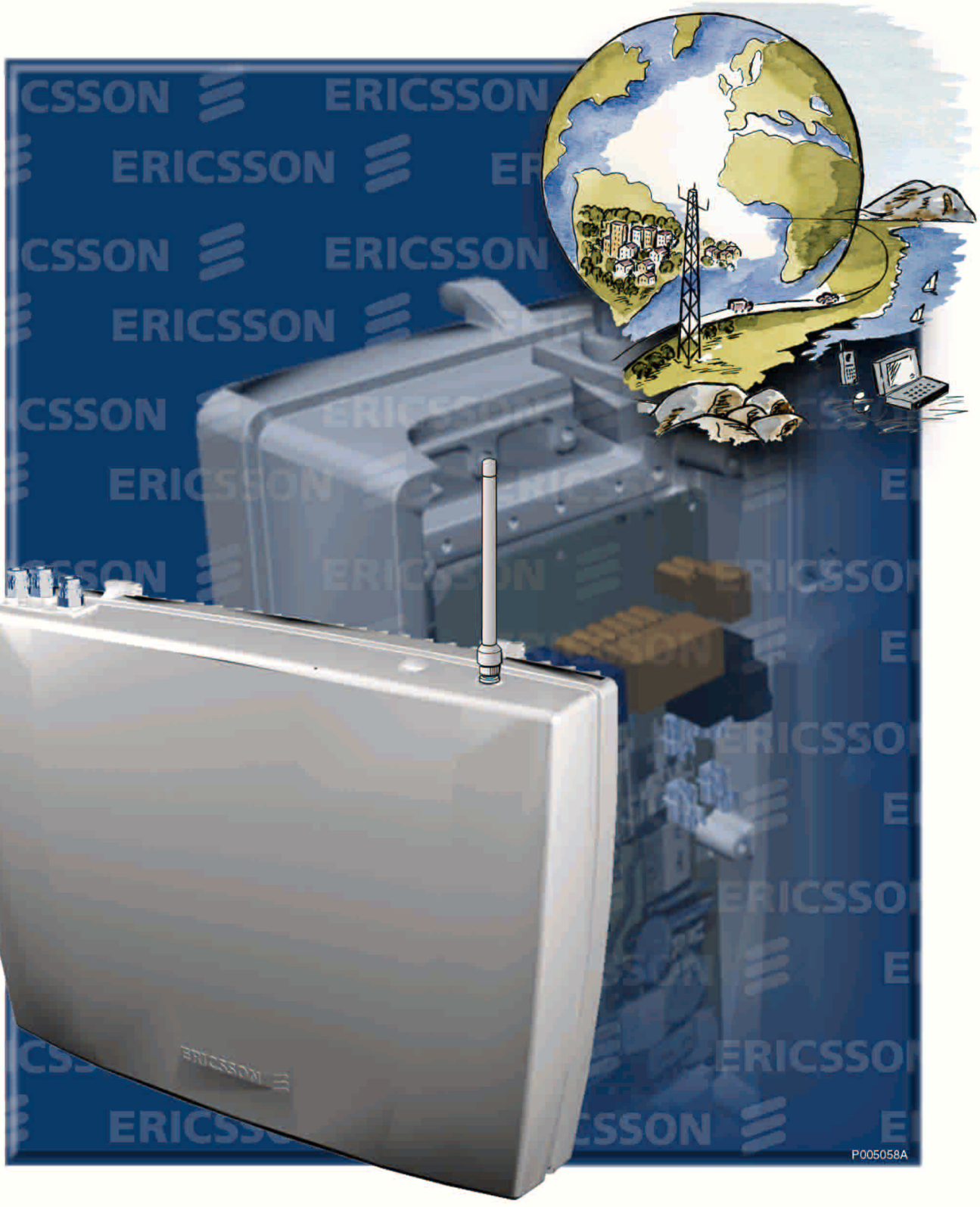

Ericsson GSM System

RBS 2401 User´s Guide

ERICSSON

LZN 302 14 R3A

RBS 2401 User's Guide

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

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1 Introduction

The RBS 2401 is a pico base station intended for indoor installation. It is equipped with two low power transceivers and an optional omnidirectional antenna.

The small dimensions mean indoor coverage for GSM 900, GSM 1800 and GSM 1900 with a minimum of space required.

This User's Guide contains instructions for installation, tests, and maintenance of the RBS 2401.

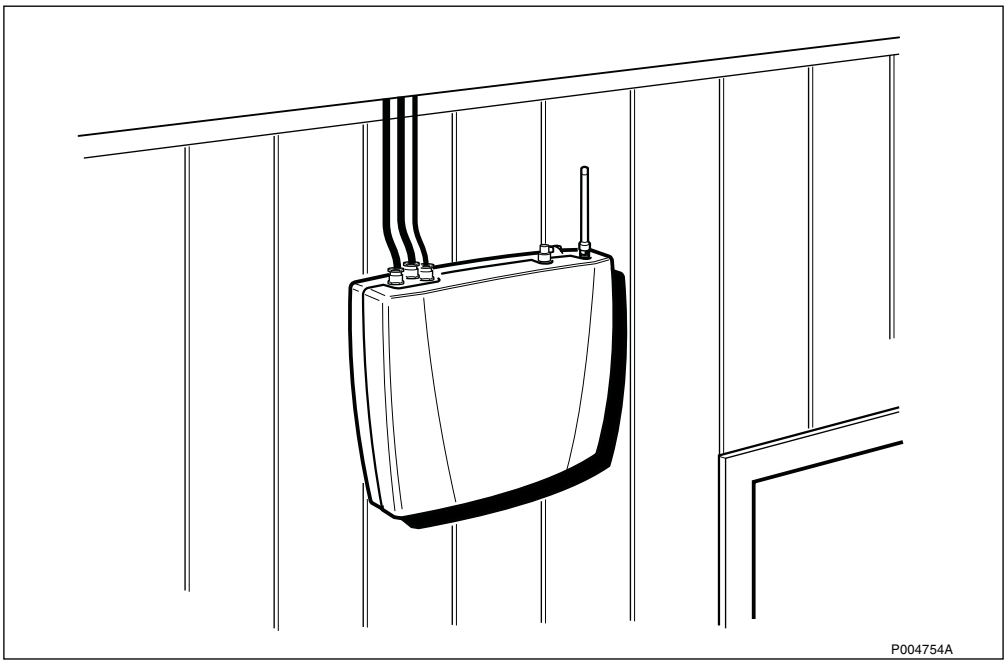

Figure 1 RBS 2401 mounted on a wall

1.1 Competence Requirements for Work with RBS 2401

In order to do the installation, test, and maintenance work according to this manual, the work shall be done by a skilled person.

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

Competence Requirements for Installation

- Basic workshop mechanics background.
- Able to read assembly drawings, and cable drawings.
- A basic knowledge about electrical matters.
- Basic understanding of technical English.

Competence Requirements for Test and Maintenance

- Well experienced radio and mobile telephone communication technician.

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- A basic knowledge of Ericsson materials.
- Good understanding of technical English.

1.2 Release History

Except editorial changes such as correction of spelling, grammar, and layout, this manual has been revised as follows:

1.2.1 R1A to R2A

- Information affecting several chapters:
  - Information about HDSL module included.
  - Information about AGW module included.
- Chapter “Safety” has been modified.
- Chapter “Maintenance and Spare Parts”:
  - Section “Fault Localisation” extended.
  - Section “Preventive Maintenance” added.
- Chapter “Glossary” has been modified.

1.2.2 R2A to R3A

- Information affecting several chapters:
  - Data for GSM 1900 has been included.
- Chapter “Site Planning and Product Data”:
  - New heading “ Site Requirements and Product Data”.
  - Subsection “Technical Data” has been updated.
  - Subsection “Transmission” has been revised.
  - Section “HDSL Module Product Data” has been revised.
- Chapter “Installation and Tests”:
  - Subsection “Tools for Installation”: tools list has been extended.
  - Subsection “Unpacking”: set of cable glands added.
  - Subsection “Connecting Cables” has been revised.
  - Subsection “Extension and Reconfiguration” has been revised.
  - Subsection “Installation and Test of Optional AGW” has been restructured.
  - Subsection “Installation of AGW” has been revised.
  - Subsection “Installation and Test of Optional HDSL Module” has been restructured.

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  - Subsection “Installation of HDSL Module” has been revised.
  - New subsection “Test through HDSL (Optional Test)” has been added.
  - Subsection ”Repair Delivery Note (Blue Tag)”: fill-in instructions added.

- Chapter “Maintenance and Spare Parts”:
  - Section “Tools for Maintenance”: Tools list has been extended.
  - Subsection “HDSL Module” has been revised.
  - Subsection ”Repair Delivery Note (Blue Tag)” has been modified
  - Section “Spare Parts” has been updated.
- Chapter “Glossary” has been updated.

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2 Safety Instructions

This chapter shows the system used for presenting safety information.

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

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

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

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

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

2.1 Warnings

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

Figure 2 Hazard symbol

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

DANGER

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

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WARNING

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

CAUTION

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

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

Figure 3 Radio frequency radiation

Figure 4 Electrical hazard

Figure 5 Electrostatic discharge

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

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

2.2 Notes

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

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2.3 Electrical Hazards

High Voltage

DANGER

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

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

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

DANGER

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

Cable Markings

CAUTION

Verify that the cable markings correspond before connecting cables.

Faulty Electric Tools

WARNING

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

Drilling

WARNING

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

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

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Thunderstorms

DANGER

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

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

2.3.1 Electrostatic Discharge, ESD

CAUTION

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

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

Handling of printed board assemblies and IC components

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

Storing and Transporting printed board assemblies and IC Components

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

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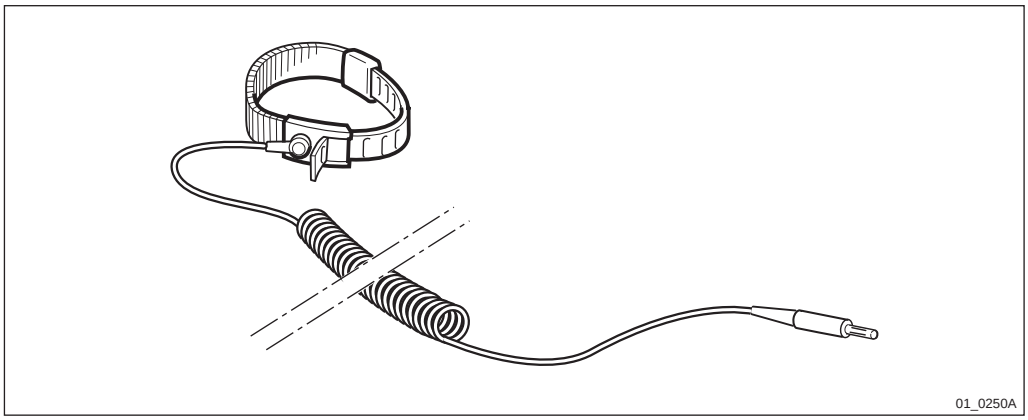

Figure 6 ESD wrist strap LYB 250 01/14

DANGER

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

2.4 Working at Heights

WARNING

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

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

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

2.4.1 Rules and Advice for the Safe Use of Ladders

- Make sure that the ladder is undamaged and has been approved for use.

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- Do not overload the ladder.

The following types of ladders must be guyed or otherwise secured

- Leaning ladder longer than 5m.
- Free-standing ladder with a platform and knee-support, and with over 2 meters height to the platform.
- Any other free-standing ladder longer than 3m.

Positioning the ladder

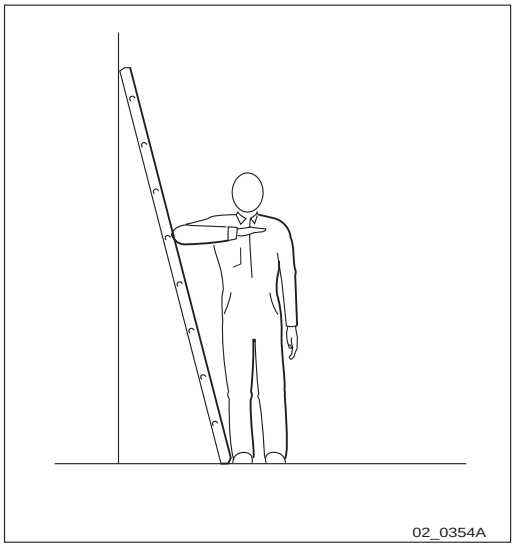

Figure 7 Checking the angle

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

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Climbing and using the ladder

Figure 8 Climbing the ladder

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

2.5 Radio Frequency Radiation

CAUTION

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

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

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2.6 Other Hazards

Fire

WARNING

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

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

Sharp Edges

WARNING

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

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3 Site Requirements and Product Data

3.1 Site Requirements

3.1.1 Preconditions

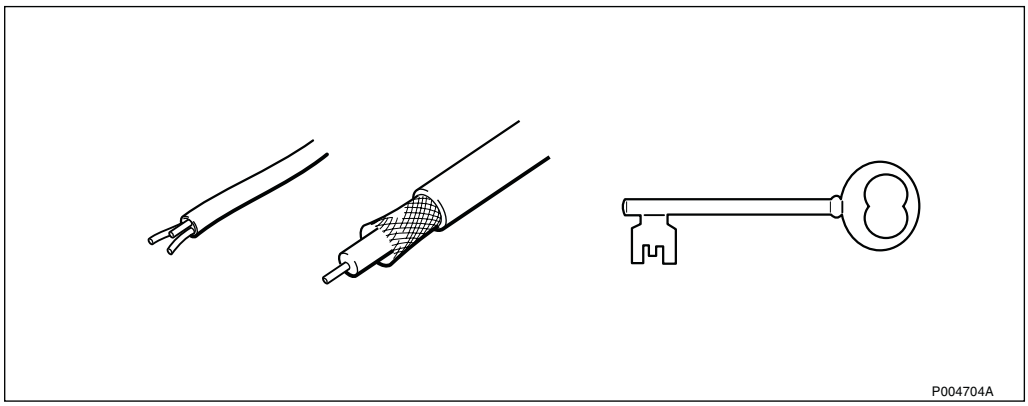

Figure 9

- Access to AC mains power.
- Access to transmission network.
- Access to site premises.

3.1.2 Environmental requirements

Required Space for Service

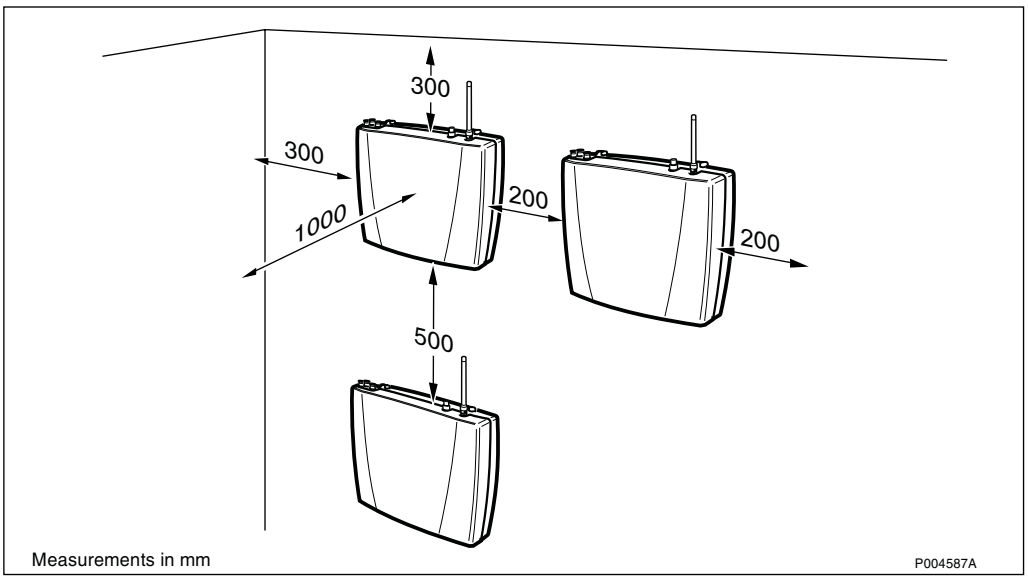

Figure 10

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Climatic Endurance

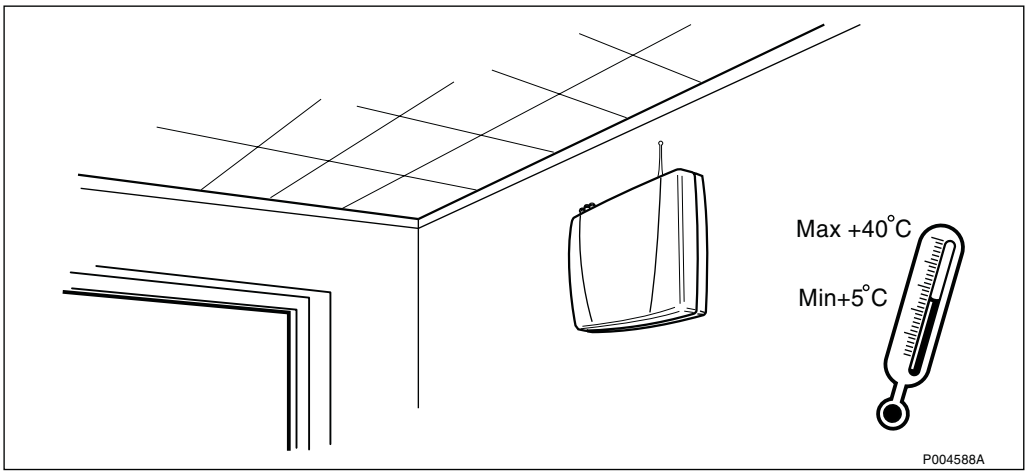

Figure 11

3.1.3 Antenna System

There are two alternatives:

- External antenna (if available)
- Omnidirectional antenna (optional)

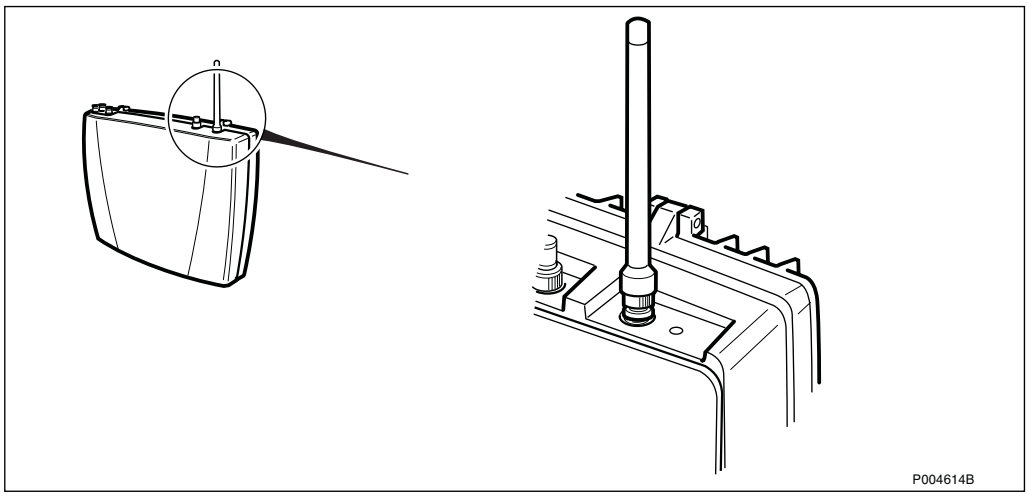

Figure 12 RBS 2401 with omnidirectional antenna (optional) mounted

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3.2 Product Data RBS 2401

3.2.1 Main Units

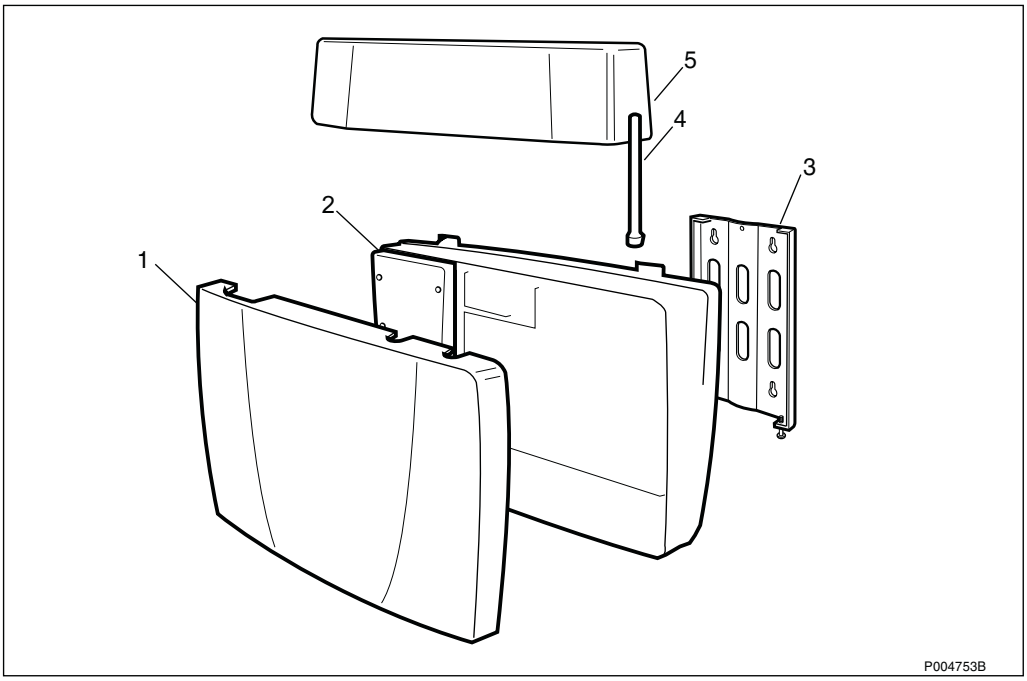

Figure 13 RBS 2401 main units

1 Front cover

2 Radio cabinet

3 Wall bracket

4 Omnidirectional antenna (Optional)

5 HDSL or AGW module (Optional)

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3.2.2 Technical Data

Dimensions

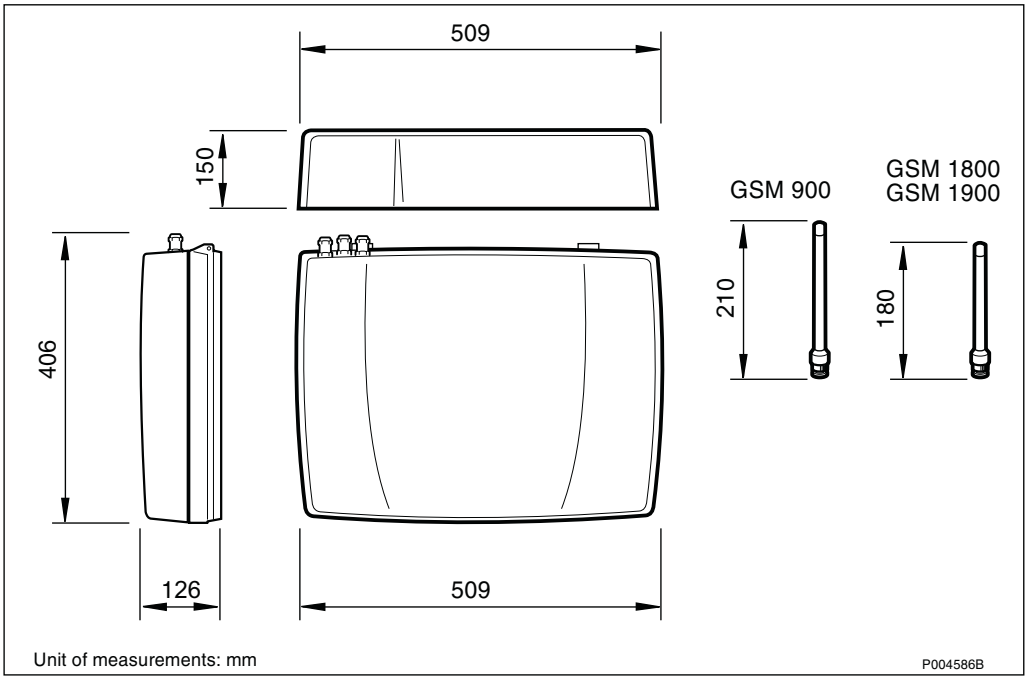

Figure 14 Dimensions and weight

Weight

Cabinet (incl. wall bracket	19 kg
HDSL module	2.8 kg
AGW module	2.6 kg

Temperature and Humidity Limits

	Operation	Transport	Storage
Temperature	+5 to +40 °C	-40 to +70 °C	-25 to +55 °C
Rel. humidity	10 to 85 %RH		

Soundless Operation

RBS 2401 does not make any noise when in operation.

Resistance against Vibrations

The RBS 2401 withstands vibrations below 0.2 g.

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Power Supply

Mains voltage, single-phase:

100 - 127 V AC ±10 %, 60 Hz ±8 %

200 - 250 V AC ±10 %, 50 Hz ±10 %

200 V AC ±10 %, 60 Hz ±8 %

RBS 2401 is automatically adapted to any voltage within the operating range 100 - 127 V AC, and 200 - 250 V AC.

Power Consumption

RBS 2401:	< 83 VA
RBS 2401 with AGW/HDSL:	< 90 VA

Cable Glands

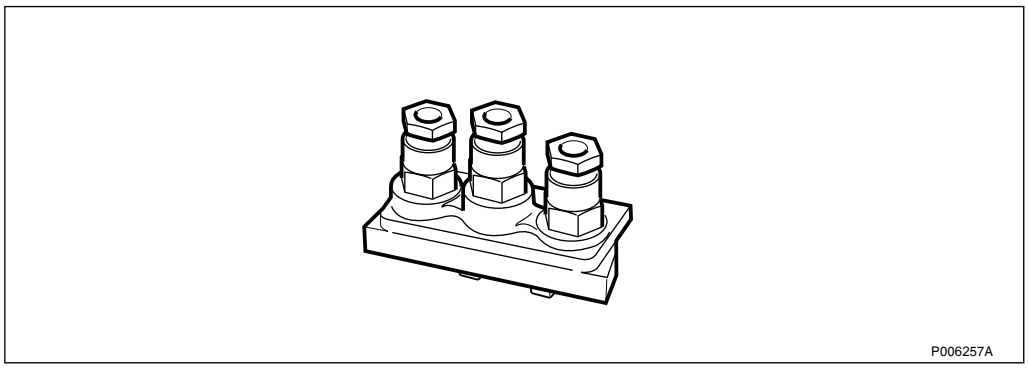

Figure 15 Cable glands mounted on the cabinet

Cable glands for AC mains cable and transmission cables are delivered mounted on the cabinet.

Alternative cable glands are provided, to be used if the existing does not fit the actual cable.

Max. cable gland capacity: ∅15 mm.

AC Mains Connection

Type of connection: Clamp terminal 2 x max. 2.5 mm^2, and screw terminal used for protective earth.

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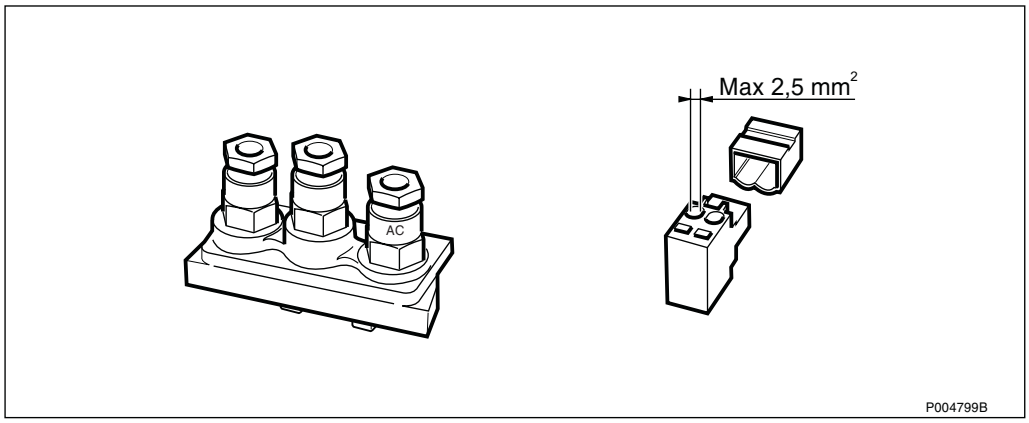

Figure 16 AC mains connection

AC Mains Limiting Values

Table 1 AC mains limiting values

Frequency	Short circuit current	Inrush current/phase (typical 10 ms)
50 Hz	max. 50 A	< 5 kA
60 Hz	max. 60 A	< 5 kA

3.2.3 Transmission

Transmission Cables

RBS 2401 can be connected to transmission interface type E1, using two coaxial cables 75 Ω, or E1/T1 using four-wire twisted pair 100/120 Ω.

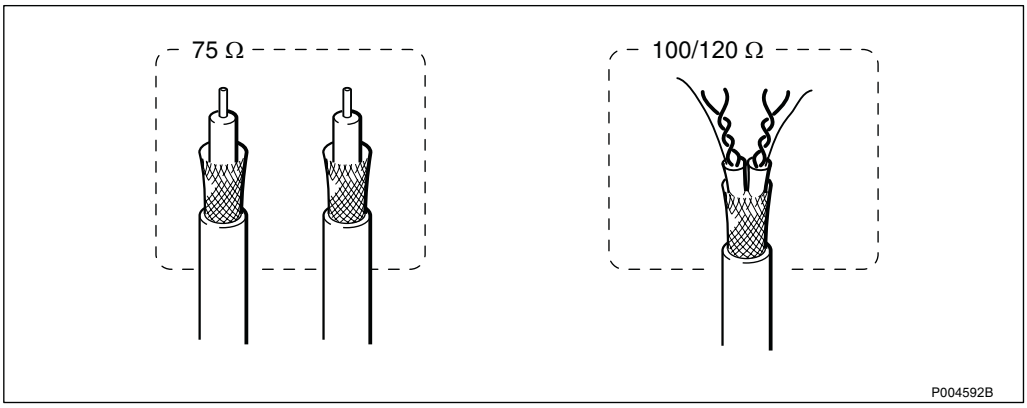

Figure 17 Transmission cables

For E1 transmission interfaces, different impedances are used depending on network operator or application:

- Unbalanced coaxial cable, impedance 75 Ω
- Balanced twisted pair cable, impedance 120 Ω

For T1 transmission interfaces a balanced twisted pair cable with impedance 100 Ω is required.

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Interfaces

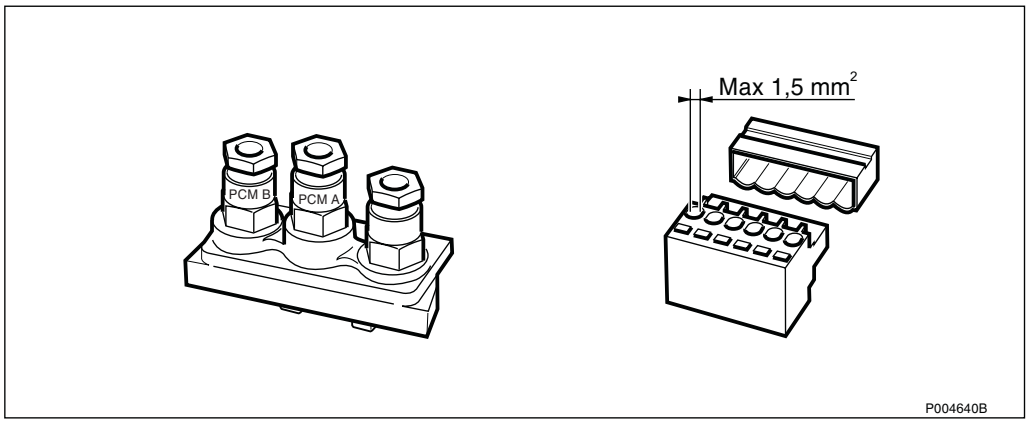

Figure 18 Cable glands and clamp terminal for transmission cables

The RBS 2401 is equipped with two transmission ports, PCM-A and PCM-B, with separate input and output pairs:

- PCM-A IN
- PCM-A OUT
- PCM-B IN
- PCM-B OUT

Type of connection: Two clamp terminals, each 6 x max. 1.5 mm^2.

Note: According to CSA C22.2 No. 950/UL 1950 (USA and Canada), maximum allowed PCM cable dimension: ∅ 0.4 mm (AWG 26).

Cascade Connection

The figure below shows five cascaded RBSs.

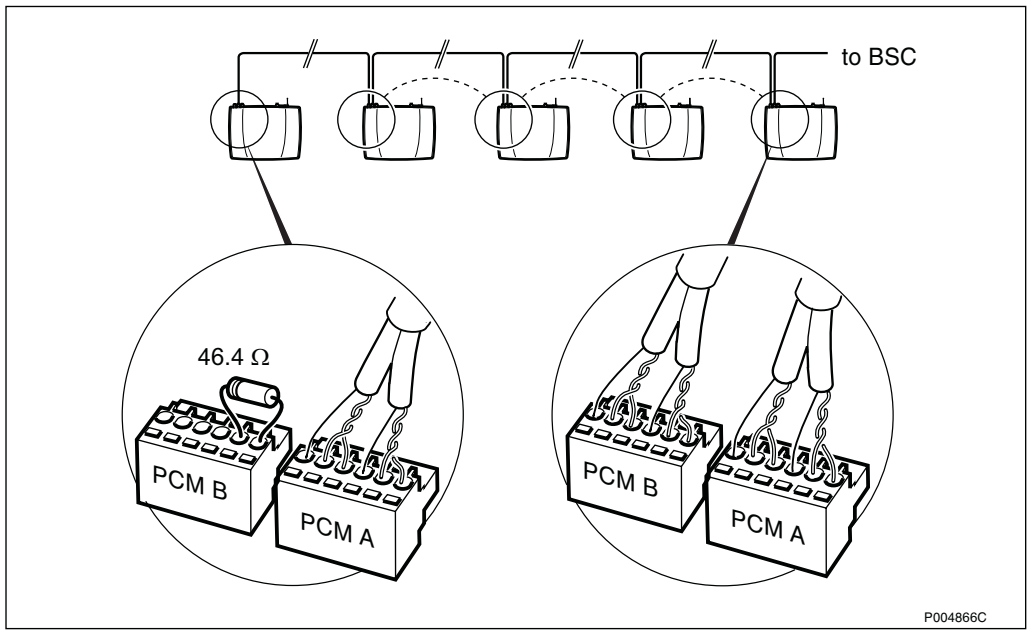

Figure 19 Cascade connection

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3.2.4 Omnidirectional Antenna (Optional)

Note: The omnidirectional antenna should not be used together with an HDSL or AGW module, due to the risk of interference.

If an HDSL or AGW module is installed, an external antenna should be used.

Both TRXs of the RBS 2401 are connected to both antenna outputs.

Antenna connectors: 2 x TNC, coaxial.

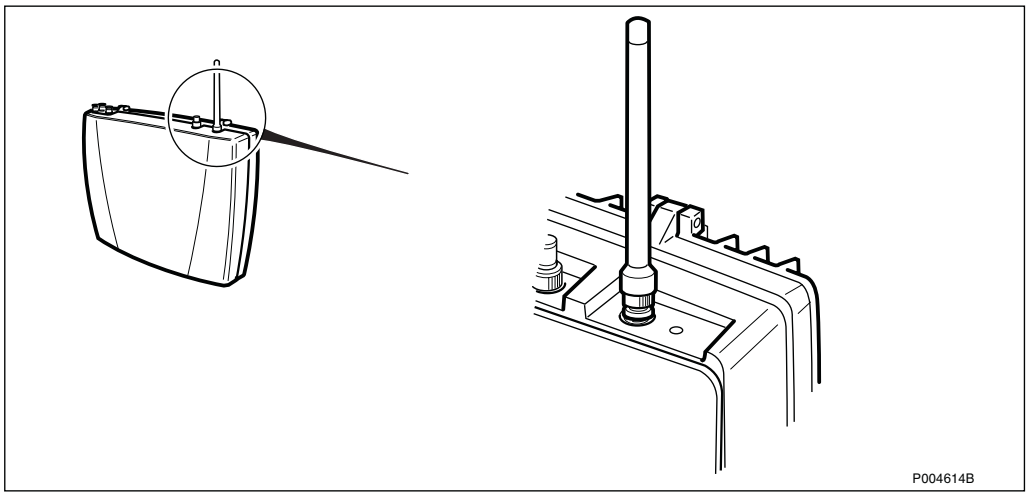

Figure 20 RBS 2401 with omnidirectional antenna

The antenna connector not used is terminated with a 50 Ω resistor.

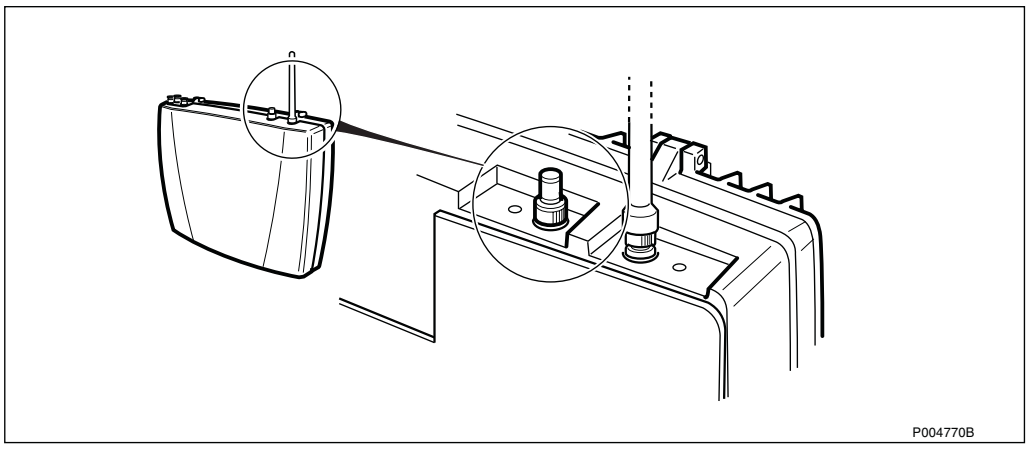

Figure 21 Unused antenna connector terminated

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3.3 Product Data HDSL Module

Dimensions and Weight

See Section 3.2.2 Technical Data on page 24.

Temperature and Humidity Limits

Same limits as for RBS 2401.

Soundless operation

The HDSL module does not make any noise when in operation.

Resistance against vibrations

Same limits as for RBS 2401.

Interfaces

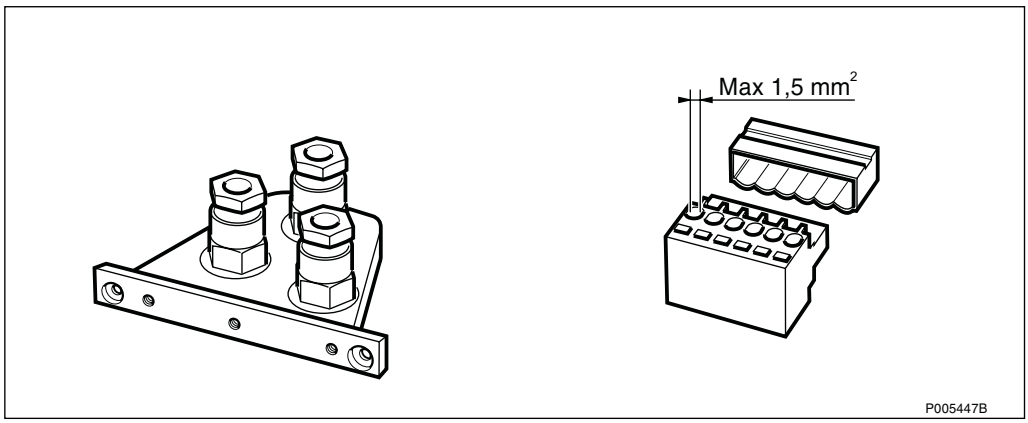

Figure 22 Cable glands and clamp terminal for transmission cables

The HDSL module is equipped with two transmission ports: one HDSL and one E1.

The table below lists the cascade configurations that can be used.

Table 2

CONFIG	HDSL (M3)	PCM
#1	US 1 OR 2 PAIR	DS OR NC
#2	US 1 OR 2 PAIR	US
#3	US & DS 1 PAIR	NC

Cable Glands

Cable glands for AC mains cable and transmission cables are delivered mounted on the module.

Alternative cable glands are provided, to be used if the existing does not fit the actual cable.

Max. cable gland capacity: ∅15 mm.

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Transmission Range

The tables below list the transmission range for different cables and noise levels.

Table 3 Maximum cable attenuation and length with 0.4 mm 37 nF/km cable. The cable attenuation is 9.1 dB/km at 150 kHz.

	0.4 mm 37nF/km 9.1 dB/km					
	no noise		**5µV/√(Hz) ie. -6 dB**		**10 µV/√(Hz) ie. 0 dB**	
line rate (kbit/s)	**maximum cable length (km)**	**maximum attenuation at 150 kHz (dB)**	**maximum cable length (km)**	**maximum attenuation at 150 kHz (dB)**	**maximum cable length (km)**	**maximum attenuation at 150 kHz (dB)**
2320	4.0	36	3.0	27	2.4	22
1168	5.2	47	4.2	38	3.6	33
592	5.4	49	4.8	43	4.2	38

Table 4 Maximum cable attenuation and length with 0.5 mm 40 nF/km cable. The cable attenuation is 6.6 dB/km at 150 kHz.

	0.5 mm 40 nF/km 6.6 dB/km					
	no noise		**5µV/√(Hz) ie. -6 dB**		**10 µV/√(Hz) ie. 0 dB**	
line rate (kbit/s)	**maximum cable length (km)**	**maximum attenuation at 150 kHz (dB)**	**maximum cable length (km)**	**maximum attenuation at 150 kHz (dB)**	**maximum cable length (km)**	**maximum attenuation at 150 kHz (dB)**
2320	5.0	33	3.9	26	3.4	23
1168	7.0	46	5.7	38	5.0	33
592	7.5	50	6.9	46	6.0	40

Note: 10µV/√(Hz) is the noise level according to the ETSI Technical Specifications TS 101 135. 5µV/√(Hz) is a 6 dB lower noise level.

For planning the HDSL transmission network following should be considered:

By using the attenuation values in the 10µV/√(Hz) noise level column, an undisturbed and reliable operation can be obtained on most connections. The attenuation values in the “no noise” column shall be considered as theoretical values.

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3.4 Product Data AGW Module

Dimensions and Weight

See Section 3.2.2 Technical Data on page 24.

Temperature and Humidity Limits

Same limits as for RBS 2401.

Soundless operation

The AGW module does not make any noise when in operation.

Resistance against vibrations

Same limits as for RBS 2401.

Interfaces

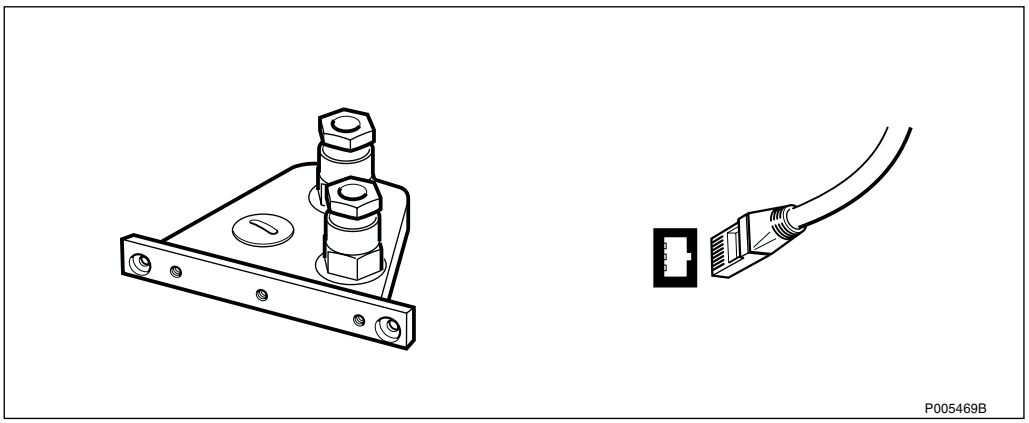

Figure 23

The AGW module is equipped with one transmission terminal (modular for connection to Ethernet LAN).

Cable Glands

Cable glands for AC mains cable and transmission cable are delivered mounted on the module.

Alternative cable glands are provided, to be used if the existing does not fit the actual cable.

Max. cable gland capacity: ∅15 mm.

Cascade Connection

It is not possible to arrange a cascade connection when using the AGW module.

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4 Installation and Tests

4.1 Tools and Instruments

Note: Only instruments that are year 2000 compliant may be used.

4.1.1 Tools for Installation

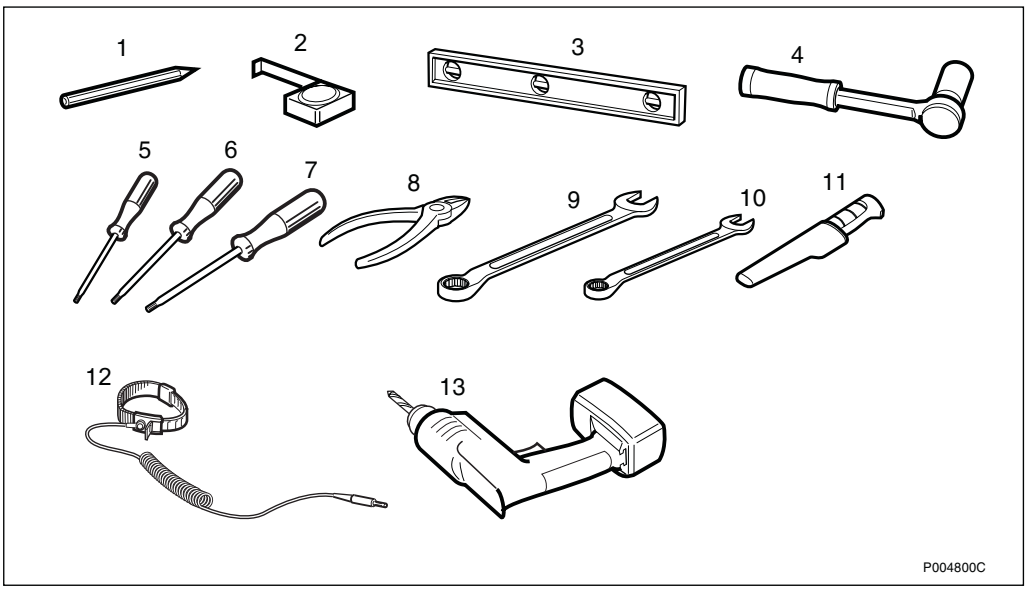

Figure 24

Table 5 Tools for installation

Item	Description	Product No.
1	Pencil	(1)
2	Measuring tape	(1)
3	Spirit level	(1)
4	Ratchet wrench with 3/8" socket set	(1)
5	Screwdriver, 3 mm wide	(1)
6	Screwdriver, TORX Tx10	(1)
7	Screwdriver, TORX Tx20	(1)
8	Side cutting plier	(1)
9	U-ring wrench 16 mm	(1)
10	U-ring wrench 19 mm	(1)
11	Knife	(1)
12	ESD wrist strap	(1)
13	Cordless hammer drill machine tool set:	
	- 220 V	LTT 601 12/2
	- 115 V	LTT 601 12/1

(1) Included in LTT 601 96/1, Personal Installation Tool Kit.

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4.1.2 Test Equipment

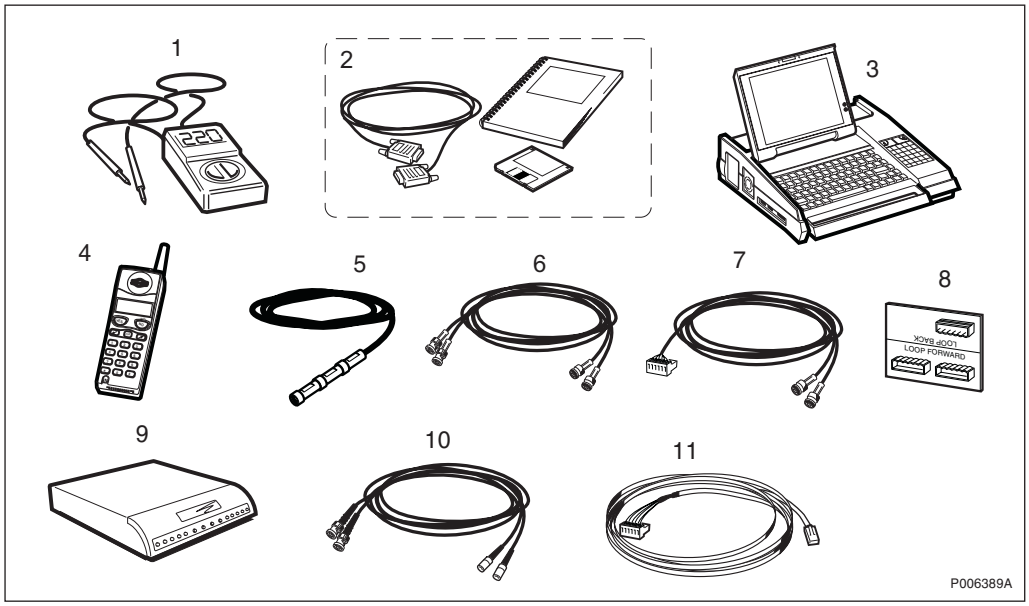

Figure 25

Table 6 Tools and instruments

Test	Tools		
	Item	**Description**	**Product Number**
AC Mains Power Test	1	Fluke 8060 Multimeter	LPK 102 024/1
Check IDB	2	OMT Kit, including: - 9 pin D-sub male to female - User's Guide - OMT SW	NTM 201 2289/1 RPM 113 463 LZN 302 01 LZY 213 1034/1
MS Test Call using BSCSim II (Optional)	3	BSCSim II Kit, including: - BSCSim II platform - BSCSim II application software - Cable Kit - User's Guide	LPP 106 35/04
	4	TEMS Kit for GSM 900 TEMS Kit for GSM 1800 TEMS Kit for Dual Band GSM 900/1800 The TEMS Kit includes: - Test Mobile Phone - User's Manual for TEMS SW - TLL Converter - MS Cable(1) - Connector Cable	LPP 112 01/1 LPP 112 02/2 LPP 11212/1

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Test	Tools		
	Item	**Description**	**Product Number**
	5	Cable Kit, including: - C27 MS cable - Ad21 Adapter - 3 x A21 Attenuator 30 dB, 2 W	NTM 201 2216/1
	6	Cable C40 (E1 75 Ω)	RPM 113 413 4134/1
	7	Cable C41 (T1 100 Ω, E1 120 Ω)	RPM 113 413 4135/1
Transmission Test (Optional)	8	CB21 (Loop forward/backward connection board)	LPY 107 757/1
MS Test Call with BSC connection	4	TEMS Kit as specified above.	See above
Test through HDSL	3	BSCSim II Kit	See above
	4	TEMS Kit as specified above.	See above
	9	Martis DXX HTU-2M	ZAT 759 20/101
	10	Cable C6	RPM 113/773/1
	11	Cable C5	RPM 113/774/1

(1) Only for TEMS Dual Band GSM 900/1800

Using the OMT SW and TEMS SW

In order to minimise the tools required at site, a PC with the following minimum capacity is required:

- Intel 486 processor
- 66 MHz
- 16 MB RAM
- Microsoft Windows version 95/NT

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4.2 Installation of Radio Cabinet

4.2.1 Installation Procedure Overview

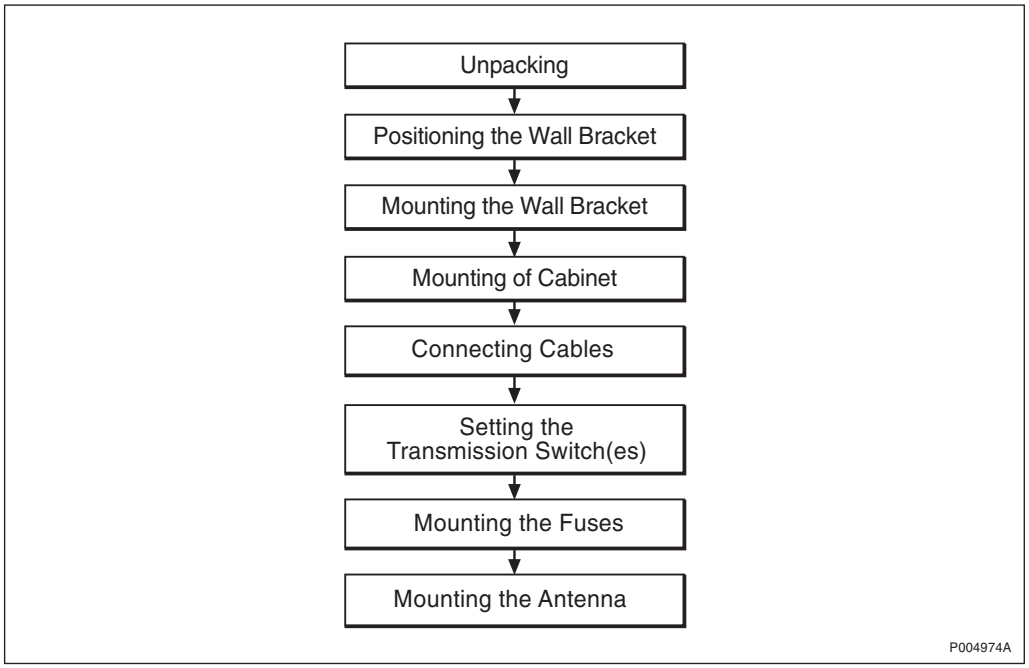

Figure 26

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4.2.2 Unpacking

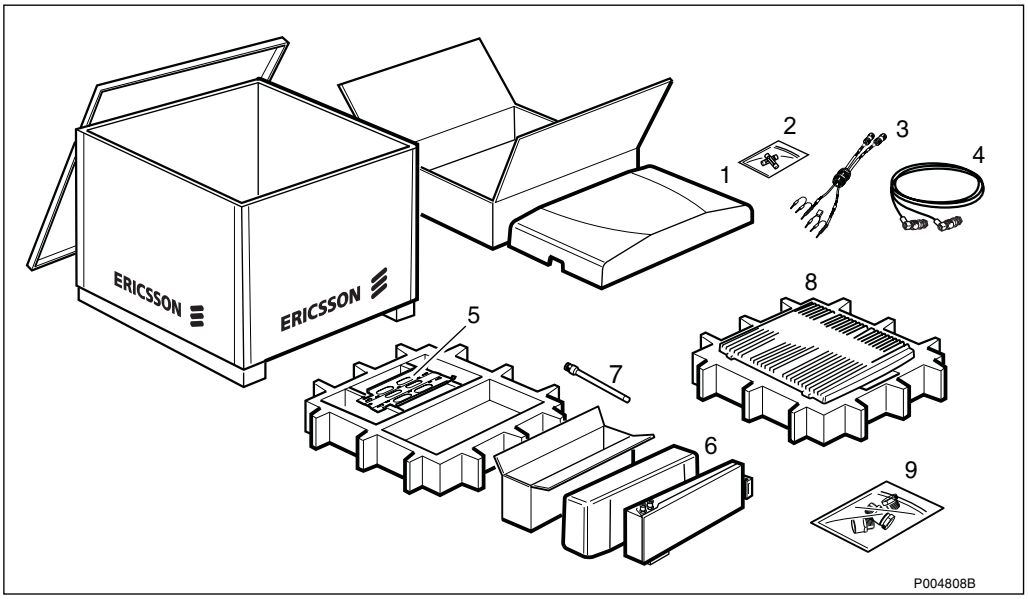

Figure 27

1 Front cover

2 Fuses and holder

3 PCM cable (Optional)

4 Jumper cable, length = 1 m (Optional)

5 Wall bracket

6 HDSL or AGW module or (Optional)

7 Antenna (Optional)

8 Radio cabinet

9 Set of cable glands to be used if the existing cable glands does not fit the actual cable dimension (see Figure 28 on page 38):

Cable gland size	Quantity
∅5 - 9 mm	2
∅7 - 15 mm	1

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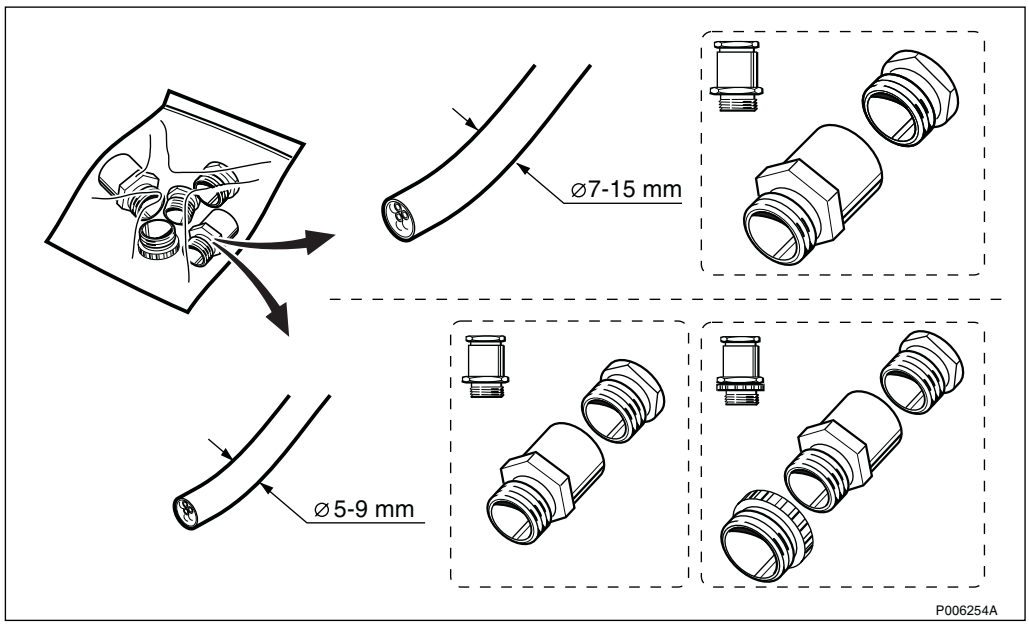

Figure 28 Alternative cable glands

4.2.3 Mounting the Radio Cabinet

Mounting the Wall Bracket

1. Find the correct position for the radio cabinet by defining the position of the reference screw for the wall bracket.

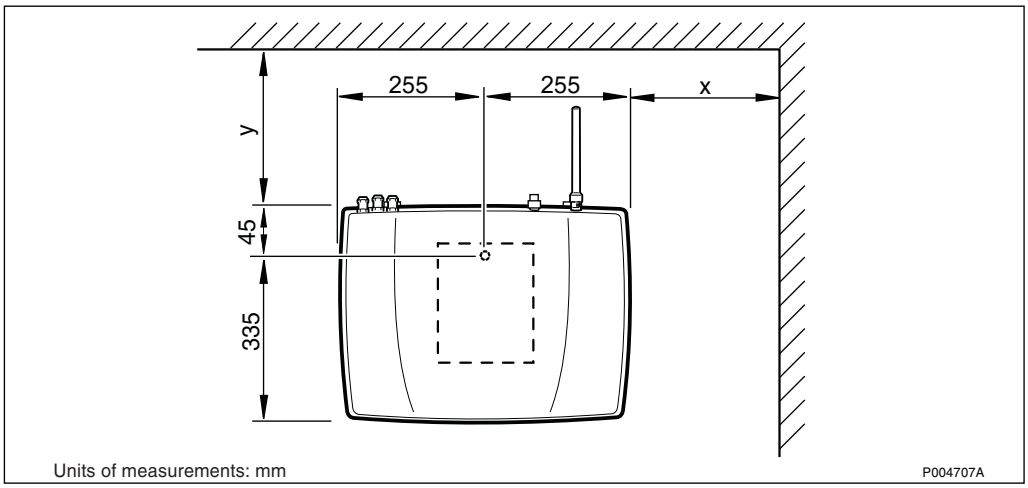

Figure 29 Defining the position of the radio cabinet in relation to the wall bracket reference screw

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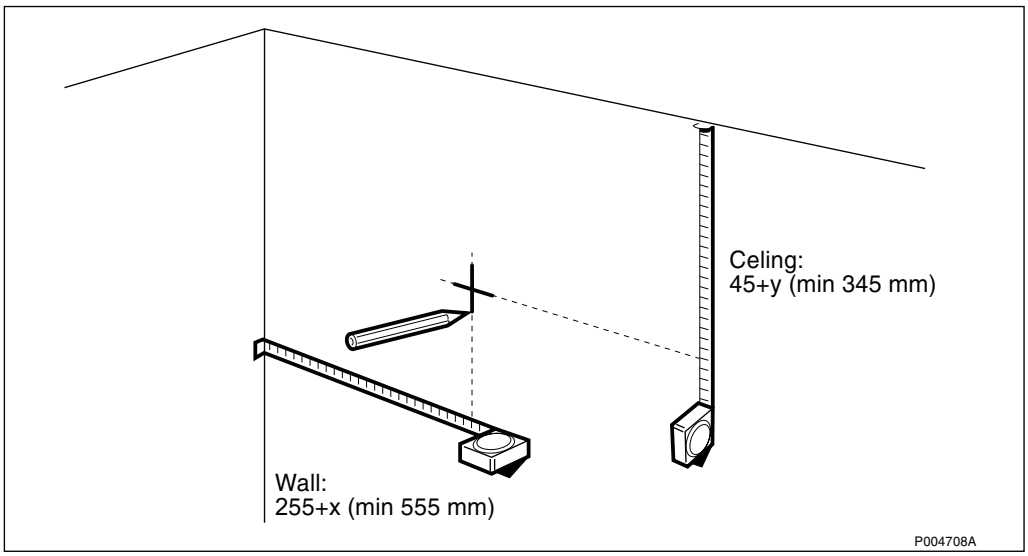

Figure 30 Marking out the position of the reference screw for the wall bracket

2. Place the wall bracket in position with the reference screw.

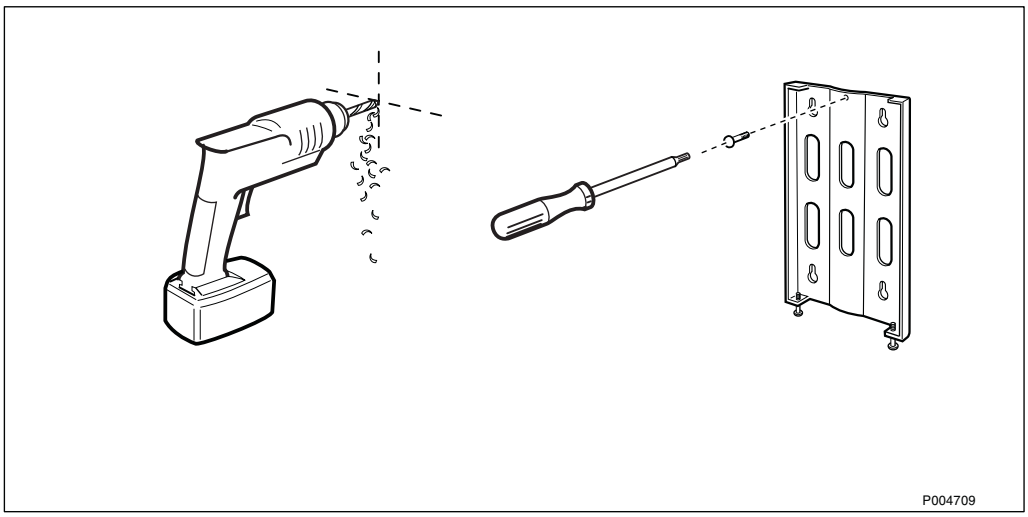

Figure 31

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3. Level the wall bracket, and mark the holes for the four fastening screws.

