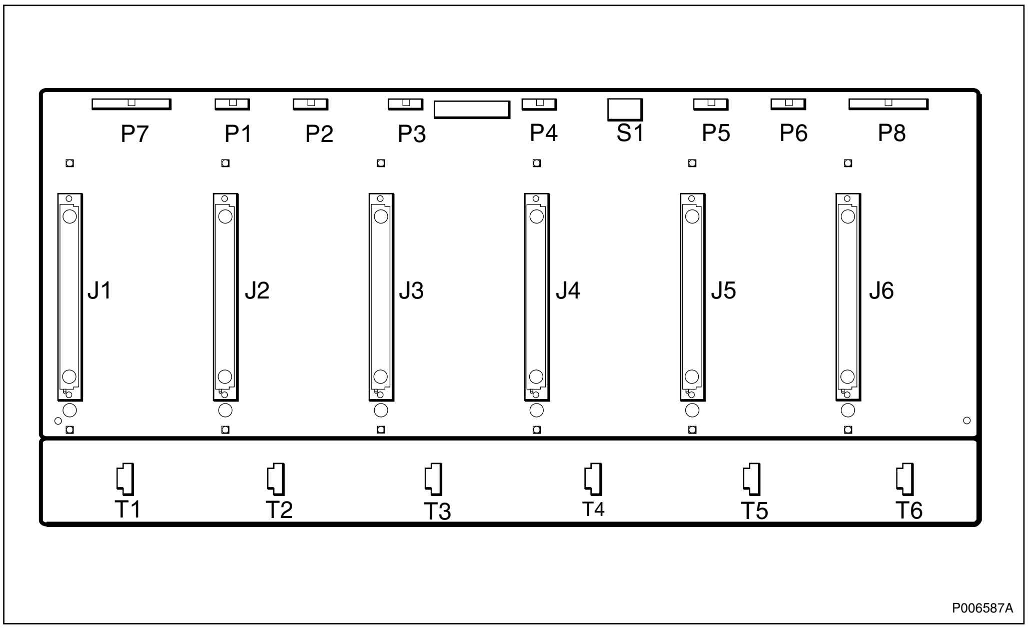


Figure 98 TRU backplane

Prior to replacement

Note: If supplied, the opto bus cables must have a bent radius of at least 35 mm.

1. Inform the OMC operator that the RBS will be removed from service temporarily.
2. Press the Local/remote button on the DXU. The yellow Local mode indicator will start flashing. Wait until it has a fixed yellow light. This indicates that the DXU is in local mode.
3. (If supplied) Isolate the cabinet from external battery or DC power at the connection field on top of the cabinet.
4. (If supplied) Isolate the cabinet from the AC mains power at the connection field located on plate B.

Replacement

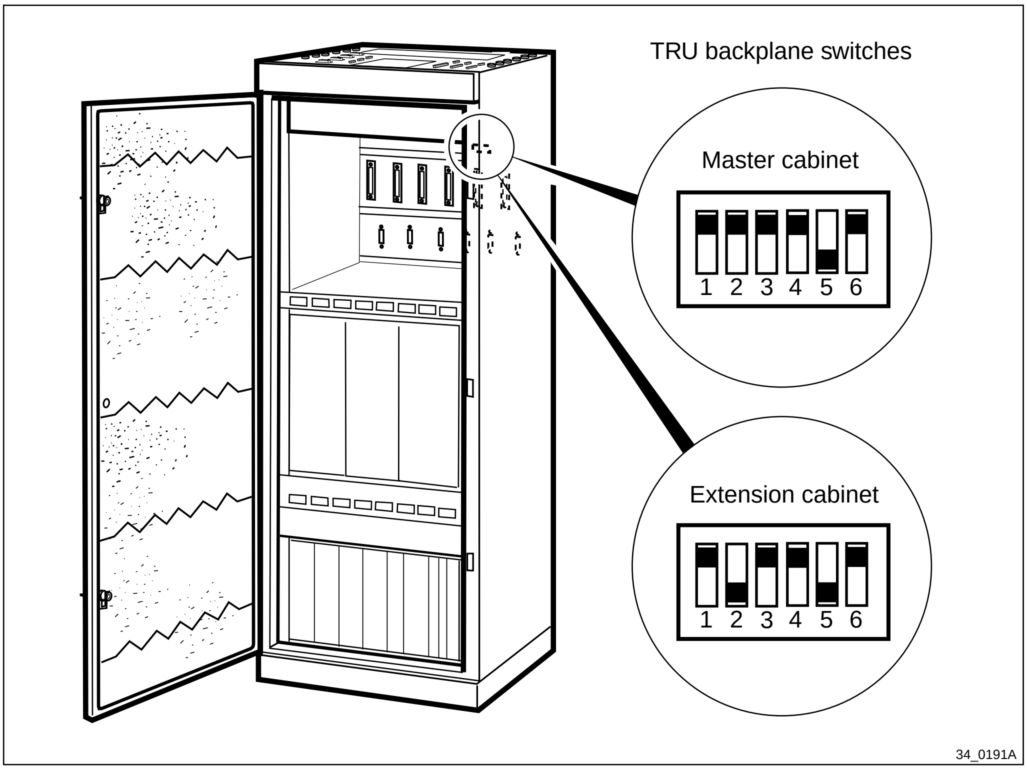


Figure 99 Setting of backplane switches in the TRU sub-rack

1. Loosen the four screws (two on each side) which hold the IDM panel above the TRU sub-rack to the cabinet.
2. Gently pull the IDM away from the cabinet to access the fans.
3. Remove the fan clamps that keep the fans in place.
4. Remove the fans.
5. Disconnect all the cables that go from the TRU backplane up to the IDM. The connectors are located on the back of the IDM on the right-hand side.
6. Put the IDM back temporarily.
7. Disconnect the cables to the CDUs and remove the CDUs.
8. Loosen the screws that hold the CDU sub-rack and take it out.
9. Remove the TRUs.
10. Loosen the screws that hold the TRU sub-rack.
11. Disconnect all the local bus cables that are connected to the top of the TRU backplane.
12. Cut the six tie wraps binding the three RF cable groups which run in the back of the cabinet, from TRU sub-rack to the CDUs.
13. Pull out the TRU sub-rack. The cables to the CDUs and the IDM will come out with the TRU sub-rack since they are integrated with the connectors on the rear of the TRU backplane.

14. Put in a new TRU sub-rack.
15. Ensure that the switch settings for the replacement part are in accordance with the figure above.
16. Reset in reverse order. New tie wraps must be installed when a new sub-rack is installed. Refer to the section "IDM" in the chapter "Cable Connections" for information on the wiring connections.

Note: Unless under contractual warranty, after replacement, the TRU sub-rack shall be disposed of locally. Do not return the TRU sub-rack to Ericsson for replacement, repair or disposal.

Put into operation

1. Reconnect the cabinet to the external power source (either AC or DC).
2. (If supplied). Connect the battery backup to the RBS.
3. Check that the Operational indicator on the DXU has a fixed green light and that the BS fault indicator is off.
4. Press the Local/remote button on the DXU. The Local mode indicator will start flashing.
5. Wait until the Local mode indicator on the DXU is off. This indicates that the DXU is in remote mode.

6.29 TX Antenna Feeders

Note: When changing antenna feeders, refer also to the chapter "Cable Connections".

Prior to replacement

CAUTION

Radio frequency (RF) radiation from antenna systems can endanger your health.

Note: To prevent exposure to RF radiation and damage to TRU(s), check before taking any further actions, that the TRU(s) that are connected to the CDU with the faulty TX antenna feeder have Local mode indicators with a fixed yellow light.

1. Press the "Local/remote" button on the TRU(s) that are transmitting on the faulty TX cable. The Local mode indicators will start flashing.

2. Wait until the "Local mode" indicator has a fixed yellow light. This indicates that the TRUs are in local mode.

Replacement

Note: After replacement it will take at least 100 minutes for the system to cease the alarm.

1. Remove the tie-wrap cable fasteners fixing the antenna feeders to the sides of the cabinet.
2. Unscrew the torx screws securing plate A or plate D on the top of the cabinet.
3. Remove the faulty antenna feeder that connects the CDU to the Connection plate by unscrewing it carefully at both ends.

Note: Unless under contractual warranty, after replacement, the antenna feeder shall be disposed of locally. Do not return the antenna feeder to Ericsson for replacement, repair or disposal.

4. Attach the new cable to the CDU with a torque of 8 Nm ±1 Nm and to the connection plate with a torque of 15 Nm ±1 Nm.
5. Refit the plate to the top of the cabinet and secure it with the torx screws.
6. Fix all antenna feeders to the sides of the cabinet using new tie-wraps.

Put into operation

Note: If base band hopping or mixed hopping was used, the hopping sequence can only be re-initiated by the BSC or MSC. After placing the TRU(s) in remote mode, contact the BSC or MSC and request they take the required actions.

1. Press the "Local/remote" button on the concerned TRU(s). The "Local mode" indicator will start flashing.
2. Block the following MOs from the BSC in the given order: RX, TS, TX, TRX.

   Use the MML command RXBLI.
3. Deblock the following MOs from the BSC in the given order: TRX, TX, TS, RX.

   Use the MML command RXBLE.
4. Wait until the "Local mode" indicators turn off. This indicates that the TRU(s) are in remote mode.

7 Test after Repair

This chapter describes the methods for verifying the RBS. The intention is to verify that the problem has been solved and that the RBS is fully functional.

Note: All known faults must be cleared before performing the tests.

7.1 How to use Test after Repair

Note that after replacing some types of unit, only the section “Before Leaving the Site” in chapter *Concluding Routines* is used as a verification test.

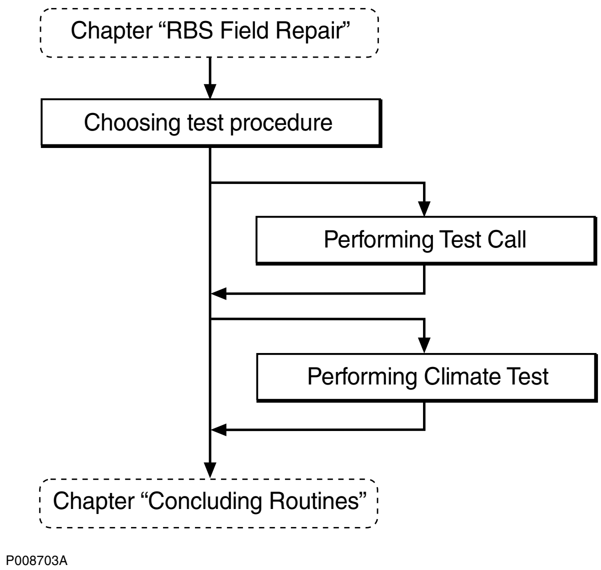


Figure 100 How to use Test after Repair

7.2 Choosing test procedure

Choose test procedure as given in the chapter Fault Localisation.

7.3 Performimg Test Call

Preconditions

Note: Test calls should be performed with a TEMS using the TEMS Software.

Test calls must be made when TRU(s) or CDU(s) have been replaced to ensure that the replaced unit(s) carry traffic.

To be able to make a test call on a specific Replacement Unit, you need information on the ARFCN(s) for the TRU(s). Contact the BSC personnel for information on ARFCN(s).

The test procedure is divided into two parts, that shall be made sequentially. The first test sequence of the downlink connection is monitored by the TEMS program. The second test sequence of the uplink connection is monitored by the OMT.

Note: Before starting with the test call, the Operational indicators on the DXU and TRUs should be lit. Set all units to remote mode.

Monitoring the Dedicated channel with a TEMS

1. Connect the TEMS to the PC serial port.
2. Start the TEMS program in the Windows environment.
3. Select **Enable Connections** in the **Externals** menu and specify the serial port for the TEMS.
4. Contact the BSC personnel to find out which ARFCN and TS that a test call should be performed on.

   The BSC personnel can use the printout command:

   ```
   RXCDP:MO=RXOTG-tg;
   ```

Note: The RXCDP gives, for the TG specified, the ARFCN and TN (timeslot number on the air interface) that corresponds to the equipment TS. The TS and TN are normally the same, but there are exceptions. Therefore always check the TN with RXCDP).

5. Choose **Cell Selection** in the **Control** menu.
6. Choose **Target frequency** and select the ARFCN for the TRU that is to be tested. Mark the frequency in the list.
7. Disable the Handover button in the **Cell Selection** menu.
8. Select **Status information** in the **Monitor** menu.
9. Choose Dedicated channel.
10. Make a call from the TEMS.
11. Monitor the Dedicated channel in TEMS and verify the downlink (DL) by checking that the targeted ARFCN and TN appear in the monitor.
12. Make repeated calls until the desired information appears in the monitor, *see the figure below.*

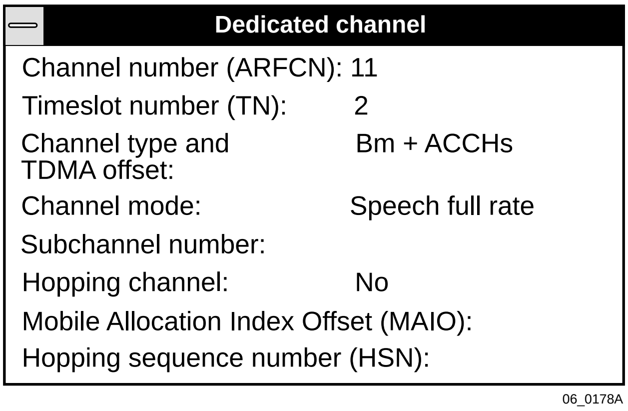


Figure 101 TEMS Dedicated channel monitor

Supervising the traffic channel with the OMT

1. Connect the OMT cable between the OMT connector on the DXU and the PC serial port.
2. Start the OMT program in the Windows environment.
3. Select **Connect** in the Connection menu.
4. Select the **Read IDB** function in the **File** menu.
5. Change view mode to **MO view**.
6. Select the appropriate TRXC object.
7. Choose **Operation Monitor**.
8. In the Monitor Setup dialogue box, scroll down the list and select the desired TCH-TS to monitor.
9. Make a call on the TEMS.
10. While a call is in progress in the correct timeslot, select the **Start monitor** button.
11. Check the **RX-LEV full** and **RX-LEV sub** values, *see the figure below* .

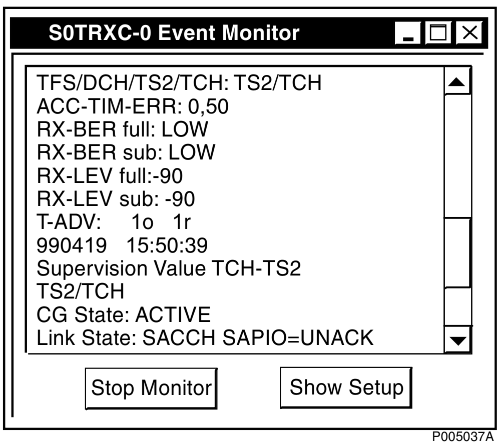


Figure 102 Example of OMT Supervision value TCH-TS 2

12. Repeat the procedure above for additional TN values as well as other TRUs.

13. Compare the RX-LEV values. Note that the values should be in the same range for all TRUs.

Before leaving the site

1. Proceed to *chapter Concluding Routines* and complete the checklist.

8 Concluding Routines

The following is a description of the different administrative routines that must be carried out as a result of a maintenance procedure.

8.1 Before Leaving the Site

The following checklist is strongly recommended. Local procedures and safety regulations must be evaluated and incorporated into this checklist.

Do not depart from the site until the problem/fault has been cleared or investigated.

Table 12 Before leaving the site, checklist.

ITEM		OK
1	The BS fault indicator on the DXU is off.	
2	The red fault indicators are off.	
3	All operational green indicators are on.	
4	The RBS is in remote mode.	
	a The yellow local mode indicator on the DXU is off.	
	b The yellow local mode indicators on all TRUs are off.	
5	All other yellow indicators are off.	
6	All the external alarms are off.	
7	All warning signs are fixed and located correctly in the cabinet.	
8	All RU positions are filled with either an RU or a dummy.(1)	
9	The cabinet is dry inside.	
10	The inside and outside of the cabinet is free from mechanical damage or rust.	
11	The radio sub-cabinet and mounting base are free from foreign objects and all cables are undamaged.	
12	The back-up copy of the RBS IDB is saved on a disk.	
13	All tools are accounted for.	
14	The door filter is inspected.	
15	The cabinet door is locked (including mounting base).	
16	The external air intake is free from obstructions.	
17	The defective part packed for for shipment including repair delevery note (Blue Tag).	
18	All other necessary paper work is completed.	
19	The hazard lights are on the antenna operational.	
20	The antennas, towers, and RF cables are operational.	
21	The OMC is notified and alarms ceased.	
Signature:		
Date:		

(1) Empty RU positions for the CDU, PSU and TRU must be occupied with dummies. The dummies will secure correct cooling airflow to units in operation. Neglecting the use of dummies can result in overheated units.

8.2 Report of Finished Work

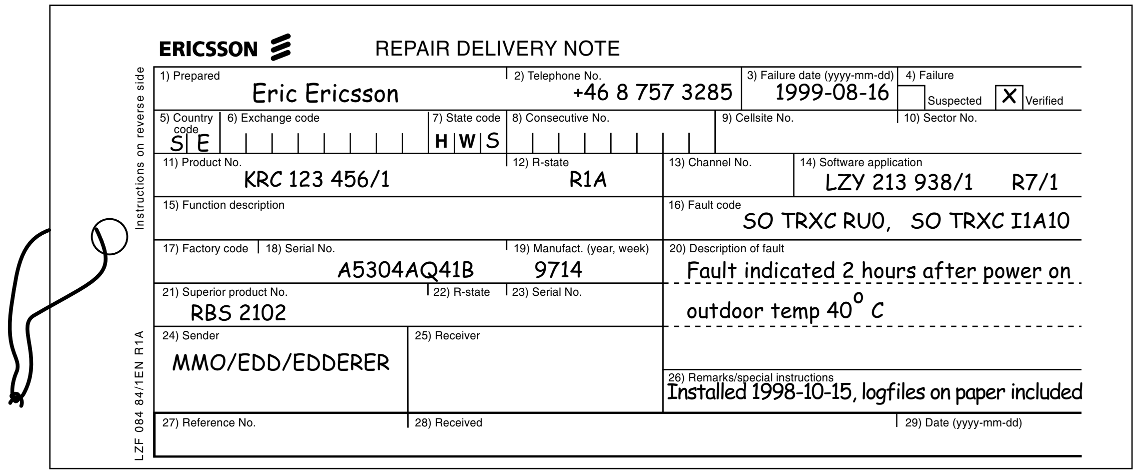
When a maintenance procedure has been completed, a report will be written including a detailed description of actions taken, all observations made in accordance with local routines for work orders, site log-book and so on.

8.3 Repair Delivery Note – “Blue Tag”

When a faulty unit is returned, it must be accompanied by a repair delivery note. When the note has been completed it must be attached to the faulty unit with a string, before sending it for repair. Tape can only be used to attach the note to the sides of the unit.

Note: Do not tape a repair delivery note on the front panel as it is hard to remove and causes extra work at the Ericsson repair center.

The repair delivery note LZF 084 84 can be ordered from the local FSC. A description of how to fill in a repair delivery note follows below.



The following fields are mandatory. Use block letters.

1	Prepared	Service technician´s name
2	Telephone	Service technician´s telephone number
3	Failure date	
4	Failure	Mark with an X if failure is Suspected or Verified
5	Country code	Two letter country code
7	State code	Hardware (HW) status when failure occurred: S = Unit in service when failure occurred (Repair) T = New unit failed during installation or test (Claim) R = Repaired unit failed during installation or test (Claim or Repair)
11	Product No.	Faulty unit
12	R-state	Faulty unit
14	Software application	RBS load, product number and R-state
16	Fault code	Check OMT or work order
18	Serial No.	Faulty unit
19	Manufact. (year week)	
20	Description of fault	Observations and external factors
21	Superior product No.	RBS type
24	Sender	Customer, Company, Corporate ID
26	Remarks/special instructions	Information about installation date, logfiles and modification requirements

P005537C

Figure 103 The “Blue tag”

The above explanations to the Repair delivery note are also given on its reverse side.

8.4 Handling of Replaced Parts and RUs

Replaced parts and RUs are divided into three categories:

- Customer disposable
- Customer repairable
- Depot repairable

The definitions of these categories as well as explanations how to treat the parts is given below.

Customer disposable

Customer disposable parts are consumable parts, which have no lower sub-assembly or component that can be used to repair them.

These items are identified in the RBS *Spare Parts Catalogue, Appendix B*, as "Recommended spare parts for customer stock (not repairable)" or "Other available parts".

Examples of these parts are:

- Cables and wiring
- Connectors
- Fuses, circuit breakers, varistors and overvoltage arresters
- Fans, compressors and heaters
- Printed circuit board assemblies (circuit cards, backplanes, temperature sensors and humidity sensors)
- Batteries
- Antennas
- Transformers
- Capacitors
- Mechanical hardware (doors, hinges, plates, locks, seals, gaskets, brackets and other parts of the RBS cabinet)

Unless under contractual warranty, after replacement, these parts shall be disposed of locally. Do not return these parts to Ericsson for replacement, repair or disposal.

Customer repairable

Customer repairable parts are such parts, which have a lower sub-assembly or component that can be used to repair them.

These items are identified in the RBS *Spare Parts Catalogue, Appendix B*, as "Recommended spare parts for customer stock (not repairable)" or "Other available parts".

Examples of these parts are:

- IDM

Unless under contractual warranty, after replacement, these parts shall be repaired locally at the RBS site or in a local repair shop.

Depot repairable

Depot repairable parts are for direct one to one replacement at the RBS site.

These items are identified in the RBS *Spare Parts Catalogue, Appendix B*, as "Recommended spare parts for customer stock (repairable)".

Examples of these parts are:

- ALNA
- BFU
- CDU
- DC/DC converter
- DXU
- ECU
- PSU
- TRU

After replacement, these parts must be returned to Ericsson for repair. Maintenance personnel must attach a repair delivery note, LZF 084 64 (Blue Tag), to the returned part. The repair delivery note shall include a clear description of the fault found. Refer to the section "Repair Delivery Note – ‘Blue Tag’" for instructions on completing a repair delivery note.

8.5 Transport of a Repairable Unit

The repairable unit must be protected against ESD and damage due to transport. Therefore the repairable unit must be packed in an ESD-insulated plastic bag and transported in a shock-absorbing box. This must be done by re-using the same packing material as the spare unit was delivered in. See *Spare Parts Catalogue, Appendix B,* to determine which repairable units should be returned for repair.

8.6 Trouble Report on Equipment or on this Manual

A trouble report should be written when system components are not operating as expected or when disturbances occur repeatedly. It should not be written for occasional hardware failures. A trouble report should also be written when a fault is found in this manual. Any comments on this manual can be submitted in a similar way.

When writing a trouble report, always include as much information as possible. Write the trouble report as soon as possible, preferably at the RBS site. The next pages contain an example of a filled-in trouble report and a blank trouble report.

The trouble report should be sent to the nearest FSC for resolution and registration in the Ericsson trouble report system MHS (Modification Handling System). The FSC should forward the trouble report via the node MHO ERA BTS.

8.6.1 Special Explanations

Product number	The product number can be found on the label of the unit. For example KRC 131 47/01
R-state	Revision state, found on the label of the unit after the product number. For example R1A
Site status	Can be “Installation Test” or “Operation”

8.6.2 Example of Filled-in Trouble Report

Trouble Report

Company: World-Wide Telecom	Date: 27 April 1995
Issued by: Jane Doe	Phone no: +01 419 555 1212
Address 501 Montgomery Avenue Mansfield, Ohio USA	Memo id: JDOE@WWT.OHIO.US Telefax no: +01 419 555 1212

Heading: TRXC (TRU) is reporting wrong fault code		
Product number or Document number: KRC 131 47/01		R-state R 1A
Site name: Hillfield, Ohio	Site id: EOA 043	Site status: Operation
Trouble symptoms: TRXC is reporting a fault code after CPU reset.		
Trouble Description: After you have pressed the CPU reset the TRU starts to send fault reports constantly. The code is: Internal Fault Class 1A fault no. 33 This fault code cannot be found in the fault list.		
Comments: The TRU fault indicator is not lit.		

03_0179B

Figure 104 Example of filled-in trouble report

8.6.3 Trouble Report, Blank

Trouble Report

Company:	Date:
Issued by:	Phone No:
Address:	Memo Id:
	Telefax No:

Heading:			
Product number or Document number:			R-state:
Site Name:	Site Id:	Site status:	
Trouble Symptoms:			
Trouble Description:			
Comments:			

02_0179B

Figure 105 Trouble report, blank

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9 Optical Indicators and Switches

9.1 Indicator Types

RBS 2000 optical indicators are either red, green or yellow. The indicators can be on, off or flashing. Their general functions are:

- Red, fault
- Green, operational
- Yellow, status

9.1.1 Self test of indicators

On the RUs ECU, DXU and TRU, there is a self test of indicators performed at startup or restart. All indicators are switched on and remain switched on until the BTS software is started.

9.2 Units with optical indicators and switches

The BFU, CDU-A, CDU-C, CDU-C+, CDU-D, DXU, ECU, PSU and TRU units in the cabinet are equipped with indicators.

The DXU, ECU and TRU units in the cabinet are equipped with switches.

9.3 BFU

The BFU is installed in the BBS cabinet.

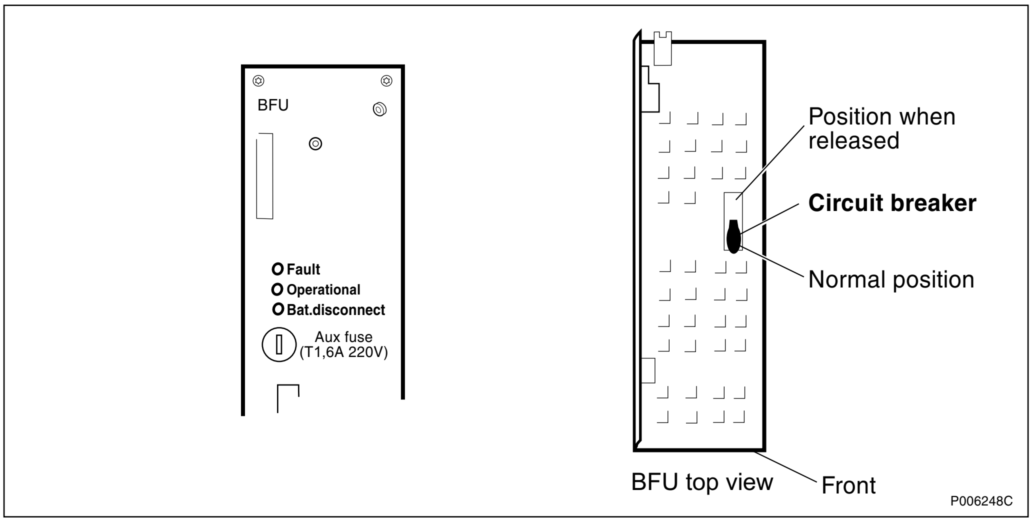

Figure 106 BFU

Table 13 BFU optical indicators

Colour, Label	Mode	Indication
Red, Fault	Off	No fault is localised in the BFU.
	On	One or more faults are localised in the BFU.
	Flashing	BFU revision 2 or later: Communication fault on the power communication loop.
Green, Operational	Off	The BFU is not operational.
	On	The BFU is operational.
	Flashing	BFU revision 1: Communication fault on the power communication loop.
Yellow, Battery disconnect	Off	Battery connected.
	On	Battery disconnected.

Table 14 BFU switch

Label	Position	Function
Circuit breaker	Normal position (ON)	Connects the battery power to the base station.
	Position when released (OFF)	Breaks the battery power to the base station.

9.4 CDU-A and CDU-C

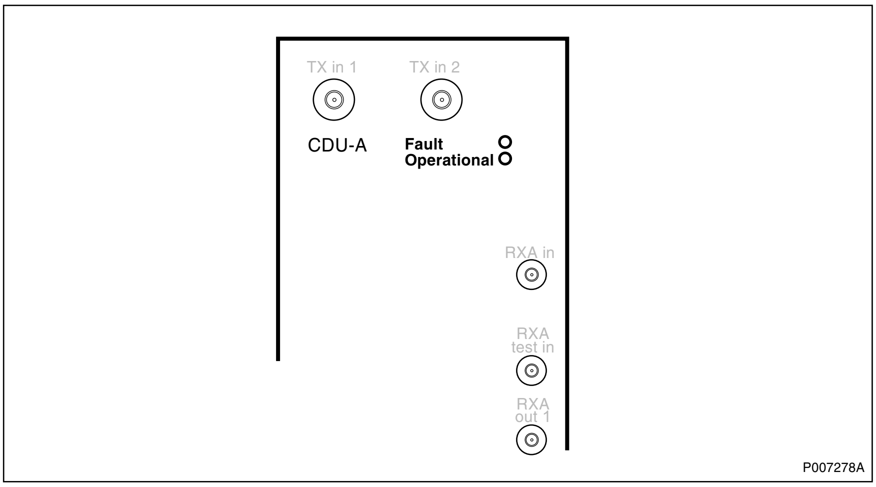

Figure 107 CDU-A

Table 15 CDU-A and CDU-C optical indicators

Colour, Label	Mode	Indication
Red, Fault	Off	No fault is localised in the CDU.
	On	One or more faults are localised in the CDU.
	Flashing	The CDU-A and CDU-C has detected lost communication to superior RU.
Green, Operational	Off	The CDU is not operational.
	On	The CDU is operational.

9.5 CDU-C+

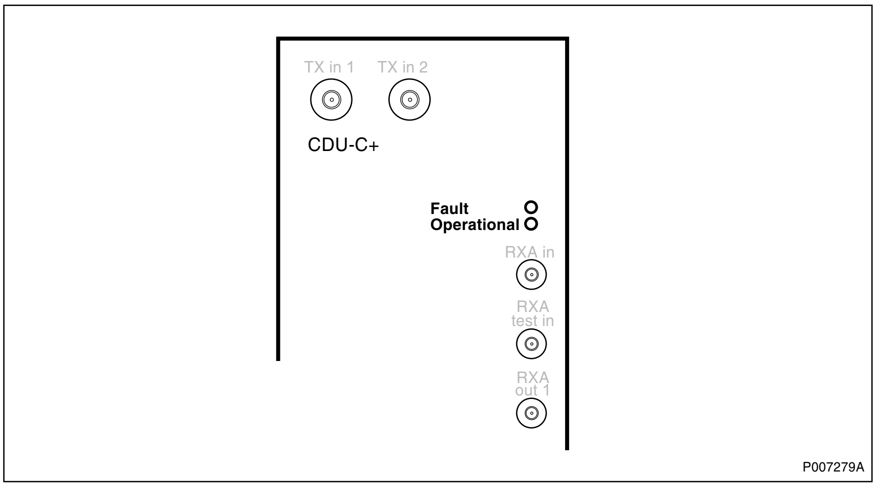

Figure 108 CDU-C+

Table 16 CDU-C+ optical indicators

Colour, Label	Mode	Indication
Red, Fault	Off	No fault is localised in the CDU.
	On	One or more faults are localised in the CDU.
	Flashing	The CDU-A and CDU-C has detected lost communication to superior RU.
Green, Operational	Off	The CDU is not operational.
	On	The CDU is operational.

9.6 CDU-D

The CDU-D consists of three different types of subunits (number of units in parenthesis):

- CU (1–3)
- FUd or FU (1)
- DU (1)

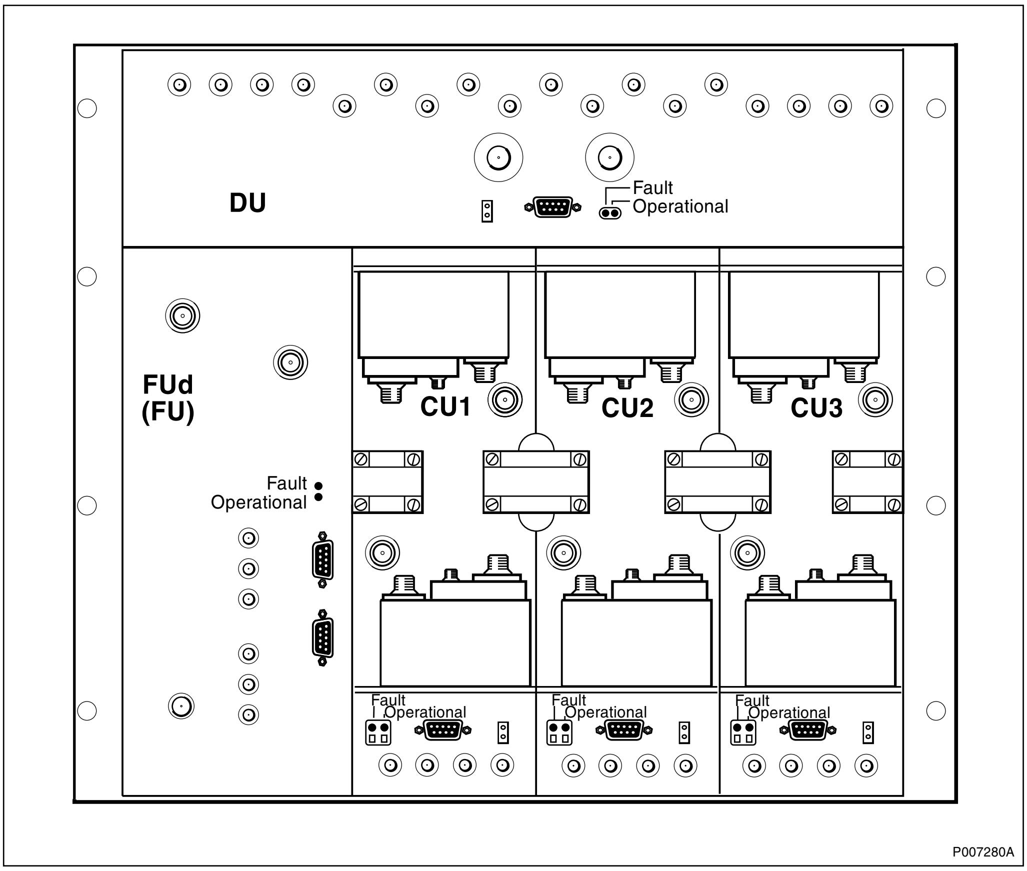

Figure 109 A typical configuration of the CDU-D

CU

Table 17 The CU (subunit to CDU-D) optical indicators

Colour, Label	Mode	Indication
Red, Fault	Off	No fault is localised in the CU.
	On	A fault is localised in the CU.
	Flashing	One of the following applies: • RBS database is missing for DXU, or CU data for any RU is missing. • Software in RBS is missing.
Green, Operational	Off	The CU is not operational.
	On	The CU is operational.
	Flashing	Software is being received.

FUd and FU

Table 18 The FUd and FU (subunits to CDU-D) optical indicators

Colour, Label	Mode	Indication
Red, Fault	Off	No fault is localised in the FUd/FU.
	On	A fault is localised in the FUd/FU.
	Flashing	RBS database is missing for DXU, or FUd/FU data for any RU is missing.
Green, Operational	Off	The FUd/FU is not operational.
	On	The FUd/FU is operational.

DU

Table 19 The DU (subunit to CDU-D) optical indicators

Colour, Label	Mode	Indication
Red, Fault	Off	No fault is localised in the DU.
	On	A fault is localised in the DU.
	Flashing	RBS database is missing for DXU, or DU data for any RU is missing.
Green, Operational	Off	The DU is not operational.
	On	The DU is operational.

9.7 DXU

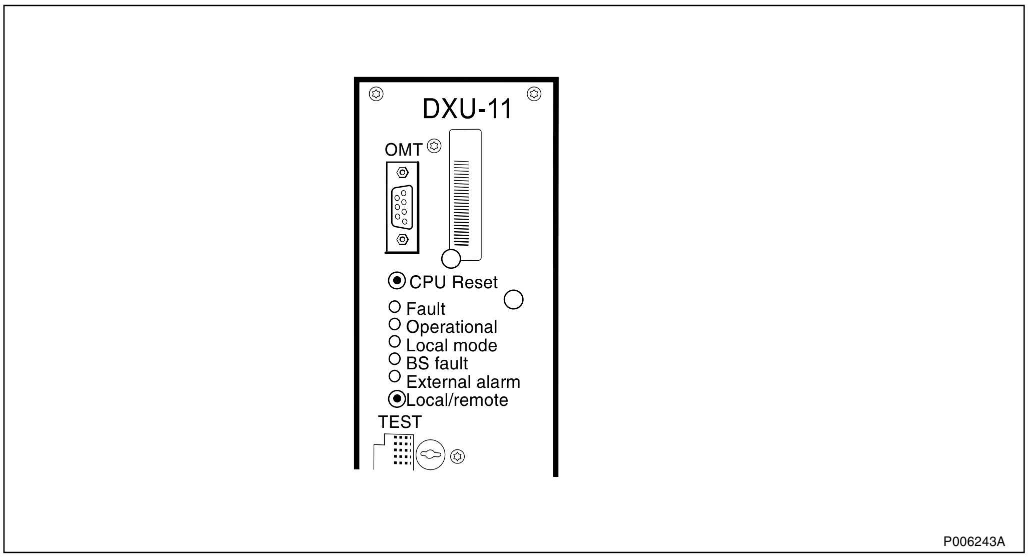

Figure 110 DXU

Table 20 DXU optical indicators

Colour, Label	Mode	Indication
Red, Fault	Off	No fault is localised in the DXU.
	On	One or more faults are localised in the DXU.
	Flashing	One of the following applies: • RBS database is missing for DXU. •Software is missing.
Green, Operational	Off	The DXU is not operational.
	On	The DXU is operational.
	Flashing	One of the following applies: • Software is being received. • Configuration activity in progress which may take longer than 10 seconds to complete. • Restart by BSC pending.
Yellow, Local mode	Off	The DXU is in remote mode. The DXU is controlled by the BSC.
	On	The DXU is in local mode. The DXU has no established link to the BSC.
	Flashing	A change of the DXU mode (from local mode to remote mode or from remote mode to local mode) is in progress. The link between the BSC and the RBS is being established or released.
Yellow, BS fault	Off	No faults are detected in the RBS.
	On	One or more faults are detected in the DXU or in the RBS.
Yellow, External alarm	Off	No external alarms are active.
	On	One or more external alarms are active.

Table 21 DXU switches

Label	Function
CPU reset	Resets the DXU, the ECU and the TRU.
Local/remote	Changes the DXU mode between local and remote.

9.8 ECU

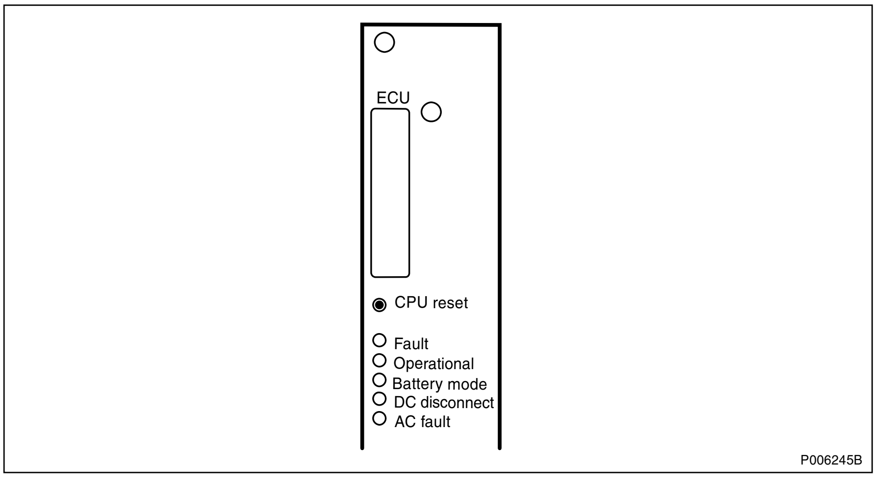

Figure 111 ECU

Table 22 OECU optical indicators

Colour, Label	Mode	Indication
Red, Fault	Off	No fault is localised in the ECU.
	On	One or more faults are localised in the ECU.
	Flashing	One of the following applies: • RBS database is missing for DXU, or the ECU database for any RU is missing. • Software is missing. • The ECU has detected lost communication to superior RU (DXU).
Green, Operational	Off	The ECU is not operational.
	On	The ECU is operational.
	Flashing	Software is being received.
Yellow, Battery mode	Off	Mains power supply only.
	On	The battery power supply is fully or partially used.
Yellow, DC disconnect	Off	Environmental conditions are fulfilled.
	On	Environmental requirements are not fulfilled.
Yellow, AC fault	Off	No AC fault.
	On	Mains power is faulty.

Table 23 ECU switches

Label	Function
CPU reset	Resets the ECU.

9.9 PSU

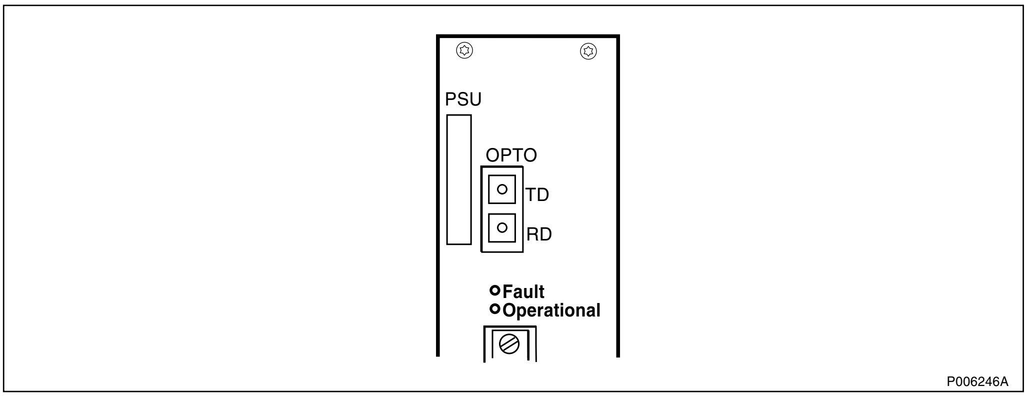

Figure 112 PSU

Table 24 PSU optical indicators

Colour, Label	Mode	Indication
Red, Fault	Off	No fault is detected in the PSU.
	On	New version: A fault is localised in the PSU. Old version: A fault is localised in the PSU or the PSU is not supplied with power.
	Flashing	The PSU has detected lost communication to superior RU. The opto bus cable can be faulty.
Green, Operational	Off	The PSU is not operational.
	On	The PSU is operational.

9.10 TRU

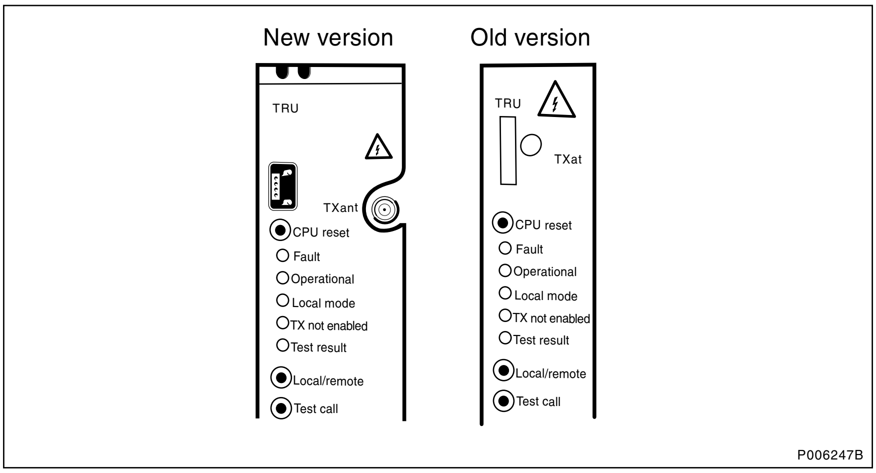

Figure 113 TRU, new and old version

Table 25 TRU optical indicators

Colour, Label	Mode	Indication
Red, Fault	Off	No fault is detected in the TRU.
	On	A fault is localised in the TRU.
	Flashing	One of the following applies: • RBS database is missing for TRU. • Software is missing. • The TRU has detected lost communication to superior RU (DXU).
Green, Operational	Off	The TRU is not operational.
	On	The TRU is operational.
	Flashing	One of the following applies: • Software is being received. • Configuration activity in progress which may take longer than 10 seconds to complete. •Restart by BSC pending.
Yellow, Local mode	Off	The TRU is in remote mode. The TRU is controlled by the BSC.
	On	The TRU is in local mode. The TRU is controlled by the RBS.
	Flashing	A change of the TRU mode (from local mode to remote mode, or from remote mode to local mode) is in progress. The link between the BSC and the RBS is being established or released.
Yellow, TX not enabled	Off	TX is enabled.
	On	TX is not enabled.
Yellow, Test result	Off	The indicator has no function.

Table 26 TRU switches

Label	Function
CPU reset	Resets all units subordinated to the TRU.
Local/remote	Changes the TRU mode between local and remote.
Test call	The switch has no function.

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10 Preventive Maintenance

During normal use, parts of the RBS become dirty or worn. To prevent a fault within the RBS, regularly scheduled cleaning or replacement of parts is necessary.

This chapter gives the information needed to perform preventive maintenance. The process causes a minimum of interruption to the RBS's operation.

10.1 Preventive Maintenance Process

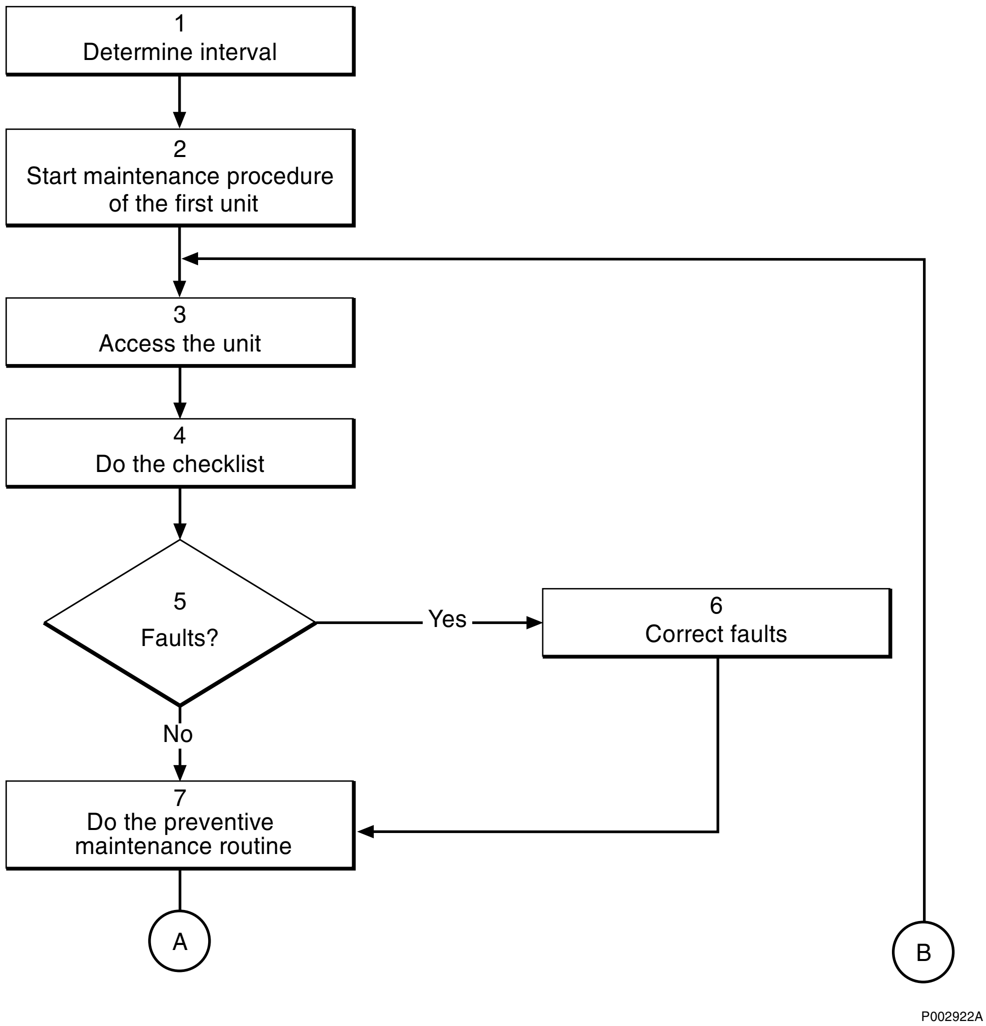

Figure 114 The "Preventive Maintenance Process"

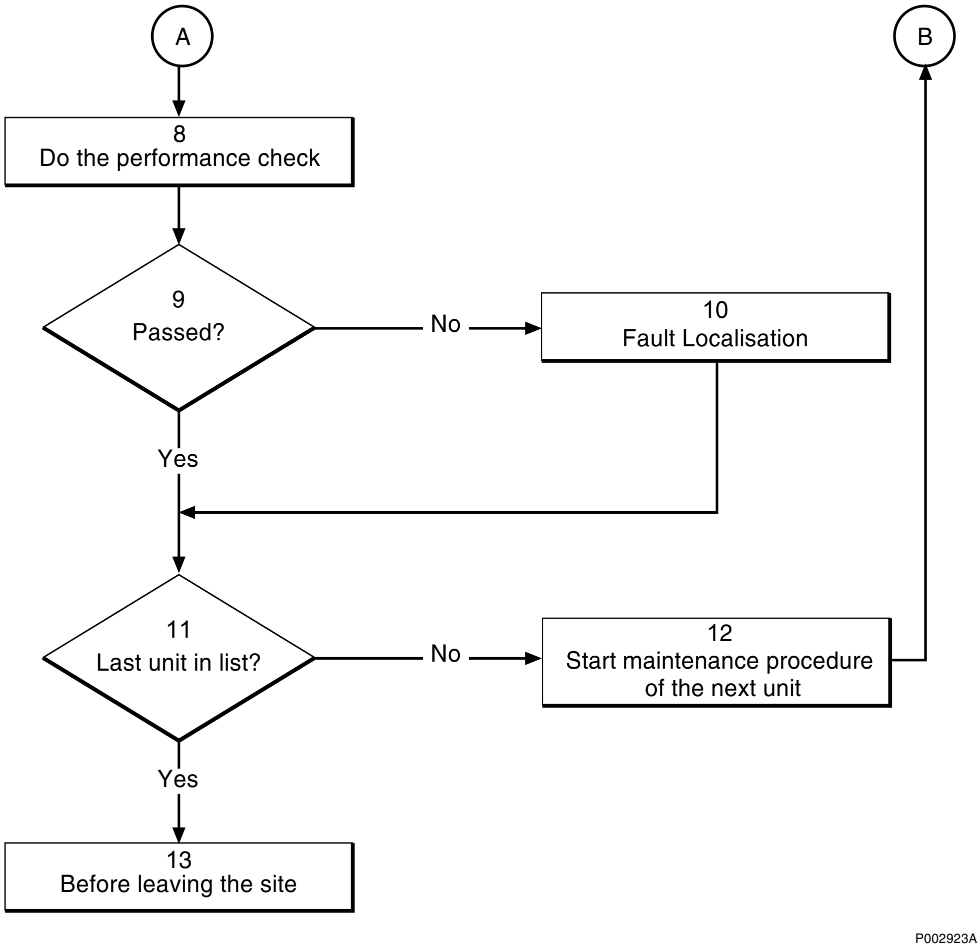

Figure 115 The “Preventive Maintenance Process”

(1) Determine interval

Determine the appropriate preventive maintenance interval according to work order information.

(2) Start maintenance procedure of the first unit

Use the table in the section "Preventive Maintenance Intervals"to determine which routines must be performed. Always perform the routines in the same order as they appear in the table.

Note: It is in particular important that the DXU maintenance is the first routine, as it requires a waiting time of 10 minutes before it is finished. During this waiting time, other maintenance routines can be performed.

(3) Access the unit

Start the preventive maintenance routine by accessing the appropriate unit.

(4) Do the checklist

Do the checklist first. The purpose of the checklist is to help determine maintenance requirements without affecting the operation of the RBS.

All questions on the checklist are written to get a "yes" response. Should the answer to any of the questions be "no", use the section "Correct Faults".

(5) Faults?

Were any faults found while doing the checklist?

- Yes: Proceed to step (6) Correct faults.
- No: Proceed to step (7) Do preventive maintenance routines.

(6) Correct faults

This section is shall instruct to clear the fault or determine if a per son with special qualifications shall respond to clear the fault. When possible, correct the faults found when using the checklist before doing the preventive maintenance routine.

(7) Do the preventive maintenance routines

Do the preventive maintenance routines according to instructions in this chapter. All routines shall be performed with power off unless specifically stated otherwise.

(8) Do the performance check

Some units have performance checks that shall be done.

(9) Passed?

Did the unit passed the performance check?

- Yes: Proceed to step (11).
- No: Proceed to step (10).

(10) Fault localisation

If the performance check uncovers a fault, use the chapter "Fault Localisation".

(11) Last unit in list?

Has the last unit been treated in the preventive maintenance routine?

- No: Proceed to step (12) Start maintenance procedure of the next unit.
- Yes: Proceed to step (13) Before leaving the site.

(12) Start maintenance procedure of the next unit

Select the next unit for the preventive maintenance routine.

(13) Before leaving the site

Proceed to the section "Before Leaving the Site"in the chapter "Test after Corrective Action" and perform the checklist provided.

10.2 Preventive Maintenance Intervals

The interval between inspections at each RBS site may vary depending upon the environmental conditions found there. Outdoor sites receive greater exposure to large amounts of contaminants and require more frequent maintenance. As a result, the RBS operator can decide to increase or decrease the recommended interval between inspections.

Table 27 Preventive maintenance intervals

Action	Period
DXU maintenance (1)	Every three years
Climate unit maintenance	Twice a year
Antenna system maintenance	Once a year
Battery maintenance (2)	Once a year
Replace batteries (2) (3)	Every five years
Replace fans	Every five years
Replace door filter(4)	Every five years
DXU maintenance, oscillator verification (1)	Every three years
Checklist "Before Leaving the Site"	Every site visit

(1) This activity applies to DXU-03 only.
(2) It is recommended that batteries be purchased locally. Refer to information supplied by the manufacturer for the correct inspection and replacement interval.
(3) This procedure is included in the "Battery maintenance procedure".
(4) Inspect the door filter every site visit.

10.3 DXU Maintenance

Note: The preventive maintenance process for the DXU comprises "DXU access" and "DXU preventive maintenance routines"only.

Note: This procedure only applies to DXU–03 and system release R7 and on.

Note: Climatic requirements, specified for the frequency counter being used, must be met during the calibration procedure.

DXU access

Open the RBS cabinet to allow access to the DXU.

DXU preventive maintenance routines

Note: The calibration procedure requires that a high precision frequency counter is used. Refer to the section "Test Equipment " in the chapter "Tools and Instruments".

1. Connect the frequency counter input A to the Test connector on the DXU-03, see Figure 116 on page 225.

   The connector labelled "Ext. trig." shall not be connected anywhere.

Note: After switching on, wait until the Unlock/Standby lamp is extinguished before performing any measurements.

