

P010476A

Figure 66 Reading Fault Status

3. In the Available monitors box, select “MO fault maps” and click → to add “RBS” into the Monitors to start box.
4. Click **Start monitor**.
5. In the RBS Event Monitor window, check the MO faults box to see if there are any faults. If there are, then correct these before continuing.

When an MO fault is selected, corresponding fault description, action and related faults are displayed. See also *Appendix Fault List*.

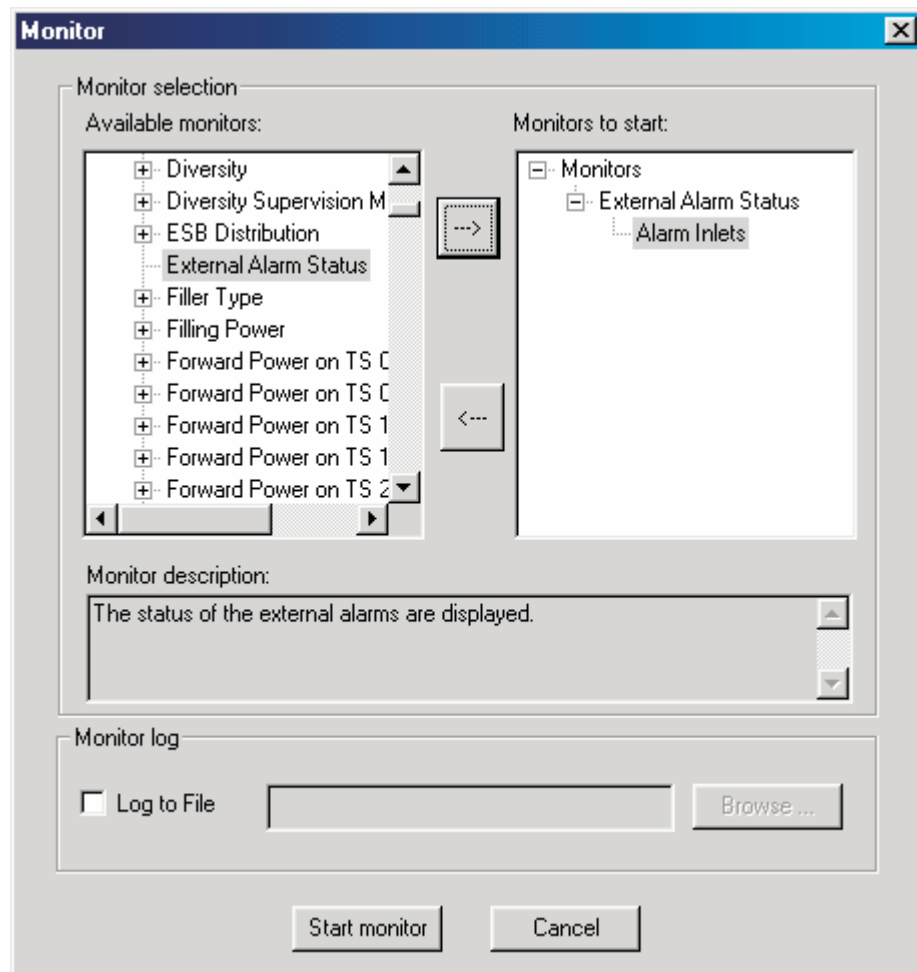
6. Close the RBS Event Monitor window.

## 7.8 Testing External Alarms

This section describes how to use the OMT to test that all external alarms, if used, are recognized and handled correctly. The test is passed when all alarms are recognized.

**Note:** The alarms must be individually identifiable in the OMT. There must be no doubt which alarm was indicated. The alarm message must be unique for each alarm.

1. On the **Maintenance** menu, click **Monitor** to open the Monitor window. See figure below.



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Figure 67 Testing External Alarms

2. In the Available monitors box, select “External Alarm Status” and click → to add “Alarm Inlets” in the Monitors to start box.
3. Click **Start monitor**.
4. Trigger the desired alarm by either shorting or breaking it.

**Note:** Test the alarms in numerical order, and always start with alarm 1.

5. Check that the appropriate alarm appears in the RBS Event Monitor window.

6. Release the trigger on the alarm and check that the alarm disappears from the OMT.
7. Repeat steps 5 to 7 for all defined external alarms.
8. Close the RBS Event Monitor window when finished.

## 7.9 Performing Concluding Routines

This section describes the actions to take before leaving the site and provides a site checklist. It also contains a test record.

### 7.9.1 Saving IDB

In case it is necessary to re-install the IDB, the IDB parameters must be saved on the PC.

1. On the **Configuration** menu, click **Save IDB**.
2. Give the IDB file an RBS-specific name and save the IDB on the PC.

### 7.9.2 Checking RRU and IXU Indicators

1. Ensure that all lids are closed and fastened with screws.
2. Set the RRU and IXU in remote mode by pressing the **Local/Remote** button.
3. Check that the RRU and IXU indicators have the status shown in the applicable table below:
  - Table 43 on page 139 shows the approved status of the RRU and IXU indicators when the RBS is in remote mode but not connected to the BSC.
  - Table 44 on page 139 shows the approved status of the RRU and IXU indicators when the RBS is in remote mode, fully operational, and connected to the BSC.

**Table 43 RRU and IXU Indicators After Site Installation Tests Without BSC Connection**

<b>RBS in remote mode and no BSC connected</b>			
<b>RRU</b>		<b>IXU</b>	
Fault	Off	Fault	Off
Operational	Off	Operational	Off
Local	Flashing	Local	Flashing
RF off	On	RBS fault	Off
AC power on	On <sup>(1)</sup>	External alarm	Off
DC power on	On <sup>(1)</sup>	AC power on	On <sup>(1)</sup>
RRU temp.	Off	DC power on	On <sup>(1)</sup>
		IXU temp.	Off
		Transmission OK	On/Off <sup>(2)</sup>

(1) Depending on power system configuration.

(2) A, B, C, and/or D, depending on transmission configuration.

**Table 44 RRU and IXU Indicators After Site Installation Tests With BSC Connection**

<b>RBS in remote mode, fully operational and connected to the BSC</b>			
<b>RRU</b>		<b>IXU</b>	
Fault	Off	Fault	Off
Operational	On	Operational	On
Local	Off	Local	Off
RF off	On/Off <sup>(1)</sup>	RBS fault	Off
AC power on	On <sup>(2)</sup>	External alarm	Off
DC power on	On <sup>(2)</sup>	AC power on	On <sup>(2)</sup>
RRU temp.	Off	DC power on	On <sup>(2)</sup>
		IXU temp.	Off
		Transmission OK	On <sup>(3)</sup>

(1) Depending on BSC.

(2) Depending on power system configuration.

(3) A, B, C, and/or D, depending on transmission configuration.

4. If the Operational indicator on the RRU and/or IXU is flashing, SW is being downloaded from the BSC. Wait until downloading is complete.
5. If the Local indicator on the RRU and/or IXU does not have the correct status, press the **Local/Remote** button to switch status.

6. If RBS site integration is not performed immediately after site installation tests, then close the sunshields.

### **7.9.3 Completing Test Record**

This section contains a test record. It is recommended to fill in the test record during the testing procedure.

## Test Record for Stand-alone Tests

### NE Commissioning

### GSM -

Date	Site
Site No	Cell
RBS type	Tester's Name

**NE STAND ALONE TEST**

		Remark
Antenna System Test Record	<input type="checkbox"/>	_____
Cable connections inspected	<input type="checkbox"/>	_____
Power supply verified	<input type="checkbox"/>	_____
Fan Unit Tested (If Applicable)	<input type="checkbox"/>	_____
IDB parameters set	<input type="checkbox"/>	_____
Fault status read	<input type="checkbox"/>	_____
External Alarms tested	<input type="checkbox"/>	_____

**Notes:** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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Figure 68 Test Record for Site Installation Tests

### 7.9.4 Filling in Checklist

The following checklist is not mandatory but strongly recommended. Local procedures and safety regulations must be evaluated and included in this checklist.

*Table 45 Checklist*

<b>Check the following:</b>		<b>OK</b>
1	The indicators on the RRU and the IXU are in the approved status.	
2	The test equipment has been disconnected from the RBS	
3	The RBS cabinet and the mounting base are free from foreign objects.	
4	All cabinets and cables are free of damage.	
5	All EMC sealants and cable penetrations are intact.	
6	Top and bottom of cabinet are free of obstructions (for airflow).	
7	The cabinet has been locked, and the screws have been tightened.	
8	All tools have been accounted for.	
9	All paperwork has been completed.	

## 8 RBS Site Integration

This chapter describes how to integrate the RBS with the BSC into the GSM network, and the tests used to verify the integration.

Integration is carried out with the RBS connected to a PCM link and in close co-operation with a BSC operator.

All results must be documented in the test record.

### **Preconditions at the RBS Site**

This section describes the preconditions for personnel at the RBS site before integrating the RBS.

Before starting the integration at the RBS site, ensure the following:

- The test record for Antenna System Tests has been completed
- The test record for Site Installation Tests has been completed
- The RBS commissioning personnel are in contact with the BSC operator
- The RBS commissioning personnel and the BSC operator have agreed on the following parameters:
  - BCCHNO parameters
  - DCHNO parameters
  - BSIC parameters
  - Time slots (TS) used for SDCCH

### **Preconditions at the BSC**

This section describes the preconditions for personnel at the BSC before integrating the RBS.

Before starting the integration at the BSC, ensure the following:

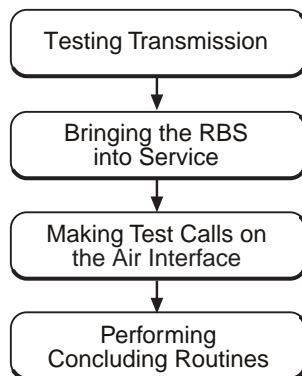
- The test record for Network Element (NE) has been completed
- The test record for Integration of MSC/VLR has been completed
- The BSC operator is in contact with the RBS commissioning personnel
- The BSC operator and the RBS commissioning personnel have agreed upon the following parameters:



- BCCHNO parameters
- DCHNO parameters
- BSIC parameters
- Time slots (TS) used for SDCCH

### Work Process for RBS Site Integration

This section describes the order in which to perform the integration and tests. Each section should be completed and the results written in the test record before moving on to the next step in the process. See *Figure below*.



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*Figure 69 Work Process for RBS Site Integration*

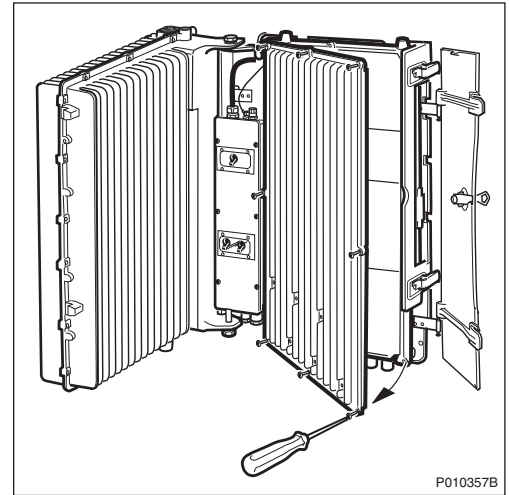
The work order can be altered, or tests can be removed due to local circumstances. However, before any such changes are made, an investigation of the consequences must be carried out. If the work order is changed or tests are removed, the department responsible for this manual must be notified and agree to the changes, or the responsibility is automatically transferred to the person making the decision.

## 8.1 Testing Transmission

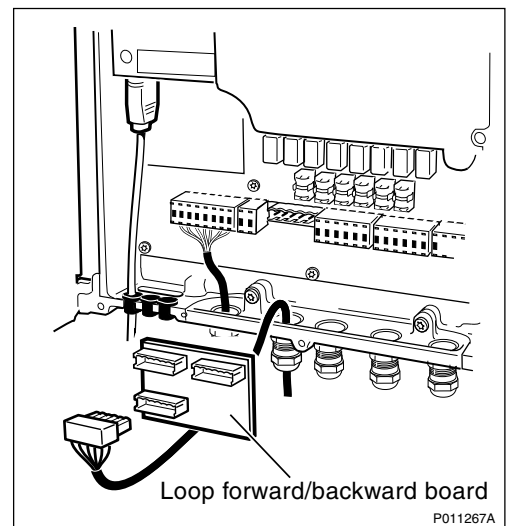
### 8.1.1 Transmission Test on E1

This section describes how to test transmission, when the E1 transmission interface is used.

1. Open the RRU, and the IXU cover.



2. Remove the PCM cable plug, starting with position A, and connect it to the Loop Back socket on the Loop forward/backward board.



3. Request that the BSC operator checks the Digital Path on the active RBLT.
4. Remove the PCM cable plug from the Loop forward/backward board and reconnect it to the socket in the IXU.
5. Wait for the BSC operator to confirm that the Abis Paths are correctly defined and that the Digital Path between the BSC and the RBS is working properly.
6. Repeat steps 2 to 5 for all used PCM lines.

7. Enter Pass/Fail in the test record, see *Section 8.4.2 Filling in the Test Record on page 152*.

## 8.1.2 Transmission Test on T1

This section describes how to test transmission, when the T1 transmission interface is used.

**Note:** Transmission test on T1 can also be performed in the same way as E1, according to *Section 8.1.1 on page 144*.

1. Request that the BSC operator uses CSU functions.
2. Configure the RBS for CSU, using OMT, and restart the RBS.

For more information regarding CSU ANSI, see:



*BSS R11 Software Reference  
Manual*

*EN/LZT 720 0047*

1. Wait for the BSC to check the Digital Path on the active RBLT.
2. Deactivate CSU functions in the RBS, using OMT and restart the RBS.
3. Wait for the BSC operator to check that the Abis Paths are correctly defined and that the Digital Path between the BSC and the RBS works properly.
4. Enter Pass/Fail in the test record, see *Section 8.4.2 Filling in the Test Record on page 152*.

## 8.2 Bringing the RBS into Service

This section describes how to bring the RBS into service.

**Note:** The BSC operator can bring the MOs into service and deblock them even when the RBS is in remote mode. (The RBS then responds directly to the BSC operator.)

1. Set the RBS in local mode by pressing the **Local/remote** button on the IXU.
2. Wait until the Local indicator has a steady yellow light, indicating that the RBS is in Local Mode.
3. Wait for the BSC operator to bring the MOs on each TRX into service logically and deblock them.
4. Press the **Local/Remote** button on the IXU. The Local indicator will start flashing.

The RBS now downloads and executes the commands previously prepared by the BSC operator. When the Local indicator turns off, the RBS is in remote mode.

5. Check that all RRUs are in Remote Mode by confirming that the Local indicator on each RRU is off.
6. If BTS PCM Supervision is used, then wait for the BSC operator to activate it and check that MO DP state is operational.
7. Wait for the BSC operator to activate and check the cell.

### 8.3 Making Test Calls on the Air Interface

This section describes how to make test calls on the air interface. The tests are performed from the RBS site to verify that all TSs on all TRXs work properly.

The test calls are performed by using a Test Mobile Station (TEMS). See *TEMS Investigation GSM Manual* in the *TEMS Kit*.

**Note:** It is important to test all TCH-TSs to ensure full capacity.

All the test calls should be made from a distance of at least 50 m (164 ft) from the antenna system. See *Figure below*.

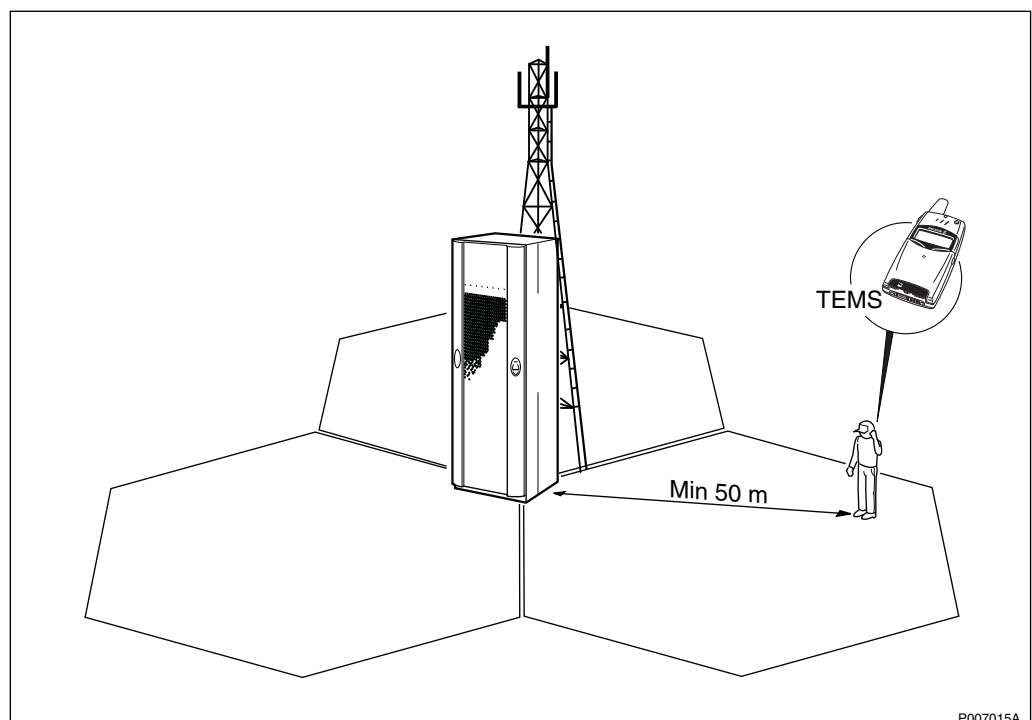


Figure 70 Test Call Using TEMS

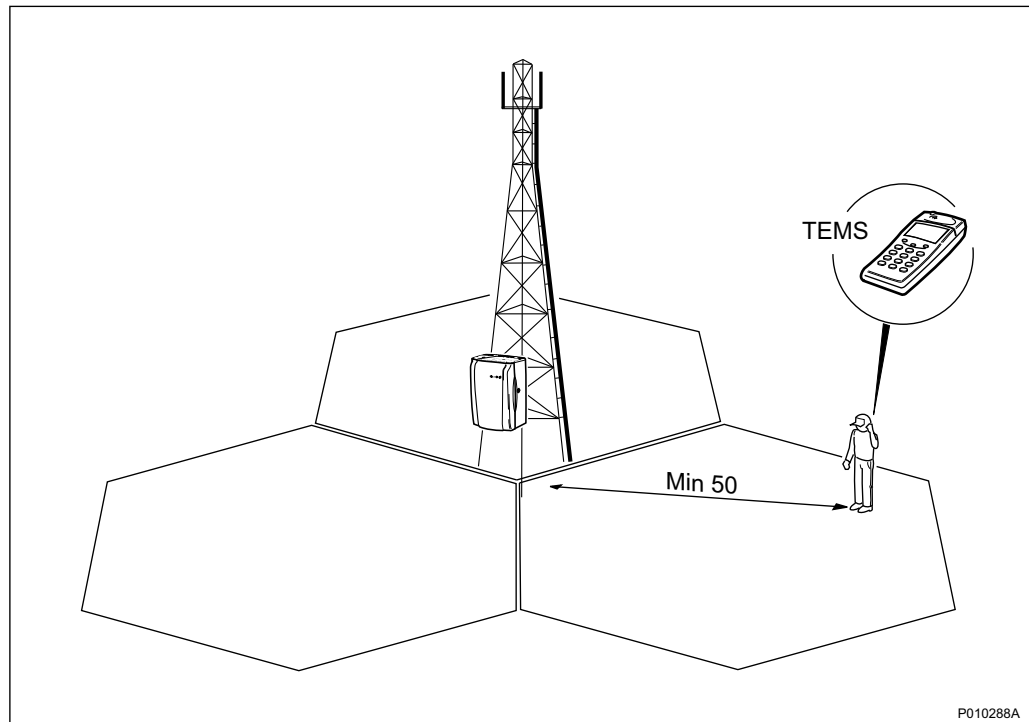


Figure 71 Distance From the Antenna System During Test Call Using TEMS

### 8.3.1 Making Test Call Using TEMS

This section describes how to make a test call using a TEMS and a PC with TEMS SW. The test confirms that all TSs on all TRXs work properly.

The test record should be completed during the test. See Section 8.4.2 Filling in the Test Record on page 152.

1. Connect the TEMS cable between the TEMS and the PC COM port 1 on the PC containing TEMS SW.
2. Start the TEMS and the TEMS SW.

For more information on the TEMS and TEMS SW, see :



TEMS Manual

LZT 108 2684

3. In the **Externals** menu, select **Enable Connections**. In the **External Connection** window, define the external connections according to the table below.

Table 46 Defining the External Connections

Definition	Port
MS1 Port	COM1
MS2 Port	N/A
Position Port	N/A

4. In the **Control** menu, select **Test of TCH**. Enter the following parameters:
  - Telephone number
  - Frequency (ARCFN)
  - Broadcast Channel (BCCH)
  - Frequency for the Traffic Channel (TCH)

5. Select the TSs used for traffic and click on **Add**. The BCCH and SDCCH channels are used for signalling and do not carry traffic. Do not make test calls on these TSs.

Repeat this procedure for each TRX.

6. Click on the **Start** button. The TEMS now makes a test call on all selected TSs. For each TS, verify the speech quality and write "Pass" or "Fail" in the test record. See *Section 8.4.2 Filling in the Test Record on page 152*.

### 8.3.2 Making Diversity Test Call

This section describes how to make a diversity test call. The test confirms that both RXD A and RXD B work properly.

**Note:** If antenna diversity is not supported, do not make a diversity test call.

1. Wait for the BSC operator to configure RXD=A.
2. Request the BSC operator to block all TRXs except the one being tested and check that BCCH and SDCCH are configured.
3. Make a test call from the TEMS.
4. Request the BSC operator to check that the TCH being tested is busy. Check the speech quality, and write "Pass" or "Fail" in the test record. See *Section 8.4.2 Filling in the Test Record on page 152*.
5. Terminate the call.
6. Request the BSC to check that the tested TCH is released.
7. Repeat steps 2 to 6 for all TRXs in the cell.
8. Wait for the BSC operator to configure RXD=B.