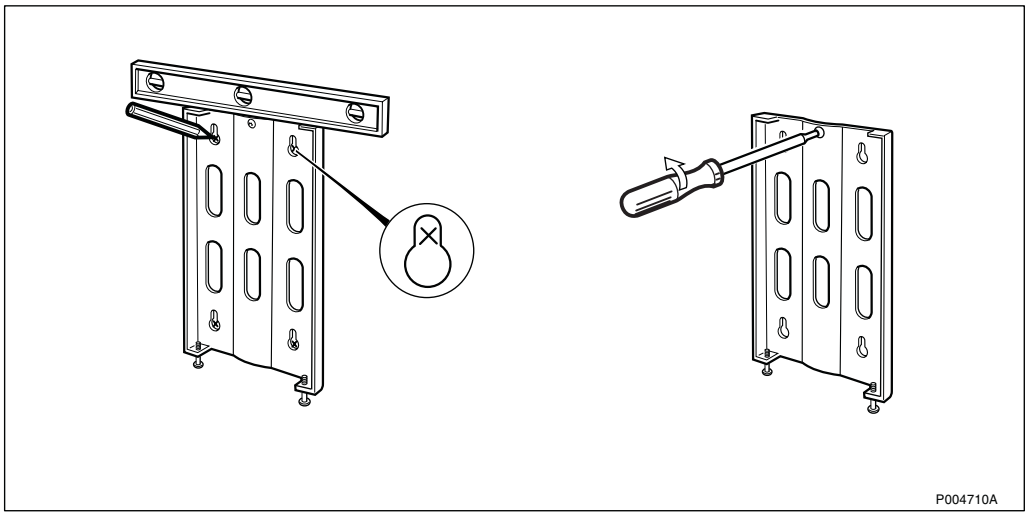

Figure 32

4. Mount the wall bracket.

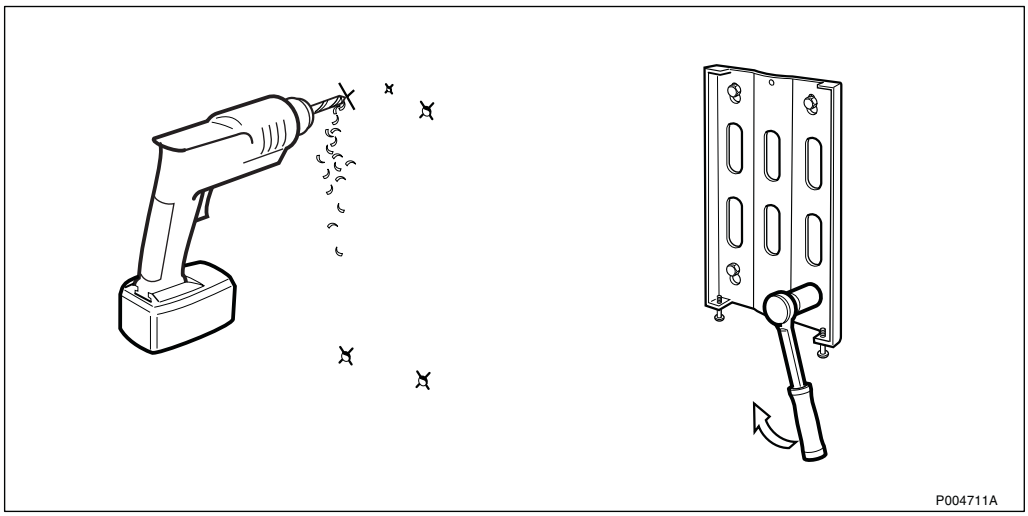

Figure 33

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Mounting the Cabinet on the Wall Bracket

5. Mount the radio cabinet on the wall bracket.

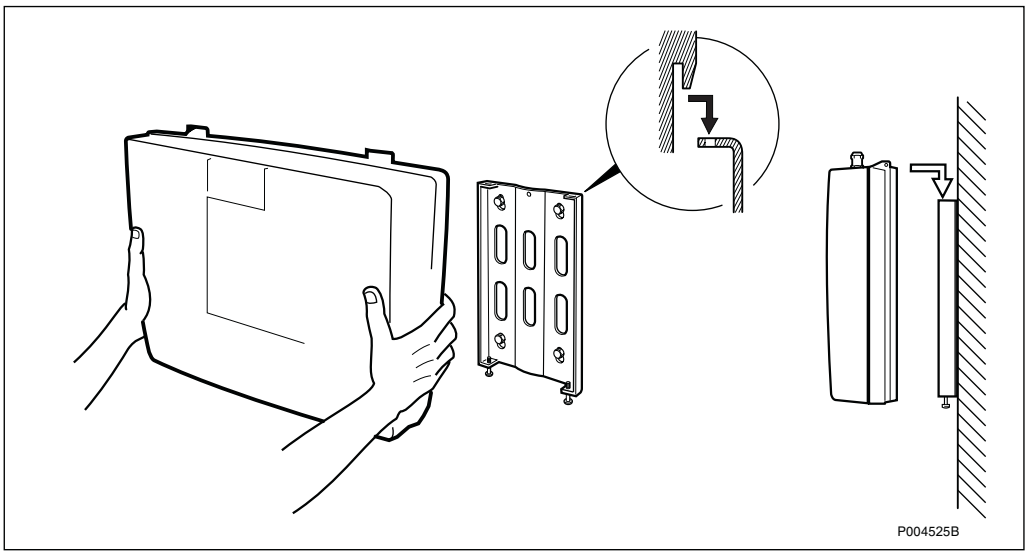

Figure 34

6. Secure the radio cabinet on the wall bracket with the two screws.

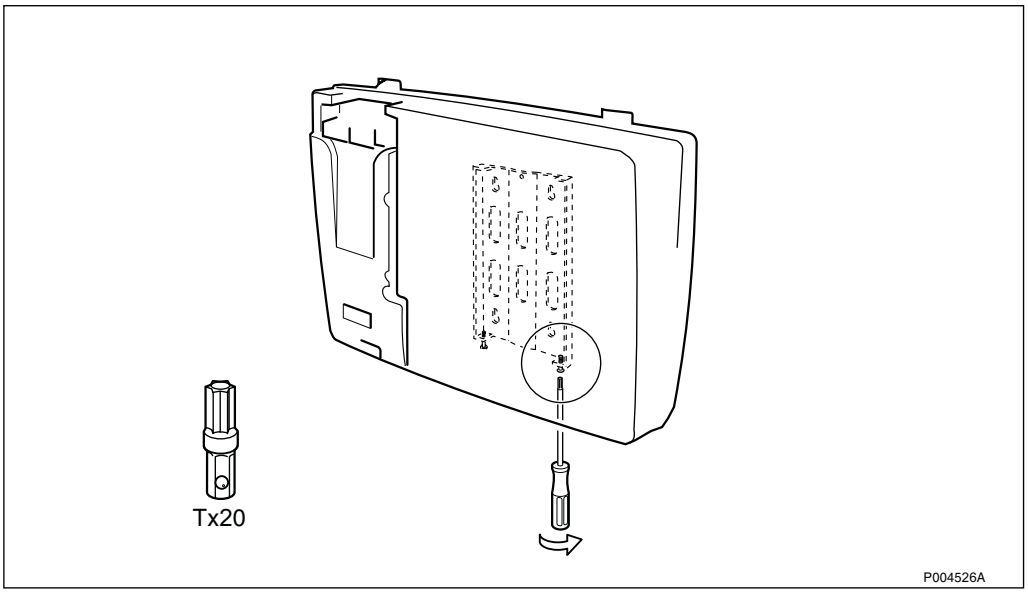

Figure 35

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4.2.4 Connecting Cables

DANGER

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

DANGER

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

CAUTION

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

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1. Remove the installation box cover.

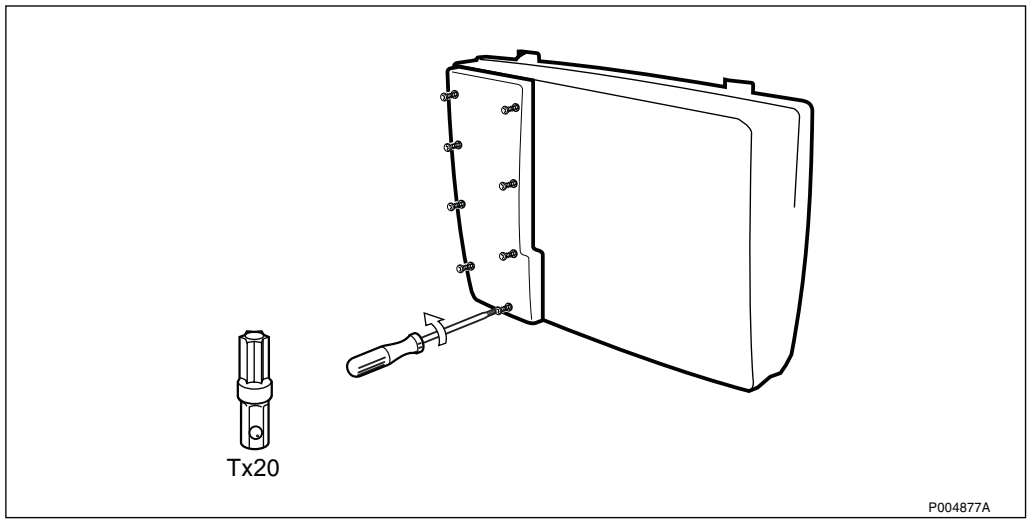

Figure 36

2. Connect the ESD wrist strap.

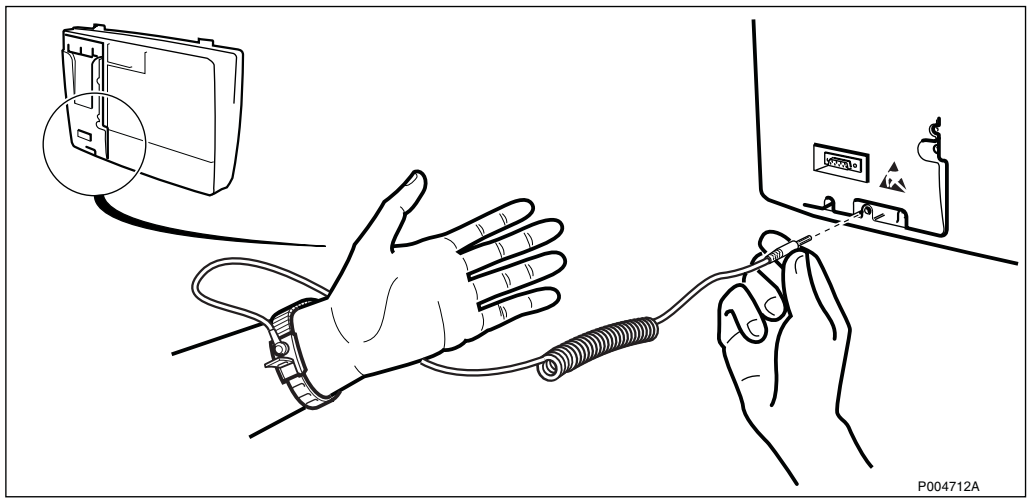

Figure 37

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3. Dismount the cable gland plate

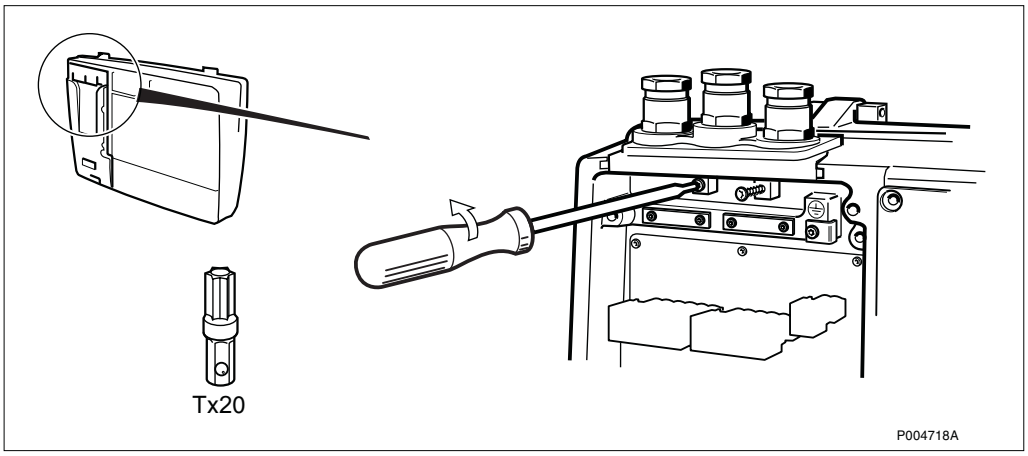

Figure 38

4. Dismount the earth clamp (if used).

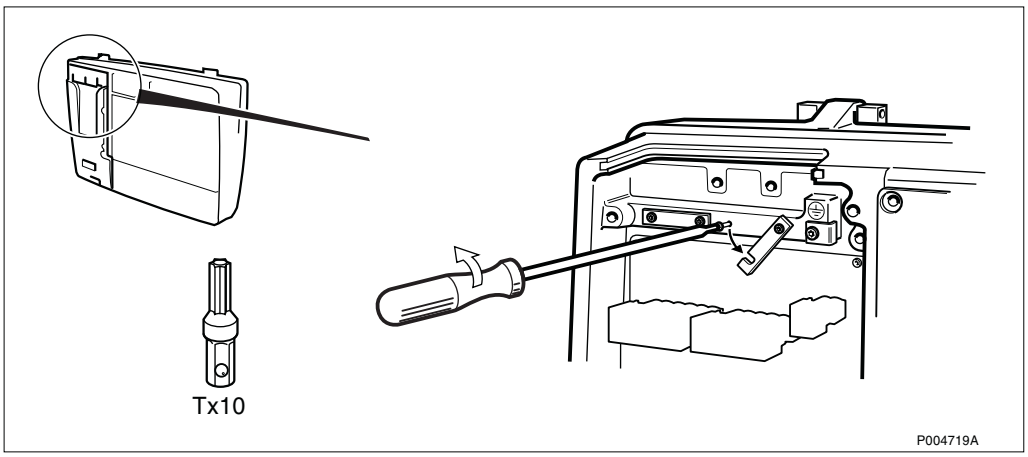

Figure 39

5. Unplug the terminal blocks.

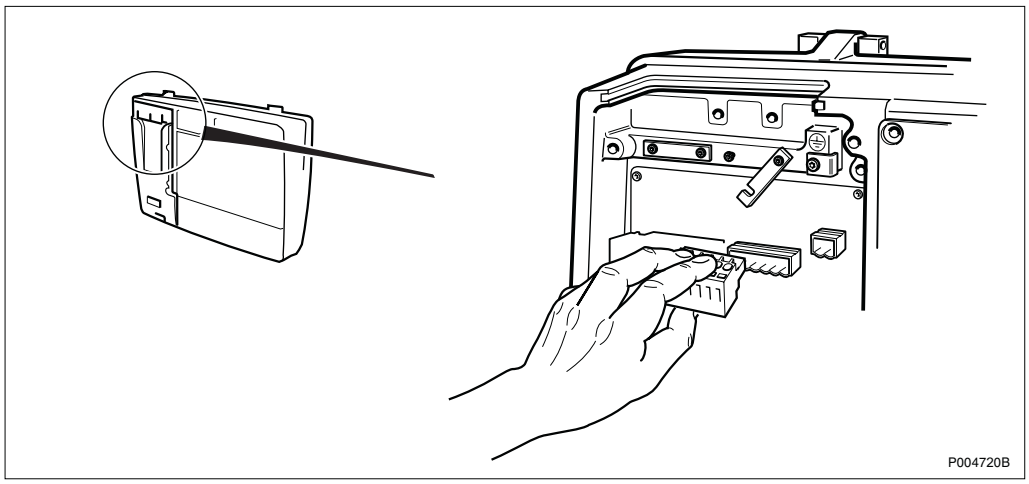

Figure 40

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- **If AGW is used: continue with Section 4.4 on page 66.**
- **If HDSL is used: continue with Section 4.5 on page 75.**

Otherwise continue with the steps below.

6. Thread on the cable gland parts on the PCM cable.

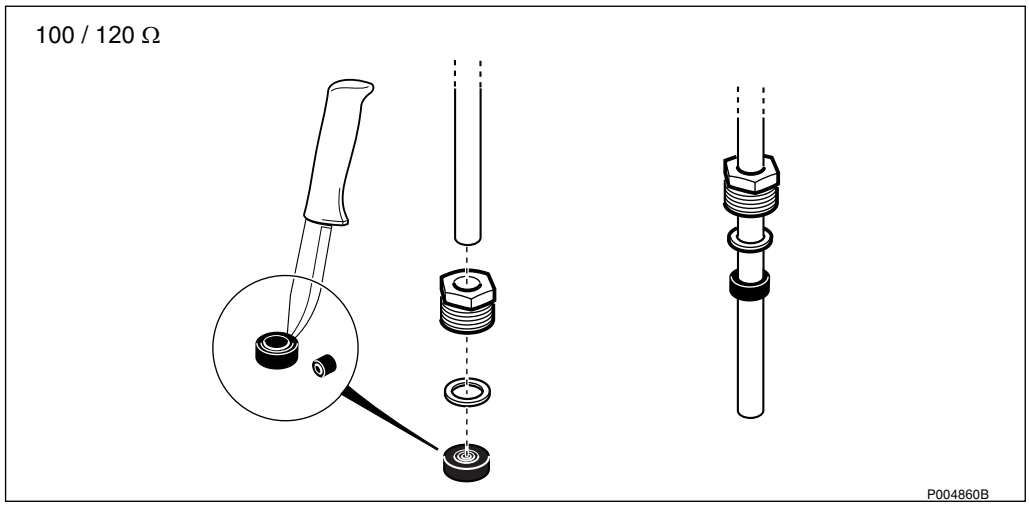

Figure 41

7. Strip the cable and the wires.

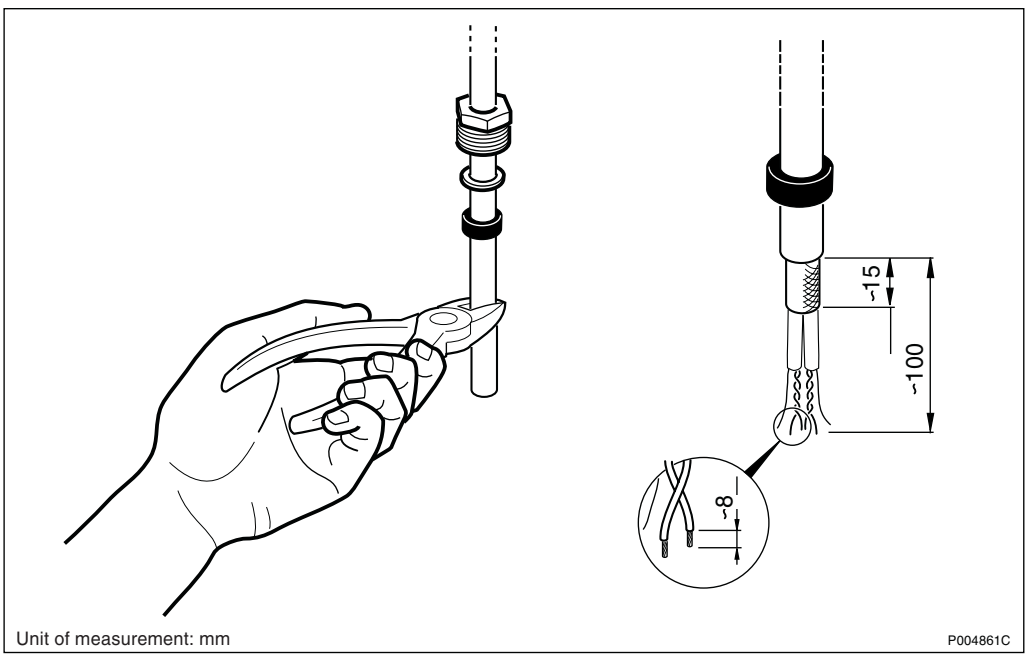

Figure 42

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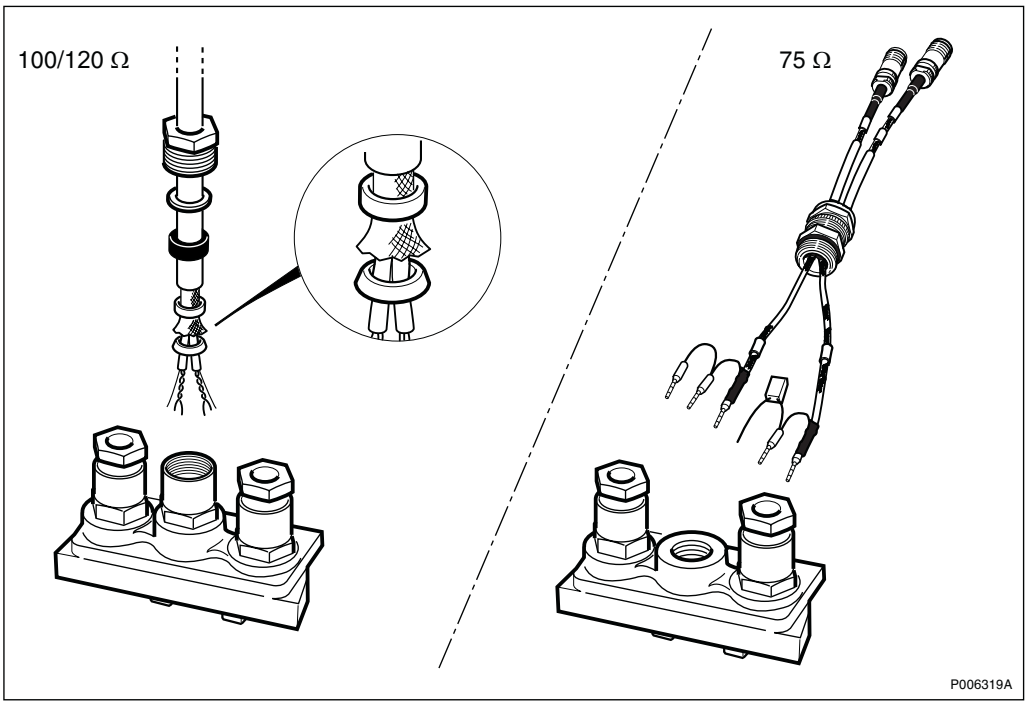

Figure 43 The 100/120 Ω PCM cable, and the optional pre-assembled 75 Ω PCM cable with DC isolation

8. Mounting the optional 75 Ω PCM cable in the gland plate:

    1. Run the cable through the cable gland plate.
    2. Mount the cable gland on the gland plate
    3. Loosen the cable gland sealing nut.
    4. Adjust the cable length to suit the position of the terminal.
    5. Tighten the cable gland sealing nut.

    Mounting the 100/120 Ω PCM cable, or an alternative PCM cable, in the gland plate:

    1. Run the cable through the cable gland.
    2. Mount the cable gland sealing nut.
    3. Adjust the cable length to suit the position of the terminal.
    4. Tighten the the cable gland sealing nut.

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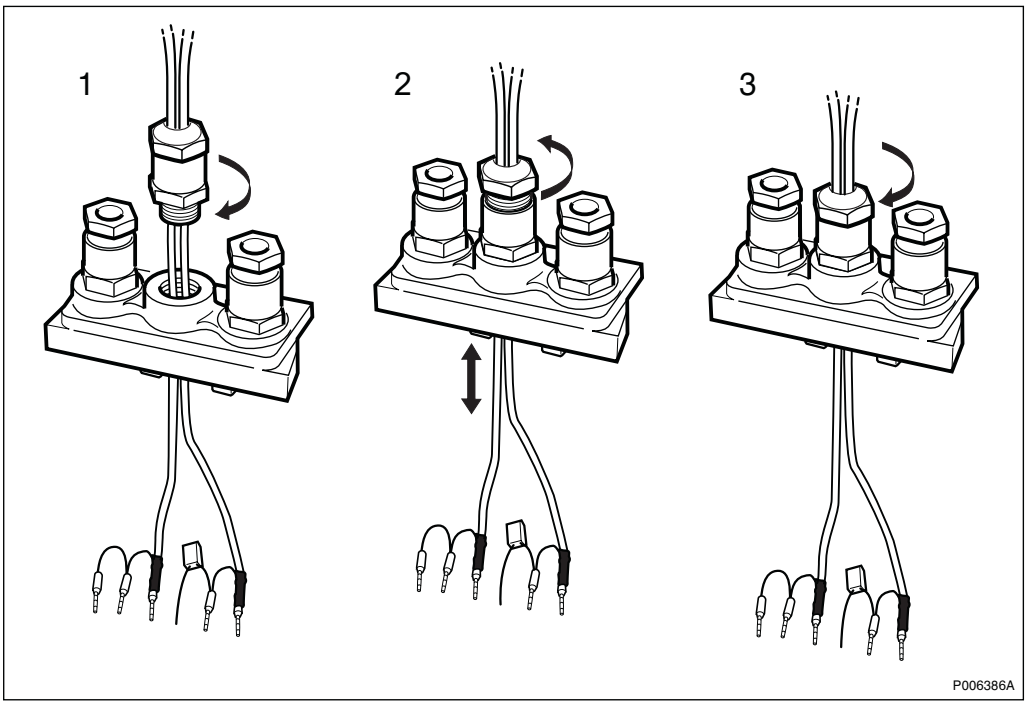

Figure 44 Mounting the cable gland with the optional 75 Ω PCM cable in the gland plate

9. Connecting the PCM cable. See also *Section Cascade Mode on page 56.*

Note: The PCM cable connections must be the same for all cascaded RBSs.

1. If the optional pre-assembled and DC isolated 75 Ω connection cable is used:

   Connect the cable according to Figure 45 on page 48.

2. If an alternative 75 Ω cable is used:
   - DC isolation is required:

     Connect the cable as shown in Figure 45 on page 48, including a 33 nF capacitor (voltage tolerance: 400 V, 30 V/µs) between IN_N_LINE and IN_GND.

   - DC isolation is not required:

     Connect the cable as shown in Figure 46 on page 48.

Note: If DC isolation (capacitor) is used, The IN and OUT wire shields and TNC connectors must be isolated from each other.

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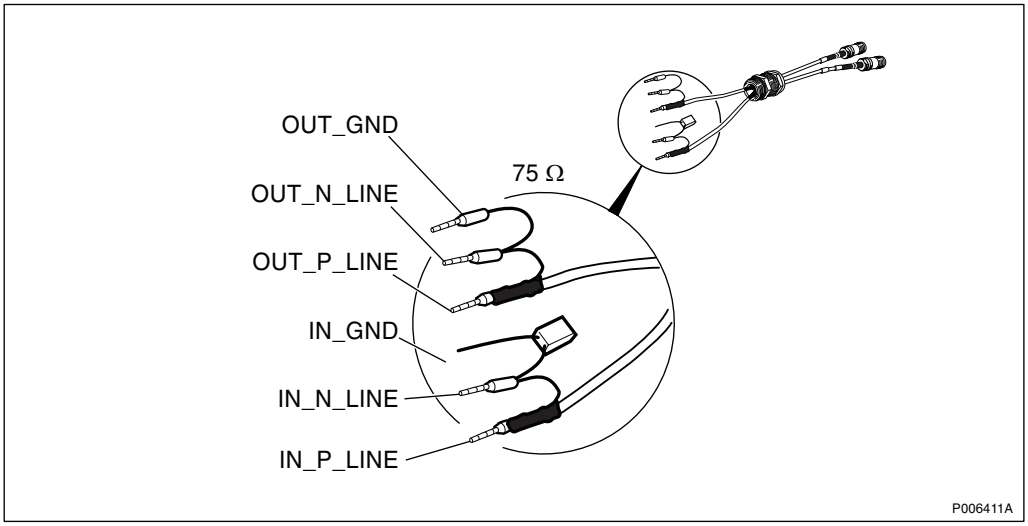

Figure 45 The optional 75 Ω PCM cable with DC isolation of IN wire, and coaxial TNC connectors

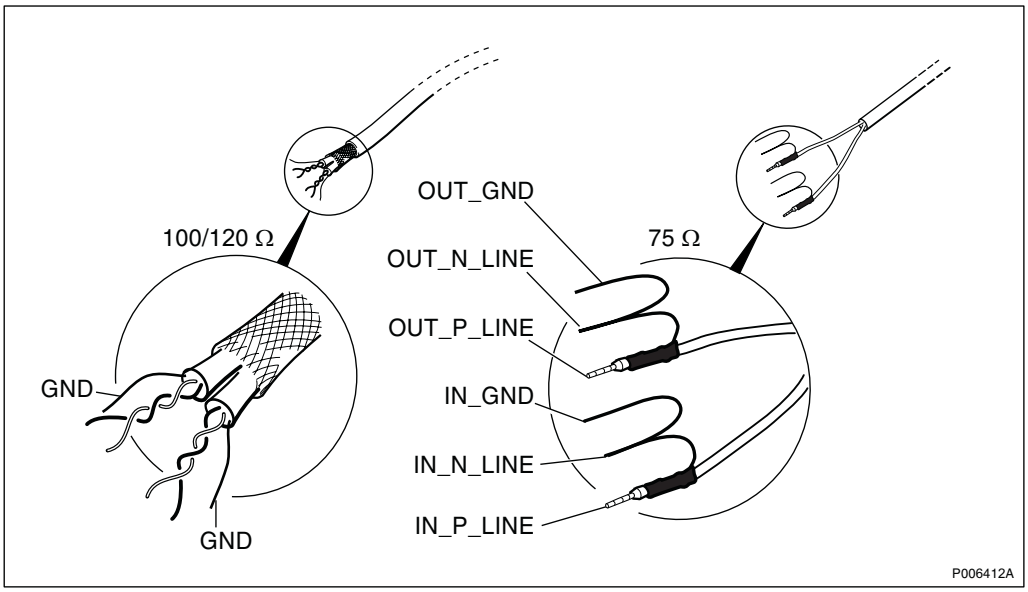

Figure 46 Alternative PCM cable if DC isolation is not required

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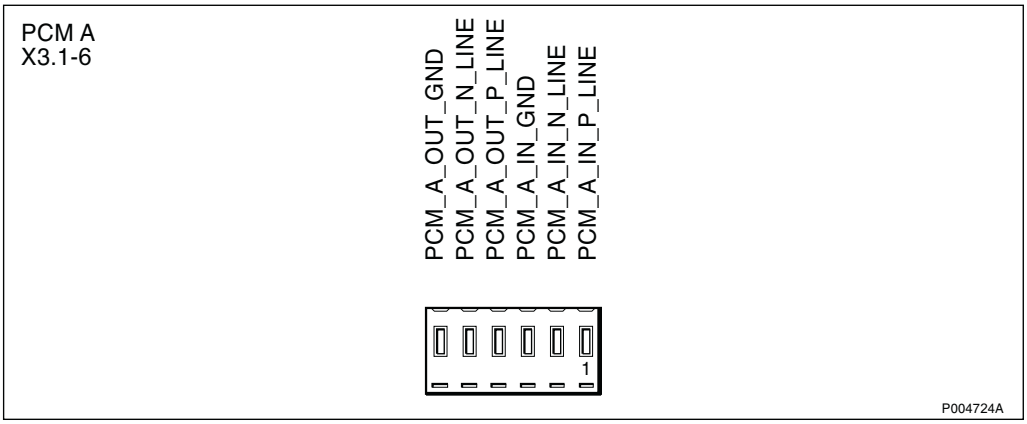

Figure 47 PCM A connection

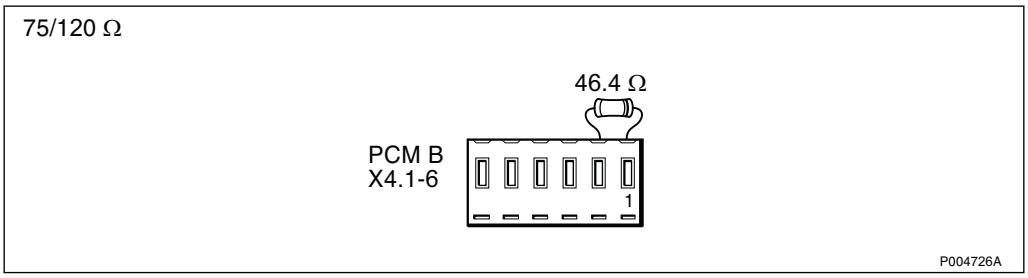

Figure 48 Stand Alone mode: PCM B terminated with a 46.4 Ω resistor

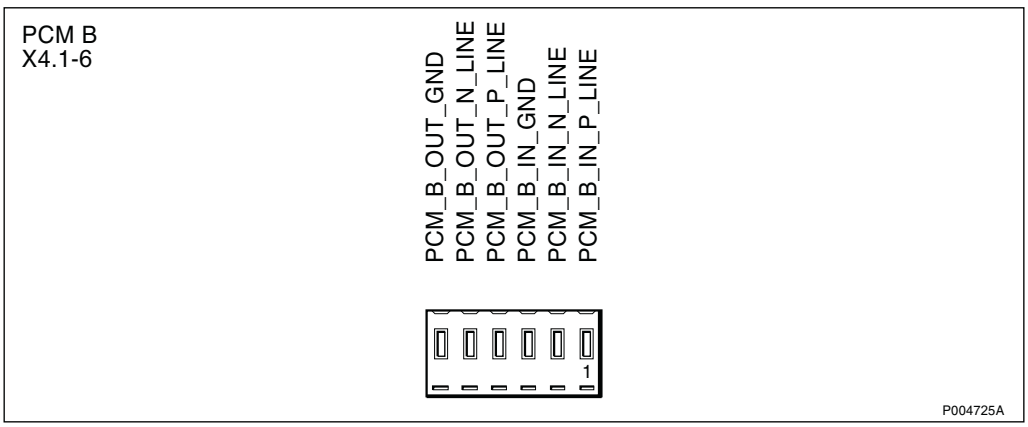

Figure 49 PCM B cascade connection

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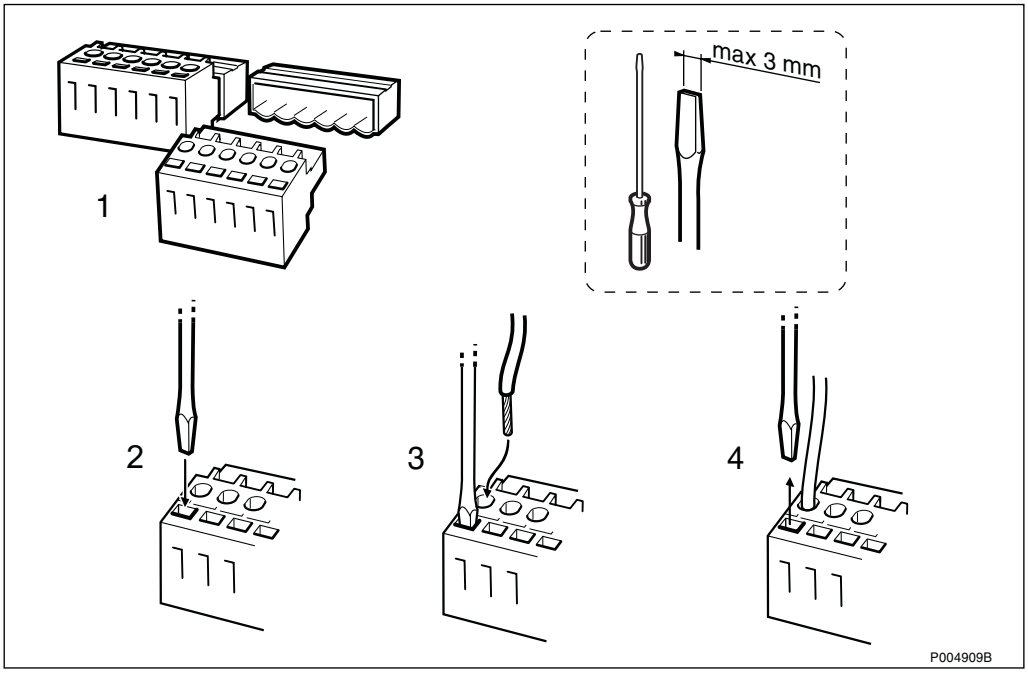

Figure 50 Recommended method when connecting wires

10. Connect the AC mains cable.

Note: Connection to AC mains supply must be done by an authorised electrician.

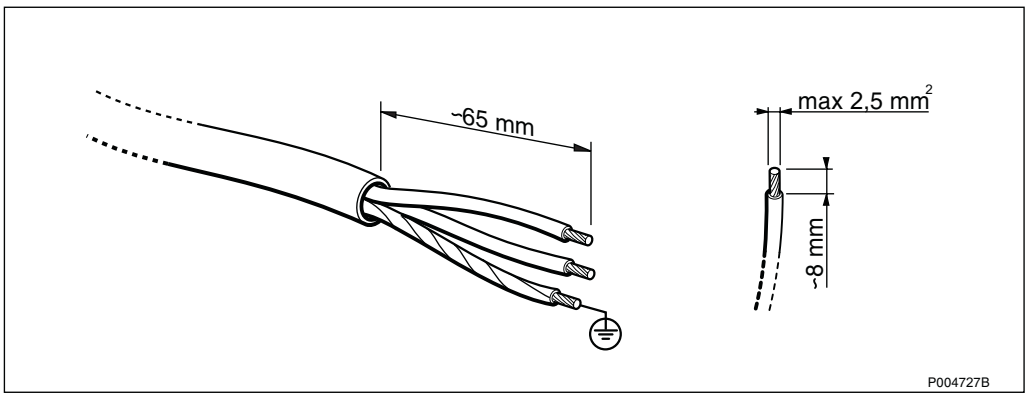

Figure 51 AC mains cable

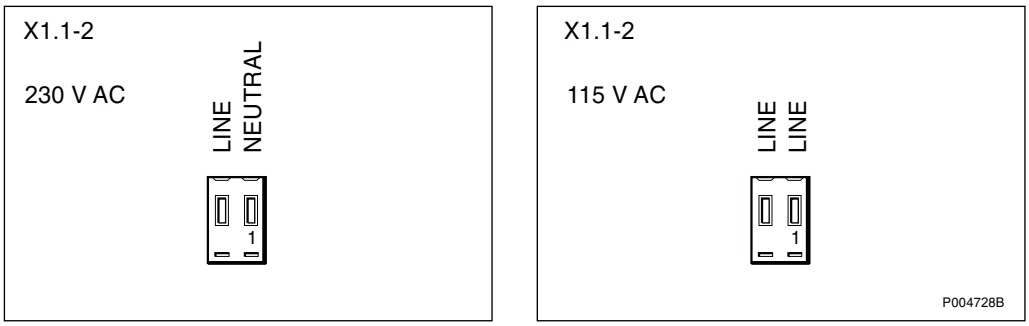

Figure 52 AC mains terminal

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11. Remount the cable gland plate.

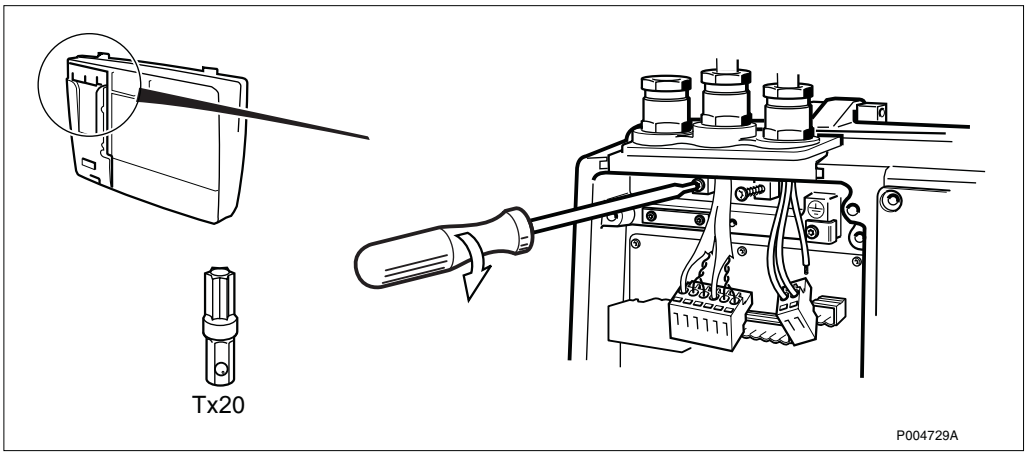

Figure 53

12. Connect the protective earth cable.

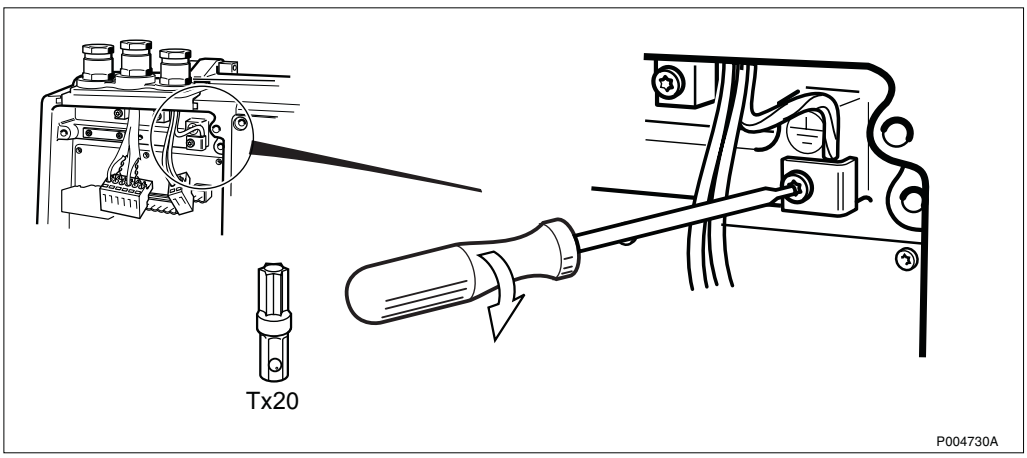

Figure 54

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13. Plug in the terminal blocks.

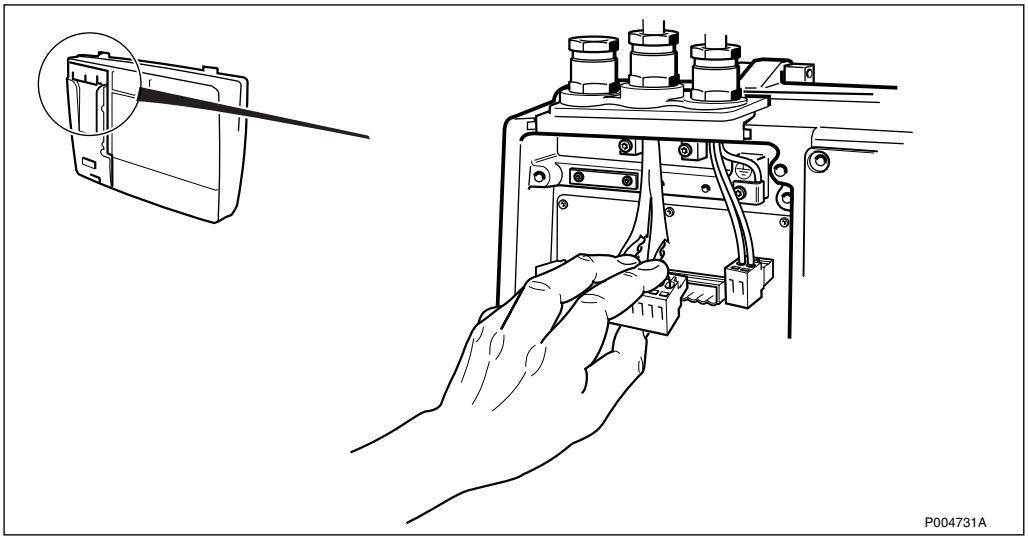

Figure 55

14. Mount the earth clamp (if used).

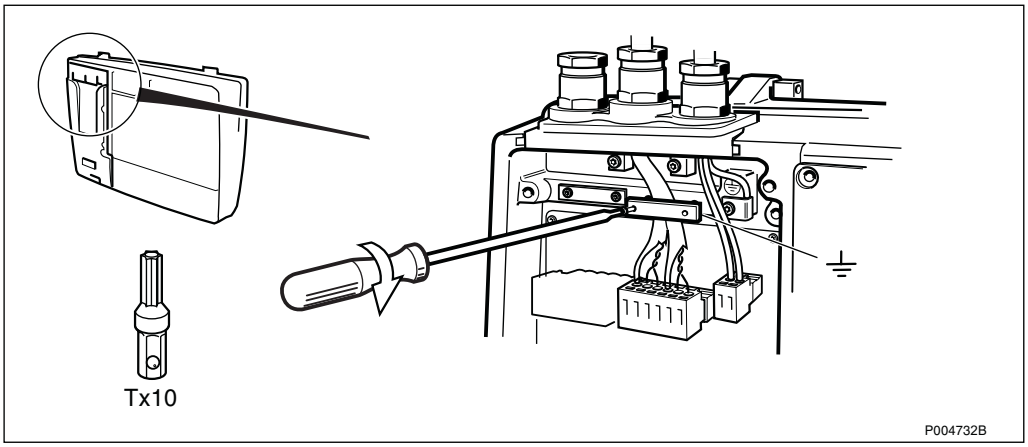

Figure 56

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15. Tighten the cable glands.

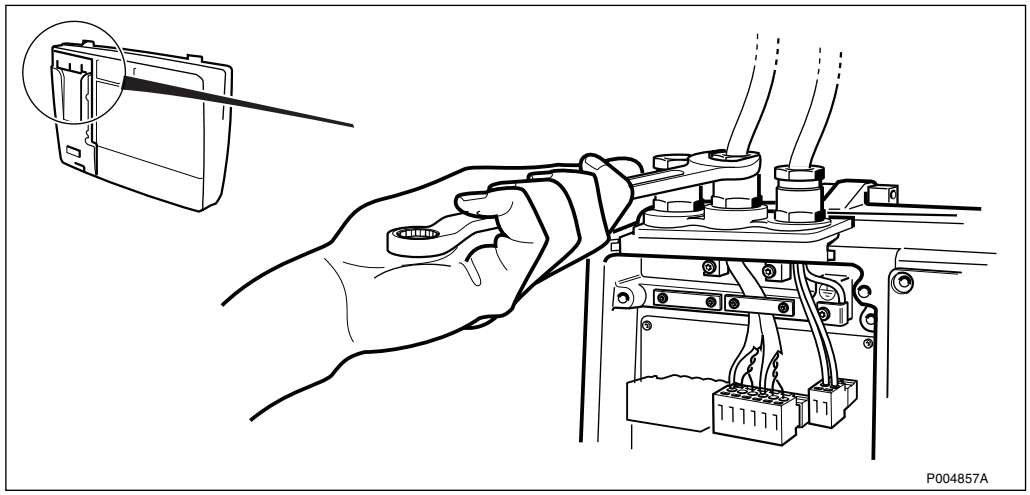

Figure 57

16. Set transmission alternative.

    (The PCM B switch position is unimportant if PCM B has been terminated).

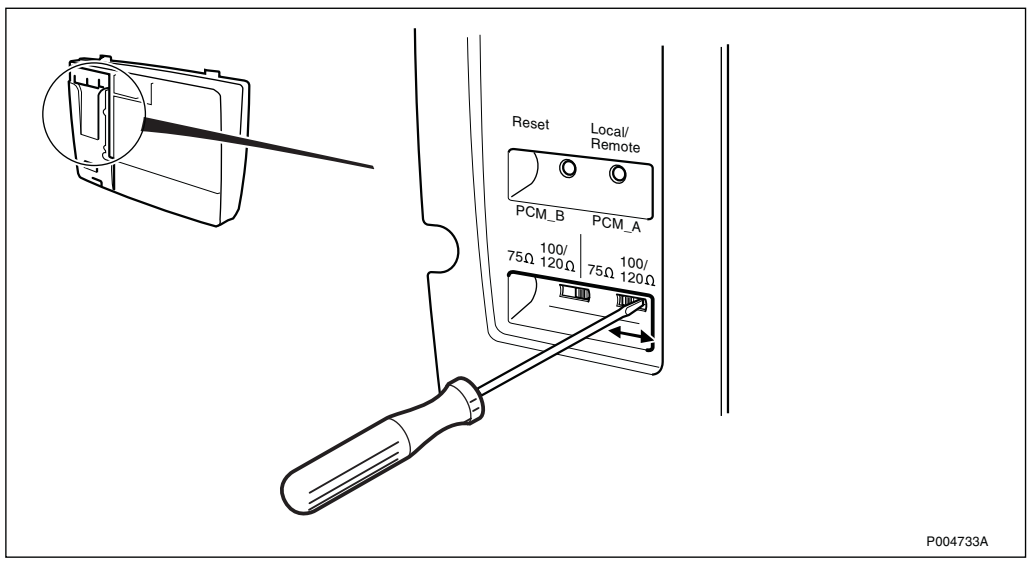

Figure 58

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17. Insert the correct fuses in the fuse holder.

Note: Throw away the bag with the fuses not used (marked with wrong amperage).

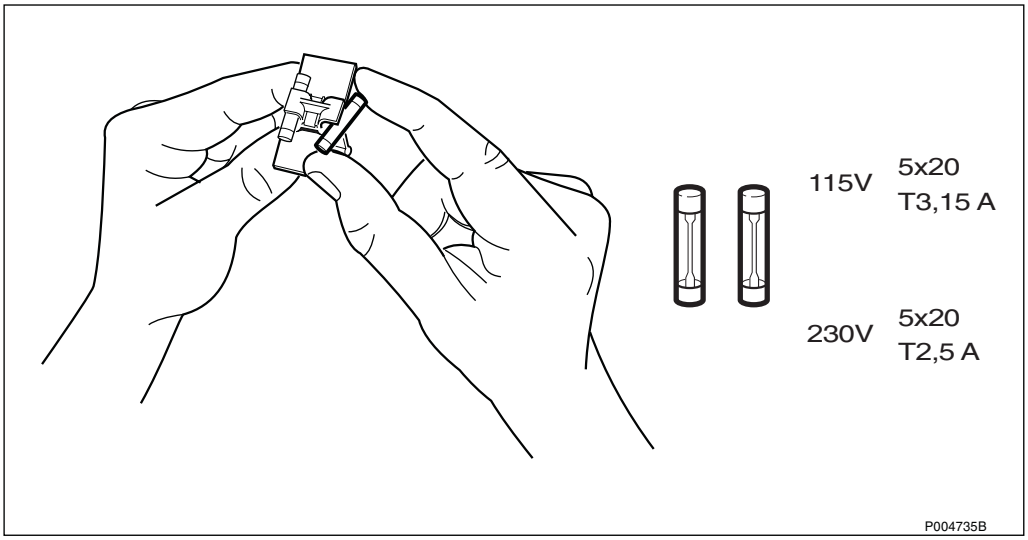

Figure 59

18. Insert the fuse holder in the fuse compartment.

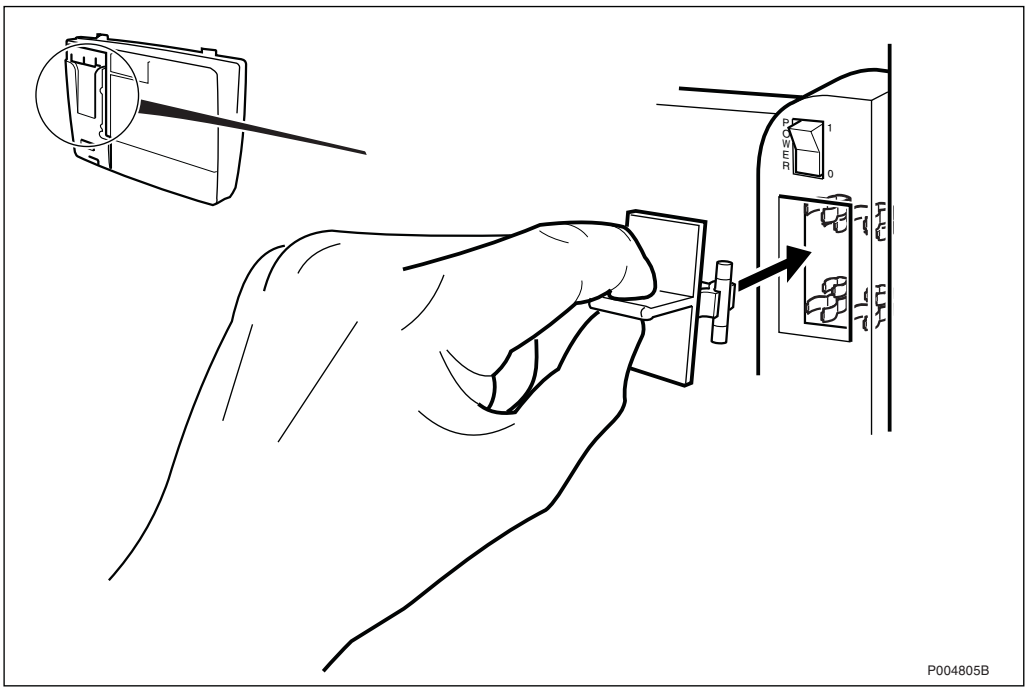

Figure 60

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19. Mount the antenna.

    (If the RBS is to be tested now, perform the tests according to Section 4.3 Test of Radio Cabinet on page 57.)

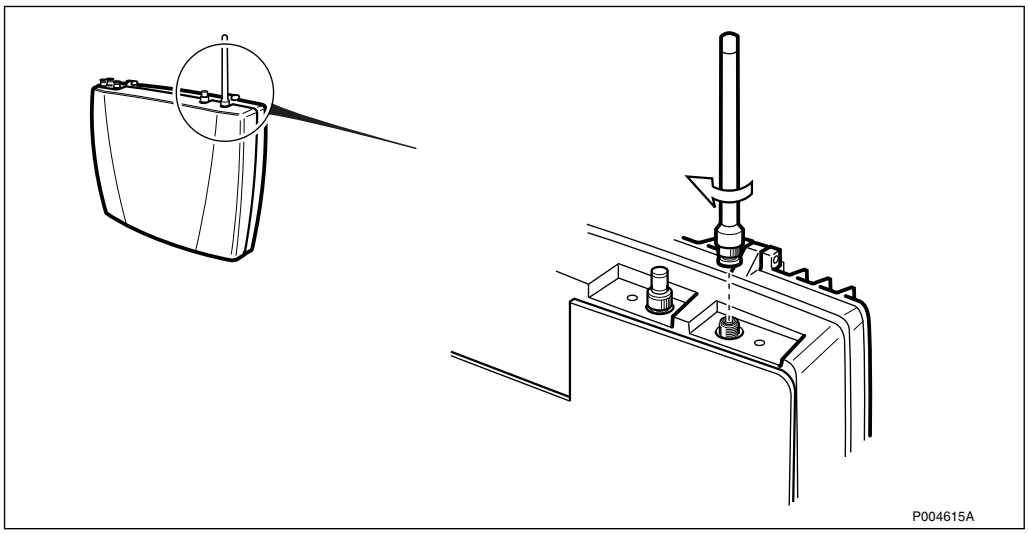

Figure 61

20. Mount the installation box cover.

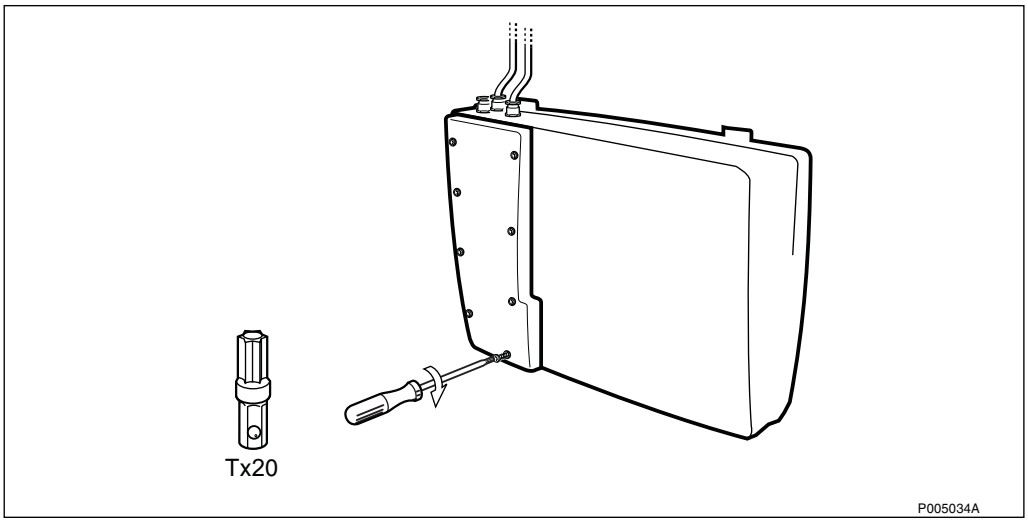

Figure 62

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21. Mount the front cover.