2. Set the input impedance to 1 MOhm.
3. Set the trigger level to Auto.
4. Set the measurement time to 10 seconds.

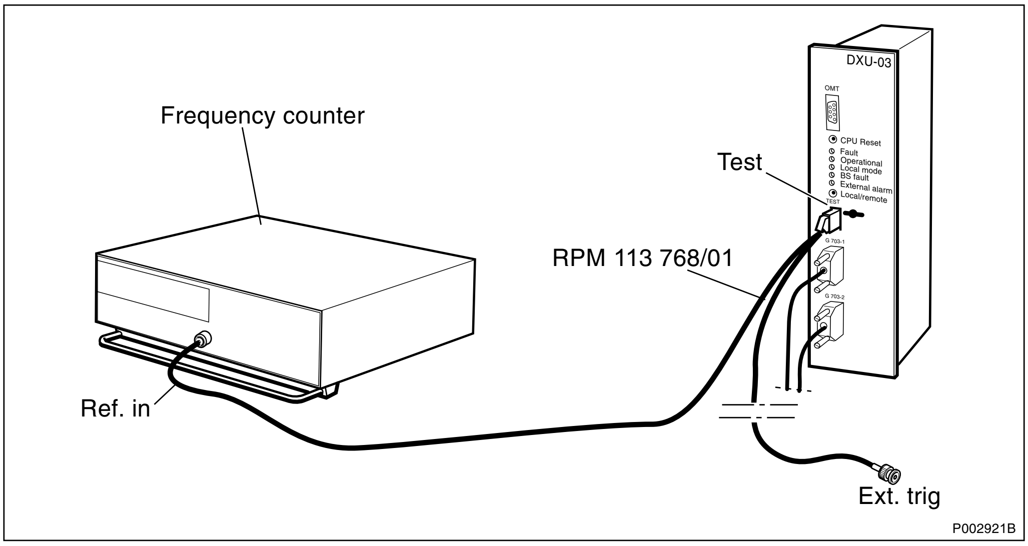

Figure 116 Connection of the frequency counter to DXU-03

The MO TF (RBS) must be syncronised to the optional reference oscillator. This is done by preforming step 5.

5. Enter the command RXMOP:MO=RXOTF-x;
6. Read the value (INTI, INTE, PCM or DEFAULT) of parameter SYNCSRC an write it down.

If the value is INTE, proceed with step 7.

7. If the value is not INTE enter:

   RXMSC:MO=RXOTF-x, TFMODE=SA, SYNCSRC=INTE;

8. Enter the command RXMOP:MO=RXOTF-x; again and make sure that the value of the parameter SYNCSRC is INTE.

9. Read off the measurement of the frequency counter.

   Is the reading within 13 MHz ±0.208 Hz?

   • Yes: The DXU oscillator frequency is within limits and no calibration shall be performed. Proceed to step 13.

   • No: Proceed to step 10.

10. Use the OMT to make the calibration of the DXU oscillator. For further information on the use of the OMT, see the *OMT User's Manual*.

Note: The GSM specification states that the frequency shall be 13 MHz ±0.208 Hz. The calibration shall thus give a result that is as close as possible to 13 MHz.

However, a class 2 alarm will not be raised until the frequency is above or below 13 MHz ±8 Hz.

11. Wait 10 minutes before a new measurement is made. This is necessary for the oscillator to stabilise at the adjusted frequency.

12. The preventive maintenance routine will be finished in Section 10.7 DXU maintenance, oscillator verification on page 230. During the 10 minutes waiting time, other units in the cabinet can be maintained.

13. If the parameter SYNCRC value (step 6) was not INTE then enter: RXMSC:MO=RXOTF-X, TFMODE=SA, SYNCSRS= [original value].

10.4 Antenna System Maintenance

The checklist below is designed for a visual inspection of the antenna system. Refer to the safety warning below.

WARNING

⚠

Some working areas involve the risk of accidents caused by falling objects.

Note: Local safety regulations may require that any maintenance on antennas, or antenna towers, be performed by an individual who has been certified to climb antenna poles and masts.

Antenna access

Open the RBS cabinet to allow for an inspection of the RF cables.

Antenna checklist

All points in the checklist are written to be answered "yes". Should any point have a "no" answer, complete the checklist first, then proceed to the section "Correct Faults".

Table 28 Antenna checklist. N/A means not applicable

ITEM		N/A	YES	NO
1	Are poles in safe condition, that is, free of cracks, not bent or loose?			
2	Is lightning protection secure and functional?			
3	Is the ALNA firmly mounted and in good condition?			
4	Do cables still have markers?			
5	Are cables secured to poles (approximately once every 0.6 meters)?			
6	Are the cable seals at the entry point into the cabinet in good condition?			
7	Are all cables free from abrasions, cuts and cracks?			
8	Are all cable connector seals in good condition?			
9	Are all cable ducts dry and the seals in good condition?			
10	Are all pressurised cables identified and in good condition?			
11	Are antenna towers and legs free of corrosion?			
12	Are antenna towers free of bowing or bends?			
13	Are hazard lights in operational order?			
14	Are support pedestals free of signs of wear and/or cracks?			
15	Are the guy wires relatively free of corrosion?			
16	Are the guy wires free of signs of slipping?			
17	Are the guy wires free of broken strands?			
18	Are the antennas correctly orientated?			
19	Are the antennas firmly mounted?			
20	Is the RBS transmission path free of obstructions? (No new buildings, towers, etc. blocking it since installation.)			
Signature:				
Date:				

Correct faults

Only tighten loose connections, or replace RF cables in the cabinet. Contact the supervisor to inform them of any other faults found when performing the checklist as further corrective action may require individuals trained and certified to climb towers.

Preventive maintenance routines

Except for the checklist provided, there are no preventive maintenance routines for the antenna system.

Performance Check

There are no performance checks for the antenna system.

10.5 Battery Maintenance

This section describes how to get access to the batteries, both internal and external when used. There is also a battery checklist and instructions on how to correct faults at the end of the section.

DANGER

⚠

Read Safety Instructions regarding handling and connecting batteries.

Note: It is recommended that batteries are purchased locally. Refer to information supplied by the manufacturer for the correct inspection and replacement interval.

Battery access

The batteries are located externally of the cabinet.

Battery checklist

All points in the checklist are written to be answered "yes". Should any point have a "no" answer, complete the checklist first, then proceed to the section "Correct Faults".

Table 29 Battery checklist. N/A means not applicable

ITEM		N/A	YES	NO
1	Are the batteries and battery box free of dirt, excessive grease, oxidation and corrosion?			
2	Are all cables firmly connected and in good condition?			
3	Are the battery casings free from discoloration and deformities?			
4	Are the battery terminals unbent and free from excessive cuts or slices?			
5	Are the batteries still within their replacement date?			
6	Are there any (acid) leaks from the batteries?			
Signature:				
Date:				

Correct faults

1. Clean dirt and grease off the batteries and battery box with a mild detergent, a soft bristle brush and rags. All cleaning items should be purchased locally. Treat all corrosion or oxidation in accordance with local procedures.
2. Tighten any loose cables found, or replace them if necessary.
3. If a discoloured or deformed battery is found during the inspection, replace all batteries in the same battery box at the same time. See the section "Batteries" in the chapter "Corrective Action" for replacement instructions.
4. If the poles show signs of excessive damage, replace both batteries in the same battery box at the same time. See the section "Batteries" in the chapter "Corrective Action"for replacement instructions.
5. If the expiry date on a battery has passed, replace all batteries in the battery box at the same time. See the section "Batteries" in the chapter "Corrective Action"for replacement instructions.
6. If the batteries have leaked acid (or are leaking), replace both batteries in the Battery Box or BDM. See the section "Batteries" in the chapter "Corrective Action"for replacement instructions.

Preventive maintenance routines

Except for the checklist provided, there are no specific preventive maintenance routines for the battery system for first line maintenance.

Performance check

There are no specific performance checks for the battery system for first line maintenance.

10.6 Door Filter Replacement

Note: The only preventive maintenance included in this procedure is replacement.

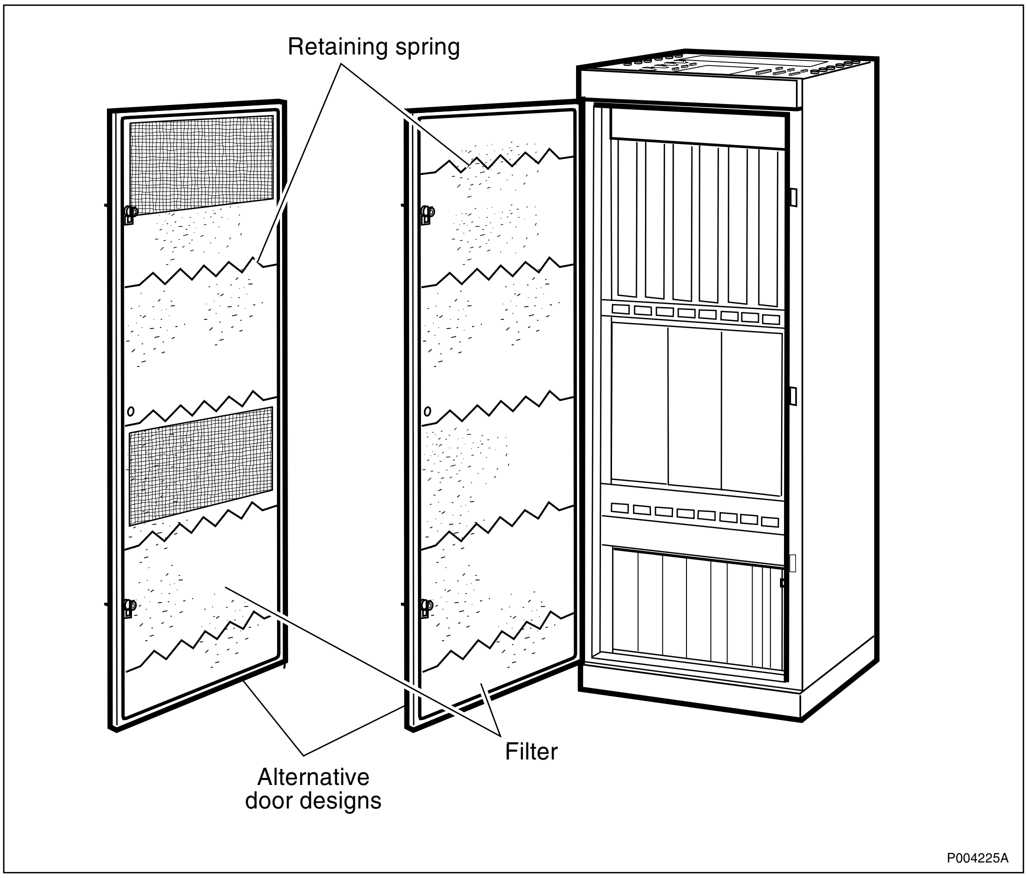

Figure 117 Location of the filter and retaining springs

1. Open the cabinet door and release one side of the four retaining springs holding the filter in place.
2. Replace the filter. Attach the retaining springs and close the cabinet door.

10.7 DXU maintenance, oscillator verification

Note: This is the concluding part of the maintenance routine of the Section 10.3 DXU Maintenance on page 224.

1. Read off the measurement of the frequency counter.

   Is the reading within 13 MHz ±0.208 Hz?

   • Yes: The calibration of the DXU oscillator frequency was successful. The calibration procedure is finished.

   • No: The calibration of the DXU oscillator frequency was unsuccessful. Replace the DXU according to instructions in the section "DXU"in the chapter "Corrective Action".

10.8 Checklist Before Leaving the Site

Refer to the section "Before Leaving the Site"in the chapter "Test after Corrective Action" and perform the checklist provided.

11 Cable Connections

The purpose of this chapter is to provide maintenance personnel assistance when replacing any of the following units where applicable:

- CDU
- DXU/ECU backplane
- IDM
- TRU backplane
- Any RU which has a cable terminated on a backplane, a CDU or an IDM

For general information about cable connections, see:

Cabinet Assembly and Extension Manual LZN 302 78

11.1 Interchanging CDU-C and CDU-C+

As previously stated, the CDU-C+ may replace a CDU-C but there are differences between the front panel legends of the CDU-C variants. The difference in the legends occur between:

- CDU-C 900 MHz (with duplexer)
- CDU-C 1800 / 1900 MHz (without duplexer)
- CDU-C+ all bands (with or without duplexer)

The following table lists the connectors with identical functions.

Table 30 CDU-C and CDU-C+ connector comparison

CDU-C		**CDU-C+**	
With duplexer	**Without duplexer**	**With / without duplexer**	
None	None	=	RX in B
None	None	=	HL out B
HL-in	HL-in	=	HL in
HL-out	HL-out	=	HL out
TX/RX Ant A	TX Ant B	=	TX/RX Ant
RX Ant	RX Ant	=	RX in A
RX-out1	RX-out1	=	RX out1
RX-out2	RX-out2	=	RX out2
RX-out3	RX-out3	=	RX out3
RX-out4	RX-out4	=	RX out4
RX-out5	RX-out5	=	RX out5
RX-out6	RX-out6	=	RX out6
CDU-Bus	CDU-Bus	=	CDU Bus
RXA MS out	RX MS out	=	None
MSTP	MSTP	=	None

DC in, Pfwd1, Pfwd2, Prefl1 and Prefl2 are all identical in all three variants.

11.2 Cable Set Modules

11.2.1 Cable Set Module Numbering

Modules are numbered consecutively from CDU 1 in the master cabinet to the CDU 3 in the extension cabinet. Each module covers one cell, unless the cell spans more than one cabinet.

Table 31 Example of module numbering

Configuration example	Module number	CDUs
2 + 4	1	CDU 1
	2	CDUs 2 and 3
4 + 2	1	CDUs 1 and 2
	2	CDU 3
3 x 2	1	CDU 1
	2	CDU 2
	3	CDU 3
3 x 4	1	CDUs 1 and 2
	2 **	CDU 3
	3 **	CDU 4*
	4	CDUs 5* and 6*
* indicates CDU is fitted in extension cabinet		
** indicates one cell spanning two cabinets = two modules		

11.2.2 Cable Set Modules

CDU-type	SCC*	Frequency MHz	BB=CDU\Freq\duplex_antenna\TRU´s	Master Cabinet CDU 1	Master Cabinet CDU 2	Master Cabinet CDU 3	Extension Cabinet CDU 1	Extension Cabinet CDU 2	Extension Cabinet CDU 3
CDU-A	1x2	900	A9d_2.2	Module 1	Module 2	Module 3			
	1x2	1800	A18_4.2	Module 1	Module 2	Module 3			
	1x2	1800/1900	A18/19_2.2	Module 1	Module 2	Module 3			
	1x4	1800/1900	A18/19_4.4	Module 1		Module 2 and 3		Module 4	
CDU-C+ used as CDU-C	1x6	900	C9d_3.6	Module 1 (1x4)		Module 2(1x6)			
	1x6	1800/1900	C18/19_5.6	Module 1 (1x4)		Module 2(1x6)			
	1x6	1800/1900	C18/19_3.6	Module 1 (1x4)		Module 2(1x6)			
	1x4	900	C9d_2.4	Module 1					
					Module 2			Module 2	
						Module 3 and 4			
	1x4	1800/1900	C18/19_4.4	Module 1					
					Module 2			Module 2	
						Module 3 and 4			
	1x4	1800/1900	C18/19_2.4	Module 1					
					Module 2			Module 2	
						Module 3 and 4			
CDU-C+	1x6	900/1800/1900	C+9d/18d/19d_3.6	Module 1 (1x4)		Module 2(1x6)			
	1x6	1800/1900	C+18/19_3.6	Module 1 (1x4)		Module 2(1x6)			
	1x4	900/1800/1900	C+9d/18d/19d_2.4	Module 1					
					Module 2			Module 2	
						Module 3 and 4			
	1x4	1800/1900	C+18/19_2.4	Module 1					
					Module 2			Module 2	
						Module 3 and 4			
	1x2	900/1800/1900	C+9d/18d/19d_2.2	Module 1	Module 2	Module 3			
	1x2	1800/1900	C+18/19_2.2	Module 1	Module 2	Module 3			

* SCC = Site Cell Configuration

1x2 = Indicates cable set module covers max. 1 CDUs and max. 2 TRUs

1x4 = Indicates cable set module covers max. 2 CDUs and max. 4 TRUs

1x6 = Indicates cable set module covers max. 3 CDUs and max. 6 TRUs

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Figure 118 Cable Set Modules

11.3 CDU—A and CDU—C

CDU is to be connected to antenna sockets located on the connection field of the cabinet. The connection field is located in the roof of the cabinet.

The lower ends of the antenna coaxial cables must be terminated to the CDUs and are marked accordingly. The upper ends of these cables are connected to RF sockets in the roof connection panel of the cabinet for termination to antennas.

The following information details the roof panel sockets and the CDU connections to which they are terminated.

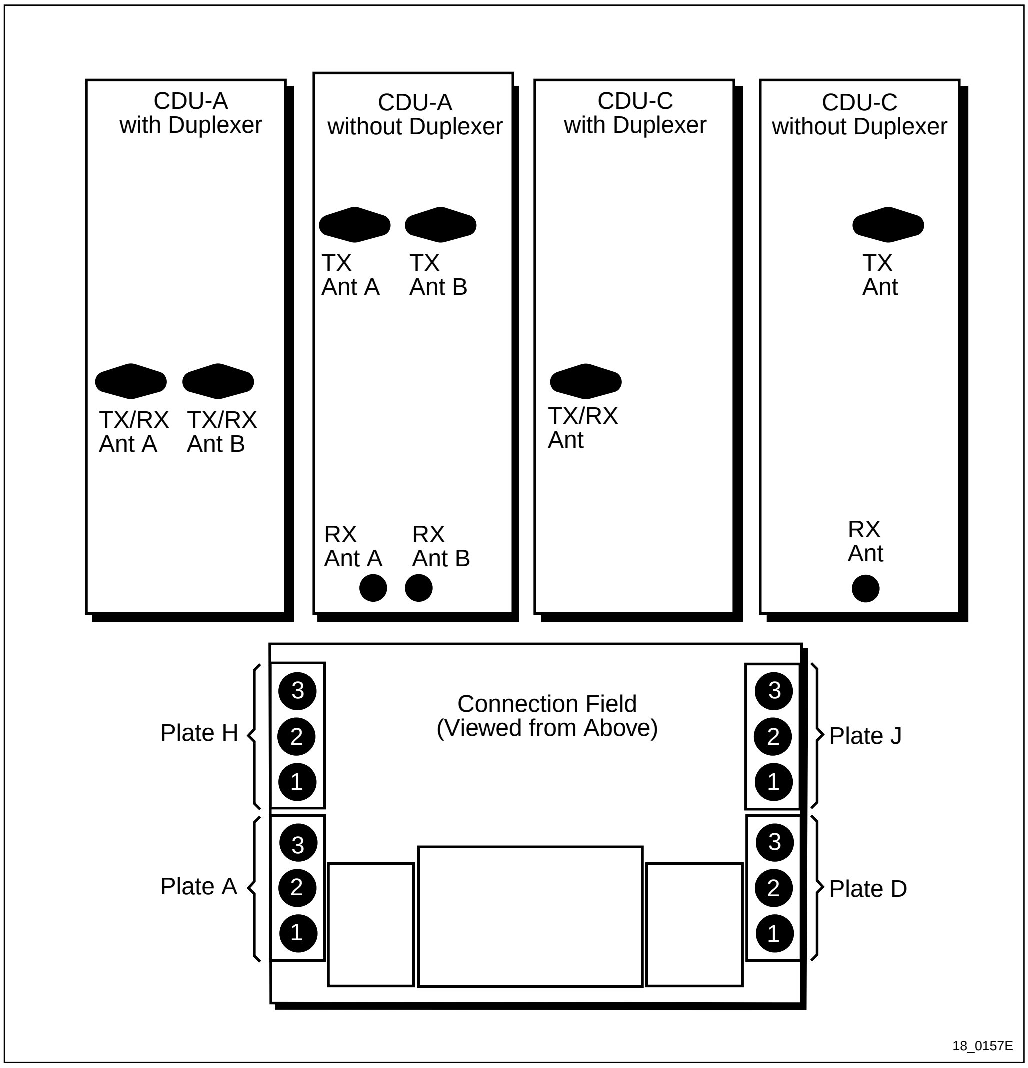

Figure 119 CDU-A and CDU-C variants at the top, connection field at the bottom

The CDUs are numbered 1 to 3 from left to right as they appear in the cabinet.

11.3.1 Previous Cabinet Wiring

Table 32 CDU-A with duplexer

CDU	CDU Connector	Connection Field		Signal
1	TX/RX Ant A	Plate H	1	TX A + RX A
	TX/RX Ant B	Plate H	2	TX B + RX B
2	TX/RX Ant A	Plate H	3	TX A + RX A
	TX/RX Ant B	Plate J	3	TX B + RX B
3	TX/RX Ant A	Plate J	2	TX A + RX A
	TX/RX Ant B	Plate J	1	TX B + RX B

Table 33 CDU-A without duplexer

CDU	CDU Connector	Connection Field		Signal
1	TX Ant A	Plate H	1	TX A
	TX Ant B	Plate H	2	TX B
	RX Ant A	Plate A	1	RX A
	RX Ant B	Plate A	2	RX B
2	TX Ant A	Plate H	3	TX A
	TX Ant B	Plate J	3	TX B
	RX Ant A	Plate A	3	RX A
	RX Ant B	Plate D	3	RX B
3	TX Ant A	Plate J	2	TX A
	TX Ant B	Plate J	1	TX B
	RX Ant A	Plate D	2	RX A
	RX Ant B	Plate D	1	RX B

Table 34 CDU-C with duplexer

CDU	CDU Connector	Connection Field		Signal
1	TX/RX Ant A	Plate H	1	TX + RX
2	TX/RX Ant A	Plate H	3	TX + RX
3	TX/RX Ant A	Plate J	2	TX (+ RX**)
3 (M)	HL in	Plate A	2	HL in
-	HL out	Plate D	3	HL out
1 (E)	HL in	Plate A	2	HL in
	HL out	Plate D	3	HL out
M	Master Cabinet			
E	Extension Cabinet			
**	Onlt TX in single cell configurations			

Table 35 CDU-C without duplexer

CDU	CDU Connector	Connection Field		Signal
1	TX Ant B	Plate H	1	TX
	RX Ant	Plate H	2	RX
2	TX Ant B	Plate H	3	TX
	RX Ant	Plate J	3	RX
3	TX Ant B	Plate J	2	TX

Table 36 CDU-C without duplexer. Multi-cabinet.

CDU	CDU Connector	Connection Field		Signal
1	TX Ant B	Plate H	1	TX
	RX Ant	Plate A	1	RX
2	TX Ant B	Plate H	3	TX
	RX Ant	Plate A	3	RX
3	TX Ant B	Plate J	2	TX
	RX Ant	Plate D	2	RX
3 (M)	HL in	Plate A	2	HL in
	HL out	Plate D	3	HL out
1 (E)	HL in	Plate A	2	HL in
	HL out	Plate D	3	HL out
M	Master Cabinet			
E	Extension Cabinet			

11.3.2 Cable Set Module Wiring

Table 37 CDU-A with duplexer. Module number = CDU number

CDU	CDU Connector	Connection Field		Signal
1	TX/RX Ant A	Plate H	1	TX A + RX A
	TX/RX Ant B	Plate H	2	TX B + RX B
2	TX/RX Ant A	Plate H	3	TX A + RX A
	TX/RX Ant B	Plate J	3	TX B + RX B
3	TX/RX Ant A	Plate J	2	TX A + RX A
	TX/RX Ant B	Plate J	1	TX B + RX B

Table 38 CDU-A without duplexer. Module number = CDU number

CDU	CDU Connector	Connection Field		Signal
1	TX Ant A	Plate H	1	TX A
	TX Ant B	Plate H	2	TX B
	RX Ant A	Plate A	1	RX A
	RX Ant B	Plate A	2	RX B
2	TX Ant A	Plate H	3	TX A
	TX Ant B	Plate J	3	TX B
	RX Ant A	Plate A	3	RX A
	RX Ant B	Plate D	3	RX B
3	TX Ant A	Plate J	2	TX A
	TX Ant B	Plate J	1	TX B
	RX Ant A	Plate D	2	RX A
	RX Ant B	Plate D	1	RX B

11.3.3 Cable Set Module Wiring CDU-C+ used as CDU-C

Table 39 CDU-C+ used in CDU-C with Duplexer, C9d_2.4

CDU	CDU Connector	Connection Field		Signal
1	TX/RX Ant	Plate H	1	TX + RX A
2	TX/RX Ant	Plate H	3	TX + RX B

Table 40 CDU-C+ used in CDU-C without Duplexer, C18/19_2.4

CDU	CDU Connector	Connection Field		Signal
1	TX/RX Ant	Plate H	1	TX + RX A
	RX in	Plate H	2	RX B
2	TX/RX Ant	Plate H	3	TX + RX A
	RX in	Plate J	3	RX B

Table 41 CDU-C+ used in CDU-C with/without Duplexer, C9/18/19_3.6 Subset of 1x6, Extension of Building Block C9d_2.4 and C18/19_2.4

CDU	CDU Connector	Connection Field		Signal
3	TX/RX Ant	Plate J	2	TX + RX A

11.4 CDU-C+

CDU is to be connected to antenna sockets located on the connection field of the cabinet. The connection field is located in the roof of the cabinet.

The lower ends of the antenna coaxial cables must be terminated to the CDUs and are marked accordingly. The upper ends of these cables are connected to RF sockets in the roof connection panel of the cabinet for termination to antennas.

The following information details the roof panel sockets and the CDU connections to which they are terminated.

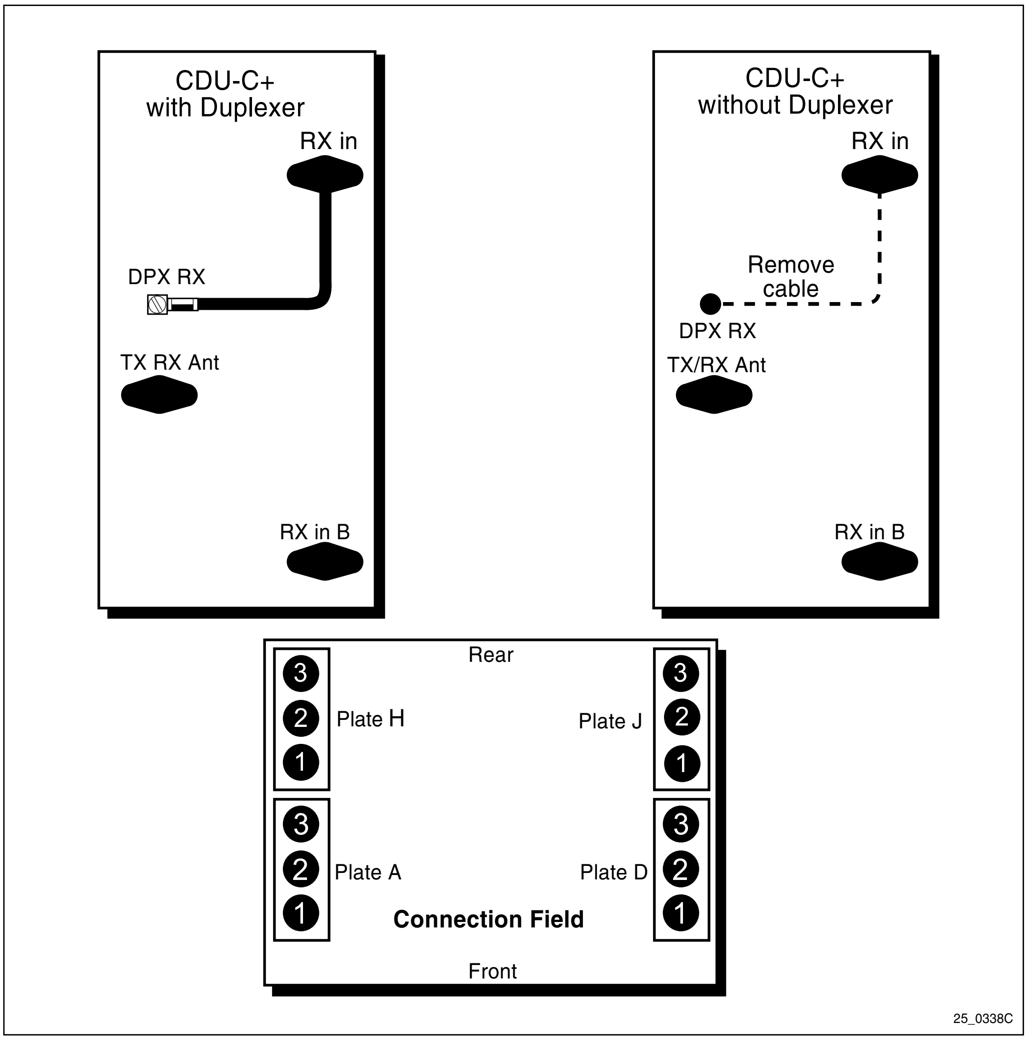

Figure 120 CDU-C+ at the top, connection field at the bottom

The CDUs are numbered 1 to 3 from left to right as they appear in the cabinet.

11.4.1 Previous Cabinet Wiring

Table 42 CDU-C+ with duplexer

CDU	CDU Connector	Connection Field		Signal
1	TX/RX Ant A	Plate H	1	TX A + RX A
	RX Ant B	Plate H	2	RXB
2	TX/RX Ant A	Plate H	3	TX A + RX A
	RX Ant B	Plate J	1	RXB
3	TX/RX Ant A	Plate J	2	TX A + RX A
	RX Ant B	Plate J	3	RX B

Table 43 CDU-C+ with duplexer

CDU	CDU Connector	Connection Field		Signal
1	TX/RX Ant	Plate H	1	TX + RX
2	TX/RX Ant	Plate H	3	TX + RX
3	TX/RX Ant	Plate J	2	TX + RX

Table 44 CDU-C+ without duplexer

CDU	CDU Connector	Connection Field		Signal
1	TX Ant A	Plate H	1	TX
	RX Ant A	Plate H	2	RX A
2	TX Ant A	Plate H	3	TX
	RX Ant A	Plate J	3	RX B
3	TX Ant A	Plate J	2	TX A

Table 45 CDU-C+ with duplexer. Multi-cabinet.

CDU	CDU Connector	Connection Field		Signal
1	TX/RX Ant	Plate H	1	TX + RX
2	TX/RX Ant	Plate H	3	TX + RX
3	TX/RX Ant	Plate J	2	TX (+ RX)
3 (M)	HLin	Plate A	2	HL in
	HLout	Plate D	3	HL out
1 (E)	HLin	Plate A	2	HL in
	HLout	Plate D	3	HL out
M	Master Cabinet			
E	Extension Cabinet			

Table 46 CDU-C+ without duplexer. Multi-cabinet.

CDU	CDU Connector	Connection Field		Signal
1	TX/RX Ant	Plate H	1	TX
	RX in B	Plate A	1	RX
2	TX/RX Ant	Plate H	3	TX
	RX in B	Plate H	3	RX
3	TX/RX Ant	Plate J	2	TX
	RX in B	Plate D	2	RX
3 (M)	HL in	Plate A	2	HL in
	HL out	Plate D	3	HL out
1 (E)	HL in	Plate A	2	HL in
	HL out	Plate D	3	HL out
M	Master Cabinet			
E	Extension Cabinet			

11.4.2 Cable Set Module Wiring

Table 47 CDU-C+ with Duplexer, Cp9d/18d/19d_2.2, single CDU. Module = CDU

CDU	CDU Connector	Connection Field		Signal
1	TX/RX Ant	Plate H	1	TX + RX A
	RX in B	Plate A	2	RX B
2	TX/RX Ant	Plate H	3	TX + RX A
	RX in B	Plate D	3	RX B
3	TX/RX Ant	Plate J	2	TX + RX A
	RX in B	Plate D	2	RX B

Table 48 CDU-C+ with Duplexer, Cp9d/18d/19d_2.4, Module 1

CDU	CDU Connector	Connection Field		Signal
1	TX/RX Ant	Plate H	1	TX + RX A
2	TX/RX Ant	Plate H	3	TX + RX B

Table 49 CDU-C+ with Duplexer, Cp9d/18d/19d_3.6 Subset of 1x6, extension to subset 1x4

CDU	CDU Connector	Connection Field		Signal
3	TX/RX Ant	Plate J	2	TX

Table 50 CDU-C+ with Duplexer, Cp9d/18d/19d_2.4 Module 2

CDU	CDU Connector	Connection Field		Signal
2	TX/RX Ant	Plate H	3	TX + RX A
3	TX/RX Ant	Plate J	2	TX + RX B

Table 51 CDU-C+ with Duplexer, Cp9d/18d/19d_2.4 Module 3

CDU	CDU Connector	Connection Field		Signal
3 (M)	TX/RX Ant	Plate J	2	TX + RX A
	HL in	Plate D	2	HL in
	HL out	Plate D	1	HL out
1 (E)	TX/RX Ant	Plate H	1	TX + RX B
	HL in	Plate A	1	HL in
	HL out	Plate A	2	HL out

Table 52 CDU-C+ without Duplexer, Cp18/19_2.2 single CDU. Module = CDU

CDU	CDU Connector	Connection Field		Signal
1	TX/RX Ant	Plate H	1	TX
	RX in B	Plate A	2	RX B
	RX in	Plate H	2	RX A
2	TX/RX Ant	Plate H	3	TX
	RX in B	Plate D	3	RX B
	RX in	Plate J	3	RX A
3	TX/RX Ant	Plate J	2	TX
	RX in B	Plate D	2	RX B
	RX in	Plate J	1	RX A

Table 53 CDU-C+ without Duplexer, Cp18/19_2.4 Module 1

CDU	CDU Connector	Connection Field		Signal
1	TX/RX Ant	Plate H	1	TX + RX A
	RX in	Plate H	2	RX B
2	TX/RX Ant	Plate H	3	TX + RX A
	RX in	Plate J	3	RX B

Table 54 CDU-C+ without Duplexer, Cp18/19_3.6 Subset of 1x6, extesion to subset 1x4

CDU	CDU Connector	Connection Field		Signal
3	TX/RX Ant	Plate J	2	TX

Table 55 CDU-C+ without Duplexer, Cp18/19_2.4 Module 2

CDU	CDU Connector	Connection Field		Signal
2	TX/RX Ant	Plate H	3	TX + RX A
	RX in	Plate J	3	RX B
3	TX/RX Ant	Plate J	2	TX + RX A
	RX in	Plate J	1	RX B

Table 56 CDU-C+ without Duplexer, Cp18/19_2.4 Module 3

CDU	CDU Connector	Connection Field		Signal
3 (M)	TX/RX Ant	Plate J	2	TX + RX A
	RX in	Palte J	1	RX B
	HL in	Plate D	2	HL in
	HL out	Plate D	1	HL out
1 (E)	TX/RX Ant	Plate H	1	TX + RX B
	RX in	Plate H	2	RX B
	HL in	Plate A	1	HL in
	HL out	Plate A	2	HL out

11.5 CDU-D

The CDU-D is a generic unit having several RUs to form the one CDU. The CDU therefore requires power, bus and subrack cables. CDU-D is also to be connected to antenna sockets located on the connection field of the cabinet. The connection field is located in the roof of the cabinet.

11.5.1 CDU-D Power

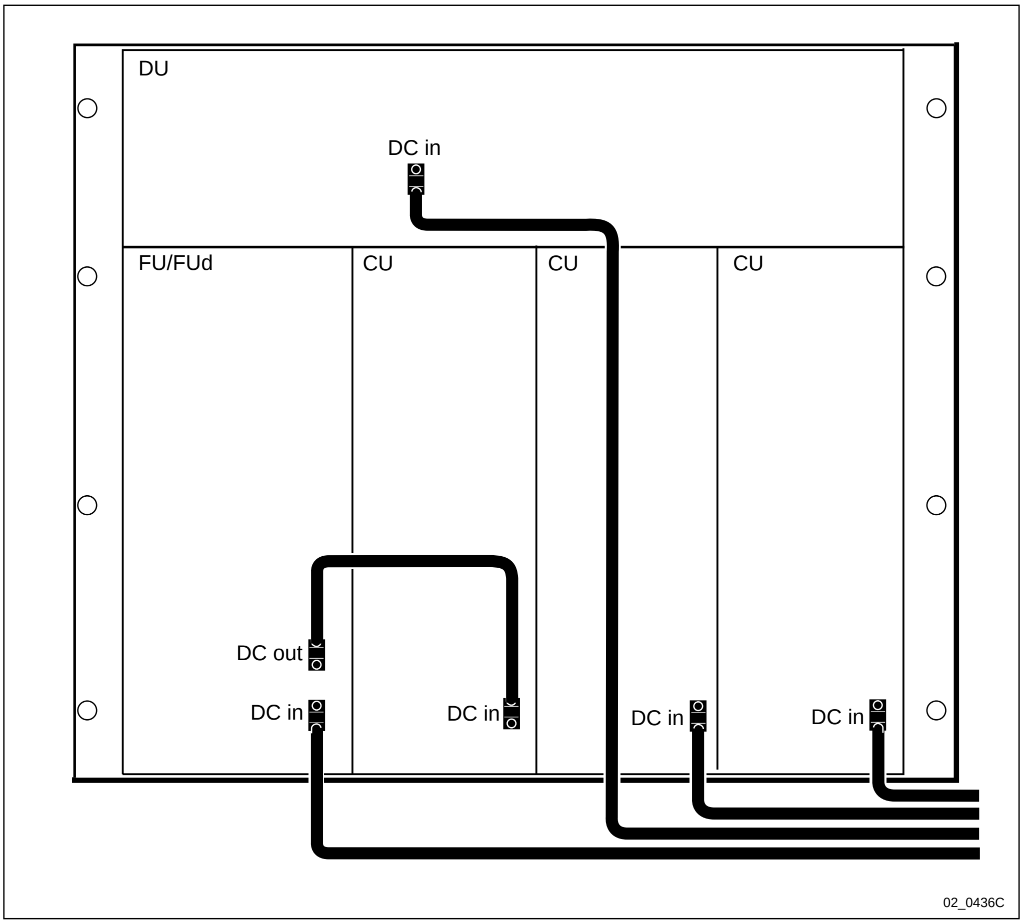

Figure 121 Power cables

Table 57 Power cables RPM 513 718/nnnnn

Cable label	Unit	Connector	To
CDU1 05/00*DC in	FU(d)	DC in	Preconnected
CDU2 05/28*DC in	CU 2	DC in	Preconnected
CDU3 05/56*DC in	CU 3	DC in	Preconnected
DU 05/00*DC in	DU	DC in	Preconnected

Table 58 CDU-D internal power cable RPM 513 718/nnnnn

From			To		
Cable label	Unit	Connector	Cable label	Unit	Connector
FU 05/00*DCout	FU(d)	DC in	CU1 05/14*DC	CU 1	DC in

11.5.2 CDU-D Bus

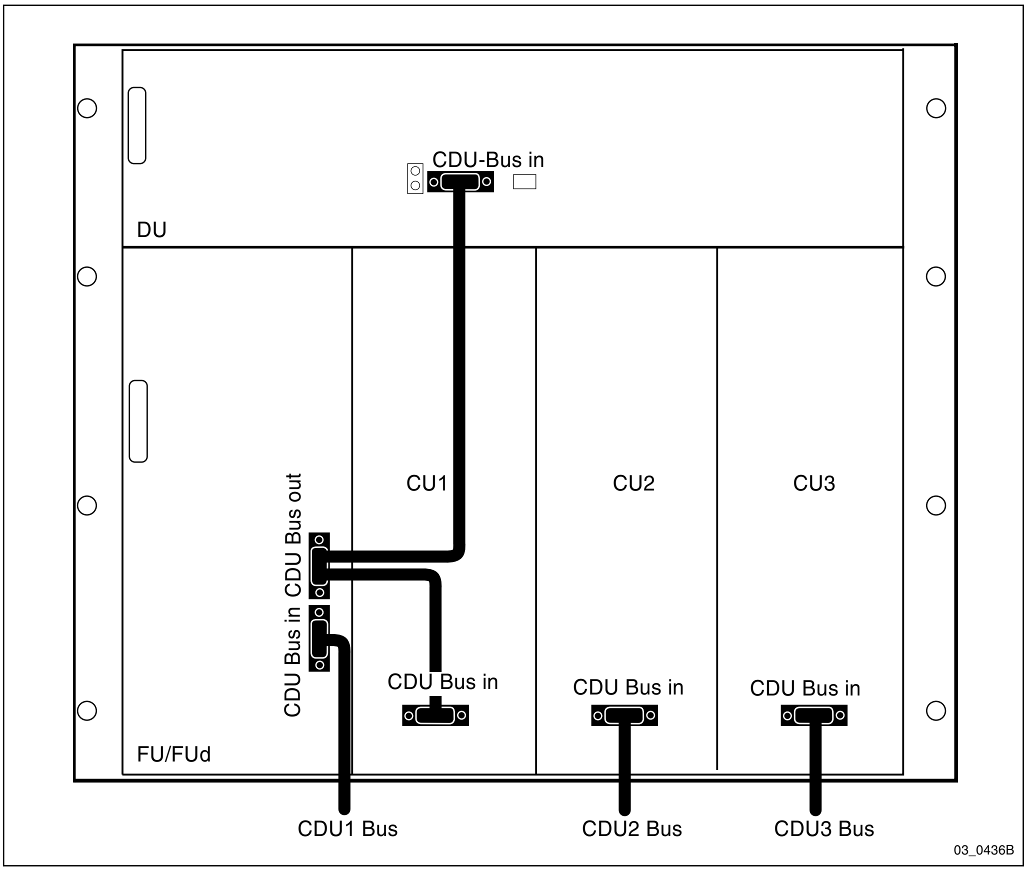

Figure 122 CDU bus cables

The only connections to the cabinet are the three CDU bus cables. There is also a CDU internal Y connection cable which is contained in the cable kit NMT 201 988/1.

Table 59 Bus cables RPM 513 717/nnnnn

Cable label	Unit	Connector	To
CDU1 05/00*CDU-bus	FU(d)	CDU-Bus in	Preassembled
CDU2 05/28*CDU-bus	CU 2	CDU bus	Preassembled
CDU3 05/56*CDU-bus	CU 3	CDU bus	Preassembled

Table 60 CDU-D bus Y connection cable

From FU(d)	Product Number	Unit	Connector
CDU-Bus out	RPM 513 1405/n	CU 1	CDU bus
-	-	DU	CDU-Bus in

11.5.3 CDU-D Subrack

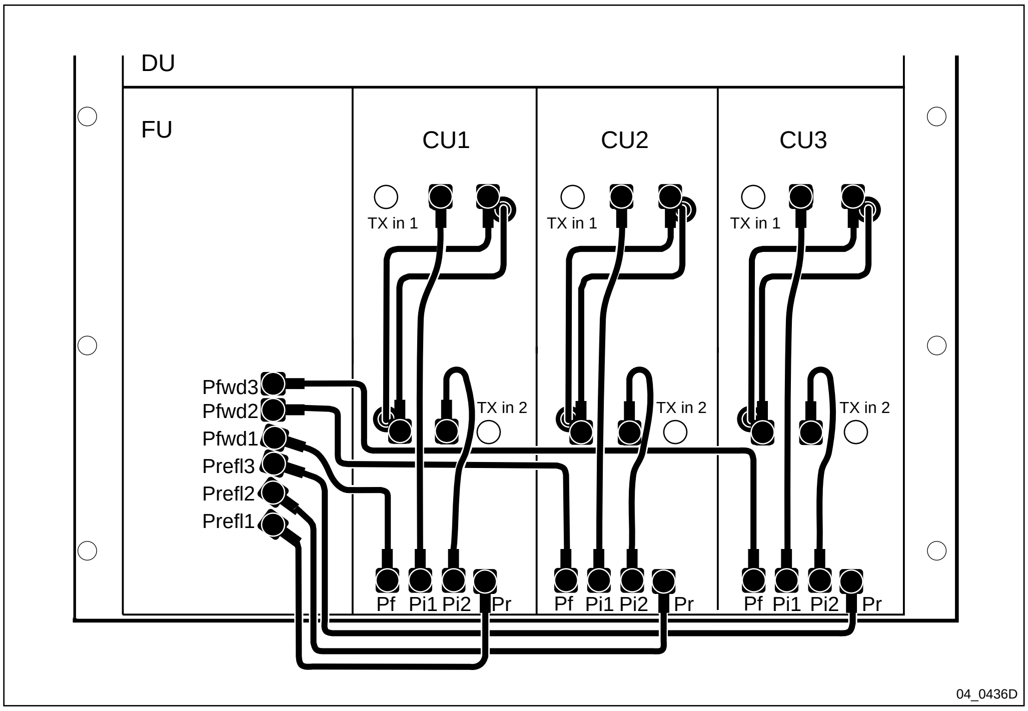

Figure 123 CDU-D internal subrack cables

Table 61 CDU-D internal subrack cables

From		Product Number	To	
Unit	**Connector**		**Unit**	**Connector**
FU / FUd	Prefl1	RPM 113 1891/1	CU 3	Pr
FU / FUd	Prefl2	RPM 113 1891/1	CU 2	Pr
FU / FUd	Prefl3	RPM 113 1891/2	CU 1	Pr
FU / FUd	Pfwd1	RPM 113 1891/2	CU 3	Pf
FU / FUd	Pfwd2	RPM 113 1891/3	CU 2	Pf
FU / FUd	Pfwd3	RPM 113 1891/3	CU 1	Pf
CU 1	Pi1	**	CU 1	Po1
CU 1	Pi2	**	CU 1	Po2
CU 2	Pi1	**	CU 2	Po1
CU 2	Pi2	**	CU 2	Po2
CU 3	Pi1	**	CU 3	Po1
CU 3	Pi2	**	CU 3	Po2
**	Component part of CU			

All the CDU-D subrack cables are a part of the CDU and are contained in the cable kit NMT 201 988/1 supplied with the CDU. These cables do not involve any connections to or from the the cabinet.

11.5.4 CDU-D Antenna

The lower ends of the antenna coaxial cables must be terminated to the CDUs and are marked accordingly. The upper ends of these cables are connected to RF sockets in the roof connection panel of the cabinet for termination to antennas.

The following information details the roof panel sockets and the CDU connections to which they are terminated.

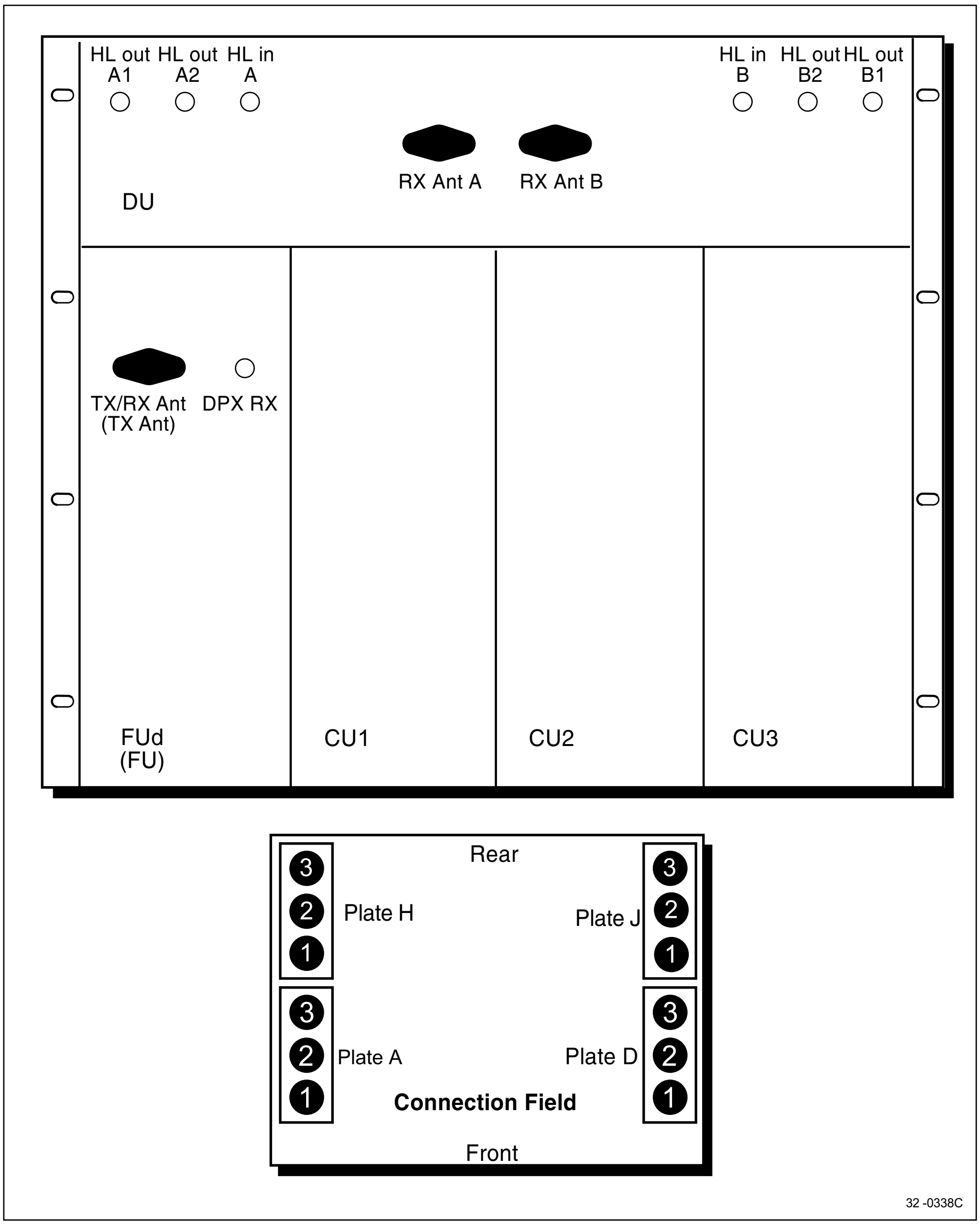

Figure 124 CDU-D at the top, connection field at the bottom

Table 62 CDU-D with duplexer, D9d/18d_2.6 (single cabinet)

CDU	**CDU Connector**	**Connection Field**		**Signal**
1	TX/RX Ant	Plate A	3	TX/RX A
	RX Ant B	Plate D	1	RX B

Table 63 CDU-D with duplexer, D9d/18d_2.12 (master cabinet)

CDU	**CDU Connector**	**Connection Field**		**Signal**
1	TX/RX Ant	Plate A	3	TX/RX A
	HL out A2	Plate A	2	HL out A2
	HL in B	Plate D	3	HL in B

Table 64 CDU-D with duplexer, D9d/18d_2.12 (extension cabinet)

CDU	CDU Connector	Connection Field		Signal
1	TX/RX Ant	Plate A	3	TX/RX B
	HL in A	Plate A	2	HL in A
	HL out B2	Plate D	3	HL out B2

Note: In the extension cabinet the connection DPX/RX will be connected to RX Ant B on the CDU-D

Table 65 CDU-D without duplexer, D9_3.6 and D18_2.6 (single cabinet)

CDU	CDU Connector	Connection Field		Signal
1	TX Ant	Plate A	3	TX
	RX Ant A	Plate A	1	RX A
	RX Ant B	Plate D	1	RX B

Table 66 CDU-D without duplexer, D18_2.12 (master cabinet)

CDU	CDU Connector	Connection Field		Signal
1	TX Ant	Plate A	3	TX
	RX Ant A	Plate A	1	RX A
	RX Ant B	Plate D	1	RX B
	HL out A2	Plate A	2	HL out A2
	HL out B2	Plate D	3	HL out B2

Table 67 CDU-D without duplexer, D18_2.12 (extension cabinet)

CDU	CDU Connector	Connection Field		Signal
1	TX Ant	Plate A	3	TX
	HL in A	Plate A	2	HL in A
	HL in B	Plate D	3	HL in B

11.6 DXU/ECU Backplane

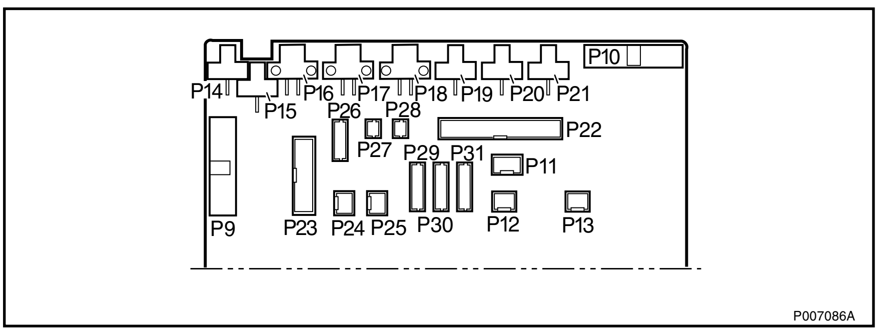

Figure 125 DXU/ECU backplane

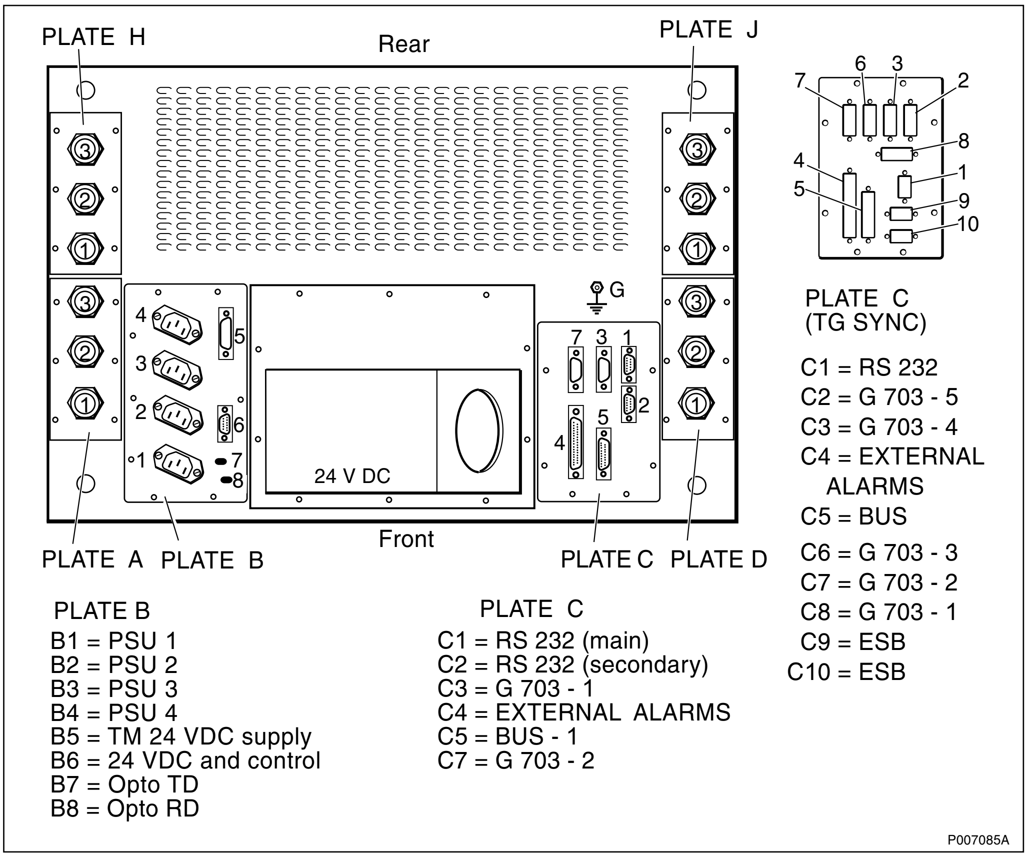

Figure 126 Connection field at the top of the cabinet

Note: Connection field shown is for the 1800 MHz models only and is different for the 900 MHz model. Plate C is the same for all models.