9. Request the BSC operator to block all TRXs except for the one being tested, and check that BCCH and SDCCH are configured.
10. Make a test call from the TEMS.
11. Request the BSC operator to check that the TCH being tested is busy. Verify the speech quality and write "Pass" or "Fail" in the test record. See *Section 8.4.2 Filling in the Test Record on page 152*.
12. Terminate the call.
13. Request the BSC to check that the tested TCH is released.
14. Repeat steps 9 to 13 for each TRX in the cell.
15. Wait for the BSC operator to restore the cell.

### 8.3.3 Making Test Call from the Fixed Network

This section describes how to make a test call from the fixed network. The test confirms that the cell is available from the fixed network.

1. Request the BSC operator to configure a TRX with BCCH and SDCCH.
2. Request the BSC commissioning staff to make a call from a fixed network phone to the TEMS.
3. Request the BSC operator to check that the TCH being tested is busy and verify the ARFCN and the TS displayed in the TEMS. Verify the speech quality and write "Pass" or "Fail" in the test record. See *Section 8.4.2 Filling in the Test Record on page 152*.
4. Terminate the call.

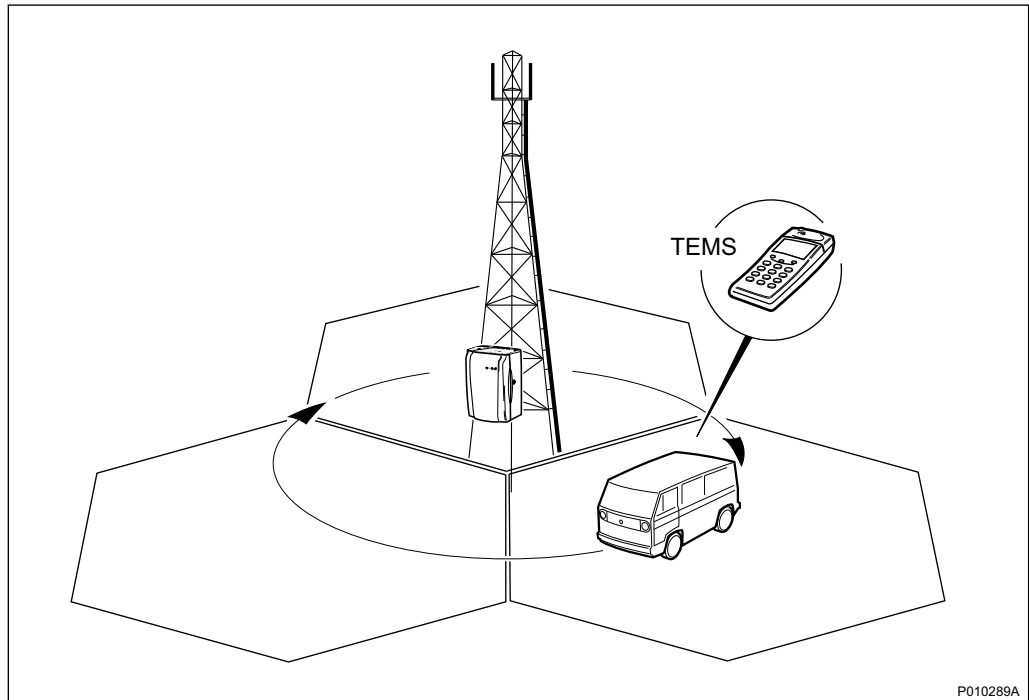
### 8.3.4 Making Handover Test Call

This section describes how to make a handover test call. The purpose of the test is to verify that handover between cells works properly and that the coverage of the cell is in accordance with the cell planning. If no handover takes place at cell borders, then the BSC personnel must be contacted.

**Note:** The handover test call must be made at least 50 m (164 feet) from the antenna system.

1. Make a test call using TEMS and a PC containing TEMS SW.
2. Move from one cell to another and verify that the call is not disconnected.
3. In the **Log** menu on the PC, select **Start Logging**. Give the log a unique name and select a destination for the log to be saved.
4. In the **Monitor** menu, select the **Status information** menu and **Serving + neighbouring cell**.

5. Monitor the signal strength (RxLev) and move through the cells to verify that handover takes place between cells at the cell borders. *See figure below.*



*Figure 72 Verifying that Handover Takes Place at the Cell Borders*

6. Write "Pass" or "Fail" in the test record. *See Section 8.4.2 Filling in the Test Record on page 152.*
7. Terminate the call and stop the log.

## 8.4 Performing Concluding Routines

This section describes the actions to be taken before leaving the site, and the test record to be completed during the tests.

### 8.4.1 Checking the RRU and IXU Indicators

This section describes how to check that the RRU and the IXU indicators show the correct status, when the RBS is connected to the BSC and is fully operational. The check should be performed before leaving the site.

1. Check that the indicators on the RRU(s) and the IXU have the status shown in the tables below:



*Table 47 RRU Indicators After Site Integration*

<b>RRU Indicator</b>	<b>State</b>
Fault	Off
Operational	On
Local	Off
RF off	Off
AC power on	On <sup>(1)</sup>
DC power on	On <sup>(1)</sup>
RRU temp.	Off

(1) Depending on power system configuration.

*Table 48 IXU Indicators After Site Integration*

<b>IXU Indicator</b>	<b>State</b>
Fault	Off
Operational	On
Local	Off
RBS fault	Off
External alarm	Off
AC power on	On <sup>(1)</sup>
DC power on	On <sup>(1)</sup>
IXU temp.	Off
Transmission OK	On <sup>(2)</sup>

(1) Depending on power system configuration.

(2) A, B, C and/or D, depending on transmission configuration.

## **8.4.2 Filling in the Test Record**

This section contains the test record to be filled in during the integration and testing of the RBS.

<b>RBS Site Integration</b>						<b>GSM -</b>						
Date:				Site Name:								
Site No.:				Cell Configuration:								
RBS Type:				Tester's Name:								
<b>Transmission Test:</b>												
Port A			Port C			Port B			Port D			
<b>Test Call Using TEMS:</b>												
TRX	Cell ID	ARFCN	BSIC	TS0	TS1	TS2	TS3	TS4	TS5	TS6	TS7	
0												
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
<b>Diversity Test Call (if Applicable):</b>												
RXD	TRX0	TRX1	TRX2	TRX3	TRX4	TRX5	TRX6	TRX7	TRX8	TRX9	TRX10	TRX11
A												
B												
<b>Test Call from Fixed Network:</b>												
Pass/Fail												
<b>Handover Test Call:</b>												
A to B	B to C	C to A	A to C	C to B	B to A							
<b>Remarks:</b> _____												
_____												
_____												

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Figure 73 Test Record for RBS Site Integration

### 8.4.3 Filling in the Checklist

This section describes the checklist to be filled in after the integration has been completed.

The following checklist is not mandatory but it is strongly recommended. Local procedures and safety regulations must be evaluated and included in this checklist.

*Table 49 Checklist*

<b>Check the following:</b>	<b>OK</b>
1. The indicators on the RRU and the IXU are in the approved status.	
2. The test equipment has been disconnected from the RBS.	
3. The RBS cabinet and the mounting base are free from foreign objects.	
4. All cables are free of damage.	
5. Top and bottom of cabinet are free of obstructions (for airflow).	
6. The cabinet has been locked, and the screws have been tightened.	
7. All tools have been accounted for.	
8. All paperwork has been completed.	

### 8.4.4 Network Element Acceptance Certificate

This section contains a Network Element Acceptance Certificate to be filled in by the person responsible. *See Figure below.*

## NETWORK ELEMENT ACCEPTANCE CERTIFICATE

This is to certify that Ericsson AB has delivered, installed and tested the Network Element ..... as defined in contract .....

The Network element acceptance has been performed in accordance with the procedures described in the above mentioned contract. Further reference should be made to the acceptance documents. The Network element passed acceptance with remarks per attached test report.

Number of remarks within Ericsson's responsibilities, that have been made on this site:.....

Date:.....

The Buyer	The Contractor
Company Name:	Company Name: Ericsson AB
Person Responsible:	Person Responsible:

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*Figure 74 Example of a Network Element Acceptance Certificate*



## 9 Maintenance

This chapter describes the maintenance procedures for the RBS 2109.

### 9.1 Introduction

#### 9.1.1 Target Group

The target group for this document is maintenance personnel. To perform maintenance work in a safe and professional way, the work must be done by skilled personnel.

The following qualifications are minimum requirements:

- Good understanding of radio and telephone engineering
- Good understanding of engineering English

### 9.2 Preconditions

This section describes the preconditions that apply to the maintenance procedures, including tools and safety.

#### 9.2.1 Health and Safety Information

Ensure that the chapters *Personal Health and Safety Instructions* and *System Safety Information* in this manual has been read and fully understood.

#### 9.2.2 Tools

This section presents the recommended torque settings for screws, nuts and connectors.

##### Torque Values

Table 50 Screws and Nuts

Dimension	Torque Nm	Remark
M4	2.6 Nm +/- 0.15 Nm	Normal
M4	1.7 Nm +/- 0.15 Nm	Reduced torque for captive screw
M8	21 Nm +/- 1.3 Nm	Earth nut

Table 51 Connectors

Connector	Torque Nm	Remark
TNC	1.7 Nm +/- 0.15 Nm	—
N	2.7 Nm +/- 0.2 Nm	—

## 9.3 Fault Localisation Using OMT

This section contains information on how to localise a fault when handling an alarm in the OMT. Ericsson recommends that the OMT is used, but if no OMT is available, or it is not possible to connect to the RBS, see *Section 9.4 Troubleshooting Using the RBS Indicators on page 175*.

The section is based on the Replacement Unit Map (RU Map) connected to an alarm. The RU Map consists of two different kinds of RUs:

- Physical Units

The following RUs are mapped to one single physical unit that can be replaced in the field.

- IXU
- TIM
- RRU
- Fan unit

- Logical units

The following RUs are handled as one unit, but can actually be one or more physical units.

- Antenna: The logical path from the RRU to (and including) the antenna
- Battery: The battery backup system including batteries
- Environment: External conditions (ambient temperature and site power)
- GPS receiver: The synch. signal received and distributed by the GPS receiver
- GPS receiver DXU cable: The logical link between the GPS receiver and the IXU
- IDB: The installation database stored in the RBS, not the physical storage
- Y Link: The logical link between IXU and RRU(s)

For supplementary information about RU maps, see:



*Fault List Micro*

*EN/LZT 720 0466*

### 9.3.1 Reading Fault Status

This section describes how to read the fault status, using the OMT. If any fault indicator on the RBS is on, then the fault status must be read.

#### Connect the OMT

1. Remove the lid from the OMT port on the IXU.
2. Connect the OMT cable from the PC serial port 1 to the OMT port on the right-hand side of the IXU. If an extended OMT cable is connected to the OMT port, then connect the OMT cable to the end of the extended OMT cable.
3. Start the OMT

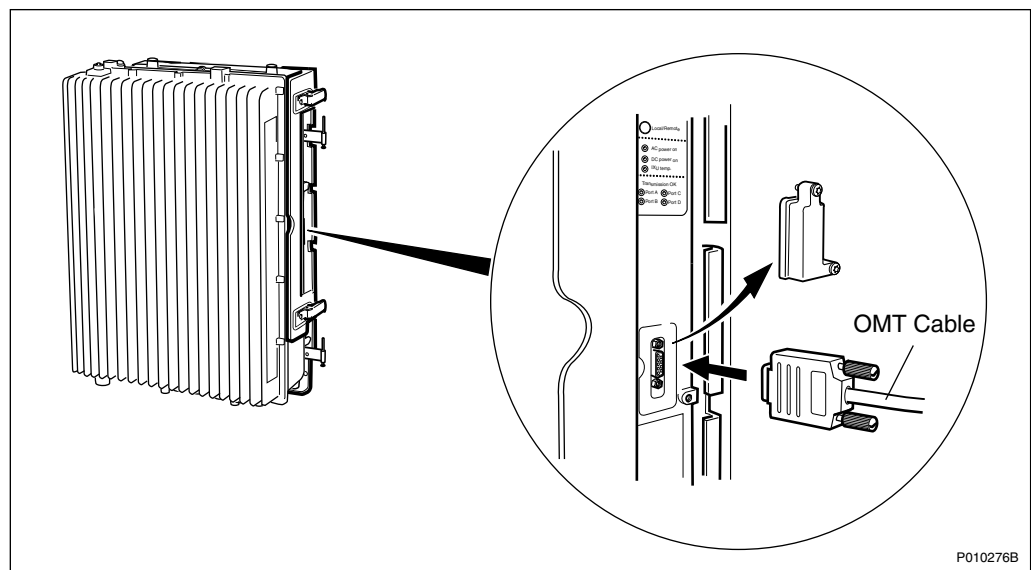
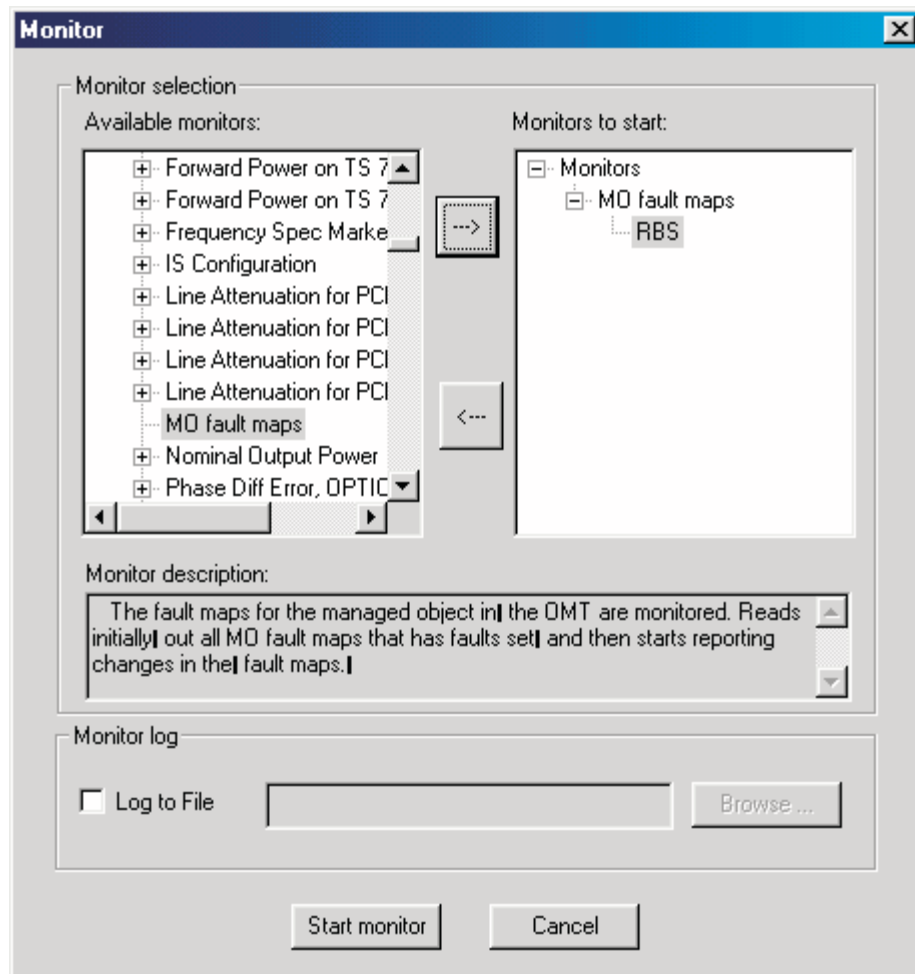


Figure 75 Connecting OMT to IXU

#### Reading the IDB

4. In the **RBS 2000** menu, select **Connect** to logically connect the OMT to the RBS.
5. In the **Configuration** menu, select **Read IDB**
6. On the **Maintenance** menu, click **Monitor** to open the Monitor window. See figure below.





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Figure 76 Reading Fault Status

7. In the Available monitors box, select “MO fault maps” and click → to add “RBS” into the Monitors to start box.
8. Click **Start monitor**.
9. In the RBS Event Monitor window, check the MO faults box to see if there are any faults. If there are, then correct these before continuing.

When an MO fault is selected, corresponding fault description, action and related faults are displayed. See also *Fault List*.

10. When all faults are corrected, close the RBS Event Monitor window.

### 9.3.2 SO CF RU:0/ IXU

This section describes how to localise an SO CF RU:0/ IXU fault.

### Related RUs

The RUs listed below have higher priority than the RU described in this section. If they are present, then proceed to the related section before handling this RU.

- If “SO CF RU:34/ IDB” appears in the OMT, then proceed with *Section 9.3.8 SO CF RU:34/ IDB on page 169*.
- If “SO CF RU:3/ Y link” appears in the OMT, then proceed with *Section 9.3.3 SO CF RU:3/ Y Link on page 161*.

### Displaying Fault Information

Display fault information according to *Section 9.3.1 Reading Fault Status on page 159*

Perform the following actions step-by-step until the fault ceases:

#### Resetting IXU

1. Press the **IXU reset** button on the IXU interface panel.

#### Loading SW in the RBS

2. Load SW and IDB.
3. Replace the flash card, proceed with *Section 9.5.1 Flash Card Replacement on page 187*.

#### Replacing IXU

4. Replace the IXU, proceed with *Section 9.5.3 IXU Replacement on page 195*.

### 9.3.3 SO CF RU:3/ Y Link

This section describes how to localise an SO CF RU:3/ Y Link fault. The Y link cable is connected between the IXU and the RRU(s).

#### Related RUs

The RU listed below has higher priority than the RU described in this section. If it is present, proceed to the related section before handling this RU.

- If “SO CF RU:34/ IDB” appears in the OMT, proceed with *Section 9.3.8 SO CF RU:34/ IDB on page 169*.

#### Displaying Fault Information

Display fault information according to *Section 9.3.1 Reading Fault Status on page 159*.

Perform the following actions step-by-step until the fault ceases:

### Checking IDB Configuration

1. In the OMT, ensure that the IDB is in accordance with the HW cabinet configuration.

### Checking RRU Power

Perform the following actions step-by-step until the fault ceases, or until the RRU power is confirmed.

**Note:** This is only valid for an RRU connected to the Y link-generated alarm.

2. Check that the indicators **AC Power on/DC Power on** on the RRU interface panel are ON.
3. Open the RBS and check that the RRU power is switched on.
4. Check that the power cable from the MBU to the RRU is correctly connected.
5. Disconnect the power cable from the RRU and use a multimeter to check that the correct voltage is being supplied to the RRU, *see Figure and Table below*.

For more information about correct voltage, *see*:



*RBS 2308, RBS 2309, RBS 2109 and EN/LZT 720 0058  
EBB-06 Hardware Reference Manual*

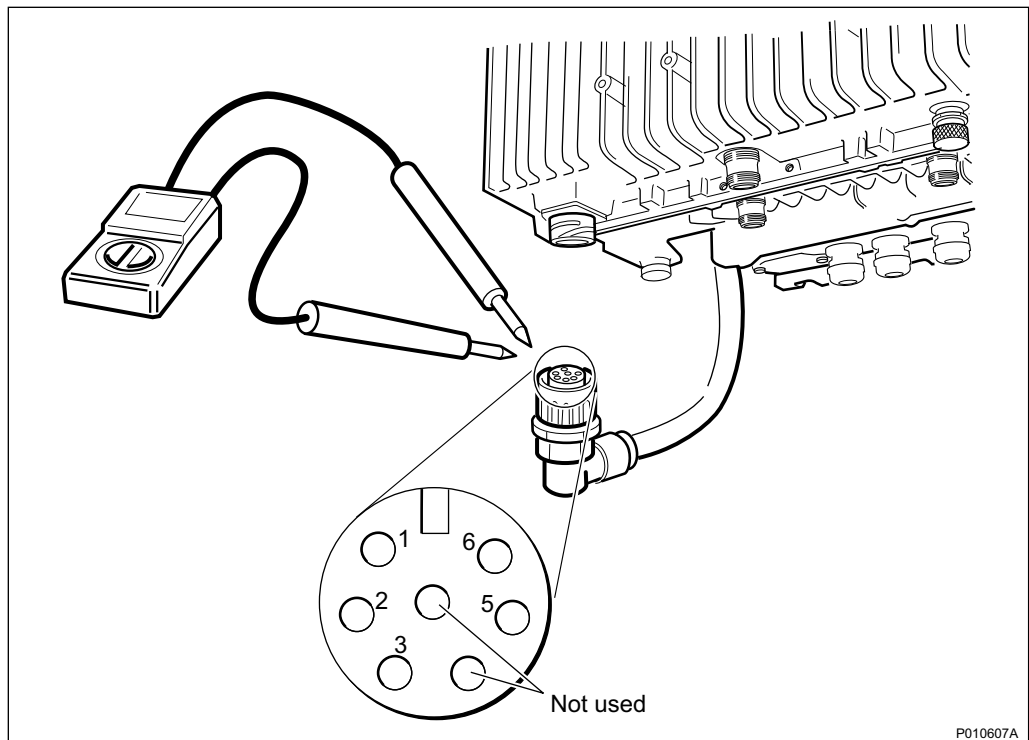


Figure 77 Measuring Voltage on RRU Power Cable

Table 52 Pins and Functions

Connector Pin	Function
1	DC_P
2	DC_N
3	PE
5	AC_L2
6	AC_L1

### Resetting RRU

6. Press the **RRU reset** button on the RRU interface panel connected to the faulty Y link

### Resetting IXU

7. Press the **IXU reset** button on the IXU interface panel

### Checking Y Link Cable

Perform the following actions step-by-step until the fault ceases:

8. Check that the Y link cable is correctly connected to both the IXU and the RRU
9. Check that the cable is free from damage
10. If the Y Link cable is damaged, replace it *according to Section 9.5.10 Y Link Cable Replacement on page 215*

#### **Replacing the RRU**

11. Replace the RRU, *see Section 9.5.7 RRU Replacement on page 208*

#### **Replacing the IXU**

12. Replace the IXU, *see Section 9.5.3 IXU Replacement on page 195*

### **9.3.4**

#### **SO CF RU:4/ TIM**

This section describes how to localise an SO CF RU:4/ TIM fault.