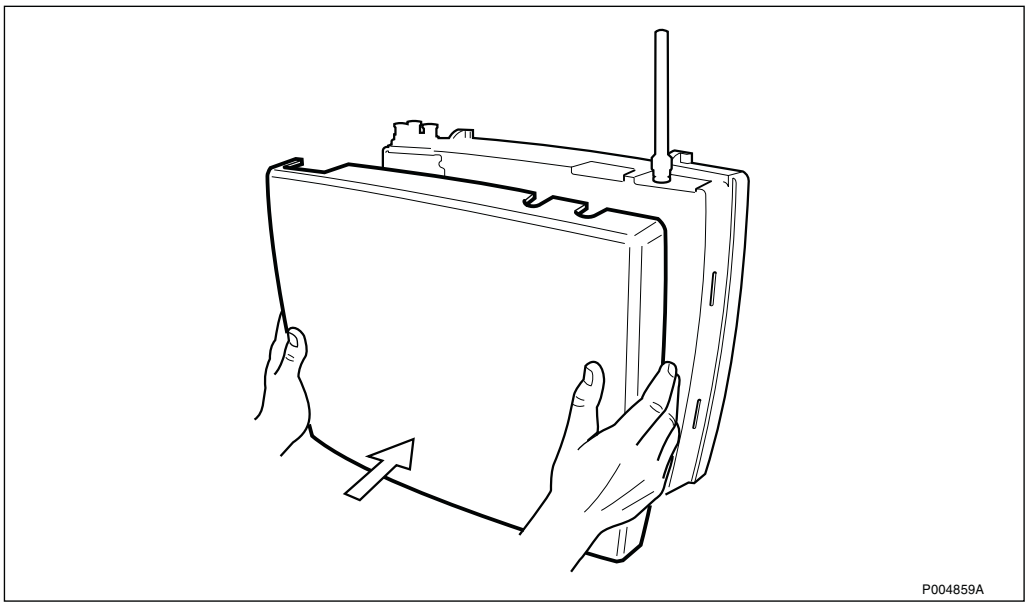

Figure 63

4.2.5 Extension and Reconfiguration

Cascade Mode

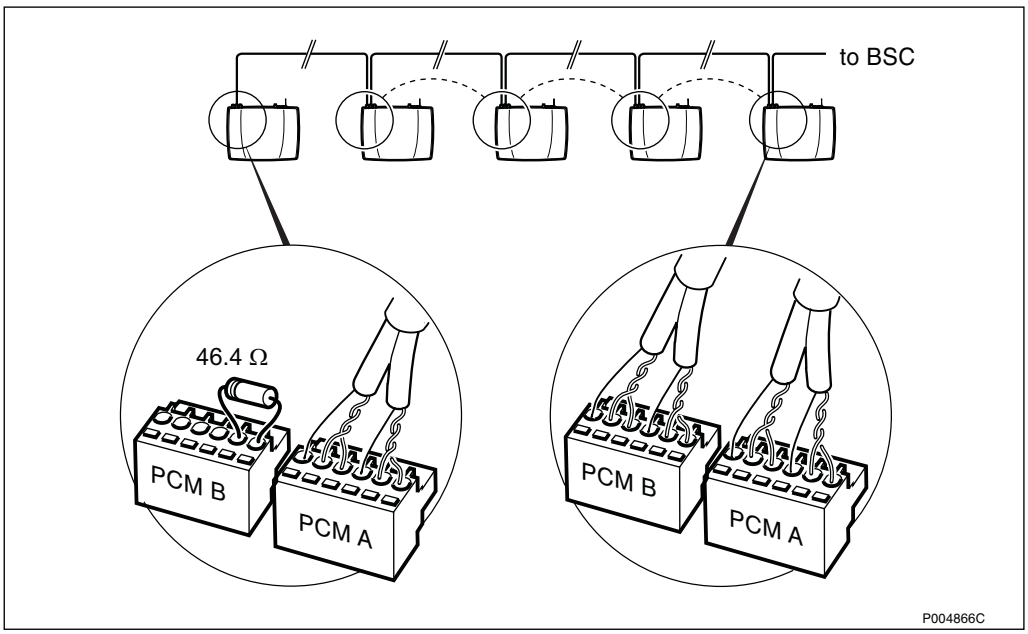

Figure 64 Cascade connection (The 100/120 Ω connection shown)

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Termination of the last PCM B IN

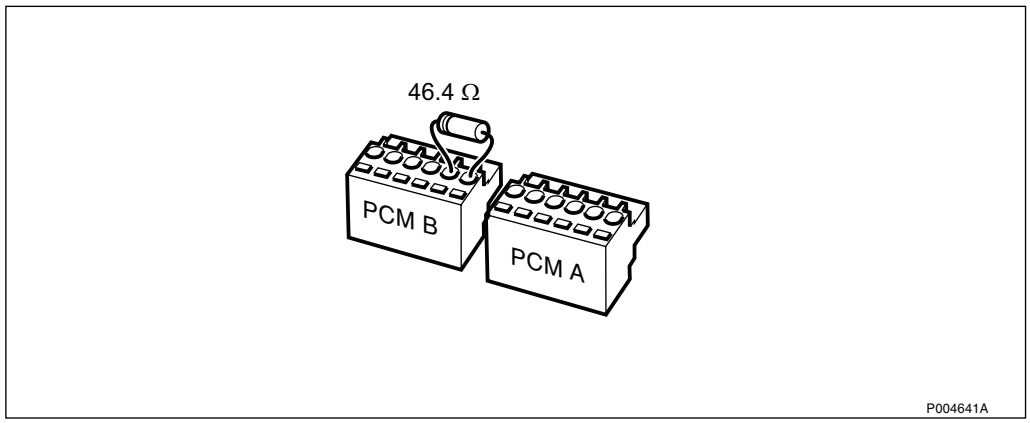

Figure 65 The last PCM B IN terminated with a 46.4 Ω resistor

4.3 Test of Radio Cabinet

4.3.1 User Interface

Optical Indicators

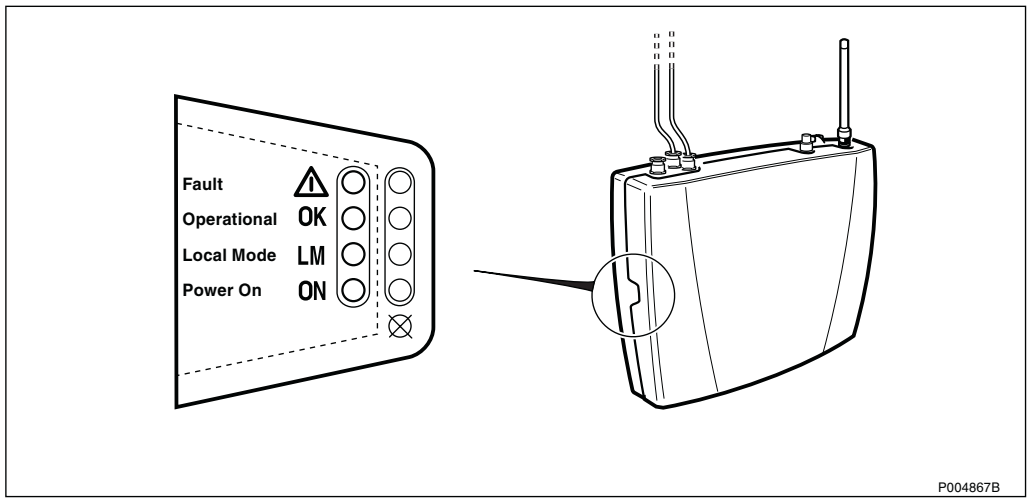

Figure 66

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Symbols Showing LED Status

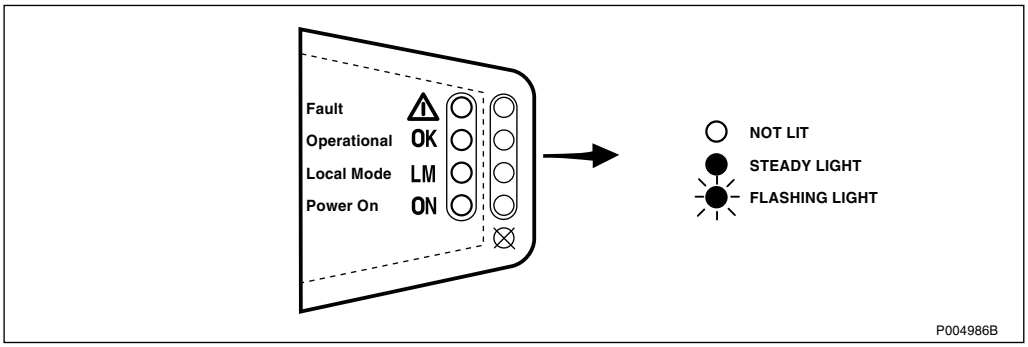

Figure 67

Switches and Connectors

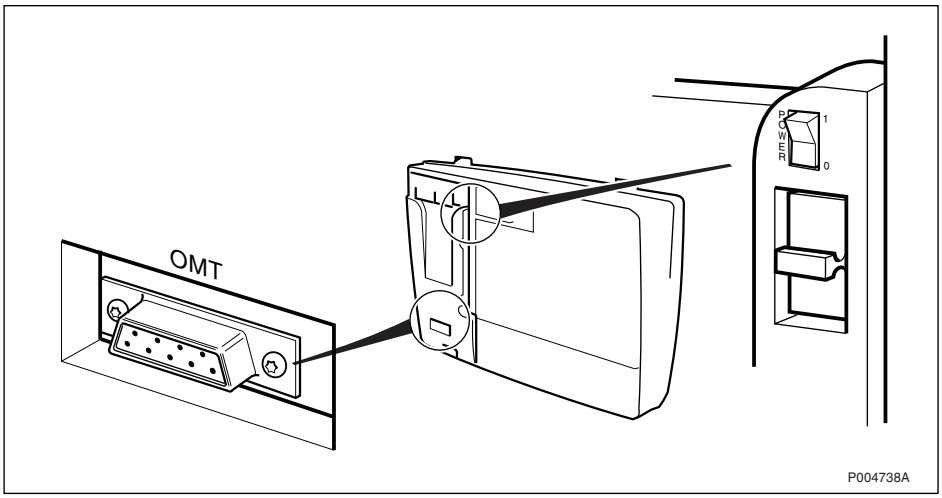

Figure 68

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4.3.2 Test Procedure Overview

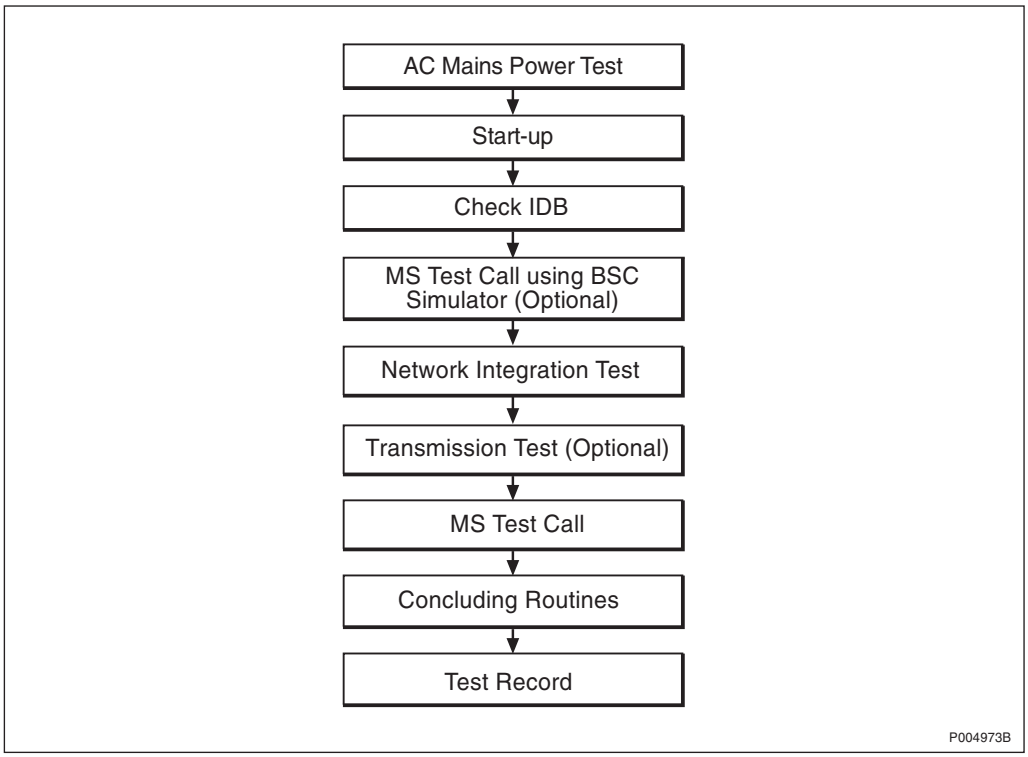

Figure 69

4.3.3 Test Procedure

AC Mains Test

DANGER

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

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1. Switch on the AC mains power and measure the voltage on the mains terminal on the RBS.

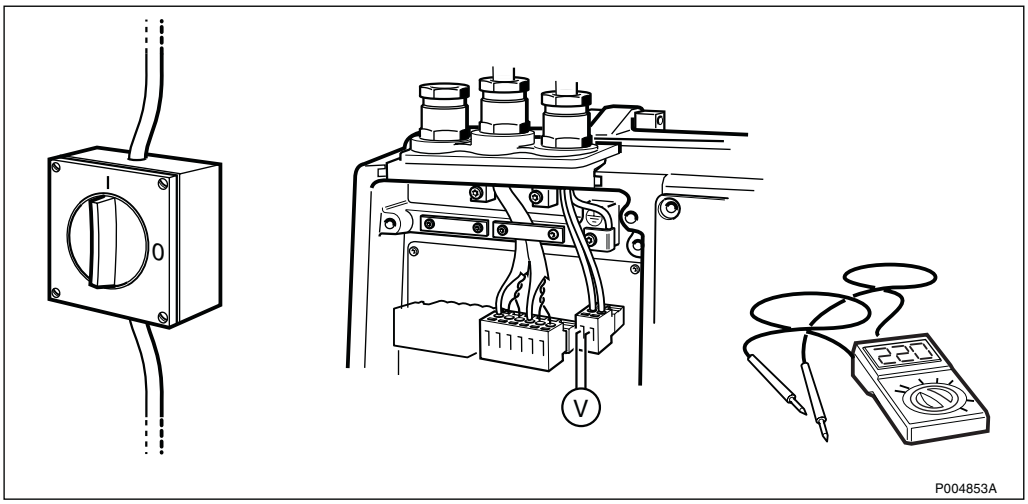

Figure 70

Start-up

1. Disconnect the PCM A connector, and switch on the AC power.
2. Check that the status of the optical indicators are as shown in the picture below.

   During start-up the Local/Remote indicator is flashing, and turns off when contact with the BSC has been established.

   Wait for the start-up to complete. This could take 30 to 120 seconds.

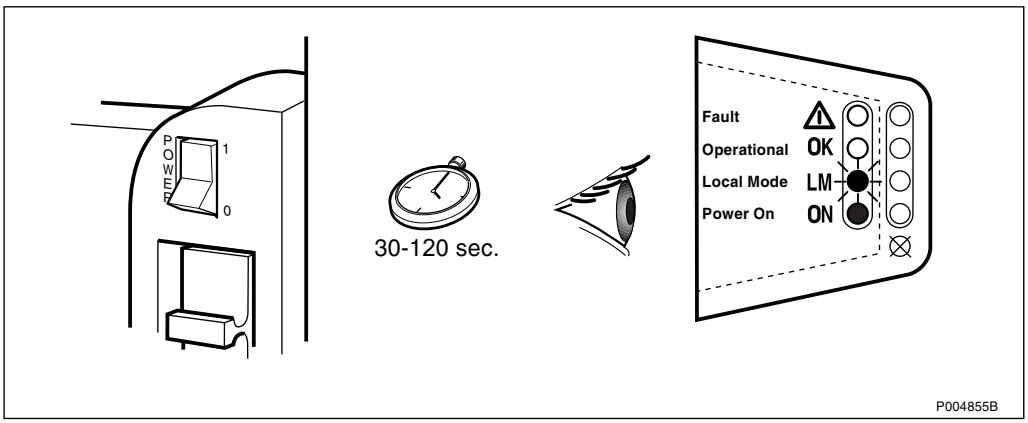

Figure 71

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Check IDB

1. Set the RBS in Local mode.

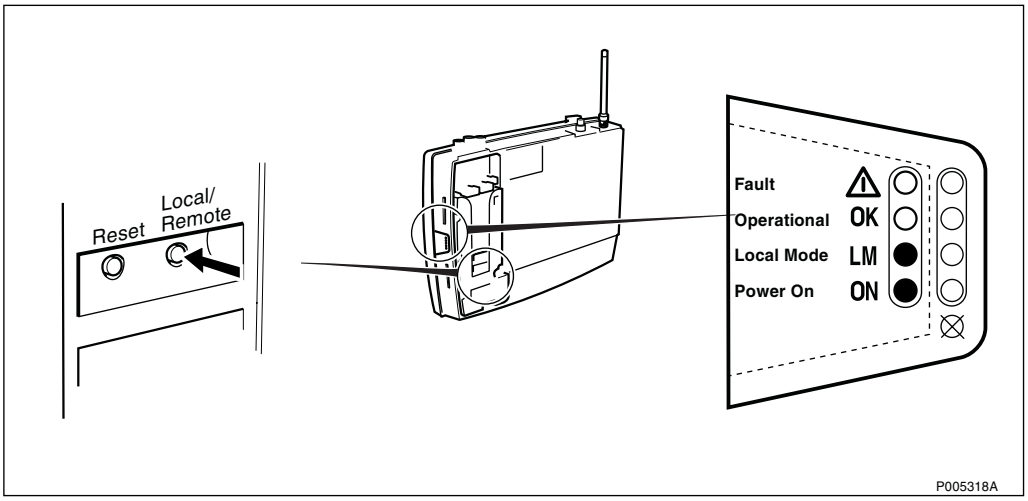

Figure 72

2. Connect the OMT.

   The BSC simulator, BSCSimII, is shown below, but any PC with OMT software (R7C or later) will do.

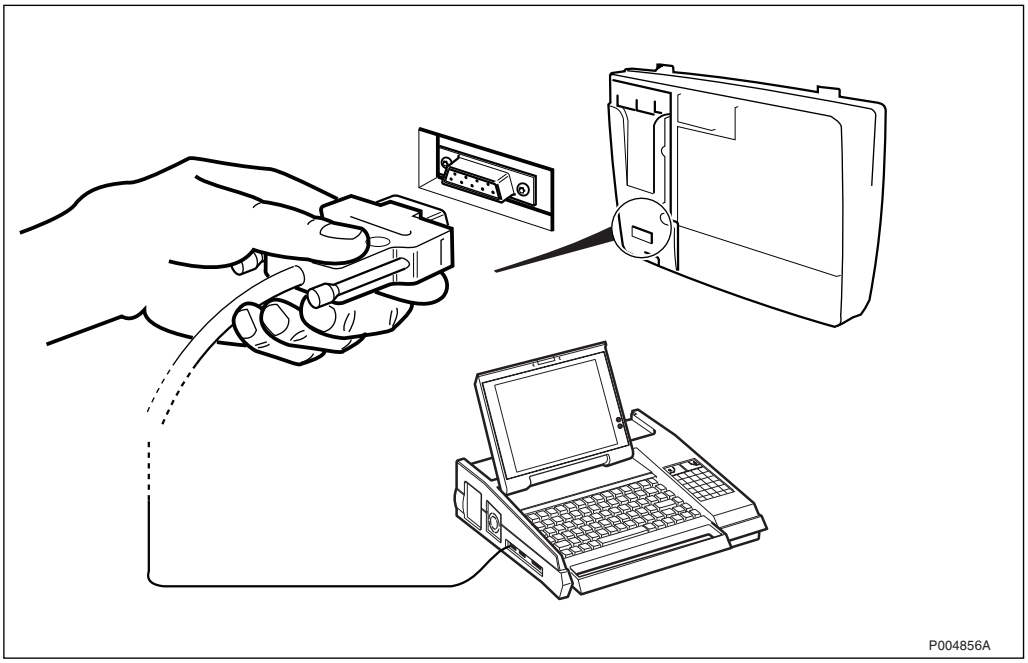

Figure 73 Connecting the OMT

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3. Start the OMT, and check that the right IDB is installed.

   In addition to frequency, transmission alternative, and RBS type, the following parameters are to be checked:

- CRC-4
- LBO (T1)
- TNOM USE
- TNOM NODE ID
- TNOM TIMESLOT
- TEI (Cascade)

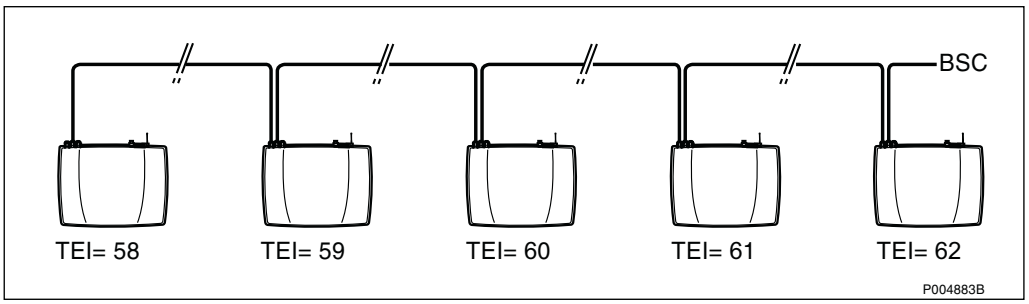

Figure 74

For further information, see:

OMT User's Manual *LZN 302 01*

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MS Test Call using BSC Simulator (Optional Test)

This test is performed if no transmission network is available.

The test is passed when a test call has been made on one timeslot for each TRX.

1. Connect the cables according to Figure 75 on page 63, or Figure 76 on page 63.

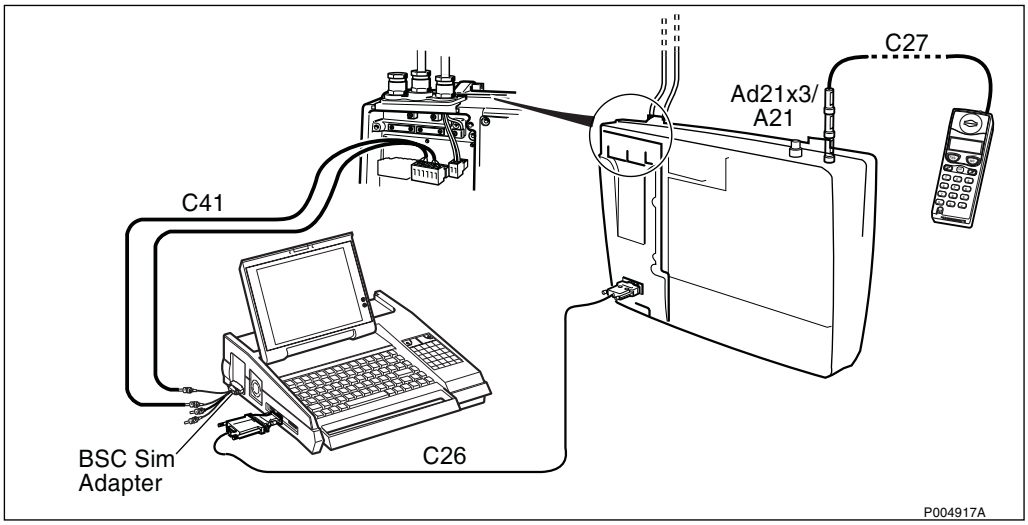

Figure 75 Test setup for T1 100 Ω (1.5 Mbit/s) and E1 120 Ω (2.0 Mbit/s)

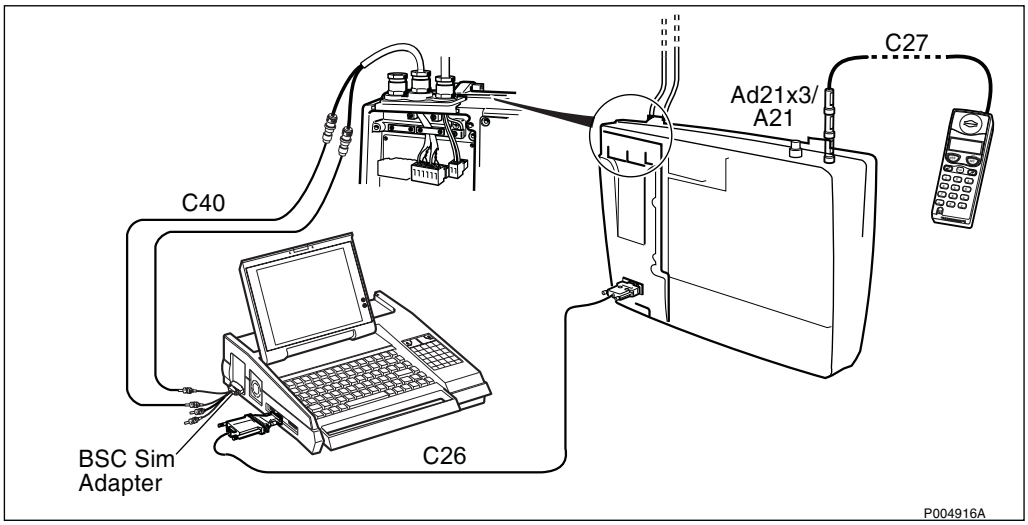

Figure 76 Test setup for E1 75 Ω (2.0 Mbit/s)

Network Integration Test

1. Request the BSC operator to send the Data Transcript for the site.
2. Ensure that the RBS is in Remote mode.

   If necessary, press the Local/ Remote button to change mode. The Local/Remote indicator starts flashing, and turns off when contact with the BSC has been established.

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Transmission Test (Optional Test)

This test is performed if a transmission problem occurs, or if integration fails.

The test is only performed for the first RBS (Master RBS) that is directly connected to the BSC on PCM line.

1. Connect the PCM A terminal to the Loop Back socket on the Connection Board (CB21).

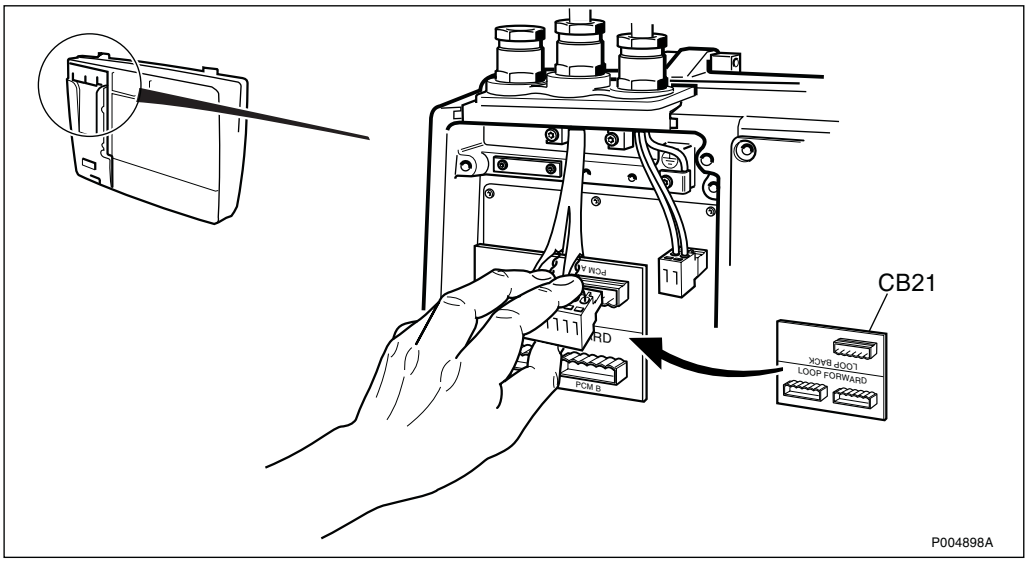

Figure 77

2. Request the BSC operator to check the digital path on the active RBLT.
3. If the digital path is OK, disconnect the CB21 connection board, and connect the PCM A terminal to the radio cabinet.

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MS Test Call

Two test calls are to be performed on each TRX: one to the mobile station, and one from the mobile station.

1. Connect the TEMS mobile as shown in the figure below.

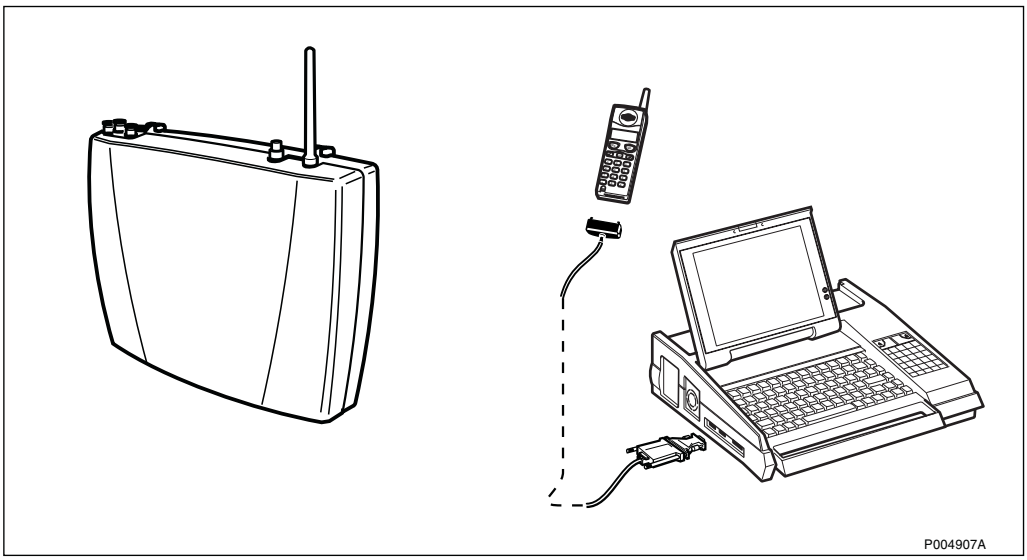

Figure 78 Test setup for MS test call

2. Start the TEMS program in Windows.
3. Select External Menu, and choose Enable Connections.
4. Select the communications port to which the test mobile is connected.

   Communication between the PC and the test mobile is initiated

Note: With the ARFCN it is possible to lock the test mobile on a specific TRX.

5. Request the BSC operator to check which one of the TRXs has been defined to carry the BCCH.
6. Choose Cell Selection in the Control Menu.
7. Enter the ARFCN for the TRXs that will be tested in the cell.
8. Select Target Frequency List and mark the frequencies.
9. Disable the handover button in the Cell Selection Menu.
10. Select Monitor/Status Information/Dedicated Channel. Information about the channels is displayed.
11. Make two test calls: one to the mobile station, and one from the mobile station. If two ARFCNs are entered, make calls until both ARFCNs are displayed in the Dedicated Channel window.

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4.4 Installation of Optional AGW Module

DANGER

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

1. Remove the gland plate on the RBS, and mount the AGW module with six screws, two on each side, and two screws on the cable gland plate.

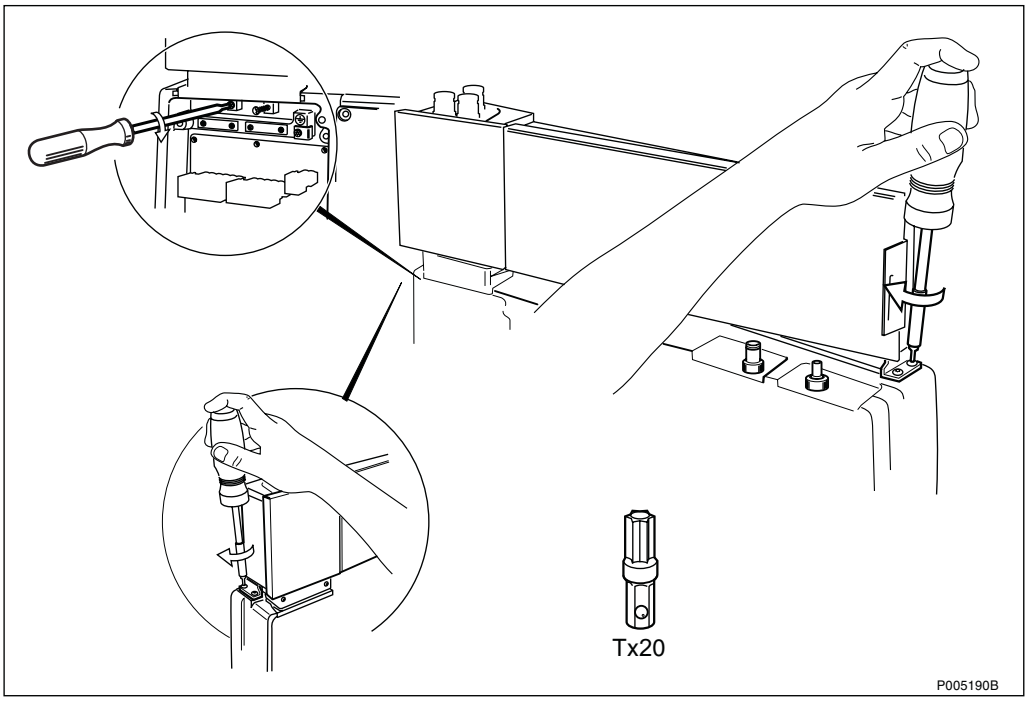

Figure 79

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2. Remove the cover.

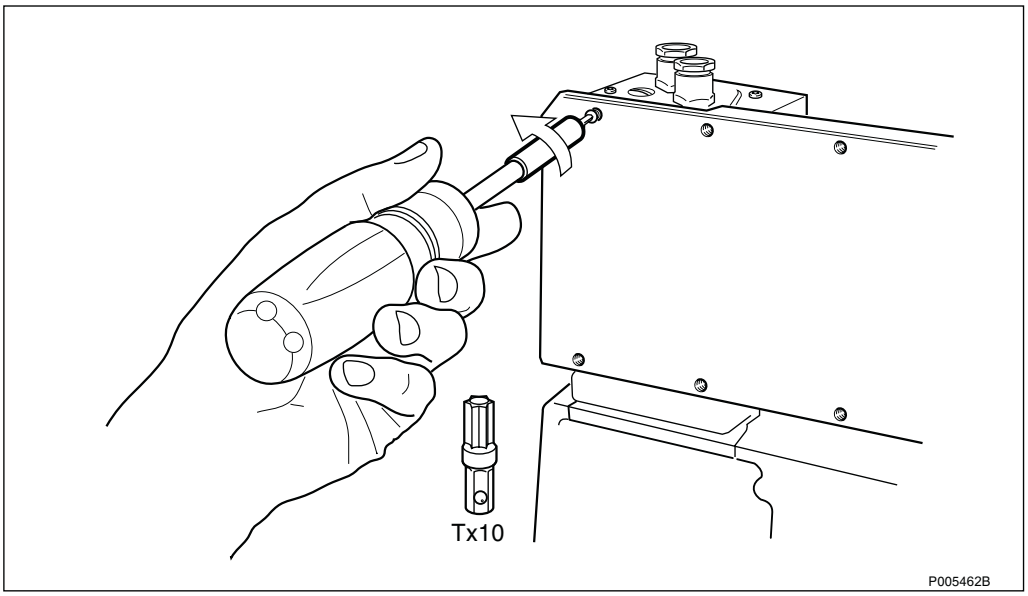

Figure 80

3. Connect the DC cable.

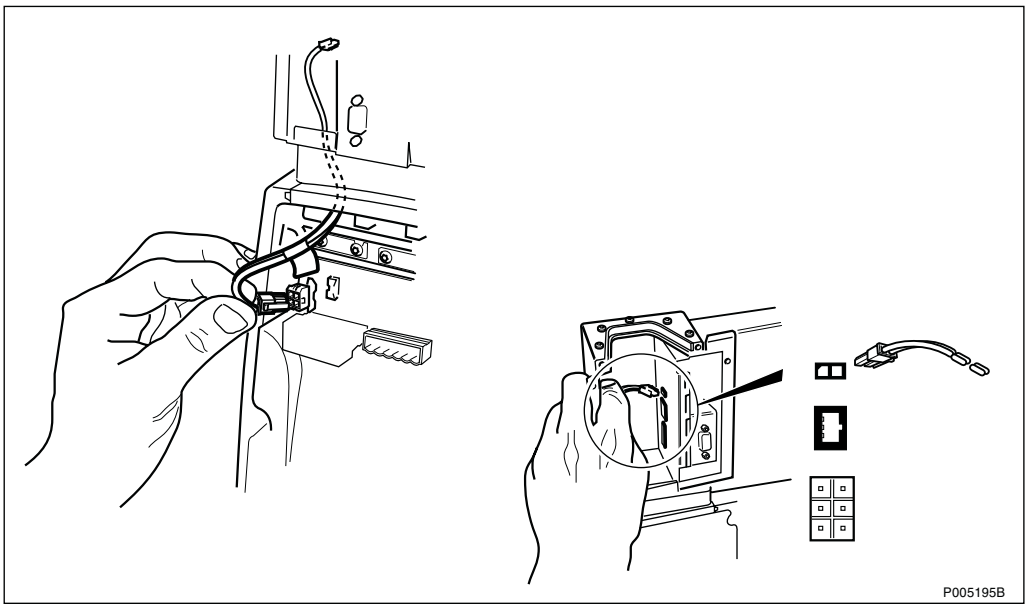

Figure 81

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4. Plug in the transmission cable.

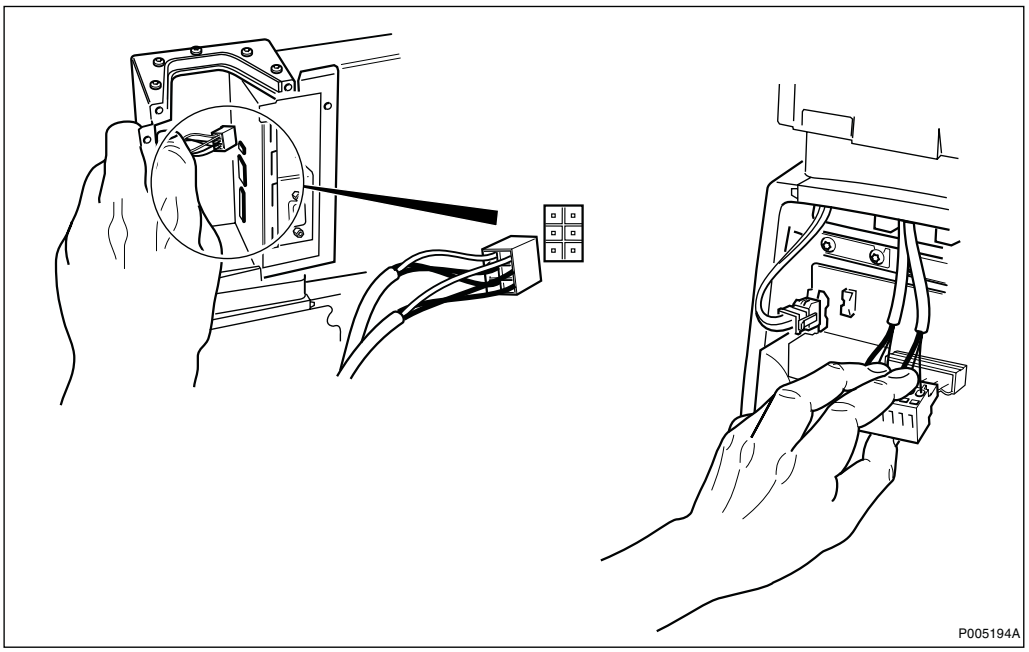

Figure 82

5. Strip the AC cable.

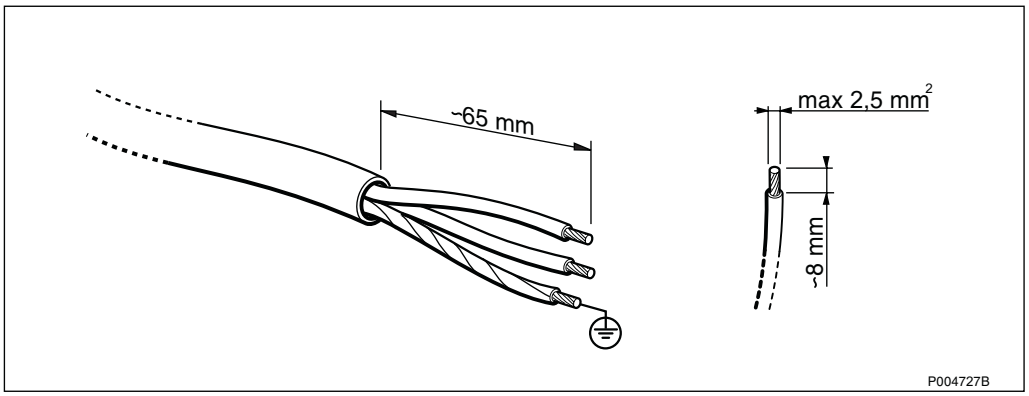

Figure 83

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6. Run the AC cable through the cable gland.

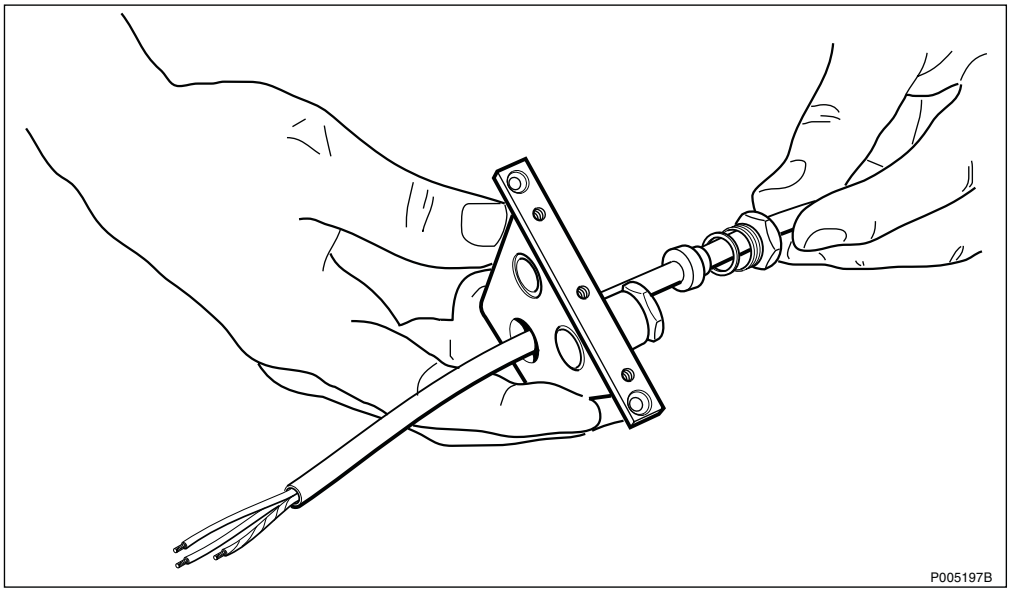

Figure 84

7. Connect the AC cable.

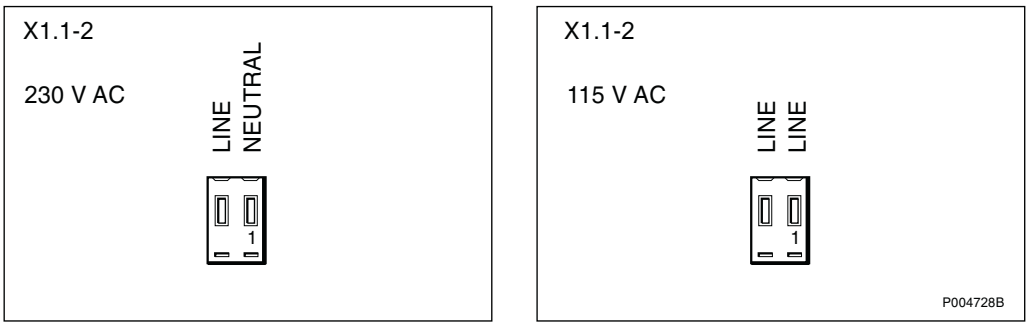

Figure 85

8. Connect the earth cable in the RBS.

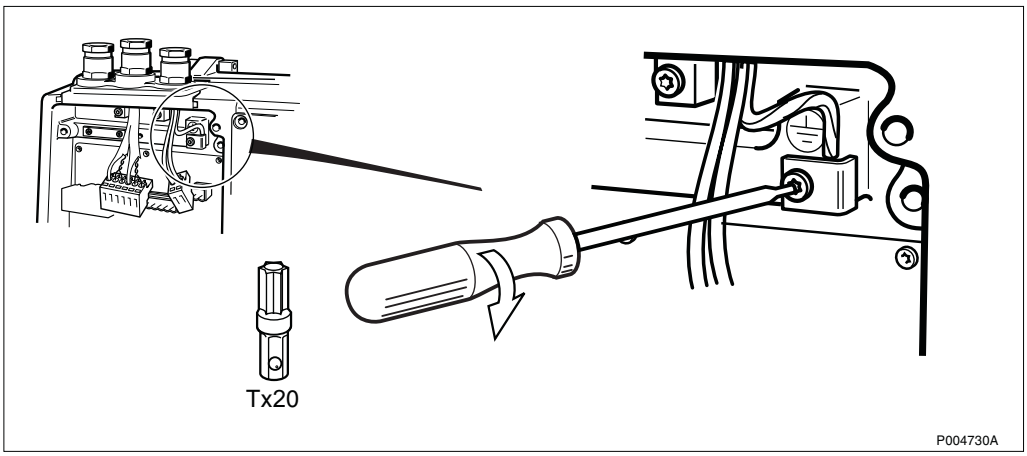

Figure 86

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9. Run the LAN cable through the gland, and shrink on the modular connector.

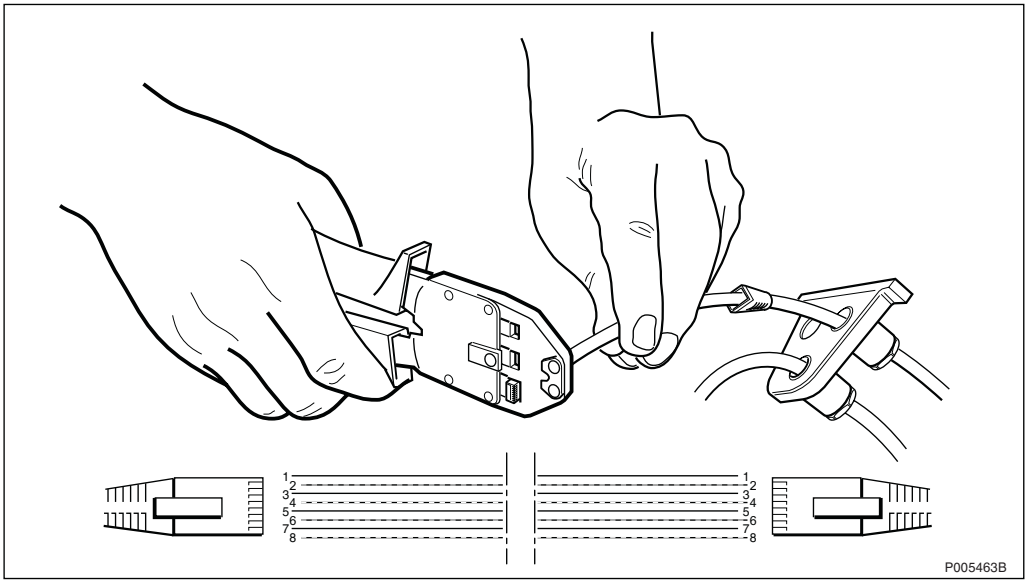

Figure 87

10. Plug in the LAN cable.

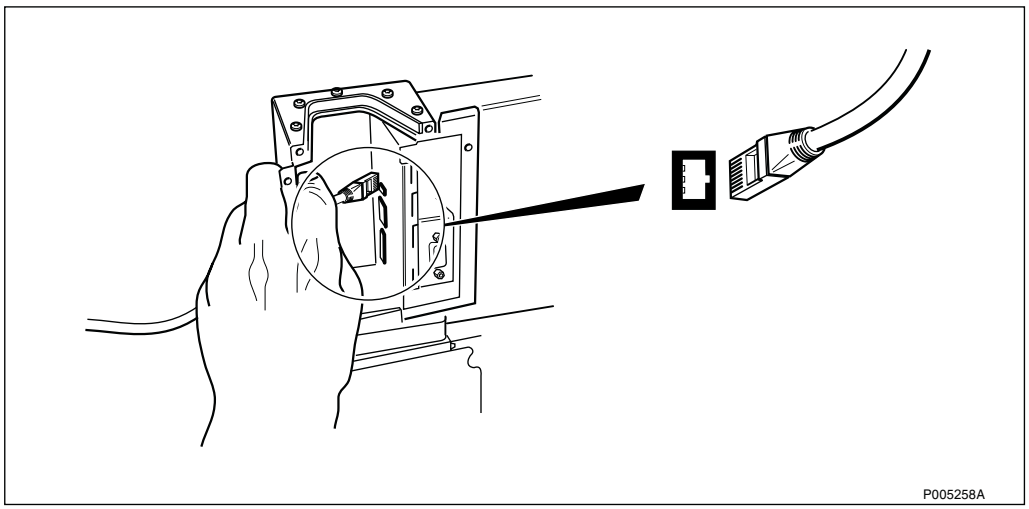

Figure 88

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11. Ensure that the cables are not stretched, then tighten the cable glands.

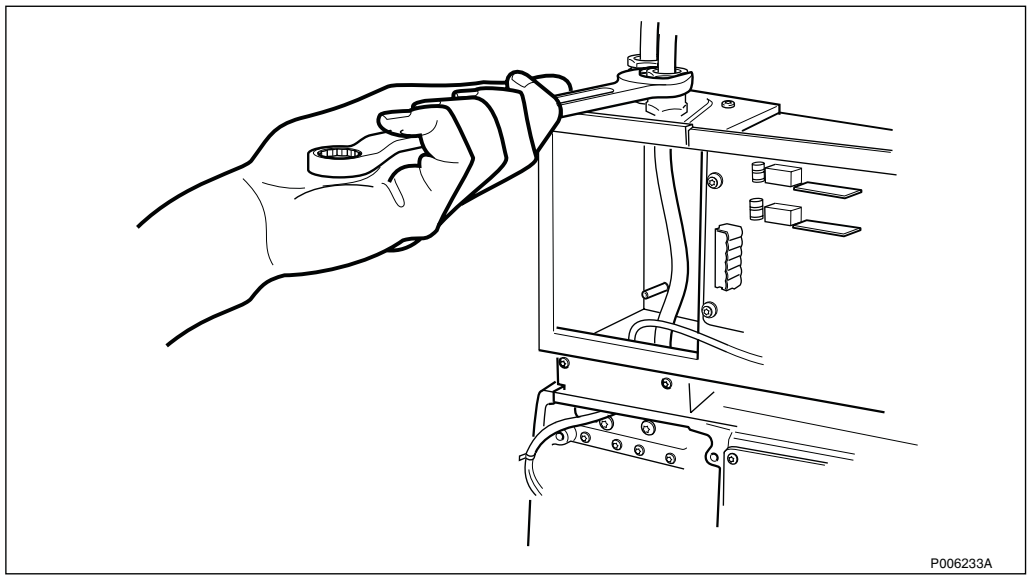

Figure 89

12. Remount the cover.

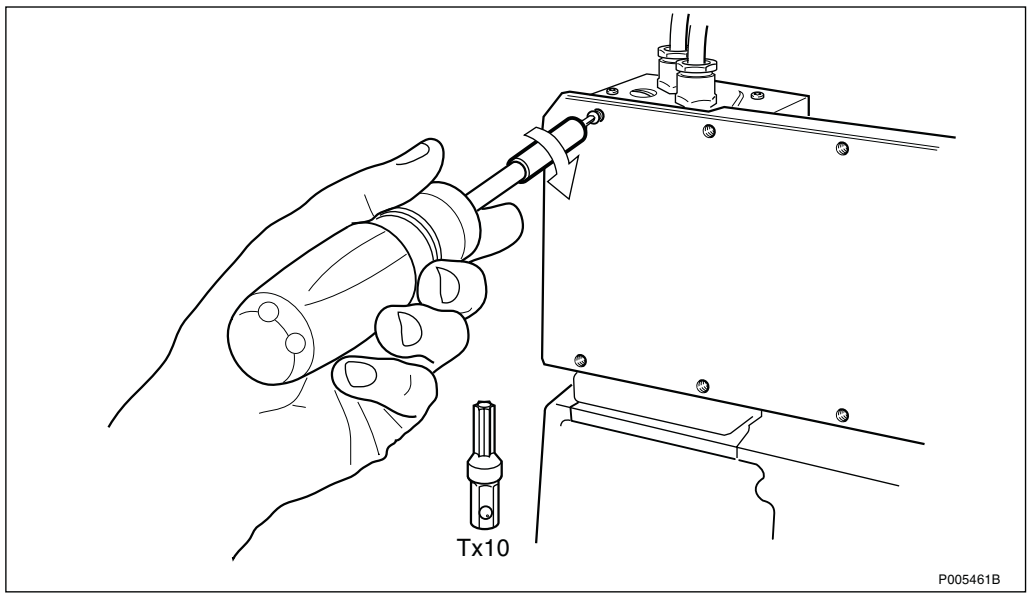

Figure 90

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13. Connect external antenna cable(s).

    The antenna connector not used is to be terminated with a 50 Ω resistor.

Note: Omnidirectional antenna is not allowed if AGW/HDSL is used.

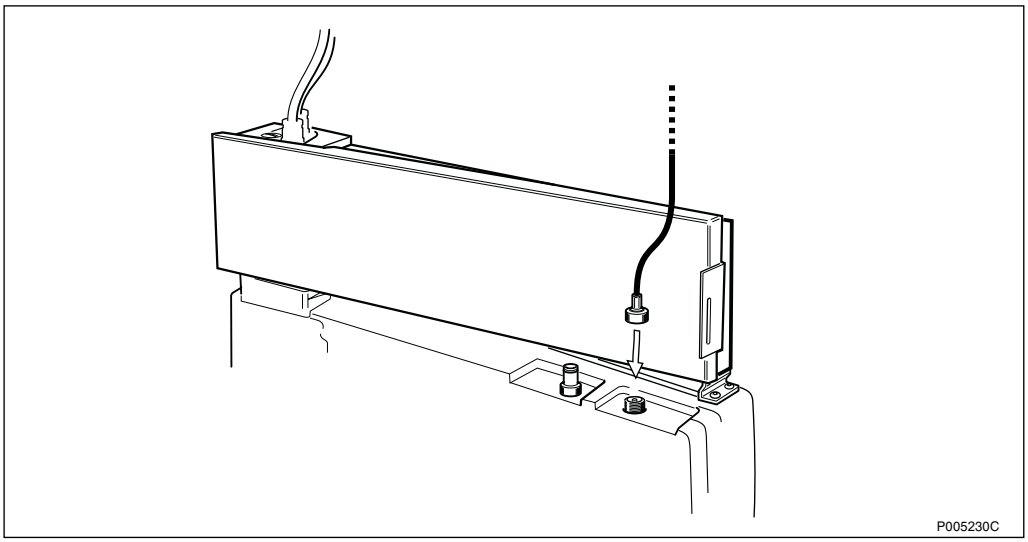

Figure 91

14. Remount the front cover on the AGW module.

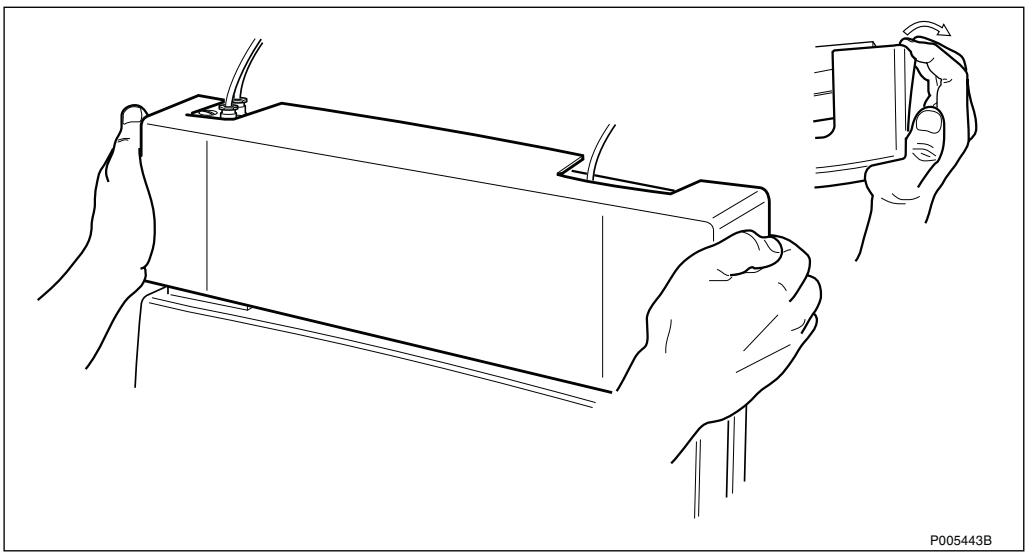

Figure 92

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15. Set the transmission switches to 120 Ω.

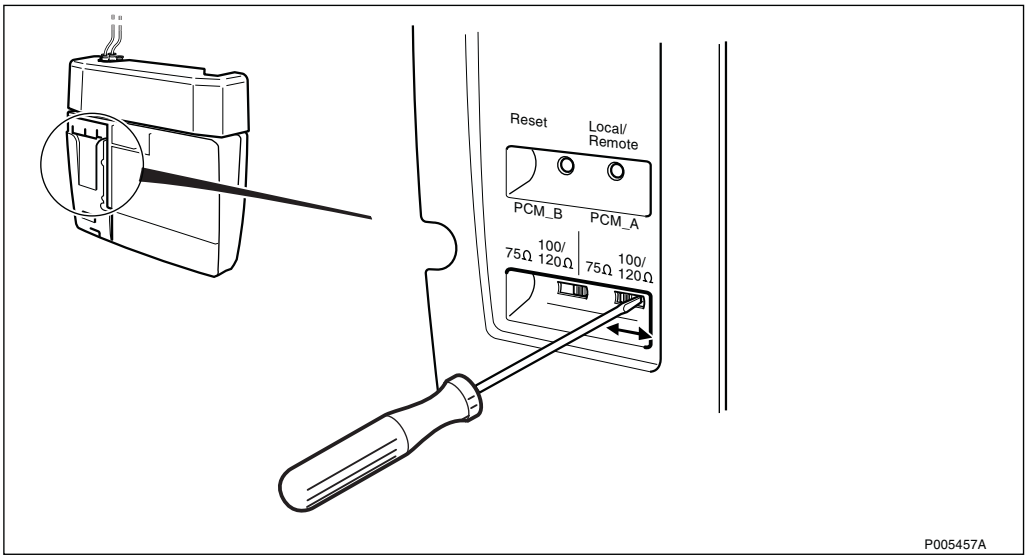

Figure 93

16. Install the fuses.

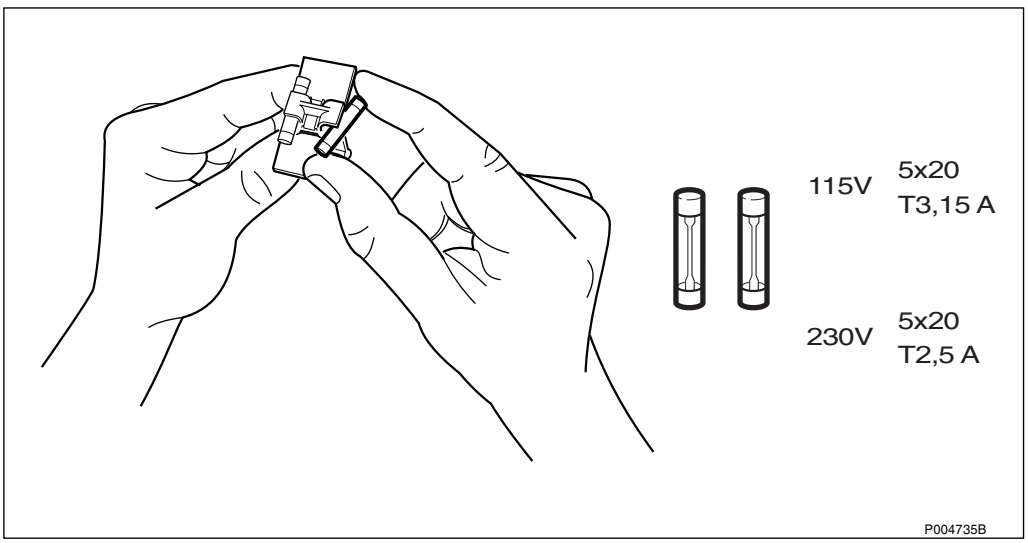

Figure 94

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17. Insert the fuse holder in the fuse compartment.

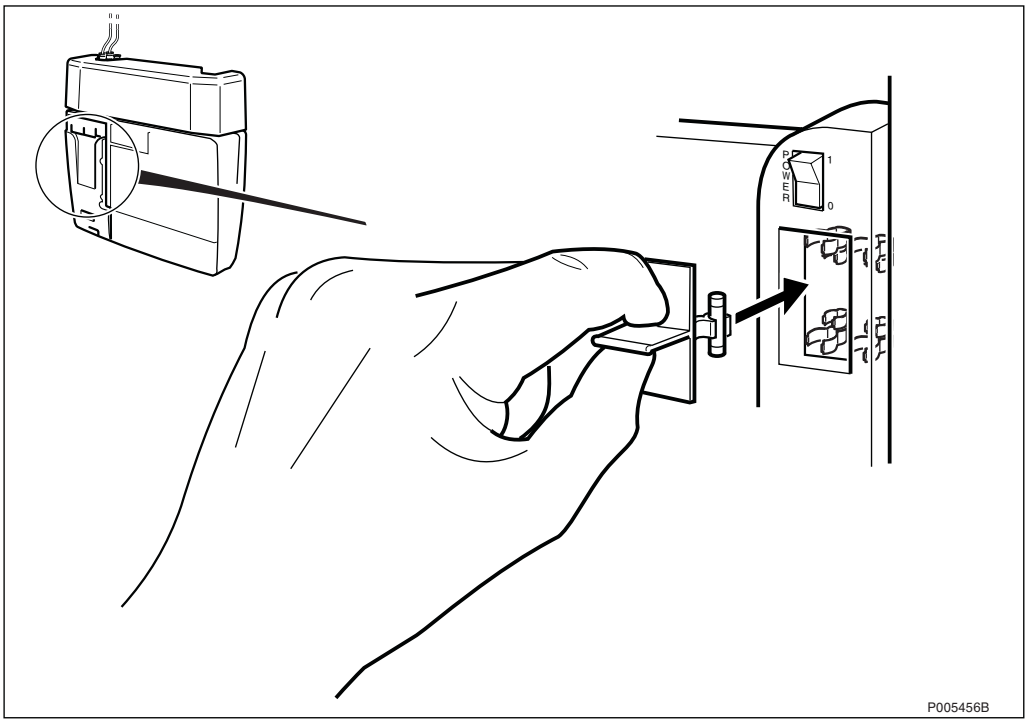

Figure 95

18. Mount the installation box cover.

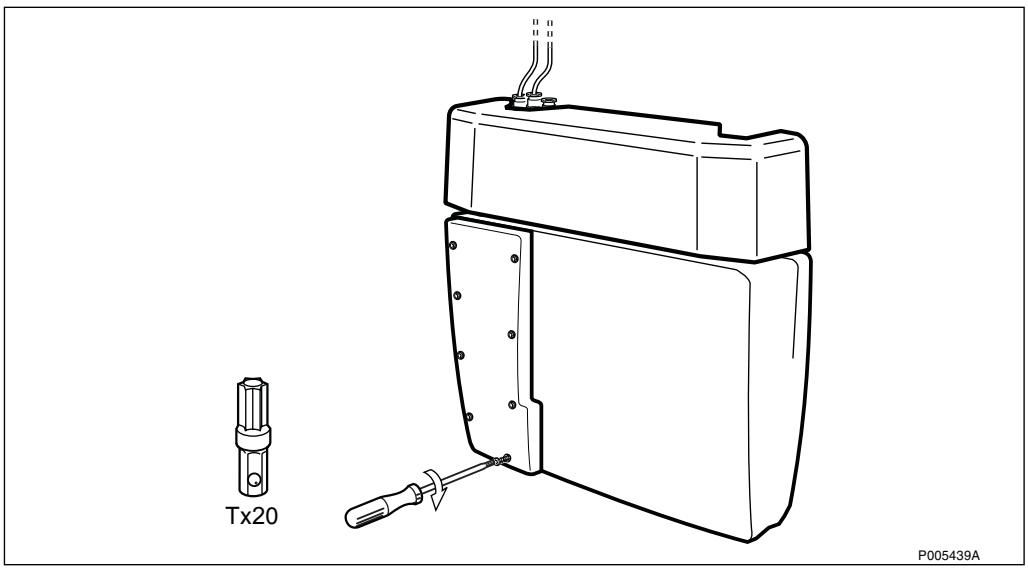

Figure 96

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19. Mount the front cover.

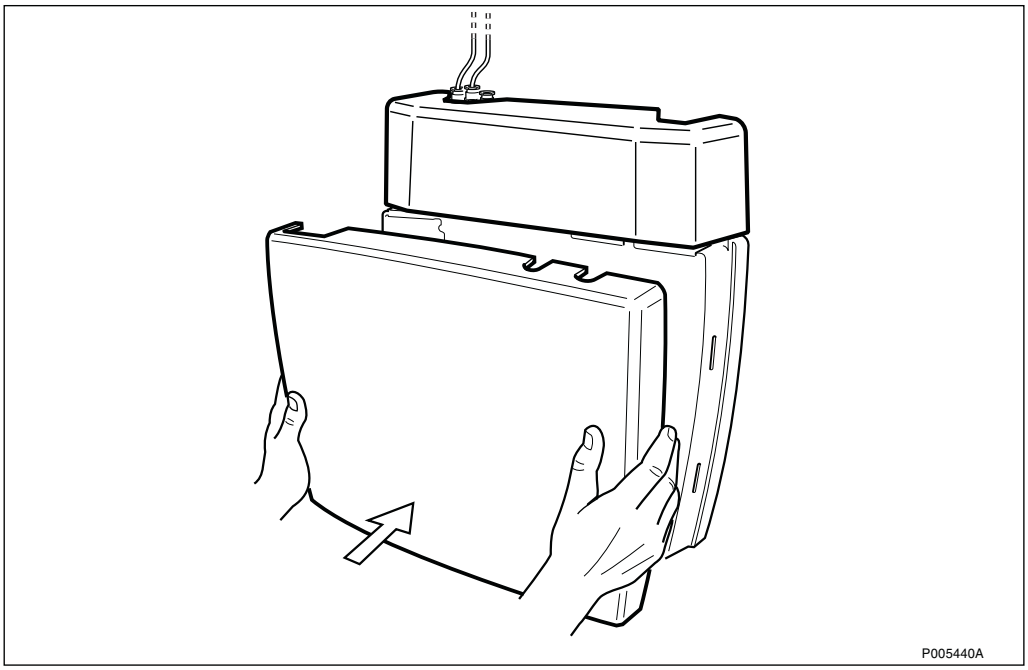

Figure 97

4.5 Installation of Optional HDSL Module

1. Remove the gland plate on the RBS, and mount the HDSL module with six screws, two on each side, and two screws on the cable gland plate.