Table 68 Cable connections, connection field— DXU/ECU backplane

A-End Connection Connection Field	←	Cable Number	→	B-End Connection DXU/ECU Backplane
Bus 1 on plate C on connection field	←	RPM 513 854/02150	→	P9
P7 TRU backplane (Local bus)	←	ROA 117 2130/1	→	P10
(Not used)				P11
RS 232 (main) on plate C on connection field	←	RPM 513 740/01925	→	P12
RS 232 (secondary) on plate C on connection field	←	RPM 513 740/01925	→	P13
24 V DC to sVs from IDM fuse 2	←	RPM 513 718/02100	→	P14
24 V DC to DXU from IDM fuse 1	←	RPM 513 718/02100	→	P15
BFU 1	←	RPM 513 872/01600	→	P16
Battery cabinet	←	RPM 513 1129/01500	→	P17
Bus 2 on plate C on connection field	←	RPM 513 873/02500	→	P18
24 V DC to FXU 1 from IDM fuse 4	←	RPM 513 718/02100	→	P19
24 V DC to FXU 2 from IDM fuse 13	←	RPM 513 718/02100	→	P20
24 V DC to FXU 3 from IDM fuse 5	←	RPM 513 718/02100	→	P21
Ext. alarm on plate C on connection field	←	RPM 513 707/02000	→	P22
(Not used)				P23
Temp sensor 1	←	RPM 513 425/1	→	P24
Temp sensor 2	←	RPM 513 425/3	→	P25
(Not used)				P26
Self terminated	←	RPM 513 1151/1	→	P27
Self terminated	←	RPM 513 1151/1	→	P28
FCU 1	←	RPM 513 738/0200	→	P29
FCU 2	←	RPM 513 738/0200	→	P30
FIU (for FCU 3)	←	RPM 513 738/01200	→	P31
Plate B conn. 7 (opto TD)	←	Extern connection to RBS 2202	→	—
Plate B conn. 8 (opto RD)	←	Extern connection to RBS 2202	→	—

11.7 IDM

IDM with circuit breakers

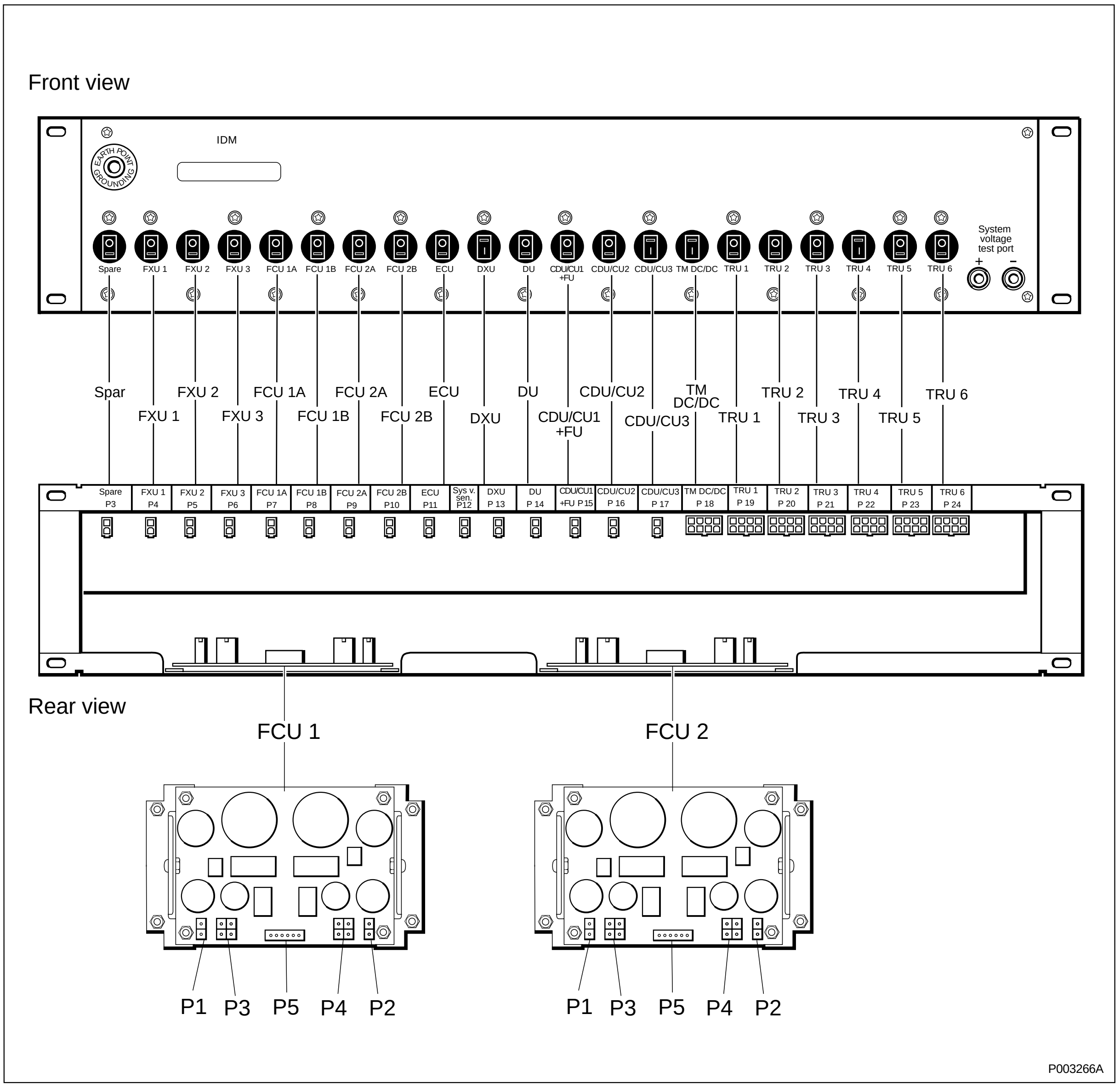

Figure 127 IDM

IDM with fuses

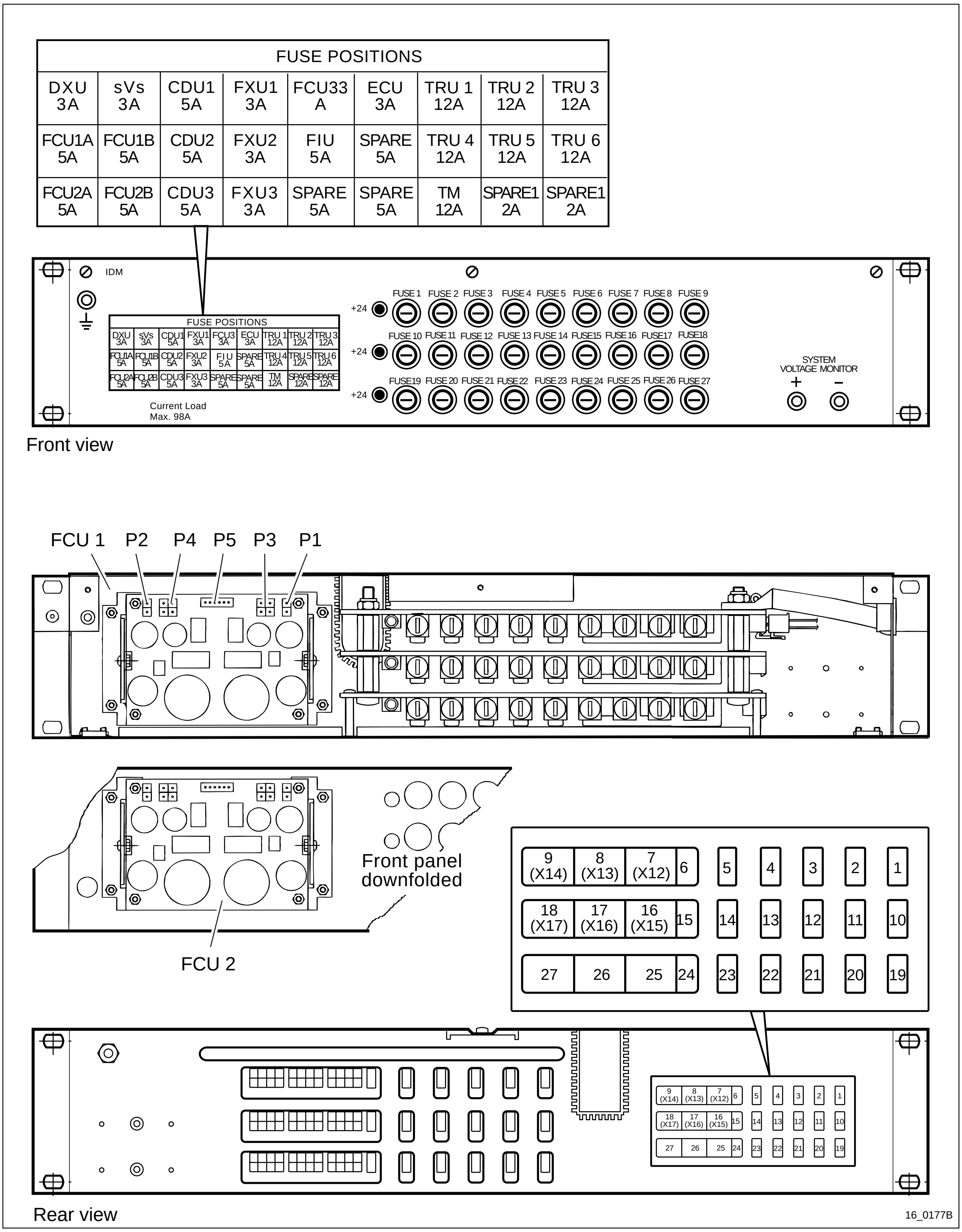

Figure 128 IDM

IDM cable connections, all versions

Table 69 IDM cable connections

A-End Connection	← Cable Number →	B-End Connection
DXU/ECU backplane P15	← RPM 513 718/02100 →	1 DXU 3 A
DXU/ECU backplane P16	← RPM 513 718/02100 →	2 sVs 3 A
DC in connector CDU 1	← RPM 513 718/02500 →	3 CDU 1 5 A
(Not used)		4 FXU 1 3 A
FCU 3 P1	← RPM 513 718/02100 →	5 TM 2 3 A
ECU/DCU backplane P14	← RPM 513 1174/02100 →	6 ECU 3 A
TRU backplane T1	← RPM 513 717/01100 →	7 TRU 1 12 A
TRU backplane T2	← RPM 513 717/01100 →	8 TRU 2 12 A
TRU backplane T3	← RPM 513 717/01100 →	9 TRU 3 12 A
FCU 1 P1	← RPM 513 718/00300 →	10 FCU 1A 5 A
FCU 1 P2	← RPM 513 718/00300 →	11 FCU 1B 5 A
DC in connector CDU 2	← RPM 513 718/02500 →	12 CDU 2 5 A
(Not used)		13 FXU 2 3 A
P1 on FIU	← RPM 513 1342/1 →	14 FIU 5 A
(Not used)		15 SPARE 5 A
TRU backplane T4	← RPM 513 717/01100 →	16 TRU 4 12 A
TRU backplane T5	← RPM 513 717/01100 →	17 TRU 5 12 A
TRU backplane T6	← RPM 513 717/01100 →	18 TRU 6 12 A
FCU 2 P1	← RPM 513 718/00300 →	19 FCU 2A 5 A
FCU 2 P2	← RPM 513 718/00300 →	20 FCU 2B 5 A
DC in connector CDU 3	← RPM 513 718/02500 →	21 CDU 3 5 A
(Not used)		22 FXU 3 3 A
(Not used)		23 SPARE 5 A
(Not used)		24 SPARE 5 A
(Not used)		25 TM 12 A
(Not used)		26 SPARE 12 A
(Not used)		27 SPARE 12 A
FCU 2 P3	← RPM 513 1128/02500 →	Fan 1
FCU 2 P4	← RPM 513 1128/02500 →	Fan 2

11.8 TRU Backplane

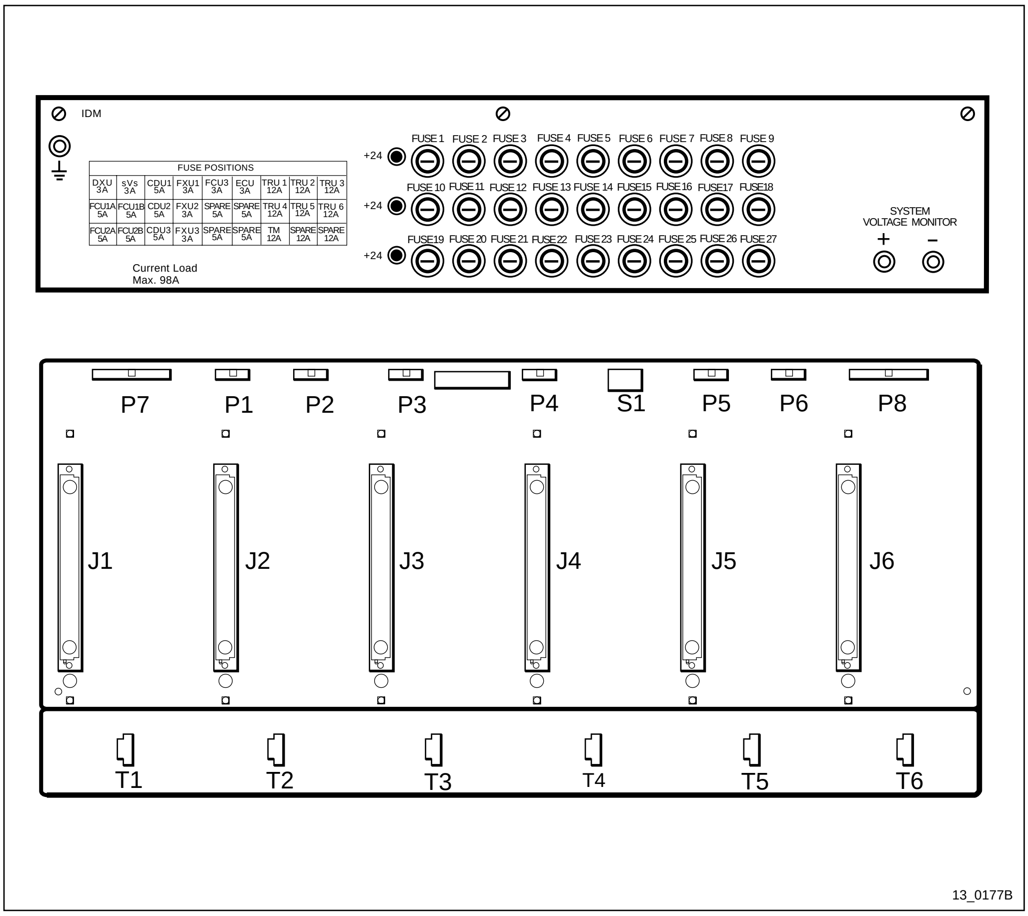

Figure 129 IDM panel (top), connections in the TRU backplane (bottom)

Table 70 TRU backplane cable connections

A-End Connection	← Cable Number →	B-End Connection
(Not used)		P1
CDU 1 CDU bus	← RPM 513 696/01600 →	P2 (jumper to P1)
(Not used)		P3
CDU 2 CDU bus	← RPM 513 696/01600 →	P4 (jumper to P3)
(Not used)		P5
CDU 3 CDU bus	← RPM 513 696/01600 →	P6 (jumper to P5)
P10 on DXU/ECU backplane (Local bus)	← RPM 513 696/00520 →	P7
120 Ω bus termination	← RPM 513 696/01600 →	P8
CDU 1 Pfwd1	← RPM 513 703/01640 →	J1 top
CDU 1 Prefl1	← RPM 513 703/01640 →	J1 bottom
CDU 1 Pfwd2	← RPM 513 703/01640 →	J2 top
CDU 1 Prefl2	← RPM 513 703/01640 →	J2 bottom
CDU 2 Pfwd1	← RPM 513 703/01640 →	J3 top
CDU 2 Prefl1	← RPM 513 703/01640 →	J3 bottom
CDU 2 Pfwd2	← RPM 513 703/01640 →	J4 top
CDU 2 Prefl2	← RPM 513 703/01640 →	J4 bottom
CDU 3 Pfwd1	← RPM 513 703/01640 →	J5 top
CDU 3 Prefl1	← RPM 513 703/01640 →	J5 bottom
CDU 3 Pfwd2	← RPM 513 703/01640 →	J6 top
CDU 3 Prefl2	← RPM 513 703/01640 →	J6 bottom
DC power from IDM fuse 7 (TRU 1)	← RPM 513 715/01100 →	T1 DC power for TRU 1
DC power from IDM fuse 8 (TRU 2)	← RPM 513 715/01100 →	T2 DC power for TRU 2
DC power from IDM fuse 9 (TRU 3)	← RPM 513 715/01100 →	T3 DC power for TRU 3
DC power from IDM fuse 16 (TRU 4)	← RPM 513 715/01100 →	T4 DC power for TRU 4
DC power from IDM fuse 17 (TRU 5)	← RPM 513 715/01100 →	T5 DC power for TRU 5
DC power from IDM fuse 18 (TRU 6)	← RPM 513 715/01100 →	T6 DC power for TRU 6

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12 Positioning of RUs

12.1 RBS 2202, IDM with Fuses

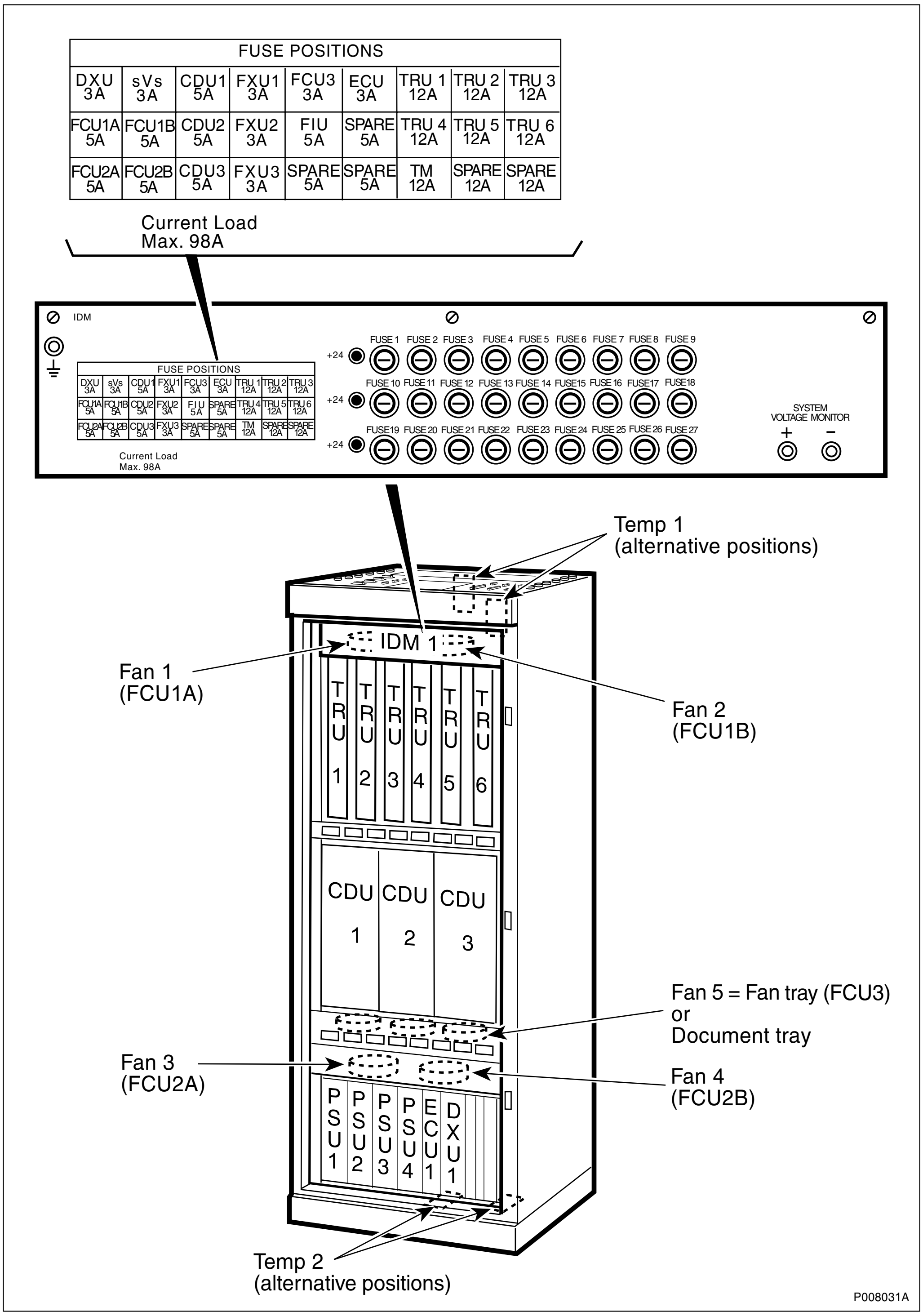

Figure 130 Positioning of RUs, IDM with fuses

12.2 RBS 2202, IDM with Circuit Breakers

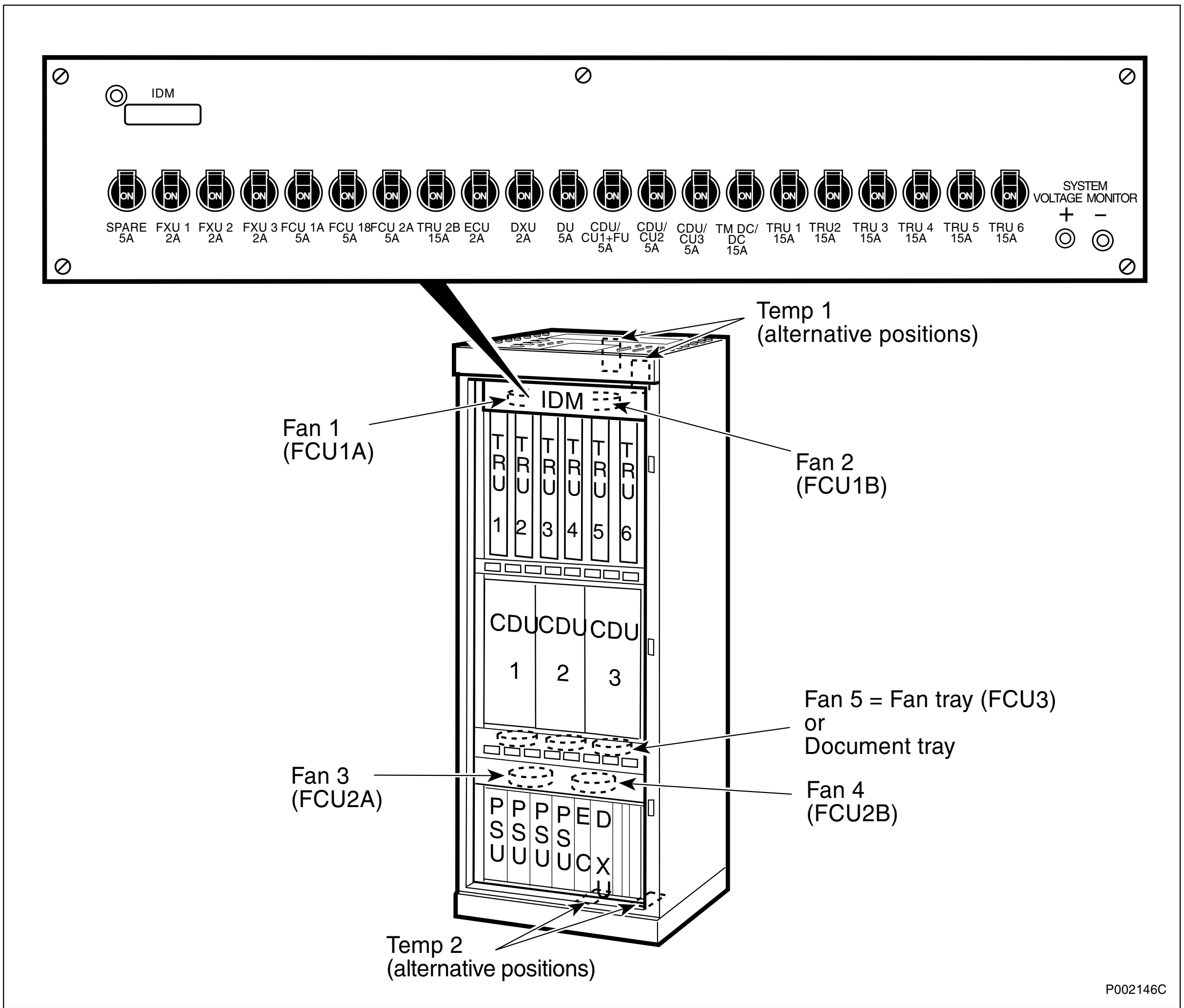

Figure 131 Positioning of RUs, IDM with circuit breakers

13 Glossary

This glossary lists abbreviations and acronyms used in texts dealing with RBS 2000 cabinets. Some basic terms and acronyms needed for cross-reference are included in the list.

Terms and Abbreviations

An arrow ⇒ is used to indicate a reference to another entry in this list.

1–P	One-Pair connection with echo cancellation (= two wires)
2–P	Two-Pair connection with echo cancellation (= four wires)
AAU	Active Antenna Unit
Abis	GSM interface standard defining attributes of the communication between BSC and BTS
AC	Alternating Current
ACB	Alarm Collection Board
ACCU	Alternating Current Connection Unit
A/D converter	Analog to Digital converter
AGW	Abis Gateway
Air conditioner	One version of the climate unit (Active cooler)
AIS	Alarm Indication Signal
ALBO	Automatic Line Build Out
ALNA	Antenna Low Noise Amplifier
ALPU	Antenna Lightning Protection Unit
AO	Application Object
ARAE	Antenna Related Auxiliary Equipment
ARFCN	Absolute Radio Frequency Channel Number
ARP	Antenna Reference Point
ARU	Active Replaceable Unit
ASIC	Application Specific Integrated Circuit
Astra	ASIC in the TRU
ASU	Antenna Sharing Unit

AT	Alphanumeric Terminal
ATRU	Adaptive Transceiver Unit
ATSR	Air Time Slot Resource
AU	Antenna Unit GSM 900 = CEU + Passive Antenna GSM 1800/1900 = AAU
BALUN	BALance and UNbalance transformer
Batt	Battery
BB	Battery Box
BBS	Battery Back-up Stand
BCCH	Broadcast Control CHannel Downlink only broadcast channel for broadcast of general information at a base station, on a base station basis.
BCS	Block Check Sequence
BDM	Battery Distribution Module The BDM is an IDM with a battery and a local processor.
BER	Bit Error Rate
BFU	Battery Fuse Unit
Bias injector	Injects DC power in the coaxial cable to feed the TMA. Isolates the DC power from the RF signal fed to the CDU.
Bm	Denotes a full rate traffic channel
BPC	Basic Physical Channel Denotes the air interface transport vehicle formed by repetition of one time slot on one or more radio frequency channels.
BS	Base Station
BSC	Base Station Controller GSM network node for control of one or more BTSs.
BSCSim	Base Station Controller Simulator
BSS	Base Station System

	GSM network logical unit comprising one BSC and one or more BTSs.
BTS	Base Transceiver Station GSM network unit operating on a set of radio frequency channels in one cell.
Burst	A portion of digital information, the physical content, that is transferred within the time interval of one time slot.
Cabinet	The physical housing of a base station
Cascade connections	Connection of several cabinets by the PCM cable. Similar to serial connection. ⇒ Cascading
Cascading	Connection of several cabinets by the PCM cable. Similar to serial connection. ⇒ Cascade connections
CBCH	Cell Broadcast CHannel This is a downlink only channel used by the GSM defined SMSCB function.
CCCH	Common Control CHannel Channel combining the following common control channels: PCH Paging CHannel RACH Random Access CHannel AGCH Access Grant CHannel
CCU	Climate Control Unit
CDU	Combining and Distribution Unit
CE	Conformité Européenne
Cell	An area of radio coverage identified by the GSM network by means of the cell identity
CEU	Coverage Extension Unit
CF	Central Functions
Channel	The common term channel denotes the virtual connection, consisting of physical and logical channels, between BSS and MS, during a call in progress. ⇒ Logical Channel ⇒ Physical Channel

Channel Combination	A physical channel on an air interface carrying a defined set of logical channels.
Channel group	A channel group is a group of dedicated logical channels to a specific MS.
CM	Control Module (for TMA)
CMD	Digital Radio Communication Tester
CMRU	Central Main Replaceable Unit. Main RU. The RBS is physically connected to the Base Station Controller (BSC) via the CMRU. There is only one CMRU in each RBS.
CNU	Combining Network Unit
Compr	Compressor
CON	LAPD concentrator LAPD concentration is used to reduce the number of required physical links between the BSC and BTS.
Config	Configuration
Co-siting	Co-siting is the operation of a radio base station in GSM together with the radio base station in Total Access Communication System (TACS) or Nordic Mobile Telephone system (NMT) on the same site by sharing common equipment.
CPI	Communication and Power Interface
CPI	Customer Product Information
CPU	Central Processing Unit
CRC	Cyclic Redundancy Check
CS	Coding Scheme
CSA	Canadian Standards Association
CSES	Consecutive Severely Errored Second
CSU	Channel Service Unit
CU	Combining Unit (RU in CDU_D)
CXU	Configuration Switch Unit
Dannie	ASIC in the TRU
DB	DataBase

DC	Direct Current
DCC	Digital Cross Connector
DCCH	Dedicated Control CHannel Dedicated control channels carry signalling data.
DCCU	DC Connection Unit
ddTMA	Dual Duplex Tower Mounted Amplifier This type needs only one combined TX/RX feeder from the BTS to the TMA. ⇒ dTMA ⇒ rTMA ⇒ TMA ⇒ BTS
DF	Distribution Frame
DFU	Distribution and Fuse Unit
DIP	DIgital Path The name of the function used for supervision of the connected PCM lines.
Dixie	ASIC in the TRU
DM	Degraded Minute
DM	Distribution Module
DMRU	Distributed Main Replaceable Unit If a Main RU is subordinated to the CMRU, it is said to be distributed.
Downlink	Signalling direction from the system to the MS
DP	Digital Path
DP	Distribution Panel
DPX	Duplexer
DS1	Digital Signal level 1 (1544 kbit/s)
DSP	Digital Signal Processor
DT	Data Transcript
DTE	Data Terminal Equipment
DTF	Distance To Fault
dTMA	Duplex TMA

	dTMA is similar to the old ALNA except for different characteristics. ⇒ ddTMA ⇒ rTMA ⇒ TMA
dTRU	double Transceiver Unit
DU	Distribution Unit (RU in CDU-D)
DUT	Device Under Test
DX	Direct Exchange
DXB	Distribution Switch Board
DXC	Digital Cross Connector
DXU	Distribution Switch Unit
DXX	Ericsson Cellular Transmission System including NMS
E1	Short for G.703 2048 kbit/s PCM link
E-GSM	Extended GSM
EACU	External Alarm Connection Unit
EC1	External Condition Map Class 1
EC2	External Condition Map Class 2
ECU	Energy Control Unit
EDGE	Enhanced Data rate for Global Evolution
EDT	Electrical Down Tilt
EEPROM	Electrically Erasable Programmable Read-Only Memory
EIRP	Effective Isotropic Radiated Power
EMC	Electro Magnetic Compatibility
EMF	ElectroMotive Force
EMI	Electromagnetic Interference
ENV	Environmental
EOC	Embedded Operations Channel
EPC	Environmental and Power Control
ES	Errored Second
ESB	External Synchronization Bus

ESD	ElectroStatic Discharge
ESO	Ericsson Support Office
ETS	European Telecommunication Standard
EXT	External
FACCH	Fast Associated Control CHannel Main signalling channel in association with a TCH.
FCC	Federal Communications Commission
FCCH	Frequency Correction CHannel
FCOMB	Filter COMBiner
FCU	Fan Control Unit
FDL	Facility Data Link
FDU	Feeder Duplexer Unit
FER	Frame Erasure Ratio
FIU	Fan Interface Unit
FS	Function Specification
FSC	Field Support Centre
FU	Filter Unit (RU in CDU-D)
FUd	Filter Unit with duplexer (RU in CDU-D)
FXU	Future Expansion Unit
G01	MO model for RBS 200
G12	MO model for RBS 2000
G.703	CCITT Standard for transmission
GPRS	General Packet Radio Services
GS	General Specification
GSL	GPRS Signalling Link
GSM	Global System for Mobile communications International standard for a TDMA digital mobile communication system. Originally, GSM was an abbreviation for Group Special Mobile, which is a European mobile telecommunication interest group, established in 1982.

GSM 900	GSM system 900 MHz (generic)
GSM 1800	(GSM-based) Digital communication system 1800 MHz (generic)
GSM 1900	(GSM-based) Digital communication system 1900 MHz (generic)
HCE	HDSL Central Equipment
HCOMB	Hybrid COMBiner
HDLC	High level Data Link Control
HDSL	High bit rate Digital Subscriber Line
Heat Exchanger	A version of the climate unit
HEU	Heat Exchanger Unit
HISC	Highway Splitter Combiner
HLIN	High Level IN
HLOUT	High Level OUT
HMS	Heat Management System
Hum	Humidity
HW	HardWare
HWU	HardWare Unit An HWU consists of one or more SEs. An HWU is a functional unit within the RBS. The HWU is either active (equipped with a processor) or passive (without processor).
I1A	Internal Fault Map Class 1A
I1B	Internal Fault Map Class 1B
I2A	Internal Fault Map Class 2A
IA	Immediate Assignment
IC	Integrated Circuit
ID	IDentification
IDB	Installation Data Base
IDM	Internal Distribution Module
IEC	International Electric Commission
IF Box	Interface Box

IMSI	International Mobile Subscriber Identity
INIT	Initial
INT	Internal
IOG	Input/Output Group
IOM	Internal Operation and Maintenance bus
IR	InfraRed
IS	Interface Switch
IWD	InterWork Description
JTC	Joint Technical Committee
LAPD	Link Access Procedures on D-channel LAPD is the data link layer (layer 2) protocol used for communication between the BSC and the BTS on the Abis interface. Abis layer 2 is sometimes used synonymously with LAPD.
LBO	Line Build Out
LED	Light Emitting Diode
LLB	Line Loop Back
LNA	Low Noise Amplifier
Local bus	The local bus offers communication between a central main RU (DXU) and distributed main RUs (TRU and ECU).
Local mode	When the RU is in Local mode, it is not communicating with the BSC.
Local/Remote switch	A switch used by the operator to order the RU to enter Local or Remote mode.
LOF	Loss Of Frame
Logical Channel	A logical channel represents a specified portion of the information carrying capacity of a physical channel. GSM defines two major categories of logical channels: TCHs Traffic CHannels, for speech or user data

	CCHs Control CHannels, for control signalling. ⇒ Physical Channel ⇒ Channel Combination
Logical RU	A unit which can be referred to, but is not a single physical unit. There are three different kinds of logical RUs: 1. Buses 2. Antennas 3. Environment
LOS	Loss Of Signal
LVD	Low Voltage Directive
LVF	Low Voltage Filter
MAC	Medium Access Controller
MADT	Mean Accumulated DownTime
Magazine	A magazine is a reserved space in the cabinet, which may hold one or more RUs.
Main RU	A main replaceable unit is a replaceable unit that contains one or more processors, to which software can be downloaded from the BSC.
MCB	MultiCasting Box
MHS	Modification Handling System Ericsson trouble report database
MMI	Man-Machine Interface
MO	Managed Object
MR	Measurement Receiver
MRT	Mean Repair Time
MS	Mobile Station
MSC	Mobile services Switching Centre GSM network unit for switching, routing and controlling calls to and from the Public Switched Telephone Network (PSTN) and other networks.
MSTP	Mobile Station Test Point
MTBF	Mean Time Between Failure

MTBCF	Mean Time Between Catastrophe Failure
Multidrop	Two or more RBSs are connected in a chain to the same transmission system. All the relevant time slots are dropped out by each RBS. (This function is sometimes called cascading.)
NCS	National Colour System
NEBS	Network Equipment Building System
NMS	Ericsson Network Management System in DXX
Nominal Power	The nominal power is the power level defined when configuring the transceiver.
N terminal	Neutral terminal in an AC mains connection
NTU	Network Terminating Unit
OL/UL	Overlaid/Underlaid
O&M	Operation and Maintenance General term for activities such as configuration, utilization of channels (frequency bands), cell planning, system supervision, hardware and software maintenance, subscriber administration, and so forth.
OMC	Operation and Maintenance Centre
OML	Operation and Maintenance Link Layer 2 communication link for operation and maintenance services on Abis.
OMT	Operation and Maintenance Terminal The OMT is a terminal that supports functions for handling the RBS on site. The terminal can be a portable PC.
Operation	Operation is the normal, everyday running of the RBS with full functions.
OPI	OPerational Instructions
OVP	OverVoltage Protection
OXU	Space for Optional Expansion
P-GSM	Primary GSM
PA	Power Amplifier

PAM	Power Amplifier Module
Passive RU	A passive replaceable unit has a very low level of intelligence and is independent of the processor system.
PBA	Printed Board Assembly
PBC	Power and Battery Cabinet
PC	Personal Computer
PCAT	Product CATalogue A web-based ordering system on Ericsson's Intranet.
PCB	Printed Circuit Board
PCH	Paging CHannel Downlink only subchannel of CCCH for system paging of MSs. ⇒ CCCH
PCM	Pulse Code Modulation
PCU	Packet Control Unit
PDCH	Packet Data Channel
PE terminal	Protective Earth terminal in an AC mains connection
PFWD	Power Forward
Physical Channel	An air interface physical channel carries one or more logical channels. A physical channel uses a combination of frequency and time division multiplexing and is defined as a sequence of radio frequency channels and time slots. ⇒ TDMA frame ⇒ Logical channel
PIN	Personal Identification Number
PLB	Payload Loop Back
PLMN	Public Land Mobile Network A network, established and operated by an administration or its licensed operator(s), for the specific purpose of providing land mobile communication services to the public. It provides communication possibilities for mobile users. For communication between mobile and fixed

	users, interworking with a fixed network is necessary.
PPE	Personal Protective Equipment
PREFL	Power Reflected
PSA	Power Supply Adapter
PSU	Power Supply Unit
PWU	Power Unit
RACH	Random Access CHannel Uplink only subchannel of CCCH for MS request for allocation of a dedicated channel. ⇒ CCCH
RAI	Remote Alarm Indication
RAM	Random Access Memory
RBER	Radio Bit Error Ratio
RBS	Radio Base Station All equipment forming one or more Ericsson base station. ⇒ BTS
RCB	Radio Connection Box
RD	Receive Data
Remote mode	When the RU is in RU Remote mode, a link is established between the BSC and the central main RU.
RF	Radio Frequency
RFCH	Radio Frequency CHannel A radio frequency carrier with its associated bandwidth.
RFTL	Radio Frequency Test Loop
RLC	Radio Link Control
RLC	Repair Logistic Centre
RSL	Radio Signalling Link
R-state	Release state

RS232	American standard for term/MODEM interconnection
rTMA	Receiver TMA rTMA has no duplexers. It is used for amplification of the RX signal. ⇒ ddTMA ⇒ dTMA ⇒ TMA
RTN	Return
RU	Replacement Unit An RU consists of one or more HWUs. An RU may be replaced by another RU of the same type. The RU is the smallest unit that can be handled on site.
RX	Receiver
RX1	Receiver antenna branch 1
RX2	Receiver antenna branch 2
RXA	Receiver antenna branch A
RXB	Receiver antenna branch B
RXD	Receiver Divider
RXDA	Receiver Divider Amplifier
RXDP	Receiver Distribution Plane
RXLEV	Measure of signal strength as defined in GSM:05.08:8.1.4
RXQUAL	Measure of signal quality as defined in GSM:05.08:8.2.4
SACCH	Slow Associated Control CHannel
SCH	Synchronization CHannel
SDCCH	Stand alone Dedicated Control CHannel Main dedicated signalling channel on the air interface, mainly used for call locating and establishment.
SCU	Switching and Combining Unit
SE	Supervised Entity
SES	Severely Errored Second
SIG	Signalling
SIM	Subscriber Identity Module

SIR	Small Indoor RBS
SMS	Short Message Service (point to point) A short message, up to 160 alphanumeric characters long, can be sent to or from an MS (point to point).
SO	Service Object
SS	Swedish Standard
Sub-RU	A sub-replaceable unit is always connected to a superior Main RU. This connection is used for example for retrieval of the RU identity. A sub-RU normally does not have a processor. Note that an RU with a processor, which cannot be loaded, is classified as a sub-RU.
SVS	System Voltage Sensor
SW	SoftWare
SWR	Standing Wave Ratio
SYNC	Synchronous
T1	Transmission facility for DS1 (1544 kbit/s)
TA	Timing Advance A signal sent by the BTS to the MS which the MS uses to advance its timing of transmissions to the BTS to compensate for propagation delay.
TC	Transaction Capabilities
TCB	Transceiver Control Board
TCH	Traffic CHannel The traffic channels carry either encoded speech or user data.
TCH SIG	Traffic CHannel Signalling
TD	Transmit Data
TDMA	Time Division Multiple Access Multiplexing of several channels in a common frequency band. Each channel is assigned a certain time division, a time slot.
TDMA frame	GSM air interface time frame comprising eight time slots

TEI	Terminal Endpoint Identifier TEI is an identification code carried by a LAPD frame as a terminal connection endpoint within a Service Access Point (SAP).
TEMS	TEst Mobile Station
TF	Timing Function
TG	Transceiver Group
Timing bus	The timing bus carries air timing information from the timing unit in the DXU to the TRUs.
TLS	Terrestrial Link Supervision
TM	Transport Module The Transport module is non-RBS equipment belonging to the transport network.
TMA	Tower Mounted Amplifier There are three types of TMAs: dTMA, rTMA and ddTMA. ⇒ dTMA ⇒ rTMA ⇒ ddTMA
TMA CM	Tower Mounted Amplifier Control Module
TN	Time slot Number
TN O&M	Transport Network operation and Maintenance (in general)
Tora	ASIC in the TRU
TRA	Transcoder Rate Adapter The TRA Unit in BSC performs transcoding of speech information and rate adaption of data information.
Tracy	ASIC in the TRU
TRS	Transceiver System
TRU	Transceiver Unit
TRX	Transceiver (combined transmitter and receiver)
TRXC	Transceiver Controller
TS	Time Slot

	A 0.577 ms period (TDMA frame subunit) corresponding to 156.25 raw bits of information. The eight time slots of each TDMA frame are numbered 0...7. ⇒ Burst
TT	Total Time
TU	Timing Unit
TX	Transmitter
TXA	Transmitter Antenna A
TXB	Transmitter Antenna B
TXBP	Transmitter BandPass filter
TXU	Radio Transmitter Unit
UAS	Unavailable Seconds
UL	Underwriter Laboratories
Uplink	Signalling direction from the MS to the system
UPS	Uninterrupted Power Supply
VCO	Voltage Controlled Oscillator
VSWR	Voltage Standing Wave Ratio RF signal measure. The quotient between transmitted and reflected voltage.
X-bus	The X-bus carries transmit air data frames between transceivers.
Y-link	The interface between the DXU and each DSP System in core based TRUs

RBS 2202 Fault List

Due to continued progress in methodology, design and manufacturing, the contents of this document are subject to revision without notice.

Contents

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1 Fault List

Note: This document gives the reader advice on how to deal with fault codes that are read in the OMT (R-OMT). The actions are not to be treated as instructions, rather they give helpful hints when the fault appears. All hints should be followed one at a time and not collectively. The document is currently under revision and is not complete.

Note: The fault must be verified before returning the faulty unit to the Ericsson repair center.

This chapter describes faults reported to the BSC and HW units suspected of causing the fault.

Where applicable, the fault lists indicate faults with restricted validity for SW releases R7.0, R7C, R7D and R8A respectively.

Note: Unused fault numbers are not indicated in the fault maps.

1.1 Terminology

The following terminology is used throughout this chapter.

1.1.1 Fault Number

The fault number is identical with the bit position in the fault map reported over the Abis interface.

1.1.2 Fault Maps

Note: No decoding of fault maps is necessary when using RBS 2000 release HRB 105 01/2, version R7 and subsequent updates. The fault maps will be presented in plain text (fault type).

Internal Fault Map Class 1A (I1A)

Faults reported in this class are faults that affect MO function. Faulty HW is part of the signalling MO.

Internal Fault Map Class 1B (I1B)

Faults reported in this class are faults that affect MO function. The origin of the fault is external to the signalling MO.

Internal Fault Map Class 2A (I2A)

Faults reported in this class are faults that do not affect MO function. Faulty HW is part of the signalling MO.

External Condition Map Class 1 (EC1)

Conditions reported in this class are conditions that affect MO function. The conditions are TG external.

External Condition Map Class 2 (EC2)

Conditions reported in this class are conditions that do not affect MO function. The conditions are TG external.

Replacement Unit Map (RU Map)

Units reported in this map are HW units suspected of causing the faults in the internal fault maps described above.

1.1.3 Logical RU

A logical RU is defined as a unit that can be referred to but is not a single physical unit. There are four different kinds of logical RUs.

Logical RUs in 1 and 2 above are pointed out when the analysis fails to give a more detailed localisation of the fault. However, the intention is still not to point out a logical RU.

1. **Buses**. These are often referred to as a single physical unit, but are implemented in the backplane of the cabinet with cables. When a bus is pointed out in the RU map it should be understood that faulty HW can be any unit connected to the bus, or the bus itself. Logical bus RUs are:
   - CDU bus
   - Local bus
   - Power communication loop
   - PSU DC cable
   - Timing bus
   - X bus
2. **Antenna**. A logical antenna means the whole signal path between the Transmitter/Receiver and the physical antenna. The logical antenna RU is:
   - Antenna
3. **Environment**. This RU records conditions that cannot be affected from the base station. There are two groups under this RU:
   - Power, that handles external power
   - Climate, that handles humidity and temperature

   For example, if the temperature in the cabinet is too high, or the incoming AC mains power is out of range, the logical RU "Environment"is denoted as faulty.

   The logical RU is:
   - Environment
4. **RBS DB**. The RBS database is regarded as a replaceble unit even though it is not a physical unit. It comprises the data in the database only, not the medium it resides in.

1.2 Fault Map Overview

Fault codes on the Abis interface are defined per MO. The SO RU map and the I1A/I2A fault maps should be read together. The SO fault map denotes which fault it is, and the RU map denotes where the fault is located.

An AO I1B fault has a corresponding SO I2A fault. So by reading the I2A fault map and the RU map for SO CF or SO TRXC, the HW that is causing the AO I1B fault can be found. This is the case when BTS internal HW affects a single AO.

The AO is not allowed to report the HW itself as this task is assigned to the HW responsible SO. One could say that the consequence is reported by the AO I1B fault map and the cause is reported by the SO I1A/I2A fault maps and the RU map.

1.2.1 Notes to the Fault Maps

Note 1: RBS behavior due to DC undervoltage

Nominal DC voltage

27.2 V DC ±0.1 V DC at 25 °C and nominal load

DC voltage falling

The following list describes what happens when the DC voltage is falling from nominal voltage to undervoltage level.

- The DC voltage is within nominal range
- Fault SO CF I2A:18 arises (DC voltage out of range)
- Fault SO CF I1A:12 arises (DC voltage out of range) and the RBS is shut down
- Batteries are disconnected

DC voltage rising

The following list describes what happens when the DC voltage is rising from undervoltage to nominal voltage level.

- The DC voltage is within nominal range
- Fault SO CF I2A:18 ceases
- Batteries are reconnected
- Fault SO CF I1A:12 ceases and the RBS is restarted

Note 2: Fault reporting connected to temperature and humidity ranges supported inside the cabinet (RBS macro) or outside the cabinet (RBS micro):

Normal Conditional Range

All RUs are able to function as specified

Temperature range: 5 – 45 °C

Humidity range: 5 – 85 % (relative)

Safe function

The RUs are able to function but with reduced performance. This operating mode should not be allowed to last more than 72 consecutive hours, and a total of not more than 15 days in one year.

Temperature range: 0 – 5 °C and 45 – 55 °C

Fault SO CF I2A:16 arises – Indoor temp out of normal conditional range (macro)

Fault SO CF I2A:44 arises – Indoor temp above normal conditional range (micro)

Fault SO CF I2A:45 arises – Indoor temp below normal conditional range (micro)

Humidity range: 85 – 90 % (relative)

Fault SO CF I2A:17 arises – Indoor humidity (macro)

Non-destruction

The RUs are not able to function properly but they will not be damaged. This condition should not be allowed to last more than 96 consecutive hours, and a total of not more than 5.5 days in a 3 year period.

Temperature range: -10 – 0 °C and 55 – 60 °C

Fault SO CF I1A:10 arises – Indoor temp out of safe range (macro)

Fault SO CF I1A:19 arises – Indoor temp above safe range (micro)

Fault SO CF I1A:20 arises – Indoor temp below safe range (micro)

1.3 SO CF Fault Maps

1.3.1 SO CF, external condition map class 1

Table 1 SO CF EC1

Fault No.	**SO CF EC1:4**
Fault name	L/R SWI (BTS in local mode)
Description	The DXU is in local mode and cannot be controlled by the BSC.
Action	Press the Local/remote button to bring the DXU into remote mode.

Fault No.	**SO CF EC1:5**
Fault name	L/R TI (Local to remote while link lost)
Description	This fault tells the BSC that the DXU went into remote mode while the link was down.
Note:	For information only, not a fault.

1.3.2 SO CF, external condition map class 2

Table 2 SO CF EC2

Fault No.	**SO CF EC2:10**
Fault name	Mains fail (External power source fail)
Remark	SW release R8A
Description	There is a failure in AC mains supply.
Possible reasons	•AC mains failure. •ACCU fault (or wrong strapping). •Disconnected AC input cable to ECU or PSU.
Note:	If this fault and the fault Nos. SO CF I2A:23, 29 and 37 arise at the same time, then there is probably a bad connection between ACCU and ECU provoking false alarms.

Fault No.	**SO CF EC2:11**
Fault name	ALNA/TMA fault
Remark	SW release R8A
Related fault	AO RX I1B:1 – ALNA/TMA fault
Description	A TMA has probably malfunctioned. The RX is getting a weaker signal from the side using this TMA, which reduces the sensitivity by about 3.5 dB. If the other RX side is also faulty, then the fault AO RX I1B:1 arises. The current consumption in the TMA is supervised from the CDU and can be monitored with the OMT. The fault arises when the current in the TMA is outside the range 33 – 147 mA. These limits are set in the IDB but can be changed with the OMT.
Action	Try the following actions until the fault is corrected: •Check that feeders and jumpers are OK. •Check and that the correct IDB is installed. •Replace the TMA.
Note:	If the TMA has two amplifiers, and if only one is faulty, the current will be pulsated. This will be detected by the CDU and reported as fault SO CF EC2:12.
Note:	In SW releases R7.0, R7C and R7D, this fault is found in SO CF I2A:11.

Fault No.	**SO CF EC2:12**
Fault name	ALNA/TMA degraded
Remark	SW release R8A
Related fault	AO RX I1B:1 – ALNA/TMA fault
Description	A TMA has probably malfunctioned. The RX is getting a weaker signal from the side using this TMA, which reduces the sensitivity by about 3.5 dB. If the other RX side is also faulty, then the fault AO RX I1B:1 arises. The current consumption in the TMA is supervised from the CDU and can be monitored with the OMT. The fault arises when the current in the TMA is outside the range 33 – 147 mA. These limits are set in the IDB but can be changed with the OMT.
Action	Try the following actions until the fault is corrected: •Check that feeders and jumpers are OK. •Check and that the correct IDB is installed. •Replace the TMA.

Fault No.	**SO CF EC2:13**
Fault name	Auxiliary equipment fault
Remark	SW release R8A
Related fault	AO TX I1B:47 – Auxiliary equipment fault AO TX I2A:0 – Diversity fault
Description	
Action	

1.3.3 SO CF, internal fault map class 1A

Table 3 SO CF I1A

Fault No.	**SO CF I1A:0**
Fault name	Reset, failed restart attempt
Remark	SW releases R7.0, R7C and R7D
Description	Reset has occurred in the DXU.
Note:	For information only, not a fault.

Fault No.	**SO CF I1A:1**
Fault name	Reset, power on
Description	Reset has occurred in the DXU.
Note:	For information only, not a fault.

Fault No.	**SO CF I1A:2**
Fault name	Reset, switch
Description	Reset has occurred in the DXU.
Note:	For information only, not a fault.

Fault No.	**SO CF I1A:3**
Fault name	Reset, watchdog
Description	Reset has occurred in the DXU.
Note:	For information only, not a fault.

Fault No.	**SO CF I1A:4**
Fault name	Reset, SW fault
Description	Reset has occurred in the DXU.
Note:	For information only, not a fault.

Fault No.	**SO CF I1A:5**
Fault name	Reset, RAM fault
Description	Reset has occurred in the DXU.
Note:	For information only, not a fault.

Fault No.	**SO CF I1A:6**
Fault name	Reset, internal function change
Description	Reset has occurred in the DXU.
Note:	For information only, not a fault.

Fault No.	**SO CF I1A:7**
Fault name	X bus fault
Related fault	SO TRXC I1A:15 – X bus communication fault
Description	This fault arises when 2 or more TRUs have reported communication problems on the X bus.
Possible reasons	Intermittent disturbances, most common reason: •One or more calls are carried by two TRXCs. •One of the TRUs contains RX and TS for a given call and the other TRXC is TX for the same cal. This is l most common with Base band hopping, but does also occur under special circumstances with Synthesize hopping. If either one of these TRXCs is reset, this alarm will arise. No HW needs to be replaced as the alarm ceases when the TRXC is reset. Other possible reasons: •Faulty TRUs. •Faulty backplane.
Actions	Try the following actions until the fault is corrected: •Check that all connections are OK: The bus terminator, the extension cable, and so on. •Switch positions between TRUs. •Switch off and on the power to the cabinet. •Replace the TRU magazine.

Fault No.	**SO CF I1A:8**
Fault name	Timing unit VCO fault
Remark:	Only valid for DXU-11
Related fault	SO CF I2A:13 – Timing unit VCO ageing
Possible reasons	a. The VCO control value has drifted out of range. The VCO needs to be recalibrated. (see fault SO CF I2A:13) b. The VCO temperature too low. The start-up heater is stuck. c. The VCO is not distributing any 13 MHz signal.
Action	The following actions correlate to the possible reasons above: a. Fault SO CF I2A:13 will probably warn before this fault arises. Note: The VCO control value can be monitored with the OMT. b. Probably a HW fault in the DXU or a power supply problem. Switch the DXU off and on with the circuit breaker on the IDM. If this does not help, change the DXU. c. Probably a HW fault in the DXU or a power supply problem. Switch the DXU off and on with the circuit breaker on the IDM. If this does not help, change the DXU.

Fault No.	**SO CF I1A:9**
Fault name	Timing bus fault
Related fault	SO TRXC I1A:8 – Timing reception fault
Description	This fault arises when the timing bus driver in the DXU is faulty or if two or more TRUs have reported timing reception problems.
Possible reasons	Faulty DXU or DXU backplane, faulty TRU backplane.
Action	Try the following actions until the fault is corrected:
	•Switch the DXU off and on with the circuit breaker on the IDM.
	•Replace the DXU.
	•Replace the local bus cable between the DXU/ECU and TRU backplanes.
	•Replace the DXU/ECU backplane.
	•Replace the TRU magazine.

Fault No.	**SO CF I1A:10**
Fault name	Indoor temperature out of safe range
Related fault	SO CF I2A:16 – Indoor temp out of normal conditional range
	SO CF RU:31 – Environment
	SO TRXC I1B:1 – Indoor temp out of safe range
Description	Temperature in master cabinet is out of the specified safe. The fault ceases when the temperature comes back within the safe range. See Note 2 on page 8 .
Possible reasons	a. TRU dummies missing.
	b. Climate system failure.
	c. Extreme weather conditions.
Action	The following actions correlate to the possible reasons above:
	a. Check for missing TRU dummies. Insert TRU dummies in empty slots in the TRU magazine.
	b. Perform a climate system test.
	c. No action is given for this cause.

Fault No.	**SO CF I1A:12**
Fault name	DC voltage out of range
Remark:	This fault is only valid for master or single cabinet. The related faults are only valid for extension cabinet.
Related faults	SO CF I2A:18 – DC voltage out of range
	SO TRXC I1B:3 – DC voltage out of range
Description	The DC voltage (in master cabinet) has dropped below safe level and the RBS will shut down immediately, see Note 1 on page 7 . The fault will cease when DC voltage returns to safe level.
Possible reasons	The AC mains has failed and the BTS is running on batteries. The batteries are almost empty and will soon be disconnected.
Action	•Check external power supply.
	•Check the ACCU

Fault No.	**SO CF I1A:14**
Fault name	Bus fault
	Local Bus fault
Related fault	SO CF I2A:30 – Bus fault
Description	The DXU is not able to send any data on the local bus.
Possible reasons	Probably a HW fault (for example local bus terminator, DXU, backplane).
Action	Check all parts of the local bus.

