Ericsson GSM System

RBS 2206
Maintenance Manual

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EN/LZT 720 0011 R5A

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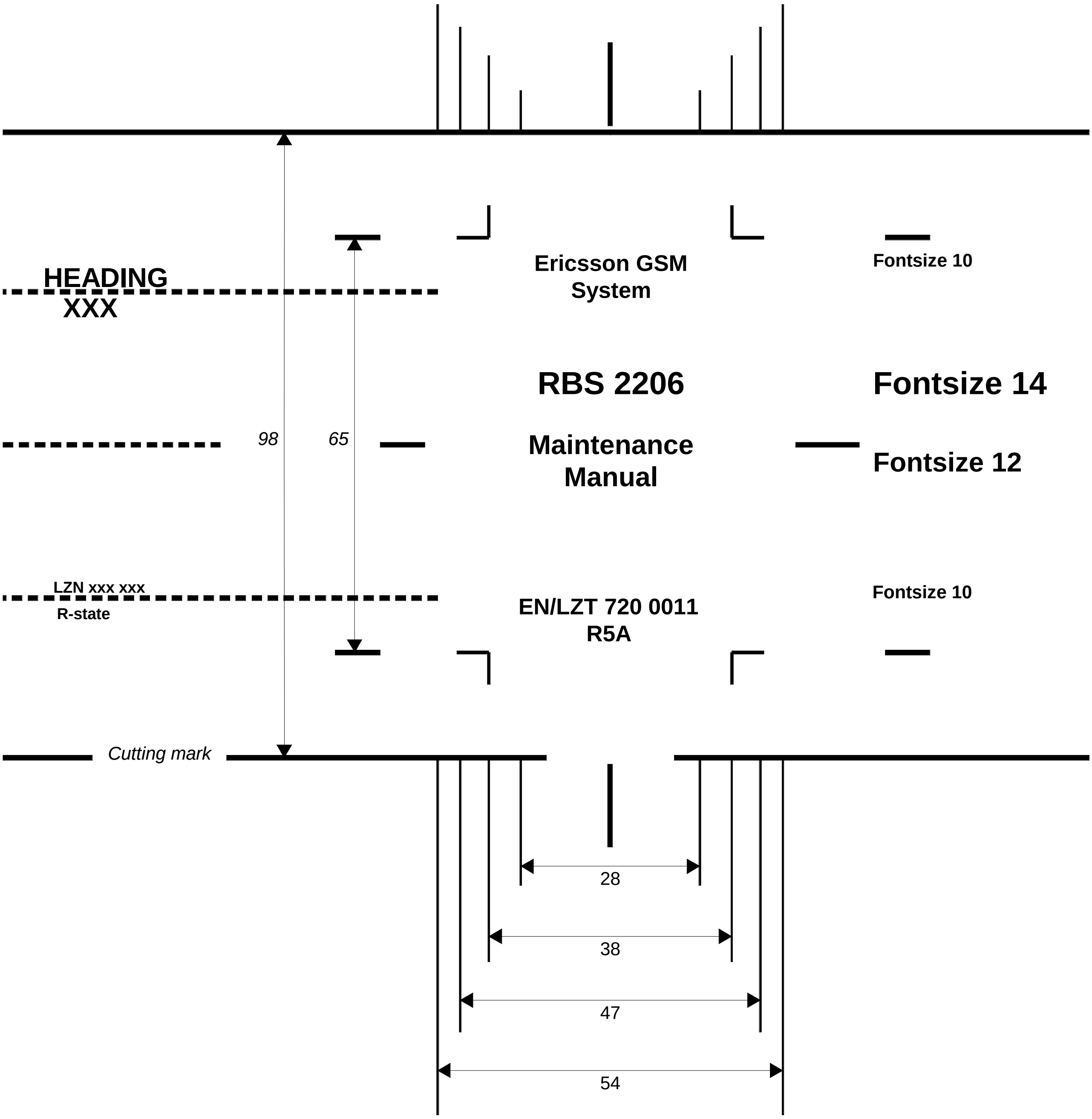
CAPTION LIST

Document No.	
2/001 59-EN/LZT 720 0011 RBS 2206 Maintenance Manual	
Date	Rev
2002-09-17	B

ERICSSON

Uppgjord (även faktaansvarig om annan) - *Prepared (also subject responsible if other)*		Nr - *No.*		
SG/ERA/SRB/ZP Per Olof Höglund		4/001 59-EN/LZT 720 0011 Uen		
Dokansv/Godkänd - *Doc respons/Approved*	Kontr - *Checked*	Datum - *Date*	Rev	File
ERA/SRB/Z		2001-06-29	A	



Doc nr: 2/001 59-EN/LZT 720 0011 Uen Rev B

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RBS 2206 Maintenance Manual

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Trademark List

Contents

1 Introduction

This Maintenance Manual is valid for the RBS 2206.

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 only apply to the RBS connected to a Base Station Controller (BSC), and it is assumed that the RBS is installed and in operation.

Note: The instructions in this manual presuppose that the replaced units are always put into operation.

1.1 Product Overview

This section gives a brief overview of the RBS 2206.

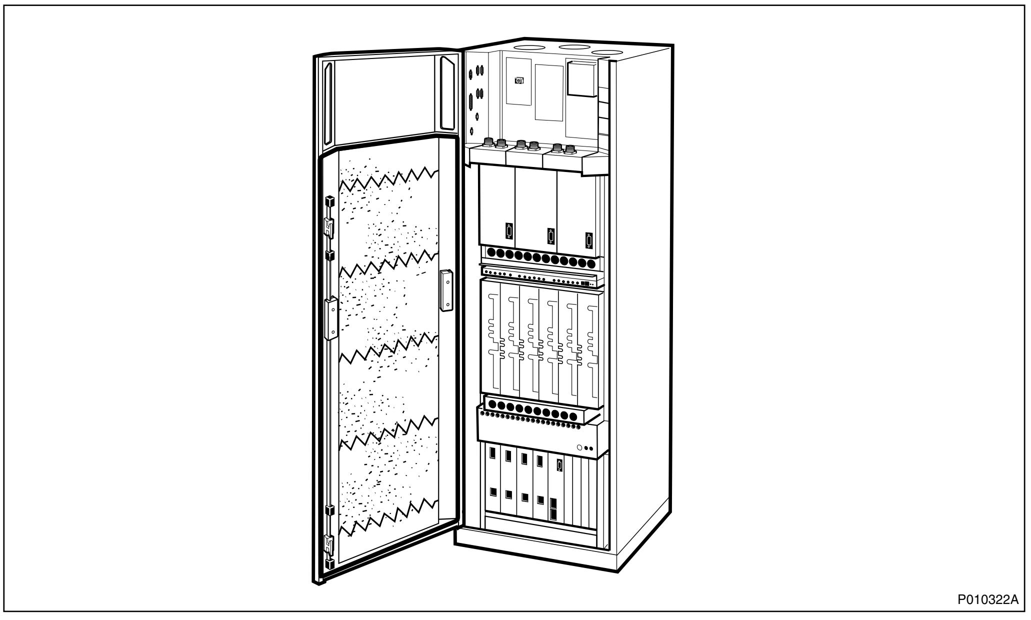

Figure 1 RBS 2206 Cabinet Overview

The RBS 2206 is a member of the RBS 2000 family of indoor and outdoor RBSs operating in the GSM 800, GSM 900, GSM 1800 and GSM 1900 frequency bands.

The RBS 2206 is designed for indoor installation. It consists of a radio cabinet mounted on a base frame.

Cable entries for feeders, transmission and power cables are concentrated to the upper part of the cabinet on connection fields, which are covered by the cabinet door.

For further information about the RBS 2206, *see* :

RBS 2106, RBS 2206 Hardware Reference Manual	*EN/LZT 720 0024*

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*

1.3 Target Group

The target group for this manual is the RBS 2000 field technicians. The sub-section *Fault Analysis from OMC* in 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 have the following:

- Experience of radio and mobile communications
- Good understanding of technical English

The required knowledge of the equipment can be acquired by following the Ericsson GSM System training path for RBS 2000 field technicians.

1.4 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.

1.4.1 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.

1.4.2 Fault Handling Workflow

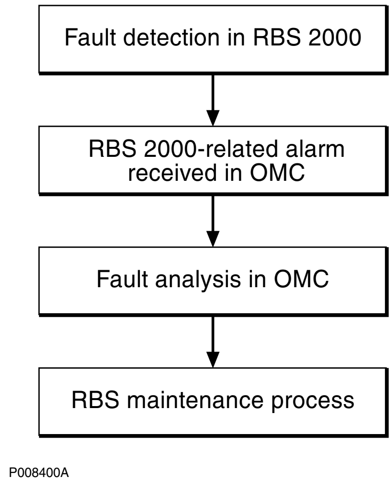

Figure 2 Fault handling workflow

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.

1.4.3 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.

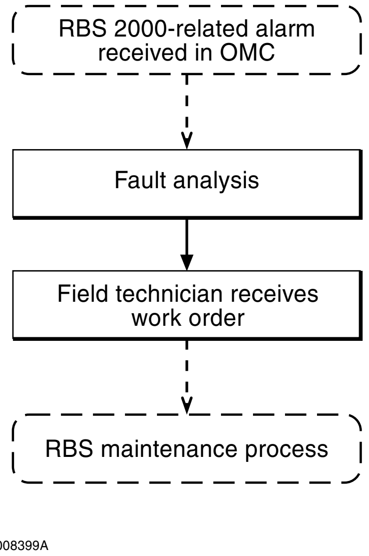

Figure 3 Fault analysis from OMC

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, if a logical RU is suspected of being 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.

1.4.4 RBS Maintenance Process

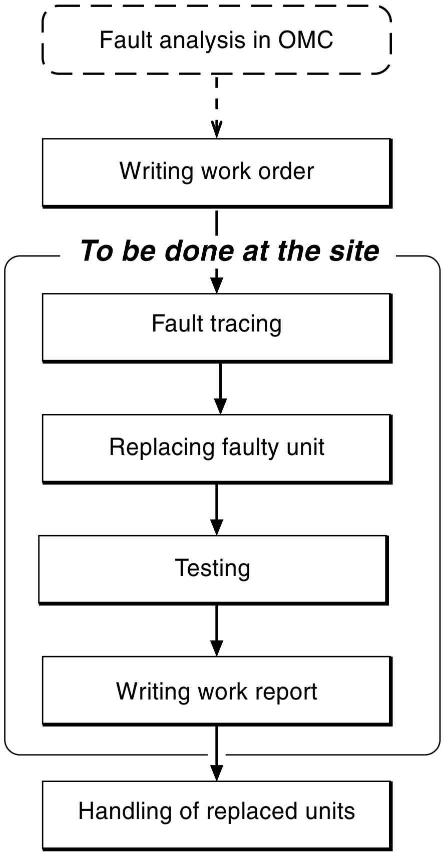

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Figure 4 The RBS Maintenance Process

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 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 provides information 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 reducing 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.

1.4.5 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: The BSS only pinpoints one RU in the RU Map.

Indication with an indicator and an RU Map

Examples of units	DXU, dTRU, CXU, PSU 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 is 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	CDU bus, EPC bus and Y link.
Method of localisation	A systematic order of replacement is used to determine the unit that has generated the fault.

1.5 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 of this manual is given below.

Table 1 Manual description

Chapter No.	**Title**	**Brief description**
1.	Introduction	Introduces this manual.
2.	Safety Instructions	Describes the risks involved when working with RBS equipment.
3.	Tools and Instruments	Specifies recommended equipment.
4.	Fault Localisation	Recommends actions for each RU. The purpose is to find the faulty unit so it can be replaced.
5.	RBS Field Repair	Describes actions to be performed as soon as the faulty unit has been localised.
6.	Test after Repair	Describes verification procedures for the RBS.
7.	Concluding Routines	Describes administrative routines resulting from maintenance activity.
8.	Optical Indicators and Switches	Describes optical indicators and switches on all RUs in the RBS.
9.	Preventive Maintenance	Describes recommendations for preventive maintenance activities.
10.	RF Connections	Describes the cabling between CDUs, TRUs, CXU and optional ASU.
11.	Non-RF Connections	Gives information about power cables, EPC bus cables and DC and signal cables.
12.	CDU Antenna Configurations	Describes different antenna configurations.
13.	Glossary	Explains terms and abbreviations.
Appendix A	Fault List	Lists different types of fault in the RBS.
Appendix B	Spare Parts Catalogue	Catalogue of all spare parts of the RBS.

1.6 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.

1.6.1 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 the following:

- 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.

1.6.2 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.

1.7 Release History

Except for editorial changes this manual has been revised as follows:

1.7.1 R4A to R5A

Tools and Instruments

- Chapter restructured.
- Product numbers changed.

Fault Localisation

- OMT commands changed.

RBS Field Repair

- Reference to *Installation and Integration Manual* added for information about battery parameters in the OMT.
- Torque value for battery cable in *Section DC Filter Replacement* added.
- *Section Setting the IDB Parameters* updated.

CDU Antenna Configurations

- Figure showing the internal cabling between CDUs and antenna connection field updated.

1.7.2 R3A to R4A

Fault Localisation

- Updated section for *Y Link* fault localisation.

RBS Field Repair

- Information about RU temperature requirement has been added.
- Updated repair procedure for *Antenna Replacement* and *Antenna Feeder Cable Replacement* .
- Updated procedure for *TRU Replacement* .
- Updated procedure for *EPC Bus Cable Replacement* .

Preventive Maintenance

- Chapter restructured.

RF Connections

- New information about mounting stub added.
- New information about internal CDU-F connection added.

CDU Antenna Configurations

- New information for 3x2 CDU-G and 3x4 CDU-G configurations.

1.7.3 R2A to R3A

CDU Antenna Configurations

- Information about configuration 1+1+2 CDU-G is added.
- Information about configuration 1x4 CDU-G without hybrid combiner is added.
- Information about configuration 1x6 CDU-G without hybrid combiner is added.

Fault List

Information is added in following faults:

- SO TRXC I2A:25
- SO TRXC I2A:34

2 Safety Instructions

This chapter describes the system used for presenting safety information and the instructions to maintain the highest level of personal safety, while using Ericsson's products and to protect the products themselves.

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

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.

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 this common hazard symbol.

Figure 5 Hazard symbol

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

Level 1

Danger!

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

Level 2

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.

Level 3

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.

2.1.1 Specialised Symbols

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

Figure 6 Radio frequency radiation

Figure 7 Electrical hazard

Figure 8 Electrostatic discharge

Warnings are used throughout Ericsson manuals and documents 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 Use of Notes

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

2.3 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, and so on.
- Switch off the power if the cabinet is damp inside.
- Prevent moisture entering the equipment during work in bad weather conditions.

Danger!

Improper electrical installation may cause fire or electric 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 electrical installations.

Cable Markings

Caution!

Verify that the cable markings correspond before connecting cables.

Faulty Electric Tools

Warning!

Do not repair a faulty electric tool yourself. Ask your supervisor for a replacement 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 (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 lightning strikes, it is essential that the equipment is properly earthed for thunderstorm conditions.

2.3.1 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, for example when a body moves, rubs against clothes, slides against a chair, when shoes rub against the floor, and when you handle ordinary plastics, and so on. 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.

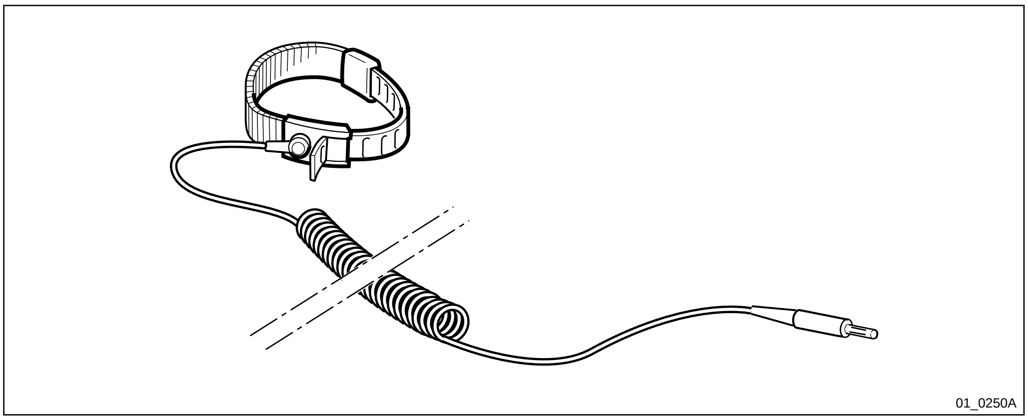

Figure 9 ESD wrist strap LYB 250 01/14

Danger!

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

Note: Test the wrist strap regularly.

2.4 Batteries

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

Work

Danger!

Read the safety instructions regarding how to handle and connect batteries.

General Precautions

When working with batteries:

- Remove wrist watches, rings, bracelets, and so on.
- 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 Section Hazardous Waste Material from Leaks* .

Hazardous Waste Material from Leaks

Ensure that there are sufficient absorbers or neutralising 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 neutralising materials must be suitable for the hazardous substances involved.

Table 2 Typical neutralisers

Typical Neutralisers	
Baking soda (bicarbonate)	$NaHCO_3$
Sal soda	$Na_2 CO_3 IOH_2 O$
Soda ash	$Na_2 CO_3$

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

2.5 Working at Heights

Warning!

Work at height ongoing. Falling objects may cause injury or death.

When working at heights, such as 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.

2.5.1 Rules and Advice for the Safe Use of Ladders

- Make sure that the ladder is free of damage 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 5 m.
- Free-standing ladder with a platform and knee-support, and with over 2 metres height to the platform.
- Any other free-standing ladder longer than 3 m.

Positioning the Ladder

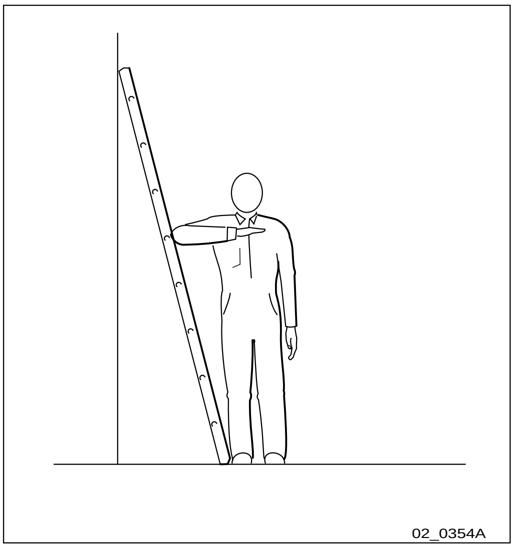

Figure 10 Checking the angle

- 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 positioned on a firm base.

Climbing and Using the Ladder

Figure 11 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 three 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.

2.6 Radio Frequency Electromagnetic Fields

This section provides instructions and information on safety in the presence of radio frequency (RF) electromagnetic fields (EMF).

Caution!

Very high levels of RF exposure can result in adverse health effects. In order to protect all people against such effects, RF exposure limits, which include wide margins, are specified by national and international health authorities.

If it is suspected that exposure limits may be exceeded, co-ordinate with relevant mast users in order to switch off the transmitters or reduce output power whilst working with, or near, antennas.

2.6.1 Safety Requirements for Installation and Maintenance Personnel

It is important that all personnel working with the installation and maintenance of RBS equipment and antennas have basic knowledge regarding RF safety. They should have been informed or trained to be observant of potential exposure risks, which are calculated to exceed prescribed exposure limits, and the appropriate precautionary measures necessary for differing situations.

Caution!

Do not stand or work in front of an operational antenna, unless it has been verified or documented that RF exposure levels are within specified limits.

Caution!

Always be aware of other RF transmitters located close to the RBS antenna. If the RF exposure level is unknown, contact the transmitter operator or ensure that measurements are done to verify that levels are below safety limits before commencing work.

Caution!

Broken or disconnected RF cables may lead to RF exposure reaching, or exceeding, accepted levels. Such cables must be repaired or reconnected before work commences.

Note: Working below or behind ordinarily positioned RBS antennas is possible, since the RF exposure does not normally reach the occupational exposure levels stated in the standards and regulations.

2.6.2 RF Exposure Limits

A number of national and international RF regulations, safety standards and recommendations exist that are relevant for RBS RF exposure. The limits within these standards are similar and are often based on international guidelines set by the International Commission on Non-Ionizing Radiation Protection (ICNIRP), itself recognised by the World Health Organization (WHO). These guidelines have been adopted in the European Council recommendation, 1999/519/EC.

2.7 Other Hazards

Handling Heavy Goods

Warning!

Read the Safety Instructions 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.

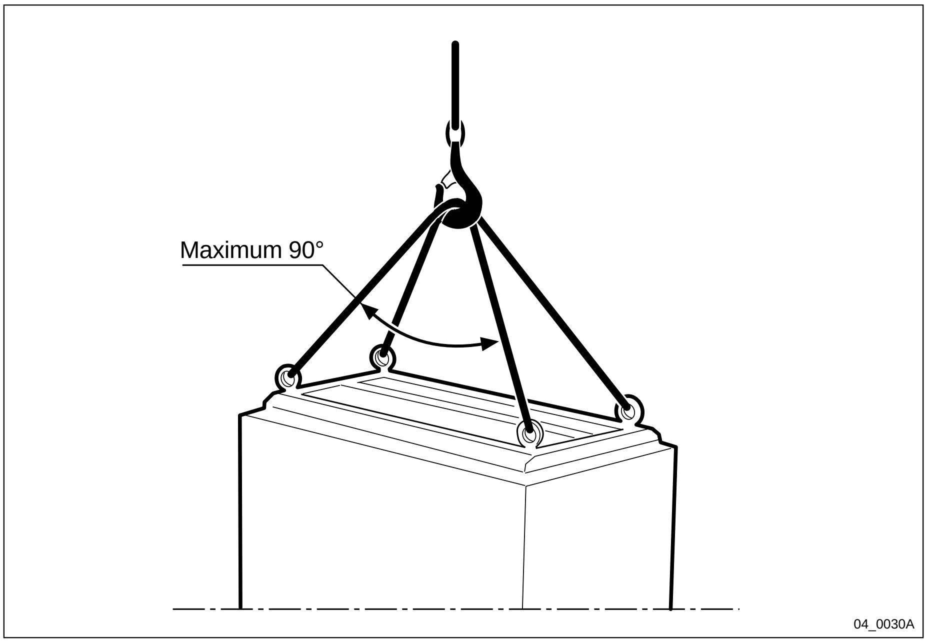

Figure 12 Use long straps

- 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 very serious 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.
- Minimise 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 nature of the electric equipment inside the RBS.

Hot surfaces

Caution!

This equipment attains high temperatures during normal operation, which will cause burns to the skin if touched without heat protective clothing. Always use heat protective clothing when working with this equipment, or switch it off and allow it to cool before commencing work.

Sharp Edges

Warning!

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

3 Tools and Instruments

This chapter defines tools and instruments required for maintenance activities.

For a specification of all kits below, see:

Standard Tools and Equipment Catalogue *EN/LZT 720 0013*

3.1 Test Equipment

Table 3 Test equipment

Product Name	Description	Product No.
Installation tester	TEMS for GSM 900/1800/1900	FAB 801 1700
Digital multimeter	Measuring instrument (voltage, current and resistance)	LPK 102 024/3

3.2 OMT Kit for Fault Localisation

Table 4 OMT Kit

Product Name	Description	Product No.
OMT Kit	SW, cable and manual	NTM 201 2289/1

3.3 Personal Tool Kit

Table 5 Tool Set, Maintenance Tools

Description	Product No.
Tool Set, Maintenance Tools	LTT 601 137/1

3.3.1 Tools for antenna feeders

Table 6 Tools for antenna feeders

Product Name	Description	Product No.
Torque Set	Torque wrench 20 – 100 Nm	LTT 601 141/1
U-key, 32 mm	U-key for slotted socket 32 mm	LSB 107 12/5

3.3.2 Tools for RF connectors

Table 7 Tools for RF connectors

Product Name	Description	Product No.
Torque set	Torque set 0.5 – 4 Nm	LTT 601 145/1

3.4 Torque Wrenches

The following torque wrenches are recommended for the work:

Table 8 Torque Wrenches

Torque Wrenches	Connector type
0.8 Nm	SMA
0.8 Nm +/- 0.2	TNC
2.8 Nm	N
25 Nm	7/16

4 Fault Localisation

4.1 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.

Preconditions

Before starting fault localisation, ensure the following:

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

4.1.1 Work Process for Fault Localisation

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

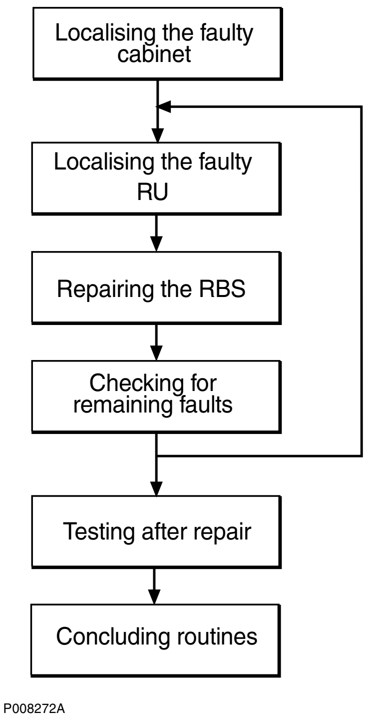

Figure 13 Work process for fault localisation

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 RBS fault indicator, which is on when there is a fault.

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 tripped circuit breaker on the IDM, where applicable. The very first action must always be to reset a tripped circuit breaker. If the circuit breaker trippes 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.*

4.1.2 Fault Cases

This section explains the different fault cases and this forms the basis for choosing methods to localise faults. The methods are as follows:

- 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: The BSS only pinpoints one RU in the RU Map.

Indication with an indicator and an RU Map

Examples of units	DXU, TRU, CXU, PSU 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	CDU bus/IOM bus, EPC bus and Y link.
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.

4.2 Fault Lists

The tables below give all faults that are dealt with in this chapter. These faults indicate that a fault is present in HW.

If this chapter does not deal with the indicated fault, or if the instructions provided have not solved the problem, for supplementary information *see Appendix A: Fault List* .

Note: Faults not related to the RBS 2206 are excluded.

4.2.1 Faults in the SO CF RU map

Fault No.	Fault designation
0	DXU
3	Y link
5	CDU
7	PSU
9	BDM or BFU
12	ALNA/TMA A
13	ALNA/TMA B
14	Battery
15	Fan
20	TMA-CM
23	CDU_RX in cable
30	CDU bus/IOM bus
33	EPC bus/Power communication loop
34	RBS DB
37	CDU_CXU_RXA cable
38	CDU_CXU_RXB cable
40	Antenna
41	PSU DC cable
43	Flash card
44	OVP
45	Battery temp sensor
46	FCU
47	TMA-CM cable

4.2.2 Faults in the SO TRXC RU map

Fault No.	Fault designation
0	TRU, dTRU or ATRU
3	CXU_TRU_RXA cable
4	CXU_TRU_RXB cable

4.2.3 All HW faults in alphabetical order

Fault designation	Fault No.
ACCU	SO CF RU:10
Antenna	SO CF RU:40
Battery	SO CF RU:14
Battery temp sensor	SO CF RU:45
BDM or BFU	SO CF RU:9
CDU	SO CF RU:5
CDU bus/IOM bus	SO CF RU:30
CDU_CXU_RXA cable	SO CF RU:37
CDU_CXU_RXB cable	SO CF RU:38
CDU_RX in cable	SO CF RU:23
CXU_TRU_RXA cable	SO TRXC RU:3
CXU_TRU_RXB cable	SO TRXC RU:4
DXU	SO CF RU:0
EPC bus/Power communication loop	SO CF RU:33
Fan	SO CF RU:15
FCU	SO CF RU:46
Flash card	SO CF RU:43
PSU	SO CF RU:7
OVP	SO CF RU:44
PSU DC cable	SO CF RU:41
RBS DB	SO CF RU:34
TMA-CM	SO CF RU:20
TMA-CM cable	SO CF RU:47
TRU, dTRU or ATRU	SO TRXC RU:0
Y link	SO CF RU:3

4.3 Antenna

This section describes how to localise faults in the total antenna system.

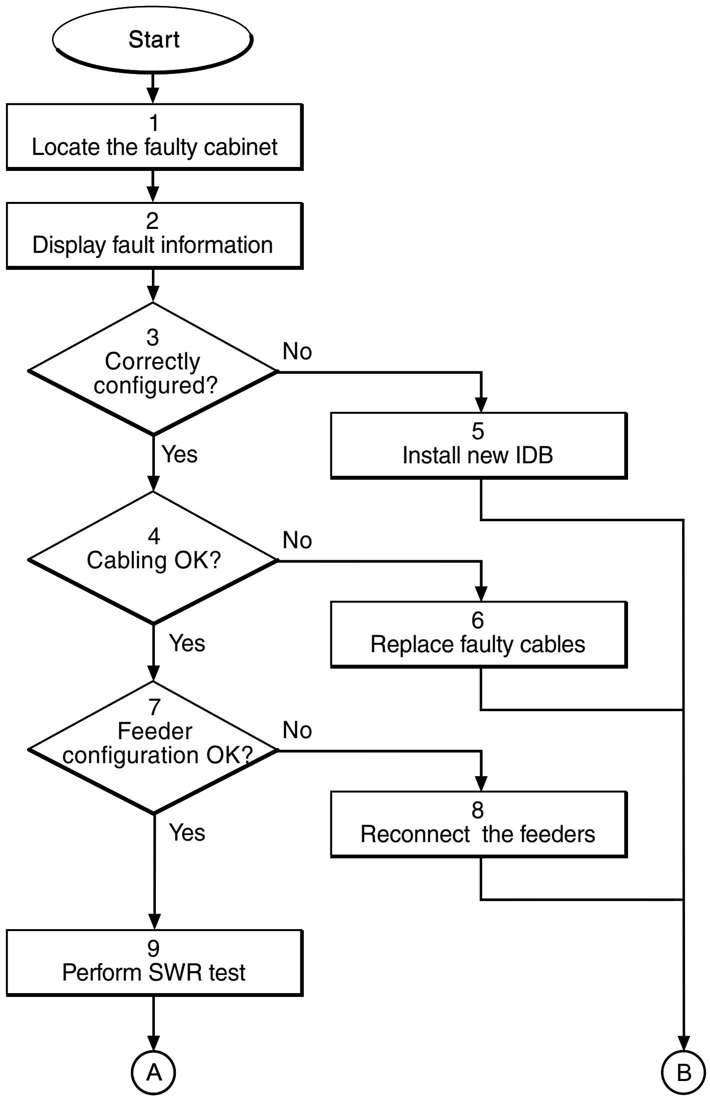

Figure 14   Antenna fault (part 1 of 2)

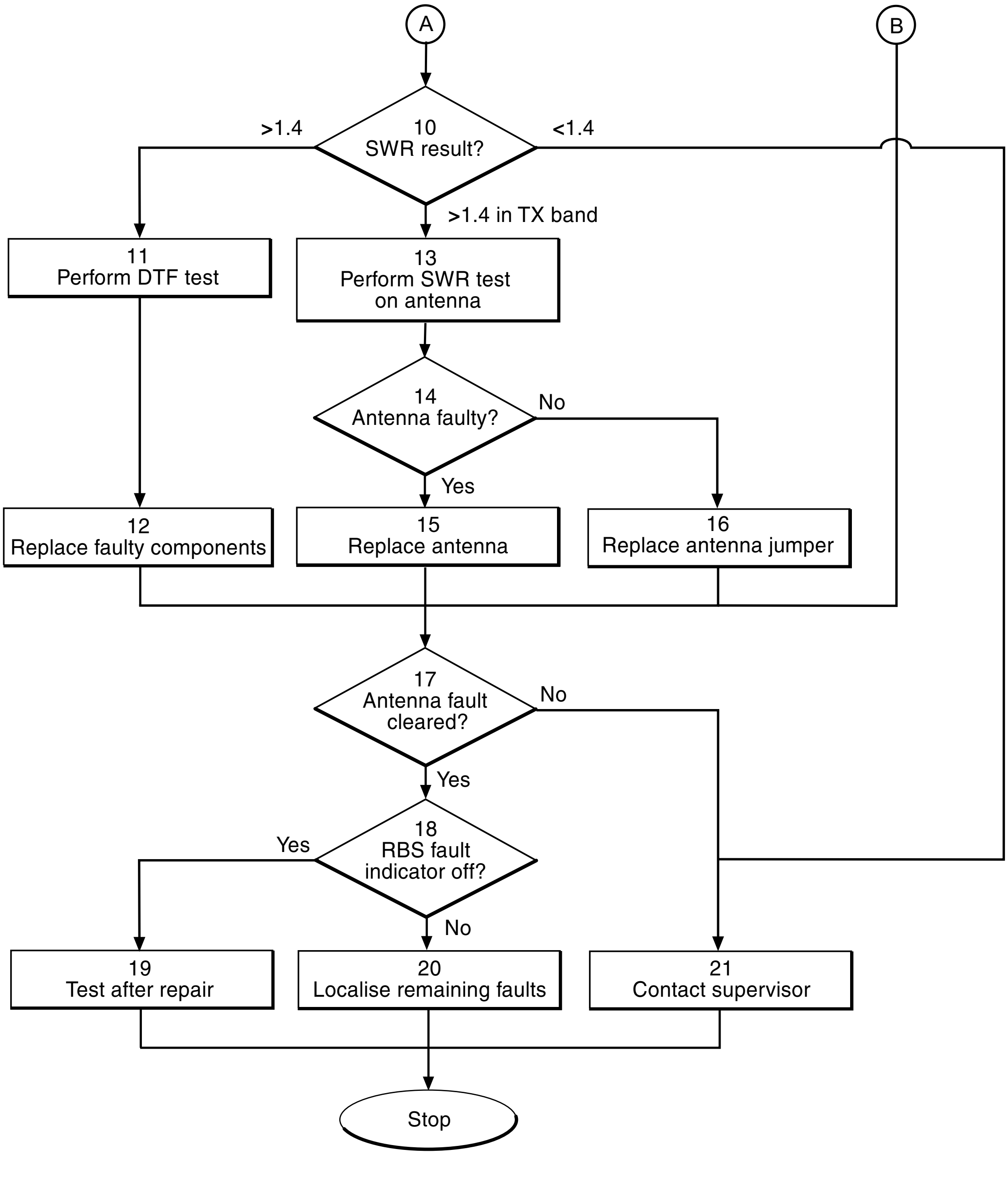

Figure 15 Antenna fault (part 2 of 2)

(1) Locate the faulty cabinet

1. Locate the faulty cabinet according to work order information.

(2) Display fault information

Use the OMT to monitor activated alarms.

1. Start the OMT.
2. In the **RBS 2000** menu, select **Connect** .
3. In the **Configuration** menu, select **Read IDB** and click **Yes** .
4. In the **Maintenance** menu, select **Monitor...** .
5. Select **Fault Status** and click on **Start monitor** .

(3) Correctly configured?

1. In the **Configuration** menu, select **Define** and **ALNA/TMA...** .
2. In the Define ALNA/TMA window, select TMA <xy> and click **Run** .
3. Check that the ALNA/TMA values correspond with the Site Installation Documentation.
4. Close the Define ALNA/TMA window.
5. In the **Configuration** menu, select **Define** and **VSWR Limits...** .
6. In the Define VSWR Limits window, select Antenna <x> and click **Run** .
7. Check that the VSWR limits correspond with the Site Installation Documentation.

Is the configuration correct?

Answer	Comment	Action
Yes	The configuration is correct.	Proceed to stage **(4)**
No	The configuration is not correct.	Proceed to stage **(5)**

(4) Cabling OK?

1. Check that the internal cabling is OK and correctly configured according to *Chapter RF Connections* .

Is the internal cabling OK?

Answer	Comment	Action
Yes	The internal cabling is OK.	Proceed to stage **(7)**
No	The internal cabling is not OK.	Proceed to stage **(6)**

(5) Install new IDB

1. Install a new IDB according to instructions in *Section IDB Parameters Settings* in *Chapter RBS Field Repair* .

2. Proceed to stage **(17)** .

(6) Replace faulty cables

1. Replace any faulty cables according to *Chapter RF Connections.*

2. Proceed to step **(17)** .

(7) Feeder configuration OK?

1. Check that the antenna feeders are connected to the correct CDUs.

2. Also check that the feeders are labelled correctly.

Are the feeders correctly connected?

Answer	Comment	Action
Yes	The feeders are correctly connected.	Proceed to stage **(9)**
No	The feeders are not correctly connected.	Proceed to stage **(8)**

(8) Reconnect the feeders

1. Reconnect the feeders according to the Site Installation Documentation.

2. Proceed to stage **(17)** .

(9) Perform SWR test

1. Perform a SWR test. For information about how to perform a SWR test, *see:*

RBS 2206 Installation and Integration Manual	*EN/LZT 720 0009*

(10) SWR result?

There are two different SWR limits of approval depending on if TMA is used or not.

If TMA is not used

If SWR somewhere in the GSM system frequency band exceeds 1.4 (= 15.6 dB RL), the result is not approved, *see figure below* . Then proceed to stage **(11)** , otherwise go to stage **(21)** .

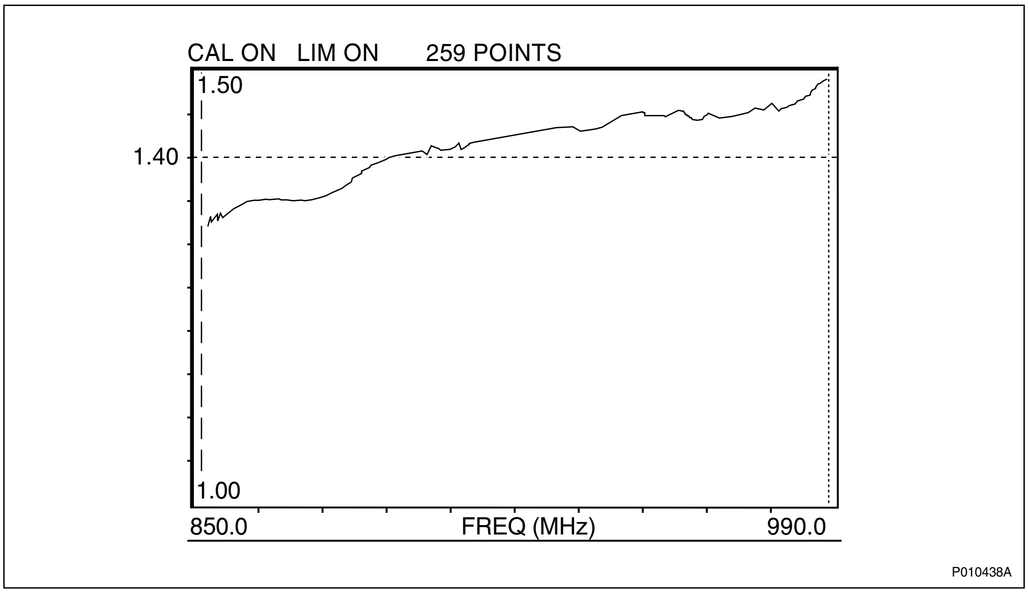

Figure 16 Example of unapproved SWR level. Part of the curve is above 1.4.

If TMA is used

If SWR in both the RX and TX band exceeds 1.5 (= 14.0 dB RL), the result is not approved, *see figure below* . Then proceed to stage **(11)** .

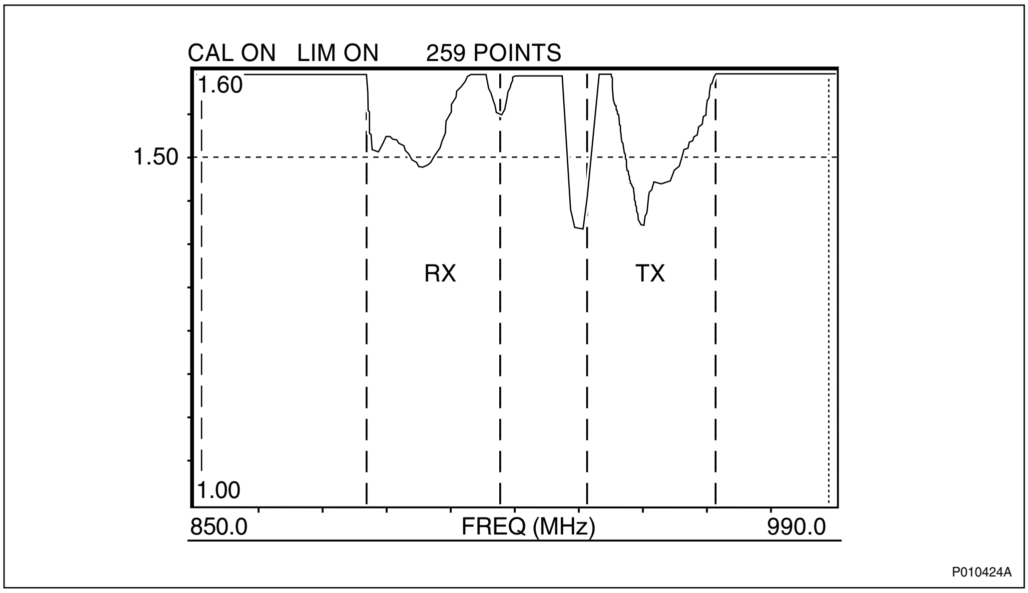

Figure 17 Example of unapproved SWR level. Parts of the curve is above 1.5 in both RX and TX band.

If SWR exceeds 1.5 (= 14.0 dB RL) in the TX band but not in the RX band, the result is not approved, *see figure below* . Then proceed to stage **(13)** .

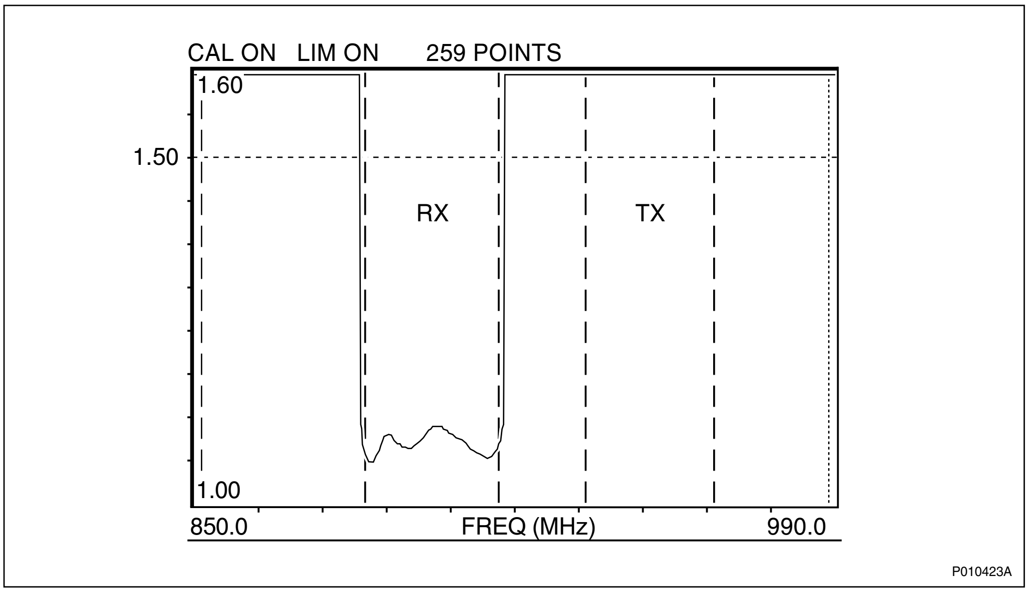

Figure 18 Example of unapproved SWR level in the TX band. The level is here above 1.5

If SWR is below 1.5 (= 14.0 dB RL) in both RX and TX band, the result is approved, *see figure below* . Then proceed to stage **(21)** .

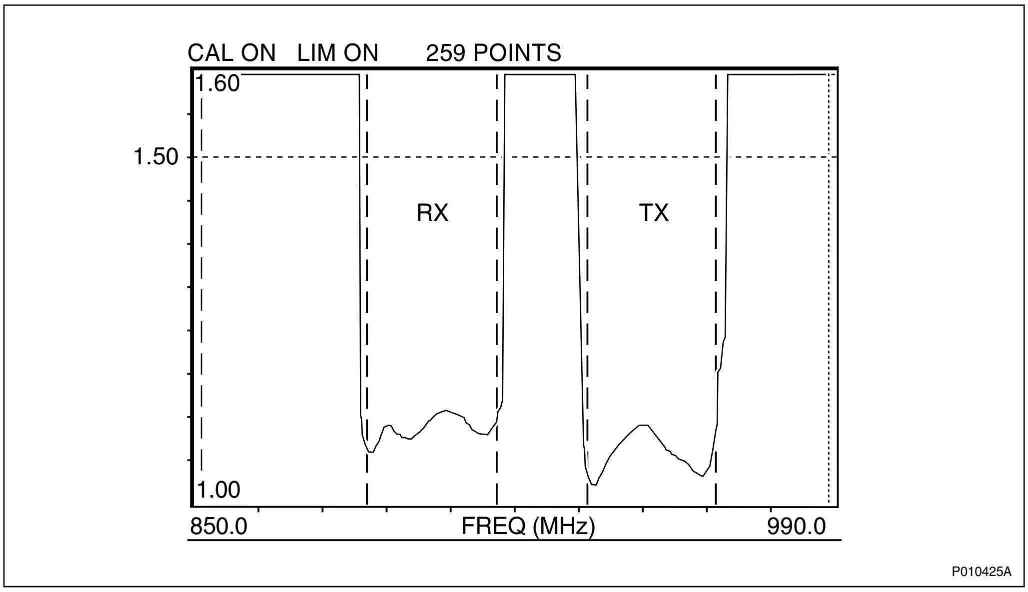

Figure 19 Example of approved SWR level. Both in the RX and TX band SWR is below 1.5.

(11) Perform DTF Test

1. Perform a DTF test to localise the fault. For information about how to perform a DTF test, *see:*

	RBS 2206 Installation and Integration Manual	*EN/LZT 720 0009*

(12) Replace faulty components

1. Replace the components indicated as faulty in the DTF test.

2. Proceed to stage **(17)** .

(13) Perform SWR test on antenna

1. Perform a SWR test on the antenna to determine if the antenna is faulty. For information about SWR test, *see* :

	RBS 2206 Installation and Integration Manual	*EN/LZT 720 0009*

(14) Antenna faulty?

If the SWR level exceeds 1.5 (=14.0 dB RL), the antenna is faulty.

Is the antenna faulty?

Answer	Comment	Action
Yes	The antenna is faulty.	Proceed to stage **(15)**
No	The antenna is not faulty.	Proceed to stage **(16)**

(15) Replace antenna

1. Replace the antenna according to instructions in *Section Antenna Replacement* in *Chapter RBS Field Repair* .
2. Proceed to stage **(17)** .

(16) Replace antenna jumper

1. Replace the antenna jumper according to instructions in *Section Feeder and Antenna Jumper Cable Replacement* in *Chapter RBS Field Repair* .
2. Proceed to stage **(17)** .

(17) Antenna fault cleared?

1. Use the **Display Faulty RUs** in the OMT to list the faulty RUs.

Has the antenna fault ceased?

Answer	Comment	Action
Yes	There is no antenna fault.	Proceed to stage **(18)**
No	There is still an antenna fault.	Proceed to stage **(21)**

(18) RBS fault indicator off?

1. Check that the RBS Fault indicator on the DXU is off.

Is the RBS fault indicator off?

Answer	Comment	Action
Yes	There are no faults in the RBS.	Proceed to stage **(19)**
No	There is still one or more faults in the RBS.	Proceed to stage **(20)**

(19) Test after Repair

1. Make a test call according to *Section Test Call* in *Chapter Test after Repair* .
2. Proceed to *Section Before Leaving the Site* in *Chapter Concluding Routines* .

(20) Localise remaining faults

1. In the **Maintenance** menu, select **Display** and **Faulty RUs** .
2. Localise the faults that are listed by the OMT. *See respective RU section in this chapter* .

(21) Contact supervisor

1. Contact the supervisor, or manager, who will take further action.

4.4 Battery

The Battery fault only arises when the external battery back-up system, specifically BBS 2000, is connected to the RBS.

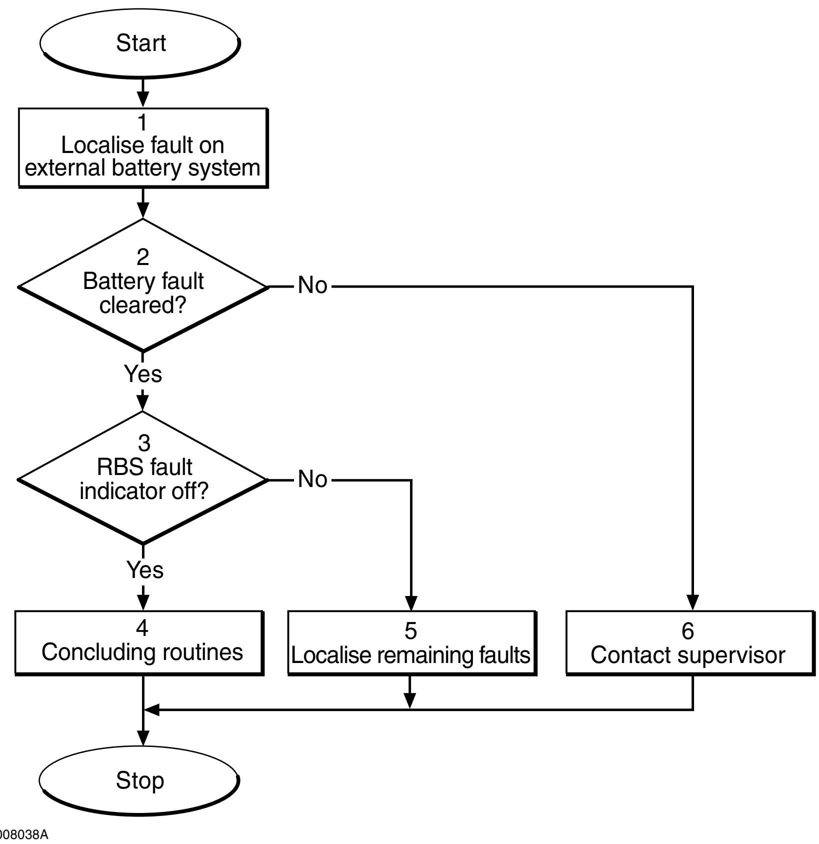

Figure 20 Battery fault, external batteries

(1) Localise fault 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 manufacturer’s documentation to perform fault localisation on the external battery system.

(2) Battery fault cleared?

1. Start the OMT.
2. In the **RBS 2000** menu, select **Connect** .
3. In the **Configuration** menu, select **Read IDB** and click **Yes** .
4. In the **Maintenance** menu, select **Display** and **Faulty RUs** to list all RUs that are faulty.

Has the battery fault disappeared?

Answer	Comment	Action
Yes	The Battery fault is cleared.	Proceed to stage **(3)**
No	There is still a Battery fault.	Proceed to stage **(6)**

(3) RBS fault indicator off?

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

   Is the RBS fault indicator off?

Answer	Comment	Action
Yes	There are no faults in the RBS.	Proceed to stage **(4)**
No	There is still one or more faults in the RBS.	Proceed to stage **(5)**

(4) Concluding routines

1. Proceed to *Section Before Leaving the Site* in *Chapter Concluding Routines* .

(5) Localise remaining faults

1. Use the monitor **Display Faulty RUs** in the OMT to list all RUs that are faulty.
2. Localise the faults that are listed by the OMT. See respective RU section in this chapter.

(6) Contact supervisor

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

4.5 Battery Temperature Sensor

For information about the battery temperature sensor, *see* :

BZZ 208 06 Power Manual *EN/LZB 135 019*

4.6 BDM or BFU

This section describes how to localise BDM or BFU fault.

The BDM or BFU fault only arises when the external battery back-up system, specifically BBS 2000, is connected to the RBS.

Note: The fault text is always *BDM or BFU* . As there is no BDM in the RBS 2206, the expression *BFU fault* is used in the procedure below.

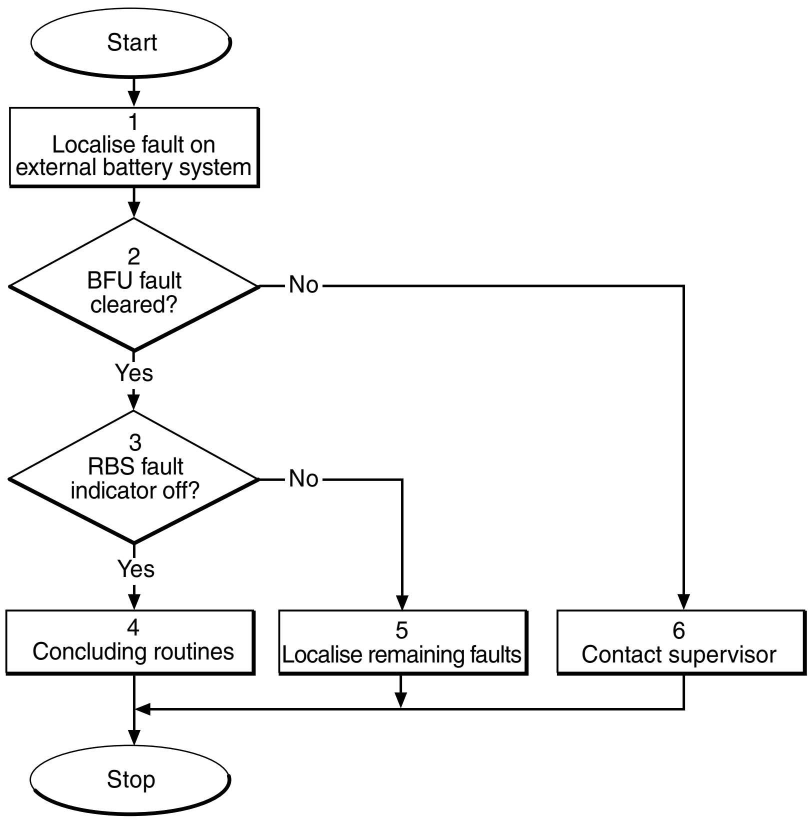

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Figure 21 BDM or BFU fault

(1) Localise fault 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 manufacturer's documentation to perform fault localisation on the external battery system.

(2) BFU fault cleared?

1. Start the OMT.
2. In the **RBS 2000** menu, select **Connect** .
3. In the **Configuration** menu, select **Read IDB** and click **Yes** .
4. In the **Maintenance** menu, select **Display** and **Faulty RUs** to list all RUs that are faulty.

Has the BFU fault disappeared?

Answer	Comment	Action
Yes	The BFU fault is cleared.	Proceed to stage **(3)**
No	There is still a BFU fault.	Proceed to stage **(6)**

(3) RBS fault indicator off?

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

   Is the RBS fault indicator off?

Answer	Comment	Action
Yes	There are no faults in the RBS.	Proceed to stage **(4)**
No	There is still one or more faults in the RBS.	Proceed to stage **(5)**

(4) Concluding routines

1. Proceed to *Section Before Leaving the Site* in *Chapter Concluding Routines* .

(5) Localise remaining faults

1. Use the monitor **Display Faulty RUs** in the OMT to list all RUs that are faulty.

2. Localise the faults that are listed by the OMT. See respective RU section in this chapter.

(6) Contact supervisor

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

4.7 CDU

This section describes how to localise CDU fault in the RBS.

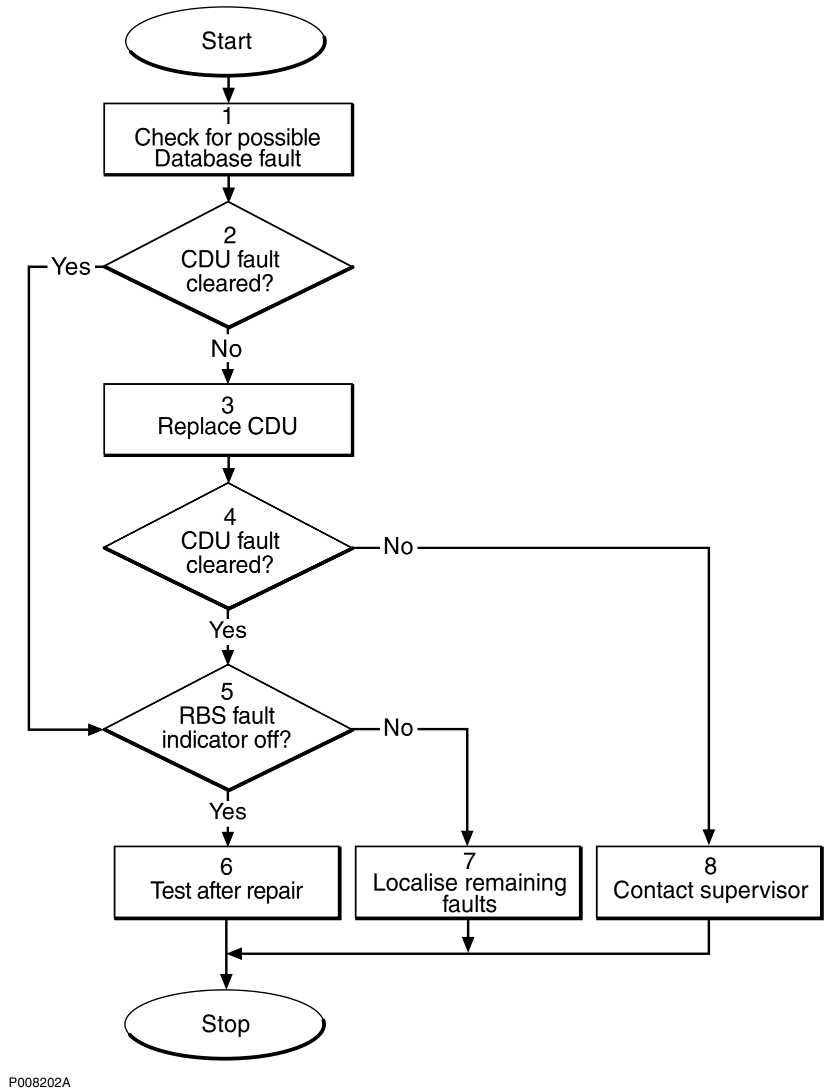


Figure 22 CDU fault

(1) Check for possible Database fault

1. Start the OMT.
2. In the **RBS 2000** menu, select **Connect** .
3. In the **Configuration** menu, select **Read IDB** and click **Yes** .
4. In the **Maintenance** menu, select **Display** and **Faulty RUs** to list all RUs that are faulty.
5. Check for the presence of any of the following faults:

   • SO CF I1A:17 – HW and IDB inconsistent

   • SO CF I2A:36 – RU database corrupted

   • SO CF I2A:46 – DB parameter fault

6. If any of the faults listed in step 2 above are found, reload the database. See instructions in *Section IDB Parameters Settings* in *Chapter RBS Field Repair* .

   Then proceed to stage **(2)** below.

7. If none of the faults listed in step 2 above are found, proceed to stage **(2)** below.

(2) CDU fault cleared?

1. Check the red Fault and the green Operational indicators on the CDU.

   Is the Fault indicator off and the Operational indicator on?

Answer	Comment	Action
Yes	The CDU fault is cleared.	Proceed to stage **(5)**
No	There is still a CDU fault.	Proceed to stage **(3)**

Note that the status of the CDU can also be checked with the OMT.

(3) Replace CDU

1. Replace the faulty CDU. See instructions in *Section CDU Replacement* in *Chapter RBS Field Repair* .

(4) CDU fault cleared?

1. Check the red Fault and the green Operational indicators on the CDU.

   Is the Fault indicator off and the Operational indicator on?

Answer	Comment	Action
Yes	The CDU fault is cleared.	Proceed to stage **(5)**
No	There is still a CDU fault.	Proceed to stage **(8)**

Note that the status of the CDU can also be checked with the OMT.

(5) RBS fault indicator off?

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

   Is the RBS fault indicator off?

Answer	Comment	Action
Yes	There are no faults in the RBS.	Proceed to stage **(6)**
No	There is still one or more faults in the RBS.	Proceed to stage **(7)**

Note that the status of the RBS can also be checked with the OMT.

(6) Test after repair

1. Make a test call over the CDU concerned. Proceed to *Section Test Call* in *Chapter Test after Repair* .

2. Proceed to *Section Before Leaving the Site* in *Chapter Concluding Routines* .

(7) Localise remaining faults

1. Use the monitor **Display Faulty RUs** in the OMT to list all RUs that are faulty.

2. Localise the faults that are listed by the OMT. *See respective RU section in this chapter* .

(8) Contact supervisor

1. If the fault remains, contact the supervisor or manager, who will take further action.

4.8 CDU bus/IOM bus

This section describes how to localise CDU bus/IOM bus fault in the RBS.

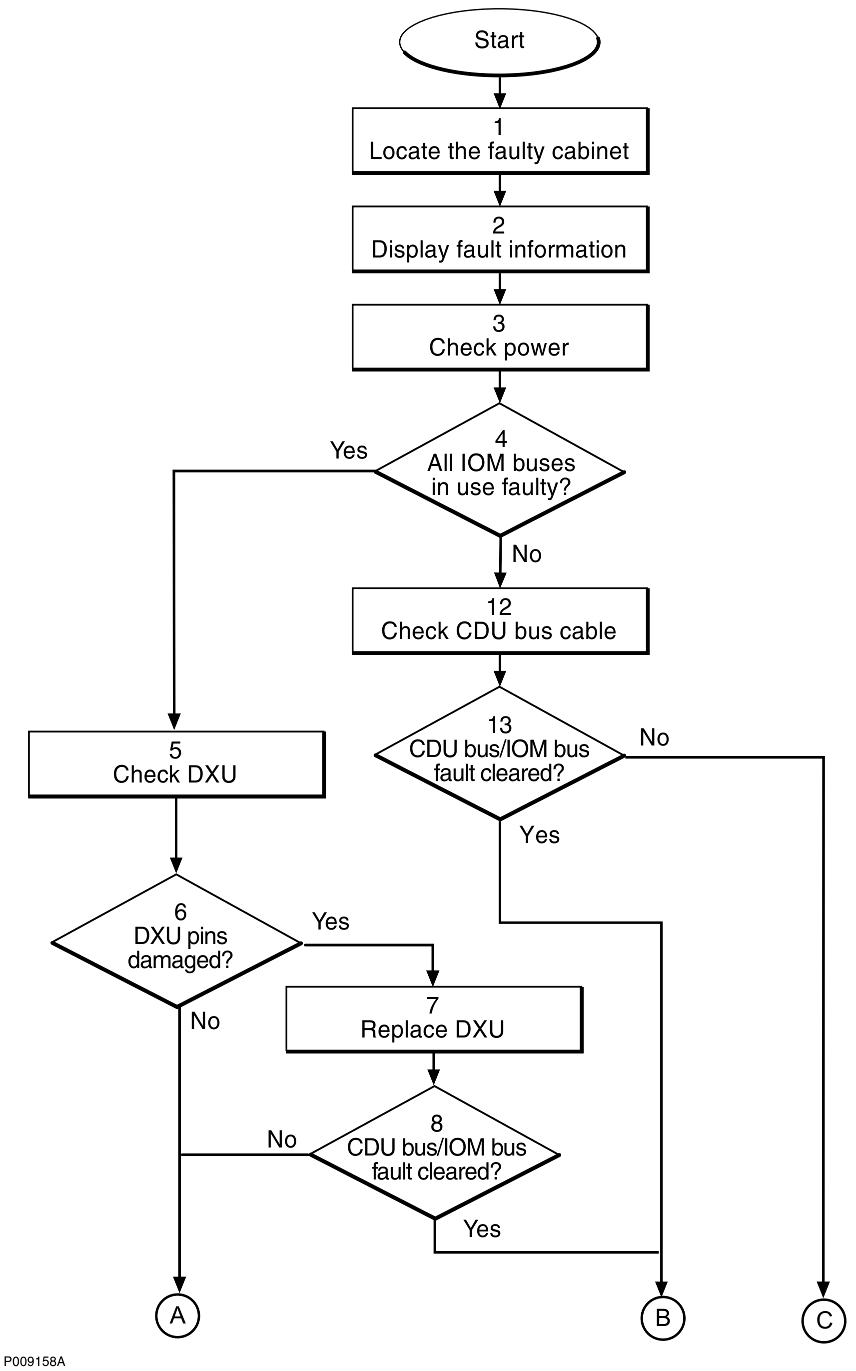


Figure 23 CDU bus/IOM bus fault (part 1 of 2)

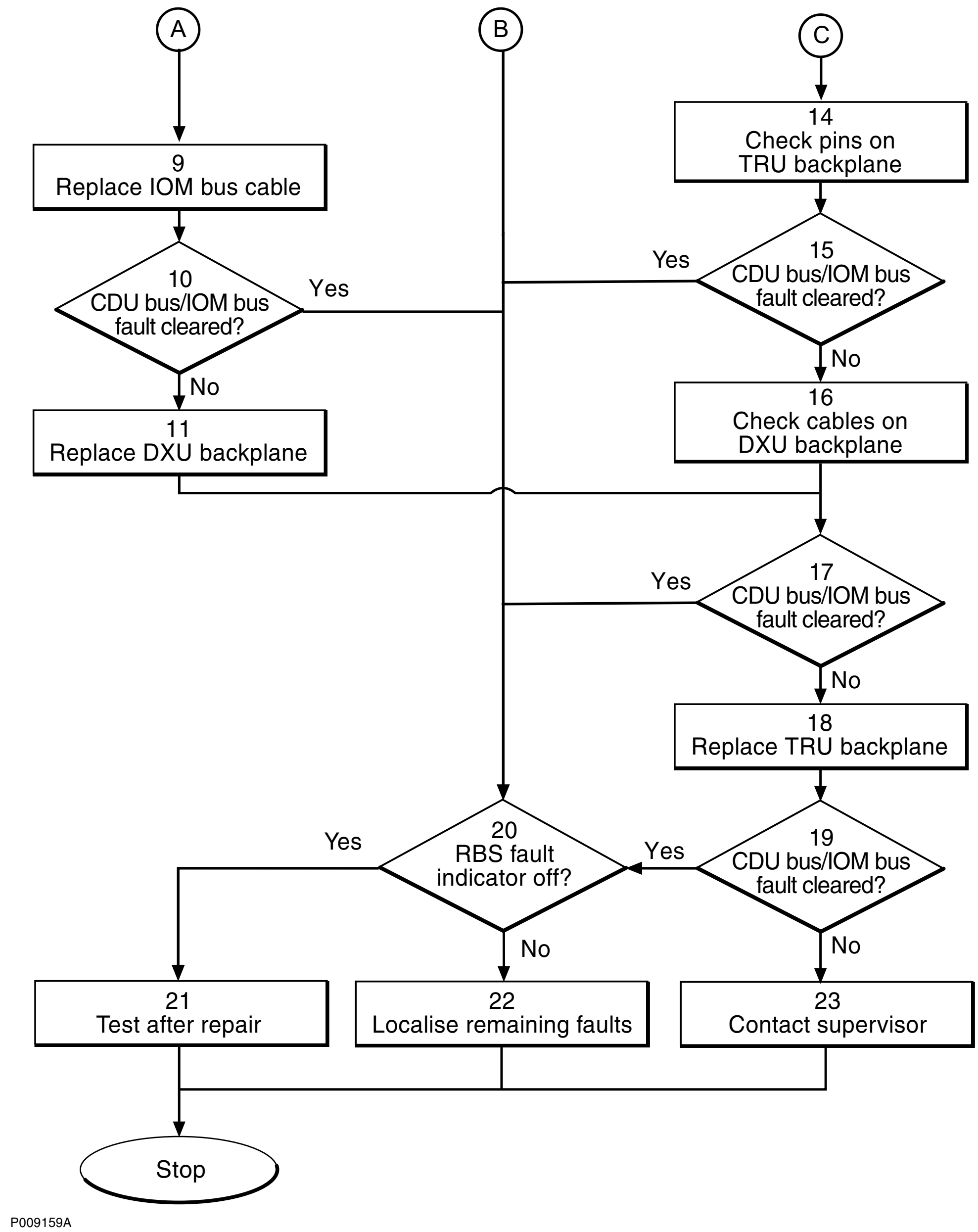


Figure 24 CDU bus/IOM bus fault (part 2 of 2)

(1) Locate the faulty cabinet

1. Locate the faulty cabinet according to work order information.

(2) Display fault information

Use the OMT to monitor the alarms.

1. Start the OMT.
2. In the **RBS 2000** menu, select **Connect** .
3. In the **Configuration** menu, select **Read IDB** and click **Yes** .
4. In the **Maintenance** menu, select **Monitor...** .
5. Select **Fault Status** and click on **Start Monitor** .

(3) Check power

1. Check on the IDM that all configured CDUs, TRUs, DXU, CXU and TMA-CM have power.

(4) All IOM buses in use faulty?

1. Use the OMT to monitor if all IOM buses, according to configuration, are faulty.

Are all IOM buses faulty?

Answer	Comment	Action
Yes	All IOM buses in use are faulty.	Proceed to stage **(5)**
No	All IOM buses in use are not faulty.	Proceed to stage **(10)**

(5) Check DXU

1. Check at the rear of the DXU if the pins are damaged.

(6) DXU pins damaged?

Are the pins damaged?

Answer	Comment	Action
Yes	The pins are damaged.	Proceed to stage **(7)**
No	The pins are not damaged.	Proceed to stage **(9)**

(7) Replace DXU

1. Replace the DXU according to the instructions in *Section DXU Replacement* in *Chapter RBS Field Repair* .

(8) CDU bus/IOM bus fault cleared?

1. Use the OMT to monitor the alarms.

Has the CDU bus/IOM bus fault ceased?

Answer	Comment	Action
Yes	There is no CDU bus/IOM bus fault.	Proceed to stage **(20)**
No	There is still a CDU bus/IOM bus fault.	Proceed to stage **(9)**

(9) Replace IOM bus cable

1. Replace the IOM bus cable between the DXU backplane and TRU backplane according to the instructions in *Section IOM Bus Cable Replacement* in *Chapter RBS Field Repair* .

(10) CDU bus/IOM bus fault cleared?

1. Use the OMT to monitor the alarms.

Has the CDU bus/IOM bus fault ceased?

Answer	Comment	Action
Yes	There is no CDU bus/IOM bus fault.	Proceed to stage **(20)**
No	There is still a CDU bus/IOM bus fault.	Proceed to stage **(11)**

(11) Replace DXU backplane

1. Replace the DXU backplane according to instructions in *Section DXU Backplane Replacement* in *Chapter RBS Field Repair* .

2. Proceed to stage **(17)** .

(12) Check CDU bus cable

1. Check that the CDU bus cable on the CDU is correctly connected.

2. If the CDU bus cable is correctly connected the fault is probably in the cable. Replace the CDU bus cable according to instructions in *Section CDU Bus Cable Replacement* in *Chapter RBS Field Repair* .

(13) CDU bus/IOM bus fault cleared?

1. Use the OMT to monitor the alarms.

Has the CDU bus/IOM bus fault ceased?

Answer	Comment	Action
Yes	There is no CDU bus/IOM bus fault.	Proceed to stage **(20)**
No	There is still a CDU bus/IOM bus fault.	Proceed to stage **(14)**

(14) Check pins on TRU backplane

1. Check the pins on the TRU backplane.
2. If there are no visible faults, replace the faulty cable(s) according to the specific instructions in *Chapter RBS Field Repair* .

(15) CDU bus/IOM bus fault cleared?

1. Use the OMT to monitor the alarms.

Has the CDU bus/IOM bus fault ceased?

Answer	Comment	Action
Yes	There is no CDU bus/IOM bus fault.	Proceed to stage **(20)**
No	There is still a CDU bus/IOM bus fault.	Proceed to stage **(16)**

(16) Check cables on DXU backplane

1. Check that all cables on the DXU backplane are correctly connected.

(17) CDU bus/IOM bus fault cleared?

1. Use the OMT to monitor the alarms.

Has the CDU bus/IOM bus fault ceased?

Answer	Comment	Action
Yes	There is no CDU bus/IOM bus fault.	Proceed to stage **(20)**
No	There is still a CDU bus/IOM bus fault.	Proceed to stage **(18)**

(18) Replace TRU backplane

1. Replace the TRU backplane according to instructions in *Section TRU Backplane Replacement* in *Chapter RBS Field Repair* .

(19) CDU bus/IOM bus fault cleared?

1. Use the OMT to monitor the alarms.

Has the CDU bus/IOM bus fault ceased?

Answer	Comment	Action
Yes	There is no CDU bus/IOM bus fault.	Proceed to stage **(20)**
No	There is still a CDU bus/IOM bus fault.	Proceed to stage **(23)**

(20) RBS fault indicator off?

1. Check that the RBS Fault indicator on the DXU is off.

Is the RBS fault indicator off?

Answer	Comment	Action
Yes	There are no faults in the RBS.	Proceed to stage **(21)**
No	There is still one or more faults in the RBS.	Proceed to stage **(22)**

(21) Test after Repair

1. Make a test call according to *Section Test Call* in *Chapter Test after Repair* .

2. Proceed to *Section Before Leaving the Site* in *Chapter Concluding Routines* .

(22) Localise remaining faults

1. In the **Maintenance** menu, select **Display** and **Faulty RUs** .

2. Localise the faults listed by the OMT. *See respective RU section in this chapter* .

(23) Contact supervisor

1. If the fault remains, contact the supervisor or manager, who will take further action.

4.9 CDU_CXU_RXA Cable and CDU_CXU_RXB Cable

This section describes how to localise CDU_CXU_RXA Cable and CDU_CXU_RXB Cable fault in the RBS.

Note: The fault text is always *CDU_CXU_RXA cable and CDU_CXU_RXB cable* . For simplicity reasons, the expression *Cable fault* is used in the procedure below.

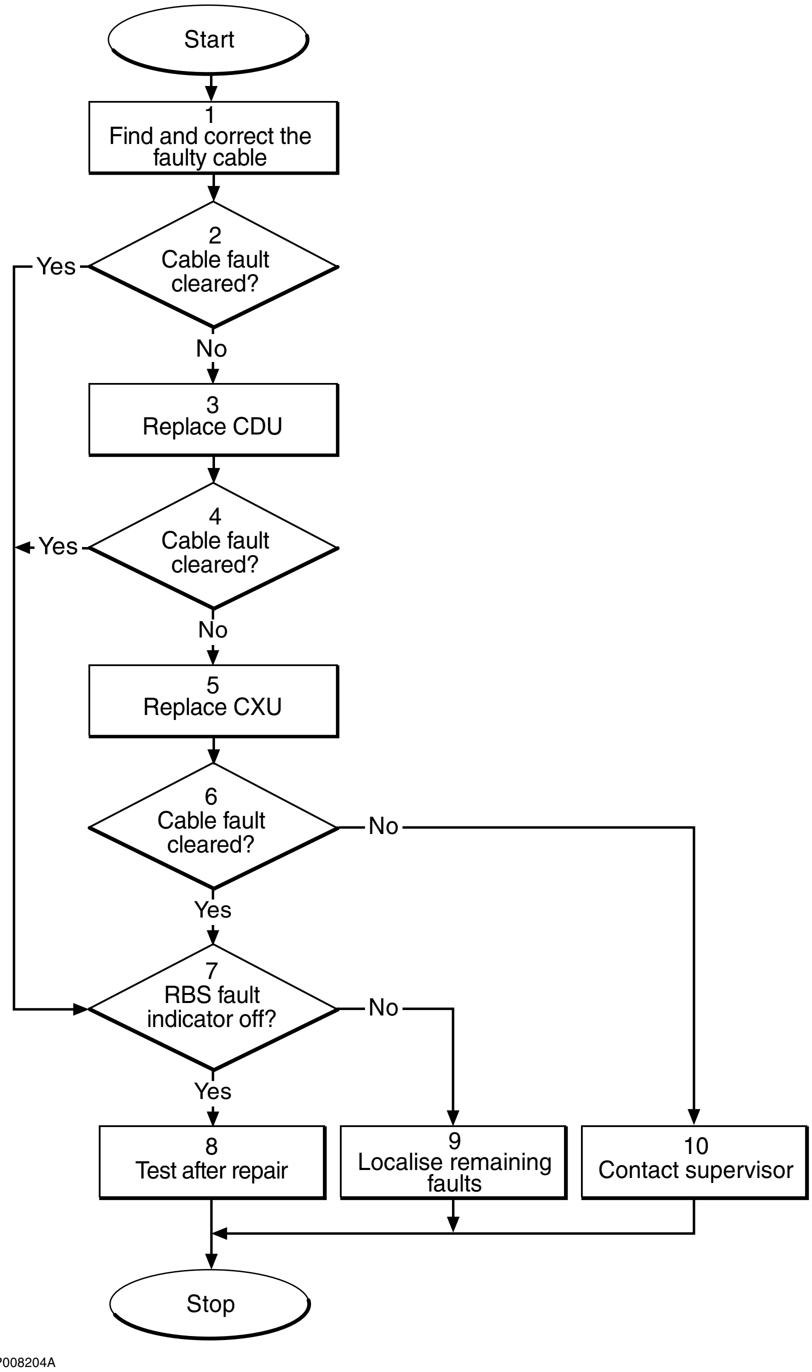


Figure 25 CDU_CXU_RXA cable and CDU_CXU_RXB cable fault

(1) Find and correct the faulty cable

1. Start the OMT.
2. In the **RBS 2000** menu, select **Connect** .
3. In the **Configuration** menu, select **Read IDB** and click **Yes** .
4. In the **Maintenance** menu, select **Display** and **Faulty RUs** to list all RUs that are faulty.
5. Localise the faulty RX cable.
6. Check that the cable is correctly connected at both ends. *See Chapter RF Connections.*
7. Check that the cable connectors are correctly inserted into the mating connectors in the CDU and the CXU.
8. If the fault does not disappear, replace the faulty cable.

(2) Cable fault cleared?

1. Use the monitor **Display Faulty RUs** in the OMT to list all RUs that are faulty.

   Has the cable fault been cleared?

Answer	Comment	Action
Yes	The cable fault is cleared.	Proceed to stage **(7)**
No	There is still a cable fault.	Proceed to stage **(3)**

(3) Replace CDU

1. Replace the CDU connected to the suspected cable. See instructions in *Section CDU Replacement* in *Chapter RBS Field Repair* .

(4) Cable fault cleared?

1. Use the monitor **Display Faulty RUs** in the OMT to list all RUs that are faulty.

   Has the cable fault been cleared?

Answer	Comment	Action
Yes	The cable fault is cleared.	Proceed to stage **(7)**
No	There is still a cable fault.	Proceed to stage **(5)**

(5) Replace CXU

1. Replace the CXU connected to the suspected cable. See instructions in *Section CXU Replacement* in *Chapter RBS Field Repair* .

(6) Cable fault cleared?

1. Use the monitor **Display Faulty RUs** in the OMT to list all RUs that are faulty.

   Has the cable fault been cleared?

Answer	Comment	Action
Yes	The cable fault is cleared.	Proceed to stage **(7)**
No	There is still a cable fault.	Proceed to stage **(10)**

(7) RBS fault indicator off?

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

   Is the RBS fault indicator off?

Answer	Comment	Action
Yes	There are no faults in the RBS.	Proceed to stage **(8)**
No	There is still one or more faults in the RBS.	Proceed to stage **(9)**

Note that the status of the RBS can also be checked with the OMT.

(8) Test after repair

1. Make a test call over the CDU concerned. Proceed to *Section Test Call* in *Chapter Test after Repair* .
2. Proceed to *Section Before Leaving the Site* in *Chapter Concluding Routines* .

(9) Localise remaining faults

1. Use the monitor **Display Faulty RUs** in the OMT to list all RUs that are faulty.
2. Localise the faults that are listed by the OMT. *See respective RU section in this chapter* .

(10) Contact supervisor

1. If the fault remains, contact the supervisor or manager, who will take further action.

4.10 CDU_RX in Cable

This section describes how to localise CDU_RX in cable fault in the RBS.

Note: The fault text is always *CDU_RX in cable* . For simplicity reasons, the expression *Cable fault* is used in the procedure below.

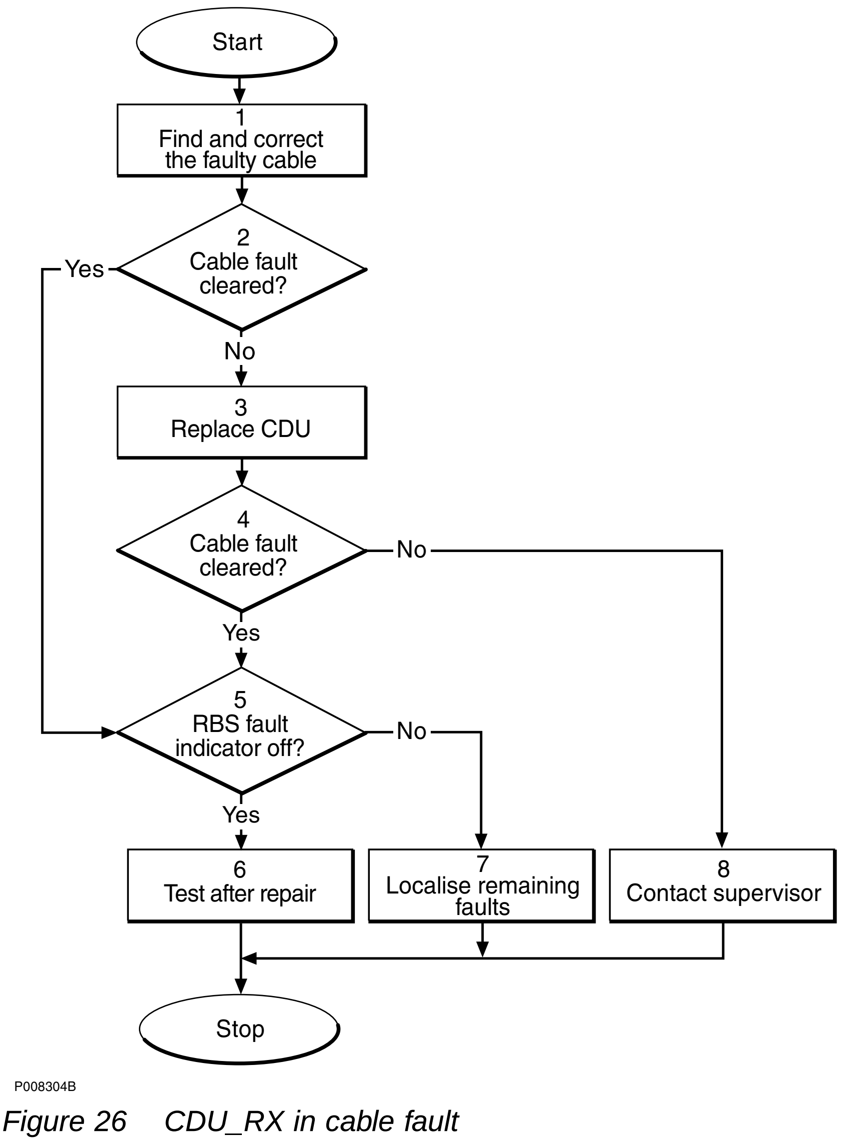


Figure 26 CDU_RX in cable fault

(1) Find and correct the faulty cable

1. Start the OMT.
2. In the **RBS 2000** menu, select **Connect** .
3. In the **Configuration** menu, select **Read IDB** and click **Yes** .

4. In the **Maintenance** menu, select **Display** and **Faulty RUs** to list all RUs that are faulty.

5. Look 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.

6. Check that the correct cable is connected to the CDU. *See Chapter CDU Antenna Configurations* .

7. Check that the cable connector is correctly inserted into the connector on the CDU.

8. If the fault does not disappear, replace the faulty cable.

(2) Cable fault cleared?

1. Use the monitor **Display Faulty RUs** in the OMT to list all RUs that are faulty.

   Has the cable fault disappeared?

Answer	Comment	Action
Yes	The cable fault is cleared.	Proceed to stage **(5)**
No	There is still a cable fault.	Proceed to stage **(3)**

(3) Replace CDU

1. Replace the CDU connected to the suspected cable. See instructions in *Section CDU Replacement* in *Chapter RBS Field Repair* .

(4) Cable fault cleared?

1. Use the monitor **Display Faulty RUs** in the OMT to list all RUs that are faulty.

   Has the cable fault disappeared?

Answer	Comment	Action
Yes	The cable fault is cleared.	Proceed to stage **(5)**
No	There is still a cable fault.	Proceed to stage **(8)**

(5) RBS fault indicator off?

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

   Is the RBS fault indicator off?

Answer	Comment	Action
Yes	There are no faults in the RBS.	Proceed to stage **(6)**
No	There is still one or more faults in the RBS.	Proceed to stage **(7)**

Note that the status of the RBS can also be checked with the OMT.

(6) Test after repair

1. Make a test call over the CDU concerned. Proceed to *Section Test Call* in *Chapter Test after Repair* .

2. Proceed to *Section Before Leaving the Site* in *Chapter Concluding Routines* .

(7) Localise remaining faults

1. Use the monitor **Display Faulty RUs** in the OMT to list all RUs that are faulty.

2. Localise the faults that are listed by the OMT. *See respective RU section in this chapter* .

(8) Contact supervisor

1. If the fault remains, contact the supervisor or manager, who will take further action.

4.11 CXU_DC Cable

This section describes how to localise a CXU_DC cable fault in the RBS.

Note: The fault text is always *CXU_DC in cable* . For simplicity, the expression *Cable fault* is used in the procedure below.

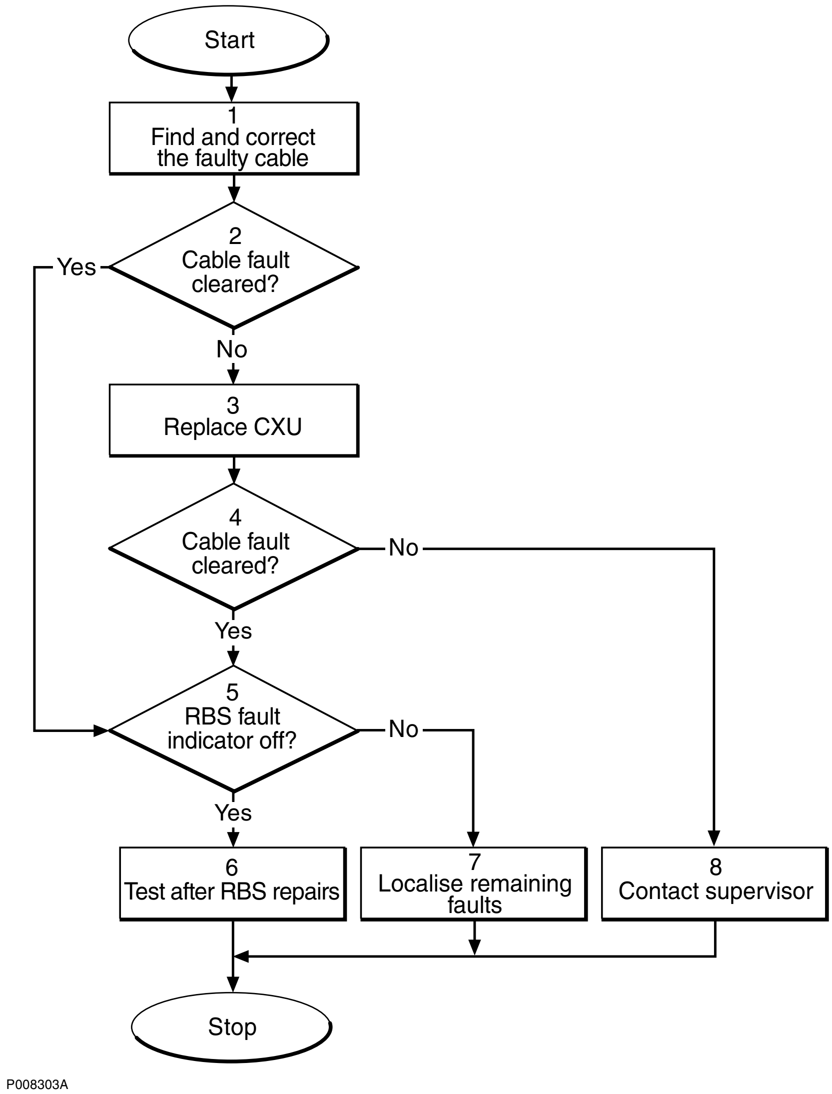


Figure 27 CXU_DC cable fault

(1) Find and correct the faulty cable

1. Start the OMT.
2. In the **RBS 2000** menu, select **Connect** .
3. In the **Configuration** menu, select **Read IDB** and click **Yes** .
4. In the **Maintenance** menu, select **Display** and **Faulty RUs** to list all RUs that are faulty.
5. Localise the faulty CXU_DC cable.