#### **Related RUs**

The RUs listed below have higher priority than the RU described in this section. If they are present, go to the related section before handling this RU.

- If “SO CF RU:0/ IXU” appears in the OMT, *proceed with Section 9.3.2 SO CF RU:0/ IXU on page 160*
- If “SO CF RU:3/ Y link” appears in the OMT, *proceed with Section 9.3.3 SO CF RU:3/ Y Link on page 161*
- If “SO CF RU:34/ IDB” appears in the OMT, *proceed with Section 9.3.8 SO CF RU:34/ IDB on page 169*
- If “SO TRXC RU:0/ RRU” appears in the OMT, *proceed with Section 9.3.12 SO TRXC RU:0/ RRU on page 174*

#### **Displaying Fault Information**

Display fault information according to *Section 9.3.1 Reading Fault Status on page 159*.

Perform the following actions step-by-step until the fault ceases:

#### **Checking Contacts on TIM and IXU**

1. Check that the TIM is correctly installed, and that all connector pins on both IXU and TIM are free from damage.

#### **Replacing TIM**

2. Replace the TIM, *see Section 9.5.6 TIM Replacement on page 205*.

### Resetting IXU

3. Press the **IXU reset** button on the IXU interface panel.

### Replacing IXU

4. Replace the IXU, see *Section 9.5.3 IXU Replacement on page 195*.

## 9.3.5 SO CF RU:14/ Battery

This section describes how to localise an SO CF RU:14/ Battery fault.

### Related RUs

- If “SO CF RU:31/ Environment” appears in the OMT, together with “SO CF EC2:10/ Mains fail (external power source fail)”, then proceed with *Section 9.3.7 SO CF RU:31/ Environment on page 167*.

### Displaying Fault Information

Display fault information according to *Section 9.3.1 Reading Fault Status on page 159*.

Perform the following actions step-by-step until the fault ceases:

### Checking HW/IDB

1. Check the DC power indicator on the IXU, and the RRU interfaces, to locate the cabinet issuing the alarm.
2. Check in the OMT that the IDB configuration is correct, according to the HW cabinet configuration, regarding defined climate system.

### Checking Cabinet Power

3. Open the RBS and check that the DC power is switched on.
4. Open the MBU cover and check that the incoming DC cable is correctly connected.

### Checking the Battery Backup System

5. Check the backup power chain from the IXU to the battery backup system, including any optional fuses.
6. Check the battery backup system according to the manufacturer's documentation.

## 9.3.6 SO CF RU:15/ Fan

This section describes how to localise an SO CF RU:15/ Fan fault.

### Related RU

The RU listed below has higher priority than the RU described in this section. If it is present, go to the related section before handling this RU.

- If “SO CF RU:34/ IDB” appears in the OMT, then proceed with *Section 9.3.8 SO CF RU:34/ IDB on page 169*

### Displaying Fault Information

Display fault information according to *Section 9.3.1 Reading Fault Status on page 159*.

Perform the following actions step-by-step until the fault ceases.

### Checking IDB Configuration

1. Check in the OMT that the IDB configuration is correct, according to the HW cabinet configuration, regarding defined climate system.

### Checking Fan Unit




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### Caution!

Rotating fan blades can cause injury to body parts that come into contact with the blades. Blades in fan units continue to rotate for a period of time, even after the fan has been switched off. Wait until fans have stopped rotating completely before starting work on or near fans.

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2. Remove the fan unit cover.
3. Ensure that the fans rotate freely and without obstruction.

### Resetting Fan Unit

4. Press the **Test** button on the fan unit.

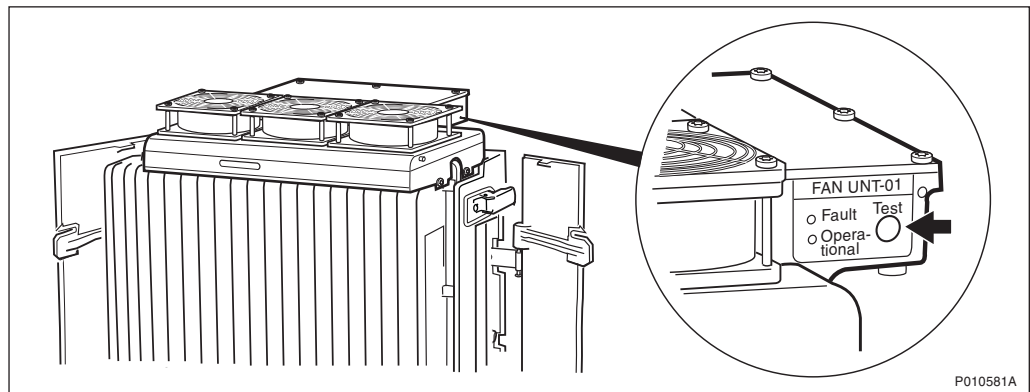


Figure 78 Fan Unit Test Button

5. Check that the test sequence below is carried out:
  - The fans run at maximum speed for approximately 5 seconds
  - The fans run at nominal speed for approximately 5 seconds
  - The fans stop for approximately 5 seconds
6. Ensure that the indicator status of the fan unit is in accordance with the table below:

Table 53 Fan Unit Indicators After Test

Fan Unit Indicator LEDs	Status
Fault	Off
Operational	On

### Replacing Fan Unit

7. Replace the fan unit, see *Section 9.5.4 Fan Unit Replacement on page 199*.

## 9.3.7 SO CF RU:31/ Environment

This section describes how to localise an SO CF RU:31/ Environment fault. This fault is only generated by external factors, for example climate or incoming power.

### Related RU

The RU listed below has higher priority than the RU described in this section. If it is present, go to the related section before handling this RU.

- If “SO CF RU:34/ IDB” appears in the OMT, then proceed with *Section 9.3.8 SO CF RU:34/ IDB on page 169*



### Displaying Fault Information

Display fault information according to *Section 9.3.1 Reading Fault Status on page 159*.

Perform the following actions step-by-step until the fault ceases:

### Checking IDB Configuration

1. Check in the OMT that the IDB configuration is correct, according to the HW cabinet configuration, regarding defined power system and climate system.

### Checking Climate

2. Inspect the airflow path in the RBS, and ensure that the airflow is not obstructed.
3. If the temperature is between 45 and 55° C, install a fan unit. For more information, see *Chapter Installation of RBS* in this manual. If the temperature is below -15° C, then the RBS should be powered with AC. AC power is needed for the RBS to start the heater. For more information, see:



*RBS 2308, RBS 2309, RBS 2109 and EN/LZT 720 0058  
EBB-06 Hardware Reference Manual*

### Checking Incoming AC Power (Optional)

4. Open the MBU cover and use a multimeter to check that the power input is either 100 V AC to 127 V AC, or 200 V AC to 250 V AC.

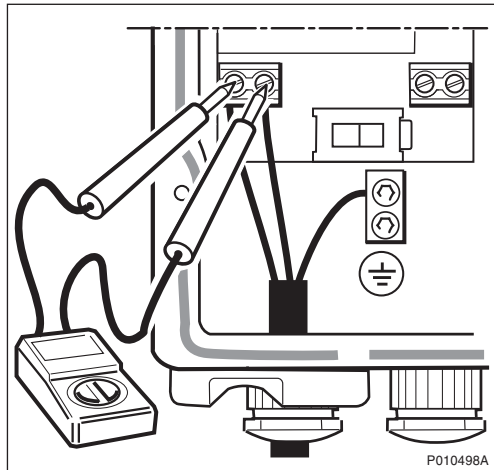


Figure 79 Measuring Incoming AC Voltage

### Checking Incoming DC Power (Optional)

5. Open the MBU cover and use a multimeter to check that the voltage, supplying the RBS, is between  $-40.5$  and  $-57$  V DC. If DC supply is not detected, then check the DC supply source.

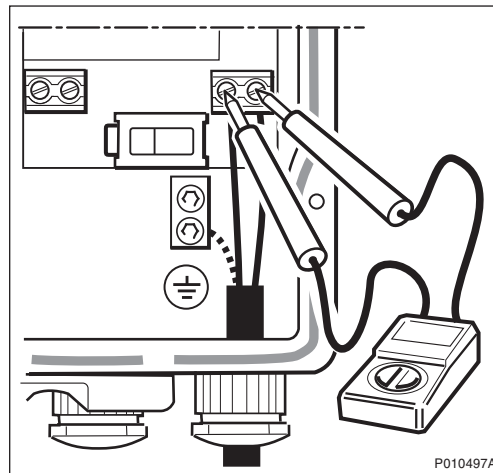


Figure 80 Measuring Incoming DC Voltage

### 9.3.8

#### SO CF RU:34/ IDB

This section describes how to localise an SO CF RU:34/ IDB.

#### Displaying Fault Information

Display fault information according to *Section 9.3.1 Reading Fault Status on page 159*.

Perform the following actions step-by-step until the fault ceases:

#### Resetting IXU

1. Press the **IXU Reset** button on the IXU Interface panel.

#### Reinstalling IDB

2. Reinstall the IDB. For more information, see *Chapter Site Installation Tests* in this manual.

#### Replacing Flash Card

3. Replace the flash card, see *Section 9.5.1 Flash Card Replacement on page 187*.

### 9.3.9 SO CF RU:40/ Antenna

This section describes how to localise an SO CF RU:40/ Antenna fault.

#### Related RU

The RU listed below has higher priority than the RU described in this section. If it is present, then go to the related section before handling this RU.

- If “SO CF RU:34/ IDB” appears in the OMT, then proceed with *Section 9.3.8 SO CF RU:34/ IDB on page 169*

#### Displaying Fault Information

Display fault information according to *Section 9.3.1 Reading Fault Status on page 159*.

Perform the following actions step-by-step until the fault ceases:

#### Checking IDB Parameters

1. Check that the following values are correctly defined in the IDB:

- RX feeder loss
- TMA gain

**Note:** TMA loss = –TMA gain

#### Reading ARAE Alarm Status

**Note:** This step is only valid if “SO CF EC2:13/ Auxiliary equipment fault” appears in the OMT.

2. In the **Configuration** menu, select **Read IDB** and click **Yes**.
3. In the **Maintenance** menu, select **Monitor**.
4. Select **Alarm Inlets** and click **Run**.
5. Check that the ARAE fault is correctly defined in the IDB.
6. Check the cable to the equipment supervised by the ARAE alarm.
7. Replace the faulty equipment supervised by that alarm.

#### Checking RX Diversity

8. Ensure that the cell is configured, in the BSC, with the correct diversity (RXD).
9. Confirm that radio cables are connected to the correct RRUs and antennas.

### Performing DTF Test

10. Disconnect the faulty feeder and locate the fault, by performing a Distance To Fault (DTF) test. For more information, see chapter *Antenna System Tests* in this manual.
11. Replace the faulty equipment identified in the DTF test.
 

**Note:** The RXBP are not included in the DTF test.
12. If no faulty equipment was identified, replace the antenna.

### 9.3.10 SO CF RU:48/ GPS Receiver

This section describes how to localise an SO CF RU:48/ GPS Receiver. To avoid complete loss of traffic, have the BSC operator configuring PCM as backup synchronisation source (SYNCSRC=DEFAULT).

#### Related RUs

The RUs listed below have higher priority than the RU described in this section. If they are present, go to the related section before handling this RU.

- If “SO CF RU:34/ IDB” appears in the OMT, then proceed with *Section 9.3.8 SO CF RU:34/ IDB on page 169*
- If “SO CF RU:0/ IXU” appears in the OMT, then proceed with *Section 9.3.2 SO CF RU:0/ IXU on page 160*

#### Displaying Fault Information

Display fault information according to *Section 9.3.1 Reading Fault Status on page 159*.

Perform the following actions step-by-step until the fault ceases:

#### Replacing GPS Receiver

1. Disconnect the power to the GPS, for example by disconnecting the connector in the OVP. Wait a few minutes and then reconnect the power.
2. Replace the GPS receiver.

### 9.3.11 SO CF RU:49/ GPS Receiver DXU Cable

This section describes how to localise an SO CF RU:49/ GPS Receiver DXU cable. To avoid complete loss of traffic, ensure that the BSC operator configures PCM as backup synchronisation source (SYNCSRC=DEFAULT).

### Related RUs

The RUs listed below have higher priority than the RU described in this section. If they are present, go to the related section before handling this RU.

- If “SO CF RU:34/ IDB” appears in the OMT, then proceed with *Section 9.3.8 SO CF RU:34/ IDB on page 169*
- If “SO CF RU:0/ IXU” appears in the OMT, then proceed with *Section 9.3.2 SO CF RU:0/ IXU on page 160*

### Displaying Fault Information

Display fault information according to *Section 9.3.1 Reading Fault Status on page 159*.

Perform the following actions step-by-step until the fault ceases:

#### Precondition

Before starting this procedure, ensure that the GPS system has no fault and is properly installed.

#### Check IXU GPS Cable

1. Check that the IXU GPS cable is free from damage. Replace if needed.
2. Check that the IXU GPS cable is correctly connected to the GPS/AUX port on the IXU.
3. If an EBB-01 is used, then check that the GPS and GPS/AUX cables on the EBB-01 are correctly connected.

#### Localising Fault on GPS Receiver

4. Check all cables and equipment (including the GPS receiver) connected to the signal chain between the IXU GPS cable and the GPS receiver.
5. Check the power supply to the GPS by checking the DC LED in the OVP.

Refer to manufacturer's documentation to perform fault localisation on the GPS receiver.

#### Checking DC Supply

6. Check that both the – 48 V LINK cable and the termination block are correctly connected, as shown in the figures below.

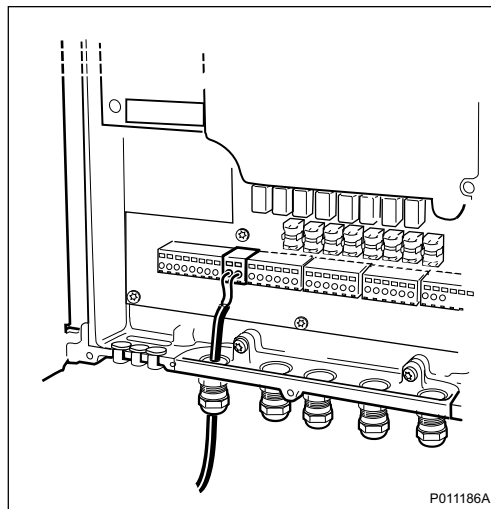


Figure 81 Cable Connection Check

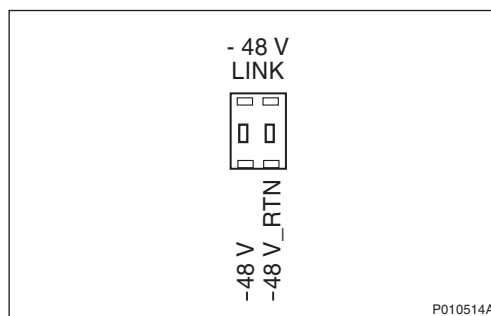


Figure 82 Connector Connection Check

7. Perform a cold reset on the GPS by disconnecting the termination block for a few seconds.
8. Check that both the – 48 V LINK cable and the conductor are free from damage. Replace if needed.
9. Check that the voltage is – 48 V DC, using a multimeter.

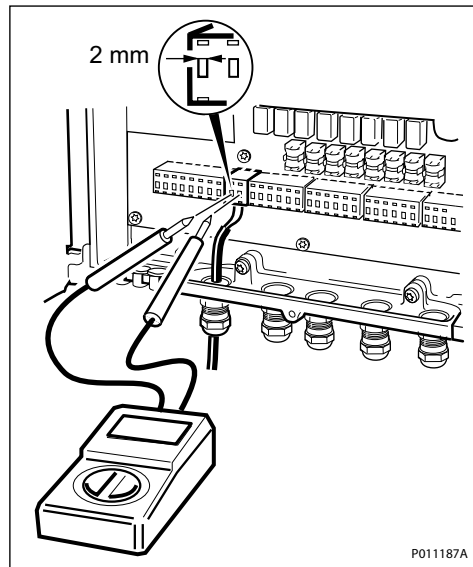


Figure 83 Voltage Check

### 9.3.12 SO TRXC RU:0/ RRU

This section describes how to localise an SO TRXC RU:0/ RRU fault.

#### Related RUs

The RUs listed below have higher priority than the RU described in this section. If they are present, go to the related section before handling this RU.

- If “SO CF RU:3/ Y link” appears in the OMT, then proceed with *Section 9.3.3 SO CF RU:3/ Y Link on page 161*
- If “SO CF RU:31/ Environment” appears in the OMT, then proceed with *Section 9.3.7 SO CF RU:31/ Environment on page 167*
- If “SO CF RU:34/ IDB” appears in the OMT, then proceed with *Section 9.3.8 SO CF RU:34/ IDB on page 169*

Two TXs are used when TX diversity is activated, but only the first TX sends the alarm. The fault is therefore located in a different RRU.

#### Displaying Fault Information

Display fault information according to *Section 9.3.1 Reading Fault Status on page 159*.

Perform the following actions step-by-step until the fault ceases:

### Resetting RRU

1. Press the **RRU reset** button on the RRU interface panel.

### Restarting RRU

2. Switch off the RRU, wait for one minute and switch it on again.

### Replacing RRU

3. Replace the RRU, see *Section 9.5.7 RRU Replacement on page 208*.

## 9.4

### Troubleshooting Using the RBS Indicators

This section describes troubleshooting procedures using the RBS indicators.

If no faults are detected in the RBS, then the indicators should be in accordance with the tables below.

*Table 54 RRU Indicator Status When the RBS is in Operation*

<b>RRU Indicator</b>	<b>State</b>
Fault	Off
Operational	On
Local	Off
RF off	Off
AC power on	On <sup>(1)</sup>
DC power on	On <sup>(1)</sup>
RRU temp.	Off

*(1) Depending on power system configuration.*

*Table 55 IXU Indicator Status When the RBS is in Operation*

<b>IXU Indicator</b>	<b>State</b>
Fault	Off
Operational	On
Local	Off
RBS fault	Off
External alarm	Off
AC power on	On <sup>(1)</sup>
DC power on	On <sup>(1)</sup>



Table 55 IXU Indicator Status When the RBS is in Operation

IXU temp.	Off
Transmission OK	On <sup>(2)</sup>

(1) Depending on power system configuration.

(2) A, B, C and/or D, depending on transmission configuration.

If the indicators indicate a fault, see the applicable Section below.

## 9.4.1 Corrective Actions for the IXU

### Fault

If the fault indicator is ON (red), IXU HW fault(s) are detected. Perform the following actions step-by-step until the fault ceases:

- Use the OMT to display fault information, see *Section 9.3 Fault Localisation Using OMT on page 158*. If the OMT cannot be connected, then proceed with the steps below
- Ensure that the flash card has been properly inserted in the IXU
- Replace the IDB and SW on the flash card, see *Section 9.5.1 Flash Card Replacement on page 187*
- Replace the flash card, see *Section 9.5.1 Flash Card Replacement on page 187*
- Replace the IXU, see *Section 9.5.3 IXU Replacement on page 195*

### Operational

If the Operational indicator is flashing (green) then configuration activity, initiated from the BSC, is in progress. Example: SW download or synchronisation is in progress. A SW download from the BSC can take 30 – 60 minutes, and synchronization 5 – 10 minutes.

- Wait until activity is finished, that is until the flashing stops

### Local

If the Local indicator is ON (yellow) and it is not possible to bring the IXU into remote mode, either by using the OMT or by pressing the IXU Local/Remote button, then perform the following actions step-by-step until the fault ceases:

- Reset the IXU
- Install a new IDB using a OMT, see chapter Site Installation Tests
- Replace the IXU. See *Section 9.5.3 IXU Replacement on page 195*

If the Local indicator is flashing (yellow) and the anticipated BSC communication cannot be established, then perform the following actions step-by-step (in close cooperation with the BSC operator) until the fault ceases:

- Reset the IXU
- Ensure that the expected Transmission OK LEDs are ON
  - Note:** Transmission OK LEDs only indicate that the incoming transmission signal is present electrically. The physical transmission connection should still be checked.
- Ensure that the TEI value in the RBS IDB corresponds with the CF TEI value set in the BSC for this RBS. Request that the BSC operator checks that no other RBSs are using the same CF TEI value on the transmission line
- Ensure that the following transmission parameters in the RBS IDB are correct:
  - Transmission Interface (E1 or T1)
  - CRC-4
  - Spare Bits
  - Sync Source
  - Receiver Sensitivity
  - LBO
- Ensure that all RBSs, connected on the same transmission line between the BSC and this RBS, have Cascade defined as Network Topology in the IDB
- Ensure that the BSC has a correctly configured A-bis path to the RBS
- Ensure that the corresponding TRH and RBLT devices in the BSC are working

### RBS Fault

If the RBS fault indicator is ON(yellow), an RBS fault(s) is detected. Perform the following actions step-by-step until the fault ceases:

- Use the OMT to display fault information, see *Section 9.3 Fault Localisation Using OMT on page 158*

### External Alarm

If the External alarm indicator is on (yellow), external alarm(s) is active in the RBS. Perform the following actions step-by-step until the fault ceases:

- Use the OMT to display fault information. *See the following instructions:*

1. Start the OMT.
2. In the **Maintenance** menu, select **Monitor**.
3. Select **External Alarms Status** and click **Start Monitor**.
4. In the Available monitors box, select "MO fault maps" and click → to add "RBS" in the Monitors to start box.
5. Check the Display Status window to see which external alarms are active.
6. Check that the external alarm are correctly defined in the IDB
7. When the faults are corrected, close the Display Status window.