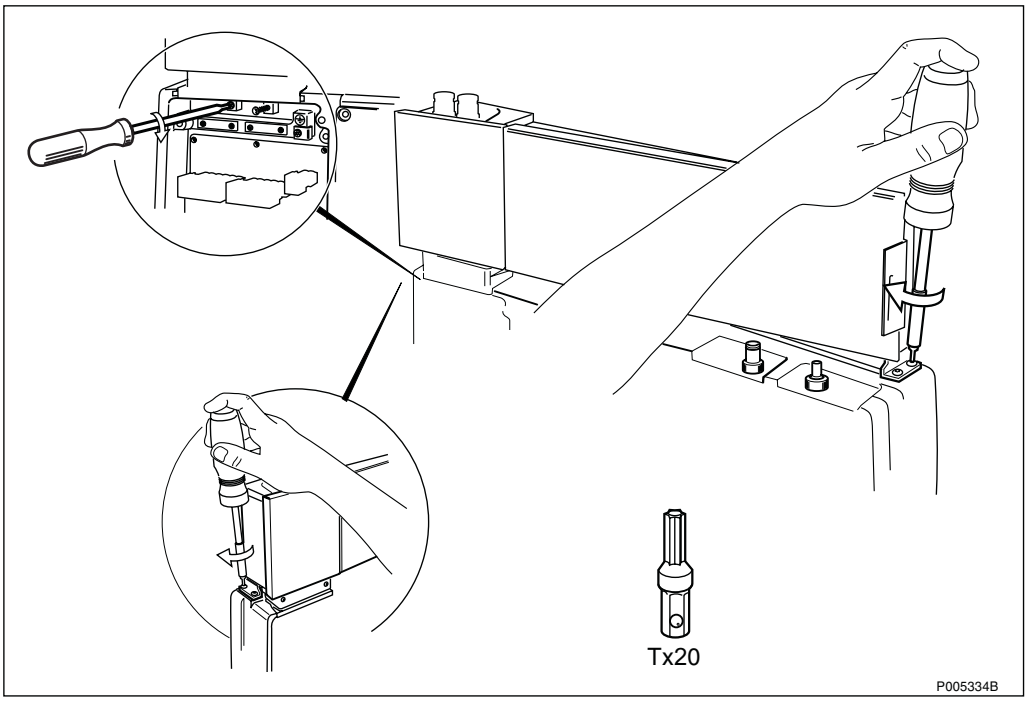

Figure 98

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2. Remove the cover.

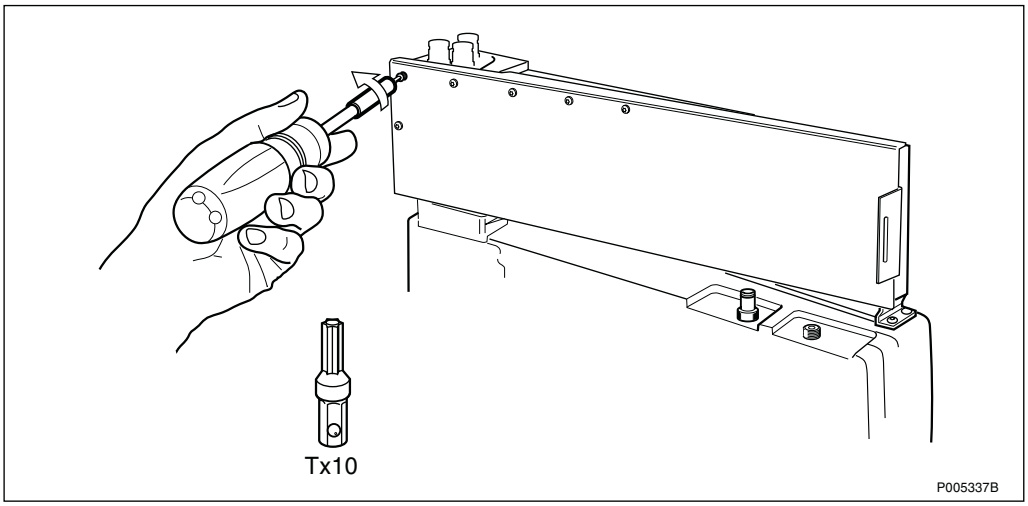

Figure 99

3. Connect the DC cable, and the internal transmission cables to the radio cabinet.

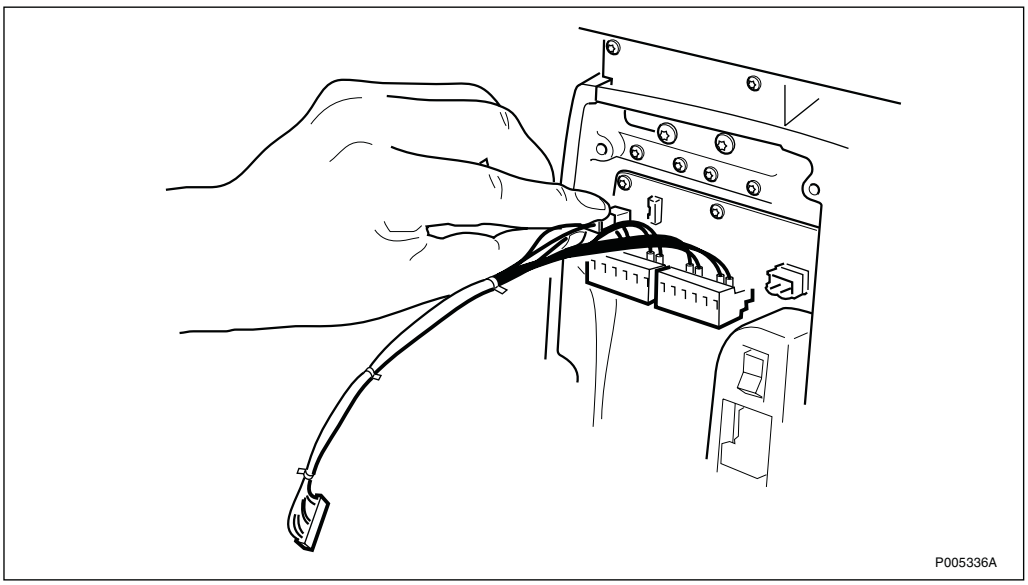

Figure 100

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4. Run the transmission cables from the radio cabinet through the opening up to the HDSL module.

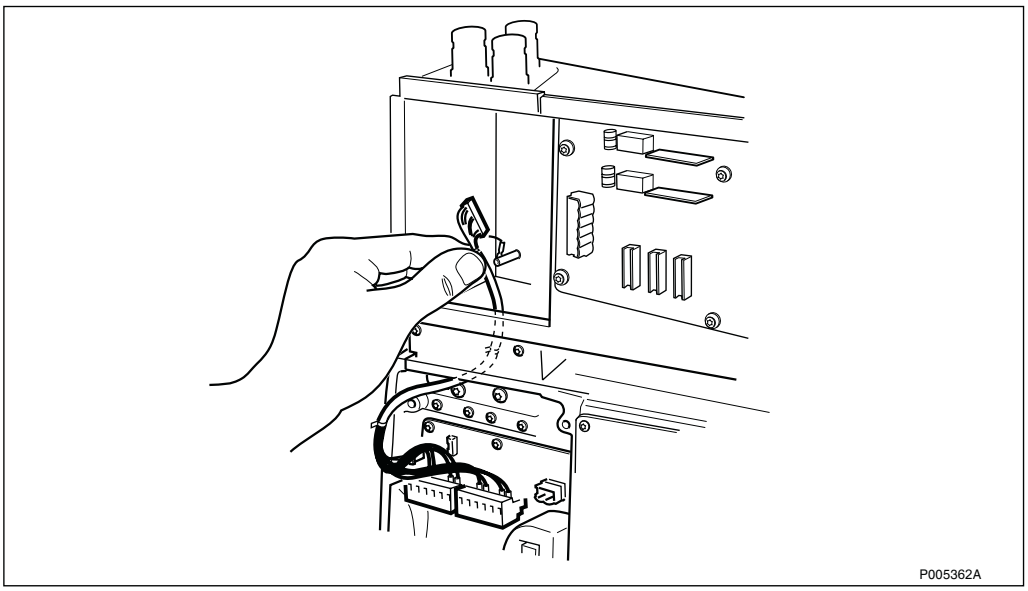

Figure 101

5. Strip the AC cable.

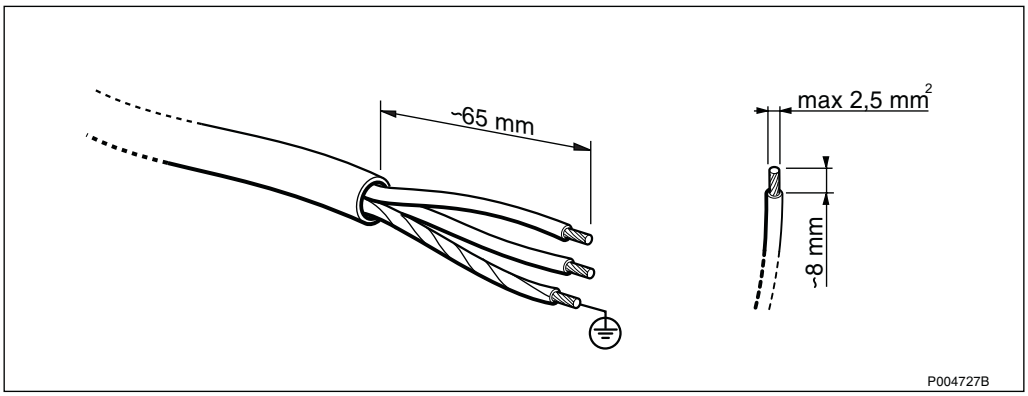

Figure 102

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6. Run the AC cable through the cable gland.

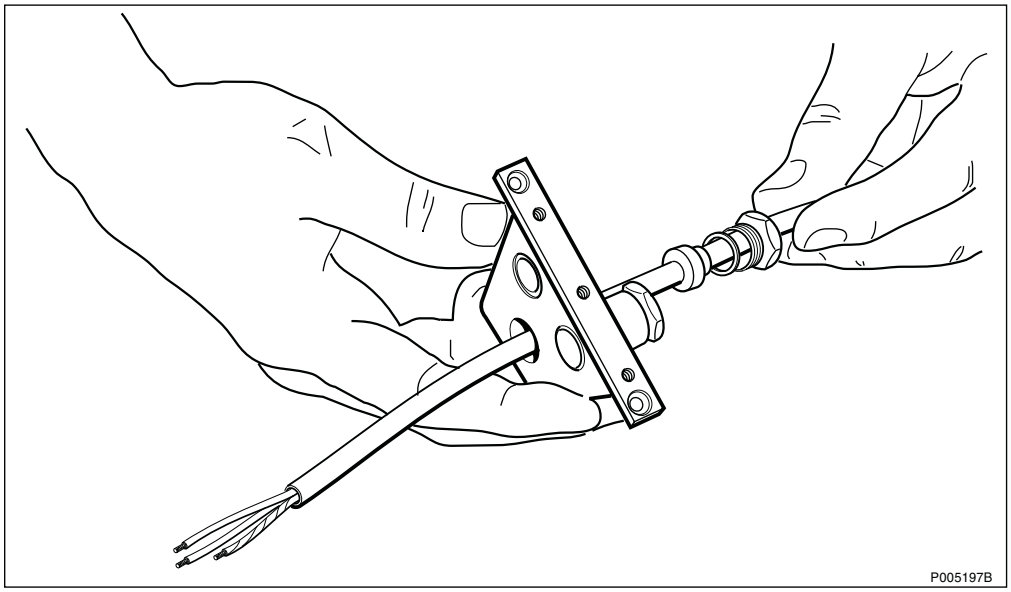

Figure 103

7. Connect the AC cable.

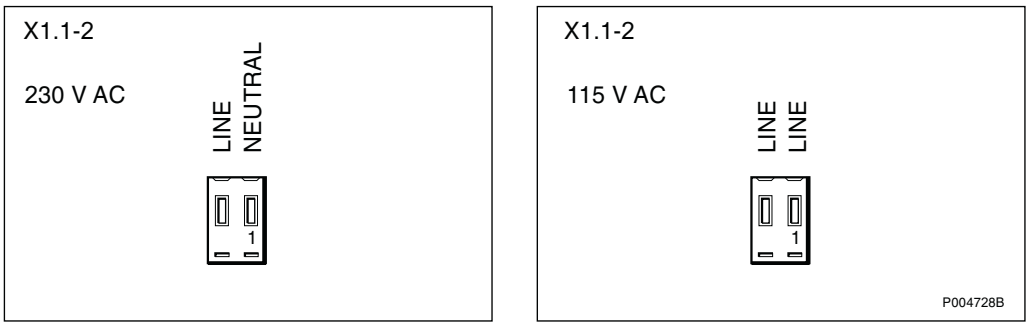

Figure 104 AC mains terminal

8. Connect the protective earth cable in the RBS.

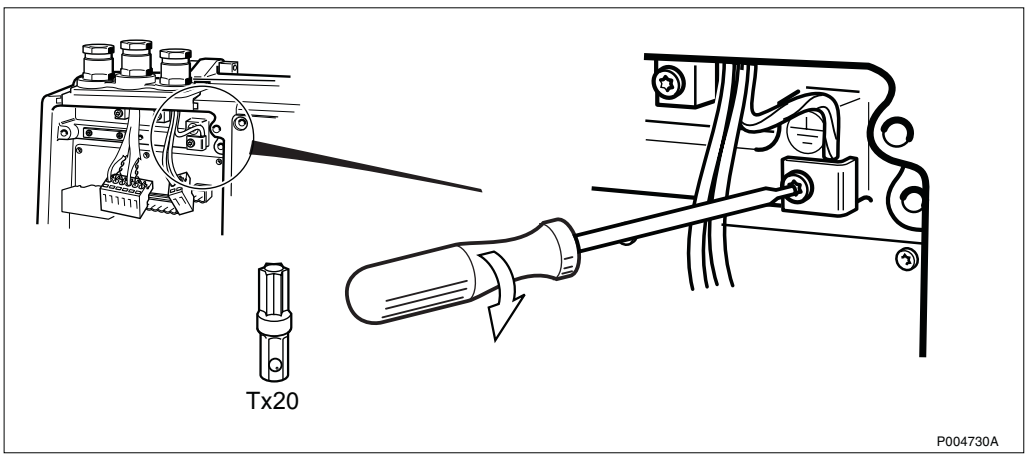

Figure 105

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9. Connect the internal transmission cable to the socket corresponding to the configuration used. The three configuration options are shown on the inner side of the cover.

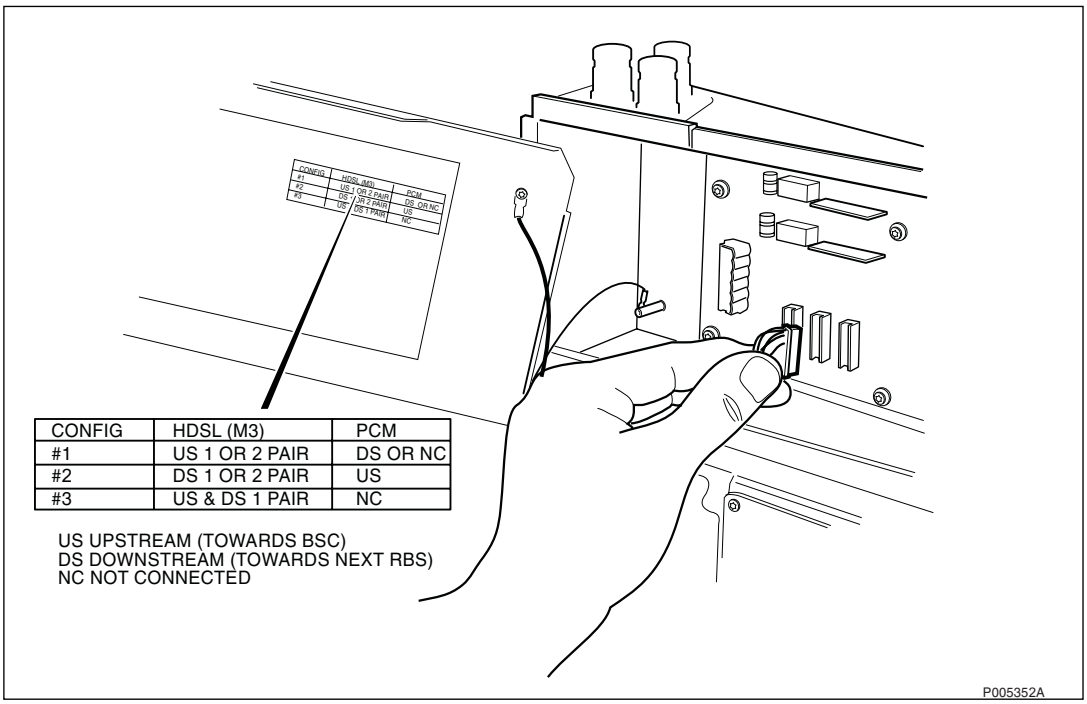

Figure 106

10. Run the transmission cable through the cable gland.

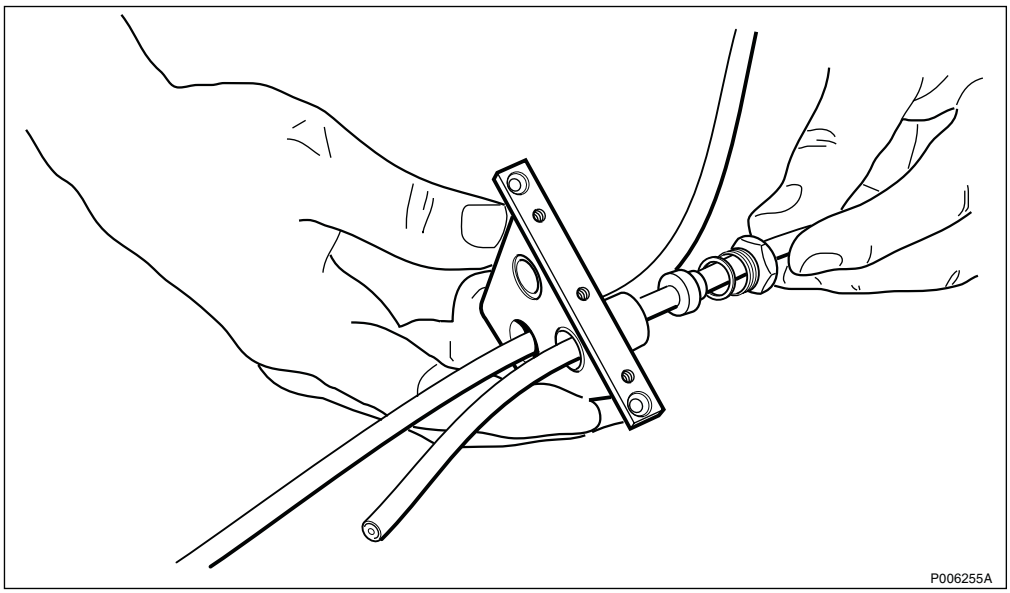

Figure 107

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11. Strip the PCM cable and the wires.

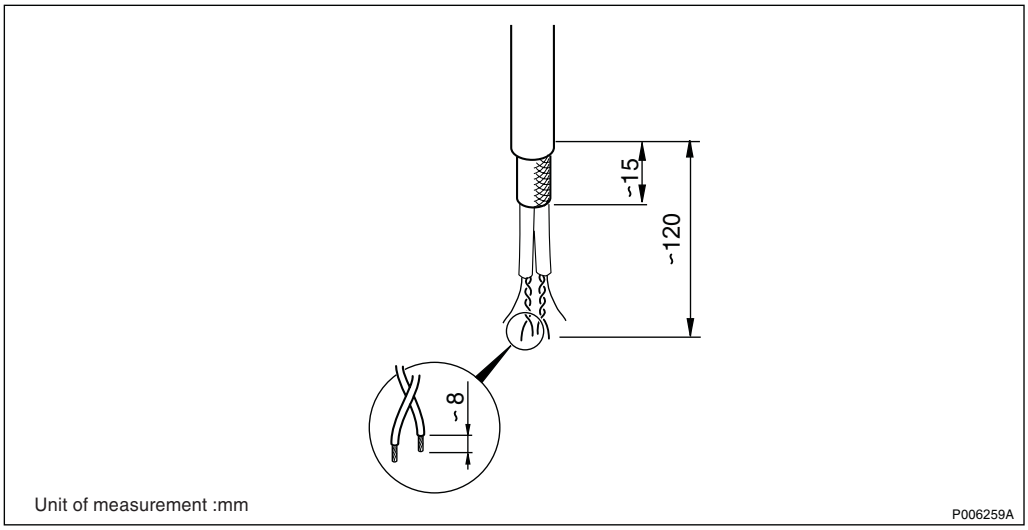

Figure 108

12. Connect the PCM A and PCM B cable on the HDSL connection board, according to Figure 112 on page 82.

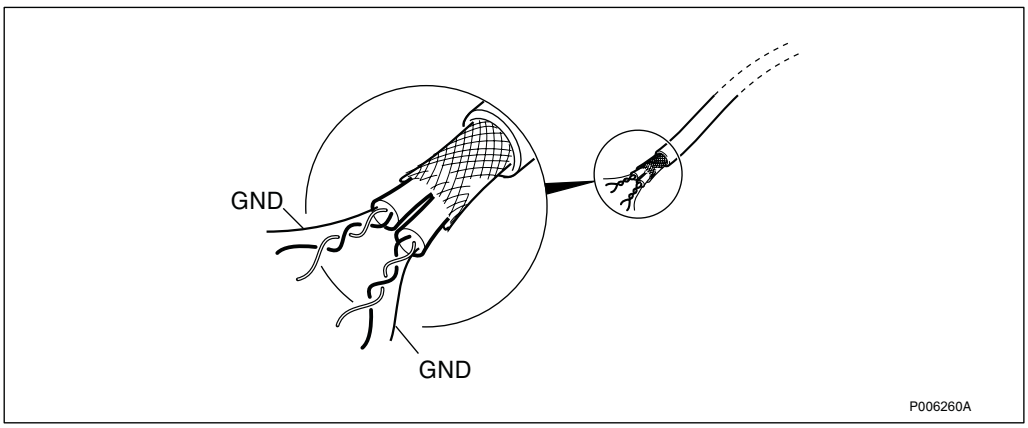

Figure 109 The PCM cable prepared for connection

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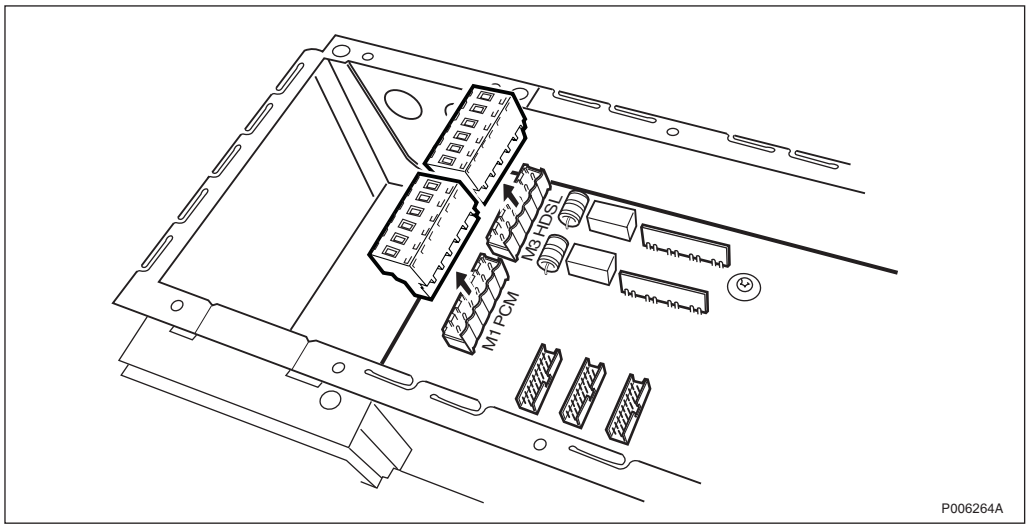

Figure 110 PCM terminal in the HDSL connection board

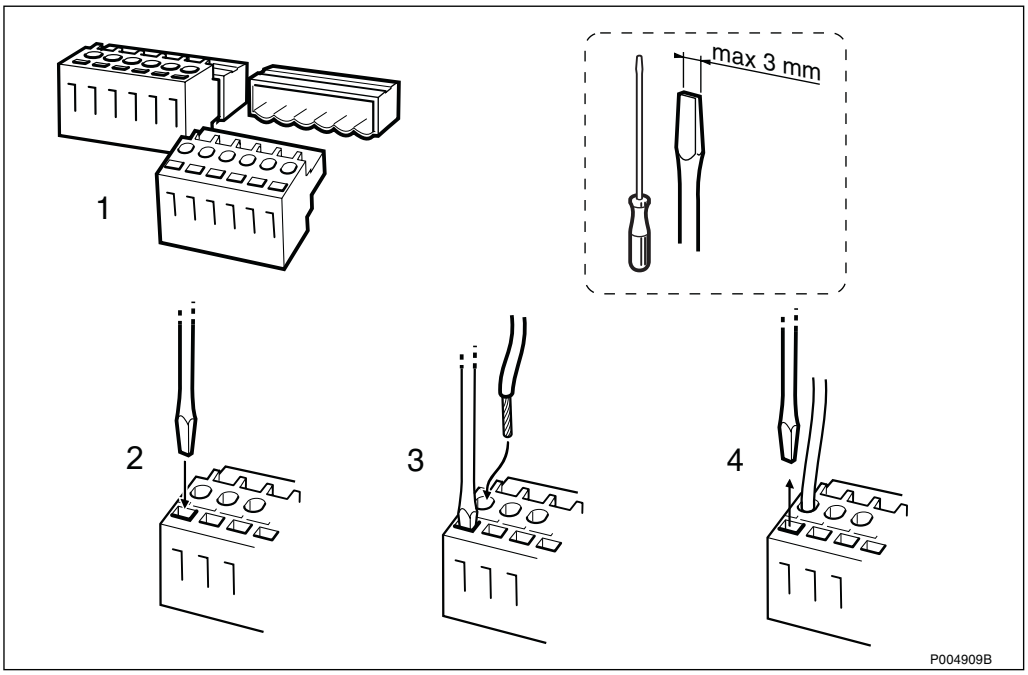

Figure 111 Recommended method when connecting wires

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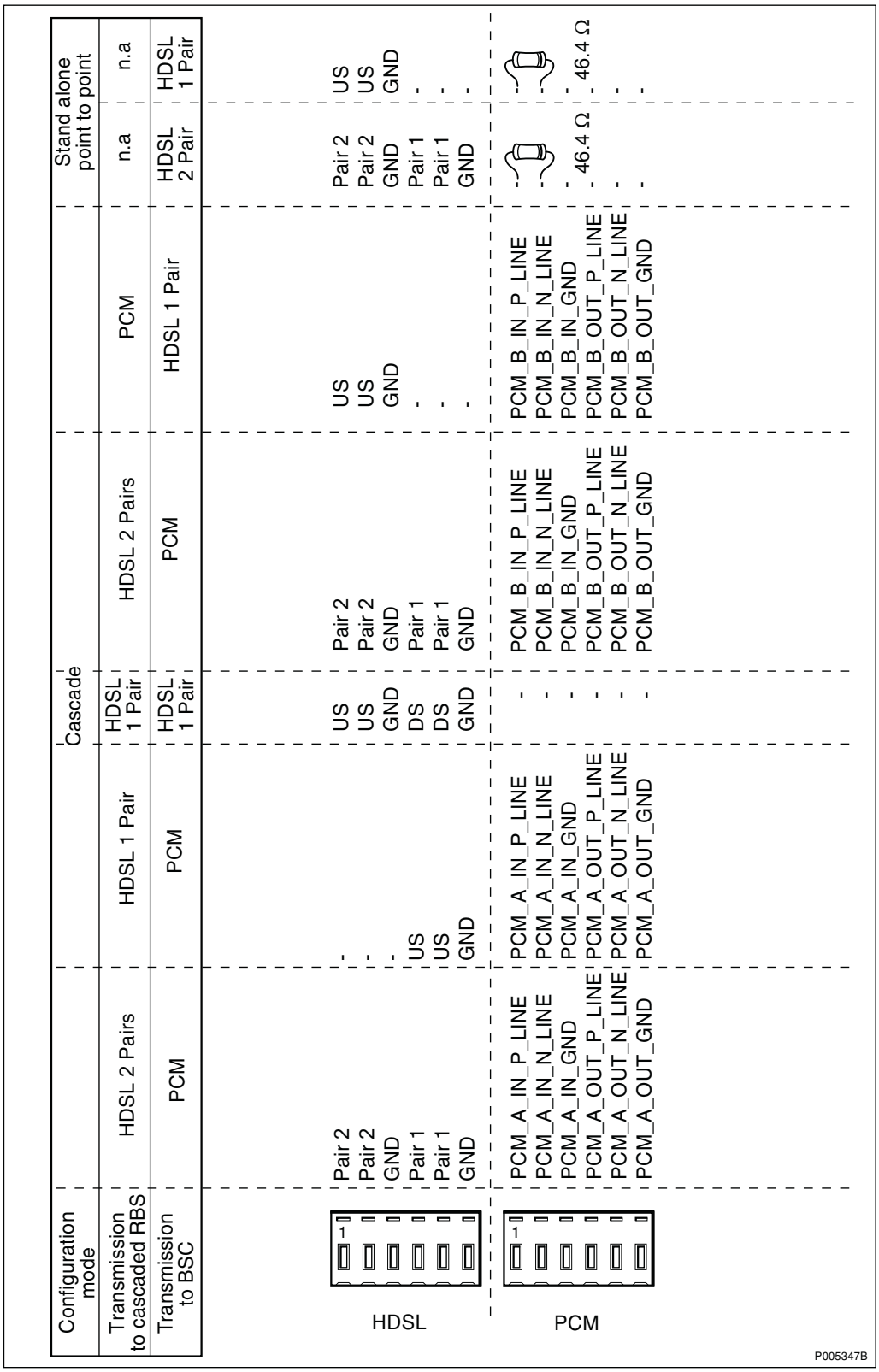

Figure 112

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13. Set the DIP switches. The tables below show the settings of the DIP switches in different modes.

Table 7 The default settings of DIP switches

Function	Switch position		Parameter value
Topology	**SW 1**	OFF	Chain
Line rate of master modem in chain mode	**SW 2**	ON	2320 kbit/s
	SW 3	ON	2320 kbit/s
Running number of RBS in chain mode	**SW 4**	ON	RBS number 1
	SW 5	ON	RBS number 1
	SW 6	ON	RBS number 1
Reserved in chain mode	**SW 7**	ON	Not applicable
Usage of external alarm	**SW 8**	OFF	Not applicable

Table 8 The chain (cascading) mode strappings

Function	Switch position			Parameter value
	SW 1			
Topology	OFF			Chain
	SW 2	**SW 3**		
Line rate of master modem in chain mode	ON	ON		2320 kbit/s
	OFF	ON		1168 kbit/s
	ON	OFF		592 kbit/s
	OFF	OFF		Reserved
	SW 4	**SW 5**	**SW 6**	
Running number of RBS in chain mode	ON	ON	ON	RBS number 1
	OFF	ON	ON	RBS number 2
	ON	OFF	ON	RBS number 3
	OFF	OFF	ON	RBS number 4
	ON	ON	OFF	RBS number 5
	OFF	ON	OFF	RBS number 6
	ON	OFF	OFF	RBS number 7
	OFF	OFF	OFF	RBS number 8
	SW 7			
Reserved in chain mode	ON			Not applicable
	SW 8			
Usage of external alarm	OFF			Not applicable

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Table 9 The point-to-point DXX proprietary mode strappings

Function	**Switch position**		**Parameter value**
	SW 1		
Topology	ON		point-to-point
	SW 2	**SW 3**	
Line rate in point-to point DXX proprietary mode	ON	ON	2320 kbit/s
	OFF	ON	1168 kbit/s
	ON	OFF	592 kbit/s
	OFF	OFF	reserved
	SW 4		
HDSL operation in point-to-point mode	ON		Proprietary mode
	SW 5		
Number of pairs in point-to-point DXX proprietary mode	ON		1 pair used
	OFF		2 pair used
	SW 6		
Protection in point-to-point proprietary mode	ON		No protection
	OFF		1 + 1 protection used
	SW 7		
Modem role in point-to-point mode	ON		HDSL Master
	OFF		HDSL Slave
	SW 8		
Usage of external alarm	OFF		Not applicable

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Table 10 The point-to-point ETSI compliant mode strappings

Function	**Switch position**		**Parameter value**
	SW 1		
Topology	ON		point-to-point
	SW 2	**SW 3**	
Line rate point-to point ETSI compilant mode	ON	ON	1 x 2 Mbit/s
	OFF	ON	2 x 1 Mbit/s asynchronous
	ON	OFF	2 x 1 Mbit/s synchronous
	OFF	OFF	2 x 1 Mbit/s partial
	SW 4		
HDSL operation in point-to-point mode	OFF		ETSI compliant mode
	SW 5		
Reserved in ETSI compliant mode	ON		Not applicable
	SW 6		
Reserved in ETSI compliant mode	ON		Not applicable
	SW 7		
Modem role in point-to-point mode	ON		HDSL Master
	OFF		HDSL Slave
	SW 8		
Usage of external alarm	OFF		Not applicable

14. If the HDSL is used in DXX proprietary mode, the DXX NMS can disable the DIP switch settings and override them.

    This can happen if the HDSL is moved to an application such as:

    - a new DXX propriatory mode application, with or without NMS, where a new power-up configuration is needed.
    - an ETSI mode application.

    The DIP switches can be enabled again by resetting the HDSL.

    To reset the HDSL, put all DIP switches to OFF position and then back to a new setting. Ensure that power is on during the reset.

    Switching power Off/On will not enable the DIP switches.

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15. Ensure that the cables are not stretched, then tighten the cable glands.

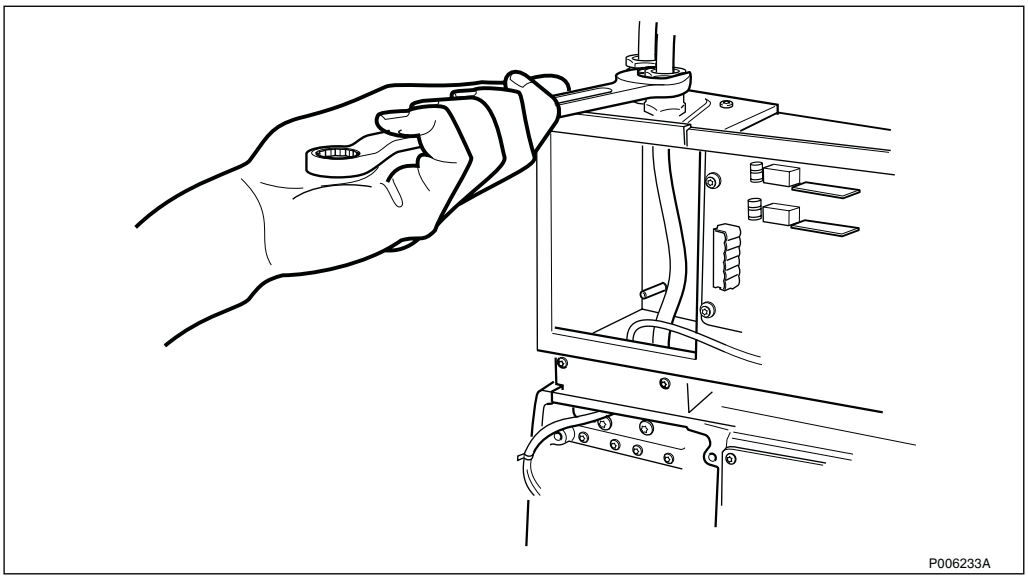

Figure 113

16. Remount the cover on the module.

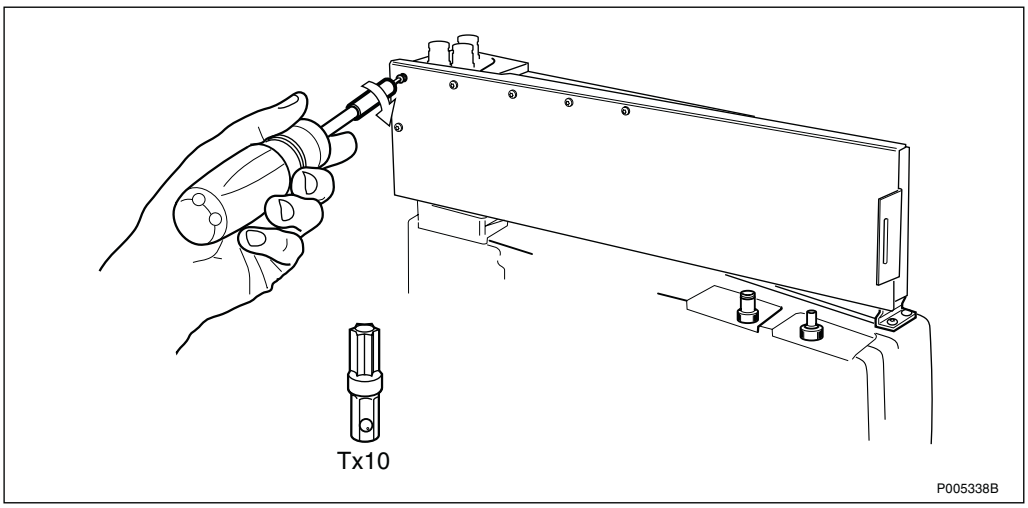

Figure 114

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17. Connect external antenna cable(s).

    The antenna connector not used is to be terminated with a 50 Ω resistor.

Note: Omnidirectional antenna is not allowed if AGW/HDSL is used.

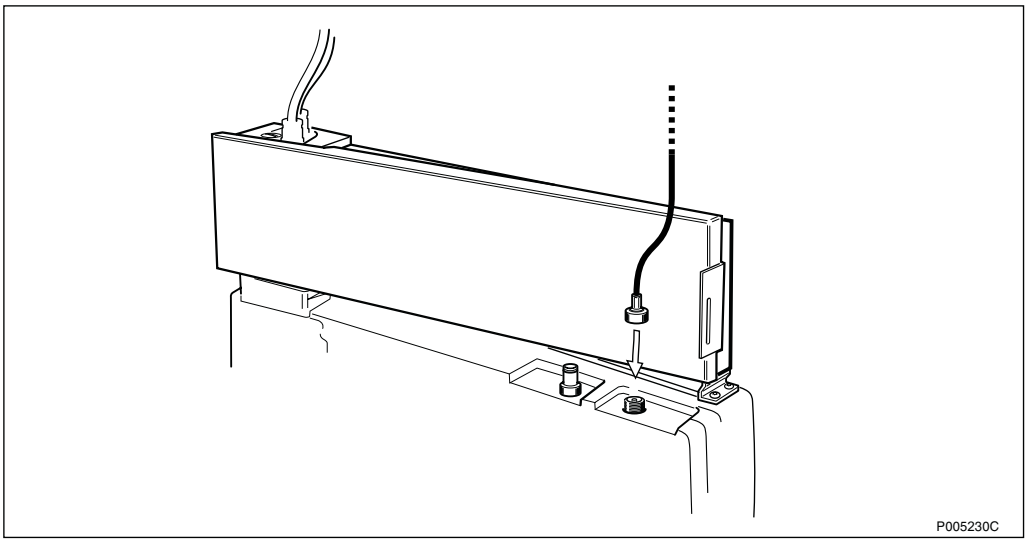

Figure 115

18. Remount the front cover on the HDSL module.

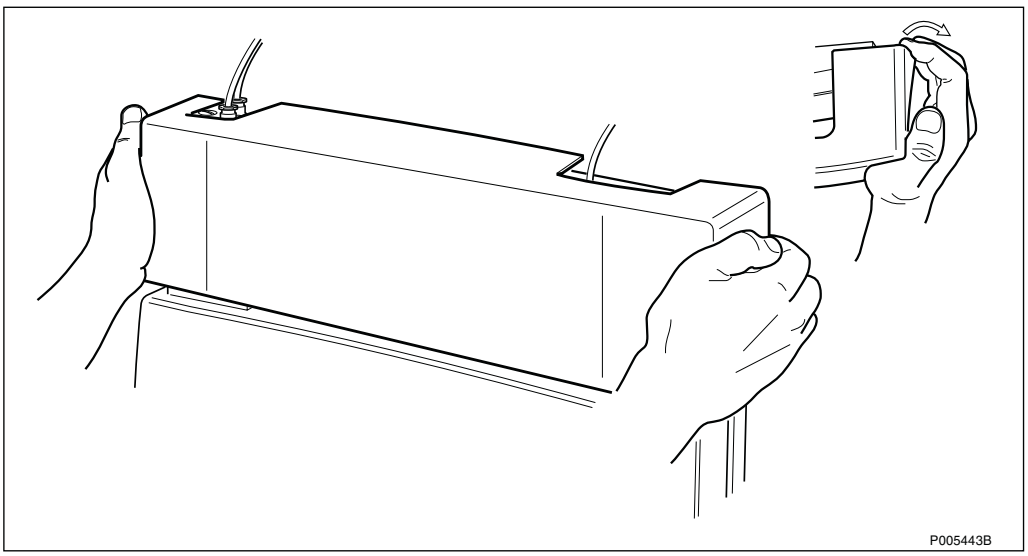

Figure 116

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19. Set the transmission switches to 120 Ω.

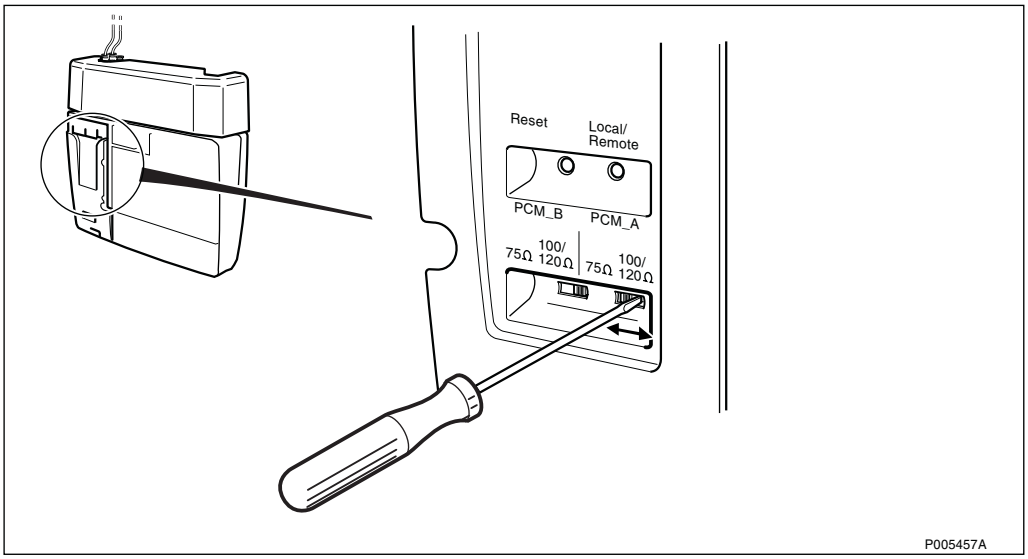

Figure 117

20. Install the fuses.

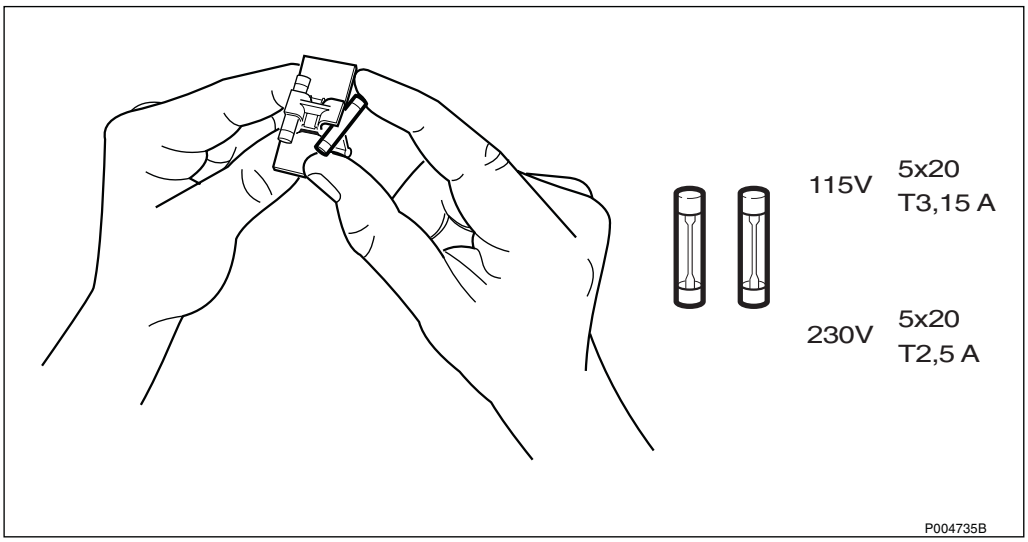

Figure 118

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21. Insert the fuse holder in the fuse compartment.

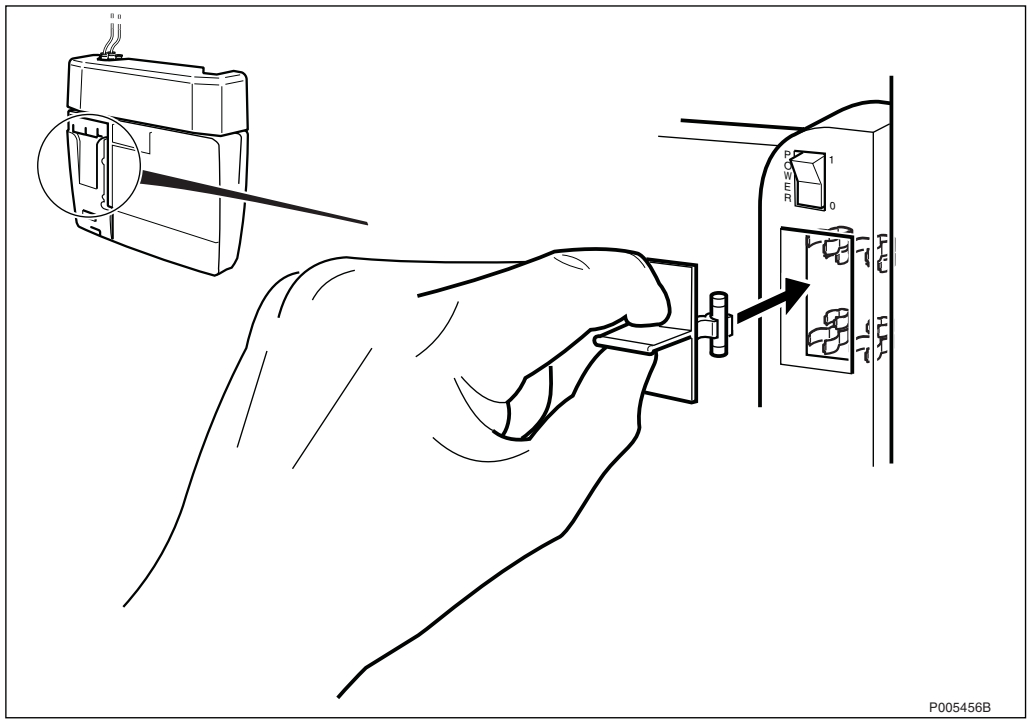

Figure 119

22. Mount the installation box cover.

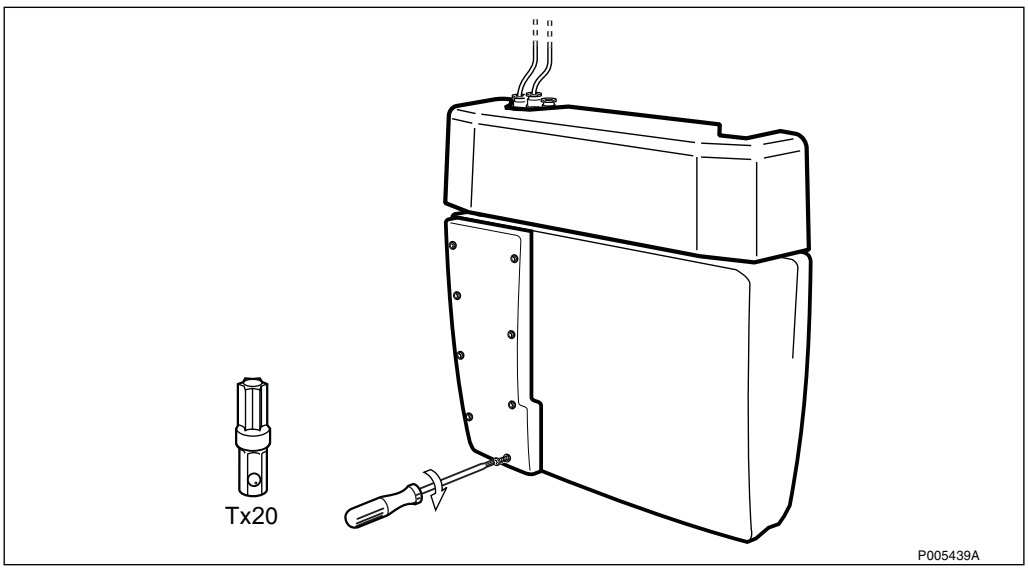

Figure 120

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23. Mount the front cover.

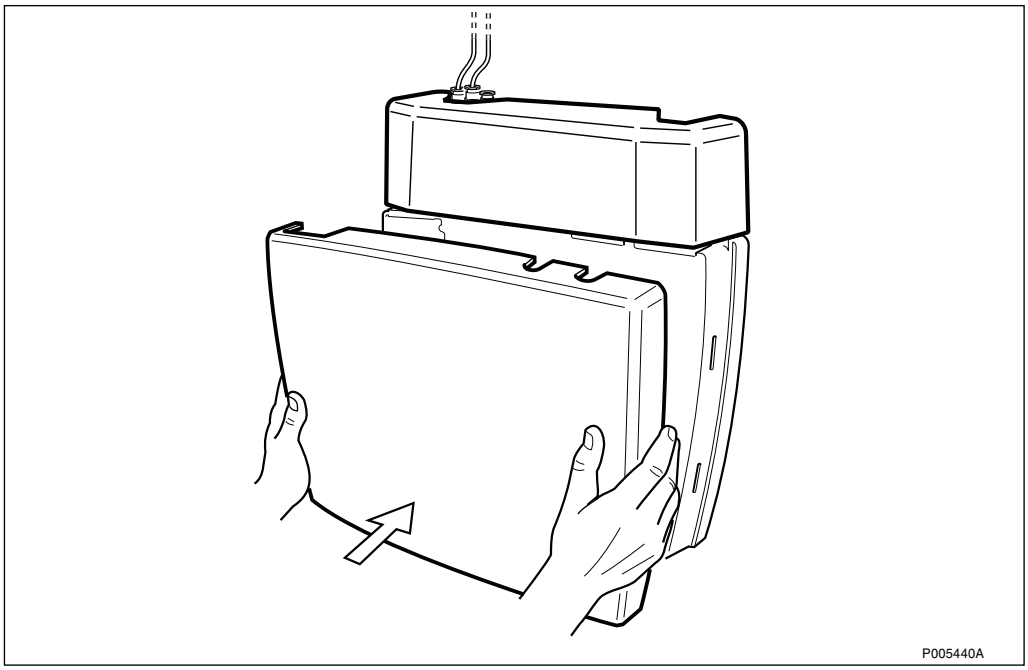

Figure 121

4.6 Test through HDSL (Optional Test)

This test is performed if no transmission network is available.

Test setup for the following configurations are described in this section:

- HDSL Upstream, one or two pairs
- HDSL Upstream - PCM Downstream, one or two pairs.
- HDSL Upstream - HDSL Downstream, one pair only.
- HDSL Downstream, one or two pairs

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4.6.1 HDSL Connection Board and Optical Indicators

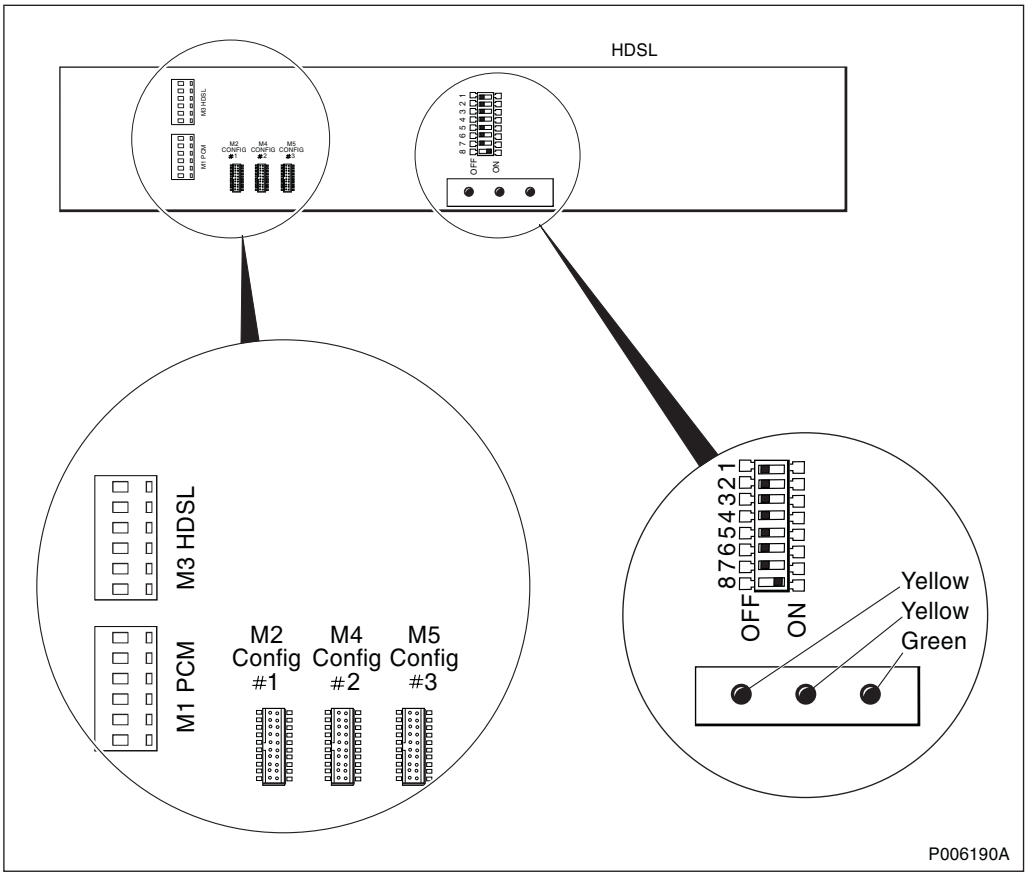

Figure 122 Location of connectors, DIP switches and optical indicators (LEDs)

LED Indicators

Table 11 Explanation of the LED indicators

LED	LED Indication	LED Status		
		Steady light	**Flashing light**	**Not lit**
Yellow (Left)(1)	Upstream or Pair 2	Link operational	Pair retraining	
Yellow (Middle)(1)	Downstream or Pair 1	Link operational	Pair retraining	
Green (Right)(1)	Power	Power ON	-	Power OFF

(1) All three LEDs flashing simultaneously indicate a faulty configuration (inconsistent setting of the DIP switches).

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4.6.2 Configurations

HDSL Module

Table 12 Connector used for different link alternatives

Configuration	HDSL Module				
	Connector	DIP switches	LEDs		
			O	O	O
HDSL upstream, one pair	M2	Table 8 on page 83	ON	OFF	ON
HDSL upstream, two pairs	M2	Table 8 on page 83	ON	ON	ON
HDSL upstream, one pair PCM downstream,	M2	Table 8 on page 83	ON	OFF	ON
HDSL upstream, two pairs PCM downstream	M2	Table 8 on page 83	ON	ON	ON
HDSL upstream - HDSL downstream, (cascade)	M5	Table 9 on page 84	ON	ON	ON
PCM upstream - HDSL downstream, one pair	M4	Table 8 on page 83	OFF	ON	ON
PCM upstream - HDSL downstream, two pairs	M4	Table 8 on page 83	ON	ON	ON

HTU

Table 13 Parameter settings in the HTU

Configuration	Parameters in HTU			
	HDSLTyp	Line Mode	Role	NWTopol
HDSL upstream, one pair	OTU	1 x 2	Master	P_to_P
HDSL upstream, two pairs		2 x 1	Master	P_to_P
HDSL upstream - PCM downstream, one pair	OTU	1 x 2	Master	P_to_P
HDSL upstream - PCM downstream, two pairs	OTU	2 x 1	Master	P_to_P
HDSL upstream - HDSL downstream, (cascade)	OTU	1 x 2	Master	Chain
PCM upstream - HDSL downstream, one pair	OTU	1 x 2	Master	P_to_P
PCM upstream - HDSL downstream, two pairs	OTU	2 x 1	Master	P_to_P

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Figure 123

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4.6.3 Test Setup: HDSL Upstream, one or two pairs

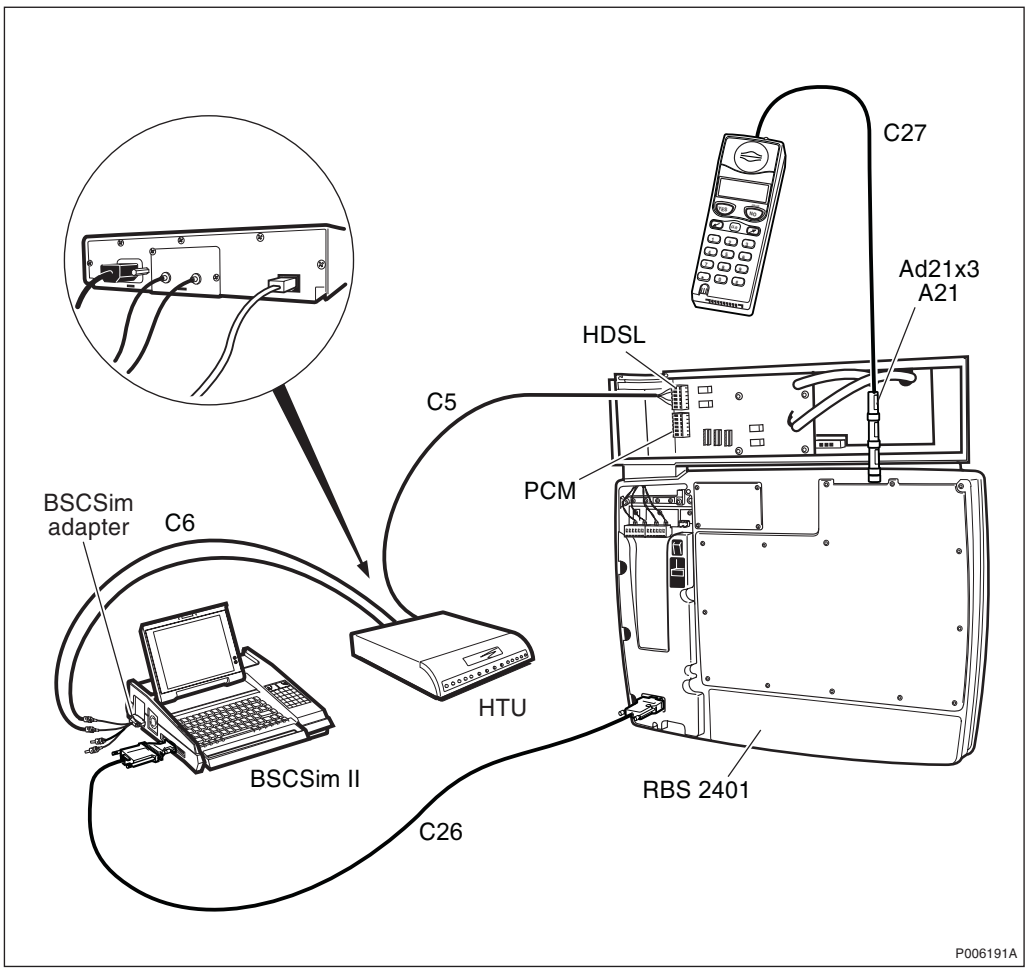

Figure 124 Test Setup: HDSL Upstream, one or two pairs

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Connecting Cables

1. Connect cable C26 to the COM1 port on the BSC Simulator, and to the input marked OMT on the RBS, *see Figure 73 on page 61*.

2. Connect the BSC simulator adapter to the input on the BSC simulator.

Note: Always connect the BSC simulator to the Master RBS (BSCSim II R2A, or later, is required).

3. Connect the cables between the BSC simulator via the HTU to the HDSL module:

    1. Remove the existing HDSL cable plug from the HDSL module.
    2. Connect the coaxial cable C6 to the BNC connectors on the BSC simulator adapter.
    3. Connect the coaxial cable C6 from the BSC simulator to the SMB connectors on the HTU.
    4. Connect the cable C5 to the RJ45 socket on the HTU, and connect the cables plug to the HDSL socket on the HDSL module.

4. Choose configuration M2 for the internal transmission cable. For detailed information on how to connect the cables, see *Table 12 on page 92*, and *Section 4.5 on page 75*.

5. Connect cable C27 to the antenna inlet on the mobile and to the adapter Ad21.

6. Connect the adapter Ad21 to the first attenuator A21.

7. Connect the three attenuators A21 together.

8. Ensure that the RBS either has been switched off, or is not transmitting.

    Then disconnect the antenna on the RBS, and connect the third attenuator A21 to the antenna connector on the RBS.

Note: The antenna connector that is not used must be terminated with a 50 Ω resistor.