6. Check that the cable is correctly connected at both ends. *See Chapter Non-RF Connections* .

7. Check that the cable connector as well as the corresponding connector in the CXU are not burned or mechanically damaged.

8. Check that the cable connector is correctly inserted into the mating connector in the CXU.

9. If the fault does not disappear, replace the faulty cable.

(2) Cable fault cleared?

1. Use the monitor **Display Faulty RUs** in the OMT to list all RUs that are faulty.

   Has the cable fault disappeared?

Answer	Comment	Action
Yes	The cable fault is cleared.	Proceed to stage **(5)**
No	There is still a cable fault.	Proceed to stage **(3)**

(3) Replace CXU

1. Replace the CXU connected to the suspected cable. See instructions in *Section CXU Replacement* in *Chapter RBS Field Repair* .

(4) Cable fault cleared?

1. Use the monitor **Display Faulty RUs** in the OMT to list all RUs that are faulty.

   Has the cable fault disappeared?

Answer	Comment	Action
Yes	The cable fault is cleared.	Proceed to stage **(5)**
No	There is still a cable fault.	Proceed to stage **(8)**

(5) RBS fault indicator off?

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

   Is the RBS fault indicator off?

Answer	Comment	Action
Yes	There are no faults in the RBS.	Proceed to stage **(6)**
No	There is still one or more faults in the RBS.	Proceed to stage **(7)**

Note that the status of the RBS can also be checked with the OMT.

(6) Test after repair

1. Make test calls over all TRUs. Proceed to *Section Test Call* in *Chapter Test after Repair* .

2. Proceed to *Section Before Leaving the Site* in *Chapter Concluding Routines* .

(7) Localise remaining faults

1. Use the monitor **Display Faulty RUs** in the OMT to list all RUs that are faulty.

2. Localise the faults that are listed by the OMT. *See respective RU section in this chapter* .

(8) Contact supervisor

1. If the fault remains, contact the supervisor or manager, who will take further action.

4.12 CXU_dTRU_RXA Cable and CXU_dTRU_RXB Cable

This section describes how to localise CXU_dTRU_RXA cable and CXU_dTRU_RXB cable fault in the RBS.

Note: The fault text is always *CXU_dTRU_RXA cable and CXU_dTRU_RXB cable* . For simplicity, the expression *Cable fault* is used in the procedure below.

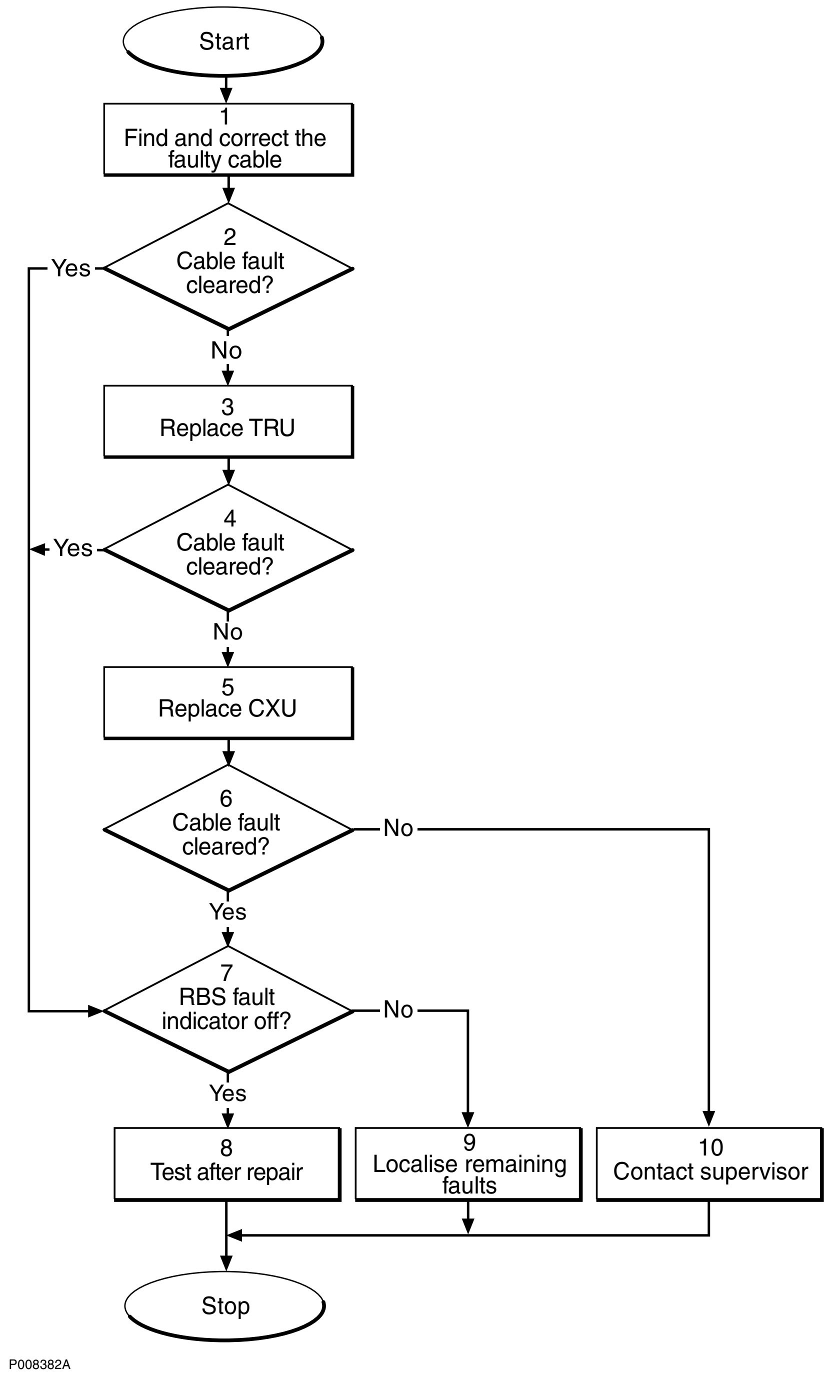


Figure 28 CXU_dTRU_RXA cable and CXU_dTRU_RXB cable fault

(1) Find and correct the faulty cable

1. Start the OMT.
2. In the **RBS 2000** menu, select **Connect** .

3. In the **Configuration** menu, select **Read IDB** and click **Yes** .

4. In the **Maintenance** menu, select **Display** and **Faulty RUs** .

5. Use the monitor **Display Faulty RUs** in the OMT to list all RUs that are faulty.

6. Localise the faulty RX cable.

7. Check that the cable is correctly connected in both ends. *See Chapter RF Connections* .

8. Check that the cable connectors are correctly inserted into the mating connectors in the dTRU and the CXU.

9. If the fault does not disappear, replace the faulty cable.

(2) Cable fault cleared?

1. Use the monitor **Display Faulty RUs** in the OMT to list all RUs that are faulty.

   Has the cable fault been cleared?

Answer	Comment	Action
Yes	The cable fault is cleared.	Proceed to stage **(7)**
No	There is still a cable fault.	Proceed to stage **(3)**

(3) Replace TRU

1. Replace the TRU (dTRU) connected to the suspected cable. See instructions in *Section TRU Replacement* in *Chapter RBS Field Repair* .

(4) Cable fault cleared?

1. Use the monitor **Display Faulty RUs** in the OMT to list all RUs that are faulty.

   Has the cable fault been cleared?

Answer	Comment	Action
Yes	The cable fault is cleared.	Proceed to stage **(7)**
No	There is still a cable fault.	Proceed to stage **(5)**

(5) Replace CXU

1. Replace the CXU connected to the suspected cable. See instructions in *Section CXU Replacement* in *Chapter RBS Field Repair* .

(6) Cable fault cleared?

1. Use the monitor **Display Faulty RUs** in the OMT to list all RUs that are faulty.

   Has the cable fault been cleared?

Answer	Comment	Action
Yes	The cable fault is cleared.	Proceed to stage **(7)**
No	There is still a cable fault.	Proceed to stage **(10)**

(7) RBS fault indicator off?

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

   Is the RBS fault indicator off?

Answer	Comment	Action
Yes	There are no faults in the RBS.	Proceed to stage **(8)**
No	There is still one or more faults in the RBS.	Proceed to stage **(9)**

Note that the status of the RBS can also be checked with the OMT.

(8) Test after repair

1. Make a test call over the CDU concerned. Proceed to *Section Test Call* in *Chapter Test after Repair* .
2. Proceed to *Section Before Leaving the Site* in *Chapter Concluding Routines* .

(9) Localise remaining faults

1. Use the monitor **Display Faulty RUs** in the OMT to list all RUs that are faulty.
2. Localise the faults that are listed by the OMT. *See respective RU section in this chapter.*

(10) Contact supervisor

1. If the fault remains, contact the supervisor, or manager, who will take further action.

4.13 DXU

This section describes how to localise DXU fault in the RBS.

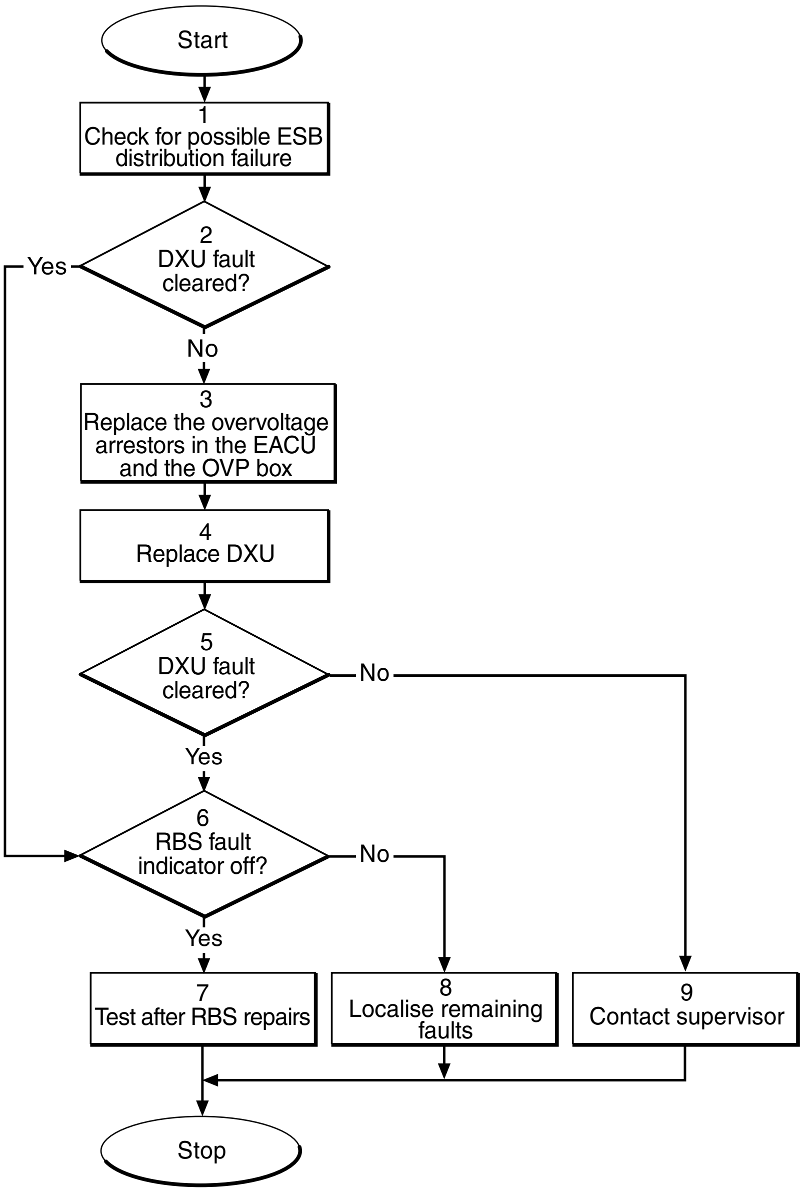


Figure 29 DXU fault

(1) Check for possible ESB distribution failure

1. Is TG synchronisation used to connect the RBS to another RBS via an ESB cable?

   If there is no such connection, proceed directly to stage **(2)** below. Otherwise, continue below.

2. Start the OMT.

3. In the **RBS 2000** menu, select **Connect** .

4. In the **Configuration** menu, select **Read IDB** and click **Yes** .

5. In the **Maintenance** menu, select **Monitor...** .

6. In the Monitor window, select **RBS** and click **Run** .

7. In the RBS Monitor Setup window, select **Fault Status** and click on **Start Monitor** .

8. Close the Monitor window.

9. Check for the presence of the following fault:

   • SO CF I2A:44 – ESB distribution failure

10. If the fault indicated in step 7 above is found, do the following:

    • Check all connectors and cables in the connection between ESB connectors on the DXUs in the two cabinets.

    • If the external ESB cable is suspected to be faulty, replace the cable. See instructions in *Section ESB cable Replacement* in *Chapter RBS Field Repair* .

(2) DXU fault cleared?

1. Check the red Fault and the green Operational indicators on the DXU.

   Is the Fault indicator off and the Operational indicator on?

Answer	**Comment**	**Action**
Yes	The DXU fault is cleared.	Proceed to stage **(6)**
No	There is still a DXU fault.	Proceed to stage **(3)**

Note that the status of the DXU can also be checked with the OMT.

(3) Replace the overvoltage arrestors in the EACU and the OVP box

Note: When a fault is suspected in the DXU, the overvoltage arrestors in the EACU and the OVP functions of the DF must be replaced. If the DXU is faulty, due to surges caused by lightning, then the overvoltage arrestors in the EACU and the OVP functions of the DF are likely to be faulty.

1. Replace the overvoltage arrestors in the EACU functions of the DF.

2. If the PCM connection or ESB cable is routed via the DF, then the overvoltage arrestors in the OVP functions of the DF must be replaced.

(4) Replace DXU

1. Replace the faulty DXU according to instructions in *Section DXU Replacement* in *Chapter RBS Field Repair* .

(5) DXU fault cleared?

1. Check the red Fault and the green Operational indicators on the DXU.

   Is the Fault indicator off and the Operational indicator on?

Answer	Comment	Action
Yes	The DXU fault is cleared.	Proceed to stage **(6)**
No	There is still a DXU fault.	Proceed to stage **(9)**

Note that the status of the DXU can also be checked with the OMT.

(6) RBS fault indicator off?

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

   Is the RBS 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)**

Note that the status of the RBS can also be checked with the OMT.

(7) Test after repair

1. Make a test call over all TRUs. Proceed to *Section Test Call* in *Chapter Test after Repair* .

2. Proceed to *Section Before Leaving the Site* in *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. Localise the faults that are listed by the OMT. *See respective RU section in this chapter* .

(9) Contact supervisor

1. If the fault remains, contact the supervisor or manager, who will take further action.

4.14 EPC Bus/Power Communication Loop

This section describes how to localise EPC Bus/Power Communication Loop fault in the RBS.

The EPC bus 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 fault EPC bus/Power Communication Loop is set in the RU map.

Possible faults are a faulty RU or a faulty fibre optic cable. The indicator EPC bus fault will be lit on the DXU and on those RUs that have lost communication with the EPC function of the DXU.

Note: The fault text is always *EPC bus/Power communication loop* . For simplicity reasons, the expression *EPC bus fault* is used in the procedure below.

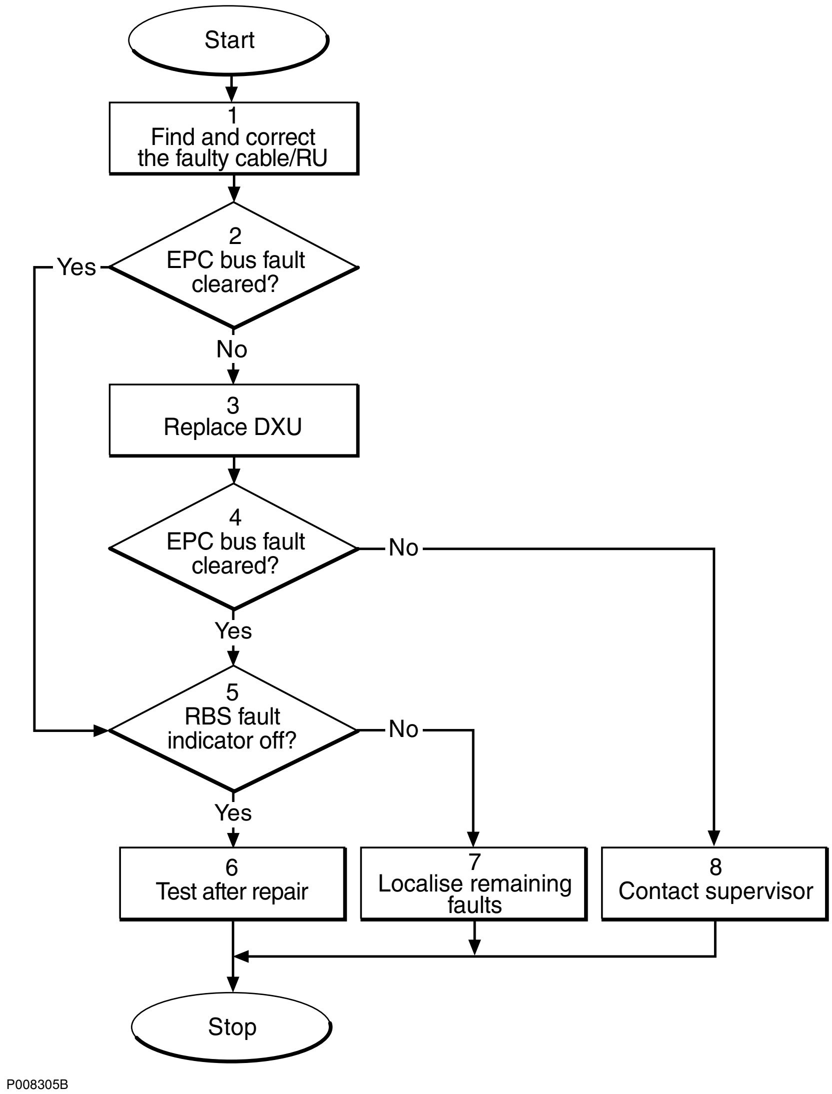


Figure 30 EPC bus/Power communication loop fault

(1) Find and correct the faulty cable/RU

1. Locate the fault, by using bypassing of the suspected faulty units in order to get a closed loop. When the loop is closed, the EPC bus fault indicators on all RUs within the loop will be extinguished.

   Bypassing means that, for example, the opto bus cable from TD output on PSU 1 goes directly to RD input on PSU 3.

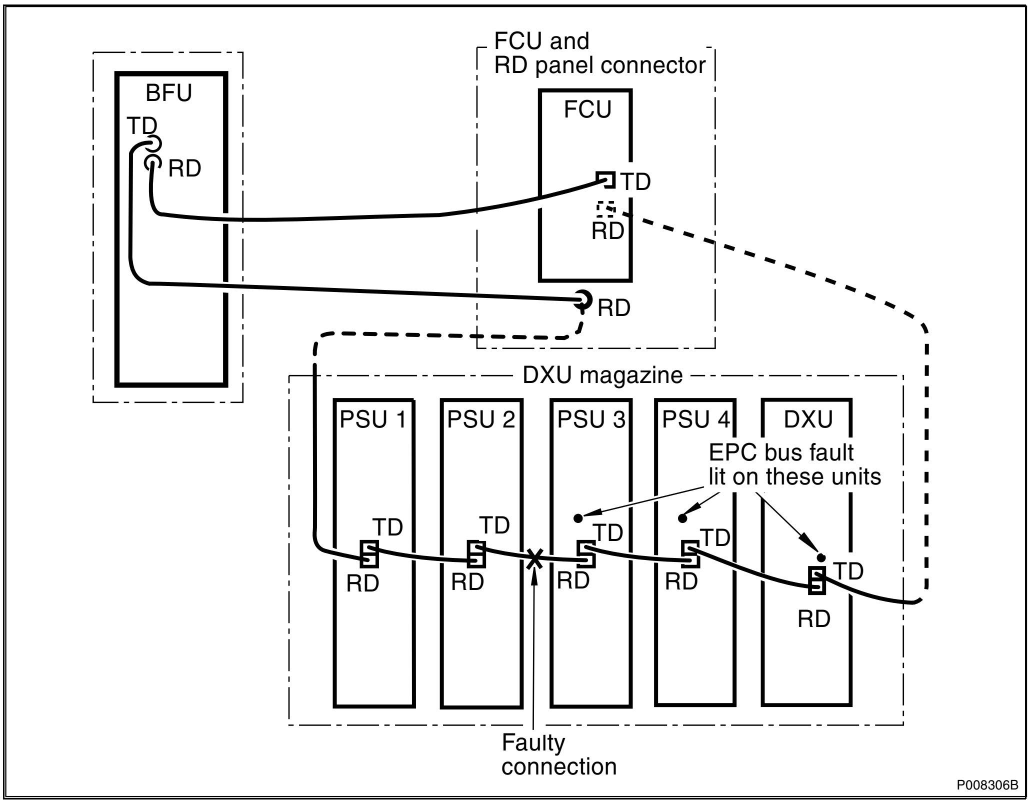


Figure 31 Example of a fault situation in the power communication loop

2. Repeat the bypass until the faulty RU or cable is identified.

3. • If found to be faulty, replace the EPC bus cable.

   • If found to be faulty, replace any faulty RU in the RBS cabinet according to instructions in *Section PSU Replacement* , *FCU Replacement* or *DXU Replacement* in *Chapter RBS Field Repair* .

   • If found to be faulty, replace the BFU in the external battery system. See manufacturer's documentation.

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

(2) EPC bus fault cleared?

1. Check the yellow indicator EPC bus fault on each RU connected to the EPC bus.

   Is the indicator EPC bus fault off on each RU connected to the EPC bus?

Answer	Comment	Action
Yes	The EPC bus fault is cleared.	Proceed to stage **(5)**
No	There is still an EPC bus fault.	Proceed to stage **(3)**

Note that the status of the EPC bus can also be checked with the OMT.

(3) Replace DXU

1. Replace the faulty DXU according to instructions in *Section DXU Replacement* in *Chapter RBS Field Repair* .

(4) EPC bus fault cleared?

1. Check the yellow indicator EPC bus fault on all RUs connected to the EPC bus.

   Is the indicator EPC bus fault off on all RUs connected to the EPC bus?

Answer	Comment	Action
Yes	The EPC bus fault is cleared.	Proceed to stage **(5)**
No	There is still an EPC bus fault.	Proceed to stage **(8)**

Note that the status of the EPC bus can also be checked with the OMT.

(5) RBS fault indicator off?

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

   Is the RBS fault indicator off?

Answer	Comment	Action
Yes	There are no faults in the RBS.	Proceed to stage **(6)**
No	There is still one or more faults in the RBS.	Proceed to stage **(7)**

Note that the status of the RBS can also be checked with the OMT.

(6) Test after repair

1. (Only if the DXU has been replaced) Make test calls over all TRUs. Proceed to *Section Test Call* in *Chapter Test after Repair* .

2. Proceed to *Section Before Leaving the Site* in *Chapter Concluding Routines* .

(7) Localise remaining faults

1. Use the monitor **Display Faulty RUs** in the OMT to list all RUs that are faulty.

2. Localise the faults that are listed by the OMT. *See respective RU section in this chapter.*

(8) Contact supervisor

1. If the fault remains, contact the supervisor or manager, who will take further action.

4.15 External Alarms

The instructions in this section are used when there is a fault in the external alarm system.

Note: This procedure is repeated for each triggered alarm.

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 Ext alarm on the DXU will be lit if any external alarms are triggered. When a fault in the external alarm system occurs, the OMT is used to check the alarm status and the alarm set-up.

Two cases are covered in the following external alarm fault localisation procedure:

- A false external alarm is triggered.
- An expected external alarm that should be triggered, is not.

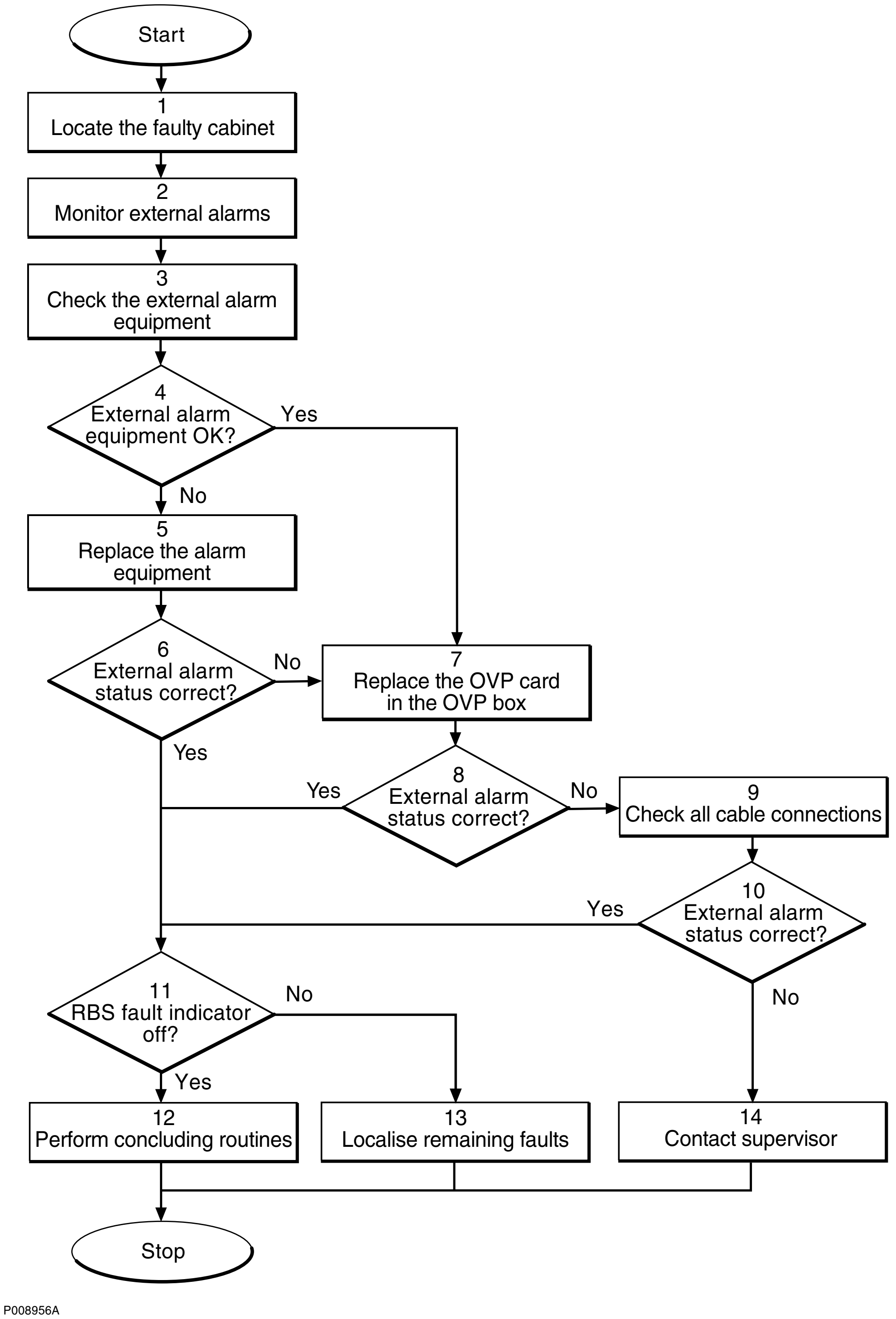


Figure 32 External alarm fault

(1) Locate the faulty cabinet

1. Locate the faulty cabinet according to work order information.

(2) Monitor external alarms

Use the OMT to monitor the external alarms.

1. Start the OMT.
2. In the **RBS 2000** menu, select **Connect** .
3. In the **Configuration** menu, select **Read IDB** and click **Yes** .
4. In the **Object** menu, click on the **Alarm Inlets** icon.
5. In the **Maintenance** menu, select **Monitor...** .
6. In the new window, select **External Alarm Status** and click on **Start Monitor** .

(3) Check the external alarm equipment

1. Disconnect the external alarm equipment cables from the DF and measure the resistance between them with a multimeter.

   In the triggered state, a closing alarm sensor should have a resistance close to zero, and a breaking alarm sensor should have infinite resistance.

(4) External alarm equipment OK?

Is the alarm equipment OK?

Answer	Comment	Action
Yes	The alarm equipment is OK.	Proceed to stage **(7)**
No	The alarm equipment is faulty.	Proceed to stage **(5)**

(5) Replace the alarm equipment

1. Replace the alarm equipment. *See supplier documentation* .

(6) External alarm status correct?

1. Use the OMT to monitor the external alarms.

If a false external alarm was triggered, the alarm should now have ceased in the OMT. An expected alarm that was not triggered should now appear in the OMT.

Is the alarm status correct?

Answer	Comment	Action
Yes	The external alarm status is correct.	Proceed to stage **(11)**
No	The external alarm status is still not correct.	Proceed to stage **(7)**

(7) Replace the OVP card in the OVP box

1. Replace the OVP card according to instructions in *Section OVP Card Replacement* in *Chapter RBS Field Repair* .

(8) External Alarm status correct?

1. Use the OMT to monitor the external alarms.

If a false external alarm was triggered, the alarm should now have ceased in the OMT. An expected alarm that was not triggered should now appear in the OMT.

Is the alarm status correct?

Answer	Comment	Action
Yes	The external alarm status is correct.	Proceed to stage **(11)**
No	The external alarm status is still not correct.	Proceed to stage **(9)**

(9) Check all cable connections

1. Check that the external alarm cable from the RBS to the DF is properly connected.

2. Check that all cable connections in the DF are properly connected.

(10) External Alarm status correct?

1. Use the OMT to monitor the external alarms.

If a false external alarm was triggered, the alarm should now have ceased in the OMT. An expected alarm that was not triggered should now appear in the OMT.

Is the alarm status correct?

Answer	Comment	Action
Yes	The external alarm status is correct.	Proceed to stage **(11)**
No	The external alarm status is still not correct.	Proceed to stage **(14)**

(11) RBS fault indicator off?

1. Check that the RBS fault indicator on the DXU is off.

Is the RBS fault indicator off?

Answer	Comment	Action
Yes	There are no faults in the RBS.	Proceed to stage **(12)**
No	There is still one or more faults in the RBS.	Proceed to stage **(13)**

(12) Perform concluding routines

1. Proceed to *Section Before Leaving the Site* in *Chapter Concluding Routines* .

(13) Localise remaining faults

1. In the **Maintenance** menu, select **Display** and **Faulty RUs** .

2. Localise the faults listed by the OMT. *See respective RU section in this chapter.*

(14) Contact supervisor

1. If the fault remains, contact the supervisor or manager, who will take further action.

4.16 Fan

This section describes how to localise a Fan fault in the RBS.

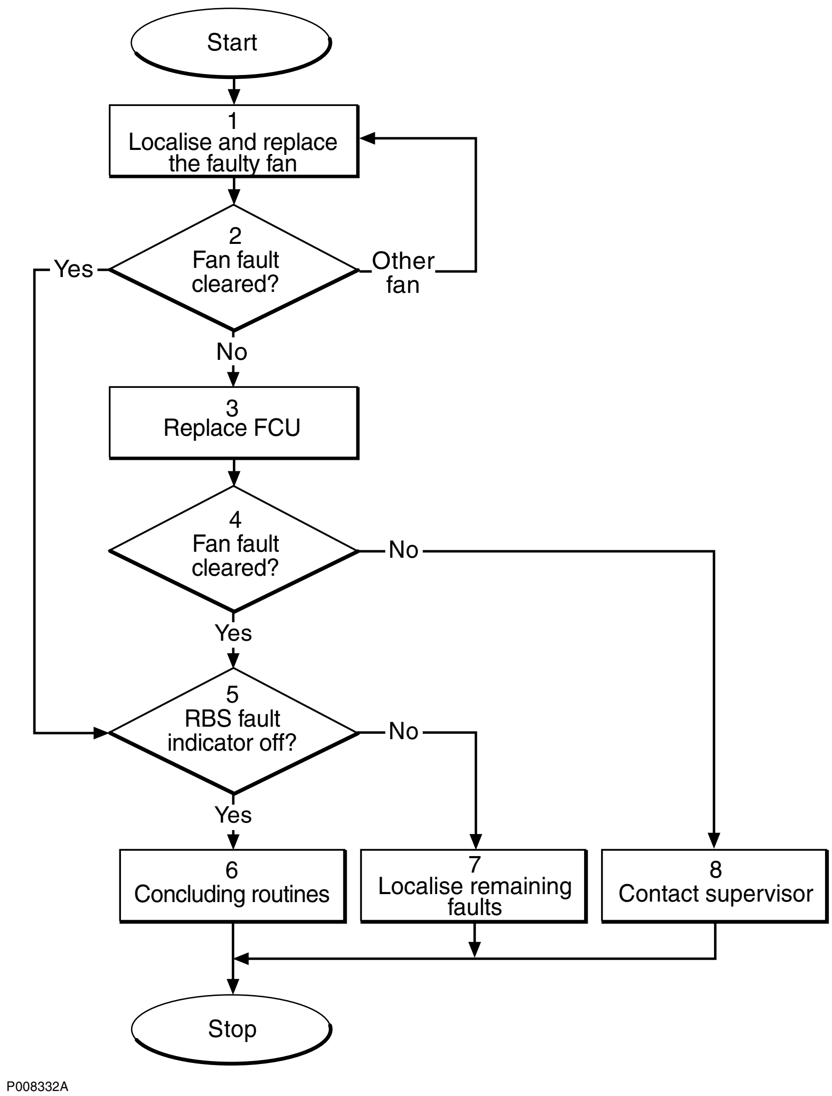


Figure 33 Fan fault

(1) Localise and replace the faulty fan

1. Check the FCU to find which fan is indicated as faulty.

2. Replace the faulty fan. See instructions in *Section Fan Replacement* in *Chapter RBS Field Repair* .

(2) Fan fault cleared?

1. Check the red Fan Fault indicators on the FCU.

   Are the Fan Fault indicators off on the FCU?

Answer	Comment	Action
Yes	The Fan fault is cleared.	Proceed to stage **(5)**
No	The same fan is indicated as faulty.	Proceed to stage **(3)**
Other fan	Another fan is indicated as faulty.	Go back to stage **(1)**

Note that the status of the fans can also be checked with the OMT.

(3) Replace FCU

1. Replace the FCU according to instructions in *Section FCU Replacement* in *Chapter RBS Field Repair* .

(4) Fan fault cleared?

1. Check the red Fan Fault indicators on the FCU.

   Are the Fan Fault indicators off on the FCU?

Answer	Comment	Action
Yes	The Fan fault is cleared.	Proceed to stage **(5)**
No	There is still a Fan fault.	Proceed to stage **(8)**

Note that the status of the fans can also be checked with the OMT.

(5) RBS fault indicator off?

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

   Is the RBS fault indicator off?

Answer	Comment	Action
Yes	There are no faults in the RBS.	Proceed to stage **(6)**
No	There is still one or more faults in the RBS.	Proceed to stage **(7)**

Note that the status of the RBS can also be checked with the OMT.

(6) Concluding routines

1. Proceed to *Section Before Leaving the Site* in *Chapter Concluding Routines* .

(7) Localise remaining faults

1. Use the monitor **Display Faulty RUs** in the OMT to list all RUs that are faulty.
2. Localise the faults that are listed by the OMT. *See respective RU section in this chapter* .

(8) Contact supervisor

1. If the fault remains, contact the supervisor or manager, who will take further action.

4.17 FCU

This section describes how to localise FCU fault in the RBS.

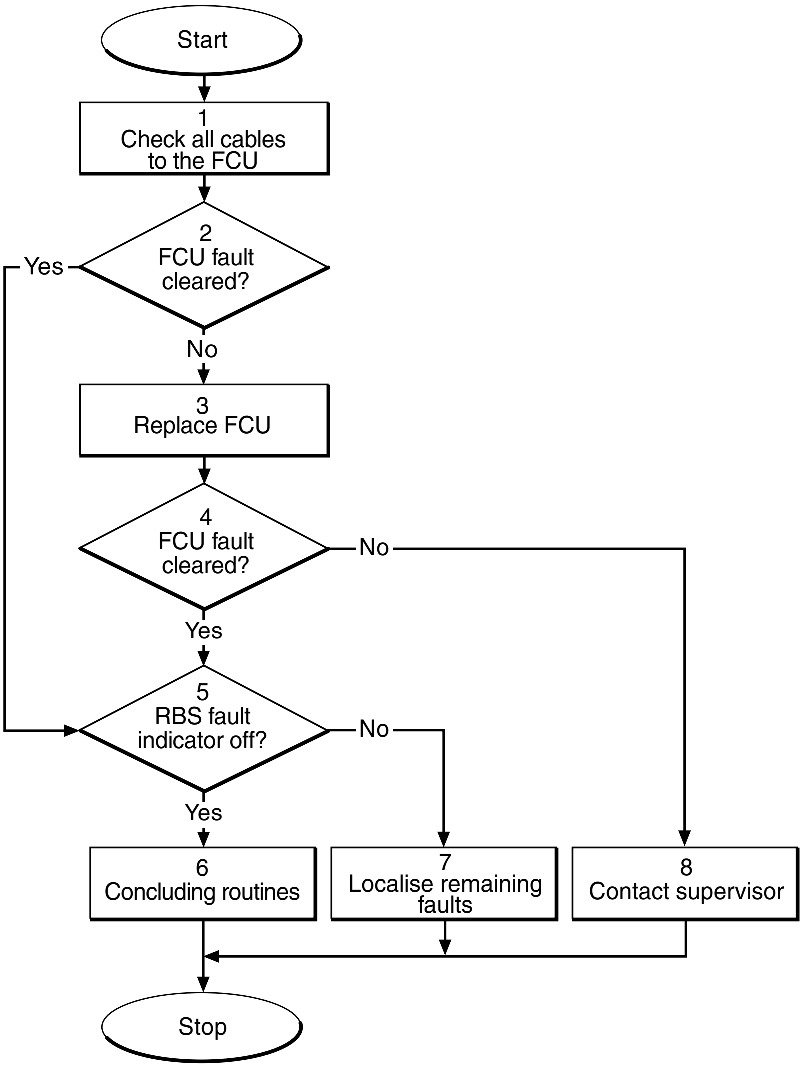


Figure 34 FCU fault

(1) Check all cables to the FCU

1. Check that all cables to the FCU are correctly connected and free from damages.

2. Replace any faulty cable to the FCU.

(2) FCU fault cleared?

1. Check the red Fault indicators on the FCU.

   Are the Fault indicators off on the FCU?

Answer	Comment	Action
Yes	The FCU fault is cleared.	Proceed to stage **(5)**
No	There is still an FCU fault.	Proceed to stage **(3)**

Note that the status of the fans can also be checked with the OMT.

(3) Replace FCU

1. Replace the FCU according to instructions in *Section FCU Replacement* in *Chapter RBS Field Repair* .

(4) Fan fault cleared?

1. Check the red Fan Fault indicators on the FCU.

   Are the Fan Fault indicators off on the FCU?

Answer	Comment	Action
Yes	The FCU fault is cleared.	Proceed to stage **(5)**
No	There is still an FCU fault.	Proceed to stage **(8)**

Note that the status of the fans can also be checked with the OMT.

(5) RBS fault indicator off?

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

   Is the RBS fault indicator off?

Answer	Comment	Action
Yes	There are no faults in the RBS.	Proceed to stage **(6)**
No	There is still one or more faults in the RBS.	Proceed to stage **(7)**

Note that the status of the RBS can also be checked with the OMT.

(6) Concluding routines

1. Proceed to *Section Before Leaving the Site* in *Chapter Concluding Routines* .

(7) Localise remaining faults

1. Use the monitor **Display Faulty RUs** in the OMT to list all RUs that are faulty.

2. Localise the faults that are listed by the OMT. *See respective RU section in this chapter* .

(8) Contact supervisor

1. If the faults remains, contact the supervisor or manager, who will take further action.

4.18 Flash Card

This section describes how to localise Flash Card fault in the RBS.

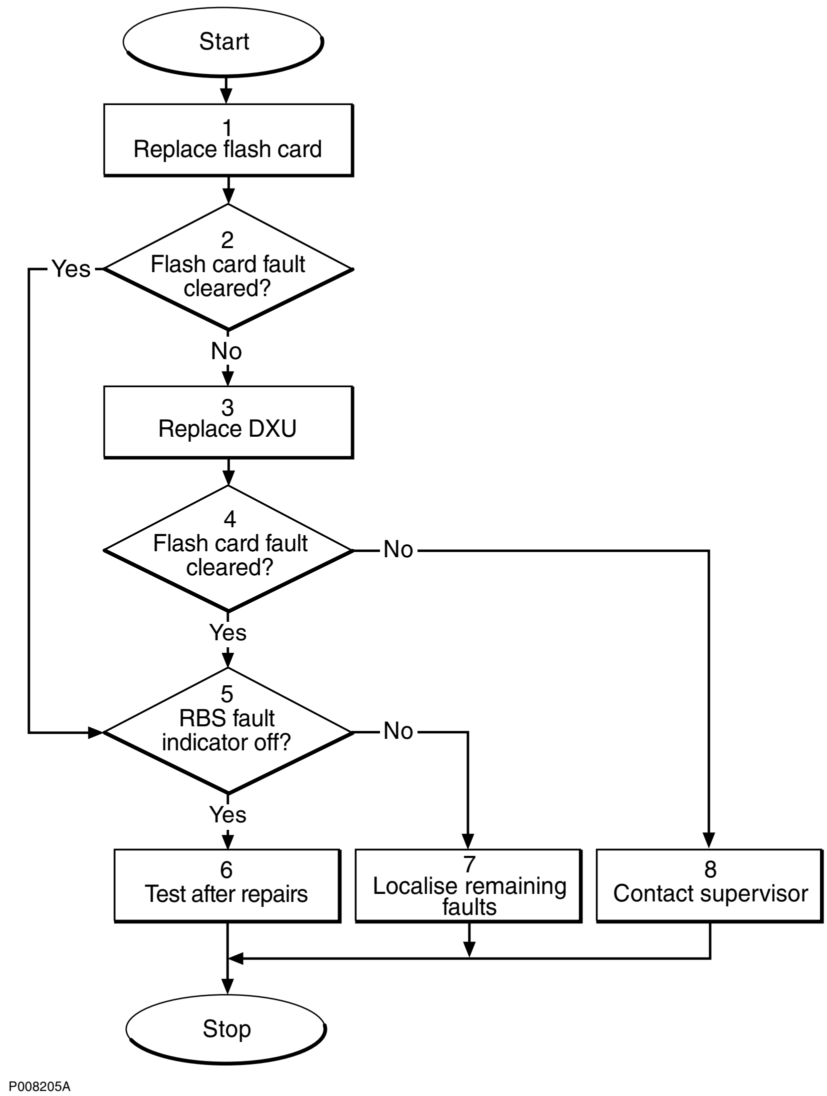


Figure 35 Flash card fault

(1) Replace flash card

1. Replace the flash card with a flash card containing the correct IDB. See instructions in *Section Flash Card Replacement* in *Chapter RBS Field Repair* .

(2) Flash card fault cleared?

1. Start the OMT.
2. In the **RBS 2000** menu, select **Connect** .
3. In the **Configuration** menu, select **Read IDB** and click **Yes** .
4. In the **Maintenance** menu, select **Monitor...** .
5. In the Monitor window, select **RBS** and click **Run** .
6. In the RBS Monitor Setup window, select **Fault Status** and click on **Start Monitor** .
7. Close the Monitor window.
8. Check that the Flash card fault is cleared.

   Is the fault cleared?

Answer	Comment	Action
Yes	The Flash card fault is cleared.	Proceed to stage **(5)**
No	There is still a Flash card fault.	Proceed to stage **(3)**

(3) Replace DXU

Replace the DXU. See instructions in *Section DXU Replacement* in *Chapter RBS Field Repair* .

(4) Flash card fault cleared?

1. Check with the OMT if the Flash card fault is cleared.

   Is the fault cleared?

Answer	Comment	Action
Yes	The Flash card fault is cleared.	Proceed to stage **(5)**
No	There is still a Flash card fault.	Proceed to stage **(8)**

(5) RBS fault indicator off?

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

Is the RBS fault indicator off?

Answer	Comment	Action
Yes	There are no faults in the RBS.	Proceed to stage **(6)**
No	There is still one or more faults in the RBS.	Proceed to stage **(7)**

Note that the status of the RBS can also be checked with the OMT.

(6) Test after repair

1. Make a test calls over all TRUs. Proceed to *Section Test Call* in *Chapter Test after Repair* .
2. Proceed to *Section Before Leaving the Site* in *Chapter Concluding Routines* .

(7) Localise remaining faults

1. Use the monitor **Display Faulty RUs** in the OMT to list all RUs that are faulty.
2. Localise the faults that are listed by the OMT. *See respective RU section in this chapter* .

(8) Contact supervisor

1. If the fault remains, contact the supervisor or manager, who will take further action.

4.19 PSU

This section describes how to localise PSU fault in the RBS.

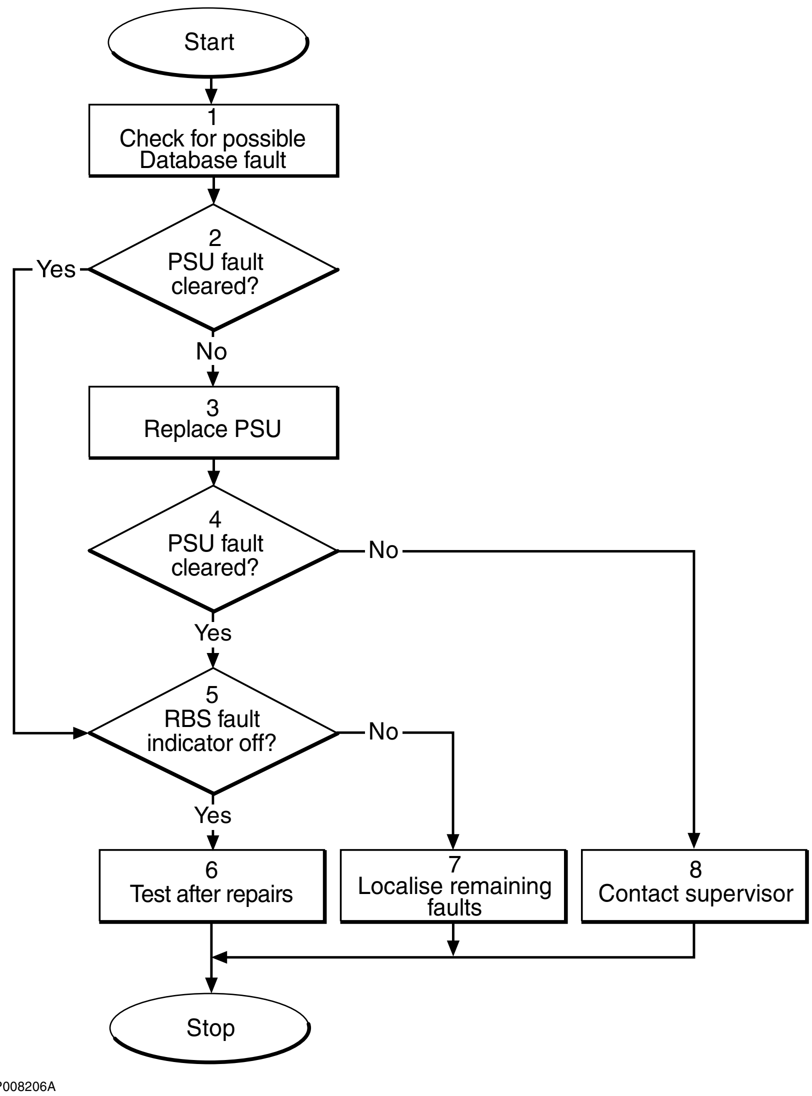


Figure 36 PSU fault

(1) Check for possible Database fault

1. Start the OMT.
2. In the **RBS 2000** menu, select **Connect** .
3. In the **Configuration** menu, select **Read IDB** and click **Yes** .
4. In the **Maintenance** menu, select **Display** and **Faulty RUs** to list all RUs that are faulty.
5. Check for the presence of any of the following faults:

   • SO CF I2A:36 – RU database corrupted

- SO CF I2A:46 – DB parameter fault

6. If any of the faults listed in step 2 above are found, reload the database. See instructions in *Section IDB Installation* in *Chapter RBS Field Repair* .

(2) PSU fault cleared?

1. Check the red Fault and the green Operational indicators on the PSU.

   Is the Fault indicator off and the Operational indicator on?

Answer	Comment	Action
Yes	The PSU fault is cleared.	Proceed to stage **(5)**
No	There is still a PSU fault.	Proceed to stage **(3)**

Note that the status of the PSU can also be checked with the OMT.

(3) Replace PSU

1. Replace the faulty PSU. See instructions in *Section PSU Replacement* in *Chapter RBS Field Repair* .

(4) PSU fault cleared?

1. Check the red Fault and the green Operational indicators on the PSU.

   Is the Fault indicator off and the Operational indicator on?

Answer	Comment	Action
Yes	The PSU fault is cleared.	Proceed to stage **(5)**
No	There is still a PSU fault.	Proceed to stage **(8)**

Note that the status of the PSU can also be checked with the OMT.

(5) RBS fault indicator off?

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

   Is the RBS fault indicator off?

Answer	Comment	Action
Yes	There are no faults in the RBS.	Proceed to stage **(6)**
No	There is still one or more faults in the RBS.	Proceed to stage **(7)**

Note that the status of the RBS can also be checked with the OMT.

(6) Test after repair

1. Proceed to *Section Before Leaving the Site* in *Chapter Concluding Routines* .

(7) Localise remaining faults

1. Use the monitor **Display Faulty RUs** in the OMT to list all RUs that are faulty.

2. Localise the faults that are listed by the OMT. *See respective RU section in this chapter* .

(8) Contact supervisor

1. If the fault remains, contact the supervisor or manager, who will take further action.

4.20 PSU DC Cable

This section describes how to localise PSU DC Cable fault in the RBS.

Note: The fault text is always *PSU DC cable* . For simplicity reasons, the expression *Cable fault* is used in the procedure below.

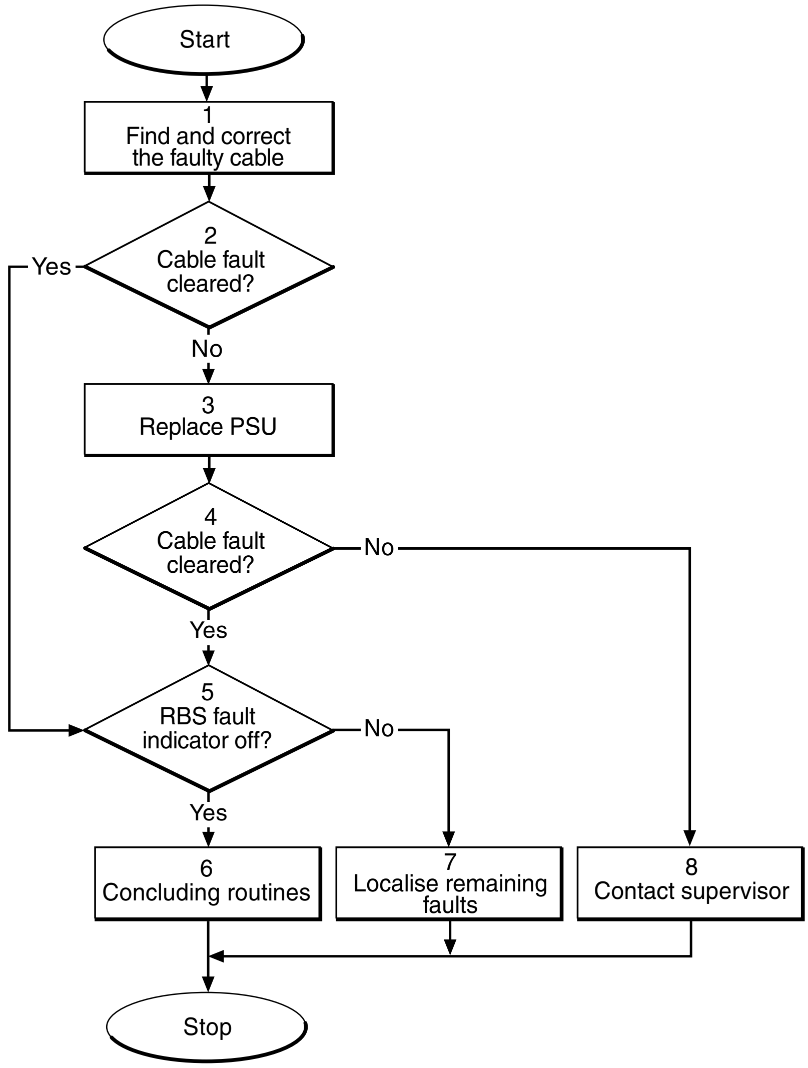


Figure 37 PSU DC cable fault

(1) Find and correct the faulty cable

1. Start the OMT.
2. In the **RBS 2000** menu, select **Connect** .
3. In the **Configuration** menu, select **Read IDB** and click **Yes** .
4. In the **Maintenance** menu, select **Display** and **Faulty RUs** to list all RUs that are faulty.
5. Localise the faulty PSU DC cable.

6. Check that the cable is correctly connected at both ends. *See Chapter Non-RF Connections* .

7. Check that the cable connector as well as the corresponding connector in the PSU are not burned or mechanically damaged.

8. Check that the cable connector is correctly inserted into the connector in the PSU.

9. If the fault does not disappear, replace the faulty cable.

(2) Cable fault cleared?

1. Use the monitor **Display Faulty RUs** in the OMT to list all RUs that are faulty.

   Has the fault PSU DC cable disappeared?

Answer	Comment	Action
Yes	The cable fault is cleared.	Proceed to stage **(5)**
No	There is still a cable fault.	Proceed to stage **(3)**

(3) Replace PSU

1. Replace the PSU connected to the suspected cable. See instructions in *Section PSU Replacement* in *Chapter RBS Field Repair* .

(4) Cable fault cleared?

1. Use the monitor **Display Faulty RUs** in the OMT to list all RUs that are faulty.

   Has the fault PSU DC cable disappeared?

Answer	Comment	Action
Yes	The cable fault is cleared.	Proceed to stage **(5)**
No	There is still a cable fault.	Proceed to stage **(8)**

(5) RBS fault indicator off?

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

   Is the RBS fault indicator off?

Answer	Comment	Action
Yes	There are no faults in the RBS.	Proceed to stage **(6)**
No	There is still one or more faults in the RBS.	Proceed to stage **(7)**

Note that the status of the RBS can also be checked with the OMT.

(6) Concluding routines

1. Proceed to *Section Before Leaving the Site* in *Chapter Concluding Routines* .

(7) Localise remaining faults

1. Use the monitor **Display Faulty RUs** in the OMT to list all RUs that are faulty.

2. Localise the faults that are listed by the OMT. *See respective RU section in this chapter.*

(8) Contact supervisor

1. If the fault remains, contact the supervisor or manager, who will take further action.

4.21 RBS DB

This section describes how to localise RBS DB fault in the RBS.

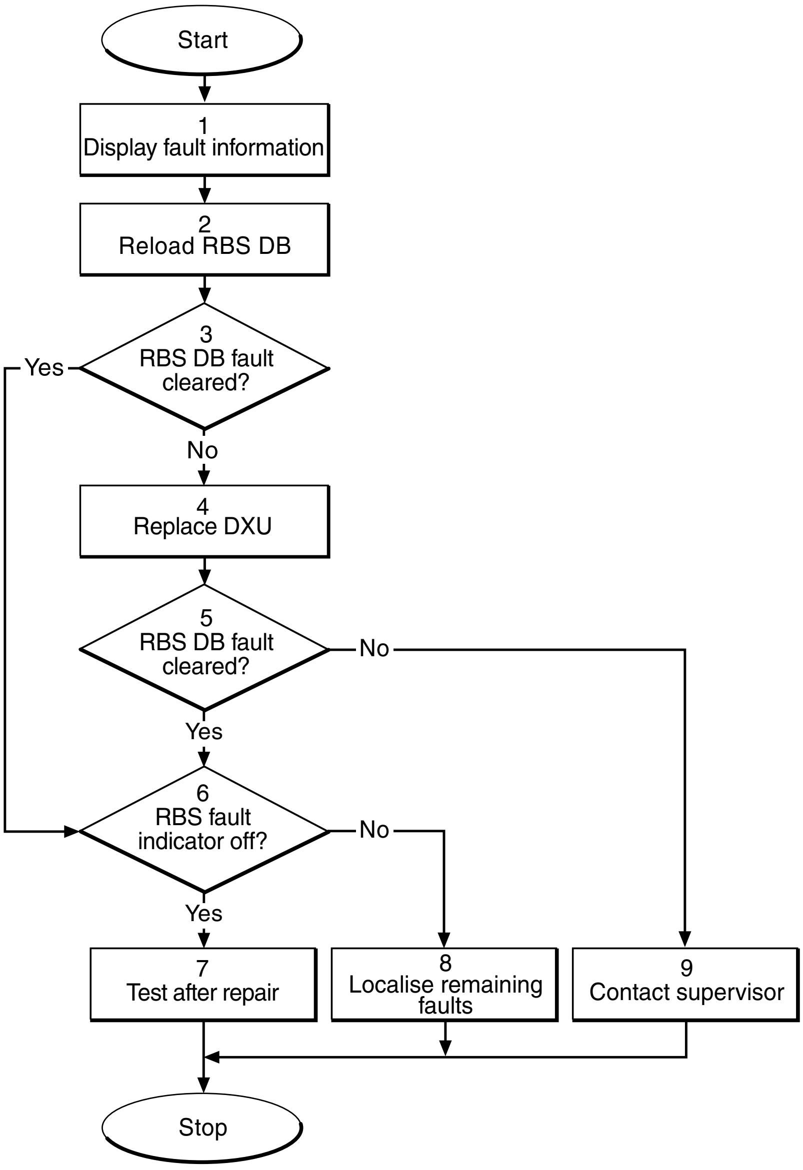


Figure 38 RBS DB fault

(1) Display fault information

1. Start the OMT.
2. In the **RBS 2000** menu, select **Connect** .
3. In the **Configuration** menu, select **Read IDB** and click **Yes** .
4. In the **Maintenance** menu, select **Display** and **Faulty RUs** to list all RUs that are faulty.

5. Check for the fault RBS DB.

(2) Reload RBS DB

1. Reload the database according to instructions in *Section IDB Parameters Settings* in *Chapter RBS Field Repair* .

(3) RBS DB fault cleared?

1. Use the monitor **Display Faulty RUs** in the OMT to list all RUs that are faulty.

2. Check for the fault RBS DB.

   Is the RBS DB fault cleared?

Answer	Comment	Action
Yes	The RBS DB fault is cleared.	Proceed to stage **(6)**
No	There is still a RBS DB fault.	Proceed to stage **(4)**

(4) Replace DXU

1. Replace the faulty DXU according to instructions in *Section DXU Replacement* in *Chapter RBS Field Repair* .

(5) RBS DB fault cleared?

1. Use the monitor **Display Faulty RUs** in the OMT to list all RUs that are faulty.

2. Check for the fault RBS DB.

   Is the RBS DB fault cleared?

Answer	Comment	Action
Yes	The RBS DB fault is cleared.	Proceed to stage **(6)**
No	There is still a RBS DB fault.	Proceed to stage **(9)**

(6) RBS fault indicator status?

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

   Is the RBS 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)**

Note that the status of the RBS can also be checked with the OMT.

(7) Test after repair

1. Proceed to *Section Before Leaving the Site* in *Chapter Test after Repair* .

(8) Localise remaining faults

1. Use the monitor **Display Faulty RUs** in the OMT to list all RUs that are faulty.

2. Localise the faults that are listed by the OMT. *See respective RU section in this chapter* .

(9) Contact the supervisor

1. If the fault remains, contact the supervisor or manager, who will take further action.

4.22 TMA

This section describes how to localise TMA fault.

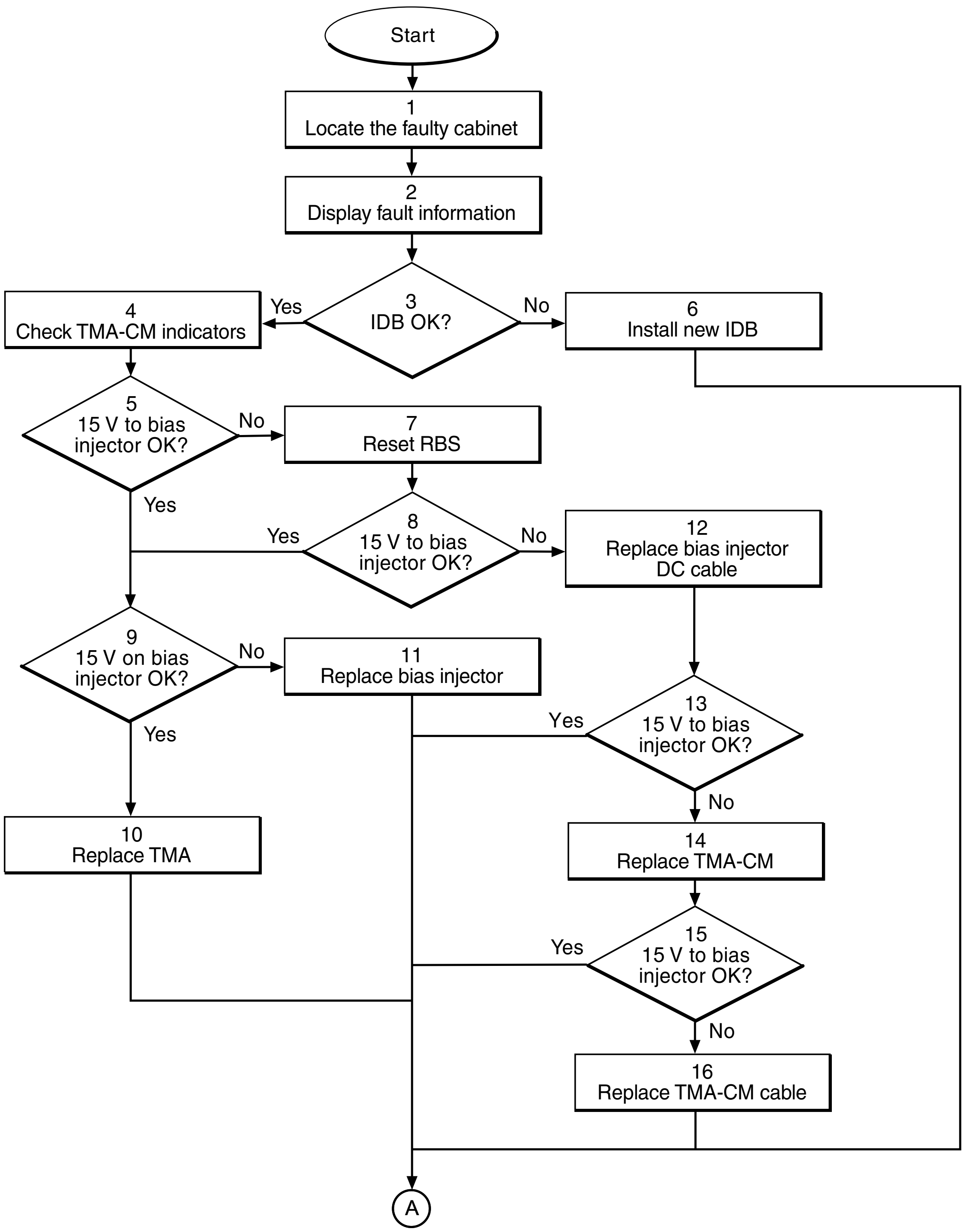


Figure 39 TMA fault (part 1 of 2)

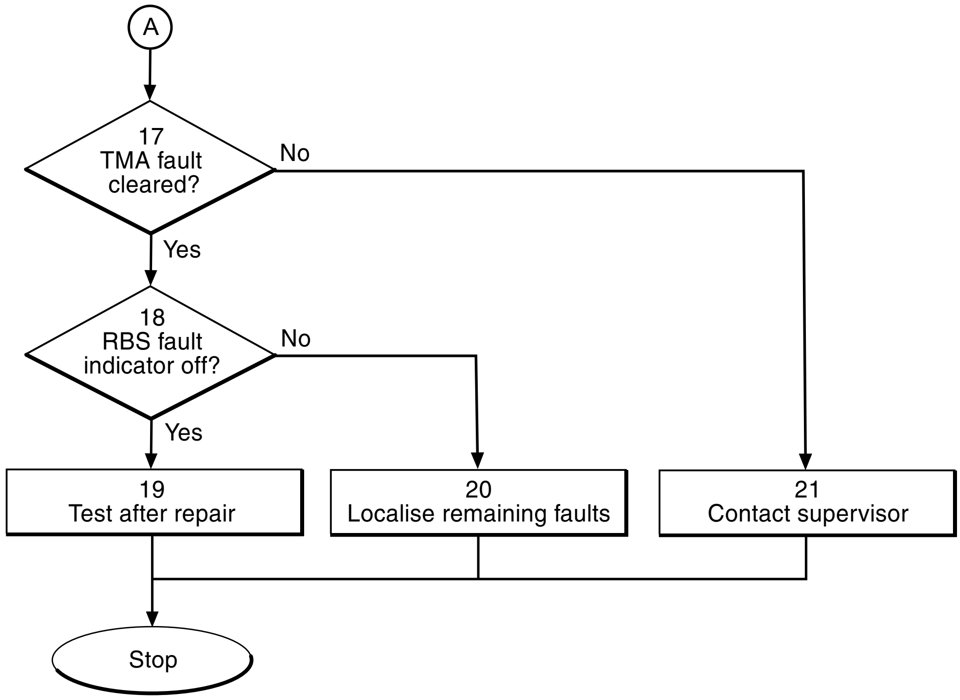


Figure 40 TMA fault (part 2 of 2)

(1) Locate the faulty cabinet

1. Locate the faulty cabinet according to work order information.

(2) Display fault information

Use the OMT to monitor the alarms.

1. Start the OMT.
2. In the **RBS 2000** menu, select **Connect** .
3. In the **Configuration** menu, select **Read IDB** and click **Yes** .
4. In the **Maintenance** menu, select **Monitor...** .
5. Select **Fault Status** and click on **Start Monitor** .

(3) IDB OK?

1. Ensure that the TMA (current supervision limits) and TMA-CM settings in the IDB are correct.

Is the IDB correct?

Answer	Comment	Action
Yes	The IDB is correct.	Proceed to stage **(4)**
No	The IDB is not correct.	Proceed to stage **(6)**

(4) Check TMA-CM indicators

1. Check the indicators on the TMA-CM to see which TMA is faulty.

(5) 15 V to bias injector OK?

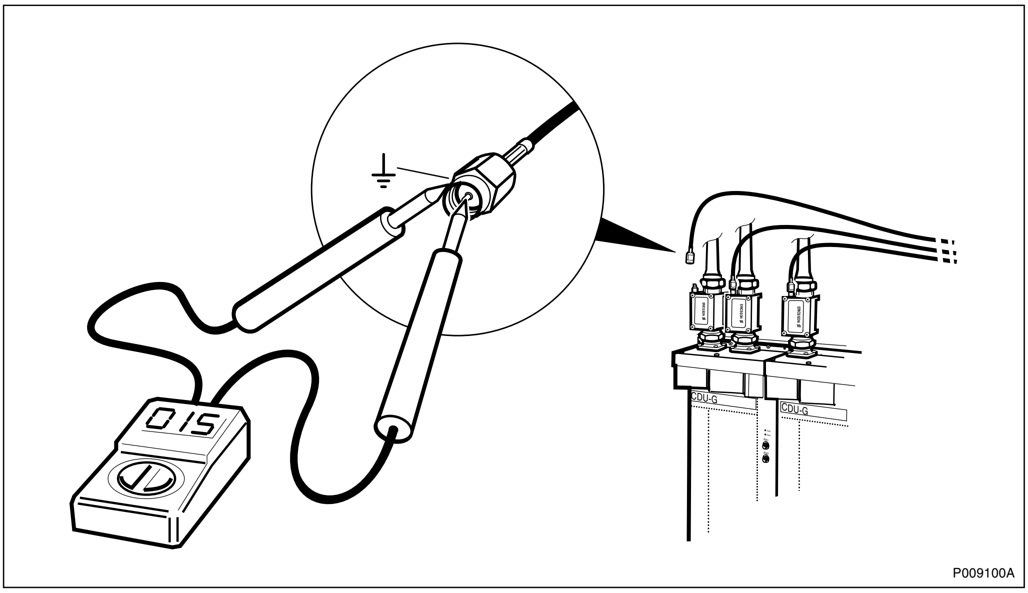


Figure 41 Measuring the voltage on the bias injector DC cable

1. Use a multimeter to measure that 15 V DC is being supplied to the bias injector.

Is the voltage correct?

Answer	Comment	Action
Yes	15 V DC supplied.	Proceed to stage **(9)**
No	15 V DC not supplied.	Proceed to stage **(7)**

(6) Install new IDB

1. Install a new IDB according to instructions in *Section IDB Parameters Settings* in *Chapter RBS Field Repair* .

2. Proceed to step **(17)** .

(7) Reset RBS

Note: Do not reconnect the bias injector DC cable before resetting the RBS.

1. Reset the RBS by pressing the **DXU reset** button.

(8) 15 V to bias injector OK?

1. Use a multimeter to measure that 15 V DC is being supplied to the bias injector, *see Figure 41 on page 99* .

Is the voltage correct?

Answer	Comment	Action
Yes	15 V DC supplied.	Proceed to stage **(9)**
No	15 V DC not supplied.	Proceed to stage **(12)**

(9) 15 V on bias injector OK?

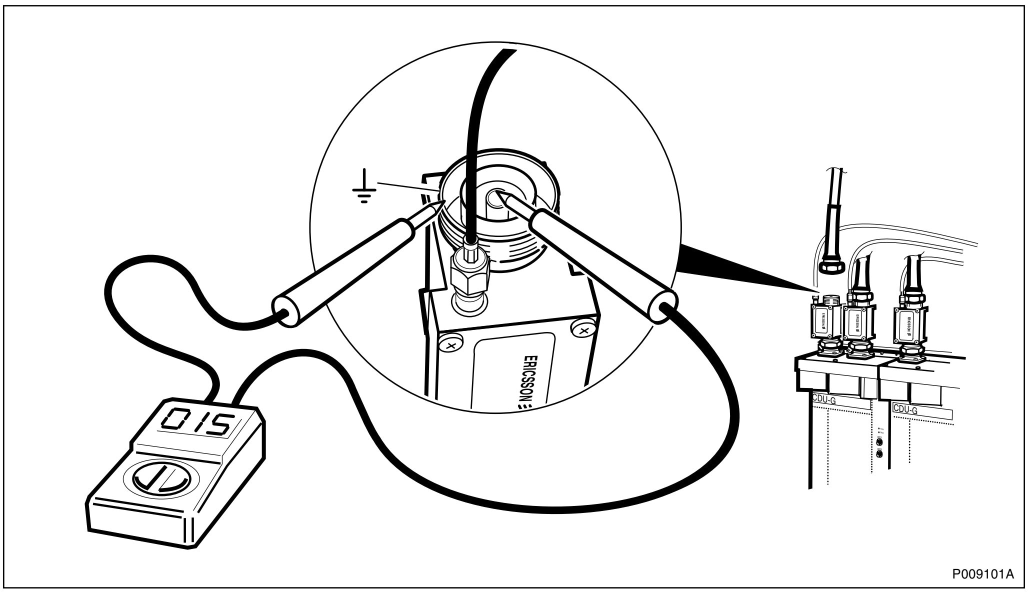


Figure 42 Measuring the voltage on the bias injector

1. Reconnect the bias injector DC cable.

2. Use a multimeter to measure that 15 V DC is being supplied in the bias injector, *see figure above* .

Is the voltage correct?

Answer	Comment	Action
Yes	15 V DC supplied.	Proceed to stage **(10)**
No	15 V DC not supplied.	Proceed to stage **(11)**

(10) Replace TMA

1. Replace the TMA according to instructions in *Section TMA Replacement* in *Chapter RBS Field Repair* .
2. Proceed to step **(17)** .

(11) Replace bias injector

1. Replace the bias injector according to instructions in *Section Bias Injector Replacement* in *Chapter RBS Field Repair* .
2. Proceed to step **(17)** .

(12) Replace bias injector DC cable

1. Replace the bias injector DC cable according to instructions in *Section Bias Injector DC Cable Replacement* in *Chapter RBS Field Repair* .
2. Reset the RBS by pressing the **DXU reset** button.

(13) 15 V to bias injector OK?

1. Use a multimeter to measure that 15 V DC is being supplied to the bias injector, *see Figure 41 on page 99* .

Is the voltage correct?

Answer	Comment	Action
Yes	15 V DC supplied.	Proceed to stage **(17)**
No	15 V DC not supplied.	Proceed to stage **(14)**

(14) Replace TMA-CM

1. Replace the TMA-CM according to instructions in *Section TMA-CM Replacement* in *Chapter RBS Field Repair* .
2. Reset the RBS by pressing the **DXU reset** button.

(15) 15 V to bias injector OK?

1. Use a multimeter to measure that 15 V DC is being supplied to the bias injector, *see Figure 41 on page 99* .

Is the voltage correct?

Answer	Comment	Action
Yes	15 V DC supplied.	Proceed to stage **(17)**
No	15 V DC not supplied.	Proceed to stage **(16)**

(16) Replace TMA-CM cable

1. Replace the TMA-CM cable according to instructions in *Section TMA-CM Cable Replacement* in *Chapter RBS Field Repair* .

2. Reset the RBS by pressing the **DXU reset** button.

(17) TMA fault cleared?

1. Use the OMT to monitor the alarms.

Has the TMA fault ceased?

Answer	Comment	Action
Yes	The TMA fault has ceased.	Proceed to stage **(18)**
No	There is still a TMA fault.	Proceed to stage **(21)**

(18) RBS fault indicator off?

1. Check that the RBS Fault indicator on the DXU is off.

Is the RBS fault indicator off?

Answer	Comment	Action
Yes	There are no faults in the RBS.	Proceed to stage **(19)**
No	There is still on or more faults in the RBS.	Proceed to stage **(20)**

(19) Test after Repair

1. Make a test call according to *Section Test Call* in *Chapter Test after Repair* .

2. Proceed to *Section Before Leaving the Site* in *Chapter Concluding Routines* .

(20) Localise remaining faults

1. In the **Maintenance** menu, select **Display** and **Faulty RUs** .

2. Localise the faults listed by the OMT. *See respective RU section in this chapter.*

(21) Contact supervisor

1. If the fault remains, contact the supervisor or manager, who will take further action.

4.23 TMA-CM

This section describes how to localise TMA-CM fault in the RBS.

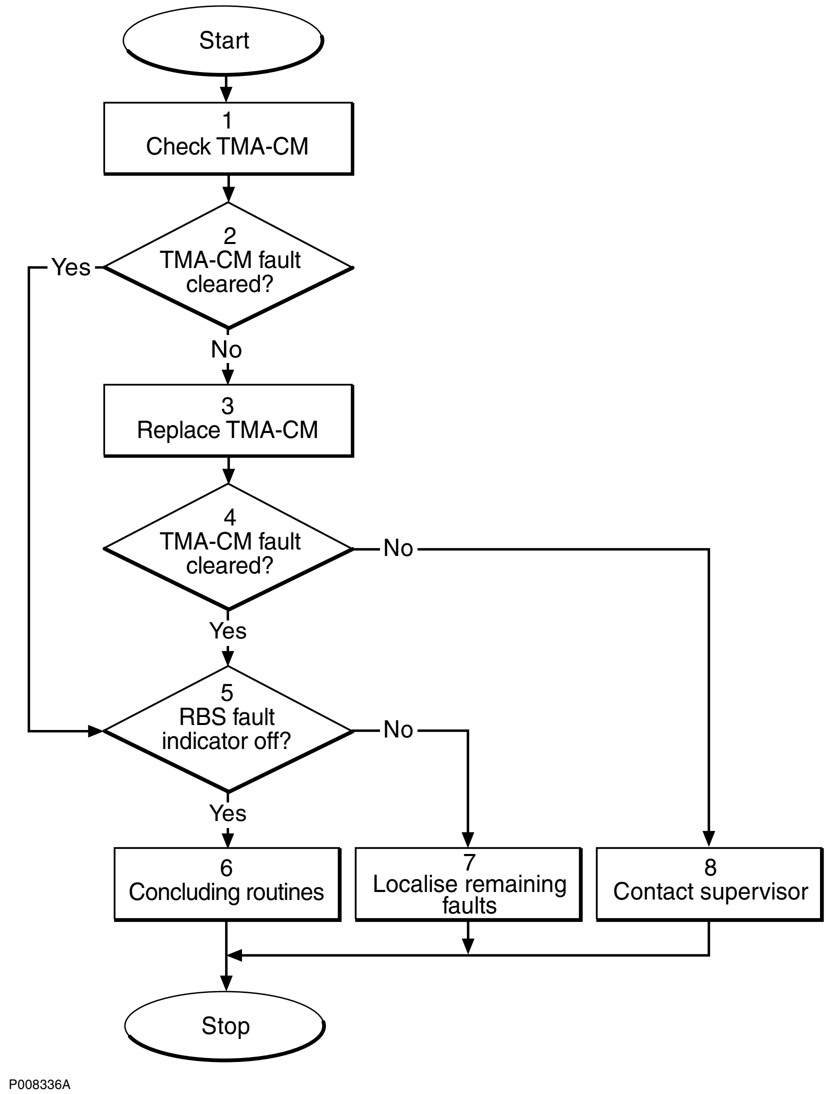


Figure 43 TMA-CM fault

(1) Check TMA-CM

1. Check that the TMA-CM is correctly inserted and fastened into the sub-rack in the correct position.

2. Check that the TMA power connector is correctly connected to the TMA-CM.

(2) TMA-CM fault cleared?

1. Check the red Fault and the green Operational indicators on the TMA-CM.

   Is the Fault indicator off and the Operational indicator on?

Answer	Comment	Action
Yes	The TMA-CM fault is cleared.	Proceed to stage **(5)**
No	There is still a TMA-CM fault.	Proceed to stage **(3)**

Note that the status of the TMA-CM can also be checked with the OMT.

(3) Replace TMA-CM

1. Replace the faulty TMA-CM. See instructions in *Section TMA-CM Replacement* in *Chapter RBS Field Repair* .

(4) TMA-CM fault cleared?

1. Check the red Fault and the green Operational indicators on the TMA-CM.

   Is the Fault indicator off and the Operational indicator on?

Answer	Comment	Action
Yes	The TMA-CM fault is cleared.	Proceed to stage **(5)**
No	There is still a TMA-CM fault.	Proceed to stage **(8)**

Note that the status of the TMA-CM can also be checked with the OMT.

(5) RBS fault indicator off?

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

   Is the RBS fault indicator off?

Answer	Comment	Action
Yes	There are no faults in the RBS.	Proceed to stage **(6)**
No	There is still one or more faults in the RBS.	Proceed to stage **(7)**

Note that the status of the RBS can also be checked with the OMT.

(6) Test after repair

1. Make test calls over all TRUs. Proceed to *Section Test Call* in *Chapter Test after Repair* .

2. Proceed to *Section Before Leaving the Site* in *Chapter Concluding Routines* .

(7) Localise remaining faults

1. Use the monitor **Display Faulty RUs** in the OMT to list all RUs that are faulty.

2. Localise the faults that are listed by the OMT. *See respective RU section in this chapter* .

(8) Contact supervisor

1. If the fault remains, contact the supervisor or manager, who will take further action.

4.24 TMA-CM Cable

This section describes how to localise TMA-CM Cable fault in the RBS.

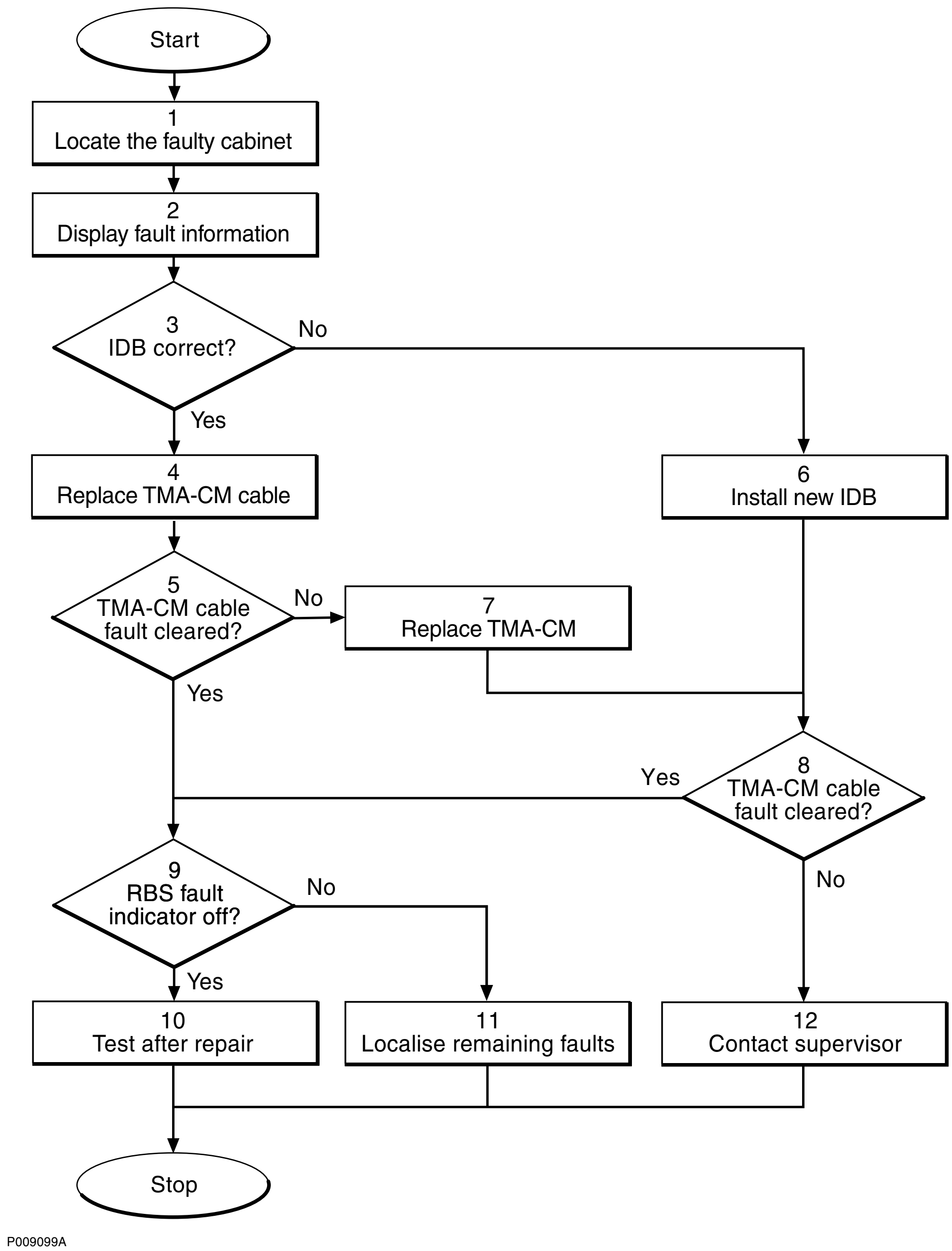


Figure 44 TMA-CM cable faults

(1) Locate the faulty cabinet

1. Locate the faulty cabinet according to work order information.

(2) Display fault information

Use the OMT to monitor the alarms that is activated.

1. Start the OMT.
2. In the **RBS 2000** menu, select **Connect** .
3. In the **Configuration** menu, select **Read IDB** and click **Yes** .
4. In the **Maintenance** menu, select **Monitor...** .
5. Select **Fault Status** and click on **Start Monitor** .

(3) IDB OK?

1. Ensure that the IDB is correctly configured regarding TMA and TMA-CM.

Is the IDB correct?

Answer	Comment	Action
Yes	The IDB is correct.	Proceed to stage **(4)**
No	The IDB is not correct.	Proceed to stage **(6)**

(4) Replace TMA-CM cable

1. Replace the TMA-CM cable according to instructions in *Section TMA-CM Cable Replacement* in *Chapter RBS Field Repair* .

(5) TMA-CM cable fault cleared?

1. Use the OMT to monitor the alarms.

Has the TMA-CM cable fault ceased?

Answer	Comment	Action
Yes	There is no TMA-CM cable fault.	Proceed to stage **(9)**
No	There is still a TMA-CM cable fault.	Proceed to stage **(7)**

(6) Install new IDB

1. Install a new IDB according to instructions in *Section IDB Parameters Settings* in *Chapter RBS Field Repair* .
2. Proceed to step **(8)** .

(7) Replace TMA-CM

1. Replace the TMA-CM according to instructions in *Section TMA-CM Replacement* in *Chapter RBS Field Repair* .

(8) TMA-CM cable fault cleared?

1. Use the OMT to monitor the alarms.

Has the TMA-CM cable fault ceased?

Answer	Comment	Action
Yes	There is no TMA-CM cable fault.	Proceed to stage **(9)**
No	There is still a TMA-CM cable fault.	Proceed to stage **(12)**

(9) RBS fault indicator off?

1. Check that the RBS Fault indicator on the DXU is off.

Is the RBS fault indicator off?

Answer	Comment	Action
Yes	There are no faults in the RBS.	Proceed to stage **(10)**
No	There is still one or more faults in the RBS.	Proceed to stage **(11)**

(10) Test after repair

1. Make a test call according to *Section Test Call* in *Chapter Test after Repair* .
2. Proceed to *Section Before Leaving the Site* in *Chapter Concluding Routines* .

(11) Localise remaining faults

1. In the **Maintenance** menu, select **Display** and **Faulty RUs** .
2. Localise the faults that are listed by the OMT. *See respective RU section in this chapter.*

(12) Contact supervisor

1. If the fault remains, contact the supervisor or manager, who will take further action.

4.25 TRU, dTRU or ATRU

This section describes how to localise TRU, dTRU or ATRU fault in the RBS.

Note: The fault text is always *TRU, dTRU or ATRU* . For simplicity reasons, the expression *TRU* is used in the procedure below.