Fault No.	**SO CF I1A:15**
Fault name	RBS database corrupted
Related fault	SO CF RU:34 – RBS DB
Description	The RBS database in the DXU is corrupted or cannot be read by the SW.
Action	Reinstall the IDB with the OMT and press the CPU Reset button on the DXU. If this does not help, change the DXU.

Fault No.	**SO CF I1A:16**
Fault name	RU database corrupted
Description	The RU database in the DXU is corrupted or cannot be read by the SW.
Action	Reset the DXU. If this does not help, change the DXU.

Fault No.	**SO CF I1A:17**
Fault name	HW and IDB inconsistent
Description	The IDB does not match the HW present in cabinet, for exemple wrong cabinet type, wrong transmission type, and so on.
Action	Install the correct IDB with the OMT and press the CPU Reset button on the DXU.

Fault No.	**SO CF I1A:18**
Fault name	Internal configuration failed
Description	One or several subsystems in DXU SW have failed their internal configuration. DXU SW will not be able to use DXU HW properly.
Possible reasons	This fault is usually a consequence of faults SO CF I1A:15, 16, or 17 above.
Action	Reinstall the IDB with the OMT and press the CPU Reset button on the DXU. If this does not help, change the DXU.

1.3.4 SO CF, internal fault map class 2A

Table 4 SO CF I2A

Fault No.	**SO CF I2A:0**
Fault name	Reset, failed restart attempt
Remark	SW releases R7.0, R7C and R7D
Description	Reset has occurred on ECU.
Note:	For information only, not a fault.

Fault No.	**SO CF I2A:1**
Fault name	Reset, power on
Description	Reset has occurred on ECU.
Note:	For information only, not a fault.

Fault No.	**SO CF I2A:2**
Fault name	Reset, switch
Description	Reset has occurred on ECU.
Note:	For information only, not a fault.

Fault No.	**SO CF I2A:3**
Fault name	Reset, watchdog
Description	Reset has occurred on ECU.
Note:	For information only, not a fault.

Fault No.	**SO CF I2A:4**
Fault name	Reset, SW fault
Description	Reset has occurred on ECU.
Note:	For information only, not a fault.

Fault No.	**SO CF I2A:5**
Fault name	Reset, RAM fault
Description	Reset has occurred on ECU.
Note:	For information only, not a fault.

Fault No.	**SO CF I2A:6**
Fault name	Reset, internal function change.
Description	Reset has occurred on ECU.
Note:	For information only, not a fault.

Fault No.	**SO CF I2A:7**
Fault name	RXDA amplifier current fault
Related fault	AO RX I1B:0 – RXDA amplifier current fault
Description	An RXDA in a CDU (or DU) is faulty. Read the BTS logs to find out which side (A or B) is faulty. •If the faulty side is not connected to an RX antenna, there is no performance degradation. •If the faulty side is connected to an RX antenna, then RX looses diversity and sensitivity decreases by 3.5 dB. •If the other RX side is also faulty, then fault AO RX I1B:0 arises.
Possible reasons	This is probably a HW fault on CDU.
Action	Try the following actions until the fault is corrected: •Switch the CDU off and on with the circuit breaker on the IDM. •Press the CPU Reset button on the DXU. •Replace the CDU or the DU in case of CDU-D.

Fault No.	**SO CF I2A:8**
Fault name	VSWR limits exceeded
Related faults	AO TX I1B:1 – CDU/Combiner VSWR limits exceeded AO TX I1B:4 – TX antenna VSWR limits exceeded AO TX I2A:0 – TX Diversity Fault
Description	The VSWR at TRU output or at CDU output has exceeded the class 2 limit (and maybe the class 1 limit as well if fault AO TX I1B:1 or AO TX I1B:4 are present). •If the RU map indicates "CDU" or "CU", the VSWR at TRU output is outside limits. •If the RU map indicates "Antenna", then the VSWR at CDU output is outside limits.
Action	See the respective related faults.

Fault No.	**SO CF I2A:9**
Fault name	Power limits exceeded
Related faults	AO TX I1B:2 – CDU output power limits exceeded
	AO TX I1B:20 – CU input power fault
Description	The TX power at the CDU output is at least 7 dB lower than expected. When the difference is at least 10 dB, the fault AO TX I1B:2 arises.
Possible reasons	•There is probably a fault on the TX path.
	•TX high temperature or saturation, see AO TX I1B:12 and 14.
Action	Try the following actions until the fault is corrected:
	•Check all TX feeders, both inside and outside the cabinet.
	•Check the Pfwd/Prefl cables.
	•Switch the TX cables from TRU to CDU between different TRUs to find out if the fault moves with the TX cable.
	•Switch TX cables in the TRU end only in such a way that the TRUs will be connected to different CDUs. Check if the fault moves with the TRU.
	•Reinstall the IDB with the OMT and press the CPU Reset button on the DXU.

Fault No.	**SO CF I2A:10**
Fault name	DXU optional EEPROM checksum fault
Related fault	AO TF I1B:1 – DXU optional EEPROM checksum fault
Description	This fault occurs only in DXUs using 5 MHz optional sync reference. The EEPROM of the DXU optional synchronisation board contains corrupted data. This data is necessary for the CPU to control the 13 MHz VCO.
Possible reasons	Probably a HW fault.
Action	It does not have any consequence if it occurs while the DXU is running. But at next DXU start-up, the TU will probably not be able to synchronise on the 5 MHz reference and fault AO TF I1B:1 will arise.

Fault No.	**SO CF I2A:11**
Fault name	ALNA fault (SW release R7.0) ALNA/TMA fault (SW releases R7C and R7D)
Related fault	AO RX I1B:1 – ALNA fault (SW release R7.0) AO RX I1B:1 – ALNA/TMA fault (SW releases R7C and R7D)
Description	A TMA is probably out of function. RX is getting a weaker signal from the side using this TMA, which reduces the sensitivity by about 3.5 dB. If the other RX side is also faulty, then the fault AO RX I1B:1 arises. The current consumption in the TMA is supervised from the CDU and can be monitored with the OMT. The fault arises when current in TMA is outside the range 33–147 mA. These limits are set in IDB but can be changed with OMT R5/2 or later.
Action	Try the following actions until the fault is corrected: •Check that feeders and jumpers are OK. •Check and that the correct IDB is installed. •Replace the TMA.
Note:	In SW release R8A, this fault is moved to SO CF EC2:11.

Fault No.	**SO CF I2A:12**
Fault name	RX maxgain/mingain violated
Remark	Only in CDU-C+ and CDU-D
Description	The fault arises when total gain in RX path (from antenna to TRU) is outside the recommended range. If the gain is too high, there is risk for blocking, a mobile close to BTS overtalks a mobile far away. If the gain is too low, the RX sensitivity is reduced. Note: In CDU-C+ and CDU-D, the gain in RXDA is adjusted by TRU (via CDU-bus) in order to fit the radio configuration. For example, RXDA gain is reduced when TMA is used and increased when no TMA.
Possible reasons	The most probable reason is that some attenuation values are wrongly defined in IDB. For example RX feeder loss, HLin/HLout loss, TMA amplification, and so on.
Action	Reinstall the IDB with the OMT and press the CPU Reset button on the DXU.

Fault No.	**SO CF I2A:13**
Fault name	Timing unit VCO ageing
Related fault	SO CF I1A:8 – Timing unit VCO fault
Description	The VCO control value is an integer between 0 and 16384. When it gets outside the range 384-16000, the fault SO CF I2A:13 arises. TU function is not affected, but if the control value gets outside the range 273-16111,the fault SO CF I1A:8 will arise and RBS function will be lost.
Possible reasons	The 13 MHz oscillator in DXU is ageing and therefore its control value is drifting outside the authorised range.
Action	The DXU should be sent to repair for recalibration of the VCO. Note: the VCO control value can be monitored with the OMT2.

Fault No.	**SO CF I2A:14**
Fault name	CDU supervision/communication lost
Related faults	SO TRXC I1B:0 – CDU not usable SO TRXC I2A:22 – CDU bus communication fault AO TX I1B:0 – CU not usable
Description	There is a communication problem on the CDU-bus between TRU and CDU/CU/DU/FU. Use the BTS logs to localise the fault more precisely.
Possible reasons	a. The CDU-bus cable is faulty, disconnected or wrongly connected (can happen when using CDU Y-cable). b. The CDU is powered off or faulty. c. A TRU connected to the CDU-bus is faulty.
Action	The following actions correlate to the possible reasons above: a. Check CDU-bus cable including backplane connection. b. Check the circuit breaker on the IDM for the CDU. If this does not help, check the CDU. c. Check the TRU.

Fault No.	**SO CF I2A:15**
Fault name	VSWR/Output power supervision lost
Remark	Only CDU-D
Related faults	SO TRXC I2A:15 – VSWR/Output power supervision lost AO TX I1B:22 – VSWR/Output power supervision lost
Description	One or several Pfwd/Prefl cables between FU(d) and CU are disconnected, check the RU map to find out which. If a Pfwd cable is disconnected, the CU cannot function and the TX function is lost (fault AO TX I1B:22 arises). If only a Prefl cable is disconnected, the VSWR supervision is lost but traffic is not affected.
Action	Reconnect or replace the Pfwd or Prefl cable between FU(d) and CU.

Fault No.	**SO CF I2A:16**
Fault name	Indoor temp out of normal conditional range
Related faults	SO CF I1A:10 – Indoor temp out of safe range
	SO CF RU:31 – Environment
	SO TRXC I1B:1 – Indoor temp out of safe range
Description	The temperature in the cabinet is out of the range 5-45 °C, see Note 2 on page 8 . The fault ceases when temperature is in the range 7-43 °C.

Fault No.	**SO CF I2A:17**
Fault name	Indoor humidity
Description	The humidity inside cabinet is outside the normal condition range, see Note 2 on page 8 .

Fault No.	**SO CF I2A:18**
Fault name	DC voltage out of range
Related fault	SO CF I1A:12 – DC voltage out of range
	SO TRXC I1B:3 – DC voltage out of range
Possible reasons	The DC voltage is out of range. More information is given in Note 1 on page 7 :

Fault No.	**SO CF I2A:19**
Fault name	Power system in stand-alone mode
Description	This indicates a fault in opto-communication loop. The power supply system continues to operate but it cannot be controlled or supervised from ECU or DXU.
Possible reasons	•The Opto cable is broken or wrongly connected.
	•An RU on the opto-loop is faulty or powered off.

Fault No.	**SO CF I2A:20**
Fault name	External power fault
Remark	SW releases R7.0, R7C and R7D
Description	There is a failure in AC supply.
Possible reasons	•AC mains failure.
	•ACCU fault (or wrong strapping).
	•Disconnected AC input cable to ECU or PSU.
Note:	If this fault and the faults SO CF I2A:23, 29 and 37 arise at the same time, then there is probably a bad connection between ACCU and ECU provoking false alarms.

Fault No.	**SO CF I2A:21**
Fault name	Internal power capacity reduced
Description	The power supply from the PSUs is reduced.
Possible reasons	•AC failure, see SO CF I2A:20.
	•Faulty PSU.
	•Missing PSU. This can happen when there are more PSU units defined in IDB than the actual amount installed in cabinet. Can be corrected by doing "modify IDB" in OMT.

Fault No.	**SO CF I2A:22**
Fault name	Battery backup capacity reduced
Description	The power supply from the batteries is reduced.
Possible reasons	•The BFU circuit breaker has tripped.
	•Battery overtemperature (battery temperature > 60 °C).
	•Faulty BFU or battery.
	•Missing BFU or battery. This can happen when there are more BFU or battery units defined in the IDB than the actual amount installed in the cabinet. This can be corrected by doing "modify IDB" in the OMT.

Fault No.	**SO CF I2A:23**
Fault name	Climate capacity reduced
Description	The climate system is not able to function properly. Check the SO CF RU map to find out which part of the climate system that is causing problems.
Possible reasons	•Faulty fan or FCU (fan control unit).
	•Faulty connection between ACCU and ECU, see note in SO CF I2A:20.
Action	•Check fans and the FCU.

Fault No.	**SO CF I2A:24**
Fault name	HW fault
Remark	Only CDU-D
Related faults	AO TX I1B:18 – CU HW fault
	AO TX I1B:19 – CU SW load/start fault
	AO TX I1B:21 – CU park fault
	AO TX I1B:23 – CU reset, power on
	AO TX I1B:24 – CU reset, communication fault
	AO TX I1B:25 – CU reset, watchdog
	AO TX I1B:26 – CU fine tuning fault
Description	A fault has occurred on CU, affecting TX. See AO TX fault map to find out which fault it is.
Possible reasons	See the respective related fault.

Fault No.	**SO CF I2A:25**
Fault name	Loadfile missing in DXU or ECU
Related fault	SO TRXC I2A:17 – Loadfile missing in TRU
Description	A SW file is missing in DXU or ECU flash.
Possible reasons	Probable cause is failed function change or connection of a unit lacking SW. In case of DXU, a function change must be performed to download the missing file. In case of ECU, the SW file should be transferred from DXU.

Fault No.	**SO CF I2A:26**
Fault name	Climate sensor fault
Description	A temperature sensor or humidity sensor is faulty.
Action	Check the connection to the sensor, otherwise replace the sensor.

Fault No.	**SO CF I2A:27**
Fault name	System voltage sensor fault
Description	The system voltage sensor in ECU is not functioning. ECU reads voltage value from PSU/BFU instead. If the opto-loop becomes faulty, then system voltage supervision is lost.
Action	Check system voltage circuit breaker. Otherwise replace ECU.

Fault No.	**SO CF I2A:28**
Fault name	A/D Converter fault
Description	The A/D converter in ECU is faulty => measurements from climate and voltage sensors cannot be read. Temperature and humidity supervision is lost. System voltage is read from PSU/BFU instead of sensor. If the opto-loop becomes faulty, then system voltage supervision is lost as well.
Action	Replace ECU.

Fault No.	**SO CF I2A:30**
Fault name	Bus fault
Related fault	SO CF I1A:14 – Bus fault
Description	DXU has received a high number of faulty frames on local bus. There are many disturbances on the local bus.
Possible reasons	•Missing local bus terminator •Extension bus between cabinets disconnected •Faulty DXU •Faulty ECU or TRU •Incorrect IDB •Incorrect switch settings on the backplanes •Faulty DXU/ECU backplane or TRU backplane

Fault No.	**SO CF I2A:31**
Fault name	High-frequency SW fault
Related fault	SO TRXC I2A:19 – High-frequency software fault
Description	Frequent errors during execution of application SW in DXU or ECU can lead to restart.
Possible reasons	Bugs in SW.
Action	1. Read the MRU logs to find out what is causing this fault. Send a trouble report to Ericsson for correction. 2. Reset the affected RU and, if necessary, also the DXU.

Fault No.	**SO CF I2A:32**
Fault name	Non-volatile memory corrupted
Related fault	SO TRXC I2A:16 – Non-volatile memory corrupted
Description	The contents of the DXU or ECU flash memory is corrupted. The DXU flash contains RBS database, DXU database and SW files for all units. The ECU flash contains ECU SW and ECU database.
Action	Try to perform a function change and reinstall IDB. If this does not help, power off/on the faulty unit. Otherwise replace the unit.

Fault No.	**SO CF I2A:33**
Fault name	RX diversity lost
Description	The imbalance in signal strength between the receiver A- and B-side is supervised on a TRU basis. The fault arises when one or several TRUs have reported a signal strength imbalance of at least 12 dB during 50 minutes. This indicates that an RX path to one or several TRUs is faulty. The receiver sensitivity for these TRUs is reduced by about 3.5 dB. Note: This fault is not raised if one of the faults SO CF I2A:7 (RXDA), SO CF I2A:11 (TMA current), SO CF I2A:34 (TMA voltage) or SO CF I2A:39 (RX cable) is active.
Action	Enable the diversity supervision monitor in OMT for each TRU, to find out which TRUs are affected and which side (A or B) is faulty. The diversity supervision measurements are only taken every 5 minutes so it takes some time to notice changes. The measurements give signal strength imbalance (SSI, expressed in dB) on each TS. The SSI is equal to RX signal A-side minus B-side so positive values indicate that A-side is better and vice-versa. Check that all cables on RX-path are properly connected (including HLin/HLout). Also check the antennas. If several cells are affected then maybe two RX feeders have been switched. If only one TRU is affected, then check RX cable between TRU and CDU. Try moving TRUs, CDUs and cables in the cabinet to see if the fault follows the unit(s).

Fault No.	**SO CF I2A:34**
Fault name	Output voltage fault
Related fault	AO RX I1B:11 – CDU output voltage fault
Description	The voltage supply to a TMA is faulty. RX is not getting any signals from the side using this TMA which reduces sensitivity by about 3.5 dB. If the other RX side is also faulty, then fault AO RX I1B:11 arises.
Possible reasons	The voltage supply to a TMA is faulty. RX is not getting any signals from the side using this TMA which reduces sensitivity by about 3.5 dB. If the other RX side is also faulty, then fault AO RX I1B:11 arises.
Action	Try to power off/on the CDU. Otherwise replace the CDU.

Fault No.	**SO CF I2A:35**
Fault name	Optional synchronisation source
Related fault	AO TF I1B:0 – Optional synchronisation source
Action	See AO TF I1B:0.

Fault No.	**SO CF I2A:36**
Fault name	RU database corrupted
Related fault	SO CF I2A:38 – Default values used
Description	The RU database in one of the following units (CDU, CU, FU, DU, ECU, BFU, PSU, BDM) is corrupted or cannot be read by the SW. If it is the CDU/CU/DU/FU, then fault I1B:0 arises on TRXC as well and TRU function is lost.
Action	Check RU map to find out which RU is involved, then check that the communication to the RU is ok (that is,CDU bus, opto-loop, local bus). If the communication is ok, power off/on the faulty RU and reset DXU/ECU. If this does not help, change the RU and reset DXU/ECU.

Fault No.	**SO CF I2A:38**
Fault name	Default values used
Related fault	SO CF I2A:36 – RU database corrupted
	SO CF I2A:46 – DB parameter fault
Description	A SW subsystem in DXU or ECU is using default parameters for its internal configuration => the DXU/ECU performance might be reduced.
Possible reasons	This fault is usually a consequence of faults SO CF I2A:36 or SO CF I2A:46.

Fault No.	**SO CF I2A:39**
Fault name	RX cable disconnected
Related fault	AO RX I1B:9 – RX cable disconnected
Description	An RX cable is disconnected (for example, CDU RXin, HLin/HLout, Cab HLin). Check the RU map to see which one.
Action	Reconnect or replace the disconnected RX cable.

Fault No.	**SO CF I2A:40**
Fault name	Reset, DXU link lost
Possible reasons	Reset has occurred on ECU.
Note:	For information only, not a fault.

Fault No.	**SO CF I2A:41**
Fault name	Lost communication to TRU
Description	DXU has no contact on local bus with one or several TRUs that are marked as expected in the IDB.
Possible reasons	•TRU missing or powered off (This can happen when there are more TRUs defined in IDB than the actual amount installed in cabinet. Can be corrected by doing "modify IDB" in OMT)
	•Faulty dip switch setting in backplane
	•Local bus fault (see SO CF I2A:30)

Fault No.	**SO CF I2A:42**
Fault name	Lost communication to ECU
Description	DXU has no contact on local bus with one or several ECUs that are marked as expected in the
Possible reasons	Same reason as in SO CF I2A:41 but with ECU instead of TRU.

Fault No.	**SO CF I2A:43**
Fault name	Internal configuration failed
Related fault	SO CF I2A:19 – Power system in stand-alone mode
	SO CF I2A:36 – RU database corrupted
Description	One or several subsystems in ECU SW have failed their internal configuration. The ECU will not be able to function properly.
Possible reasons	HW and IDB inconsistent, ECU database corrupted, communication problems on local bus or opto-loop.
Action	Check all the connections. Reinstall IDB with OMT and press DXU reset. If this does not help, change ECU.

Fault No.	**SO CF I2A:44**
Fault name	ESB distribution failure
Remark	R8 and on.
Description	
Action	

Fault No.	**SO CF I2A:46**
Fault name	DB parameter fault
Related fault	SO CF I2A:38 – Default values used
Description	The RBS Database or one of the RU databases (in DXU, ECU, CDU, CU, FU, DU, PSU, BFU, BDM) contains one or several erroneous parameters (for example out of range). SW will use a default value instead, the performance might be reduced.
Action	Check RU map to find out which database is faulty. If it is the RBS Database, reinstall IDB and reset DXU. If it is a RU database, see indications in fault SO CF I2A:36. Notice: In some cases, the RU map will indicate several faulty CDUs whereas only one is actually faulty. If this happens, change only one CDU at a time and press DXU reset to see if the fault disappears.

Fault No.	**SO CF I2A:47**
Fault name	Auxiliary equipment fault
Remark	SW releases R7.0, R7C and R7D.
Related fault	AO RX I1B:47 – RX Auxiliary Equipment Fault
	AO TX I1B:47 – TX Auxiliary Equipment Fault
Description	A fault has occurred on auxiliary equipment related to TX/RX antenna (for example power booster in active antenna). If AO RX I1B:47 or AO TX I1B:47 is active, then the fault is class 1. If not, the fault is class 2.
Possible reasons	This is a new feature in R7 where the ARAE (Antenna Related Auxiliary Equipment) can be supervised via external alarms inlets by MOs TX/RX/CF. This allows BSC to take appropriate action on TX and RX which would not be possible if the fault was reported via external alarm.

1.3.5 SO CF, replacement unit map

Table 5 SO CF RU

RU No.	**SO CF RU:0**
RU name	DXU
Related faults	SO CF I1A:8 – Timing unit VCO fault
	SO CF I1A:9 – Timing bus fault
	SO CF I1A:14 – Local bus fault
	SO CF I1A:16 – RBS database corrupted
	SO CF I2A:10 – DXU optional EEPROM checksum fault
	and AO TF I1B:1 – PCM synch (no usable PCM reference)
	SO CF I2A:13 – Timing unit VCO ageing
	SO CF I2A:31 – High-frequency software fault
	SO CF I2A:32 – Non-volatile memory corrupted
	SO CF I2A:35 – Optional synchronisation source
	and AO TF I1B:0 – EXT synch (no usable external reference)
	SO CF I2A:46 – DB parameter fault
Description	Several possible reasons will give this fault. See related faults.
Possible reasons	Check with the OMT for possible related fault. See respective related fault.
Action	See the respective related faults.

RU No.	**SO CF RU:1**
RU name	ECU
Related faults	SO CF I2A:27 – System voltage sensor fault
	SO CF I2A:28 – A/D converter fault
	SO CF I2A:31 – High-frequency software fault
	SO CF I2A:32 – Non-volatile memory corrupted
	SO CF I2A:36 – RU database corrupted
	SO CF I2A:46 – DB parameter fault
Description	Several possible reasons will give this fault. See related faults.
Possible reasons	Check with the OMT for possible related fault. See respective related fault.
Action	Try the following actions until the fault is corrected:
	•Reset the ECU.
	•Change the ECU.
	•Change the DXU/ECU backplane.

RU No.	**SO CF RU:5**
RU name	CDU
Related faults	SO CF I2A:7 – RXDA amplifier current fault
	SO CF I2A:8 – VSWR limits exceeded
	SO CF I2A:9 – Power limits exceeded
	SO CF I2A:34 – Output voltage fault
	SO CF I2A:36 – RU database corrupted
	SO CF I2A:46 – DB parameter fault
Description	Several possible reasons will give this fault. See related faults.
Possible reasons	Check with the OMT for possible related fault. See respective related fault.
Action	Try the following actions until the fault is corrected:
	•Check or replace the CDU – TRU TX cables.
	•Replace the CDU.
	•See also the respective related faults.

RU No.	**SO CF RU:6**
RU name	BFU
Remark	SW releases R7.0, R7C and R7D
Related faults	SO CF I2A:22 – Battery backup capacity reduced
	SO CF I2A:36 – RU database corrupted
	SO CF I2A:46 – DB parameter fault
Description	Several possible reasons will give this fault. See related faults.
Possible reasons	Check with the OMT for possible related fault. See respective related fault.
Action	Try the following actions until the fault is corrected:
	•Check the auxiliary fuse on the front of the BFU.
	•Check the circuit breaker on the top of the BFU.
	•Replace the BFU.
	•See also the respective related faults.

RU No.	**SO CF RU:7**
RU name	PSU
Related faults	SO CF I2A:21 – Internal power capacity reduced
	SO CF I2A:36 – RU database corrupted
	SO CF I2A:46 – DB parameter fault
Description	Several possible reasons will give this fault. See related faults.
Possible reasons	Check with the OMT for possible related fault. See respective related fault.
Action	Try the following actions until the fault is corrected:
	•Restart the PSU.
	•Replace the PSU.
	•See also the respective related faults.

RU No.	**SO CF RU:9**
RU name	BDM or BFU
Remark	SW release R8A.
Related fault	SO CF I2A:22 – Battery backup capacity reduced
	SO CF I2A:36 – RU database corrupted
	SO CF I2A:46 – DB parameter fault
Description	Several possible reasons will give this fault. See related faults.
Possible reasons	Check with the OMT for possible related fault. See respective related fault.
Action	Try the following actions until the fault is corrected:
	•Check the auxiliary fuse on the front of the BFU. (BFU only)
	•Check the circuit breaker on the top of the BFU. (BFU only)
	•Replace the BDM or the BFU.
	•See also the respective related faults.

RU No.	**SO CF RU:12**
RU name	ALNA A (SW release R7.0)
	ALNA/TMA A (SW releases R7C, R7D and R8A)
Related fault	SO CF I2A:11 – ALNA fault (SW release R7.0)
	SO CF I2A:11 – ALNA/TMA fault (SW releases R7C, R7D and R8A)
Action	Try the following actions until the fault is corrected. More information about the procedures is given in the section *ALNA A, ALNA B, ALNATMA A and ALNA/TMA B* in the chapter *Fault Localisation* in the *Maintenance Manual*.
	•Check the power supply to the ALNA/TMA. Replace the CDU if the power supply is faulty.
	•Check the RX feeders. Replace the ALNA/TMA if any RX feeder is found defective.

RU No.	**SO CF RU:13**
RU name	ALNA B (SW release R7.0),
	ALNA/TMA B (SW releases R7C, R7D and R8A)
Related fault	SO CF I2A:11 – ALNA fault (SW release R7.0)
	SO CF I2A:11 – ALNA/TMA fault (SW releases R7C, R7D and R8A)
Action	See the fault SO CF RU:12 — ALNA A.

RU No.	**SO CF RU:14**
RU name	Battery
Related fault	SO CF I2A:18 – DC voltage out of range
	SO CF I2A:22 – Battery backup capacity reduced
Action	Actions are given in the section *Battery* in the chapter *Fault Localisation* in the *Maintenance Manual*.

RU No.	**SO CF RU:15**
RU name	Fan
Related fault	SO CF I2A:23 – Climate capacity reduced
Action	Actions are given in the section *Fan* in the chapter *Fault Localisation* in the *Maintenance Manual*.

RU No.	**SO CF RU:21**
RU name	Temperature sensor
Related fault	SO CF I2A:26 – Climate sensor fault
Action	Actions are given in the section *Temperature sensor* in the chapter *Fault Localisation* in the *Maintenance Manual*.

RU No.	**SO CF RU:22**
RU name	CDU HLOUT HLIN cable
Related fault	SO CF I2A:39 – RX cable disconnected
Action	Actions are given in the section *CDU HLOUT HLIN cable* in the chapter *Fault Localisation* in the *Maintenance Manual*.

RU No.	**SO CF RU:23**
RU name	CDU RX in cable
Related fault	SO CF I2A:39 – RX cable disconnected
Action	Actions are given in the section *CDU RX in cable* in the chapter *Fault Localisation* in the *Maintenance Manual*.

RU No.	**SO CF RU:24**
RU name	CU
Related fault	SO CF I2A:8 – VSWR limits exceeded
	SO CF I2A:9 – Power limits exceeded
	SO CF I2A:24 – CU HW fault
	SO CF I2A:36 – RU database corrupted
	SO CF I2A:46 – DB parameter fault
Description	Several possible reasons will give this fault. See related faults.
Possible reasons	Check with the OMT for possible related fault. See respective related fault.
Action	Actions are given in the section *CU* in the chapter *Fault Localisation* in the *Maintenance Manual*.

RU No.	**SO CF RU:25**
RU name	DU
Related fault	SO CF I2A:7 – RXDA amplifier current fault
	SO CF I2A:34 – Output voltage fault
	SO CF I2A:36 – RU database corrupted
	SO CF I2A:46 – DB parameter fault
Description	Several possible reasons will give this fault. See related faults.
Possible reasons	Check with the OMT for possible related fault. See respective related fault.
Action	Actions are given in the section *DU* in the chapter *Fault Localisation* in the *Maintenance Manual*.

RU No.	**SO CF RU:26**
RU name	FU
Related fault	SO CF I2A:9 – Power limits exceeded
	SO CF I2A:36 – RU database corrupted
	SO CF I2A:46 – DB parameter fault
Description	Several possible reasons will give this fault. See related faults.
Possible reasons	Check with the OMT for possible related fault. See respective related fault.
Action	Actions are given in the section *FU* in the chapter *Fault Localisation* in the *Maintenance Manual*.

RU No.	**SO CF RU:27**
RU name	FU CU PFWD cable or CDU CDU PFWD cable
Related fault	SO CF I2A:15 – VSWR/Output power supervision lost
Action	Actions are given in the section *FU CU PFWD cable* in the chapter *Fault Localisation* in the *Maintenance Manual*.

RU No.	**SO CF RU:28**
RU name	FU CU PREFL cable or CDU CDU PREFL cable
Related fault	SO CF I2A:15 – VSWR/Output power supervision lost
Action	Actions are given in the section *FU CU PREFL cable* in the chapter *Fault Localisation* in the *Maintenance Manual*.

RU No.	**SO CF RU:29**
RU name	CAB HLIN cable
Related fault	SO CF I2A:39 – RX cable disconnected
Action	Actions are given in the section *CAB HLIN cable* in the chapter *Fault Localisation* in the *Maintenance Manual*.

RU No.	**SO CF RU:30**
RU name	CDU bus
Related fault	SO CF I2A:14 – CDU supervision/communication lost
Action	Actions are given in the section *CDU bus* in the chapter *Fault Localisation* in the *Maintenance Manual*.

RU No.	**SO CF RU:31**
RU name	Environment
Related fault	SO CF I1A:10 – Indoor temperature out of safe range
	SO CF I1A:12 – DC voltage out of range
	SO CF I1A:19 – Indoor temperature above safe range (Micro)
	SO CF I1A:20 – Indoor temperature below safe range (Micro)
	SO CF I2A:16 – Indoor temperature out of normal conditional range
	SO CF I2A:17 – Indoor humidity
	SO CF I2A:18 – DC voltage out of range
	SO CF I2A:20 – External power fault
Description	Several possible reasons will give this fault. See related faults.
Possible reasons	Check with the OMT for possible related fault. See respective related fault.
Action	Actions are given in the section *Environment* in the chapter *Fault Localisation* in the *Maintenance Manual*.

RU No.	**SO CF RU:32**
RU name	Local bus
Related fault	SO CF I2A:30 – Local bus fault
	SO CF I2A:41 – Lost communication to TRU
	SO CF I2A:42 – Lost communication to ECU
Description	Several possible reasons will give this fault. See related faults.
Possible reasons	Check with the OMT for possible related fault. See respective related fault.
Action	Actions are given in the section *Local bus* in the chapter *Fault Localisation* in the *Maintenance Manual*.

RU No.	**SO CF RU:33**
RU name	EPC bus / Power communication loop
Related fault	SO CF I2A:19 – Power system in stand-alone mode
Action	Actions are given in the section *EPC bus / Power communication loop* in the chapter *Fault Localisation* in the *Maintenance Manual*.

RU No.	**SO CF RU:34**
RU name	RBS DB
Related fault	SO CF I1A:15 – RBS database corrupted
	SO CF I2A:46 – DB parameter fault
Action	Actions are given in the section *RBS DB* in the chapter *Fault Localisation* in the *Maintenance Manual*.

RU No.	**SO CF RU:36**
RU name	Timing bus
Related fault	SO CF I1A:9 – Timing bus fault
Action	Actions are given in the section *Timing bus* in the chapter *Fault Localisation* in the *Maintenance Manual*.

RU No.	**SO CF RU:39**
RU name	Xbus
Related fault	SO CF I1A:7 – X bus fault
Action	Actions are given in the section *X bus* in the chapter *Fault Localisation* in the *Maintenance Manual*.

RU No.	**SO CF RU:40**
RU name	Antenna
Related fault	SO CF I2A:8 – VSWR limits exceeded
	SO CF I2A:12 – RX maxgain/mingain violated
	SO CF I2A:33 – RX diversity lost
	SO CF I2A:47 – Auxiliary Equipment Fault
Description	Several possible reasons will give this fault. See related faults.
Possible reasons	Check with the OMT for possible related fault. See respective related fault.
Action	Actions are given in the section *Antenna* in the chapter *Fault Localisation* in the *Maintenance Manual*.

RU No.	**SO CF RU:41**
RU name	PSU DC cable
Remark	SW releases R7D and R8A
Related fault	SO CF I2A:21 – Internal power capacity reduced
Action	Actions are given in the section *PSU DC cable* in the chapter *Fault Localisation* in the *Maintenance Manual*.

RU No.	**SO CF RU:45**
RU name	Battery temp sensor
Remark	SW releases R7D and R8A
Related fault	SO CF I2A:22 – Battery Backup Capacity Reduced
Action	Actions are given in the section *Battery temp sensor* in the chapter *Fault Localisation* in the *Maintenance Manual*.

RU No.	**SO CF RU:47**
RU name	OVPU
Remark	SW release R8A
Related fault	
Action	Actions are given in the section *OVPU* in the chapter *Fault Localisation* in the *Maintenance Manual*.

1.4 SO TRXC Fault Maps

1.4.1 SO TRXC, external condition map class 1

Table 6 SO TRXC EC 1

Fault No.	**SO TRXC EC1:4**
Fault name	L/R SWI (BTS in local mode)
Remark	The DXU is in local mode and cannot be controlled by BSC.
Action	To bring the DXU into remote mode, you need to press the local/remote button.

Fault No.	**SO TRXC EC1:5**
Fault name	L/R TI (Local to remote while link lost)
Remark	This fault tells the BSC that the TRU went into remote mode while the link was down.
Action	The field technician does not need to care so much about this fault.

1.4.2 SO TRXC, internal fault map class 1A

Table 7 SO TRXC I1A

Fault No.	**SO TRXC I1A:0**
Fault name	Reset, failed restart attempt
Remark	SW releases R7.0, R7C and R7D.
Description	Reset has occurred on TRU.
Note:	For information only, not a fault.

Fault No.	**SO TRXC I1A:1**
Fault name	Reset, power on
Description	Reset has occurred on TRU.
Note:	For information only, not a fault.

Fault No.	**SO TRXC I1A:2**
Fault name	Reset, switch
Description	Reset has occurred on TRU.
Note:	For information only, not a fault.

Fault No.	**SO TRXC I1A:3**
Fault name	Reset, watchdog
Description	Reset has occurred on TRU.
Note:	For information only, not a fault.

Fault No.	**SO TRXC I1A:4**
Fault name	Reset, SW fault
Description	Reset has occurred on TRU.
Note:	For information only, not a fault.

Fault No.	**SO TRXC I1A:5**
Fault name	Reset, RAM fault
Description	Reset has occurred on TRU.
Note:	For information only, not a fault.

Fault No.	**SO TRXC I1A:6**
Fault name	Reset, Internal function change
Description	Reset has occurred on TRU.
Note:	For information only, not a fault.

Fault No.	**SO TRXC I1A:8**
Fault name	Timing reception fault
Remark	If two or more TRUs have this fault, SO I1A:9 arises.
Related fault	SO CF I1A:9 – Timing bus fault
Description	The TRU gets bad timing signals.
Possible reasons	Could be a fault in TRU (for example, Timing Bus receiver, LTU) or TRU backplane.
Action	Try to switch places between TRUs to see if the fault depends on TRU or TRU backplane. If the fault stays at same position, then TRU backplane is faulty. If the fault follows the TRU, then TRU is faulty.

Fault No.	**SO TRXC I1A:9**
Fault name	Signal processing fault
Description	Internal HW fault in the TRU: Fault on Tora or CMA
Action	Try to power off/on TRU. If this does not help, replace TRU.

Fault No.	**SO TRXC I1A:10**
Fault name	Tora – Dannie communication fault
Description	Internal HW fault in the TRU: Fault on RX-bus
Action	Try to power off/on TRU. If this does not help, replace TRU.

Fault No.	**SO TRXC I1A:11**
Fault name	DSP-CPU communication fault
Description	Internal HW fault in the TRU: Fault on CPU bus towards DSP0
Action	Power off/on the TRU. If this does not help, replace the TRU.

Fault No.	**SO TRXC I1A:12**
Fault name	Terrestrial traffic channel fault
Description	Internal HW fault in the TRU: Fault on iLIB (internal Line Bus)
Action	Power off/on TRU. If this does not help, replace TRU.

Fault No.	**SO TRXC I1A:13**
Fault name	RF loop test fault
Remark	Each test takes about 5 minutes. The fault arises after 3 failed consecutive tests. (In SW released before MR99:1, fault arises after only 1 failed test).
Description	Internal HW fault in the TRU: The RF loop test is used to detect faults on TXU/RXU. Dummy bursts are sent from Tora to TXU (via X-bus), then to RXU and finally back to Tora
Action	Reset or power off/on the TRU. Try to switch positions between TRUs (might be a fault on X-bus). If this does not help, change the TRU.

Fault No.	**SO TRXC I1A:14**
Fault name	RU database corrupted
Related fault	SO TRXC I2A:16 – RU database corrupted
Description	The RU database in TRU flash is corrupted or cannot be read by the SW.
Action	Reset or power off/on TRU. If this does not help, change TRU.

Fault No.	**SO TRXC I1A:15**
Fault name	Xbus communication fault
Remark	If two or more TRUs get this fault, SO CF I1A:7 will arise.
Related fault	SO CF I1A:7 – X bus fault
Description	The TRU has communication problem on X-bus.
Possible reasons	Intermittent disturbances. Most common reason for intermittent disturbance: •One or more calls are carried by two TRXCs. •One of the TRUs contains RX and TS for a given call and the other TRXC is TX for the same call most common with Base band hopping but does also occur under special circumstances with Synthesize hopping. If either one of these TRXCs is reset, this alarm will arise. No HW needs to be replaced as the alarm ceases when the TRXC is reset. Other possible reasons: •Faulty TRUs •Faulty backplane
Actions	Try the following actions until the fault is corrected: •Check that all connections are OK: bus terminator, extension cable, and so on. •Try to switch places between TRUs •Try to power off/on the cabinet •Replace the TRU magazine

Fault No.	**SO TRXC I1A:16**
Fault name	Initiation fault
Remark	This fault occurs at TRU start-up and stays as long as the initialisation is unsuccessful.
Description	Internal HW fault in the TRU: Not possible to initialize ASTRA or LTU
Action	Try to power off/on TRU. If this does not help, replace TRU.

Fault No.	**SO TRXC I1A:17**
Fault name	X-interface fault
Description	Internal HW fault in the TRU: Fault on X-interface
Action	Try to power off/on TRU. If this does not help, replace TRU.

Fault No.	**SO TRXC I1A:18**
Fault name	DSP fault
Description	Internal HW fault in the TRU: DSP SW corrupted or communication fault on the internal DSP bus between DSP0 and DSP cluster
Action	Reset or power off/on TRU. If this does not help, change TRU.

Fault No.	**SO TRXC I1A:19**
Fault name	Reset, DXU link lost
Description	Reset has occurred on TRU.
Action	For information only, not a fault.

Fault No.	**SO TRXC I1A:20**
Fault name	HW and IDB inconsistent
Description	The IDB does not match the TRU/CDU HW (for example, wrong frequency band, CDU type, and so on).
Action	Try the following actions until the fault is corrected: •Check that the correct TRU/CDU HW is installed •Installthe right IDB and press DXU reset.

Fault No.	**SO TRXC I1A:21**
Fault name	Internal Configuration failed
Remark	TRU SW will not be able to use TRU/CDU HW properly.
Related fault	SO CF I2A:14 – CDU supervision/communication lost SO TRXC I1A:14 – RU database corrupted SO TRXC I1A:20 – HW and IDB inconsistent SO TRXC I1B:0 – CDU not usable SO TRXC I2A:22 – CDU bus communication fault
Description	One or several subsystems in TRU SW have failed their internal configuration.
Possible reasons	This fault is usually a consequence of faults SO TRXC I1A:14 or SO TRXC I1A:20
Action	Power off/on TRU and CDU. Check all the connections: CDU-bus, CDU bus extension (Y-cable), backplane. Install right IDB and press DXU reset. If this does not help, change TRU, CDU or CDU-bus.

Fault No.	**SO TRXC I1A:22**
Fault name	Voltage Supply fault
Remark	SW releases R7D and R8A
Related faults	SO TRXC I2A:14 – Voltage supply fault
Description	Internal HW fault in the TRU: The voltage supply from PWU to PAU is supervised. When it comes outside of the range 24.8V-26.2V, fault SO TRXC I2A:14 arises. The TX output power might be reduced but TRU is still functional. If PWU is not responding or if PAU voltage comes out of the range 24V-26.3V, fault SO TRXC I1A:22 arises.
Action	Power off/on TRU. If this does not help, change TRU.

1.4.3 SO TRXC, internal fault map class 1B

Table 8 SO TRXC I1B

Fault No.	**SO TRXC I1B:0**
Fault name	CDU/Combiner not usable
Remark	SW releases R7D and R8A
Related faults	SO CF I2A:14 – CDU supervision/communication lost
	SO CF I2A:36 – RU database corrupted
Description	The CDU cannot be used by the TRU and the TRU function is lost.
Possible reasons	CDU-bus communication fault. CDU database corrupted.
Action	See the respective related SO CF fault.

Fault No.	**SO TRXC I1B:1**
Fault name	Indoor temp out of safe range
Remark	Only macro RBS.
Related faults	SO CF I1A:10 – Indoor temperature out of safe range
	SO CF I2A:16 – Indoor temp out of normal conditional range
	SO CF RU:31 – Environment
Description	Temperature in extension cabinet is out of range 0-55 °C
	Fault ceases when temperature is in range 2-53 °C.

Fault No.	**SO TRXC I1B:3**
Fault name	DC voltage out of range
Related faults	SO CF I2A:18 – DC voltage out of range
Description	The DC voltage in extension cabinet is below 21.2 V
	Fault ceases when DC voltage is above 22.2 V.

1.4.4 SO TRXC, internal fault map class 2A

Table 9 SO TRXC I2A

Fault No.	**SO TRXC I2A:0**
Fault name	RX cable disconnected
Related fault	AO RX I1B:9 – RX cable disconnected
Description	An RX cable between TRU and CDU is disconnected.
Action	Reconnect the RX cable.

Fault No.	**SO TRXC I2A:1**
Fault name	RX EEPROM checksum fault
Related fault	AO RX I1B:3 – RX EEPROM checksum fault
Action	See AO RX I1B:3.

Fault No.	**SO TRXC I2A:2**
Fault name	RX config table checksum fault
Related fault	AO RX I1B:4 – RX configuration table checksum fault
Action	See AO RX I1B:4.

Fault No.	**SO TRXC I2A:3**
Fault name	RX synthesiser unlocked
Related fault	AO RX I1B:5 – RX synthesizer A/B unlocked
	AO RX I1B:6 – RX synthesizer C unlocked
Action	See AO RX I1B:5 and AO RX I1B:6.

Fault No.	**SO TRXC I2A:4**
Fault name	RX internal voltage fault
Related fault	AO RX I1B:8 – RX internal voltage fault
Action	See AO RX I1B:8.

Fault No.	**SO TRXC I2A:5**
Fault name	Astra-Dixie communication fault
Related fault	AO RX I1B:7 – Astra Dixie communication fault
Action	See AO RX I1B:7.

Fault No.	**SO TRXC I2A:6**
Fault name	Astra-Tracy Communication fault
Related fault	AO TX I1B:10 – Astra Tracy communication fault
Action	See AO TX I1B:10.

Fault No.	**SO TRXC I2A:7**
Fault name	TX EEPROM checksum fault
Related fault	AO TX I1B:6 – TX EEPROM checksum fault
Action	See AO TX I1B:6.

Fault No.	**SO TRXC I2A:8**
Fault name	TX config table checksum fault
Related fault	AO TX I1B:7 – TX configuration table checksum fault
Action	See AO TX I1B:7

Fault No.	**SO TRXC I2A:9**
Fault name	TX synthesiser unlocked
Related fault	AO TX I1B:8 – TX synthesizer A/B unlocked
	AO TX I1B:9 – TX synthesizer C unlocked
Action	See AO TX I1B:8 and AO TX I1B:9

Fault No.	**SO TRXC I2A:10**
Fault name	TX internal voltage fault
Related fault	AO TX I1B:11 – TX internal voltage fault
Action	See AO TX I1B:11.

Fault No.	**SO TRXC I2A:11**
Fault name	TX High temperature
Related fault	AO TX I1B:12 – TX high temperature
Action	See AO TX I1B:12

Fault No.	**SO TRXC I2A:12**
Fault name	TX output power limits exceeded
Related fault	AO TX I1B:13 – TX output power limits exceeded
Description	The difference between actual and expected TX power (at TRU output) exceeds 2 dB. TX performance is degraded but not lost. TX performance is lost when difference exceeds 4 dB and the fault AO TX I1B:13 arises.
Possible reasons	Faulty TRU, low power supply, TX cable not properly connected>

Fault No.	**SO TRXC I2A:13**
Fault name	TX saturation
Related fault	AO TX I1B:14 – TX saturation
Action	See AO TX I1B:14.

Fault No.	**SO TRXC I2A:14**
Fault name	Voltage supply fault
Related fault	SO TRXC I1A:22 – Voltage supply fault
Action	See SO TRXC I1A:22.

Fault No.	**SO TRXC I2A:15**
Fault name	VSWR/output power supervision lost
Remark	Only CDU–A, CDU–C, CDU–C+
Related fault	SO CF I2A:15 – VSWR/Output power supervision lost
	SO TRXC RU:10 – CDU to TRU Pfwd cable
	SO TRXC RU:11 – CDU to TRU Prefl cable
Description	A Pfwd or Prefl cable between TRU and CDU is disconnected. Check the RU map to find out which. The VSWR and output power supervision is lost but traffic is not affected.
Action	Reconnect the Pfwd/Prefl cable. If this does not help, check the coaxial connectors in TRU backplane, they can worst case be damaged when inserting a TRU.
Fault No.	**SO TRXC I2A:16**
Fault name	Non-volatile memory corrupted
Related fault	SO CF I2A:32 – Non-volatile memory corrupted
Description	The contents of the TRU flash memory is corrupted. The TRU flash contains TRU database and TRU SW.
Action	Try to power off/on the faulty TRU or reset DXU. Otherwise replace the TRU.

Fault No.	**SO TRXC I2A:17**
Fault name	Loadfile missing in TRU
Related fault	SO CF I2A:25 – Loadfile missing in DXU or ECU
Description	An SW file is missing in TRU flash.
Possible reasons	Probable cause is failed function change or connection of a TRU lacking SW. DXU should automatically download new SW file to TRU.

Fault No.	**SO TRXC I2A:18**
Fault name	DSP fault
Related fault	DSP fault
Description	This fault is not implemented in current BTS SW.

Fault No.	**SO TRXC I2A:19**
Fault name	High-frequency SW fault
Related fault	SO CF I2A:31 – High-frequency software fault
Description	Frequent SW errors during execution of application SW in TRU can lead to restart.
Possible reasons	Bugs in SW.
Action	1. Read the MRU logs to find out what is causing this fault. Send a trouble report to Ericsson for correction.
	2. Reset the affected RU and, if necessary, also the DXU.

Fault No.	**SO TRXC I2A:20**
Fault name	RX initiation fault
Related fault	AO RX I1B:10 – RX initiation fault
Action	See AO RX I1B:10

Fault No.	**SO TRXC I2A:21**
Fault name	TX initiation fault
Related fault	AO TX I1B:17 – TX initiation fault
Action	See AO TX I1B:17

Fault No.	**SO TRXC I2A:22**
Fault name	CDU bus communication fault
Related fault	SO CF I2A:14 – CDU supervision/communication lost
Possible reasons	This fault is equivalent to SO CF I2A:14
Action	See SO CF I2A:14

Fault No.	**SO TRXC I2A:23**
Fault name	Default values used
Related fault	SO TRXC I2A:26 – DB parameter fault
	SO CF I2A:36 – RU database corrupted
	SO CF I2A:46 – DB parameter fault
Description	A SW subsystem in TRU is using default parameters for its internal configuration =>the TRU performance might be reduced.
Possible reasons	This fault is usually a consequence of faults SO CF I2A:36, SO CF I2A:46 (faulty parameters in CDU) or SO TRXC I2A:26.

Fault No.	**SO TRXC I2A:25**
Fault name	TX max power restricted
Related fault	AO TX I1B:27 – TX maximum power restricted
Action	Refer to AO TX I1B:27.

Fault No.	**SO TRXC I2A:26**
Fault name	DB parameter fault
Related fault	SO TRXC I2A:23 – Default values used
Description	The RU Database in TRU contains one or several erroneous parameters (for example out of range). SW will use default value instead, the TRU performance is reduced.
Action	Reset TRU. If this does not help, change TRU.

Fault No.	**SO TRXC I2A:27**
Fault name	RX path fault
Remark	SW release R7D
Related fault	AO RX I1B:13 – RX path fault
Description	
Action	

1.4.5 SO TRXC, replacement unit map

Table 10 SO TRXC RU

RU No.	**SO TRXC RU:0**
RU name	TRU (SW releases R7.0 and R7C)
	TRU, dTRU or ATRU (SW releases R7D and R8A)
Related faults	SO TRXC I1A:8 – Timing reception fault
	SO TRXC I1A:9 – Signal Signal processing faultprocessing fault
	SO TRXC I1A:10 – Tora – Dannie communication fault
	SO TRXC I1A:11 – DSP CPU communication fault
	SO TRXC I1A:12 – Terrestrial traffic channel fault
	SO TRXC I1A:13 – RF loop test fault
	SO TRXC I1A:14 – RU database corrupted
	SO TRXC I1A:15 – X bus communication fault
	SO TRXC I1A:16 – Initiation fault
	SO TRXC I1A:17 – X-interface fault
	SO TRXC I1A:18 – DSP fault
	SO TRXC I1A:22 – Voltage supply fault
	SO TRXC I2A:1 – RX EEPROM checksum fault
	SO TRXC I2A:2 – RX configuration table checksum fault
	SO TRXC I2A:3 – RX synthesizer unlocked
	SO TRXC I2A:4 – RX internal voltage fault
	SO TRXC I2A:5 – Astra Dixie communication fault
	SO TRXC I2A:6 – Astra Tracy communication fault
	SO TRXC I2A:7 – TX EEPROM checksum fault
	SO TRXC I2A:8 – TX configuration table checksum fault
	SO TRXC I2A:9 – TX synthesizer unlocked
	SO TRXC I2A:10 – TX internal voltage fault
	SO TRXC I2A:11 – TX high temperature
	SO TRXC I2A:12 – TX output power limits exceeded
	SO TRXC I2A:13 – TX saturation
	SO TRXC I2A:14 – Voltage supply fault
	SO TRXC I2A:16 – Non-volatile memory corrupted

	SO TRXC I2A:18 – DSP fault
	SO TRXC I2A:20 – RX initiation fault
	SO TRXC I2A:21 – TX initiation fault
	SO TRXC I2A:22 – CDU bus communication fault
	SO TRXC I2A:25 – TX maximum power restricted
	SO TRXC I2A:26 – DB parameter fault
Description	Several possible reasons will give this fault. See related faults.
Possible reasons	Check with the OMT for possible related fault. See respective related fault.
Action	Actions are given in the section *TRU* in the chapter *Fault Localisation* in the *Maintenance Manual*.

RU No.	**SO TRXC RU:10**
RU name	CDU to TRU PFWD cable
Related fault	SO TRXC I2A:15 – VSWR/output power supervision lost
Action	Actions are given in the section *TRU* in the chapter *Fault Localisation* in the *Maintenance Manual*.

RU No.	**SO TRXC RU:11**
RU name	CDU to TRU PREFL cable
Related fault	SO TRXC I2A:15 – VSWR/output power supervision lost
Action	Actions are given in the section *TRU* in the chapter *Fault Localisation* in the *Maintenance Manual*.

RU No.	**SO TRXC RU:12**
RU name	CDU to TRU RXA cable
Related fault	SO TRXC I2A:0 – RX cable disconnected
Action	Actions are given in the section *TRU* in the chapter *Fault Localisation* in the *Maintenance Manual*.

RU No.	**SO TRXC RU:13**
RU name	CDU to TRU RXB cable
Related fault	SO TRXC I2A:0 – RX cable disconnected
Action	Actions are given in the section *TRU* in the chapter *Fault Localisation* in the *Maintenance Manual*.

1.5 AO Fault Maps

1.5.1 AO CON, external condition map class 1

Table 11 AO CON EC1

Fault No.	**AO CON EC1:8**
Fault name	LAPD Q CG (LAPD queue congestion)
Description	The LAPD concentrator in DXU supervises the length of uplink message queues. Class 1 fault arises when a message is discarded due to queue overflow. Fault ceases after 5 seconds of operation without queue overflow.
Possible reasons	The signalling load is high and the signalling bandwidth is reduced due to use of LAPD concentration or LAPD multiplexing.
Action	Try to increase the LAPD bandwidth by, for example, reducing the concentration factor.

1.5.2 AO CON, external condition map class 2

Table 12 AO CON EC2

Fault No.	**AO CON EC2:8**
Fault name	LAPD Q CG (LAPD queue congestion)
Description	The signalling load is high and the signalling bandwidth is reduced due to use of LAPD concentration or LAPD multiplexing. Class 2 fault arises when a message queue is more than 70 % full.
Possible reasons	The signalling load is high and the signalling bandwidth is reduced due to use of LAPD concentration or LAPD multiplexing.
Action	Try to increase the LAPD bandwidth by, for example, reducing the concentration factor.

1.5.3 AO DP

AO DP is not supervised.

Note: The Digital Path is supervised by PCM supervision.

1.5.4 AO RX, internal fault map class 1B

Table 13 AO RX I1B

Fault No.	**AO RX I1B:0**
Fault name	RXDA amplifier current fault
Related fault	SO CF I2A:7 – RXDA amplifier current fault
Description	An RXDA in CDU is faulty and there is no signal coming from the other RX side => RX function is lost.
Possible reasons	Probably a HW fault on CDU
Action	Try to power off/on CDU and reset DXU. If this does not help, replace CDU.

Fault No.	**AO RX I1B:1**
Fault name	ALNA/TMA fault
Remark	SW releases R7C, R7D and R8A
Related fault	SO CF I2A:11 – ALNA/TMA fault
Description	A TMA is faulty and there is no signal coming from the other RX side => RX function is lost
Possible reasons	Probably a HW fault on TMA.
Action	Power off/on CDU and TRU. If this does not help, replace TMA.

Fault No.	**AO RX I1B:3**
Fault name	RX EEPROM checksum fault
Related fault	SO TRXC I2A:1 – RX EEPROM checksum fault
Description	The data stored in RXU eeprom is corrupted. This data is needed by TRU SW to perform internal configuration.
Possible reasons	Probably a HW fault in TRU.
Action	Try to power off/on TRU before replacing it.

Fault No.	**AO RX I1B:4**
Fault name	RX config table checksum fault
Related fault	SO TRXC I2A:2 – RX configuration table checksum fault
Description	At TRU start-up, the data from RXU eeprom is copied into TRU RAM in order to create the RX configuration table which will be used for internal configuration of TRU SW. This fault arises when the data in TRU RAM is faulty.
Action	Try to reset or power off/on the TRU. If this does not help, change TRU.

Fault No.	**AO RX I1B:5**
Fault name	RX synthesiser A/B unlocked
Related fault	SO TRXC I2A:3 – RX synthesizer unlocked
Description	One or both of the RF synthesisers in RXU could not lock to the required frequency.
Possible reasons	Probably a HW fault in TRU.
Action	Try to power off/on TRU before replacing it.