9. Switch on the RBS, the HTU and the BSC simulator.

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4.6.4 Test Setup: HDSL Upstream, one or two pairs - PCM Downstream,

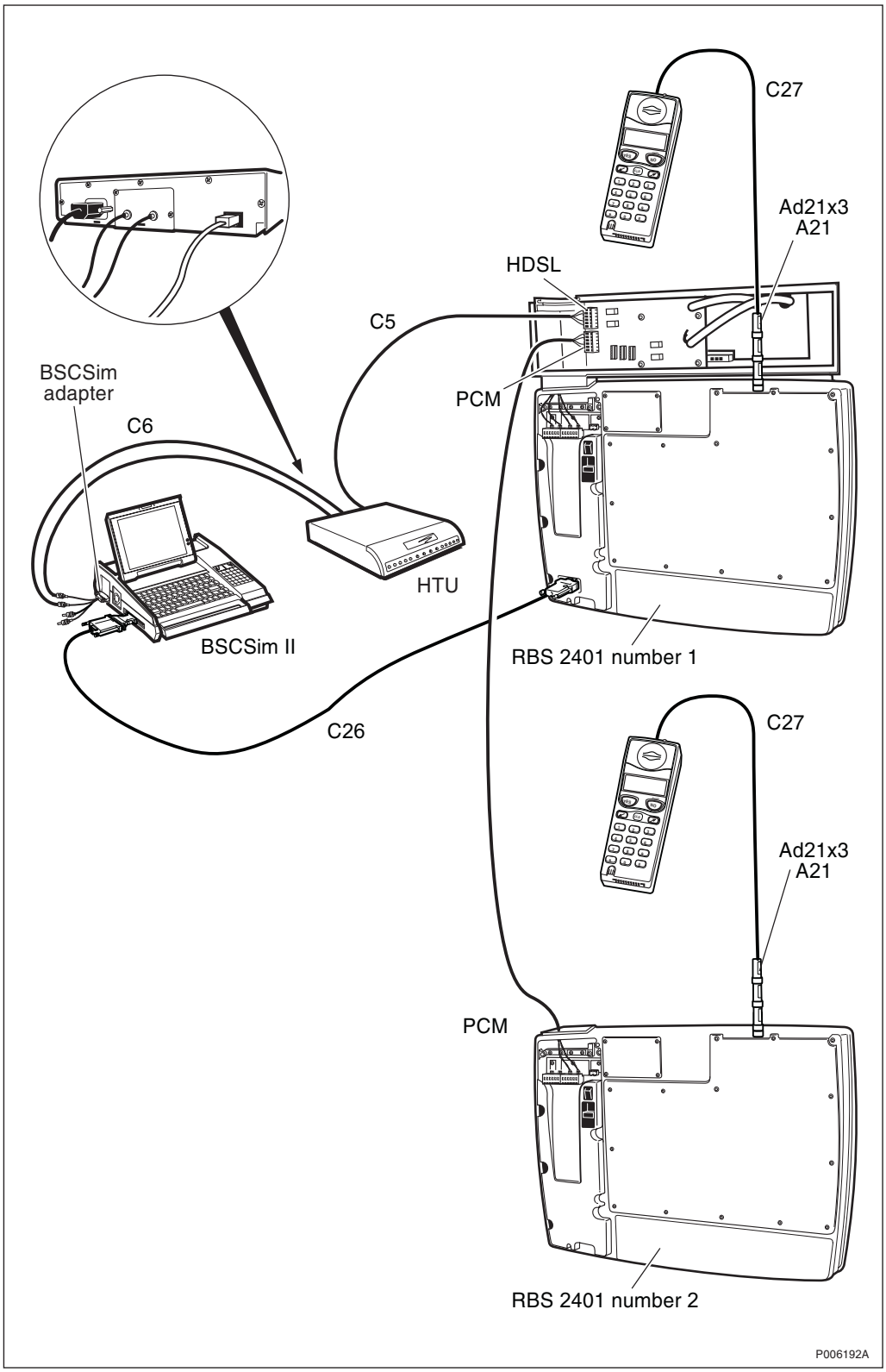

Figure 125 Test Setup: HDSL Upstream, one or two pairs - PCM Downstream

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Connecting Cables

1. Connect cable C26 to the COM1 port on the BSC Simulator, and to the input marked OMT on the RBS, *see Figure 73 on page 61*.

2. Connect the BSC simulator adapter to the input on the BSC simulator.

Note: Always connect the BSC simulator to the Master RBS (BSCSim II R2A, or later, is required).

3. Connect the cables between the BSC simulator via the HTU to the HDSL module:

    1. Remove the existing HDSL/PCM cable plug from the HDSL module.
    2. Connect the coaxial cable C6 to the BNC connectors on the BSC simulator adapter.
    3. Connect the coaxial cable C6 from the BSC simulator to the SMB connectors on the HTU.
    4. Connect the cable C5 to the RJ45 socket on the HTU, and connect the cables plug to the HDSL socket on the HDSL module on the first RBS.

4. Choose configuration M2 for the internal transmission cable. For detailed information on how to connect the cables, see *Table 12 on page 92*, and *Section 4.5 on page 75*.

5. Connect the transmission cable to the PCM socket on the first RBS, and to the PCM A socket on the second RBS.

6. Connect cable C27 to the antenna inlet on the mobile and to the adapter Ad21

7. Connect the adapter Ad21 to the first attenuator A21.

8. Connect the three attenuators A21 together.

9. Ensure that the RBS either has been switched off, or is not transmitting.

    Then disconnect the antenna on the RBS, and connect the third attenuator A21 to the antenna connector on the RBS.

Note: The antenna connector that is not used must be terminated with a 50 Ω resistor

10. Switch on the RBS, the HTU and the BSC simulator.

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4.6.5 Test Setup: HDSL Upstream, one pair - HDSL Downstream, one pair

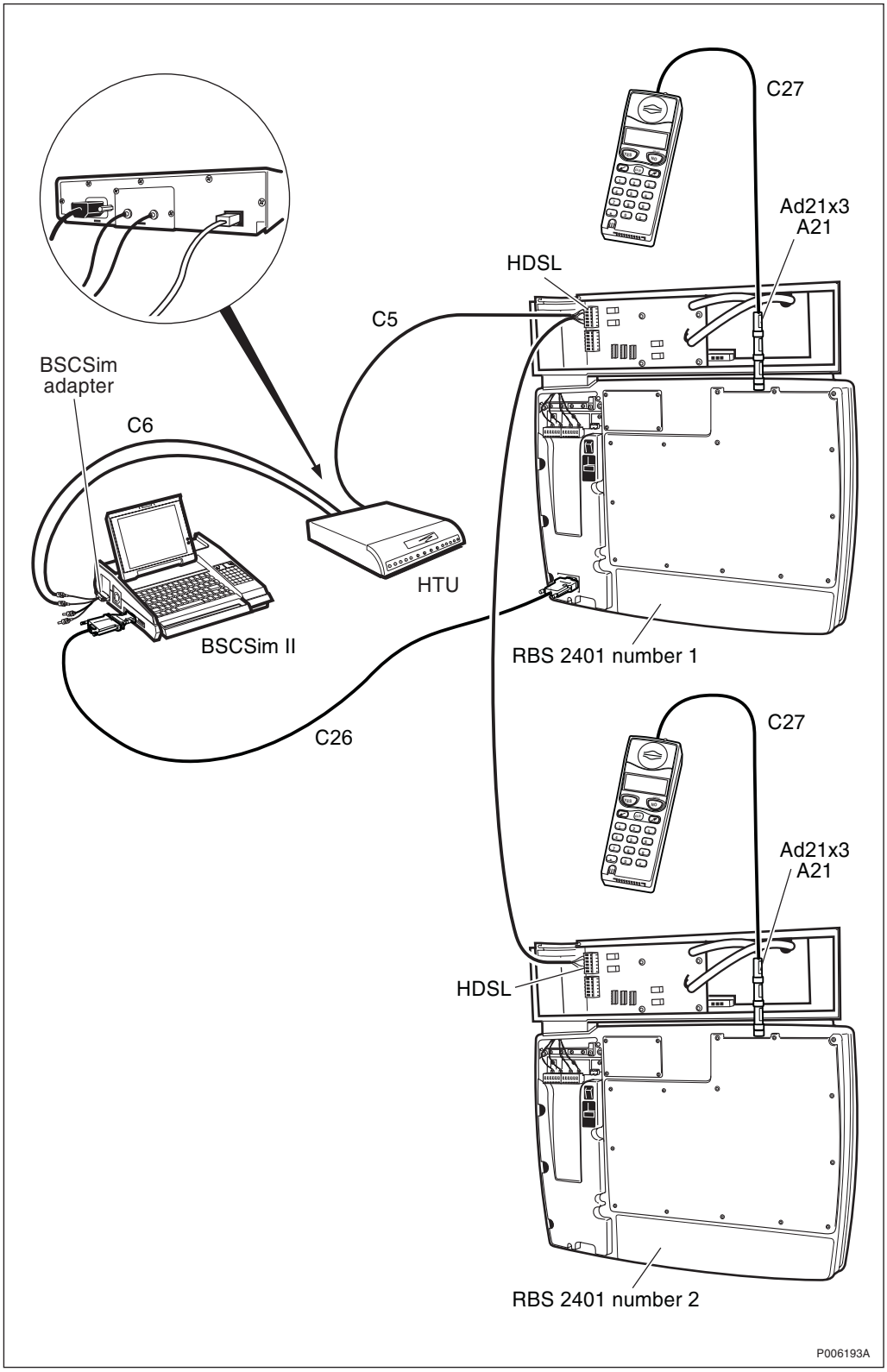

Figure 126 Test Setup: HDSL Upstream, one pair- HDSL Downstream, one pair

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Connecting Cables

1. Connect cable C26 to the COM1 port on the BSC Simulator, and to the input marked OMT on the RBS, *see Figure 73 on page 61*.

2. Connect the BSC simulator adapter to the input on the BSC simulator.

Note: Always connect the BSC simulator to the Master RBS (BSCSim II R2A, or later, is required.

3. Connect the cables between the BSC simulator via the HTU to the HDSL module:

    1. Remove the existing HDSL cable plug from the HDSL module.
    2. Connect the coaxial cable C6 to the BNC connectors on the BSC simulator adapter.
    3. Connect the coaxial cable C6 from the BSC simulator to the SMB connectors on the HTU.
    4. Connect the cable C5 to the RJ45 socket on the HTU, and connect the cables plug to the HDSL socket on the HDSL module on the first RBS.

4. Choose configuration M5 for the internal transmission cable. For detailed information on how to connect the cables, see *Table 12 on page 92*, and *Section 4.5 on page 75*.

5. Connect the transmission cable to the HDSL socket on the first RBS, and to the HDSL socket on the second RBS.

6. Connect cable C27 to the antenna inlet on the mobile and to the adapter Ad21

7. Connect the adapter Ad21 to the first attenuator A21.

8. Connect the three attenuators A21 together.

9. Ensure that the RBS either has been switched off, or is not transmitting.

    Then disconnect the antenna on the RBS, and connect the third attenuator A21 to the antenna connector on the RBS.

Note: The antenna connector that is not used must be terminated with a 50 Ω resistor

10. Switch on the RBS, the HTU and the BSC simulator.

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4.6.6 Test Setup: PCM Upstream - HDSL Downstream, one or two pairs

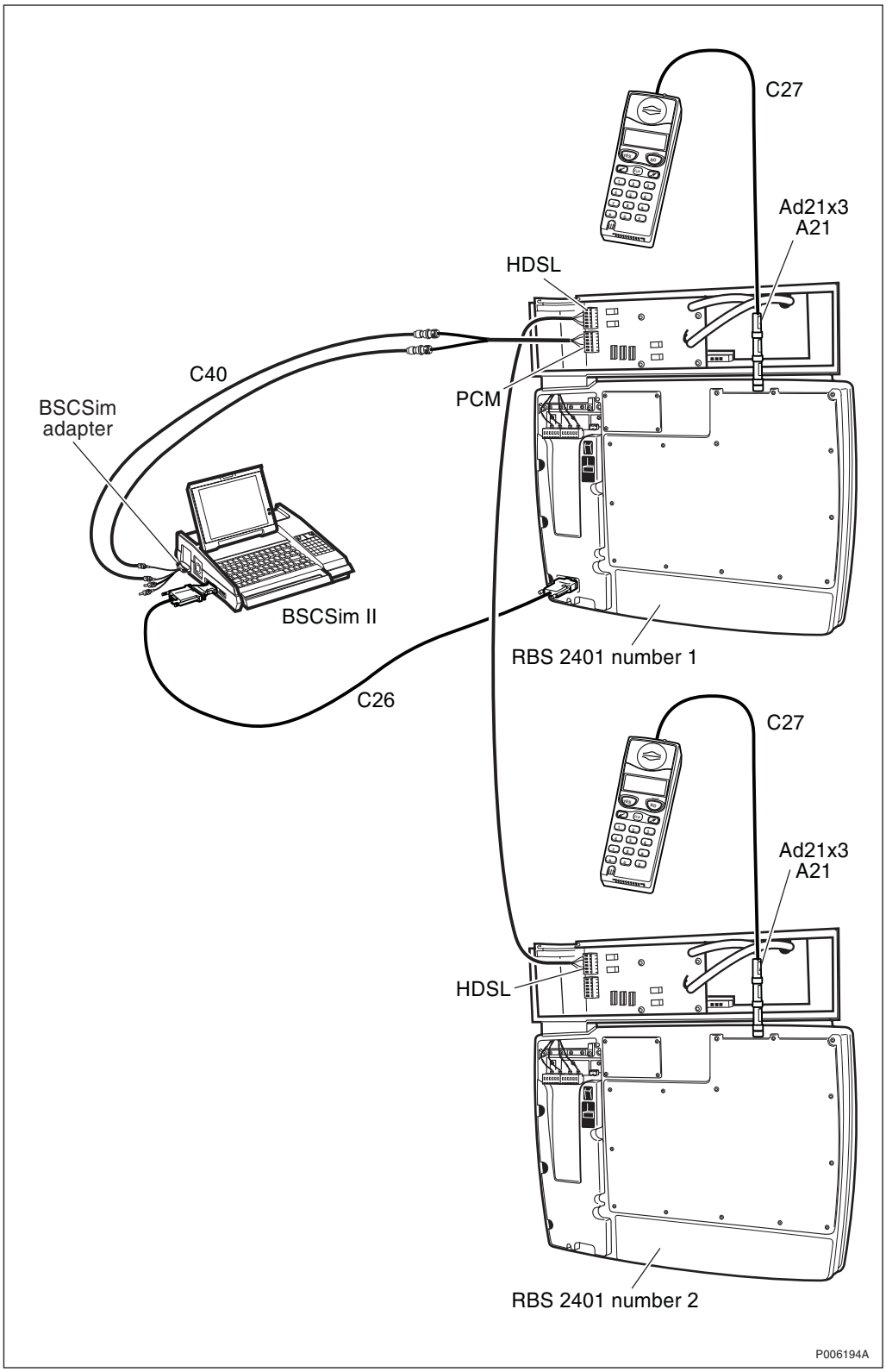

Figure 127 Test Setup: HDSL Downstream, one or two pairs

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Connecting Cables

1. Connect cable C26 to the COM1 port on the BSC Simulator, and to the input marked OMT on the RBS, *see Figure 73 on page 61*.

2. Connect the BSC simulator adapter to the input on the BSC simulator.

Note: Always connect the BSC simulator to the Master RBS (BSCSim II R2A, or later, is required.

3. Connect the cables between the BSC simulator via the HTU to the HDSL module:

    1. Remove the existing HDSL/PCM cable plug from the HDSL module.
    2. Connect the coaxial cable C40 to the BNC connectors on the BSC simulator adapter.
    3. Connect the coaxial cable C40 from the BSC simulator to the PCM socket on the HDSL module on the first RBS.

4. Choose configuration M4 for the internal transmission cable. For detailed information on how to connect the cables, see *Table 12 on page 92*, and *Section 4.5 on page 75*.

5. Connect the transmission cable to the HDSL socket on the first RBS, and to the HDSL socket on the second RBS.

6. Connect cable C27 to the antenna inlet on the mobile and to the adapter Ad21

7. Connect the adapter Ad21 to the first attenuator A21.

8. Connect the three attenuators A21 together.

9. Ensure that the RBS either has been switched off, or is not transmitting.

    Then disconnect the antenna on the RBS, and connect the third attenuator A21 to the antenna connector on the RBS.

Note: The antenna connector that is not used must be terminated with a 50 Ω resistor.

10. Switch on the RBS, and the BSC simulator.

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4.6.7 Test Sequence

1. Ensure that the connectors and the DIP switches are set correctly, according to *Table 12 on page 92.*.
2. Set the HTU parameters: To confirm a selection, press Enter on the HTU.
    1. Select HTU-2M.
    2. Select Params.
    3. Select HDSLine.
    4. Select HDSLTyp and OTU.
    5. Select LineMod and choose 1x2M (one pair) or 2x1M (two pairs), depending on the configuration, *see Table 13 on page 92.*
    6. Select Role and choose Master (when using the HTU, the HTU is always defined as Master and the HDSL module as Slave).
    7. Select NWTopol and choose P_to_P or Chain depending on the configuration. Set the HTU parameters according to *Table 13 on page 92.*
    8. Select Update and choose Update. The display shows "UPDATING"
    9. Go back to the main menu by pressing Exit three times.
3. Check on the HDSL module that the LEDs are indicating the correct configuration, *see Table 12 on page 92*.
4. Check on the HTU that LineCnd on the display shows "ok" (for one pair) or "OK/OK" (for two pairs). If not, check the connections and make sure that the correct configuration is used.
5. Make test calls (diversity A and B) using the BSC simulator. The test is passed when calls have been made on all TRXs. At least one timeslot must be tested in each TRX.
6. When the test is completed, disconnect the test equipment and reconnect the HDSL/PCM socket on the HDSL module.

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4.7 Concluding Routines

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

If any check point is not OK, do not leave the site until the problem/ fault has been cleared or investigated.

Table 14 Checklist

Checklist	**OK**
1. LED indicator FAULT is OFF.	
2. LED indicator OPERATIONAL is ON.	
3. RBS 2401 is in Remote mode (Local mode indicator OFF).	
4. Backup copy of the RBS IDB saved on a diskette.	
5. LED status on HDSL/AGW module checked.	
Signature **Date**	

4.8 Test Record

Example of a test record that is to be filled in during the tests.

4.8.1 Site Data

Site name _____

Date _____

Site Hardware Status

Unit	**Product No.**	**Serial No.**	**Rev.**	**Manufact. date**
RBS 1				
- Radio cabinet				
- HDSL module				
- AGW module				

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4.8.2 Test Result

Visual Installation Check

OK	Remarks

Test Checklist

Test	OK	Failed	Remarks
- Start-up of RBS 1			
- Read IDB			
- Fault Status Reading			
- MS Test Call using simulator			

IDB Status

	ON	OFF
CRC-4 (E1)		

	ON	OFF
TNOM USE (1)		

TNOM TIMESLOT (1)	
TNOM NODE ID (1)	

(1) R7 and later

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TEI Value

	TEI Value	
	Multidrop	**Stand Alone**
RBS 1		
RBS 2		
RBS 3		
RBS 4		
RBS 5		

LBO Parameter Settings (T1)

Short Haul

	RBS 1	**RBS 2**	**RBS 3**	**RBS 4**	**RBS 5**
LBO-A (feet)					
LBO-B (feet					

Long Haul

	RBS 1	**RBS 2**	**RBS 3**	**RBS 4**	**RBS 5**
LBO-A (dB)					
LBO-B (dB)					

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Antenna Installation Test

Installation check

		Remarks
Visual check		
Antenna system used:		
- RBS 2401 omnidirectional		
- External		

MS Test Call using BSC Simulator (Optional test)

			RX Level		RX Quality		
		TS	DL	UL	DL	UL	TA
RX-A	TRX 1						
	TRX 2						

Mobile used for this test

Model _____

Rev. _____ Serial No. _____

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Network Integration Tests

TEST CALL ON AIR INTERFACE					
TRX	**Cell ID**	**ARFCN**	**BSIC**	**MS Originated**	**MS Terminated**
1					
2					

Remarks

PSTN TO MS CALL	

	OK	**Failed**	**Remarks**
HDSL module			
AGW module			

4.8.3 Signatures

Responsible for Test Record

Name Date

Customer Acceptance

Name Date

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4.8.4 Trouble Report

A trouble report should be written when system components are not operating as expected or when disturbances occur repeatedly. It should not be written for occasional hardware failures. A trouble report should also be written when a fault is found in this manual.

When writing a trouble report, always include as much information as possible. Write the trouble report as soon as possible, preferably at the RBS site. The next pages contain an example of a filled-in trouble report and a blank trouble report.

The trouble report should be sent to the nearest FSC (Field Support Center) for resolution and registration in the Ericsson trouble report system MHS (Modification Handling System). The FSC should forward the trouble report via the node MHO ERA BTS.

Special Explanations

Product number	The product number can be found on the label of the unit. Example: KRC 131 47/01.
R-state	Revision state, found on the label of the unit after the product number. Example: R1A.
Site status	Can be “Installation Test” or “Operation”

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Example of Filled-in Trouble Report

Trouble Report

Company: World-Wide Telecom	Date: 27 April 1995
Issued by: Jane Doe	Phone no: +01 419 555 1212
Address 501 Montgomery Avenue Mansfield, Ohio USA	Memo id: JDOE@WWT.OHIO.US Telefax no: +01 419 555 1212

Heading: TRXC (TRU) is reporting wrong fault code		
Product number or Document number: KRC 131 47/01		R-state R 1A
Site name: Hillfield, Ohio	Site id: EOA 043	Site status: Operation
Trouble symptoms: TRXC is reporting a fault code after CPU reset.		
Trouble Desciption: After you have pressed the CPU reset the TRU starts to send fault reports constantly. The code is: Internal Fault Class 1A fault no. 33 This fault code cannot be found in the fault list.		
Comments: The TRU fault indicator is not lit.		

03_0179A

Figure 128 Example of filled-in trouble report

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Trouble Report, Blank

Trouble Report

Company:	Date:
Issued by:	Phone no:
Address	Memo id:
	Telefax no:

Heading:		
Product number or Document number:		R-state
Site name:	Site id:	Site status:
Trouble symptoms:		
Trouble Desciption:		
Comments:		

02_0179A

Figure 129 Trouble report, blank

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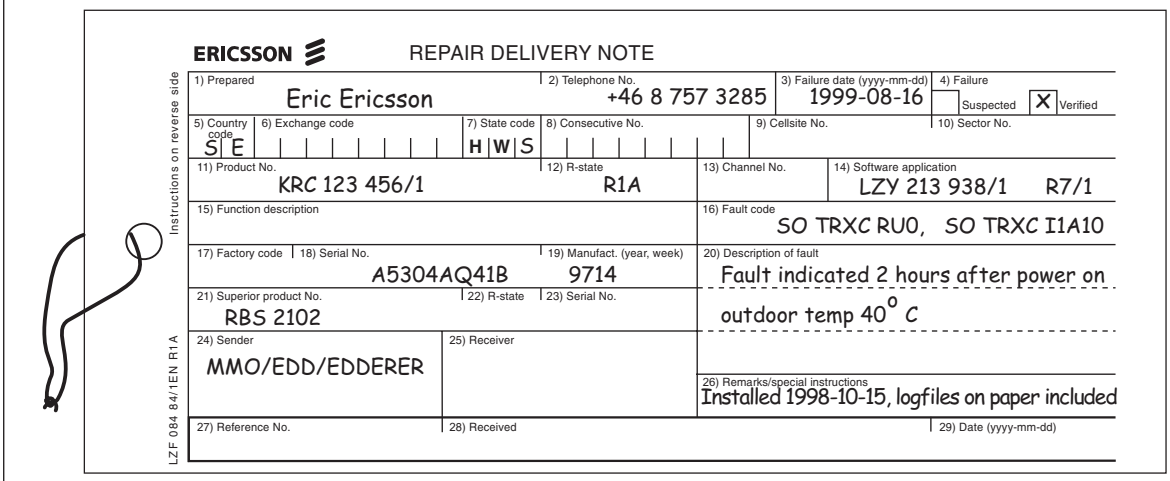
4.8.5 Repair Delivery Note ‘‘Blue Tag’’

When a faulty unit is returned, it must always be accompanied by a repair delivery note. When the repair delivery note has been completed it must be attached to the faulty unit before sending it for repair.

The repair delivery note LZF 084 84 can be ordered from the local FSC. A description of how to fill in a repair delivery note follows below.



The following fields are mandatory. Use block letters.

1	Prepared	Service technician´s name
2	Telephone	Service technician´s telephone number
3	Failure date	
4	Failure	Mark with an X if failure is Suspected or Verified
5	Country code	Two letter country code
7	State code	Hardware (HW) status when failure occurred: S = Unit in service when failure occurred (Repair) T = New unit failed during installation or test (Claim) R = Repaired unit failed during installation or test (Claim or Repair)
11	Product No.	Faulty unit
12	R-state	Faulty unit
14	Software application	RBS load, product number and R-state
16	Fault code	Check OMT or work order
18	Serial No.	Faulty unit
19	Manufact. (year week)	
20	Description of fault	Observations and external factors
21	Superior product No.	RBS type
24	Sender	Customer, Company, Corporate ID
26	Remarks/special instructions	Information about installation date, logfiles and modification requirements

P005537C

Figure 130 Repair delivery note “Blue Tag”

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5 Maintenance and Spare Parts

5.1 Tools for Maintenance

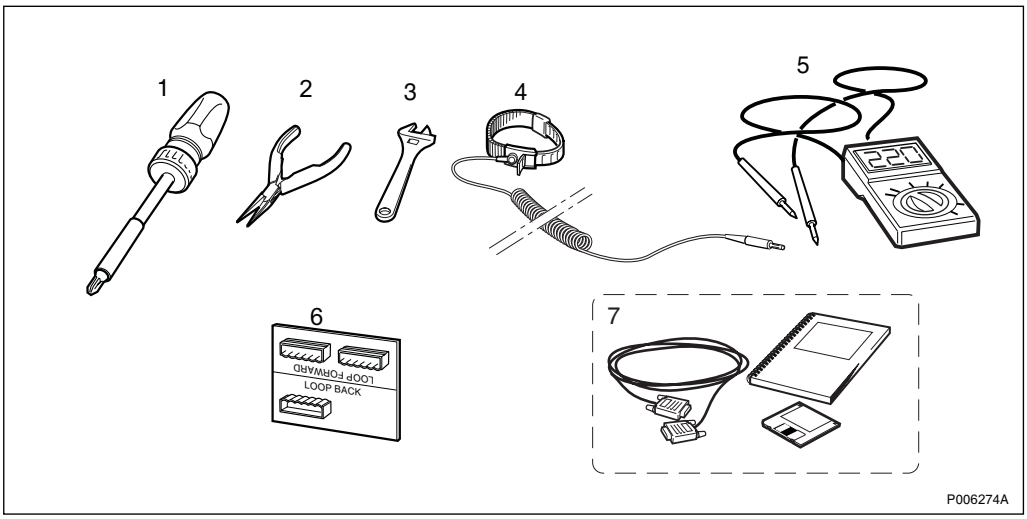

Figure 131

Table 15 Tools for maintenance

Item	Description	Product No.
1	Bit holder (bits Tx10 and Tx20 are used)	(1)
2	Snipe nose pliers	(1)
3	Adjustable spanner (L = 100 mm)	(1)
4	Static control wrist strap	(1)
5	Voltage tester	(1)
6	CB21 (Loop Forward/Backward connection board)	LPY 107 757/1
7	OMT kit	NMT 201 216/1

(1) Included in LTT 601 107/1, Maintenance Tools.

Using the OMT SW

In order to minimise the tools required at site, a PC with the following minimum capacity is required:

- Intel 486 processor
- 66 MHz
- 16 MB RAM
- Microsoft Windows version 95/NT

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5.2 Fault Localisation

5.2.1 Radio Cabinet

Explanation of LED Symbols

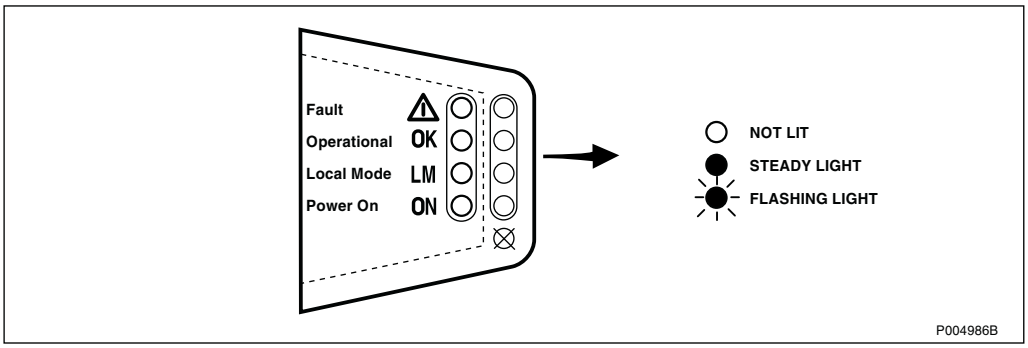

Figure 132

RBS 2401 Operational

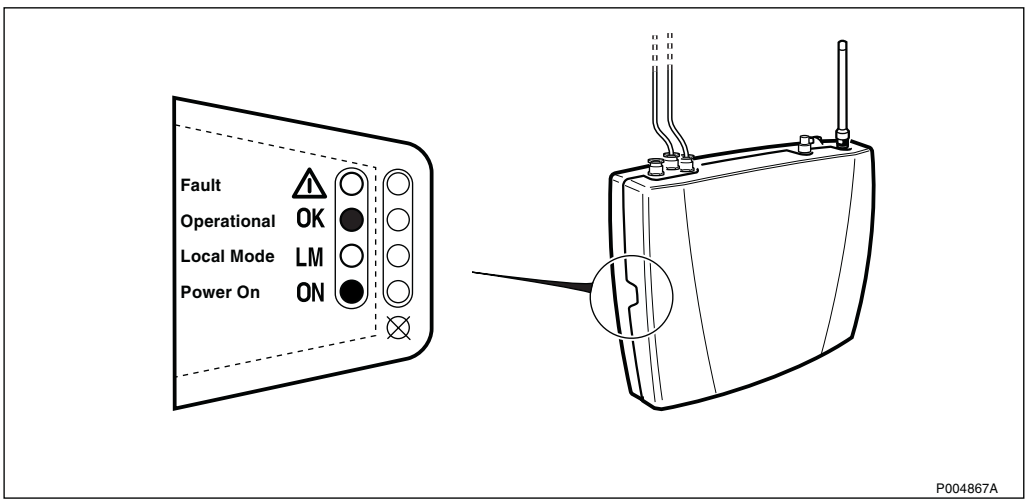

Figure 133 “RBS 2401 operational” indicated

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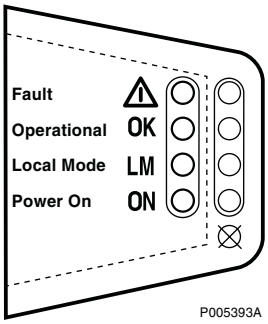
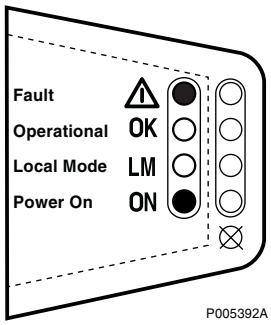
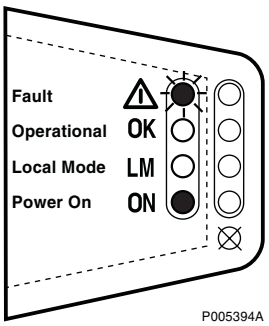
Fault Tracing Guidelines

Table 16

LED status	Possible cause	Suggested action
 AC power fault	External power failure.	Check RBS status, see Table 21 on page 170.
	Fuse(s) blown.	Replace the fuses, see Section 5.3.2 on page 135.
	Cabinet faulty.	Replace the cabinet, see Section 5.3.1 on page 119.
	High temperature power shut down.	Wait until the temperature is normal. Then the RBS starts automatically.
 Internal fault	Running on Base application.	Use the OMT to monitor fault(s). Try to reload BTS software.
	Cabinet HW fault.	Replace the cabinet according to instructions in chapter Maintenance.
 Software fault	Running on Base application. The BSC is currently reloading BTS software.	Wait approximately one hour(do not press any button). Then, if the Fault LED is still flashing, try to reload BTS software manually or replace the cabinet.
	IDB is corrupt.	Reinstall IDB.

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5.2.2 HDSL Module

Explanation of LED Indications

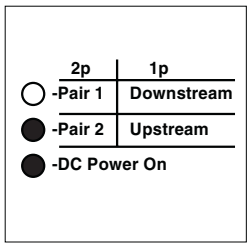
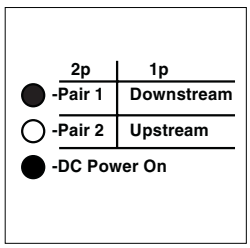
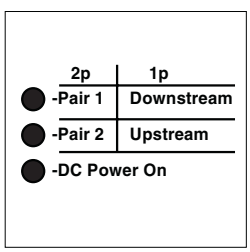
Table 17

LED	LED status		
	Steady light	**Flashing light**	**Not lit**
Pair 1/Downstream	Link operational	Filter tuning in progress.	Link break, or not in use.
Pair 2/Upstream	Link operational	Filter tuning in progress.	Link break, or not in use.
DC Power On	Power ON	See note(1)	Power OFF

(1) A faulty configuration (inconsistent settings of DIP switches) is indicated by all three LEDs flashing simultaneously.

LED Indications when Operational

Table 18

Configuration	LED Status	Explanation
1 Pair (1p)	 P005400B	Upstream ON DC Power ON
1 Pair (1p)	 P005399B	Downstream ON DC Power ON
2 Pair (2p)	 P005401B	Pair 1/Downstream ON Pair 2/Upstream ON DC Power ON

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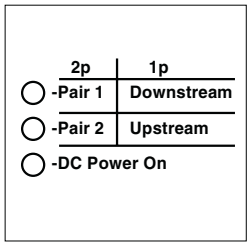
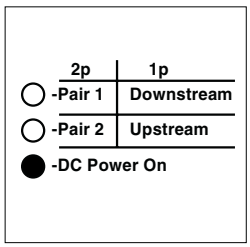
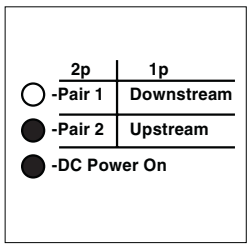
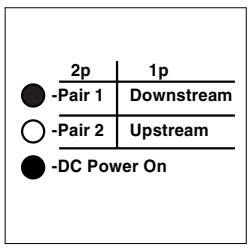
Fault Tracing Guidelines

Table 19

LED status	Possible cause	Suggested action
 P005397B	Configuration 1 or 2 pair: • DC power failure.	• Check the small fuse located in the installation box close to the PCM B terminal. Refer to Section 5.3.5 on page 157.
 P005398B	Configuration 1 or 2 pair: • Link break.	• Check transmission Line(s).
 P005400B	Configuration 2 pair: • Pair 1 or Downstream link missing	• Check transmission Line PAIR 2/Upstream link
 P005399B	Configuration 2 pair: • Pair 2 or Upstream link missing	• Check transmission Line PAIR 1/Downstream link

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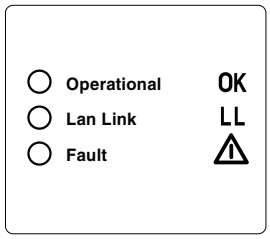
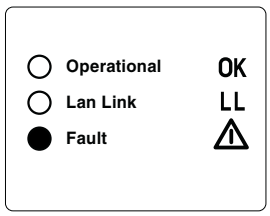
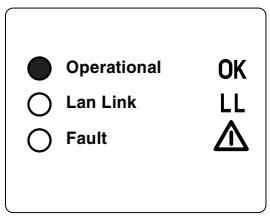
5.2.3 AGW Module

Fault Tracing Guidelines

Table 20

LED status	Possible cause	Suggested action
 P005402A	DC power failure.	Check that the DC cable is properly connected.
		Check the small fuse, located in the installation box close to the PCM B terminal. Refer to Section 5.3.5 on page 157.
 P005404B	Internal fault.	Replace the AGW according to instructions in Section 5.3.4 on page 148.
 P005403B	LAN connection missing.	Check LAN connection, or possible network problem.

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5.3 Corrective Action

DANGER

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

CAUTION

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

5.3.1 Replacement of Radio Cabinet

1. Remove the front cover.

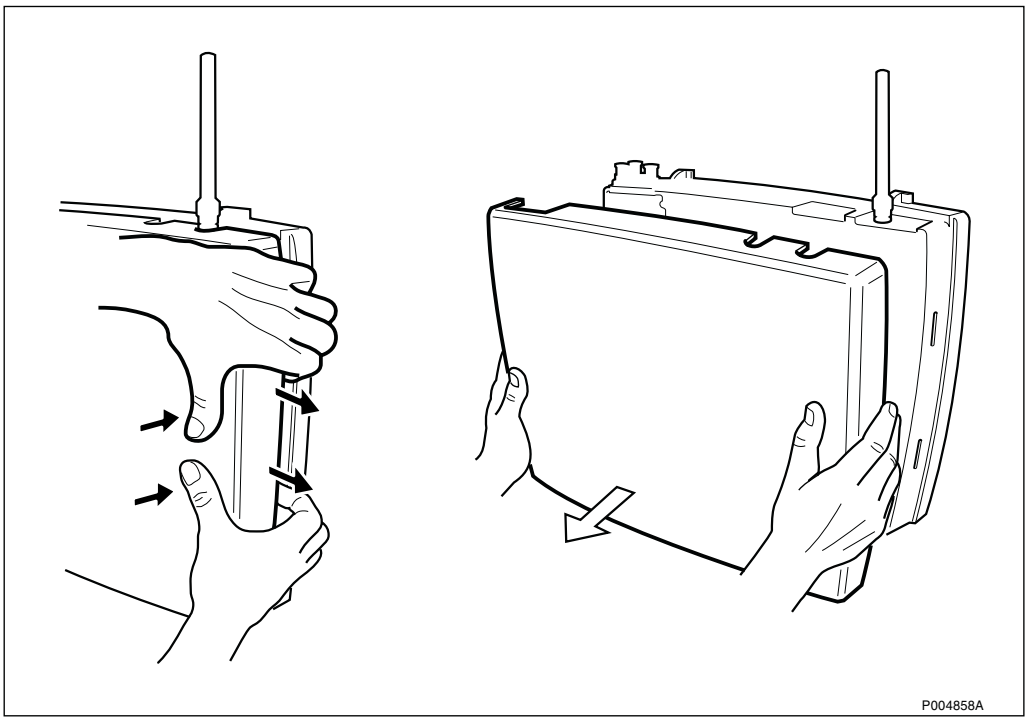

Figure 134

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2. Remove the installation box cover.

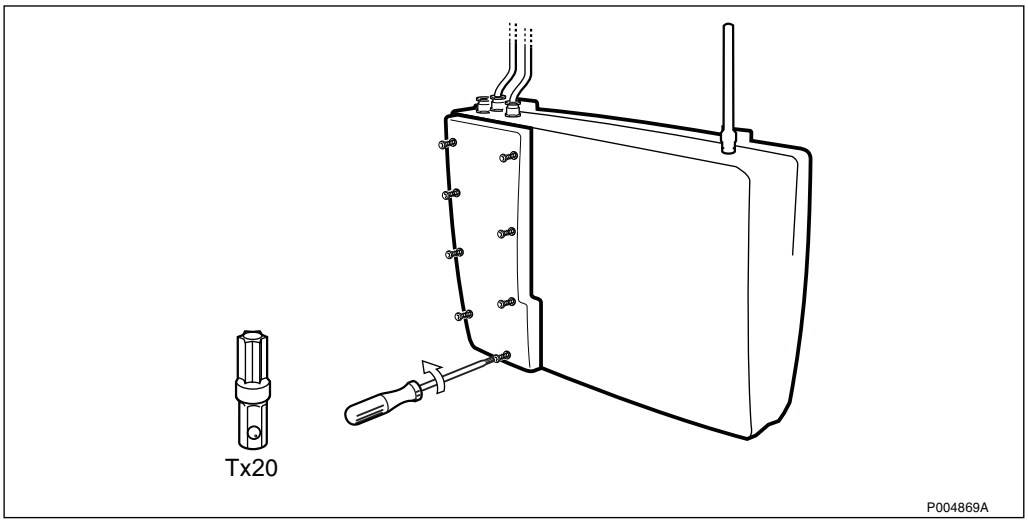

Figure 135

3. Press the Local/Remote button to set the RBS in Local mode.

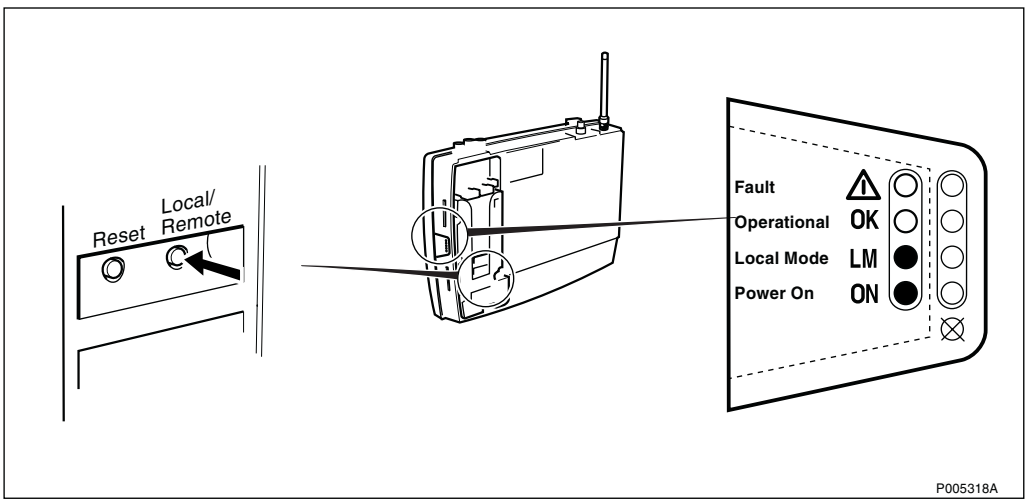

Figure 136

4. Switch off the AC mains power.

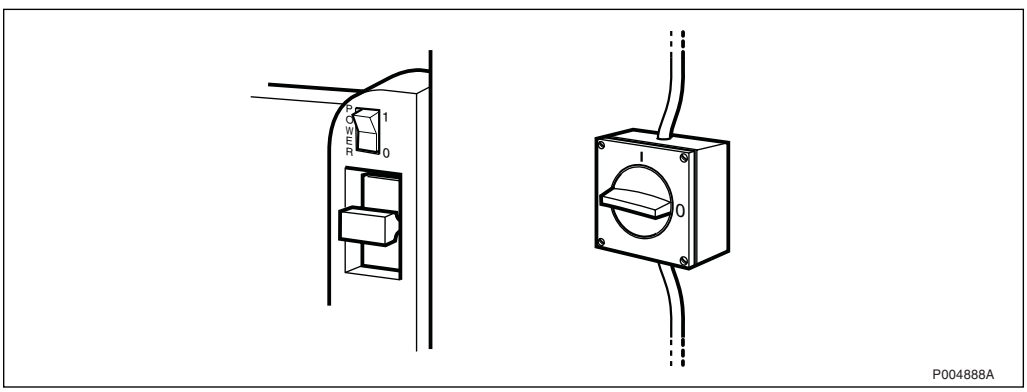

Figure 137

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5. Connect the ESD wrist strap.

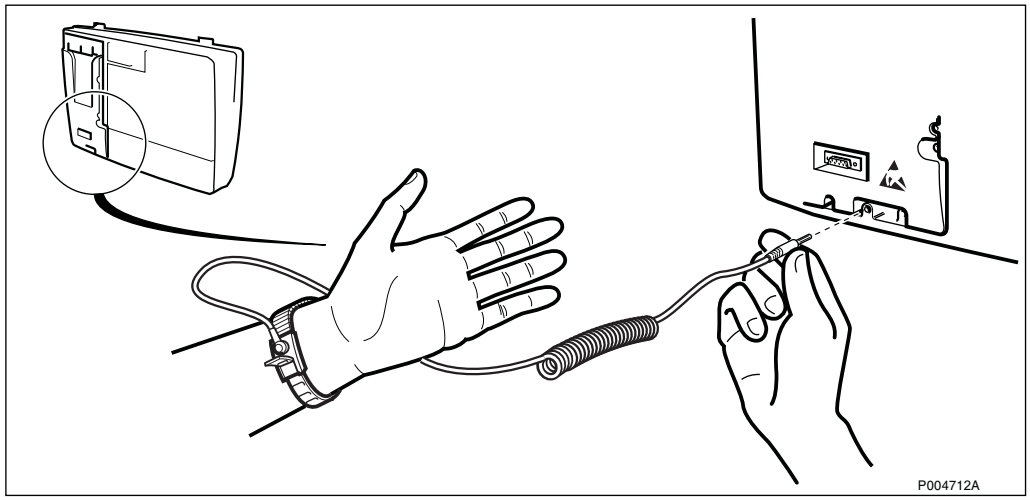

Figure 138

6. Remove the antenna

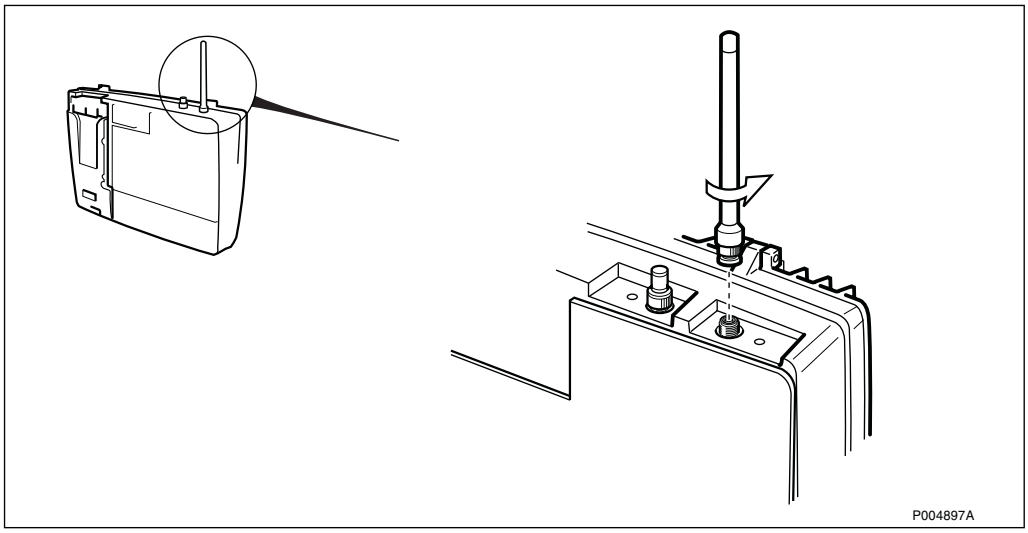

Figure 139

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7. Loosen the earth clamp(s) if used.

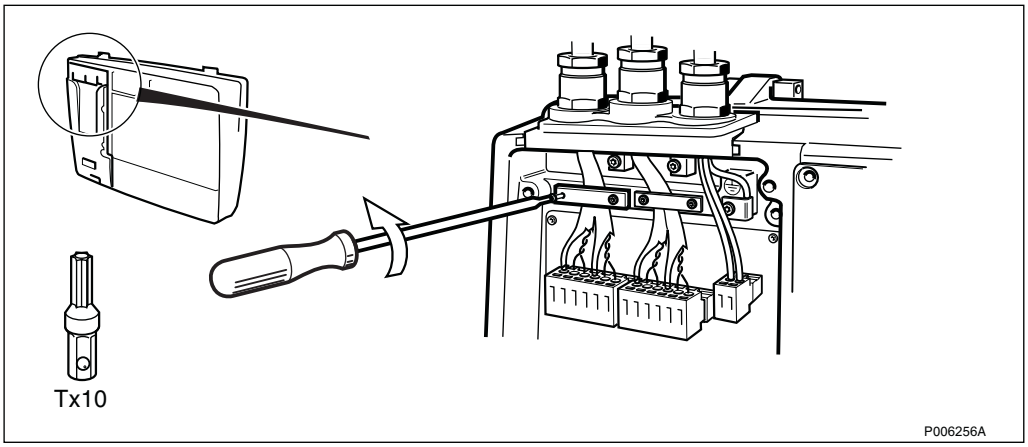

Figure 140

8. Move the PCM terminal(s) to the connection board CB21.

   The CB21 board can only be used if the transmission type is equal for PCM A and PCM B.

Note: If the RBS is cascaded, this step must be completed within 10 seconds, otherwise the PCM line will be lost.

If the RBS is not cascaded (PCM B has been terminated), it is not necessary to use the CB21 connection board.

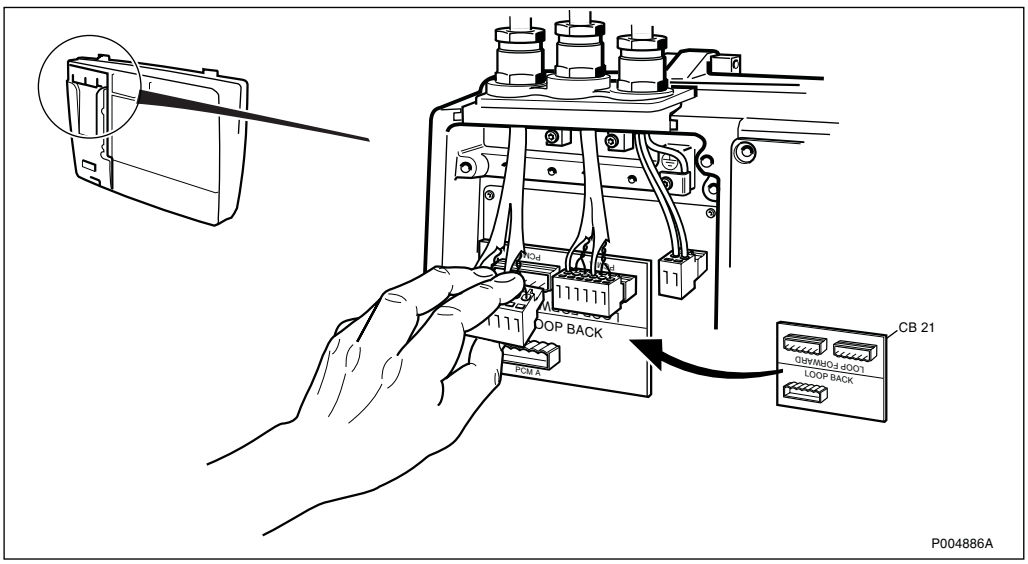

Figure 141

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9. Unplug the AC terminal.

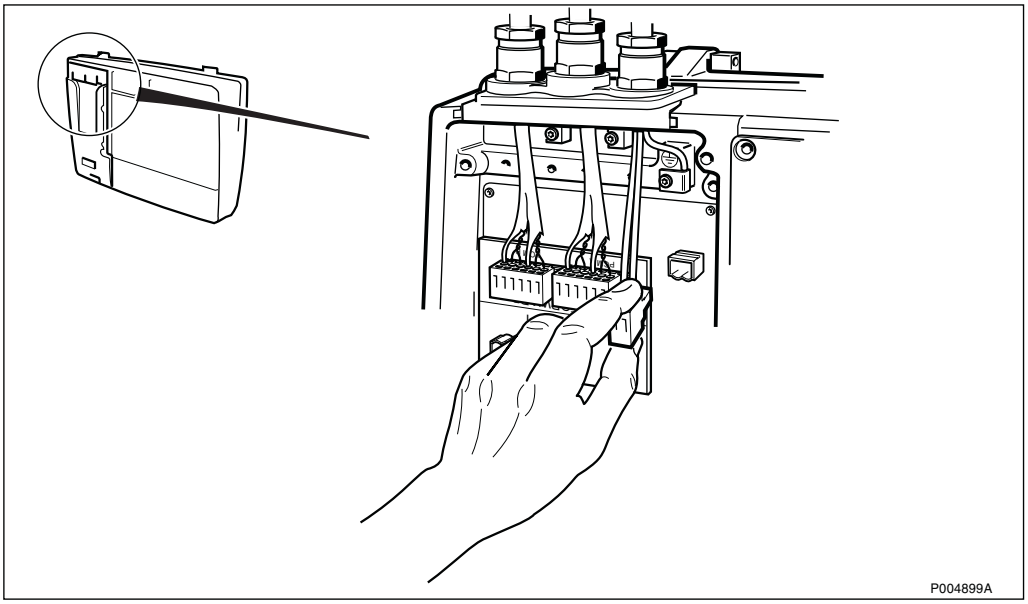

Figure 142

10. Disconnect the protective earth wire.

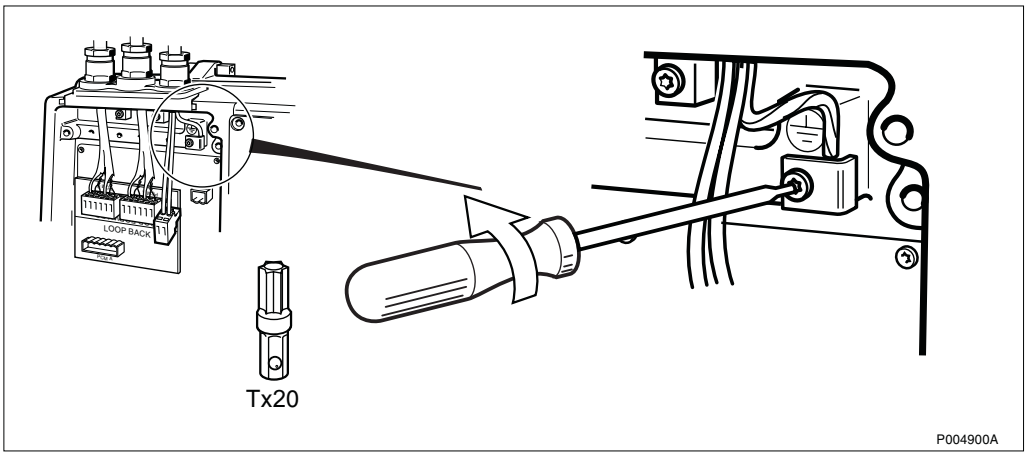

Figure 143

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11. Loosen the cable gland plate.

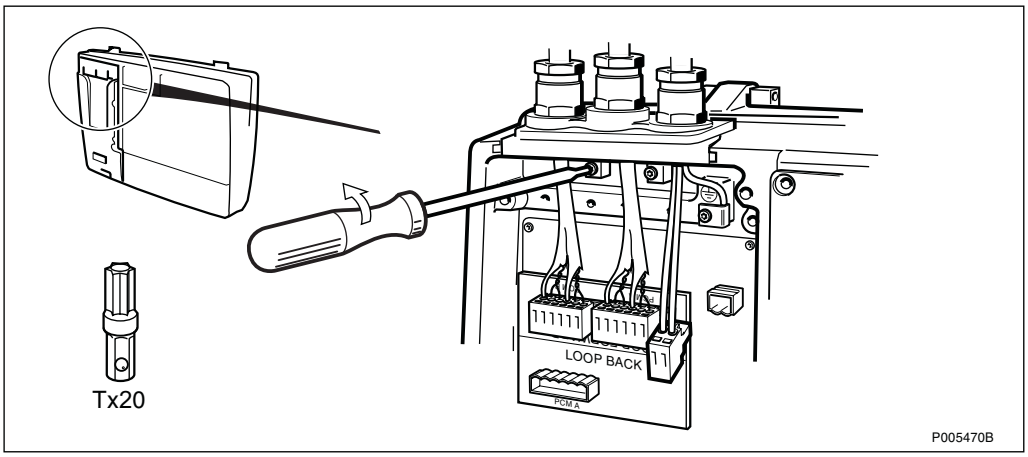

Figure 144

12. Disconnect the ESD wrist strap.

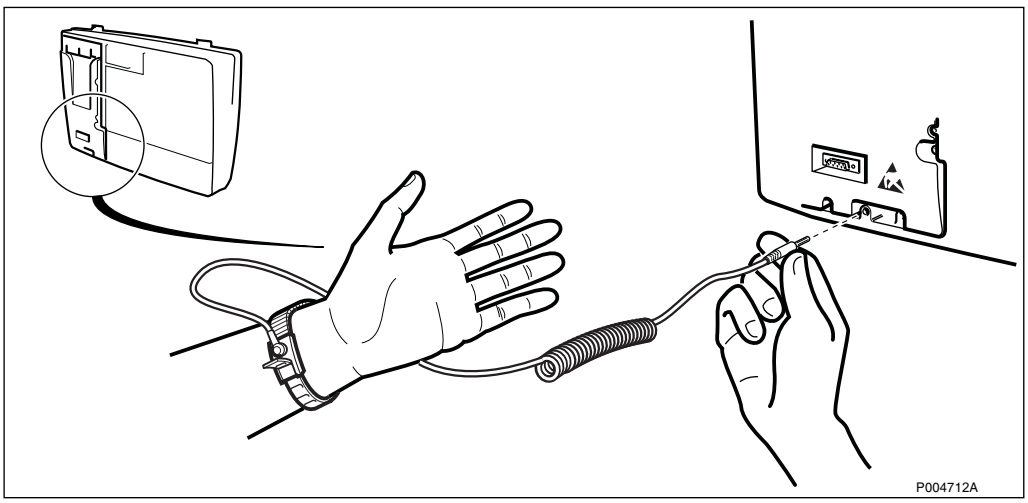

Figure 145

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13. Loosen the two cabinet securing screws.

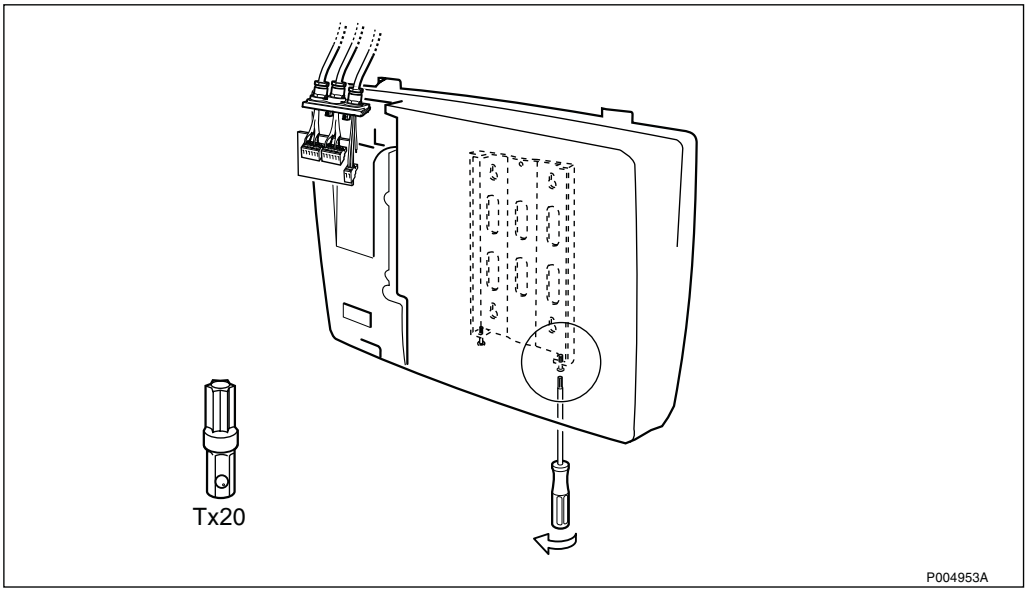

Figure 146

14. Lift the faulty cabinet to unhook it from the mounting bracket, and mount a new cabinet.

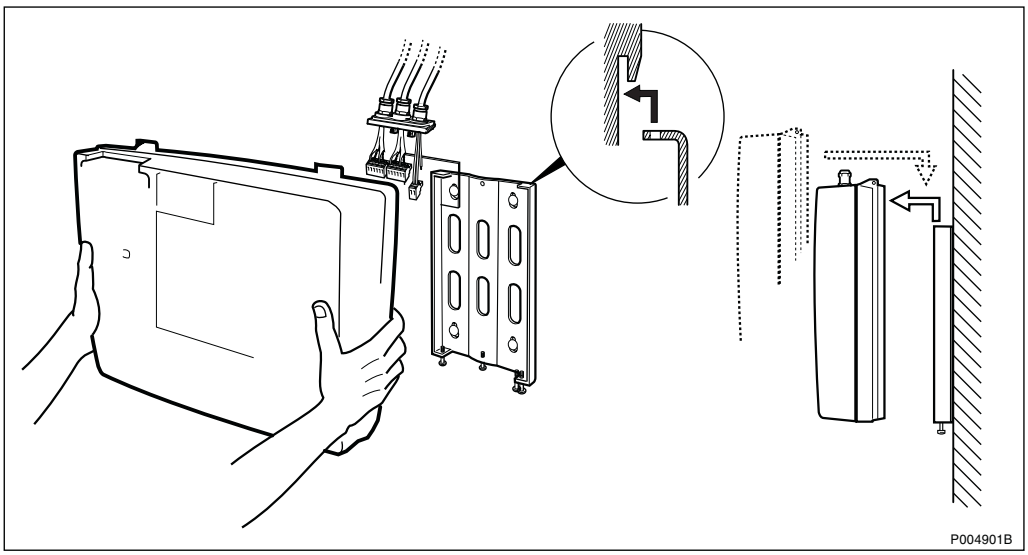

Figure 147

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15. Secure the cabinet by tightening the two securing screws.