**AC Power On**

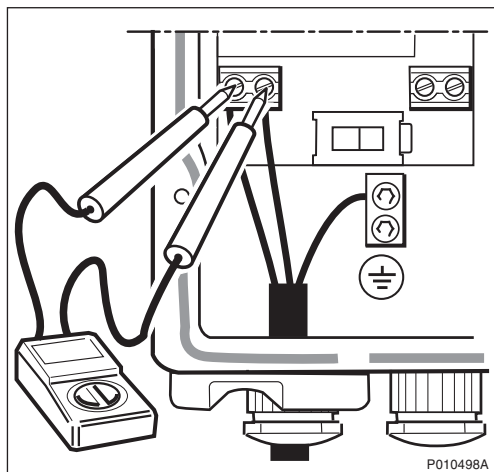
If the AC power on indicator is OFF (green), and if AC Mains power should be available, then perform the following actions step-by-step until the fault ceases or until the IXU power is confirmed:

For more information about RBS AC mains voltage, see:



*RBS 2308, RBS 2309, RBS 2109 and EN/LZT 720 0058  
EBB-06 Hardware Reference Manual*

- Ensure that the RBS AC Mains power switch on the MBU is ON
- Open the MBU cover and use a multimeter to check that the power input is either 100 V AC to 127 V AC, or 200 V AC to 250 V AC.



**Figure 84** *Measuring Incoming AC Voltage*

- Disconnect the power cable from the IXU and use a multimeter to check that the power supply to the IXU, is either 100 V AC to 127 V AC, or 200 V AC to 250 V AC, see *table below*

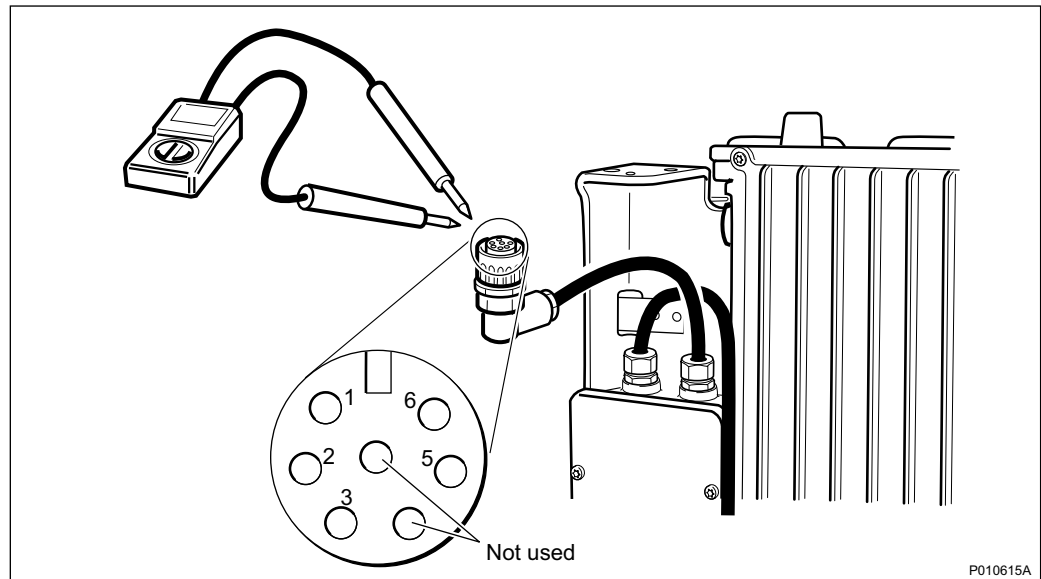


Figure 85 Measuring AC Voltage on IXU Power Cable

Table 56 Pins and Functions

Connector Pin	Function
1	DC_P
2	DC_N
3	PE
5	AC_L2
6	AC_L1

- Replace the PIB in the MBU, see *Section 9.5.5 PIB Replacement on page 202*
- Replace the IXU, see *Section 9.5.3 IXU Replacement on page 195*

### DC Power On

If the DC power on indicator is OFF (green), and if DC supply should be available, then perform the following actions step-by-step until the fault ceases, or until the IXU power is confirmed:

For more information about RBS DC supply voltage, see:



*RBS 2308, RBS 2309, RBS 2109 and EN/LZT 720 0058 EBB-06 Hardware Reference Manual*

- Ensure that the RBS DC supply switch on the MBU is ON

- Open the MBU cover and use a multimeter to check that the incoming voltage is between  $-40.5\text{ V DC}$  and  $-57\text{ V DC}$

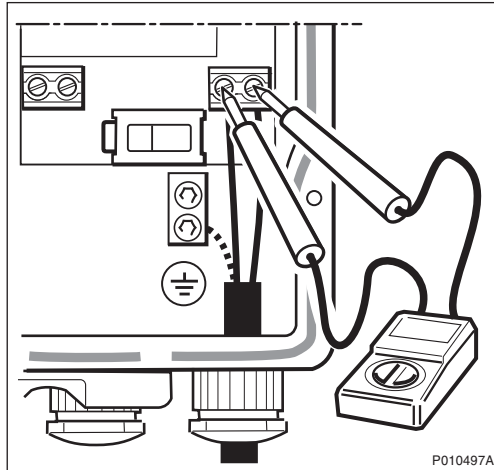


Figure 86 Measuring Incoming DC Voltage

- Disconnect the power cable from the IXU and use a multimeter to check that the voltage, supplying the IXU, is between  $-40.5\text{ V DC}$  and  $-57\text{ V DC}$ , see table below

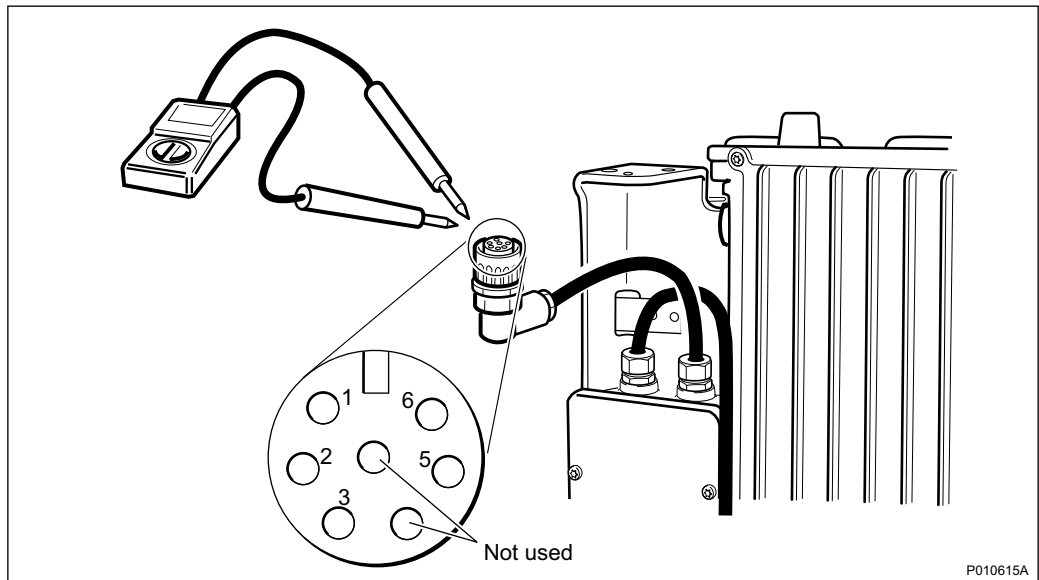


Figure 87 Measuring Voltage on IXU Power Cable

Table 57 Pins and Functions

Connector Pin	Function
1	DC_P
2	DC_N

Table 57 Pins and Functions

Connector Pin	Function
3	PE
5	AC_L2
6	AC_L1

- Replace the PIB in the MBU, see *Section 9.5.5 PIB Replacement on page 202*
- Replace the IXU, see *Section 9.5.3 IXU Replacement on page 195*

### IXU Temp

If the IXU temp indicator is ON (yellow) and the conditions are hot, perform the following actions step-by-step until the fault ceases:

- Ensure that airflow is not obstructed above or below the RRU, or through its cooling flanges
- Install the IXU cabinet at a colder location

If the IXU temp indicator is ON (yellow) and the conditions are cold, perform the following actions step-by-step until the fault ceases:

**Note:** The IXU will not start if it is too cold. It can take up to 75 minutes for the internal heater to warm up the IXU.

- Ensure that the IXU is provided with AC Mains power, since the heater in the IXU only works when AC Mains power supply is available
- Install the IXU cabinet at a warmer location

### Transmission OK

If a Transmission OK port LED indicator is OFF (green), even though transmission is expected, then perform the following actions step-by-step until the fault ceases:

- Ensure that the TIM is properly mounted, and the selector switch for transmission impedance selection is set correctly for each port
- Ensure that the transmission cables have been properly connected to the right port in the IXU, and each cable thread connected to the correct inlet

**Note:** The order of the ports in the IXU is: A C B D.

- Ensure that the external transmission equipment is working properly and that cables are connected correctly

- Swap the cable thread pairs
- Perform a transmission test, see chapter *RBS Site Integration*
- Check the transmission cable. If it is faulty, replace it
- Replace the TIM, see *Section 9.5.6 TIM Replacement on page 205*.
- Replace the IFB, see *Section 9.5.2 IFB Replacement on page 191*.

## 9.4.2 Corrective Actions on the RRU

### Fault

If the fault indicator is ON (red), an RRU HW fault(s) is detected. Perform the following actions step-by-step until the fault ceases:

- Use the OMT to display fault information, see *Section 9.3.1 Reading Fault Status on page 159*

### Operational

If the Operational indicator is flashing (green), then a configuration activity, initiated from the BSC or the IXU, is in progress. For example, SW download or synchronisation is in progress. A SW download from the BSC can take 30 – 60 minutes, a SW download from the IXU flash card 5 – 10 minutes and synchronization 5 – 10 minutes.

- Wait until activity is finished, that is until the flashing stops

### Local

If the Local indicator is ON (yellow) and if it is not possible to bring the RRU into remote mode, either by using the OMT or by pressing the RRU Local/Remote, then perform the following actions step-by-step until the fault ceases:

- Reset the RRU
- Replace the RRU, see *Section 9.5.7 RRU Replacement on page 208*

If the Local indicator is flashing (yellow) and BSC communication (though expected) is not established, check the Local indicator on the IXU.

If the Local indicator on the IXU is flashing, see *Page 176*.

If the IXU has established a BSC connection, perform the following actions step-by-step until the fault ceases:

- Ensure that the BSC has deblocked the TRXCs for the RBS

- Ensure that the BSC has a correct configured A-bis path to the RBS [Digital Connection Point (DCP)].
- Reset the RRU
- Ensure that the Y link cable is undamaged and properly connected to the correct ports, both on the RRU and the IXU
- Check that each transmission line is connected to the correct ports in both the RRU and the IXU

**Note:** The IXU could be able to establish BSC connection even if the transmission lines have been connected to the ports wrongly. The order of the ports in the IXU is: A C B D.

- Ensure that the RRU is defined in the installed IDB. To create a new IDB, see *Chapter Site Installation Tests* in this manual.
- Reset the IXU
- Replace the Y link cable, see *Section 9.5.10 Y Link Cable Replacement on page 215*
- Replace the RRU, see *Section 9.5.7 RRU Replacement on page 208*
- Replace the IXU, see *Section 9.5.3 IXU Replacement on page 195*

### RF Off

RRU is not transmitting on any of its radio ports. No TX in the RRU is enabled at the BSC.

### AC Power On

If the AC power on indicator is OFF (green), and if AC Mains power should be available, perform the following actions step-by-step until the fault ceases:

For more information about RBS AC mains voltage, see:



*RBS 2308, RBS 2309, RBS 2109 and EN/LZT 720 0058  
EBB-06 Hardware Reference Manual*

- Ensure that the RBS AC supply and RRU power switches on the MBU are ON
- Open the MBU cover and use a multimeter to check that the power input is either 100 V AC to 127 V AC, or 200 V AC to 250 V AC



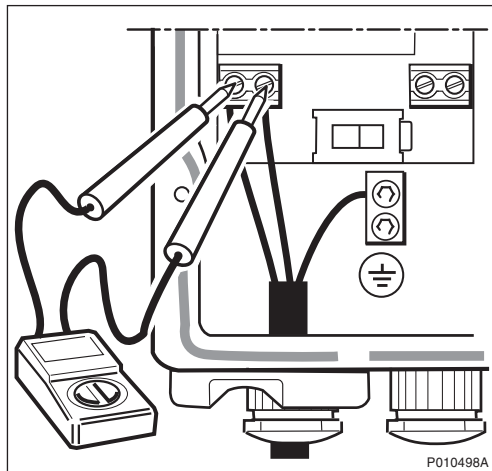


Figure 88 Measuring Incoming AC Voltage

- Disconnect the power cable from the RRU and use a multimeter to check that the power supply to the RRU, is either 100 V AC to 127 V AC, or 200 V AC to 250 V AC, see table below.

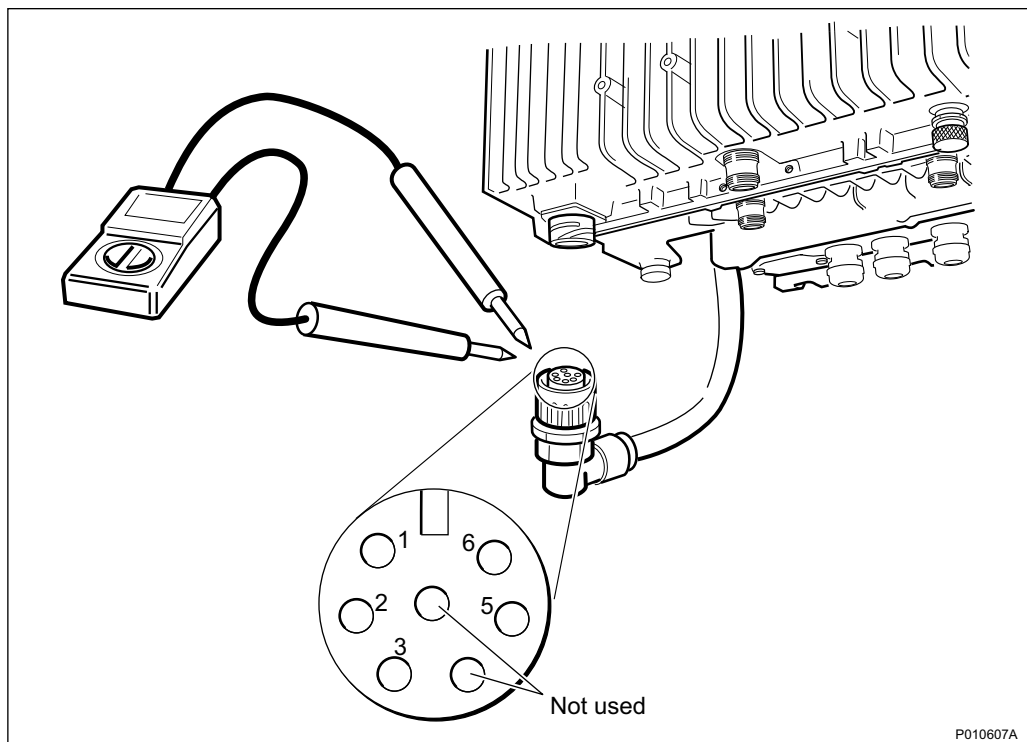


Figure 89 Measuring Voltage on the RRU Power Cable

Table 58 Pins and Functions

Connector Pin	Function
1	DC_P
2	DC_N
3	PE
5	AC_L2
6	AC_L1

- Replace the PIB in the MBU, see *Section 9.5.5 PIB Replacement on page 202*
- Replace the RRU, see *Section 9.5.7 RRU Replacement on page 208*

### DC Power On

If the DC power on indicator is OFF (green) and if DC supply should be available, perform the following actions step-by-step until the fault ceases:

For more information about RBS DC supply voltage, see:



*RBS 2308, RBS 2309, RBS 2109 and EN/LZT 720 0058 EBB-06 Hardware Reference Manual*

- Ensure that the RBS DC supply and RRU switches on the MBU are ON
- Open the MBU cover and use a multimeter to check that the incoming voltage is between – 40.5 V DC and – 57 V DC

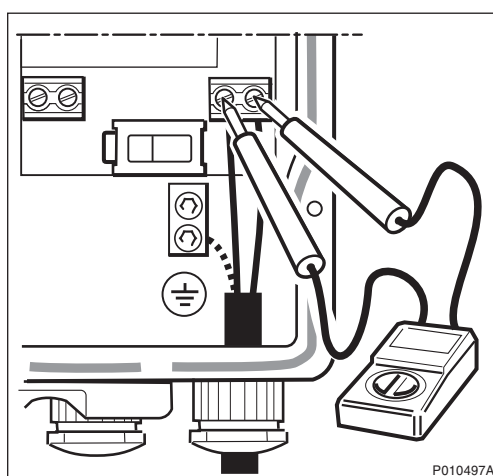


Figure 90 Measuring the Incoming DC Voltage

- Disconnect the power cable from the RRU and use a multimeter to check that the voltage, supplying the RRU, is between – 40.5 and – 57 V DC. See figure and table below.

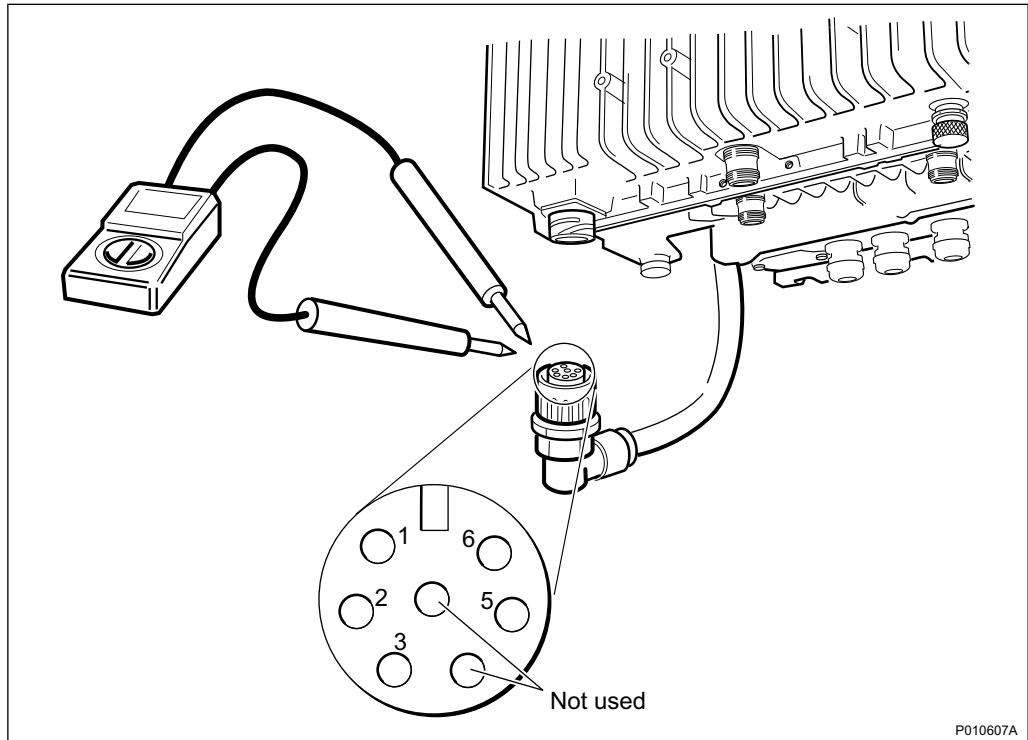


Figure 91 Measuring the Voltage on RRU Power Cable

Table 59 Pins and Functions

Connector Pin	Function
1	DC_P
2	DC_N
3	PE
5	AC_L2
6	AC_L1

- Replace the PIB in the MBU, see *Section 9.5.5 PIB Replacement on page 202*
- Replace the RRU, see *Section 9.5.7 RRU Replacement on page 208*

### RRU Temp

If the RRU temp indicator is ON (yellow), and the conditions are hot, perform the following actions step-by-step until the fault ceases:

- Ensure that airflow is not obstructed above or below the RRU, or through its cooling flanges
- Install a fan unit to the RRU
- Install the RRU cabinet at a colder location

If the RRU temp indicator is ON (yellow) and the conditions are cold, perform the following actions step-by-step until the fault ceases:

**Note:** The RRU will not start if it is too cold. It can take up to 75 minutes for the internal heater to warm up the RRU.

- Ensure that the RRU is provided with AC Mains power, since the heater in the RRU only works when AC Mains power is available
- Install the RRU cabinet at a warmer location

## 9.5 HW Replacement

This section describes how to replace faulty units identified in *Section Fault Localisation*.

### 9.5.1 Flash Card Replacement

This section describes how to replace a faulty flash card.

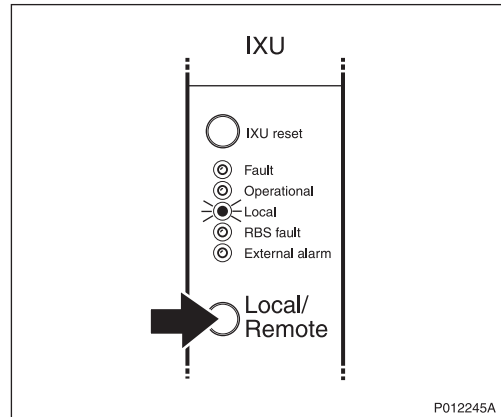
#### Loading IDB and SW (Optional)

This section describes how to load the IDB and SW onto the new flash card.

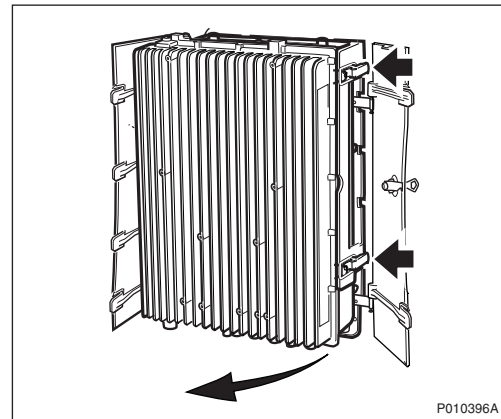
1. Create and save an IDB. For more information, see chapter *Site Installation Tests* in this manual.
2. From the **Configuration** menu in the OMT, select **Load flash card**.
3. In **Flash card location**, click **Browse** and select the location of the flash card driver.
4. In **Select IDB to use on flash card**, click **Browse** and select the IDB to use.
5. In **Select RBS SW to use on flash card**, click **Browse** and select the SW to use.
6. Click **Load**.