Fault No.	**AO RX I1B:6**
Fault name	RX synthesiser C unlocked
Related fault	SO TRXC I2A:3 – RX synthesizer unlocked
Description	The IF synthesiser in RXU could not lock to the required frequency.
Possible reasons	Probably a HW fault in TRU.
Action	Try to power off/on TRU before replacing it.

Fault No.	**AO RX I1B:7**
Fault name	Astra-Dixie communication fault
Related fault	SO TRXC I2A:5 – Astra Dixie communication fault
Description	Communication fault between Astra and Dixie.
Possible reasons	Probably a HW fault in TRU.
Action	Try to power off/on TRU before replacing it.

Fault No.	**AO RX I1B:8**
Fault name	RX internal voltage fault
Related fault	SO TRXC I2A:10 – TX internal voltage fault
Description	Fault on the internal voltage regulators of the RXU.
Possible reasons	Probably a HW fault in TRU.
Action	Try to power off/on TRU before replacing it.

Fault No.	**AO RX I1B:9**
Fault name	RX cable disconnected
Related fault	SO CF I2A:39 – RX cable disconnected SO TRXC I2A:0 – RX cable disconnected
Description	An RX cable is disconnected and there is no signal coming from the other RX side => RX function lost.
Action	Check the SO CF RU and SO TRXC RU maps to find out which RX cable is disconnected. It can be either of the following: •CDU RX out •CDU HL out H Lin •CDU RXin •Cab HLin

Fault No.	**AO RX I1B:10**
Fault name	RX initiation fault
Related fault	SO TRXC I2A:4 – RX internal voltage fault
Description	The RXU could not be initialised. There is probably a fault in ASICS (Dannie, Dixie), the synthesisers or the eeprom. This fault occurs at TRU start-up and stays as long as the initialisation is unsuccessful.
Possible reasons	Probably a HW fault in TRU.
Action	Try to power off/on TRU before replacing it.

Fault No.	**AO RX I1B:11**
Fault name	CDU output voltage fault
Related fault	SO CF I2A:34 – Output voltage fault
Description	The voltage supply to the TMA is faulty and there is no signal coming from the other RX side => RX function lost. Note: the TMA voltage is supplied by the CDU via the RX feeder. The nominal value is 15 V. The fault arises when the TMA voltage supply is outside the range 13.75-16.25 V.
Possible reasons	This is probably a HW fault in CDU.
Action	Try to power off/on the CDU. Otherwise replace CDU.

Fault No.	**AO RX I1B:13**
Fault name	RX path fault
Remark	SW release R7D
Related fault	SO TRXC I2A:27 – RX path fault
Description	
Action	

Fault No.	**AO RX I1B:47**
Fault name	RX auxiliary equipment fault
Related fault	SO CF I2A:47 – Auxiliary Equipment Fault
	AO TX I1B:47 – TX Auxiliary Equipment Fault
Description	A class 1 fault has occurred on auxiliary equipment related to RX antenna (for example TMA in active antenna).

1.5.5 AO RX, internal fault map class 2A

Table 14 AO RX I2A

Fault No.	**AO RX I2A:0**
Fault name	TRA (Remote transcoder communication lost)
Description	The TRAU frames (speech/data) coming from BSC to a specific TRU time-slot are missing or corrupted.
Possible reasons	This is most likely to be a fault in the BSC (for example, no TRA allocated, no connection in Group-Switch, and so on) or in the A-bis transmission path.

1.5.6 AO TF, external condition map class 1

Table 15 AO TF EC1

Fault No.	**AO TF EC1:0**
Fault name	EXT Synch (No usable external reference)
Remark	Only when TF mode is slave
Description	The synchronisation reference from ESB (External Sync Bus) is missing. •If the fault occurs while TF is trying to synchronise, then the fault AO TF EC1:0 arises after 5 minutes. •If the fault occurs while TF is synchronised, then TF goes into hold-over mode and if the ESB reference has not come back within 2 minutes (holdover timeout), fault AO TF EC1:0 arises and TF is disabled. No class 2 fault arises before the class 1.
Possible reasons	The master TF is disabled or powered off. The master TF is in stand-alone mode (for example, after PCM link break longer than 10 minutes) The ESB cable is faulty or disconnected. A terminator on the ESB is faulty or missing.

Fault No.	**AO TF EC1:1**
Fault name	PCM synch (No usable PCM reference)
Remark	Only when TF mode ismaster or stand-alone.
Description	The synchronisation reference from the PCM network is faulty (for example, too much jitter/wander) or missing. •If the fault occurs while TF is trying to synchronise, then the fault AO TF EC1:1 arises after 5 minutes. •If the fault occurs while TF is synchronised, then TF goes into hold-over mode (that is, stops using the reference) and after 5 minutes, the fault AO TF EC2:0 arises on TF. •If the PCM reference hasn't come back within one hour (hold-over timeout), fault AO TF EC1:1 arises and TF becomes disabled.
Possible reasons	This is probably a transmission fault. •Check the PCM line, the transmission equipment, and so on. •Check PCM quality with BSC printout "DTQUP" and OMT monitor "Phase difference error, PCM". **Note:** The preferred PCM reference can be set in the IDB, for example,PCM A, PCM B or both.

1.5.7 AO TF, external condition map class 2

Table 16 AO TF EC1

Fault No.	**AO TF EC2:0**
Fault name	EXT Synch (No usable external reference)
Remark	Only when TF mode is slave.
Description	The synchronisation reference from ESB (External Sync Bus) is missing. •If the fault occurs while TF is trying to synchronise, then the fault AO TF EC1:0 arises after 5 minutes. •If the fault occurs while TF is synchronised, then TF goes into hold-over mode and if the ESB reference has not come back within 2 minutes (holdover timeout), fault AO TF EC1:0 arises and TF is disabled. No class 2 fault arises before the class 1.
Possible reasons	The master TF is disabled or powered off. The master TF is in stand-alone mode (for example, after PCM link break longer than 10 minutes) The ESB cable is faulty or disconnected. A terminator on the ESB is faulty or missing.

Fault No.	**AO TF EC2:1**
Fault name	PCM synch (No usable PCM reference)
Remark	Only when TF mode is master or stand-alone.
Description	The synchronisation reference from the PCM network is faulty (for example, too much jitter/wander) or missing. •If the fault occurs while TF is trying to synchronise, then the fault AO TF EC1:1 arises after 5 minutes. •If the fault occurs while TF is synchronised, then TF goes into hold-over mode (that is, stops using the reference) and after 5 minutes, the fault AO TF EC2:0 arises on TF. •If the PCM reference hasn’t come back within one hour (hold-over timeout), fault AO TF EC1:1 arises and TF becomes disabled.
Possible reasons	This is probably a transmission fault. •Check the PCM line, the transmission equipment, and so on. •Check PCM quality with BSC printout "DTQUP" and OMT monitor "Phase difference error, PCM". **Note:** The preferred PCM reference can be set in the IDB, for example,PCM A, PCM B or both.

1.5.8 AO TF, internal fault map class 1B

Table 17 AO TF I1B

Fault No.	**AO TF I1B:0**
Fault name	Optional synchronisation source
Remark	Only in DXUs using 5 MHz optional sync reference
Related fault	SO CF I2A:35 – Optional synchronisation source
Description	The long-term synchronisation reference from the optional oscillator is faulty (for example, too much jitter/wander) or missing. The VCO goes into hold-over mode (that is, stops using the reference) and after 5 minutes, the fault SO CF I2A:35 arises. If the reference has not come back within one hour (hold-over timeout), the fault AO TF I1B:0 arises and TF is disabled.
Possible reasons	There is probably a fault on the 5 MHz oscillator in DXU. It might be a temporary disturbance in the oscillator
Action	Try to power off/on DXU. Then wait a while (several hours) to see if the fault comes back. If this does not help, replace DXU. Note: at DXU "cold start", it will take at least one hour for the 5 MHz oscillator to warm up and stabilize.

Fault No.	**AO TF I1B:1**
Fault name	DXU-opt EEPROM checksum fault
Remark	Onl in DXUs using 5 MHz optional sync referencey
Related fault	SO CF I2A:10 – DXU optional EEPROM checksum fault
Description	The EEPROM of the DXU optional synchronisation board contains corrupted data. This data is necessary for the CPU to control the 13 MHz VCO. The TU is unable to synchronise
Possible reasons	Probably a HW fault
Action	Try to power off/on the DXU. If this does not help, replace DXU.

1.5.9 AO TF, internal fault map class 2A

Table 18 AO TF I2A

Fault No.	**AO TF I2A:0**
Fault name	ESB distribution failure, faulty DXU driver
Remark	SW release R7D
Description	Temporary solution. The Fault indicator on the DXU shall be lit when this fault occurs.
Possible reasons	Faulty DXU driver
Action	Replace the DXU

1.5.10 AO TS, external condition map class 1

Table 19 AO TS E1

Fault No.	**AO TS E1:3**
Fault name	TRA (Remote transcoder com. lost) (SW release R7.0)
	TRA/PCU (Remote transcoder/PCU com. lost) (SW releases R7C, R7D and R8A)
Description	The TRAU frames (speech/data) coming from the BSC to a specific TRU time-slot are missing or corrupted.
Possible reasons	This is most likely to be a fault in the BSC (for example, no TRA allocated, no connection in Group-Switch, and so on) or in the A-bis transmission path.

1.5.11 AO TX, internal fault map class 1A

Table 20 AO TX I1A

Fault No.	**AO TX I1A:0**
Fault name	TX offending
Description	This fault has been introduced especially for CDU-D. It arises when the BSC has configured two TXs on the same frequency or if the frequency separation is below the guard band (600 kHz in GSM 900 and 1 MHz in GSM 1800). The TX will be disabled in order to protect the CU from overheating.
Possible reasons	BSC wants to move a frequency from one TX to another TX and "forgets" to disable the first TX before configuring the second TX. The TX will be automatically disabled and reconfigured to a non-offending frequency.
Action	The frequency planning is wrong (check Data Transcript for this cell).

1.5.12 AO TX, internal fault map class 1B

Table 21 AO TX I1B

Fault No.	**AO TX I1B:0**
Fault name	CU not usable (SW releases R7.0 and R7C)
	CU/CDU not usable (SW releases R7D and R8A)
Related fault	SO CF I2A:14 – Reset, SW fault
	SO TRXC I1B:0 – CDU not usable
	SO TRXC I2A:22 – CDU bus communication fault
Description	There is a communication problem on the CDU-bus between TRU and CU. TX function is affected since the CDU-bus is used to tune the CU.
Possible reasons	•The CDU-bus cable is faulty or disconnected.
	•The CU is powered off
	•One of the two TRUs controlling the CDU-bus is faulty.
Action	Check backplane connection as well.

Fault No.	**AO TX I1B:1**
Fault name	Combiner VSWR Limits Exceeded (SW releases R7.0 and R7C) CDU/combiner VSWR Limits Exceeded (SW releases R7D and R8A)
Related fault	SO CF I2A:8 – VSWR limits exceeded SO CF RU:5 – CDU
Description	When VSWR at TRU output exceeds 2.0, the TX power is automatically reduced until VSWR goes below 2.0. Fault SO CF I2A:8 arises on CF with RU map "CDU". When VSWR exceeds 4.0, fault AO TX I1B:1 arises and BSC should normally disable the TX.
Possible reasons	•The TX cable between a CDU and a TRU is faulty or disconnected. •A HW error in the TRU.
Note:	The Fault LED on the CDU is turned on and the SO CF RU map indicates CDU which can be misleading since the fault is more likely to be in TRU or TX cable between TRU/CDU.
Action	•Check the TX cable between CDU and TRU. •If the TX cable is OK, change the TRU.

Fault No.	**AO TX I1B:2**
Fault name	CDU output power limits exceeded
Related fault	SO CF I2A:9 – Power limits exceeded
Description	When TX power at CDU output is 7 dB lower than expected, fault SO CF I2A:9 arises. When the difference is 10 dB, fault AO TX I1B:2 arises.
Possible reasons	There is probably a fault on the TX path. Other reason: TX high temperature or saturation (see AO TX I1B:12 and AO TX I1B:14).
Action	Try the following actions until the fault is corrected: •Check all TX cables, both inside and outside cabinet. •Check the CDU — TRU Pfwd/Prefl cables. •Check the RU logs to see which TRU is emitting the fault. •Switch positions between TRUs/CDUs to find out it is the units or the RF cables that are faulty. •Reinstall the IDB.

Fault No.	**AO TX I1B:4**
Fault name	TX antenna VSWR limits exceeded
Related fault	SO CF I2A:8 – VSWR limits exceeded
	SO CF RU:40 – Antenna
Description	When VSWR at CDU output exceeds the class 2 limit defined in IDB with OMT (default value: 1.8), the fault SO CF I2A:8 arises with RU map "Antenna". When VSWR exceeds the class 1 limit (default value: 2.2), the fault SO CF I1B:4 arises on TX.
Possible reasons	Faulty IDB, faulty CDU, TX antenna/feeder faulty or disconnected, Pfwd/Prefl cables and, in some cases, the measurement receiver in TRU/CU.
Action	Try to reinstall the IDB before replacing units.

Fault No.	**AO TX I1B:6**
Fault name	TX EEPROM checksum fault
Related fault	SO TRXC I2A:7 – TX EEPROM checksum fault
Description	The data stored in TXU eeprom is corrupted. This data is needed by TRU SW to perform internal configuration.
Possible reasons	Probably a HW fault in TRU.
Action	Try to power off/on TRU before replacing it.

Fault No.	**AO TX I1B:7**
Fault name	TX config table checksum fault
Related fault	SO TRXC I2A:8 – TX configuration table checksum fault
Description	At TRU start-up, the data from TXU eeprom is copied into TRU RAM in order to create the TX configuration table which will be used for internal configuration of TRU SW. This fault arises when the data in TRU RAM is faulty
Action	Try to reset or power off/on the TRU. If this does not help, change TRU.

Fault No.	**AO TX I1B:8**
Fault name	TX synthesiser A/B unlocked
Related fault	SO TRXC I2A:9 – TX synthesizer unlocked
Description	One or both of the RF synthesisers in TXU could not lock to the required frequency.
Possible reasons	Probably a HW fault in TRU
Action	Try to power off/on TRU before replacing it.

Fault No.	**AO TX I1B:9**
Fault name	TX synthesiser C unlocked
Related fault	SO TRXC I2A:9 – TX synthesizer unlocked
Description	The IF synthesiser in TXU could not lock to the required frequency.
Possible reasons	Probably a HW fault in TRU.
Action	Try to power off/on TRU before replacing it.

Fault No.	**AO TX I1B:10**
Fault name	Astra-Tracy Communication fault
Related fault	SO TRXC I2A:6 – Astra Tracy communication fault
Description	Communication fault between Astra and Tracy.
Possible reasons	Probably a HW fault in TRU.
Action	Try to power off/on TRU before replacing it.

Fault No.	**AO TX I1B:11**
Fault name	TX internal voltage fault
Related fault	SO TRXC I2A:10 – TX internal voltage fault
Description	Fault on the internal voltage regulators of the TXU.
Possible reasons	Probably a HW fault in TRU.
Action	Try to power off/on TRU before replacing it.

Fault No.	**AO TX I1B:12**
Fault name	TX High temperature
Related fault	SO TRXC I2A:11 – TX high temperature
	SO TRXC I2A:25 – TX maximum power restricted
	AO TX I1B:27 – TX maximum power restricted
Description	The temperature of the PA transistors is supervised. At 75 °C (equals about 45 °C cabinet temperature), faults SO TRXC I2A:11 and SO TRXC I2A:25 are raised on TRXC and maximum TX output power is reduced by 2 dB. If the temperature is still over 75 °C after 2 minutes, the maximum output power is reduced by another 2 dB. If the temperature is still over 75 °C after 2 more minutes the transmitter is automatically shut down and faults AO TX I1B:12 and AO TX I1B:27 are raised. The fault stays active until temperature stays below the limit for 5 minutes. The TX is then enabled and maximum output power is progressively increased.
Possible reasons	Climate system failure - TRU dummies missing - high temperature outside the cabinet

Fault No.	**AO TX I1B:13**
Fault name	TX output power limits exceeded
Related fault	SO TRXC I2A:12 – TX output power limits exceeded
Description	When TX power at TRU output is 2 dB lower than expected, fault SO TRXC I2A:12 arises. When the difference is 4 dB, fault AO TX I1B:13 arises.
Possible reasons	The TX cable between CDU and TRU is faulty or disconnected. The power supply is reduced. The TXU or PAU are faulty or affected by too high temperature.

Fault No.	**AO TX I1B:14**
Fault name	TX saturation
Related fault	SO TRXC I2A:13 – TX saturation
Description	TX saturation means that the TXU delivers maximum RF power to the PAU but it is still not sufficient to get the desired power from the PAU. The fault SO TRXC I2A:13 arises at the same time. Other faults such as AO TX I1B:2 and AO TX I1B:13 might raise as consequence.
Possible reasons	Many possible reasons both SW and HW related. Can even be temperature related.
Action	Try to block/deblock the TRU. If this does not help, power off/on the TRU or replace the TRU.

Fault No.	**AO TX I1B:15**
Fault name	Voltage supply fault
Remark	SW releases R7.0 and R7C. This fault is replaced by fault SO TRXC I1A:22 in SW releases R7D and R8A.
Related fault	SO TRXC I1A:22 – Voltage supply fault
Description	See fault SO TRXC I1A:22.
Possible reasons	See fault SO TRXC I1A:22.
Action	See fault SO TRXC I1A:22.

Fault No.	**AO TX I1B:16**
Fault name	Power unit not ready
Remark	SW releases R7.0 and R7C This fault is replaced by fault SO TRXC I1A:22 in SW releases R7D and R8A.
Related fault	SO TRXC I1A:22 – Voltage supply fault
Description	See fault SO TRXC I1A:22.
Possible reasons	See fault SO TRXC I1A:22.
Action	See fault SO TRXC I1A:22.

Fault No.	**AO TX I1B:17**
Fault name	TX initiation fault
Related fault	SO TRXC I2A:21 – TX initiation fault
Description	The TXU could not be initialised. There is probably a fault in the ASIC (Tracy), the synthesisers or the eeprom. This fault occurs at TRU start-up and stays as long as the initialisation is unsuccessful.
Possible reasons	Probably a HW fault in TRU.
Action	Try to power off/on TRU before replacing it.

Fault No.	**AO TX I1B:18**
Fault name	CU HW fault (SW releases R7.0 and R7C)
	CU/CDU HW fault (SW releases R7D and R8A)
Related fault	SO CF I2A:24 – CU HW fault
Description	There is a fault in CU/CDU HW, for example step motor, measurement receiver, and so on.
Action	Try to power off/on CU/CDU and reset TRU. If this does not help, replace the CU/CDU.

Fault No.	**AO TX I1B:19**
Fault name	CU SW load/start fault (SW releases R7.0 and R7C)
	CU/CDU SW load/start fault (SW releases R7D and R8A)
Related fault	SO CF I2A:24 – CU HW fault
Description	The CU/CDU SW has a checksum fault or cannot be started in CU/CDU processor. TRU reloads CU/CDU SW over CDU-bus and CU/CDU is restarted. The fault should cease.
Possible reasons	If the fault does not cease or occurs too often, there is probably a HW fault in CU (for example boot prom corrupted).
Action	Try to power off/on CU/CDU and reset TRU. If this does not help, replace CU/CDU.

Fault No.	**AO TX I1B:20**
Fault name	CU input power fault (SW releases R7.0 and R7C)
	CU/CDU input power fault (SW releases R7D and R8A)
Related fault	SO CF I2A:9 – Power limits exceeded
Description	This alarm arises by CU/CDU when TX power at CU input is different than the value expected (sent by TRU to CU/CDU over CDU-bus).
Possible reasons	TX cable between TRU and CU is faulty or disconnected.
Action	Replace the TRU or CU/CDU.

Fault No.	**AO TX I1B:21**
Fault name	CU park fault (SW releases R7.0 and R7C)
	CU/CDU park fault (SW releases R7D and R8A)
Related fault	SO CF I2A:24 – CU HW fault
Description	One of the filter cavities in CU/CDU has failed to park or did not park within the specified time (30 s). This might affect other TRUs as well. Note: "parking" means that the filter cavity is tuned outside the TX frequency band in order not to disturb other TRUs. This is done for example when TX is disabled or when CU/CDU has lost contact with TRU.
Possible reasons	Probably HW fault in CU/CDU . Could also be a communication fault (CDU-bus).
Action	Try to power off/on CU/CDU and reset TRU. If this does not help, replace CU/CDU .

Fault No.	**AO TX I1B:22**
Fault name	VSWR/Output power supervision lost
Remark	Only CDU-D
Related fault	SO CF I2A:15 – VSWR/Output power supervision lost
Description	The Pf cable between FU and CU is missing or disconnected => CU cannot be tuned so TX function is lost. Moreover, antenna VSWR and output power cannot be supervised.
Action	Replace the Pf cable between CU and FU.

Fault No.	**AO TX I1B:23**
Fault name	CU reset, power on (SW releases R7.0 and R7C)
	CU/CDU reset, power on (SW releases R7D and R8A)
Related fault	SO CF I2A:24 – CU HW fault
Possible reasons	CU/CDU has been reset. Fault raises and ceases immediately after reset.

Fault No.	**AO TX I1B:24**
Fault name	CU reset, communication fault (SW releases R7.0 and R7C)
	CU/CDU reset, communication fault (SW releases R7D and R8A)
Related fault	SO CF I2A:24 – CU HW fault
Possible reasons	CU/CDU has been reset. Fault raises and ceases immediately after reset.

Fault No.	**AO TX I1B:25**
Fault name	CU reset, watchdog (SW releases R7.0 and R7C)
	CU/CDU reset, watchdog (SW releases R7D and R8A)
Related fault	SO CF I2A:24 – CU HW fault
Possible reasons	CU/CDU has been reset. Fault raises and ceases immediately after reset

Fault No.	**AO TX I1B:26**
Fault name	CU fine tuning fault (SW releases R7.0 and R7C)
	CU/CDU fine tuning fault (SW releases R7D and R8A)
Related fault	SO CF I2A:24 – CU HW fault
Description	The fine tuning occurs when TX is enabled. The purpose is to adjust the cavity according to TX power variations.
Possible reasons	Probably a HW fault in CU/CDU (for example step motor or cavity axes).
Action	Try to power off/on CU/CDU and reset TRU. If this does not help, replace CU/CDU .

Fault No.	**AO TX I1B:27**
Fault name	TX max power restricted
Related fault	SO TRXC I2A:11 – TX high temperature
	SO TRXC I2A:25 – TX maximum power restricted
	AO TX I1B:12 – TX high temperature
Description	This fault arises when the TX has been disabled in order to protect it against high temperature. There is a corresponding class 2 fault (SO TRXC I2A:25) which arises when the maximum TX output power has been reduced.
Action	See description of fault AO TX I1B:12.

Fault No.	**AO TX I1B:28**
Fault name	CDU high temperature
Related fault	SO TRXC I2A:25 – TX Max Power Restricted
	AO TX I1B:12 – TX High Temperature
	AO TX I2A:0 – TX Diversity Fault
Description	
Action	Replace the CDU.

Fault No.	**AO TX I1B:47**
Fault name	TX Auxiliary equipment fault
Related fault	SO CF I2A:47 – Auxiliary Equipment Fault
	AO RX I1B:47 – RX Auxiliary Equipment Fault
Description	A class 1 fault has occurred on auxiliary equipment related to TX antenna (for example power booster in active antenna).

1.5.13 AO TX, internal fault map class 2A

Table 22 AO TX I2A

Fault No.	**AO TX I2A:0**
Fault name	TX diversity fault
Description	The function TX diversity uses two TRUs to send on one carrier, providing an extra gain of 3 dB. If one TRU becomes faulty, the TX-diversity function is lost but the carrier is still able to carry traffic thanks to the second TRU.
Action	Replace the faulty TRU.

P006554B

Ericsson GSM System

RBS 2202

Spare Parts Catalogue

ERICSSON

LZN 302 95 R7D

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Ericsson GSM System

RBS 2202

Spare Parts Catalogue

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Spare Parts Catalogue

Due to continued progress in methodology, design and manufactoring the contents of this document are subject to revision without notice.

Contents

Preface

This catalogue is a complement to the Maintenance Manual and provides the information necessary to order replaceable parts. This information is useful for the general planning of a maintenance organisation and in building up a spare parts stock.

The main target groups are:

- Field Technichians
- Technical Administrators

Customer Documentation Library

The user documentation for the RBS 2202 consists of customer manuals divided up to suit different process events. The *Library Overview* contains the following information for each manual:

- Short description
- Recommended target group
- Product number

For more information about the RBS 2000 customer documentation library, see:

RBS 2000 Library Overview *LZN 302 73*

Release History

In addition to editorial changes, such as corrections of spelling, grammar and layout, the following changes have been made for each release. Only the three last R-states are listed below.

R6A to R7A, R78

- New TRU version for 1800 and 1900 MHz.
- Improved illustrations.
- Missing chapter (Transmission Cables) added (R7B).

R7B to R7C

- Fan in cabinet SEB 112 62/01-02 excluded.
- New cable (TG-sync and Co-siting).
- Adapter when using DXU11 introduced.

R7C to R7D

- KFE 101 1140/3 and KFE 101 1140/5 replaced by KFE 101 1148/1.
- Bracket no longer a Spare Part.
- TMA introduced.

Spare Parts Philosophy for RBS 2000

The specifying and classifying of spare parts is done during the service preparation process which is a part of the industrialization process. The result is a spare part list containing three classes of spare parts:

• Recommended for customer stock. Intended to be replaced on site and intended to be repaired at Ericsson Repair Center or by the Local Service Organisation (former code = U)

• Recommended for customer stock. Intended to be replaced on site or at local shop and intended to be disposed after consumption (former code = R).

• Not recommended for customer stock. The parts are available when needed (former code = A).

The spare parts catalogue is adapted to this structure.

The dimensioning and recommendation of spare parts will not follow the principle one-of-each-board-in-use unless the customer expressly so insists.

The dimensioning and recommendation of spare part stocks is and will be done with a computer-based calculation model for BTS equipment.

The tool is working with the parameters:

• Product reliability (MTBF)

• Spare part delivery lead time or repair turn around time.

• Chosen service level (Spare Part Management).

• The spare part structure.

• Quantity of each unit in operation to be supported by the specific stock.

• The probability of shortage.

General Information

The catalogue is divided into separate chapters, depending on recommendations (classifications).

Position numbers put in brackets ( ) are associated parts, not necessary shown in illustrations. Position numbers with letters, like 3A, 3B are alternative products. New products are indicated by a #-sign in front of the position number.

Parts without Product number may be shown on illustrations, but are not recommended for customer stock, or may be included in a Spare Parts Set (and not separate orderable). If a reference to another chapter is given, more information will be found there.

Spare Parts Ordering Address:

Please use the Regional Ericsson Company, else:

Ericsson Radio Systems AB

SG/ERA/GV/DP

Customer Support Services, Strategic Supply Management

S-164 80 Stockholm

FAX: +46 8 751 4176

Repair Delivery Address:

Please use the Regional Logistics Center specified in the System Services Contract with the local Ericsson Company.

Catalogue Ordering:

Use the product no. ...... seen at the bottom of this page.

External users can order Spare Parts Catalogues (or other manuals according to the Library Overview), from the same address as for Spare Parts, above.

Internal users (within the Ericsson Company) can always find the latest version of the Catalogue on the Intranet address:

http://cpistore.ericsson.se/

Remarks

External user's comments or questions regarding information in this catalogue should be addressed to:

Spare Parts Documentation, Telefax: **+46 8 757 1388**

or as e-mail to **hws.support@era.ericsson.se**

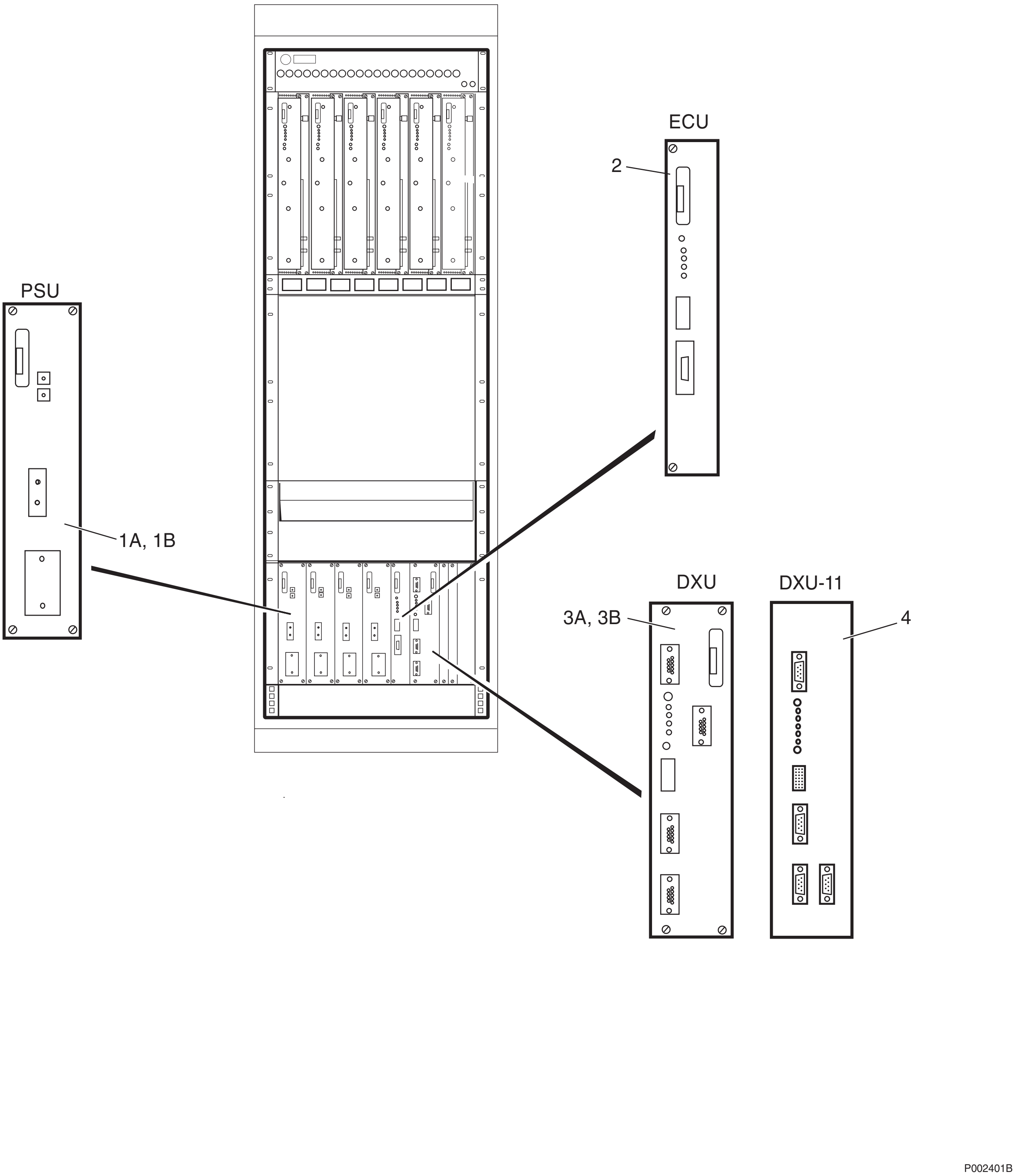
Internal Ericsson users can make a MHS Trouble Report on the catalogue's Product No. and R-state seen at the bottom of this page.

Recommended (Repairable) Spare Parts for Customer Stock

About this chapter

All parts in this chapter have the internal code = U. These parts recommended for Customer stock, are intended to be replaced on site and intended to be repaired at an Ericsson Repair Centre or by the Local Service Organisation

It is only possible to order new repairable parts as long as serial production continues. When production ceases these parts can only be sent for repair.

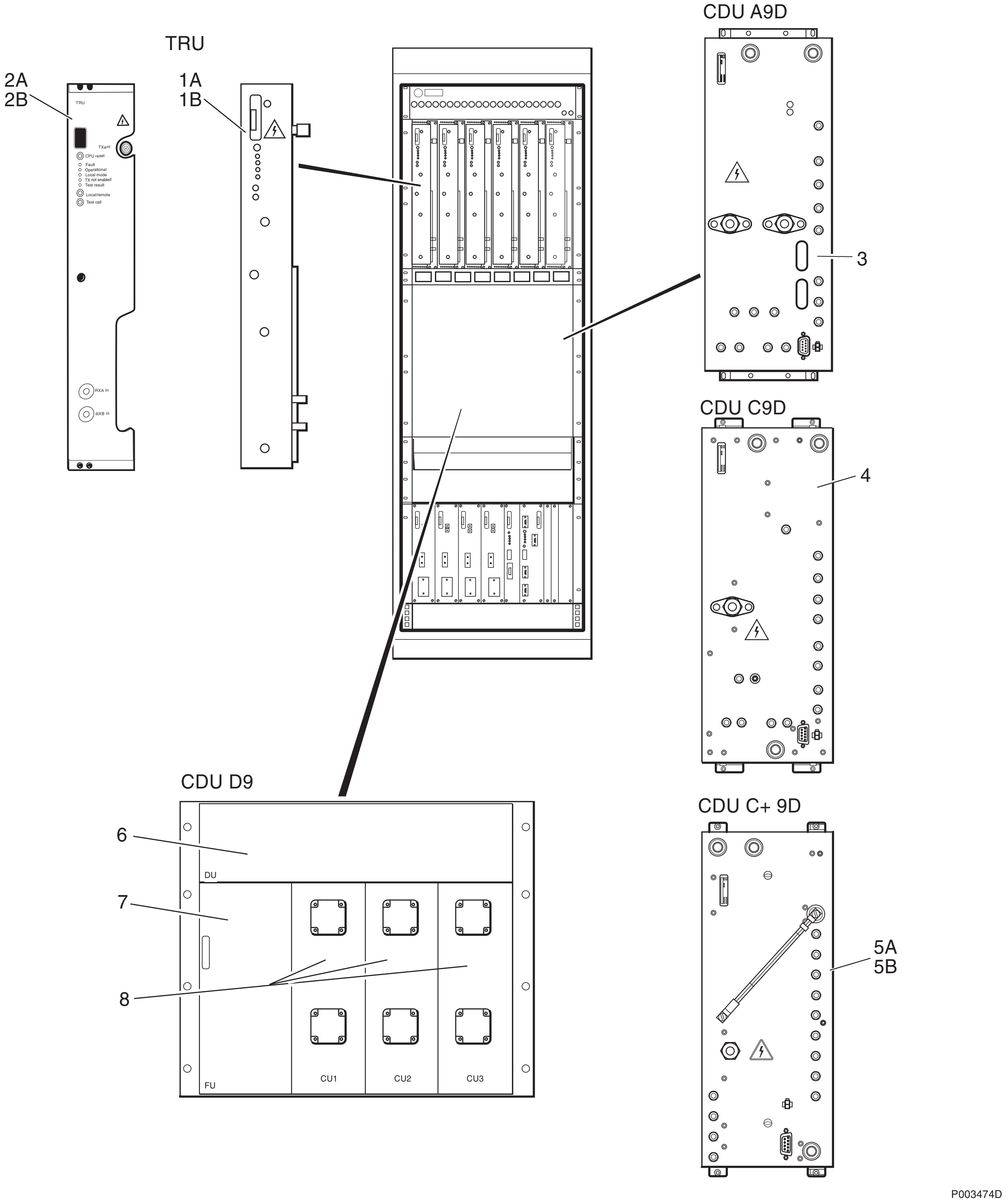

ECU
2
PSU
1A, 1B
DXU
DXU-11
3A, 3B
4
P002401B

Basic Units

Pos	Product Number	Product Name	Description
1A	BML 231 201/1	Power supply unit	PSU230 700W +24VDC FC
1B	BMR 960 013/1	Converter	PSU48 700W, -48/+24VDC FC
2	BMP 903 021/1	Energy control unit	
3A	BOE 602 02/01	Functional unit	DXU 01 /E1, PCM Synch. (Distrib. Switch Unit)
3B	BOE 602 02/03	Functional unit	DXU 03
4	BOE 602 11/11	Functional unit	[1] DXU 11 (long Haul + TG Synch)

Note: Information about Dummy Plates, see chapter "Other Available Parts".

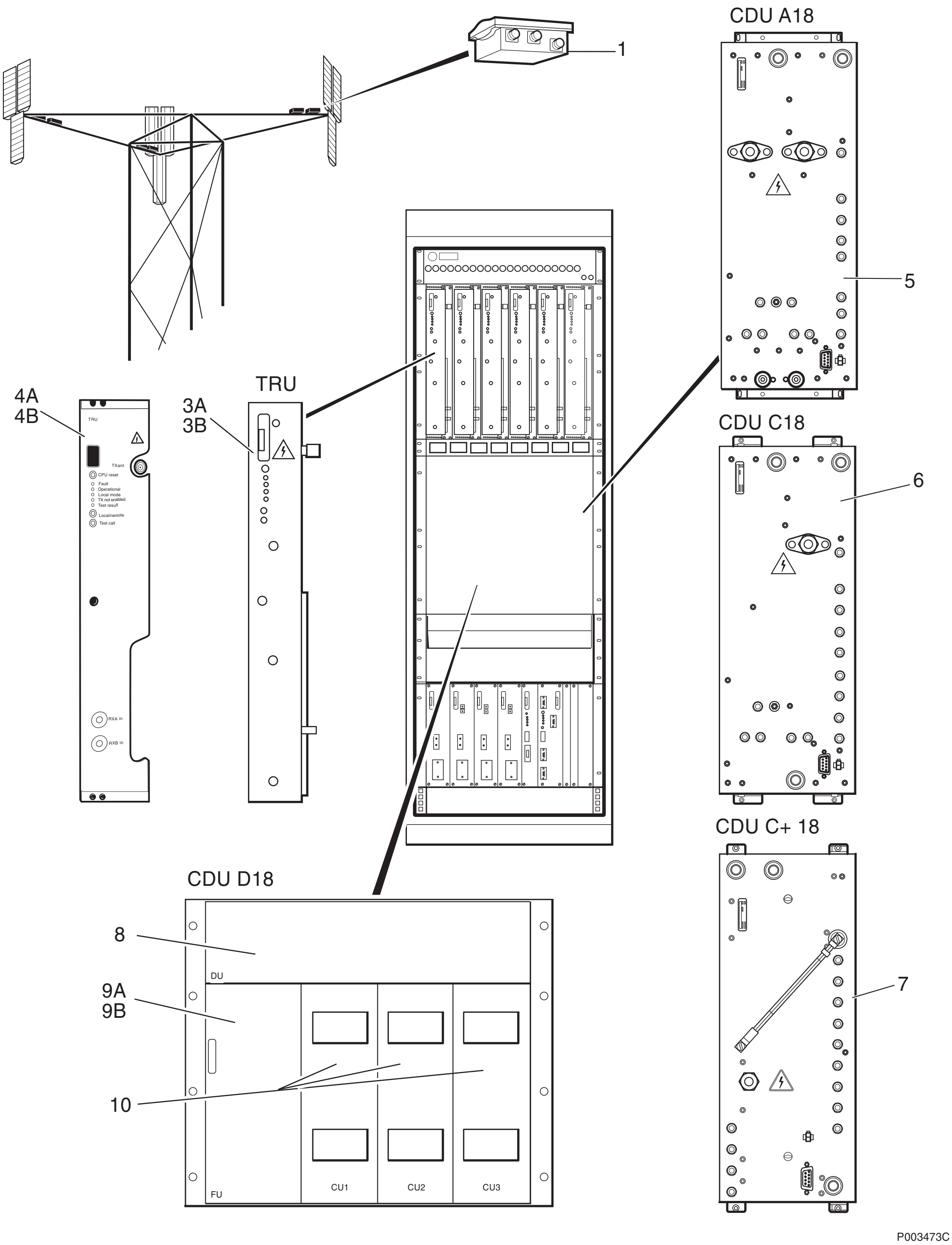
[1] Complete kit to be used when replacing DXU 01 or 03 with DXU 11, please order NTM 201 2798/1 (including 2 adapters and 1 DXU 11).


CDU A9D
TRU
2A
2B
1A
1B
3
CDU C9D
4
CDU D9
6
DU
7
8
FU
CU1
CU2
CU3
CDU C+ 9D
5A
5B
P003474D

900 MHz Units

Pos	Product Number	Product Name	Description
Transceivers			
1A	KRC 131 47/03	Transceiver	TRU 900 20W A5/1
1B	KRC 131 47/04	Transceiver	TRU 900 20W A5/2
2A	KRC 131 47/15	Transceiver	TRU 900 20W A5/1
2B	KRC 131 47/16	Transceiver	TRU 900 20W A5/2
Combiners Type A, C, C+			
3	BFL 119 104/1	Combiner unit	CDU_A9d, 900 MHz
4	BFL 119 113/1	Combiner unit	CDU_C9d, 900 MHz
5A	BFL 119 123/1	Combiner unit	P-GSM 900/CDU_C+
5B	BFL 119 135/1	Combiner unit	E-GSM 900/CDU_C+
Combiner Type D			
6	KRY 101 1535/1	Distribution unit	DU, 900 MHz
7	KRF 201 382/1	Filter unit	FUd (duplex) 900 MHz
8	KRF 201 396/1	Combiner unit	CU, 900 MHz (Incl. E-GSM)

Note: Information about Dummy Plates, see chapter "Other Available Parts".

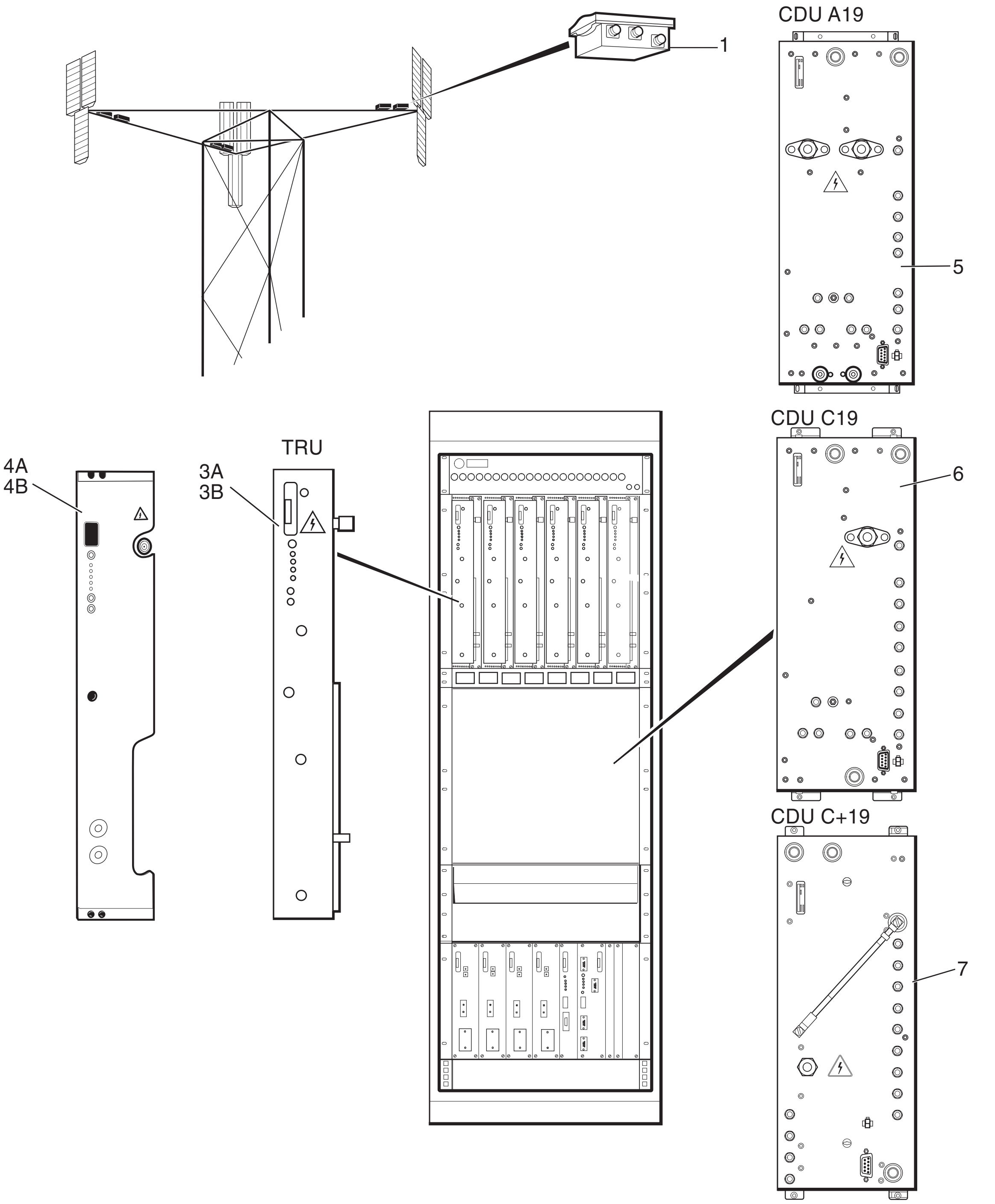

CDU A18
1
5
4A
4B
3A
3B
TRU
CDU C18
6
CDU C+ 18
7
CDU D18
8
DU
9A
9B
10
FU
CU1
CU2
CU3
P003473C

1800 MHz Units

Pos	Product Number	Product Name	Description
Transceivers and Amplifiers			
#1	KRY 112 38/1	Amplifier	TMA 1800/75 GSM DPX
3A	KRC 131 48/01	Transceiver	2) TRU 1800 A5/1
3B	KRC 131 48/02	Transceiver	2) TRU 1800 A5/2
4A	KRC 131 48/15	Transceiver	TRU 1800 A5/1
4B	KRC 131 48/16	Transceiver	TRU 1800 A5/2
Combiners Type A, C, C+			
5	BFL 119 106/1	Combiner unit	CDU A18
6	BFL 119 118/1	Combiner unit	CDU C18, 1800 MHz
7	BFL 119 127/1	Combiner unit	GSM 1800/CDU_C+
Combiner Type D			
8	KRY 101 1483/2	Distribution unit	DU 1800 MHz
9A	KRF 201 250/1	Filter unit	FU 1800 MHz, for use with TMA
9B	KRF 201 383/1	Filter unit	FUd (duplex) 1800MHz, for use without TMA.
10	KRF 201 389/1	Combiner unit	CU 1800 MHz

Note: Information about Dummy Plates, see chapter "Other Available Parts".

2) Production and sales of new parts have ceased.


CDU A19
1
5
CDU C19
6
TRU
4A
4B
3A
3B
CDU C+19
7
P002957C

1900 MHz Units

Pos	Product Number	Product Name	Description
Transceivers and Amplifiers			
#1	KRY 112 37/1	Amplifier	TMA 1900/60 GSM DPX
3A	KRC 131 49/01	Transceiver	[3] TRU 1900 A5/1
3B	KRC 131 49/02	Transceiver	[3] TRU 1900 A5/2
4A	KRC 131 49/15	Transceiver	[4] TRU 1900 A5/1
4B	KRC 131 49/16	Transceiver	[4] TRU 1900 A5/2
Combiners Type A, C, C+			
5	BFL 119 108/1	Combiner unit	CDU A19
6	BFL 119 117/1	Combiner unit	CDU C19, 1900 MHz
7	BFL 119 128/1	Combiner unit	GSM 1900/CDU_C+

Note: Information about Dummy Plates, see chapter "Other Available Parts".

[3] Production and sales of new parts have ceased.
[4] This product is available from October 2000.

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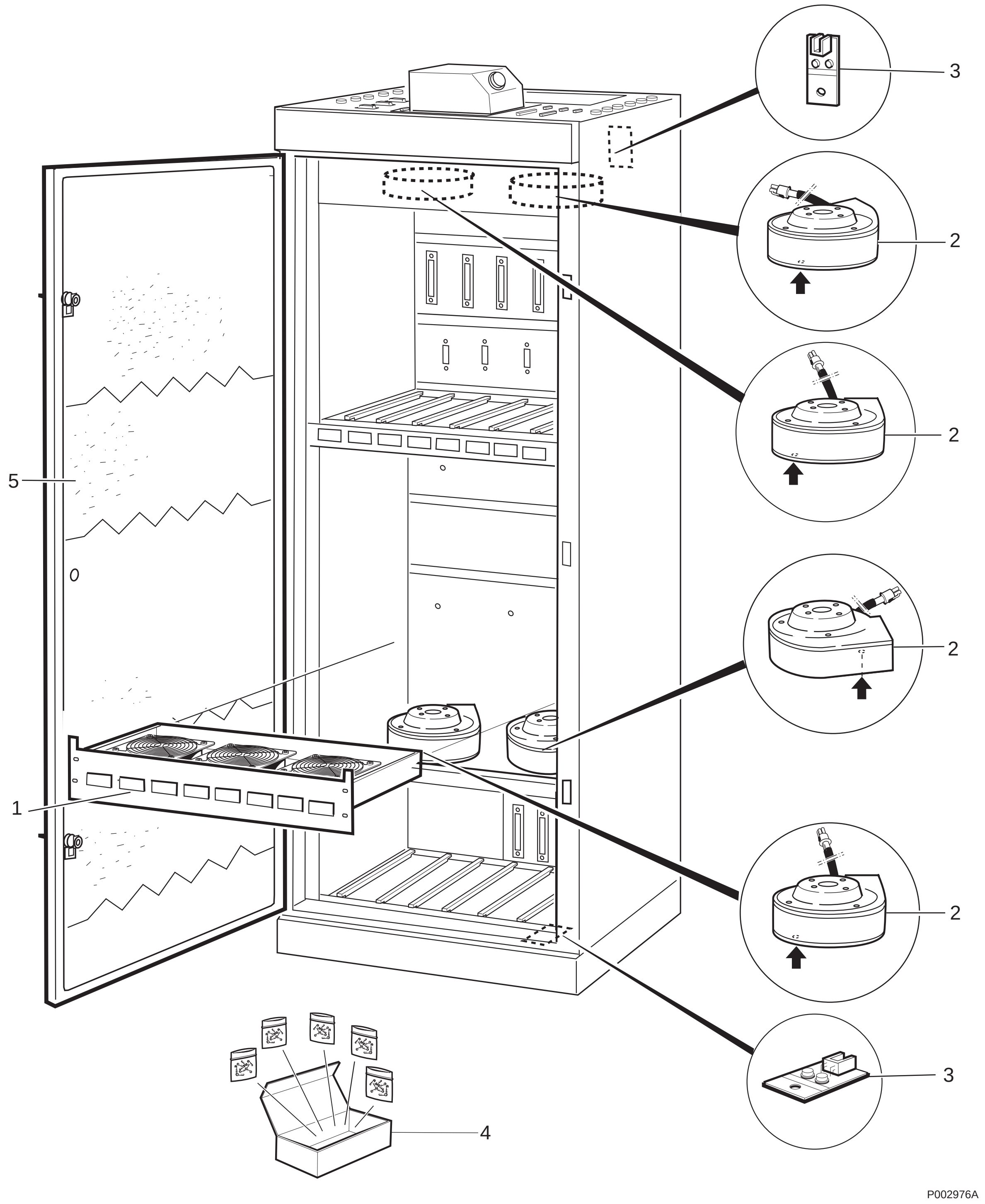
Recommended (Not Repairable) Spare Parts for Customer Stock

About this chapter

All parts in this chapter have the internal code = R.

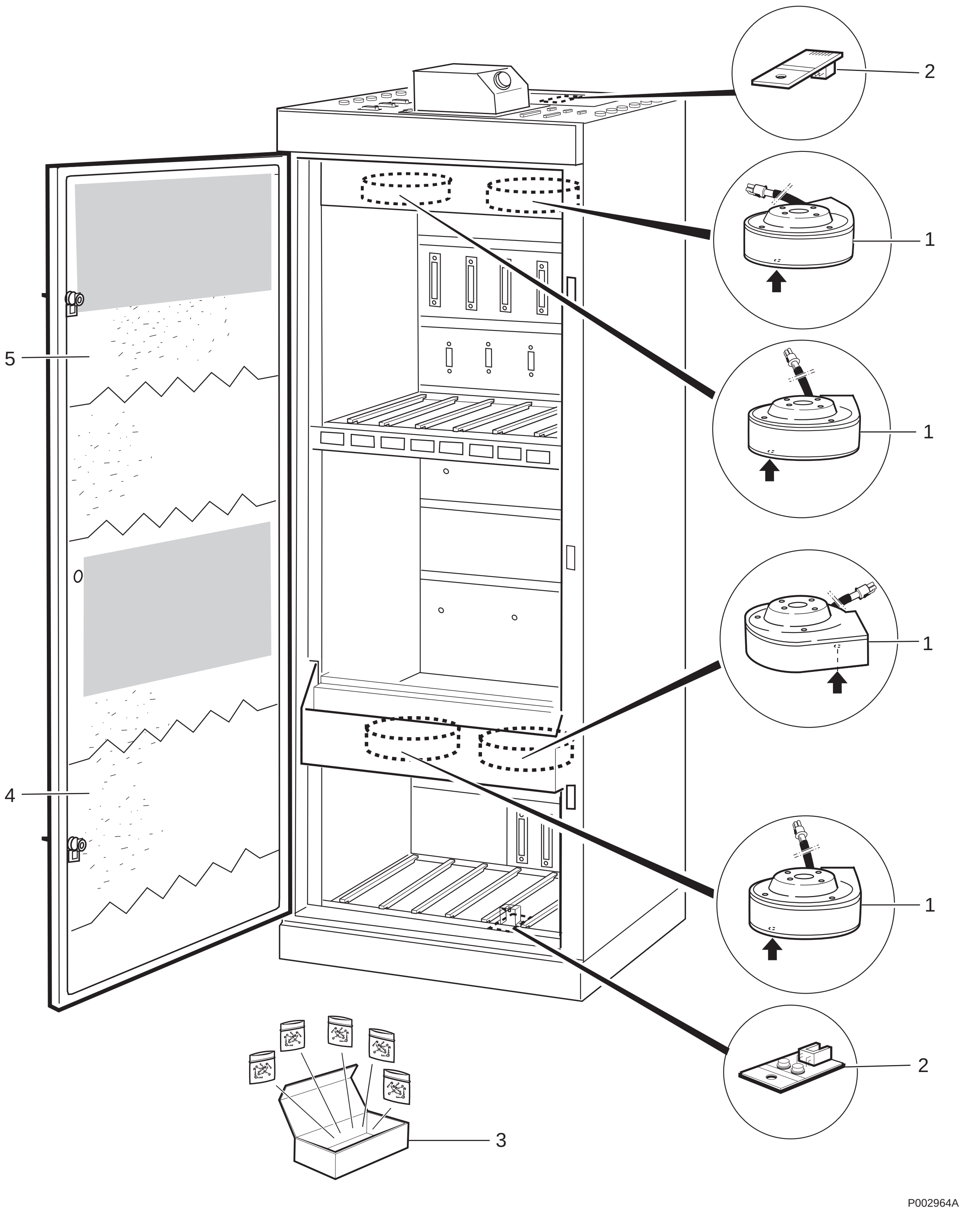
These parts are recommended for customer stock, and are intended to be replaced on site, or at a local shop and are intended to be disposed of after consumption.