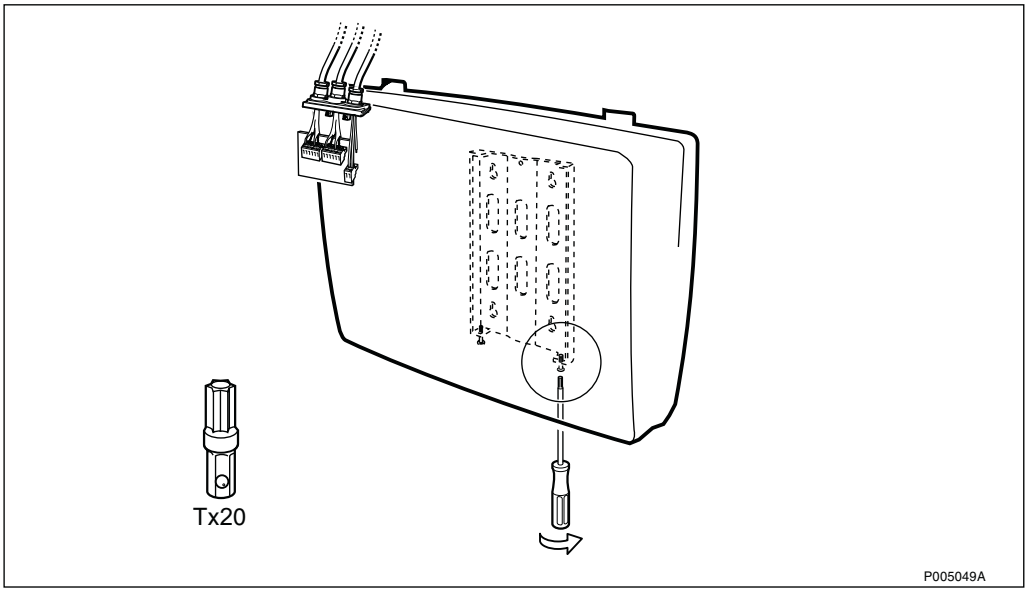

Figure 148

16. Remove the installation box cover.

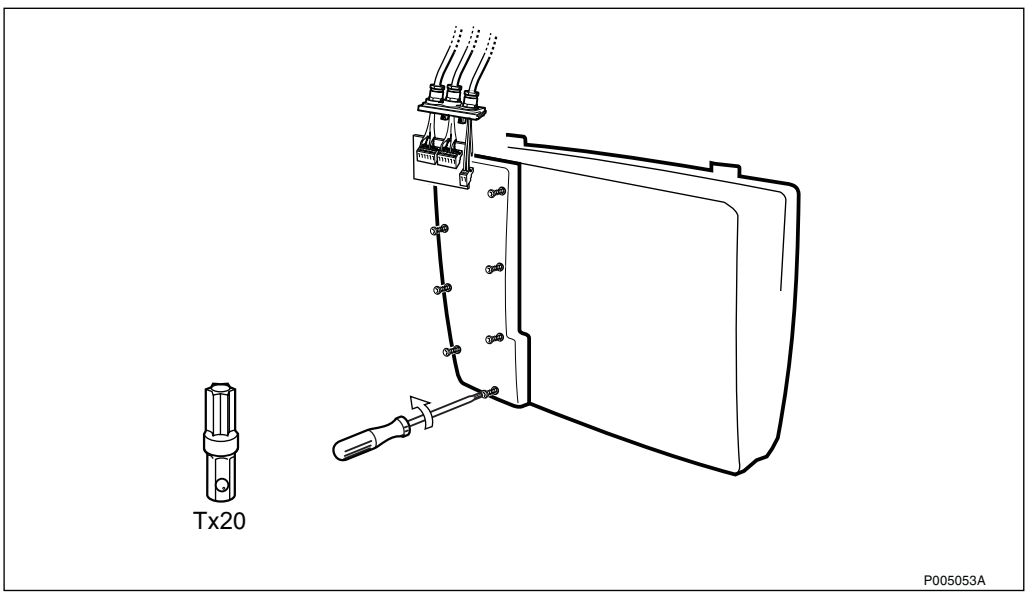

Figure 149

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17. Connect the ESD wrist strap to the new cabinet.

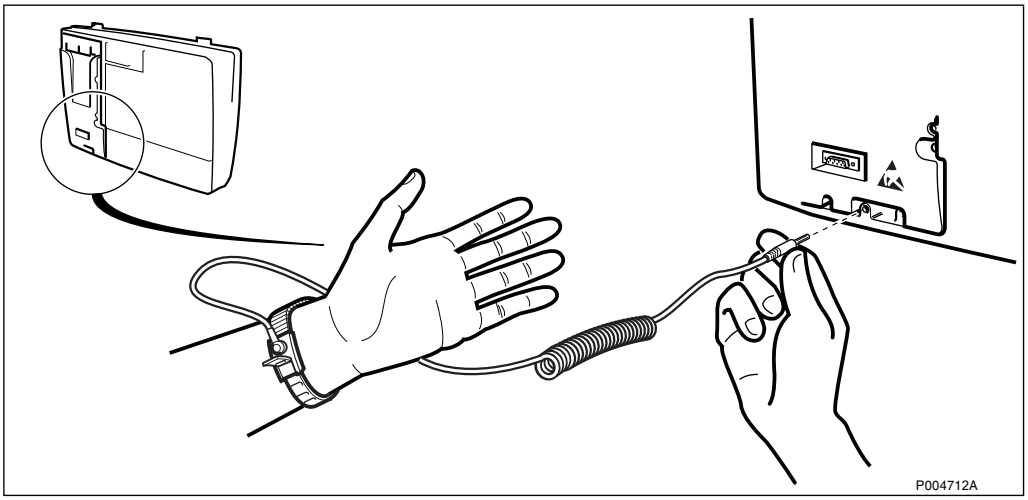

Figure 150

18. Dismount the cable gland plate on the new cabinet, and mount it on the faulty cabinet.

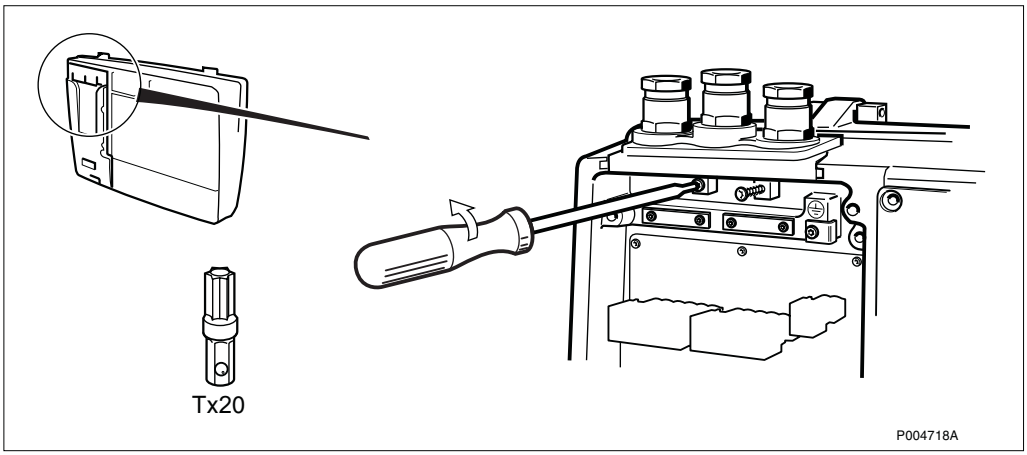

Figure 151

19. Mount the cable gland plate, with its cables, on the new cabinet.

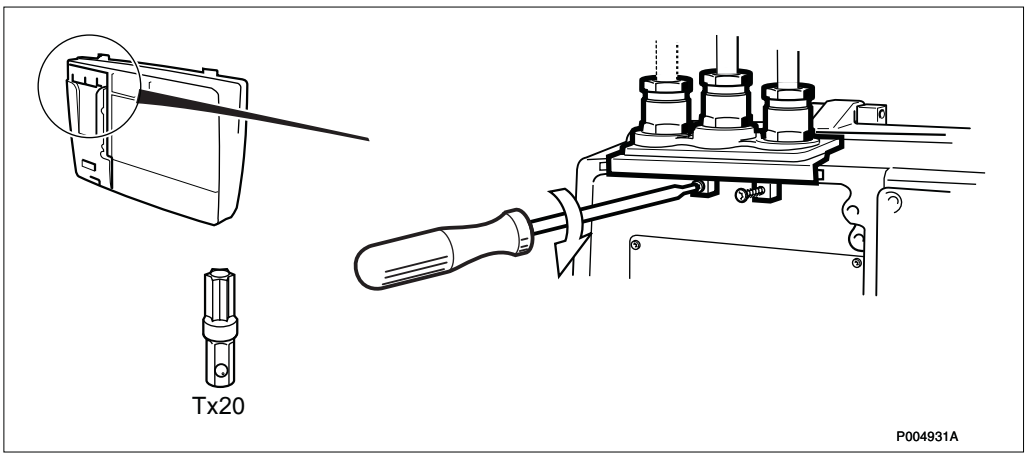

Figure 152

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20. Connect the protective earth wire.

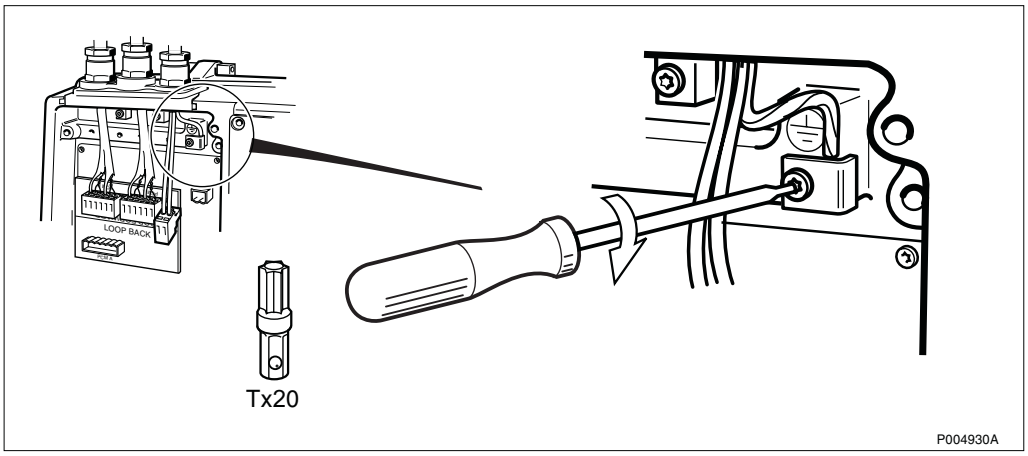

Figure 153

21. Mount the fuses in the fuse holder. Be sure to use the fuses intended for the actual mains voltage.

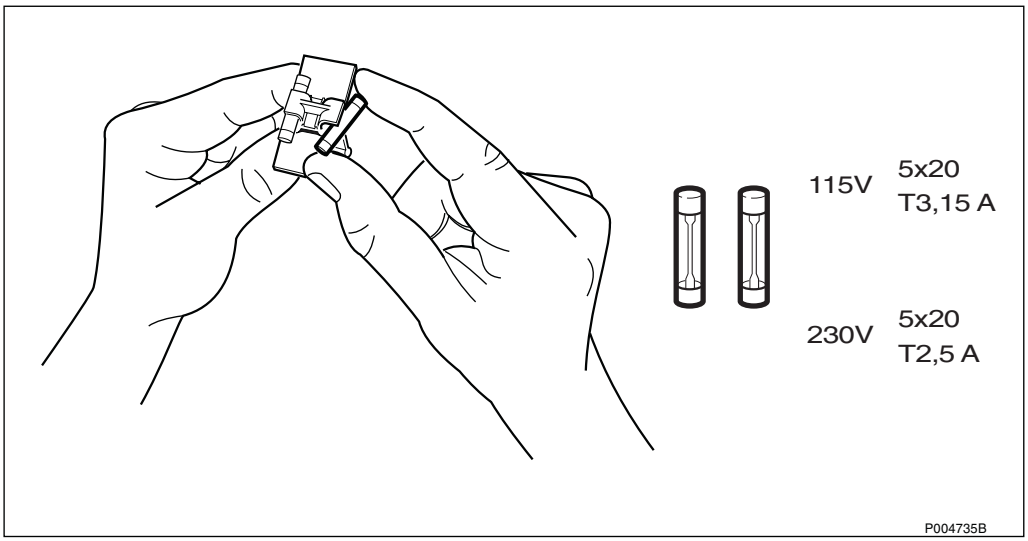

Figure 154

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22. Insert the fuse holder in the fuse compartment.

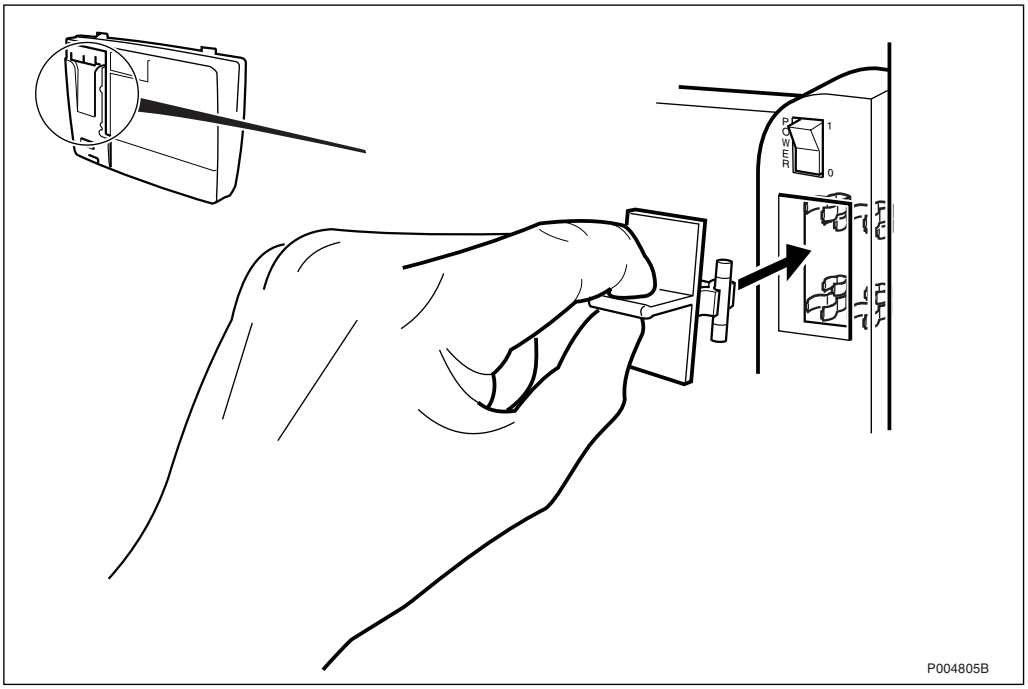

Figure 155

23. Mount the antenna.

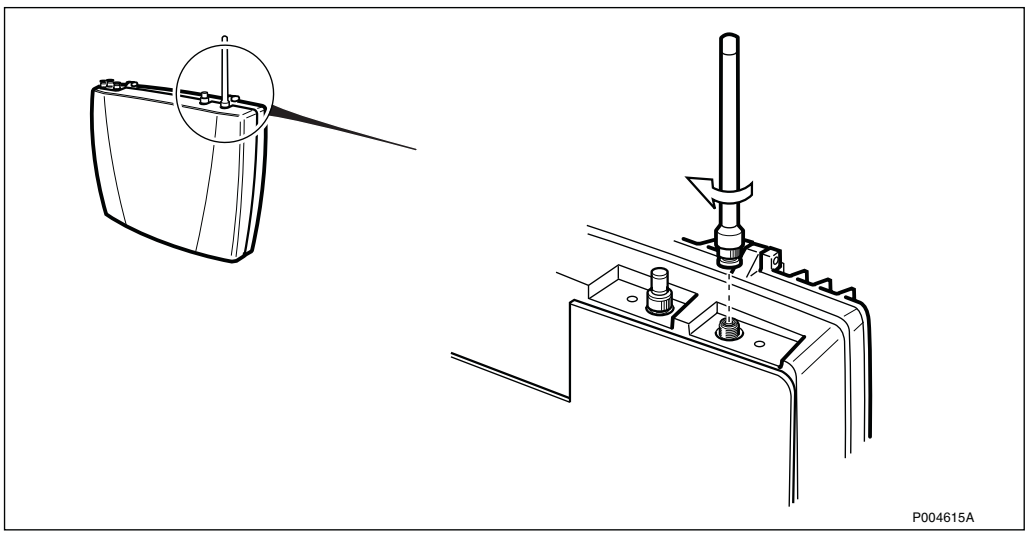

Figure 156

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24. Switch on the AC mains power.

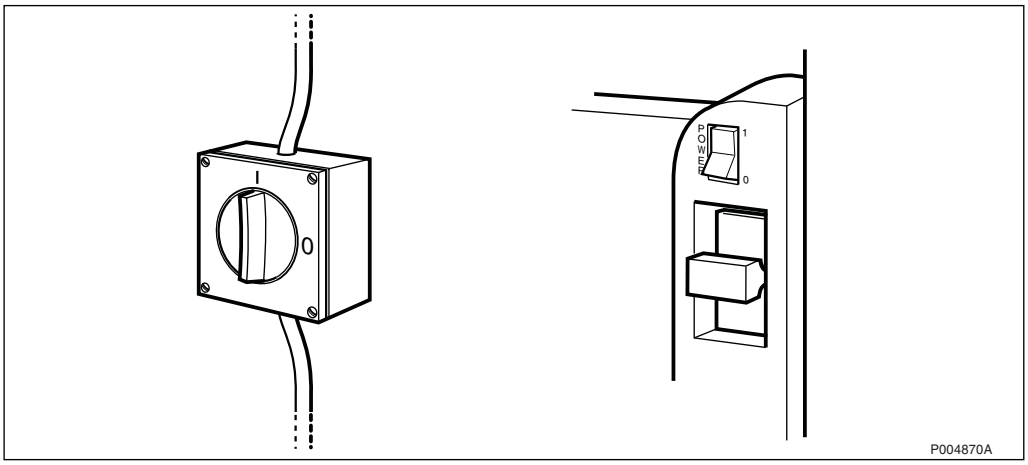

Figure 157

25. Set the RBS in Local mode.

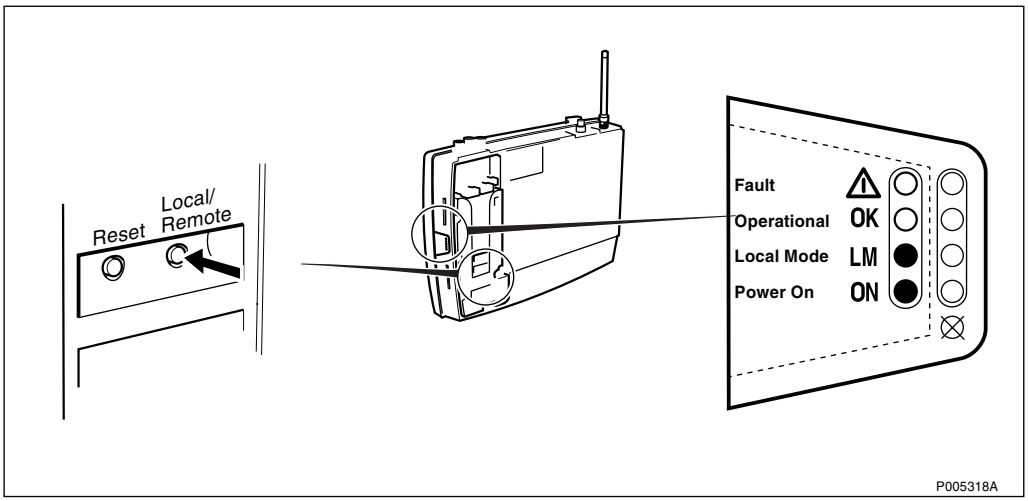

Figure 158

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26. Connect the OMT.

    The BSC simulator, BSCSimII, is shown below, but any PC with OMT software (R7C or later) will do.

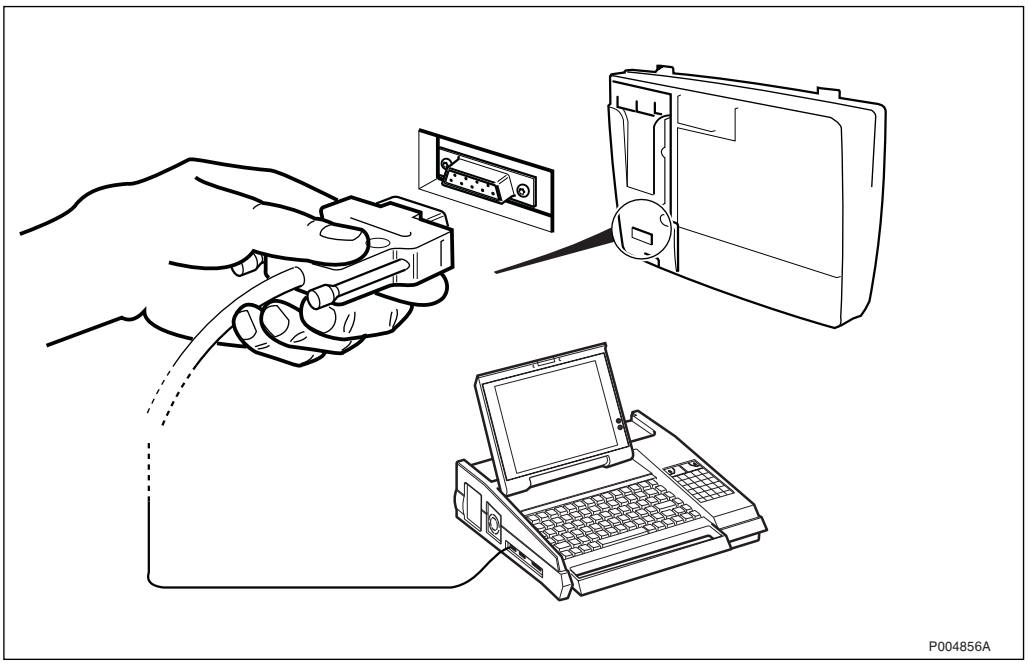

Figure 159 Connecting the OMT using BSCSimII

27. Start the OMT, and check that the correct IDB is installed.

    In addition to frequency, transmission alternative, and RBS type, the following parameters are to be checked:

- CRC-4
- LBO (T1)
- TNOM USE
- TNOM NODE ID
- TNOM TIMESLOT
- TEI (Cascade)

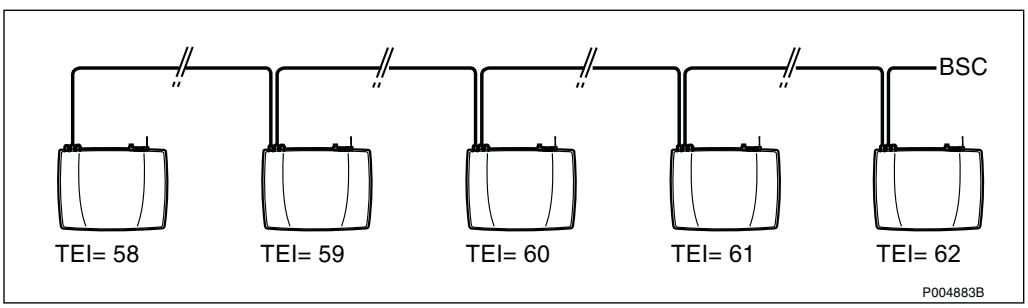

Figure 160

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For further information, see:

	OMT User's Manual	*LZN 302 01*

28. Plug in the PCM terminal(s), and the AC terminal.

Note: If the RBS is cascaded, this step must be completed within 10 seconds, otherwise the PCM line will be lost.

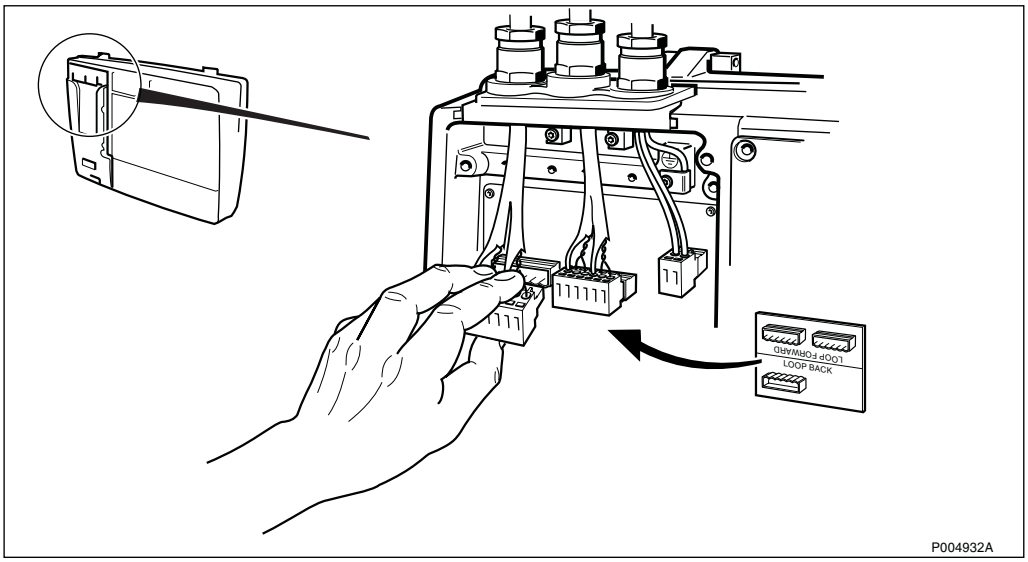

Figure 161

29. Fasten the earth clamp.

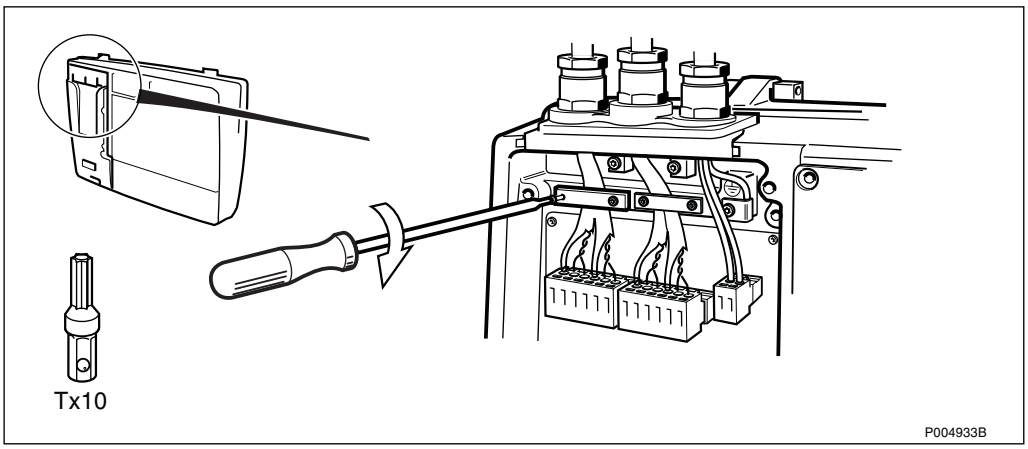

Figure 162

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30. Make an MS Test Call.

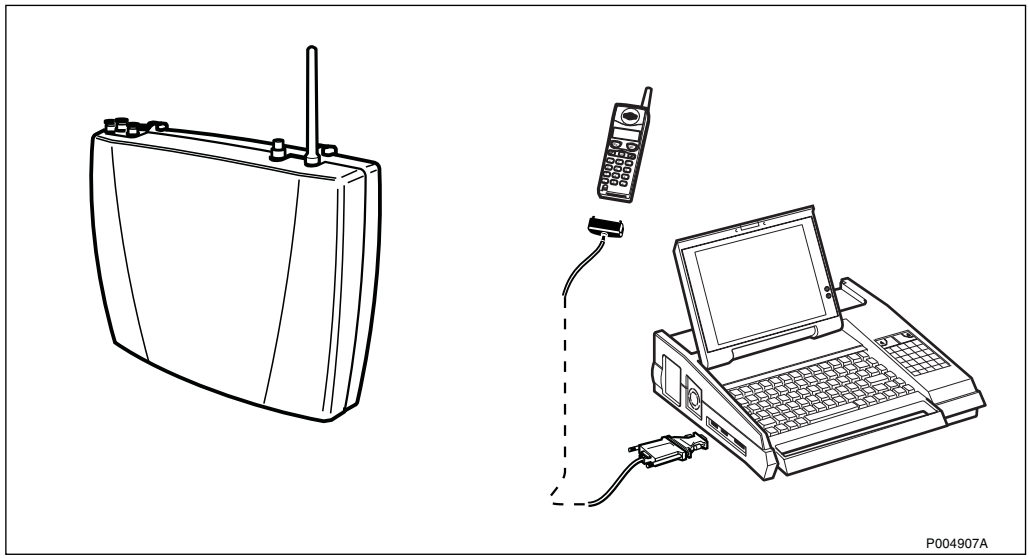

Figure 163

31. Press the Local/Remote button to set the RBS in Remote mode.

    Check that contact has been established with the BSC (The Local mode indicator is OFF).

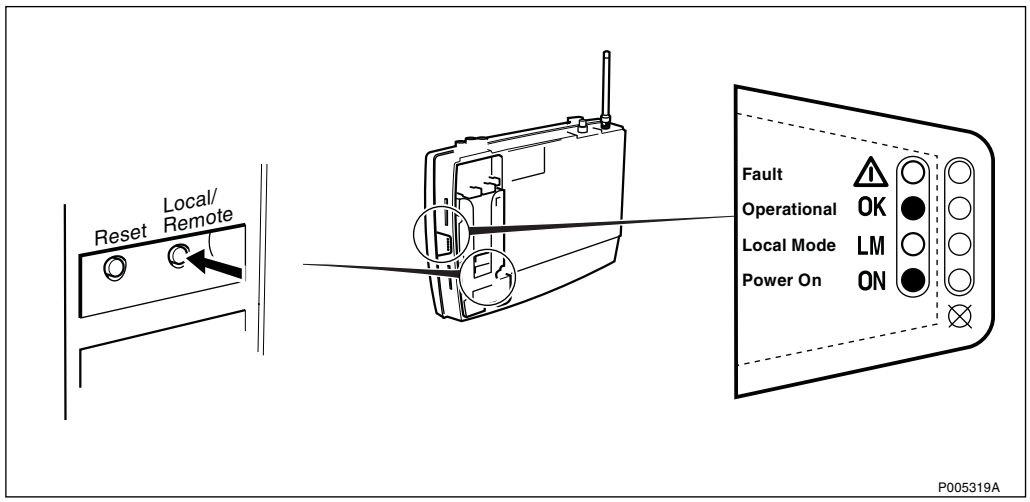

Figure 164

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32. Mount the installation box cover and tighten the screws.

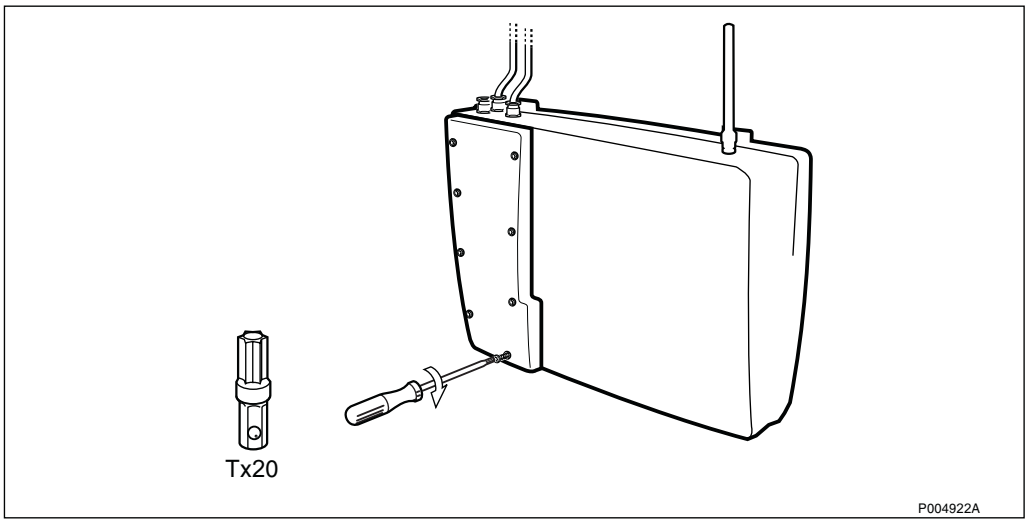

Figure 165

33. Mount the front cover.

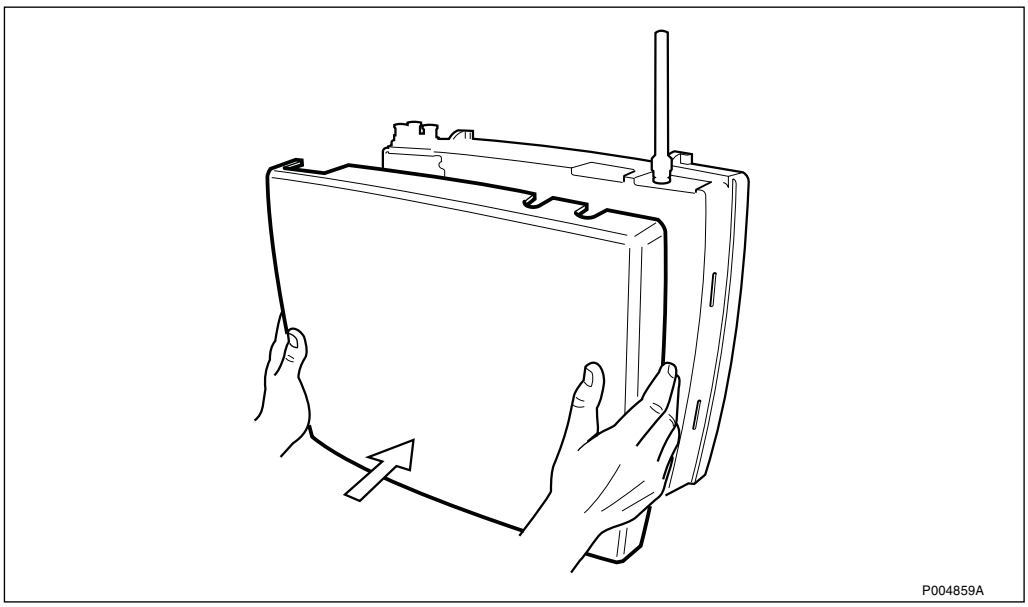

Figure 166

34. To finish the work, continue with section Section 5.5 Concluding Routines on page 170.

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5.3.2 Replacement of Fuses in Radio Cabinet

Checking the Fuses

1. Remove the front cover.

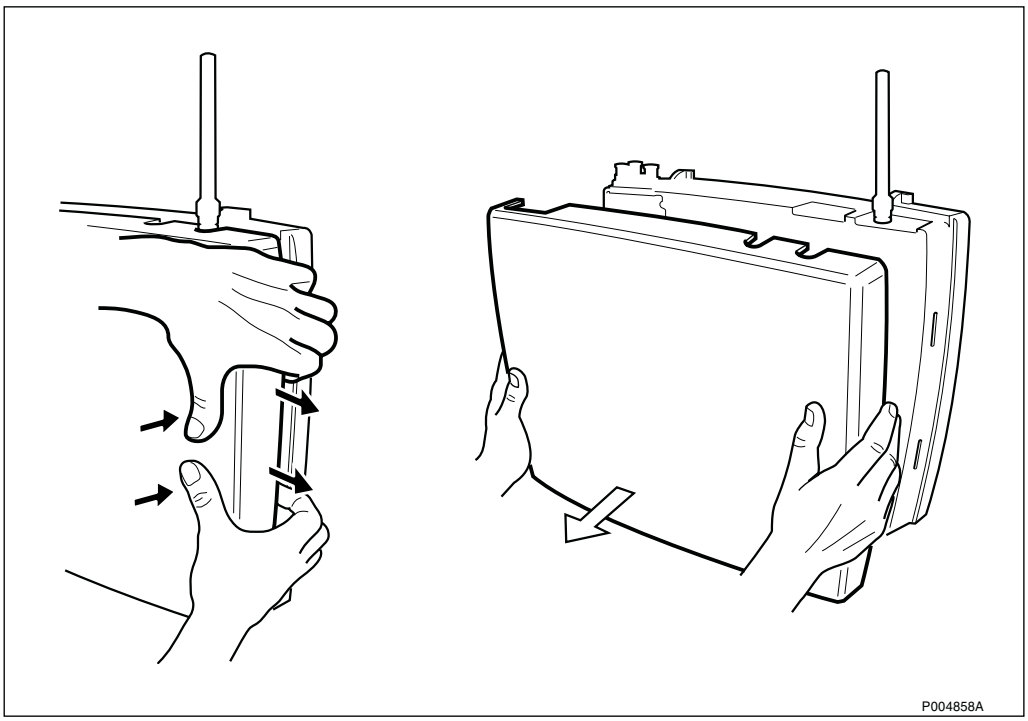

Figure 167

2. Remove the installation box cover.

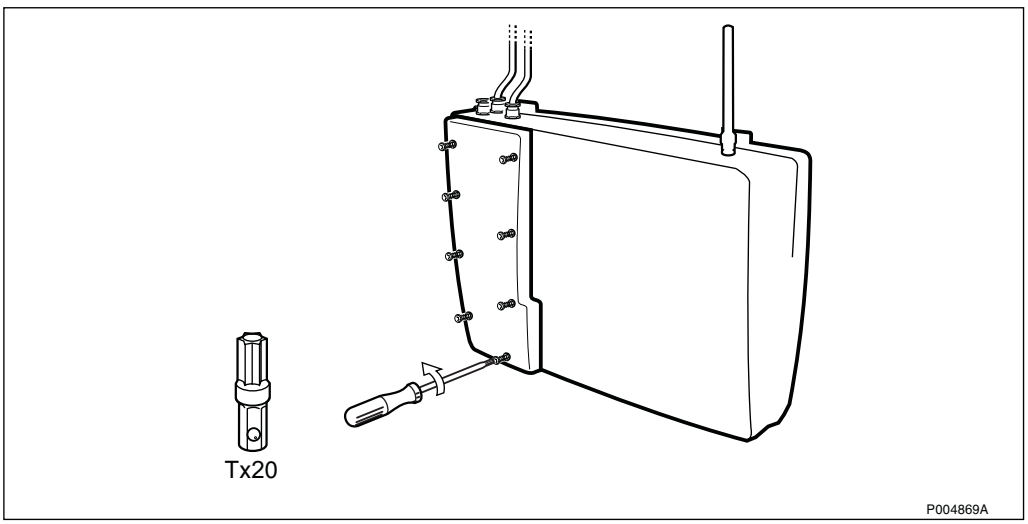

Figure 168

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3. Ensure that the AC mains power is switched on.

   Measure on the AC terminal to verify that the RBS has voltage.

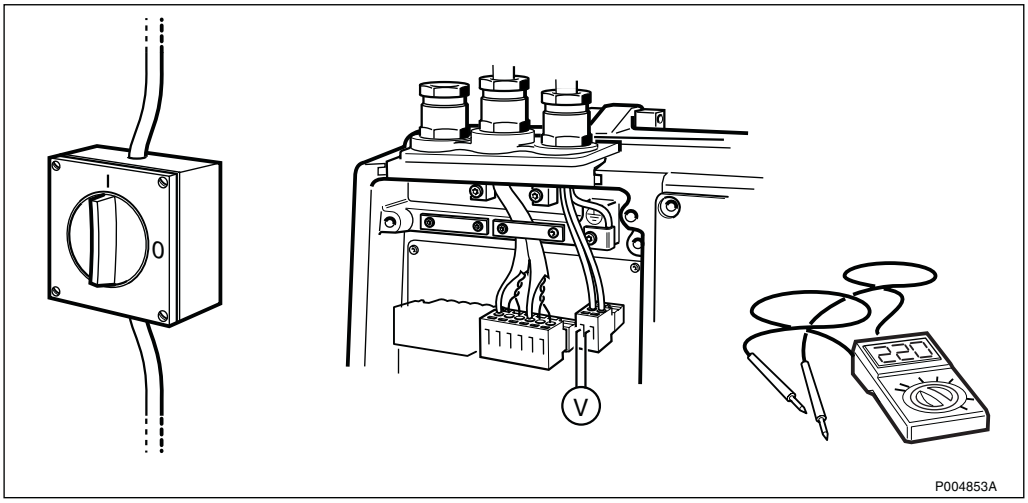

Figure 169

4. Switch off the AC power.

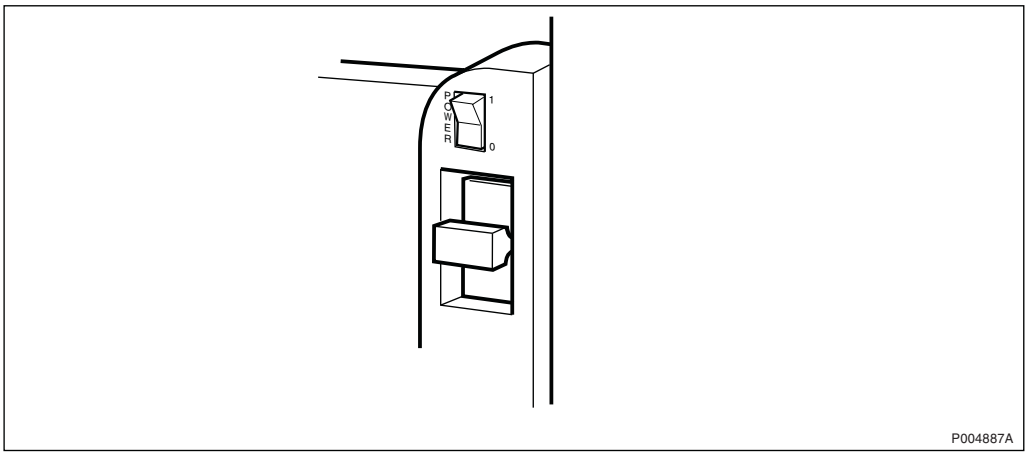

Figure 170

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5. Pull out the fuse holder, and check the fuses with an ohmmeter.

   If the fuses are OK, replace the RBS according to instructions on Section 5.3.1 on page 119.

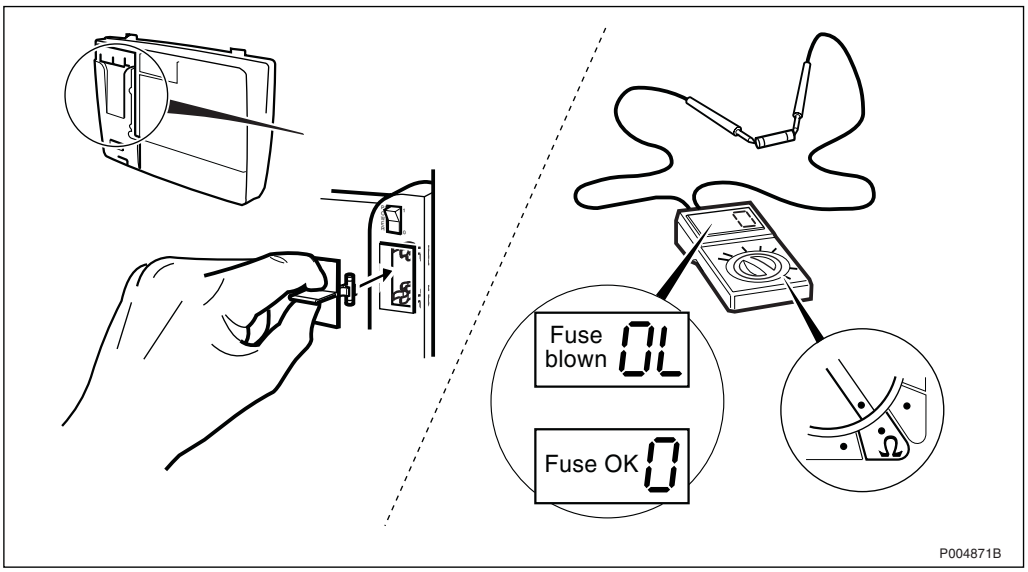

Figure 171

Replacing Fuses

6. Remove the blown fuse, and insert a new in the fuse holder.

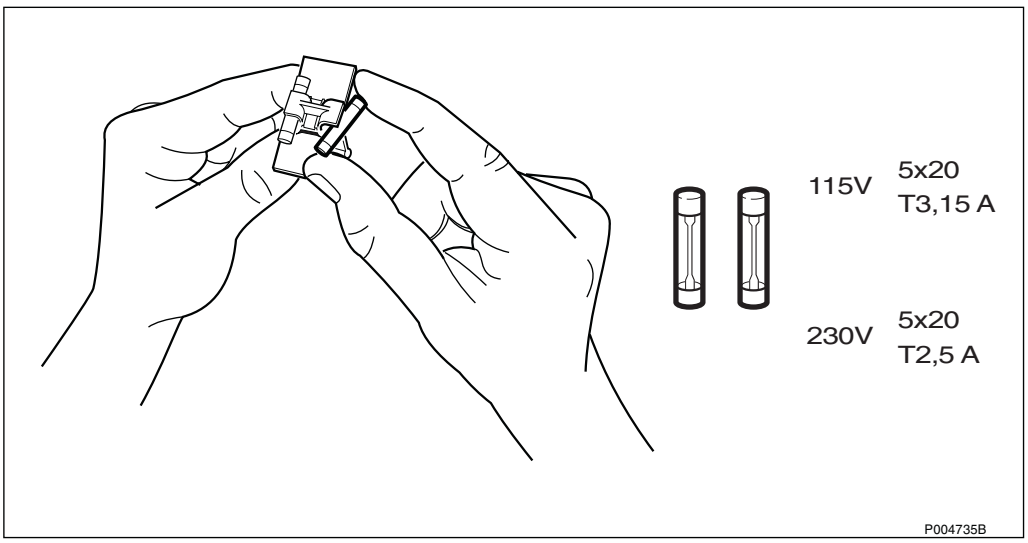

Figure 172

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7. Insert the fuse holder in the fuse compartment.

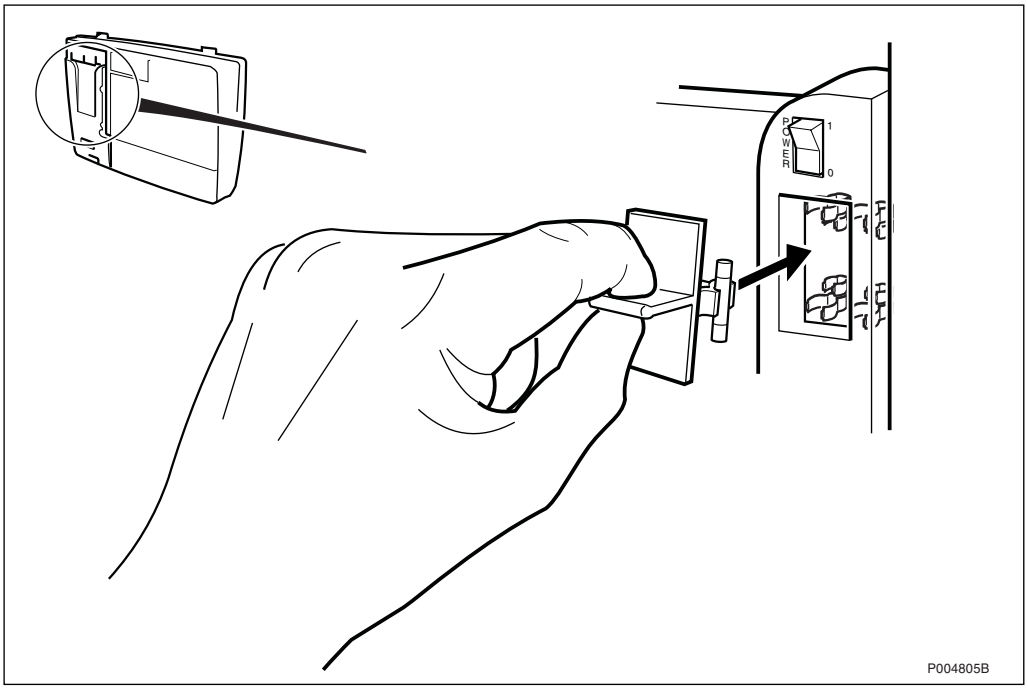

Figure 173

8. Switch on the AC power.

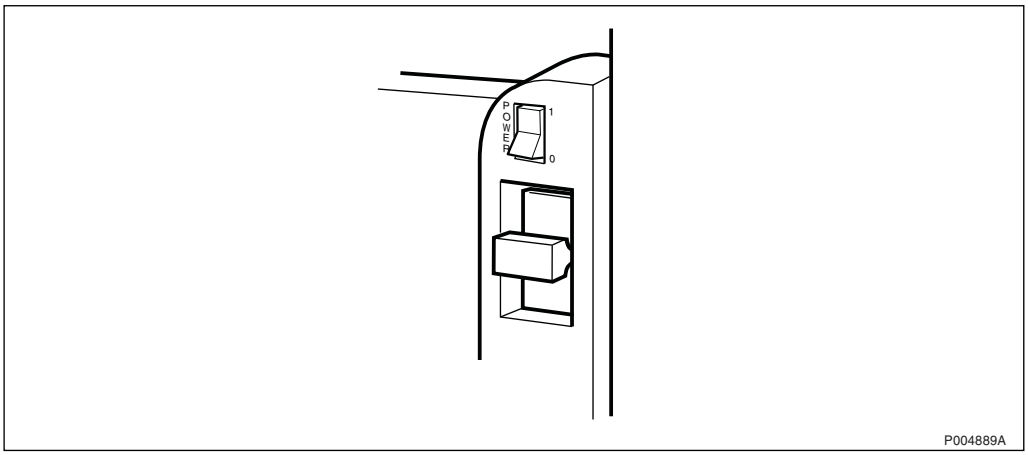

Figure 174

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9. Check the status of the LED indicators to verify that the RBS is operational. If not, replace the cabinet according to instructions on Section 5.3.1 on page 119.

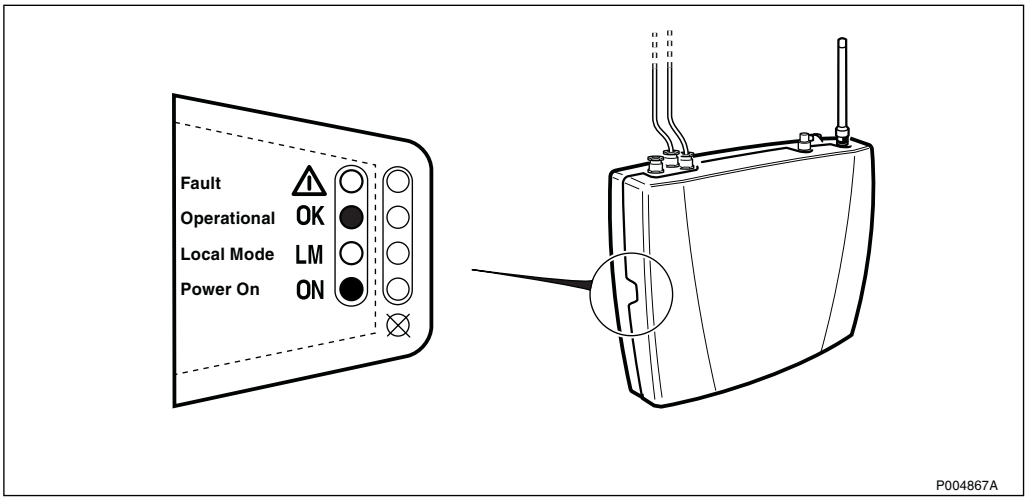

Figure 175

10. Mount the installation box cover and tighten the screws.

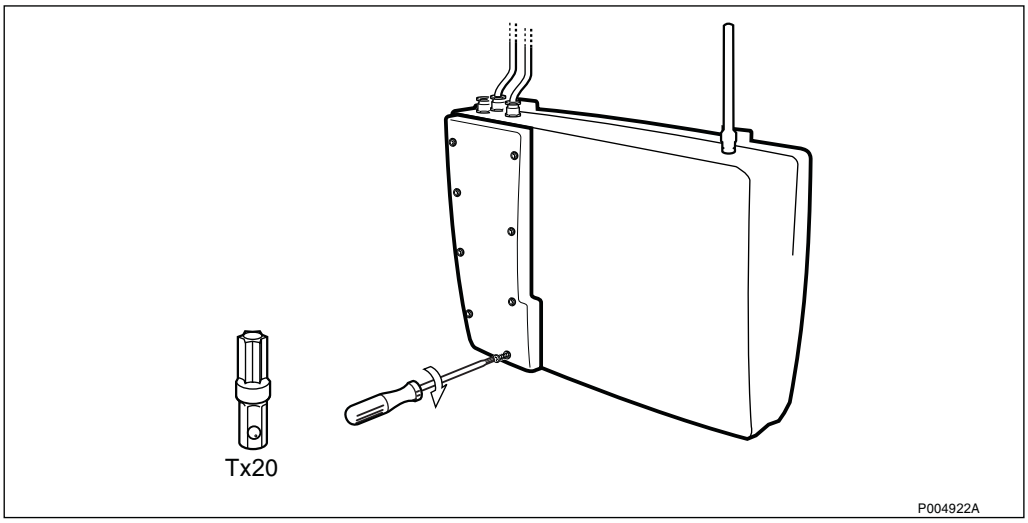

Figure 176

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11. Mount the front cover.

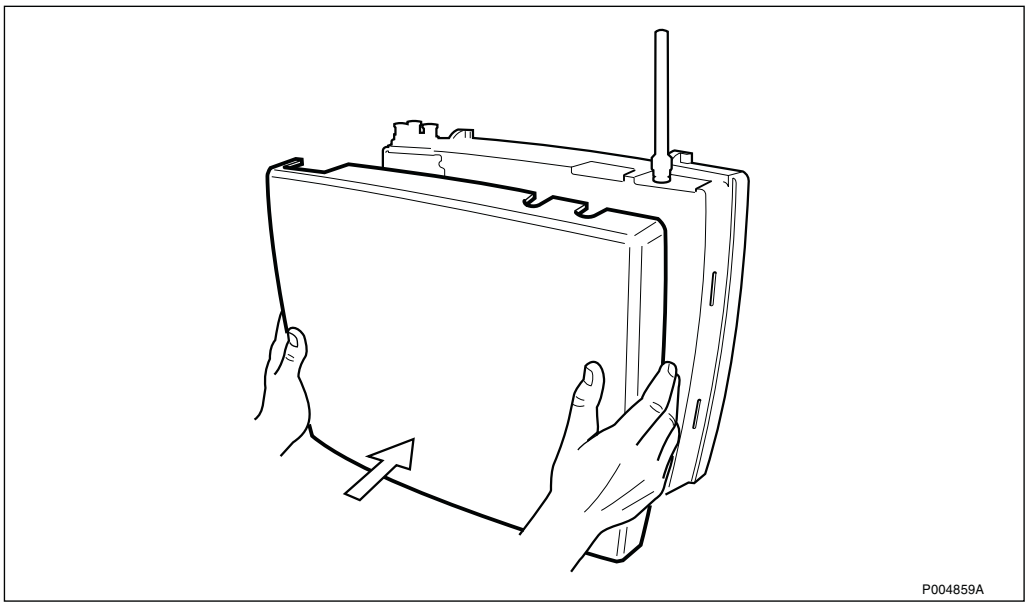

Figure 177

12. To finish the work, continue with section Section 5.5 Concluding Routines on page 170.

5.3.3 Replacement of HDSL Module

1. Remove the front cover on the radio cabinet.

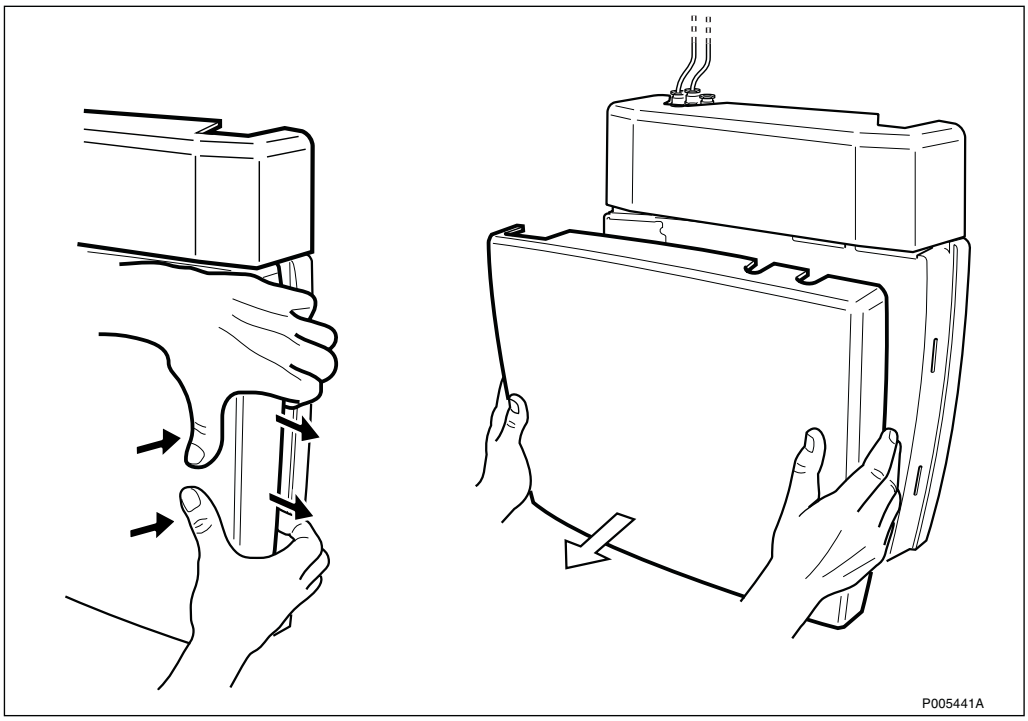

Figure 178

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2. Remove the installation box cover on the radio cabinet.

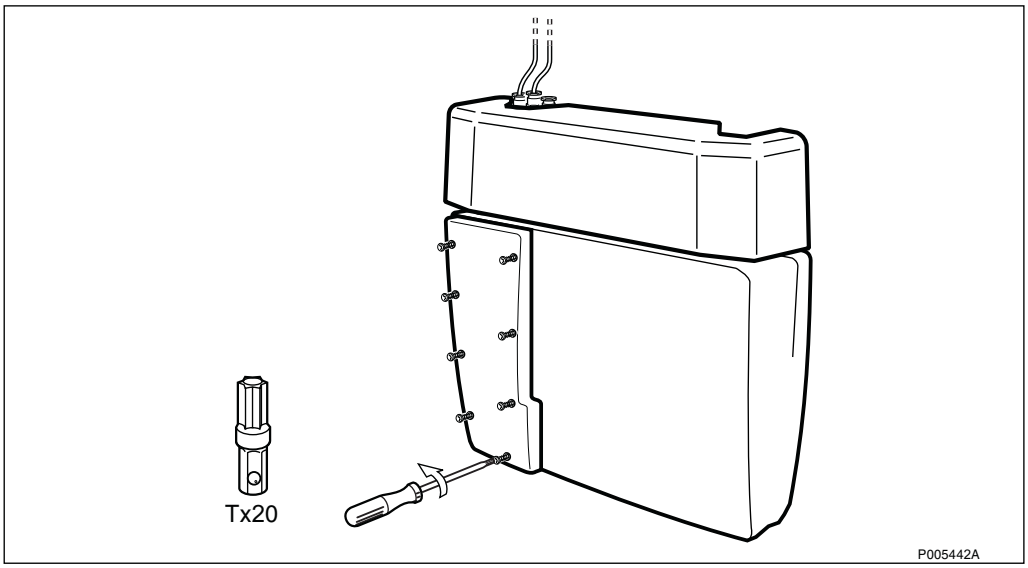

Figure 179

3. Press the Local/Remote button to set the RBS in Local mode.

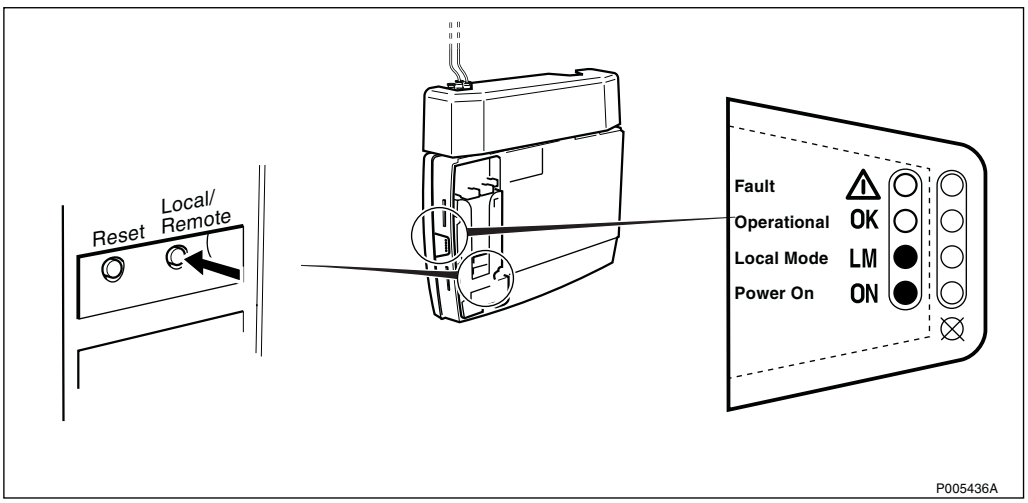

Figure 180

4. Switch off the AC mains power.

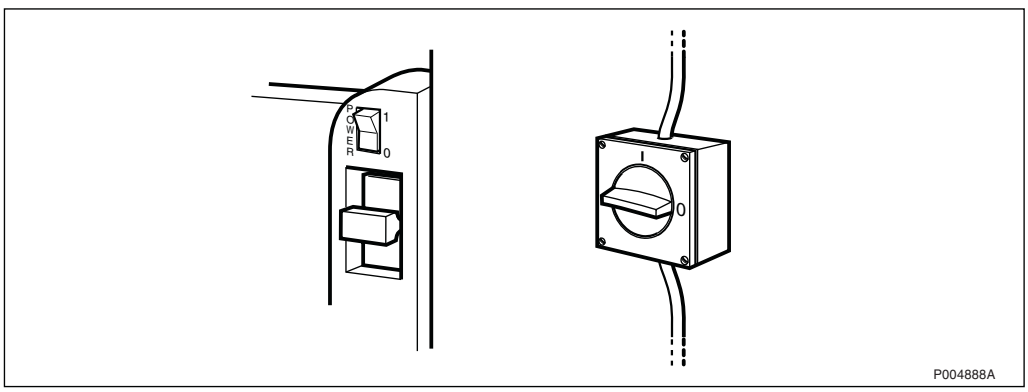

Figure 181

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5. Connect the ESD wrist strap.