### Taking the RBS Out of Operation

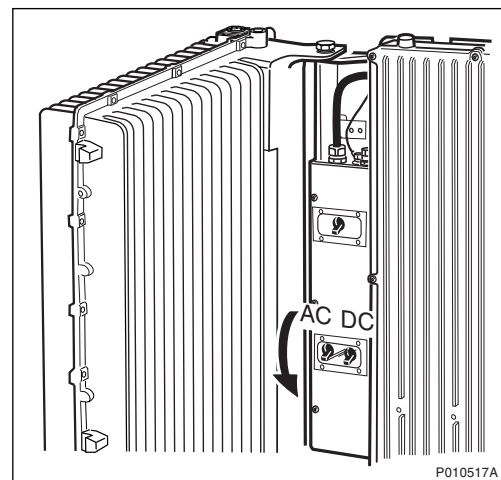
- 1 Open the sunshields.
- 2 Contact the OMC operator to obtain permission to temporarily take cells out of service. Wait until the RF off indicator (on all RRU interface panels) shows a continuous light.
- 3 Press the Local/Remote button on the IXU to set the RBS to local mode. Wait until the local indicator on the IXU shows a continuous light.



- 4 Open the two clasps and pull the RRU to the left side, to gain access to the power switches.

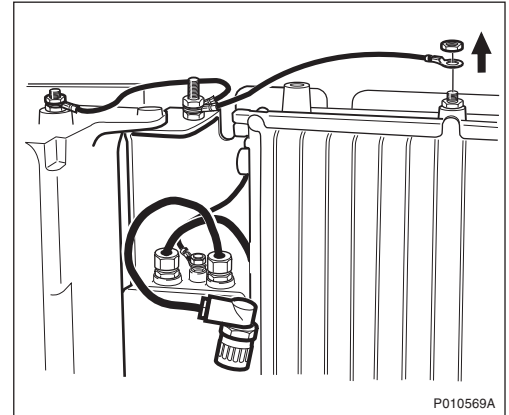


- 5 Switch off the AC Mains power and DC power supply.

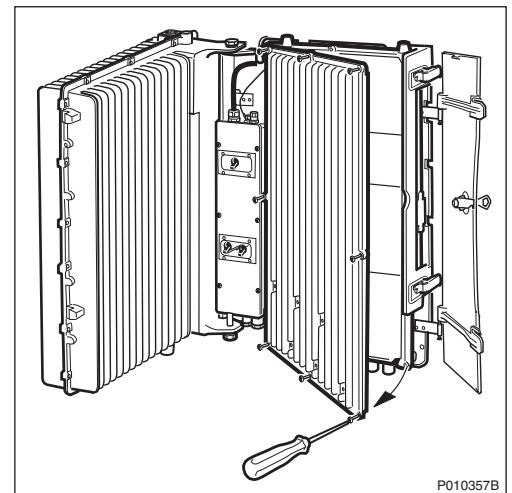


## Replacing Flash Card

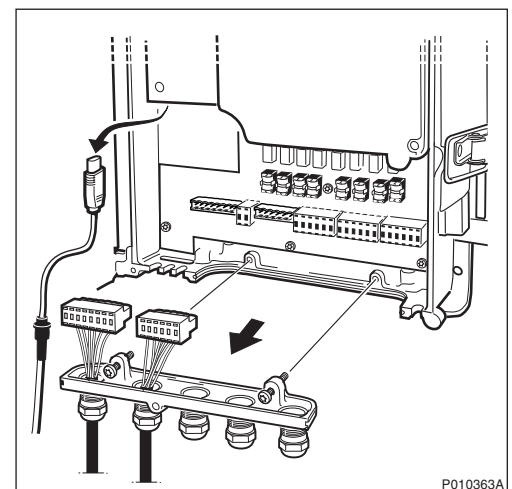
- 6 Disconnect the AC/DC cable and the earth cable from the IXU.



- 7 Disconnect the OMT cable.
- 8 Open the IXU cover.

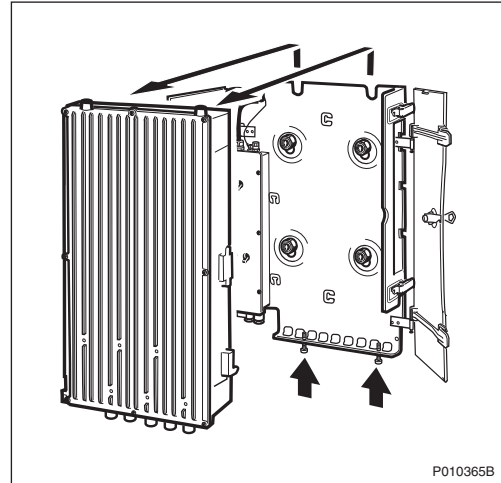


- 9 Remove the connection frame and loosen the cables from the IFB. Remove the Y link cable(s).

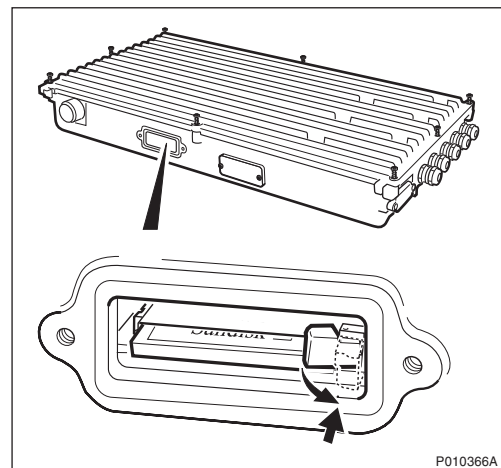


**Note:** Make a note of which connectors the Y link cables were connected to.

- 10 Loosen the two securing screws under the IXU and remove the unit.



- 11 Remove the cover for the flash card. To remove the flash card, lift up the release lever and then push it in.



- 12 Insert the new flash card, reset the lever, then refit the cover.

**Note:** The flash card should be preloaded with the correct software and IDB. For instructions, see *Chapter Site Installation Tests*.

- 13 Mount the IXU and secure it with the two screws under the IXU.
- 14 Connect the Y link cable(s). Ensure the Y link cable(s) are connected to the correct connector(s).
- 15 Mount the connection frame and connect all cables. Close the IXU cover.
- 16 Connect the earth cable and the AC/DC cable.

### Taking the RBS Into Operation

- 17 Switch on the appropriate power supply: AC Mains, DC, or both AC and DC.
- 18 If new SW has earlier been prepared for loading, it now starts. This may take up to 10 minutes.
- 19 Close the RRU.
- 20 Inform the OMC operator that the applicable cells are to be taken into service.
- 21 Press the Local/Remote button on the IXU, and the RRU's to set the RBS to remote mode. Wait until the RF off indicator on the RRU interface panel extinguishes and the Operational indicator illuminates.
- 22 Close the sunshields.

### Handling Replaced Units

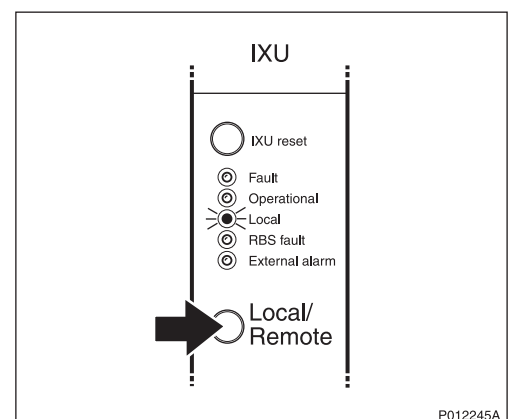
Unless under contractual warranty, after replacement, the flash card should be disposed of locally by the customer according to environmental regulations. Do not return the flash card to Ericsson for replacement, repair or disposal.

## 9.5.2 IFB Replacement

This section describes how to replace a faulty IFB.

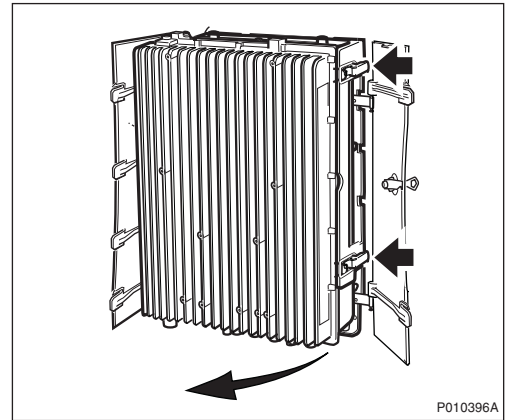
### Taking the RBS Out of Operation

- 1 Open the sunshields.
- 2 Contact the OMC operator to obtain permission to temporarily take cells out of service. Wait until the RF off indicator (on all RRU interface panels) shows a continuous light.
- 3 Press the Local/Remote button on the IXU to set the RBS to local mode. Wait until the local indicator on the IXU shows a continuous light.

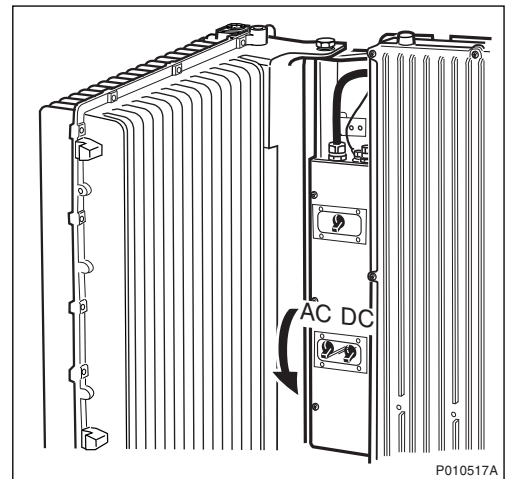




- 4 Open the two clasps and pull the RRU to the left side, to gain access to the power switches.

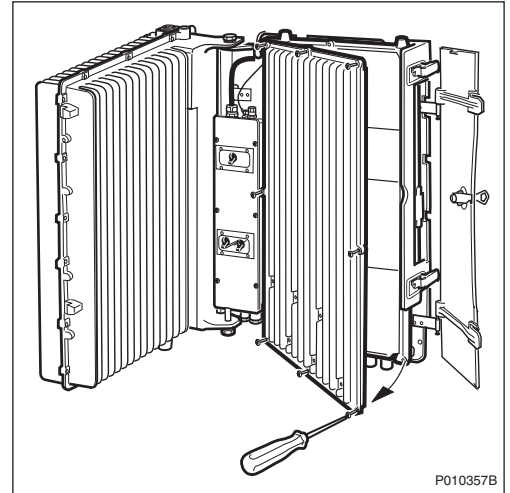


- 5 Switch off AC Mains power and DC power supply.

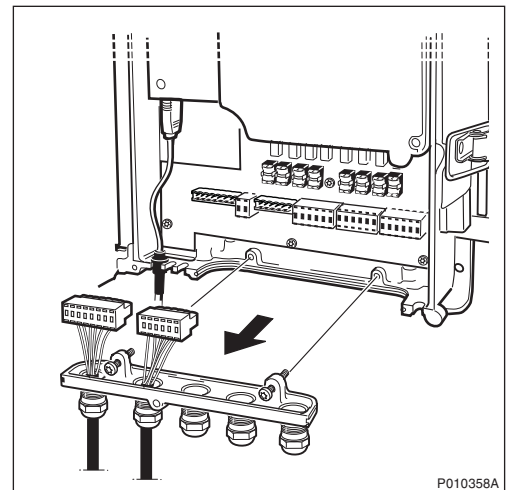


## Replacing IFB

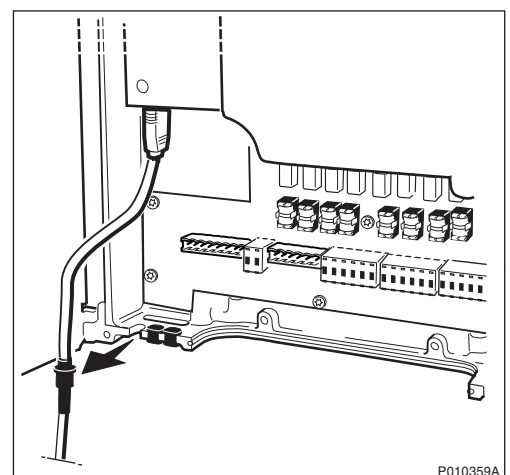
- 6 Open the IXU cover.



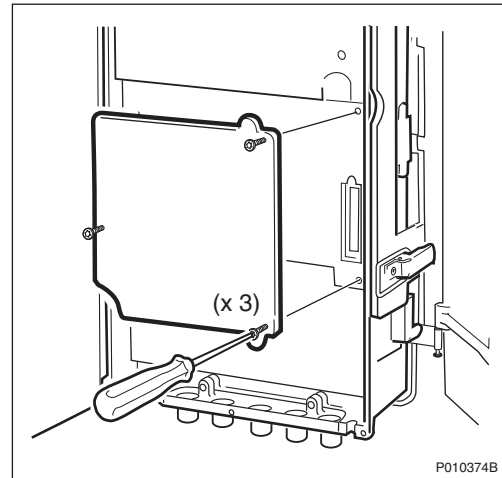
- 7 Remove the connection frame and all cables from the IFB.



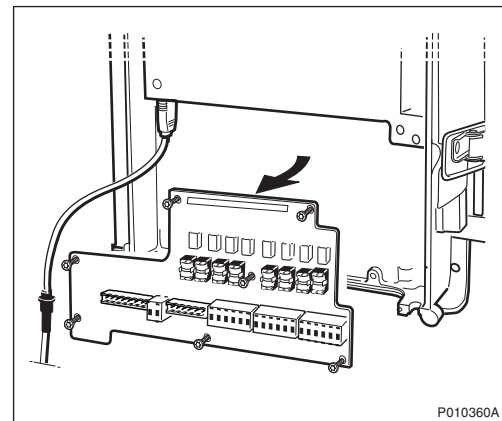
- 8 Loosen, but do not remove, the Y link cable(s) from the cable inlet.



- 9 Remove the TIM after loosening the three screws.



- 10 Remove the IFB after loosening the seven screws.



- 11 Put back the new IFB, the connection frame, and all cables.
- 12 Put back the TIM. Tighten the screws to 1.7 Nm.
- 13 Secure the Y link cable(s).
- 14 Reconnect the IXU cover.

### Taking the RBS Into Operation

- 15 Switch on the appropriate power supply: AC Mains, DC, or both AC and DC.
- 16 Close the RRU.
- 17 Inform the OMC operator that the applicable cells are to be taken into service.
- 18 Press the Local/Remote button on the IXU to set the RBS to remote mode. Wait until the RF off indicator on the RRU interface panel extinguishes and the Operational indicator illuminates.
- 19 Close the sunshields.

## Handling Replaced Units

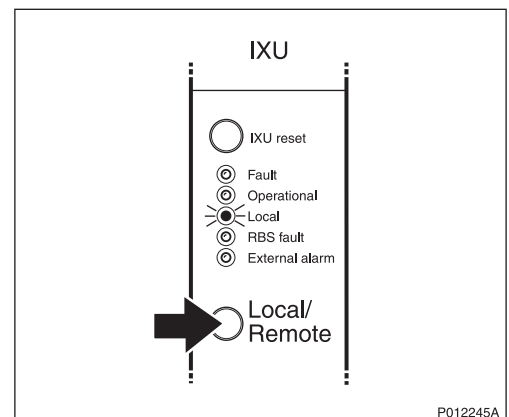
Unless under contractual warranty, after replacement, the IFB should be disposed of locally by the customer according to environmental regulations. Do not return the IFB to Ericsson for replacement, repair or disposal.

### 9.5.3 IXU Replacement

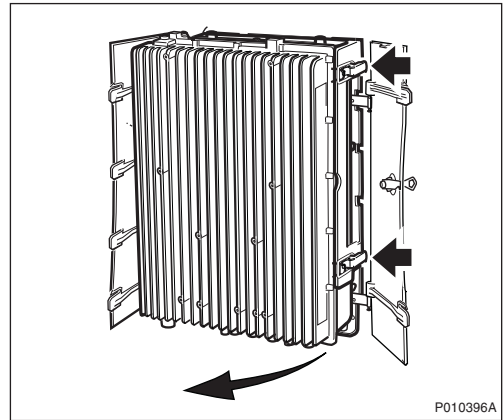
This section describes how to replace a faulty IXU.

#### Taking the RBS Out of Operation

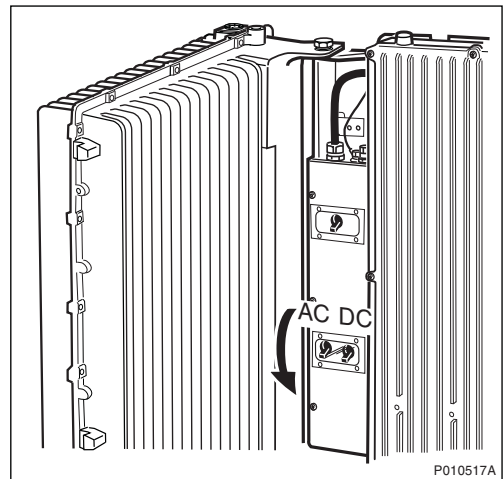
- 1 Open the sunshields.
- 2 Contact the OMC operator to obtain permission to temporarily take cells out of service. Wait until the RF off indicator (on all RRU interface panels) shows a continuous light.
- 3 Press the Local/Remote button on the IXU to set the RBS to local mode. Wait until the local indicator on the IXU shows a continuous light.



- 4 Open the two clasps and pull the RRU to the left side, to gain access to the power switches.

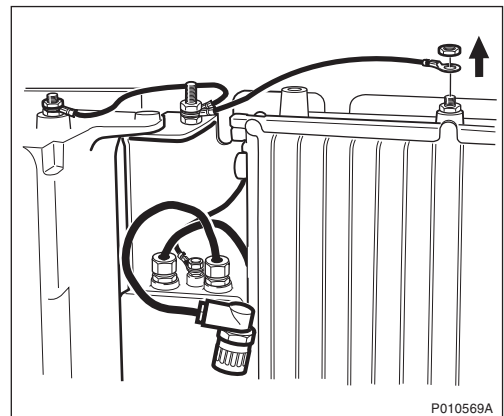


- 5 Switch off AC Mains power and DC power supply.



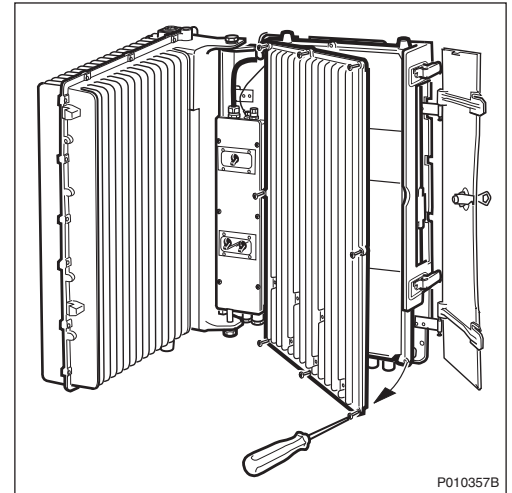
### Replacing IXU

- 6 Disconnect the AC/DC cable and the earth cable.

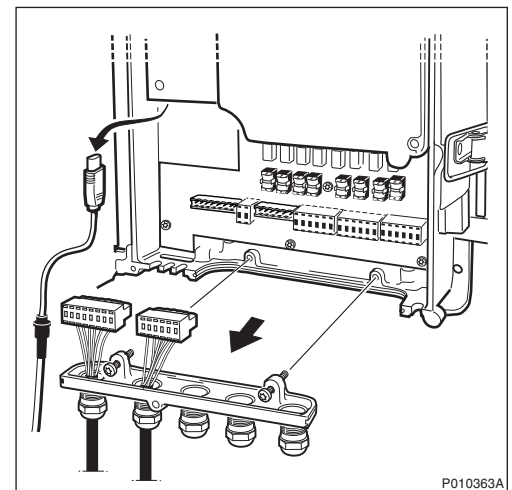


- 7 Remove the OMT cable.

- 8 Open the IXU cover.

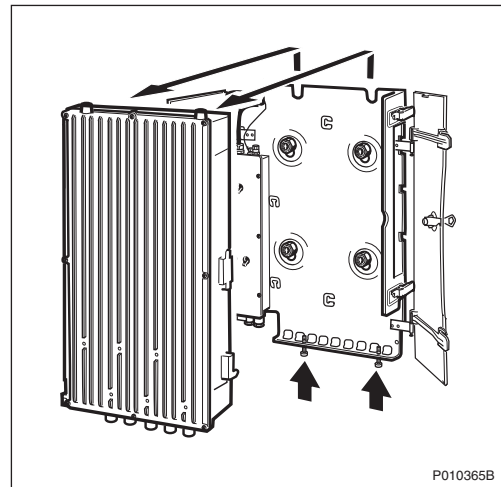


- 9 Remove the connection frame and loosen the cables from the IFB. Remove the Y link cable(s).

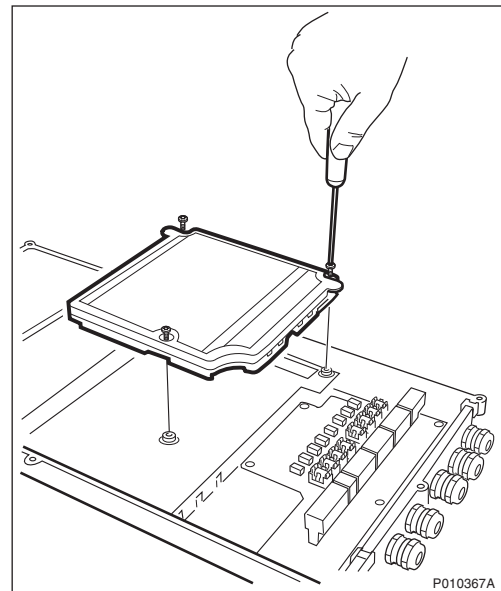


**Note:** Make a note of which connectors the Y link cables were connected to.

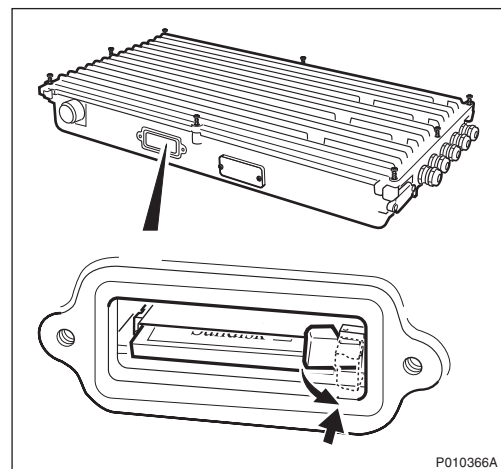
- 10 Loosen the two securing screws under the IXU, and remove the unit.