3
2
2
5
2
1
2
3
4
P002976A

Basic Cabinet SEB 112 621/01-02

Pos	Product Number	Product Name	Description
1		Fan	5) CHANNEL
2	BKV 301 253/3	Fan	Replacement Set for original BKV 301 253/1 and BKV 301 253/2 including an instruction document on how to reuse screw, plate and holder from an old (faulty) fan. Radial, 180*171*82, 24 VDC
3	ROA 117 666/1	Printed board assemb	6) TEMP SENSOR
4	NTZ 112 85/SC04	Spare parts set	Screw Kit
5	SXA 120 7943/1	Filter	DOOR

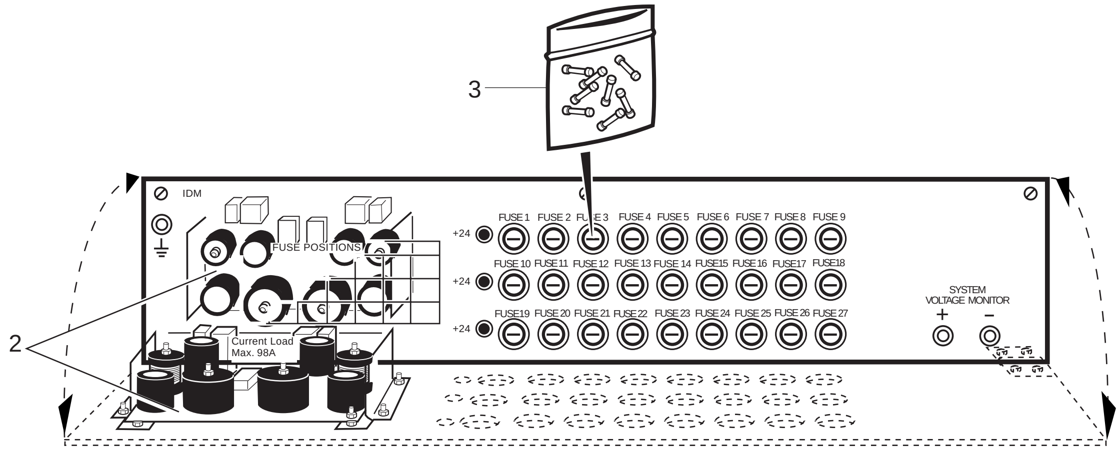
5) If the fan is faulty no action is needed. Leave fan, the whole shelf, in place (in the cabinet) or the airflow in the cabinet will be out of control. From BSS/BTS SW version 6.1.
6) Information about cables for temperature sensors, see chapter "Other Available Parts".


2
1
1
1
1
2
5
4
3
P002964A

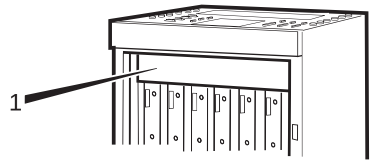
Basic Cabinet SEB 112 1024/01-02

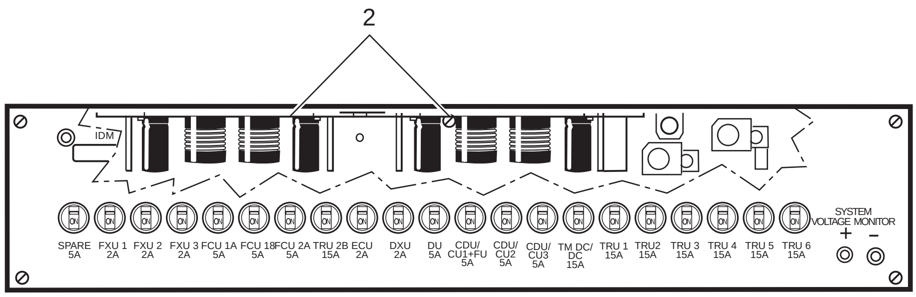
Pos	Product Number	Product Name	Description
1	BKV 301 253/3	Fan	Replacement Set for original BKV 301 253/1 and BKV 301 253/2 including an instruction document on how to reuse screw, plate and holder from an old (faulty) fan.
2	ROA 117 666/1	Printed board assemb	7) TEMP SENSOR
3	NTZ 112 85/SC04	Spare parts set	Screw Kit
4	SXA 120 9758/1	Filter	DOOR
5	SXA 120 9758/2	Filter	DOOR

7) Information about cables for temperature sensors, see chapter "Other Available Parts".



VERSION 1





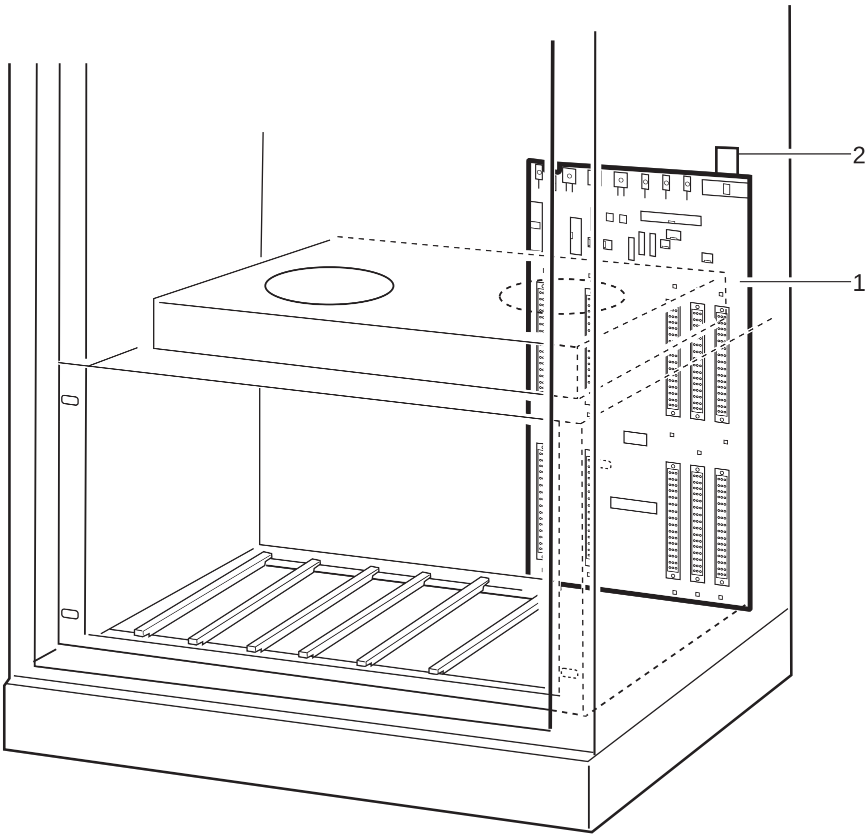
VERSION 2

19_0213B

IDM, Internal Distribution

Pos	Product Number	Product Name	Description
1	1/BMG 980 316/1	Distribution unit	[8) 9)] IDM RBS2202 Replaces previous BMG 980 306/1. See footnote.
2	ROA 117 2136/2	Printed board assemb	FCU 2, Fan Control Unit, Version 2
3	NTZ 112 85/FU02	Spare parts set	IDM FUSES. Fuse kit for V1 of Distribution Unit (BMG 980 306/1)
4		Fuse	12 A, Slow, 250 V, 6.3 x 32 mm. UL listed.
5		Fuse	3 A, Slow, 250 V, 6.3 x 32mm. UL listed
6		Fuse	5 A, Slow, 250 V, 6.3 x 32 mm. UL listed

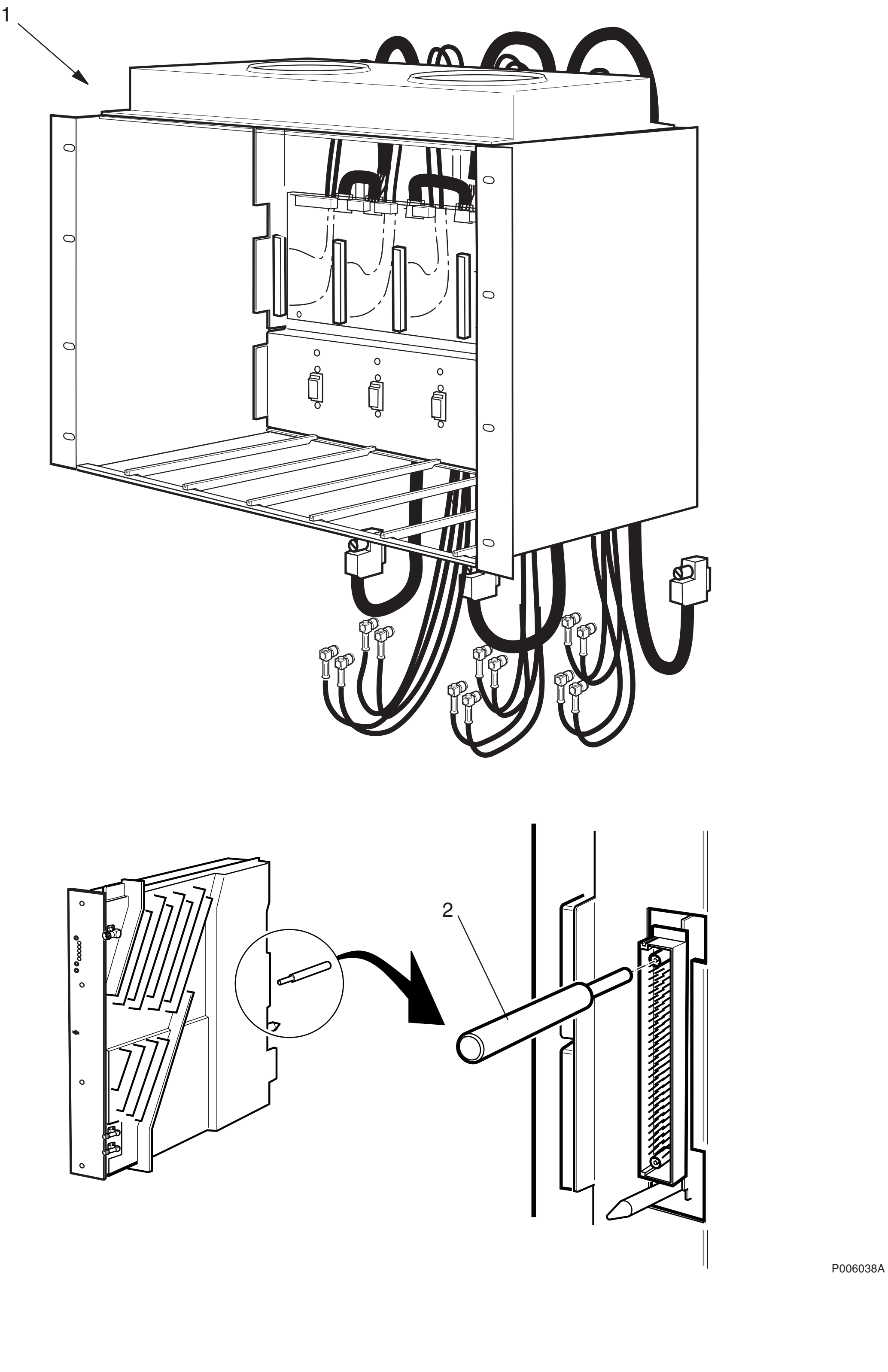
[8)] Distribution Unit 1/BMG 980 316/1 Version 2 is compatible with Version 1. See illustration.
[9)] The spare part IDM with product number 1/BMG 980 316/1 does not include all the cables used for attaching the IDM to the Cabinet.



P002955A

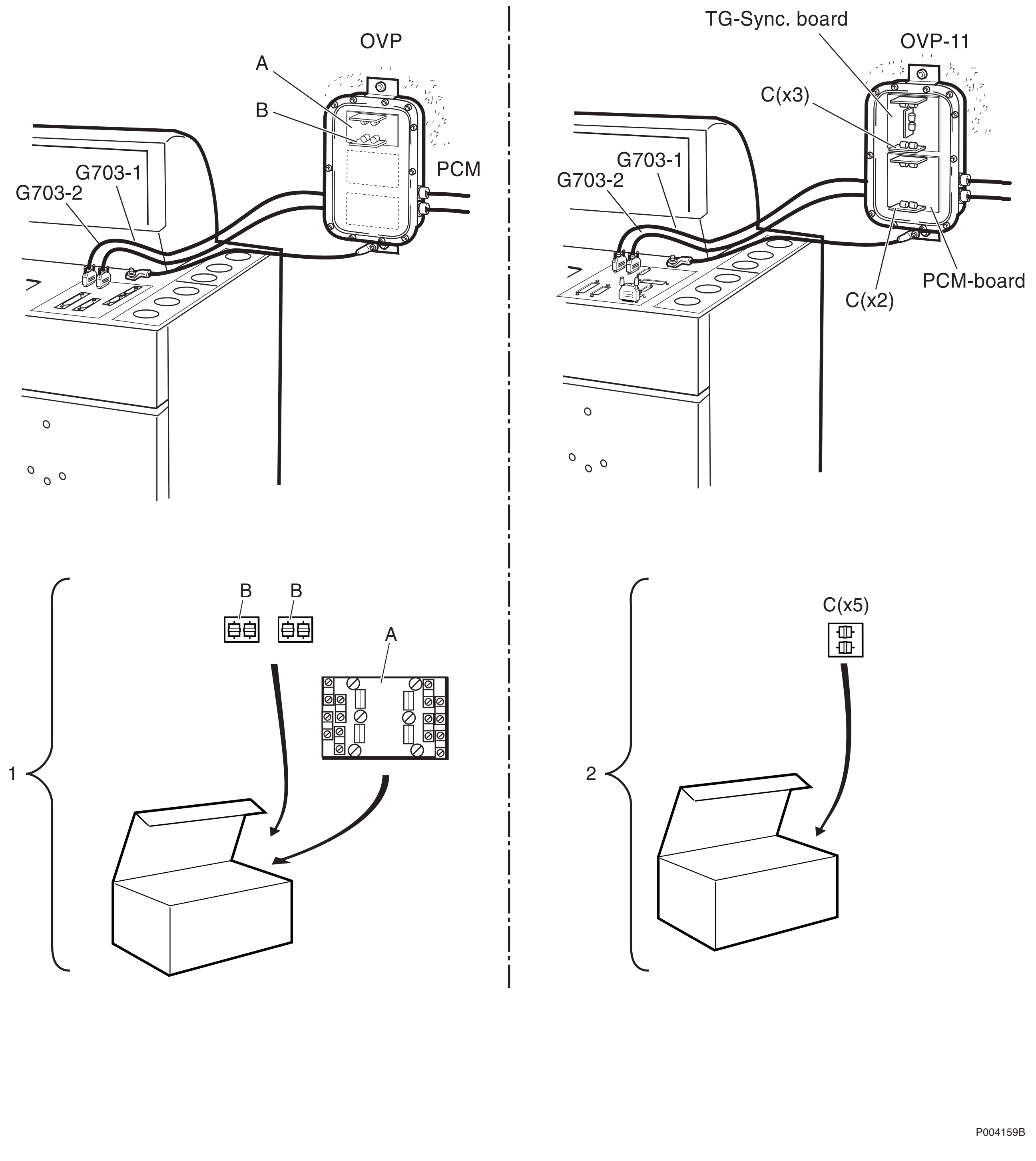
ECU/DXU Backplane Board

Pos	Product Number	Product Name	Description
1	ROA 117 2156/1	Printed board assemb	ECU DXU BP
2	ROA 117 2130/1	Printed board assemb	LOCAL BUS TERMINATION


1
2
P006038A

TRU Sub-rack

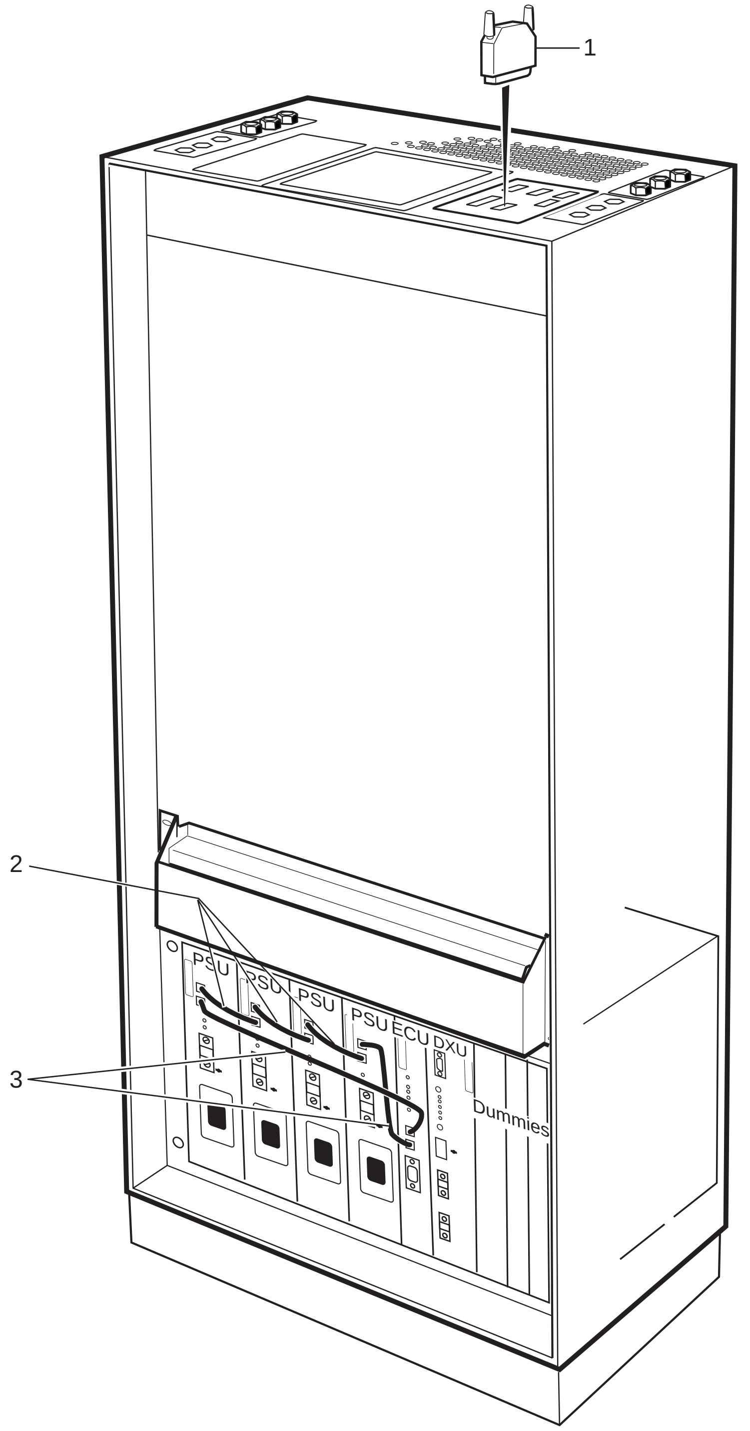
Pos	Product Number	Product Name	Description
1	BFL 119 80/3	Subrack	Complete Sub-rack for TRU including: Backplane board, 3 CDU bus cables, 12 coaxial cables and mechanics A TRU Backplane Set is also available, see chapter "Other Available Parts"
2	SXK 107 2300/1	Tool	Centring tool for coax pins


OVP
A
B
G703-1
G703-2
PCM
TG-Sync. board
OVP-11
C(x3)
G703-1
G703-2
PCM-board
C(x2)
B
B
A
1
C(x5)
2
P004159B

External Safety Products

DXU Lightning Protection

Pos	Product Number	Product Name	Description
1	NFD 302 20/2	Overvoltage arrester	(Spare parts for the OVP Connection Box). Set with 1 board 'A' and 2 sub-boards 'B'. (3 sets may be needed)
2	NFD 302 27/5	Overvoltage arrester	(Spare parts for the OVP-11 Connection Box). Set with 5 sub-boards, type 'C'

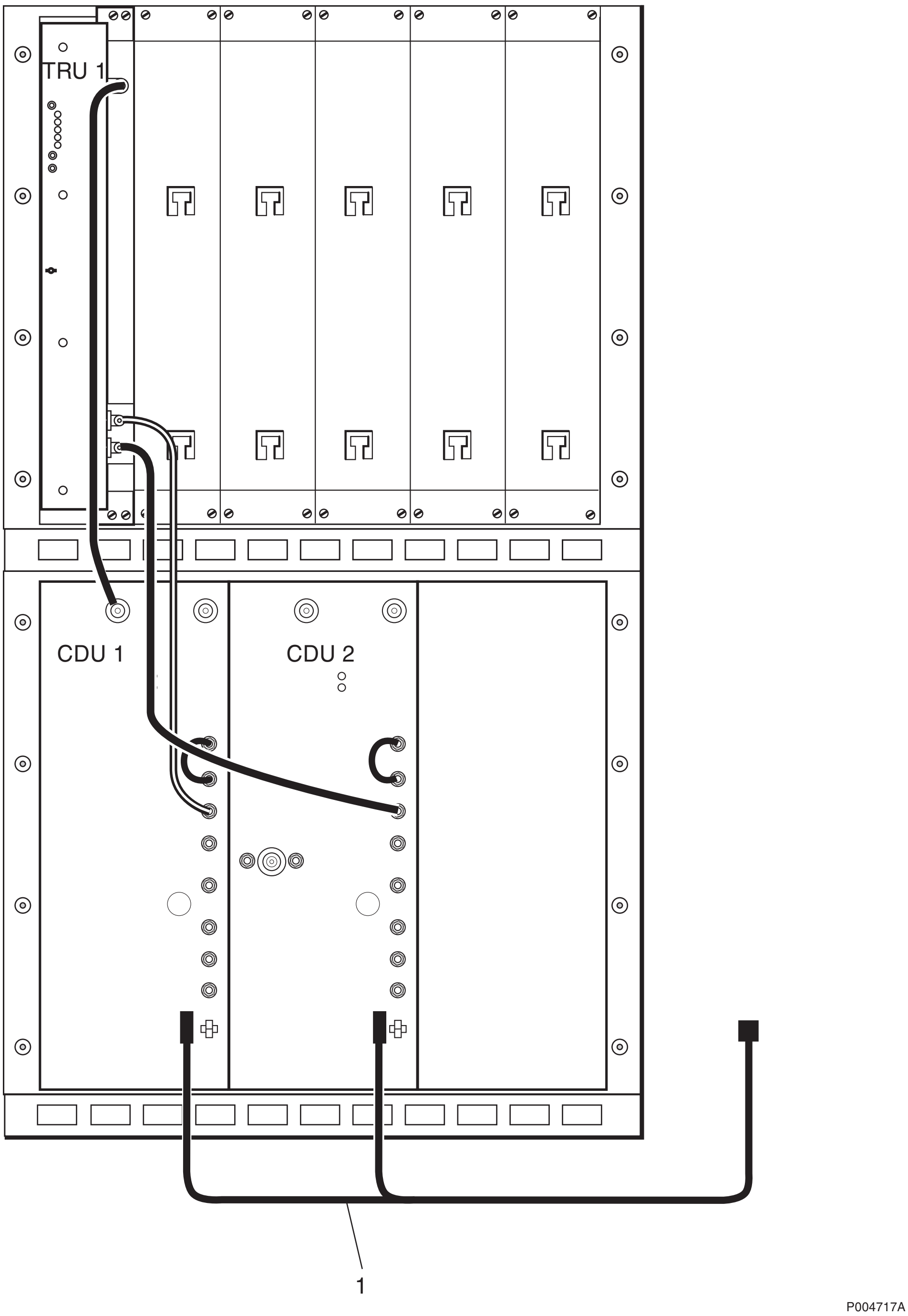


P003110A

Basic Cable Set

Common Cables

Pos	Product Number	Product Name	Description
1		Connector	D-SUB STRAPPING PLUG 120 OHM See chapter "Other Available Parts"
2	RPM 119 081/160	Cable with connector	OPTO
3	RPM 119 081/600	Cable with connector	OPTO


TRU 1
CDU 1
CDU 2
1
P004717A

Special Cable Set for C9d with one TRU and two CDU’s

Pos	Product Number	Product Name	Description
1	RPM 513 1396/1	Connection cable	[10] For 1xTRU, 2xCDU

[10] If only one TRU is to be installed in a cell using CDU type C, this additional cable assembly must be fitted. For other TRU-CDU cables see chapter "Other Available Parts".

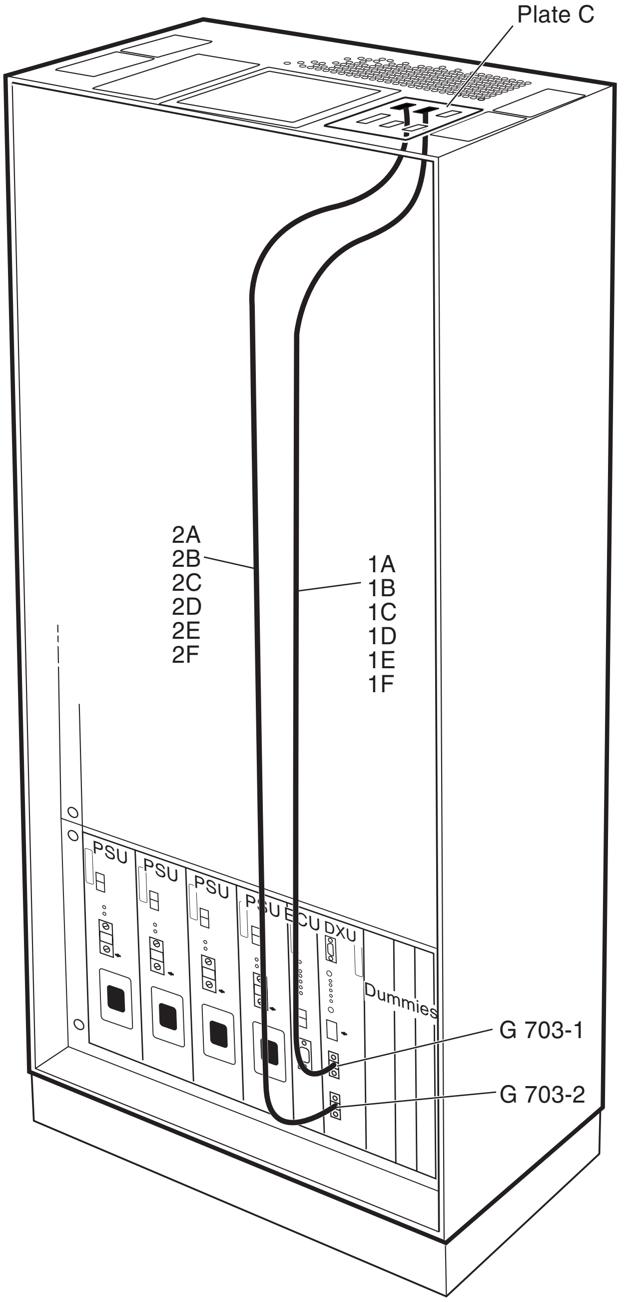


Plate C
2A
2B
2C
2D
2E
2F
1A
1B
1C
1D
1E
1F
PSU
PSU
PSU
PSU
ECU
DXU
Dummies
G 703-1
G 703-2

07_0472C

Transmission Cables

Pos	Product Number	Product Name	Description
1A	RPM 513 708/02250	Connection cable	75 Ohm, L=2.25 m. Bus G703
2A	RPM 513 708/02250	Connection cable	75 Ohm, L=2.25 m. Bus G703
1B-2C		Connection cable	120 Ohm, L= 2.25 m. Bus G703 See chapter "Other Available Parts"
1D, 2D	RPM 513 868/02250	Cable with connector	75 ohm/L=2.25 m/Bus G703/DXU11
1E-2F		Cable with connector	100 ohm/L=2.25 m/Bus G703/DXU11 See chapter "Other Available Parts"

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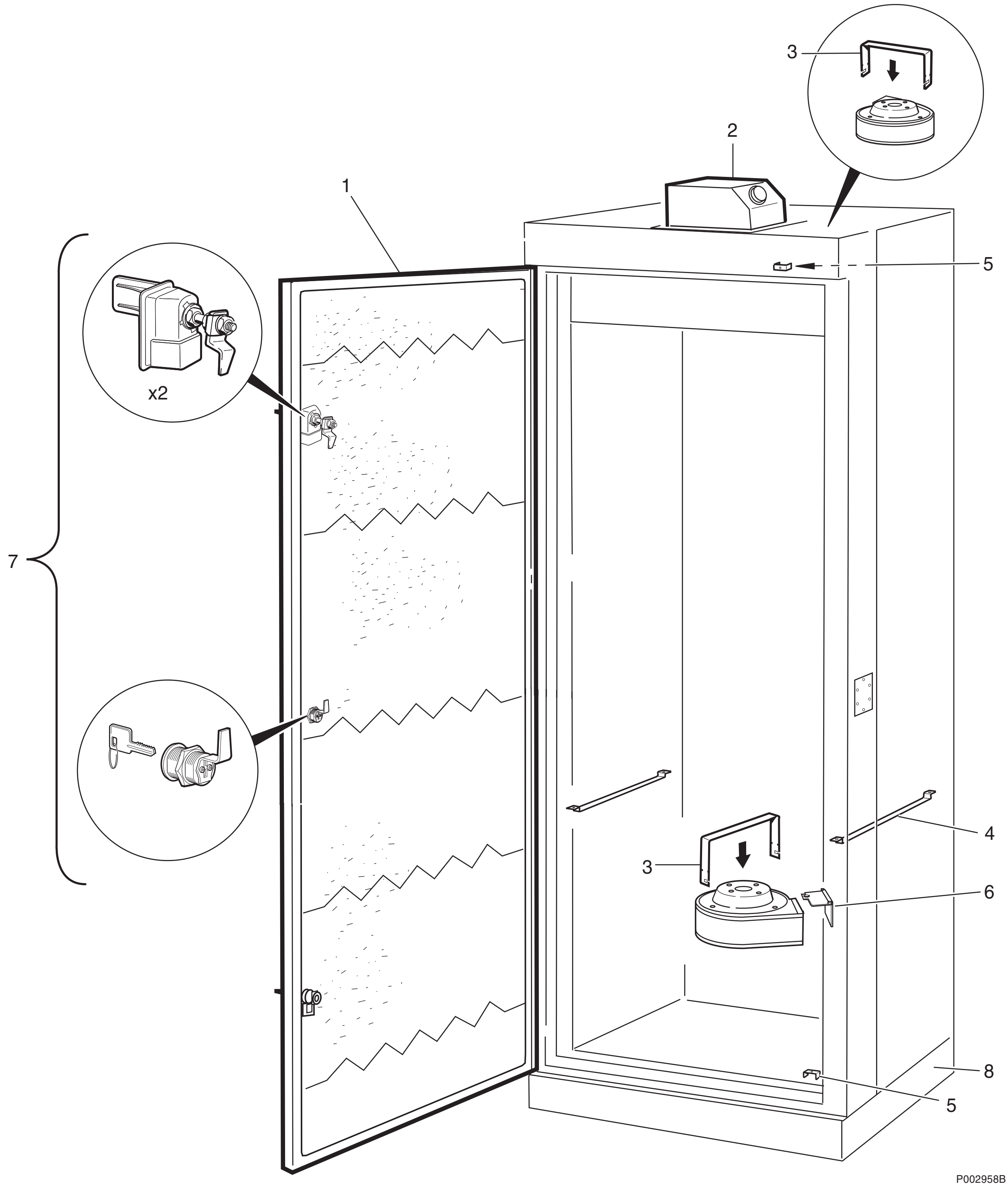
Other Available Parts

About this chapter

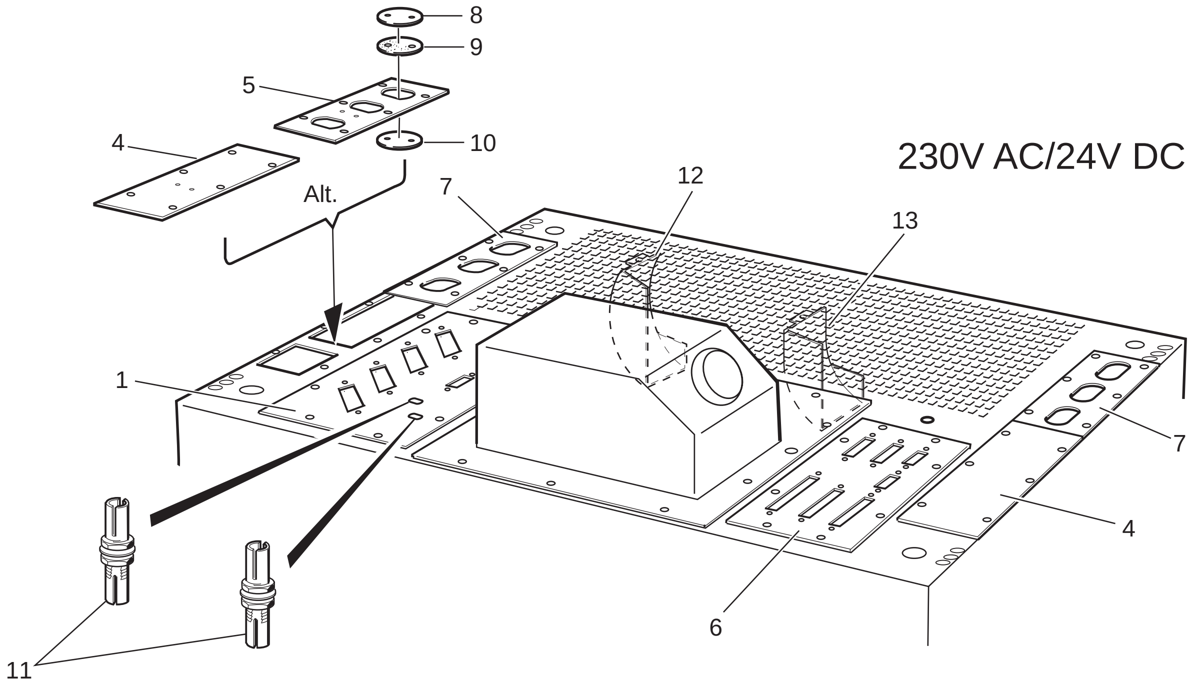
All parts in this chapter have the internal code = A.

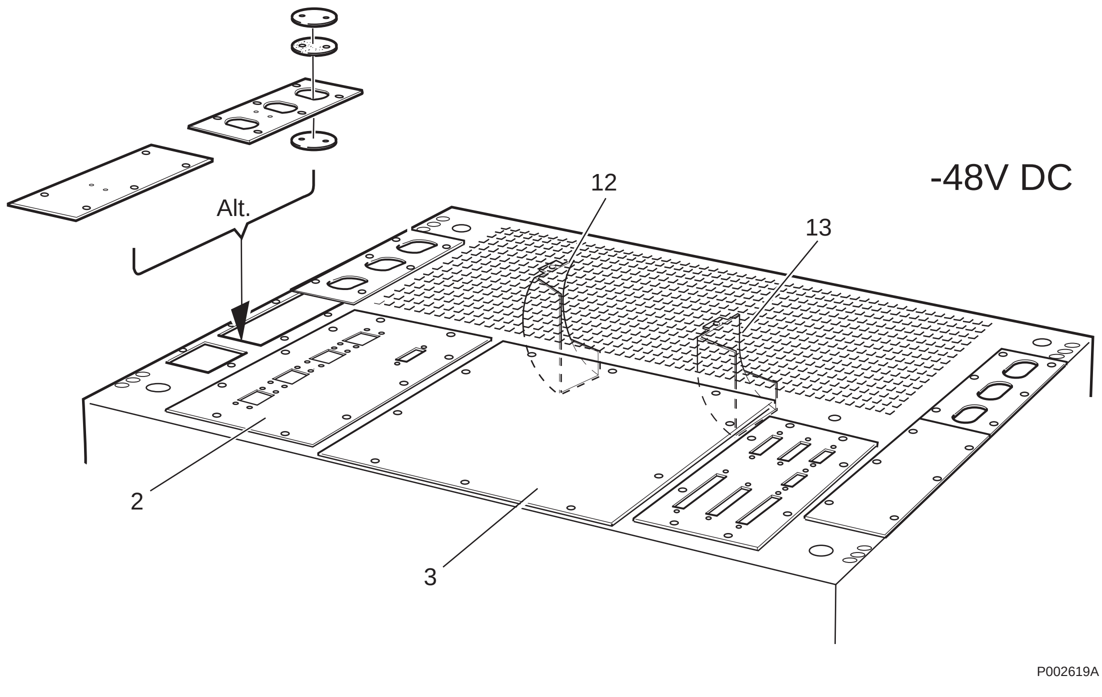
These parts are not recommended for customer stock. The parts are available upon request and the lead time may be longer.


3
2
1
5
x2
7
4
3
6
8
5
P002958B

Basic Cabinet SEB 112 621/01-02

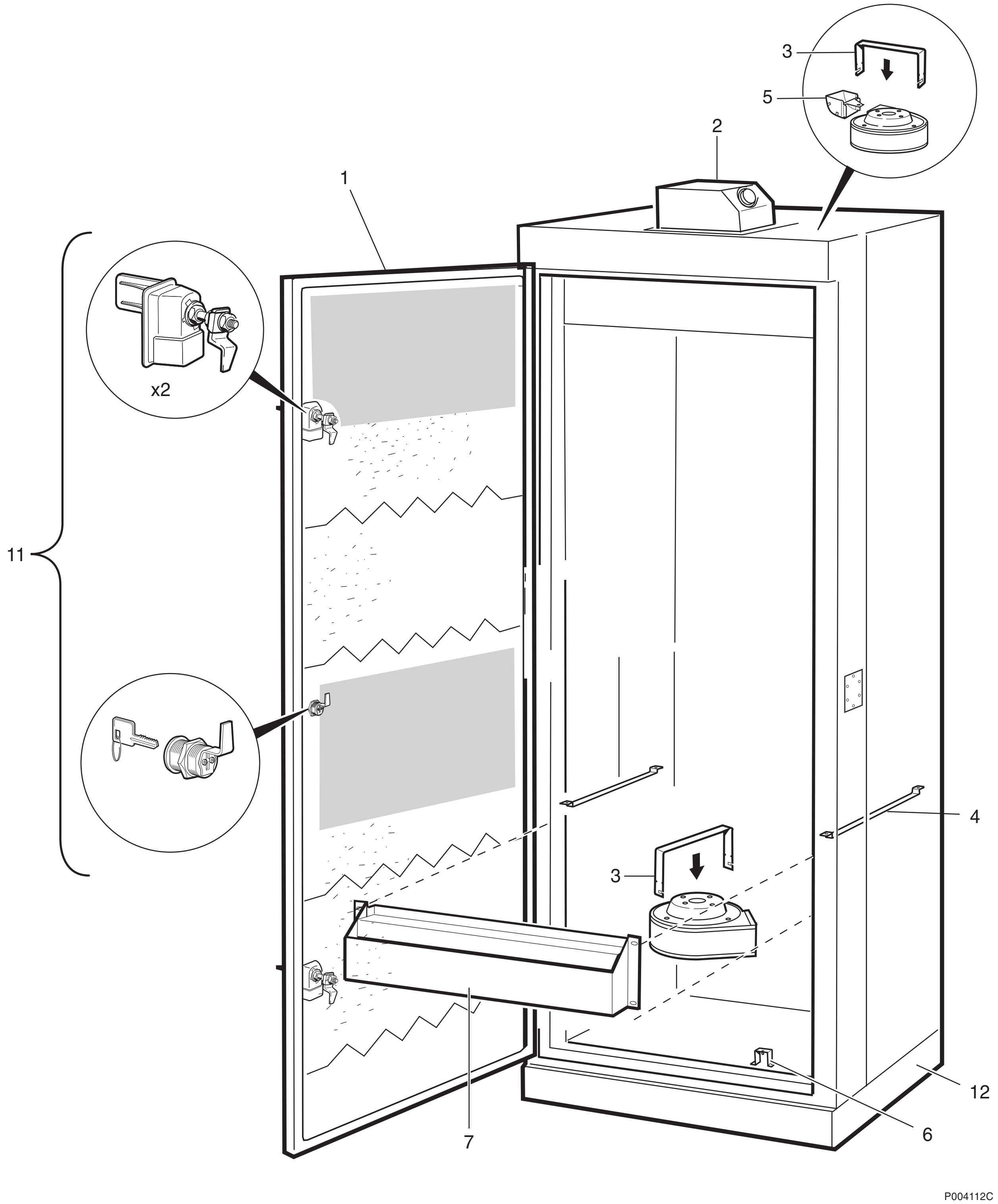
Pos	Product Number	Product Name	Description
1	SXK 107 4745/1	Door	
#2	KFE 101 1148/1	Filter unit	DC-filter 27.2V 100A.
3	SXA 120 5769/1	Clamp	FAN CLAMP
4	SXK 107 5042/1	Bracket	
5	SXA 120 7923/1	Cover-hood	TEMPERATURE SENSOR
6	SXK 107 2720/1	Damper	DAMPER, FAN
7	NTZ 112 85/LK05	Spare parts set	LOCK SET RBS 2202
8	SXK 107 4742/1	Base frame	Cabinet Base


8
9
5
10
4
Alt.
7
12
230V AC/24V DC
13
1
7
4
6
11


Alt.
12
-48V DC
13
2
3
P002619A

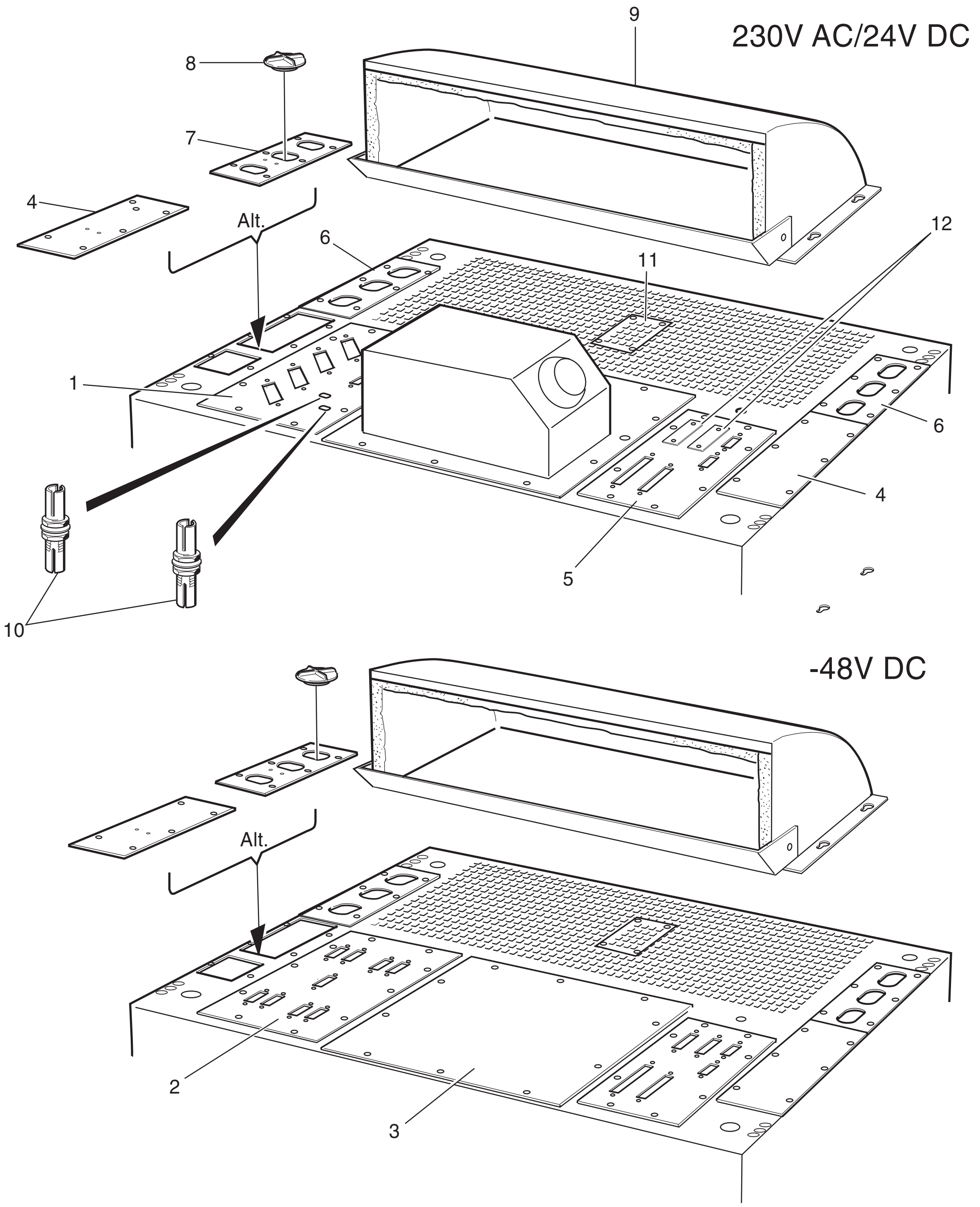
Roof for Basic Cabinet SEB 112 621/01-02

Pos	Product Number	Product Name	Description
1	SXK 107 5090/1	Connector plate	230V AC/24V DC
2	SXA 120 9747/1	Connector plate	-48 V DC
3	SXA 120 7805/1	Filter	-48V DC BLANKING PANEL
4	SXA 120 7778/1	Plate	ANTENNA BLANKING
5	SXA 120 7916/1	Connector plate	
6	SXA 120 7780/1	Connector plate	STANDARD
7	SXA 120 7917/1	Connector plate	
8	SXA 120 7198/1	Covering plate3	COVERING PLATE
9	SXA 120 7193/3	Gasket	GASKET
10	SXA 120 7198/2	Covering plate3	COVERING PLATE
11	NTZ 112 85/AT01	Spare parts set	ADAPTER KIT RBS 2202
12	SXK 107 5048/1	Guide plate	DUCTING-RH
13	SXK 107 5049/1	Guide plate	DUCTING-LH


3
5
2
1
x2
11
4
3
12
6
7
P004112C

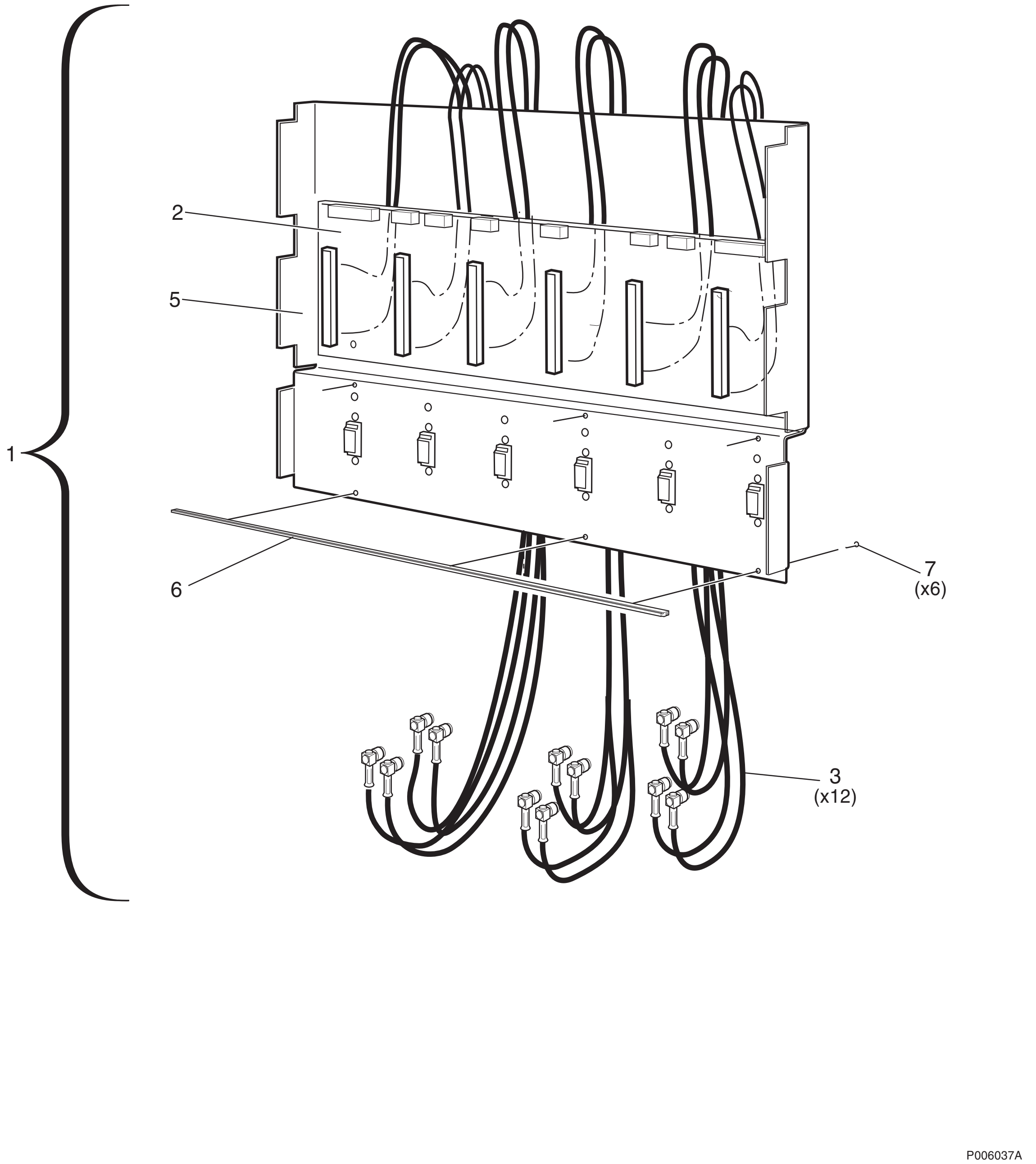
Basic Cabinet SEB 112 1024/01-02

Pos	Product Number	Product Name	Description
1	SXK 107 5075/2	Door	DOOR RBS2202 / GSM
#2	KFE 101 1148/1	Filter unit	DC-filter 27.2V 100A.
3	SXA 120 5769/1	Clamp	FAN CLAMP
4	SXK 107 5042/1	Bracket	
5	SXK 107 5092/1	Guide plate	DUCTING
6	SXK 107 5678/1	Bracket	For temp sensor.
7	SXK 107 5097/1	Document compartment	
11	NTZ 112 85/LK05	Spare parts set	LOCK SET RBS 2202
12	SXK 107 4742/1	Base frame	Cabinet Base


9
230V AC/24V DC
8
7
4
Alt.
6
11
12
1
6
4
5
10
-48V DC
Alt.
2
3
P002408

Roof for Basic Cabinet SEB 112 1024/01-02

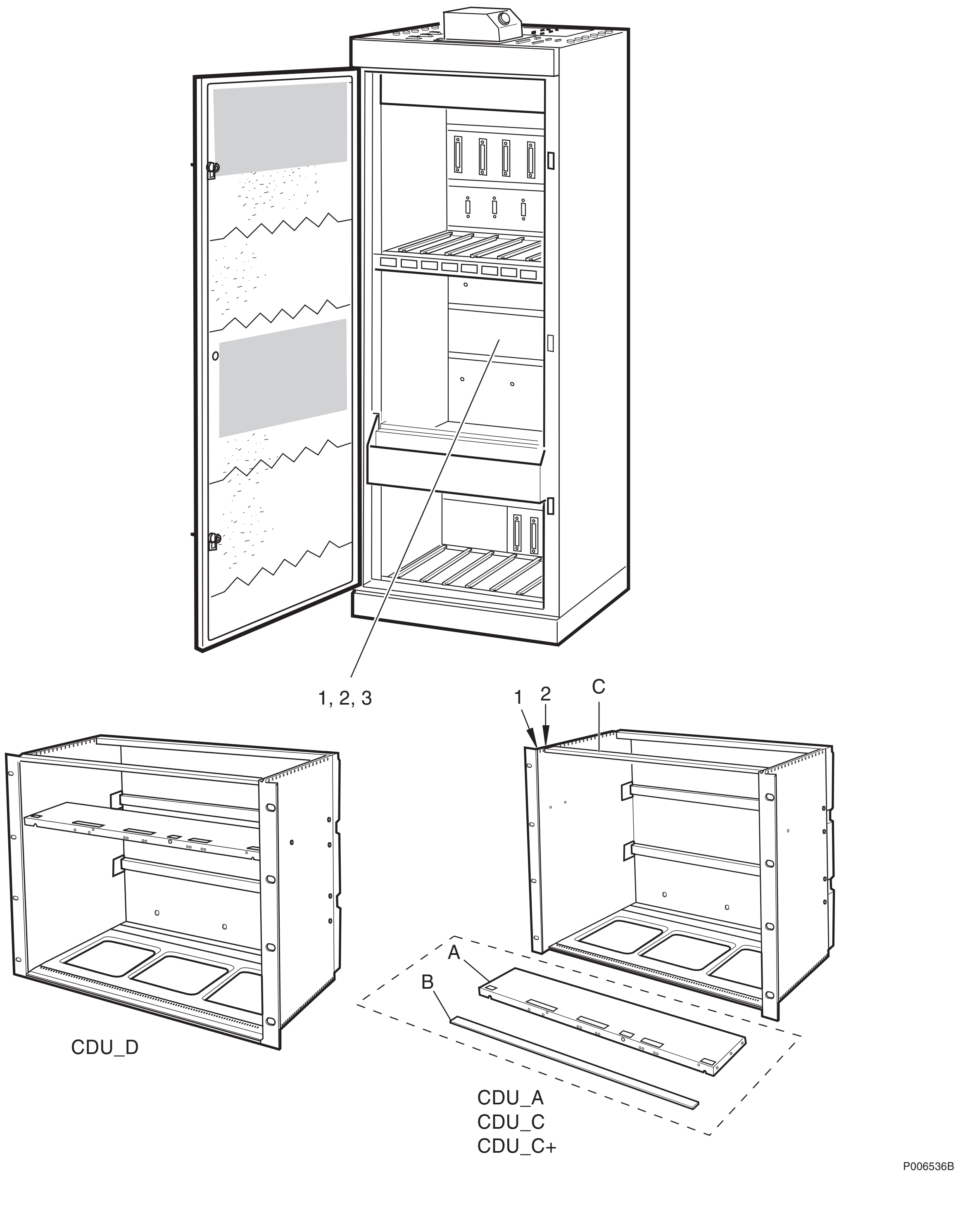
Pos	Product Number	Product Name	Description
1	SXK 107 5090/2	Connector plate	230V AC/24V DC
2	SXA 120 9747/2	Connector plate	-48 V DC
3	SXA 120 7805/1	Filter	-48V DC BLANKING PANEL
4	SXA 120 7778/2	Plate	ANTENNA BLANKING
5	SXA 120 7780/2	Connector plate	STANDARD
6	SXA 120 7917/2	Connector plate	
7	SXA 120 7916/2	Connector plate	FRONT
8	SXA 120 7198/3	Covering plate	COVER.PLATE (MOUNT.PL.)
9	SXK 107 5093/1	Sound damper	MUFFLER/ COVER
10	NTZ 112 85/AT01	Spare parts set	ADAPTER KIT RBS 2202
11	SXK 107 5087/1	Mounting plate	
12	SXA 104 0323/1	Covering plate	


2
5
1
6
7
(x6)
3
(x12)
P006037A

TRU Backplane Set

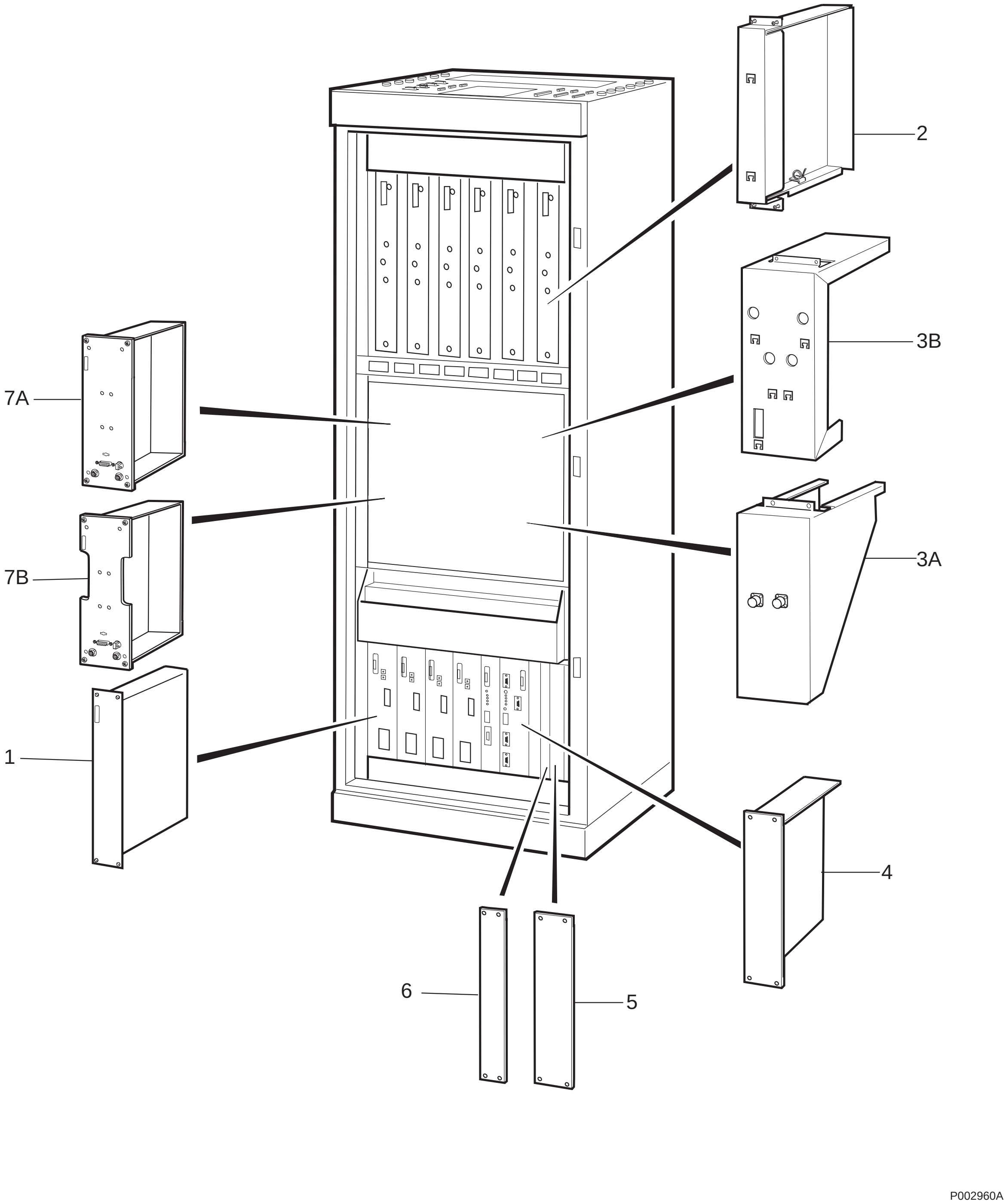
Pos	Product Number	Product Name	Description
1	NTZ 112 85/BB02	Spare parts set	[11] TRU BACKPLANE BOARD SET
2		Printed board assemb	TRU BP
3		Coaxial cable	L =1.64 m. 12 pcs in the set
5		Rear cover	FOR TRU
6		Profiled bar	L=431.8 mm./INTEGRATED NUT BAR
7		Screw	SCREW MRT M 2,5X6 ST FZG

[11] A complete Subrack for TRU is also available, see chapter "Recommended (Not Repairable) Spare Parts".