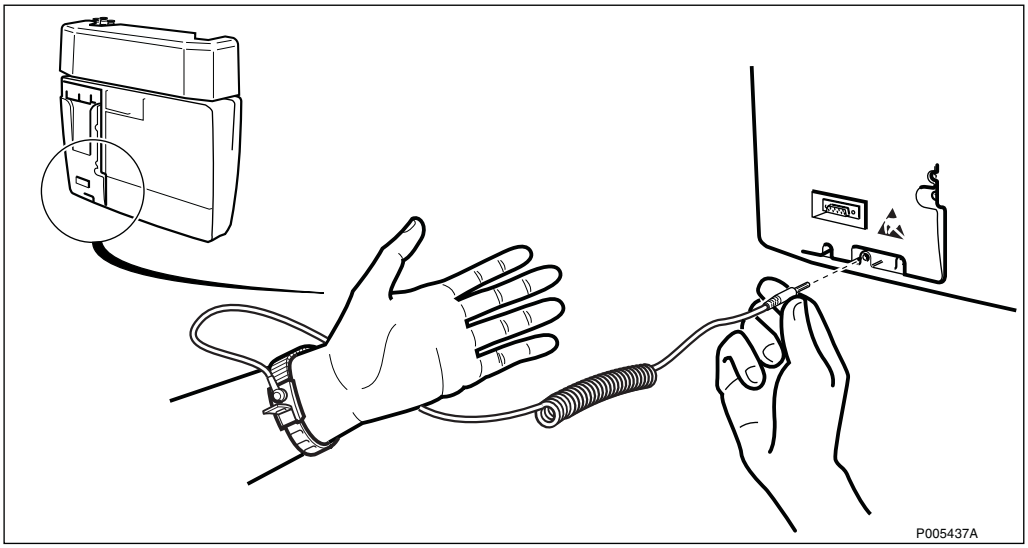

Figure 182

6. Remove the front cover on the module.

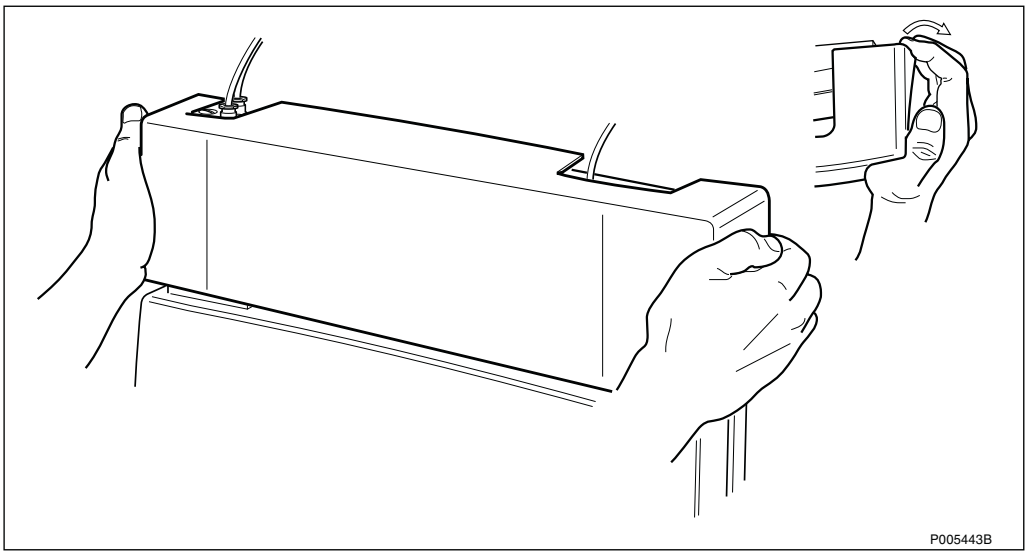

Figure 183

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7. Remove the installation box cover on the module.

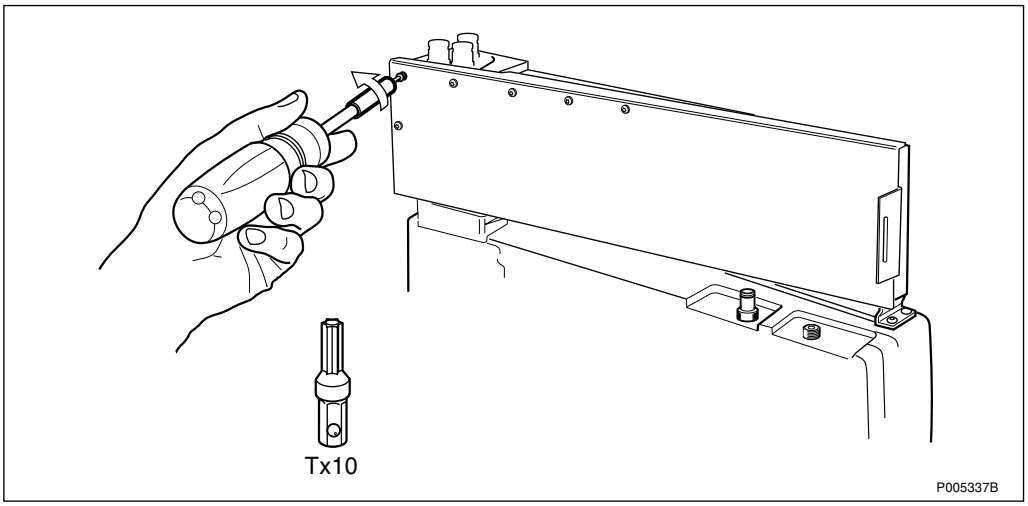

Figure 184

8. Disconnect the cables to the PCM terminals from the module (PCM M1 and HDSL M3).

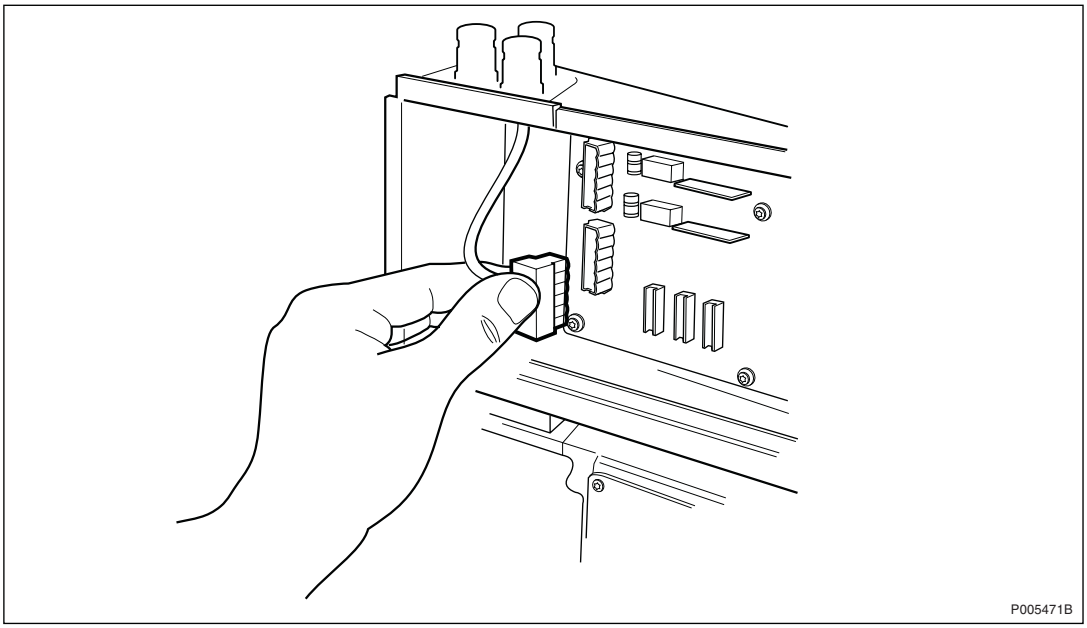

Figure 185

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9. Disconnect the configuration and transmission cable from the radio cabinet (depending on configuration M2, M4 or M5).

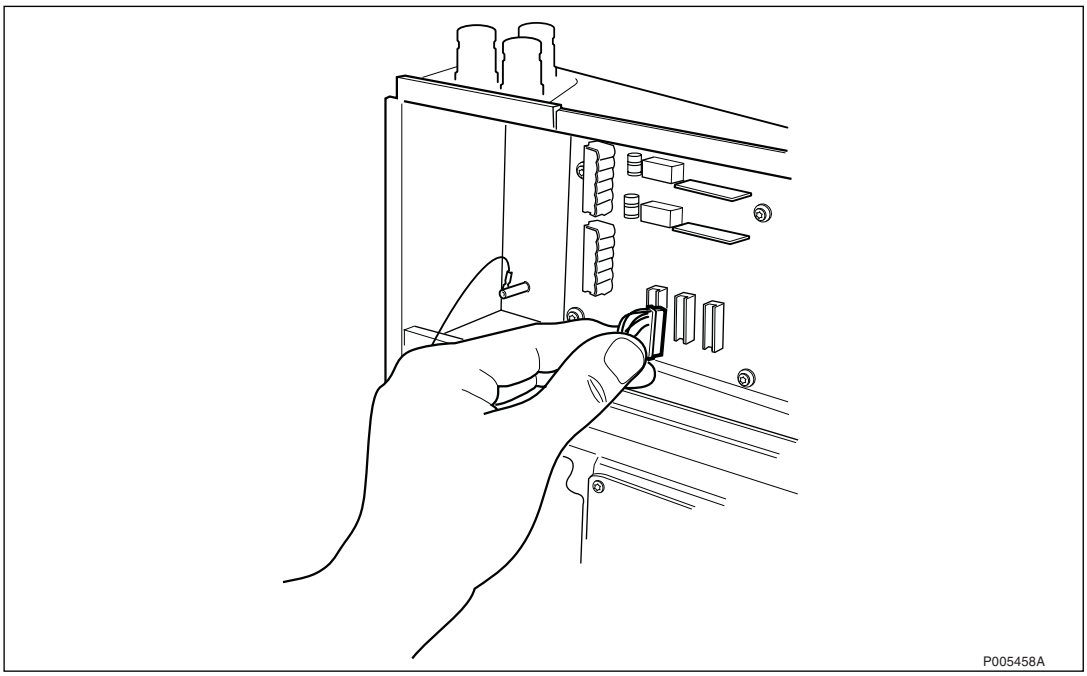

Figure 186

10. Loosen the two flange plates.

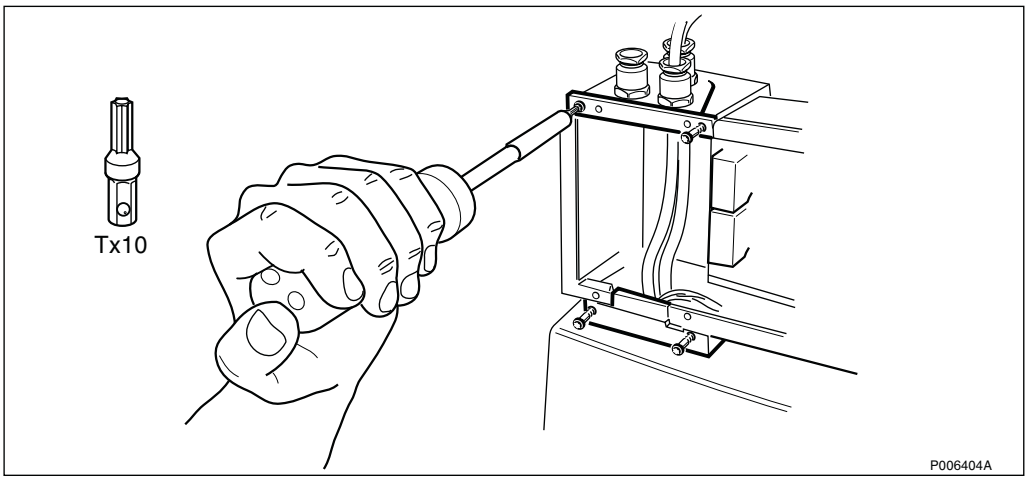

Figure 187

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11. Loosen the six screws, two on each side, and two on the cable gland plate.

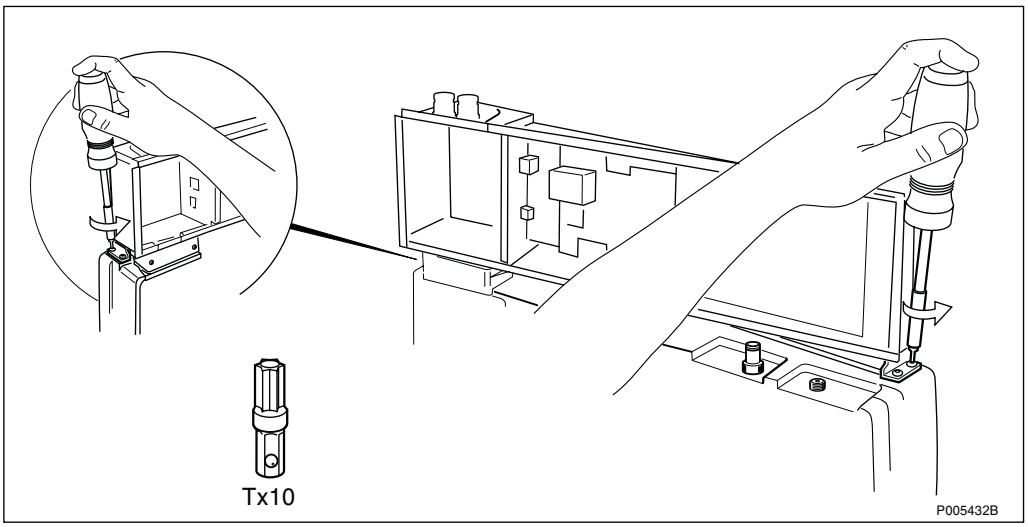

Figure 188

12. Carefully remove the module without damaging any cables.

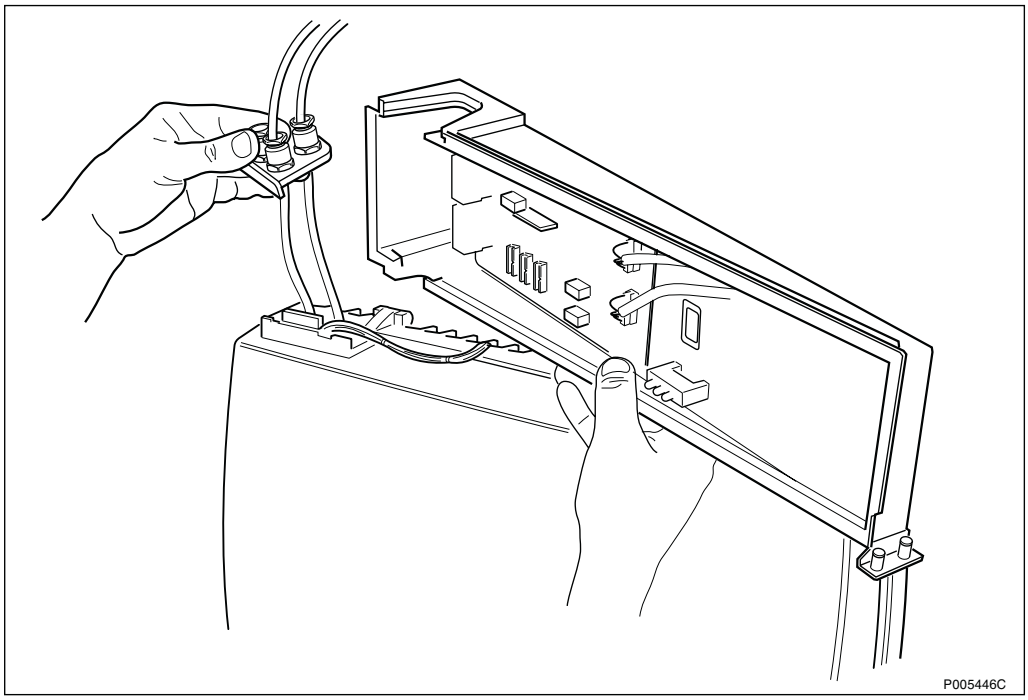

Figure 189

13. Configure the new HDSL module according to the configuration used for the replaced module.

    For further information on DIP-switch settings, refer to chapter Installation and Tests.

14. Install the new HDSL module (follow the steps above in reverse order).

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15. Switch on the AC mains power.

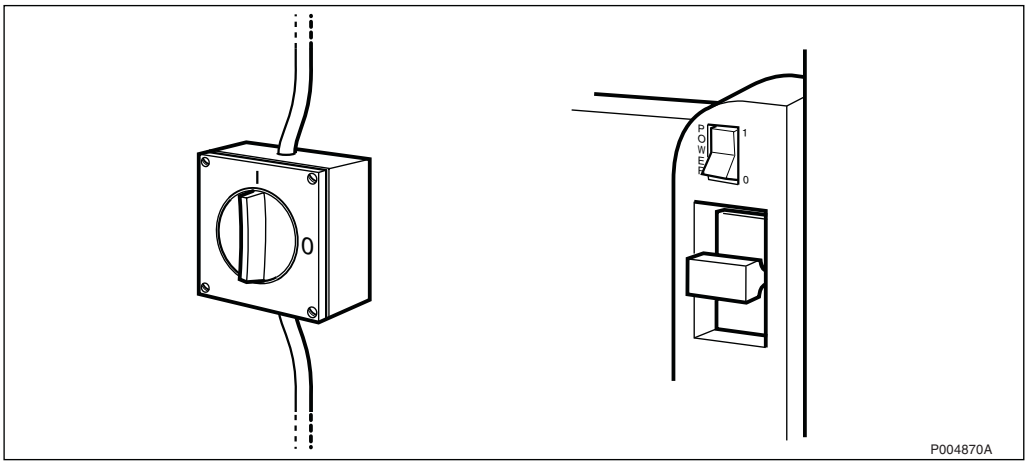

Figure 190

16. Press the Local/Remote button to set the RBS in Remote mode.

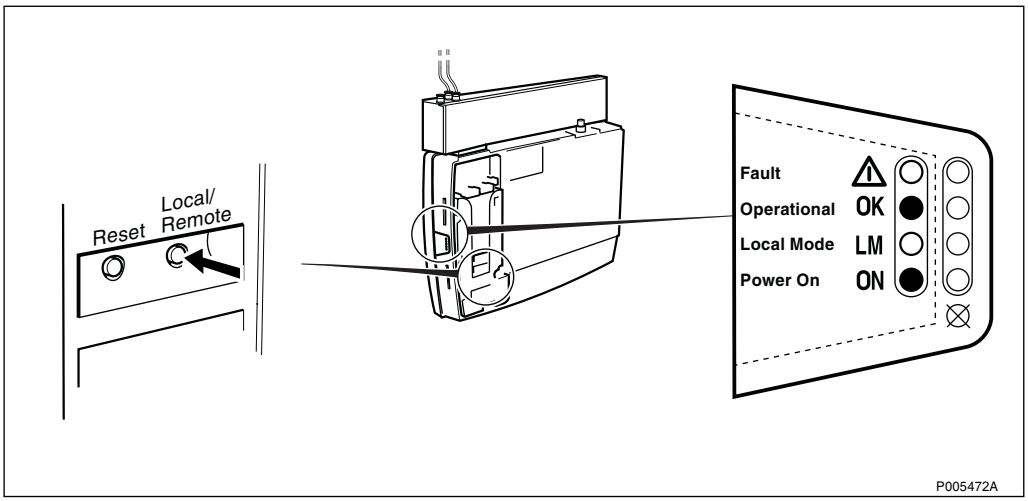

Figure 191

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17. Remount the front cover on the module.

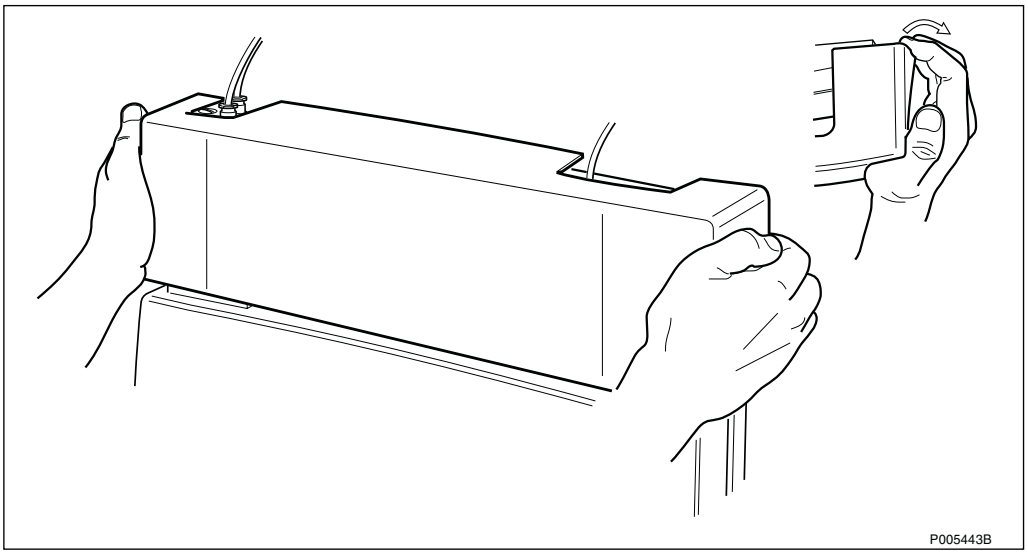

Figure 192

18. Remount the installation box cover on the radio cabinet.

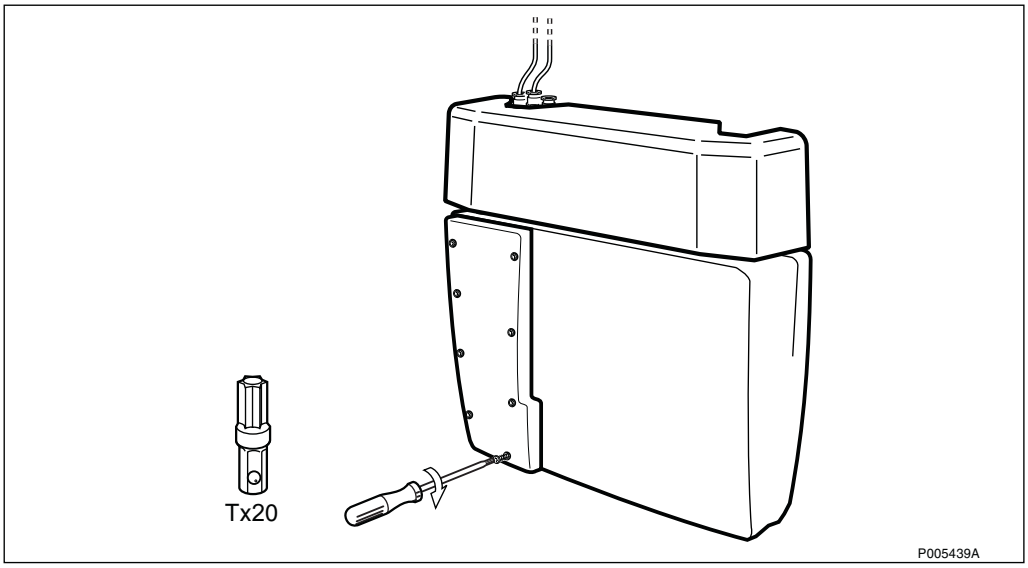

Figure 193

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19. Remount the front cover on the radio cabinet.

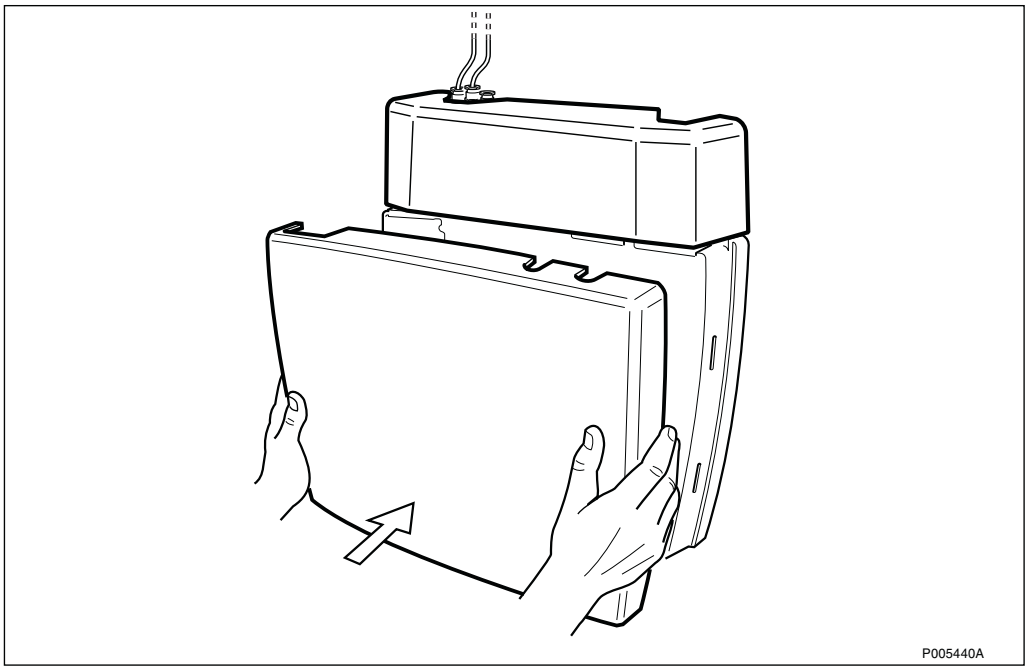

Figure 194

20. Check the status of the RBS, see Table 21 on page 170.

5.3.4 Replacement of AGW Module

1. Remove the front cover on the radio cabinet.

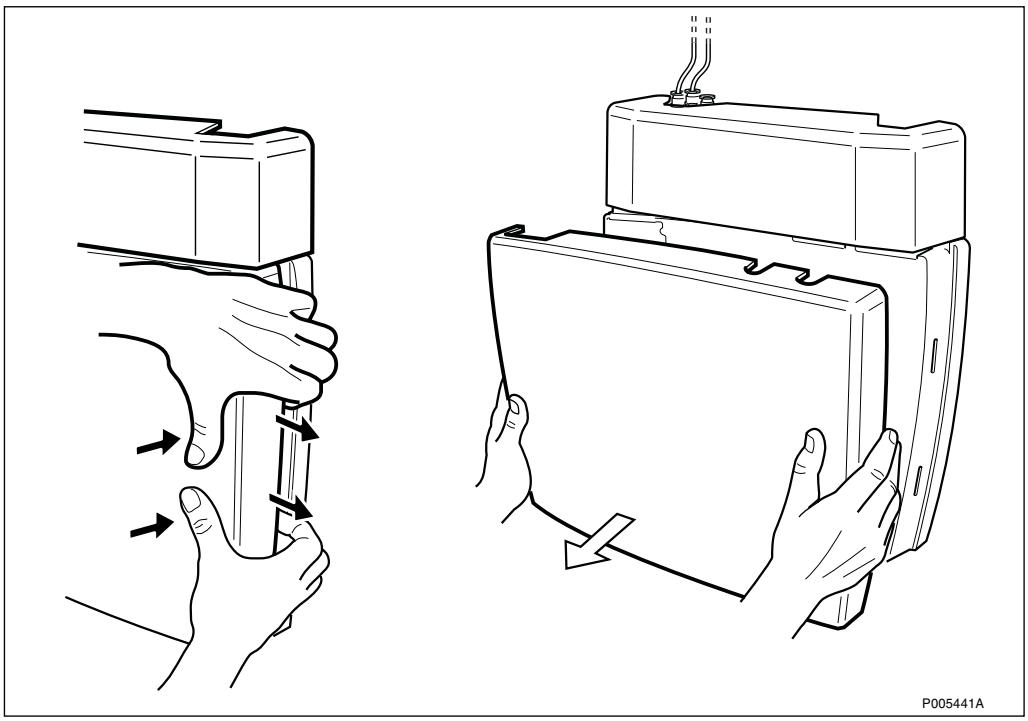

Figure 195

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2. Remove the installation box cover on the radio cabinet.

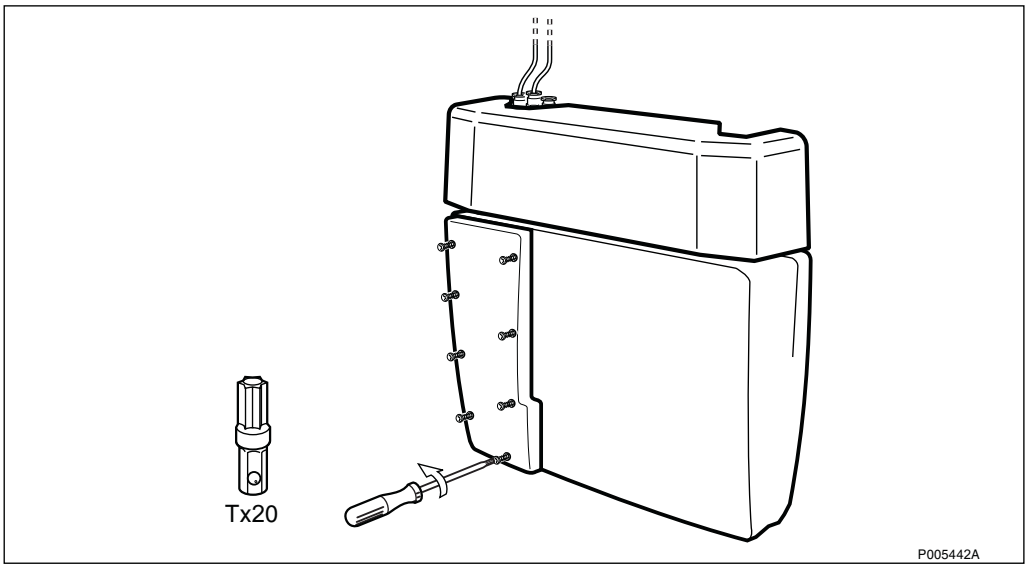

Figure 196

3. Press the Local/Remote button to set the RBS in Local mode.

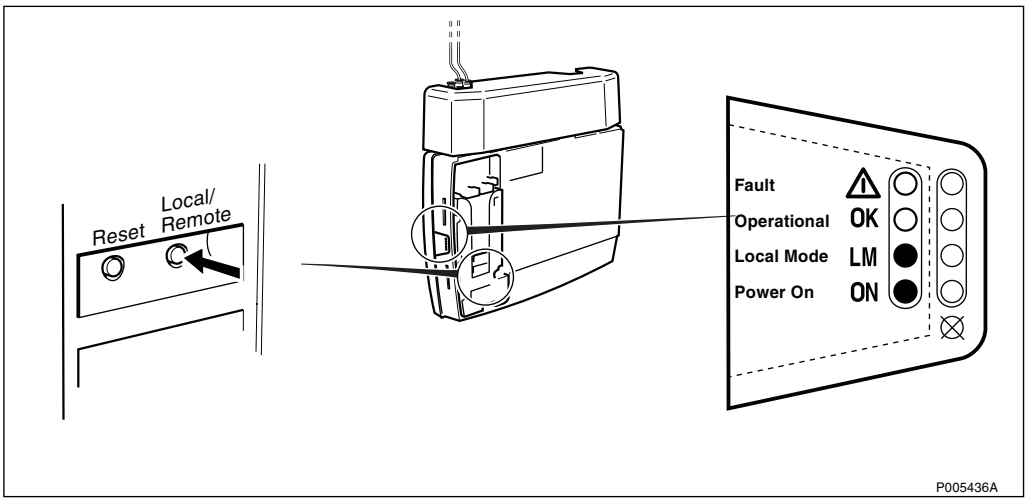

Figure 197

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4. Switch off the AC mains power.

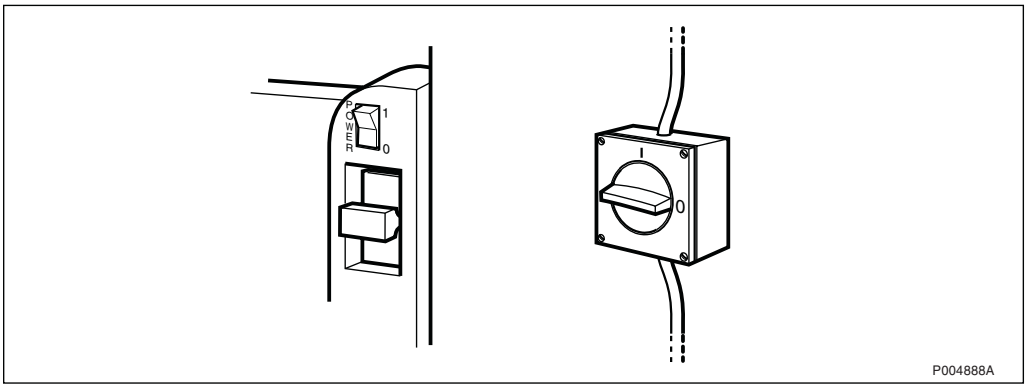

Figure 198

5. Connect the ESD wrist strap.

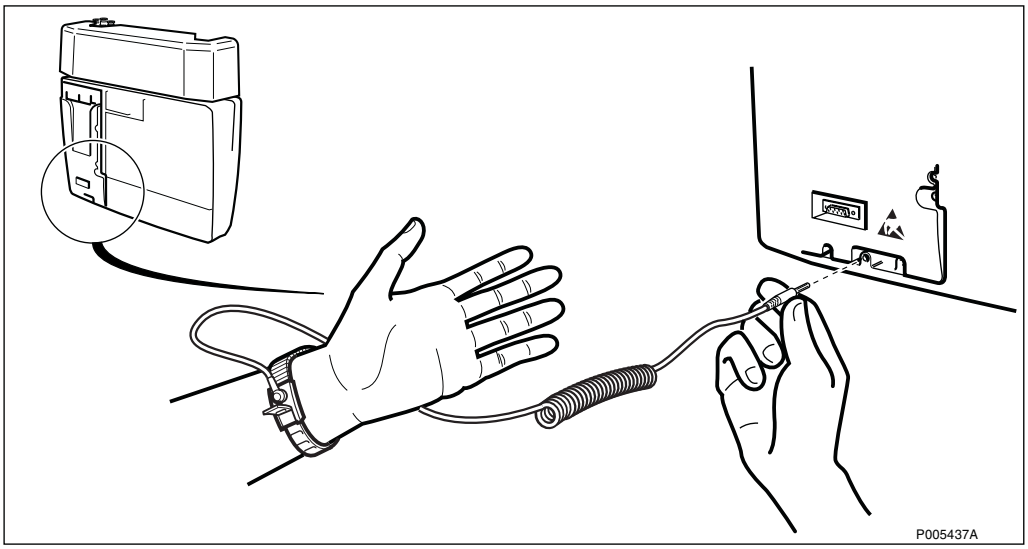

Figure 199

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6. Remove the front cover on the AGW module.

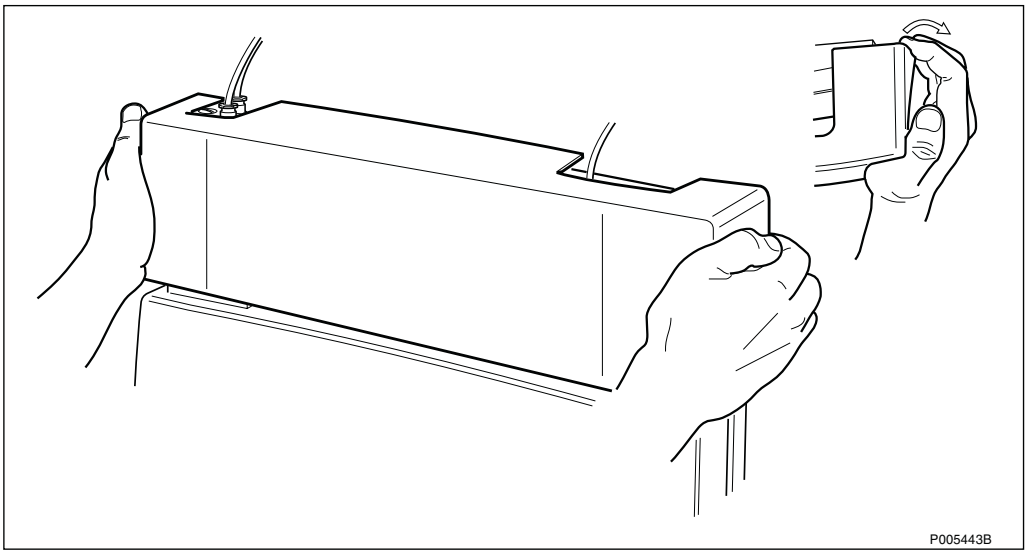

Figure 200

7. Remove the installation box cover on the AGW module.

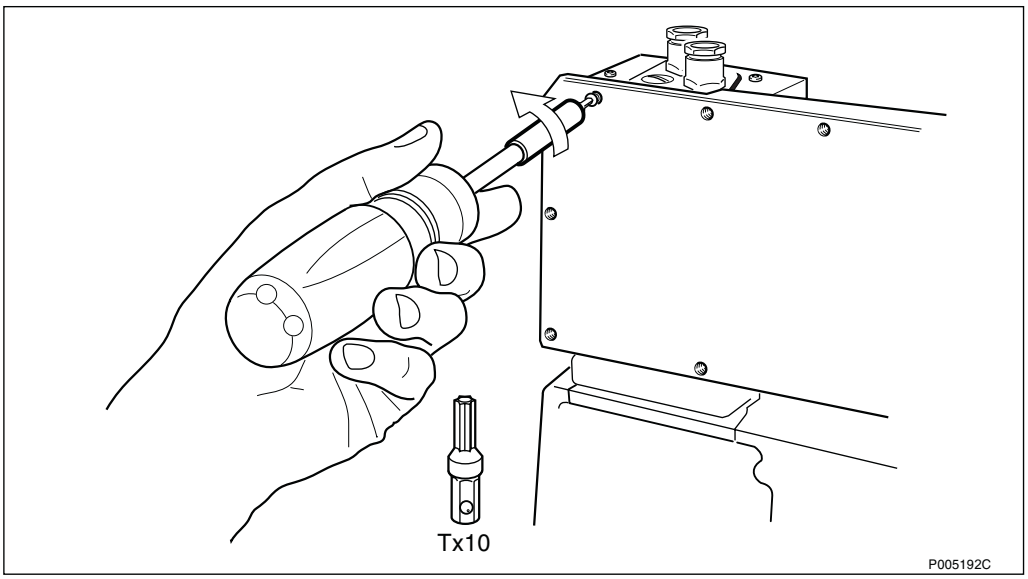

Figure 201

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8. Disconnect the LAN cable to the AGW module (Ethernet).

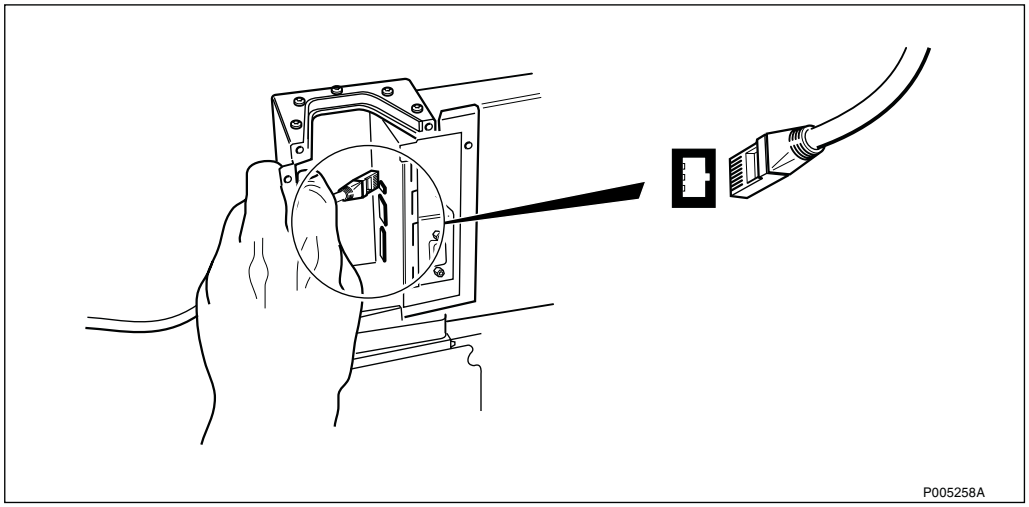

Figure 202

9. Disconnect the transmission cable from the radio cabinet (E1/T1).

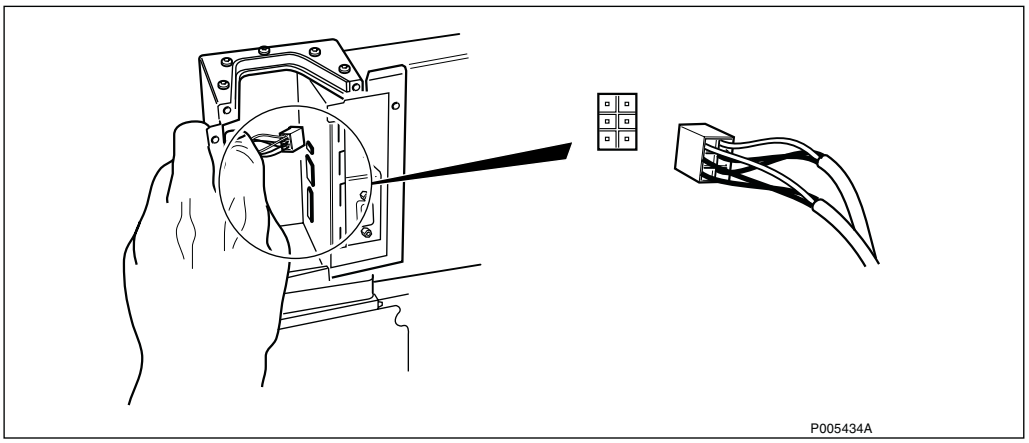

Figure 203

10. Disconnect the DC cable from the AGW module (7 V DC).

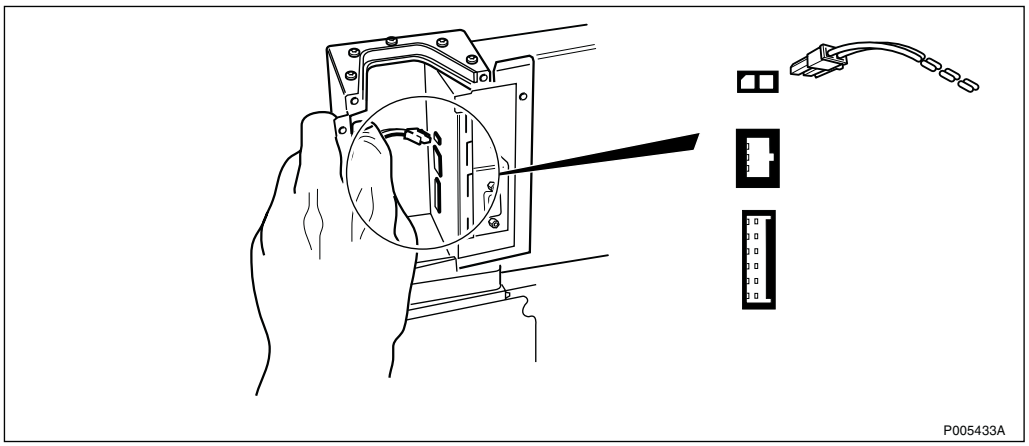

Figure 204

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11. Loosen the two flange plates.

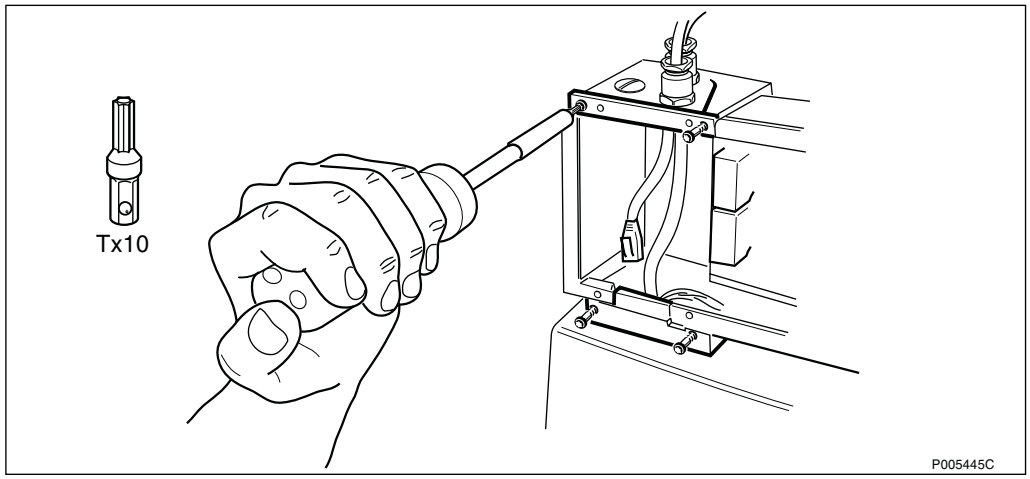

Figure 205

12. Loosen the six screws, two on each side, and two on the cable gland plate.

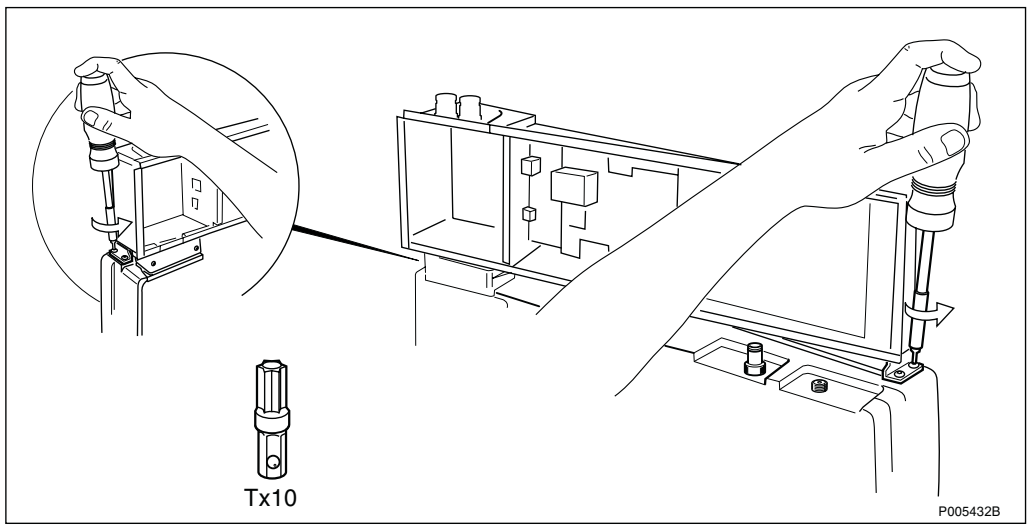

Figure 206

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13. Carefully remove the AGW module without damaging any cables.

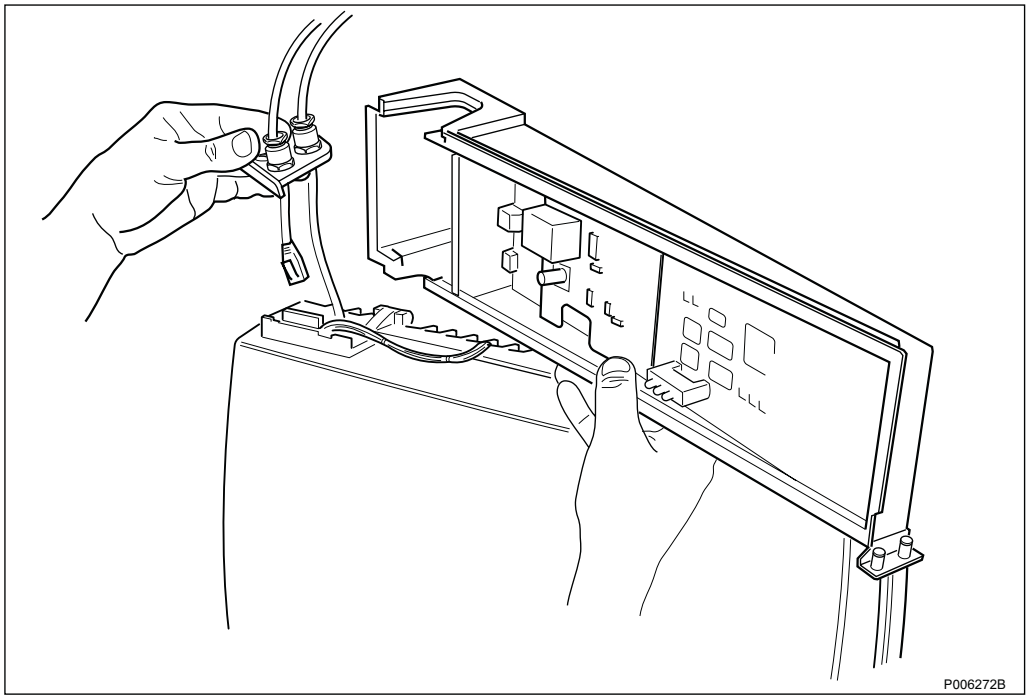

Figure 207

14. Install the new AGW module (follow the steps above in reverse order).

15. Switch on the AC mains power.

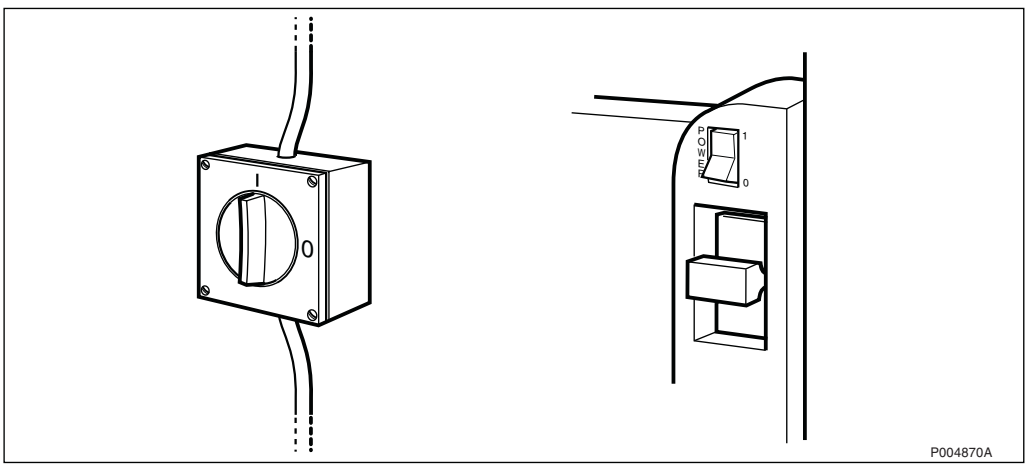

Figure 208

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16. Press the Local/Remote button to set the RBS in Remote mode.

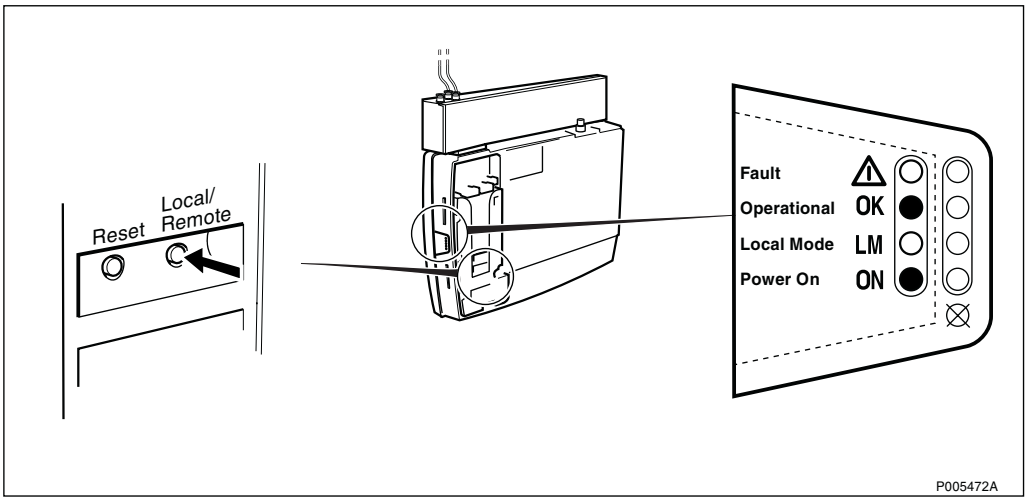

Figure 209

17. Remount the front cover on the AGW module.

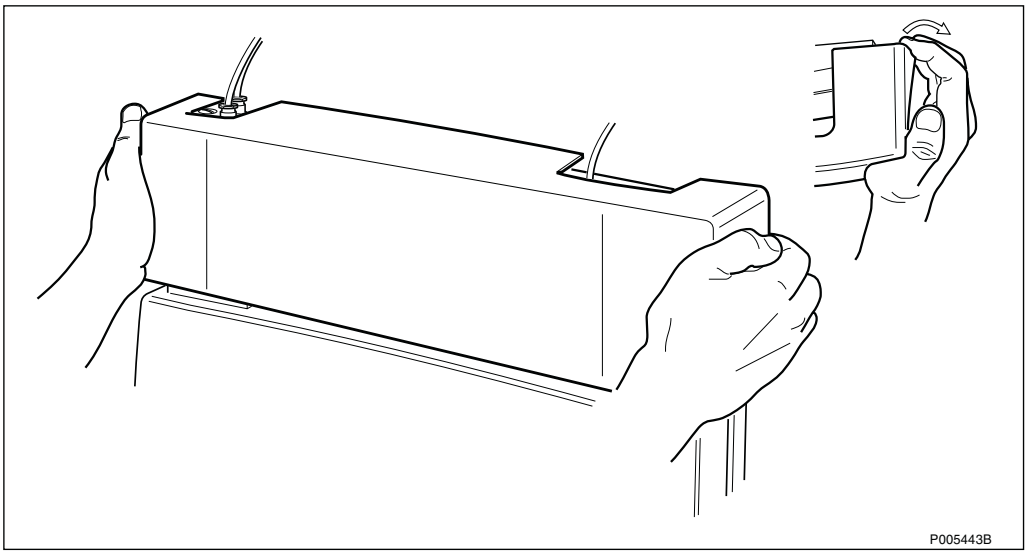

Figure 210

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18. Remount the installation box cover on the radio cabinet.

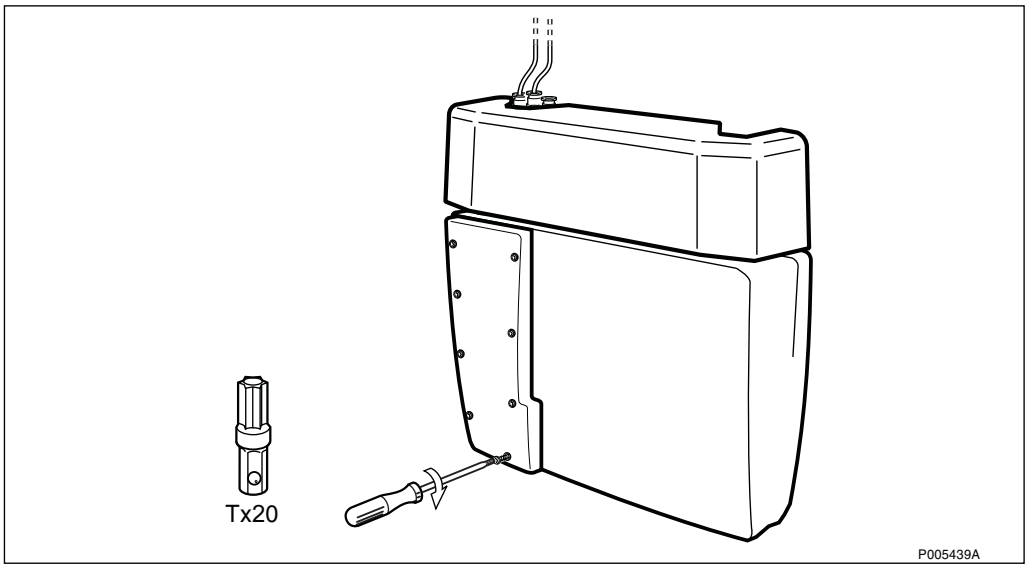

Figure 211

19. Remount the front cover on the radio cabinet.

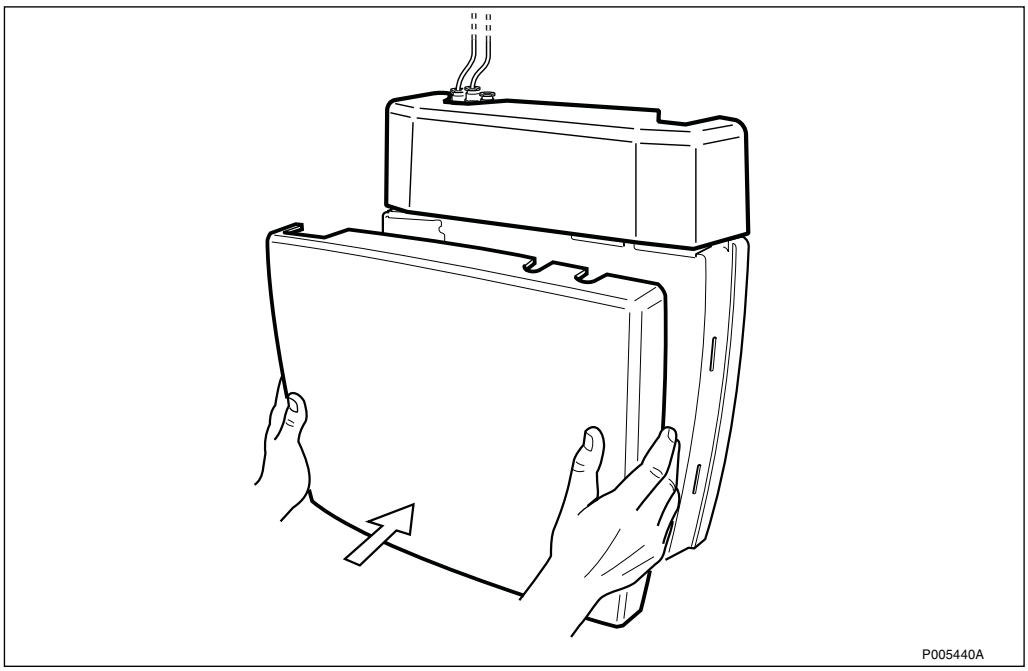

Figure 212

20. Check the status of the RBS with the new AGW module, refer to Table 21 on page 170.

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5.3.5 Replacement of Fuse for HDSL and AGW Module

1. Remove the front cover on the radio cabinet.

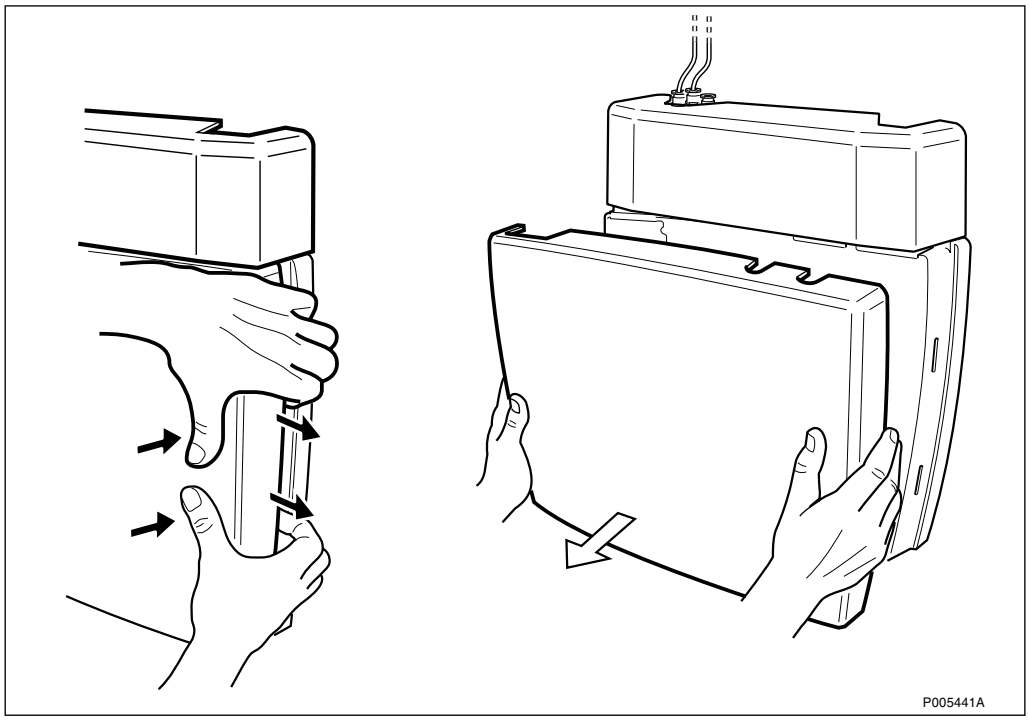

Figure 213

2. Remove the installation box cover on the radio cabinet.

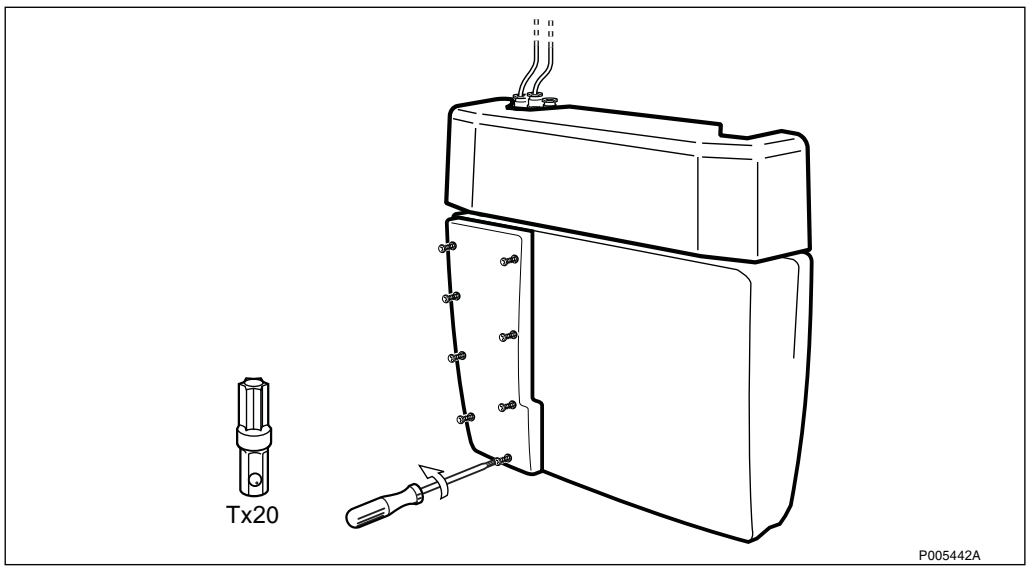

Figure 214

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3. Press the Local/Remote button to set the RBS in Local mode.