- 11 Remove the TIM from the faulty IXU after loosening the three securing screws.



- 12 Remove the cover for the flash card. To remove the flash card, lift up the release lever and then push it in.



- 13 Remove the cover for the flash card. Insert the old flash card in the new unit and push it down and reset the release lever, ensuring that the flash card is in position.
- 14 Open the cover of the new IXU and insert the TIM. Tighten the screws to 1.7 Nm.

**Note:** Ensure that the switch positions on the TIM are correct.

- 15 Mount the connection frame delivered with the new IXU into the old IXU, and close the cover.
- 16 Mount the IXU and secure it with the two screws under the IXU.
- 17 Connect the Y link cables. Ensure the Y link cable(s) are connected to the correct connector(s).
- 18 Mount the connection frame and connect all cables. Close the IXU cover.
- 19 Connect the earth cable and the AC/DC cable.

#### **Taking the RBS Into Operation**

- 20 Switch on the appropriate power supply: AC Mains, DC or both AC and DC.
- 21 Close the RRU.
- 22 Inform the OMC operator that the applicable cells are to be taken into service.
- 23 Press the Local/Remote button on the IXU to set the RBS to remote mode. Wait until the RF off indicator on the RRU interface panel extinguishes and the Operational indicator illuminates.
- 24 Close the sunshields.

#### **Handling Replaced Units**

The IXU should be returned to Ericsson for repair with a repair delivery note, LZF 084 84 (Blue Tag) attached. Include a clear description of the fault found. See *Section 9.5.11 Performing Concluding Routines on page 218* for instructions on completing a repair delivery note.

### **9.5.4 Fan Unit Replacement**

This section describes how to replace a faulty fan unit and how to test the new unit.





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## Caution!

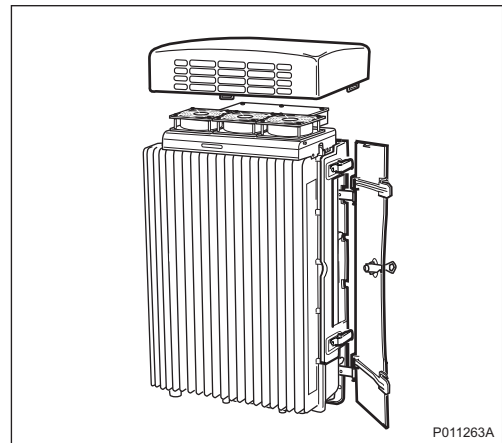
Rotating fan blades can cause injury to body parts that come into contact with the blades. Blades in fan units continue to rotate for a period of time, even after the fan has been switched off. Wait until fans have stopped rotating completely before starting work on or near fans.

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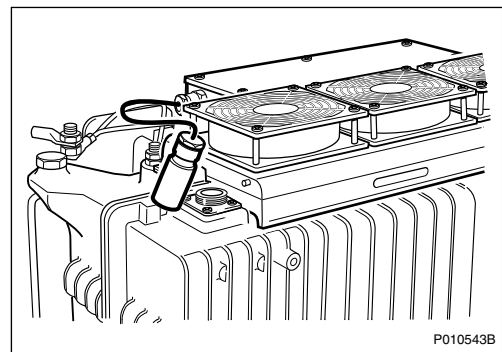
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### Replacing Fan Unit

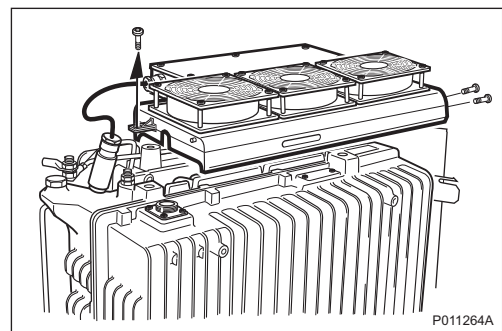
- 1 Remove the fan unit cover



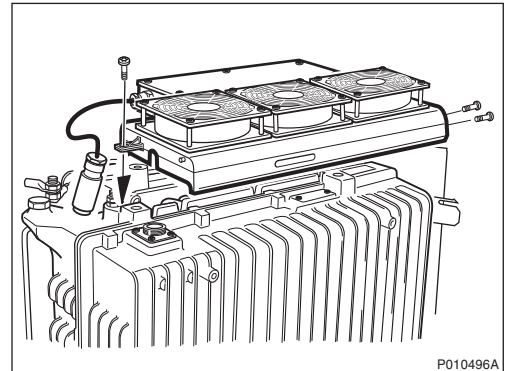
- 2 Disconnect the fan power cable from the RRU.



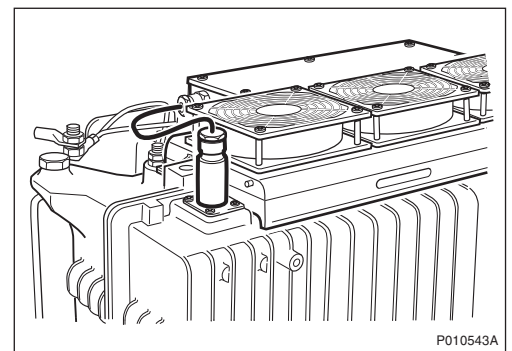
- 3 Loosen the three screws and remove the fan unit.



- 4 Install the new fan unit and fasten the three screws.

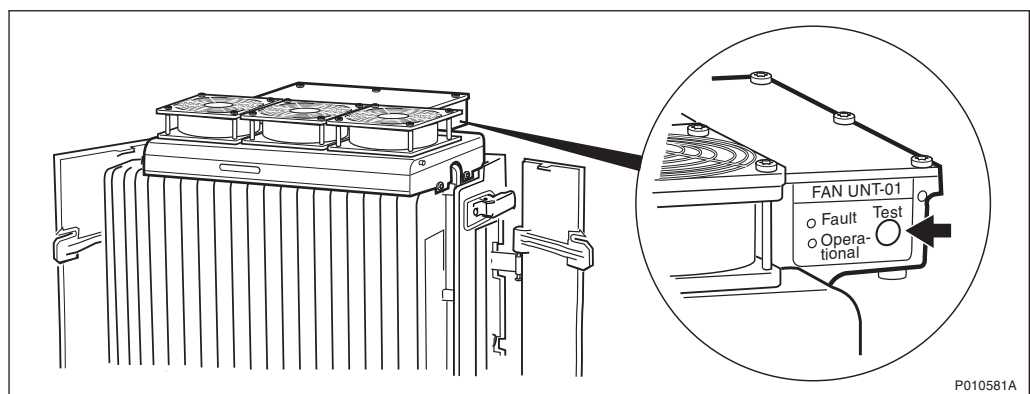


- 5 Connect the fan power cable to the RRU.



### Testing Fan Unit

- 6 Press the **Test** button on the fan unit.



The fan unit performs a self test

- 7 Check that the test sequence below is carried out:
  - The fans run at maximum speed for approximately 5 seconds
  - The fans run at nominal speed for approximately 5 seconds
  - The fans stop for approximately 5 seconds
- 8 Ensure that the indicator status of the fan unit is in accordance with the table below:

*Table 60 Fan Unit Indicators After Test*

Fan Unit Indicator	Status
Fault	Off
Operational	On

7. Reinstall the fan unit cover.

### Handling Replaced Units

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

## 9.5.5 PIB Replacement

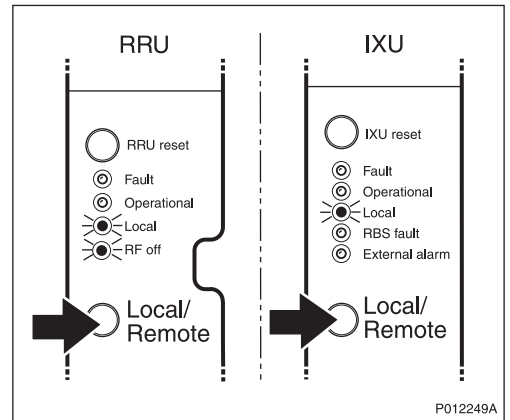
This section describes how to replace a faulty Power Interface Board (PIB). The PIB is located in the MBU.

### Taking the RBS Out of Operation

**Note:** If the PIB is mounted in an extension cabinet, only that cabinet needs to be taken out of operation.

- 1 Open the sunshields.
- 2 Contact the OMC operator to obtain permission to temporarily take cells out of service. Wait until the RF off indicator shows a continuous light.

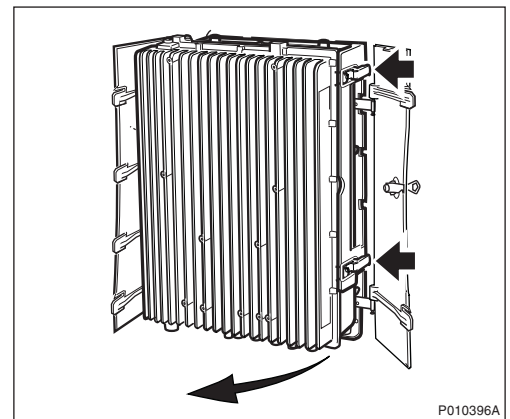
- 3 Press the Local/Remote button on the IXU to set the RBS to local mode. If it is an extension cabinet, press the Local/Remote button on the RRU to set the unit to local mode.



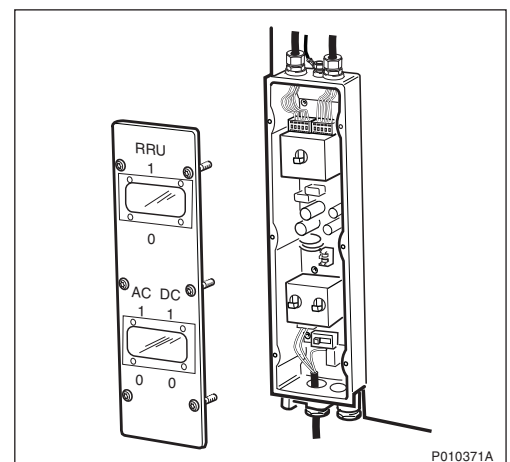
- 4 Switch off the AC and DC switches on the MBU.
- 5 Switch off the AC Mains power and DC power supply outside the cabinet.

### Replacing PIB

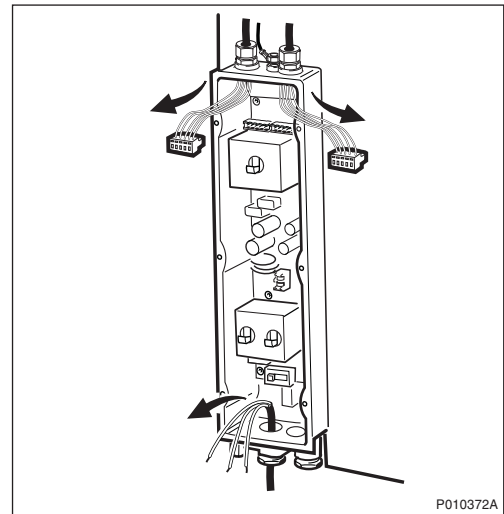
- 6 Open the two clasps and pull the RRU to the left side, to gain access to the power switches.



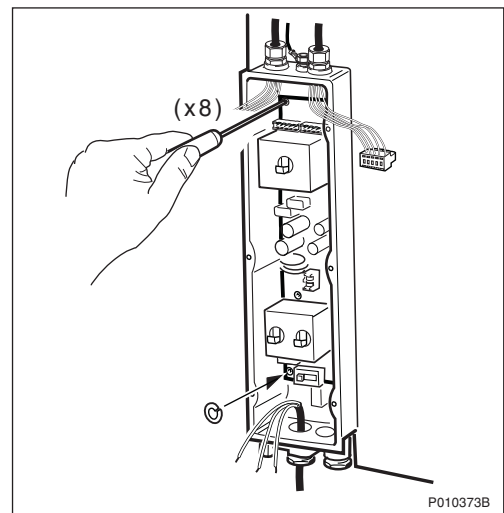
- 7 Remove the MBU cover.



- 8 Disconnect the upper AC/DC cables and the applicable power cable at the bottom.



- 9 Remove the PIB after loosening the securing screws.



**Note:** Be careful not to drop the washer attached behind the lower left screw when loosening it.

- 10 Insert the new PIB and secure it.  
11 Ensure that the ground selector switch is in the correct position.

**Note:** Remember to insert the washer behind the lower left screw.

- 12 Reconnect the upper AC/DC cables.  
13 Reconnect the applicable AC/DC cable at the bottom.  
14 Reconnect the protection earth cable.  
15 Refit the cover.

- 16 Switch on the AC and DC switches.
- 17 Close the RRU.

### **Taking the RBS Into Operation**

- 18 Switch on the AC Mains power and DC power supply outside the cabinet.
- 19 Inform the OMC operator that the applicable TRXs are to be taken into service.
- 20 Press the Local/Remote button on the IXU to set the units to remote mode. If it is an extension cabinet, press the Local/Remote button on the RRU to set the unit to remote mode. Wait until the RF off indicator on the RRU interface panel extinguishes and the Operational indicator illuminates.
- 21 Close the sunshields.

### **Handling Replaced Units**

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

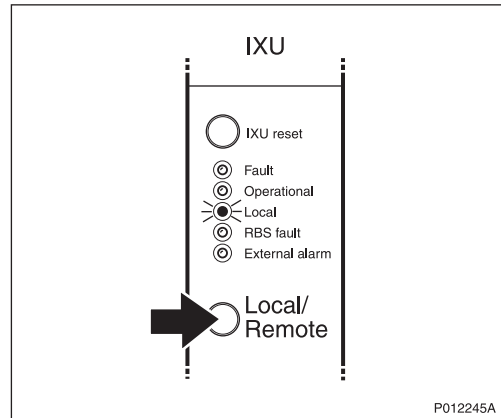
## **9.5.6 TIM Replacement**

This section describes how to replace a faulty TIM.

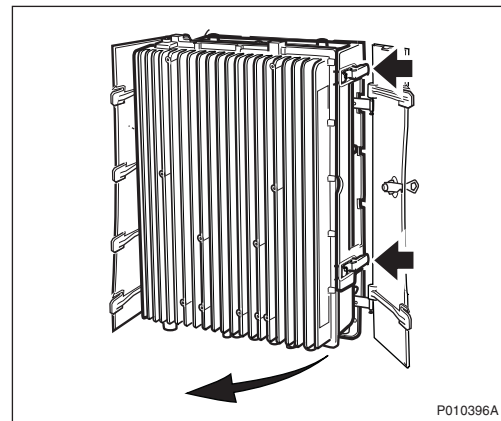
### **Taking the RBS out of Operation**

- 1 Open the sunshields.
- 2 Contact the OMC operator to obtain permission to temporarily take cells out of service. Wait until the RF off indicator (on all RRU interface panels) shows a continuous light.

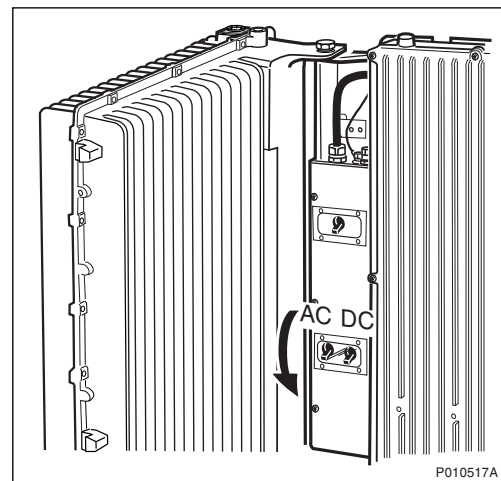
- 3 Press the Local/Remote button on the IXU to set the RBS to local mode. Wait until the local indicator on the IXU shows a continuous light.



- 4 Open the two clasps and pull the RRU to the left side, to gain access to the power switches.

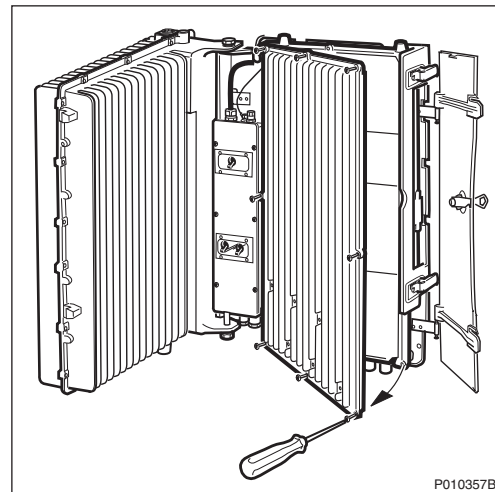


- 5 Switch off the AC Mains power and DC power supply.

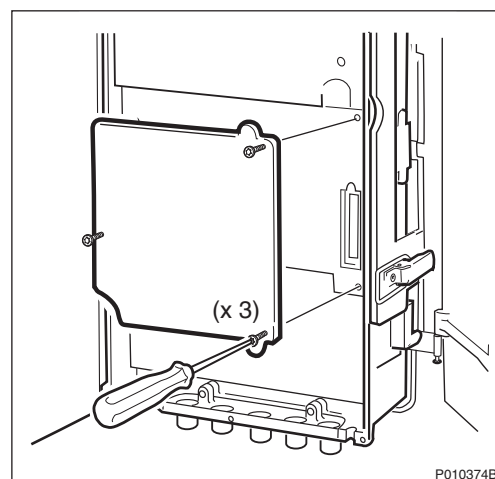


## Replacing TIM

- 6 Open the IXU cover.

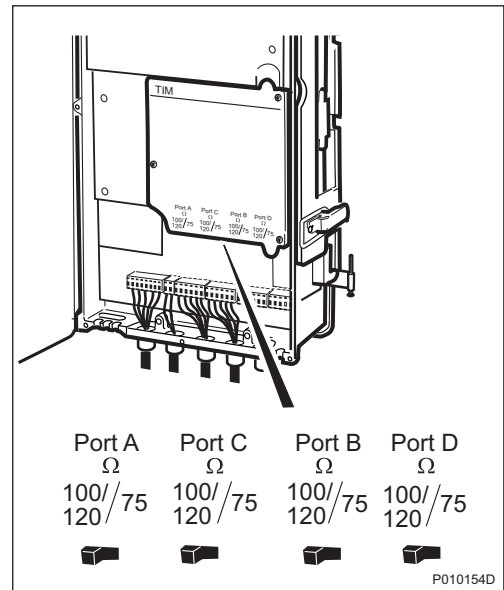


- 7 Remove the TIM after loosening the three screws securing it.





- 8 Mount the new TIM and ensure that the switches are set correctly. Tighten the screws to 1.7 Nm.



- 9 Close the IXU cover

### Taking the RBS Into Operation

- 10 Switch on the AC and DC switches.
- 11 Close the RRU.
- 12 Inform the OMC operator that the applicable cells are to be taken into service.
- 13 Press the Local/Remote button on the IXU to set the RBS to remote mode. Wait until the RF off indicator on the RRU interface panel extinguishes and the Operational indicator illuminates.
- 14 Close the sunshields.

### Handling Replaced Units

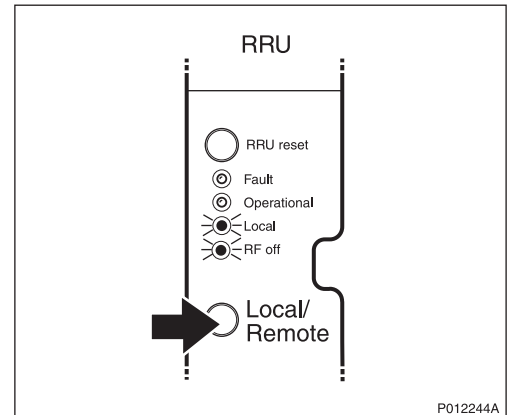
Unless under contractual warranty, after replacement, the TIM should be disposed of locally by the customer according to environmental regulations. Do not return the TIM to Ericsson for replacement, repair or disposal.

## 9.5.7 RRU Replacement

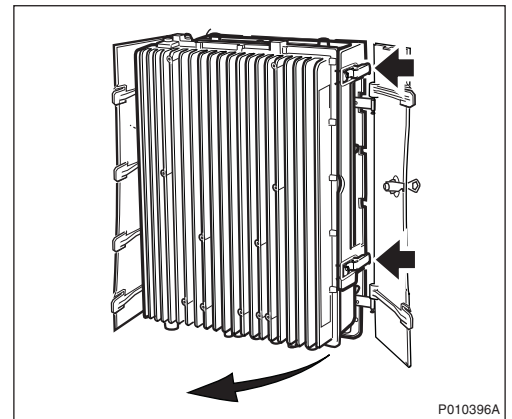
This section describes how to replace a faulty RRU.

### Taking the RRU Out of Service

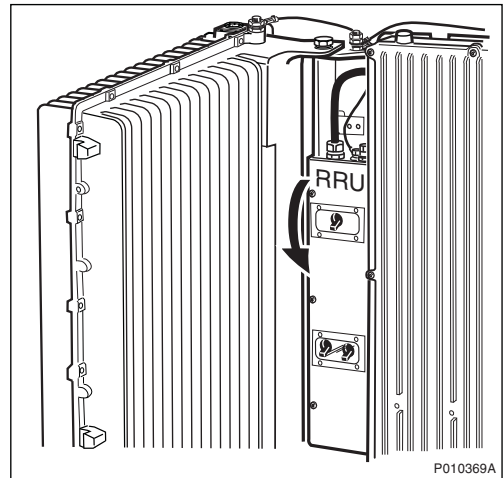
- 1 Open the sunshields.
- 2 Contact the OMC operator to obtain permission to temporarily take the TRXs connected to the RRU out of service. Wait until the RF off indicator shows a continuous light.
- 3 Press the Local/Remote button on the RRU to set the unit to local mode. Wait until the local indicator on the RRU shows a continuous light.