1, 2, 3
1
2
C
A
B
CDU_D
CDU_A
CDU_C
CDU_C+
P006536B

CDU Sub-rack

Pos	Product Number	Product Name	Description
1		Subrack	For CDU_D Replaced by NTZ 112 469
2		Subrack	For CDU_D Replaced by NTZ 112 469
3	NTZ 112 469	Spare parts set	CDU Sub-rack. replacement for BFL 119 319/1 Sub-rack prepared for CDU_D. For use together with CDU_A, CDU_C or CDU_C+ remove shelf 'A' and rail 'B'. Move rail 'C' from position 1 to position 2.


2
3B
3A
7A
7B
1
4
6
5
P002960A

Dummy plates

Pos	Product Number	Product Name	Description
1	SXK 119 393/1	Dummy	FOR PSU
2	SXK 107 4722/1	Dummy	TRU DUMMY
3A	SXK 107 5040/1	Dummy	CDU DUMMY/w srews, connectors
3B	SXK 107 6059/1	Dummy	CDU DUMMY/w screws, strip hold
4	SXK 107 4516/1	Dummy	DXU DUMMY
5	SDK 107 60/06	Dummy front	W=30.2 mm H=262 mm
6	SDK 107 60/04	Dummy front	W=20 mm H=262mm
7A	SXK 107 6427/1	Assembled parts	CU DUMMY 1800
7B	SXK 107 6417/1	Assembled parts	CU DUMMY 900

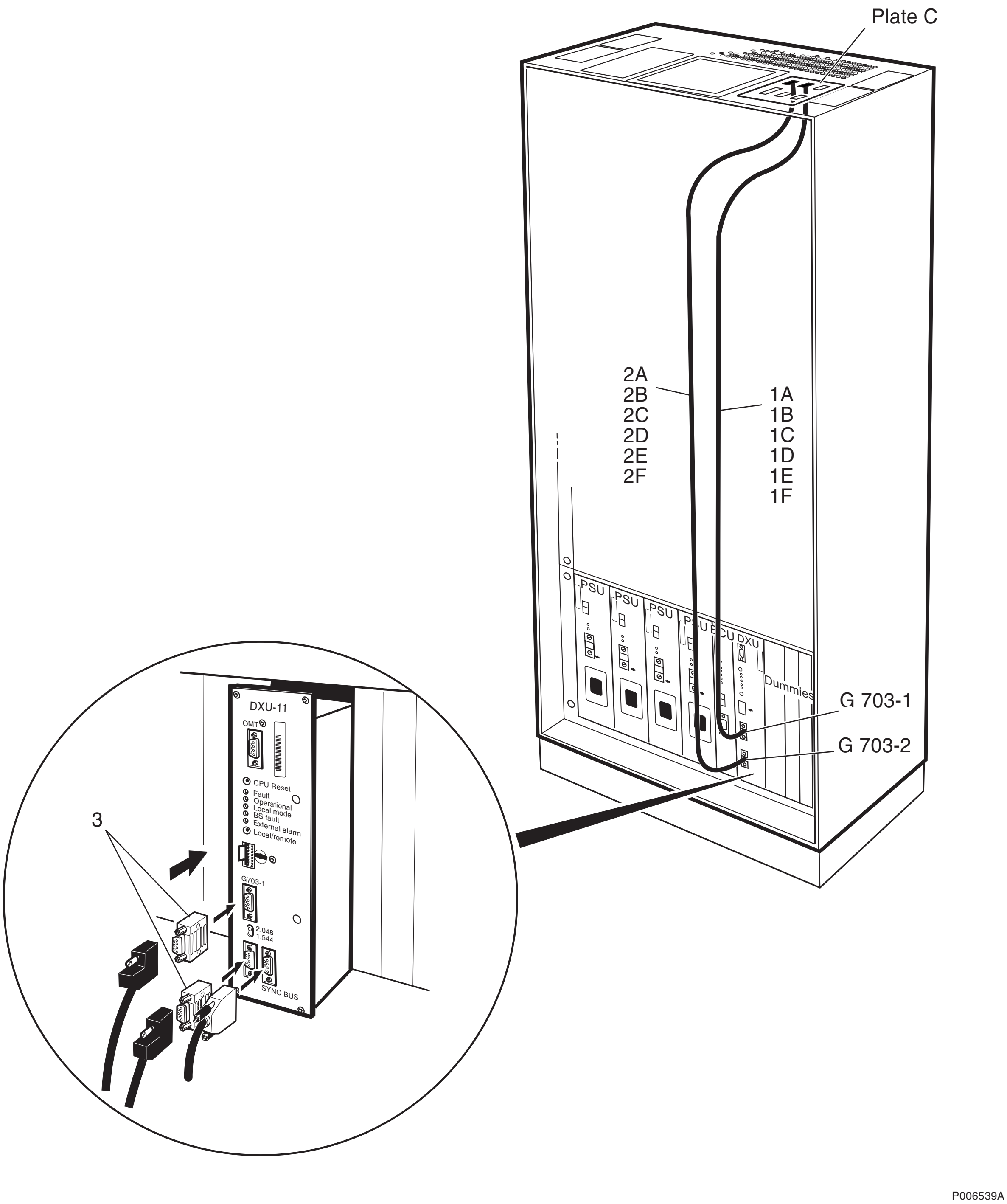
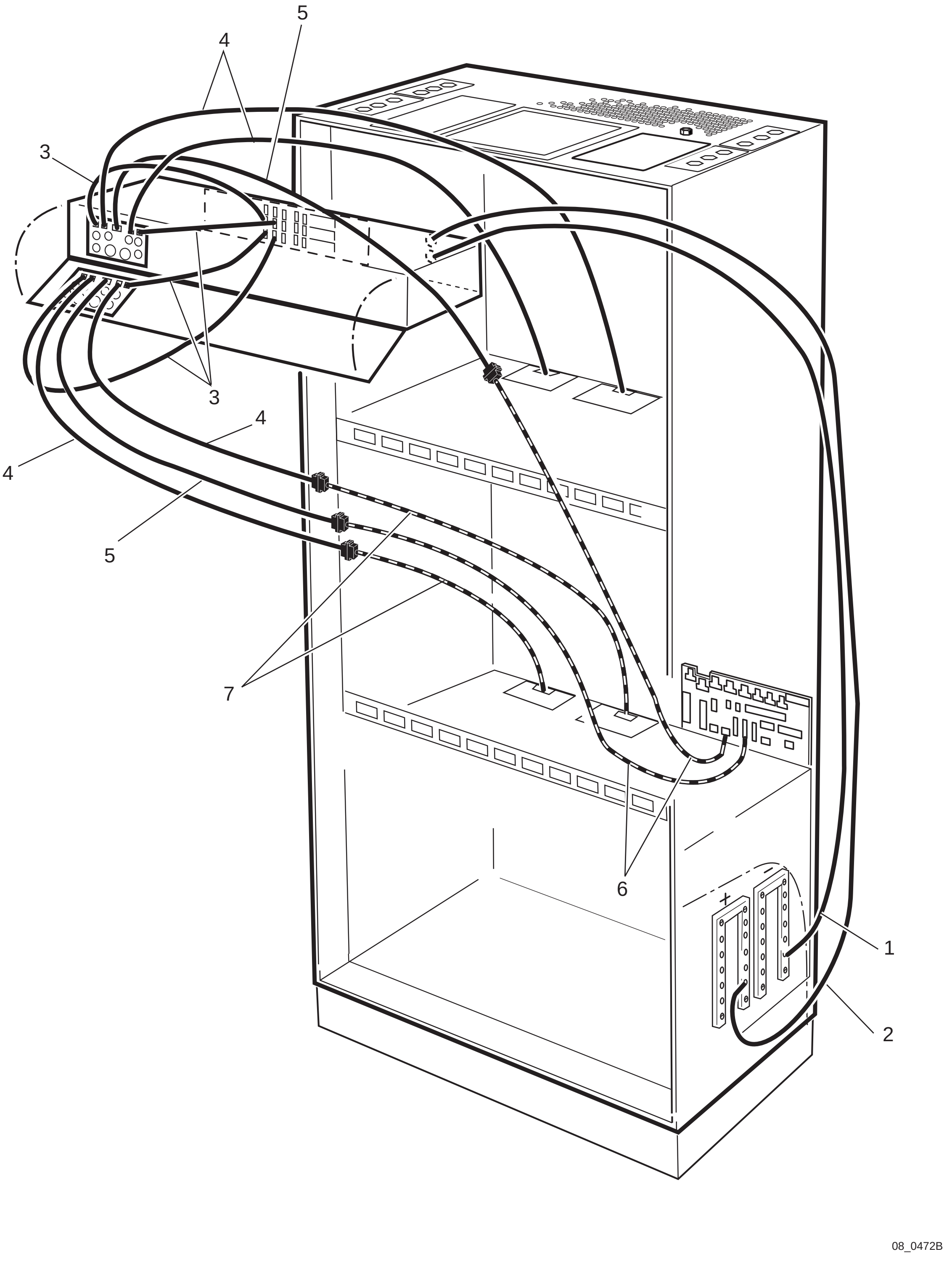


Plate C
2A
2B
2C
2D
2E
2F
1A
1B
1C
1D
1E
1F
PSU
PSU
PSU
PSU
ECU
DXU
Dummies
G 703-1
G 703-2
DXU-11
OMT
CPU Reset
Fault
Operational
Local mode
BS fault
External alarm
Local/remote
G703-1
2.048
1.544
SYNC BUS
3
P006539A

Transmission Cables

Pos	Product Number	Product Name	Description
1A, 2A		Connection cable	75 Ohm, L=2.25 m. Bus G703 See chapter "Recommended (Not Repairable) Spare Parts."
1B	RPM 513 709/02250	Connection cable	120 Ohm, L= 2.25 m. Bus G703
2B	RPM 513 709/02250	Connection cable	120 Ohm, L= 2.25 m. Bus G703
1C	RPM 513 880/02250	Connection cable	100 Ohm, L= 2.25 m. Bus G703
2C	RPM 513 880/02250	Connection cable	100 Ohm, L= 2.25 m. Bus G703
1D, 2D		Cable with connector	75 ohm/L=2.25 m/Bus G703/DXU11 See chapter "Recommended (Not Repairable) Spare Parts."
1E	RPM 513 869/02250	Cable with connector	100 ohm/L=2.25 m/Bus G703/DXU11
2E	RPM 513 869/02250	Cable with connector	100 ohm/L=2.25 m/Bus G703/DXU11
1F	RPM 513 870/02250	Cable with connector	120 ohm/L=2.25 m/Bus G703/DXU11
2F	RPM 513 870/02250	Cable with connector	120 ohm/L=2.25 m/Bus G703/DXU11
3	RPM 919 310	Adapter	[12)] Must be used if DXU01/03 is replaced by DXU11

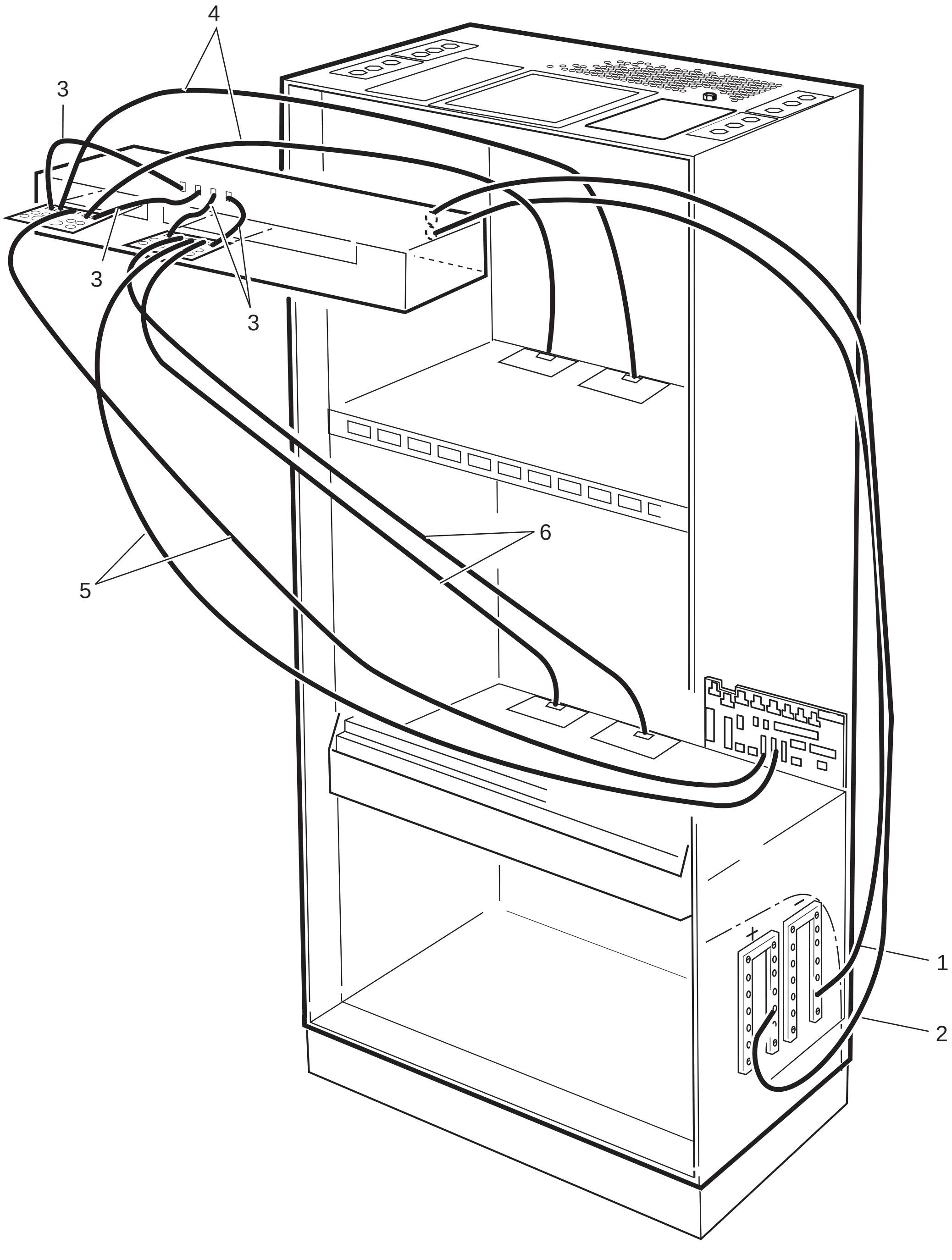
[12)] Complete kit (NTM 201 2798/1) including 2 Adapters (RPM 919 310) and 1 DXU11 (BOE 602 11/11) is orderable.


5
4
3
3
4
4
5
7
6
1
2
+
-
08_0472B

IDM Cables

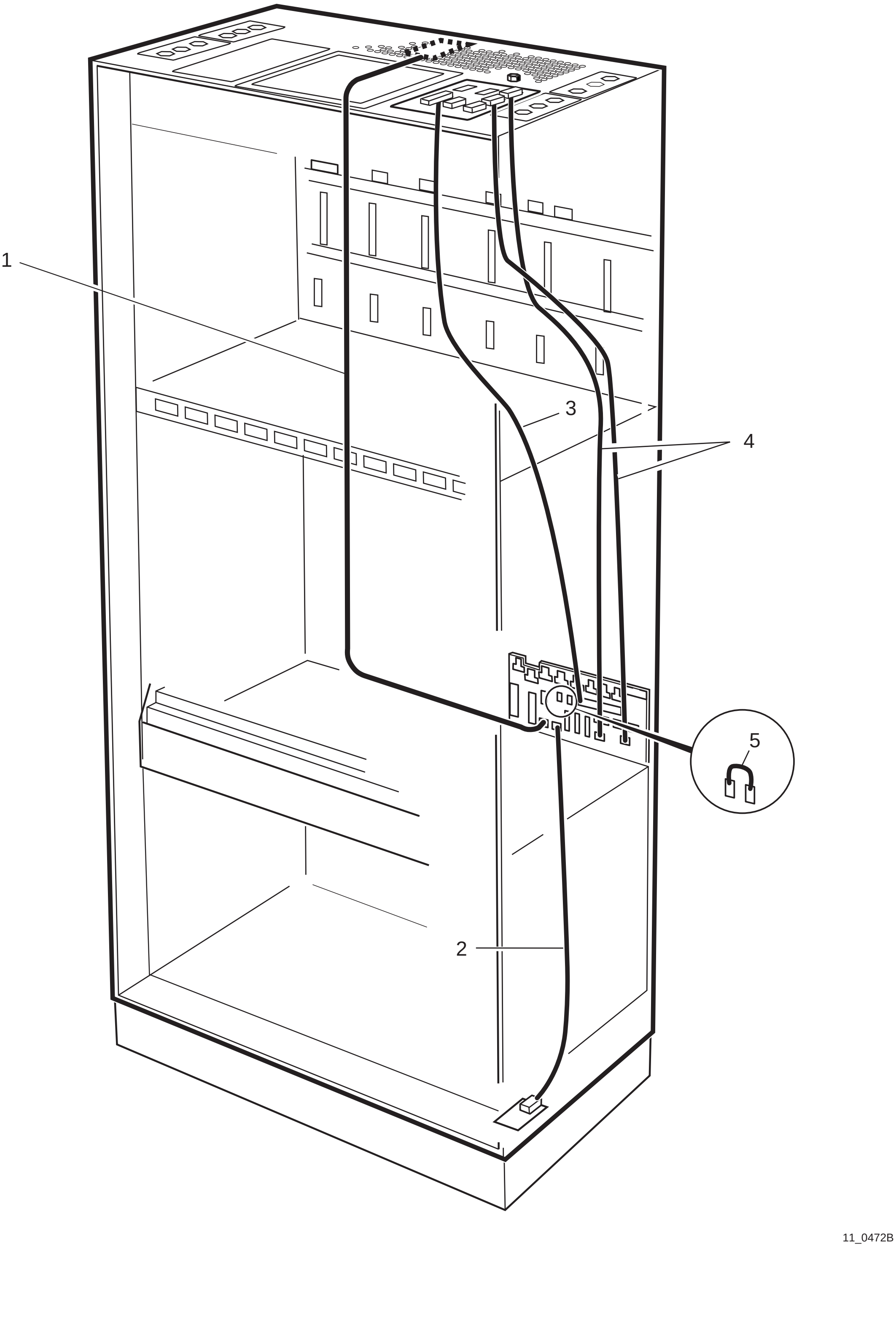
Cables for SEB 112 621/01-02

Pos	Product Number	Product Name	Description
1	RPM 513 749/01800	Power cable	RBS2202
2	RPM 513 1157/01800	Connection cable	+24V DC
3	RPM 513 718/00300	Power cable	
4	RPM 513 1128/00300	Extension cable	
5	RPM 513 1175/00300	Extension cable	
6	RPM 513 1176/01700	Extension cable	
7	RPM 513 1128/02200	Power cable	


4
3
3
3
5
6
1
2
+
09_0472B

Cables for SEB 112 1024/01-02

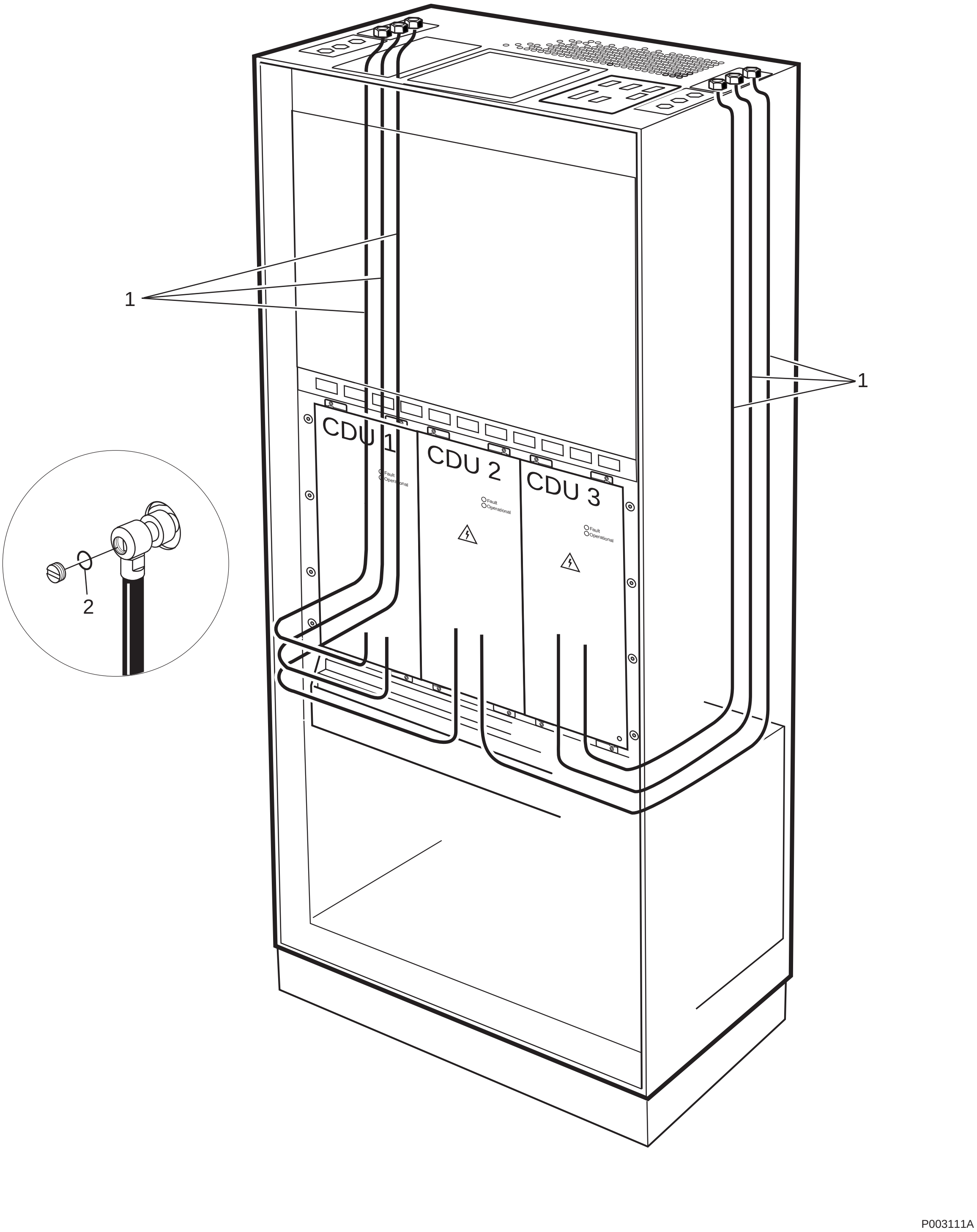
Pos	Product Number	Product Name	Description
1	RPM 513 749/01500	Power cable	RBS2202
2	RPM 513 1157/01500	Connection cable	+24V DC
3	RPM 513 718/00300	Power cable	
4	RPM 513 1128/00300	Extension cable	
5	RPM 513 738/02000	Connection cable	
6	RPM 513 1128/02200	Power cable	


1
2
3
4
5
11_0472B

Basic Cables

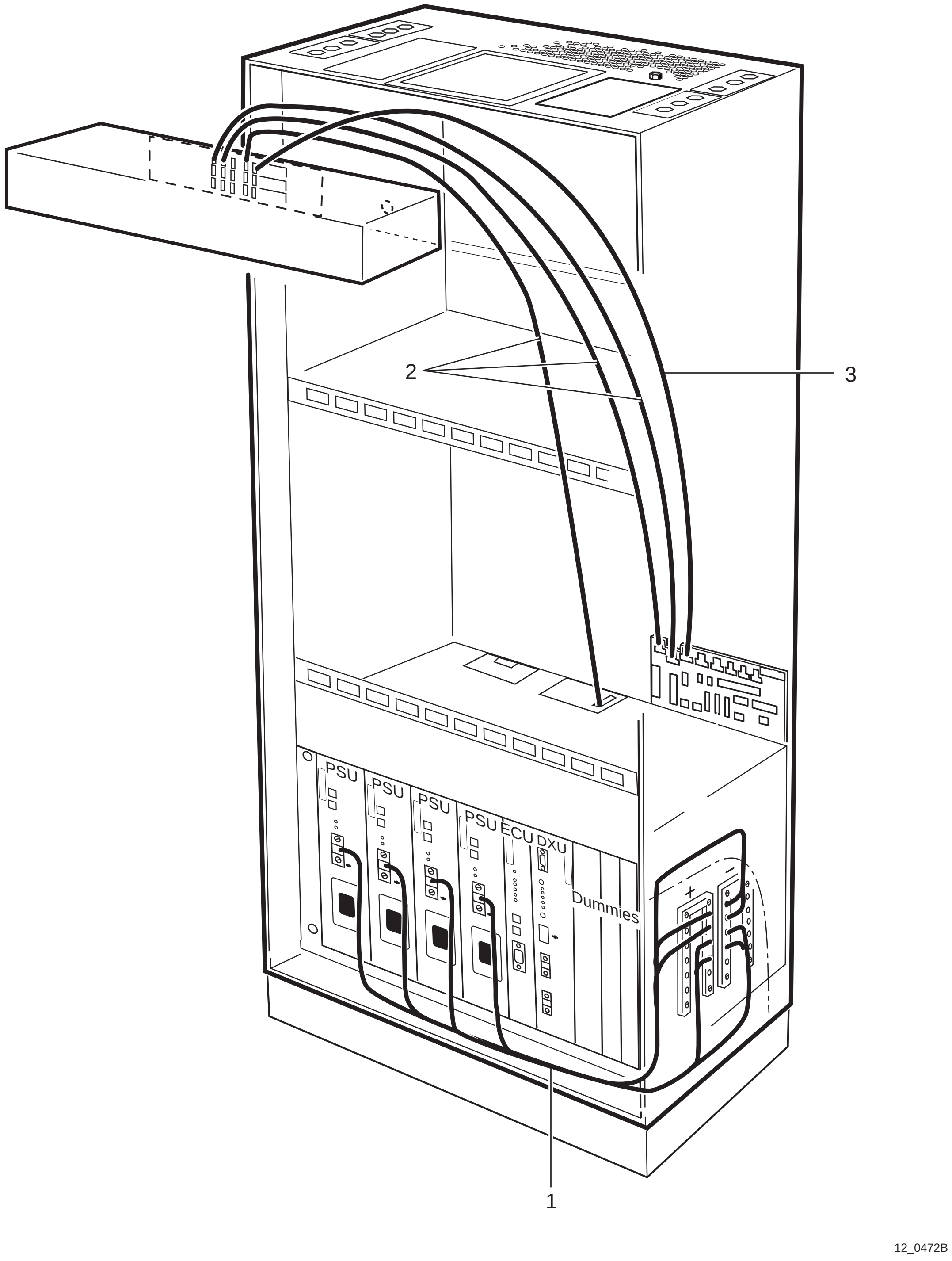
Basic Cable Sets Common

Pos	Product Number	Product Name	Description
1	RPM 513 425/1	Connection cable	
2	RPM 513 425/3	Connection cable	ALARM RXDA 1,2-ACU1
3	RPM 513 707/02000	Connection cable	
4	RPM 513 740/01925	Connection cable	
5	RPM 513 1151/1	Connection cable	


1
1
2
CDU 1
CDU 2
CDU 3
P003111A

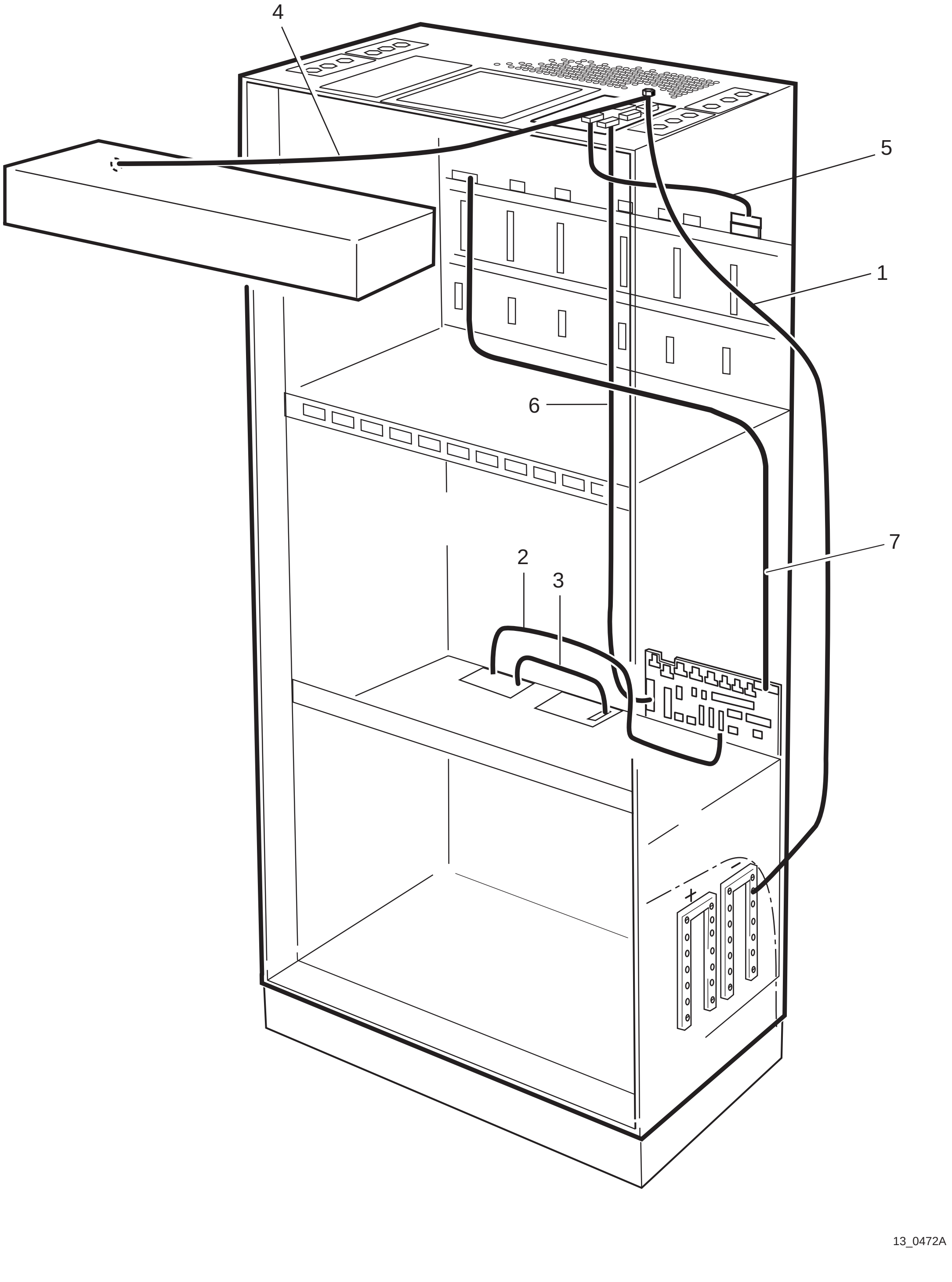
Basic Coaxial Cables Common

Pos	Product Number	Product Name	Description
1	RPM 513 878/01700	Coaxial cable	
2	SCG 326 10/5	Sealing ring	DY=10 DI=8


2
3
PSU
PSU
PSU
PSU
ECU
DXU
Dummies
+
–
1
12_0472B

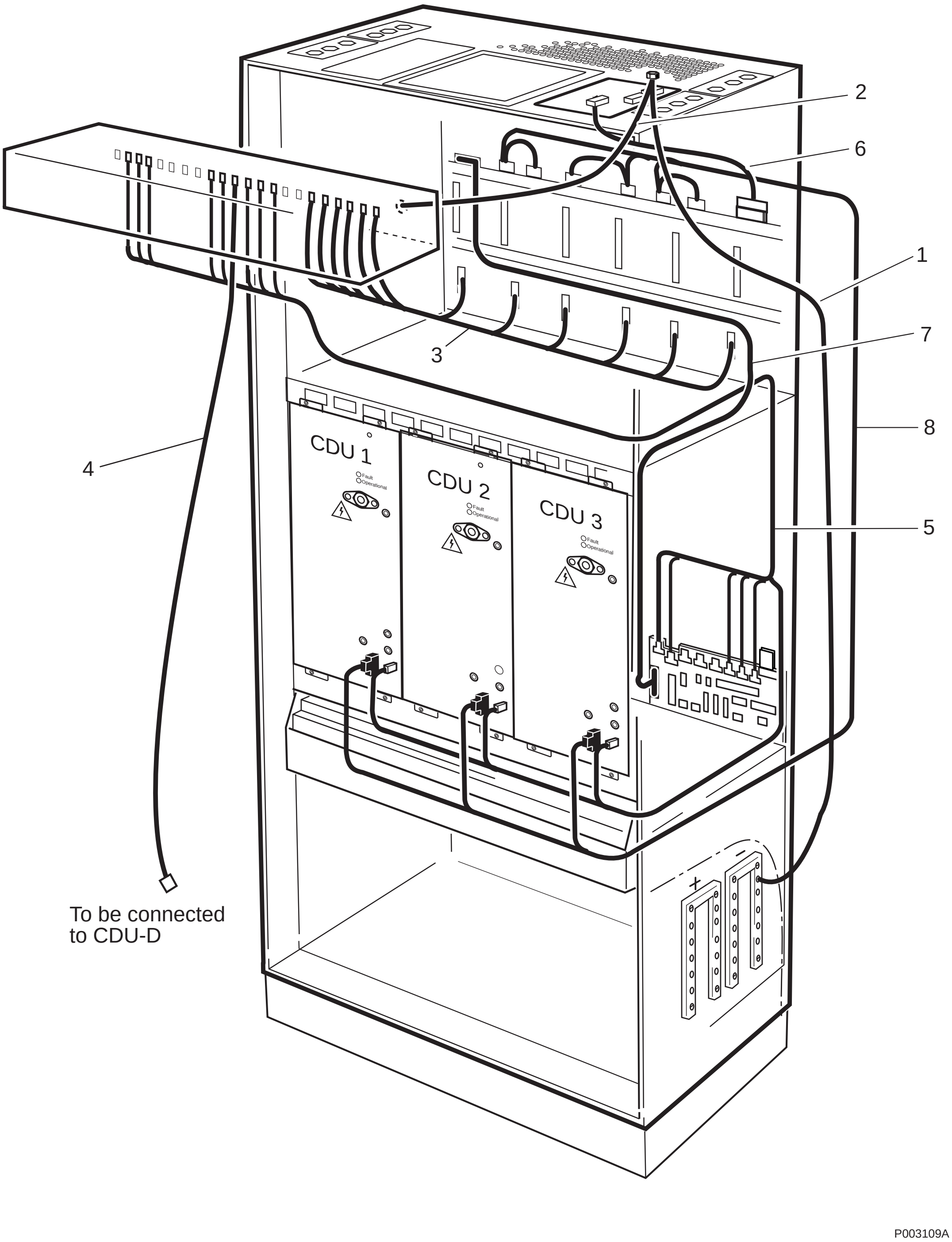
Basic Power Cables Common

Pos	Product Number	Product Name	Description
1	RPM 513 1155/01100	Power cable	One cable for each PSU
2	RPM 513 718/02100	Power cable	
3	RPM 513 1174/02100	Power cable	+24V DC


4
5
1
6
7
2
3
+
–
13_0472A

Basic Cable Set for Cabinet SEB 112 621/01-02

Pos	Product Number	Product Name	Description
1	RPM 513 850/01500	Earthing cable	
2	RPM 513 738/01200	Connection cable	
3	RPM 513 425/7	Connection cable	Temp sensor
4	RPM 513 1134/00550	Connection cable	
5	RPM 513 854/01100	Connection cable	
6	RPM 513 854/02160	Connection cable	
7	RPM 513 696/01600	Connection cable	



2
6
1
7
8
5
4
3
CDU 1
CDU 2
CDU 3
To be connected
to CDU-D
P003109A

Basic Cable Set for Cabinet SEB 112 1024/01-02

Pos	Product Number	Product Name	Description
1	RPM 513 1422/01500	Power cable	
2	RPM 513 1421/00550	Connection cable	
3	RPM 513 715/01100	Power cable	+24V TRU-MAG
4	RPM 513 718/02500	Power cable	
5	RPM 513 718/02100	Power cable	
6	RPM 513 854/00550	Connection cable	
7	RPM 513 696/01600	Connection cable	
CDU bus cable			
8	RPM 513 1408/01500	Connection cable	L =1.5 m.

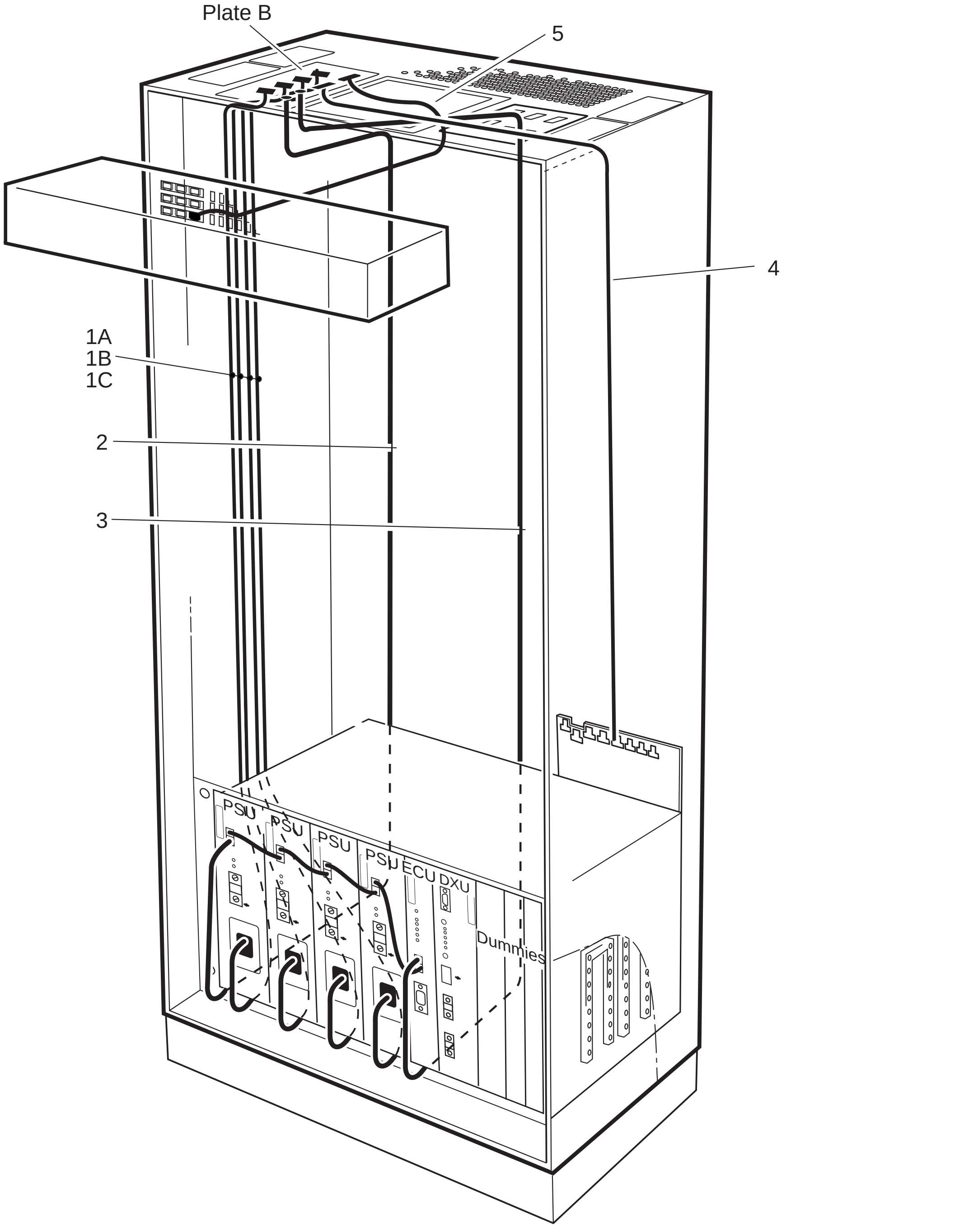
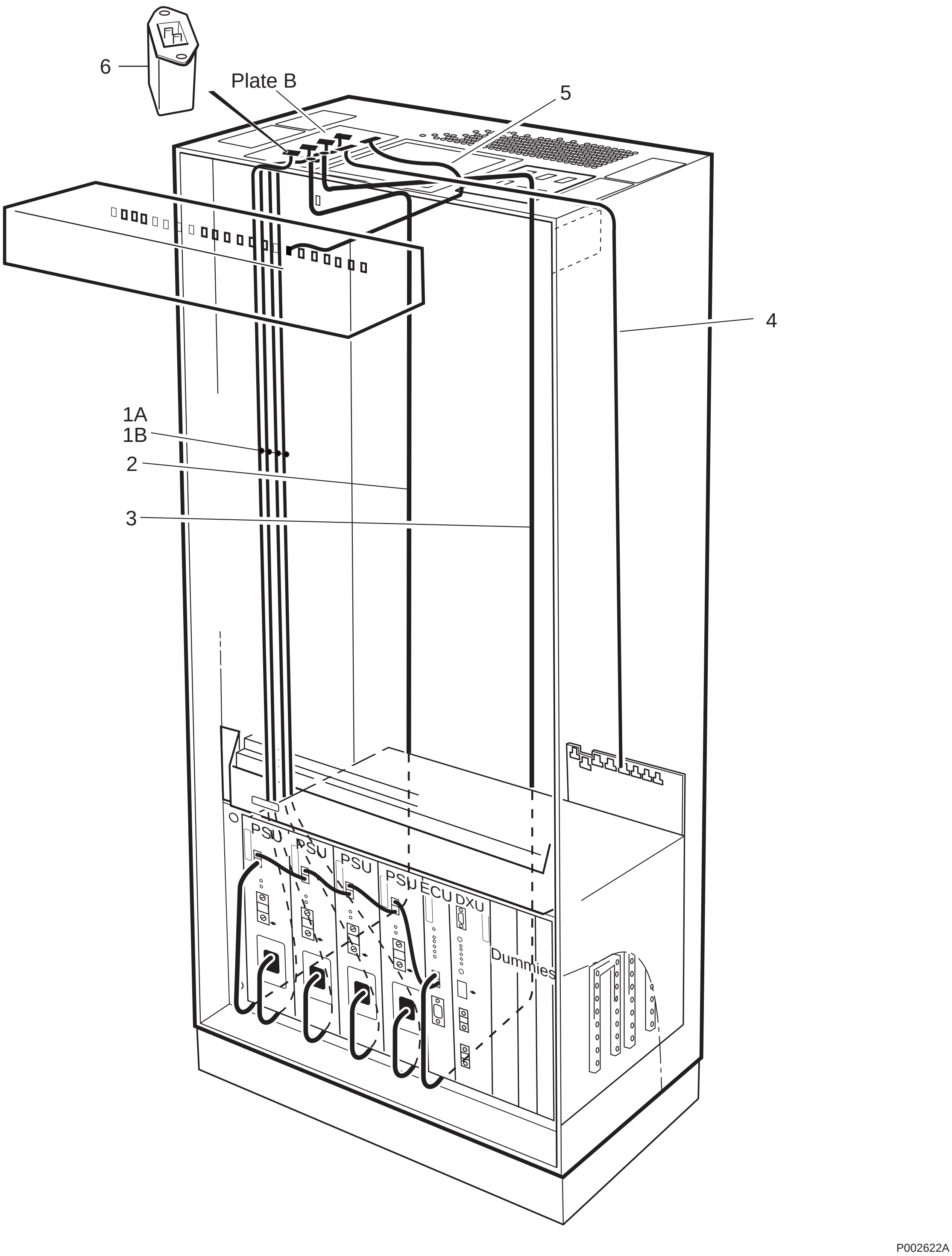


Plate B
5
4
1A
1B
1C
2
3
PSU
PSU
PSU
PSU
ECU
DXU
Dummies
P003108A

Cabinet Cables Set, Plate B

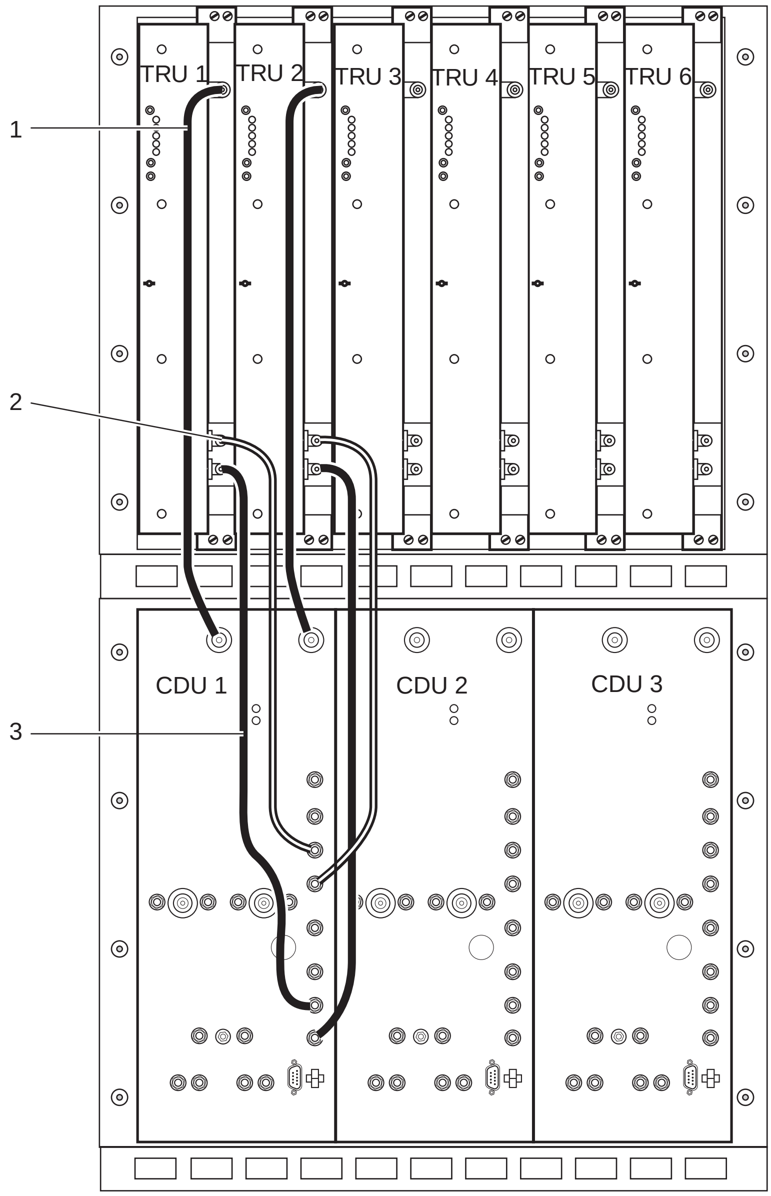
Cables for SEB 112 621/01-02

Pos	Product Number	Product Name	Description
For Cabinet SEB 112 621 R-state R2A, R3A, R3B			
1A	RPM 513 1341/02250	Power cable	230V AC
For Cabinet SEB 112 621 R-state R3C, R3D			
1B	RPM 513 1402/02250	Power cable	Power Cable AC
1C	RPM 513 1180/02250	Power cable	-48V DC
Common Cables			
2	RPM 513 1131/02500	Connection cable	OPTO
3	RPM 513 1161/02500	Connection cable	OPTO
4	RPM 513 873/02500	Connection cable	
5	RPM 513 849/01000	Power cable	


6
Plate B
5
4
1A
1B
2
3
PSU
PSU
PSU
PSU
ECU
DXU
Dummies
P002622A

Cables for SEB 112 1024/01-02

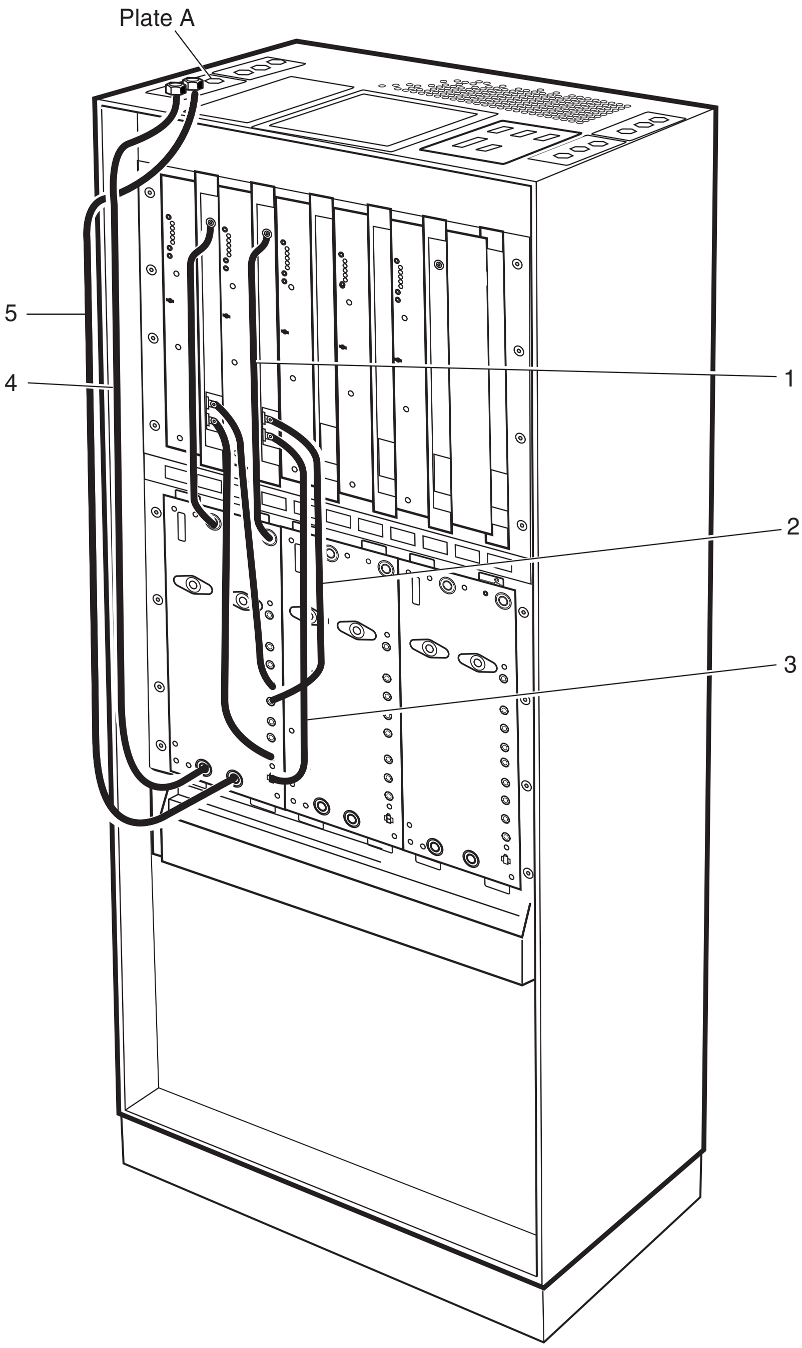
Pos	Product Number	Product Name	Description
1A	RPM 513 1402/02250	Power cable	Power Cable AC
1B	RPM 513 1392/02150	Power cable	-48V DC
Common Cables			
2	RPM 513 1410/02500	Optical fibre cable	OPTICAL FIBRE CABLE RBS2202
3	RPM 513 1409/02500	Optical fibre cable	OPTICAL FIBRE CABLE RBS 2202
4	RPM 513 873/02500	Connection cable	
5	RPM 513 849/01000	Power cable	
6	REV 909 14/10	Filter	10 A, MAINS INLET Only used for 230V AC. (Pos 1A above)



17_0472A

Cable Set specification A9d

Pos	Product Number	Product Name	Description
1	RPM 513 705/00440	Coaxial cable	
2	RPM 513 699/00380	Coaxial cable	
3	RPM 513 699/00490	Coaxial cable	



18_0472B

Cable Set specification A18, A19, TRU 1+2-CDU

Pos	Product Number	Product Name	Description
1	RPM 513 705/00440	Coaxial cable	
2	RPM 513 699/00380	Coaxial cable	
3	RPM 513 699/00490	Coaxial cable	
4	RPM 513 878/01090	Coaxial cable	
5	RPM 513 878/01190	Coaxial cable	