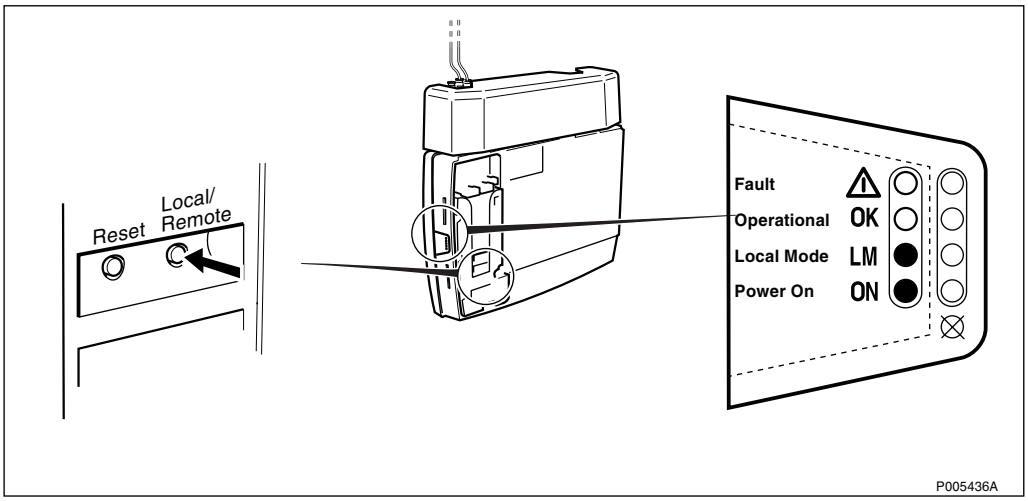

Figure 215

4. Switch off the AC mains power.

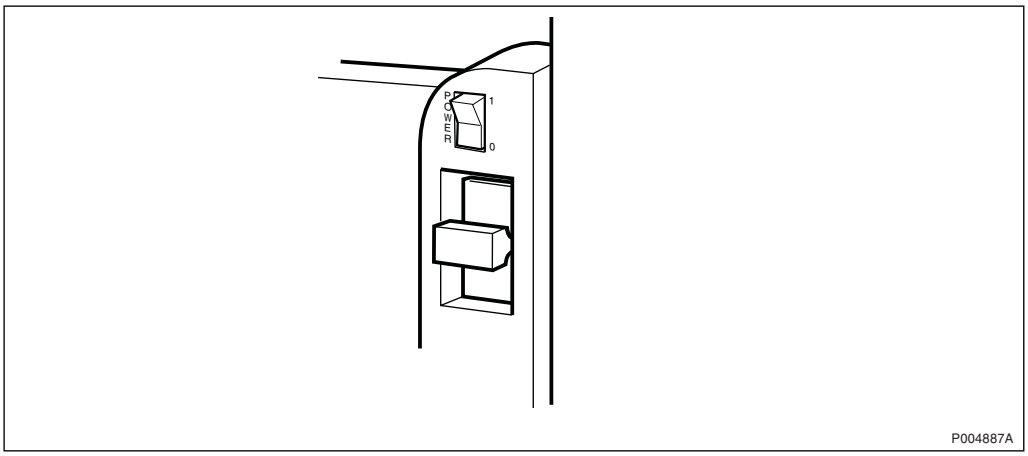

Figure 216

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5. Connect the ESD wrist strap.

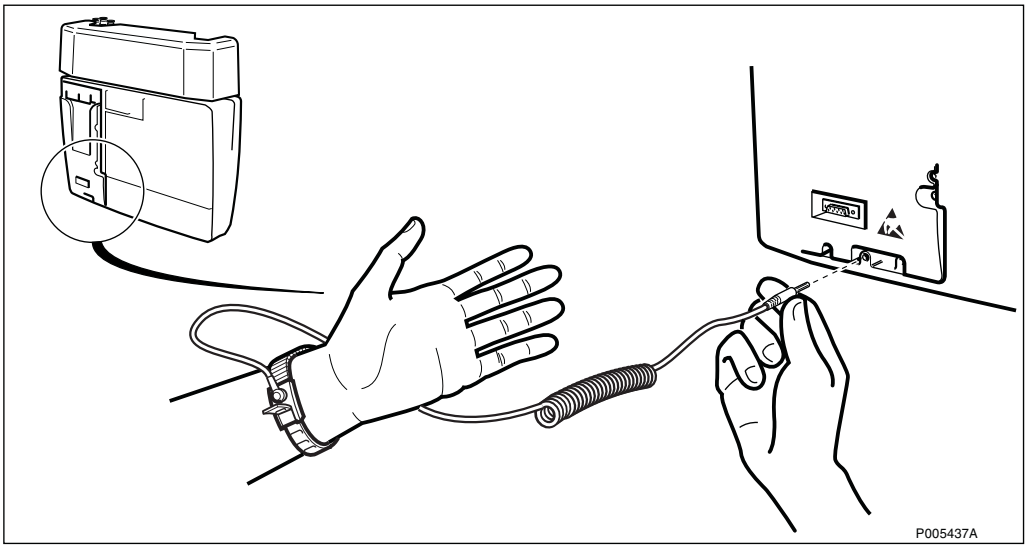

Figure 217

6. Remove the 3.15 A fuse and replace it with a new one. Use a nose cutting plier, or similar.

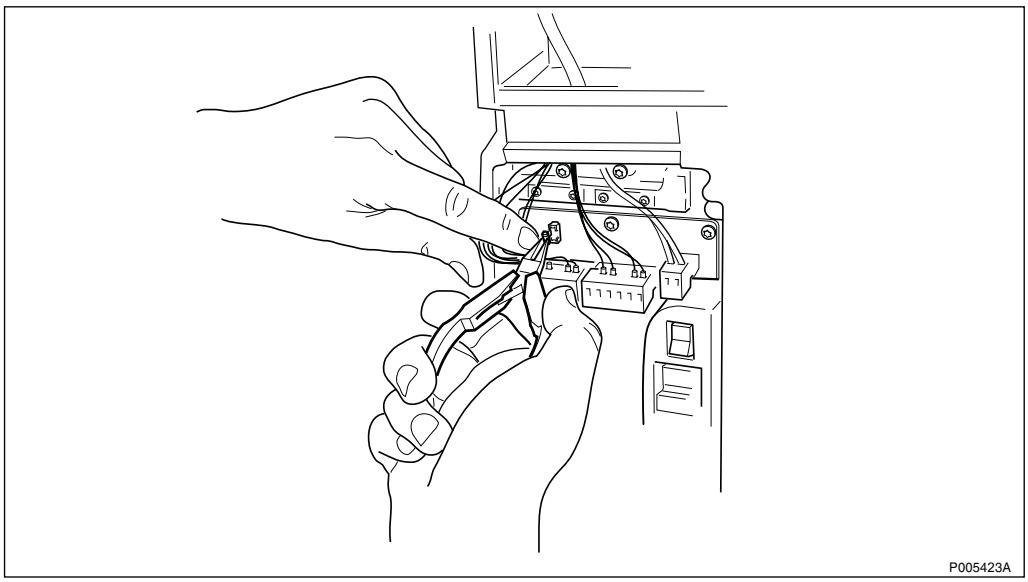

Figure 218

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7. Switch on the AC mains power.

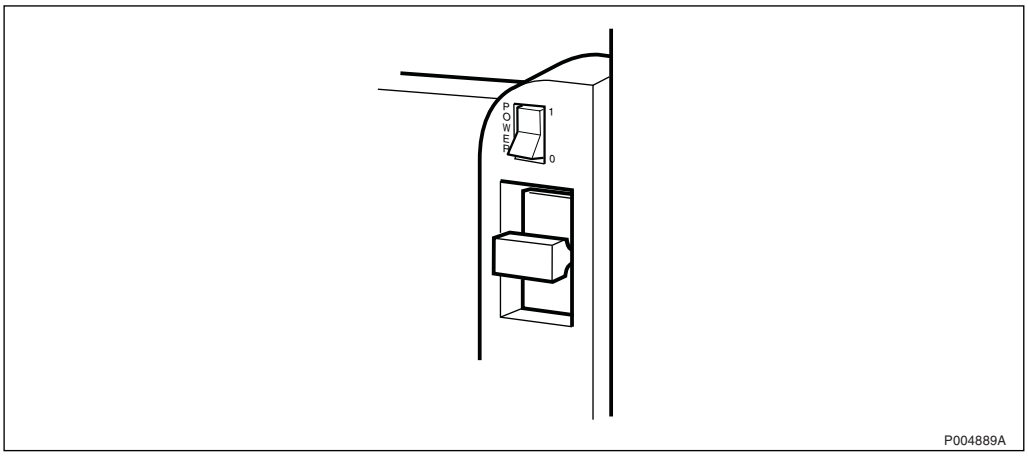

Figure 219

8. Press the Local/Remote button to set the RBS in Remote mode.

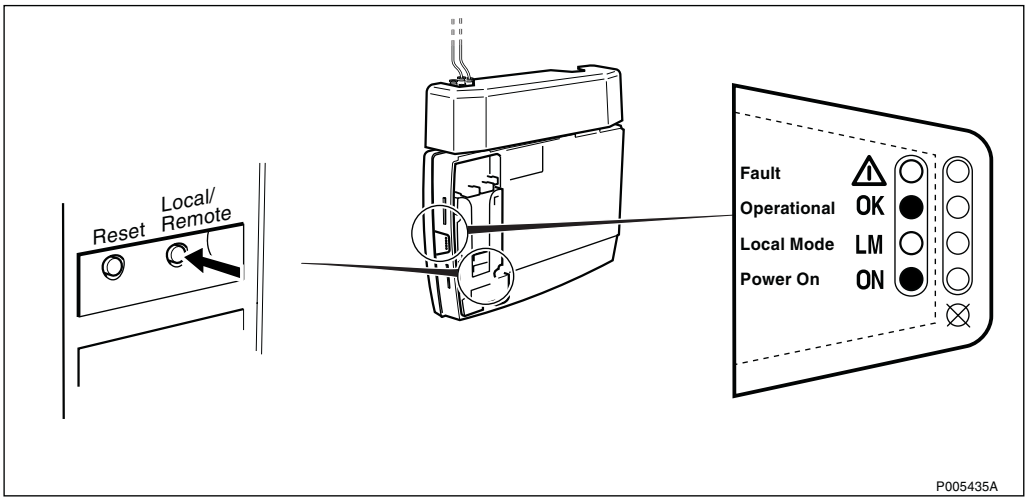

Figure 220

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9. Remount the installation box cover on the radio cabinet.

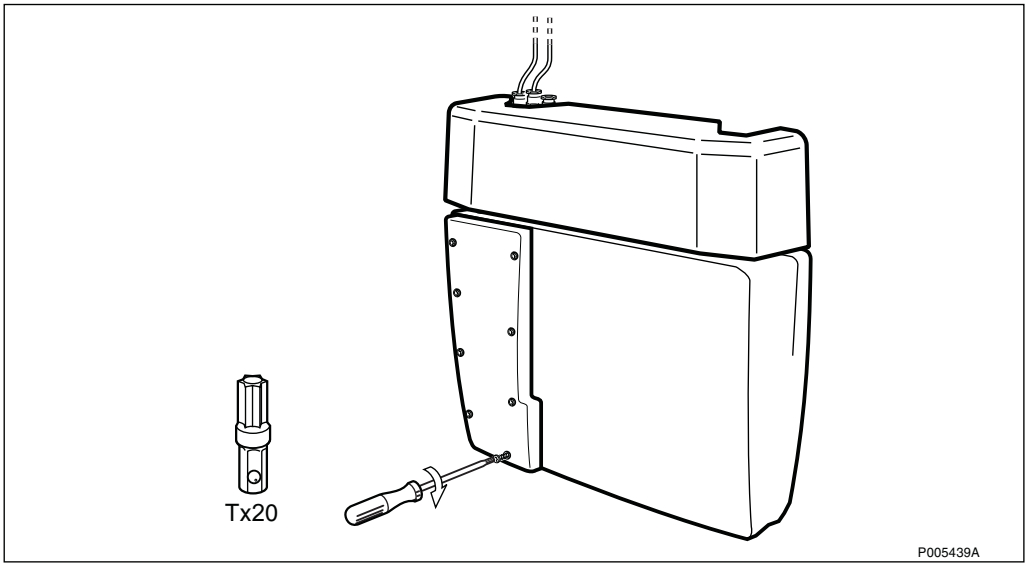

Figure 221

10. Remount the front cover on the radio cabinet.

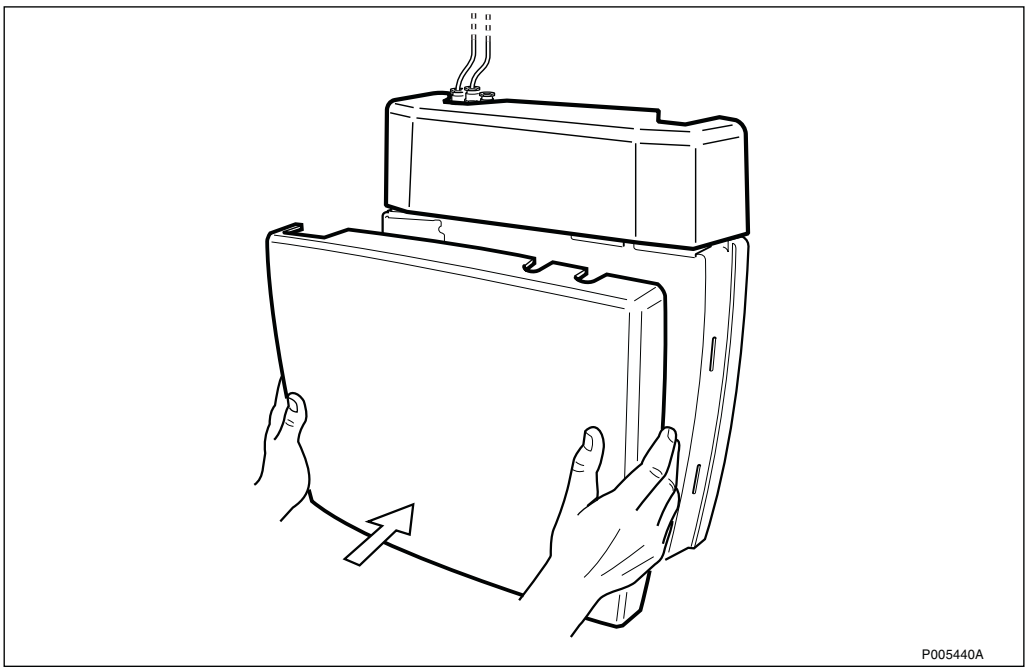

Figure 222

11. Check the status of the RBS, refer to Table 21 on page 170.

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5.4 Preventive Maintenance

Exchange the CPI board at 10 year intervals.

This is the only preventive maintenance action that is required.

DANGER

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

CAUTION

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

Replacement of the CPI board

1. Remove the front cover on the radio cabinet.

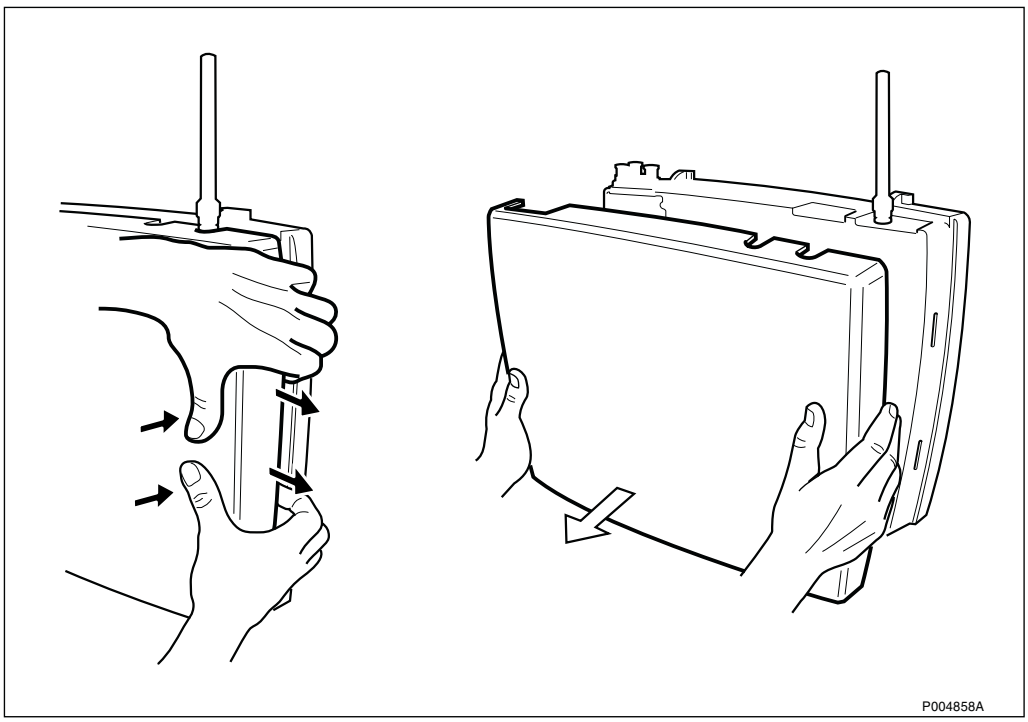

Figure 223 Removing the front cover

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2. Remove the installation box cover on the radio cabinet.

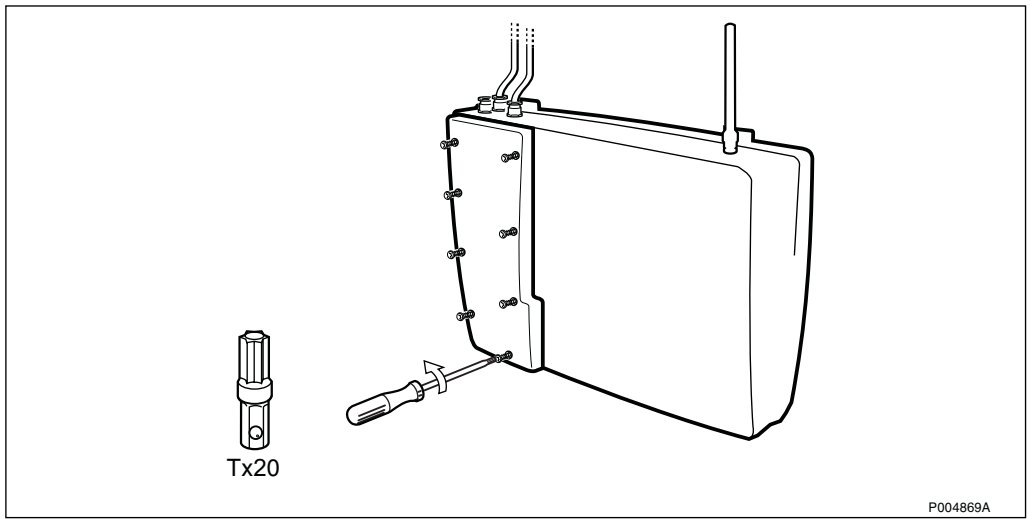

Figure 224 Removing the installation box cover

3. Press the Local/Remote button to set the RBS in Local mode.

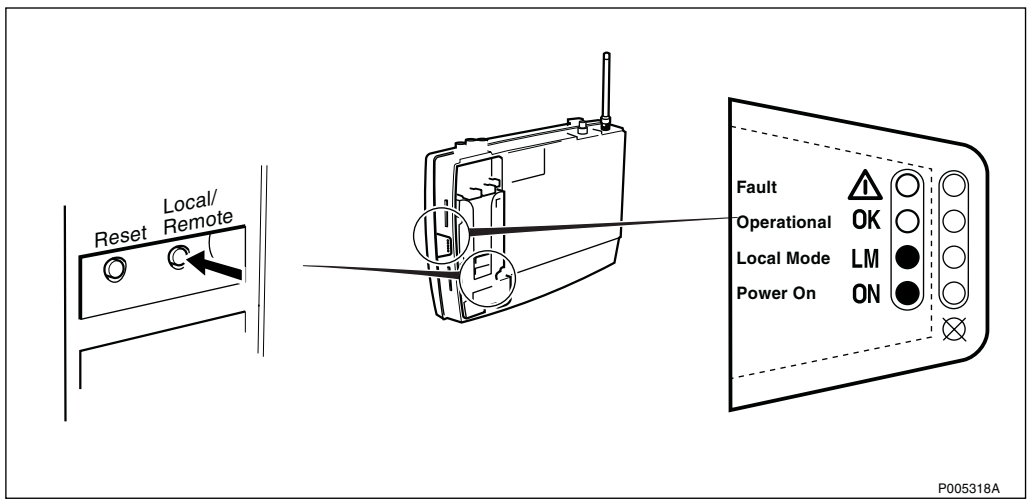

Figure 225

4. Switch off the AC mains power.

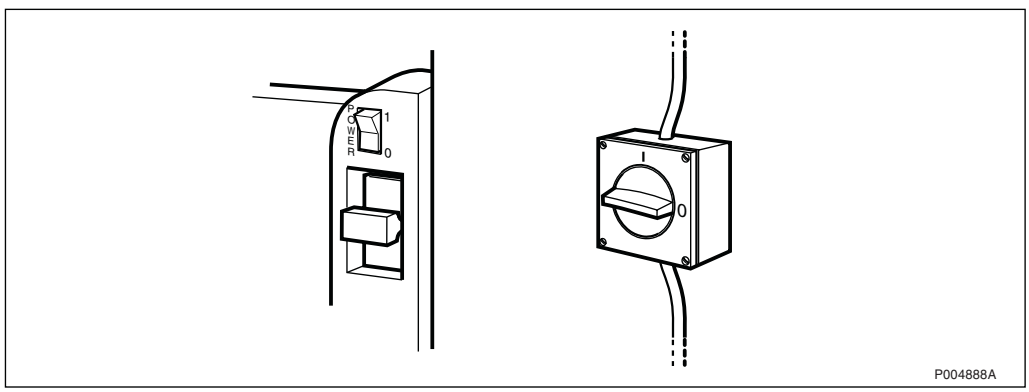

Figure 226

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5. Connect the ESD wrist strap.

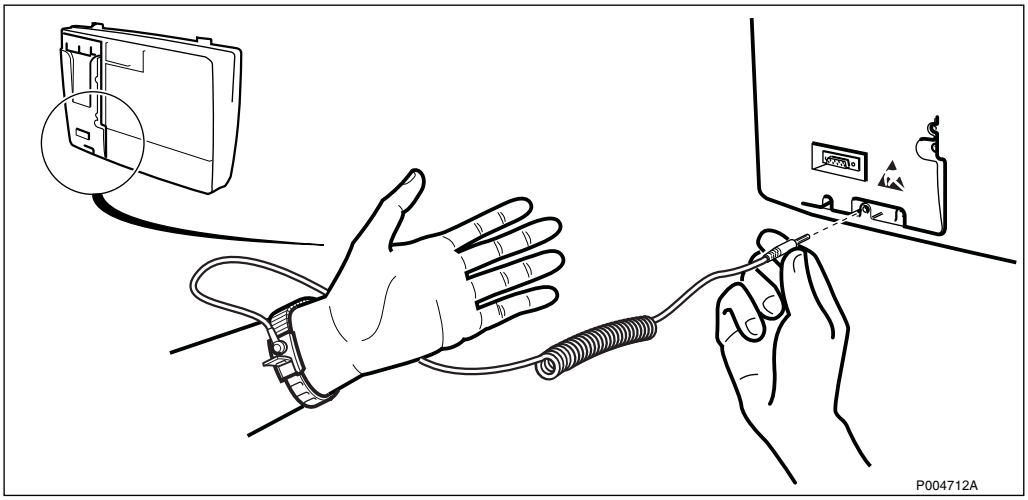

Figure 227

6. Remove the protective cover.

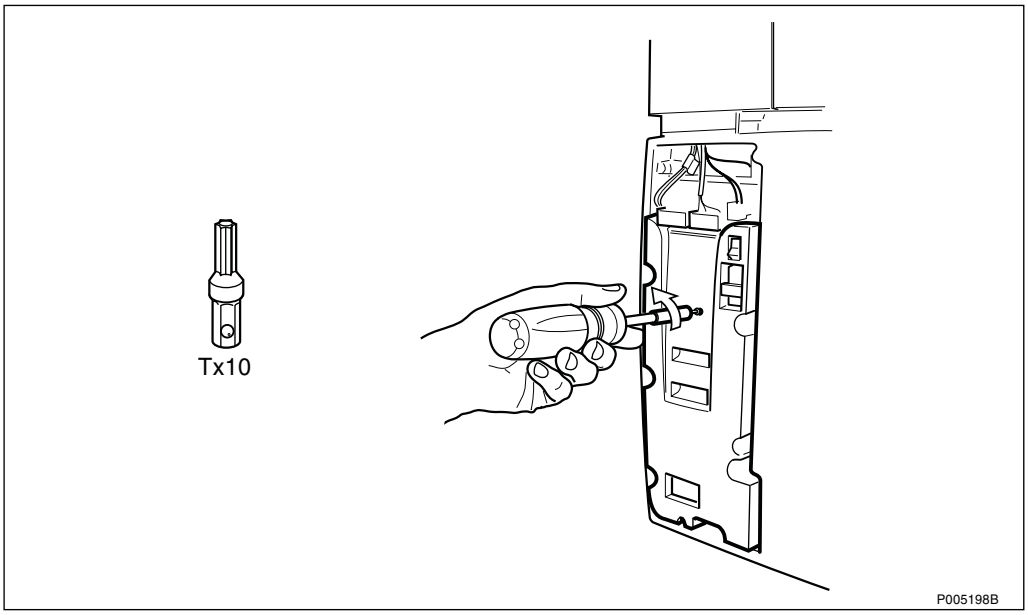

Figure 228

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7. Disconnect the cables from the CPI board.

8. Unscrew the distance screw.

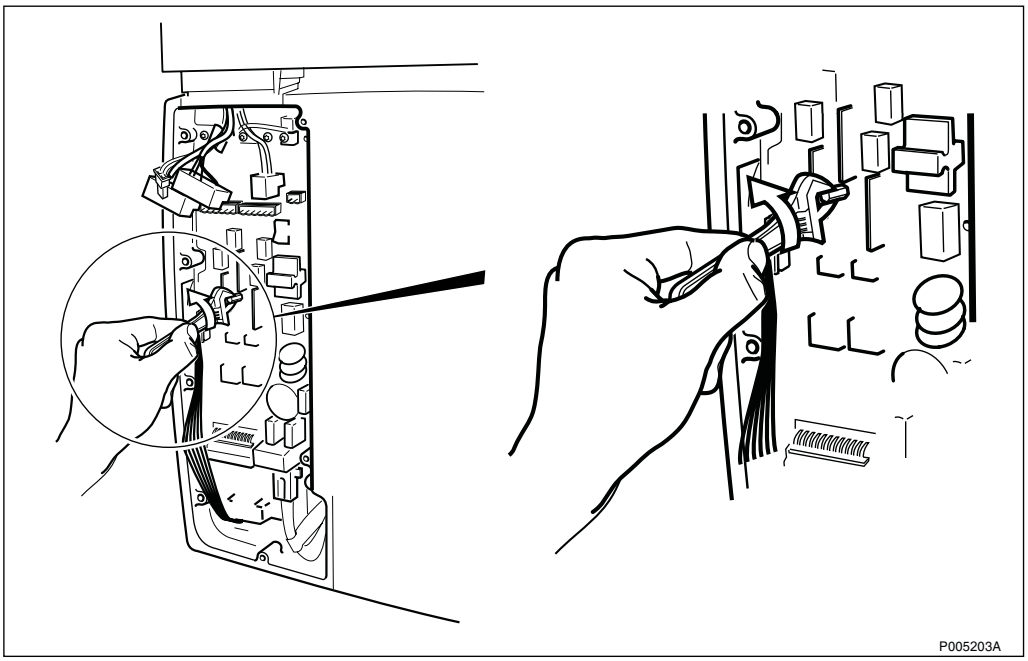

Figure 229

9. Unscrew all screws.

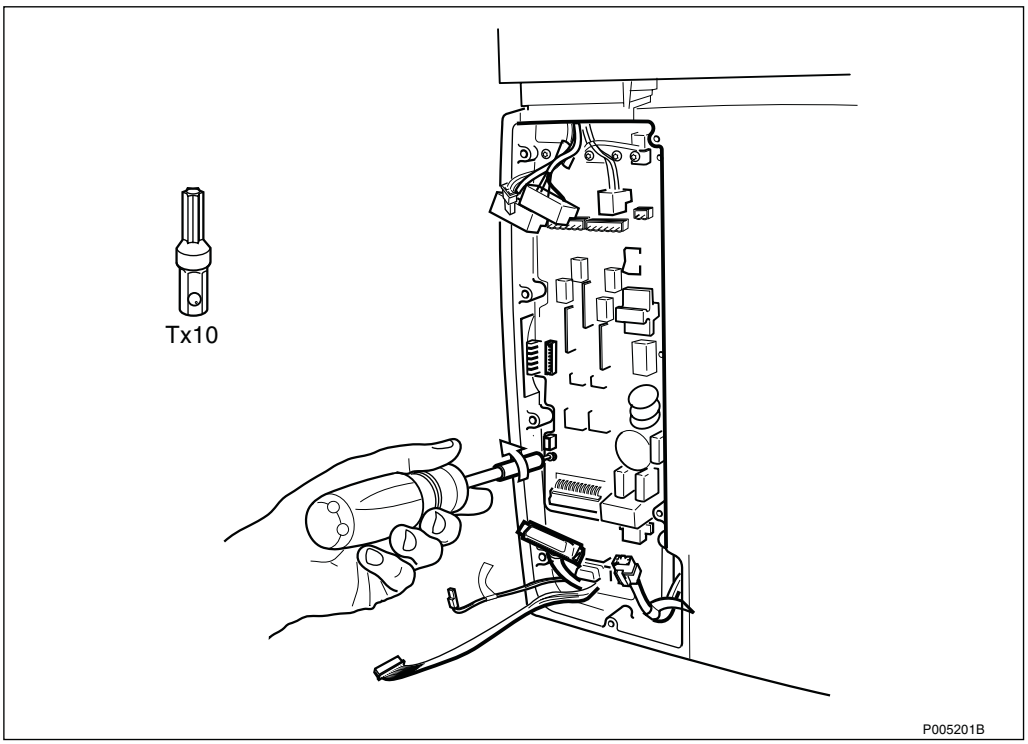

Figure 230

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10. Remove the CPI board. Be careful not to damage the LEDs.

11. Mount the new CPI board and tighten all screws, including the distance screw.

12. Connect the cables to the CPI board.

13. Remount the protective cover.

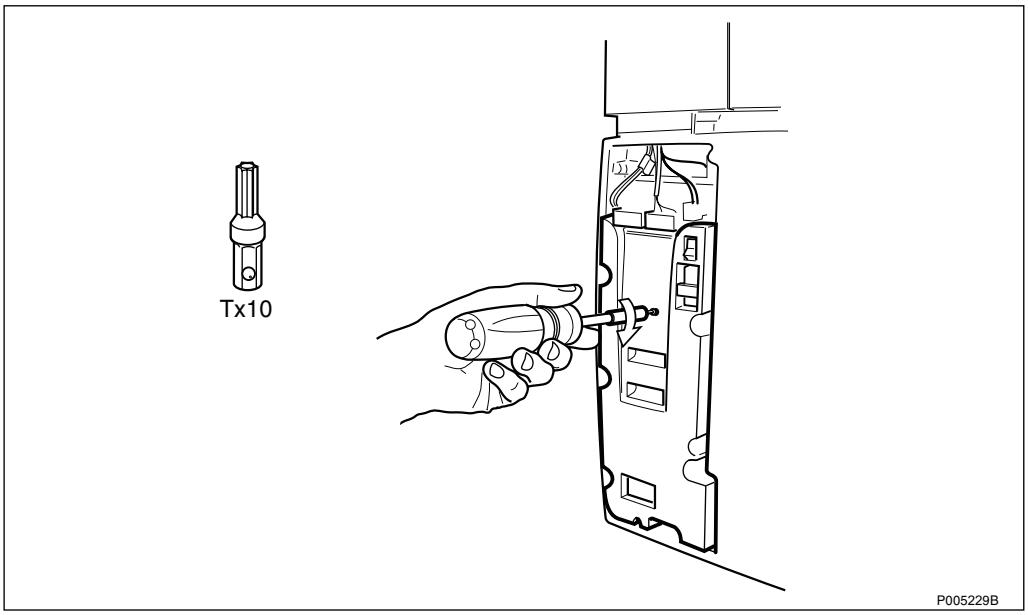

Figure 231

14. Set the transmission switches.

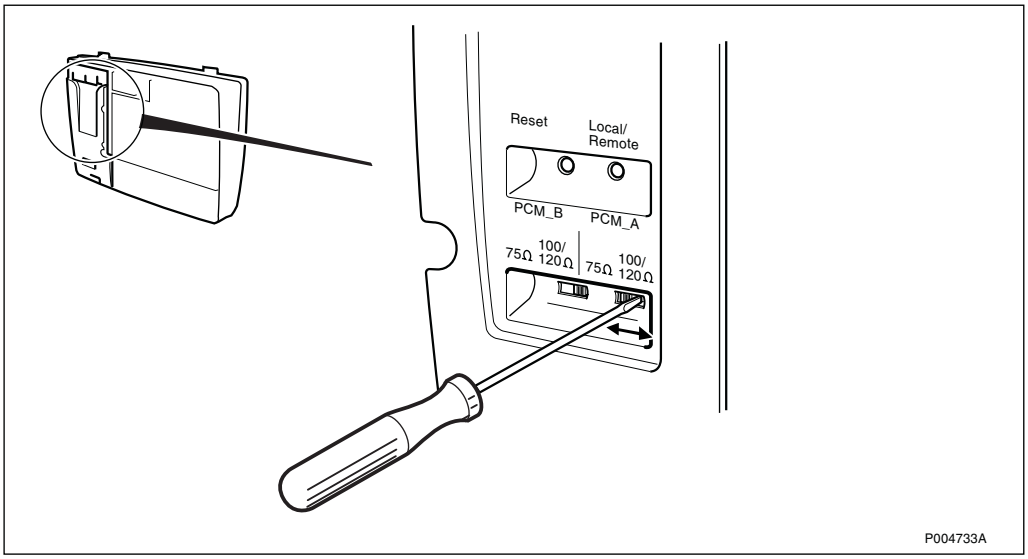

Figure 232

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15. Mount the fuses in the fuse holder. Be sure to use the fuses intended for the actual mains amperage.

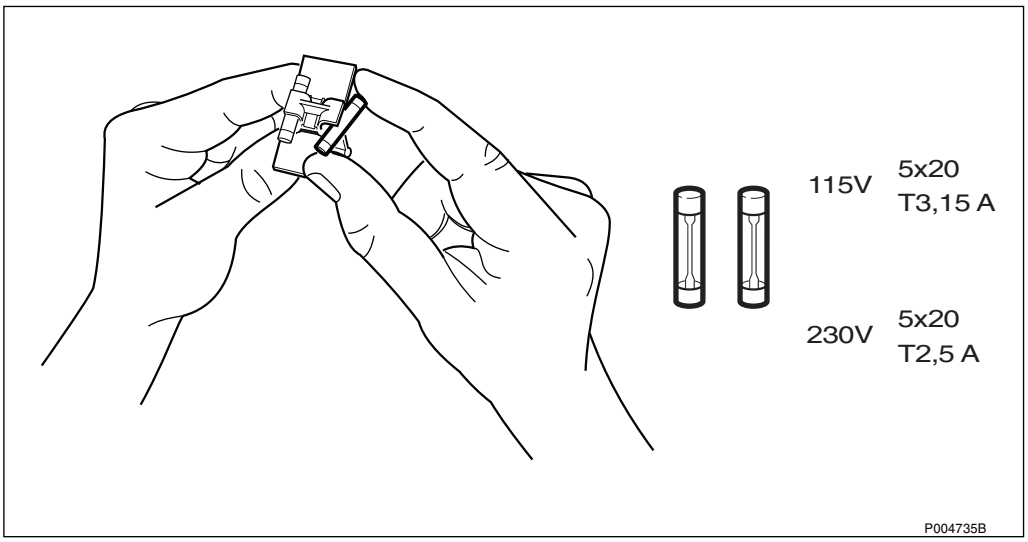

Figure 233

16. Insert the fuse holder in the fuse compartment.

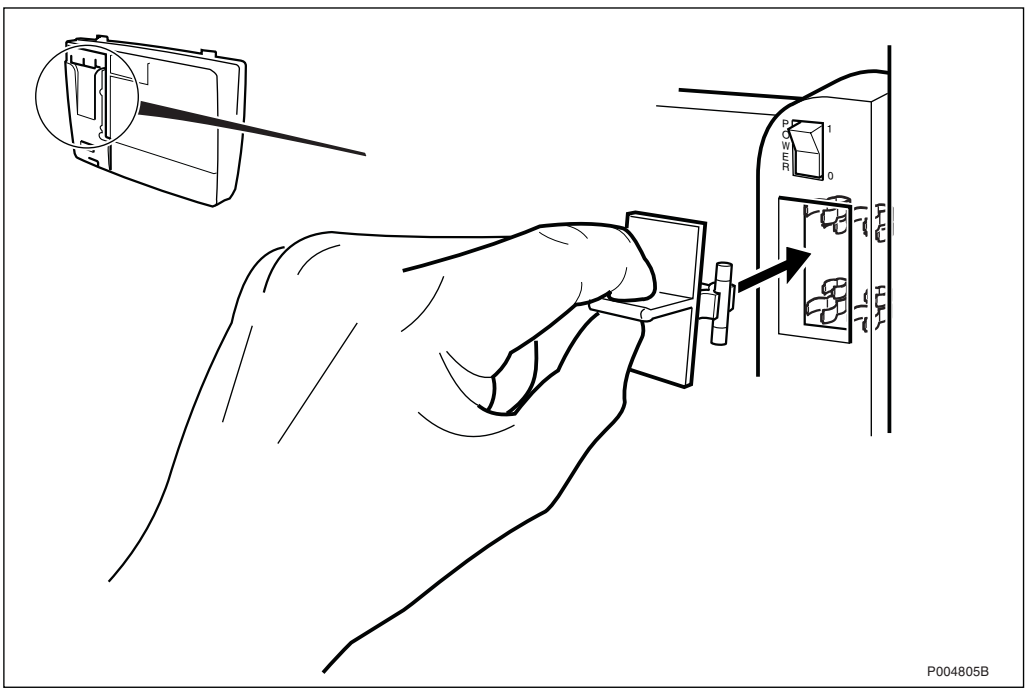

Figure 234

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17. Disconnect the ESD wrist strap.

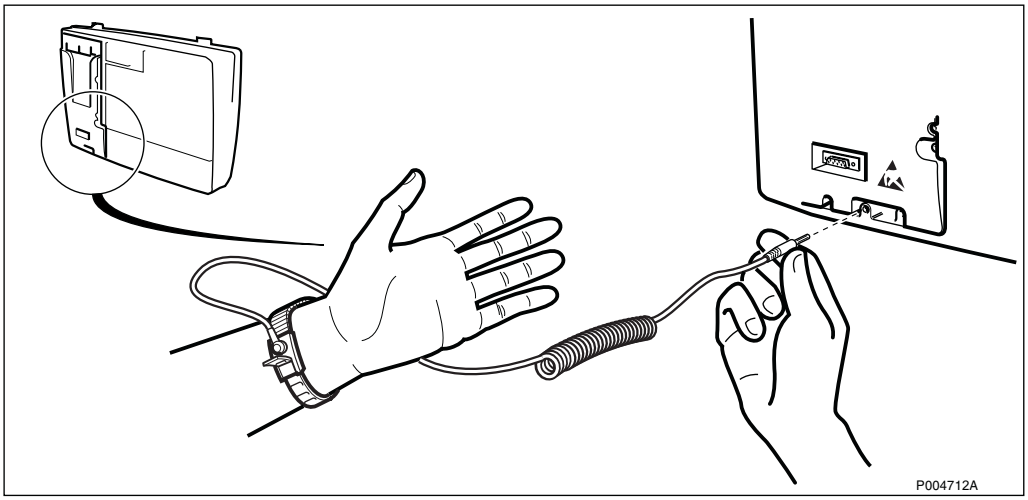

Figure 235

18. Switch on the AC mains power.

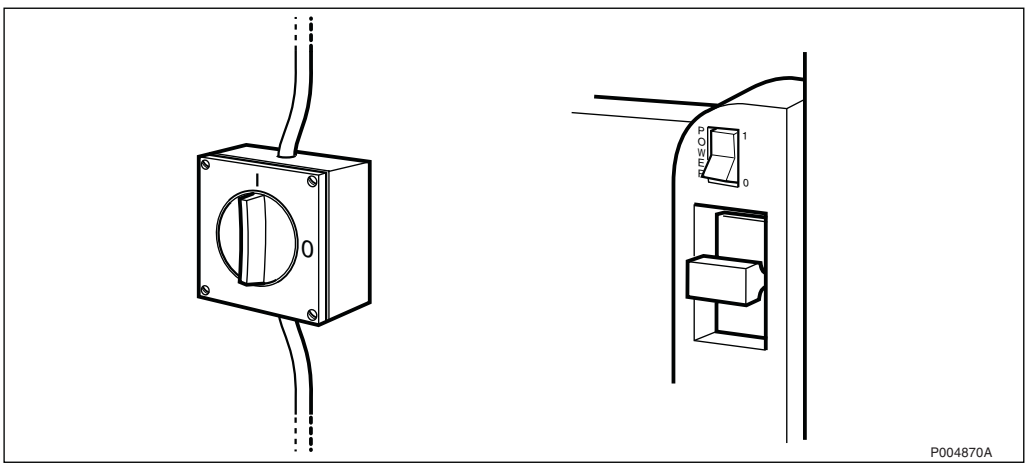

Figure 236

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19. Press the Local/Remote button to set the RBS in Remote mode. Check that contact has been established with the BSC (The Local mode indicator is OFF).

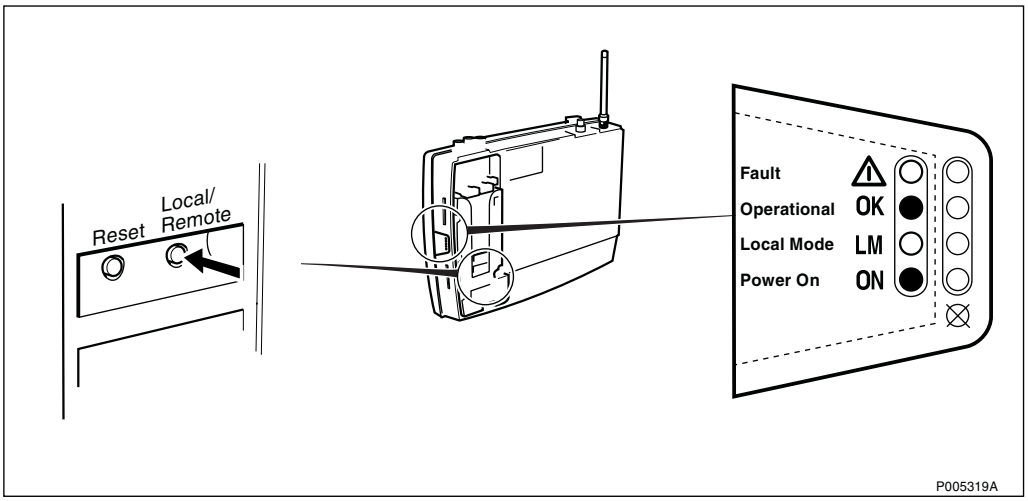

Figure 237

20. Remount the installation box cover on the radio cabinet.

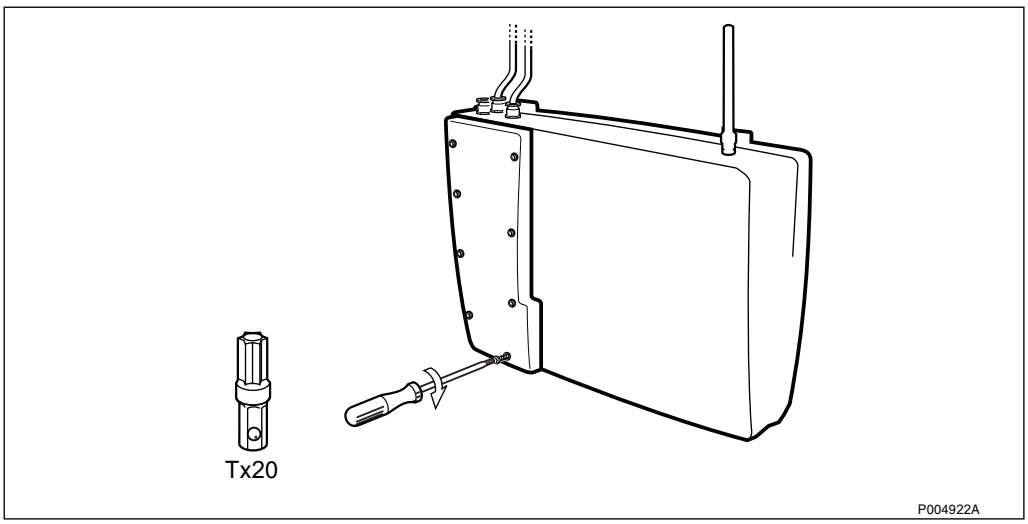

Figure 238

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21. Remount the front cover.

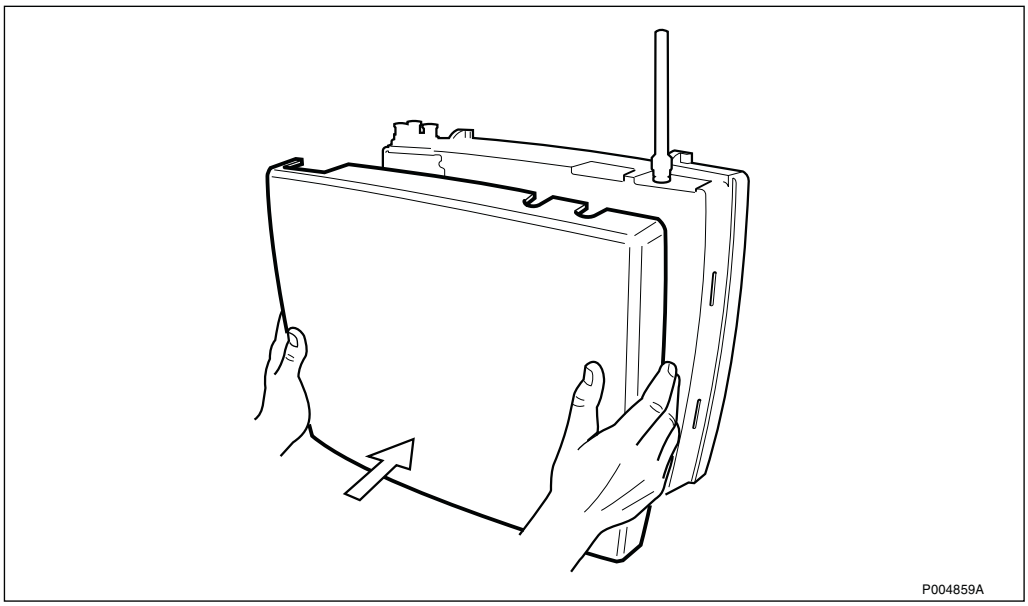

Figure 239

5.5 Concluding Routines

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

If any check point is not OK, do not leave the site until the problem/ fault has been cleared or investigated.

Table 21 Checklist

Checklist	**OK**
1. LED indicator FAULT is OFF.	
2. LED indicator OPERATIONAL is ON.	
3. RBS 2401 is in Remote mode (Local mode indicator OFF).	
4. Backup copy of the RBS IDB saved on a diskette.	
5. LED status on HDSL /AGW module checked.	
Signature **Date**	

5.5.1 Transport of a Faulty Unit

The faulty unit should be transported in the same packaging materials as the spare unit was delivered in.

5.5.2 Report of Finished Work

When a maintenance procedure has been completed, a report should be written including a detailed description of actions taken, all observations made in accordance with local routines for work orders, site log-book, etc.

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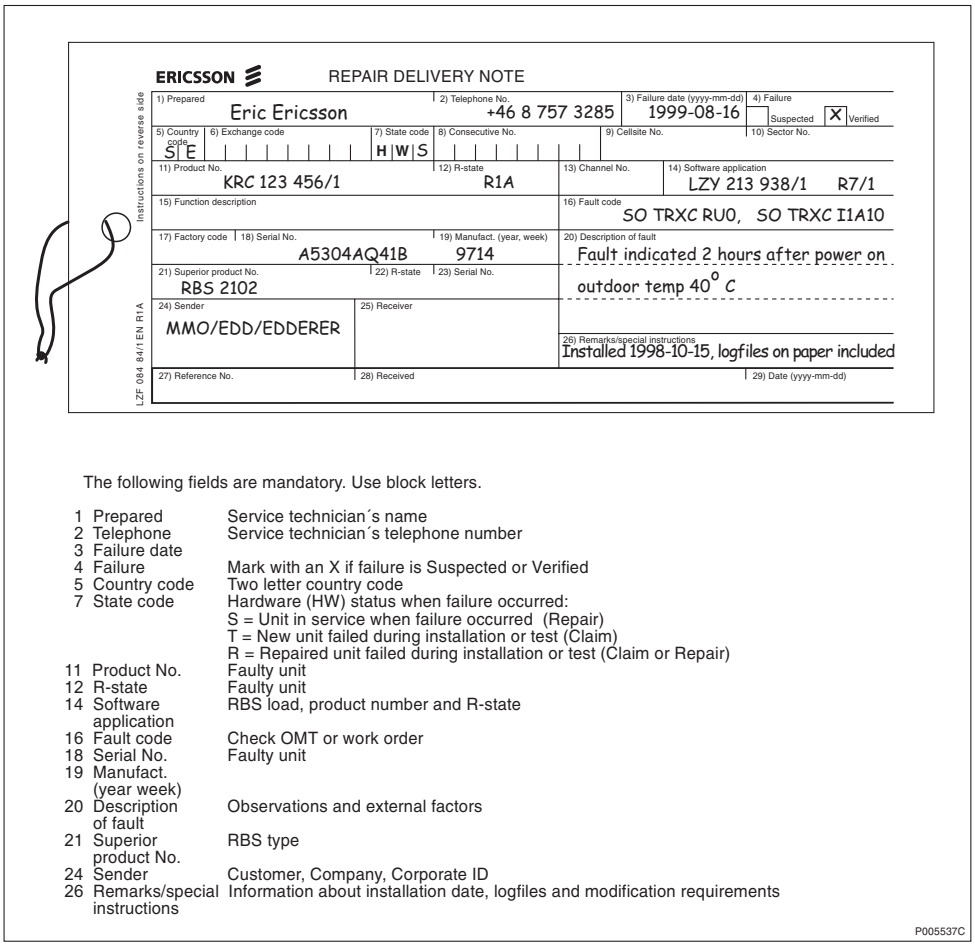
5.5.3 Repair Delivery Note - “Blue Tag”

When a faulty unit is returned, it must always be accompanied by a repair delivery note. When the repair delivery note has been completed it must be attached to the faulty unit before sending it for repair.

The repair delivery note (LZF 084 84) can be ordered from the local FSC. A description of how to fill in a repair delivery note follows below.

Note: Add as much information as possible to Field 20 on the Repair Delivery Note to make it easier for the Repair Center.



The following fields are mandatory. Use block letters.

1	Prepared	Service technician´s name
2	Telephone	Service technician´s telephone number
3	Failure date	
4	Failure	Mark with an X if failure is Suspected or Verified
5	Country code	Two letter country code
7	State code	Hardware (HW) status when failure occurred: S = Unit in service when failure occurred (Repair) T = New unit failed during installation or test (Claim) R = Repaired unit failed during installation or test (Claim or Repair)
11	Product No.	Faulty unit
12	R-state	Faulty unit
14	Software application	RBS load, product number and R-state
16	Fault code	Check OMT or work order
18	Serial No.	Faulty unit
19	Manufact. (year week)	
20	Description of fault	Observations and external factors
21	Superior product No.	RBS type
24	Sender	Customer, Company, Corporate ID
26	Remarks/special instructions	Information about installation date, logfiles and modification requirements

P005537C

Figure 240 The “Blue tag”

OMT Fault Log

If there is a OMT fault log, it should be sent in with the “Blue Tag” on the faulty unit.

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03_021

Figure 241

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5.6 Spare Parts

5.6.1 Classification of Spare Parts

The spare parts are divided into three classes:

Recommended for customer stock (Repairable)

These parts that are intended to be replaced on site, and sent to an Ericsson Repair Centre for repair.

Recommended for customer stock (Not repairable)

These parts that are not repairable, intended to be replaced on site and then disposed.

Not recommended for customer stock

These parts are available when needed.

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5.6.2 Recommended Spare Parts

Exploded View

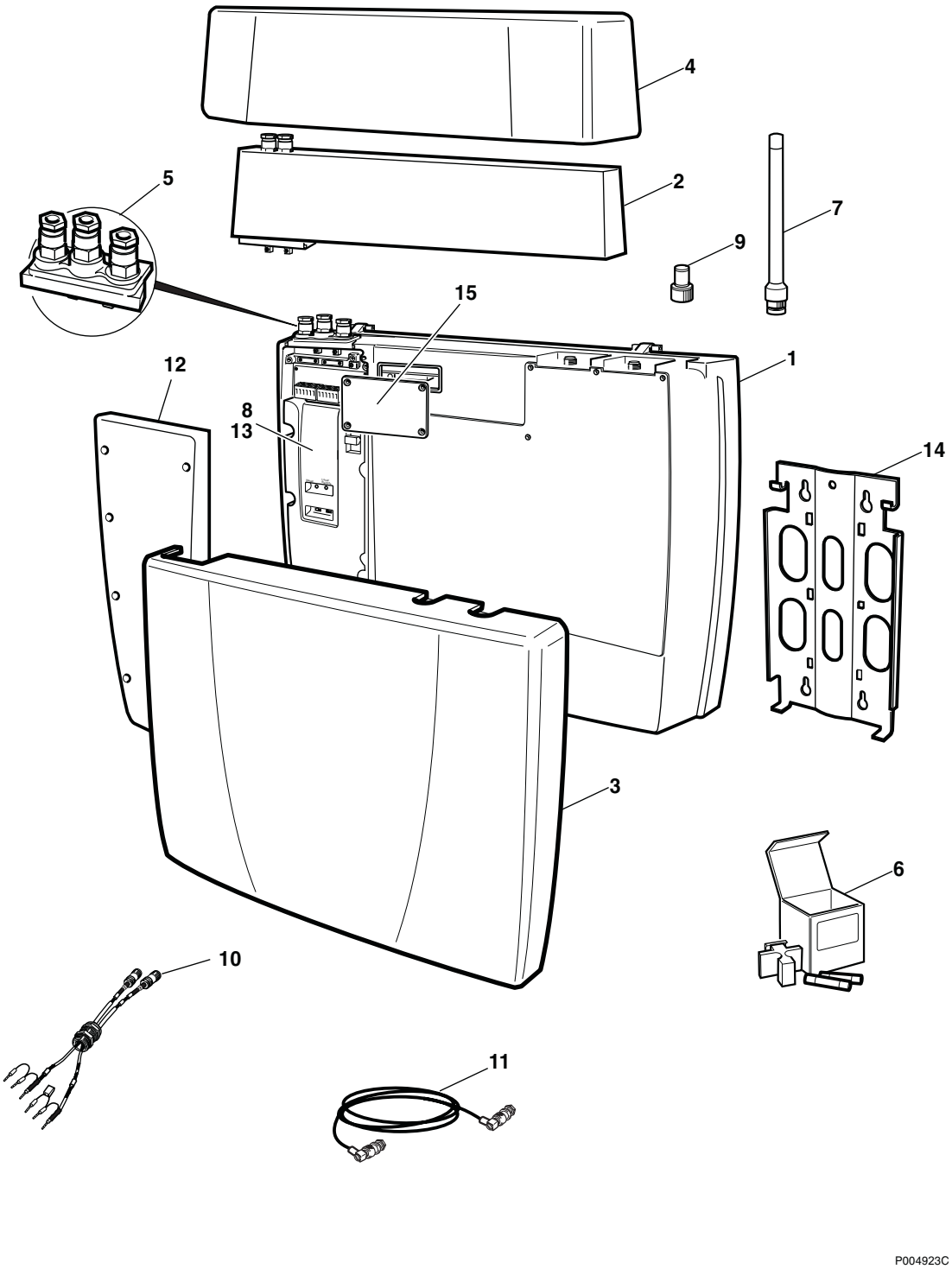

Figure 242

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Spare Parts for Customer Stock (Repairable)

Table 22

Pos	Product No.	Product Name	System standard	Number of TRX	Transm interface	Intern synch	Encr
1(1)	KRC 161 45/022	Radio Unit	GSM 900	2	E1	N	A5/1
1(1)	KRC 161 45/024	Radio Unit	GSM 900	2	E1	N	A5/2
1(1)	KRC 161 45/032	Radio Unit	GSM 900	2	T1	N	A5/2
1(1)	KRC 161 45/054	Radio Unit	GSM 1800	2	E1	N	A5/1
1(1)	KRC 161 45/056	Radio Unit	GSM 1800	2	E1	N	A5/2
1(1)	KRC 161 45/064	Radio Unit	GSM 1800	2	T1	N	A5/2
1(1)	KRC 161 45/088	Radio Unit	GSM 1900	2	E1	N	A5/2
1(1)	KRC 161 45/090	Radio Unit	GSM 1900	2	T1	Y	A5/1
1(1)	KRC 161 45/094	Radio Unit	GSM 1900	2	T1	N	A5/1
2	KDU 137 50	AGW module					
2	ZAT 759 27/1	HDSL module					

(1) Including Pos 3, 5, 8, 11, 12, 14.

Spare Parts for Customer Stock (Not Repairable)

Table 23

Pos	Product No.	Product Name	Description
3	SDF 105 34/1	Cover	Front cover for radio unit
4	SDF 105 39/1	Cover	Cover for HDSL/AGW module
5	NTZ 112 1037/1	Spare parts set	Gland plate with cable bushing
6	NTZ 112 1037/2	Spare parts set	Fuses 2.5A, 200-250V, fuse holder (20 pcs/set)
6	NTZ 112 1037/3	Spare parts set	Fuses 3.15A, 100-127V, fuse holder (20 pcs/set)
7	KRE 101 1203/1	Antenna unit (GSM 900)	
7	KRE 101 1203/2	Antenna unit (GSM 1800)	
7	KRE 101 1203/3	Antenna unit (GSM 1900)	
8	NTZ 112 1037/5	Spare parts set	CPI board kit

Other Available Parts

Table 24

Pos	Product No.	Product Name	Description
9	NTZ 112 1037/4	Spare parts set	50 Ω, 1 W, TNC plug termination (5 pcs/set)
10	RPM 518 974/2	Cable with connector	Cable with connector (PCM coax. 75 Ω)
11	RPM 119 079/1	Cable with connector	Jumper cable for external antenna.
12	SDD 513 0081/1	Cover lid	Installation box cover
13	SDF 105 35/1	Cover	Touch guard for CPI
14	SEB 114 110/1	Wall attachment	Mounting bracket
15	SDD 513 0095/1	Cover lid	Cover lid for test connection.
-	RTK 994 368	Packing set	Packing set for RBS 2401
-	RTK 994 471	Packing set	Packing set for HDSL/AGW module

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6 Glossary

This glossary lists abbreviations and acronyms used in texts dealing with RBS 2401. Some basic terms and acronyms needed for cross-references are included in the list.

In the RBS manuals, terminology defined by Ericsson GSM System is used.

Terms and Abbreviations

An arrow -> is used to indicate a reference to another entry in this list.

Abis	GSM interface standard defining attributes of the communication between BSC and BTS.
AC	Alternating Current.
AGW	Abis Gateway
ARFCN	Absolute Radio Frequency Channel Number.
AWG	American Wire Gauge.
BCCH	Broadcast Control CHannel Downlink only broadcast channel for broadcast of general information at a base station, on a base station basis.
BSC	Base Station Controller GSM network node for control of one or more BTSs.
BSCSim	Base Station Controller Simulator.
BSIC	Base Transceiver Station Identity Code.
BSS	Base Station System. GSM network logical unit comprising one BSC and one or more BTSs.
BTS	Base Transceiver Station GSM network unit operating on a set of radio frequency channels in one cell.
Cabinet	The physical housing of a base station.
Cascade connections	Connection of several cabinets by the PCM cable. Similar to serial connection. -> Cascading
Cascading	Connection of several cabinets by the PCM cable. Similar to serial connection.

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	-> Cascade connections
CCCH	Common Control CHannel
	Channel combining the following common control channels:
	PCH Paging CHannel.
	RACH Random Access CHannel.
	AGCH Access Grant CHannel.
Cell	An area of radio coverage identified by the GSM network by means of the cell identity.
CPI	Communication and Power Interface.
dB	decibel
DC	Direct Current.
DIP	DIgital Path
	The name of the function used for supervision of the connected PCM lines.
DXX	Ericsson Cellular Transmission System including NMS.
E1	Short for G.703 2048 kbit/s PCM link.
EMC	Electro Magnetic Compatibility.
ESD	ElectroStatic Discharge.
ETSI	European Telecommunication Standard Institute.
FSC	Field Support Centre.
GSM	Global System for Mobile communications.
	International standard for a TDMA digital mobile communication system. Originally, GSM was an abbreviation for Groupe Special Mobile, which is a European mobile telecommunication interest group, established in 1982.
GSM 900	GSM system 900 MHz (generic).
GSM 1800	(GSM-based) Digital Communication System 1800 MHz (generic).
GSM 1900	(GSM-based) Digital Communication System 1900 MHz (generic).

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HDSL	High bit rate Digital Subscriber Line.
HTU	HDSL Terminating Unit
HW	HardWare.
HWU	HardWare Unit. An HWU consists of one or more SEs. An HWU is a functional unit within the RBS. The HWU is either active (equipped with a processor) or passive (without processor).
ID	IDentification.
IDB	Installation Data Base.
LAN	Local Area Network.
LBO	Line Build Out.
LED	Light Emitting Diode.
Local mode	When the RU is in RU mode Local it is not prepared for BSC communication.
Local/Remote switch	Using the Local/Remote switch, an operator orders the RU to enter Local or Remote mode.
MHS	Modification Handling System. Ericsson trouble report database.
MS	Mobile Station
NMS	Ericsson Network Management System in DXX.
OMC	Operation and Maintenance Centre.
OMT	Operation and Maintenance Terminal. The OMT is a terminal that supports functions for handling the RBS on site. The terminal can be a portable PC.
Operation	Operation is the normal, everyday running of the RBS with full functionality.
OTU	Outdoor Terminating Unit
PC	Personal Computer.
PCM	Pulse Coded Modulations (used as a name for the G.703 transmission interface).
PSTN	Public Switched Telephone Network.

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RAM	Random Access Memory.
RBS	Radio Base Station. All equipment forming one or more Ericsson base stations. ->BTS
RBS 2000	New RBS generation.
Remote mode	When the RU is in RU mode Remote, a link is established between the BCS and the central main RU.
R-state	Release state.
RU	Replaceable Unit. An RU consists of one or more HWUs. An RU may be replaced by another RU of the same type. The RU is the smallest unit that can be handled on site.
RX	Receiver.
RXA	Receiver antenna branch A.
RXB	Receiver antenna branch B.
SW	SoftWare.
SYNC	Synchronous.
T1	Transmission facility for DS1 (1544 kbit/s).
TEI	Terminal Endpoint Identifier. TEI is an identification code carried by a LAPD frame as a terminal connection endpoint within a Service Access Point (SAP).
TEMS	TEst Mobile Station.
TG	Transceiver Group.
TRX	Transceiver (combined transmitter and receiver).

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