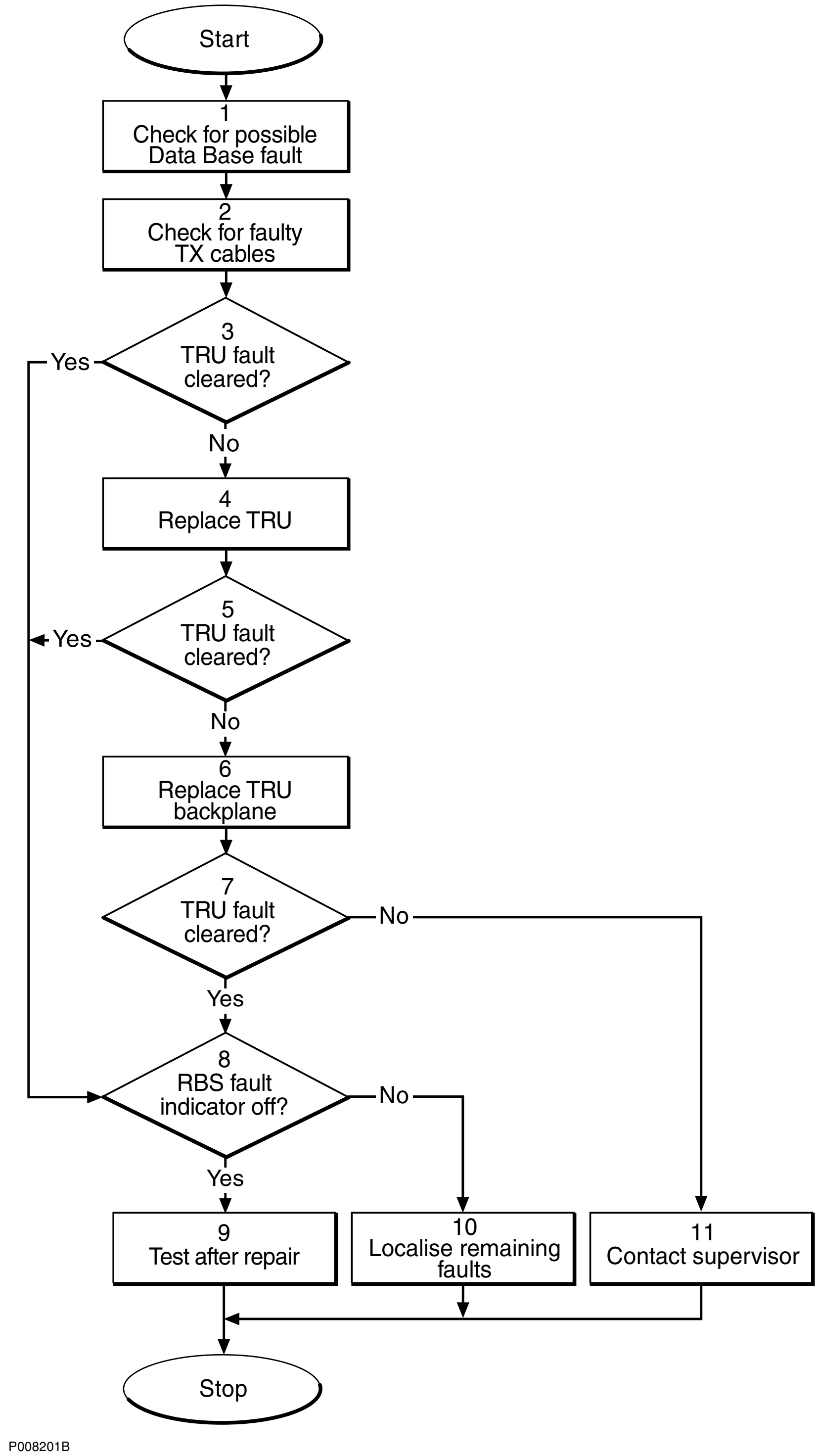


Figure 45   TRU, dTRU or ATRU fault

(1) Check for possible database fault

1. Start the OMT.

2. In the **RBS 2000** menu, select **Connect** .

3. In the **Configuration** menu, select **Read IDB** and click **Yes** .

4. In the **Maintenance** menu, select **Display** and **Faulty RUs** to list all RUs that are fault.

5. Check for the presence of any of the following faults:

   • SO TRXC I1A:14 – RU database corrupted

   • SO TRXC I2A:26 – DB parameter fault

6. If any of the faults listed in step 2 above is found, reload the database. See instructions in *Section IDB Installation* in *Chapter RBS Field Repair* .

7. Proceed to stage **(2)** below.

(2) Check for faulty TX cables

1. Replace one or both CDU_TRU_TX cables according to instructions in *Section CDU_TRU_TX Cables Replacement* in *Chapter RBS Field Repair* .

(3) TRU fault cleared?

1. Check the red Fault and the green Operational indicators on the TRU.

   Is the Fault indicator off and the Operational indicator on?

Answer	Comment	Action
Yes	The TRU fault is cleared.	Proceed to stage **(8)**
No	There is still a TRU fault.	Proceed to stage **(4)**

Note that the status of the TRU can also be checked with the OMT.

(4) Replace TRU

1. Replace the faulty TRU according to instructions in *Section TRU Replacement* in *Chapter RBS Field Repair* .

(5) TRU fault cleared?

1. Check the red Fault and the green Operational indicators on the TRU.

   Is the Fault indicator off and the Operational indicator on?

Answer	Comment	Action
Yes	The TRU fault is cleared.	Proceed to stage **(8)**
No	There is still a TRU fault.	Proceed to stage **(6)**

Note that the status of the TRU can also be checked with the OMT.

(6) Replace TRU backplane

The fault is probably located in the backplane.

1. Replace the TRU backplane according to *Section TRU backplane Replacement* in *Chapter RBS Field Repair* .

(7) TRU fault cleared?

1. Check the red Fault and the green Operational indicators on the TRU.

   Is the Fault indicator off and the Operational indicator on?

Answer	Comment	Action
Yes	The TRU fault is cleared.	Proceed to stage **(8)**
No	There is still a TRU fault.	Proceed to stage **(11)**

Note that the status of the TRU can also be checked with the OMT.

(8) RBS fault indicator status?

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

   Is the RBS fault indicator off?

Answer	Comment	Action
Yes	There are no faults in the RBS.	Proceed to stage **(9)**
No	There is still one or more faults in the RBS.	Proceed to stage **(10)**

Note that the status of the RBS can also be checked with the OMT.

(9) Test after repair

1. Make a test call:

   • If a TRU was replaced, make a test call over that specific TRU according to *Section Test Call* in *Chapter Test after Repair* .

- If the TRU backplane was replaced, make test calls over all TRUs according to *Section Test Call* in *Chapter Test after Repair* .

2. Proceed to *Section Before Leaving the Site* in *Chapter Concluding Routines* .

(10) Localise remaining faults

1. Use the monitor **Display Faulty RUs** in the OMT to list all RUs that are faulty.
2. Localise the faults that are listed by the OMT. *See respective RU section in this chapter* .

(11) Contact supervisor

1. If the fault remains, contact the supervisor or manager, who will take further action.

4.26 Y Link

This section describes how to localise a Y Link fault (SO CF I2A:30/Bus Fault) in the RBS.

Displaying fault information in the OMT

The OMT is used to monitor activated alarms.

1. Start the OMT.
2. In the **RBS 2000** menu, select **Connect** .
3. In the **Configuration** menu, select **Read IDB** and click **Yes** .
4. In the **Maintenance** menu, select **Monitor...** .
5. Select **Fault Status** and click on **Start monitor** .

Table 9 TRU alarm

If...	then...
only one TRU alarms *SO TRXC I1B: 8/ Baseband Hopping Fault*	proceed to *Section One TRU alarm active* .
two or more TRU(s) alarm *SO TRXC I1B: 8/ Baseband Hopping Fault*	proceed to *Section Two or more TRU alarm active* .

One TRU alarm active

The following actions should be carried out step-by-step until the fault ceases:

- Replace the TRU according to *Section TRU Replacement* in *Chapter RBS Field Repair.*
- Check the pins on the DXU to which the Y link cable is connected.

Note: Only the Y link connected to the TRU with active alarm needs to be checked.

- Replace the DXU according to *Section DXU Replacement* in *Chapter RBS Field Repair.*
- Replace the Y link cable according to *Section Y Link Cable Replacement* in *Chapter RBS Field Repair.*
- Replace the TRU backplane according to *Section TRU Backplane Replacement* in *Chapter RBS Field Repair* .
- If there is still a Y link fault present, proceed to *Section 4.26.2 on page 114.*

Two or more TRU alarm active

The following actions should be carried out step-by-step until the fault ceases:

- Check the pins on the DXU to which the Y link cable(s) is connected.
- Replace the DXU according to *Section DXU Replacement* in *Chapter RBS Field Repair.*
- Replace the alarming TRU(s) according to *Section TRU Replacement* in *Chapter RBS Field Repair.*
- Replace the Y link cable according to *Section Y Link Cable Replacement* in *Chapter RBS Field Repair.*
- Replace the TRU backplane according to *Section TRU Backplane Replacement* in *Chapter RBS Field Repair* .
- If there is still a Y link fault present, proceed to *Section 4.26.2 on page 114* .

4.26.1 Routines after Repair

1. Check that the RBS fault indicator on the DXU is off.

Table 10 DXU indicator

If...	**then...**
the indicator is off	make a test call according to *Section Test Call* in *Chapter Test after Repair* .
the indicator is still on	localise remaining faults according to the *instructions below* .

2. Start the OMT.
3. In the **RBS 2000** menu, select **Connect** .
4. In the **Configuration** menu, select **Read IDB** and click **Yes** .
5. In the **Maintenance** menu, select **Display** and **Faulty RUs** .
6. Localise the faults that are listed by the OMT. *See respective RU section in this chapter* .

4.26.2 Contact Supervisor

1. If the fault remains, contact the supervisor or manager, who will take further action.

5 RBS Field Repair

This chapter describes how to replace faulty Replaceable Units (RUs) that have been indicated by the OMT and verified by following the instructions in *Chapter Fault Localisation.*

Note: Do not replace an RU until a fault has been localised to that unit.

5.1 RU Overview

The figure below shows an overview of the RUs in the RBS cabinet.

Note: Not all RUs described in this chapter are shown in *the figure below* .

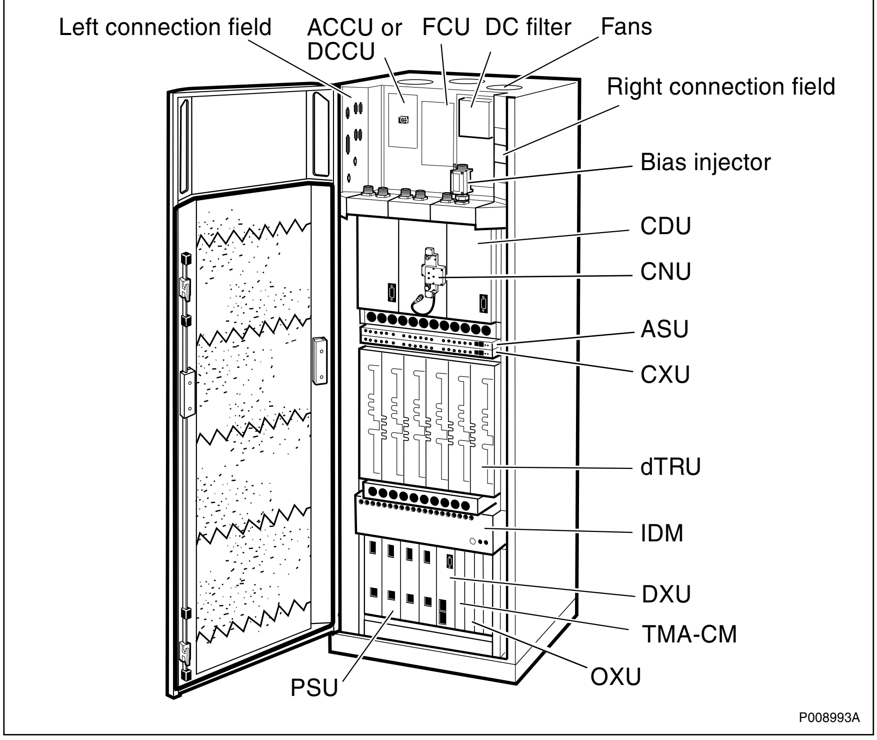


Figure 46 RBS 2206 RU overview

5.2 Taking the RBS out of and into Operation

This section contains an overview of the units involved when setting the RBS in local and remote mode and how to switch on and off the cabinet for different sources of power supply.

5.2.1 Units for Taking the RBS in and out of Operation

This section describes where the switches for switching on and off the RBS or units in the RBS are placed. *See figure below.*

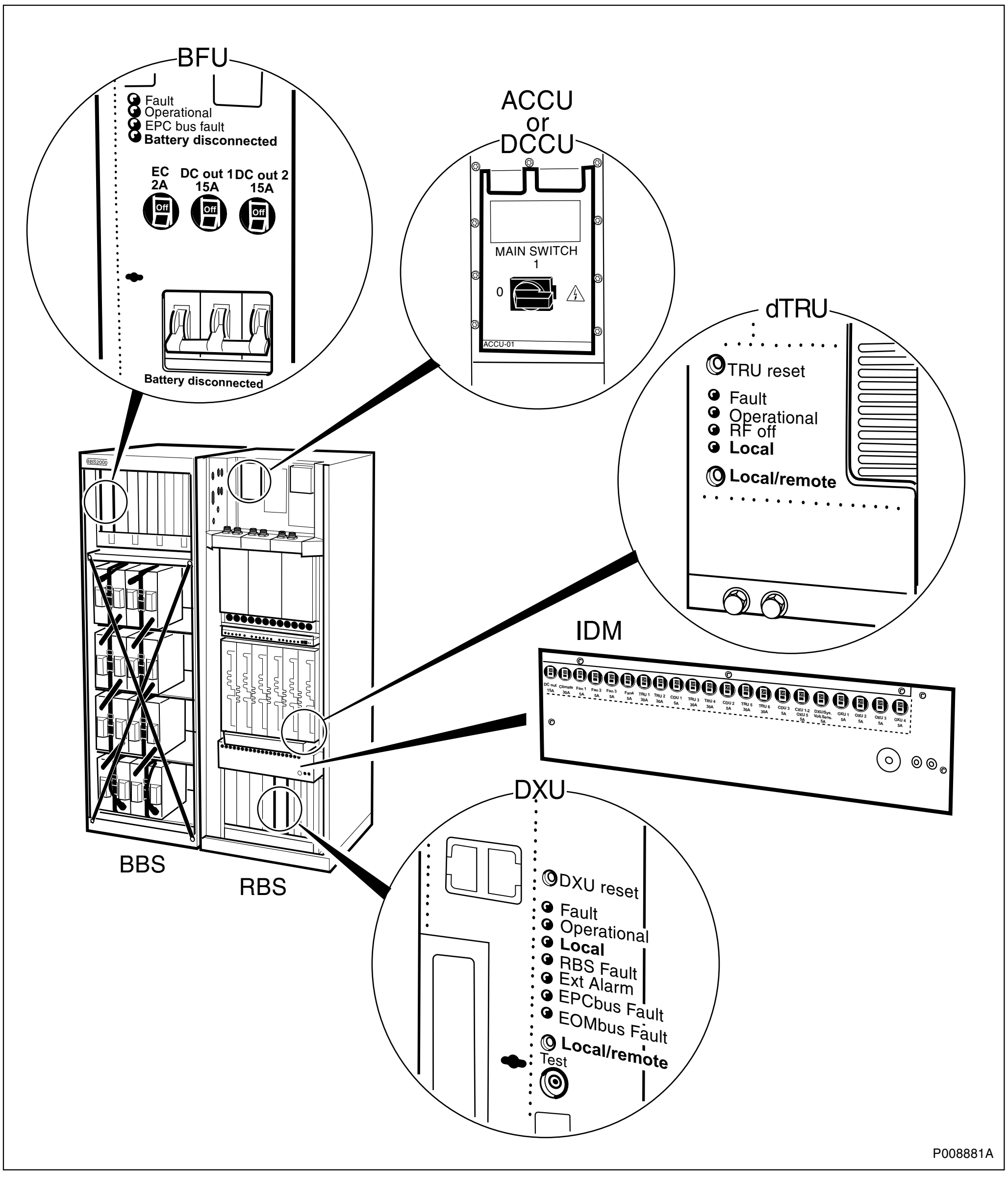


Figure 47 Switches for switching on and off units in the RBS

5.2.2 Switching off the RBS

This section describes how to switch off different sources of power supply to the RBS. *See table below.*

Table 11 Selecting how to switch off different sources of power supply

Power supply source	**Switching off**	
AC mains power without battery back-up	1.	Switch off the MAINS SWITCH on the ACCU by turning it to position 0.
AC mains power with BBS	1.	Switch off Battery disconnect on the BFU in the battery cabinet.
	2.	Switch off the MAINS SWITCH on the ACCU by turning it to position 0.
AC mains power with battery cabinet from other suppliers	1.	Switch off the incoming DC power supply according to *the manufacturer's instructions* on how to disconnect the batteries.
	2.	Switch off the MAINS SWITCH on the ACCU by turning it to position 0.
DC main power (-48V DC)	1.	Switch off the MAIN SWITCH on the DCCU by turning it to position 0.
DC main power (+24 V DC)	1.	Switch off the DC main power outside the cabinet. *See Site Installation Documentation.*

5.2.3 Switching on the RBS

This section describes how to switch on different sources of power supply to the RBS. *See table below.*

Table 12 Selecting how to switch on different sources of power supply

Power supply source		Switching on
AC mains power without battery back-up	1.	Switch on the MAINS SWITCH on the ACCU by turning it to position 1.
AC mains power with BBS	1.	Switch on the MAINS SWITCH on the ACCU by turning it to position 1.
	2.	Switch on Battery disconnect on the BFU in the battery cabinet
AC mains power with battery cabinet from other suppliers	1.	Switch on the MAINS SWITCH on the ACCU by turning it to position 1.
	2.	Switch on the incoming DC power supply according to *the manufacturer's instructions* on how to connect the batteries.
DC main power (-48V DC)	1.	Switch on the MAIN SWITCH on the DCCU by turning it to position 1.
DC main power (+24 V DC)	1.	Switch on the DC main power outside the cabinet. *See Site Installation Documentation.*

5.3 Temperature Requirements for an RU

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

5.4 ESD Wrist Strap

This section describes the ESD wrist strap to be used when handling or working close to printed boards during maintenance work.

Caution!

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

The ESD wrist strap, *see figure below* , is connected to the grounding/earth point on the IDM panel. If the IDM is removed during maintenance work, the ESD wrist strap should be connected to the cabinet.

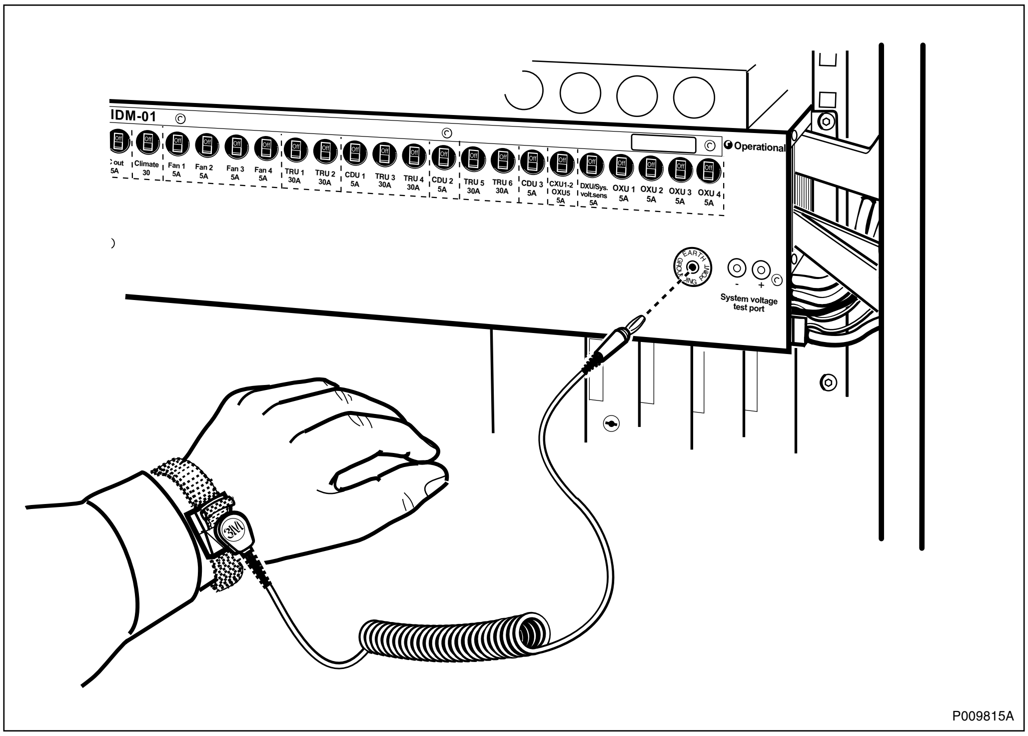


Figure 48 ESD wrist strap LYB 250 01/14

5.5 ACCU Replacement

This section describes how to replace a faulty ACCU.

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.

Preconditions

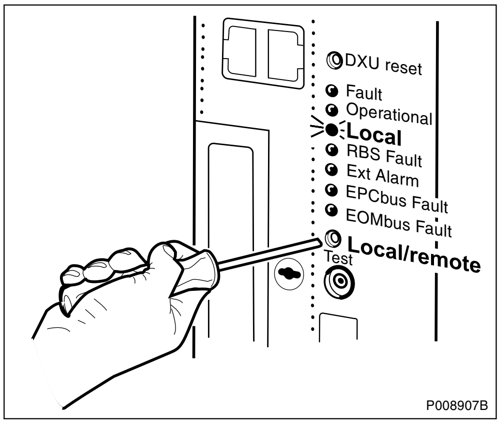
Before replacing the ACCU, ensure the following:

☐ An approved ESD wrist strap is available for use.

Taking the RBS out of operation

1. Inform the OMC operator and get approval for temporarily taking the RBS out of service.

2. Press the Local/remote button on the DXU to set the RBS to local mode.



3. Wait until the Local indicator has a fixed yellow light.

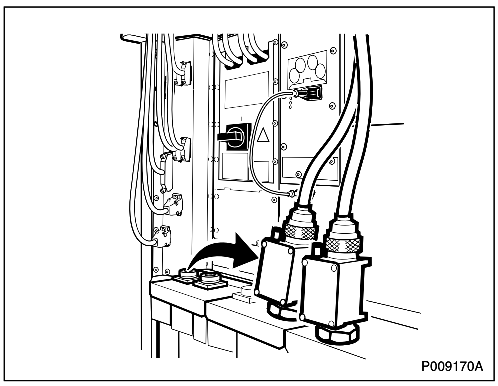
4. Switch off the power in the cabinet. *See Section 5.2.2 Switching off the RBS on page 116.*

5. Switch off the external AC mains power supply from the site to the RBS cabinet.

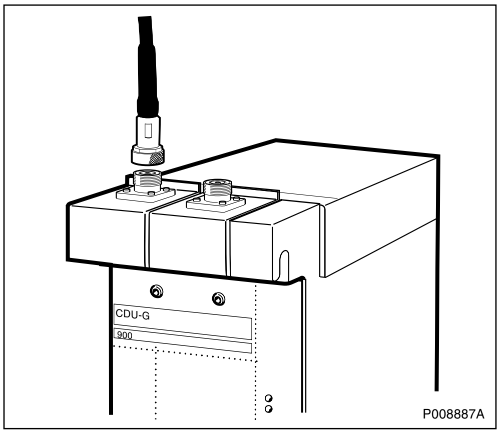
Removing the faulty ACCU

Note: There must be no power in the cabinet when working with the ACCU.

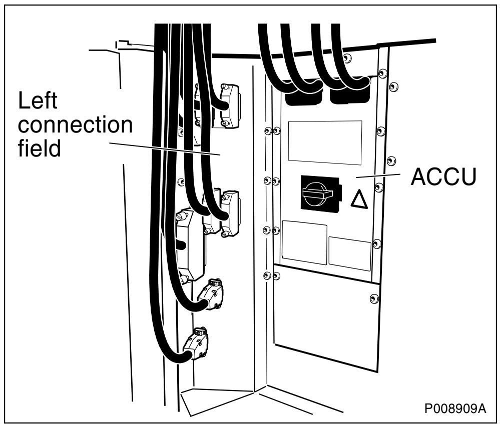
6. If bias injectors are used, loosen the bias injectors from CDU 1.



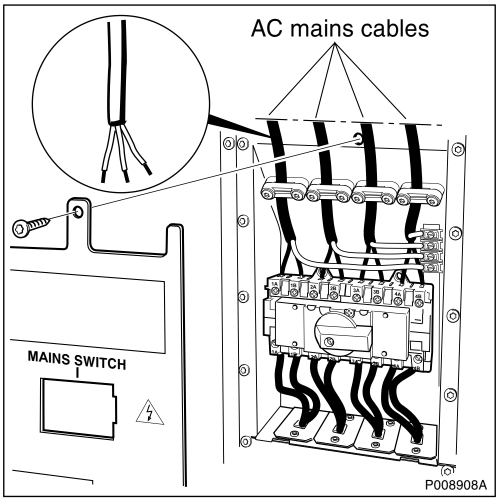
If no bias injectors are used, remove the jumper cables from CDU 1.



7. Disconnect the cables from the left connection field, loosen the screws and remove the connection field.



8. Remove the ACCU cover plate and disconnect the AC mains cables from the top of the AC MAINS SWITCH.



9. Cut the cable ties around the cables running from the ACCU to the PSUs and disconnect the cables from the PSUs.

10. Remove the ACCU including the cables.

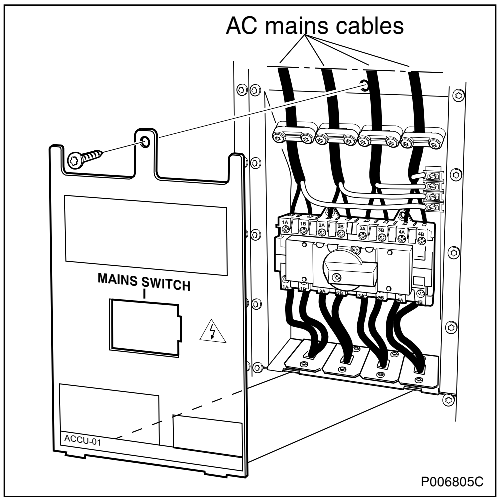
Mounting the new ACCU

11. Connect the new ACCU cables to the PSUs.

12. Fasten the cable ties around the cables running between the new ACCU and the PSUs.

13. Insert the ACCU.

14. Reconnect the AC mains cables to the top of the AC MAINS SWITCH and reattach the ACCU cover plate.



15. Reattach the left connection field, tighten the screws and reconnect the cables.

16. If bias injectors are used, reconnect them to CDU 1.

    If no bias injectors are used, reconnect the jumper cables to CDU 1.

Taking the RBS into operation

17. Switch on the external AC mains power from the site to the RBS cabinet.

18. Switch on the power supply to the cabinet. *See Section 5.2.3 Switching on the RBS on page 117.*

19. Inform the OMC operator that the RBS will be taken into service.

20. Press the Local/remote button on the DXU to set the RBS to remote mode and wait until the flashing indicator turns off.

21. Return to the applicable section in *Chapter Fault Localisation* for the next step in the process.

Handling replaced unit(s)

Unless under contractual warranty the ACCU shall be repaired locally at the RBS site or in a local repair shop. If the ACCU is irreparable, it shall be disposed of locally by the customer according to environmental regulations. Do not return the ACCU to Ericsson for replacement, repair or disposal.

5.6 Antenna Replacement

This section describes how to replace a faulty antenna.

Caution!

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

Note: When mounting the antenna feeder cable, a tightening torque specified by the feeder manufacturer must be used. Exceeding the maximum torque may damage the feeder connector, thus breaching the antenna feeder cable guarantee.

Preconditions

Before replacing the faulty antenna, ensure that the following documentation is available:

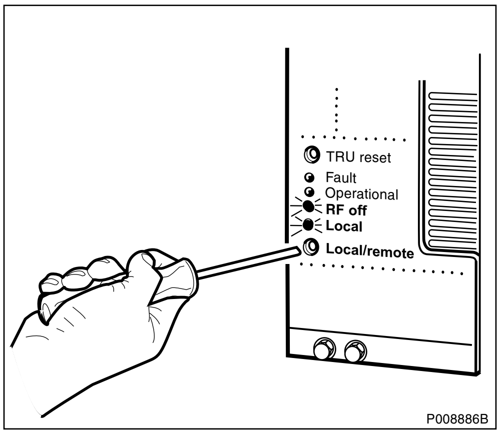
Radio Site Installation and Test - Antenna	*EN/LZT 720 0018*

	Standard Site Material Installation Instructions	*EN/LZT 720 0014*

Taking the TRU out of operation

1. Inform the OMC operator and get approval for temporarily taking TRU(s) out of service.

2. Press the Local/remote button on the TRU(s) connected to the faulty antenna to set the TRU(s) to local mode.



3. Wait until the RF off and local indicators have a fixed yellow light.

Replacing the antenna

An antenna system without a ddTMA is shown in *the figure below* .

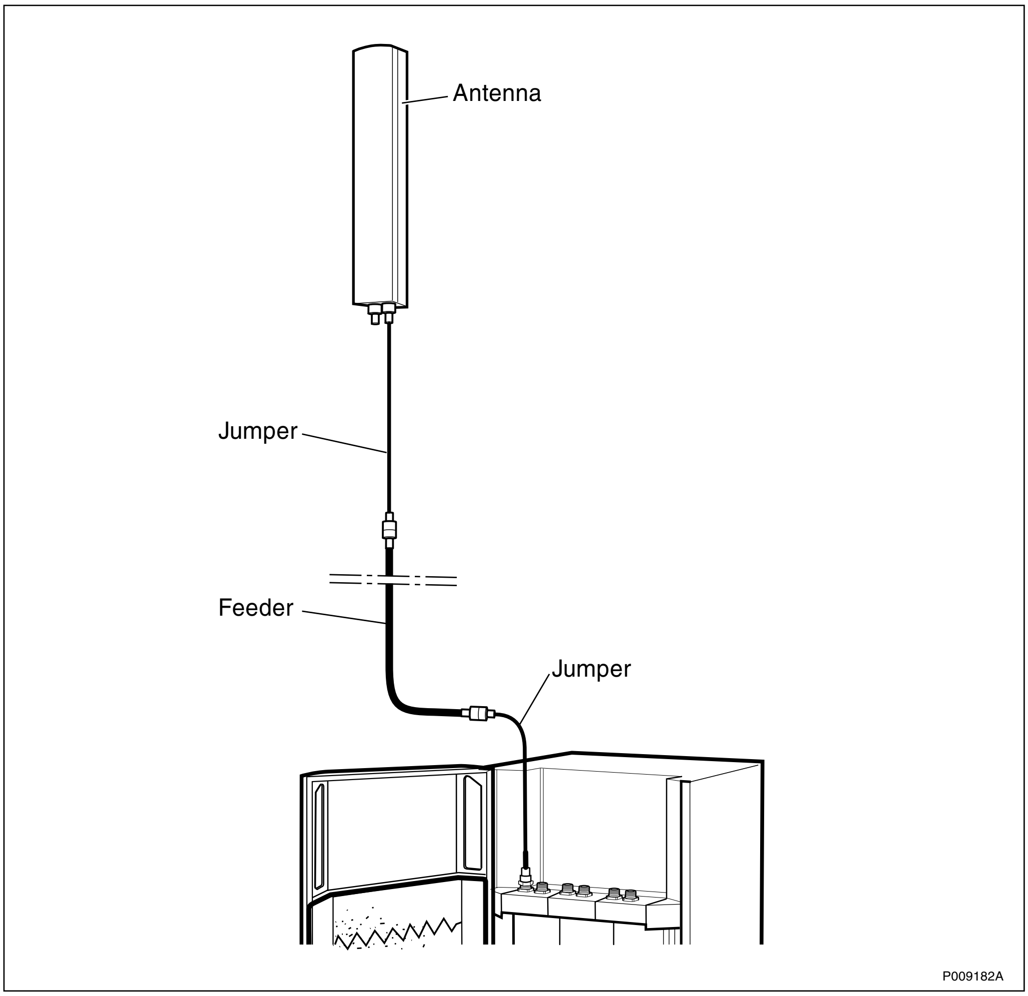


Figure 49 The antenna system without a ddTMA installed

An antenna system with a ddTMA installed is shown in *the figure below* .

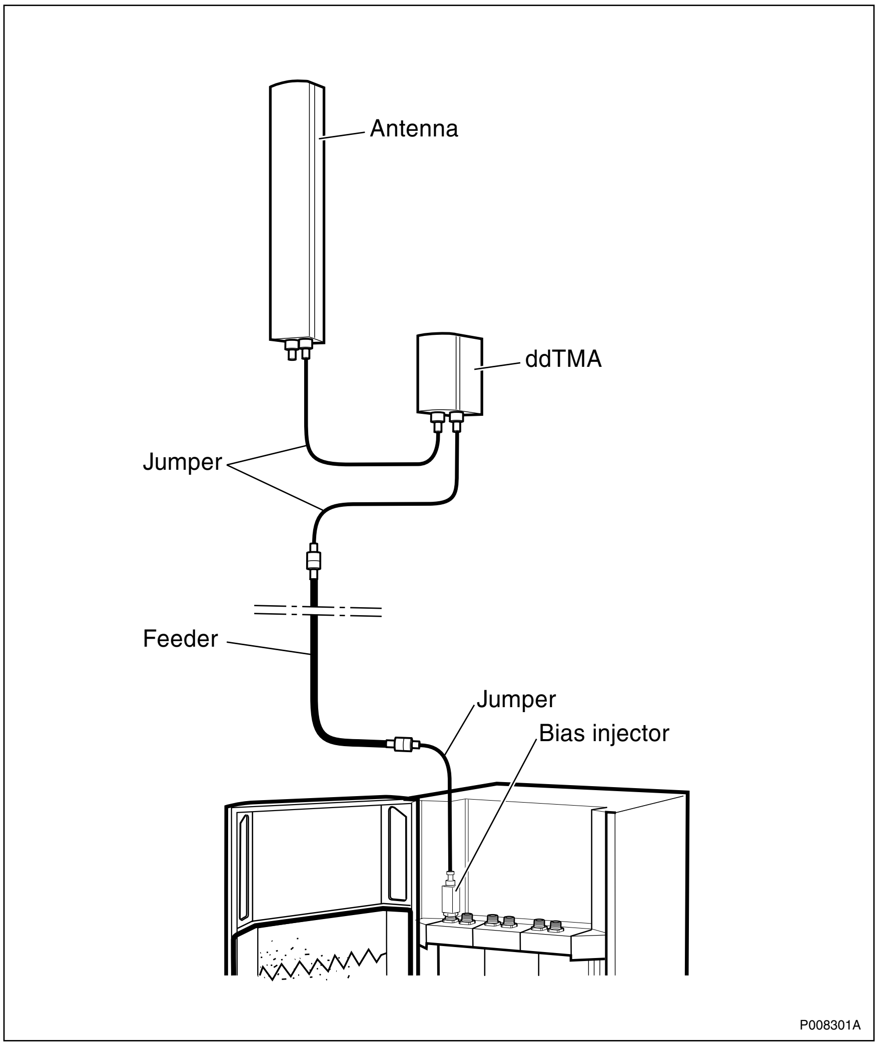


Figure 50 The antenna system with a ddTMA installed

4. Unpack and prepare the new antenna for installation.

5. Remove the sealant, disconnect the antenna feeders or jumpers from the faulty antenna and remove it.

6. Mount the new antenna and reconnect the antenna feeders or jumpers.

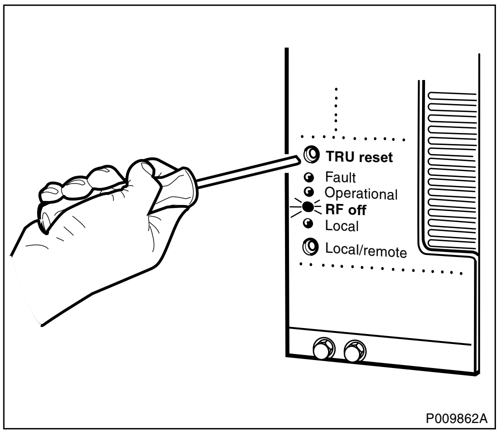
Note: If tests are to be carried out on the antenna system, do not seal the connections until the testing has been completed.

7. Seal the connectors *according to the antenna installation documentation.*

Taking the TRU into operation

8. In the OMT, open the **Radio** view and mark the TX box to see which TRU(s) is connected to the faulty antenna.

9. Press the reset button on the TRU(s) connected to the faulty antenna.



10. Inform the OMC operator that the TRU will be taken into service.

11. Press the Local/remote button on the TRU(s) to set the TRU(s) to remote mode and wait until the flashing indicator(s) turns off.

12. Return to the applicable section in *Chapter Fault Localisation* for the next step in the process.

Handling replaced unit(s)

Unless under contractual warranty the antenna shall be disposed of locally by the customer according to environmental regulations. Do not return the antenna to Ericsson for replacement, repair or disposal.

5.7 Antenna Feeder and Jumper Cable Replacement

This section describes how to replace faulty antenna feeders and jumper cables.

Warning!

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

Note: Care must be taken when disconnecting and connecting the jumper cable at the top of the bias injector to avoid damaging the bias injector's DC connector.

Note: When mounting the antenna feeder cable, a tightening torque specified by the feeder manufacturer must be used. Exceeding the maximum torque may damage the feeder connector, thus breaching the antenna feeder cable guarantee.

Preconditions

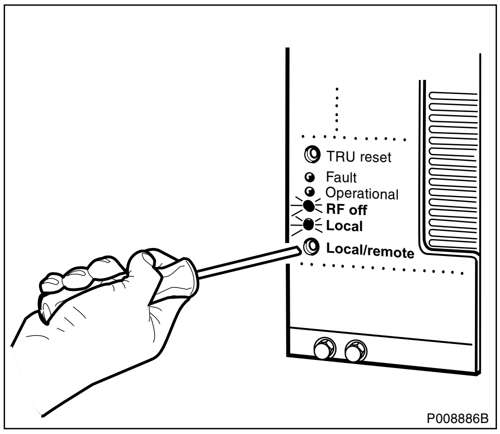
Before replacing the faulty antenna feeder or jumper cable, ensure that the following documentation about connecting feeders and jumpers is available:

Standard Site Material Installation Instructions	*EN/LZT 720 0014*

Taking the TRU out of operation

1. Inform the OMC operator and get approval for temporarily taking TRU(s) out of service.

2. Press the Local/remote button on the TRU(s) connected to the faulty feeder or jumper to set the TRU(s) to local mode.



3. Wait until the RF off and Local indicators have a fixed yellow light.

Replacing the antenna feeder or jumper cable

The feeders or jumpers in an antenna system with and without a ddTMA are shown in *Figure 49 on page 125* and *Figure 50 on page 126* .

4. Unpack and prepare the new feeder or jumper cable for installation.

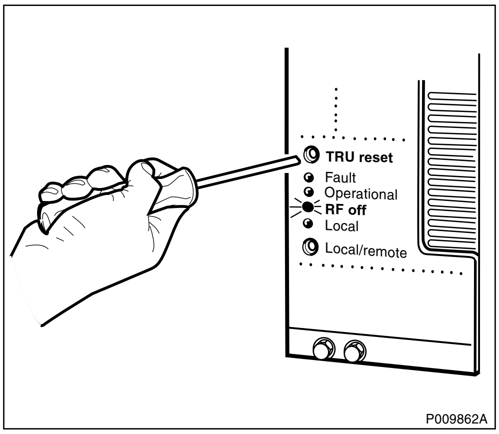
5. Disconnect the faulty antenna feeder or jumper cable at both ends and remove it.

6. Connect the new feeder or jumper cable according to *Standard Site Material Installation Instructions* .

Taking the TRU into operation

7. In the OMT, open the **Radio** view and mark the TX box to see which TRU is connected to the faulty antenna.

8. Press the reset button on the TRU(s) connected to the faulty antenna feeder cable.



9. Inform the OMC operator that the TRU(s) will be taken into service.

10. Press the Local/remote button on the TRU(s) to set the TRU(s) to remote mode and wait until the flashing indicator turns off.

11. Return to the applicable section in *Chapter Fault Localisation* for the next step in the process.

Handling replaced unit(s)

Unless under contractual warranty the antenna feeder or jumper cable shall be disposed of locally by the customer according to environmental regulations. Do not return the antenna feeder or jumper cable to Ericsson for replacement, repair or disposal.

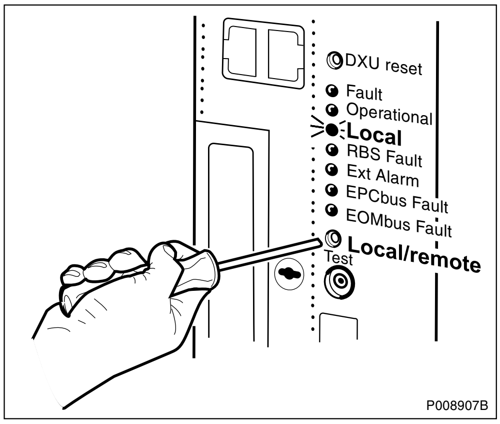
5.8 ASU Replacement

This section describes how to replace a faulty ASU.

Taking the RBS out of operation

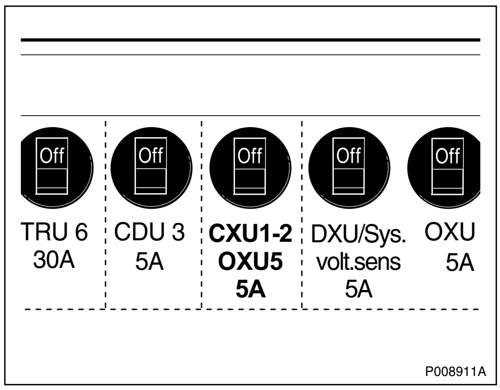
1. Inform the OMC operator and get approval for temporarily taking the RBS out of service.

2. Press the Local/remote button on the DXU to set the RBS to local mode.



3. Wait until the Local indicator has a fixed yellow light.

4. Switch off circuit breaker CXU1-2 OXU 5 on the IDM.

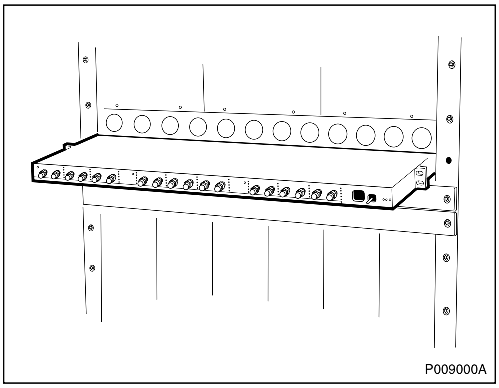


Replacing the ASU

5. Check the position of the TMA/No TMA switch on the ASU before disconnecting all cables to the ASU.

6. Loosen the two screws on the ASU. If a protective plate is used, remove it.

7. Remove the ASU by pulling it out.



8. Insert the new ASU, mount the protective plate, if used, and fasten the screws.

9. Reconnect the cables to the ASU.

10. Set the TMA/No TMA switch in the correct position.

Taking the RBS into operation

11. Switch on CXU1-2 OXU 5 circuit breaker on the IDM.

12. Inform the OMC operator that the RBS will be taken into service.

13. Press the Local/remote button on the DXU to set the RBS to remote mode and wait until the flashing indicator turns off.

14. Return to the applicable section in *Chapter Fault Localisation* for the next step in the process.

Handling replaced unit(s)

The ASU should be returned to Ericsson for repair with a repair delivery note, LZF 084 64 (Blue Tag) attached. Include a clear description of the fault found. *See Chapter Concluding Routines* for instructions on completing a repair delivery note.

5.9 Battery Replacement

For information on how to replace a faulty battery in the BBS 2000, *see* :

BZZ 208 06 Power Manual *EN/LZB 135 019*

If the new battery is a different type than the battery being replaced, update the parameters in the OMT. For more information on updating parameters, see:

RBS 2206 Installation and Integration Manual *EN/LZT 720 0009*

5.10 Battery Temperature Sensor Replacement

For information on how to replace a faulty battery temperature sensor in the BBS 2000, *see* :

BZZ 208 06 Power Manual *EN/LZB 135 019*

5.11 BFU Replacement

For information on how to replace a faulty BFU in the BBS 2000, *see* :

BZZ 208 06 Power Manual *EN/LZB 135 019*

5.12 Bias Injector Replacement

This section describes how to replace a faulty bias injector.

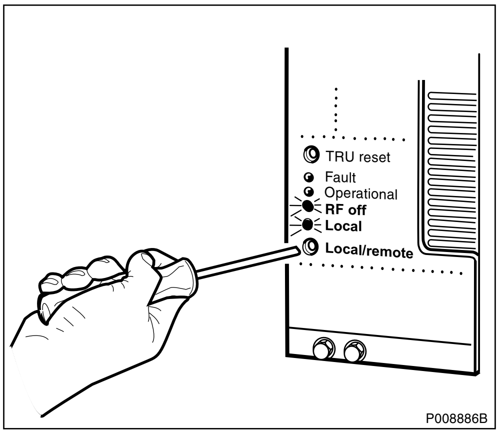
Note: Be careful when disconnecting and connecting the antenna feeder cable at the top of the bias injector to avoid damaging the bias injector’s DC connector.

Note: When mounting the internal antenna feeder cable, a tightening torque, specified by the feeder manufacturer, must be used. Exceeding the maximum torque may damage the feeder connector, thus breaching the antenna feeder cable guarantee.

Taking the TRU out of operation

1. Inform the OMC operator and get approval for temporarily taking one (or several) TRU(s) out of service.

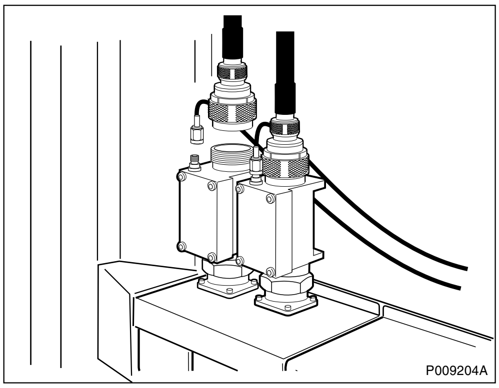
2. Press the Local/remote button on the TRU connected to the faulty bias injector to set the TRU to local mode.



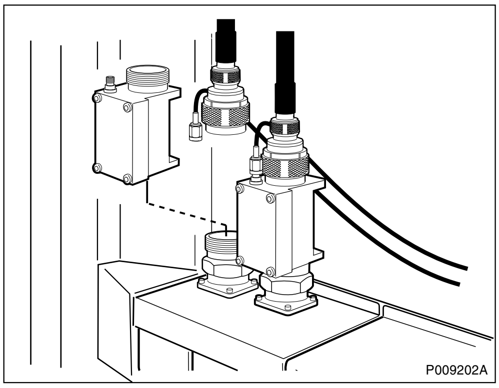
3. Wait until the RF off and Local indicators have a fixed yellow light.

Replacing the bias injector

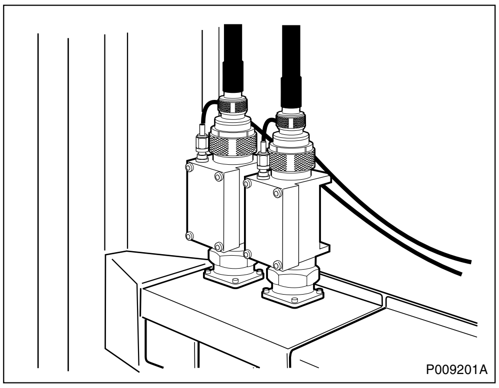
4. Disconnect the DC cable and the jumper cable from the top of the bias injector.



5. Remove the bias injector.



6. Connect the jumper cable on the new bias injector to a torque of 25 Nm. Mount the bias injector on the CDU to a torque of 25 Nm. Reconnect the DC cable.



Taking the TRU into operation

7. Inform the OMC operator that the TRU(s) will be taken into service.

8. Press the Local/remote button on the TRU(s) to set the TRU(s) to remote mode and wait until the flashing indicator turns off.

9. Return to the applicable section in *Chapter Fault Localisation* for the next step in the process.

Handling replaced unit(s)

Unless under contractual warranty the bias injector shall be disposed of locally by the customer according to environmental regulations. Do not return the bias injector to Ericsson for replacement, repair or disposal.

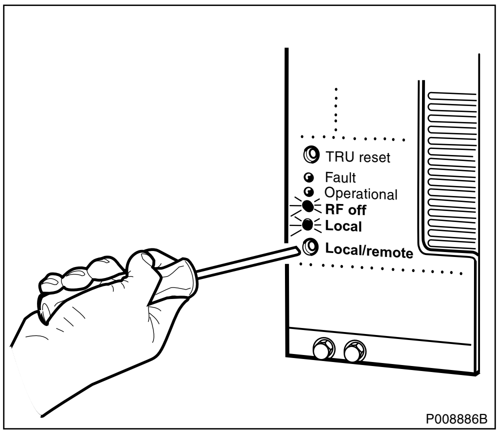
5.13 Bias Injector DC Cable Replacement

This section describes how to replace a faulty bias injector DC cable running between the bias injector and the right connection plate.

Taking the TRU(s) out of operation

1. Inform the OMC operator and get approval for temporarily taking one (or several) TRU(s) out of service.

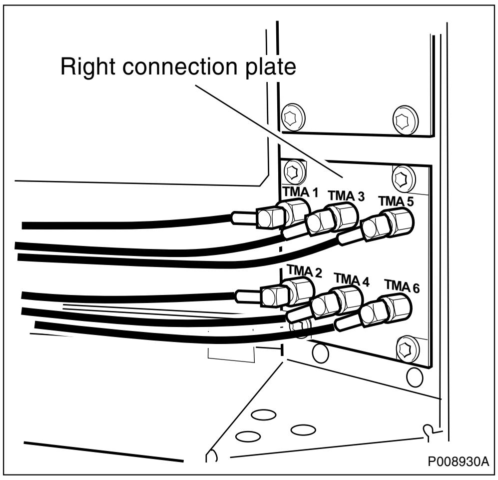
2. Press the Local/remote button on the TRU connected to the faulty bias injector to set the TRU to local mode.



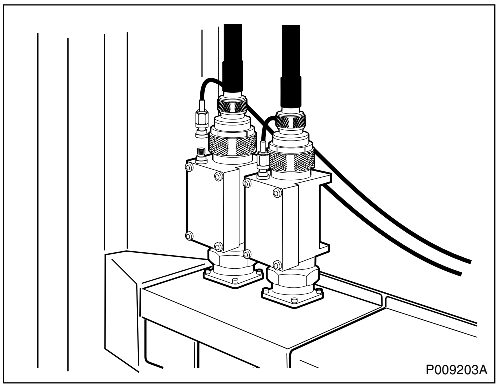
3. Wait until the RF off and Local indicators have a fixed yellow light.

Replacing the bias injector DC cable

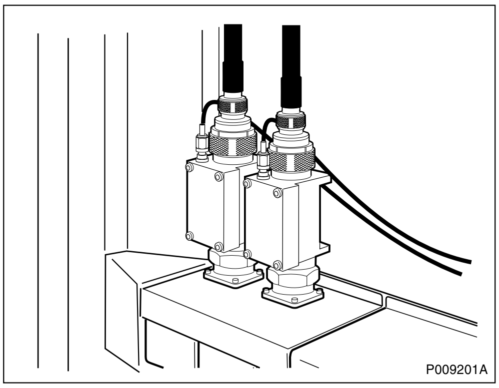
4. Disconnect the faulty DC cable from the right connection plate.



5. Disconnect the other end of the faulty DC cable from the bias injector.



6. Connect the new DC cable to the bias injector.



7. Connect the other end of the DC cable to the right connection plate.

Taking the TRU(s) into operation

8. Inform the OMC operator that the TRU(s) will be taken into service.

9. Press the Local/remote button on the TRU(s) to set the TRU(s) to remote mode and wait until the flashing indicator turns off.

10. Return to the applicable section in *Chapter Fault Localisation* for the next step in the process.

Handling replaced unit(s)

Unless under contractual warranty the bias injector DC cable shall be disposed of locally by the customer according to environmental regulations. Do not return the DC cable to Ericsson for replacement, repair or disposal.

5.14 CDU Replacement

This section describes how to replace a faulty CDU.

Warning!

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

Note: Be careful when disconnecting and connecting the antenna feeder cable at the top of the bias injector to avoid damaging the bias injector’s DC connector.

Note: When mounting the antenna feeder cable, a tightening torque specified by the feeder manufacturer must be used. Exceeding the maximum torque may damage the feeder connector, thus breaching the antenna feeder cable guarantee.

Preconditions

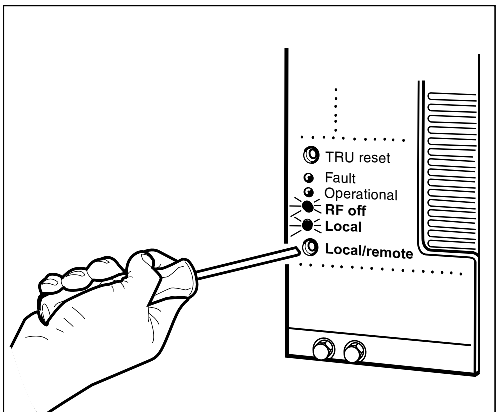
Before replacing the CDU, ensure the following:

- ☐ A CDU of the correct frequency is available. CDUs are marked on the front with a label showing the frequency.
- ☐ An approved ESD wrist strap is available for use.

Taking the TRUs out of operation

1. Inform the OMC operator and get approval for temporarily taking a CDU out of service.

2. Press the Local/remote button on the TRUs connected to the faulty CDU to set the RBS to local mode.

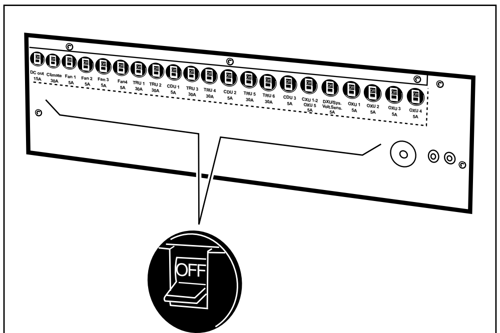


P008886B

3. Wait until the RF off and Local indicators have a fixed yellow light.

Note: If uncombined mode in the TRUs is used, make sure all (up to three if CDU-F is used) TRUs connected to the faulty CDU are set in local mode, to prevent damage to the TRUs and exposure to RF radiation.

4. Switch off the circuit breaker for the faulty CDU on the IDM.



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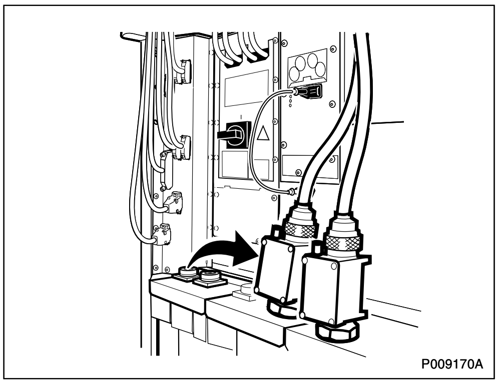
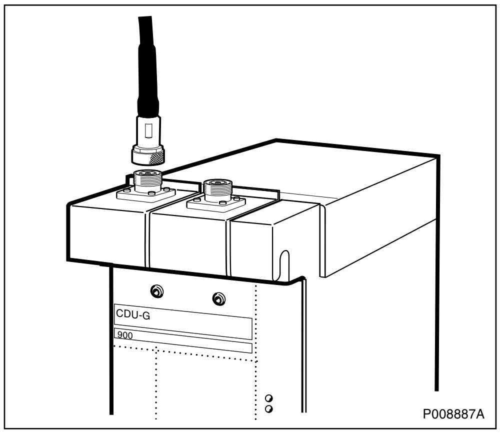
Replacing the CDU

5. Disconnect all cables connected to the faulty CDU.

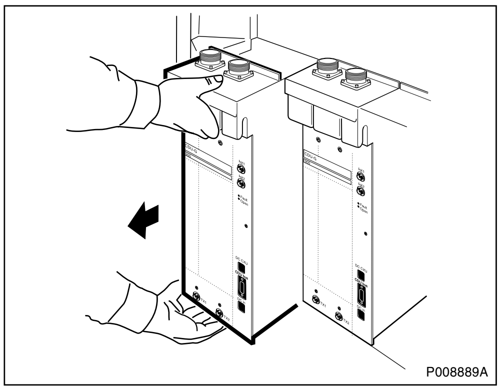
6. If bias injectors are used, remove both bias injectors from the faulty CDU.



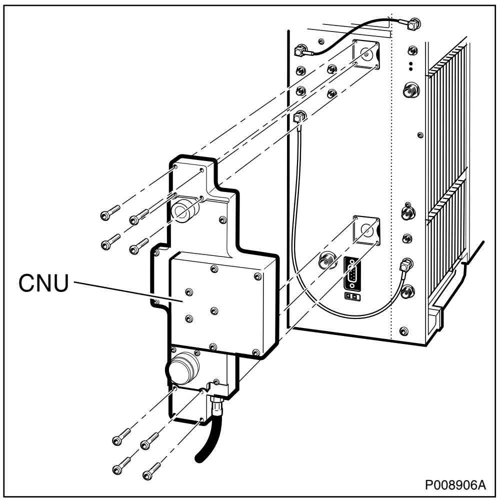
If no bias injectors are used, remove the jumper cables from the CDU.



7. Disconnect the cables to the CDU, loosen the screws on the CDU and lift it out, using the lifting handle.



8. If the CDU-F is equipped with a CNU, move the CNU to the new CDU-F. *See Section 5.18 CNU Replacement on page 148.*



9. Insert the new CDU, tighten the screws and reconnect the cables.

10. If bias injectors are used, reconnect the bias injectors to the CDU connectors and tighten them.

    If bias injectors are not used, reconnect the jumper cables to the CDU.

Taking the TRUs into operation

11. Switch on the circuit breaker for the replaced CDU on the IDM.

12. Press the TRU reset button on the TRUs connected to the faulty CDU.

13. Inform the OMC operator that the TRUs will be taken into service.

Note: If baseband hopping is used, contact the BSC/MSC and request that they re-initiate the hopping sequence. This can only be done by the BSC/MSC.

14. Press the Local/remote button on the TRUs to set the TRUs to remote mode and wait until the flashing indicator turns off.

15. Return to the applicable section in *Chapter Fault Localisation* for the next step in the process.

Handling replaced unit(s)

The CDU should be returned to Ericsson for repair with a repair delivery note, LZF 084 64 (Blue Tag) attached. Include a clear description of the fault found. *See Chapter Concluding Routines* for instructions on completing a repair delivery note.

5.15 CDU Bus Cable Replacement

This section describes how to replace a faulty CDU bus cable.

The CDU bus cable runs from the front of the CDU to the TRU backplane.

Preconditions

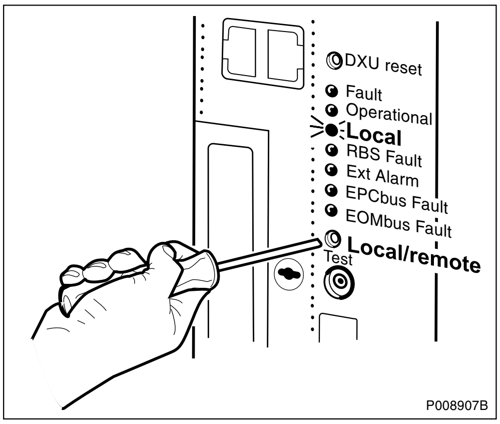
Before replacing the CDU bus cable, ensure the following:

- ☐ An approved ESD wrist strap is available for use.

Taking the RBS out of operation

1. Inform the OMC operator and get approval for temporarily taking the RBS out of service.

2. Press the Local/remote button on the DXU to set the RBS to local mode.

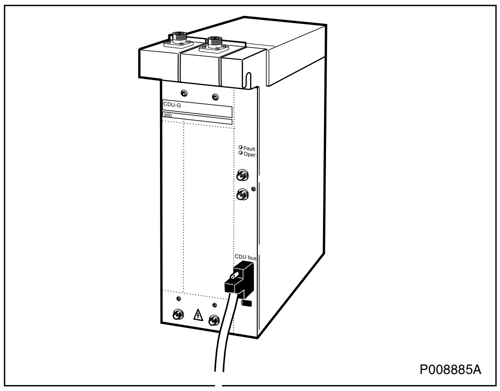


3. Wait until the Local indicator has a fixed yellow light.

4. Switch off the power to the cabinet. *See Section 5.2.2 Switching off the RBS on page 116.*

Replacing the CDU bus cable

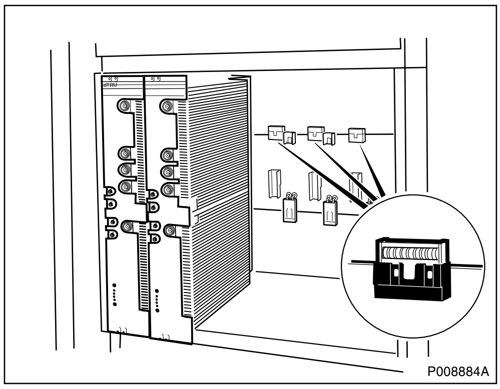
5. Disconnect the faulty CDU bus cable from the CDU.



6. Remove the IDM. *See Section 5.29 IDM Replacement on page 180* .

7. Remove the four rightmost TRUs (TRU 3 to 6). *See Section 5.40 TRU Replacement on page 230.*

8. Disconnect the faulty CDU bus cable from the connector on the TRU backplane and carefully pull it out.



9. Connect the new CDU bus cable to the TRU backplane and pull it out to the CDU front.

10. Mount the TRUs and the IDM. *See Section 5.40 TRU Replacement on page 230* and *Section 5.29 IDM Replacement on page 180* .

11. Connect the new CDU bus cable to the CDU.

Taking the RBS into operation

12. Switch on the power to the cabinet. *See Section 5.2.3 Switching on the RBS on page 117.*

13. Inform the OMC operator that the RBS will be taken into service.

14. Press the Local/remote button on the DXU to set the RBS to remote mode and wait until the flashing indicator turns off.

15. Return to the applicable section in *Chapter Fault Localisation* for the next step in the process.

Handling replaced unit(s)

Unless under contractual warranty the CDU bus cable shall be disposed of locally by the customer according to environmental regulations. Do not return the CDU bus cable to Ericsson for replacement, repair or disposal.

5.16 CDU-CXU and TRU-CXU RX Cables Replacement

This section describes how to replace faulty CDU-CXU and TRU-CXU RX cables.

The CDU-CXU and TRU-CXU RX cables run between the CDU and the TRUs via the CXU and ASU, if used.

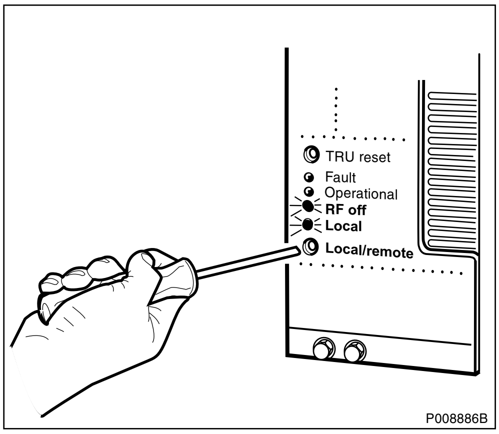
Warning!

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

Taking the TRUs out of operation

1. Inform the OMC operator and get approval for temporarily taking one or several TRU(s) out of service.

2. Press the Local/remote button on the TRUs to which the faulty cables are connected to set the RBS to local mode.



3. Wait until the RF off and Local indicators have a fixed yellow light.

Replacing the CDU-CXU and TRU-CXU RX cables

4. Replace both the RX1 and RX2 cables. For cable connections, *see figure below.*

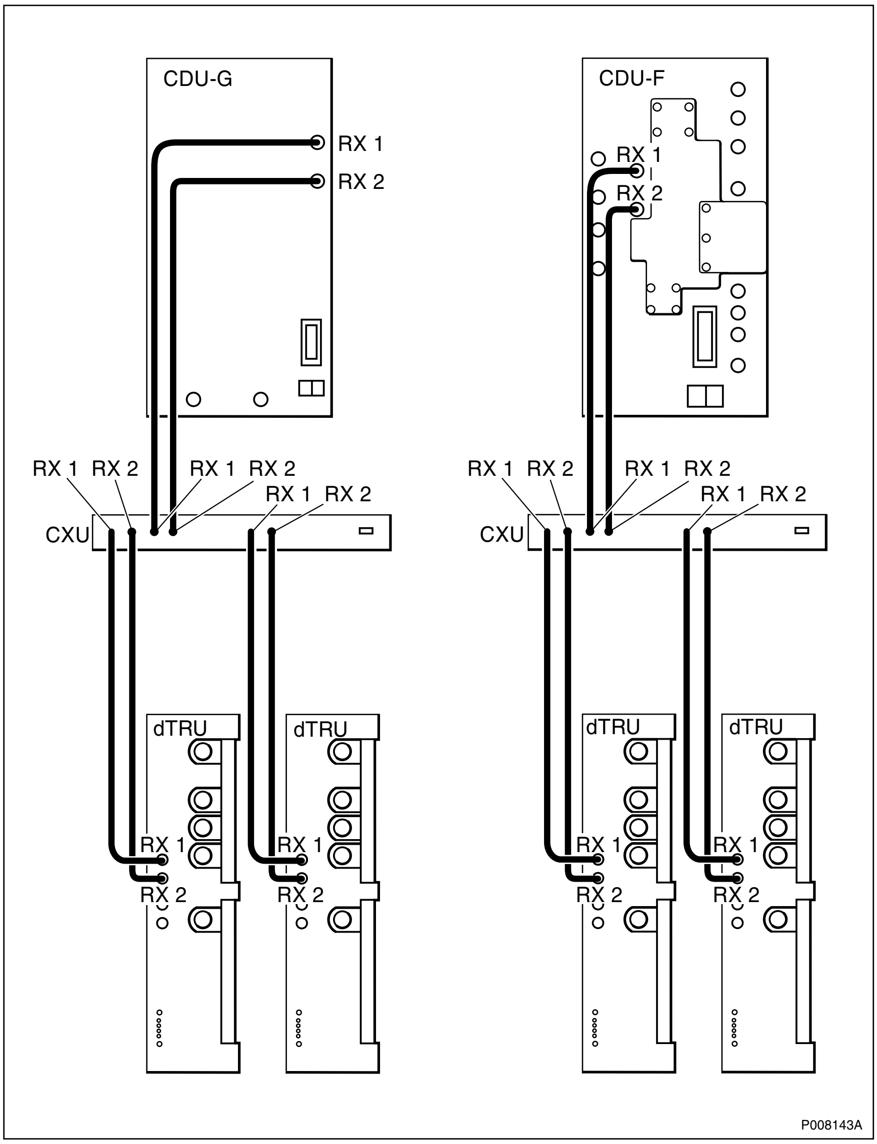


Figure 51 Cable connections for the CDU-CXU and TRU-CXU RX cables

Taking the TRUs into operation

5. Inform the OMC operator that the TRUs will be taken into service.

6. Press the Local/remote button on the TRU(s) to which the new cables are connected to set the TRU(s) to remote mode and wait until the flashing indicator turns off.

7. Return to the applicable section in *Chapter Fault Localisation* for the next step in the process.

Handling replaced unit(s)

Unless under contractual warranty the cables shall be disposed of locally by the customer according to environmental regulations. Do not return the cables to Ericsson for replacement, repair or disposal.

5.17 CDU-TRU TX Cables Replacement

This section describes how to replace faulty CDU-TRU TX cables.

The CDU-TRU TX cables run from the CDU to the TRUs.

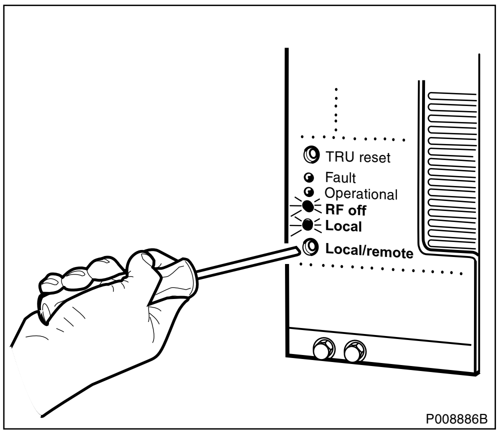
Caution!

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

Taking the TRU(s) out of operation

1. Inform the OMC operator and get approval for temporarily taking one or two TRUs, depending on the configuration, out of service.

2. Press the Local/remote button on the TRU(s) to which the faulty cables are connected to set the TRU(s) to local mode.



3. Wait until the RF off and Local indicators have a fixed yellow light.

Note: If uncombined mode in the TRUs is used, make sure all (up to three if CDU-F is used) TRUs connected to the faulty CDU are set in local mode, to prevent damage to the TRUs and exposure to RF radiation.

Replacing the CDU-TRU TX cables

4. Replace both the CDU-TRU TX cables. For cable connections, *see figure below.*

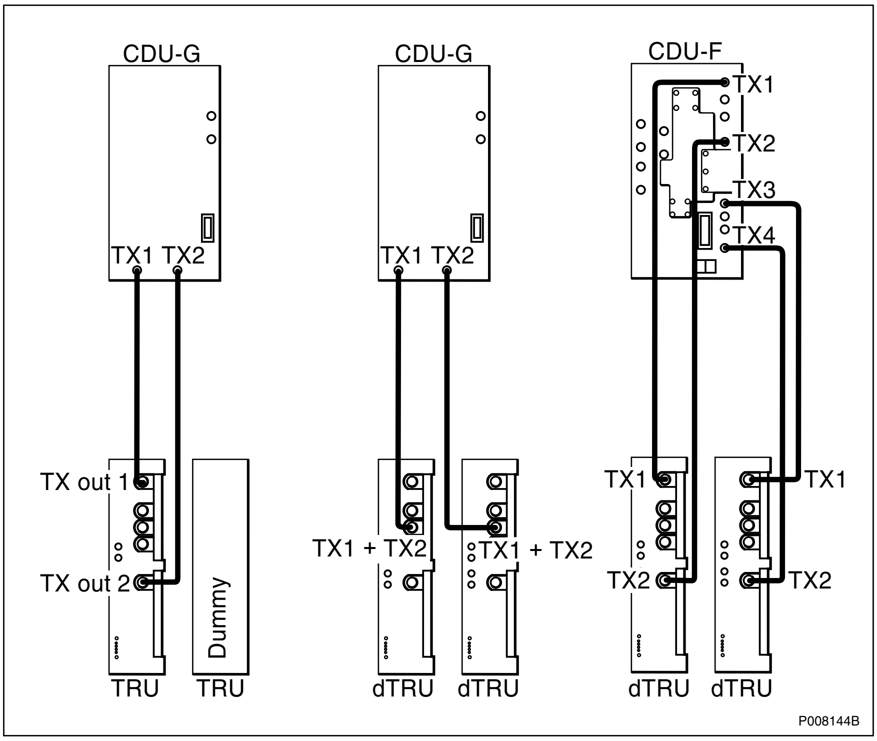
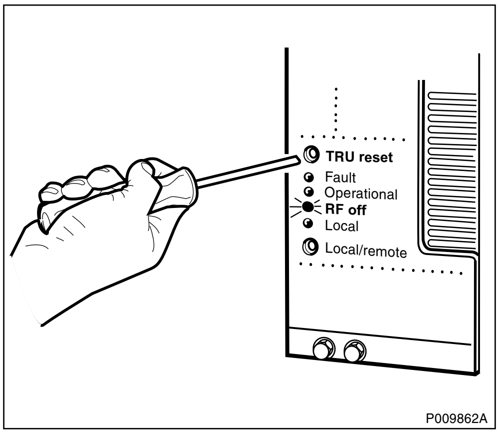


Figure 52 Cable connections for CDU-TRU TX cables in different configurations

Taking the TRUs into operation

5. Press the TRU reset button.



6. Inform the OMC operator that the TRU(s) will be taken into service.

7. Press the Local/remote button on the TRU(s) to set the TRU(s) to remote mode and wait until the flashing indicator turns off.

8. Return to the applicable section in *Chapter Fault Localisation* for the next step in the process.

Handling replaced unit(s)

Unless under contractual warranty the CDU-TRU TX cables shall be disposed of locally by the customer according to environmental regulations. Do not return the cables to Ericsson for replacement, repair or disposal.

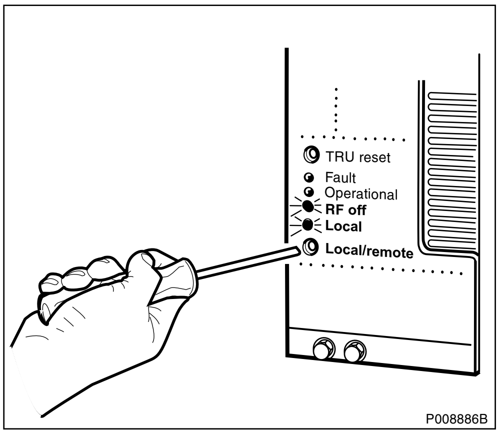
5.18 CNU Replacement

This section describes how to replace a faulty CNU.

Taking the TRUs out of operation

1. Inform the OMC operator and get approval for temporarily taking two (or more) TRUs out of service.

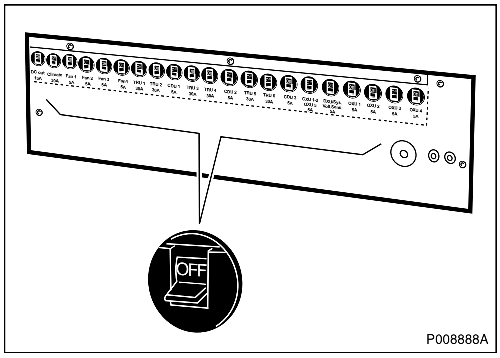
2. Press the Local/remote button on the TRUs connected to the CDU, on which the faulty CNU is placed, to set the TRUs to local mode.



3. Wait until the RF off and Local indicators have a fixed yellow light.

Note: If uncombined mode in the TRUs is used, make sure all (up to three if CDU-F is used) TRUs connected to the faulty CDU are set in local mode, to prevent damage to the TRUs and exposure to RF radiation.

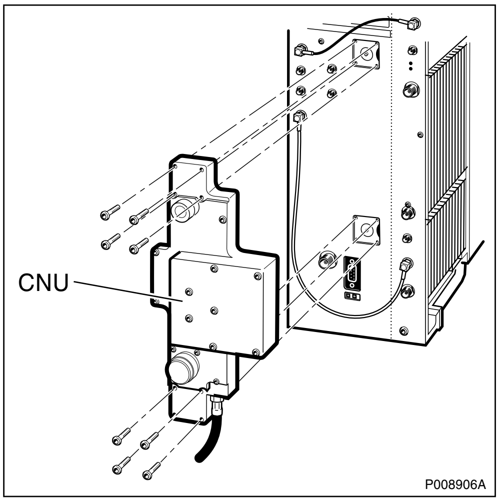
4. Switch off the circuit breaker on the IDM for the CDU on which the faulty CNU is placed.



Replacing the CNU

5. Disconnect the cables from the faulty CNU.

6. Remove the CNU by loosening the eight screws and lifting it off.



7. Attach the new CNU to the CDU and tighten the eight screws.

8. Reconnect the cables to the CNU.

Taking the TRUs into operation

9. Switch on the circuit breaker on the IDM for the CDU on which the new CNU is placed.

10. Inform the OMC operator that the TRUs will be taken into service.

11. Press the Local/remote button on the TRU(s) connected to the CDU with the new CNU to set the TRU(s) to remote mode and wait until the flashing indicator turns off.

12. Return to the applicable section in *Chapter Fault Localisation* for the next step in the process.

Handling replaced unit(s)

The CNU should be returned to Ericsson for repair with a repair delivery note, LZF 084 64 (Blue Tag) attached. Include a clear description of the fault found. *See Chapter Concluding Routines* for instructions on completing a repair delivery note.

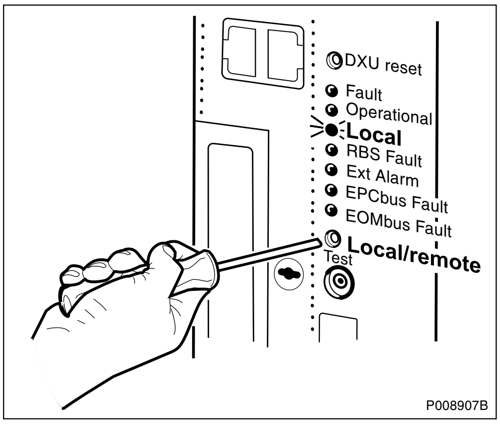
5.19 CXU Replacement

This section describes how to replace a faulty CXU.

Taking the RBS out of operation

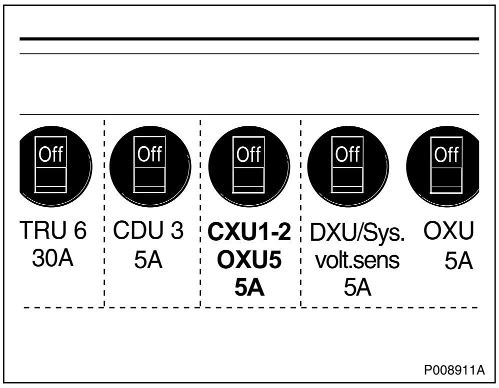
1. Inform the OMC operator and get approval for temporarily taking the RBS out of service.

2. Press the Local/remote button on the DXU to set the RBS to local mode.



3. Wait until the Local indicator has a fixed yellow light.

4. Switch off circuit breaker CXU1-2 OXU 5 on the IDM.

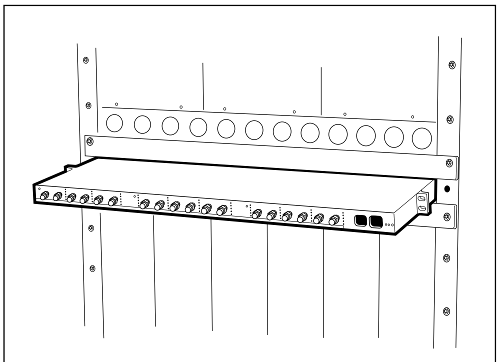


Replacing the CXU

5. Disconnect all cables to the CXU.

6. Loosen the two screws on the CXU. If a protective plate is used, remove it.

7. Remove the CXU.



8. Insert the new CXU, attach the protective plate, if used, and fasten the screws.

9. Reconnect the cables to the new CXU.

Taking the RBS into operation

10. Switch on the CXU1-2 OXU 5 circuit breaker on the IDM.

11. Inform the OMC operator that the RBS will be taken into service.

12. Press the Local/remote button on the DXU to set the DXU to remote mode and wait until the flashing indicator turns off.

13. Return to the applicable section in *Chapter Fault Localisation* for the next step in the process.

Handling replaced unit(s)

The CXU should be returned to Ericsson for repair with a repair delivery note, LZF 084 64 (Blue Tag) attached. Include a clear description of the fault found. *See Chapter Concluding Routines* for instructions on completing a repair delivery note.

5.20 DCCU Replacement

This section describes how to replace a faulty DCCU.

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.

Preconditions

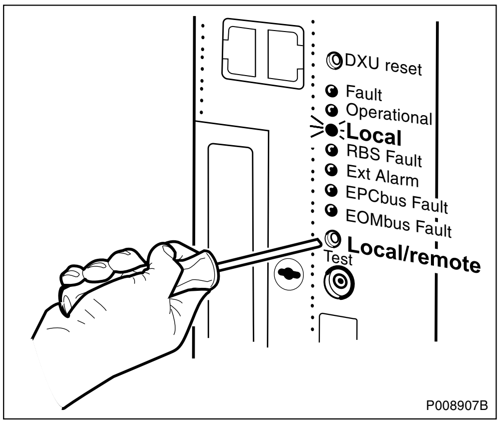
Before replacing the DCCU, ensure the following:

☐ An approved ESD wrist strap is available for use.

Taking the RBS out of operation

1. Inform the OMC operator and get approval for temporarily taking the RBS out of service.

2. Press the Local/remote button on the DXU to set the RBS to local mode.



3. Wait until the Local indicator has a fixed yellow light.

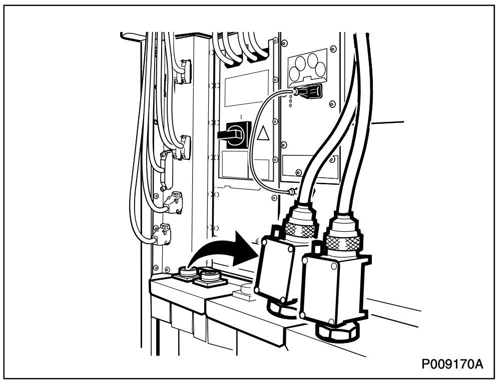
4. Switch off the power in the cabinet. *See Section 5.2.2 Switching off the RBS on page 116.*

5. Switch off the external DC power supply from the site to the RBS cabinet.

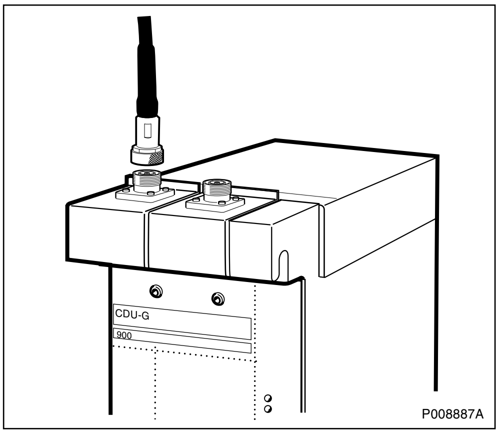
Removing the DCCU

Note: There must be no power in the cabinet when working with the DCCU.

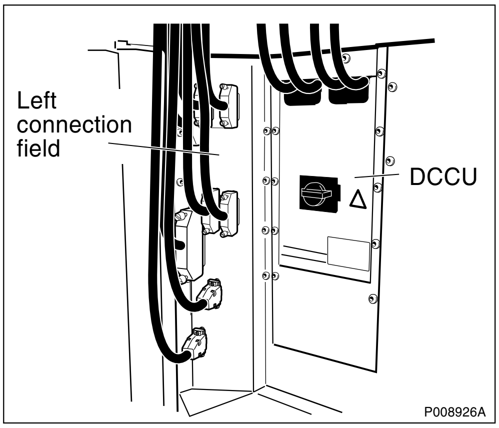
6. If bias injectors are used, remove the bias injectors from CDU 1.



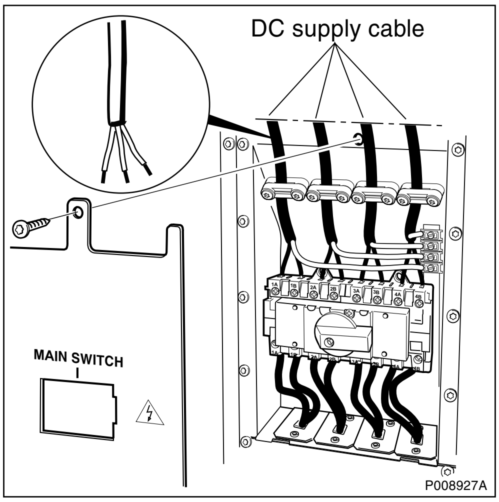
If no bias injectors are used, remove the jumper cables from CDU 1.



7. Disconnect the cables from the left connection field and remove it.



8. Remove the DCCU cover plate and disconnect the DC supply cables from the top of the DC MAIN SWITCH.



9. Cut the cable ties around the cables running from the DCCU to the PSUs and disconnect the cables from the PSUs.

10. Remove the DCCU.

Mounting the DCCU

11. Connect the DCCU cables to the PSUs.

12. Mount the cable ties around the cables running between the new DCCU and the PSUs.

13. Insert the new DCCU.

14. Connect the DC supply cables to the top of the MAIN SWITCH and reattach the DCCU cover plate.

15. Attach the left connection field, tighten the screws and reconnect the cables.

16. If bias injectors are used, remount the bias injectors on CDU 1.

    If no bias injectors are used, reconnect the jumper cables to CDU 1.

Taking the RBS into operation

17. Switch on the external DC power from the site to the RBS cabinet.

18. Switch on the incoming power to the cabinet. *See Section 5.2.3 Switching on the RBS on page 117.*

19. Press the Local/remote button on the DXU to set the DXU to remote mode and wait until the flashing indicator turns off.

20. Return to the applicable section in *Chapter Fault Localisation* for the next step in the process.

Handling replaced unit(s)

Unless under contractual warranty the DCCU shall be repaired locally at the RBS site or in a local repair shop. If the DCCU is irreparable, it shall be disposed of locally by the customer according to environmental regulations. Do not return the DCCU to Ericsson for replacement, repair or disposal.

5.21 DC Filter Replacement

This section describes how to replace a faulty DC filter.

Note: These instructions are valid only for cabinets equipped with external batteries.

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.

Preconditions

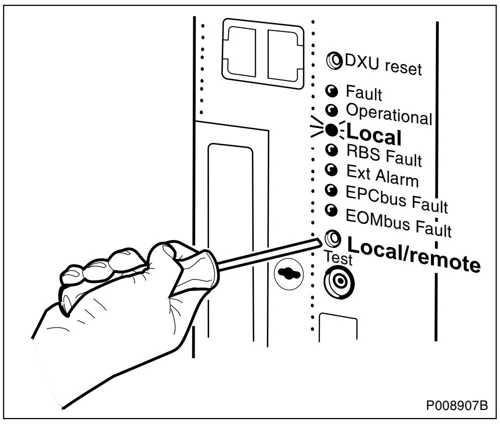
Before replacing the DC filter, ensure the following:

☐ An approved ESD wrist strap is available for use.

Taking the RBS out of operation

1. Inform the OMC operator and get approval for temporarily taking the RBS out of service.

2. Press the Local/remote button on the DXU to set the RBS to local mode.



3. Wait until the Local indicator has a fixed yellow light.

4. Switch off the incoming power to the cabinet. *See Section 5.2.2 Switching off the RBS on page 116.*

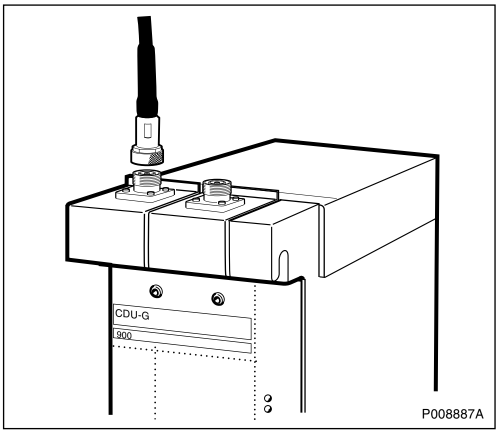
5. Switch off the external DC power supply from the site to the RBS cabinet.

Removing the DC filter

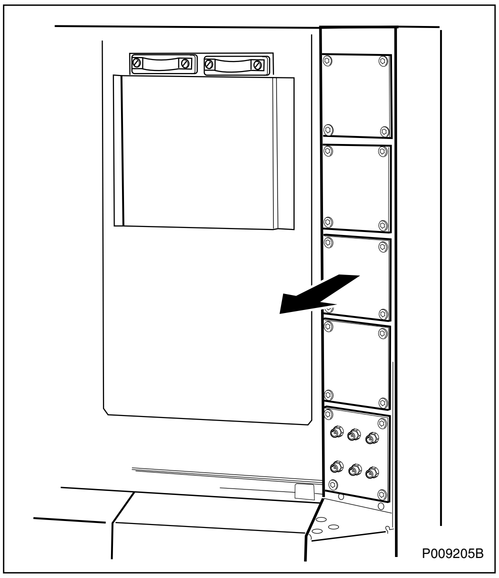
Note: There must be no power in the cabinet when working with the DC filter.

6. If bias injectors are used, remove the bias injectors from CDU 2 and CDU 3. *See Section 5.12 Bias Injector Replacement on page 132.*

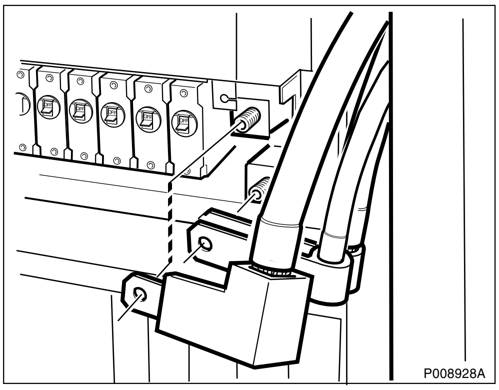
If no bias injectors are used, remove the jumper cables from CDU 2 and CDU 3.