- 4 Open the two clasps and pull the RRU to the left side, to gain access to the power switches.



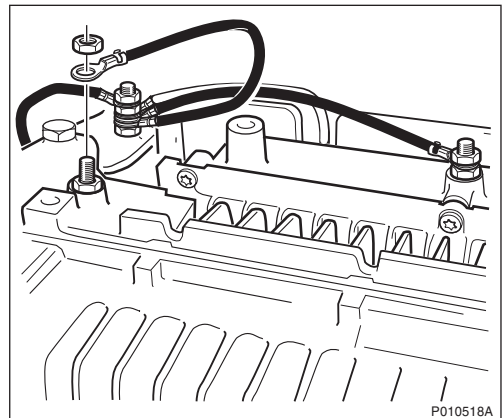
- 5 Switch off the RRU power.



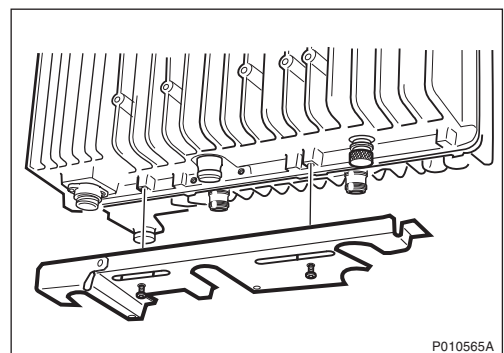
- 6 Remove any optional units mounted on the RRU, and, if applicable, the upper sunshield.

### Replacing RRU

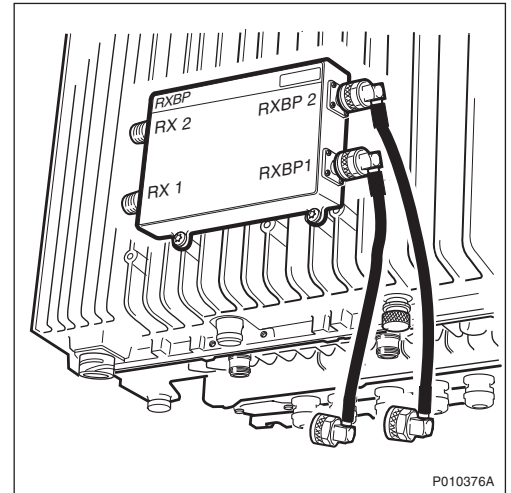
- 7 Disconnect the earth cable



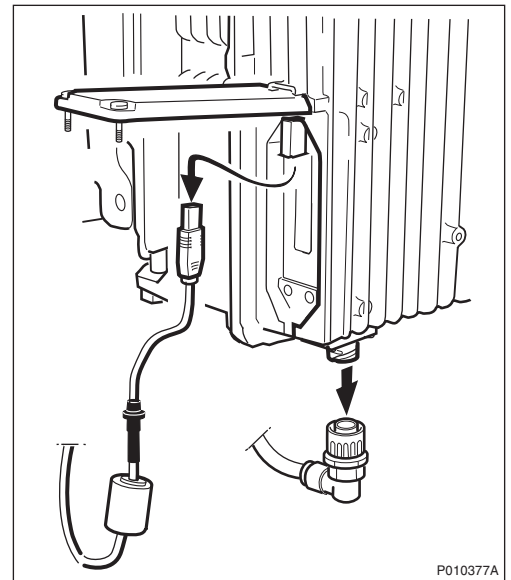
- 8 Remove the protection cover.



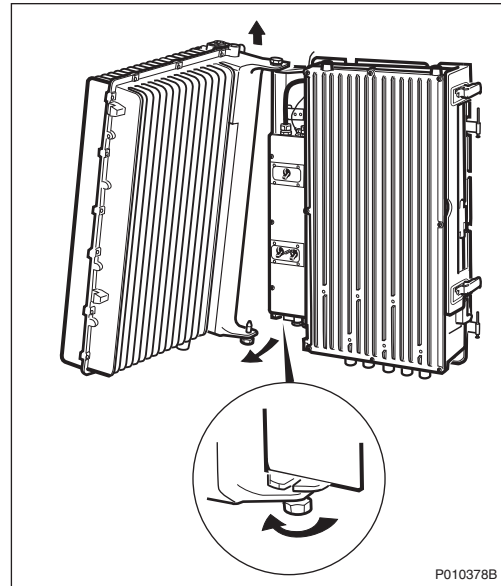
- 9 Remove the cables belonging to the RXBP (if present) from the RRU. Remove the RXBP after loosening the securing screws.



- 10 Disconnect the Y link cable and the AC/DC cable from the RRU.



- 11 Loosen the screw under the RRU and unhook the RRU.



- 12 Hang the new RRU onto the upper hinge. Position the lower hinge and tighten the screw.
- 13 Connect the earth cable, AC/DC cable and Y link cable.
- 14 Mount the RXBP (if required) and connect all cables.
- 15 Fit the protection cover under the RRU.

### Taking the RRU Into Service

- 16 Switch on the RRU power and close the RRU.
- 17 Put back the sunshield and fan unit, if present.
- 18 Inform the OMC operator that the TRXs connected to the RRU are to be taken into service.
- 19 Press the Local/Remote button on the RRU to set the unit to remote mode. Wait until the RF off indicator on the RRU interface panel extinguishes and the Operational indicator illuminates.
- 20 Close the sunshields.

### Handling Replaced Units

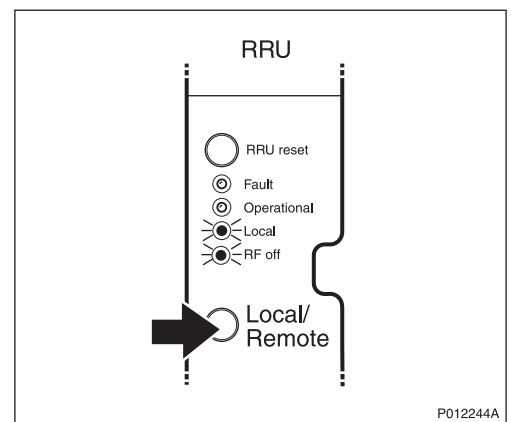
The RRU should be returned to Ericsson for repair with a repair delivery note, LZF 084 84 (Blue Tag) attached. Include a clear description of the fault found. See *Section 9.5.11 Performing Concluding Routines* on page 218 for instructions on completing a repair delivery note.

## 9.5.8 RXBP Replacement

This section describes how to replace a faulty RXBP.

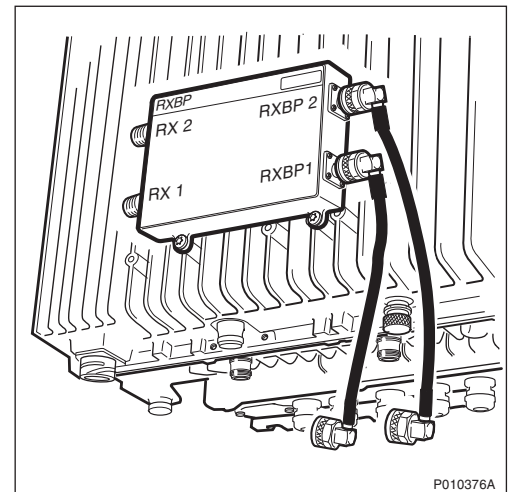
### Taking the RRU Out of Service

- 1 Open the sunshields.
- 2 Contact the OMC operator to obtain permission to temporarily take the TRXs connected to the RRU out of service. Wait until the RF off indicator shows a continuous light.
- 3 Press the Local/Remote button on the RRU to set the unit to local mode. Wait until the local indicator on the RRU shows a continuous light.



### Replacing RXBP

- 4 Remove all cables connected to the RXBP and remove it after loosening the screws securing it.



- 5 Mount the new RXBP and connect all cables.

### Taking the RRU Into Service

- 6 Inform the OMC operator that the TRXs connected to the RRU are to be taken into service.
- 7 Press the Local/Remote button on the RRU to set the unit to remote mode. Wait until the RF off indicator on the RRU interface panel extinguishes and the Operational indicator illuminates.
- 8 Close the sunshields.

### Handling Replaced Units

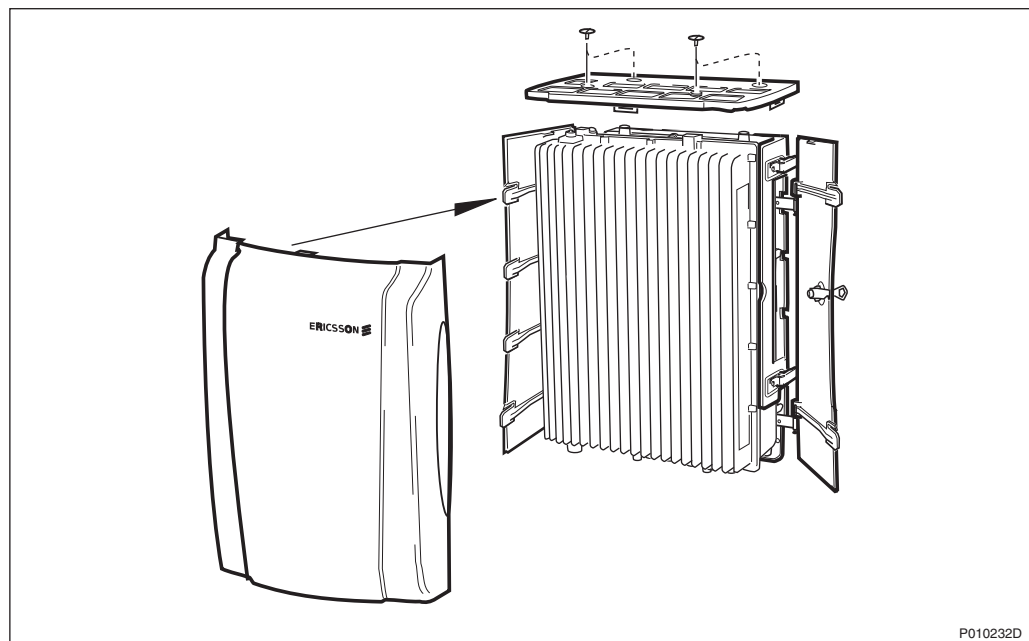
Unless under contractual warranty, after replacement, the RXBP should be disposed of locally by the customer according to environmental regulations. Do not return the RXBP to Ericsson for replacement, repair or disposal.

## 9.5.9 Sunshield Replacement

This section describes how to replace a faulty sunshield.

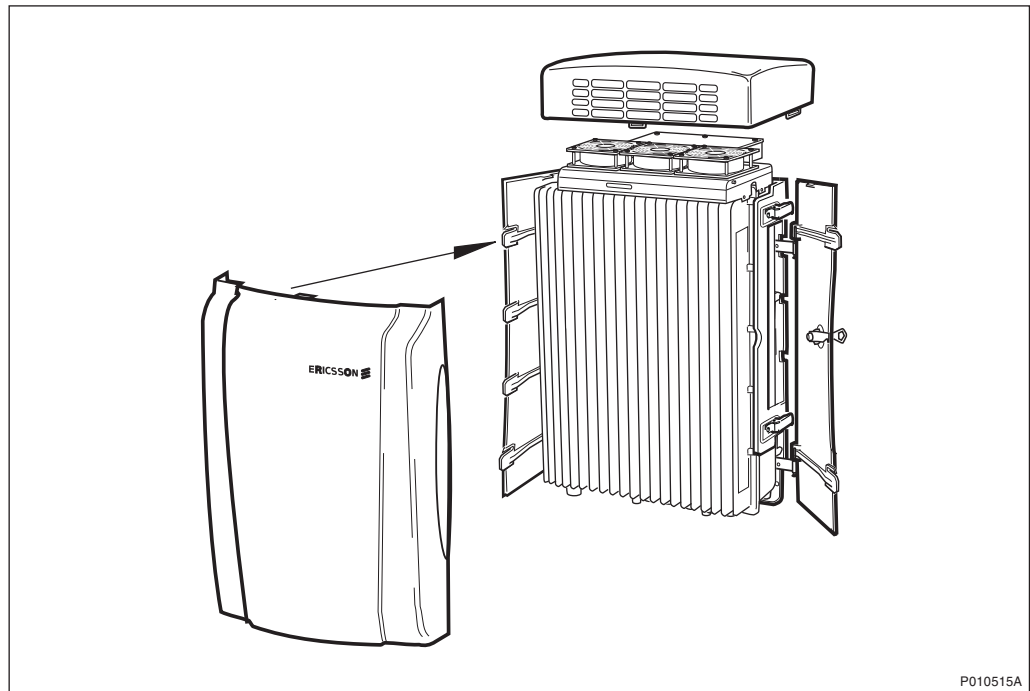
**Note:** Ericsson does not recommend removing the left and front sunshields.

- 1 Remove the faulty sunshield.
- 2 If a fan unit is not used, then install the top sunshield and fasten two screws to the RRU. If there is no RRU, then fasten the screws to the IXU instead. *see Figure below.*



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- 3 If a fan unit is used, then install the fan unit cover on top of the RRU, see *Figure below*.



- 4 Attach the front sunshield to the left sunshield.
- 5 Close the front sunshield and attach it to the top shield (fan unit cover) and to the right sunshield.
- 6 Lock the shield.

### Handling Replaced Units

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

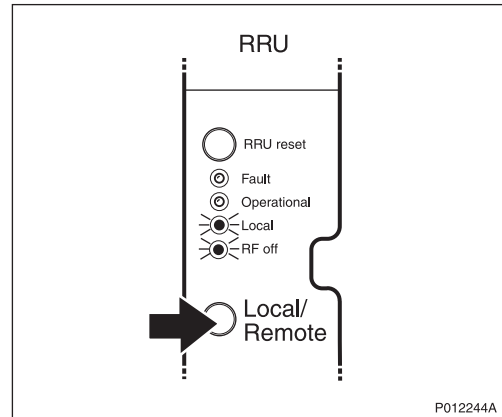
## 9.5.10 Y Link Cable Replacement

This section describes how to replace a faulty Y link cable.

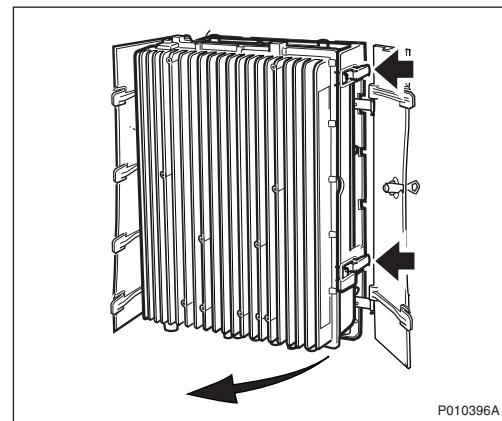


### Taking the RRU Out of Service

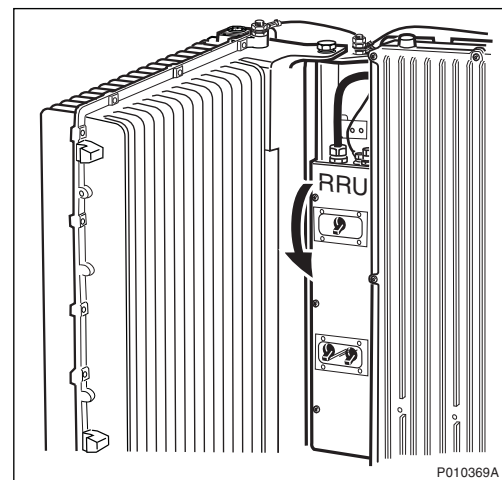
- 1 Open the sunshields.
- 2 Contact the OMC operator to obtain permission to temporarily take the TRXs connected to the RRU out of service. Wait until the RF off indicator shows a continuous light.
- 3 Press the Local/Remote button on the RRU to set the unit to local mode. Wait until the local indicator on the RRU shows a continuous light.



- 4 Open the two clasps and pull the RRU to the left side, to gain access to the power switches.

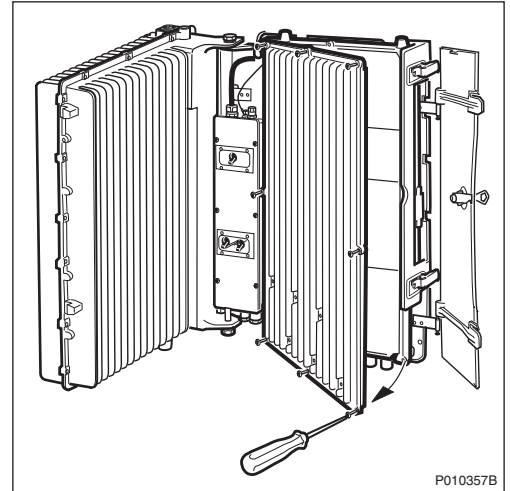


- 5 Switch off the RRU power.

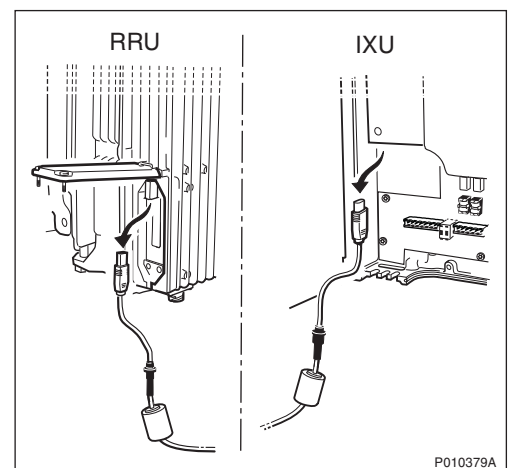


## Replacing Y Link Cable

- 6 Open the IXU cover.



- 7 Remove the faulty Y link cable from the IXU. Remove the cable from the RRU by opening the Y link cover and disconnecting it.



- 8 Connect the new Y link cable to the RRU and close the cover.  
 9 Connect the new Y link cable to the IXU and close the cover.  
 10 Switch on the RRU power and close the RRU.

## Taking the RRU Into Service

- 11 Inform the OMC operator that the RRU is to be taken into service.  
 12 Press the Local/Remote button on the RRU to set the unit to remote mode. Wait until the RF off indicator on the RRU interface panel extinguishes and the Operational indicator illuminates.  
 13 Close the sunshields.

### 9.5.11 Performing Concluding Routines

This section describes the routines to be completed before leaving the site.

**Note:** Ericsson strongly advises that when cleaning up after maintenance work on the RBS cabinet, the personnel performing maintenance pay particular attention to the environment. Recycle all waste materials that can be recycled and sort waste so that it can be disposed of according to local regulations.

*Table 61 Objects to be Recycled or Disposed of After Cabinet Maintenance*

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	

**Note:** All packing material should be recycled, and shock absorbers disposed of, in accordance with local recycling regulations.

#### Updating Site Installation Documentation

1. Check the Site Installation Documentation for deviations from the installation.
2. Update the documents with the changes that apply.
3. Send to the person responsible for Site Installation Engineering.

#### Checking RRU and IXU Indicators

This section describes how to check that the RRU and IXU indicators show the correct status, when the RBS is connected to the BSC and is fully operational. The check should be performed before leaving the site.

Check that the indicators on the RRU(s) and the IXU have the status shown in the tables below:

*Table 62 RRU Indicators After Maintenance*

<b>RRU Indicator</b>	<b>State</b>
Fault	Off
Operational	On
Local	Off
RF off	Off
AC power on	On <sup>(1)</sup>
DC power on	On <sup>(1)</sup>
RRU temp.	Off

(1) Depending on power system configuration.

*Table 63 IXU Indicators After Maintenance*

<b>IXU Indicator</b>	<b>State</b>
Fault	Off
Operational	On
Local	Off
RBS fault	Off
External alarm	Off
AC power on	On <sup>(1)</sup>
DC power on	On <sup>(1)</sup>
IXU temp.	Off
Transmission OK	On <sup>(2)</sup>

(1) Depending on power system configuration.

(2) A, B, C and/or D, depending on transmission configuration.

### **Performing Final Checks**

This section describes the checklist to be filled in after the maintenance has been completed.

The following checklist is not mandatory, but it is strongly recommended. Local procedures and safety regulation must be evaluated and included in this checklist.

Table 64 Checklist

<b>Check the following:</b>		<b>OK</b>
1	The indicators on the RRU and the IXU are in the approved status.	
2	The test equipment has been disconnected from the RBS	
3	The RBS cabinet and the mounting base are free from foreign objects.	
4	All cabinets and cables are free of damage.	
5	All EMC sealants and cable penetrations are intact.	
6	Top and bottom of cabinet are free of obstructions (for airflow).	
7	The cabinet has been locked, and the screws have been tightened.	
8	All tools have been accounted for.	
9	All paperwork has been completed.	