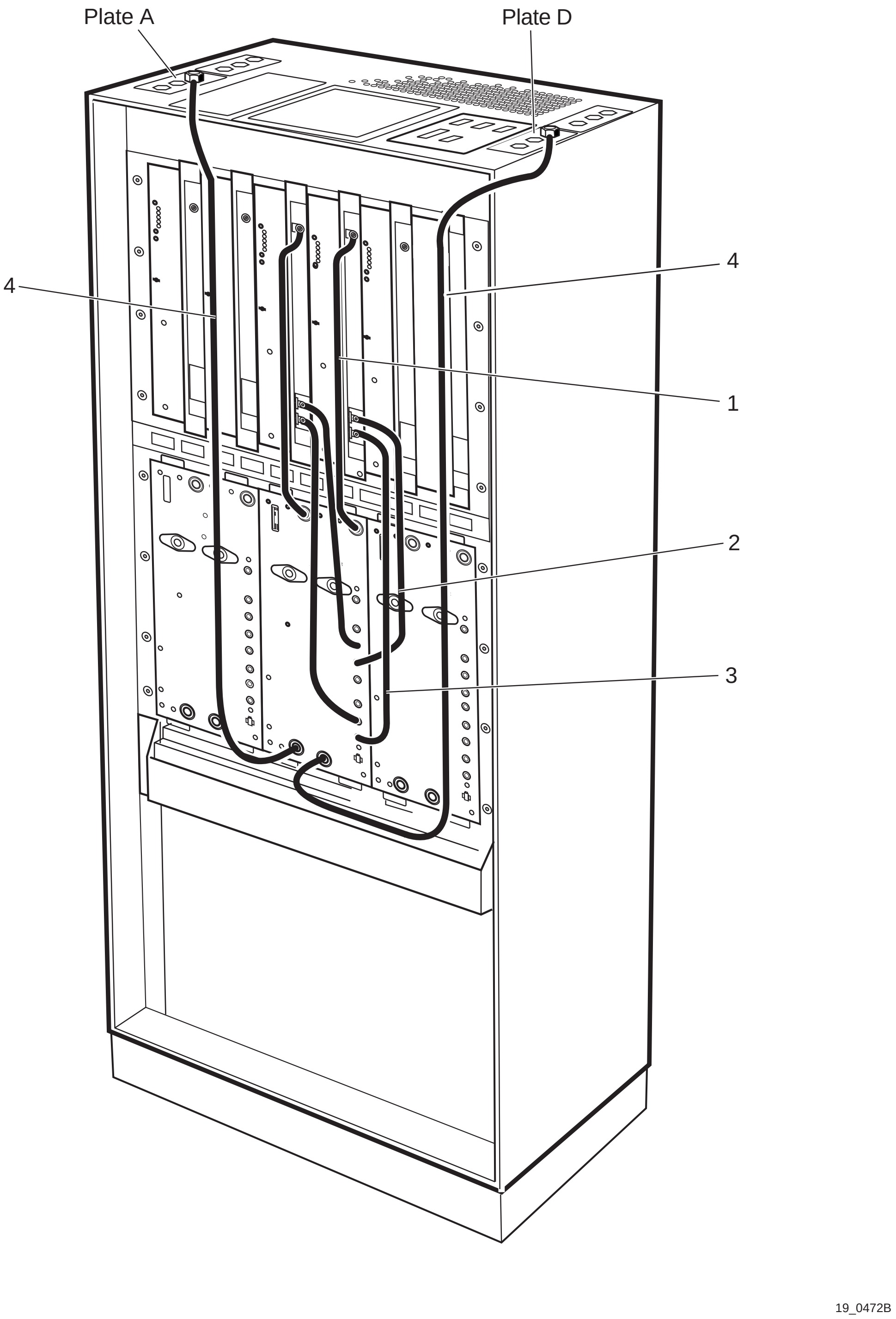


Plate A
Plate D
4
4
1
2
3
19_0472B

Cable Set specification A18, A19, TRU 3+4-CDU

Pos	Product Number	Product Name	Description
1	RPM 513 705/00440	Coaxial cable	
2	RPM 513 699/00380	Coaxial cable	
3	RPM 513 699/00490	Coaxial cable	
4	RPM 513 878/01290	Coaxial cable	

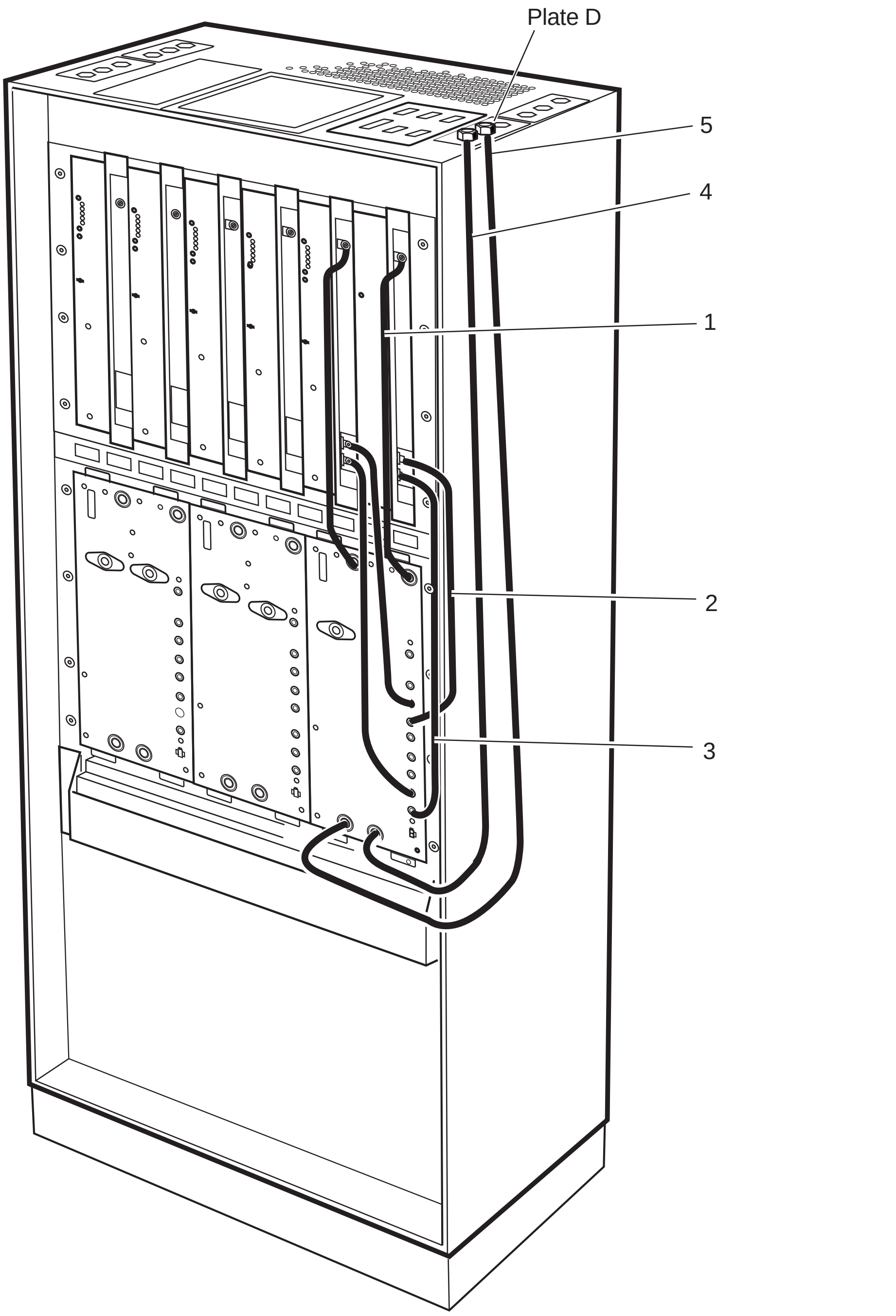
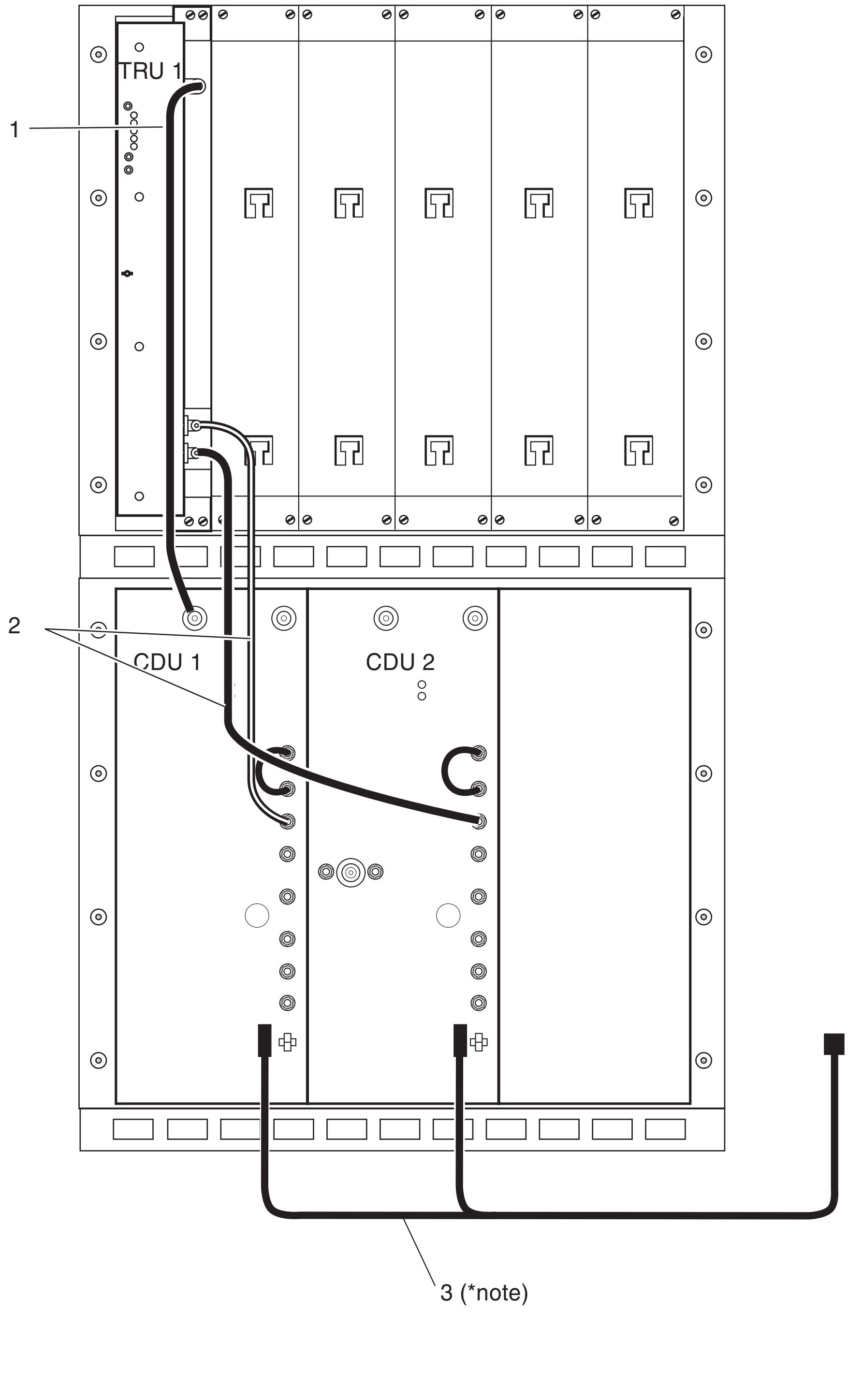


Plate D
5
4
1
2
3
20_0472B

Cable Set specification A18, A19, TRU 5+6-CDU

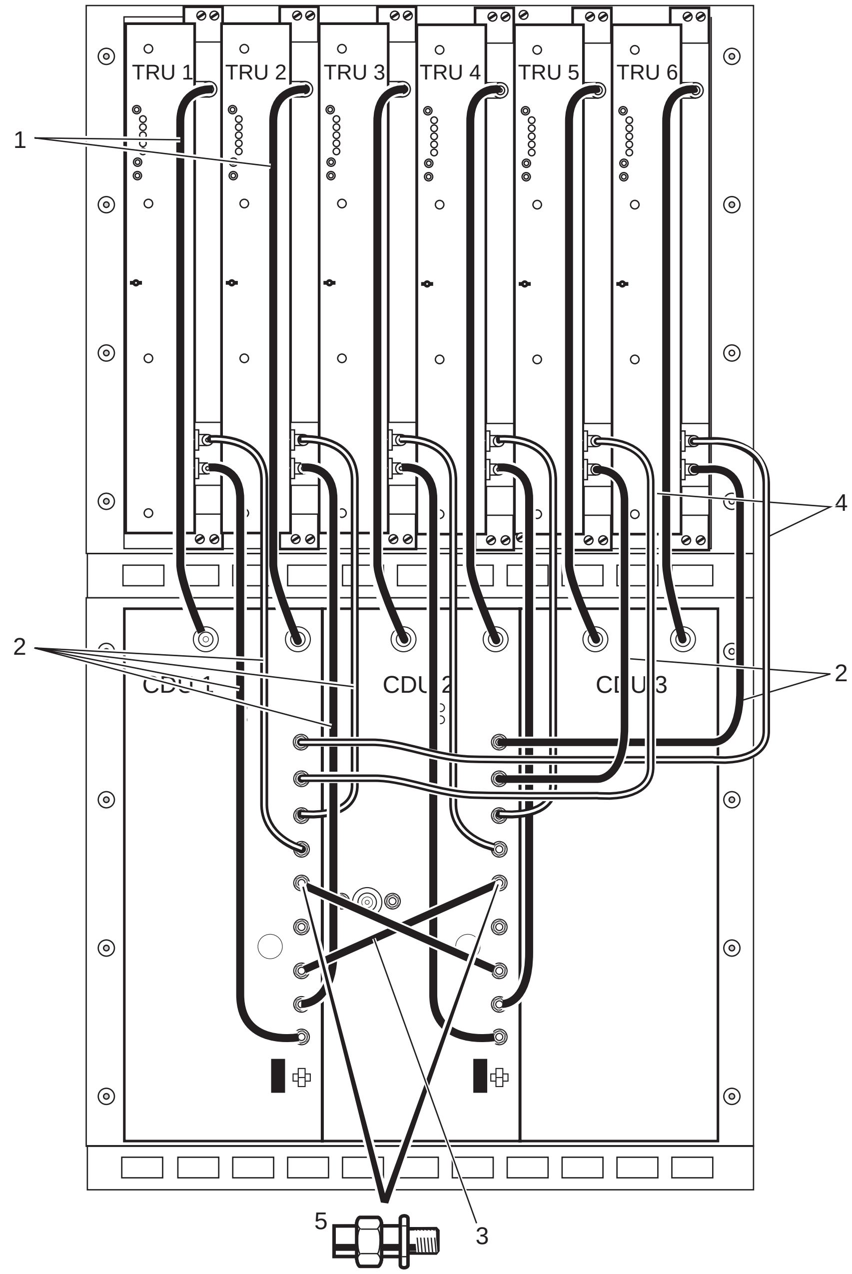
Pos	Product Number	Product Name	Description
1	RPM 513 705/00440	Coaxial cable	
2	RPM 513 699/00380	Coaxial cable	
3	RPM 513 699/00490	Coaxial cable	
4	RPM 513 878/01160	Coaxial cable	
5	RPM 513 878/01190	Coaxial cable	


TRU 1
1
2
CDU 1
CDU 2
3 (*note)
P004716A

Cable Set specification C9d

Pos	Product Number	Product Name	Description
1	RPM 513 705/00440	Coaxial cable	
2	RPM 513 699/00490	Coaxial cable	
3		Connection cable	[13] For 1xTRU, 2xCDU

[13] If only one TRU is to be installed in a cell using CDU type C, an additional cable assembly must be fitted. See chapter "Recommended Spare Parts (Not Repairable)".


TRU 1
TRU 2
TRU 3
TRU 4
TRU 5
TRU 6
1
4
2
2
CDU 1
CDU 2
CDU 3
5
3
P002961A

Cable Set specification C+ 9d

Pos	Product Number	Product Name	Description
1	RPM 513 705/00440	Coaxial cable	
2	RPM 513 699/00490	Coaxial cable	
3	RPM 513 699/00205	Coaxial cable	
4	RPM 513 699/00600	Coaxial cable	CDU-TRU/RXA
5	UMF 101 15/3	Attenuator	SMA male/female 3dB 50ohm

Note: The illustration shows only one variant of possible TRU-CDU C+ configurations.

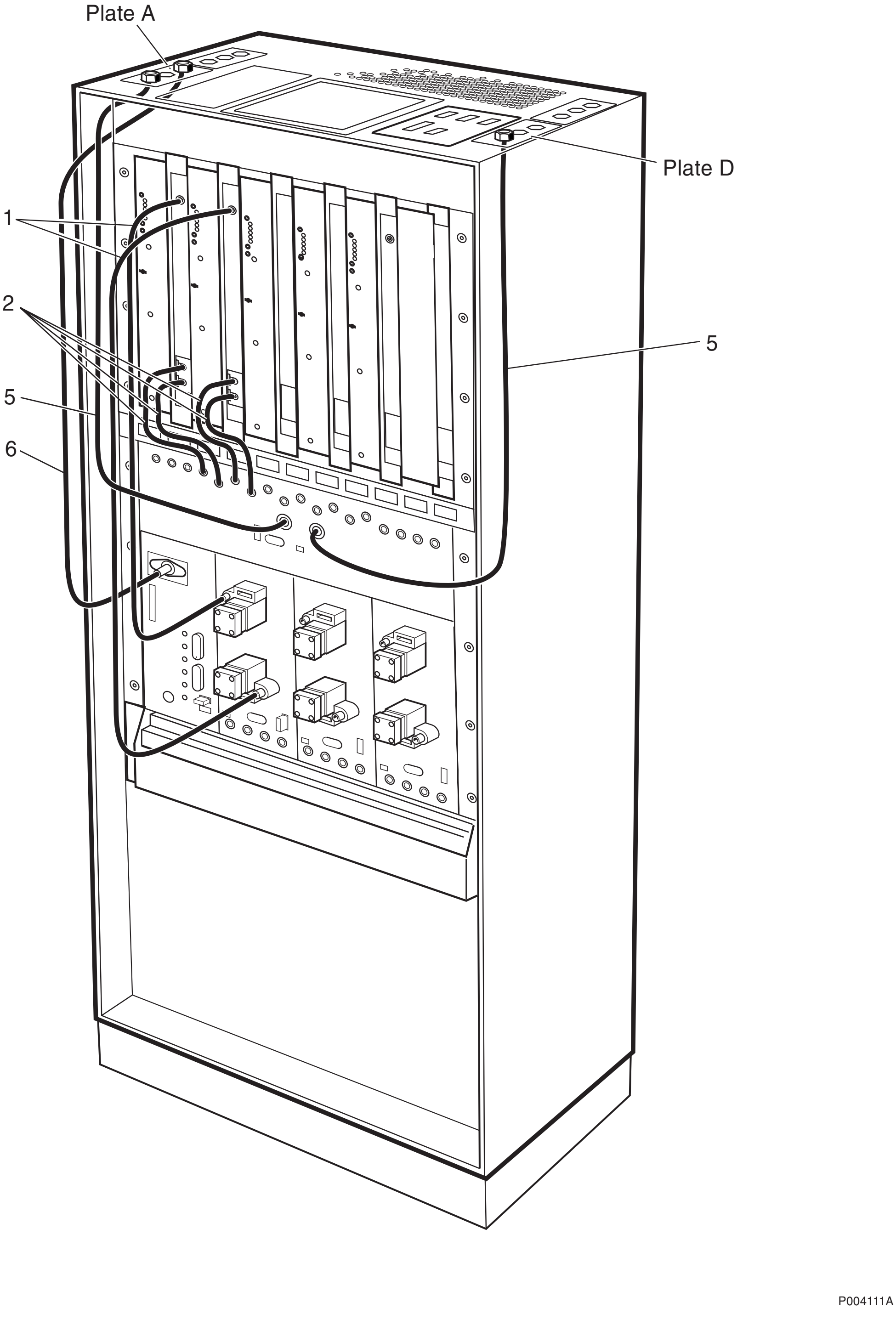


Plate A
Plate D
1
2
5
5
6
P004111A

Cable Set specification CDU D9

Pos	Product Number	Product Name	Description
1	RPM 513 705/00750	Coaxial cable	
2	RPM 513 699/00205	Coaxial cable	
5	RPM 513 1407/00940	Coaxial cable	RBS2202
6	RPM 513 1407/00870	Coaxial cable	

Note: The illustration shows only one variant of possible TRU-CDU D9 configurations. More cables to be found under "Extension Cabinet Cables" in this chapter.

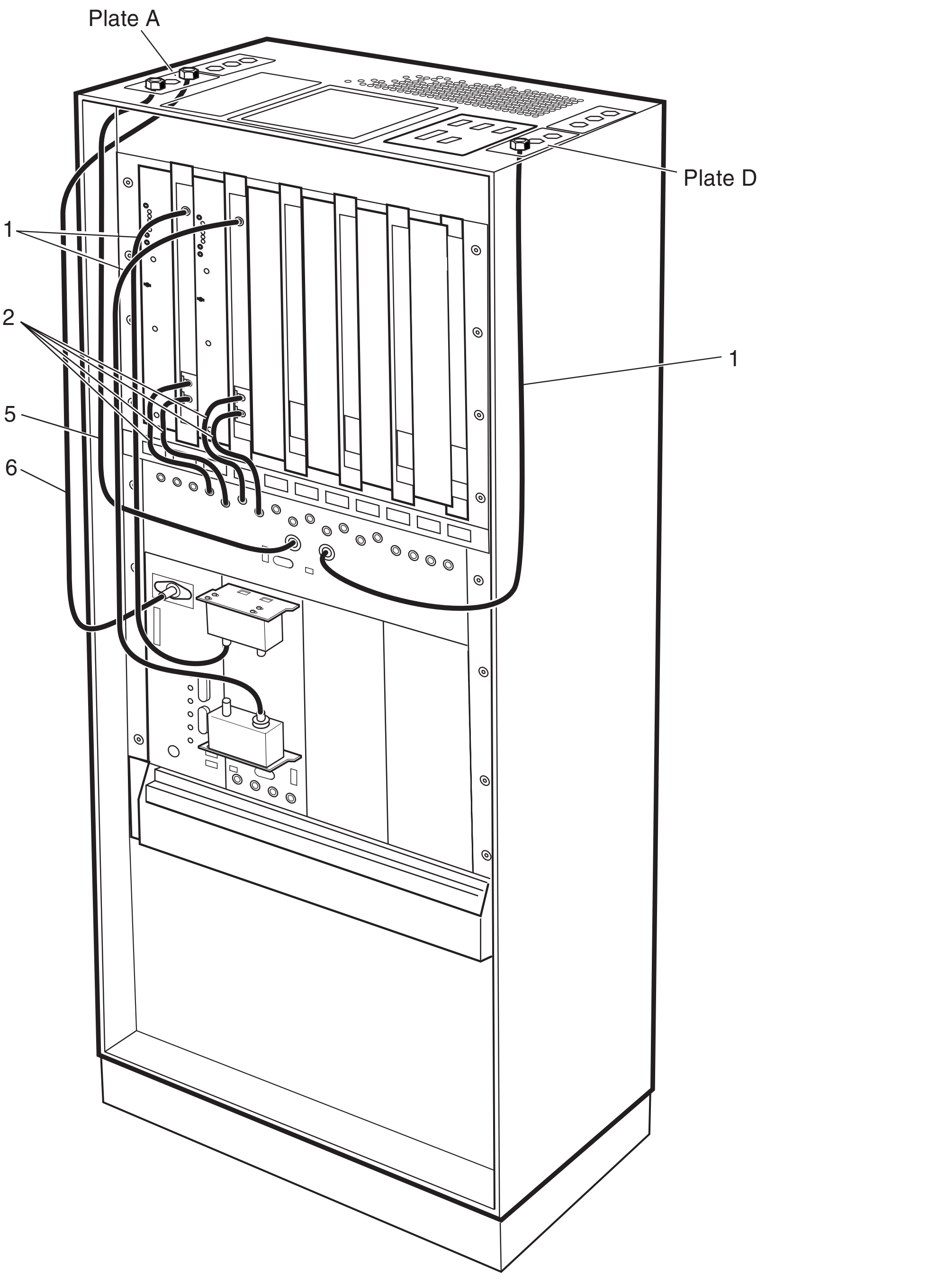
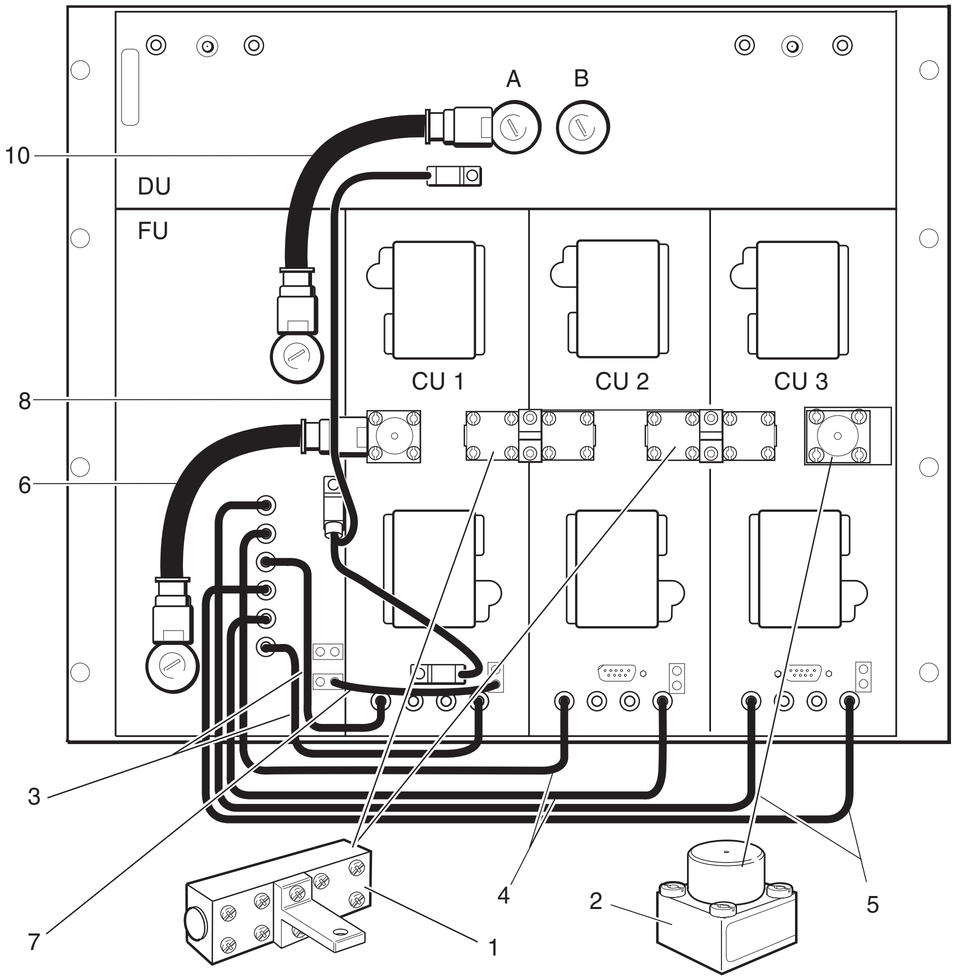


Plate A
Plate D
1
2
5
6
1
P004109A

Cable Set specification CDU D18

Pos	Product Number	Product Name	Description
1	RPM 513 1384/00730	Connection cable	CDU_D 1800
2	RPM 513 699/00205	Coaxial cable	
5	RPM 513 1407/00940	Coaxial cable	RBS2202
6	RPM 513 1407/00870	Coaxial cable	

Note: The illustration shows only one variant of possible TRU - CDU D18 configurations. More cables to be found under "Extension Cabinet Cables" in this chapter.

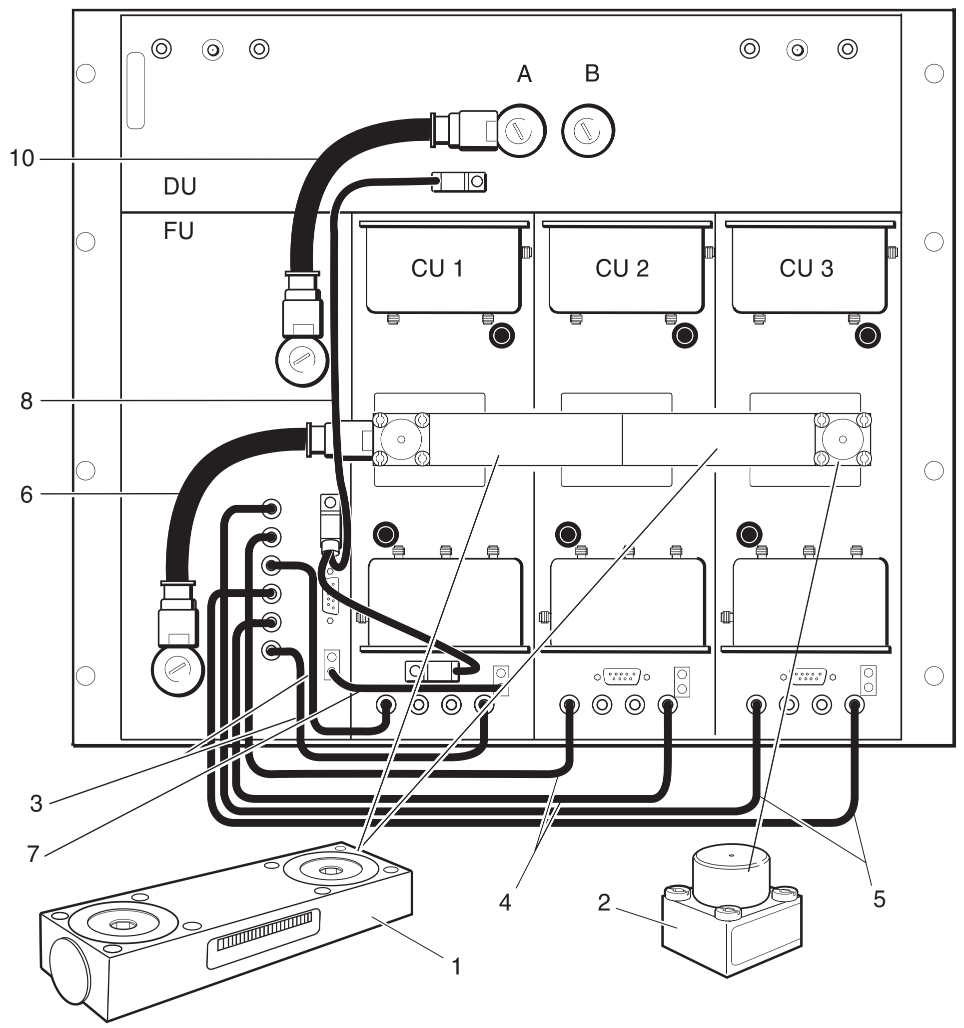


P004110B

CDU D9 Interconnections

Pos	Product Number	Product Name	Description
1	KRY 101 1442/3	U-link	U-LINK WITH HANDLE
2	KRY 101 1520/1	End sleeve	END-CAP
3	RPM 113 1891/1	Cable with connector	COAX CABLE
4	RPM 113 1891/2	Cable with connector	COAX CABLE
5	RPM 113 1891/3	Cable with connector	COAX CABLE
6	RPM 113 3171/1	Cable with connector	COAX CABLE
7	RPM 513 718/00300	Power cable	
8	RPM 513 1405/1	Connection cable	CONNECTION CABLE
10	RPM 113 3534/4	Cable with connector	FUD-DU 900

Note: The illustration shows only one possible variant. Pos 7 above can alternatively be attached to A or B, depending on configuration.

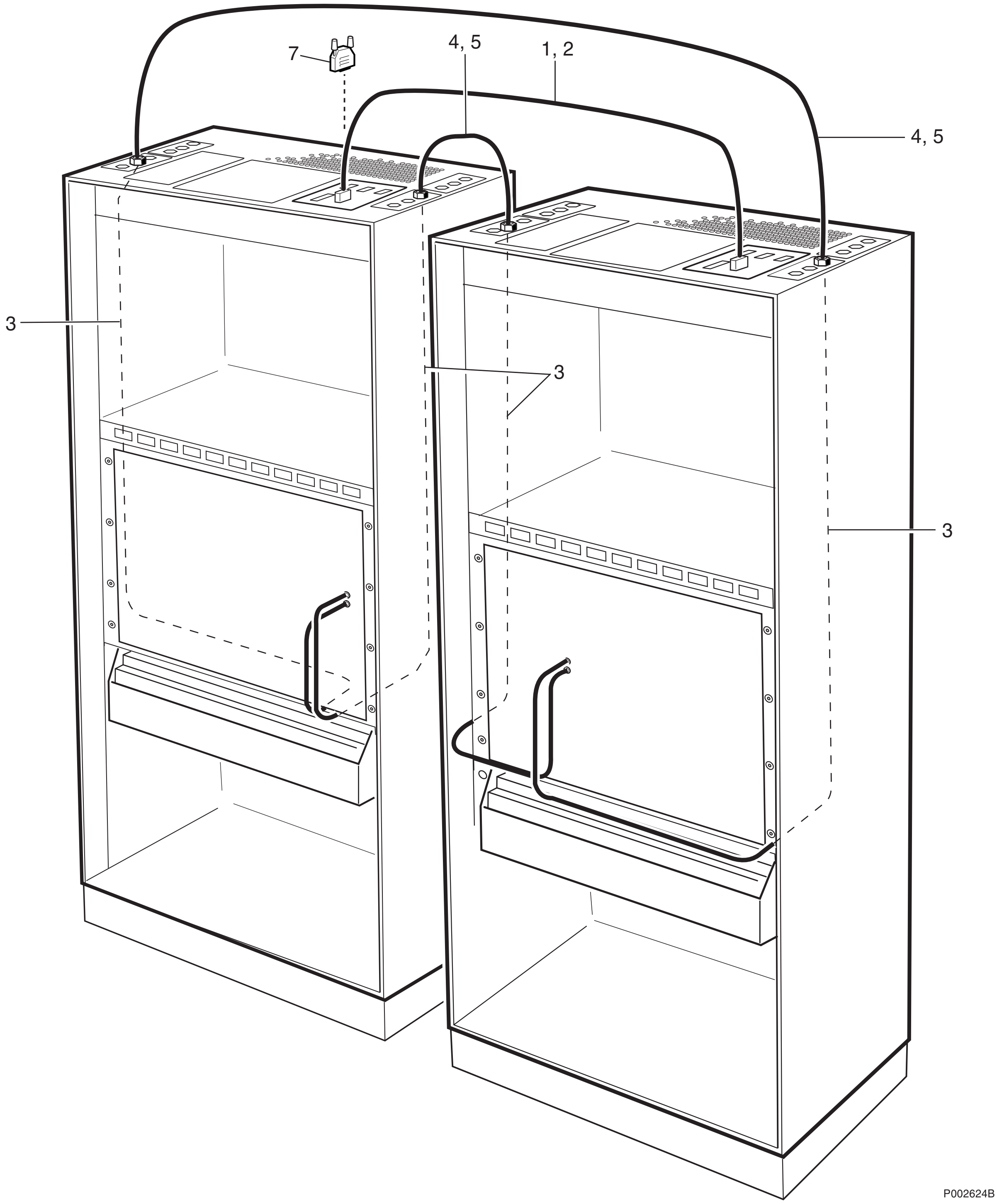


P004108A

CDU D18 Interconnections

Pos	Product Number	Product Name	Description
Common Cables			
1	KRY 101 1505	U-link	U-LINK MEDIUM
2	KRY 101 1340/2	Contact	END CAP CMS 30
3	RPM 113 1891/1	Cable with connector	COAX CABLE
4	RPM 113 1891/2	Cable with connector	COAX CABLE
5	RPM 113 1891/3	Cable with connector	COAX CABLE
6	RPM 113 1893/1	Cable with connector	COAX CABLE
7	RPM 513 718/00300	Power cable	
8	RPM 513 1405/1	Connection cable	CONNECTION CABLE
Cable for CDU D18 with FU duplex			
10	RPM 113 3534/2	Cable with connector	FUD-DU 1800

Note: The illustration shows only one possible variant. Pos 7 above can alternatively be attached to A or B, depending on configuration.

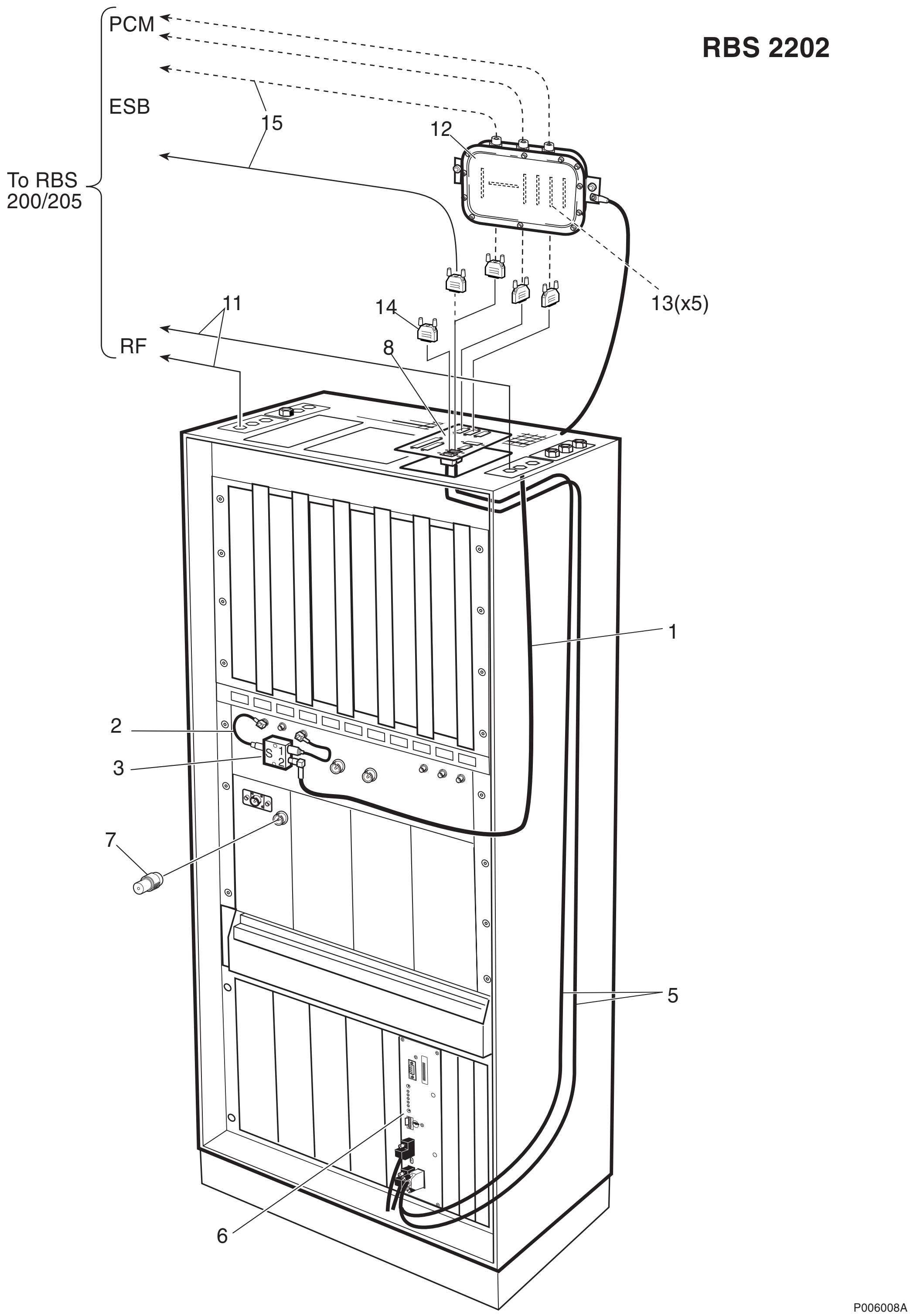

7
4, 5
1, 2
4, 5
3
3
3
P002624B

Extension Cabinet Cables

Pos	Product Number	Product Name	Description
1	RPM 513 1293/03000	Connection cable	14) CDU A/C/C+/D 900d/1800/1900
2	RPM 513 1293/09800	Connection cable	14) CDU A/C/C+/D 900d/1800/1900
3	RPM 513 1374/01200	Coaxial cable	14) CDU A/C/C+/D 900d/1800/1900
4	RPM 513 745/03000	Coaxial cable	14) CDU A/C/C+/D 900d/1800/1900
5	RPM 513 745/10000	Coaxial cable	CDU A/C/C+/D 900d/1800/1900
(6A)	UMF 101 15/1	Attenuator	15) SMA male/female 1dB 50ohm
(6B)	UMF 101 15/2	Attenuator	15) SMA male/female 2dB 50ohm
7	RPT 403 804/01	Connector	D-SUB STRAPPING PLUG 120 OHM (Used if no Extension Cabinet)

Note: The illustrations shows possible variants for CDU C and CDU C+

14) Select pos 1 or 2, 3, 4 depending on the distance between the Cabinets.
15) When used the attenuator should be mounted on HLoutA connector. For more information see "Extension and Reconfiguration Manual".

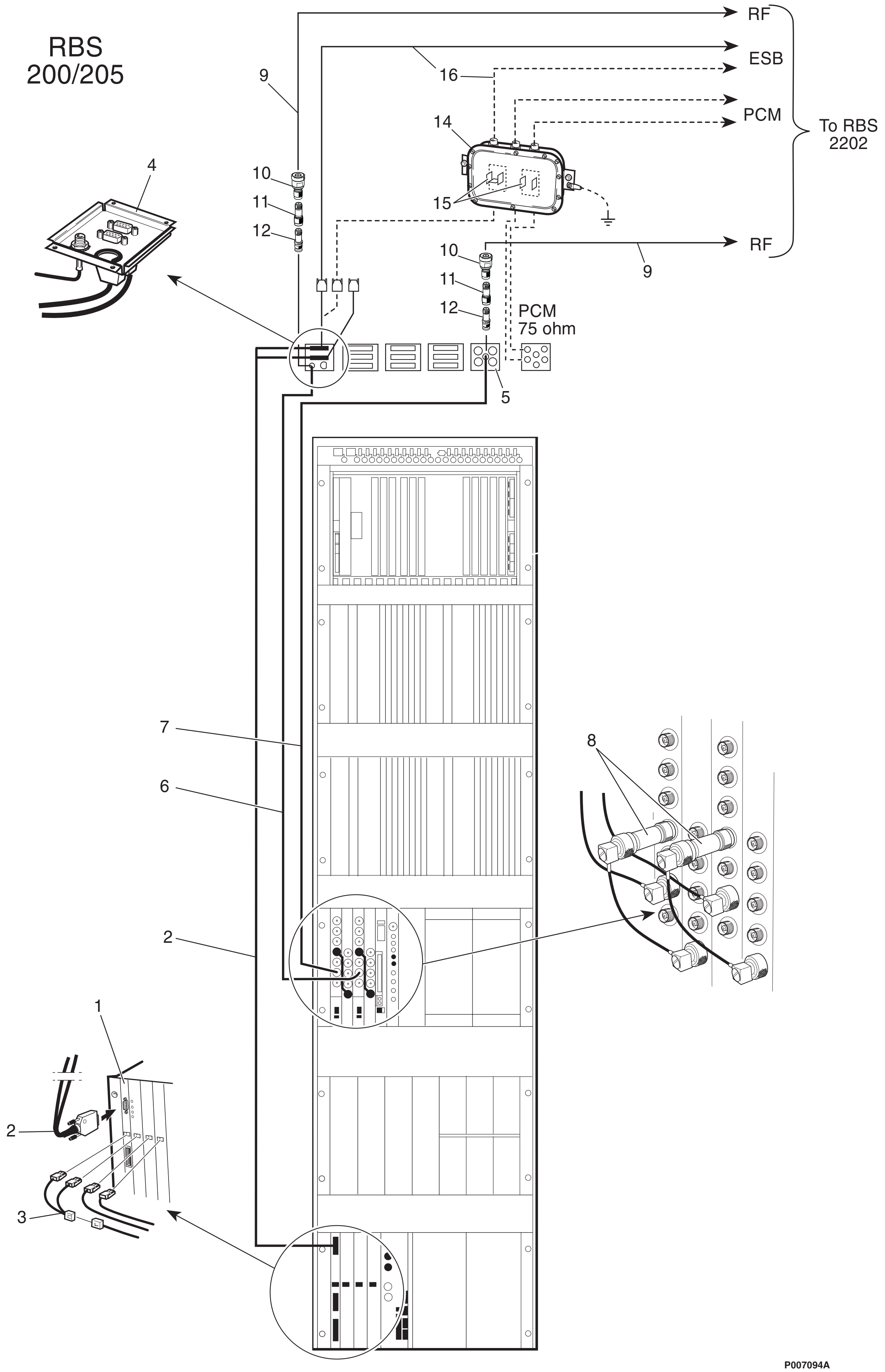

RBS 2202
PCM
ESB
15
12
To RBS
200/205
11
14
13(x5)
RF
8
1
2
3
7
5
6
P006008A

TG-Sync and Co-siting

Parts installed inside, on top of or near the RBS 2202 Cabinet

Pos	Product Number	Product Name	Description
Internal parts			
1	RPM 513 1374/01200	Coaxial cable	
2	RPM 513 1368/00140	Coaxial cable	RBS2202/CDU-D 900MHZ
3	RYT 901 6185/1	Hybrid	[16] ZN2PD-1785-1 POWER SPLITTER
(4)		Double coated tape	25X25
5	RPM 513 904/02160	Cable	SIGNAL ESB
6		Functional unit	DXU 11 (long Haul + TG Synch)
7A	RPT 403 901/1	Termination	[16] N-Type. (For CDU_D)
7B	UML 102 020/1	Matched termination	[16] SMA TERMINATION 0.5W SMA-type. 0.5W (For CDU-C+)
8		Connector plate	TG/TM Production material, included in the installation kit, but not separate orderable as spare part.
External parts. Interconnections to RBS 200/205.			
11	RPM 513 745/10000	Coaxial cable	
12A		Set of materials	[17] OVP for 2202 75ohm (NTM 503 700/1)
12B		Set of materials	[17] OVP for 2202 100ohm (NTM 503 701/1)
12C		Set of materials	[17] OVP for 2202 120ohm (NTM 503 702/1)
13		Overvoltage arrester	(Spare parts for the OVP-11 Connection Box). Set with 5 sub-boards, type 'C'
14	RPT 403 805/01	Connector	D-SUB STRAPPING PLUG 90 OHM
15A	RPM 513 1104/03240	Cable	[16] SIGNAL ESB/CAB (L=3.2m)
15B	RPM 513 1104/07020	Cable	[16] SIGNAL ESB/CAB (L=7.02m)
15C	RPM 513 1104/12420	Cable	[16] SIGNAL ESB/CAB (L=12.42m)

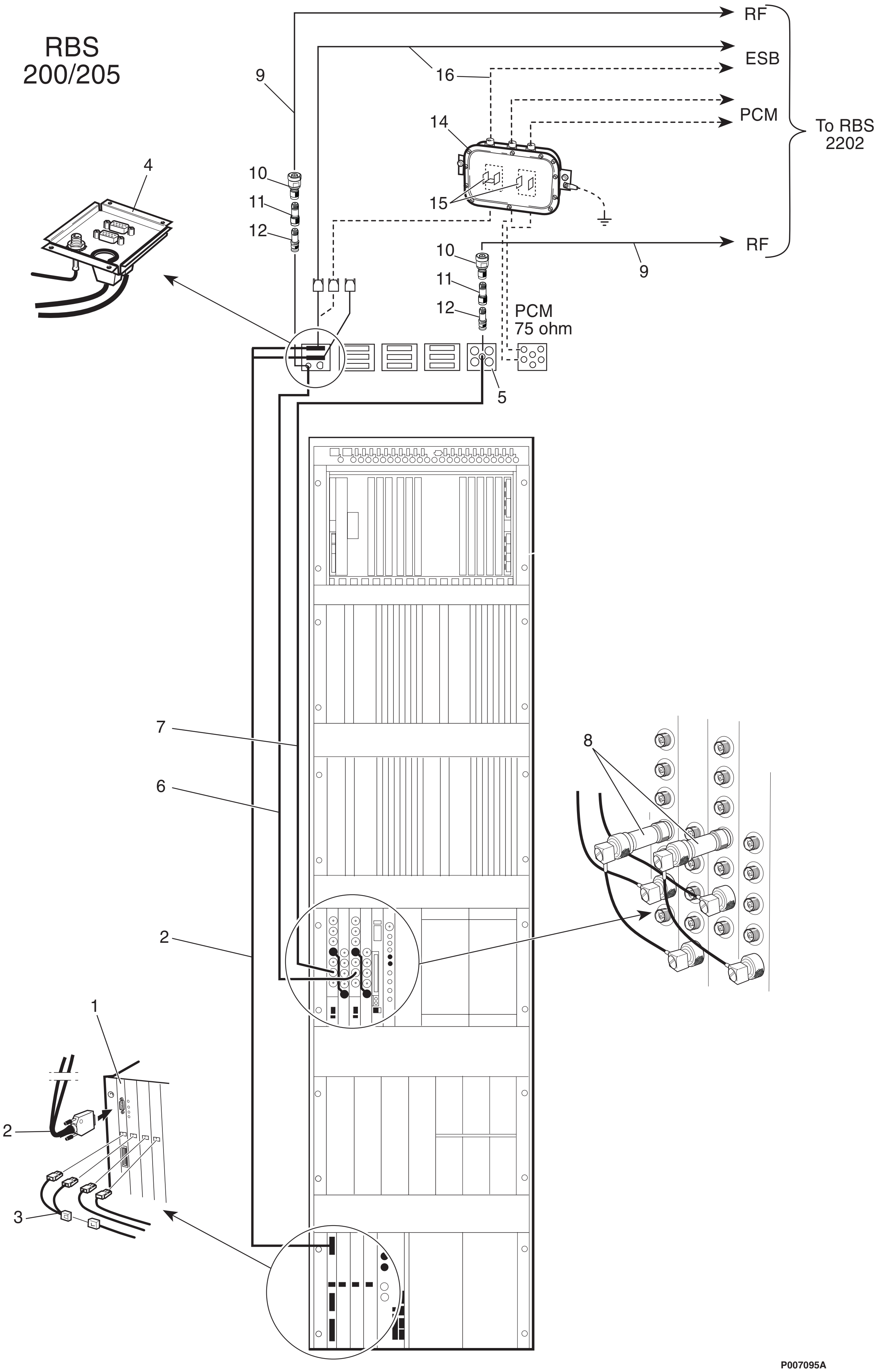
[16] More configurations, usage and quantities are shown in the Co-Siting Manual, LZN 302 27.
[17] This Product Number is only used for selection of installation material. Two circuit boards are included, 'TG-sync board' and 'PCM board with by-pass relays' (+24V is needed to activate by-pass relays). Only the sub-bord set (pos 13) is available as Spare Part.


RBS
200/205
RF
ESB
PCM
To RBS
2202
RF
9
16
14
15
4
10
11
12
10
11
12
9
PCM
75 ohm
5
7
6
8
2
1
2
3
P007094A

Parts installed in the RBS 200/205 Cabinet

Pos	Product Number	Product Name	Description
1	ROF 366 144/1	Printed board assemb	TMCB , (Use R4B or higher for TG-sync).
2	RPM 513 904/02160	Cable	SIGNAL ESB
3	RPM 513 935/1	Power cable	
4		Contact box	Production material, included in the installation kit, but not separate orderable as spare part.
5		Contact box	Production material, included in the installation kit, but not separate orderable as spare part.
6	RPM 513 427/1330	Coaxial cable	
7	RPM 513 427/02050	Coaxial cable	
8A	UMF 101 23/005	Attenuator	[18)] TNC male/female 5dB 50ohm 2W
8B	UMF 101 23/006	Attenuator	[18)] TNC male/female 6dB 50ohm 2W
8C	UMF 101 23/009	Attenuator	[18)] TNC male/female 9dB 50ohm 2W
9-16			See next page.

[18)] More configurations, usage and quantities are shown in the Co-Siting Manual, LZN 302 27.


RBS
200/205
RF
ESB
PCM
To RBS
2202
RF
9
16
14
15
4
10
11
12
10
11
12
9
PCM
75 ohm
5
7
6
2
8
1
2
3
P007095A

External Parts, installed on top of or near the RBS 200/205 Cabinet

Pos	Product Number	Product Name	Description
1-8			See previous page.
9	RPM 513 745/10000	Coaxial cable	
10	RPT 403 240/1	Connector	COAX N/7.16 ADAPTER.
11A	UMF 101 191/1	Attenuator	[19] N male/female 1dB 50 OHM
11B	UMF 101 191/2	Attenuator	[19] N male/female 2dB 50 OHM
11C	UMF 101 191/3	Attenuator	[19] N male/female 3dB 50 OHM
11D	UMF 101 191/4	Attenuator	[19] N male/female 4dB 50 OHM
11E	UMF 101 191/5	Attenuator	[19] N male/female 5dB 50 OHM
11F	UMF 101 191/6	Attenuator	[19] N male/female 6dB 50 OHM
11G	UMF 101 191/7	Attenuator	[19] N male/female 7dB 50 OHM
11H	UMF 101 191/8	Attenuator	[19] N male/female 8dB 50 OHM
11J	UMF 101 191/9	Attenuator	[19] N male/female 9dB 50 OHM
11K	UMF 101 192/1	Attenuator	[19] N male/female 10dB 50 OHM
11L	UMF 101 192/2	Attenuator	[19] N male/female 20dB 50 OHM
12	RPT 403 174/001	Pin contact unit	Adapter TNC(m)-N(fm)
13	RPT 403 805/01	Connector	D-SUB STRAPPING PLUG 90 OHM
14A		Set of materials	[20] OVP for 2202 75ohm (NTM 503 700/1)
14B		Set of materials	[20] OVP for 2202 100ohm (NTM 503 701/1)
15		Overvoltage arrester	(Spare parts for the OVP-11 Connection Box). Set with 5 sub-boards, type ’C’
16A	RPM 513 1104/03240	Cable	SIGNAL ESB/CAB (L=3.2m)
16B	RPM 513 1104/07020	Cable	SIGNAL ESB/CAB (L=7.02m)
16C	RPM 513 1104/12420	Cable	SIGNAL ESB/CAB (L=12.42m)

[19] More configurations, usage and quantities are shown in the Co-Siting Manual, LZN 302 27.
[20] This Product Number is only used for selection of installation material. Two circuit boards are included, ’TG-sync board’ and ’PCM board with by-pass relays’ (+24V is needed to activate by-pass relays). Only the sub-bord set (pos 13) is available as Spare Part.

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Replaced and Withdrawn Parts

About this chapter

This Chapter shows replaced or withdrawn products

Due to continous improvement in design and production methods, some parts are changed.

This is the only place in this catalogue release where you still can find Product Numbers shown in previous catalogues. In this way we manage to keep the Numerical Index as a list of orderable Spare Parts.

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Old Product	Revision Information	New Product
BFL 119 311/2	Replaced by:	NTZ 112 469
BFL 119 319/1	Replaced by:	NTZ 112 469
BKV 301 216/51	Replaced by:	BKV 301 253/3
BKV 301 253/1	Replaced by:	BKV 301 253/3
BKV 301 253/2	Replaced by:	BKV 301 253/3
BKV 301 254/1	Deleted	Not needed
BMG 980 306/1	Replaced by:	1/BMG 980 316/1
BMG 980 308/1	Replaced by:	1/BMG 980 316/1
KFE 101 1140/3	Replaced by:	KFE 101 1140/5
KFE 101 1140/5	Replaced by:	KFE 101 1148/1
KRC 131 47/01	Replaced by:	KRC 131 47/03
KRY 112 002/1	Replaced by:	KRY 112 38/1
KRY 112 004/1	Replaced by:	KRY 112 37/1
RPM 113 3534/1	Replaced by:	RPM 113 3534/4
RPM 513 1374/01800	Replaced by:	RPM 513 1374/01200
RPM 513 1384/00720	Replaced by:	RPM 513 1384/00730
RPM 513 1392/02250	Replaced by:	RPM 513 1392/02150
RPM 513 1379/02250	Replaced by:	RPM 513 1402/02250
RPM 513 852/00160	Replaced by:	RPM 119 081/160
RPM 513 852/00250	Replaced by:	RPM 119 081/600
RPM 513 852/00600	Replaced by:	RPM 119 081/600
RPM 513 878/01600	Replaced by:	RPM 513 878/01700
SEB 112 543	Deleted	Not needed
SXA 120 9770/1	Deleted	Not needed
SXK 107 6182/1	Replaced by:	KRY 101 1442/3

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Numerical Index