7. Disconnect the cables from the right connection field and remove it.

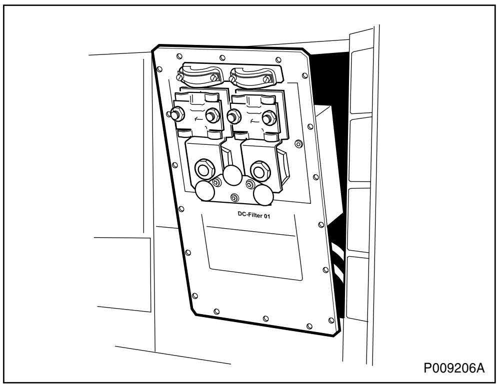


8. Remove the IDM front panel and disconnect the DC cables connected to the IDM.



9. Remove the cover from the DC filter.

10. Disconnect the DC cables from the DC filter and remove the DC filter.



Mounting the DC filter

11. Insert the new DC filter.

12. Reconnect the DC cables with torque 7-9 Nm and attach the DC filter cover.

13. Connect the DC cables to the IDM and reattach the IDM front panel.

14. Remount the right connection field and reconnect the cables.

15. If bias injectors are used, remount the bias injectors on CDU 2 and CDU 3. *See Section 5.12 Bias Injector Replacement on page 132.*

    If no bias injectors are used, remount the jumper cables to CDU 2 and CDU 3.

Taking the RBS into operation

16. Switch on the external DC power supply from the site to the RBS cabinet.

17. Switch on the incoming power supply to the cabinet. *See Section 5.2.3 Switching on the RBS on page 117.*

18. Inform the OMC operator that the RBS will be taken into service.

19. Press the Local/remote button on the DXU to set the DXU to remote mode and wait until the flashing indicator turns off.

20. Return to the applicable section in *Chapter Fault Localisation* for the next step in the process.

Handling replaced unit(s)

Unless under contractual warranty the DC filter shall be disposed of locally according to environmental regulations. Do not return the DC filter to Ericsson for replacement, repair or disposal.

5.22 DXU Replacement

This section describes how to replace a faulty DXU.

Preconditions

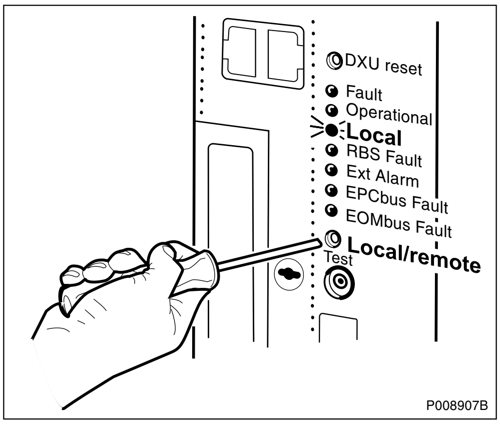
Before replacing the DXU, ensure the following:

☐ An approved ESD wrist strap is available for use.

Taking the RBS out of operation

1. Inform the OMC operator and get approval for temporarily taking the RBS out of service.

2. Press the Local/remote button on the DXU to set the RBS to local mode.



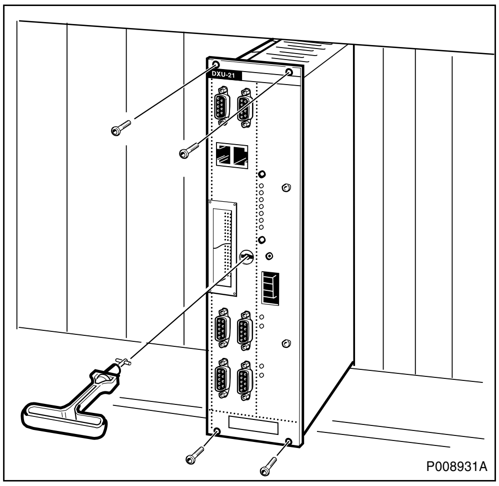
3. Wait until the Local indicator has a fixed yellow light.

4. Switch off the incoming power to the cabinet. *See Section 5.2.2 Switching off the RBS on page 116.*

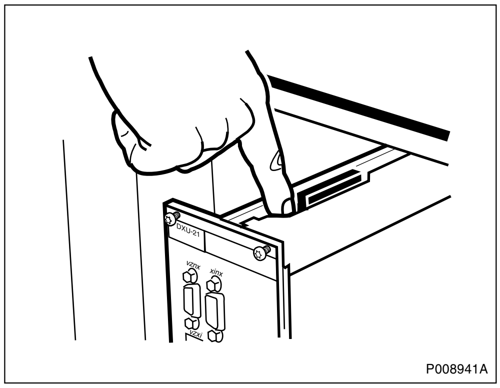
Replacing the DXU

5. Disconnect all cables connected to the DXU.

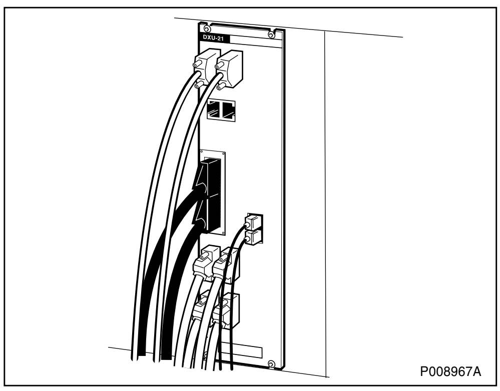
6. Loosen the screws keeping the DXU in place and use an RU extractor to remove it.



7. Move the flash card from the faulty DXU to the new one. *See Section 5.28 Flash Card Replacement on page 176.*



8. Mount the new DXU, fasten the screws and reconnect all cables.



Taking the RBS into operation

9. Switch on the incoming power to the cabinet. *See Section 5.2.3 Switching on the RBS on page 117.*

10. Inform the OMC operator that the RBS will be taken into service.

11. Press the Local/remote button on the DXU to set the DXU to remote mode and wait until the flashing indicator turns off.

12. Make a request to the OMC operator to check that all MOs are operational.

13. Return to the applicable section in *Chapter Fault Localisation* for the next step in the process.

Handling replaced unit(s)

The DXU (without flash card) should be returned to Ericsson for repair with a repair delivery note, LZF 084 64 (Blue Tag) attached. Include a clear description of the fault found. *See Chapter Concluding Routines* for instructions on completing a repair delivery note.

5.23 DXU Backplane Replacement

This section describes how to replace a faulty DXU backplane.

Note: Note the positions of RUs within the original sub-rack, so that they can be replaced into the correct positions without changing the IDB.

Preconditions

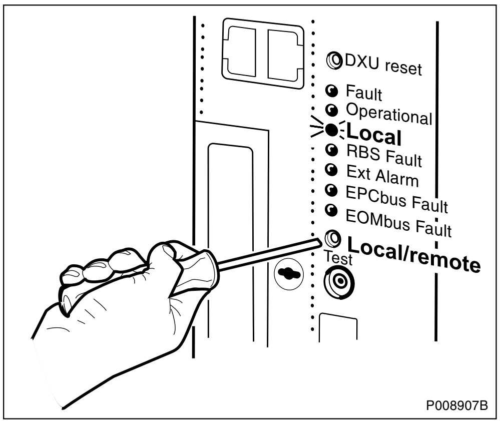
Before replacing the DXU backplane, ensure the following:

☐ An approved ESD wrist strap is available for use.

Taking the RBS out of operation

1. Inform the OMC operator and get approval for temporarily taking the RBS out of service.

2. Press the Local/remote button on the DXU to set the RBS to local mode.



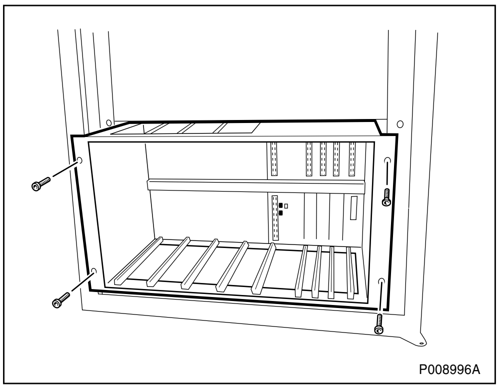
3. Wait until the Local indicator has a fixed yellow light.

4. Switch off the incoming power to the cabinet. *See Section 5.2.2 Switching off the RBS on page 116.*

Replacing the DXU backplane

5. Remove all units in the DXU subrack. *See the applicable sections.* for instructions on how to remove the units.

6. Remove the DXU subrack.

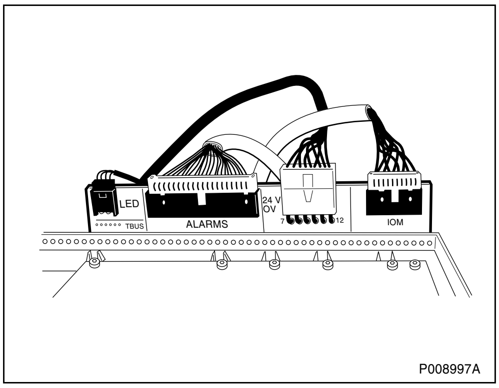


7. Disconnect all cables connected to the DXU backplane.

8. Remove the backplane from the DXU subrack by loosening the screws on the back of the subrack.

9. Mount a new DXU backplane to the DXU sub-rack.

10. Connect all cables to the DXU backplane.



For identification of cable connections, *see figure and table below.*

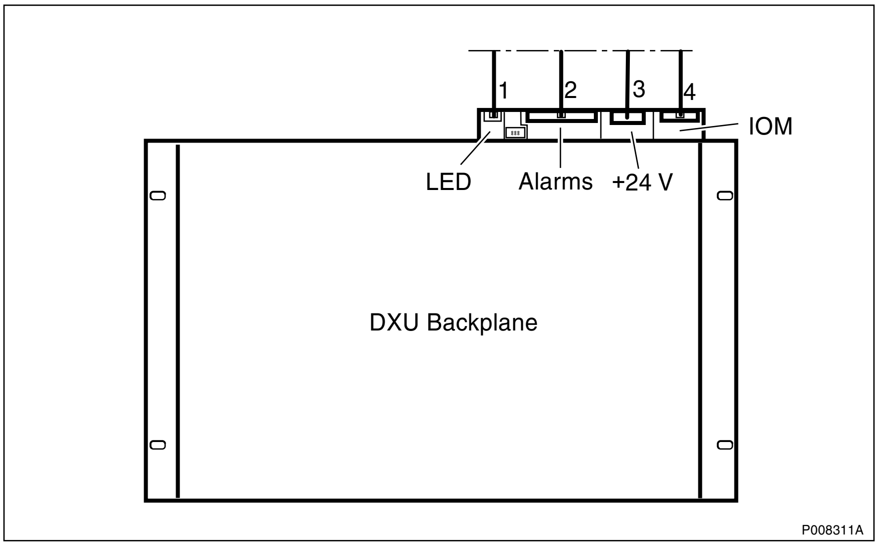


Figure 53 DXU backplane cable connections

Table 13 DXU backplane cable connections

Connector No.	**Connects to:**
1	Cabinet connection plate: LED
2	Cabinet connection plate: Ext. alarms
3	IDM backplane: sys. volt
4	TRU backplane: IOM

11. Insert the DXU subrack and secure it.

12. Mount all units in the DXU subrack and reconnect the cables. *See the applicable sections* for instructions on how to mount the units.

Taking the RBS into operation

13. Switch on the incoming power supply to the cabinet. *See Section 5.2.3 Switching on the RBS on page 117.*

14. Inform the OMC operator that the RBS will be taken into service.

15. Press the Local/remote button on the DXU to set the DXU to remote mode and wait until the flashing indicator turns off.

16. Make a request to the OMC operator to check that all MOs are operational.

17. Return to the applicable section in *Chapter Fault Localisation* for the next step in the process.

Handling replaced unit(s)

Unless under contractual warranty the DXU backplane shall be disposed of locally by the customer according to environmental regulations. Do not return the DXU backplane to Ericsson for replacement, repair or disposal.

5.24 EPC Bus Cable Replacement

This section describes how to replace a faulty EPC bus cable.

All EPC bus cables, **except** the cable between the DXU and FCU, can easily be replaced directly, without taking the RBS out of operation. For instructions on how to replace the EPC bus cable between the DXU and FCU, *see instructions below* .

Note: Be careful while connecting/disconnecting the EPC bus cables to the BBS as they are easily damaged when performing maintenance and service on the cabinet.

For an overview of the EPC bus cables in the RBS (with and without battery cabinet connected), *see figures below.*

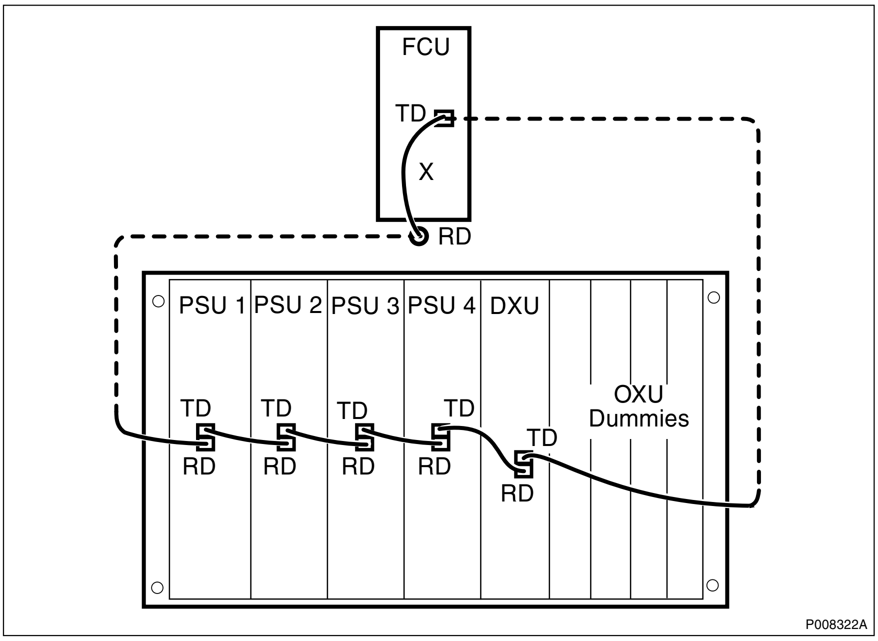


Figure 54 EPC bus cables without BBS connected

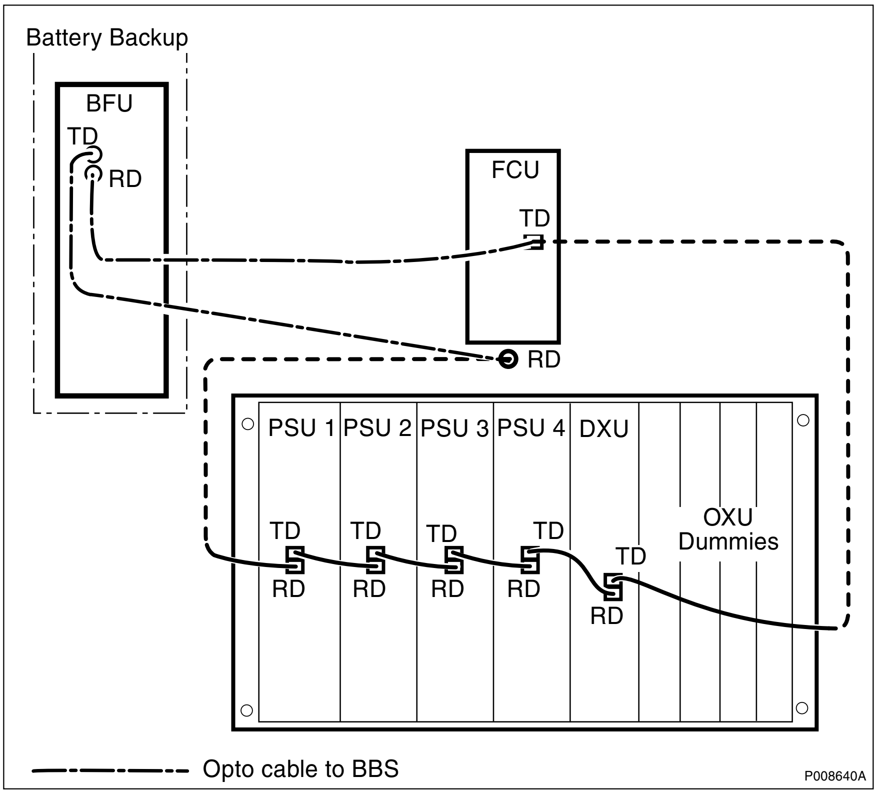


Figure 55 EPC bus cables with BBS connected

5.24.1 Replacing the EPC bus cable between the DXU and FCU

Preconditions

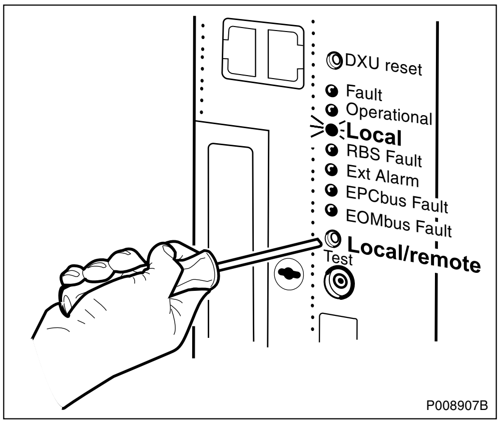
Before replacing the EPC bus cables connected to the back of the FCU, ensure the following:

☐ An approved ESD wrist strap is available for use.

Taking the RBS out of operation

4. Inform the OMC operator and get approval for temporarily taking the RBS out of service.

5. Press the Local/remote button on the DXU to set the RBS to local mode.

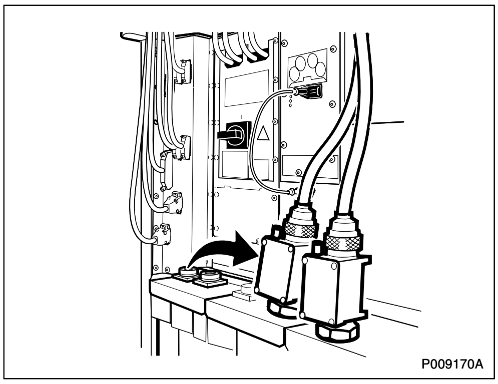


6. Wait until the Local indicator has a fixed yellow light.

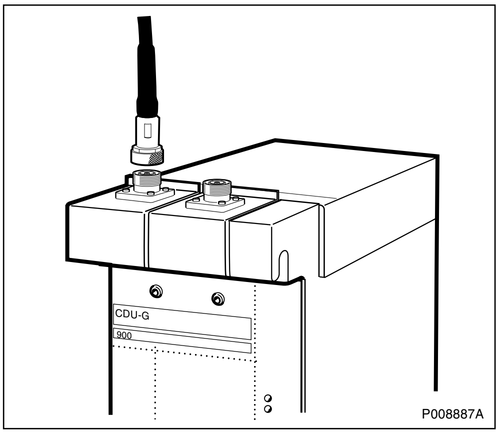
7. Switch off the incoming power to the cabinet. *See Section 5.2.2 Switching off the RBS on page 116.*

Replacing the EPC bus cable to the FCU

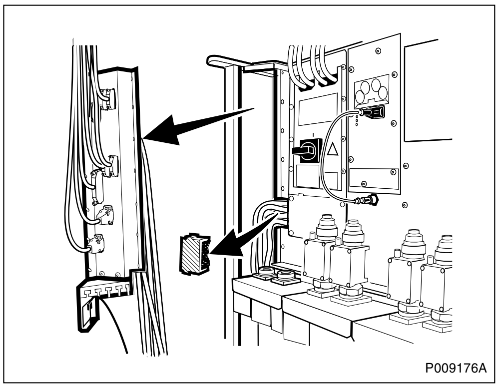
8. If bias injectors are used, remove the bias injectors from CDU 1.



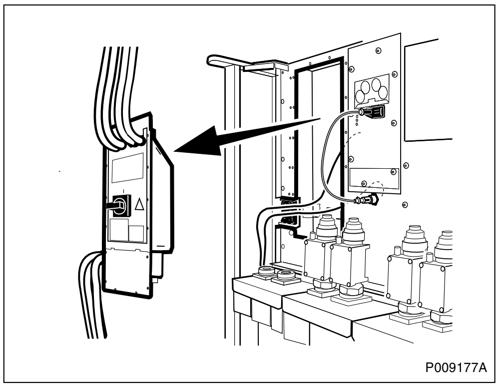
If no bias injectors are used, remove the jumper cables from CDU 1.



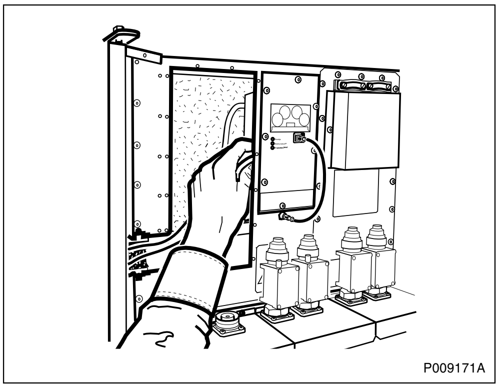
9. Remove the left connection field and the plastic cable clamp.



10. Remove the ACCU or DCCU.



11. Remove the faulty EPC bus cable from the back of the FCU.



12. Remove the other end of the faulty EPC bus cable from the DXU and PSU 1.

13. Connect the new EPC bus cables to the back of the FCU and route the cables to the front of the DXU and PSU 1.

14. Remount the left connection field and the ACCU or DCCU.

Taking the RBS into operation

15. Switch on the incoming power supply to the cabinet. *See Section 5.2.3 Switching on the RBS on page 117.*

16. Inform the OMC operator that the RBS will be taken into service.

17. Press the Local/remote button on the DXU to set the DXU to remote mode and wait until the flashing indicator turns off.

18. Return to the applicable section in *Chapter Fault Localisation* for the next step in the process.

Handling replaced unit(s)

Unless under contractual warranty the EPC bus cable(s) shall be disposed of locally by the customer according to environmental regulations. Do not return the EPC bus cable(s) to Ericsson for replacement, repair or disposal.

5.25 ESB Cable Replacement

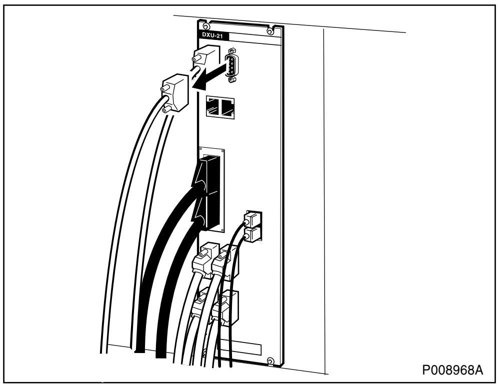
This section describes how to replace a faulty ESB cable.

The ESB cable runs from the DXU to the left connection field.

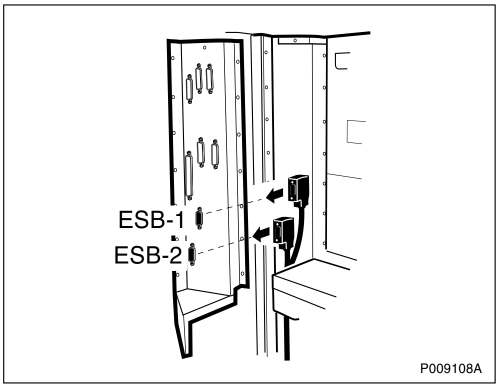
Replacing the ESB cable

1. Inform the OMC operator and get approval for temporarily taking the second RBS in the chain out of service.

2. Remove the faulty ESB cable from the DXU.



3. Remove the left connection field and remove the faulty ESB cable.



4. Connect the new ESB cable to the left connection field and remount the connection field.

5. Connect the new ESB cable to the DXU.

Handling replaced unit(s)

Unless under contractual warranty the ESB cable shall be disposed of locally by the customer according to environmental regulations. Do not return the cable to Ericsson for replacement, repair or disposal.

5.26 Fan Replacement

This section describes how to replace a faulty fan.

Taking the fan out of operation

1. Inform the OMC operator and get approval for replacing a fan.

2. Switch off the applicable fan circuit breaker on the IDM. *See the table below.*

Table 14 Switching off the fans for replacement

If...	then...
fan 1 is to be replaced	switch off circuit breaker Fan 1 on the IDM.
fan 2 is to be replaced	switch off circuit breakers Fan 1 and Fan 2 on the IDM.
fan 3 is to be replaced	switch off circuit breakers Fan 3 and Fan 4 on the IDM.
fan 4 is to be replaced	switch off circuit breaker Fan 4 on the IDM.

Replacing the fan

3. Remove the cover plate protecting the fans on top of the cabinet.

4. Pull out the fan fold and remove the faulty fan. *See table and figure below.*

Table 15 Removing the fans

If...	then...
fan 2 is to be replaced	pull out fan 1 before pulling out fan 2.
fan 3 is to be replaced	pull out fan 4 before pulling out fan 3.

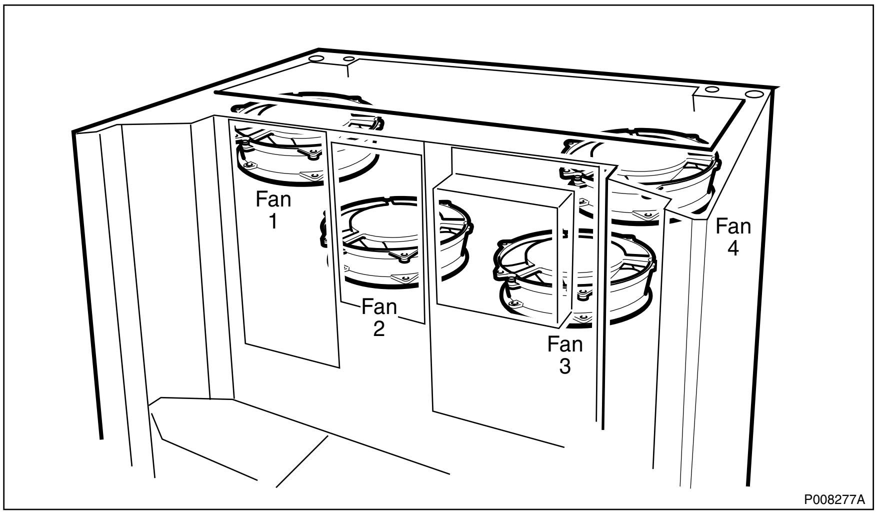
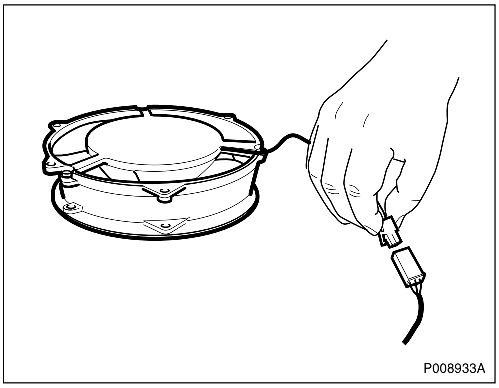


Figure 56 Fan positions

5. Disconnect the cable connected to the faulty fan.

6. Reconnect the cable to the new fan.



7. Mount the new fan and, if necessary, the fan placed above the new fan.

8. Insert the fan fold and reattach the cover plate.

Taking the RBS into operation

9. Switch on the applicable circuit breaker(s) on the IDM.

10. Inform the OMC operator that the fan has been replaced.

11. Return to the applicable section in *Chapter Fault Localisation* for the next step in the process.

Handling replaced unit(s)

Unless under contractual warranty the fan shall be disposed of locally by the customer according to environmental regulations. Do not return the fan to Ericsson for replacement, repair or disposal.

5.27 FCU Replacement

This section describes how to replace a faulty FCU.

Preconditions

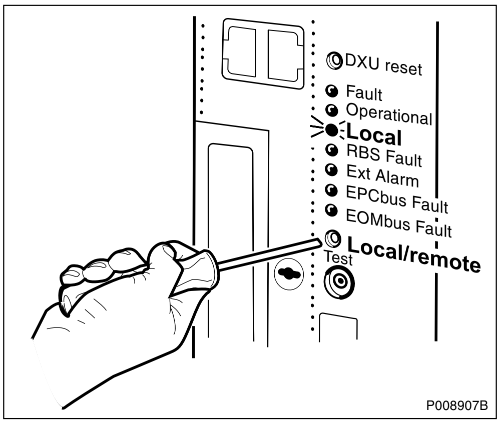
Before replacing the FCU, ensure the following:

☐ An approved ESD wrist strap is available for use.

Taking the FCU out of operation

1. Inform the OMC operator and get approval for temporarily taking the RBS out of service.

2. Press the Local/remote button on the DXU to set the RBS to local mode.



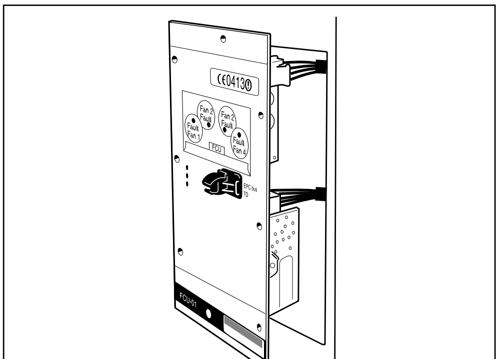
3. Wait until the Local indicator has a fixed yellow light.

4. Switch off the circuit breakers Fan 1 – 4 on the IDM.

Replacing the FCU

5. Disconnect the EPC bus cable connected to the front panel of the FCU.

6. Loosen the screws keeping the FCU in place and remove it.



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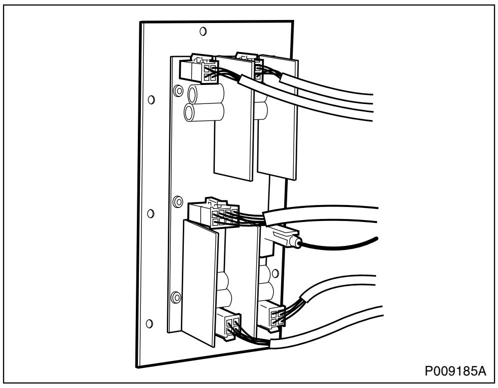
7. Disconnect the cables from the FCU. Make a note of the cable connections.

8. Connect the disconnected cables to the new FCU.



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9. Mount the FCU and tighten the screws.

10. Reconnect the EPC bus cable to the front panel of the FCU.

Taking the RBS into operation

11. Switch on the circuit breakers Fan 1 – 4 on the IDM.

12. Inform the OMC operator that the RBS will be taken into service.

13. Press the Local/remote button on the DXU to set the DXU to remote mode and wait until the flashing indicator turns off.

14. Return to the applicable section in *Chapter Fault Localisation* for the next step in the process.

Handling replaced unit(s)

Unless under contractual warranty the FCU shall be disposed of locally by the customer according to environmental regulations. Do not return the FCU to Ericsson for replacement, repair or disposal.

5.28 Flash Card Replacement

This section describes how to replace a faulty flash card.

Preconditions

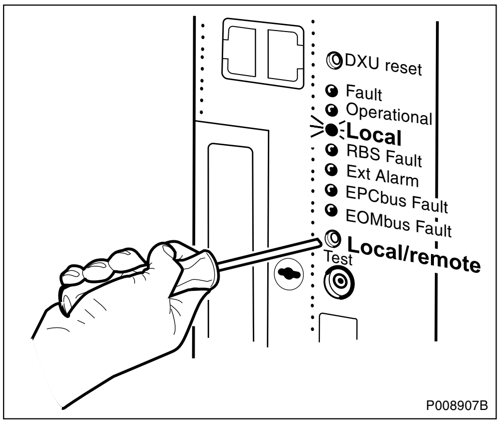
Before replacing the flash card, ensure the following:

☐ An approved ESD wrist strap is available for use.

Taking the RBS out of operation

1. Inform the OMC operator and get approval for temporarily taking the RBS out of service.

2. Press the Local/remote button on the DXU to set the RBS to local mode.

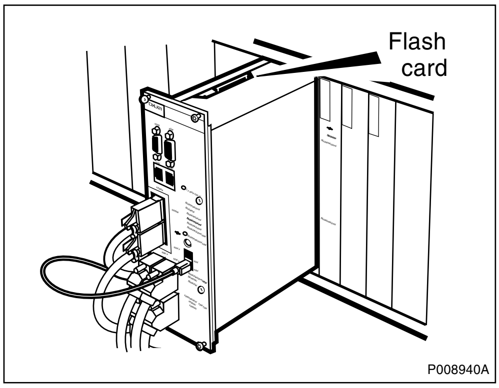


3. Wait until the Local indicator has a fixed yellow light.

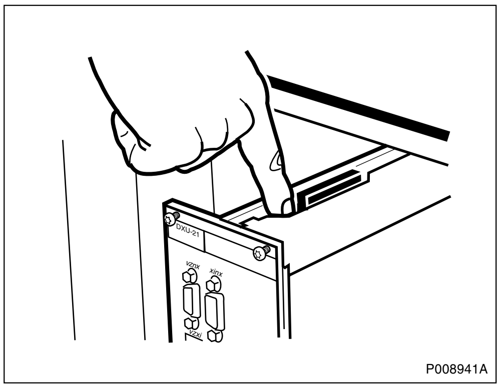
4. Switch off the incoming power to the cabinet. *See Section 5.2.2 Switching off the RBS on page 116.*

Removing the flash card

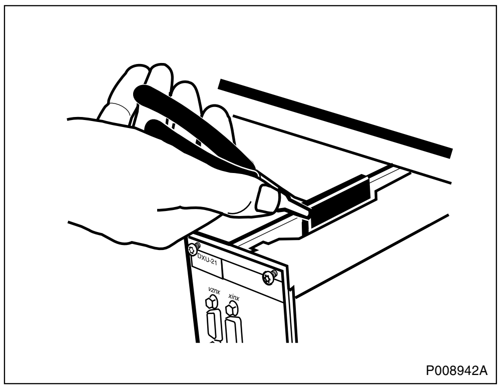
5. Disconnect the EPC bus cable. Loosen the screws on the DXU. Using an RU extractor, carefully pull it out of its position until the flash card slot on top of the DXU is clear of the frame.



6. Lift the release lever to an upright position. Then push it down to release the flash card.



7. Use needle-nosed pliers to gently grip the flash card and pull it upwards and out of the DXU.

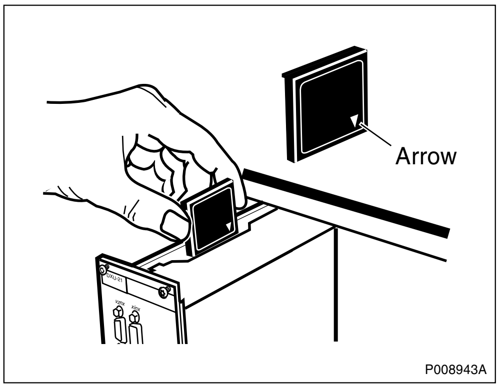


8. If a new IDB and/or RBS SW is to be used, load the flash card with the new IDB and/or RBS SW. *See Section 5.36 on page 193* and/or *Section 5.34 RBS SW Update on page 191* .

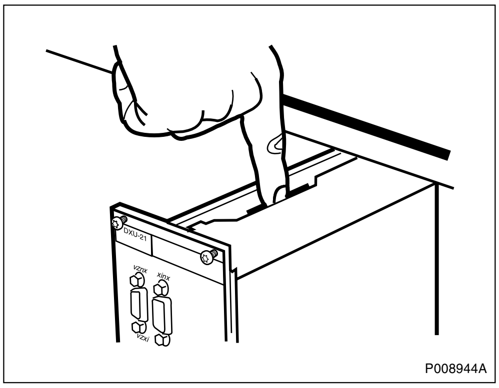
Inserting the flash card

9. Release the locking arm by pulling it upwards.

10. While holding the locking arm to the side, insert the flash card (connector edge downwards) between the guide rails on the sides. Gently push it down until it comes into contact with the connectors at the bottom.

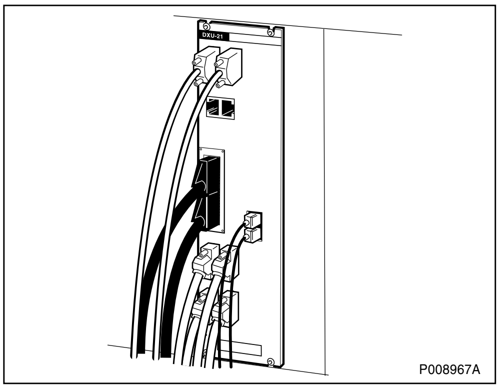


11. Push the locking arm down over the flash card.



Note: The locking arm must be in place to secure the flash card in position.

12. Push the DXU back into place and tighten the screws. Reconnect the EPC bus cable and ensure that the cables are properly connected.



Taking the RBS into operation

13. Switch on the incoming power to the cabinet. *See Section 5.2.3 Switching on the RBS on page 117.*

14. Inform the OMC operator that the RBS will be taken into service.

15. Press the Local/remote button on the DXU to set the DXU to remote mode and wait until the flashing indicator turns off.

16. Make a request to the OMC operator to check that all MOs are operational.

17. Return to the applicable section in *Chapter Fault Localisation* for the next step in the process.

Handling replaced unit(s)

Unless under contractual warranty the flash card shall be disposed of locally by the customer according to environmental regulations. Do not return the flash card to Ericsson for replacement, repair or disposal.

5.29 IDM Replacement

This section describes how to replace a faulty IDM.

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.

Preconditions

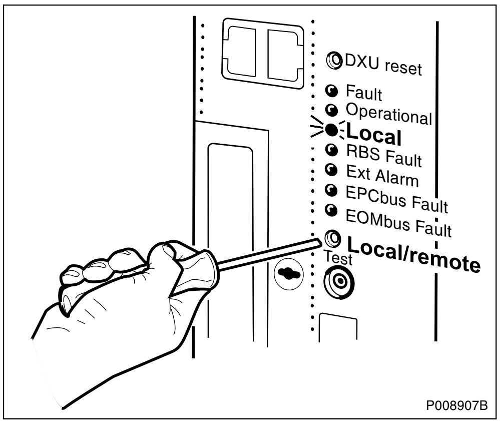
Before replacing the IDM, ensure the following:

- ☐ An approved ESD wrist strap is available for use.

Taking the RBS out of operation

1. Inform the OMC operator and get approval for temporarily taking the RBS out of service.

2. Press the Local/remote button on the DXU to set the RBS to local mode.

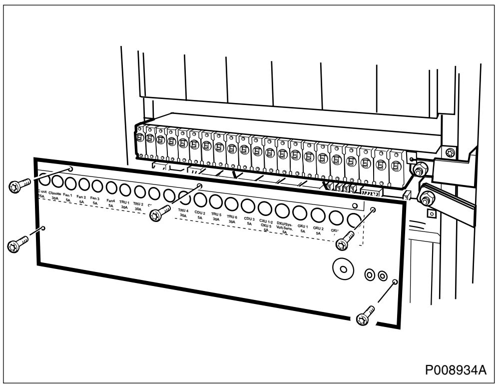


3. Wait until the Local indicator has a fixed yellow light.

4. Switch off the incoming power supply to the cabinet. *See Section 5.2.2 Switching off the RBS on page 116.*

Replacing the IDM

5. Loosen the five screws on the IDM front plate and remove it.



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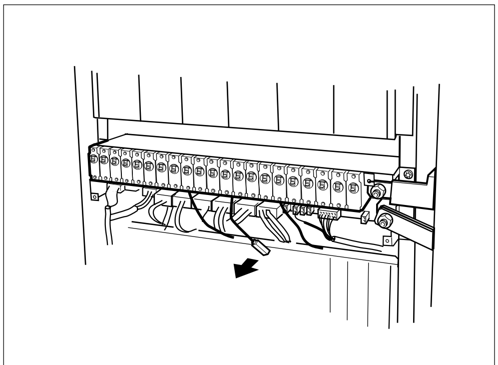
6. Disconnect all cables connected to the IDM.



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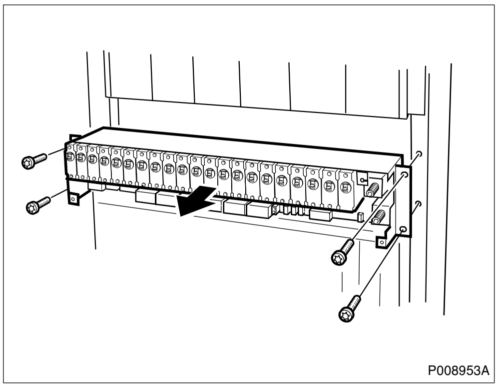
7. Loosen the four screws keeping the IDM in place and remove it.



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8. Insert the IDM, tighten the four screws and reconnect the cables.

9. Mount the IDM front plate and tighten the five screws.

Taking the RBS into operation

10. Switch on the incoming power supply to the cabinet. *See Section 5.2.3 Switching on the RBS on page 117.*

11. Inform the OMC operator that the RBS will be taken into service.

12. Press the Local/remote button on the DXU to set the DXU to remote mode and wait until the flashing indicator turns off.

13. Return to the applicable section in *Chapter Fault Localisation* for the next step in the process.

Handling replaced unit(s)

Unless under contractual warranty the IDM shall be disposed of locally by the customer according to environmental regulations. Do not return the IDM to Ericsson for replacement, repair or disposal.

5.30 IOM Bus Cable Replacement

This section describes how to replace a faulty IOM bus cable.

The IOM bus cable runs between the DXU and TRU backplanes.

Preconditions

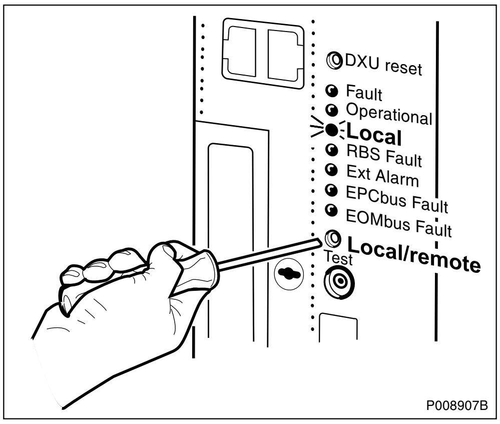
Before replacing the IOM bus cable, ensure the following:

☐ An approved ESD wrist strap is available for use.

Taking the RBS out of operation

1. Inform the OMC operator and get approval for temporarily taking the RBS out of service.

2. Press the Local/remote button on the DXU to set the RBS to local mode.



3. Wait until the Local indicator has a fixed yellow light.

4. Switch off the incoming power supply to the cabinet. *See Section 5.2.2 Switching off the RBS on page 116.*

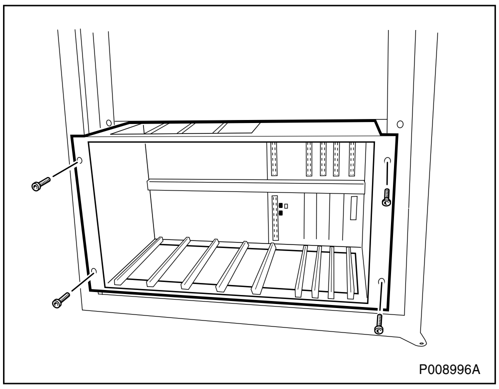
Replacing the IOM bus cable

5. Remove the two leftmost TRUs. *See Section 5.40 TRU Replacement on page 230.*

6. Remove the IDM. *See Section 5.29 IDM Replacement on page 180* .

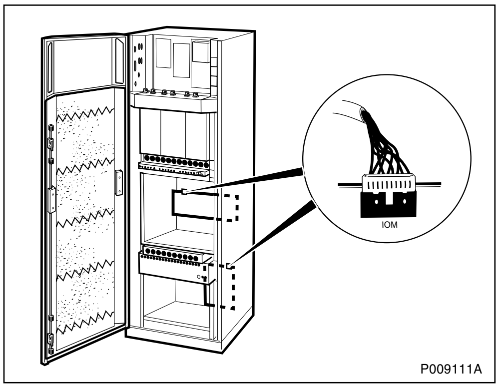
7. Remove all units in the DXU subrack. *See the applicable sections* for instructions on how to remove the units.

8. Loosen the four screws on the DXU subrack and carefully lift it out of the cabinet.



9. Disconnect the faulty IOM bus cable from the DXU backplane and the TRU backplane.

10. Connect the new IOM bus cable to the DXU backplane and the TRU backplane.



11. Replace the DXU subrack and secure it.

12. Replace the units removed from the DXU subrack reconnect all cables. *See the applicable sections* for instructions on how to remove the units.

13. Mount the IDM. *See Section 5.29 IDM Replacement on page 180.*

14. Mount the TRUs. *See Section 5.40 TRU Replacement on page 230.*

Taking the RBS into operation

15. Switch on the incoming power supply to the cabinet. *See Section 5.2.3 Switching on the RBS on page 117.*

16. Inform the OMC operator that the RBS will be taken into service.

17. Press the Local/remote button on the DXU to set the DXU to remote mode and wait until the flashing indicator turns off.

18. Return to the applicable section in *Chapter Fault Localisation* for the next step in the process.

Handling replaced unit(s)

Unless under contractual warranty the IOM bus cable shall be disposed of locally by the customer according to environmental regulations. Do not return the cable to Ericsson for replacement, repair or disposal.

5.31 OVP Card Replacement

This section describes how to replace a faulty OVP card in the DF.

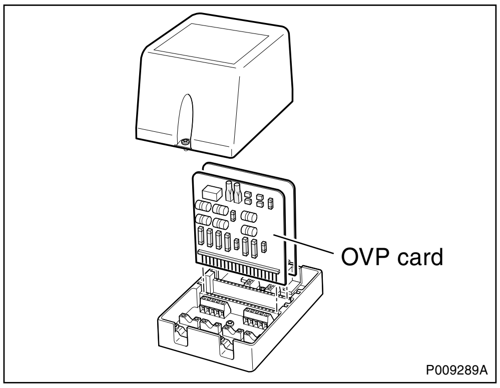
Preconditions

Before replacing the OVP card, ensure the following:

- ☐ An approved ESD wrist strap is available for use.

Replacing the OVP card

1. Remove the OVP cover and the OVP card.



2. Insert the new OVP card and replace the cover.

Handling replaced unit(s)

Unless under contractual warranty the OVP card shall be disposed of locally by the customer according to environmental regulations. Do not return the card to Ericsson for replacement, repair or disposal.

5.32 PSU Replacement

This section describes how to replace a faulty PSU.

Note: The EPC bus cables for the power communication loop must have a bend radius of at least 35 mm.

Caution!

The DC cable will be live when disconnecting it from the PSU.

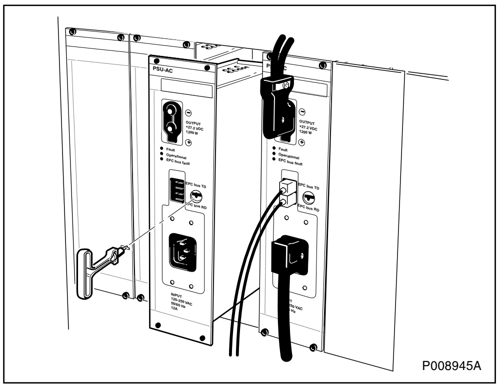
Taking the RBS out of operation

1. Inform and get approval from the OMC operator that a PSU will be replaced.

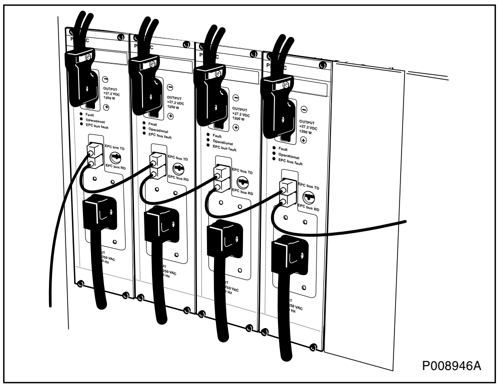
Replacing the PSU

2. Disconnect all cables connected to the PSU.

3. Loosen the four screws on the PSU and, using an RU extractor, remove the PSU.



4. Mount the new PSU and reconnect all cables.



Taking the RBS into operation

5. Inform the OMC operator that the PSU has been replaced and the RBS will be taken into service.

6. Return to the applicable section in *Chapter Fault Localisation* for the next step in the process.

Handling replaced unit(s)

The PSU should be returned to Ericsson for repair with a repair delivery note, LZF 084 64 (Blue Tag) attached. Include a clear description of the fault found. *See Chapter Concluding Routines* for instructions on completing a repair delivery note.

5.33 PSU DC Cable Replacement

This section describes how to replace a faulty PSU DC cable.

The PSU DC cable runs between the PSUs and the IDM.

Preconditions

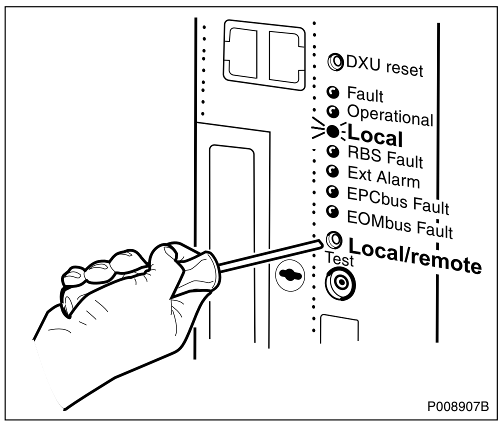
Before replacing the PSU DC cable, ensure the following:

☐ An approved ESD wrist strap is available for use.

Taking the RBS out of operation

1. Inform the OMC operator and get approval for temporarily taking the RBS out of service.

2. Press the Local/remote button on the DXU to set the RBS to local mode.

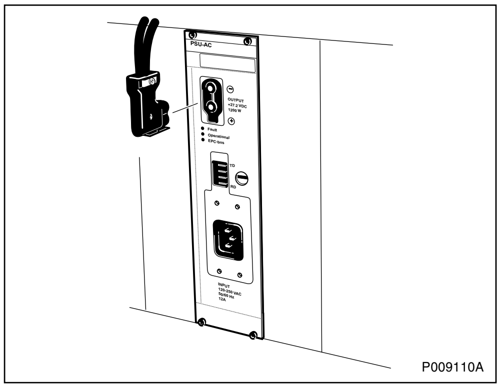


3. Wait until the Local indicator has a fixed yellow light.

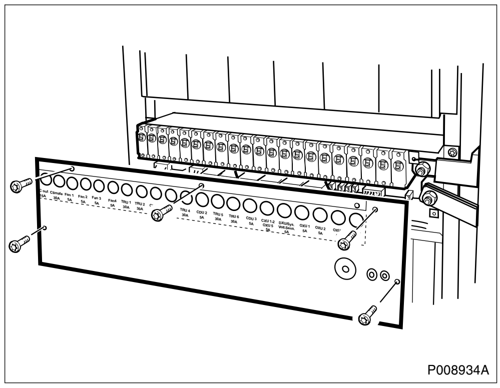
4. Switch off the incoming power supply to the cabinet. *See Section 5.2.2 Switching off the RBS on page 116.*

Replacing the PSU DC cable

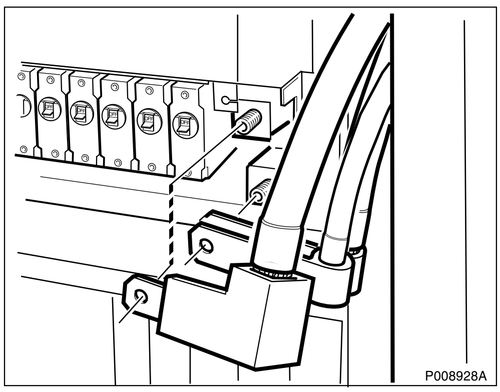
5. Disconnect the DC cable from the PSU.



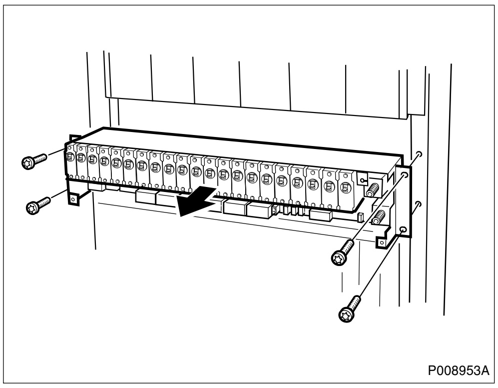
6. Loosen the five screws on the IDM front plate and remove it.



7. Disconnect the DC cable connected to the IDM.



8. Loosen the four screws on the IDM and remove it.



9. Remove the IDM housing and disconnect the faulty PSU DC cable from the IDM

10. Connect the new PSU DC cable to the IDM and mount the IDM housing.

11. Mount the IDM.

12. Connect the DC cable to the IDM and mount the IDM front plate.

13. Connect the new DC cable to the PSU.

Taking the RBS into operation

14. Switch on the incoming power supply to the cabinet. *See Section 5.2.3 Switching on the RBS on page 117.*

15. Inform the OMC operator that the RBS will be taken into service.

16. Press the Local/remote button on the DXU to set the DXU to remote mode and wait until the flashing indicator turns off.

17. Return to the applicable section in *Chapter Fault Localisation* for the next step in the process.

Handling replaced unit(s)

Unless under contractual warranty the PSU DC cable shall be disposed of locally by the customer according to environmental regulations. Do not return the PSU DC cable to Ericsson for replacement, repair or disposal.

5.34 RBS SW Update

This section describes how to install new RBS SW to the flash card with the OMT.

For more information on the use of the OMT, *see* :

OMT User's Manual *LZN 302 01*

Normally the BSC sends new or updated RBS SW when needed. However, if the RBS SW is corrupt and there is no communication between the BSC and the RBS, it may be necessary to load new RBS SW to the DXU flash card in the RBS using the OMT.

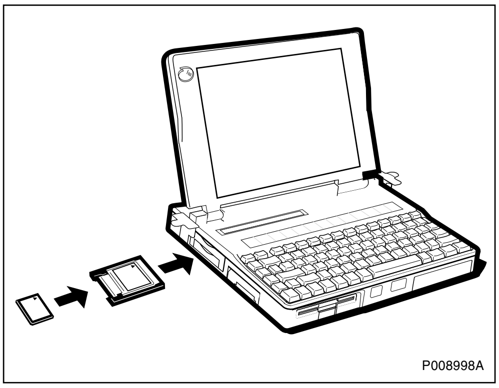
Preconditions

Before updating the RBS SW, ensure the following:

- ☐ The PC used is equipped with a PCM CIA slot and a flash card adapter.
- ☐ The correct RBS SW is present on the PC.
- ☐ An approved ESD wrist strap is available for use.

Removing the flash card from the DXU and inserting it into a PC

1. Inform the OMC operator and get approval for loading new RBS SW to the RBS,
2. Remove the flash card. *See Section 5.28 Flash Card Replacement on page 176.*
3. Insert the flash card into the PCM CIA slot on the PC, using the flash card adapter.



Loading RBS SW from the PC to the flash card

This section describes how to load IDB and/or RBS SW to the flash card inserted in a PC.

4. In the **File** menu, select **Load DXU Flash Card** to open the Load DXU Flash Card dialogue box.

5. In the Load DXU Flash Card dialogue box, click on **Browse** to find the flash card location.

6. In the Select IDB to use on flash card window, select the correct IDB to use on the flash card. *See table below.*

Table 16 Selecting IDB and/or RBS SW

When	Option	See
New IDB saved on the PC or disk is to be used.	IDB on disk	*Step 7.*
New IDB created, using the OMT, is to be used.	IDB in RAM and **Create**	*Section 5.36.5 Creating IDB on page 201* for information about setting the IDB parameters.
The IDB on the flash card is kept.	IDB on flash card	*Step 8.*

7. If IDB saved on the PC or disk is to be used, select **IDB on disk** and click on **Browse** to find the correct IDB to use.

8. In the Select RBS SW to use on flash card window, select **RBS SW on disk** and click on **Browse** to find the correct RBS SW to use.

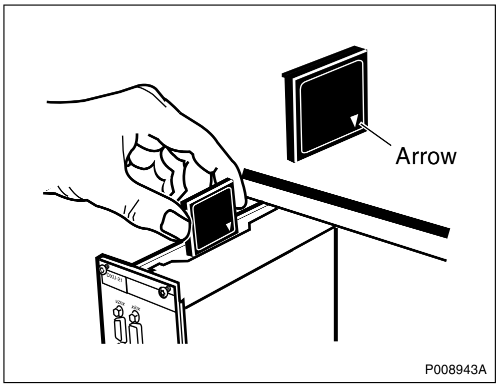
9. Click on **Load** to load the RBS SW and, if applicable, the IDB parameters to the flash card.

Inserting the flash card

This section describes how to insert the flash card.

10. Remove the flash card from the PCM CIA slot.

11. Insert the flash card into the DXU. *See Section 5.28 Flash Card Replacement on page 176.*



5.35 RX Antenna Feeder Replacement

See Section 5.7 Antenna Feeder and Jumper Cable Replacement on page 127 .

5.36 Setting the IDB Parameters

This section describes how to set the IDB parameters using the Operation and Maintenance Terminal (OMT).

For more information on the use of the OMT, *see* :

OMT User's Manual	*EN/LZN 720 0001*

The IDB parameters can be loaded to the RBS in two ways:

- By connecting the OMT to the DXU and installing the IDB.
- By inserting a flash card with the new IDB into the DXU.

There are different versions of the OMT depending on the BTS software installed in the RBS. *See Chapter Fault Handling.*

Preconditions

Before setting the IDB parameters, ensure the following:

☐ If the flash card is to be removed, the PC used is equipped with a PCM CIA slot and a flash card adapter.

☐ The test record from Antenna System Tests is available.

Work Process for Setting the IDB Parameters

This section describes the work process for setting the IDB parameters.

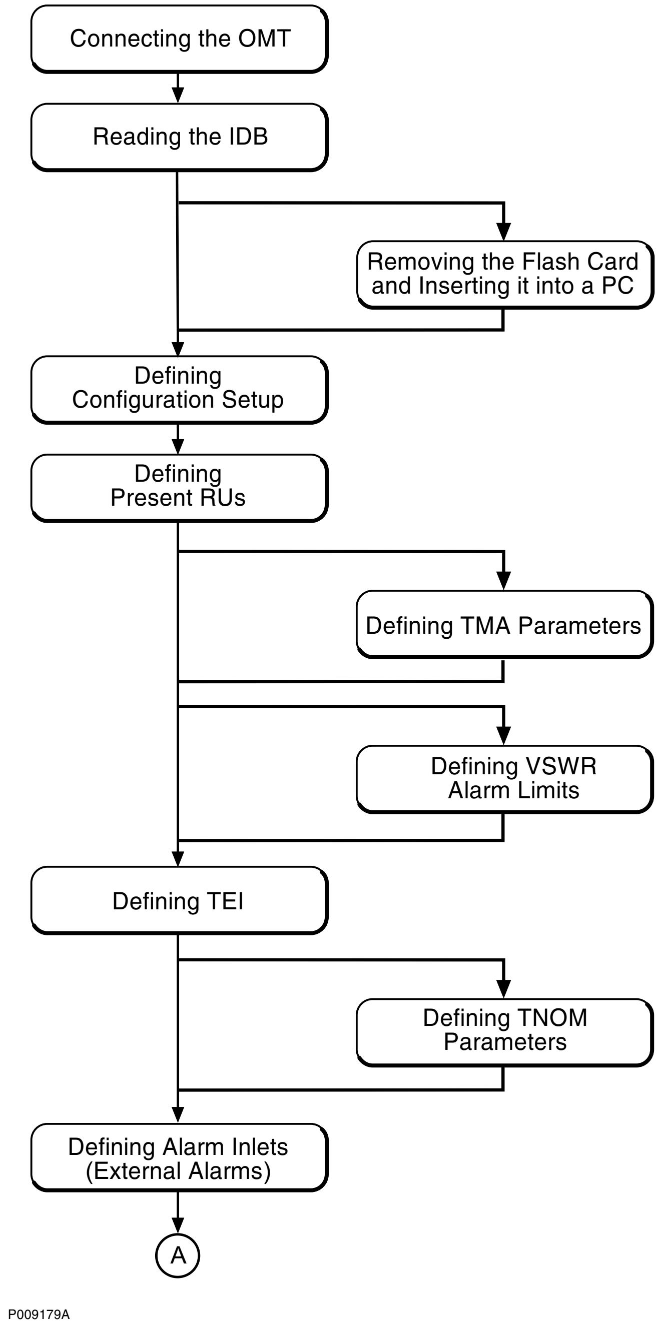


Figure 57 Work process for setting the IDB parameters (part 1 of 2)

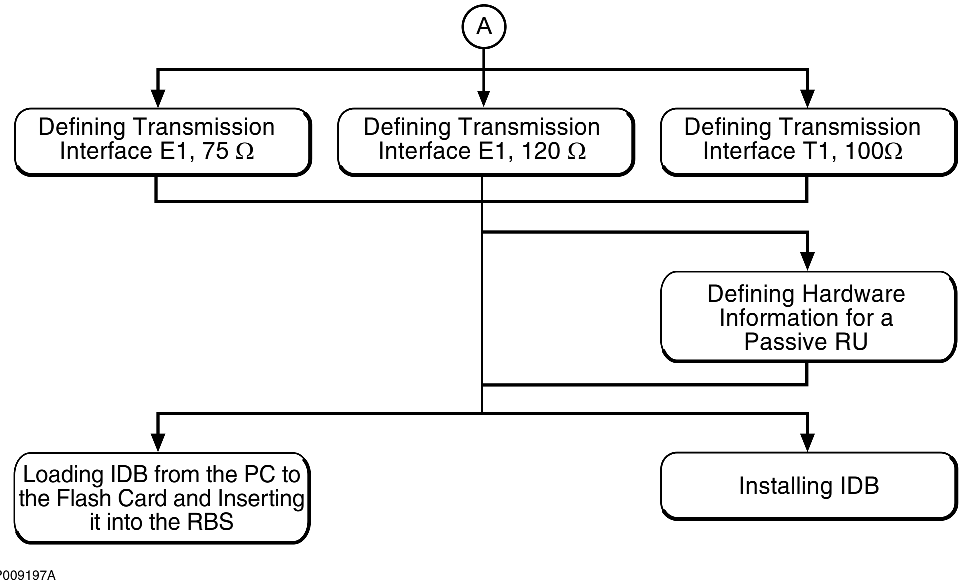


Figure 58 Work process for setting the IDB parameters (part 2 of 2)

5.36.1 Switching on the RBS

This section describes how to switch on the RBS.

1. Switch on the RBS. *See table below.*

Table 17 How to switch on different sources of power supply

Power supply source	Switching on
AC mains power without battery back-up	1. Switch on the MAINS SWITCH on the ACCU by turning it to position 1.
AC mains power with BBS	1. Switch on the MAINS SWITCH on the ACCU by turning it to position 1.
	2. Switch on Battery disconnect on the BFU in the battery cabinet
AC mains power with battery cabinet from other suppliers	1. Switch on the MAINS SWITCH on the ACCU by turning it to position 1.
	2. Switch on the incoming DC power supply according to *the manufacturer's instructions* on how to connect the batteries.
DC main power (-48V DC)	1. Switch on the MAIN SWITCH on the DCCU by turning it to position 1.
DC main power (+24 V DC)	1. Switch on the DC main power outside the cabinet. *See Site Installation Documentation.*

2. Wait until all units are powered up before continuing testing the site installation.

   Note: It may take up to 10 minutes before all units in the cabinet are in operation.

5.36.2 Connecting the OMT

This section describes how to physically connect the OMT to the RBS.

1. Connect the OMT cable (C1) from the PC serial port 1 to the OMT port on the DXU. *See figure below* .

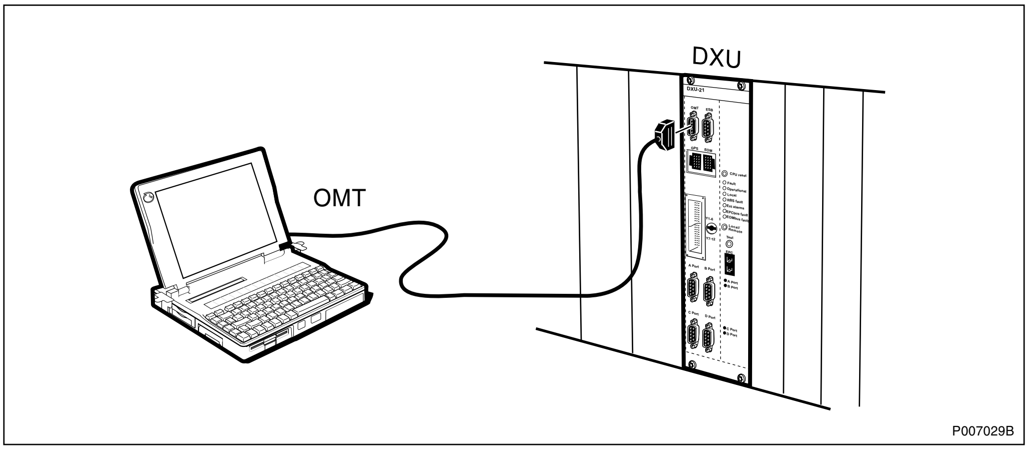


Figure 59 Connecting the OMT to the DXU

2. Start the OMT.

5.36.3 Reading the IDB

This section describes how to read the IDB in the OMT to check that the values of the IDB parameters are correct.

1. In the **RBS 2000** menu, select **Connect** .

2. In the **Configuration** menu, select **Read IDB** .

3. In the **Configuration** menu, select **Display** and **Information** to enter the Display Information window.

4. Select **RBS** and click **Run** . Check the parameters in the table below.

Table 18 Reading and checking IDB

Check that the following parameters are correct:	OK
Transmission interface	
Cabinet configuration(s)	
Antenna sector configuration(s)	
Present RUs	

5. Close the Display Information window.

6. If the IDB parameters in the table above need to be set, *see Section 5.36.4 Removing the Flash Card from the DXU and Inserting it into a PC on page 198* or *Section 5.36.5 Creating IDB on page 201.*

   If the IDB parameters above are correct, set the applicable site-specific IDB parameters from the list below.

- Alarm inlets (external alarms)

- ALNA/TMA parameters
- Antenna Hopping
- Battery parameters
- Hardware Information
- Transmission (PCM) parameters
- System voltage
- TEI value
- TNOM parameters
- VSWR alarm limits

5.36.4 Removing the Flash Card from the DXU and Inserting it into a PC

This section describes how to remove the flash card from the DXU and insert it into a PC, if applicable.

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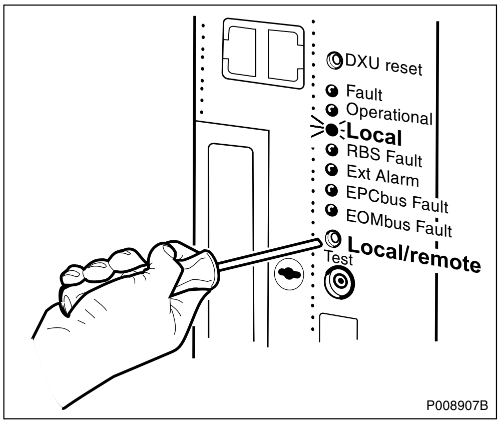
Caution!

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

Note: An ESD wrist strap must be used when handling the flash card.

1. If the RBS is in remote mode, set the RBS in local mode by pressing the **Local/remote button** on the DXU. The Local indicator will start flashing.

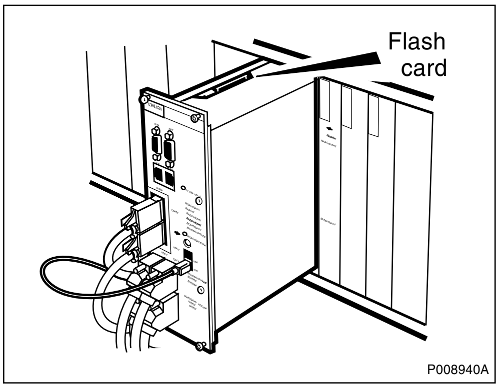


2. Wait until the Local indicator has a fixed yellow light, indicating that the RBS is in local mode.
3. Switch off the RBS. *See table below.*

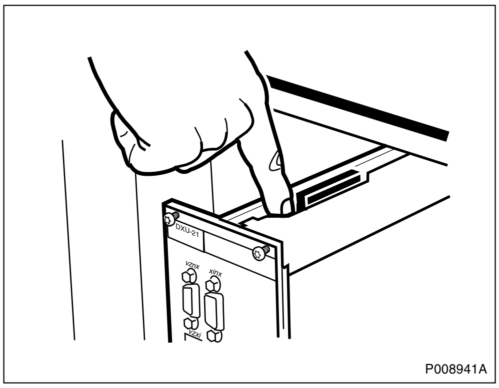
Table 19 How to switch off different sources of power supply

Power supply source	Switching off
AC mains power without battery back-up	1. Switch on the MAINS SWITCH on the ACCU by turning it to position 0.
AC mains power with BBS	1. Switch off Battery disconnect on the BFU in the battery cabinet.
	2. Switch off the MAINS SWITCH on the ACCU by turning it to position 0.
AC mains power with battery cabinet from other suppliers	1. Switch off the incoming DC power supply according to *the manufacturer's instructions* on how to connect the batteries.
	2. Switch off the MAINS SWITCH on the ACCU by turning it to position 0.
DC main power (-48V DC)	1. Switch off the MAIN SWITCH on the DCCU by turning it to position 0.
DC main power (+24 V DC)	1. Switch off the DC main power outside the cabinet. *See Site Installation Documentation.*

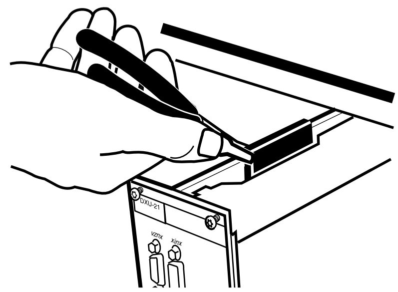
4. Disconnect the EPC bus cable from the DXU.
5. Loosen the screws on the DXU. Using the RU extractor, carefully pull it out of its position until the flash card on top of the DXU is clear of the frame.



6. Lift the release lever to an upright position. Then push it down to release the flash card.



7. Use needle-nosed pliers to gently grip the flash card and pull it upwards and out of the DXU.



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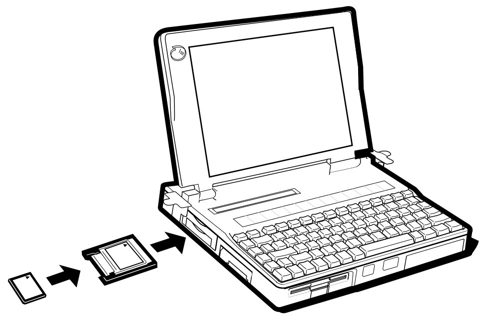
8. Insert the flash card into the PCMCIA slot on the PC, using the flash card adapter.



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5.36.5 Creating IDB

This section describes how to define the configuration setup in the OMT.

Defining transmission interface

1. In the **RBS 2000** menu, select **Disconnect** to logically disconnect the OMT from the RBS.

2. In the **Configuration** menu, select **Create IDB** , to open the Create IDB window.

3. Select transmission interface.

Defining cabinet setup

4. To add cabinets to the Cabinet Setup box, click **New** to open the Define Setup For Cabinet window.

5. In the Cabinet Type box, select the cabinet type.

6. In the Power System box, select power system.

7. In the Climate System box, select climate system.

8. Click **OK** .

Defining antenna sector setup

9. To add antenna sectors to the Antenna Sector Setup box, click on **New** to open the Define Setup For Antenna Sector window.
10. In the Frequency box, select the frequency used.
11. In the CDU type box, select the CDU type used.
12. In the Duplexer box, select “Yes” or “No” depending on CDU configuration.
13. If a TMA is used, in the TMA (Tower Mounted Amplifier) box, select “Yes” (“No” is the default value). Click **OK** .
14. Repeat steps 9 to 13 for remaining antenna sectors.
15. Click **OK** in the Create IDB window when all antenna sectors are defined.

Selecting the final configuration

16. In the Final Configuration Selection window, select the site cell configuration (SCC).
17. Verify that the correct parameters have been entered. Click **OK** .
18. In the OMT dialogue box asking “Do you really want to overwrite the IDB data in the OMT?” , click **Yes** .
19. In the OMT dialogue box asking “Do you want to re-use data in the previous configuration?” , click **Yes** if the IDB is to be modified only and **No** if an entirely new IDB is to be configured.

5.36.6 Defining Present RUs

This section describes how to check and, if necessary, define the RUs present in the RBS.

1. In the **RBS 2000** menu, select **Disconnect** to logically disconnect the OMT from the RBS, if not already disconnected.
2. In the **Configuration** menu, select **Define** and **Present RUs** to open the Define present RUs window.
3. If necessary, move the RUs in the configuration used to the Present box by selecting the RU to be moved and clicking the **arrow** keys (or double-clicking the RUs to be moved).

   If RUs not present in the configuration are in the Present box, move them to the Not present box the same way.
4. Click **OK** when finished.

5.36.7 Defining Alarm Inlets (External Alarms)

This section describes how to define the external alarms, if applicable.

1. In the **Configuration** menu, select **Define** and **Alarm Inlets** to open the Define Alarm Inlets window.
2. In the Alarm Inlet Information window, select an unused alarm inlet.
3. In the Inlet Usage box, select “External Alarm” .
4. In the Type box, define the alarm type as “Closing” (the alarm cable is open when there is no alarm) or “Breaking” (the alarm cable is closed when there is no alarm).
5. In the ID box, select an alarm inlet number.
6. In the Severity box, set the severity level of the alarm.
7. Add a comment in the Comment box, if required.
8. Click **Apply** after defining the alarm.
9. Repeat steps 2 to 8 to define remaining alarms.
10. Click **OK** when all alarms are defined.

5.36.8 Defining ALNA/TMA Parameters

This section describes how to set the ALNA/TMA parameters (if applicable) and check that the total loss value is within limits.

The TMA parameters must be set when a TMA is connected and the characteristics of the TMA are different from the default values in the IDB files in the OMT. If any parameter is missing, the default values should be used.

Note: If the TMA parameters exceed the set limits, the RBS will issue fault reports.

Setting the TMA parameters

1. In the **Configuration** menu, select **Define** and **ALNA/TMA** .
2. In the Define ALNA/TMA window, select the appropriate TMA and click **Run** .
3. Set the parameters listed below. *See the installation instructions for the TMA* .

   Note: TMA Loss = - TMA Gain.

- TMA Type
- TX Group Delay (in ns)

- RX Group Delay (in ns)
- Loss (in dB) (TMA Loss = - TMA Gain)
- RX Frequency Range (in MHz)
- Current Supervision Limits (in mA)

4. Click **OK** when all parameters are set.
5. Repeat steps 2 to 4 for all TMAs. Close the Define ALNA/TMA window.

Entering the Total Feeder Attenuation and Calculating and Checking the Total Gain value

1. In the **Configuration** menu, select **Define** and **Loss** to open the Define Loss window.
2. Select the appropriate RX feeder (for example FEED_TXA_RXA 0) and click **Run** .
3. In the Define Loss window, enter the Total Feeder Attenuation from the *test record for Antenna System Tests* and click **OK** .
4. Repeat steps 2 to 3 for each RX feeder.
5. Close the Define Loss window when finished.
6. Calculate the Total Gain value using the following formula:

   Total Gain = TMA Gain - Total Feeder Attenuation

7. Compare the calculated value to the Max. and Min. values in the table below.

   $\text{Gain}_{TOTmin} \leq \text{Total Gain} \leq \text{Gain}_{TOTmax}$

   See example below.

Table 20 System performance limits

GSM System	**CDU Type**	**Gain $_{tot}$ (dB)**	
		Min.	**Max.**
GSM 800/900	CDU-G	7	9
GSM 900	CDU-F	7	9
GSM 1800/1900	CDU-G	7	12
GSM 1800/1900	CDU-F	7	12

The values in the table guarantee the specified sensitivity performance, and that the GSM specification is met.

```
Preconditions: GSM 1800/1900,
CDU-G TMA Gain = 12 dB
Total Feeder Attenuation = 4 dB
Total Gain = TMA Gain - Total Feeder Attenuation =
= 12 – 4  =  8 dB
Result: 7 ≤ 8 ≤ 12
```

Example 1 Checking that the Total Gain value is within limits

5.36.9 Defining Antenna Hopping

This section describes how to define antenna hopping.

1. In the **Configuration** menu, select **Define** and **Antenna Hopping** .
2. In the Define Antenna Hopping window, select the Administrative state ("On" or "Off") and click **OK** .

5.36.10 Defining Battery Parameters

This section describes how to define the battery parameters, if applicable.

1. In the **Configuration** menu, select **Define** and **Battery Parameters** .
2. In the Define Battery Parameters window, select the applicable battery object and click **Run** .
3. In the Define Parameters window, enter the parameters and click **OK** .

5.36.11 Defining Hardware Information for a Passive RU

This section describes how to define hardware information for a passive RU, if applicable.

1. In the **Configuration** menu, select **Define** and **Hardware Info** to open the Define HW Info window.
2. Select the applicable HW unit in the list and click **Run** .
3. Enter the hardware information and click **OK** when finished.
4. Repeat steps 2 to 3 for all applicable HW units.
5. Click **Close** when finished.

5.36.12 Defining Transmission Interface E1, 75 Ω

This section describes how to define the PCM parameters for transmission interface E1, 75 Ω.

1. In the **Configuration** menu, select **Define** and **PCM** .
2. Set the parameters according to the table and instructions below.

3. Click **OK** when all parameters are set.

Table 21 PCM parameters settings for transmission interface E1, 75 Ω

PCM Parameter		**Settings**
Transmission Interface		E1
Network Topology		*See Site Installation Documentation.*
Sync Source		*See Site Installation Documentation.*
CRC-4		*See Site Installation Documentation.*
Spare bits		*See Site Installation Documentation.*
Receiver Sensitivity	A	Short haul
	B	Short haul
	C	Short haul
	D	Short haul

5.36.13 Defining Transmission Interface E1, 120 Ω

This section describes how to define the PCM parameters for transmission interface E1, 120 Ω.

Note: Calculating the total attenuation of the entire RBS chain is only necessary if multidrop in combination with OVPs with bypass relays is used.

1. In the **Configuration** menu, select **Define** and **PCM** .

2. Set the parameters according to the table and instructions below.

3. Click **OK** when all parameters are set.

Table 22 PCM parameters settings for transmission interface E1, 120 Ω

PCM Parameter		Settings
Transmission Interface		E1
Network Topology		*See Site Installation Documentation.*
Sync Source		*See Site Installation Documentation.*
CRC-4		*See Site Installation Documentation.*
Spare bits		*See Site Installation Documentation.*
Receiver Sensitivity	A	*See instructions below.*
	B	
	C	
	D	

The instructions below describe how to calculate the cable attenuation between the Far End and the RBS. The cable attenuation determines whether receiver sensitivity is to be set to short or long haul. Using long haul requires that the equipment at the far end supports long haul.

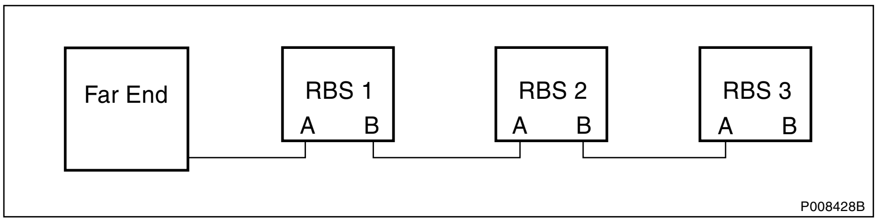

Figure 60 System view for transmission interface E1, 120 Ω

1. Calculate the cable attenuation between the Far End and the RBS according to the following formula:

   Cable attenuation = cable length x cable attenuation per metre (or foot).

   If multidrop is used, calculate the attenuation of the entire RBS chain, since Receiver Sensitivity A (C) is determined by the total attenuation of the chain. Receiver Sensitivity B (D) is determined by the total attenuation to the last RBS in the chain.

2. If the cable attenuation is less than 6 dB, set the receiver sensitivity to short haul.

   If the cable attenuation is greater than 6 dB, set the receiver sensitivity to long haul.

3. Set unused ports to short haul.

Example of a Receiver Sensitivity Parameters Calculation for E1, 120 Ω

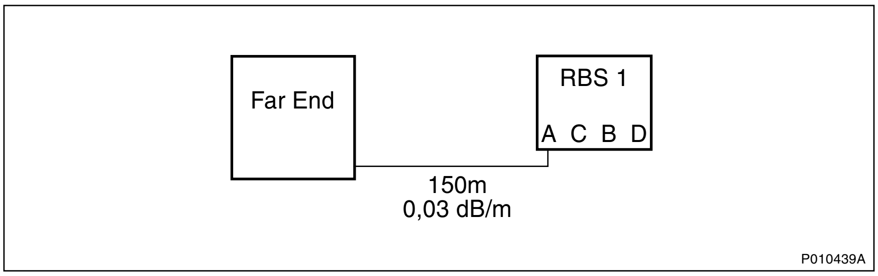

Figure 61 Example of a receiver sensitivity parameters calculation for E1, 120 Ω

```
In this example, Far End and the RBS refer to the figure above.
The cable length between the RBS and the Far End is 150 m.
The cable attenuation for the cable between the RBS and
the Far End is 0.03 dB/m
1.    Calculate the cable attenuation between the Far End and
      the RBS:
      150 m x 0.03 dB/m = 4.5 dB
2.    Set Receiver Sensitivity A for the RBS to "Short haul"
3.    Set Receiver Sensitivity B for the RBS to "Short haul"
      (not connected).
```

Example 2 Calculating the receiver sensitivity parameters for transmission interface E1, 120 Ω

5.36.14 Defining Transmission Interface T1, 100 Ω

This section describes how to define parameters for transmission interface T1. When using the cable length for calculations in the following sections, the cable used has to be the reference cable (multipair 22 AWG office cable) or similar.

1. Find the transmission interface type in the *Site Installation Documentation* and use the table below to find the applicable section with instructions for setting the parameters.

Table 23 Selecting section for defining T1, knowing the transmission interface type

If the transmission interface type is...		then...
DSX-1		go to *Section Defining LBO Parameters as Short Haul on Page 210* .
DS1 and...	the signal level at the customer interface and the cable attenuation is known	go to *Section Defining LBO Parameters as Long Haul Manually on Page 211* .
	only the maximum input signal level at the far end is known	go to *Section Defining LBO Parameters as Long Haul Automatically on Page 214* .
	neither the signal level at the customer interface nor the cable attenuation are known	go to *Section Defining LBO Parameters when Transmission Characteristics are Unknown on Page 217* .

2. If there is no information about the transmission interface type in the *Site Installation Documentation* , use the cable length to find the appropriate section in the table below.

Table 24 Selecting section for defining T1, knowing the cable length

If...		then...
the cable length is less than 655 feet		go to *Section Defining LBO Parameters as Short Haul on Page 210* .
the cable length is more than 655 feet and...	the signal level at the customer interface and the cable attenuation is known	go to *Section Defining LBO Parameters as Long Haul Manually on Page 211* .
	only the maximum input signal level at the far end is known	go to *Section Defining LBO Parameters as Long Haul Automatically on Page 214* .
	neither the signal level at the customer interface nor the cable attenuation are known	go to *Section Defining LBO Parameters when Transmission Characteristics are Unknown on Page 217* .

3. If no information is given in Site Installation Documentation, *see the table below.*

Table 25 Selecting section for defining T1, not having any information about the cable length

If...	**then...**
there is no information about the cable length	go to *Section Defining LBO Parameters when Transmission Characteristics are Unknown on Page 217* .

Note: Calculating the total attenuation of the entire RBS chain is only necessary if multidrop in combination with OVPs with bypass relays is used.

Defining LBO Parameters as Short Haul

This section describes how to define the LBO parameters as short haul.

1. In the **Configuration** menu, select **Define** and **PCM** .
2. Set the parameters according to the table and instructions below.
3. Click **OK** when all parameters are set.

Table 26 PCM parameters settings for transmission interface T1, short haul

PCM Parameter	**Setting**
Sync Source	*See Site Installation Documentation.*
Transmission Interface	DS1(T1)
Network Topology	*See Site Installation Documentation* .
LBO A	*See instructions below.*
LBO B	
LBO C	
LBO D	
FDL Use	*See Site Installation Documentation.*

The instructions below describe how to calculate the LBO parameters.

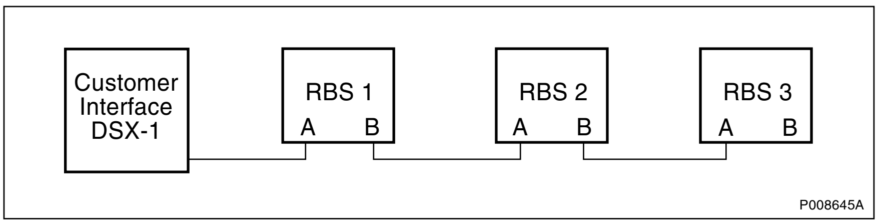

Figure 62 System view for transmission interface T1, short haul

1. Find out the length of the cable between the RBS and the customer interface (the cross-connection point DSX-1). *See figure above.*

If multidrop is used, calculate the attenuation of the entire RBS chain, since LBO A (C) is determined by the total attenuation of the chain. LBO B (D) is determined by the total attenuation to the last RBS in the chain.

If the cable length is not known, set the LBO parameters to “Short h., 0 – 133 feet” .

2. Use the cable length and the table below to set the correct LBO parameters in the OMT.

Table 27 Setting LBO parameters to short haul in the OMT

Cable Length		**LBO Setting**
Feet	**Metres**	**(in the OMT)**
0 – 133	0 – 40	Short h., 0 – 133 feet
133 – 266	40 – 81	Short h., 133 – 266 feet
266 – 399	81 – 122	Short h., 266 – 399 feet
399 – 533	122 – 162	Short h., 399 – 533 feet
533 – 655	162 – 200	Short h., 533 – 655 feet

3. Set unused ports to “Short h., 0 – 133 feet” .

Example of an LBO Parameters Setting for Short Haul

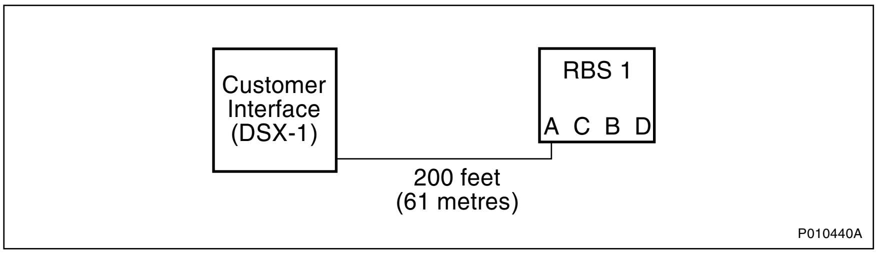

Figure 63 Example of calculating LBO parameters for short haul

```
In this example, customer interface (DSX-1) and the
RBS refer to the figure above.
The cable length between the RBS and the customer interface
(DSX-1) is 200 feet (61 m).
1.    Set LBO A for the RBS to “Short h., 133 – 266 feet”       See
 2.    Set LBO B, C and D for the RBS  (not connected) to
       “Short h., 0 – 133 feet”.
```

Example 3 Setting LBO parameters to short haul

Defining LBO Parameters as Long Haul Manually

This section describes how to define LBO as long haul when the signal level at the customer interface and the cable attenuation is known.