# 10 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.

<b>1-P</b>	One-Pair connection with echo cancellation (= two wires)
<b>2-P</b>	Two-Pair connection with echo cancellation (= four wires)
<b>AAU</b>	Active Antenna Unit
<b>Abis</b>	GSM interface standard defining attributes of the communication between the BSC and the BTS.
<b>AC</b>	Alternating Current
<b>ACB</b>	Alarm Collection Board
<b>ACCU</b>	Alternating Current Connection Unit
<b>ACCU-CU</b>	ACCU Connection Unit
<b>ACCU-DU</b>	ACCU Distribution Unit
<b>A/D converter</b>	Analog to Digital converter
<b>AFS</b>	AMR Full-rate speech
<b>AGW</b>	Abis Gateway
<b>AHR</b>	AMR Half-rate speech
<b>Air conditioner</b>	One version of the climate unit (Active cooler)
<b>AIS</b>	Alarm Indication Signal
<b>ALBO</b>	Automatic Line Build Out
<b>ALNA</b>	Antenna Low Noise Amplifier
<b>ALPU</b>	Antenna Lightning Protection Unit

<b>AMR</b>	Adaptive Multi-Rate
<b>AO</b>	Application Object
<b>ARAE</b>	Antenna Related Auxiliary Equipment
<b>ARFCN</b>	Absolute Radio Frequency Channel Number
<b>ARP</b>	Antenna Reference Point
<b>ARU</b>	Active Replaceable Unit
<b>ASIC</b>	Application Specific Integrated Circuit
<b>ASU</b>	Antenna Sharing Unit
<b>AT</b>	Alphanumeric Terminal
<b>ATRU</b>	Adaptive Transceiver Unit
<b>ATSR</b>	Air Time Slot Resource
<b>AU</b>	Antenna Unit
<b>AWG</b>	American Wire Gauge
<b>BALUN</b>	BALance and UNbalance transformer
<b>Batt</b>	Battery
<b>BB</b>	Battery Box
<b>BBS</b>	Battery Back-up System
<b>BCCH</b>	Broadcast Control CHannel  Downlink only broadcast channel for broadcast of general information at a base station, on a base station basis.
<b>BCS</b>	Block Check Sequence
<b>BDM</b>	Battery Distribution Module  The BDM is an IDM with a battery and a local processor.
<b>BER</b>	Bit Error Rate
<b>BFF</b>	Bit Fault Frequency
<b>BFI</b>	Bad Frame Indication
<b>BFU</b>	Battery Fuse Unit

<b>Bias injector</b>	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.
<b>Bm</b>	Denotes a full-rate traffic channel
<b>BPC</b>	Basic Physical Channel  Denotes the air interface transport vehicle formed by repetition of one time slot on one or more radio frequency channels.
<b>BS</b>	Base Station
<b>BSC</b>	Base Station Controller  GSM network node for control of one or more BTSs.
<b>BSCSim</b>	Base Station Controller Simulator
<b>BSIC</b>	Base Transceiver Station Identity Code.
<b>BSS</b>	Base Station System  GSM network logical unit comprising one BSC and one or more BTSs.
<b>BTS</b>	Base Transceiver Station  GSM network unit operating on a set of radio frequency channels in one cell.
<b>burst</b>	A portion of digital information, the physical content, that is transferred within the time interval of one time slot.
<b>cabinet</b>	The physical housing of a base station
<b>Cascading</b>	Connection of several cabinets by the PCM cable. Similar to serial connection.
<b>CBCH</b>	Cell Broadcast CHannel  This is a downlink only channel used by the GSM defined SMSCB function.
<b>CCCH</b>	Common Control CHannel  Channel combining the following common control channels: <ul style="list-style-type: none"> <li>• PCH Paging CHannel</li> <li>• RACH Random Access CHannel</li> </ul>



	<ul style="list-style-type: none"> <li>• AGCH Access Grant CHannel</li> </ul>
<b>CCU</b>	Climate Control Unit
<b>CDU</b>	Combining and Distribution Unit
<b>CE</b>	Conformité Européenne
<b>cell</b>	An area of radio coverage identified by the GSM network by means of the cell identity.
<b>CEU</b>	Coverage Extension Unit
<b>CF</b>	Central Functions
<b>channel</b>	<p>The common term channel denotes the virtual connection, consisting of physical and logical channels, between BSS and MS, during a call in progress.</p> <p>⇒ Logical Channel ⇒ Physical Channel</p>
<b>Channel Combination</b>	A physical channel on an air interface carrying a defined set of logical channels.
<b>Channel group</b>	A channel group is a group of dedicated logical channels to a specific MS.
<b>CM</b>	Control Module (for TMA)
<b>CMD</b>	Digital Radio Communication Tester
<b>CME 20</b>	<p>Cellular Mobile Europe</p> <p>- CME 20 Ericsson digital land mobile telecommunication system based on the GSM standards.</p> <p>- CME 201 Ericsson GSM system comprising Ericsson equipment only.</p>
<b>CMRU</b>	<p>Central Main Replaceable Unit.</p> <p>The RBS is physically connected to the Base Station Controller (BSC) via the CMRU. There is only one CMRU in each RBS.</p> <p><b>Macro</b>      CMRU = DXU</p> <p><b>Micro</b>      CMRU = The whole RBS</p> <p><b>RBS 2308</b>    CMRU = IXU</p>
<b>CMS 40</b>	Cellular Mobile System

	Ericsson digital land mobile telecommunication system based on the Joint Technical Committee (JTC) specification for PCS 1900.
<b>CNU</b>	Combining Network Unit
<b>Compr</b>	Compressor
<b>CON</b>	LAPD concentrator
	LAPD concentration is used to reduce the number of required physical links between the BSC and BTS.
<b>Config</b>	Configuration
<b>Co-siting</b>	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.
<b>CPI</b>	Communication and Power Interface
<b>CPI</b>	Customer Product Information
<b>CPU</b>	Central Processing Unit
<b>CRC</b>	Cyclic Redundancy Check
<b>CS</b>	Coding Scheme
<b>CSA</b>	Canadian Standards Association
<b>CSES</b>	Consecutive Severely Errored Second
<b>CSU</b>	Channel Service Unit
<b>CU</b>	Combining Unit (RU in CDU_D)
<b>CXU</b>	Configuration Switch Unit
<b>dB</b>	decibel
<b>dBm</b>	Decibel per 1 milliwatt
<b>DB</b>	DataBase
<b>DC</b>	Direct Current
<b>DCC</b>	Digital Cross Connector
<b>DCCH</b>	Dedicated Control CHannel
	Dedicated control channels carry signalling data.

<b>DCCU</b>	DC Connection Unit
<b>ddTMA</b>	dual duplex Tower Mounted Amplifier
<b>DF</b>	Distribution Frame
<b>DF</b>	Disturbance Frequency
<b>DFU</b>	Distribution and Fuse Unit
<b>DIP</b>	Digital Path
	The name of the function used for supervision of the connected PCM lines.
<b>DM</b>	Degraded Minute
<b>DM</b>	Distribution Module
<b>DMRU</b>	Distributed Main Replaceable Unit
	If a Main RU is subordinated to the CMRU, it is said to be distributed.
<b>downlink</b>	Signalling direction from the system to the MS.
<b>DP</b>	Digital Path
<b>DP</b>	Distribution Panel
<b>DPX</b>	Duplexer
<b>DS1</b>	Digital Signal level 1 (1544 kbit/s)
<b>DSP</b>	Digital Signal Processor
<b>DT</b>	Data Transcript
<b>DTE</b>	Data Terminal Equipment
<b>DTF</b>	Distance To Fault
<b>dTMA</b>	duplex TMA
<b>dTRU</b>	double TRAnsceiver Unit
<b>DU</b>	Distribution Unit (RU in CDU-D)
<b>DUT</b>	Device Under Test
<b>DX</b>	Direct Exchange
<b>DXB</b>	Distribution Switch Board

<b>DXC</b>	Digital Cross Connector
<b>DXU</b>	Distribution Switch Unit
<b>DXX</b>	Ericsson Cellular Transmission System including NMS
<b>E1</b>	Transmission standard, G.703, a 2048 kbit/s PCM link
<b>E-GSM</b>	Extended GSM
<b>EACU</b>	External Alarm Connection Unit
<b>EBB</b>	External Battery Backup
<b>EC1</b>	External Condition Map Class 1
<b>EC2</b>	External Condition Map Class 2
<b>ECU</b>	Energy Control Unit
<b>EDGE</b>	Enhanced Data rate for Global Evolution
<b>EDGE dTRU</b>	EDGE double TRAnsceiver Unit ⇒ EDGE
<b>EDT</b>	Electrical Down Tilt
<b>EEPROM</b>	Electrically Erasable Programmable Read-Only Memory
<b>EIRP</b>	Effective Isotropic Radiated Power
<b>EMC</b>	ElectroMagnetic Compatibility
<b>EMF</b>	ElectroMotive Force
<b>EMF</b>	ElectroMagnetic Field
<b>EMI</b>	Electromagnetic Interference
<b>ENV</b>	Environmental
<b>EOC</b>	Embedded Operations Channel
<b>EPC</b>	Environmental and Power Control
<b>ES</b>	Errored Second
<b>ESB</b>	External Synchronization Bus
<b>ESD</b>	ElectroStatic Discharge
<b>ESF</b>	Extended Superframe Format

<b>ESO</b>	Ericsson Support Office
<b>ETS</b>	European Telecommunication Standard
<b>ETSI</b>	European Telecommunication Standard Institute.
<b>EXT</b>	External
<b>FACCH</b>	Fast Associated Control CHannel Main signalling channel in association with a TCH.
<b>FCC</b>	Federal Communications Commission
<b>FCCH</b>	Frequency Correction CHannel
<b>FCOMB</b>	Filter COMBiner
<b>FCU</b>	Fan Control Unit
<b>FDL</b>	Facility Data Link
<b>FDU</b>	Feeder Duplexer Unit
<b>FER</b>	Frame Erasure Ratio
<b>FIU</b>	Fan Interface Unit
<b>FS</b>	Function Specification
<b>FSC</b>	Field Support Centre
<b>FU</b>	Filter Unit (RU in CDU-D)
<b>FUd</b>	Filter Unit with duplexer (RU in CDU-D)
<b>FXU</b>	Future Expansion Unit
<b>G01</b>	MO model for RBS 200
<b>G12</b>	MO model for RBS 2000
<b>G.703</b>	Physical/electrical characteristics of hierarchical digital interfaces, as defined by the ITU.
<b>G.704</b>	Synchronous frame structures used at 1544, 6312, 2048, 8448 and 44 736 kbit/s, as defined by the ITU.
<b>GPRS</b>	General Packet Radio Services
<b>GPS</b>	Global Positioning System
<b>GS</b>	General Specification

<b>GSL</b>	GPRS Signalling Link
<b>GSM</b>	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.
<b>GSM 800</b>	GSM system 800 MHz (generic)
<b>GSM 900</b>	GSM system 900 MHz (generic)
<b>GSM 1800</b>	GSM system 1800 MHz (generic)
<b>GSM 1900</b>	GSM system 1900 MHz (generic)
<b>HCE</b>	HDSL Central Equipment
<b>HCOMB</b>	Hybrid COMBiner
<b>HDLC</b>	High level Data Link Control
<b>HDSL</b>	High bit rate Digital Subscriber Line
<b>Heat Exchanger</b>	A version of the climate unit
<b>HEU</b>	Heat Exchanger Unit
<b>HISC</b>	Highway Splitter Combiner
<b>HLIN</b>	High Level IN
<b>HLOUT</b>	High Level OUT
<b>HMS</b>	Heat Management System
<b>HTU</b>	HDSL Terminating Unit
<b>Hum</b>	Humidity
<b>HW</b>	HardWare
<b>HWU</b>	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).
<b>I1A</b>	Internal Fault Map Class 1A

<b>I1B</b>	Internal Fault Map Class 1B
<b>I2A</b>	Internal Fault Map Class 2A
<b>IA</b>	Immediate Assignment
<b>IC</b>	Integrated Circuit
<b>ICMI</b>	Initial Codec Mode Indicator
<b>ID</b>	Identity
<b>IDB</b>	Installation DataBase
<b>IDM</b>	Internal Distribution Module
<b>IEC</b>	International Electric Commission
<b>IFB</b>	Interface Board
<b>IF Box</b>	Interface Box
<b>IMSI</b>	International Mobile Subscriber Identity
<b>INIT</b>	Initial
<b>INT</b>	Internal
<b>IOG</b>	Input/Output Group
<b>IOM</b>	Internal Operation and Maintenance bus
<b>IR</b>	InfraRed
<b>IS</b>	Interface Switch
<b>IWD</b>	InterWork Description
<b>IXU</b>	Interface and Switching Unit
<b>JTC</b>	Joint Technical Committee
<b>LAN</b>	Local Area Network
<b>LAPD</b>	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.

<b>LBO</b>	Line Build Out
<b>LED</b>	Light Emitting Diode
<b>LLB</b>	Line Loop Back
<b>LNA</b>	Low Noise Amplifier
<b>Local bus</b>	The local bus offers communication between a central main RU (DXU) and distributed main RUs (TRU and ECU).
<b>Local mode</b>	When the RU is in Local mode, it is not communicating with the BSC.
<b>Local/Remote switch</b>	A switch used by the operator to order the RU to enter Local or Remote mode.
<b>LOF</b>	Loss Of Frame
<b>Logical Channel</b>	<p>A logical channel represents a specified portion of the information carrying capacity of a physical channel.</p> <p>GSM defines two major categories of logical channels:</p> <ul style="list-style-type: none"> <li>• TCHs – Traffic CHannels, for speech or user data</li> <li>• CCHs – Control CHannels, for control signalling</li> </ul> <p>⇒ Physical Channel ⇒ Channel Combination</p>
<b>Logical RU</b>	A unit which can be referred to, but is not a single physical unit.
<b>LOS</b>	Loss Of Signal
<b>LVD</b>	Low Voltage Directive
<b>LVF</b>	Low Voltage Filter
<b>MAC</b>	Medium Access Controller
<b>MADT</b>	Mean Accumulated DownTime
<b>magazine</b>	A magazine is a reserved space in the cabinet, which may hold one or more RUs.
<b>Main RU</b>	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.
<b>MBU</b>	Mounting Base Unit



<b>MCB</b>	MultiCasting Box
<b>MHS</b>	Modification Handling System Ericsson trouble report database
<b>MiniLink</b>	Ericsson's microwave transmission system.
<b>MMI</b>	Man-Machine Interface
<b>MO</b>	Managed Object
<b>MR</b>	Measurement Receiver
<b>MRT</b>	Mean Repair Time
<b>MS</b>	Mobile Station
<b>MSC</b>	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.
<b>MSTP</b>	Mobile Station Test Point
<b>MTBF</b>	Mean Time Between Failure
<b>MTBCF</b>	Mean Time Between Catastrophe Failure
<b>Multidrop</b>	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.)
<b>N/A</b>	Not Applicable
<b>NCS</b>	National Colour System
<b>NEBS</b>	Network Equipment Building System
<b>NMS</b>	Ericsson Network Management System in DXX
<b>Nominal Power</b>	The nominal power is the power level defined when configuring the transceiver.
<b>N terminal</b>	Neutral terminal in an AC mains connection
<b>NTU</b>	Network Terminating Unit
<b>OL/UL</b>	Overlaid/Underlaid
<b>O&amp;M</b>	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.
<b>OMC</b>	Operation and Maintenance Centre
<b>OML</b>	Operation and Maintenance Link
	Layer 2 communication link for operation and maintenance services on Abis.
<b>OMT</b>	Operation and Maintenance Terminal
	The OMT is a PC application for O&M of an RBS.
<b>Operation</b>	Operation is the normal, everyday running of the RBS with full functions.
<b>OPI</b>	Operational Instructions
<b>OTU</b>	Outdoor Terminating Unit
<b>OVP</b>	OverVoltage Protection
<b>OXU</b>	Space for Optional Expansion
<b>P-GSM</b>	Primary GSM
<b>PA</b>	Power Amplifier
<b>PAM</b>	Power Amplifier Module
<b>Passive RU</b>	A passive replaceable unit has a very low level of intelligence and is independent of the processor system.
<b>PBA</b>	Printed Board Assembly
<b>PBC</b>	Power and Battery Cabinet
<b>PC</b>	Personal Computer
<b>PCB</b>	Printed Circuit Board
<b>PCH</b>	Paging CHannel
	Downlink only subchannel of CCCH for system paging of MSs.
	⇒ CCCH
<b>PCM</b>	Pulse Code Modulation

<b>PCU</b>	Packet Control Unit
<b>PDCH</b>	Packet Data Channel
<b>PE terminal</b>	Protective Earth terminal in an AC mains connection
<b>PFWD</b>	Power Forward
<b>Physical Channel</b>	<p>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.</p> <p>⇒ TDMA frame ⇒ Logical channel</p>
<b>PIB</b>	Power Interface Board
<b>PIN</b>	Personal Identification Number
<b>PLB</b>	Payload Loop Back
<b>PLMN</b>	<p>Public Land Mobile Network</p> <p>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.</p>
<b>PPE</b>	Personal Protective Equipment
<b>PREFL</b>	Power Reflected
<b>PSA</b>	Power Supply Adapter
<b>PSTN</b>	Public Switch Telephone Network
<b>PSU</b>	Power Supply Unit
<b>PWU</b>	Power Unit
<b>RACH</b>	<p>Random Access CHannel</p> <p>Uplink only subchannel of CCCH for MS request for allocation of a dedicated channel.</p> <p>⇒ CCCH</p>
<b>RAI</b>	Remote Alarm Indication

<b>RAM</b>	Random Access Memory
<b>RBER</b>	Radio Bit Error Ratio
<b>RBS</b>	Radio Base Station  All equipment forming one or more Ericsson base station.  ⇒ BTS
<b>RCB</b>	Radio Connection Box
<b>RD</b>	Receive Data
<b>Remote mode</b>	When the RU is in RU Remote mode, a link is established between the BSC and the Central Main RU (CMRU).
<b>RF</b>	Radio Frequency
<b>RFCH</b>	Radio Frequency CHannel  A radio frequency carrier with its associated bandwidth.
<b>RFTL</b>	Radio Frequency Test Loop
<b>RLC</b>	Radio Link Control
<b>RLC</b>	Repair Logistic Centre
<b>RRU</b>	Remote Radio Unit
<b>RSL</b>	Radio Signalling Link
<b>R-state</b>	Release state
<b>RS232</b>	American standard for term/MODEM interconnection.
<b>rTMA</b>	Receiver TMA
<b>RTN</b>	Return
<b>RU</b>	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.
<b>RX</b>	Receiver
<b>RX1</b>	Receiver antenna branch 1

<b>RX2</b>	Receiver antenna branch 2
<b>RXA</b>	Receiver antenna branch A
<b>RXB</b>	Receiver antenna branch B
<b>RXBP</b>	Receiver BandPass filter
<b>RXD</b>	Receiver Divider
<b>RXDA</b>	Receiver Divider Amplifier
<b>RXDP</b>	Receiver Distribution Plane
<b>RXLEV</b>	Measure of signal strength as defined in GSM:05.08:8.1.4
<b>RXQUAL</b>	Measure of signal quality as defined in GSM:05.08:8.2.4
<b>SACCH</b>	Slow Associated Control CHannel
<b>SCC</b>	Site Cell Configuration
<b>SCH</b>	Synchronization CHannel
<b>SCU</b>	Switching and Combining Unit
<b>SDCCH</b>	Stand alone Dedicated Control CHannel
	Main dedicated signalling channel on the air interface, mainly used for call locating and establishment.
<b>SE</b>	Supervised Entity
<b>SEC</b>	Site Extension Configuration
<b>SES</b>	Severely Errored Second
<b>SF</b>	Slip Frequency
<b>SID</b>	Silence Descriptor
<b>SIG</b>	Signalling
<b>SIM</b>	Subscriber Identity Module
<b>SMS</b>	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).
<b>SO</b>	Service Object

<b>SS</b>	Swedish Standard
<b>sTRU</b>	single Transceiver Unit
<b>Sub-RU</b>	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.
<b>SVS</b>	System Voltage Sensor
<b>SW</b>	SoftWare
<b>SWR</b>	Standing Wave Ratio
<b>SYNC</b>	Synchronous
<b>T1</b>	Transmission standard, G.703, a 1544 kbit/s PCM link
<b>TA</b>	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.
<b>TC</b>	Transaction Capabilities
<b>TCB</b>	Transceiver Control Board
<b>TCH</b>	Traffic CHannel  The traffic channels carry either encoded speech or user data.
<b>TCH/F</b>	Traffic Channel, Full-rate
<b>TCH/H</b>	Traffic Channel, Half-rate
<b>TCC</b>	Transmission Coherent Combining
<b>TCH SIG</b>	Traffic CHannel Signalling
<b>TD</b>	Transmit Data
<b>TDMA</b>	Time Division Multiple Access  Multiplexing of several channels in a common frequency band. Each channel is assigned a certain time division, a time slot.
<b>TDMA frame</b>	GSM air interface time frame comprising eight time slots.

<b>TEI</b>	Terminal Endpoint Identifier
	TEI is an identification code carried by a LAPD frame as a terminal connection endpoint within a Service Access Point (SAP).
<b>TEMS</b>	TEst Mobile Station
<b>TF</b>	Timing Function
<b>TG</b>	Transceiver Group
<b>TIM</b>	Transmission Interface Module
<b>Timing bus</b>	The timing bus carries air timing information from the timing unit in the DXU to the TRUs.
<b>TLS</b>	Terrestrial Link Supervision
<b>TM</b>	Transport Module
	The Transport module is non-RBS equipment belonging to the transport network.
<b>TMA</b>	Tower Mounted Amplifier
<b>TMA-CM</b>	Tower Mounted Amplifier – Control Module
<b>TN</b>	Time slot Number
<b>TN O&amp;M</b>	Transport Network Operation and Maintenance (in general)
<b>TRA</b>	Transcoder Rate Adapter
	The TRA Unit (TRAU) in BSC performs transcoding of speech information and rate adaptation of data information.
<b>TRS</b>	Transceiver System
<b>TRU</b>	Transceiver Unit
<b>TRX</b>	Transceiver (combined transmitter and receiver)
<b>TRXC</b>	Transceiver Controller
<b>TS</b>	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
<b>TT</b>	Total Time
<b>TU</b>	Timing Unit
<b>TX</b>	Transmitter
<b>TXA</b>	Transmitter Antenna A
<b>TXB</b>	Transmitter Antenna B
<b>TXBP</b>	Transmitter BandPass filter
<b>TXU</b>	Radio Transmitter Unit
<b>UAS</b>	Unavailable Seconds
<b>UAST</b>	UnAvailable STate supervision
<b>UL</b>	Underwriter Laboratories
<b>uplink</b>	Signalling direction from the MS to the system.
<b>UPS</b>	Uninterrupted Power Supply
<b>VCO</b>	Voltage Controlled Oscillator
<b>VSWR</b>	Voltage Standing Wave Ratio RF signal measure. The quotient between transmitted and reflected voltage.
<b>X bus</b>	The X bus carries transmit air data frames between transceivers.
<b>Y link</b>	The interface between the DXU and each DSP System in core based TRUs.