Signal level at the customer interface means either the maximum input signal level at the Far End or the carrier advised code at the network interface. *See figure below.*

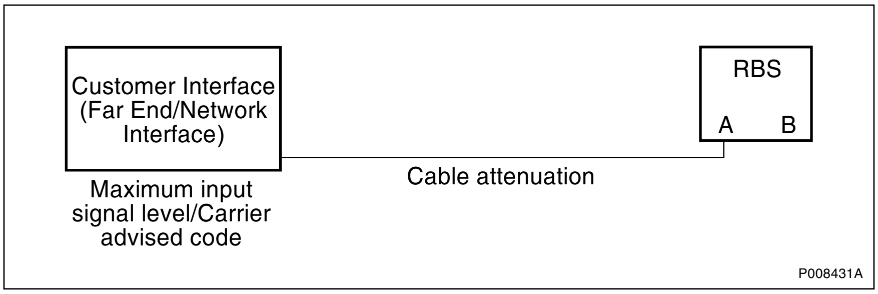

Figure 64 System parameters for defining LBO parameters to long haul

1. In the **Configuration** menu, select **Define** and **PCM** .
2. Set the parameters according to the table and instructions below.
3. Click **OK** when all parameters are set.

Table 28 Manual PCM parameters settings for transmission interface T1, long haul

PCM Parameter	Settings
Transmission Interface	DS1(T1)
Network Topology	*See Site Installation Documentation.*
Sync Source	*See Site Installation Documentation.*
LBO A	*See instructions below.*
LBO B	
LBO C	
LBO D	
FDL Use	*See Site Installation Documentation.*

The instructions below describe how to manually set the LBO parameters to long haul.

1. If the carrier advised code is given in the *Site Installation Documentation* , use the table below to set the correct A (B, C, D) LBO parameters.

   If multidrop is used, calculate the attenuation of the entire RBS chain, since LBO A (C) is determined by the total attenuation of the chain.

Table 29 Long haul parameters for different carrier advised codes at the network interface

Cable Attenuation (dB)	Long Haul Parameters for Different Values of the Carrier Advised Code at the Network Interface			
	A (0 dB)	**B (-7.5 dB)**	**C (-15 dB)**	**D (-22.5 dB)**
0 – 7.5	0	-7.5	-15	-22.5
7.5 – 15	NA	0	-7.5	-15
15 – 22.5	NA	NA	0	-7.5
> 22.5	NA	NA	NA	0

2. If the maximum input signal level is given in the *Site Installation Documentation* , use the table below to set the correct LBO A (B, C, D) parameters.

Table 30 Long haul parameters for different maximum input signal levels

Cable Attenuation (dB)	Long Haul Parameters for Different Values of the Maximum Input Signal Level at the Far End			
	0 dB	**-7.5 dB**	**-15 dB**	**-22.5 dB**
0 – 7.5	0	-7.5	-15	-22.5
7.5 – 15	0	0	-7.5	-15
15 – 22.5	0	0	0	-7.5
> 22.5	0	0	0	0

3. If multidrop, set LBO B (D) to “Long h., 0 dB” . Used B (D) ports in multidrop configurations should always be set to “Long h., 0 dB”

4. Set unused ports to “Short h., 0 – 133 feet” . Unused ports should always be set to “Short h., 0 – 133 feet” .

Example of a Manual LBO Parameters Calculation for Long Haul

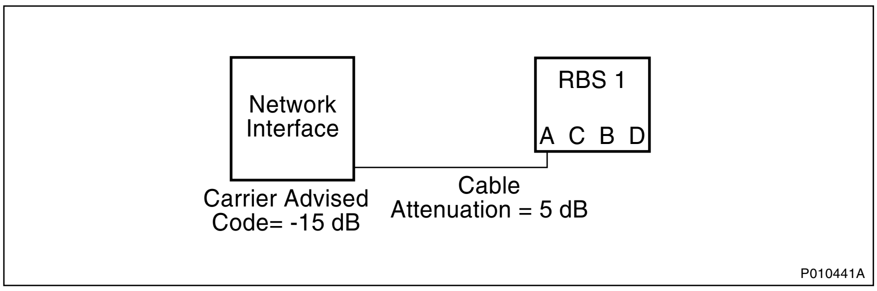

Figure 65 Example of calculating LBO parameters manually for long haul

```
In this example, network interface and
the RBS refer to the figure above.
Carrier advised code at the network interface is “C” (-15 dB)
and the cable attenuation is 5 dB.
1.    See the table Long haul parameters for different      carrier
      to find the correct LBO parameter for LBO A.
2.    Set LBO A to “Long h., -15 dB”
3.    Set LBO B, C and D (not connected) to
      “Short h., 0 - 133 feet”
```

Example 4 Calculating LBO parameters manually for long haul

Defining LBO Parameters as Long Haul Automatically

This section describes how to define LBO to long haul when the maximum input signal level at the Far End is known, but not the cable attenuation. The cable attenuation can be measured by the RBS according to the instructions below. *See figure below.*

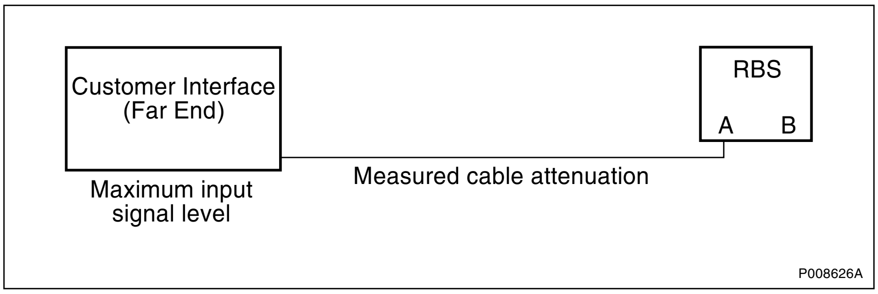

Figure 66 System parameters for defining LBO parameters automatically to long haul

1. In the **Configuration** menu, select **Define** and **PCM** .

2. Use the table and instructions below to set the parameters.

3. Click **OK** when all parameters are set.

Table 31 PCM parameters settings for transmission interface T1, long haul automatically

PCM Parameter	**Setting**
Transmission Interface	DS1(T1)
Network Topology	*See Site Installation Documentation* .
Sync Source	*See Site Installation Documentation.*
LBO A	*See instructions below.*
LBO B	
LBO C	
LBO D	
FDL Use	*See Site Installation Documentation.*

The instructions below describe how to automatically set the PCM parameters.

For RBS 1 only:

1. Set LBO A (C) to “Long h. ALBO, <value of the maximum input signal level> dB” .
2. If stand alone, set unused ports to “Short h., 0 – 133 feet” . Unused ports are always set to “Short h., 0 – 133 feet” .

   The RBS will automatically set the correct value in the IDB when the IDB is installed.

Note: The following instructions are for multidrop only.

If multidrop is used, the line attenuation for RBS 1 must be measured according to the instructions below.

For RBS 1:

1. Set LBO B (D) to “Long h., 0 dB” . Used B (D) ports in multidrop are always set to “Long h., 0 dB”
2. In the **RBS 2000** menu, select **Connect** .
3. In the **Configuration** menu, select **Install IDB** .

   The RBS will automatically set the correct value in the IDB.

   The RBS remains in Local mode after the IDB has been installed.
4. In the **Maintenance** menu, select **Monitor** and **Lin Att PCM A (C)** .
5. Click on **Start Monitor** and read the value of the cable attenuation. The displayed value is given in deci dB (10 deci dB = 1 dB). Make a note of the value in the test record.

When configuring the IDB for RBS 2 and RBS 3, follow the instructions below.

For RBS 2 and RBS 3:

6. Set LBO A (C) on RBS 2 (RBS 3) to “Long h. ALBO, 0 dB” .
7. In the **Configuration** menu, select **Install IDB** .
8. In the **Maintenance** menu, select **Monitor** and **Lin Att PCM A (C)** .
9. Click on **Start Monitor** and read the value of the cable attenuation. The displayed value is given in deci dB (10 deci dB = 1 dB). Make a note of the value in the test record.
10. Add the measured cable attenuation values. The value given by Lin Att PCM A is the cable attenuation to the previous RBS in the chain, so the measured value must be added to the value for the previous RBS(s) to obtain the total cable attenuation for the RBS in question.
11. Use the total cable attenuation value to find the long haul parameter value for LBO A (C) in the table below.

Table 32 Long haul parameters for different maximum input signal levels

Cable Attenuation (dB)	**Long Haul Parameters for Different Maximum Input Signal Levels at the Far End**			
	0 dB	**-7.5 dB**	**-15 dB**	**-22.5 dB**
0 – 7.5	0	-7.5	-15	-22.5
7.5 – 15	0	0	-7.5	-15
15 – 22.5	0	0	0	-7.5
> 22.5	0	0	0	0

12. If there is another RBS in the chain, set LBO B (D) to “Long h., 0 dB” . Used B ports are always set to “Long h., 0 dB” .

    If this is the last RBS in the chain, set LBO B (D) to “Short h., 0 – 133 feet” . Unused ports are always set to “Short h., 0 – 133 feet” .

13. If there is another RBS in the chain, repeat steps 5 to 10.

Example of an Automatic LBO Parameters Calculation for Long Haul

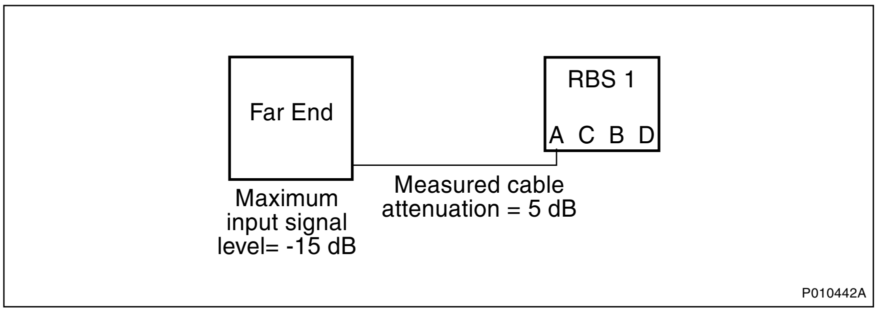

Figure 67   Example of calculating LBO parameters automatically for long haul

```
In this example, Far End and RBS refer to the figure above.
Maximum input signal level at the Far End is -15 dB.
The cable attenuation is not known.
1. Set LBO A to "Long h. ALBO, -15 dB".
The cable attenuation is measured by the RBS to 5 dB.
2. The value of LBO A is set automatically by the RBS.
3. Set LBO B, C and D (not connected) to
   "Short h., 0 - 133 feet".
```

Example 5   Calculating LBO parameters automatically for long haul

Defining LBO Parameters when Transmission Characteristics are Unknown

This section describes how to define the LBO parameters if none of the parameters carrier advised code, maximum input signal at the customer interface, cable attenuation or cable length are known.

1. In the **Configuration** menu, select **Define** and **PCM** .

2. Set the parameters. *See table below* . Click **OK** when all parameters are set.

Table 33 PCM parameters settings for transmission interface T1, transmission characteristics unknown

PCM Parameter	Settings
Transmission Interface	DS1(T1)
Network Topology	*See Site Installation Documentation.*
Sync Source	*See Site Installation Documentation.*
LBO A	“Long h., 0 dB”
LBO B	“Long h., 0 dB” , if used “Short h., 0 – 133 feet” , if unused
LBO C	“Long h., 0 dB” “Short h., 0 – 133 feet” , if unused
LBO D	“Long h., 0 dB” , if used “Short h., 0 – 133 feet” , if unused
FDL Use	*See Site Installation Documentation.*

5.36.15 Defining System Voltage

This section describes how to define the system voltage.

1. In the **Configuration** menu, select **Define** and **System Voltage** .
2. In the Define System Voltage window, select the applicable object and click **Run** .
3. Enter the system voltage and click **OK** .

5.36.16 Defining TEI

This section describes how to define the TEI value.

1. In the **Configuration** menu, select **Define** and **TEI** to open the Define TEI window.
2. Select “DXU 0” and click **Run** .
3. Enter the TEI value and click **OK** .

5.36.17 Defining TNOM

This section describes how to define the Transport Network Operation and Maintenance (TNOM) parameters if supported by the network.

1. In the **Configuration** menu, select **Define** and **TNOM** to open the Define TNOM Parameters dialogue box.

2. Set TNOM Use to “On” .

3. In the TNOM Timeslot box, enter the value. Valid TNOM time slot values are shown in the table below.

Table 34 Valid TNOM time slot values

Transmission interface	**Valid TNOM time slot value**
G.703 (E1)	1 – 31
DS1 (T1)	1 – 24

4. In the TNOM Node ID box, enter the correct values. Valid TNOM Node ID values are 1 – 65534. Click **OK** when finished.

5.36.18 Defining VSWR Alarm Limits

This section describes how to define VSWR alarm limits for configuring the supervision of the antenna system, including installing an IDB with class 1 and 2 VSWR Alarm Limits for the antenna system at the site.

Preconditions

Before defining the VSWR alarm limits, ensure the following:

☐ The test results from the SWR tests are available.

☐ There are no faults in the antenna system. For information on how to test the antenna system, *see Chapter Antenna System Tests* .

Note: If VSWR alarms are received and no faults are found in the antenna system, the IDB needs to be updated with increased VSWR alarm limits.

Defining recommended VSWR alarm limits

1. Select the recommended VSWR alarm limit from the table below by cross-checking the measured VSWR value with the recommended VSWR alarm limit.

   For measured VSWR value (in the test record from Antenna System Tests) and recommended VSWR alarm limit, *see:*

   Site Installation Documentation

Table 35 Recommended VSWR alarm limits for different initial VSWR values

Measured VSWR value	**Recommended VSWR Alarm Limit**		
	Class 2 Limit ≤ 1.5 %	**Class 2 Limit ≤ 0.2 %**	**Class 1 Limit ≤ 0.01 %**
1.00 – 1.30	1.6	1.7	2.2
1.31 – 1.37	1.7	1.8	2.2
1.38 – 1.43	1.8	2.0	2.2
1.44 – 1.55	2.0	2.2	2.5
1.56 – 1.66	2.2	2.5	2.8
≥ 1.67	Not recommended		

2. In the **Configuration** menu, select **Define** and **VSWR Limits** .

3. In the Define VSWR Limits window, select the applicable object from the list and click **Run** .

4. In the Define VSWR Limits dialogue box, set the VSWR Class 1 and Class 2 values according to the table above and click **OK** .

5. Repeat steps 3 to 4 for each applicable antenna object.

6. Click **Close** when finished.

5.36.19 Loading IDB to the Flash Card and Inserting it into the RBS

This section describes how to load a saved IDB to the flash card from the PC and how to insert it into the DXU.

1. In the **Configuration** menu, select **Load DXU Flash Card.**
2. In the Flash card location box, use the **Browse** button to find the flash card location.
3. Select **IDB on disk** . Click on the **Browse** key to locate and select the IDB saved on the PC.
4. When the IDB has been selected, use the table below to select the RBS SW to use on the flash card.

Table 36 Selecting RBS SW to use on flash card

If...	**then...**
new RBS SW saved on PC or disk is to be used.	select **RBS SW on disk** and click on **Browse** to search for the RBS SW file on the PC.
the RBS SW present on the flash card is to be used	select **RBS SW on flash card.**

5. Click on the **Load** key to load the IDB and, if applicable, the RBS SW to the flash card.

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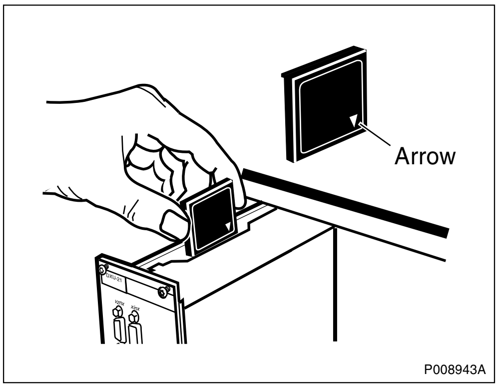
Caution!

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

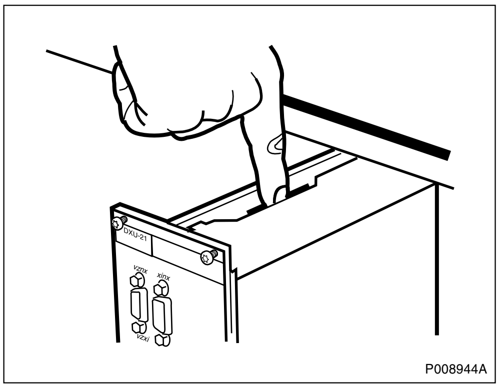
Note: An ESD wrist strap must be used when inserting the flash card.

If the DXU has been put back into place after removing the flash card, *see Section 5.36.4 Removing the Flash Card from the DXU and Inserting it into a PC on page 198* for information on how to pull the DXU out.

6. Remove the flash card from the PCM CIA slot on the PC.
7. Release the locking arm on the top of the DXU by lifting it to an upright position.
8. While holding the locking arm to the side, insert the flash card (connector edge downwards) between the guide rails on the sides. Gently push it down until it comes into contact with the connectors at the bottom.

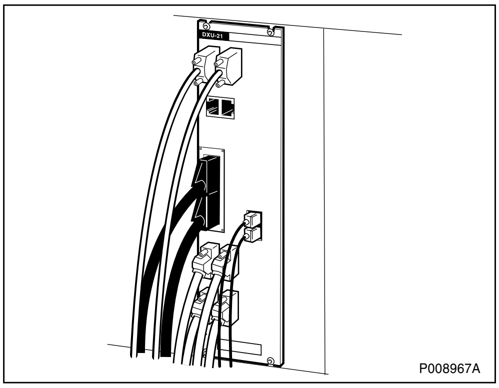


9. Push the locking arm down over the flash card.



Note: The locking arm must be in place to secure the flash card in its position.

10. Push the DXU back into place and tighten the screws. Reconnect the EPC bus cable and check that all cables are properly connected.



11. Switch on the RBS. *See Table 17 on page 196* .

5.36.20 Installing IDB

This section describes how to install the IDB in the RBS by connecting the OMT to the DXU.

If the flash card has been removed, *see Section 5.36.19 Loading IDB to the Flash Card and Inserting it into the RBS on page 220* .

Note: The RBS must be in local mode to accept a new or modified IDB.

1. Physically connect the OMT to the RBS if not already connected. *See Section 5.36.2 Connecting the OMT on page 196* .
2. In the **RBS 2000** menu, select **Connect** to logically connect the OMT to the RBS.
3. In the **Configuration** menu, select **Install IDB** .

   The RBS remains in local mode after the IDB has been installed.
4. In the **Configuration** menu, select **Site Specific Data** and **Display** to open the site_specific_data.txt - window. Check that the correct parameters have been defined.

5.36.21 Saving IDB

In case it is necessary to re-install the IDB, the IDB parameters must be saved on the PC.

1. In the **Configuration** menu, select **Save IDB** .
2. Give the IDB file an RBS-specific name and save the IDB on the PC.

5.37 TMA Replacement

This section describes how to replace a faulty TMA.

Warning!

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

Caution!

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

Preconditions

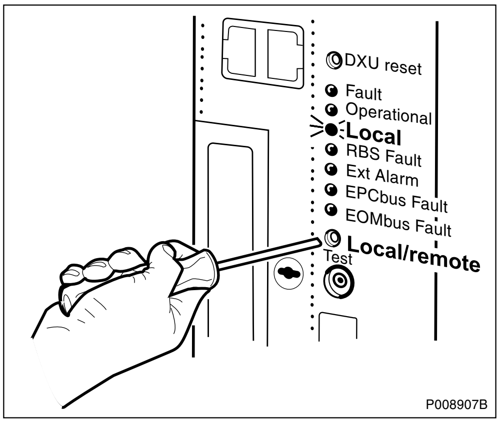
Before replacing the TMA, ensure the following:

- ☐ All TRUs connected to the antenna tower where the faulty TMA is mounted have the RF off indicators on before any work with the TMA is done.
- ☐ The TMA installation instructions are available.

Taking the RBS out of operation

1. Inform the OMC operator and get approval for temporarily taking the RBS out of service.

2. Press the Local/remote button on the DXU to set the RBS to local mode.



3. Wait until the Local indicator has a fixed yellow light.

Replacing the TMA

4. Remove the sealant from the connectors at the bottom of the TMA and disconnect the antenna jumper and TX/RX jumpers from the TMA.

5. Remove the TMA.

6. Mount the new TMA and connect the antenna and TX/RX jumpers to the TMA. *See the TMA installation instructions* supplied with the TMA.

Note: Ensure that the antenna and TX/RX jumpers are not swapped when reconnecting them to the TMA. Swapping the jumpers may damage the TMA and will cause an alarm.

Taking the RBS into operation

7. Inform the OMC operator that the RBS will be taken into service.

8. Press the Local/remote button on the DXU to set the DXU to remote mode and wait until the flashing indicator turns off.

9. Return to the applicable section in *Chapter Fault Localisation* for the next step in the process.

Handling replaced unit(s)

If the TMA is an Ericsson product, it should be returned to Ericsson for repair with a repair delivery note, LZF 084 64 (Blue Tag) attached. Include a clear description of the fault found. *See Chapter Concluding Routines* for instructions on completing a repair delivery note.

Otherwise the TMA shall be disposed of locally by the customer according to environmental regulations. Do not return the TMAs from other manufacturers to Ericsson for replacement, repair or disposal.

5.38 TMA-CM Replacement

This section describes how to replace a faulty TMA-CM.

Preconditions

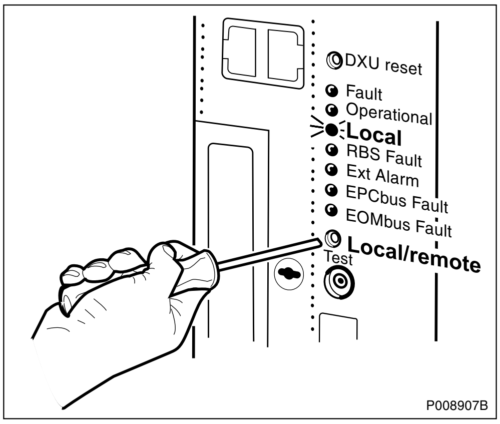
Before replacing the TMA-CM, ensure the following:

☐ An approved ESD wrist strap is available for use.

Taking the RBS out of operation

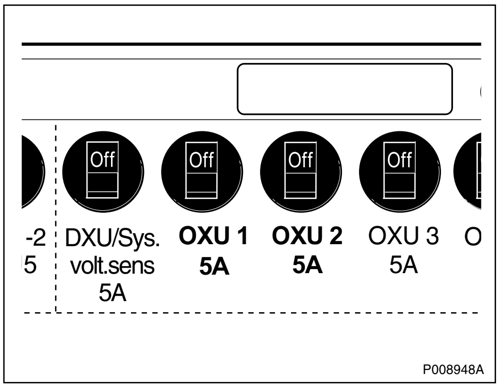
1. Inform the OMC operator and get approval for temporarily taking the RBS out of service.

2. Press the Local/remote button on the DXU to set the RBS to local mode.



3. Wait until the Local indicator has a fixed yellow light.

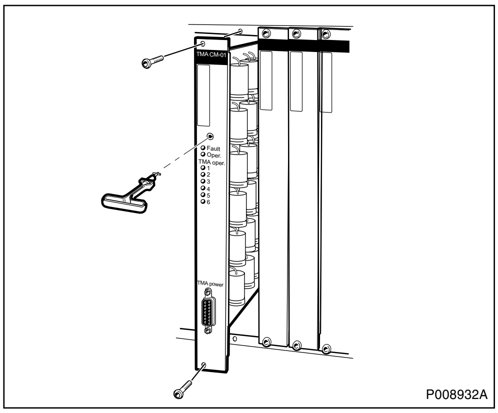
4. Switch off the applicable circuit breaker OXU 1 or OXU 2 on the IDM.



Replacing the TMA-CM

5. Disconnect the power cable connected to the TMA-CM.

6. Loosen the screws on the TMA-CM and pull it out, using an RU extractor.



7. Mount the new TMA-CM, tighten the screws and reconnect the cable.

Taking the RBS into operation

8. Switch on the applicable circuit breaker OXU 1 or OXU 2 on the IDM.

9. Inform the OMC operator that the RBS will be taken into service.

10. Press the Local/remote button on the DXU to set the DXU to remote mode and wait until the flashing indicator turns off.

11. Return to the applicable section in *Chapter Fault Localisation* for the next step in the process.

Handling replaced unit(s)

The TMA-CM should be returned to Ericsson for repair with a repair delivery note, LZF 084 64 (Blue Tag) attached. Include a clear description of the fault found. *See Chapter Concluding Routines* for instructions on completing a repair delivery note.

5.39 TMA-CM Cable Replacement

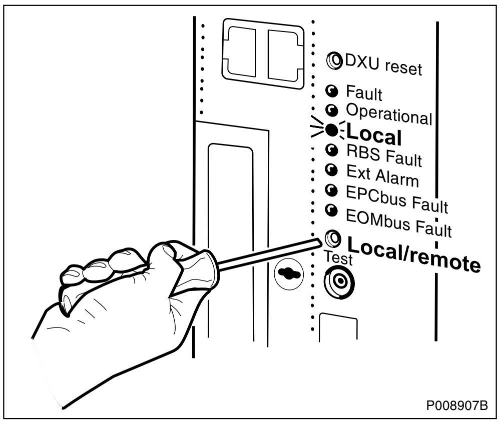
This section describes how to replace a faulty TMA-CM power cable.

The TMA-CM power cable runs between the TMA-CM and the right connection plate.

Taking the RBS out of operation

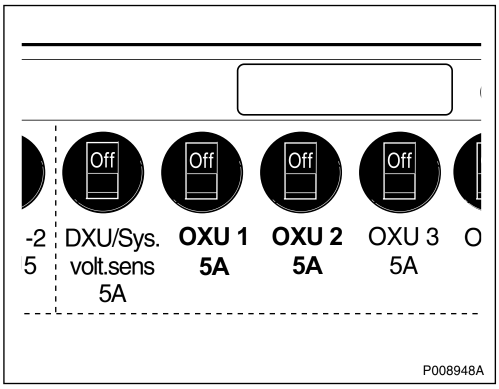
1. Inform the OMC operator and get approval for temporarily taking the RBS out of service.

2. Press the Local/remote button on the DXU to set the RBS to local mode.



3. Wait until the Local indicator has a fixed yellow light.

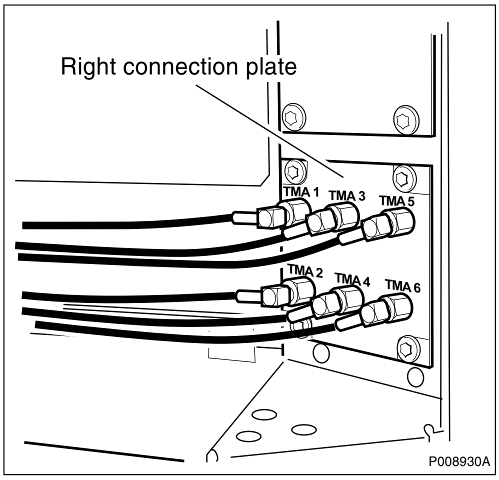
4. Switch off circuit breaker OXU 1 or OXU 2 on the IDM.



Replacing the TMA-CM cable

5. Disconnect the power cable from the TMA-CM.

6. Disconnect the DC cables to the bias injectors from the right connection plate.



7. Loosen the screws on the right connection plate securing the TMA-CM cable and remove the right connection plate including the cable.

   If the steel clips keeping the cables in place need to be removed, rotate them downwards and pull them out. *See figure below.*

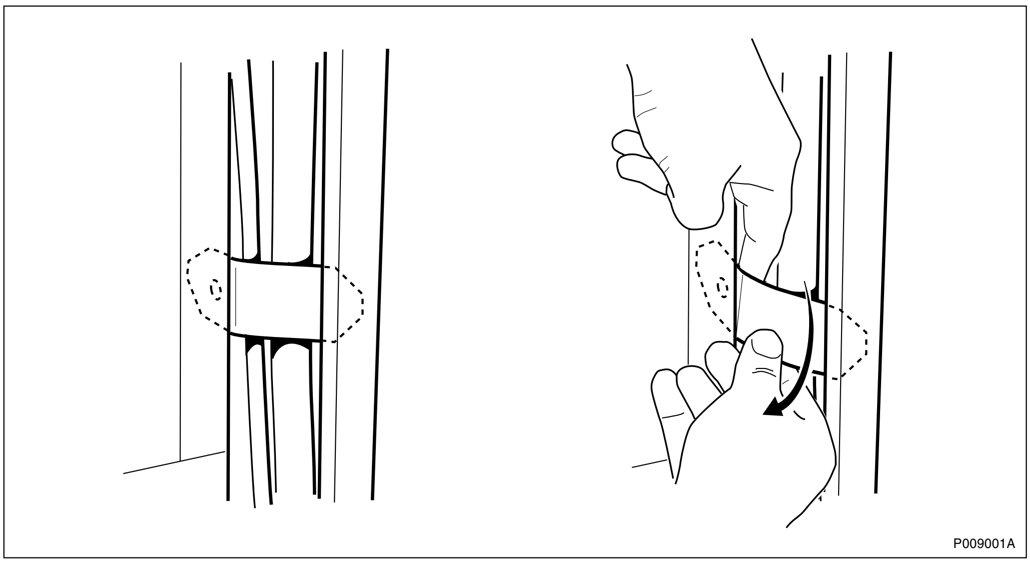


Figure 68 Removing the steel clips

8. Remove the TMA-CM cable.

9. Mount the new right connection plate and route the TMA-CM cable down to the TMA-CM.

   If the steel clips keeping the cables in place have been removed, remount them.

Taking the RBS into operation

10. Switch on circuit breaker OXU 1 or OXU 2 on the IDM.

11. Inform the OMC operator that the RBS will be taken into service.

12. Press the Local/remote button on the DXU to set the DXU to remote mode and wait until the flashing indicator turns off.

13. Return to the applicable section in *Chapter Fault Localisation* for the next step in the process.

Handling replaced unit(s)

Unless under contractual warranty the TMA-CM cable shall be disposed of locally by the customer according to environmental regulations. Do not return the TMA-CM cable to Ericsson for replacement, repair or disposal.

5.40 TRU Replacement

This section describes how to replace a faulty TRU.

Preconditions

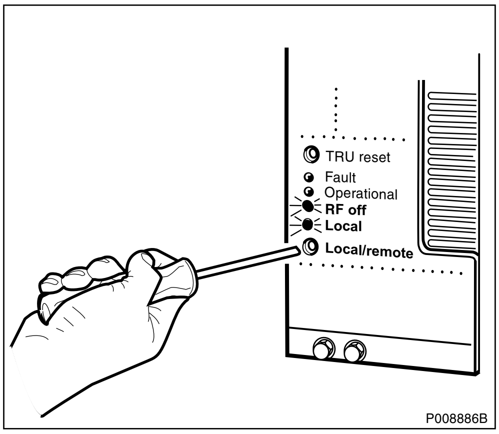
Before replacing a TRU, ensure the following:

- ☐ The TRU of the correct frequency is available. TRUs are marked on the front with a label showing frequency.
- ☐ An approved ESD wrist strap is available for use.

Taking the TRU out of operation

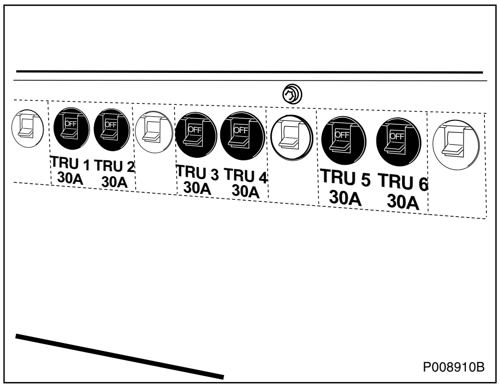
1. Inform the OMC operator and get approval for temporarily taking a TRU out of service.

2. Press the Local/remote button on the faulty TRU to set the TRU to local mode.



3. Wait until the RF off and Local indicators have a fixed yellow light.

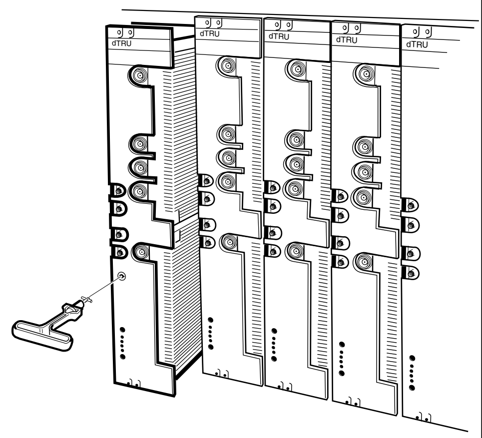
4. Switch off the circuit breaker for the faulty TRU on the IDM.



Replacing the TRU

5. Disconnect all cables from the faulty TRU.

6. Loosen the screws on the faulty TRU and use the RU extractor to remove it.



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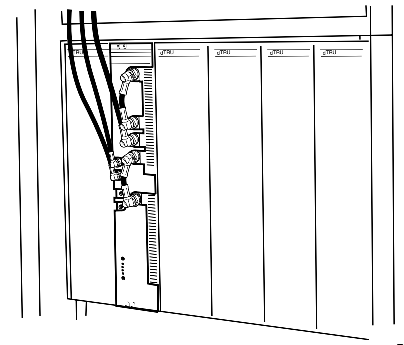
7. Insert the new TRU and fasten the screws.

8. Connect all cables to the new TRU. For cable connections, *see Chapter RF Connections.*



P008949A

Taking the TRU into operation

9. Switch on the circuit breaker for the replaced TRU on the IDM.

10. Wait until the RF off and Local indicators have a fixed yellow light, indicating that the TRU is ready for traffic.

11. Inform the OMC operator that the TRU will be taken into service.

12. Press the Local/remote button on the TRU to set the TRU to remote mode and wait until the flashing indicator turns off.

13. Return to the applicable section in *Chapter Fault Localisation* for the next step in the process.

Handling replaced unit(s)

The TRU should be returned to Ericsson for repair with a repair delivery note, LZF 084 64 (Blue Tag) attached. Include a clear description of the fault found. *See Chapter Concluding Routines* for instructions on completing a repair delivery note.

5.41 TRU Backplane Replacement

This section describes how to replace a faulty TRU backplane.

Preconditions

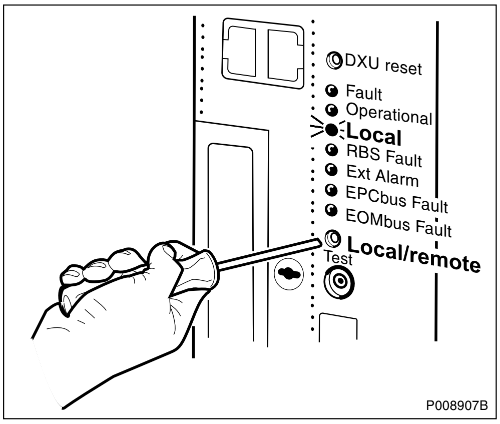
Before replacing the TRU backplane, ensure the following:

☐ An approved ESD wrist strap is available for use.

Taking the RBS out of operation

1. Inform the OMC operator and get approval for temporarily taking the RBS out of service.

2. Press the Local/remote button on the DXU to set the RBS to local mode.



3. Wait until the Local indicator has a fixed yellow light.

4. Switch off the incoming power to the cabinet. *See Section 5.2.2 Switching off the RBS on page 116.*

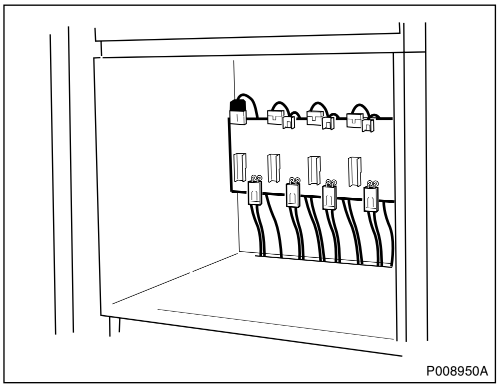
Replacing the TRU backplane

5. Disconnect all cables from the TRUs.

6. Remove all TRUs. *See Section 5.40 TRU Replacement on page 230* .

7. Disconnect all cables connected to the TRU backplane, loosen the screws keeping the TRU backplane in place and remove it.

8. Mount the new TRU backplane and reconnect all cables.



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9. Mount all TRUs, tighten the screws and reconnect all cables. *See Section 5.40 TRU Replacement on page 230* .

Taking the RBS into operation

10. Switch on the incoming power supply to the cabinet. *See Section 5.2.3 Switching on the RBS on page 117.*

11. Inform the OMC operator that the RBS will be taken into service.

12. Press the Local/remote button on the DXU to set the DXU to remote mode and wait until the flashing indicator turns off.

13. Check that all TRUs are in remote mode. If they are not, and the Local indicator on one or several TRUs has a fixed yellow light, press the Local/remote button on the TRU(s) in question. The Local indicator will start flashing. When it turns off, the TRU is in remote mode.

14. Return to the applicable section in *Chapter Fault Localisation* for the next step in the process.

Handling replaced unit(s)

Unless under contractual warranty the TRU backplane shall be disposed of locally by the customer according to environmental regulations. Do not return the TRU backplane to Ericsson for replacement, repair or disposal.

5.42 TX Antenna Feeder Replacement

See Section 5.7 Antenna Feeder and Jumper Cable Replacement on page 127 .

5.43 Y Link Cable Replacement

This section describes how to replace a faulty Y link cable.

The Y link cable runs from the front of the DXU to two connectors on the TRU backplane. The connector to the left is for TRU 1 to 6 and the connector to the right is for TRU 7 to 12.

Preconditions

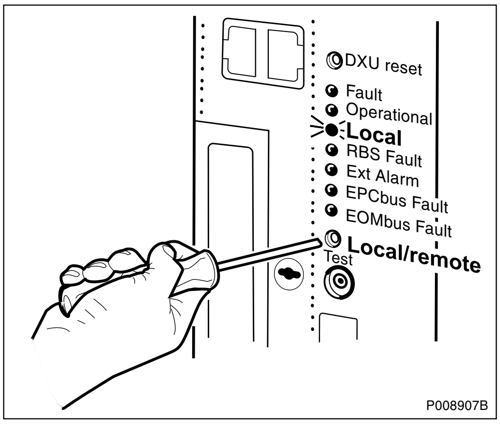
Before replacing the Y link cable, ensure the following:

☐ An approved ESD wrist strap is available for use.

Taking the RBS out of operation

1. Inform the OMC operator and get approval for temporarily taking the RBS out of service.

2. Press the Local/remote button on the DXU to set the RBS to local mode.



3. Wait until the Local indicator has a fixed yellow light.

4. Switch off the incoming power supply to the cabinet. *See Section 5.2.2 Switching off the RBS on page 116.*

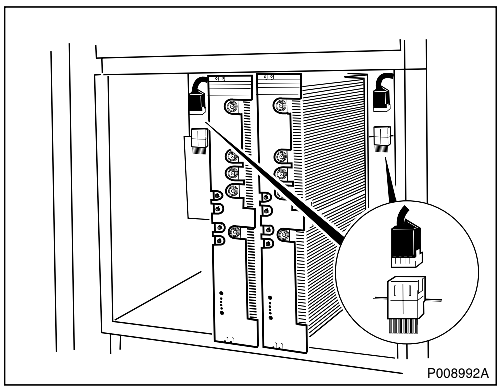
Replacing the Y link cable

5. Remove the IDM. *See Section 5.29 IDM Replacement on page 180.*

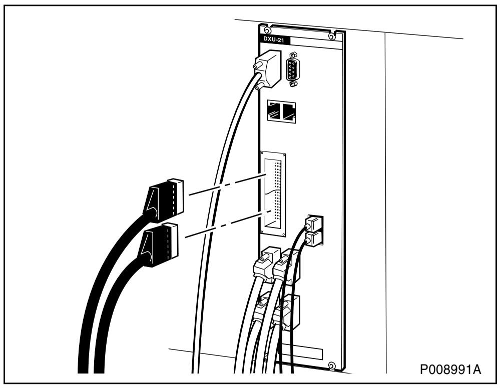
6. Disconnect all cables from other units connected to the two leftmost TRUs (Y link cable to TRU 1 – 6) and/or to the two rightmost TRUs (Y link cable to TRU 7 – 12).

7. Loosen the screws keeping the TRUs in place and remove the two leftmost (Y link cable to TRU 1 – 6) and/or the two rightmost TRUs (Y link cable to TRU 7 – 12). *See Section 5.40 TRU Replacement on page 230* .

8. Disconnect the faulty Y link(s), Y link cable 1 – 6 and/or Y link cable 7 – 12 from the TRU backplane.



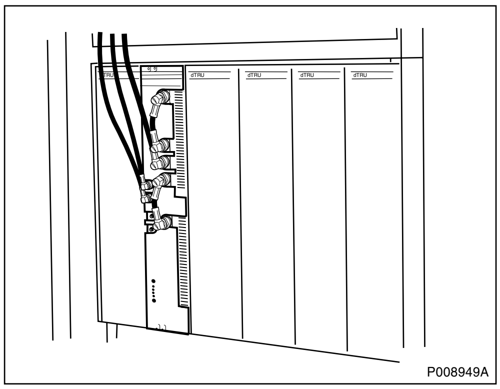
9. Disconnect the faulty Y link cable from the DXU.



10. Carefully pull the Y link cable out of the cabinet from behind the TRU backplane.

11. Insert the new Y link cable and connect it to the TRU backplane and the DXU.

12. Mount the TRUs, tighten the screws and reconnect all cables to the TRUs. *See Section 5.40 TRU Replacement on page 230* .



13. Mount the IDM. *See Section 5.29 IDM Replacement on page 180.*

Taking the RBS into operation

14. Switch on the incoming power supply to the cabinet. *See Section 5.2.3 Switching on the RBS on page 117.*

15. Inform the OMC operator that the RBS will be taken into service.

16. Press the Local/remote button on the DXU to set the DXU to remote mode and wait until the flashing indicator turns off.

17. Return to the applicable section in *Chapter Fault Localisation* for the next step in the process.

Handling replaced unit(s)

Unless under contractual warranty the Y link cable shall be disposed of locally by the customer according to regulations for the environment. Do not return the cable to Ericsson for replacement, repair or disposal.

6 Test after Repair

This chapter describes the methods for testing the RBS after repair. 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.

6.1 How to use Test after Repair

Note that after replacing an RU, only the section “Before Leaving the Site” in *Chapter Concluding Routines* is used as a verification test.

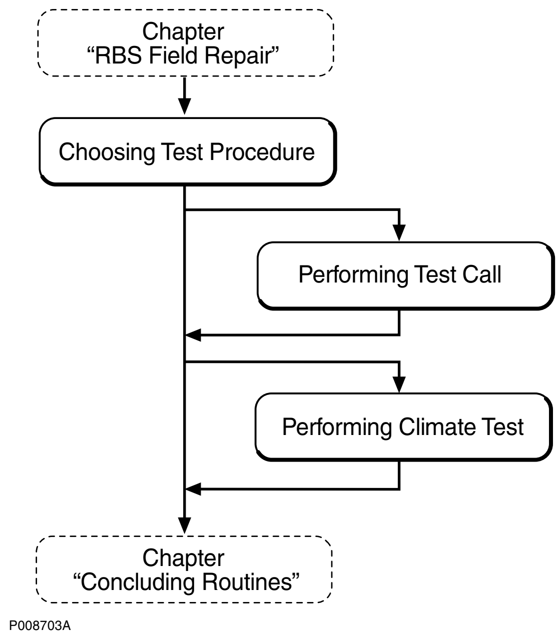


Figure 69 How to use Test after Repair

6.2 Choosing Test Procedure

Choose test procedure according to the reference in the *Chapter Fault Localisation* .

Test Call

Test call(s) must be performed when an RU in the RF part of the RBS, backplanes and parts in the antenna system have been replaced to ensure that the RBS can carry traffic.

Climate Test

A Climate Test must be performed when parts in the Climate Unit have been replaced.

6.3 Performing Test Call

This chapter describe how to make a test call using a TEMS and TEMS software.

Preconditions

Before making test call, to ensure that the RBS can carry traffic, ensure the following:

- ☐ A DXU, TRU(s), CDU(s), CXU, RF cable, backplane or parts in the antenna system have been replaced.
- ☐ If a technican is required to make a test call on a specific RU, information is needed on the ARFCN(s) for each TRU. Contact the BSC personnel for information on ARFCN(s).
- ☐ The Operational indicators on the DXU and TRUs should be on.
- ☐ All units are in remote mode.

The test procedure is divided into two parts that are done in sequence. The first test sequence of the downlink connection is monitored by the TEMS. The second test sequence of the uplink connection is monitored by the OMT.

Monitoring the dedicated channel with a TEMS

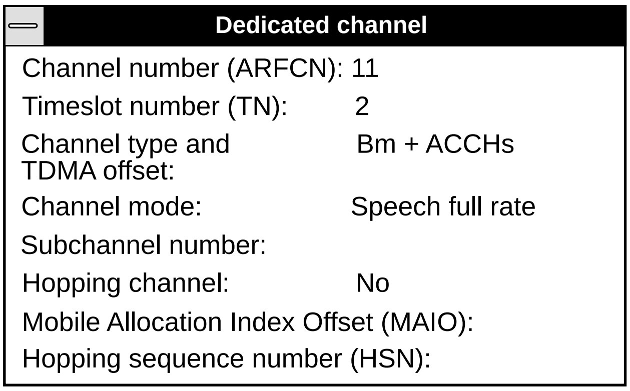
1. Connect the TEMS to the PC serial port.
2. Start the TEMS program in the Windows environment.
3. Select **Enable Connections** in the **Externals** menu and specify the serial port for the TEMS.
4. Contact the BSC personnel to find out which ARFCN and TS that a test call should be performed on.

   The BSC personnel can use the printout command:

   RXCDP:MO=RXOTG-tg;

   Note: The RXCDP gives, for the TG specified, the ARFCN and TN (time slot 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 figure below.*



06_0178A

Figure 70 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 time slot, select the **Start monitor** button.

11. Check the **RX-LEV full** and **RX-LEV sub** values, *see figure below* .

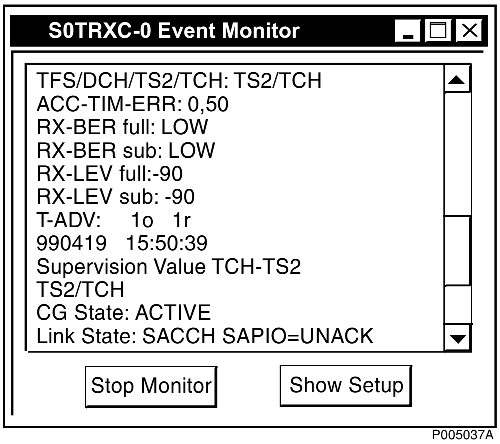


Figure 71 Example of OMT Supervision value TCH-TS 2

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.

6.3.1 Before leaving the site

1. Proceed to *Chapter Concluding Routines* and complete the checklist.

7 Concluding Routines

This chapter describes the different administrative routines that must be carried out as a result of a maintenance procedure.

Packing Materials

This section describes the routines to be completed with packing materials before leaving the site.

Note: Ericsson strongly advises that when cleaning up after maintenance of the RBS cabinet, the personnel performing the maintenance work pay particular attention to the environment. Primarily, recycle all waste materials that can be recycled and sort waste so that it can be disposed of according to local regulations.

Table 37 Objects to be recycled or disposed of after maintenance work

Item	Sort or recycle?
Cable insulation from crimping, brazing or welding	Sorted with plastics
Packing chips	
Foam	
Polystyrene	
Bubble plastic	
Cable tie clippings	
Paper and wood	Paper recycling
Waste metal from cable ladders	Recycled or sorted as metals.
Pieces of cable	
Nuts, bolts, washers and screws	
CFCs	Refrigeration fluids are disposed of according to local regulations.
Batteries	Batteries contain acid and should be carefully disposed of according to local regulations.

Note: All packing material should be recycled, and shock absorbers disposed of, in accordance with local recycling regulations.

7.1 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 38 Before leaving the site, checklist

Ensure the following:		**OK**
1	All operational green indicators are on.	
2	All other indicators are off.	
3	All the warning signs are fixed and located correctly in the cabinet.	
4	All RU positions are filled with either an RU or a dummy. (1)	
5	The cabinet is dry inside.	
6	The inside and outside of the cabinet is free from mechanical damage or rust.	
7	The radio sub-cabinet and mounting base are free from foreign objects and all cables are free of damage.	
8	The back-up copy of the RBS IDB is saved on a disk.	
9	All tools are accounted for.	
10	All EMC sealants are intact.	
11	The door filter is inspected.	
12	The cabinet is locked.	
13	The external air intake is free from obstructions.	
14	All other necessary paper work is completed.	
15	The defective part packed for shipment including repair Delivery Note (Blue Tag).	
16	The hazard lights on the antenna are operational.	
17	The antennas, towers, and RF cables are operational.	
18	The OMC is notified and no alarms are present.	
Signature:		
Date:		

(1) Empty RU positions for the CDU, PSU, OXU 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.

7.2 Report of Finished Work

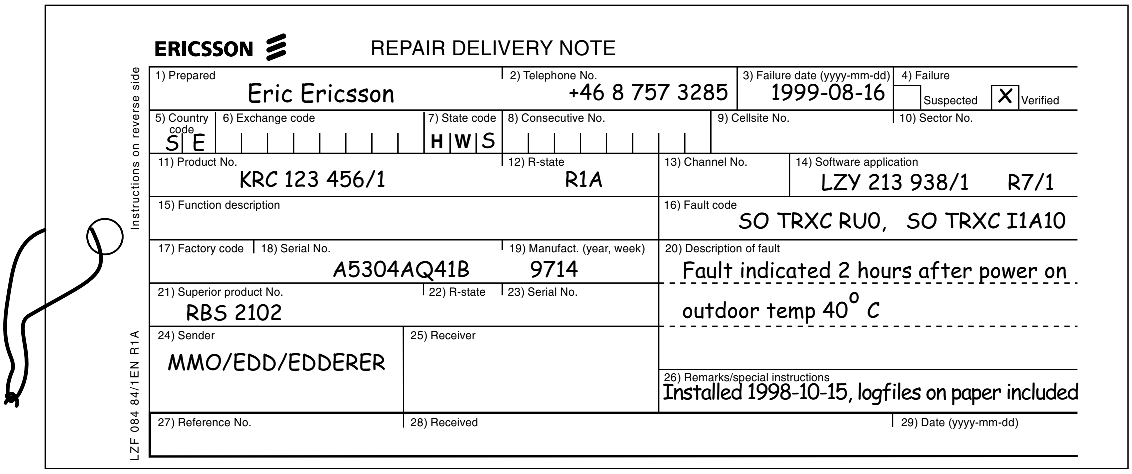
When a maintenance procedure has been completed, a report is written including a detailed description of actions taken, all observations made in accordance with local routines for work orders, site log-book and so on.

7.3 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 First Line Support. An example of completed repair delivery note follows below.



ERICSSON REPAIR DELIVERY NOTE

Instructions on reverse side

1) Prepared: Eric Ericsson	2) Telephone No.: +46 8 757 3285	3) Failure date (yyyy-mm-dd): 1999-08-16	4) Failure: Suspected / X Verified
5) Country code: S E	6) Exchange code	7) State code: H W S	8) Consecutive No. / 9) Cellsite No. / 10) Sector No.
11) Product No.: KRC 123 456/1	12) R-state: R1A	13) Channel No.	14) Software application: LZY 213 938/1 R7/1
15) Function description		16) Fault code: SO TRXC RU0, SO TRXC I1A10	
17) Factory code / 18) Serial No.: A5304AQ41B	19) Manufact. (year, week): 9714	20) Description of fault: Fault indicated 2 hours after power on outdoor temp 40° C	
21) Superior product No.: RBS 2102	22) R-state / 23) Serial No.		
24) Sender: MMO/EDD/EDDERER	25) Receiver	26) Remarks/special instructions: Installed 1998-10-15, logfiles on paper included	
27) Reference No.	28) Received	29) Date (yyyy-mm-dd)	

LZF 084 84/1EN R1A

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 72 An example of completed repair delivery note (“Blue tag”)

The above explanations to the Repair delivery note are also given on its reverse side.

7.4 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 are given below.

Customer disposable Customer 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 *Appendix B: Spare Parts Catalogue* 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 arrestors
- 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 *Appendix B: Spare Parts Catalogue* 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 *Appendix B: Spare Parts Catalogue* as “Recommended spare parts for customer stock (repairable)” .

Examples of these parts are:

- CDU
- DXU
- PSU
- TRU
- CXU

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.

Note: The fault must be verified before returning the faulty unit to the Ericsson repair center.

7.5 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 *Appendix B: Spare Parts Catalogue* to determine which repairable units should be returned for repair.

7.6 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 page that follows contain an example of an completed trouble report and a blank trouble report.

The trouble report should be sent to the nearest First Line Support center.

7.6.1 Site explanations

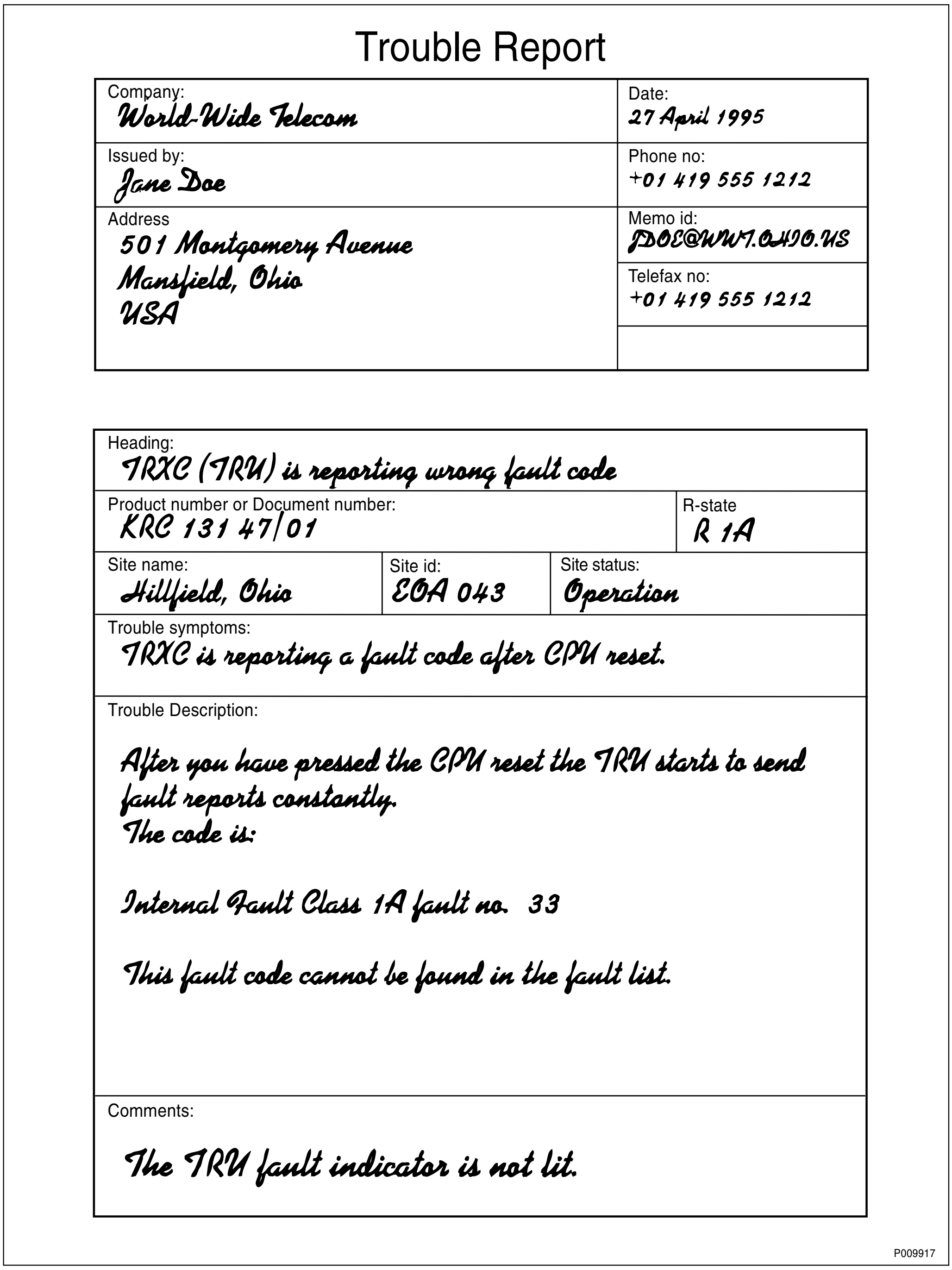
When completing the Trouble Report, it is important that the following is noted:

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”

7.6.2 Example of an completed 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.

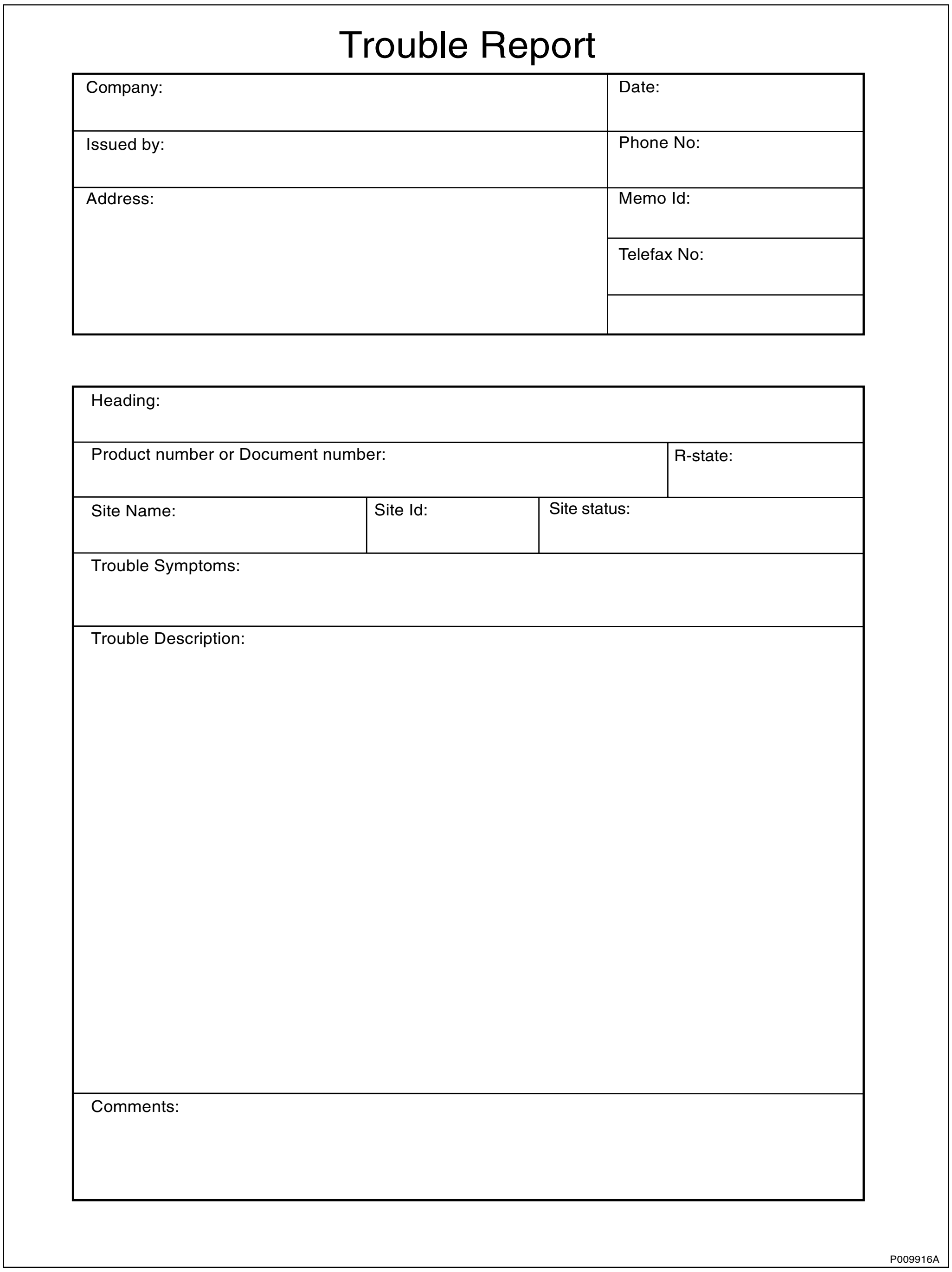
Comments:

The TRU fault indicator is not lit.

P009917

Figure 73 Example of an completed trouble report

7.6.3 Blank Trouble Report,



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:

P009916A

Figure 74 Blank Trouble report

8 Optical Indicators and Switches

This chapter describes the optical indicators and switches in the RBS and their function.

The units and their respective indicators and switches are listed in alphabetical order.

8.1 Indicator Types

RBS 2000 optical indicators are either red, green or yellow. The indicators can be on, off or flashing.

Table 39 Indicators and indications

Indicator type	Indicates
Red	Fault
Green	Operational
Yellow	Status

At start-up, all indicators on the DXU and dTRUs will start flashing and continue to flash until the RBS SW is started. When the software starts the Operational indicator has a fixed green light and all other indicators switch off.

8.2 ACCU

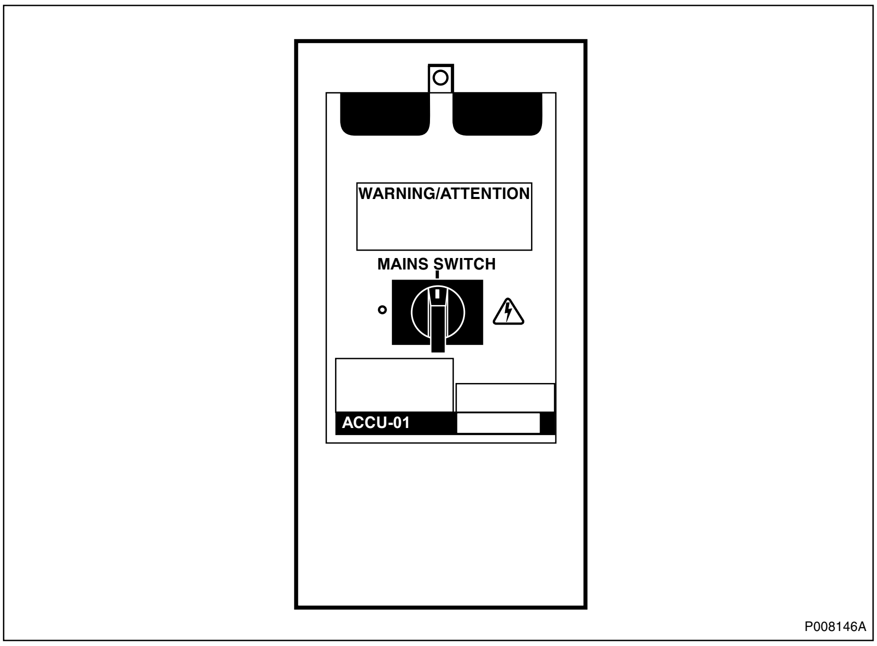


Figure 75 ACCU-01 switch

Table 40 ACCU-01 switch

Label	**Mode**	**Function**
MAINS SWITCH	1	AC mains power connected
	0	AC mains power disconnected

8.3 ASU-01

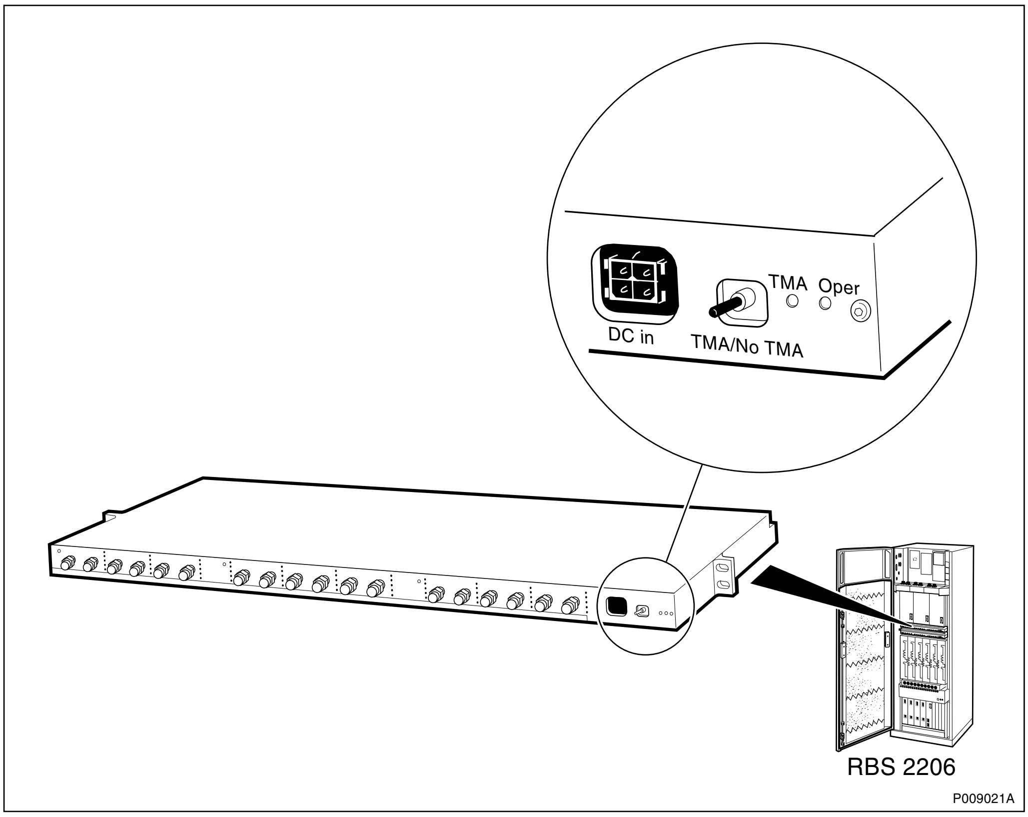


Figure 76 ASU-01 optical indicators and switch

Table 41 ASU-01 optical indicators

Label	Colour	Mode	Indicates
Operational	Green	Off	ASU not operational
		On	ASU operational
TMA	Yellow	Off	No TMA installed
		On	TMA installed

Table 42 ASU-01 switch

Label	Mode	Function
TMA/No TMA	No TMA	Adjusts ASU output for no presence of TMA
	TMA	Adjusts ASU output for the presence of TMA

8.4 CDU-F

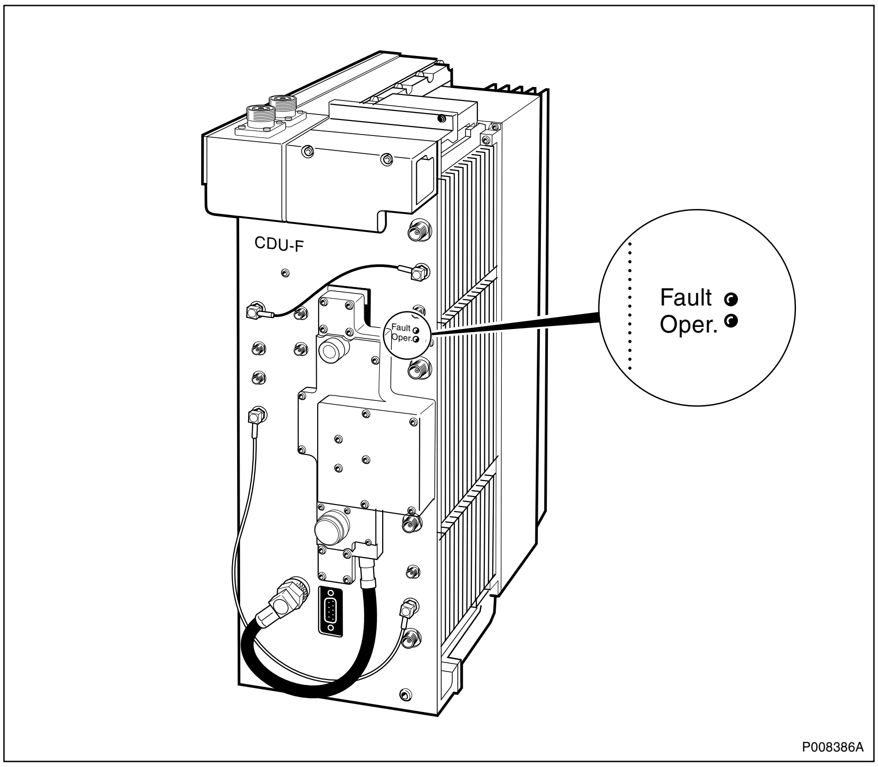


Figure 77 CDU-F optical indicators

Table 43 CDU-F optical indicators

Label	Colour	Mode	Indicates
Fault	Red	Off	No faults detected in CDU-F
		On	Fault detected in CDU-F
Oper.	Green	Off	CDU-F not operational
		On	CDU-F operational

8.5 CDU-G

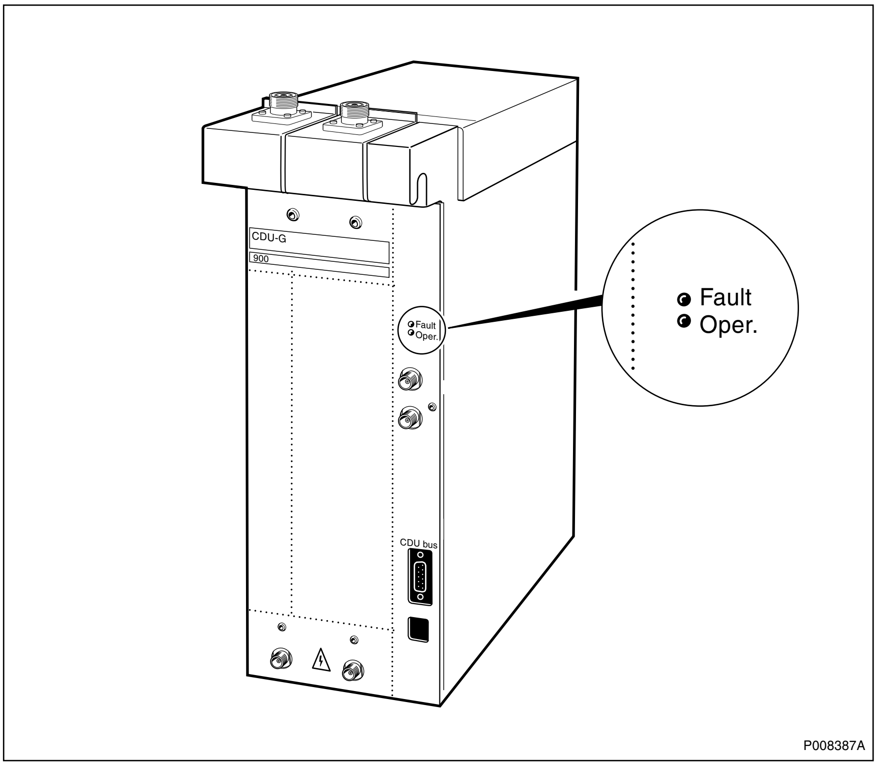


Figure 78 CDU-G optical indicators

Table 44 CDU-G optical indicators

Label	Colour	Mode	Indicates
Fault	Red	Off	No faults detected in CDU-G
		On	Fault detected in CDU-G
Oper.	Green	Off	CDU-G not operational
		On	CDU-G operational

8.6 CXU-10

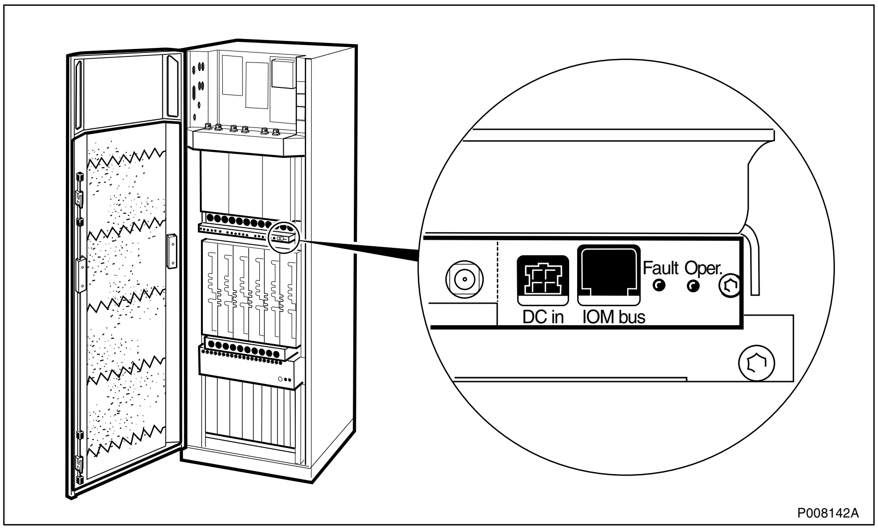


Figure 79 CXU-10 optical indicators

Table 45 CXU-10 optical indicators

Label	Colour	Mode	Indication
Fault	Red	Off	No faults detected in the CXU
		On	Fault detected in the CXU
Oper.	Green	Off	CXU not operational
		On	CXU operational

8.7 DCCU-01

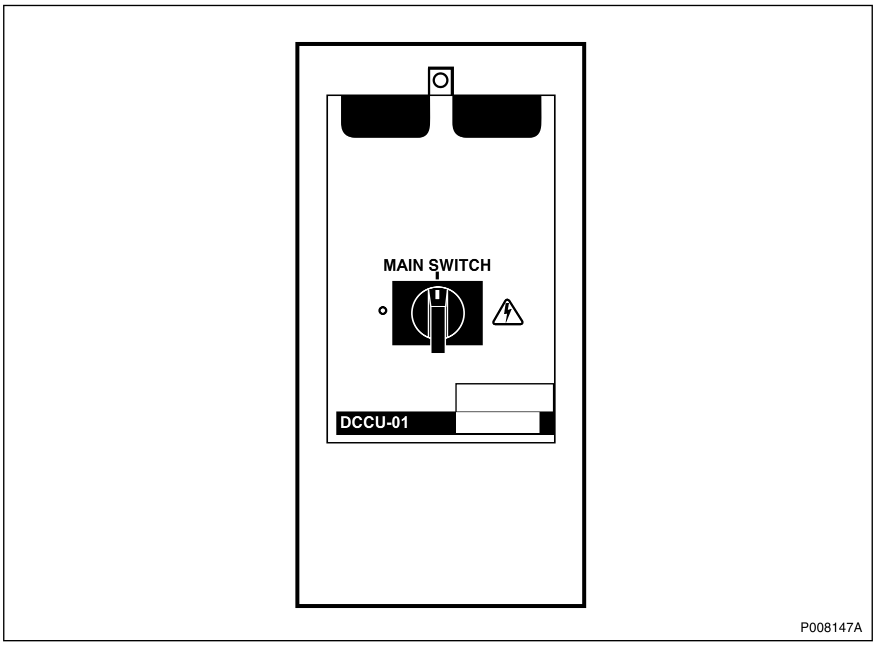


Figure 80 DCCU-01 switch

Table 46 DCCU-01 switch

Label	Mode	Function
MAIN SWITCH	1	DC power connected
	0	DC power disconnected

8.8 dTRU

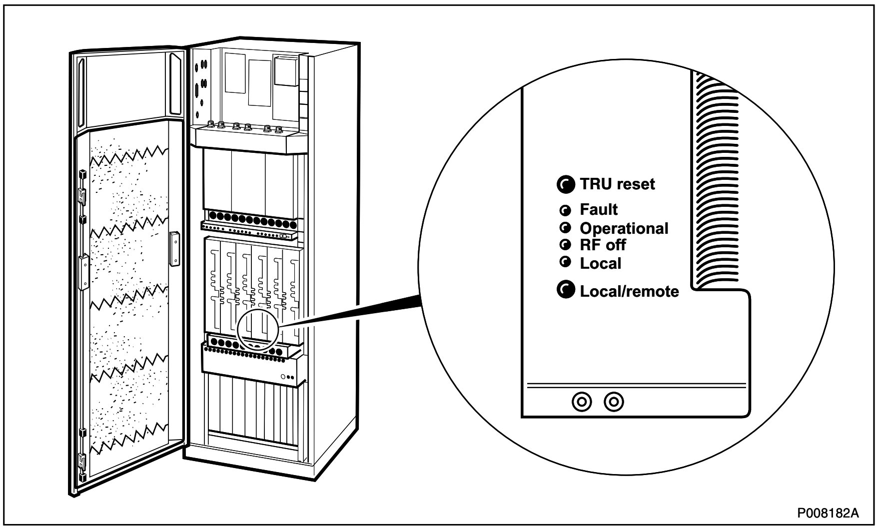


Figure 81 dTRU optical indicators and switches

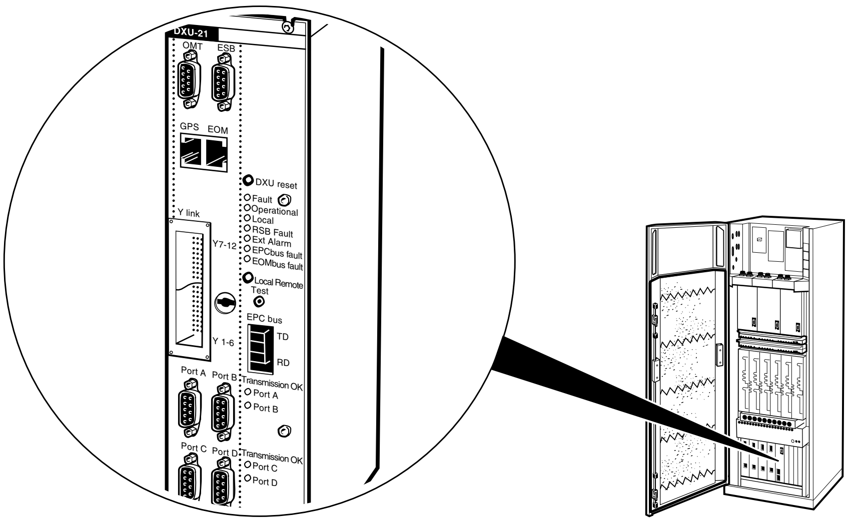
Table 47 dTRU optical indicators

Label	Colour	Mode	Indicates
Fault	Red	Off	No fault detected in dTRU
		On	Fault detected in dTRU
Operational	Green	Off	dTRU not operational
		On	dTRU operational
		Flashing	One of the following: • Software being downloaded • Configuration activity in progress, which may take longer than 10 seconds to complete • Restart by BSC pending
RF off	Yellow	Off	RF output power on
		On	RF output power off
Local	Yellow	Off	dTRU in remote mode, that is, controlled by the BSC
		On	dTRU in local mode, that is, is controlled by the RBS
		Flashing	dTRU mode change in progress, that is, a link between the BSC and the RBS is being established or released

Table 48 Switches on dTRU

Label	Function
TRU reset	Resets the dTRU and all units subordinated to the dTRU
Local/remote	Changes the dTRU mode between local and remote

8.9 DXU-21



P008995A

Figure 82 DXU-21 optical indicators and switches

Table 49 DXU-21 optical indicators

Label	Colour	Mode	Indicates
Fault	Red	Off	No faults detected in DXU
		On	Fault detected in DXU
Operational	Green	Off	DXU not operational
		On	DXU operational
		Flashing	One of the following: • Software being received • Configuration activity in progress, which may take longer than 10 seconds to complete • Restart by BSC pending
Local	Yellow	Off	DXU in remote mode, that is, it is controlled by the BSC
		On	DXU in local mode, that is, the DXU has no communication with the BSC
		Flashing	DXU mode change in progress, that is, a link between the BSC and RBS is being established or released

Table 49 DXU-21 optical indicators

Label		Colour	Mode	Indicates
RBS fault		Yellow	Off	No faults detected in the RBS
			On	One or more faults detected in the RBS
Ext. alarm		Yellow	Off	No external alarms triggered
			On	One or more external alarms triggered
EPC bus fault		Yellow	Off	No communication fault on the EPC bus
			On	A communication fault on the EPC bus detected
EOM bus fault		Yellow		For future use
Trans-mis-sion OK	Port A	Green	Off	Loss of Signal or Loss of Frame Alignment detected on Port A
			On	Transmission OK on Port A
	Port B	Green	Off	Loss of Signal or Loss of Frame Alignment detected on Port B
			On	Transmission OK on Port B
	Port C	Green	Off	Loss of Signal or Loss of Frame Alignment detected on Port C
			On	Transmission OK on Port C
	Port D	Green	Off	Loss of Signal or Loss of Frame Alignment detected on Port D
			On	Transmission OK on Port D

Table 50 DXU-21 switches

Label	Function
DXU reset	Resets DXU and all units subordinate to the DXU
Local/remote	Changes DXU mode between local and remote

8.10 FCU-01

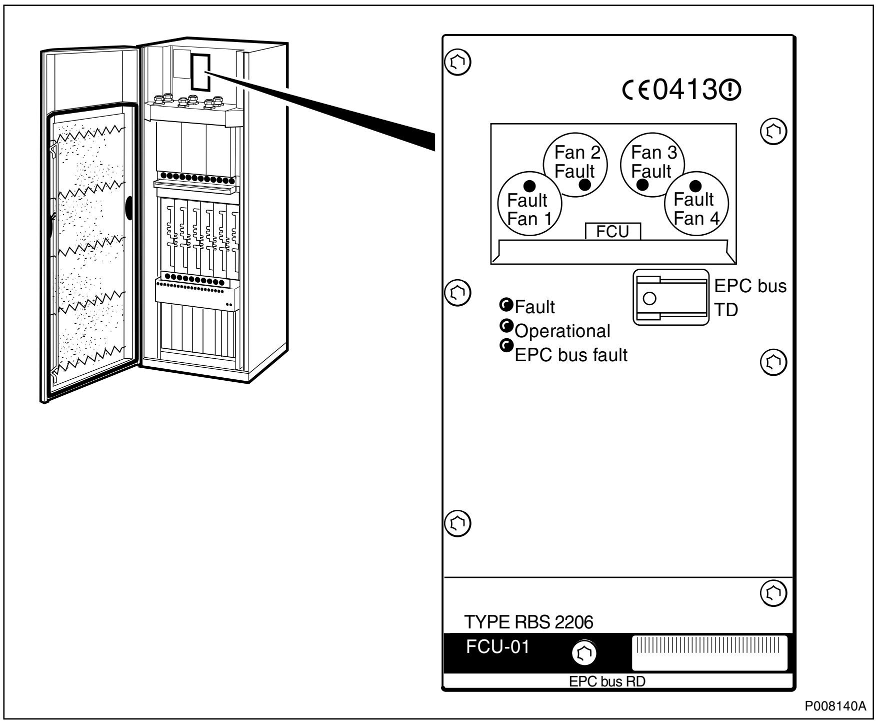


Figure 83 FCU-01 optical indicators

Table 51 FCU-01 optical indicators

Label	Colour	Mode	Indicates
Fault	Red	Off	No fault detected in FCU
		On	Fault detected in FCU
Operational	Green	Off	FCU not operational
		On	FCU operational
EPC bus fault	Yellow	Off	FCU has communication with DXU
		On	FCU has no communication with DXU
Fault Fan 1	Red	Off	No faults detected in Fan 1
		On	One or more faults detected in Fan 1
Fan 2 Fault	Red	Off	No faults detected in Fan 2
		On	One or more faults detected in Fan 2
Fan 3 Fault	Red	Off	No faults detected in Fan 3
		On	One or more faults detected in Fan 3
Fault Fan 4	Red	Off	No faults detected in Fan 4
		On	One or more faults detected in Fan 4

8.11 IDM-01

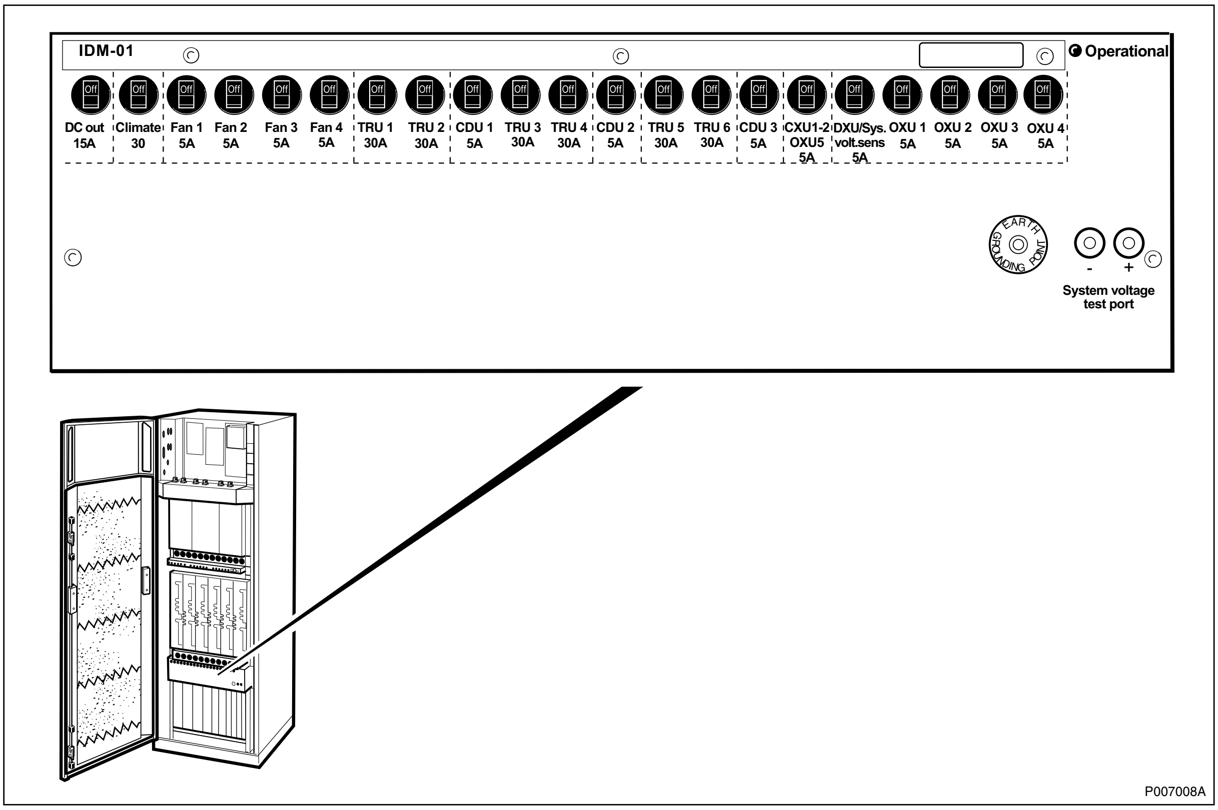


Figure 84 IDM-01 optical indicators and switches

Table 52 IDM-01 optical indicators

Label	**Colour**	**Mode**	**Indicates**
Operational	Green	Off	IDM not operational
		On	IDM operational

Table 53 IDM-01 switches

Label	**Logical label (if applicable)**	**Pos.**	**Function**
DC out 15 A		On	+24 V DC to auxiliary equipment and internal lighting
		Off	Fault detected or turned off manually
Climate 30 A		On	+24 V DC to climate unit
		Off	Fault detected or turned off manually

Table 53 IDM-01 switches

Label	Logical label (if applicable)	Pos.	Function
Fan 1 5 A	Fan 0	On	+24 V DC to fan 1
		Off	Fault detected or turned off manually
Fan 2 5 A	Fan 1	On	+24 V DC to fan 2
		Off	Fault detected or turned off manually
Fan 3 5 A	Fan 2	On	+24 V DC to fan 3
		Off	Fault detected or turned off manually
Fan 4 5 A	Fan 3	On	+24 V DC to fan 4
		Off	Fault detected or turned off manually
TRU 1 30 A	TRU 0	On	+24 V DC to TRU 1
		Off	Fault detected or turned off manually
TRU 2 30 A	TRU 1	On	+24 V DC to TRU 2
		Off	Fault detected or turned off manually
CDU 1 5 A	CDU 0	On	+24 V DC to CDU 1
		Off	Fault detected or turned off manually
TRU 3 30 A	TRU 2	On	+24 V DC to TRU 3
		Off	Fault detected or turned off manually
TRU 4 30 A	TRU 3	On	+24 V DC to TRU 4
		Off	Fault detected or turned off manually
CDU 2 5 A	CDU 1	On	+24 V DC to CDU 2
		Off	Fault detected or turned off manually
TRU 5 30 A	TRU 4	On	+24 V DC to TRU 5
		Off	Fault detected or turned off manually
TRU 6 30 A	TRU 5	On	+24 V DC to TRU 6
		Off	Fault detected or turned off manually
CDU 3 5 A	CDU 2	On	+24 V DC to CDU 3
		Off	Fault detected or turned off manually
CXU 1-2 OXU 5 5 A		On	+24 V DC to CXU 1-2
		Off	Fault detected or turned off manually

Table 53 IDM-01 switches

Label	Logical label (if applicable)	Pos.	Function
DXU/Sys volt sens 5 A		On	+24 V DC to DXU and system voltage sensor
		Off	Fault detected or turned off manually
OXU 1 5 A	OXU 0	On	+24 V DC to OXU 1
		Off	Fault detected or turned off manually
OXU 2 5 A	OXU 1	On	+24 V DC to OXU 2
		Off	Fault detected or turned off manually
OXU 3 5 A	OXU 2	On	+24 V DC to OXU 3
		Off	Fault detected or turned off manually
OXU 4 5 A	OXU 3	On	+24 V DC to OXU 4
		Off	Fault detected or turned off manually

8.12 PSU

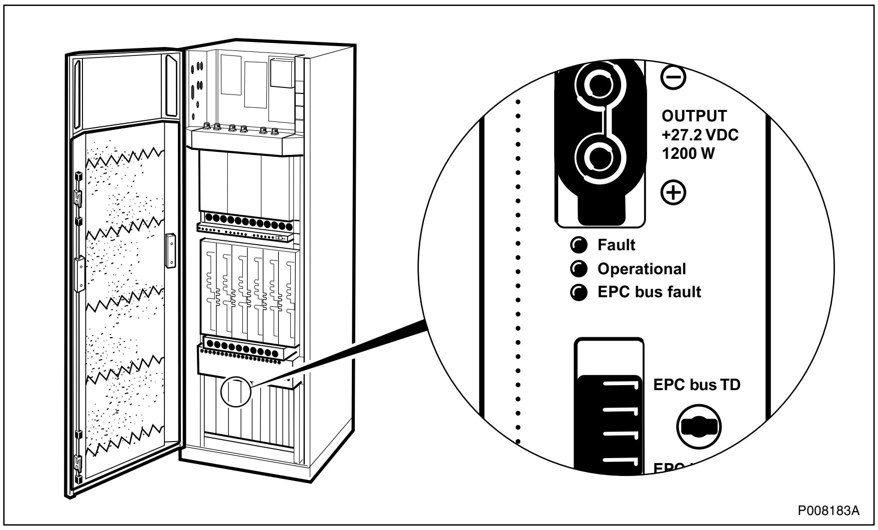


Figure 85 PSU optical indicators

Table 54 PSU optical indicators

Label	Colour	Mode	Indicates
Fault	Red	Off	No fault detected in PSU
		On	Fault detected in PSU
Operational	Green	Off	PSU not operational
		On	PSU operational
EPC bus fault	Yellow	Off	PSU has communication with DXU
		On	PSU has no communication with DXU

8.13 RBS Status Panel

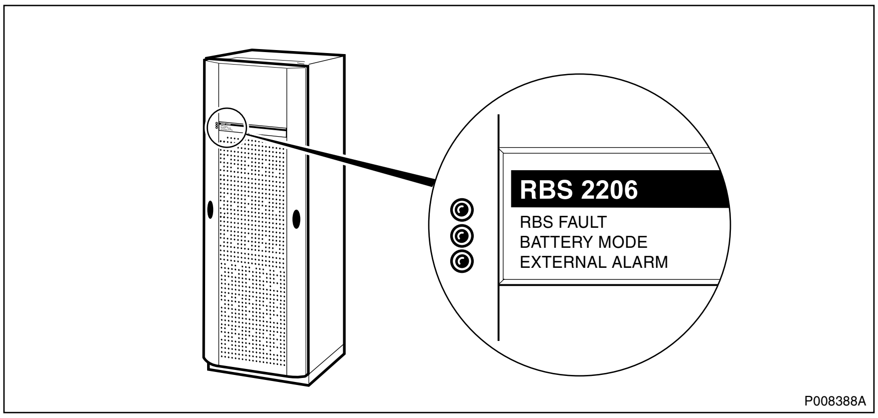


Figure 86 RBS Status Panel optical indicators

Table 55 RBS Status Panel optical indicators

Label	Colour	Mode	Indicates
RBS fault	Yellow	Off	No faults detected in RBS
		On	One or more faults detected in RBS
External alarm	Yellow	Off	No external alarms triggered
		On	One or more external alarms triggered
Battery mode	Yellow	Off	No battery power used
		On	Battery power supply fully or partly used

8.14 TMA-CM-01

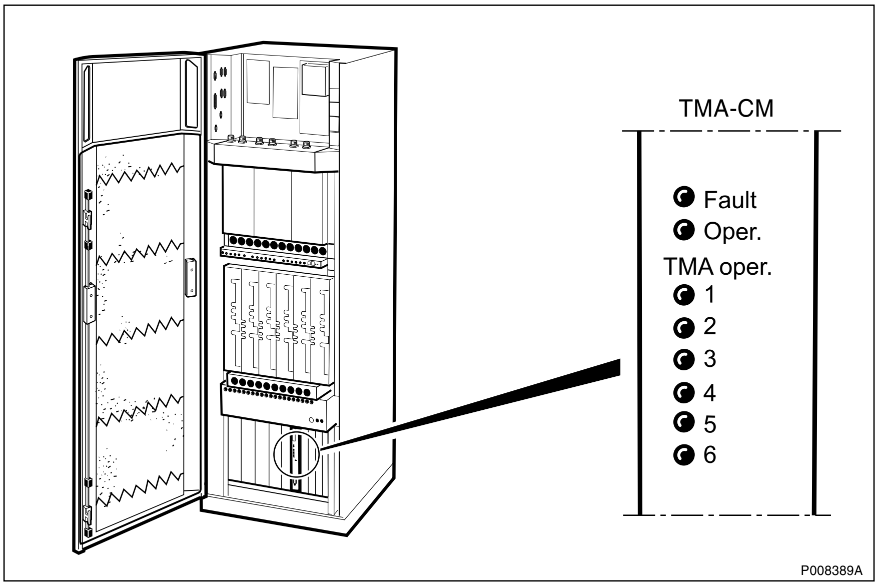


Figure 87 TMA-CM-01 optical indicators

Table 56 TMA-CM-01 optical indicators

Label		Colour	Mode	Indicates
Fault		Red	Off	No fault detected in TMA CM
			On	Fault detected in TMA CM
Oper.		Green	Off	TMA CM not operational
			On	TMA CM operational
TMA oper.	1	Green	Off	TMA 1 not operational
			On	TMA 1 operational
	2	Green	Off	TMA 2 not operational
			On	TMA 2 operational
	3	Green	Off	TMA 3 not operational
			On	TMA 3 operational
	4	Green	Off	TMA 4 not operational
			On	TMA 4 operational
	5	Green	Off	TMA 5 not operational
			On	TMA 5 operational
	6	Green	Off	TMA 6 not operational
			On	TMA 6 operational

9 Preventive Maintenance

This chapter provides information needed to perform preventive maintenance. The process causes a minimum of interruption to operation of the RBS.

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.

Preventive Maintenance Process

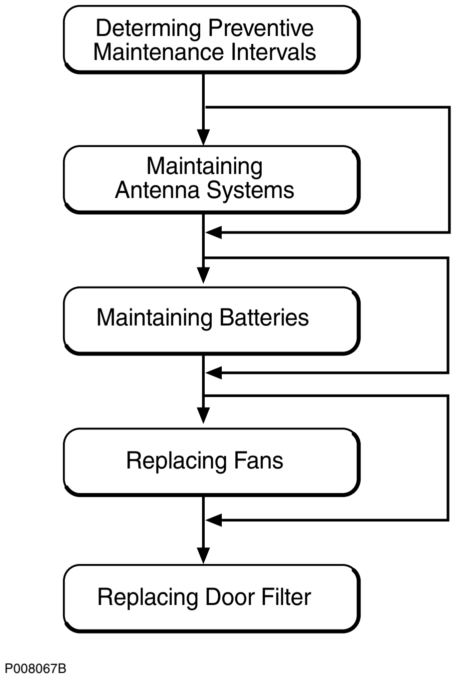


Figure 88 Preventive Maintenance Process

9.1 Determining Preventive Maintenance Intervals

The table below is used to determine which routines to perform. The routines are always performed in the order they appear in the table.

Note: The interval between inspections at each RBS site may vary depending upon the environmental conditions found there.

Table 57 Preventive maintenance intervals

Action	Period
Antenna system maintenance	Once a year
Battery maintenance (1)	Every five years
Replace batteries (1) (2)	Every five years
Replace fans	Every ten years
Replace door filter (3)	Every five years
Checklist “Before Leaving the Site”	Every site visit

(1) It is recommended that batteries be purchased locally. Refer to information supplied by the manufacturer for the correct inspection and replacement interval.
(2) This procedure is included in the “Battery maintenance procedure” .
(3) Inspect the door filter every site visit.

9.2 Maintaining Antenna Systems

This section presents a checklist for the antenna system and actions to take if faults are found.

There is no performance check for the antenna system.

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.

9.2.1 Checking Antenna Systems

The following checklist is not mandatory, but strongly recommended. Local procedures and safety regulations must be evaluated and included in this checklist. If any of the statements in the checklist cannot be complied with, instructions to rectify the situation follow the checklist.

Table 58 Antenna checklist

Ensure the following:		OK
1	The poles are in a safe condition, that is, free of cracks, bends or loose connections.	
2	The lightning protection system is secure and functional.	
3	The TMA(s) is firmly mounted and in good condition.	
4	All cables have labels.	
5	Cables secured to poles (approximately once every 0.6 m).	
6	The cable seals at the entry point into the cabinet are in good condition.	
7	All cables are free from abrasions, cuts and cracks.	
8	All cable connector seals are in good condition.	
9	All cable ducts are dry and the seals in good condition.	
10	Antenna towers and legs are free of corrosion.	
11	Antenna towers are free of bows or bends.	
12	Aircraft warning lights are operational.	
13	Support foundations are free of signs of wear and/or cracks.	
14	Guy wires are free of excessive corrosion.	
15	Guy wires are free of signs of slipping.	
16	Guy wires have no broken strands.	
17	Antennas are correctly orientated.	
18	Are the antennas firmly mounted.	
19	The RBS transmission path is free of obstructions (no new buildings, towers, and so on blocking it since installation).	
Signature:		
Date:		

Actions

1. Tighten loose connections.
2. Replace defective RF cables in the cabinet.
3. Contact the supervisor to inform them of any other faults found when filling in the checklist as further repair activities may require field technicians trained and certified to climb towers.

9.3 Maintaining Batteries

This section describes how to access batteries, both internal and external. There are also instructions on how to correct faults at the end of the section.

There is no specific performance check for the battery system for first line maintenance.

Note: Read Safety Instructions regarding handling and connecting batteries in chapter Safety.

Note: It is recommended that batteries are purchased locally. Refer to information supplied by the manufacturer for the correct inspection and replacement interval.

Caution!

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

9.4 Replacing Fans

Note: The only preventive maintenance included in this procedure is replacement.

1. When replacement is necessary for preventive maintenance, replace all four fans. *See Section Fan Replacement in Chapter RBS Field Repair.*

9.5 Replacing Door Filter

Note: The only preventive maintenance included in this procedure is replacement.

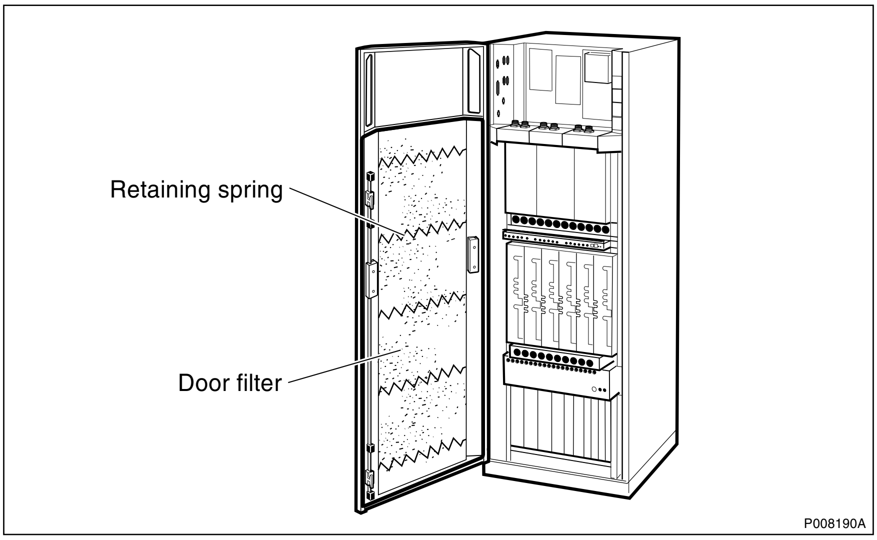


Figure 89 Location of the door filter and retaining springs

1. Open the cabinet door and release one side of the four retaining springs holding the filter in place.

2. Replace the door filter, attach the retaining springs and close the cabinet door.

10 RF Connections

This chapter describes the cables between CDUs, CXU, dTRUs and ASU.

The cabinet cables are grouped into cable sets and provided as a cable pack. These packs provide all the cables for the following functions:

- EPC - EPC cables between PSUs, FCU, DXU and BFUs
- Power - All cables related to the main input power
- CDU - All cables related to dTRU, CXU and CDU

Note: All connectors, except QMA, are to be tightened using a torque wrench. *See Chapter General Information.*

All unused RF output ports on the RUs shall be terminated with 50 Ω terminators. All RF input ports not in use (for example, transmitter ports) on the RUs shall be fitted with plastic protective sleeves. These terminators and protective sleeves are supplied with the CXU.

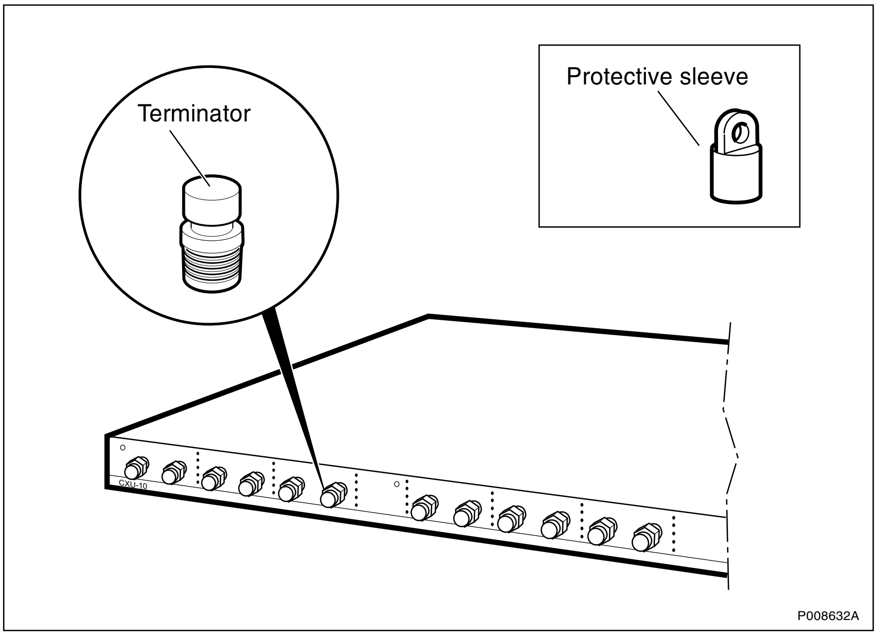


Figure 90 Terminating unused CXU ports

10.1 Wiring CDU-F

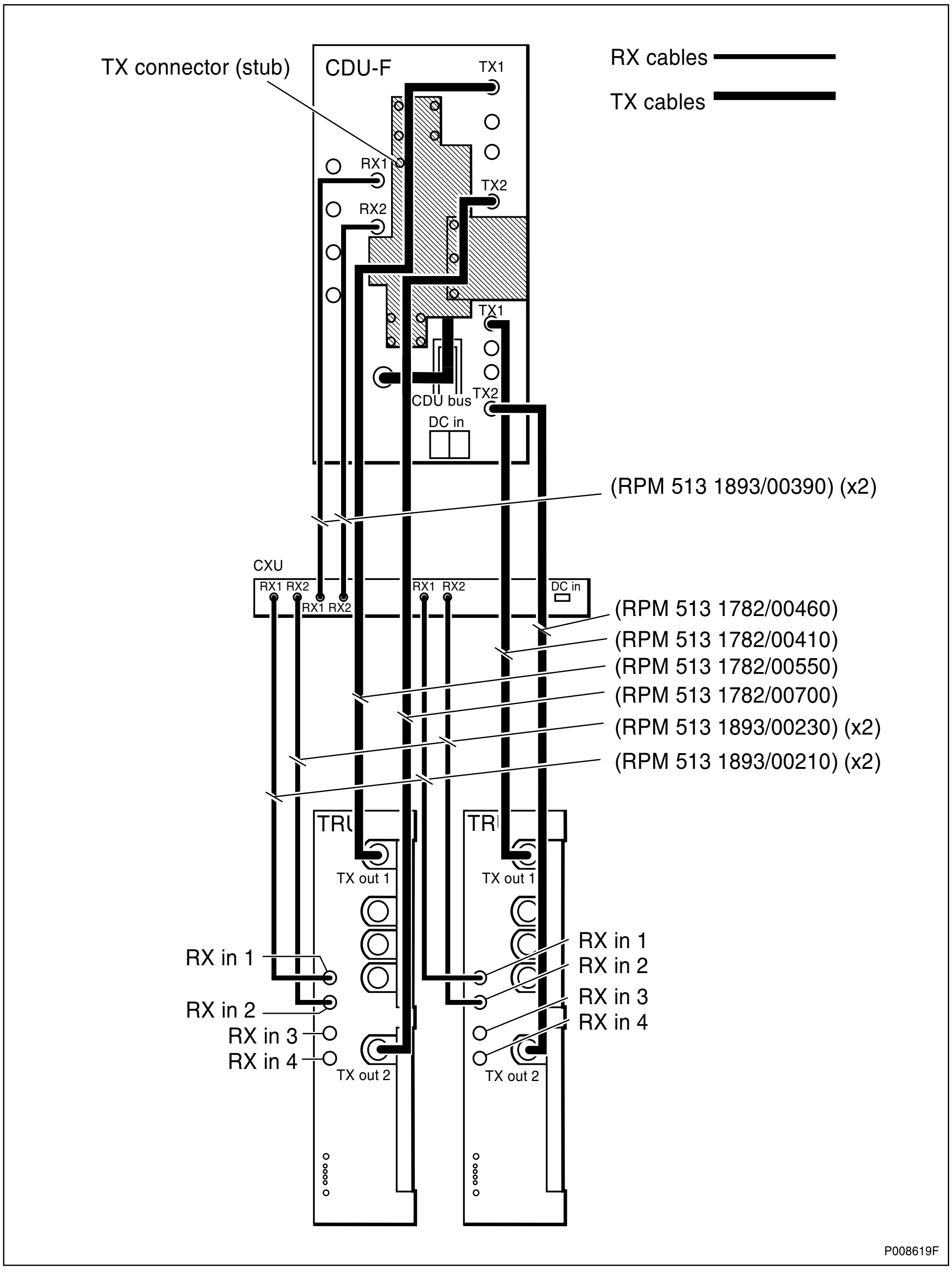


Figure 91 CDU-F connections to CXU and TRU

Cable kit No.: NTM 201 2984/1

Note: It is very important that the stub is moved to the TX connector *according to figure above* .

10.2 Wiring CDU-G with Hybrid Combiner

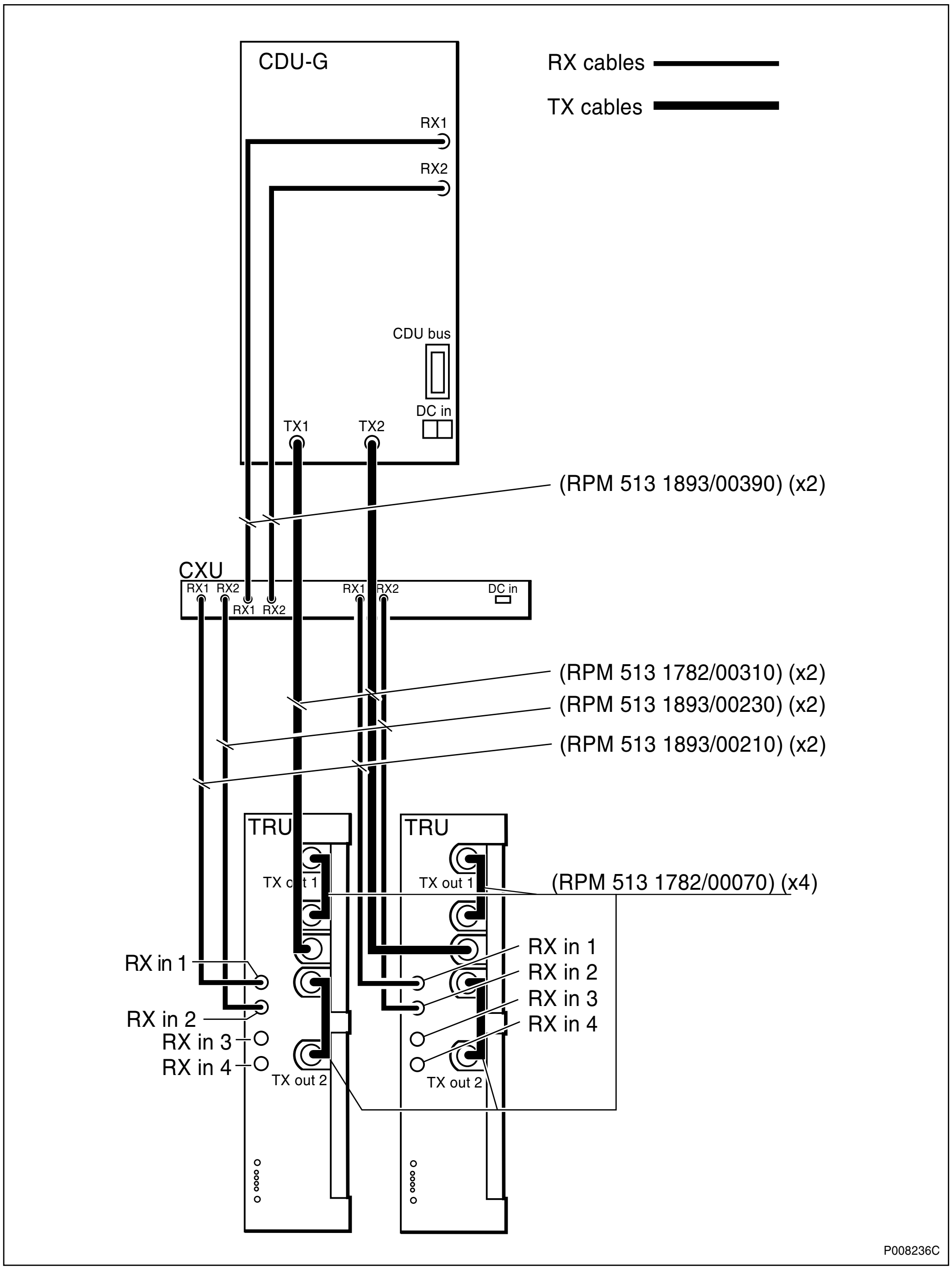


Figure 92 CDU-G connections to CXU and TRU with hybrid combiner

Cable kit No.: NTM 201 2983/1

When an ASU is used, all cable connections between CDU, ASU and CXU are made according to *Figure 98 on page 284* .

10.3 Wiring CDU-G without Hybrid Combiner

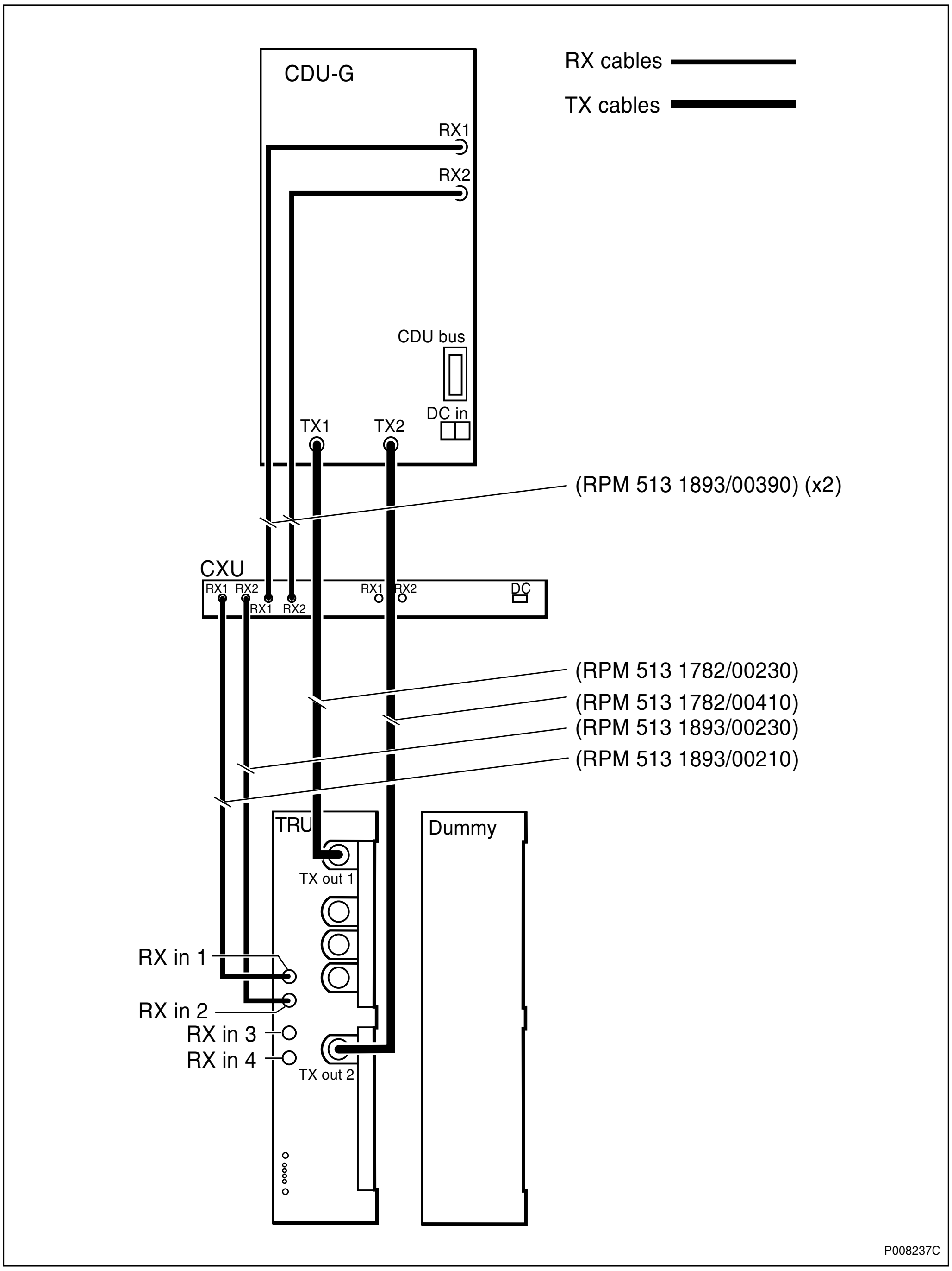


Figure 93 CDU-G connections to CXU and TRU without hybrid combiner

Cable kit No.: NTM 201 2962/1

When an ASU is used, all cable connections between CDU, ASU and CXU are made according to *Figure 98 on page 284* .

10.4 Wiring CDU-G 1+1+2 Configuration

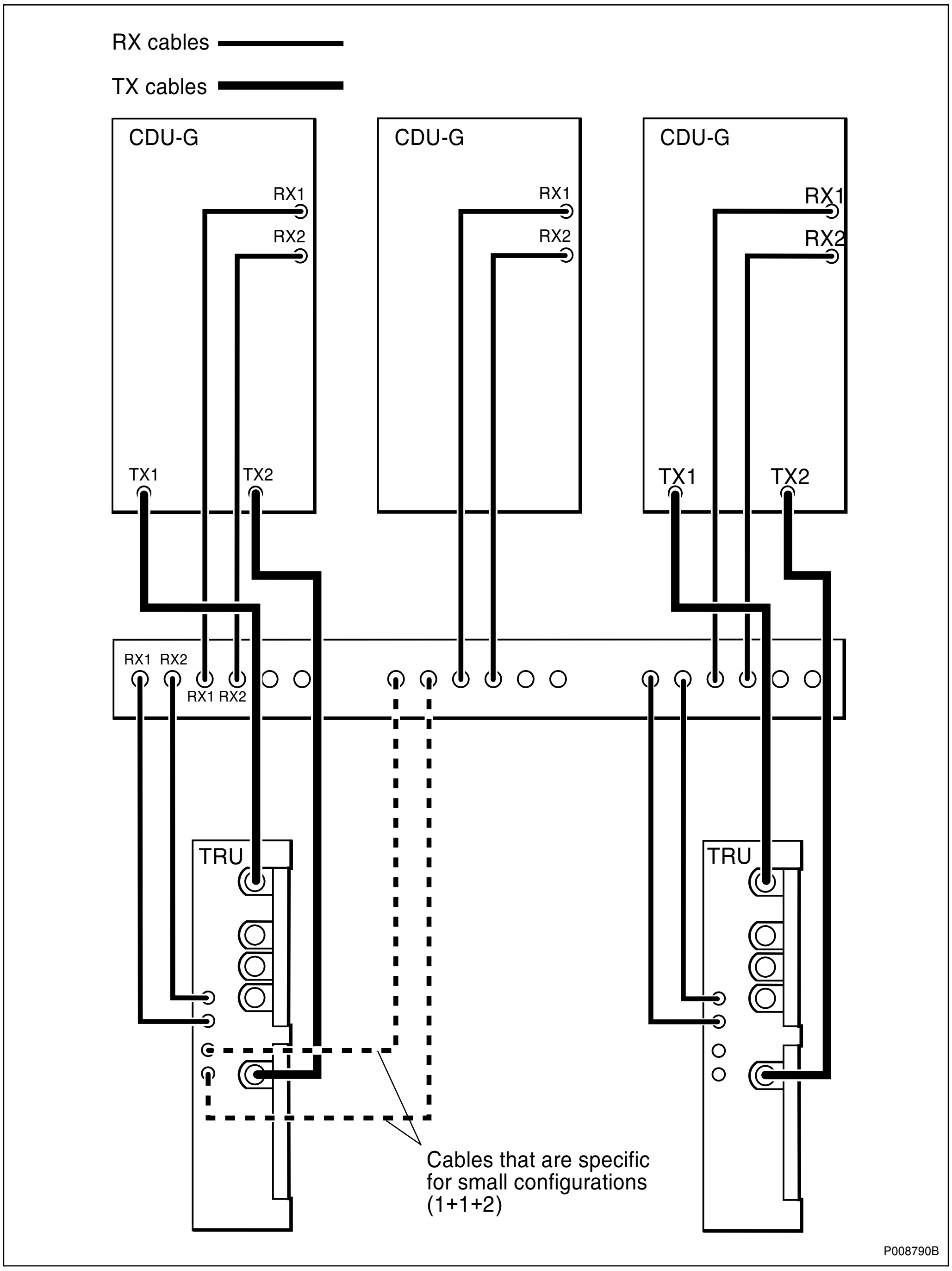


Figure 94 CDU-G connections to CXU and TRU in a 1+1+2 configuration

For cable product number, *see Figure 93 on page 280* .

When an ASU is used, all cable connections between CDU, ASU and CXU are made according to *Figure 98 on page 284* .

10.5 Internal CDU-F Connections

Configurations with maximum four TRX per antenna

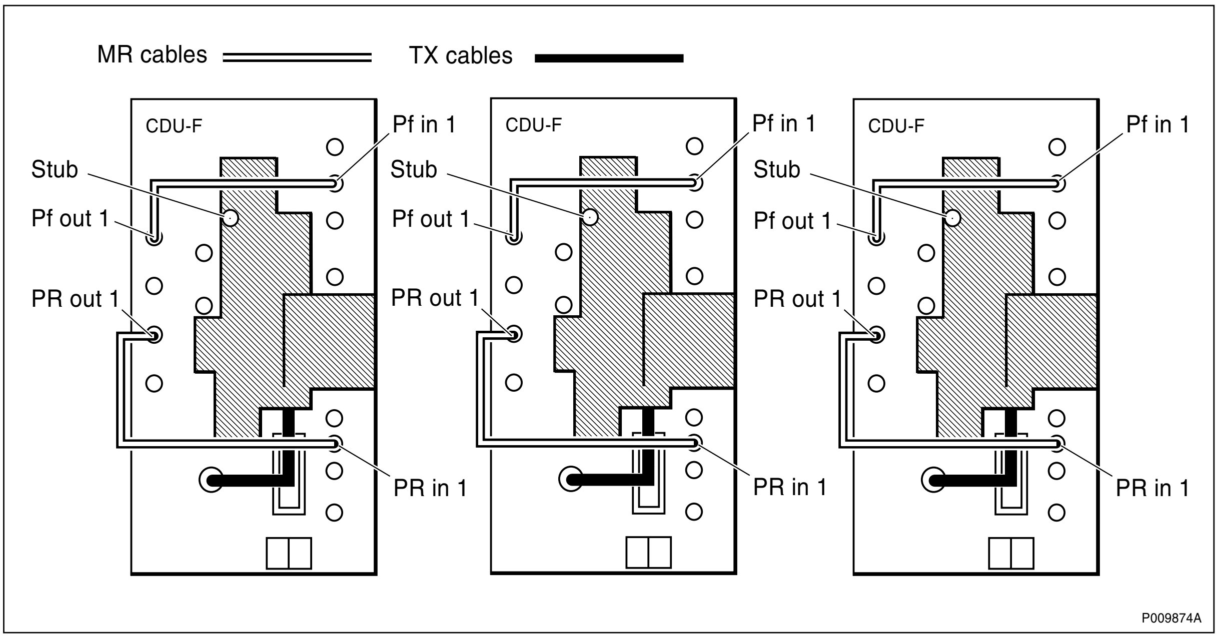


Figure 95 CDU-F internal connections

For cabling to CXU and TRU, *see Figure 91 on page 278.*

Note: It is very important that the stub is moved to the TX connector *according to figure above* .

Configurations with more than four TRX per antenna

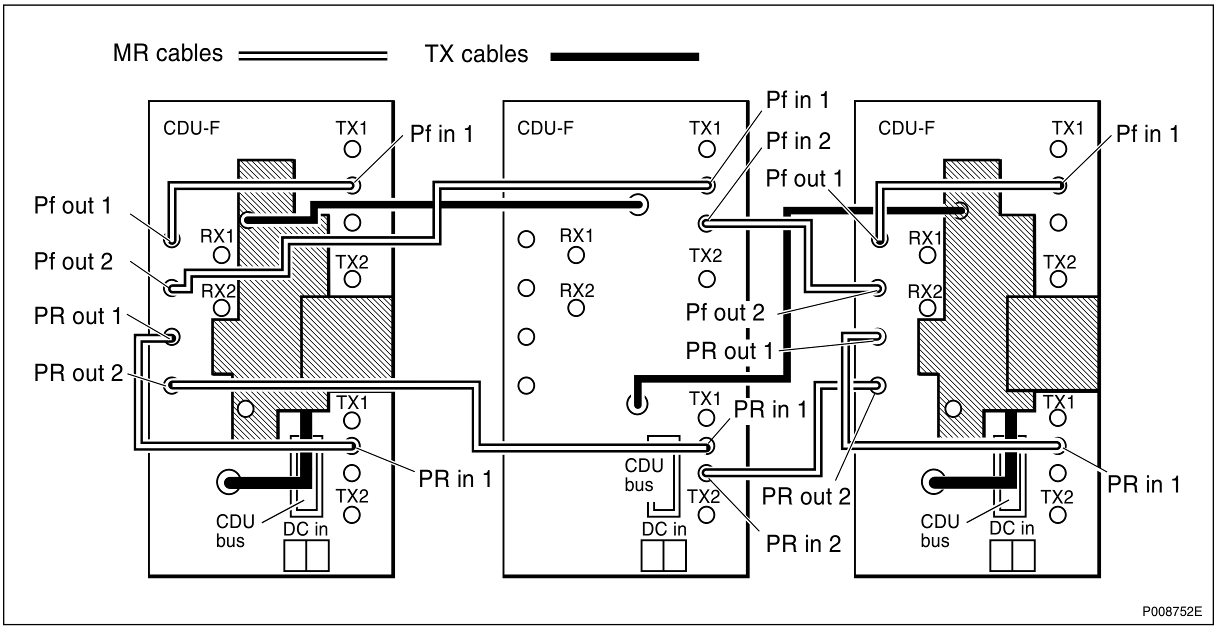


Figure 96 Internal connections and connections between CDUs

Cable kit No.: NTM 201 2741/1 and NTM 201 2742/2.

For cabling to CXU and TRU, *see Figure 91 on page 278.*

Note: It is important that the stub is moved to the parking position *according to figure below* .

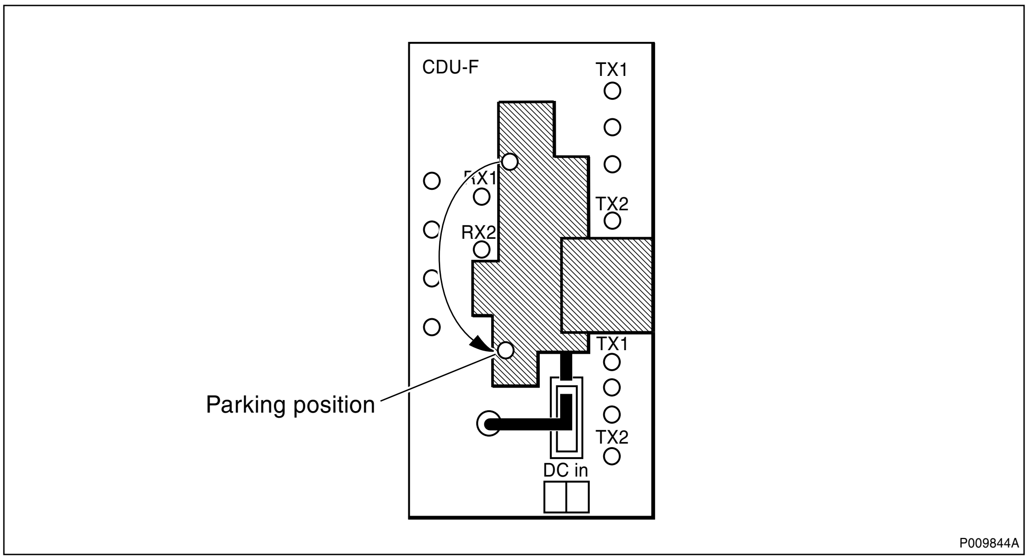


Figure 97 Moving the stub to the parking position

10.6 ASU Cable Connections

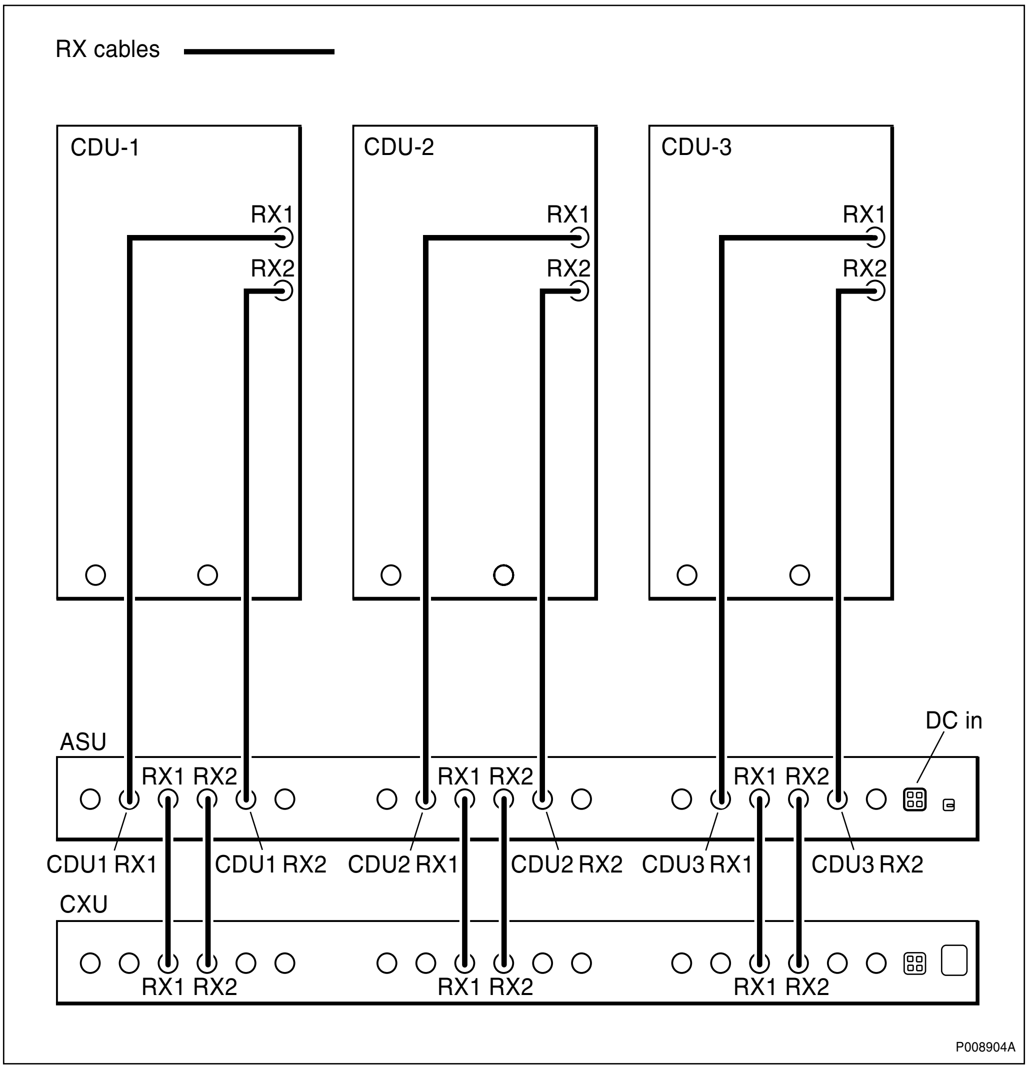


Figure 98 ASU connections to CDU and CXU

11 Non-RF Connections

This chapter describes how to connect three cable groups:

- Power cables
- EPC bus cables
- DC and Signal cables

11.1 Power cables

The power in the cabinet can be configured in different ways. The figures in this section show overviews of the configurations.

RBS Cabinet with PSU AC and Battery Back-up Cabinet BBS 2000/2202

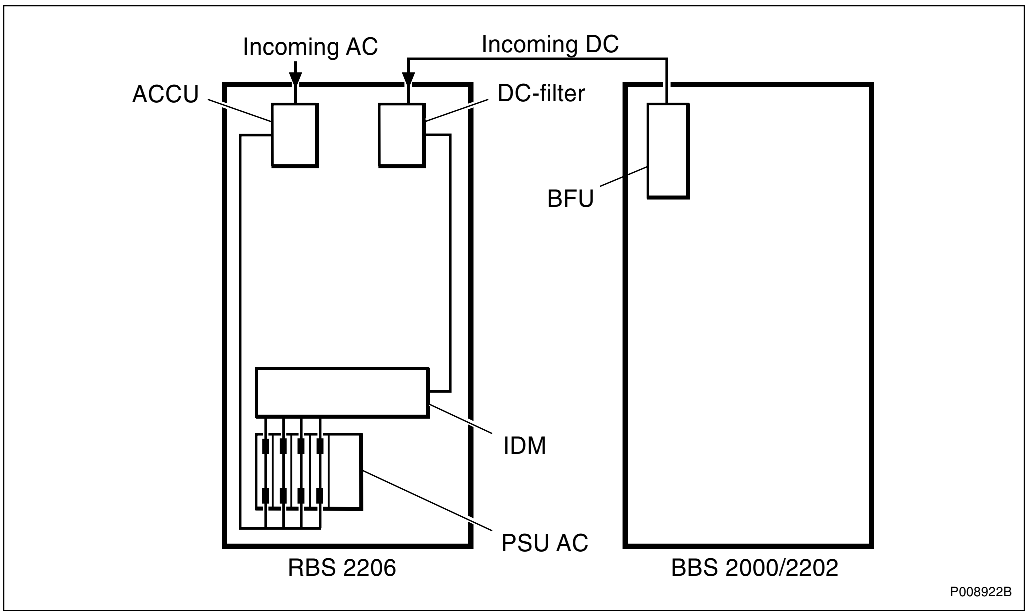


Figure 99 RBS 2206 with PSU AC and BBS

RBS Cabinet with PSU AC

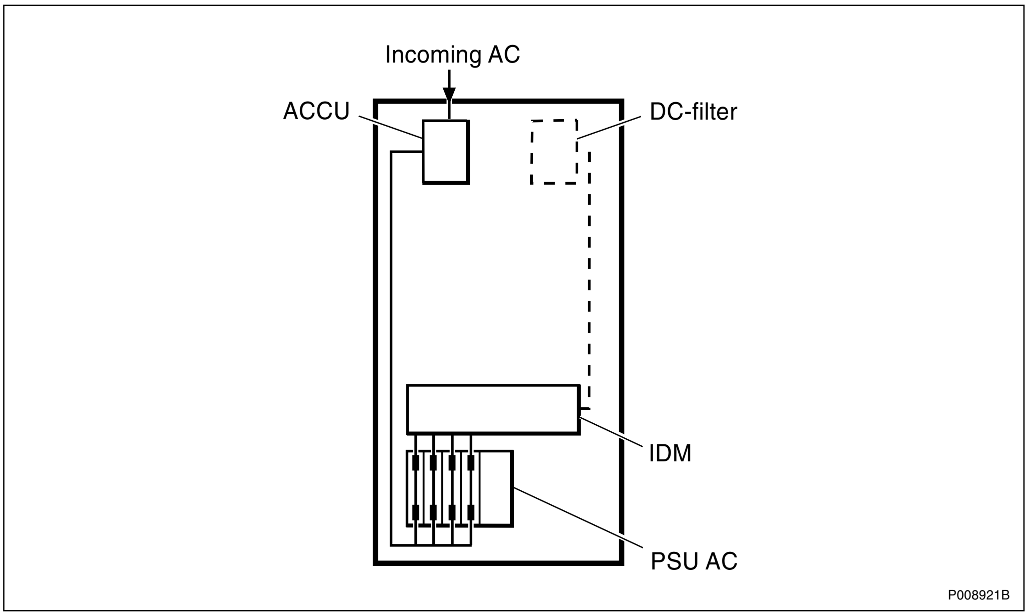


Figure 100 RBS 2206 with PSU AC

RBS Cabinet with PSU DC

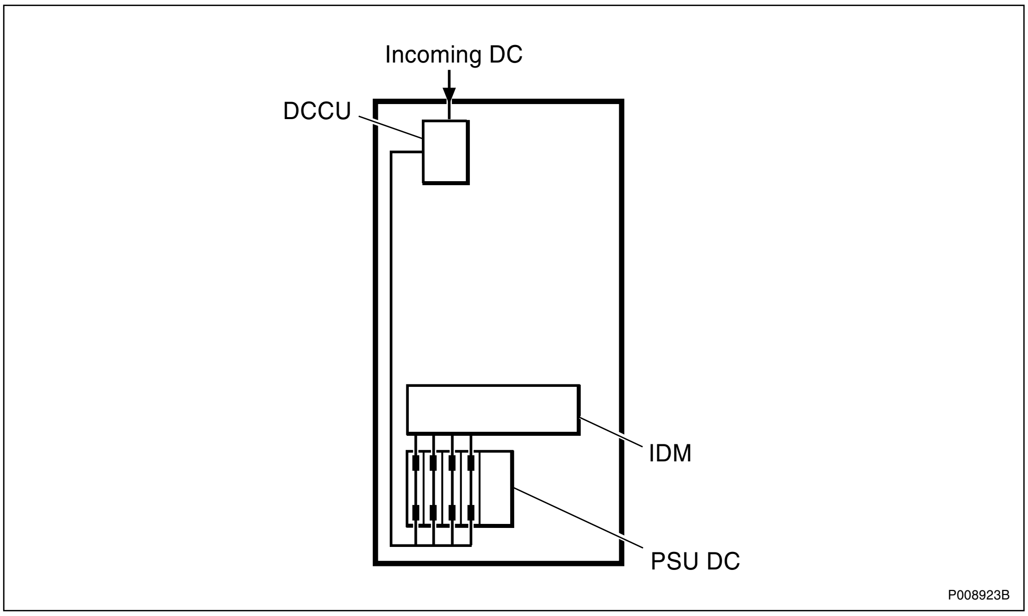


Figure 101 RBS 2206 with PSU DC

RBS Cabinet with + 24 V DC Power Supply

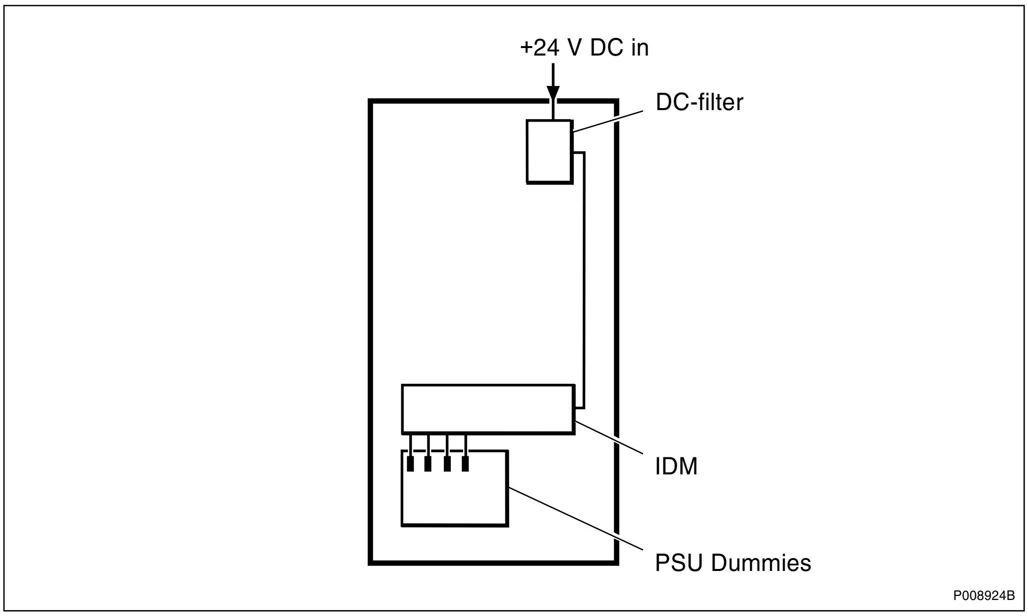


Figure 102 RBS 2206 with +24 V DC power supply

11.2 EPC Bus Cables

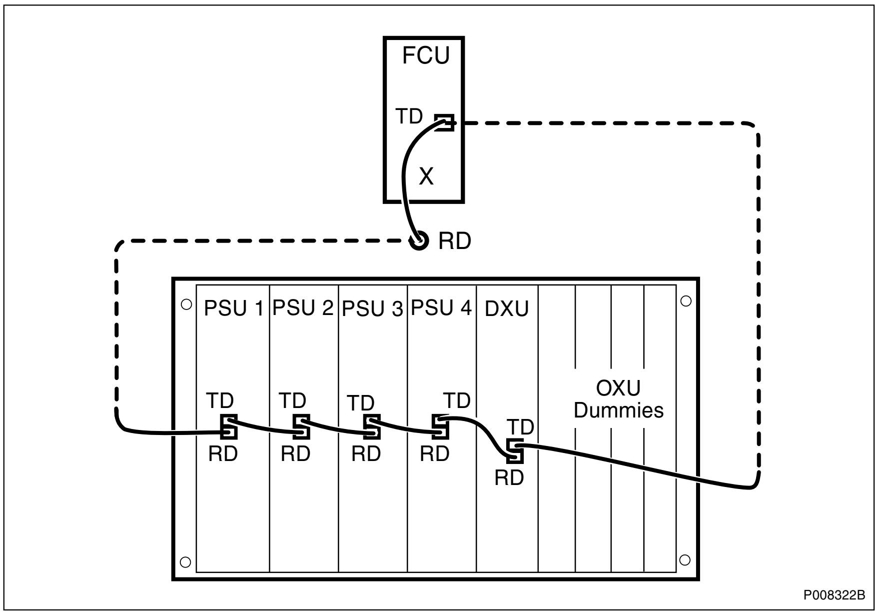


Figure 103 EPC bus (batteries not fitted)

In the above configurations the EPC bus cables are fitted to the PSUs, DXU and FCU as the factory default.

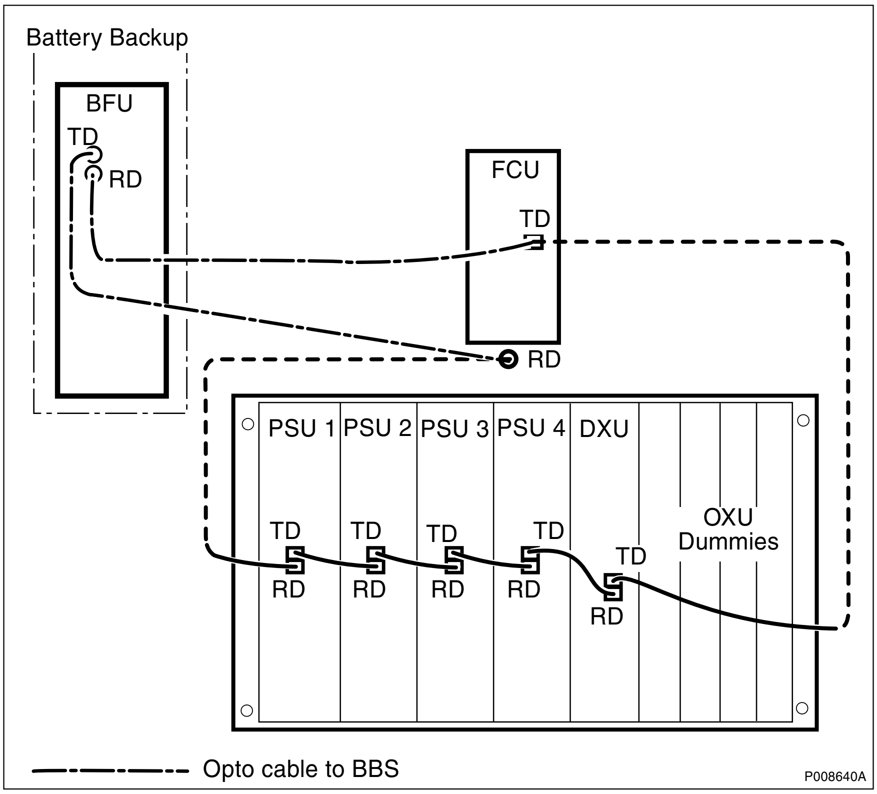


Figure 104 EPC bus for external batteries fitted for BBS 2000 or BBS 2202

Two additional EPC bus cables are connected to the cabinet from the connection field. These cables are only used when external batteries are used. When not in use, they should be stored neatly for possible future use.

11.3 DC and Signal Cables

The backplane cables are either signal or power cables.

To reach the backplane cables the RUs have to be removed. Some cables are connected to both the backplane and the front of the RUs.

The internal cabling to the left connection field is routed from behind it, *see figure and table below.*

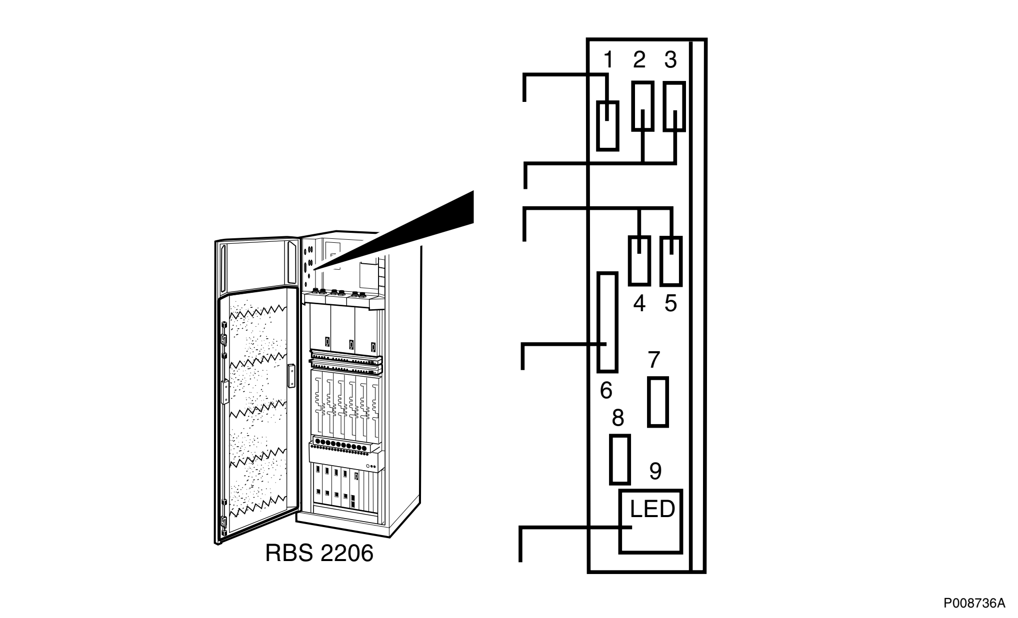


Figure 105 Left connection field in the cabinet top

Table 59 The internal cables

Connector No.	Cable Product No.	Connects to
1	RPM 513 1110/01700	IDM backplane: DC out
2 – 5	RPM 513 870/02250	DXU front: Port A to D
6	RPM 513 1108/02660	DXU backplane: Ext alarm
7 and 8	RPM 513 904/02160	DXU front: ESB
9	RPM 513 1116/02500	DXU backplane: LED

CDU Power and Signal Cables

The CDU magazine has no backplane. The CDU bus and DC in connectors are located at the front of the CDUs, *see figures and table below.*

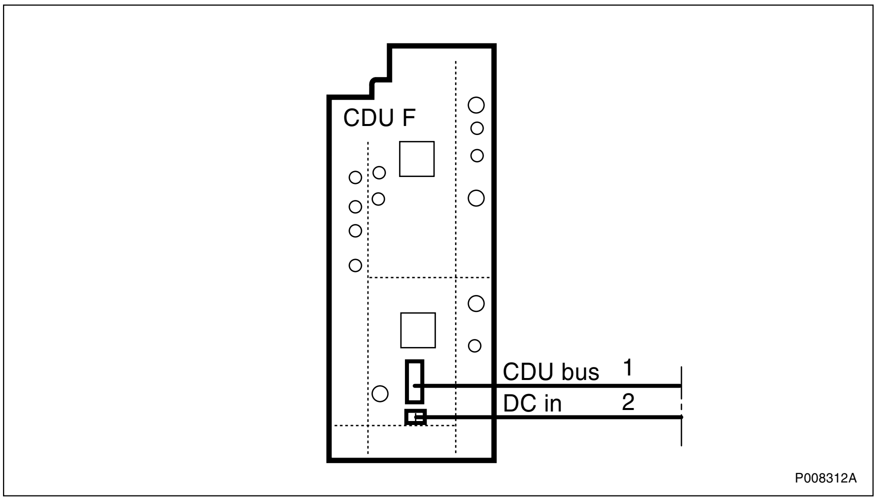


Figure 106 CDU-F cables

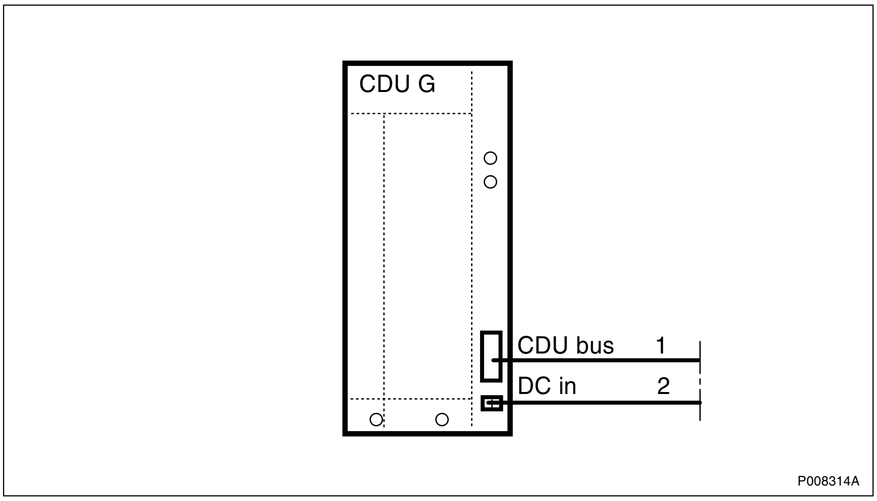


Figure 107 CDU-G cables

Table 60 CDU cables

Connector	Product No.	Connects to
CDU bus	RPM 513 1118/02130	TRU backplane: CDU 1 – 3
DC in	RPM 513 718/01400	IDM backplane. CDU 1 – 3

CXU Power and Signal Cables

For a description of CXU RF cables, *see Chapter RF Connections.*

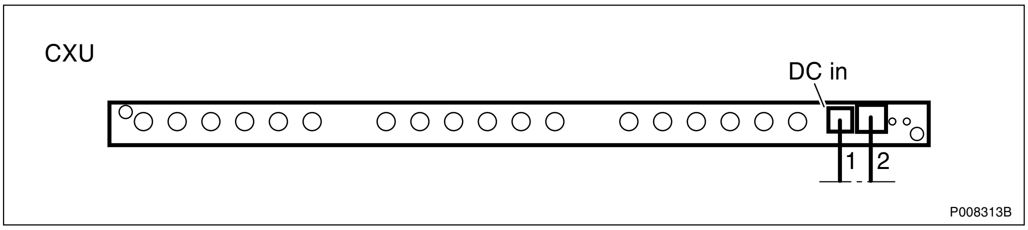


Figure 108 CXU cabling

Table 61 CXU cables

Connector No.	Product No.	Connects to
1	RPM 513 1162/01000	IDM backplane: CXU 1 DC in
2	RPM 513 1903/01650	TRU backplane: CXU 1

TRU Backplane Power and Signal Cables

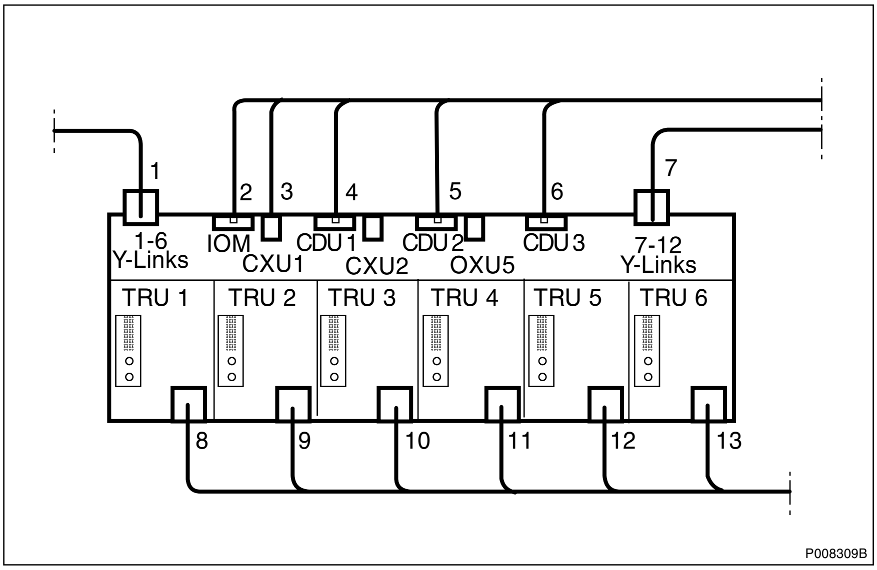


Figure 109 TRU backplane

Table 62 TRU backplane cables

Connector No.	Product No.	Connects to
1	RPM 513 1781/02000	DXU front: Y links 1 – 6
2	RPM 513 1117/02130	DXU backplane: IOM
3	RPM 513 1903/01650	CXU front: IOM bus
4 – 6	RPM 513 1118/02130	CDU front: CDU Bus 1 – 3

Table 62 TRU backplane cables

Connector No.	Product No.	Connects to
7	RPM 513 1781/2000	DXU front:Y links 7 – 12
8 – 13	RPM 513 1120/00700	IDM backplane: TRU 1 – 6

IDM Backplane Power Cables

To access the IDM cables the front plate has to be removed. There are two connectors to the front plate, which should be removed carefully.

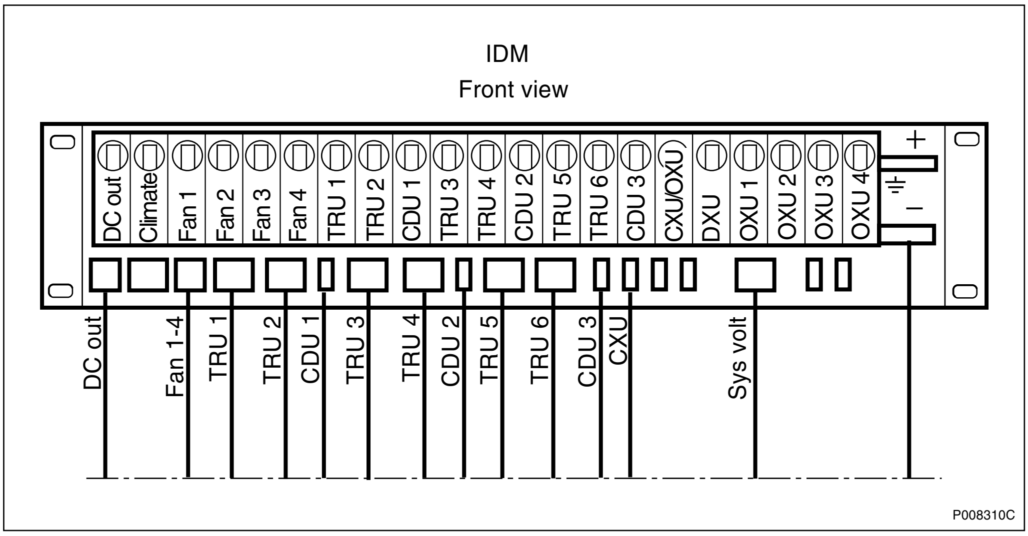


Figure 110 IDM without front panel

Table 63 IDM backplane cables for RBS 2206

Connector	Product No.	Connects to
DC out	RPM 513 1110/01700	Cabinet connector plate: DC out
Fan 1 – 4	RPM 513 1138/01700	FCU card: Fan 1 – 4
TRU 1	RPM 513 1120/00700	TRU backplane: TRU 1 – 2 DC in
TRU 2	RPM 513 718/01400	CDU front: CDU 1 DC in
TRU 3 – 4	RPM 513 1120/00700	TRU backplane: TRU 3 – 4 DC in
CDU 2	RPM 513 718/01400	CDU front: CDU 2 DC in
TRU 5 – 6	RPM 513 1120/00700	TRU backplane: TRU 5 – 6 DC in
CDU 3	RPM 513 718/01400	CDU front: CDU 3 DC in
CXU	RPM 513 1162/01000	OXU front: DC in

Table 63 IDM backplane cables for RBS 2206

Connector	Product No.	Connects to
sys. volt.	RPM 513 1845/01600	DXU backplane: +24 V
earthing	RPM 513 1114/01400	system earthing

DXU Backplane Power and Signal Cables

To access the DXU cables the OXU dummies, DXU and PSUs must be removed.

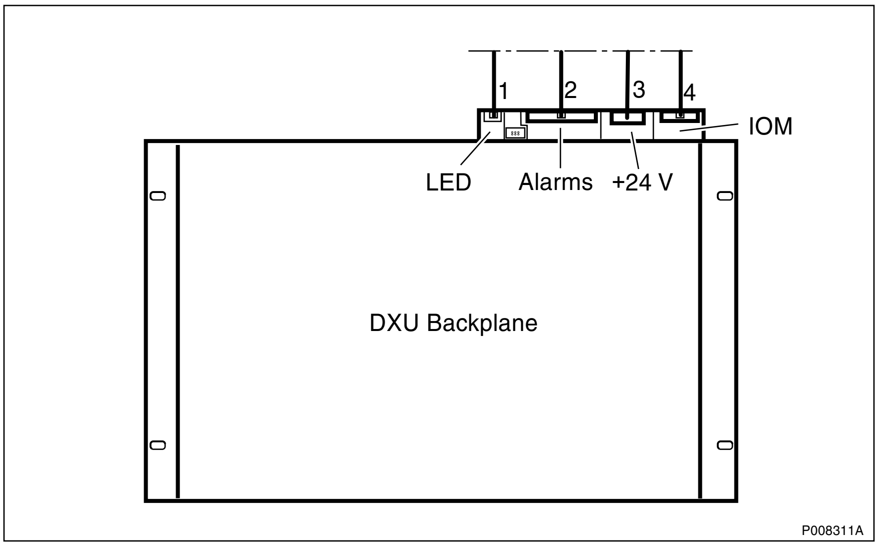


Figure 111 DXU backplane cables

Table 64 DXU backplane for RBS 2206

Connector No.	Product No.	Connects to
1	RPM 513 1116/02500	Cabinet connection plate: LED
2	RPM 513 1108/02660	Cabinet connection plate: Ext alarms
3	RPM 513 1845/01600	IDM backplane: sys. volt
4	RPM 513 1117/02130	TRU backplane: IOM

12 CDU Antenna Configurations

This chapter presents different antenna configurations. The chapter does not list all configurations in the RBS. For a complete list, *see:*

RBS 2106, RBS 2206 Hardware Reference Manual	*EN/LZT 720 0024*

The various configurations available for cabinets are described according to the following example:

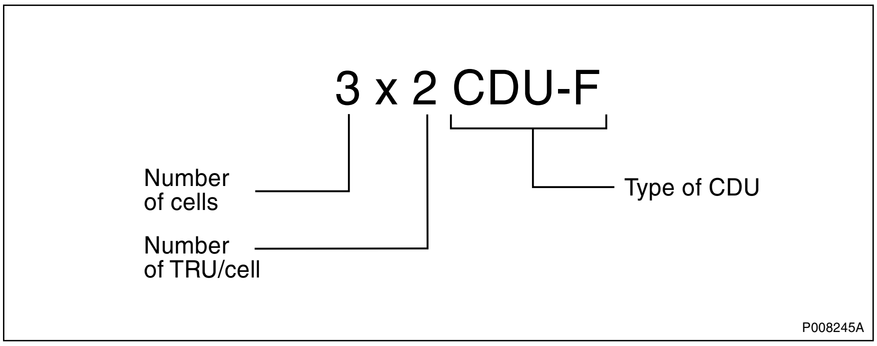


Figure 112 CDU configuration key

In the example above, the cabinet is configured for three cells, each using two TRXs. The total number TRXs is thus six in this case. The CDU is type CDU-F.

Note: If TMA is used the bias injectors must be installed.

12.1 Antenna Connection Field

This section describes the cabling from the antenna connection field to the ASU.

The RF cables between each CDU and its associated TRUs are standardised and do not normally change.

The figure below gives an overview of the antenna sharing connectors and cabling from the ASU.

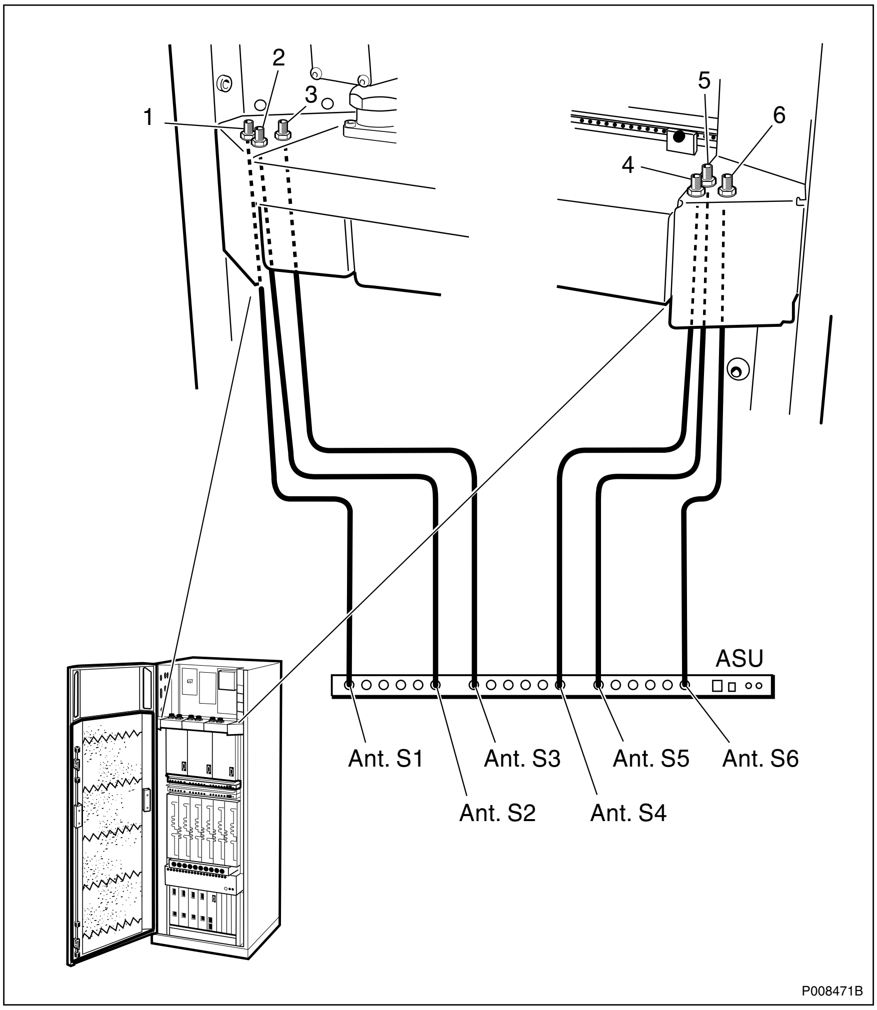


Figure 113 Cabling between ASU and antenna sharing connectors

12.2 CDU-F Antenna Connections

The antenna connectors are located on the top of the CDU, *see figures below.*

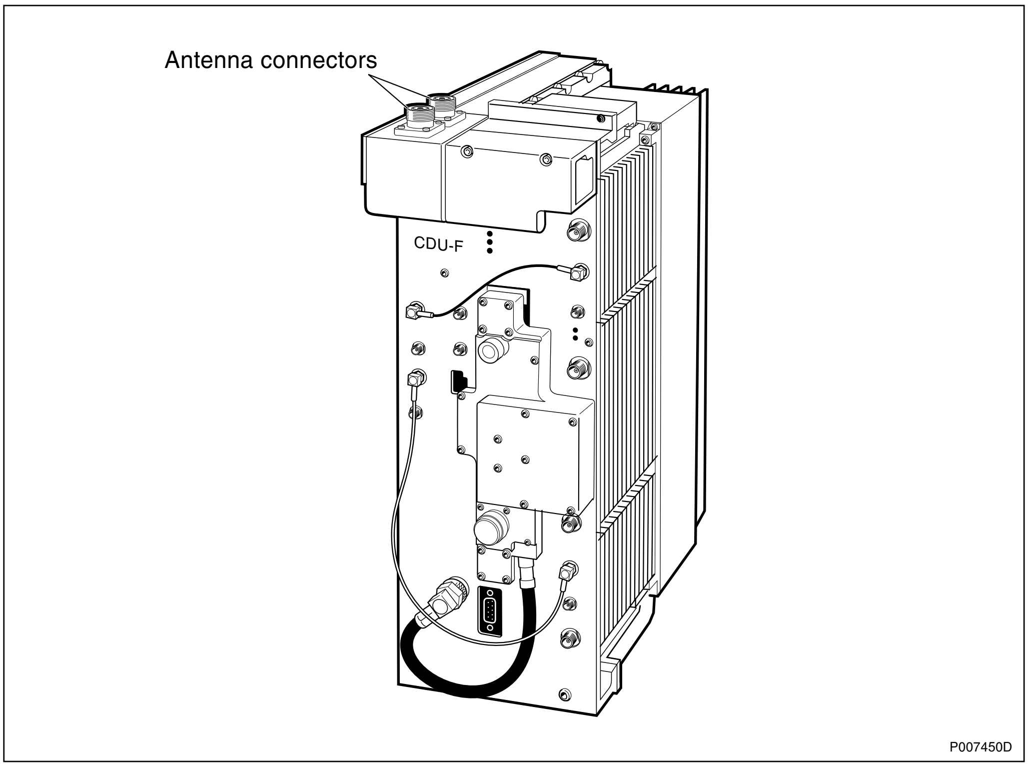


Figure 114 CDU-F

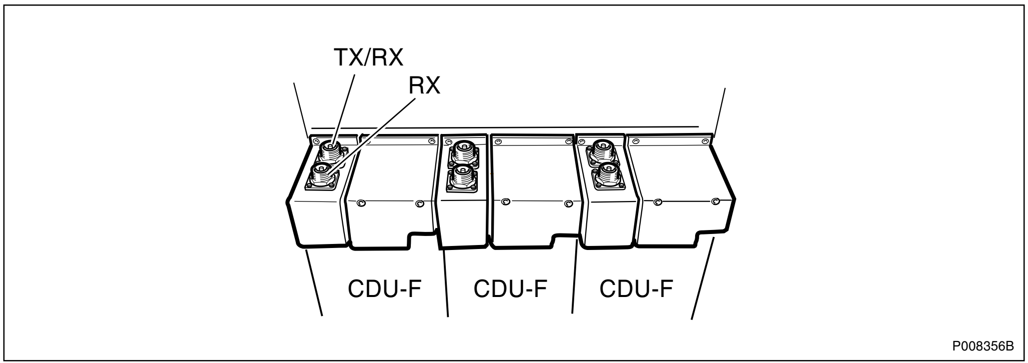


Figure 115 CDU-F antenna feeder connectors

12.3 CDU-F Configurations

Note: In the figures and tables that follow, only cabinets that are fully-equipped are shown. Configurations consisting of part of the fully-equipped cabinet are also possible to extract from the following figures and tables.

See Figure 113 on page 296 and *Figure 115 on page 297* for a description of the column headers in the tables below.

12.3.1 3x2 CDU-F and 3x4 CDU-F

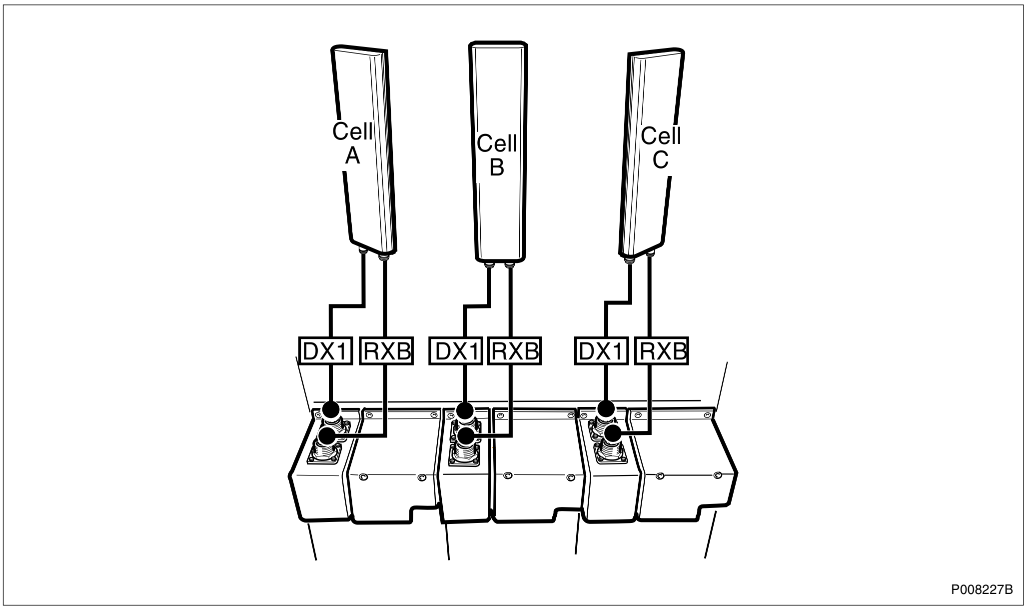


Figure 116 Configuration without TMA

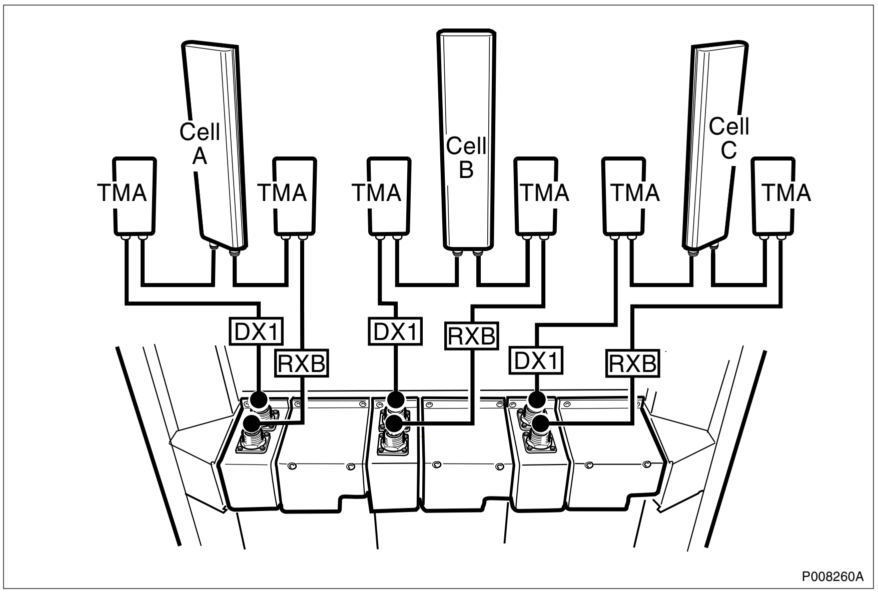


Figure 117 Configuration with TMA

Table 65 3x2 CDU-F and 3x4 CDU-F

	CDU				
Cell	**CDU No.**	**Feeder label**	**CDU connector**	**Signal**	**ASU Connector**
A	1	CellA: DX1	TX/RX	TX/RX A	1
		CellA: RXB	RX	RX B	2
B	2	CellB: DX1	TX/RX	TX/RX A	3
		CellB: RXB	RX	RX B	4
C	3	CellC: DX1	TX/RX	TX/RX A	5
		CellC: RXB	RX	RX B	6

From the configuration shown in the figures and tables above, the following configurations can be derived:

- 1x2 CDU-F
- 2x2 CDU-F
- 1x4 CDU-F
- 2x4 CDU-F

12.3.2 1x8 CDU-F

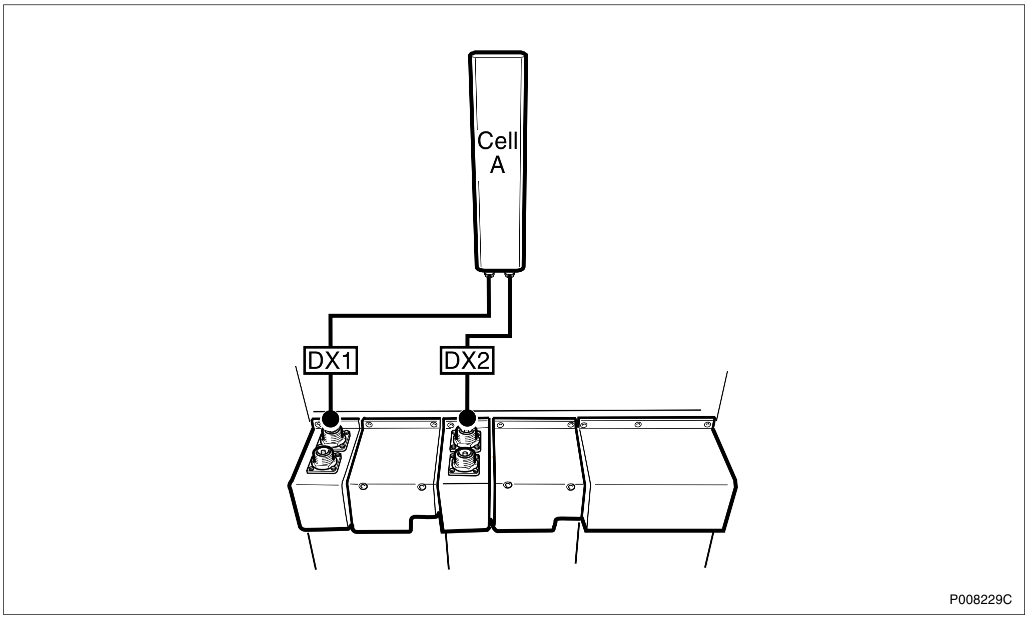


Figure 118 Configuration without TMA

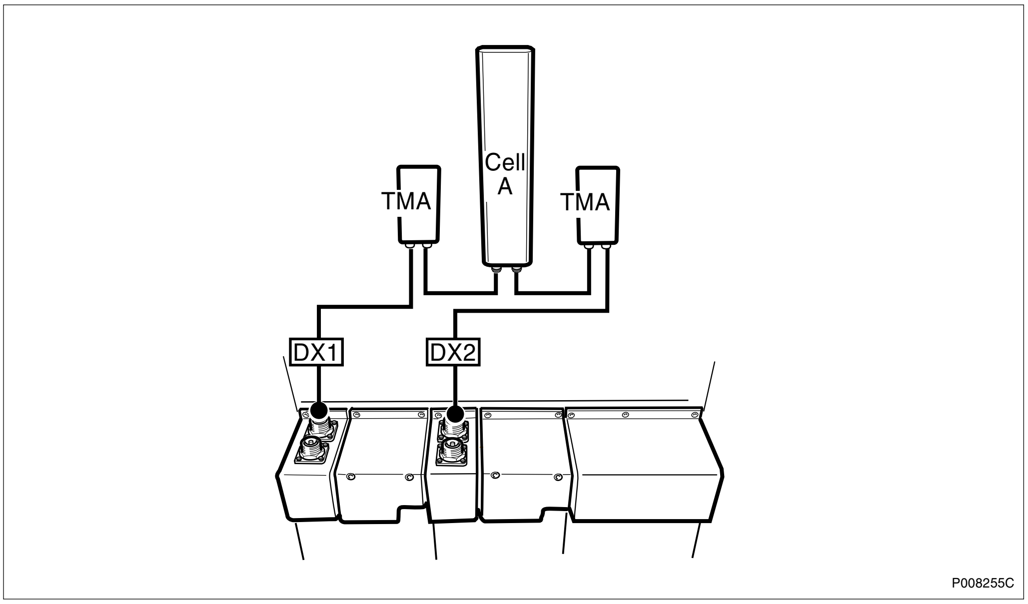


Figure 119 Configuration with TMA

Table 66 1x8 CDU-F

Cell	CDU				ASU Connector
	CDU No.	**Feeder label**	**CDU connector**	**Signal**	
A	1	CellA: DX1	TX/RX	TX/RX A	1
	2	CellA: DX2	TX/RX	TX/RX B	3

12.3.3 1x12 CDU-F

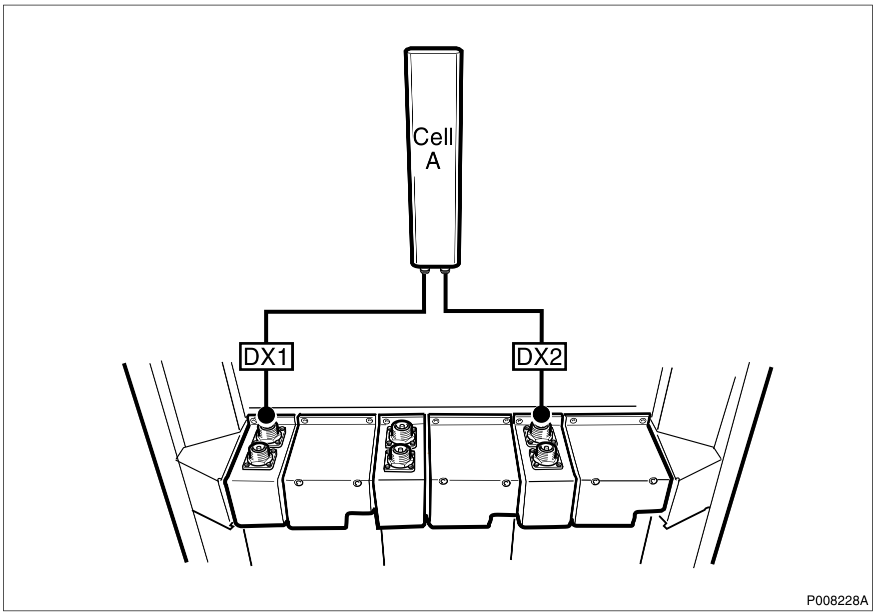


Figure 120 Configuration without TMA

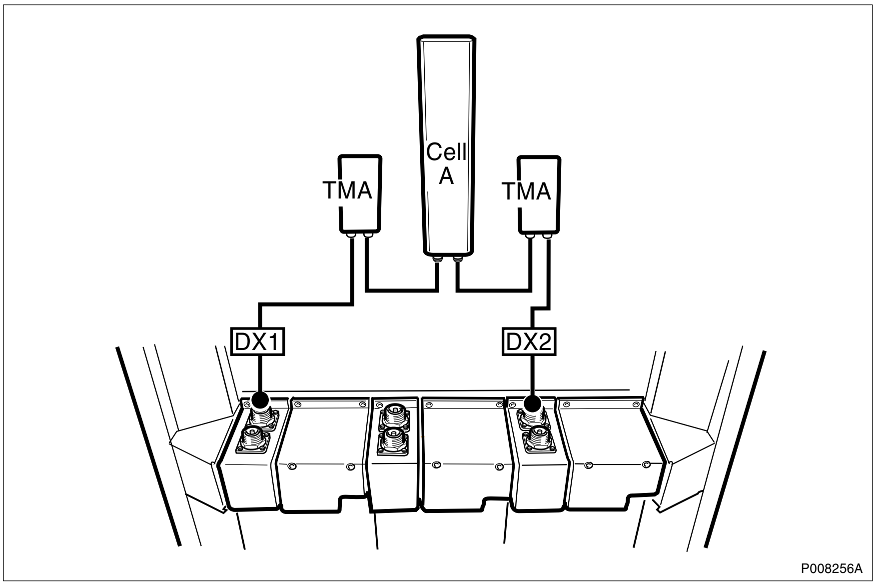


Figure 121 Configuration with TMA

Table 67 1x12 CDU-F

Cell	CDU				ASU Connector
	CDU No.	Feeder label	CDU connector	Signal	
A	1	CellA: DX1	TX/RX	TX/RX A	1
	3	CellA: DX2	TX/RX	TX/RX B	5

12.3.4 2x6 CDU-F

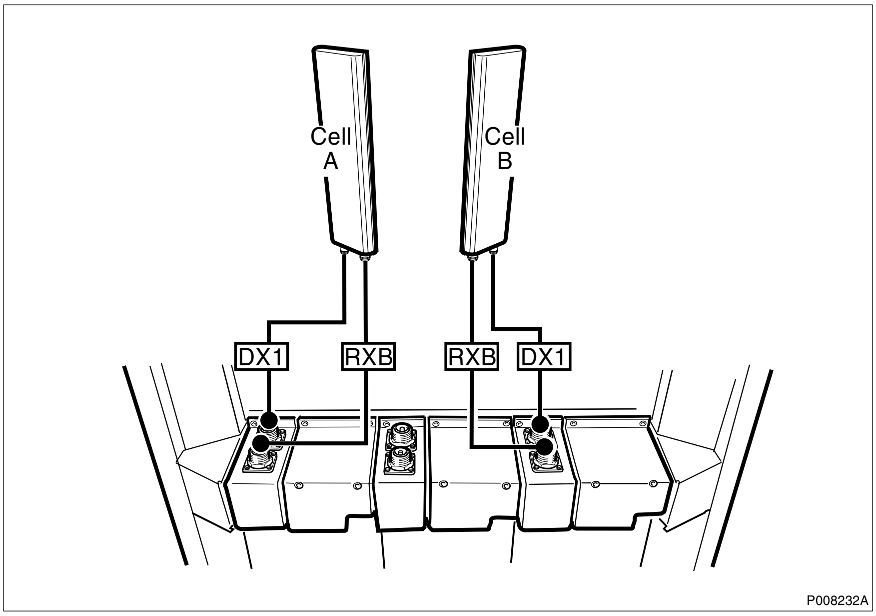


Figure 122 Configuration without TMA

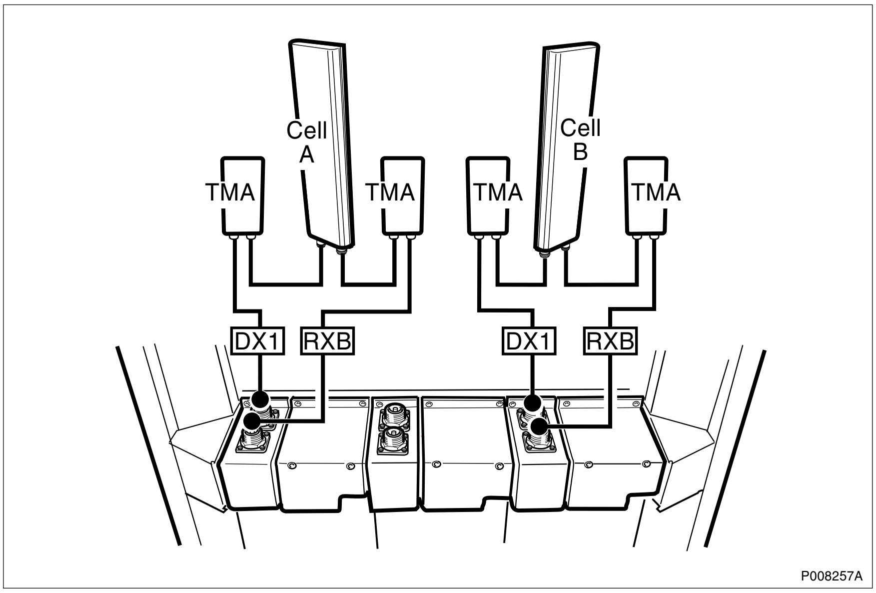


Figure 123 Configuration with TMA

Table 68 2x6 CDU-F

	CDU				
Cell	**CDU No.**	**Feeder label**	**CDU connector**	**Signal**	**ASU Connector**
A	1	CellA: DX1	TX/RX	TX/RX A	1
		CellA: RXB	RX	RX B	2
B	3	CellB: DX1	TX/RX	TX/RX A	5
		CellB: RXB	RX	RX B	6

12.3.5 1x4 + 1x8 CDU-F

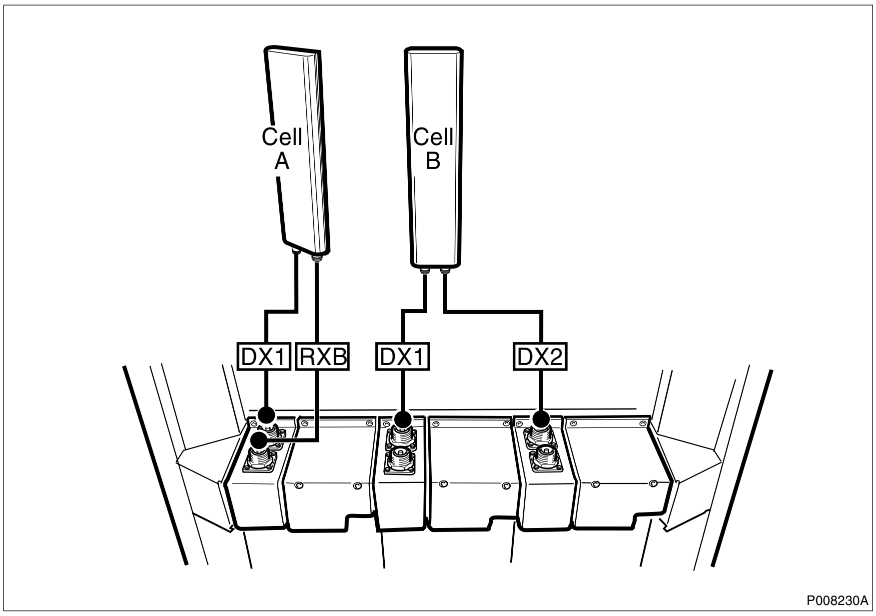


Figure 124 Configuration without TMA

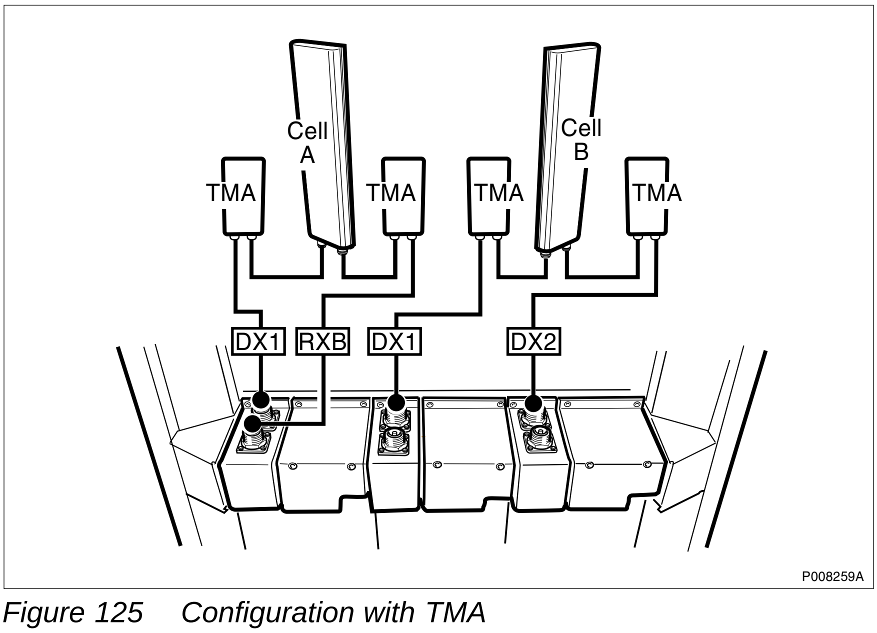


Figure 125 Configuration with TMA

Table 69 1x4+1x8 CDU-F

Cell	CDU				ASU Connector
	CDU No.	Feeder label	CDU connector	Signal	
A	1	CellA: DX1	TX/RX	TX/RX A	1
		CellA: RXB	RX	RX B	2
B	2	CellB: DX1	TX/RX	TX/RX B	3
	3	CellB: DX2	TX/RX	TX/RX B	5

12.3.6 1x8 + 1x4 CDU-F

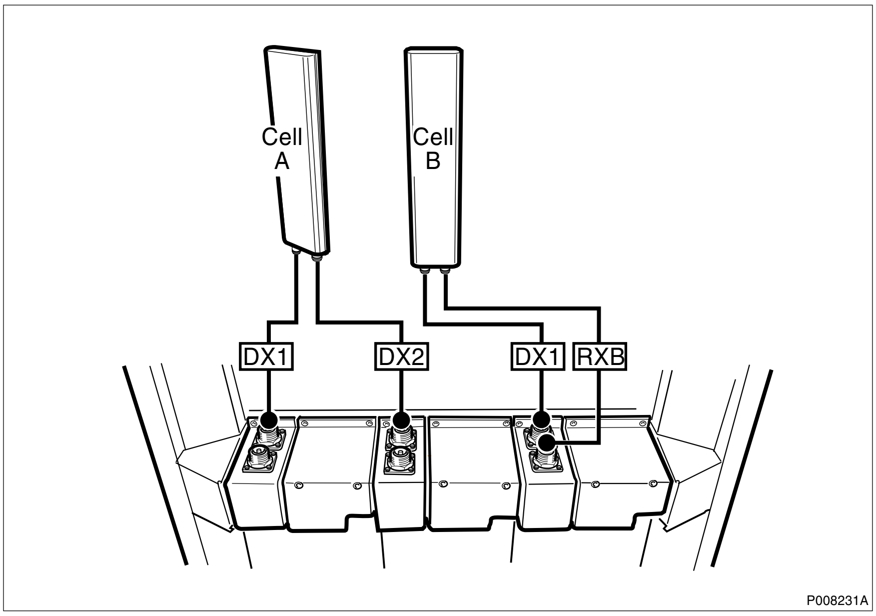


Figure 126 Configuration without TMA

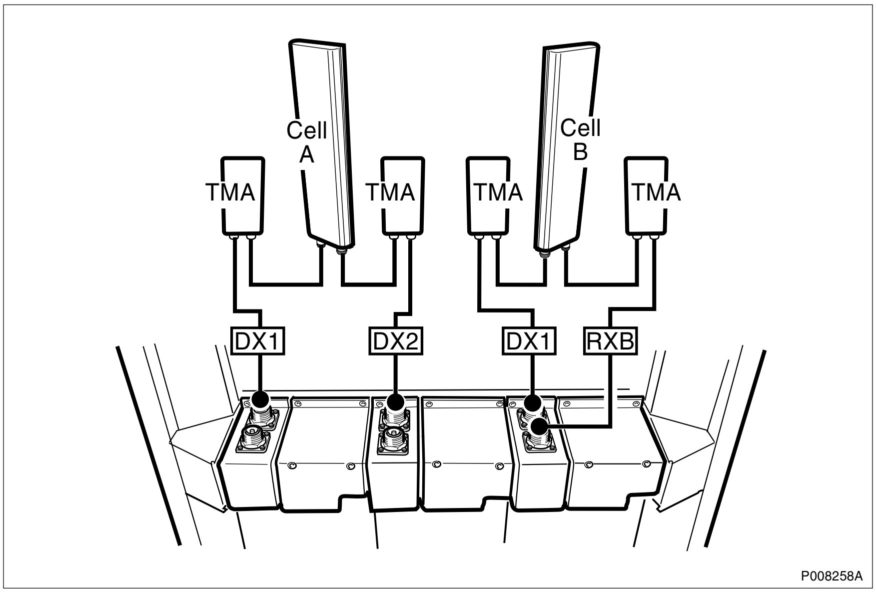


Figure 127 Configuration with TMA

Table 70 1x8+1x4 CDU-F

	CDU				
Cell	**CDU No.**	**Feeder label**	**CDU connector**	**Signal**	**ASU Connector**
A	1	CellA: DX1	TX/RX	TX/RX A	1
	2	CellA: DX2	TX/RX	TX/RX B	3
B	3	CellB: DX1	TX/RX	TX/RX A	5
		CellB: RXB	RX	RX B	6

12.4 CDU-G Antenna Connections

The antenna connectors are located on the top of the CDU, *see figures below.*

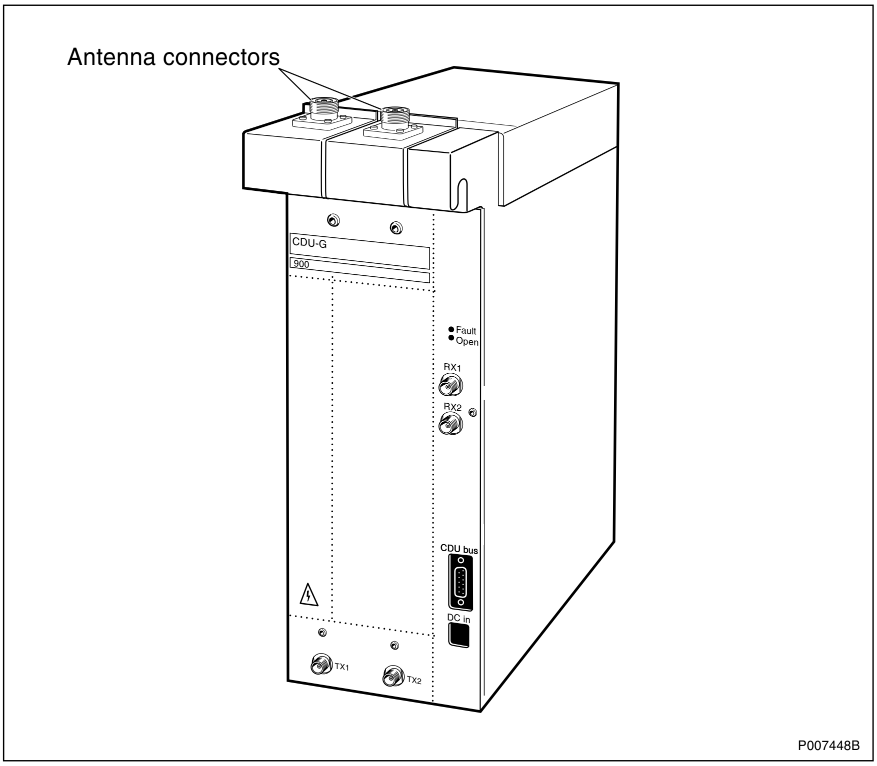


Figure 128 CDU-G

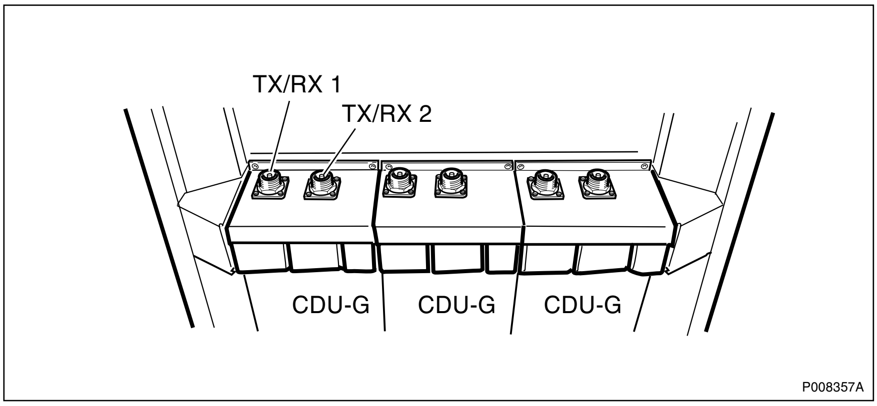


Figure 129 CDU-G antenna feeder connectors

12.5 CDU-G Configurations

Note: In the figures and tables that follow, only cabinets that are fully-equipped are shown. Configurations consisting of part of the fully-equipped cabinet are also possible to extract from the following figures and tables.

See Figure 113 on page 296 and *Figure 129 on page 307* for a description of the column headers in the tables below.

12.5.1 3x2 CDU-G and 3x4 CDU-G

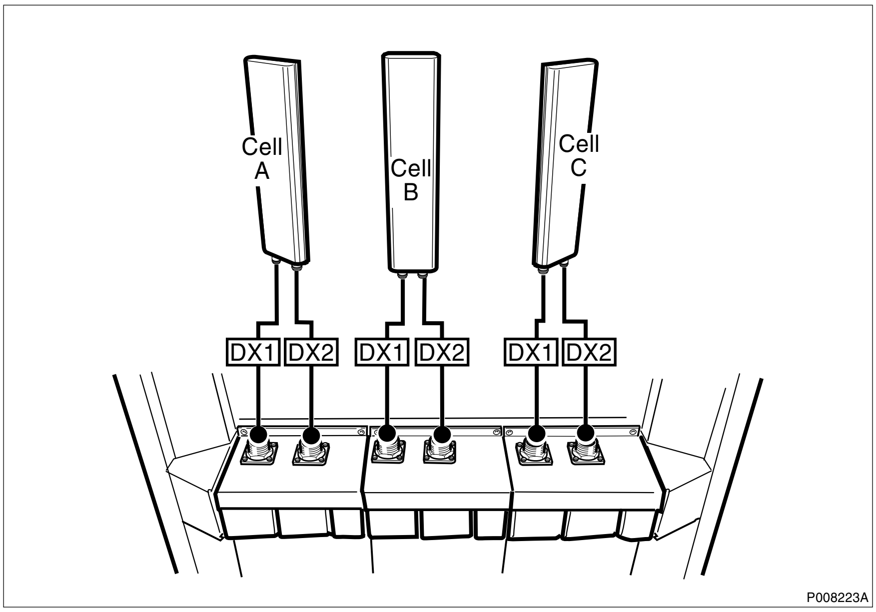


Figure 130 Configuration without TMA

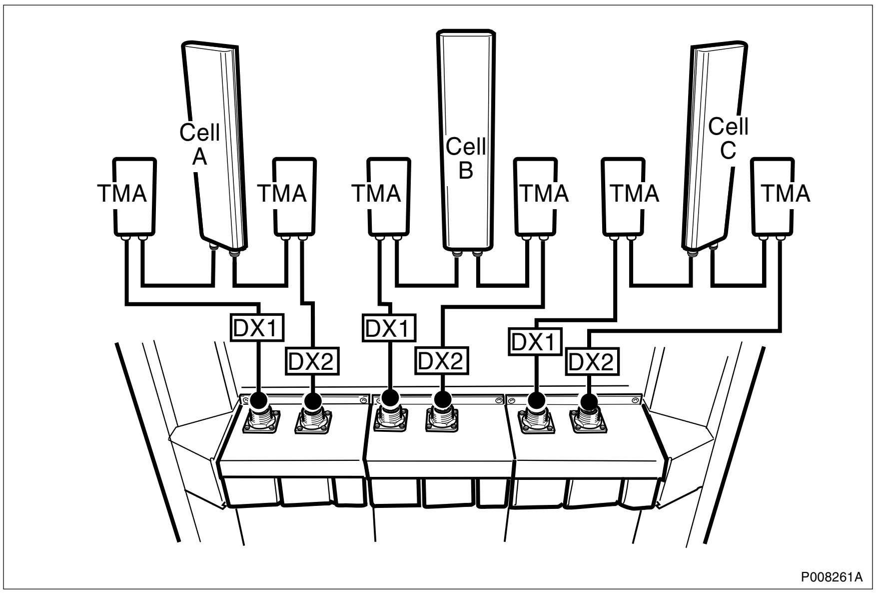


Figure 131 Configuration with TMA

Table 71 RBS 2206: 3x2 CDU-G and 3x4 CDU-G

Cell	CDU				ASU Connector
	CDU No.	Feeder label	CDU connector	Signal	
A	1	CellA: DX1	TX/RX1	TX/RX A	1
		CellA: DX2	TX/RX2	TX/RX B	2
B	2	CellB: DX1	TX/RX1	TX/RX A	3
		CellB: DX2	TX/RX2	TX/RX B	4
C	3	CellC: DX1	TX/RX1	TX/RX A	5
		CellC: DX2	TX/RX2	TX/RX B	6

From the configuration in the figures and tables above, the following configurations can be derived:

- 1x2 CDU-G
- 2x2 CDU-G
- 1x4 CDU-G
- 2x4 CDU-G

Note: Configurations 3x2, 1x2 and 2x2 do not support the use of a hybrid combiner.

12.5.2 1+1+2 CDU-G

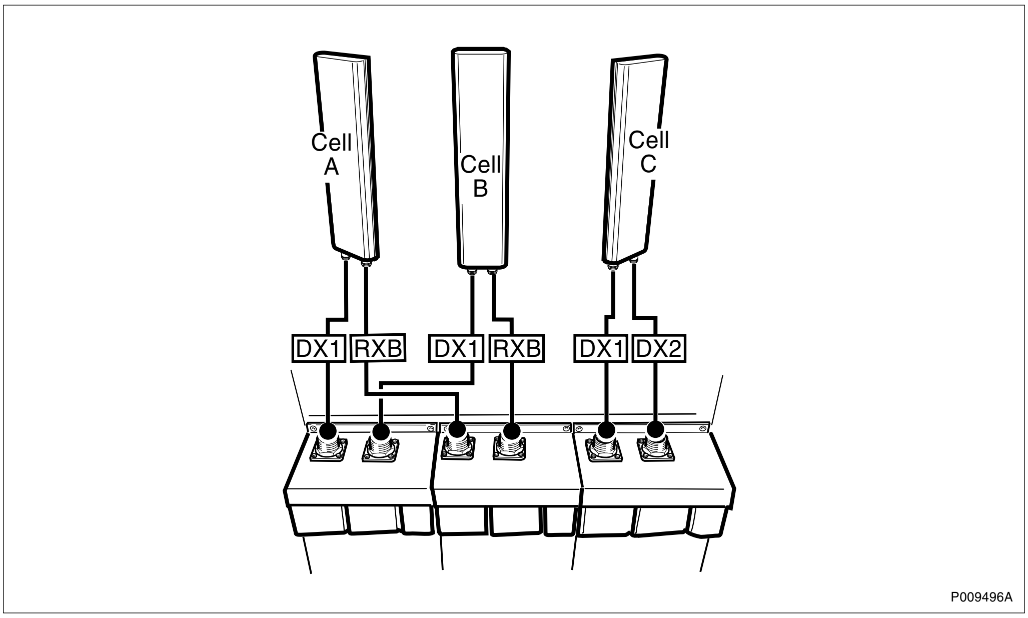


Figure 132 Configuration without TMA

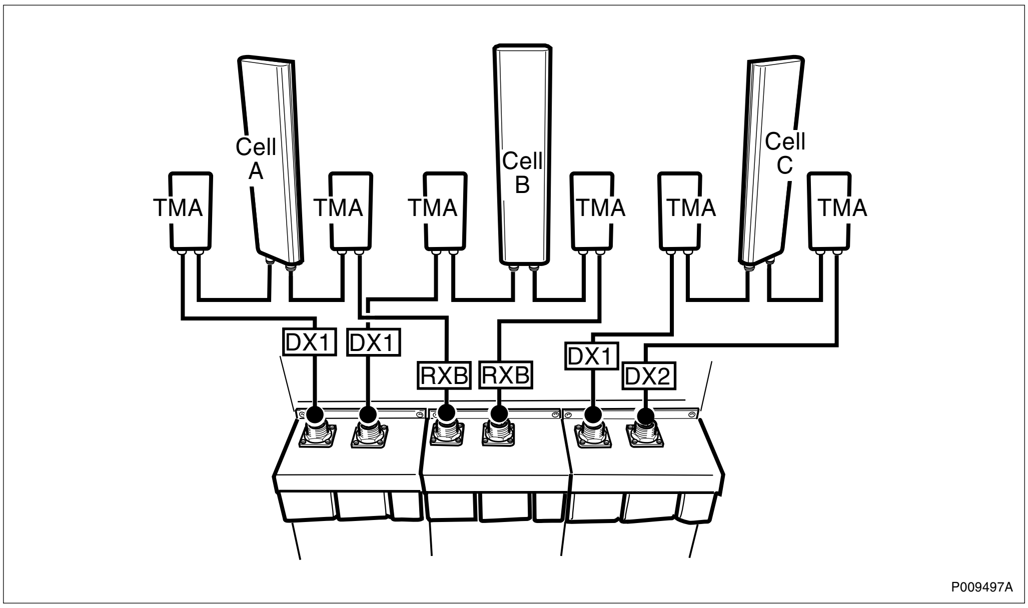


Figure 133 Configuration with TMA

Table 72 1+1+2 CDU-G

Cell	CDU				ASU Connector
	CDU No.	**Feeder label**	**CDU connector**	**Signal**	
A	1	CellA: DX1	TX/RX1	TX/RX A	1
	2	CellA: RXB	TX/RX1	RX B	3
B	1	CellB: DX1	TX/RX2	TX/RX A	2
	2	CellB: RXB	TX/RX2	RX B	4
C	3	CellC: DX1	TX/RX1	TX/RX A	5
		CellC: DX2	TX/RX2	TX/RX B	6

12.5.3 1x4 CDU-G without hybrid combiner and 1x8 CDU-G with hybrid combiner

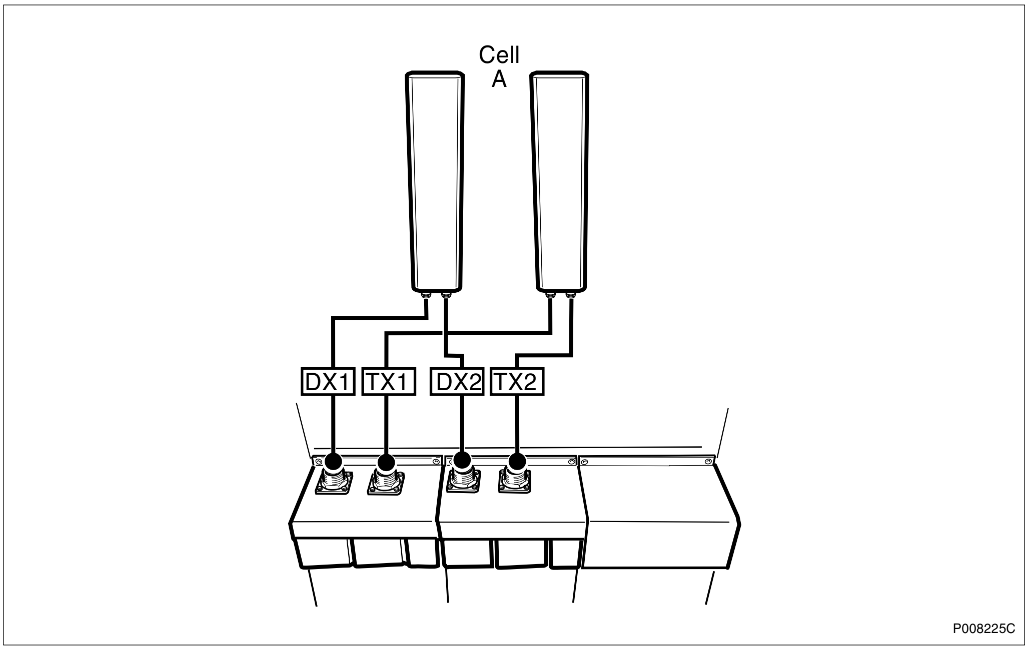


Figure 134 Configuration without TMA

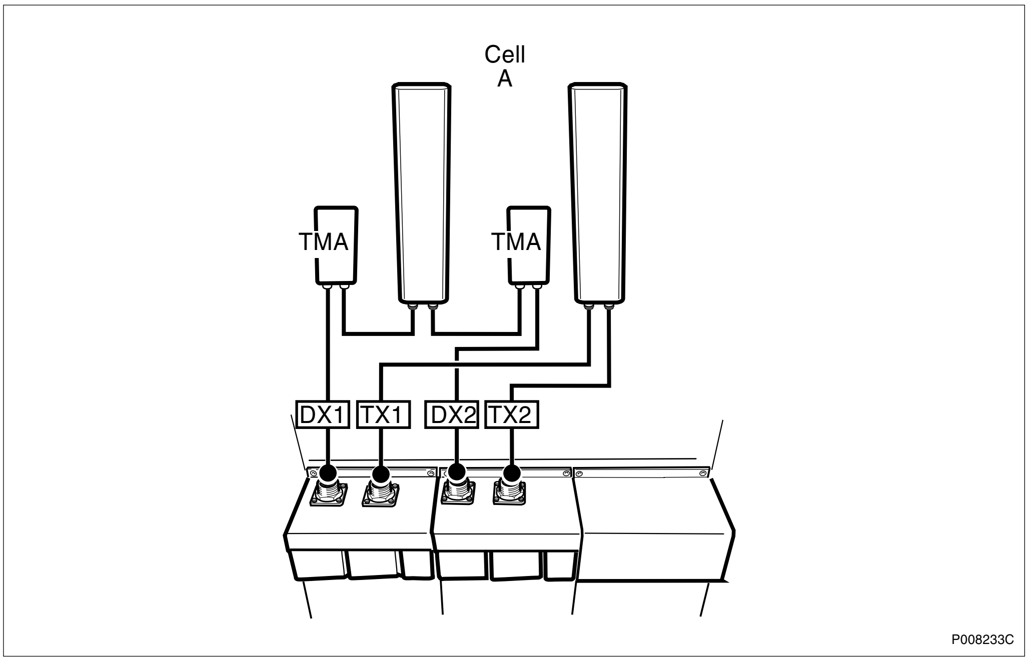


Figure 135 Configuration with TMA

Table 73 1x4 CDU-G without hybrid combiner and 1x8 CDU-G with hybrid combiner

Cell	CDU				ASU Connector
	CDU No.	Feeder label	CDU connector	Signal	
A	1	CellA: DX1	TX/RX1	TX/RX A	1
		CellA: TX1	TX/RX2	TX	
	2	CellA: DX2	TX/RX1	TX/RX B	3
		CellA: TX2	TX/RX2	TX	

12.5.4 1x6 CDU-G without hybrid combiner and 1x12 CDU-G with hybrid combiner

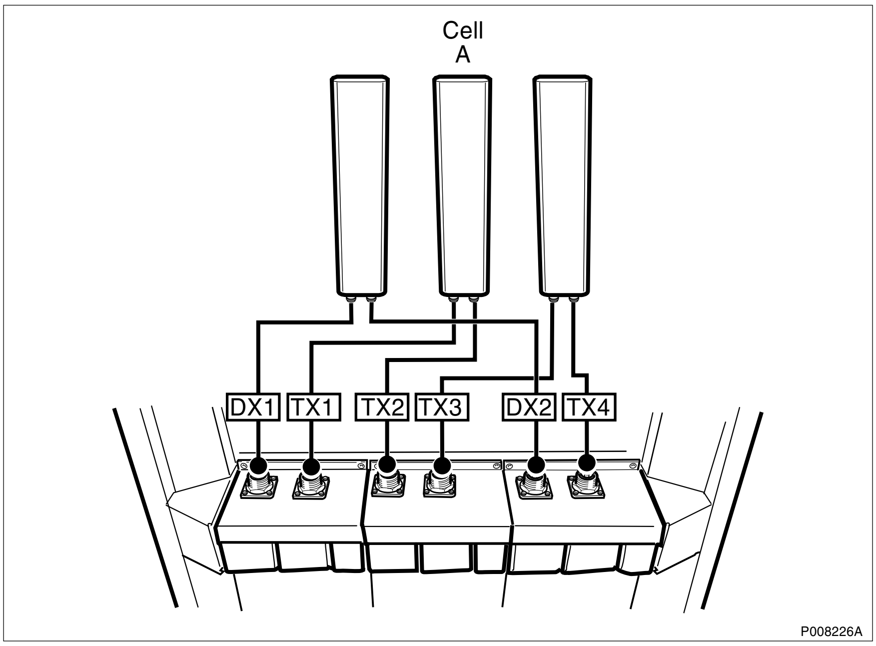


Figure 136 Configuration without TMA

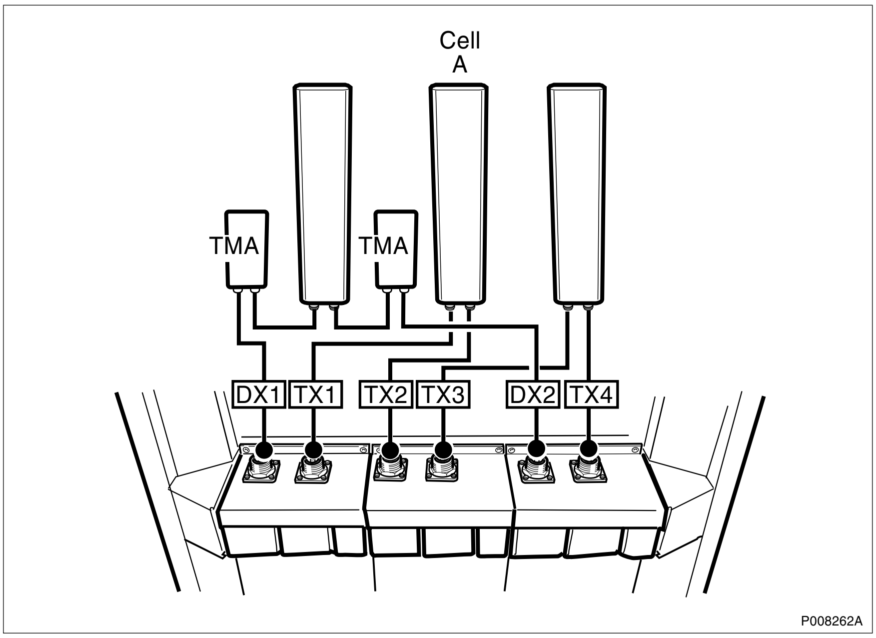


Figure 137 Configuration with TMA

Table 74 1x6 CDU-G without hybrid combiner and 1x12 CDU-G with hybrid combiner

Cell	CDU				ASU Connector
	CDU No.	**Feeder label**	**CDU connector**	**Signal**	
A	1	CellA: DX1	TX/RX1	TX/RX A	1
		CellA: TX1	TX/RX2	TX	
	2	CellA: TX2	TX/RX1	TX	
		CellA: TX3	TX/RX2	TX	
	3	CellA: DX2	TX/RX1	TX/RX B	5
		CellA: TX4	TX/RX2	TX	

12.5.5 2x6 CDU-G

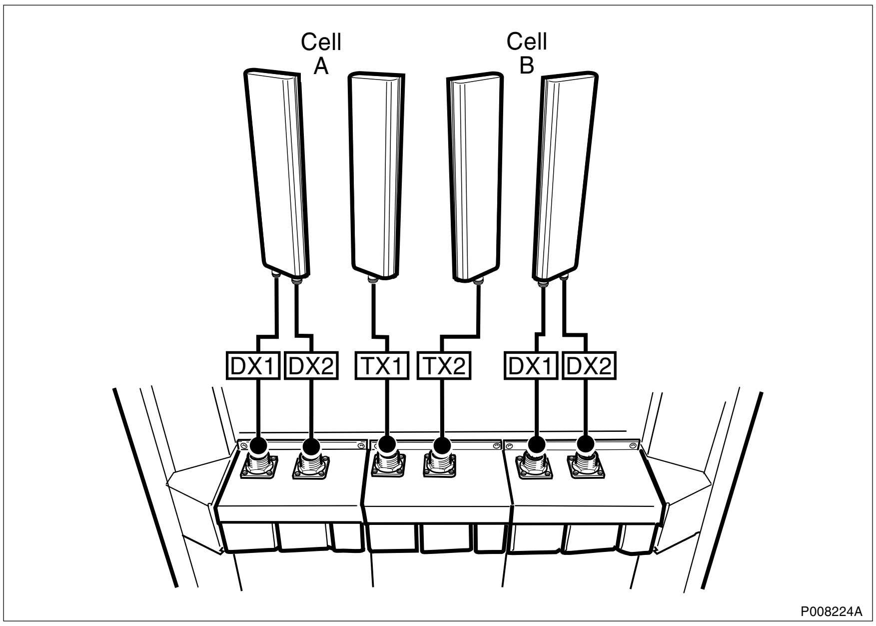


Figure 138 Configuration without TMA

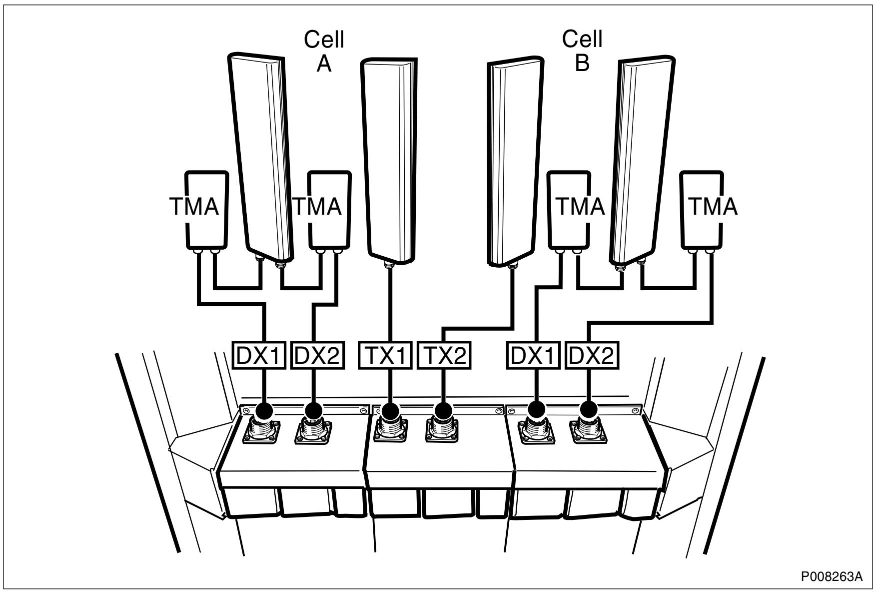


Figure 139 Configuration with TMA

Table 75 2x6 CDU-G

Cell	CDU				ASU Connector
	CDU No.	Feeder label	CDU connector	Signal	
A	1	CellA: DX1	TX/RX1	TX/RX A	1
		CellA: DX2	TX/RX2	TX/RX B	2
	2	CellA: TX1	TX/RX1	TX	
B		CellB: TX2	TX/RX2	TX	
	3	CellB: DX1	TX/RX1	TX/RX A	5
		CellB: DX2	TX/RX2	TX/RX B	6

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 the 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 the BSC and the BTS.
AC	Alternating Current
ACB	Alarm Collection Board
ACCU	Alternating Current Connection Unit
ACCU-CU	ACCU Connection Unit
ACCU-DU	ACCU Distribution Unit
A/D converter	Analog to Digital converter
AFS	AMR Full-rate speech
AGW	Abis Gateway
AHR	AMR Half-rate speech
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

AMR	Adaptive Multi-Rate
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 System
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
BFF	Bit Fault Frequency

BFI Bad Frame Indication

BFU Battery Fuse Unit

Bias injector A unit which injects DC power into 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.

The RBS is physically connected to the Base Station Controller (BSC) via the CMRU. There is only one CMRU in each RBS.

Macro	CMRU = DXU
Micro	CMRU = The whole 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 radio equipment from more than one mobile telephone system and/or frequency on the same site 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
DF	Disturbance Frequency

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	Transmission standard, G.703, a 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
EDGE dTRU	EDGE double TRansceiver Unit
	⇒ EDGE
EDT	Electrical Down Tilt
EEPROM	Electrically Erasable Programmable Read-Only Memory
EIRP	Effective Isotropic Radiated Power
EMC	ElectroMagnetic Compatibility
EMF	ElectroMotive Force
EMF	ElectroMagnetic Field
EMI	Electromagnetic Interference
ENV	Environmental
EOC	Embedded Operations Channel
EPC	Environmental and Power Control
ES	Errored Second
ESB	External Synchronization Bus
ESD	ElectroStatic Discharge
ESF	Extended Superframe Format
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	Physical/electrical characteristics of hierarchical digital interfaces, as defined by the ITU.
G.704	Synchronous frame structures used at 1544, 6312, 2048, 8448 and 44 736 kbit/s, as defined by the ITU.
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 800	GSM system 800 MHz (generic)
GSM 900	GSM system 900 MHz (generic)
GSM 1800	GSM system 1800 MHz (generic)
GSM 1900	GSM 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
ICMI	Initial Codec Mode Indicator

ID	IDentification
IDB	Installation DataBase
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:

- Antennas
- Buses
- 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 Contains one or more processors, to which software can be downloaded from the BSC. A Main RU is either Central (CMRU) or Distributed (DMRU). A Main RU may or may not have a direct signalling link to the BSC.

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 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 on.
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
PSTN	Public Switch Telephone Network
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 (CMRU).
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	Replaceable 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
SF	Slip Frequency
SID	Silence Descriptor
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 standard, G.703, a 1544 kbit/s PCM link
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/F	Traffic Channel, Full-rate
TCH/H	Traffic Channel, Half-rate
TCC	Transmission Coherent Combining
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 (TRAU) in BSC performs transcoding of speech information and rate adaptation 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
UAST	UnAvailable STate supervision
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.

Fault List

ERICSSON

Contents

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.

Note: Unused fault numbers are not indicated in the fault lists.

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

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/IOM bus

    • EOM bus

    • EPC bus

    • PSU DC cable

    • Y link

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)
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 or DC supply.
Possible reasons	• AC mains failure. • DC supply failure. • ACCU fault (or wrong strapping). • Disconnected AC input cable to PSU.

Table 2 SO CF EC2

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.

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.

Table 2 SO CF EC2

Fault No.	**SO CF EC2:13**
Fault name	Auxiliary equipment fault
Remark	SW release R8A
Related fault	AO RX I1B:47 – RX auxiliary equipment fault
	AO TX I1B:47 – TX auxiliary equipment fault
	AO TX I2A:0 – Diversity 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.
Action	

Fault No.	**SO CF EC2:14**
Fault name	Battery backup external fuse fault
Remark	SW release R8A
Related fault	
Description	A fault has occurred in the DFU in the BBS outside the RBS.
Action	Refer to the BBS documentation.

1.3.3 SO CF, internal fault map class 1A

Table 3 SO CF I1A

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.

Table 3 SO CF I1A

Fault No.	**SO CF I1A:3**
Fault name	Reset, watchdog
Description	Reset has occurred in the DXU.
Possible reasons	Bugs in SW.
Action	Read the MRU logs with the OMT and send a trouble report to Ericsson for correction.
Note:	For information only, not a HW fault.

Fault No.	**SO CF I1A:4**
Fault name	Reset, SW fault
Description	Reset has occurred in the DXU.
Possible reasons	Bugs in SW.
Action	Read the MRU logs with the OMT and send a trouble report to Ericsson for correction.
Note:	For information only, not a HW fault.

Fault No.	**SO CF I1A:5**
Fault name	Reset, RAM fault
Description	Reset has occurred in the DXU.
Action	If this fault occurs **frequently** on a particular DXU, replace 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.

Table 3 SO CF I1A

Fault No.	**SO CF I1A:8**
Fault name	Timing unit VCO fault
Remark:	Only valid for DXU-03
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	Time distribution 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 Y link between the DXU and the TRUs. • Replace the DXU backplane.

Table 3 SO CF I1A

Fault No.	**SO CF I1A:10**
Fault name	Indoor temp 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	The temperature in the cabinet is out of the specified safe range. The fault ceases when the temperature comes back within the safe range. See Note 2 on Page 4 .
Possible reasons	a. TRU dummies missing. b. Climate system failure. c. The climate system of the room is not working according to specification.
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. Localise the fault in the climate system of the room.
Fault No.	**SO CF I1A:12**
Fault name	DC voltage out of range
Related faults	SO CF I2A:18 – DC voltage out of range SO TRXC I1B:3 – DC voltage out of range
Description	The DC voltage has dropped below safe level and the RBS will shut down immediately, see Note 1 on Page 4 . 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
Related fault	SO CF I2A:30 – Bus fault
Description	The DXU is not able to send any data on the Y link.
Possible reasons	Probably a HW fault (for example Y link cable, DXU, TRU backplane).
Action	Check all parts of the Y link.

Table 3 SO CF I1A

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.

Fault No.	**SO CF I1A:21**
Fault name	HW fault
Related fault	SO CF I2A:24 – HW fault
Description	Internal HW fault in the DXU
Action	Change the DXU.

Table 3 SO CF I1A

Fault No.	**SO CF I1A:22**
Fault name	Air time counter lost
Description	Internal signalling problem in the DXU
Action	• Reset the DXU • If resetting does not help, replace the DXU

1.3.4 SO CF, internal fault map class 2A

Table 4 SO CF I2A

Fault No.	**SO CF I2A:7**
Fault name	RX amplifier current fault
Related fault	AO RX I1B:0 – RX amplifier current fault
Description	An RXDA/LNA in a CDU is faulty. Use the OMT to 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.

Table 4 SO CF I2A

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, 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 I2A:0 – Diversity fault
	AO TX I1B:20 – CU/CDU 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.

Table 4 SO CF I2A

Fault No.	**SO CF I2A:12**
Fault name	RX maxgain/mingain violated
Description	The fault arises when total gain in RX path (from antenna to TRU) is outside the recommended range.
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.

Table 4 SO CF I2A

Fault No.	**SO CF I2A:14**
Fault name	Supervision/communication lost
Related faults	SO TRXC I1B:0 – CDU not usable
	SO TRXC I2A:22 – CDU-bus communication fault
	AO TX I2A:0 – Diversity fault
Description	There is a communication problem on the CDU bus between TRU and CDU. Use the OMT to read the BTS logs to localise the fault more precisely.
Possible reasons	a. The CDU bus cable is faulty, disconnected or wrongly connected.
	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-F
Related faults	SO TRXC I2A:15 – VSWR/Output power supervision lost
	AO TX I1B:22 – VSWR/Output power supervision lost
	AO TX I2A:0 – Diversity fault
Description	One or several Pfwd/Prefl cables are disconnected, check the RU map to find out which. If a Pfwd cable is disconnected, the CDU 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 disconnected Pfwd or Prefl cable.

Table 4 SO CF I2A

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
	AO TX I2A:0 – Diversity fault
Description	The temperature in the cabinet is out of the normal conditional range, see Note 2 on Page 4 . The fault ceases when temperature is back in the normal conditional range.

Fault No.	**SO CF I2A:17**
Fault name	Indoor humidity
Remark	
Related faults	
Description	
Possible reasons	
Action	

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 4 .

Fault No.	**SO CF I2A:19**
Fault name	Power and climate system in standalone mode
Description	This indicates a fault in the EPC bus. The power and climate systems continue to operate but they cannot be controlled or supervised from the DXU.
Possible reasons	• The EPC bus cable is broken or wrongly connected.
	• An RU on the EPC bus is faulty or powered off.

Table 4 SO CF I2A

Fault No.	**SO CF I2A:21**
Fault name	Internal power capacity reduced
Related faults	SO CF EC2:10 – Mains fail (External power source fail)
Description	The power supply from the PSUs is reduced.
Possible reasons	• Mains failure, see SO CF EC2:10.
	• 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, battery or battery temperature sensor.
	• 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 EPC bus.
Action	• Check fans and the FCU.

Table 4 SO CF I2A

Fault No.	**SO CF I2A:24**
Fault name	HW fault
Related faults	AO TX I1B:18 – CU/CDU HW fault
	AO TX I1B:19 – CU/CDU SW load/start fault
	AO TX I1B:21 – CU/CDU park fault
	AO TX I1B:23 – CU/CDU reset, power on
	AO TX I1B:25 – CU/CDU reset, watchdog
	AO TX I1B:26 – CU/CDU fine tuning fault
	AO TX I2A:0 – Diversity fault
Description	A fault has occurred in CDU, DXU or OVP. See SO CF RU 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.
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 DXU is not functioning. DXU reads voltage value from PSU/BFU instead.
Action	Check system voltage circuit breaker. Otherwise replace DXU.

Table 4 SO CF I2A

Fault No.	**SO CF I2A:28**
Fault name	A/D Converter fault
Description	The A/D converter in DXU is faulty => measurements from climate and voltage sensors cannot be read. Temperature 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 DXU.
Fault No.	**SO CF I2A:30**
Fault name	Bus fault
Related fault	SO CF I1A:14 – Bus fault
	SO TRXC I1A:15 – Base band hopping fault
	SO TRXC I1B:8 – Base band hopping fault
Description	DXU has received a high number of faulty frames on Y link. There are many disturbances on the Y link.
Possible reasons	• Faulty or missing Y link.
	• Faulty DXU
	• Faulty TRU
	• Incorrect IDB. The IDB must give the correct number of TRUs and correctly define their positions.
	• Faulty TRU backplane
Fault No.	**SO CF I2A:31**
Fault name	High frequency software fault
Related fault	SO TRXC I2A:19 – High-frequency software fault
Description	Frequent errors during execution of application SW in DXU can lead to restart.
Possible reasons	Bugs in SW.
Action	Read the MRU logs with the OMT and send a trouble report to Ericsson for correction.

Table 4 SO CF I2A

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 flash memory is corrupted. The DXU flash memory contains DXU database.
Action	Switch off and on the DXU. If this does not help, replace the DXU.

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 (RX), SO CF EC2:11 (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, CXU and CDU. Try moving cables, TRUs and CDUs in the cabinet to see if the fault follows the unit.

Fault No.	**SO CF I2A:34**
Fault name	Output voltage fault
Related fault	AO RX I1B:12 – TMA CM output voltage fault
	AO RX I1B:18 – TMA power distribution 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 TMA CM. Otherwise replace the TMA CM.

Table 4 SO CF I2A

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 (ACCU, BFU, CCU, CDU, CXU, FCU, PSU, TMA CM) is corrupted or cannot be read by the SW. If it is the CDU, 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, EPC bus, Y link or IOM bus). If the communication is ok, power off/on the faulty RU and reset DXU. If this does not help, change the RU and reset DXU.

Fault No.	**SO CF I2A:37**
Fault name	Circuit breaker tripped or fuse blown
Description	A circuit breaker in ACCU or BFU-21 has tripped or the fuse has blown in old BFU.
Action	Restore the circuit breaker in ACCU or BFU-21 or replace the fuse in old BFU.

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 is using default parameters for its internal configuration => the DXU 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.

Table 4 SO CF I2A

Fault No.	**SO CF I2A:41**
Fault name	Lost communication to TRU
Description	DXU has no contact on Y link 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) • Y link fault (see SO CF I2A:30 – Bus fault)

Fault No.	**SO CF I2A:43**
Fault name	Internal configuration failed
Related fault	SO CF I2A:19 – Power and climate system in stand-alone mode SO CF I2A:36 – RU database corrupted
Description	One or several subsystems in DXU SW have failed their internal configuration. The DXU will not be able to function properly.
Possible reasons	HW and IDB inconsistent, DXU database corrupted, communication problems on the Y link or the EPC bus.
Action	Check all the connections. Reinstall IDB with OMT and press DXU reset. If this does not help, replace DXU.

Fault No.	**SO CF I2A:44**
Fault name	ESB distribution failure
Remark	R8 and on.
Possible reasons	Faulty DXU driver
Action	Replace the DXU

Fault No.	**SO CF I2A:45**
Fault name	High temperature
Related fault	SO CF I2A:8 – VSWR limits exceeded AO TX I2A:0 – Diversity fault
Description	Temperature in CDU is above normal conditional range. Fault ceases when the temperature returns to normal conditional range, see Note 2 on Page 4 .
Action	• If the fault SO CF I2A:8 is present, correct this first. • Check that all dummies, if required, are in place and correctly mounted.

Table 4 SO CF I2A

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 ACCU, BFU, CCU, CDU, CXU, FCU, PSU, TMA CM) 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.

1.3.5 SO CF, replacement unit map

Table 5 SO CF RU

RU No.	**SO CF RU:0**
RU name	DXU or IXU (SW release R9)
	DXU (SW release R8)
Related faults	SO CF I1A:8 – Timing unit VCO fault
	SO CF I1A:9 – Timing distribution fault
	SO CF I1A:14 – Bus fault
	SO CF I1A:16 – RBS database corrupted
	SO CF I2A:10 – DXU opt 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 synchronization source
	and AO TF I1B:0 – Optional synchronization source
	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.

Table 5 SO CF RU

RU No.	**SO CF RU:3**
RU name	Y link
Description	
Possible reasons	The Y link may be incorrectly connected..
Action	Try the following actions until the fault is corrected:
	• Check that the Y link is correctly routed and that each connector is properly connected.
	• Change the Y link.
RU No.	**SO CF RU:5**
RU name	CDU
Related faults	SO CF I2A:7 – RX 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	CCU
Related faults	SO CF I2A:36 – RU database corrupted
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:
	• Replace the CCU.
	• See also the respective related faults.

Table 5 SO CF RU

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 or BFU fuse or circuit breaker
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.

Table 5 SO CF RU

RU No.	**SO CF RU:12**
RU name	ALNA/TMA A
Related fault	SO CF EC2:11 – ALNA/TMA fault
	SO CF EC2:12 – ALNA/TMA degraded
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/TMA B
Related fault	SO CF EC2:11 – ALNA/TMA fault
	SO CF EC2:12 – ALNA/TMA degraded
Action	See the fault SO CF RU:12 — ALNA/TMA A.
RU No.	**SO CF RU:14**
RU name	Battery
Related fault	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:19**
RU name	Humidity sensor or ACCU connection unit
Related fault	SO CF I2A:29 – Varistor fault
Action	Actions are given in the section *ACCU-CU* in the chapter *Fault Localisation* in the *Maintenance Manual* .

Table 5   SO CF RU

RU No.	**SO CF RU:20**
RU name	TMA CM
Related fault	SO CF I2A:34 – Output Voltage Fault
	SO CF I2A:36 – RU database Corrupted
	SO CF I2A:46 – DB Parameter Fault
	AO RX I1B:12 – TMA CM Output Voltage Fault
Action	See the respective related faults.
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: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* .
Action	Actions are given in the section *CDU CDU 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 *CDU CDU PREFL cable* in the chapter *Fault Localisation* in the *Maintenance Manual* .
RU No.	**SO CF RU:30**
RU name	CDU bus/IOM bus
Related fault	SO CF I2A:14 – Supervision/communication lost
Action	Actions are given in the section *CDU bus* in the chapter *Fault Localisation* in the *Maintenance Manual* .

Table 5 SO CF RU

RU No.	**SO CF RU:31**
RU name	Environment
Related fault	SO CF I1A:10 – Indoor temp out of safe range
	SO CF I1A:12 – DC voltage out of range
	SO CF I2A:16 – Indoor temperature out of normal conditional range
	SO CF I2A:18 – DC voltage out of range
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:33**
RU name	EPC bus / Power communication loop
Related fault	SO CF I2A:19 – Power and climate 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:37**
RU name	CDU CXU RXA cable
Related fault	SO TRXC I2A:0 – RX Cable Disconnected
Action	Try the following actions until the fault is corrected:
	• Check or replace the CDU CXU RXA cable.
	• Replace the CDU.
	• Replace the CXU. **Note:** Be sure that it is the correct step to change the CXU. This procedure requires that the complete RBS is taken out of traffic.

Table 5 SO CF RU

RU No.	**SO CF RU:38**
RU name	CDU CXU RXB cable
Related fault	SO TRXC I2A:0 – RX Cable Disconnected
Action	Try the following actions until the fault is corrected:
	• Check or replace the CDU CXU RXB cable.
	• Replace the CDU.
	• Replace the CXU. **Note:** Be sure that it is the correct step to change the CXU. This procedure requires that the complete RBS is taken out of traffic.
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 EC2:13 – 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
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:42**
RU name	CXU
Related fault	SO CF I2A:36 – RU data base corrupted
	SO CF I2A:46 – DB parameter fault
Action	Actions are given in the section *CXU* in the chapter *Fault Localisation* in the *Maintenance Manual* .

Table 5 SO CF RU

RU No.	**SO CF RU:44**
RU name	OVP
Related fault	SO CF I2A:24 – HW fault
Action	Actions are given in the section *Battery temp sensor* in the chapter *Fault Localisation* in the *Maintenance Manual* .
RU No.	**SO CF RU:45**
RU name	Battery temp sensor
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:46**
RU name	FCU
Related fault	SO CF I2A:23 – Climate Capacity Reduced
	SO CF I2A:36 – RU database Corrupted
	SO CF I2A:46 – DB Parameter Fault
Action	Actions are given in the section *FCU* in the chapter *Fault Localisation* in the *Maintenance Manual* .
RU No.	**SO CF RU:47**
RU name	TMA-CM cable
Related fault	SO CF I2A:34 – Output voltage fault
Action	Actions are given in the section *TMA-CM cable* 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 (TRU in local mode)
Remark	The TRU is in local mode and cannot be controlled by BSC.
Action	To bring the TRU into remote mode, you need to press the local/remote button on the TRU or in the OMT.

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: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.

Table 7   SO TRXC I1A

Fault No.	**SO TRXC I1A:3**
Fault name	Reset, watchdog
Possible reasons	Bugs in SW.
Action	Read the MRU logs with the OMT and send a trouble report to Ericsson for correction.
Description	Reset has occurred on TRU.
Note:	For information only, not a HW fault.
Fault No.	**SO TRXC I1A:4**
Fault name	Reset, SW fault
Possible reasons	Bugs in SW.
Action	Read the MRU logs with the OMT and send a trouble report to Ericsson for correction.
Description	Reset has occurred on TRU.
Note:	For information only, not a HW fault.
Fault No.	**SO TRXC I1A:5**
Fault name	Reset, RAM fault
Description	Reset has occurred on TRU.
Action	If this fault occurs **frequently** on a particular TRU, replace the 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.

Table 7 SO TRXC I1A

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 distribution fault
Description	The TRU gets bad timing signals.
Possible reasons	Could be a fault in TRU, Y link 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.
Action	Try to power off/on TRU. If this does not help, replace TRU.

Fault No.	**SO TRXC I1A:12**
Fault name	Terrestrial traffic channel fault
Description	Internal HW fault in the TRU.
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.
Description	Internal HW fault in the TRU: The RF loop test is used to detect faults on TXU/RXU.
Action	Reset or power off/on the TRU. 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.

Table 7 SO TRXC I1A

Fault No.	**SO TRXC I1A:15**
Fault name	Base band hopping fault
Related fault	SO CF I1A:14 – Bus fault
Description	The TRU has communication problem on Y link.
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 Y link • Faulty TRUs • Faulty backplane
Actions	Try the following actions until the fault is corrected: • Check that all connections are OK: Y link, backplane connectors. • Try to switch places between TRUs • Replace the TRU backplane • Replace DXU

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.
Action	Try to power off/on TRU. If this does not help, replace 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.

Table 7 SO TRXC I1A

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 • Install the 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 – 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, DXU and TRU backplanes. Install right IDB and press DXU reset. If this does not help, change TRU, CDU or CDU bus cable.
Fault No.	**SO TRXC I1A:22**
Fault name	Voltage supply fault
Related faults	SO TRXC I2A:14 – Voltage supply fault
Description	Internal HW fault in the TRU.
Action	Power off/on TRU. If this does not help, change TRU.
Fault No.	**SO TRXC I1A:23**
Fault name	Air time counter lost
Related faults	SO CF I1A:22 – Air time counter lost
Description	Internal HW fault in the TRU.
Action	Change the TRU.

Table 7 SO TRXC I1A

Fault No.	**SO TRXC I1A:24**
Fault name	High temperature
Related faults	
Description	Internal HW fault in the TRU.
Action	Change the TRU.

Fault No.	**SO TRXC I1A:25**
Fault name	TX/RX communication fault
Related faults	
Description	Internal HW fault in the TRU.
Action	Change the TRU.

Fault No.	**SO TRXC I1A:26**
Fault name	Radio control system load
Related faults	
Description	Internal HW fault in the TRU.
Action	Change the TRU.

Fault No.	**SO TRXC I1A:27**
Fault name	Traffic lost downlink
Related faults	
Description	Internal HW fault in the TRU.
Action	Change the TRU.

Table 7 SO TRXC I1A

Fault No.	**SO TRXC I1A:28**
Fault name	Traffic lost uplink
Related faults	
Description	Internal HW fault in the TRU.
Action	Change the TRU.

Fault No.	**SOTRXC I1A:28**
Fault name	Y link communication HW fault
Remark	
Related faults	
Description	
Possible reasons	
Action	

Fault No.	**SOTRXC I1A:29**
Fault name	DSP RAM soft error
Remark	
Related faults	
Description	
Possible reasons	
Action	

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
Related faults	SO CF I2A:14 – 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 or CXU database corrupted.
Action	See the respective related SO CF fault.

Fault No.	**SO TRXC I1B:7**
Fault name	TX adress conflict
Related faults	
Description	
Possible reasons	

Fault No.	**SO TRXC I1B:8**
Fault name	Base band hopping fault
Related faults	SO CF I2A:30 – Bus fault
Description	DXU has received a high number of faulty frames on Y link. There are many disturbances on the Y link.
Possible reasons	See SO CF I2A:30 – Bus fault.

Fault No.	**SO TRXC I1B:9**
Fault name	Y link communication lost
Remark	
Related faults	
Description	
Possible reasons	
Action	

Table 8 SO TRXC I1B

Fault No.	**SO TRXC I1B:10**
Fault name	Timing reception fault
Remark	
Related faults	
Description	
Possible reasons	
Action	

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 CXU or CXU 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: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.

Table 9 SO TRXC I2A

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	RX communication fault
Related fault	AO RX I1B:7 – RX communication fault
Action	See AO RX I1B:7.
Fault No.	**SO TRXC I2A:6**
Fault name	TX communication fault
Related faults	AO TX I1B:10 – TX communication fault
	AO TX I2A:0 – Diversity fault
Action	See AO TX I1B:10.
Fault No.	**SO TRXC I2A:7**
Fault name	TX EEPROM checksum fault
Related faults	AO TX I1B:6 – TX EEPROM checksum fault
	AO TX I2A:0 – Diversity fault
Action	See AO TX I1B:6.
Fault No.	**SO TRXC I2A:9**
Fault name	TX synthesiser unlocked
Related faults	AO TX I1B:8 – TX synthesizer A/B unlocked
	AO TX I1B:9 – TX synthesizer C unlocked
	AO TX I2A:0 – Diversity fault
Action	See AO TX I1B:8 and AO TX I1B:9
Fault No.	**SO TRXC I2A:10**
Fault name	TX internal voltage fault
Related faults	AO TX I1B:11 – TX internal voltage fault
	AO TX I2A:0 – Diversity fault
Action	See AO TX I1B:11.

Table 9 SO TRXC I2A

Fault No.	**SO TRXC I2A:11**
Fault name	TX High temperature
Related faults	AO TX I1B:12 – TX high temperature
	AO TX I2A:0 – Diversity fault
Action	See AO TX I1B:12

Fault No.	**SO TRXC I2A:12**
Fault name	TX output power limits exceeded
Related faults	AO TX I1B:13 – TX output power limits exceeded
	AO TX I2A:0 – Diversity fault
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 faults	AO TX I1B:14 – TX saturation
	AO TX I2A:0 – Diversity fault
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: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.

Table 9 SO TRXC I2A

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	SO TRXC I1A:18 – DSP fault
Description	This fault is not implemented in current BTS SW.

Fault No.	**SO TRXC I2A:19**
Fault name	High-frequency software 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 faults	AO TX I1B:17 – TX initiation fault AO TX I2A:0 – Diversity fault
Action	See AO TX I1B:17

Table 9 SO TRXC I2A

Fault No.	**SO TRXC I2A:22**
Fault name	CDU-bus communication fault
Related faults	SO CF I2A:14 – Supervision/communication lost
	AO TX I2A:0 – Diversity fault
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 faults	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 faults	SO TRXC I2A:11 – TX high temperature
	AO TX I1B:27 – TX maximum power restricted
Description	This fault arises in conjunction with SO TRXC I2A:11 – TX high temperature, indicating a high temperature in the TRX. The output power is reduced.
	Fault AO TX I1B:27 – TX maximum power restricted is raised when the output power is reduced 4 dB and fault SO TRXC I2A:11 – TX high temperature still remains.
Action	Replace the TRU.

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.

Table 9 SO TRXC I2A

Fault No.	**SO TRXC I2A:29**
Fault name	Power amplifier fault
Related fault	AO TX I2A:0 – Diversity fault
Description	Internal HW fault in the TRU.
Action	Change the TRU.

Fault No.	**SO TRXC I2A:30**
Fault name	CPU high temperature
Related faults	
Description	Internal HW fault in the TRU.
Action	Change the TRU.

Fault No.	**SO TRXC I2A:32**
Fault name	RX high temperature
Related faults	
Description	Internal HW fault in the TRU.
Action	Change the TRU.

Fault No.	**SO TRXC I2A:33**
Fault name	Inter TRX communication fault
Related faults	
Description	Internal HW fault in the TRU.
Action	Change the TRU.

Fault No.	**SO TRXC I2A:34**
Fault name	VSWR limits exceeded
Related faults	AO TX I2A:0 – Diversity fault
Description	TRU-CDU TX cable fault or internal HW fault in the TRU.
Action	1. Check the TRU-CDU TX cable. Ensure that the cable is properly connected at both ends. If the cable is faulty, replace the cable. 2. Replace the TRU if the fault still remains.

Table 9 SO TRXC I2A

Fault No.	**SO TRXC I2A:35**
Fault name	Radio control burst
Related faults	
Description	Internal HW fault in the TRU.
Action	Change the TRU.

Fault No.	**SO TRXC I2A:36**
Fault name	RX filter loadfile checksum fault
Remark	R9
Related faults	
Description	
Possible reasons	
Action	
Fault No.	**SO TRXC I2A:37**
Fault name	RX internal amplifier fault
Remark	
Related faults	
Description	
Possible reasons	
Action	

Fault No.	**SO TRXC I2A:38**
Fault name	Climate Capacity reduced
Remark	R9
Related faults	
Description	
Possible reasons	
Action	

Table 9 SO TRXC I2A

Fault No.	**SO TRXC I2A:39**
Fault name	RF loop test fault, Degraded RX
Remark	R9
	Each test takes about 5 minutes. The Fault arises after 3 failed consecutive tests.
Related faults	
Description	Internal HW fault in the TRU on the RX path: The RF loop test is used to detect faults on TXU/RXU. The TRU can continue to carry traffic with degraded RX performance, but one RX branch is lost. If RX diversity is not used, the fault is located in the inactive RX branch and there is no need to replace the TRU. If RX diversity is not used and the fault is located in the active RX branch, the fault SO TRXC I1A:13 will be raised instead.
Possible reasons	
Action	Replace the TRU if high rates of call drop or handover failure are noticed.

Fault No.	**SO TRXC I2A:40**
Fault name	Memory fault
Remark	R9
Related faults	
Description	
Possible reasons	
Action	

1.4.5 SO TRXC, replacement unit map

Table 10 SO TRXC RU

RU No.	**SO TRXC RU:0**
RU name	TRU, dTRU, ATRU or RRU
Related faults	SO TRXC I1A:8 – Timing reception fault
	SO TRXC I1A:9 – Signal processing fault
	SO TRXC I1A:12 – Terrestrial traffic channel fault
	SO TRXC I1A:13 – RF loop test fault
	SO TRXC I1A:14 – RU database corrupted

Table 10 SO TRXC RU

SO TRXC I1A:15 – Base band hopping fault
SO TRXC I1A:16 – Initiation fault
SO TRXC I1A:17 – X-interface fault
SO TRXC I1A:22 – Voltage supply fault
SO TRXC I1A:23 – Air time counter lost
SO TRXC I1A:24 – High temperature
SO TRXC I1A:25 – TX/RX communication fault
SO TRXC I1A:26 – Radio control system load
SO TRXC I1A:27 – Traffic lost downlink
SO TRXC I1A:28 – Traffic lost uplink
SO TRXC I2A:1 – RX EEPROM checksum fault
SO TRXC I2A:3 – RX synthesizer unlocked
SO TRXC I2A:4 – RX internal voltage fault
SO TRXC I2A:5 – RX communication fault
SO TRXC I2A:6 – TX communication fault
SO TRXC I2A:7 – TX EEPROM 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: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
SO TRXC I2A:29 – Power amplifier fault
SO TRXC I2A:30 – CPU high temperature
SO TRXC I2A:32 – RX high temperature
SO TRXC I2A:33 – Inter TRX communication fault

Table 10 SO TRXC RU

	SO TRXC I2A:34 – VSWR limits exceeded
	SO TRXC I2A:35 – Radio control burst
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:3**
RU name	CXU TRU RXA cable
Related fault	
Action	Actions are given in the section *CXU dTRU RXA cable* in the chapter *Fault Localisation* in the *Maintenance Manual* .
RU No.	**SO TRXC RU:4**
RU name	CXU TRU RXB cable
Related fault	
Action	Actions are given in the section *CXU dTRU RXB cable* in the chapter *Fault Localisation* in the *Maintenance Manual* .
RU No.	**SO TRXC RU:5**
RU name	CDU CXU RXA cable
Related fault	
Action	Actions are given in the section *CDU CXU RXA cable* in the chapter *Fault Localisation* in the *Maintenance Manual* .
RU No.	**SO TRXC RU:6**
RU name	CDU CXU RXB cable
Related fault	
Action	Actions are given in the section *CDU CXU RXB cable* 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	RX amplifier current fault
Related fault	SO CF I2A:7 – RX amplifier current fault
Description	An RXDA in CDU is faulty and there is no signal coming from any 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
Related fault	SO CF EC2:11 – ALNA/TMA fault
Description	A TMA is faulty and there is no signal coming from any 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: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.

Table 13 AO RX I1B

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	RX communication fault
Related fault	SO TRXC I2A:5 – RX communication fault
Description	Communication fault in the TRU.
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 RXout • CDU HLout HLin • CDU RXin • Cab HLin

Table 13 AO RX I1B

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. 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:12**
Fault name	TMA CM output voltage fault
Related fault	SO CF I2A:34 – 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 TMA CM. Otherwise replace the TMA CM.

Fault No.	**AO RX I1B:14**
Fault name	CDU supervision/communication fault
Related fault	
Description	
Action	

Fault No.	**AO RX I1B:15**
Fault name	RX high temperature
Related fault	
Description	
Action	

Table 13 AO RX I1B

Fault No.	**AO RX I1B:17**
Fault name	TMA supervision fault
Related fault	
Description	
Action	

Fault No.	**AO RX I1B:18**
Fault name	TMA power distribution fault
Related fault	
Description	
Action	

Fault No.	**AO RX I1B:19**
Fault name	RX filter loadfile checksum faultt
Remark	R9
Related fault	
Description	
Action	

Fault No.	**AO RX I1B:47**
Fault name	RX auxiliary equipment fault
Related 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	CXU supervision/communication fault
Description	
Possible reasons	CDU bus cable or CXU DC cable.

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.
Action	Replace DXU.

Fault No.	**AO TF EC1:1**
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.

1.5.7 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 TS, external condition map class 1

Table 17 AO TS E1

Fault No.	**AO TS EC1:3**
Fault name	TRA/PCU (Remote transcoder/PCU com. lost)
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.

1.5.9 AO TX, internal fault map class 1A

Table 18 AO TX I1A

Fault No.	**AO TX I1A:0**
Fault name	TX offending
Remark	Only CDU-F
Description	This fault 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 CDU-F 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).

1.5.10 AO TX, internal fault map class 1B

Table 19 AO TX I1B

Fault No.	**AO TX I1B:0**
	CU/CDU not usable
Related fault	SO CF I2A:14 – Supervision/communication 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 CDU. TX function is affected since the CDU bus is used to tune the CDU.
Possible reasons	• The CDU bus cable is faulty or disconnected.
	• The CDU 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	CDU/combiner VSWR Limits Exceeded
Related fault	SO CF I2A:8 – VSWR limits exceeded
	SO CF RU:5 – CDU
	SO TRXC I2A:34 – VSWR limits exceeded
	SO TRXC RU:0 – TRU, dTRU, ATRU or RRU
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.

Table 19 AO TX I1B

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 — CDU 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 AO TX 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.

Table 19 AO TX I1B

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	TX communication fault
Related fault	SO TRXC I2A:6 – TX communication fault
Description	Communication fault in the TRU.
Possible reasons	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.

Table 19 AO TX I1B

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 max power restricted
	AO TX I1B:27 – TX max power restricted
Description	The temperature of the PA transistors is supervised. At maximum component 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 maximum component limit after 2 minutes, the maximum output power is reduced by another 2 dB. If the temperature is still over maximum component limit after 2 minutes more, 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.

Table 19 AO TX I1B

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. 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/CDU HW faul
Related fault	SO CF I2A:24 – 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 and DXU. If this does not help, replace the CU/CDU.

Fault No.	**AO TX I1B:19**
Fault name	CU/CDU SW load/start fault
Related fault	SO CF I2A:24 – 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/CDU input power fault
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.

Table 19   AO TX I1B

Fault No.	**AO TX I1B:21**
Fault name	CU/CDU park fault
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-F
Related fault	SO CF I2A:15 – VSWR/Output power supervision lost
Description	The Pf cable is missing or disconnected => CDU cannot be tuned so TX function is lost. Moreover, antenna VSWR and output power cannot be supervised.
Action	Replace the Pf cable.
Fault No.	**AO TX I1B:23**
Fault name	CU/CDU reset, power on
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/CDU reset, watchdog
Related fault	SO CF I2A:24 – CU HW fault
Possible reasons	CU/CDU has been reset. Fault raises and ceases immediately after reset

Table 19 AO TX I1B

Fault No.	**AO TX I1B:26**
Fault name	CU/CDU fine tuning fault
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:30**
Fault name	TX CDU power control fault
Related fault	
Description	
Action	

Table 19 AO TX I1B

Fault No.	**AO TX I1B:31**
Fault name	Power amplifier fault
Related fault	
Description	
Action	

Fault No.	**AO TX I1B:32**
Fault name	TX low temperature
Related fault	
Description	
Action	

Fault No.	**AO TX I1B:47**
Fault name	TX Auxiliary equipment fault
Related 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).

1.5.11 AO TX, internal fault map class 2A

Table 20 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.

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Ericsson GSM System

RBS 2206

Spare Parts Catalogue

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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

Introduction

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 Technicians
- Technical Administrators

Customer Documentation Library

The user documentation for the RBS 2206 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.

R3A to R3B

- EDGE TRU for 800MHz and 1900MHz introduced.
- New and replaced products are indicated by #-sign.

R2A to R3A

- Improved illustrations.
- New chapter added (800 MHz).
- New chapter added (Coaxial Cables CDU-G without hybrid 1+1).

R1A to R2A

- Improved illustrations.
- New chapter added (ASU Cables).

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 (code = U)

• Recommended for customer stock. Intended to be replaced on site or at Ericsson local shop and are intended to be disposed after consumption (code = R).

• Not recommended for customer stock. The parts are available upon request and the lead time may be longer (code = A).

The spare parts catalogue is adapted to this structure.

The dimensioning and recommendation of spare parts does 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 done with a computer-based calculation model for BTS equipment.

The tool uses the parameters:

• Product reliability (MTBF)

• Spare part delivery lead time or repair turn around time

• Chosen service level (Spare Parts 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 present in brackets ( ) are associated parts, not necessarily shown in illustrations. Position numbers with letters, for example 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 in illustrations, but are not recommended for customer stock, or may be included in a Spare Parts Set (cannot be ordered separately). If a reference to another chapter is given, more information will be found there.

Spare Parts Ordering Address:

Please use the Regional Ericsson Company.

Repair Delivery Address:

Please use the Regional Logistics Centre specified in the System Services Contract assigned with the local Ericsson Company.

Catalogue Ordering:

Use the Product No. shown in the footer at the bottom of this page.

External users can order Spare Parts Catalogues, or other manuals according to instructions in the Library Overview, or they can be accessed via Ericsson Extranet adress:

https://ebusiness.ericsson.net/

Internal users (within the Ericsson Company) can always find the latest version of the Catalogue on the Intranet address:

http://cpistore.ericsson.se/

Feedback

External users 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 Rational Clear Quest Report on the catalogue's Product No. and R-state shown at the bottom of this page.

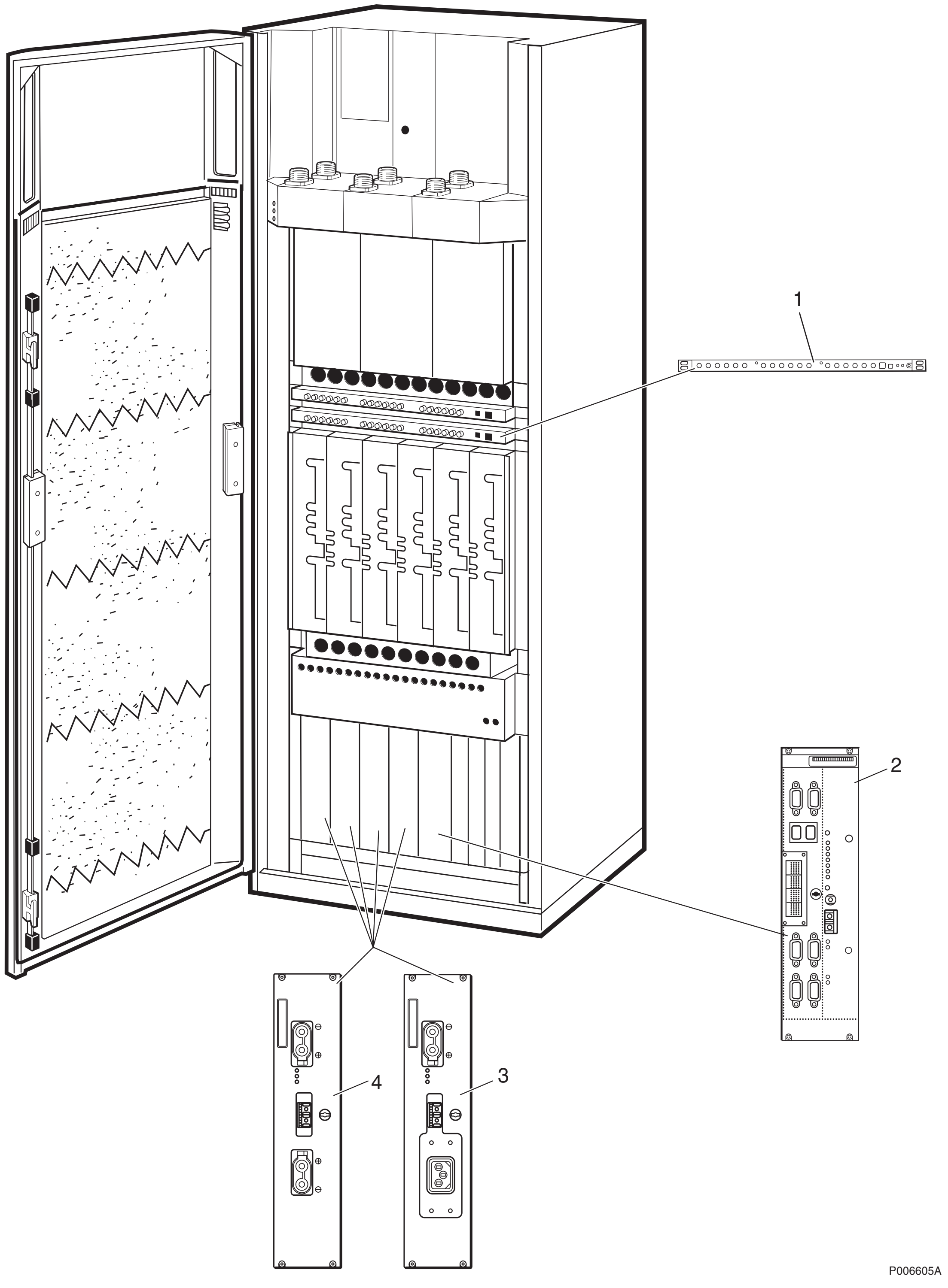
Recommended (Repairable) Spare Parts for Customer Stock

About this chapter

All parts in this chapter have the internal code = U.

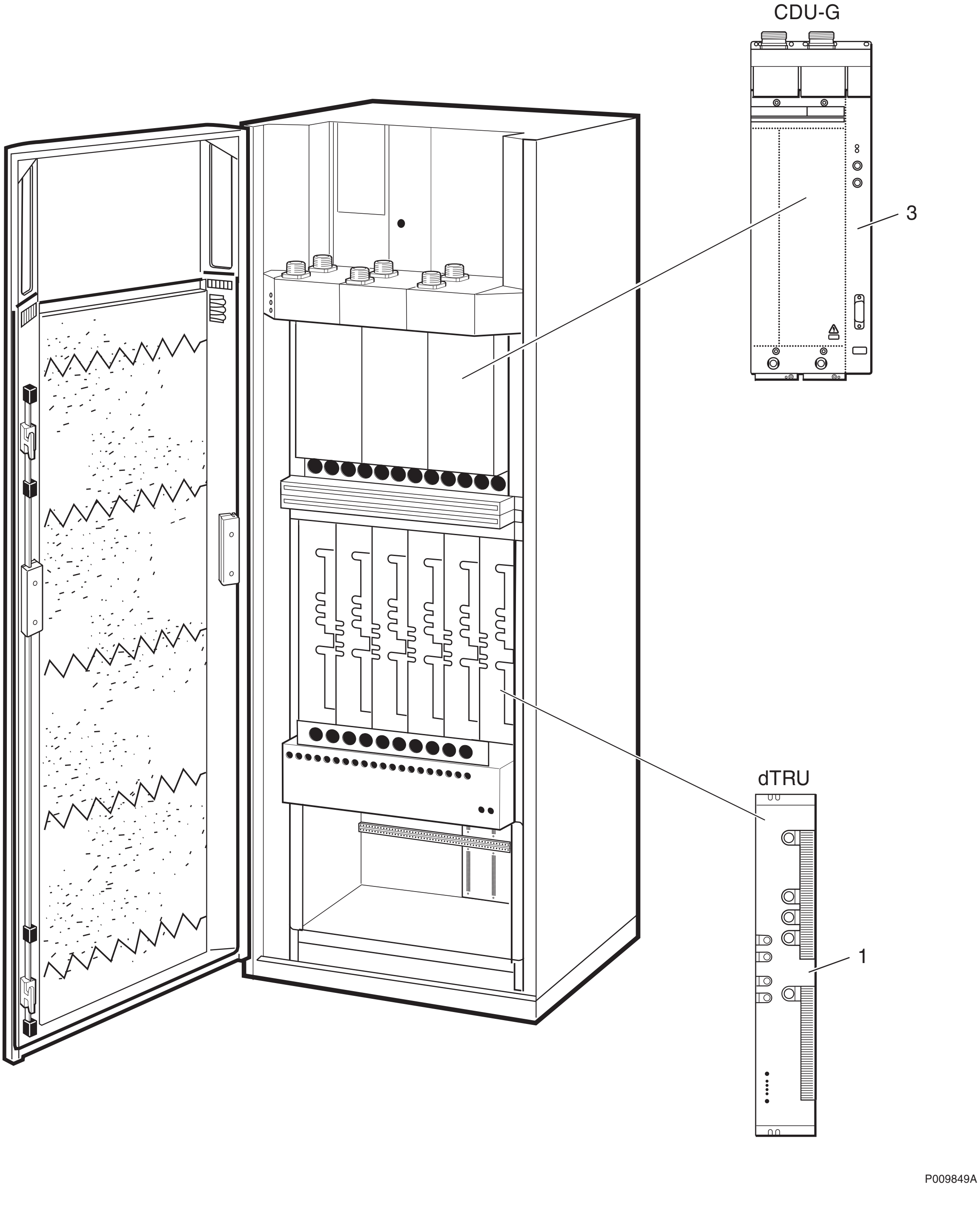
These parts, recommended for Customer stock, are intended to be replaced on site and intended to be repaired at an Ericsson Repair Centre, or by the Local Service Organisation.

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.


1
2
3
4
P006605A

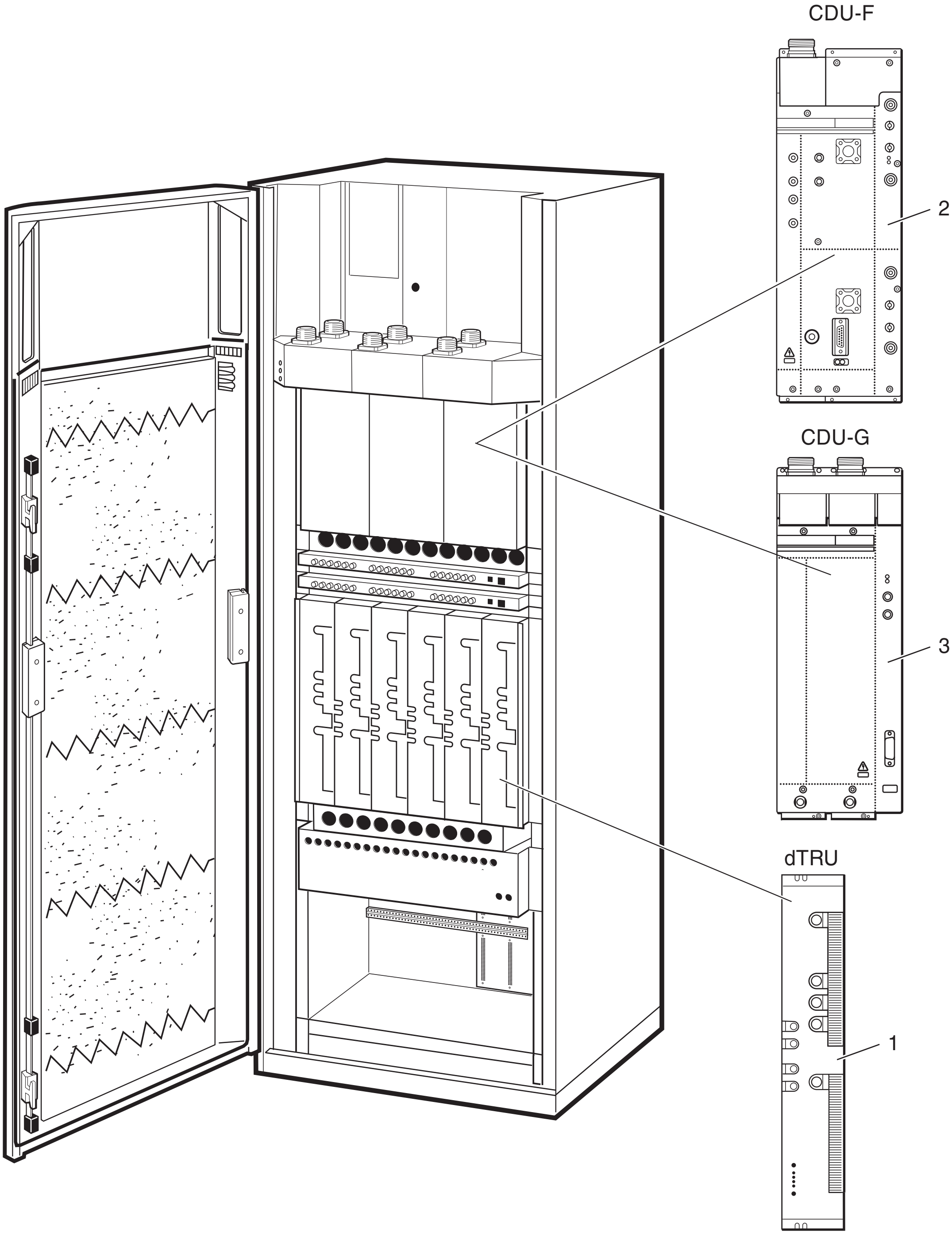
Basic Units

Pos	Product Number	Product Name	Description
1	KRY 101 1856/1	Unit	CXU-10
2	BOE 602 14/1	Functional unit	DXU-21
3	BML 231 202/1	Power supply unit	PSU AC 1200W
4	BMR 960 014/1	Converter	PSU DC 1200W


CDU-G
3
dTRU
1
P009849A

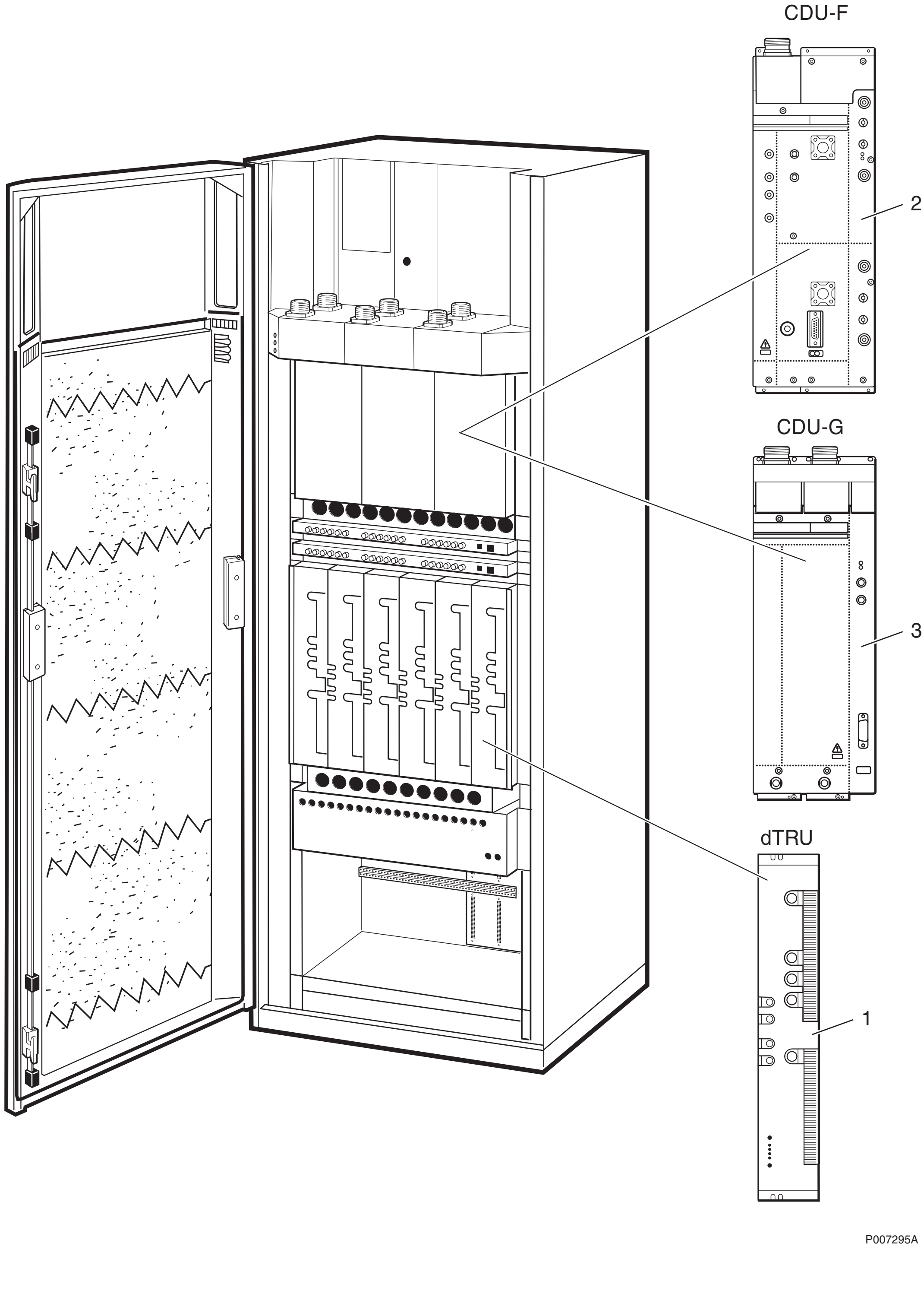
800 MHz Units

Pos	Product Number	Product Name	Description
1A	KRC 131 1005/1	Transceiver	dTRU; GMSK
#1B	KRC 131 1005/2	Transceiver	dTRU; EDGE
3	BFL 119 155/1	Combiner unit	CDU-G 800 MHz


CDU-F
2
CDU-G
3
dTRU
1
P006606A

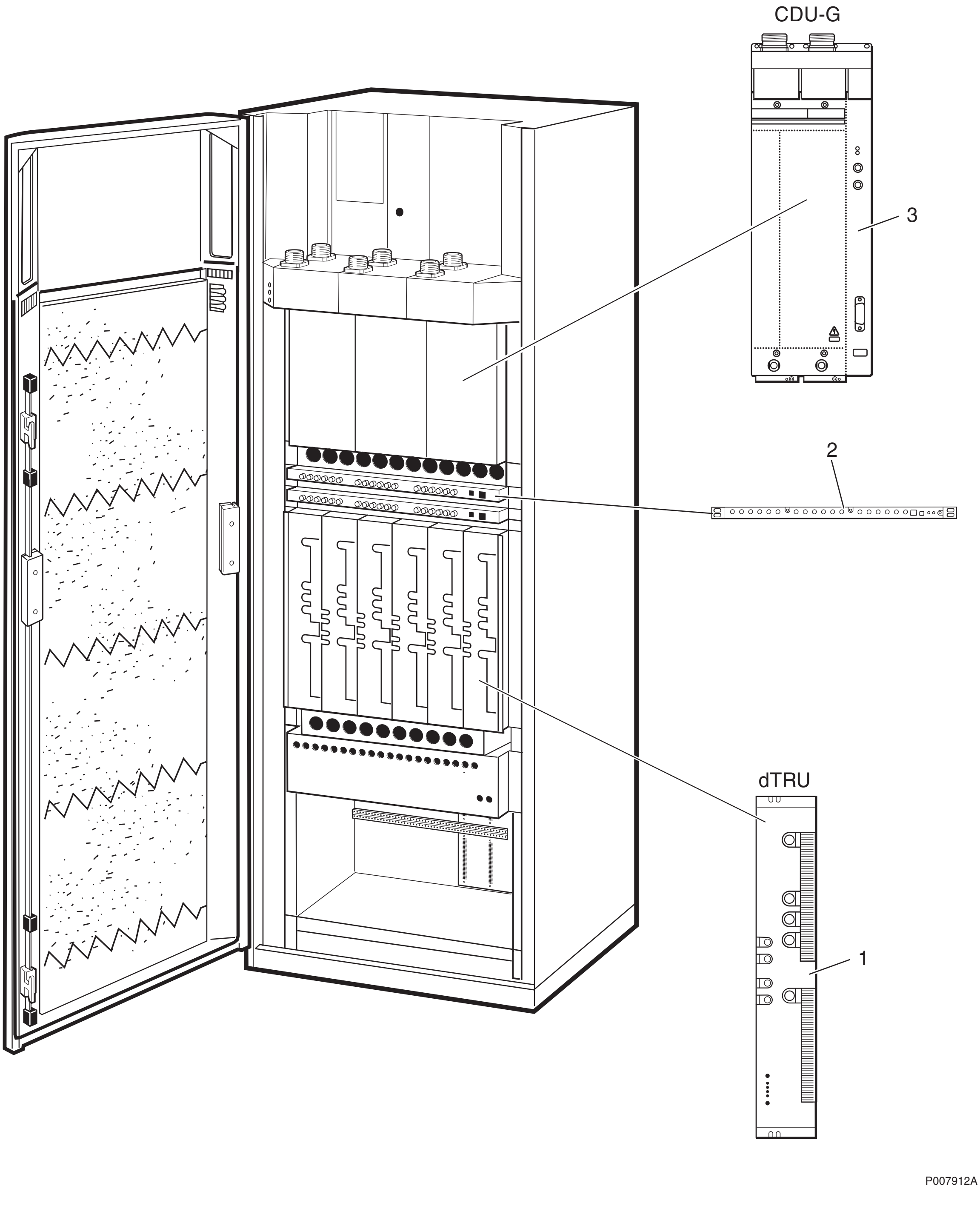
900 MHz Units

Pos	Product Number	Product Name	Description
1	KRC 131 1002/1	Transceiver	dTRU; GMSK
2	BFL 119 147/1	Combiner unit	CDU-F
3	BFL 119 142/1	Combiner unit	E-GSM / CDU-G


CDU-F
2
CDU-G
3
dTRU
1
P007295A

1800 MHz Units

Pos	Product Number	Product Name	Description
1	KRC 131 1003/1	Transceiver	dTRU; GMSK
2	BFL 119 149/1	Combiner unit	CDU-F
3	BFL 119 143/1	Combiner unit	CDU-G


CDU-G
3
2
dTRU
1
P007912A

1900 MHz Units

Pos	Product Number	Product Name	Description
1A	KRC 131 1004/1	Transceiver	dTRU; GMSK
#1B	KRC 131 1004/2	Transceiver	dTRU; EDGE
2	KRY 112 54/1	Damper	ASU
3	BFL 119 153/1	Combiner unit	CDU-G

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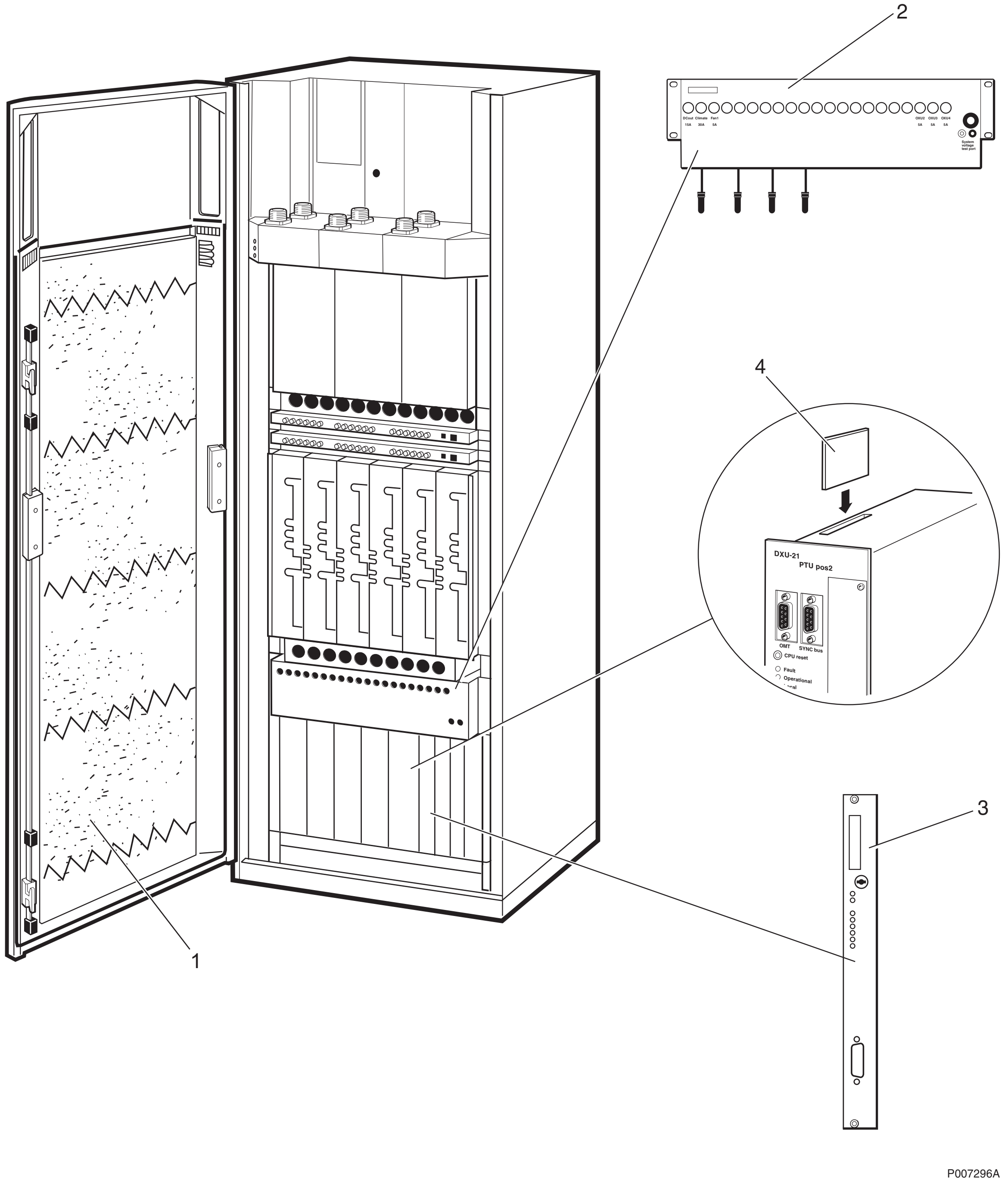
Recommended (Not Repairable) Spare Parts for Customer Stock

About this chapter

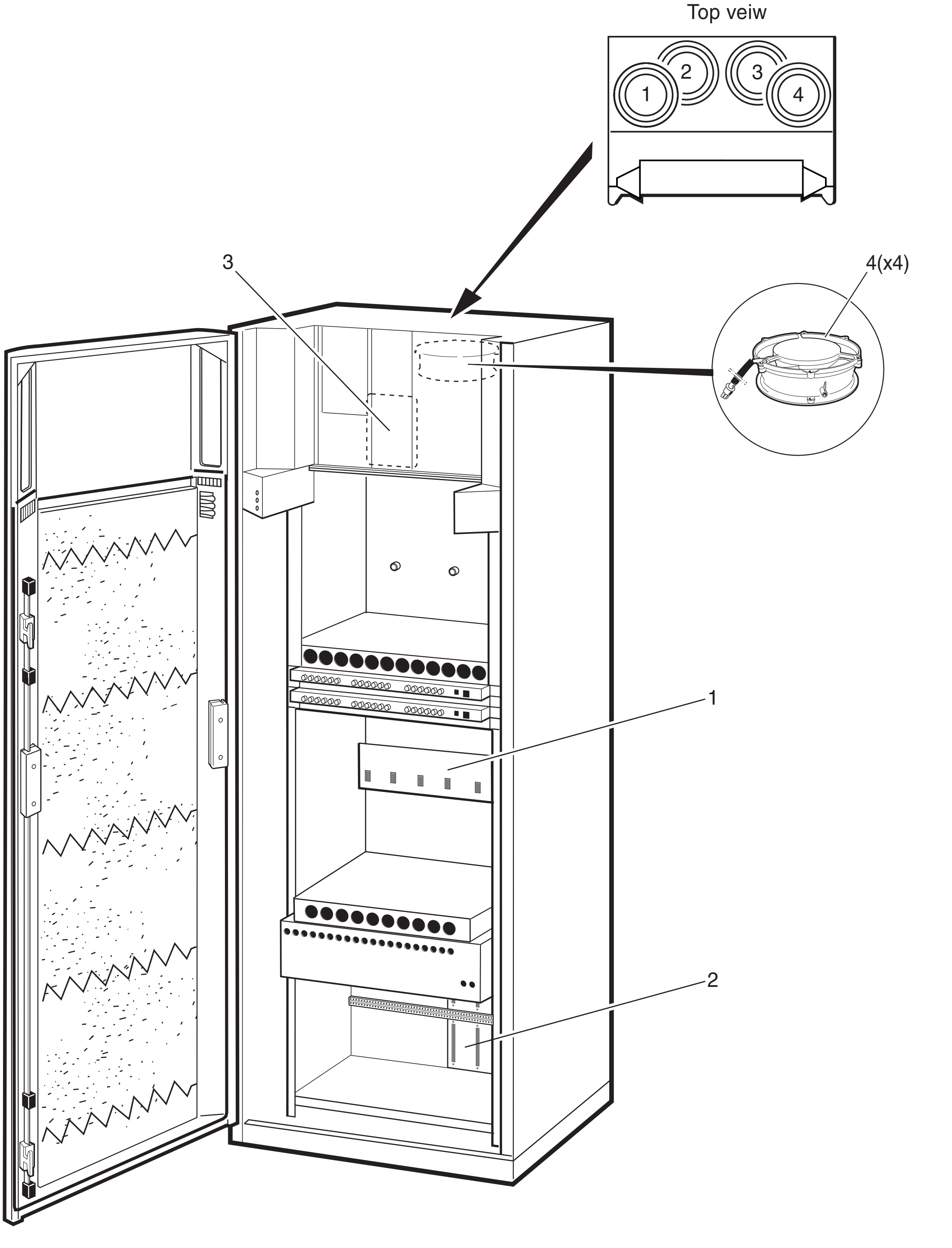
All parts in this chapter have the internal code = R.

These parts are recommended for customer stock, and are intended to be replaced on site, or at Ericsson local shop and are intended to be disposed after consumption.


2
4
DXU-21
PTU pos2
OMT
SYNC bus
CPU reset
Fault
Operational
3
1
P007296A

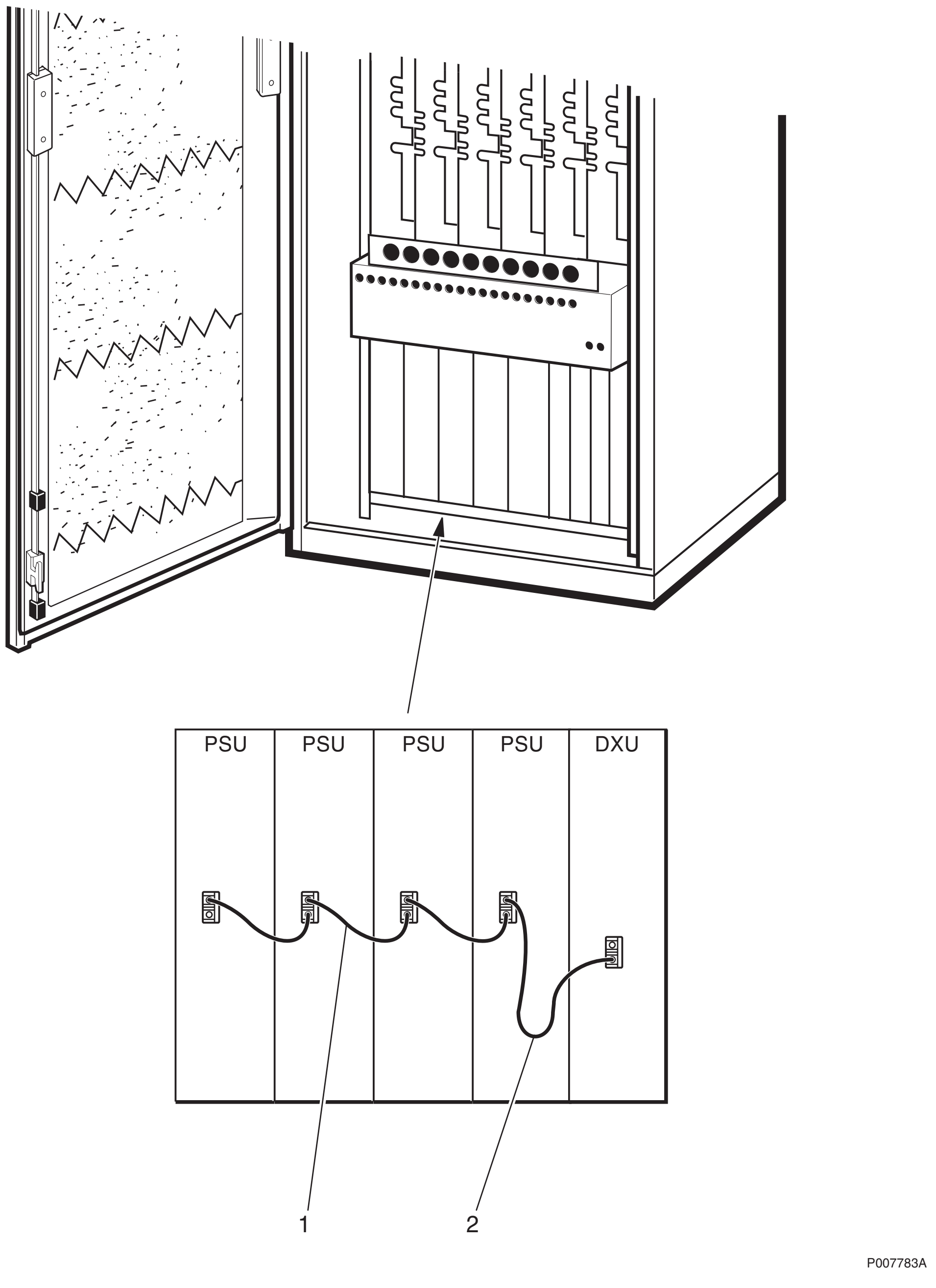
Basic Units

Pos	Product Number	Product Name	Description
1	NTZ 112 496/1	Spare parts set	DOOR FILTER KIT (Including filter and 5 springs)
2	BMG 980 06/1	Distribution unit	IDM unit including PSU cables
3	KRY 101 1873/1	Module	TMA-CM 01 Kit (Including 1 TMA-CM Module and 1 TMA-CM Cable)
4	KDR 109 61/964	Microcircuit	FLASH ATA 64.2M 5.5V 3.3V I


Top veiw
1
2
3
4
3
4(x4)
1
2
P007735A

Cabinet Parts

Pos	Product Number	Product Name	Description
1	ROA 219 5313/1	Printed board assemb	TRU BACKPLANE
2	ROA 219 5314/1	Printed board assemb	DXU BACKPLANE
3	BGM 136 1001/2	Control unit	FCU
4	BKV 301 216/77	Fan	24 VDC


PSU
PSU
PSU
PSU
DXU
1
2
P007783A

Opto Cables

Pos	Product Number	Product Name	Description
1	RPM 513 852/00160	Connection cable	OPTO
#2	RPM 513 852/00400	Connection cable	OPTO

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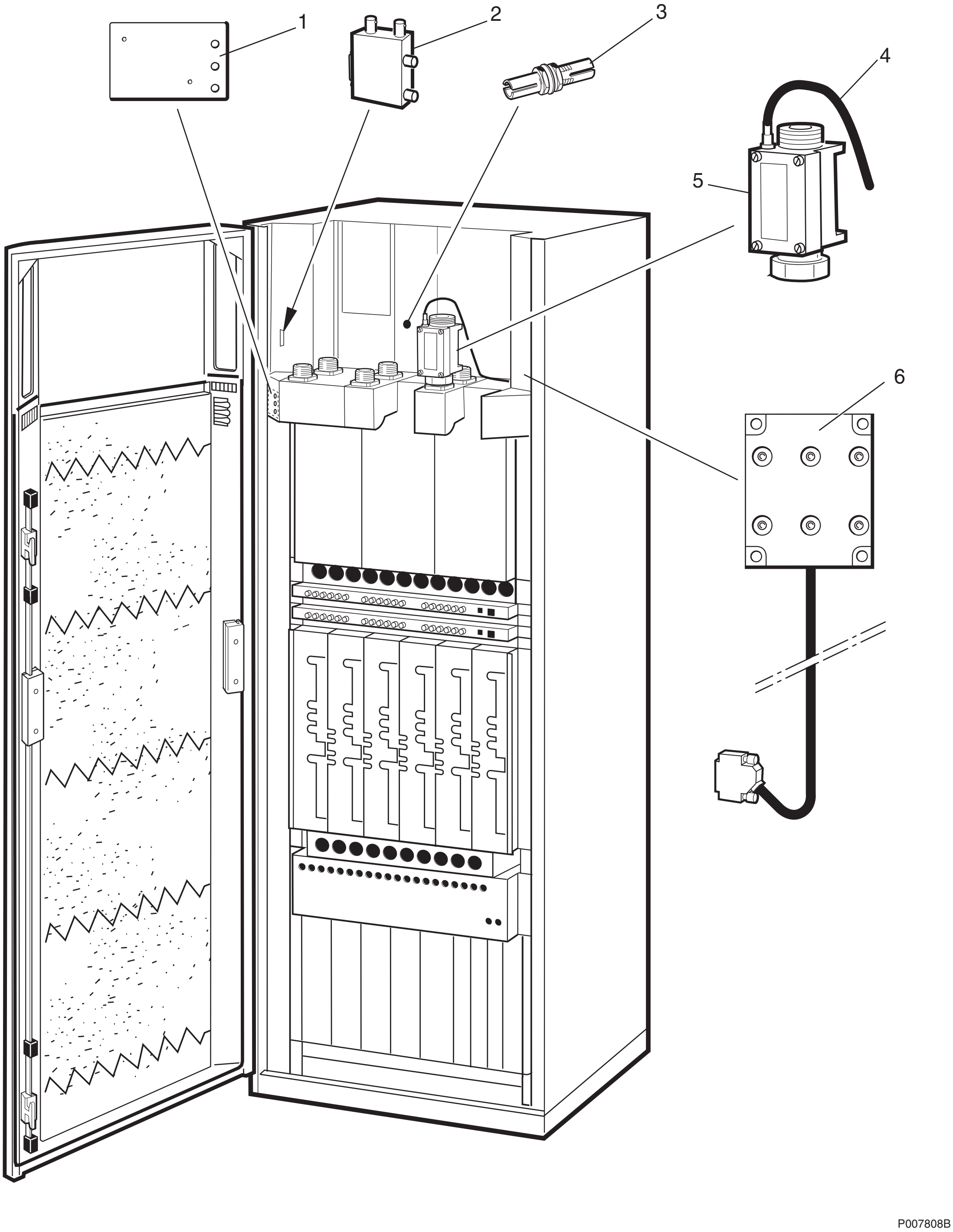
Other Available Parts

About this chapter

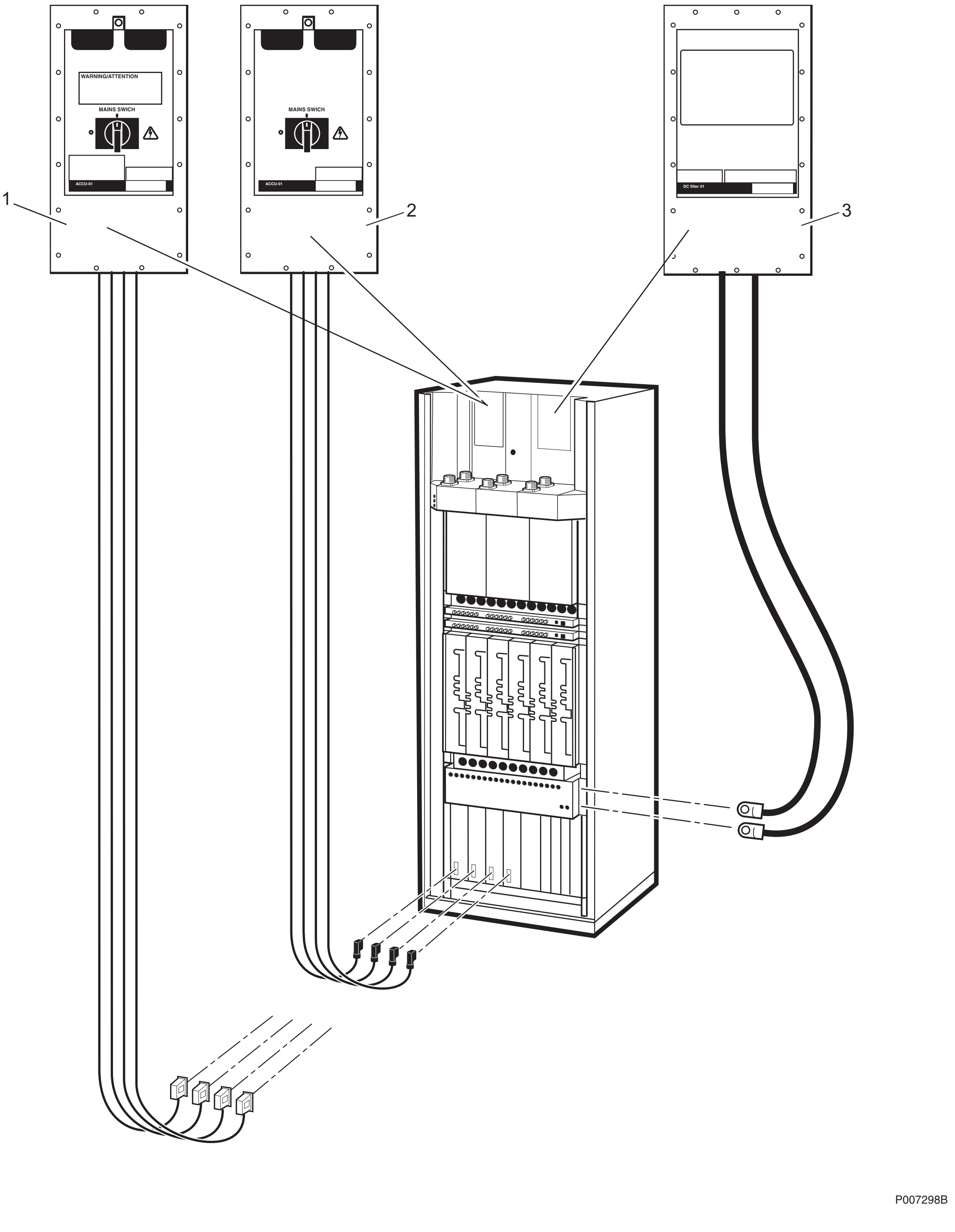
All parts in this chapter have the internal code = A.

These parts are not recommended for customer stock. The parts are available upon request and the lead time may be longer.


1
2
3
4
5
6
P007808B

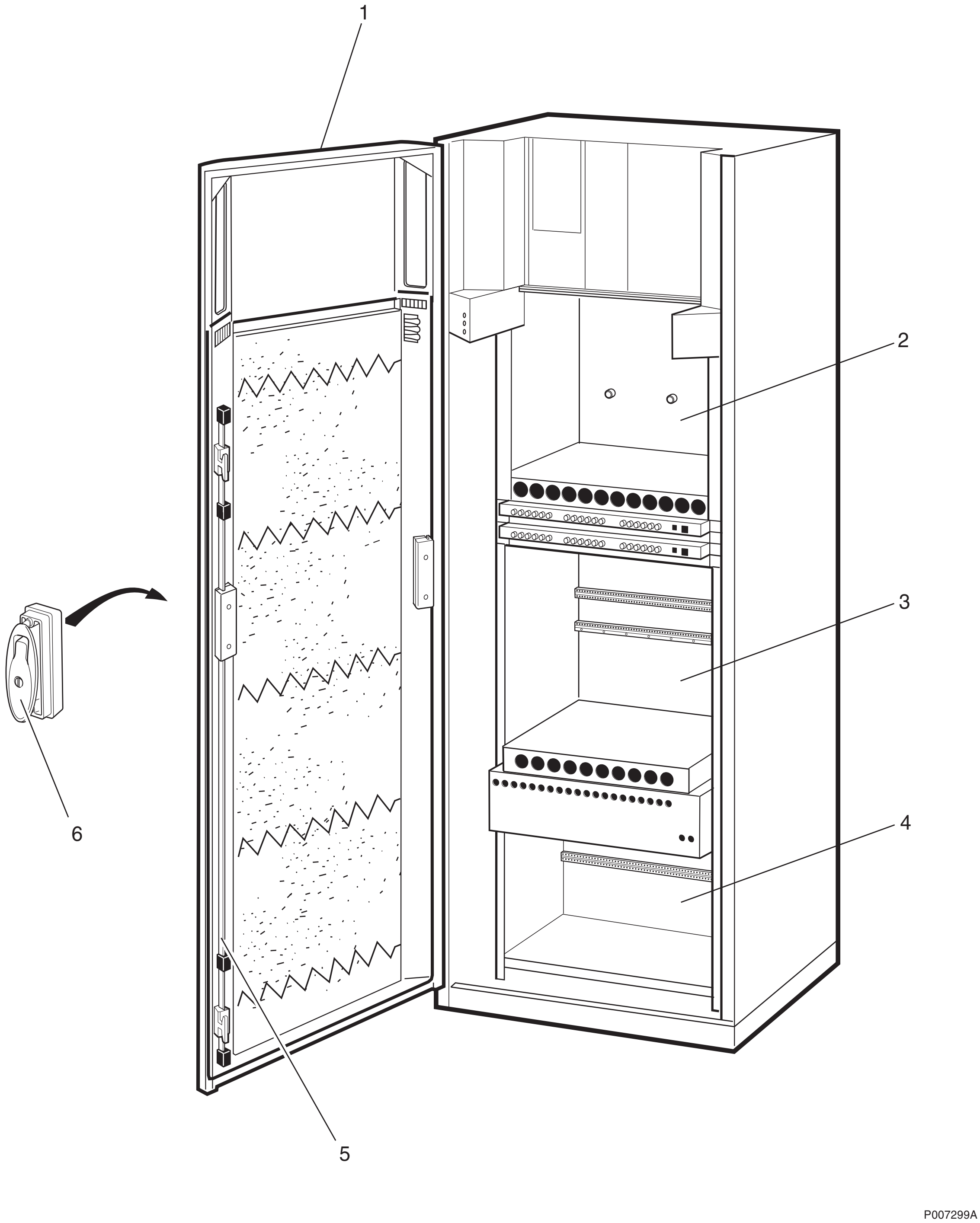
Miscellaneous Parts

Pos	Product Number	Product Name	Description
1	ROA 117 2966/1	Printed board assemb	LED-IB
2	KTY 901 05/1	Accessories	Transmission Adapter
3	NTZ 112 85/AT01	Spare parts set	ADAPTER KIT
4	RPM 113 5445/1	Cable with connector	BIAS Cable. Also included in kit KRY 101 1884/1
5	KRY 101 1884/1	Accessories	BIAS Injector Kit (Including 2 BIAS Injectors and 2 BIAS cables)
6	RPM 113 5447/1	Cable with connector	Connection plate included. Also included in kit KRY 101 1873/1


WARNING/ATTENTION
MAINS SWICH
ACCU-01
MAINS SWICH
ACCU-01
DC filter 01
1
2
3
P007298B

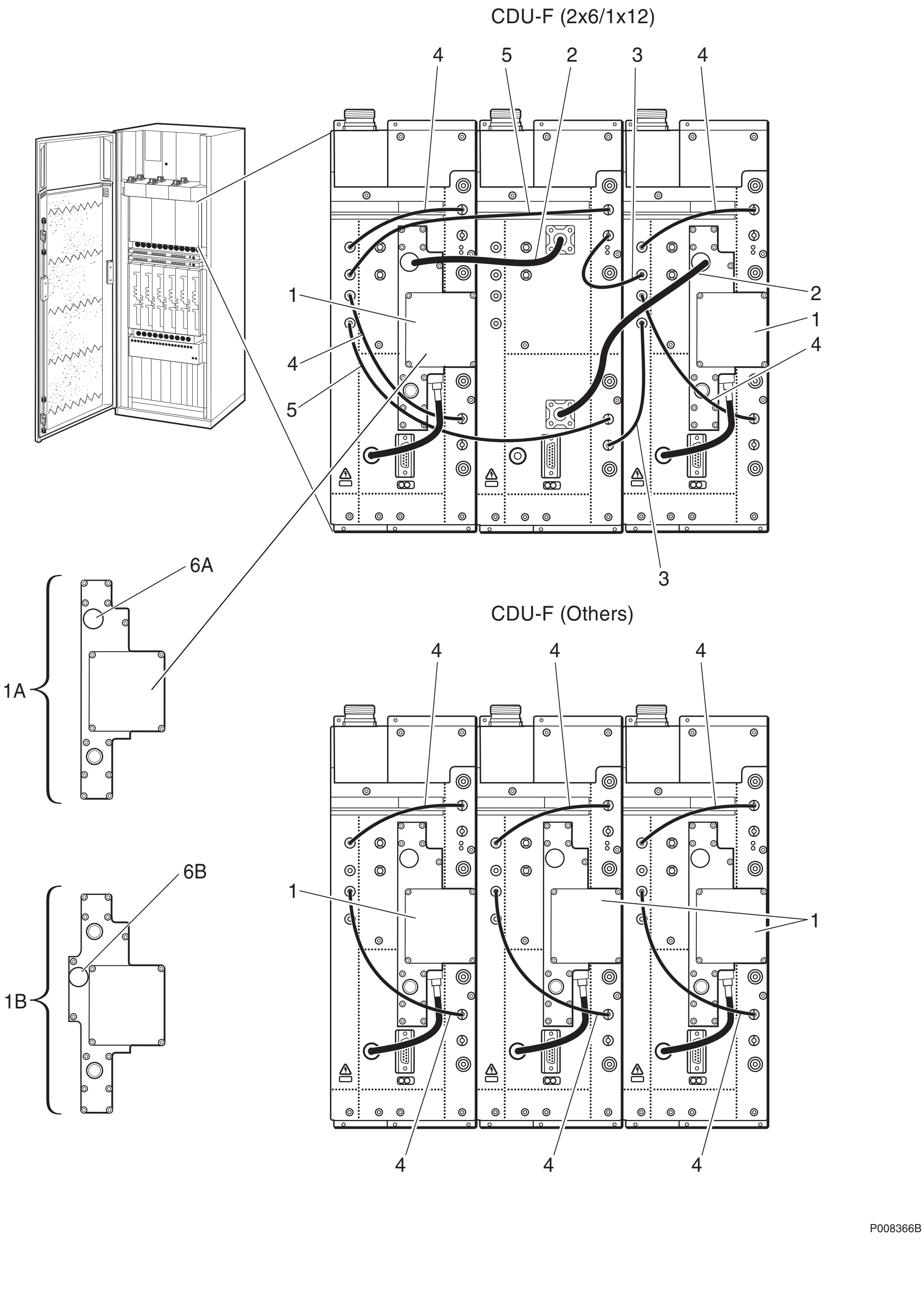
ACCU/DCCU/VDC-filter

Pos	Product Number	Product Name	Description
1	BMG 980 07/1	Connection unit	ACCU, cables to PSU included
2	BMG 980 07/2	Connection unit	DCCU, cables to PSU included
3	KFE 101 1145/1	Filter	+24VDC, cables to IDM included


1
2
3
4
5
6
P007299A

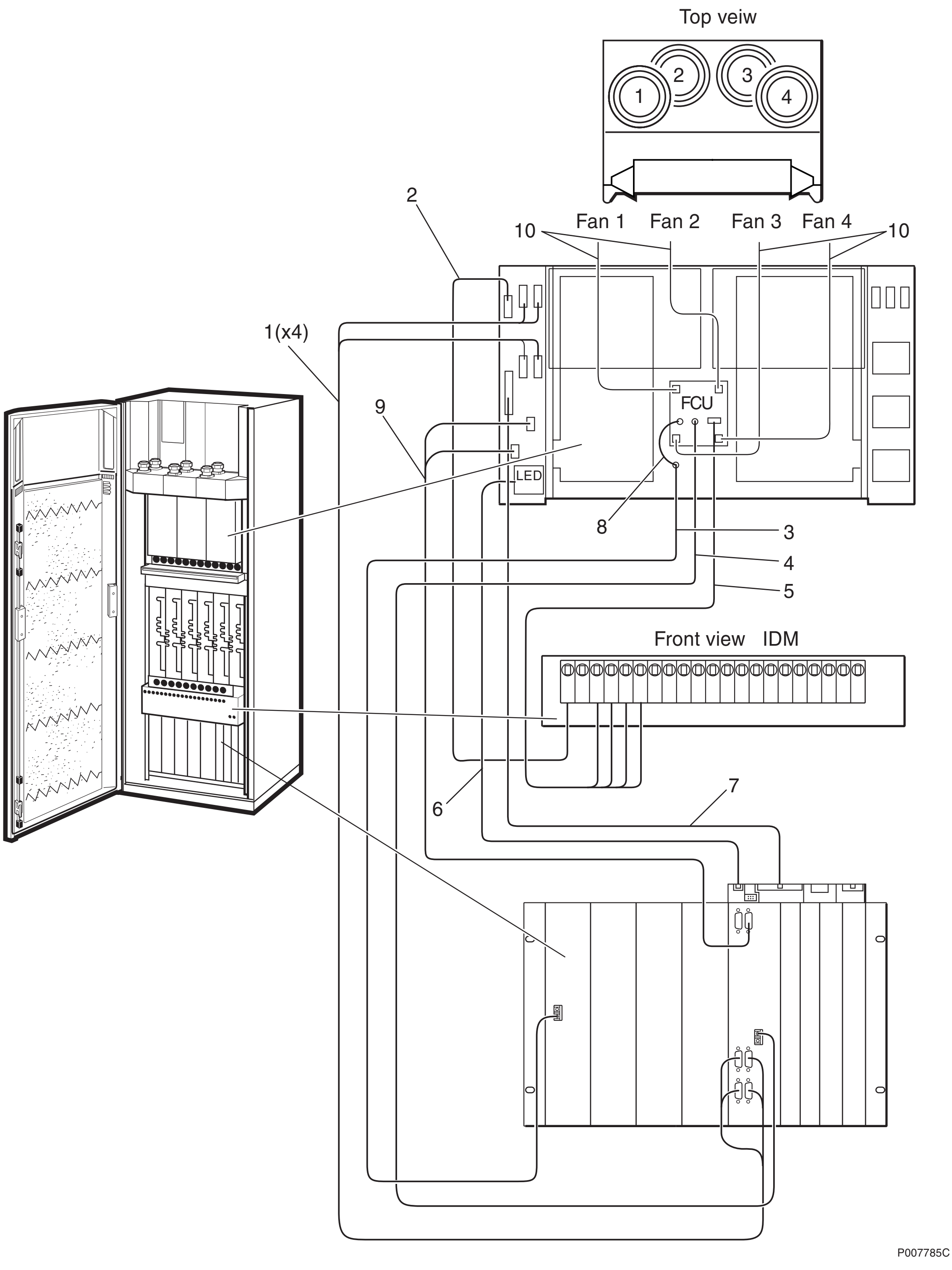
Cabinet Parts

Pos	Product Number	Product Name	Description
1	SXK 107 8304/1	Door	DOOR GSM
2	BFL 119 406/1	Subrack	Subrack CDU
3	BFL 119 407/1	Subrack	Subrack TRU excl backplane board
4	BFL 119 408/1	Subrack	Subrack DXU excl backplane board
5	SXK 107 5063/1	Lock	LOCK SYSTEM DOOR
6	SXK 107 8759/1	Lock	LOCK ASSEMBLY


CDU-F (2x6/1x12)
4
5
2
3
4
1
2
1
4
4
5
3
6A
1A
CDU-F (Others)
4
4
4
1
1
6B
1B
4
4
4
P008366B

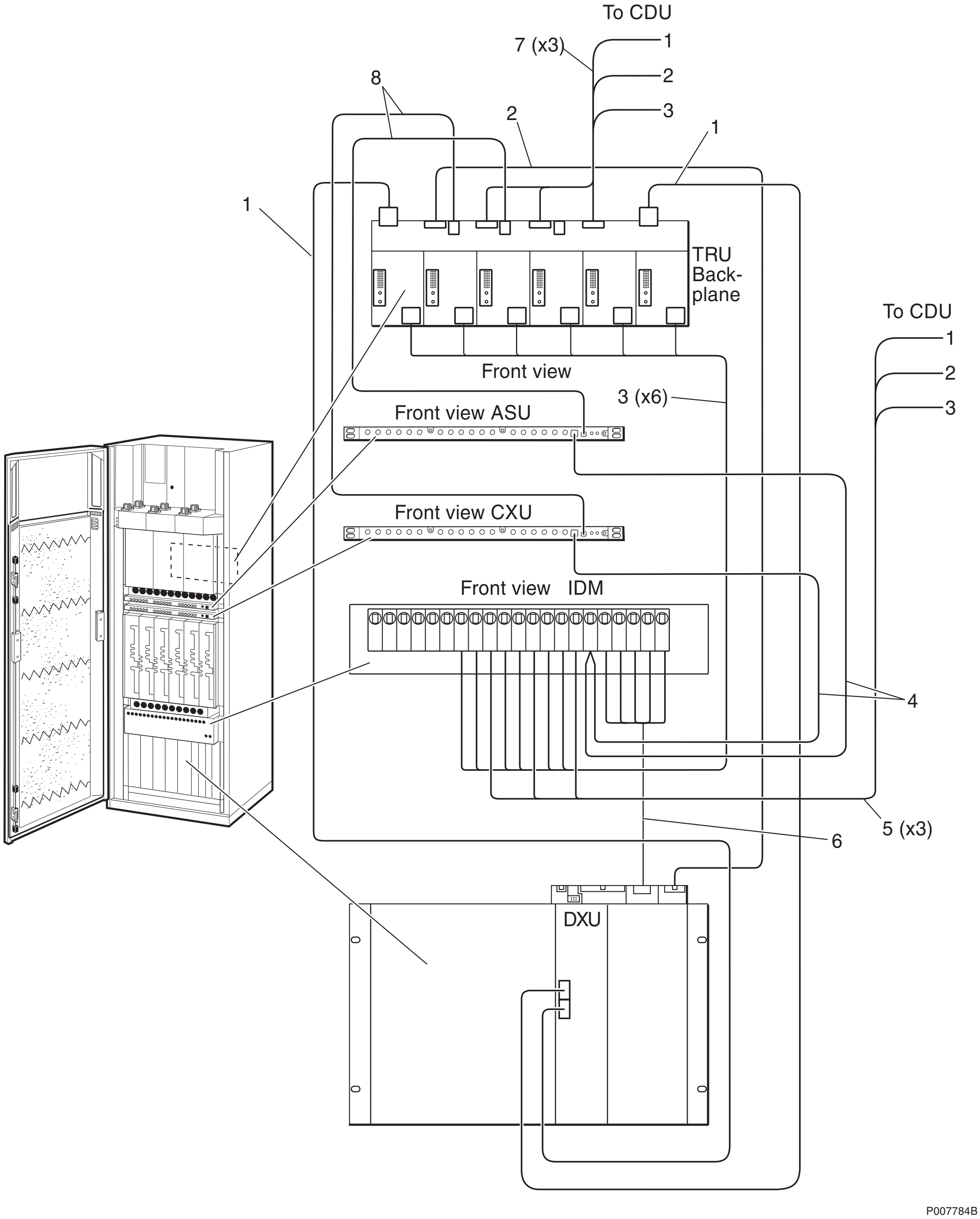
CNU connections

Pos	Product Number	Product Name	Description
1A	KRY 101 1829/1	Cnu	900MHz
1B	KRY 101 1830/1	Cnu	1800MHz
2A	RPM 213 1013/1	Cable	900MHz
2B	RPM 213 1025/1	Cable	1800MHz
3	RPM 213 1033/2	Cable	
4	RPM 213 1034/2	Cable	
5	RPM 213 1035/2	Cable	
6A	RNY 101 23/01	Accessories	N-coax cover 900MHz
6B	KRY 101 1883/1	Accessories	N-coax cover 1800MHz


Top veiw
1
2
3
4
2
10
Fan 1
Fan 2
Fan 3
Fan 4
10
1(x4)
9
FCU
LED
8
3
4
5
Front view IDM
7
6
P007785C

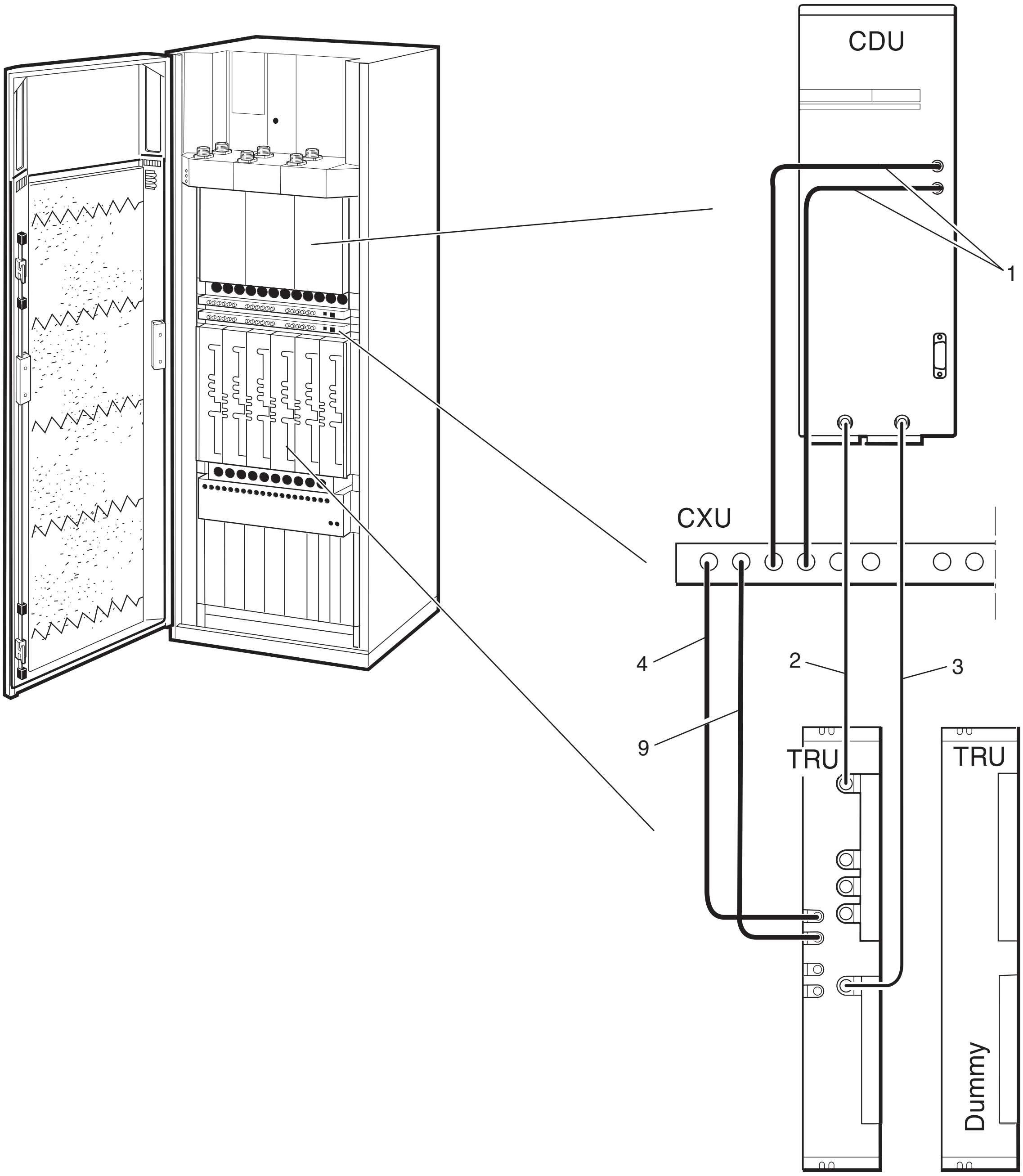
Cables

Pos	Product Number	Product Name	Description
1	RPM 513 870/02250	Cable with connector	120 ohm/L=2.25 m/Bus G703
2	RPM 513 1110/01700	Connection cable	Connect.Cable +24V
3	RPM 513 1410/02500	Optical fibre cable	OPTICAL FIBRE CABLE
4	RPM 513 1409/02500	Optical fibre cable	OPTICAL FIBRE CABLE
5	RPM 513 1138/01750	Power cable	POWER CABLE
6	RPM 513 1116/02500	Signalling cable	LED-CABLE
7	RPM 513 1108/02660	Connection cable	EXT-LARM GSM SYST
8	RPM 982 02/200	Opt.cable w. connect	L=200 MM
9	RPM 513 904/02160	Cable	SIGNAL ESB
10	RPM 513 1811/00850	Connection cable	Fan cable


To CDU
7 (x3)
1
2
3
8
2
1
1
TRU
Back-
plane
To CDU
1
2
3
Front view
3 (x6)
Front view ASU
Front view CXU
Front view IDM
4
5 (x3)
6
DXU
P007784B

Cables (continuation)

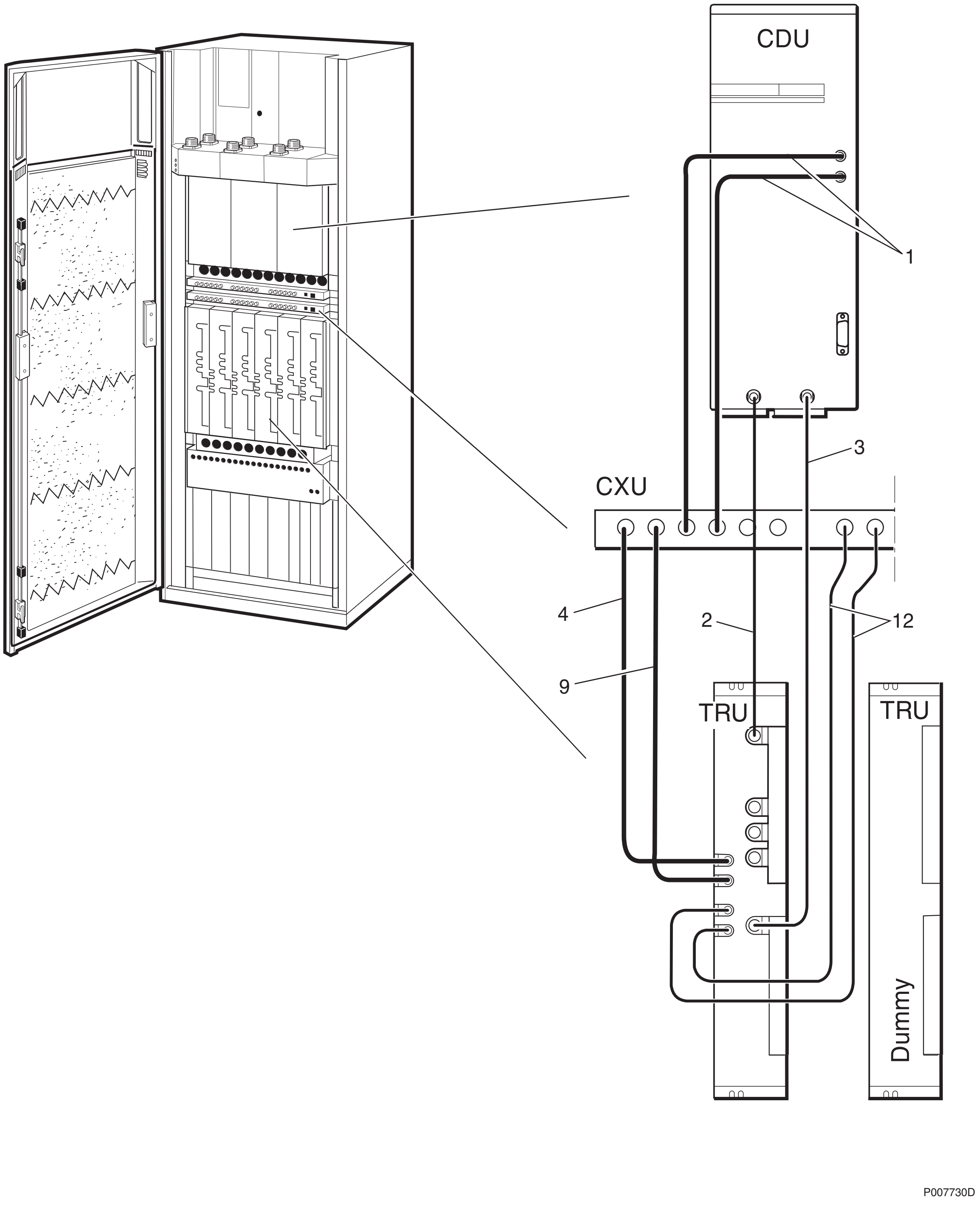
Pos	Product Number	Product Name	Description
#1	RPM 513 1781/01300	Cable with connector	Y-LINK CABLE
2	RPM 513 1117/02130	Signalling cable	IOM-BUS
3	RPM 513 1120/00700	Power cable	+24V TRU IDM
4	RPM 513 1162/01000	Power cable	POWER CABLE
5	RPM 513 718/01400	Power cable	POWER CABLE +24V
6	RPM 513 1845/01600	Cable with connector	+24V IDM OXU 1,2,3,4
7	RPM 513 1118/02130	Signalling cable	CDU-BUS CABLE
8	RPM 513 1903/01650	Cable	BUS-CABLE



P009683A

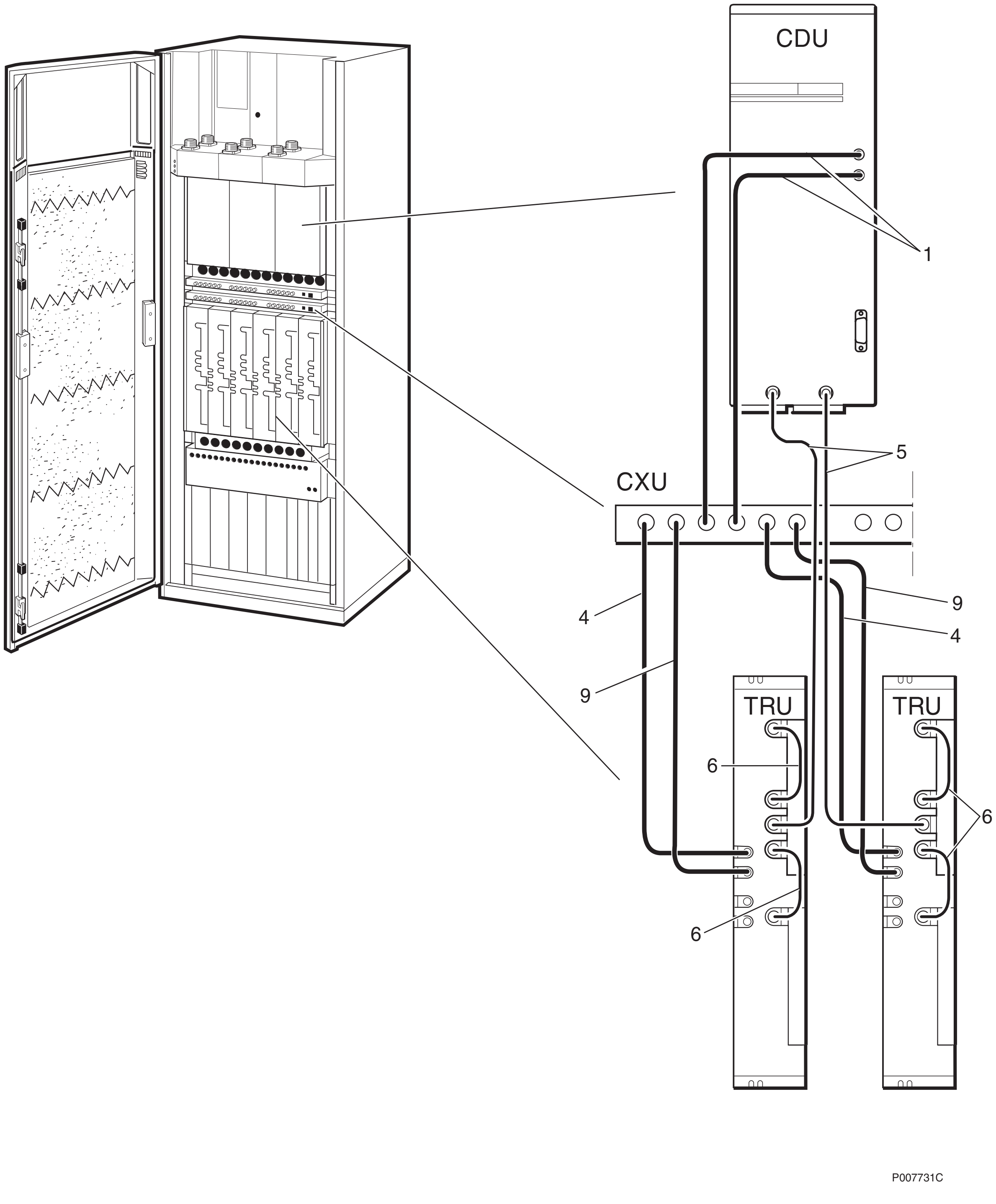
Coaxial Cables CDU-G without hybrid

Pos	Product Number	Product Name	Description
1	RPM 513 1893/00390	Coaxial cable	CDU-TRU/RXA
2	RPM 513 1782/00230	Coaxial cable	COAXIAL CABLE
3	RPM 513 1782/00410	Coaxial cable	COAXIAL CABLE
4	RPM 513 1893/00210	Coaxial cable	CDU-TRU/RXA
9	RPM 513 1893/00230	Coaxial cable	CDU-TRU/RXA


CDU
1
3
CXU
4
2
12
9
TRU
TRU
Dummy
P007730D

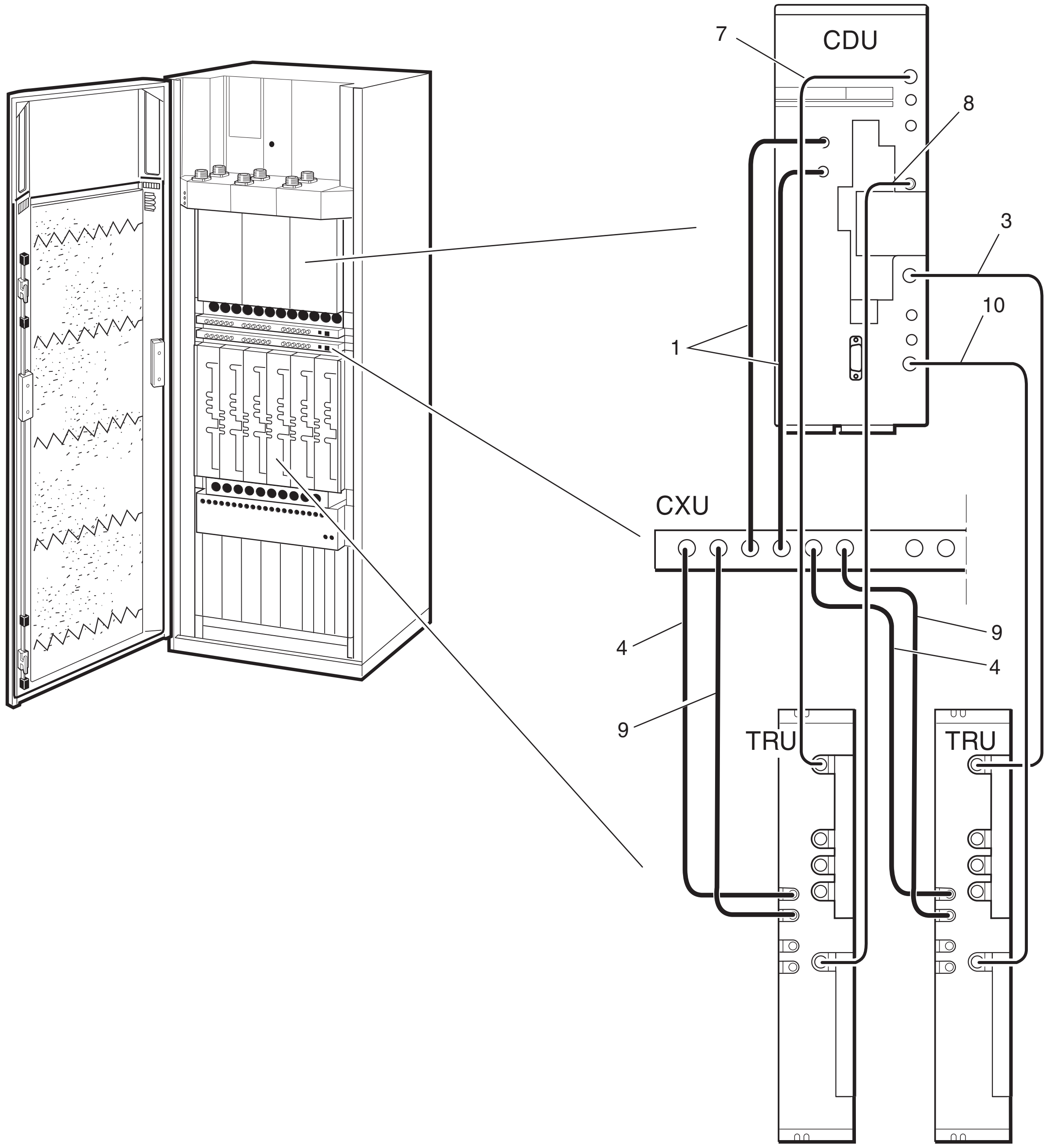
Coaxial Cables CDU-G without hybrid (1+1)

Pos	Product Number	Product Name	Description
1	RPM 513 1893/00390	Coaxial cable	CDU-TRU/RXA
2	RPM 513 1782/00230	Coaxial cable	COAXIAL CABLE
3	RPM 513 1782/00410	Coaxial cable	COAXIAL CABLE
4	RPM 513 1893/00210	Coaxial cable	CDU-TRU/RXA
9	RPM 513 1893/00230	Coaxial cable	CDU-TRU/RXA
12	RPM 513 1893/00350	Coaxial cable	QMA CDU-TRU/RXA


CDU
1
5
CXU
9
4
4
9
TRU
TRU
6
6
6
P007731C

Coaxial Cables CDU-G with hybrid

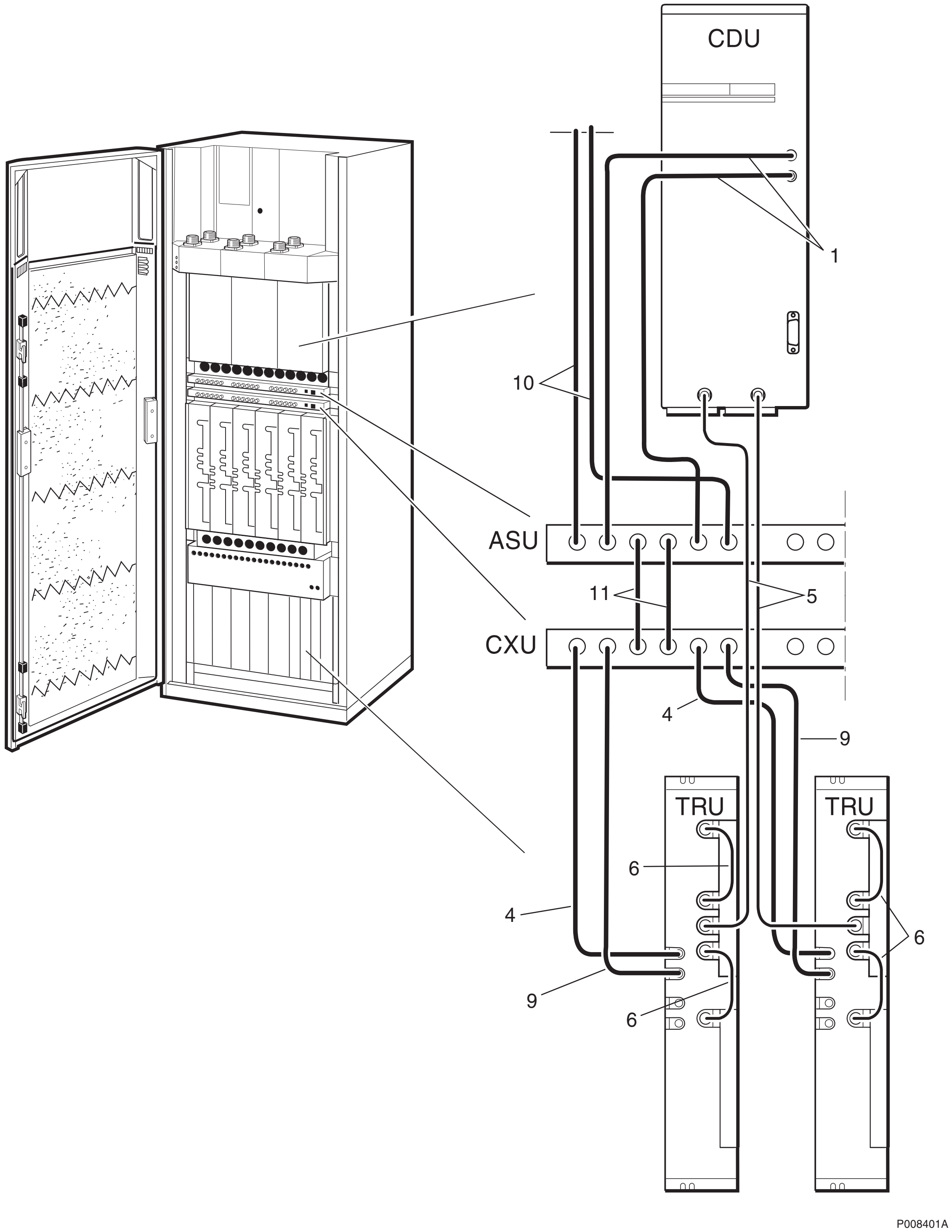
Pos	Product Number	Product Name	Description
1	RPM 513 1893/00390	Coaxial cable	CDU-TRU/RXA
4	RPM 513 1893/00210	Coaxial cable	CDU-TRU/RXA
5	RPM 513 1782/00310	Coaxial cable	COAXIAL CABLE
6	RPM 513 1782/00070	Coaxial cable	COAXIAL CABLE
9	RPM 513 1893/00230	Coaxial cable	CDU-TRU/RXA



P007732C

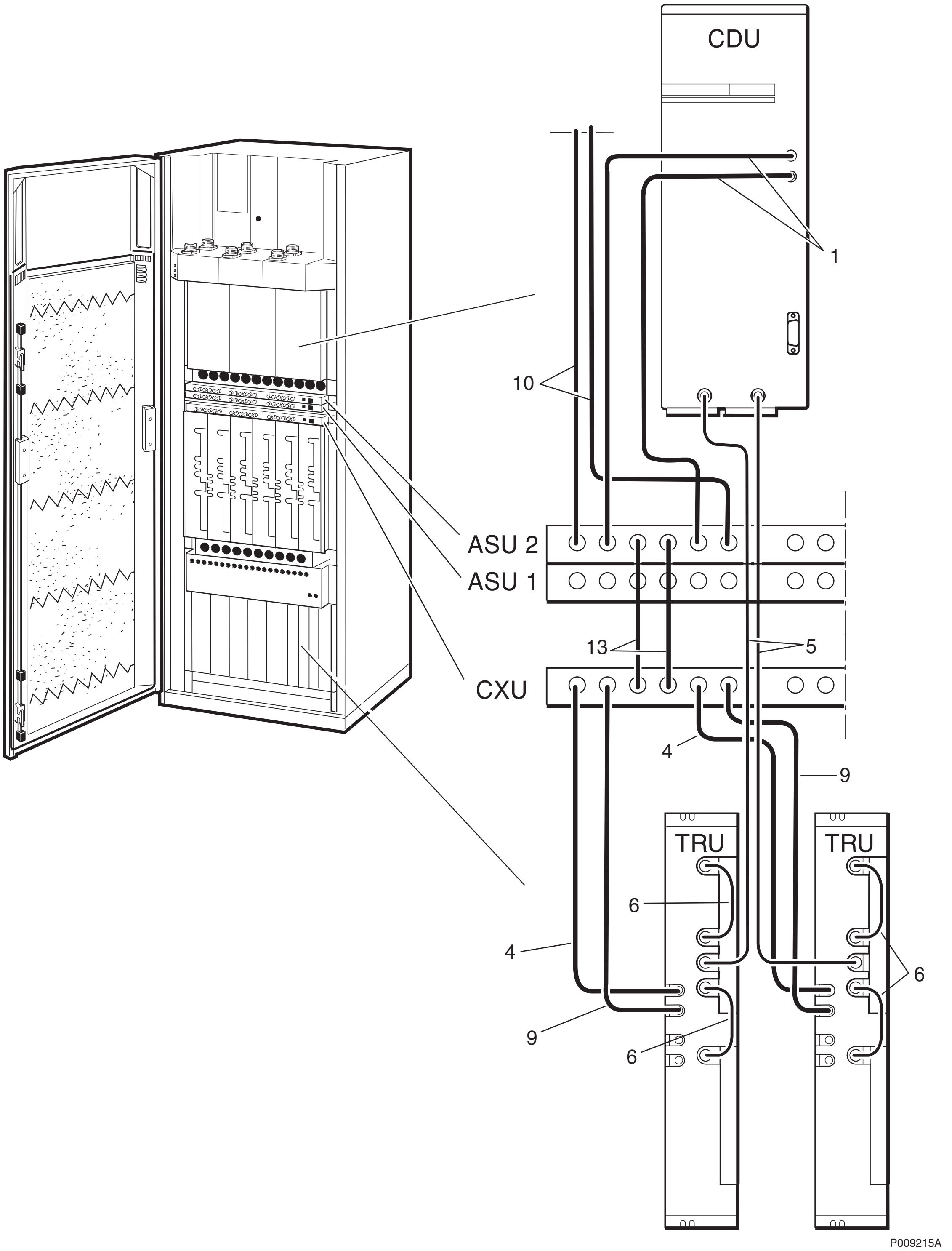
Coaxial Cables CDU-F

Pos	Product Number	Product Name	Description
1	RPM 513 1893/00390	Coaxial cable	CDU-TRU/RXA
3	RPM 513 1782/00410	Coaxial cable	COAXIAL CABLE
4	RPM 513 1893/00210	Coaxial cable	CDU-TRU/RXA
7	RPM 513 1782/00550	Coaxial cable	COAXIAL CABLE
8	RPM 513 1782/00700	Coaxial cable	COAXIAL CABLE
9	RPM 513 1893/00230	Coaxial cable	CDU-TRU/RXA
10	RPM 513 1782/00460	Coaxial cable	COAXIAL CABLE


CDU
1
10
ASU
11
5
CXU
4
9
TRU
TRU
6
4
6
9
6
P008401A

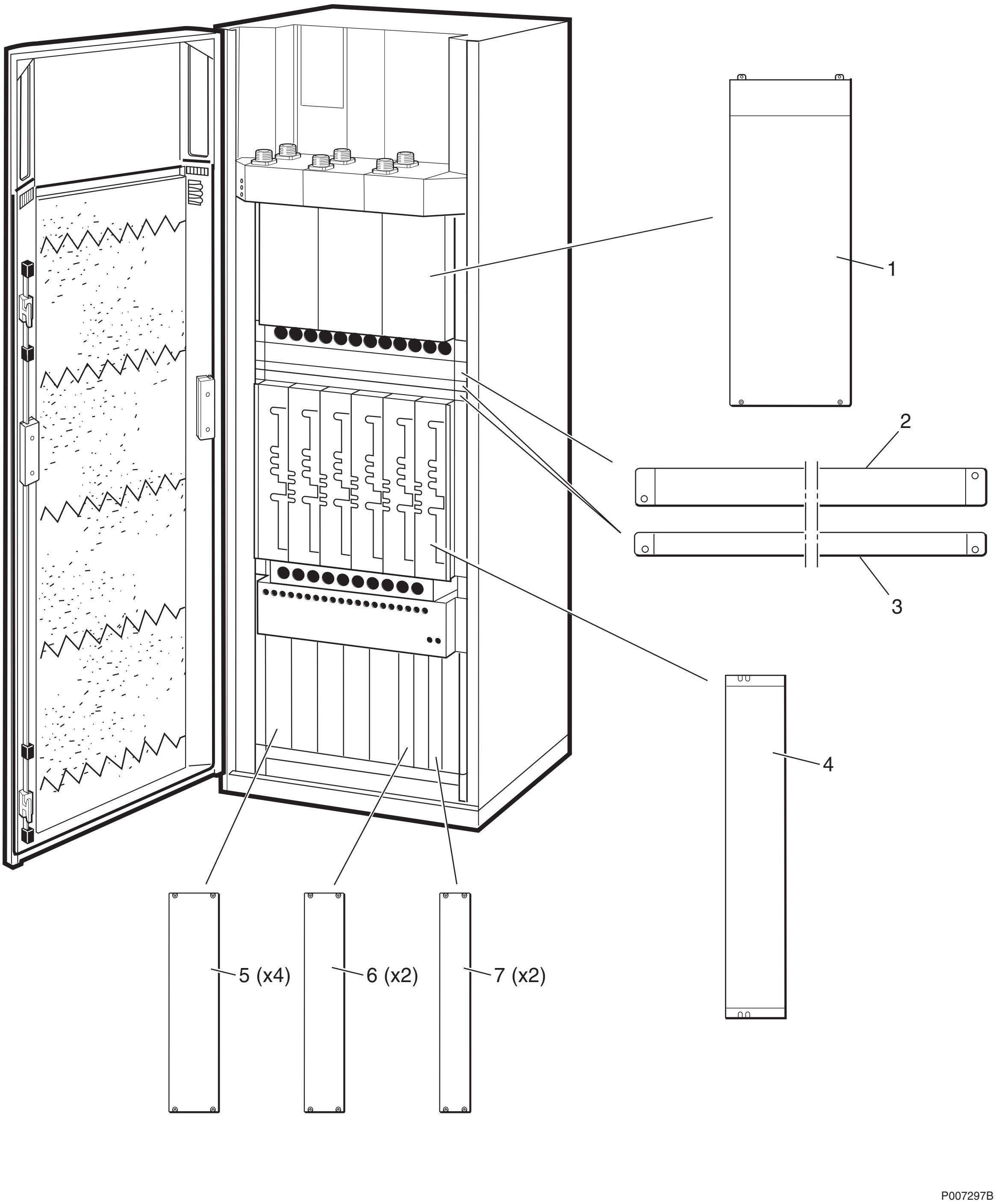
Coaxial Cables CXU - ASU

Pos	Product Number	Product Name	Description
1	RPM 513 1893/00390	Coaxial cable	CDU-TRU/RXA
4	RPM 513 1893/00210	Coaxial cable	CDU-TRU/RXA
5	RPM 513 1782/00310	Coaxial cable	COAXIAL CABLE
6	RPM 513 1782/00070	Coaxial cable	COAXIAL CABLE
9	RPM 513 1893/00230	Coaxial cable	CDU-TRU/RXA
10	RPM 513 1916/00700	Coaxial cable	ASU
11	RPM 513 1893/00047	Coaxial cable	CDU-TRU/RXA


CDU
1
10
ASU 2
ASU 1
13
5
CXU
4
9
TRU
TRU
6
4
6
9
6
P009215A

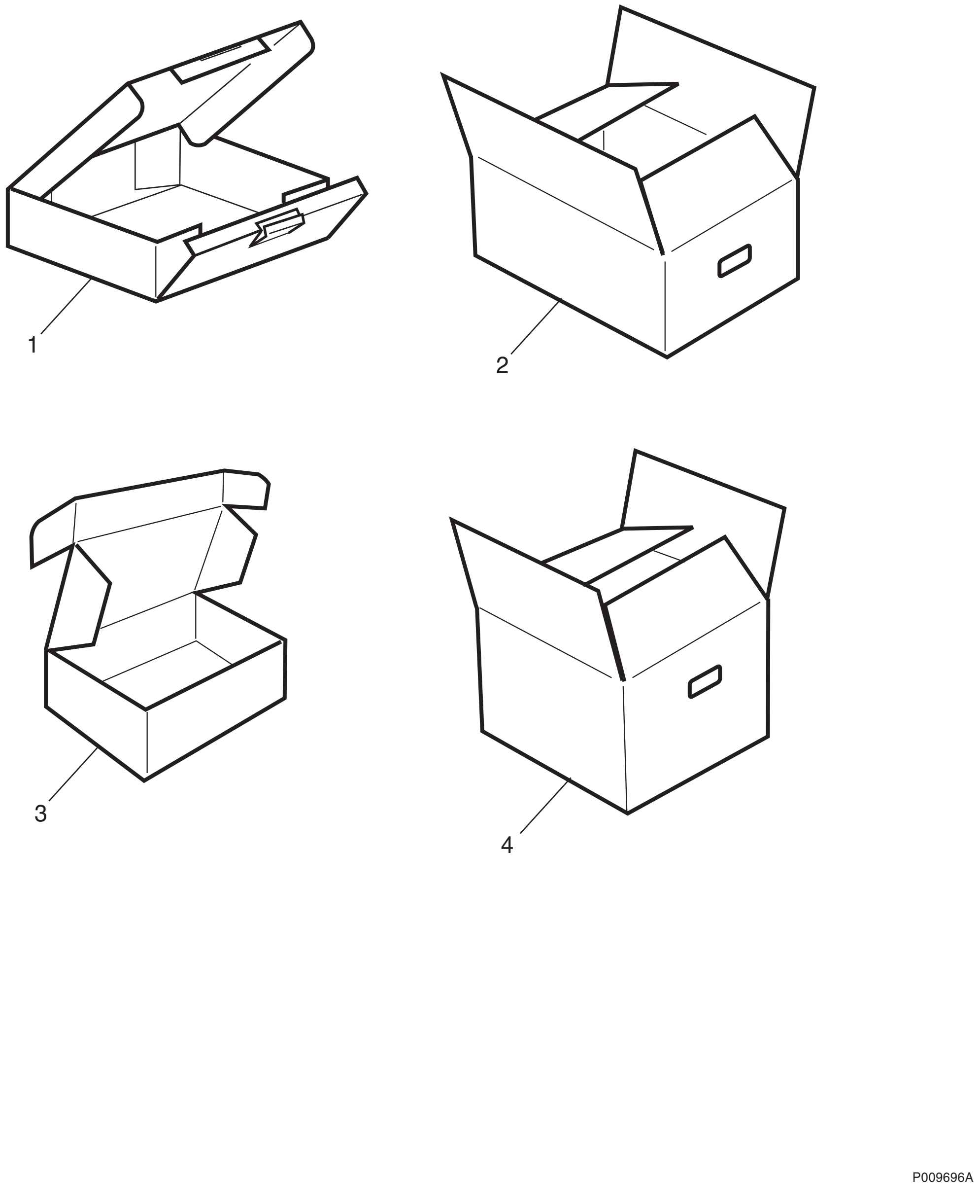
Coaxial Cables CXU - ASU(x2)

Pos	Product Number	Product Name	Description
1	RPM 513 1893/00390	Coaxial cable	CDU-TRU/RXA
4	RPM 513 1893/00210	Coaxial cable	CDU-TRU/RXA
5	RPM 513 1782/00310	Coaxial cable	COAXIAL CABLE
6	RPM 513 1782/00070	Coaxial cable	COAXIAL CABLE
9	RPM 513 1893/00230	Coaxial cable	CDU-TRU/RXA
10	RPM 513 1916/00700	Coaxial cable	ASU
13	RPM 513 1893/00077	Coaxial cable	QMA CDU-TRU/RXA


1
2
3
4
5 (x4)
6 (x2)
7 (x2)
P007297B

Dummies

Pos	Product Number	Product Name	Description
1	SXK 107 5047/1	Dummy unit	CDU
2	SXK 107 5031/2	Dummy unit	OXU
3	SXK 107 5031/1	Dummy unit	CXU
4	SXK 107 9163/1	Dummy unit	TRU
5	SXK 107 9314/1	Dummy unit	PSU
6	SXK 107 5030/1	Dummy unit	OXU 6 TE
7	SXK 107 5029/1	Dummy unit	OXU 5 TE


1
2
3
4
P009696A

Packing

Pos	Product Number	Product Name	Description
1	RTK 993 5519	Packing set	dTRU
2	RTK/KRY 101 1856/1	Packing set	CXU
3A	RTK 993 5265/2	Packing set	DXU
3B	RTK/BML 231 201	Packing set	PSU
4A	RTK/BFL 119 142/1	Packing set	CDU-G
4B	RTK/BFL 119 147/1	Packing set	CDU-F

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.

Re-use the same packing material as the spare unit was delivered in.

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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 where Product Numbers shown in previous catalogues are found. In this way a Numerical Index as a list of orderable Spare Parts can be maintained.

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Old Product	Revision Information	New Product
KRY 101 1587/1	Replaced by:	KRY 101 1884/1
ROA 117 8126/2	Replaced by:	BGM 136 1001/2
RPM 213 1033/1	Replaced by:	RPM 213 1033/2
RPM 213 1034/1	Replaced by:	RPM 213 1034/2
RPM 213 1035/1	Replaced by:	RPM 213 1035/2
RPM 513 1138/01700	Replaced by:	RPM 513 1138/01750
RPM 513 1178/01650	Replaced by:	RPM 513 1903/01650
RPM 513 1781/02000	Replaced by:	RPM 513 1781/01300
RPM 513 1783/00210	Replaced by:	RPM 513 1893/00210
RPM 513 1783/00230	Replaced by:	RPM 513 1893/00230
RPM 513 1783/00390	Replaced by:	RPM 513 1893/00390
RPM 513 852/00250	Replaced by:	RPM 513 852/00400
SDK 107 881/1	Replaced by:	KRY 101 1873/1
SXA 134 216/1	Replaced by:	NTZ 112 496/1
SXA 134 331/1	Replaced by:	NTZ 112 496/1

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Numerical Index

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Numerical Index
U - Recommended (Repairable) Spare Parts for Customer Stock

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Numerical Index

R - Recommended (Not Repairable) Spare Parts for Customer Stock

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Numerical Index
A - Other Available Parts