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Ericsson GSM System

RBS 2109

User's Guide

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EN/LZT 720 0090 R1A

RBS 2109

User's Guide

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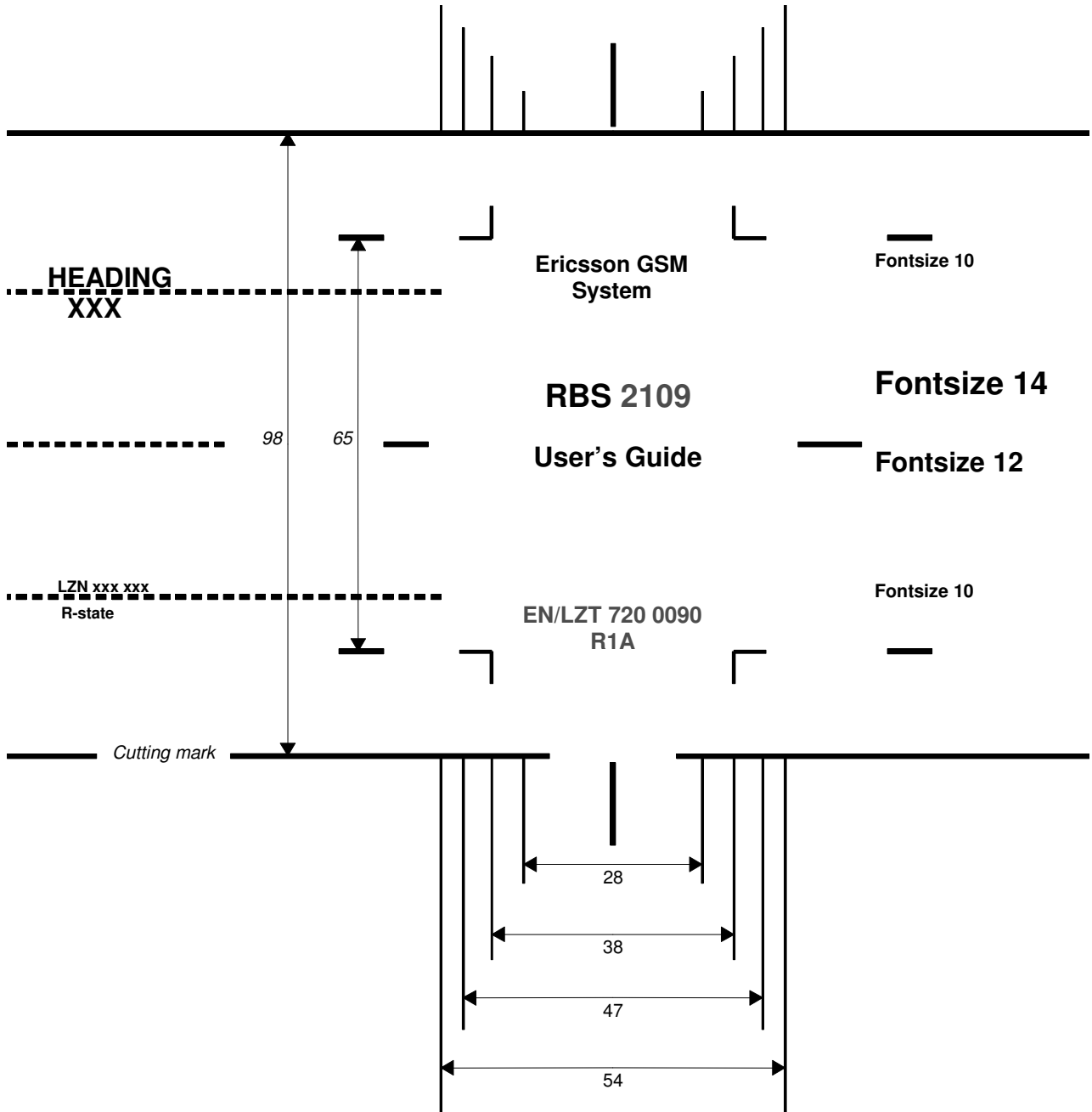
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RBS 2109 User's Guide

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1 Introduction

This User's Guide consists of the chapters listed below. Each chapter is briefly summarised.

Introduction

This chapter.

Personal Health and Safety Information

Contains personal health and safety information that applies when working with Ericsson system products.

System Safety Information

Contains system safety information that applies when working with Ericsson system products.

Tools and Instruments

Contains lists of all recommended tools and instruments.

Installation of the RBS

Describes activities for:

- Installation of the mounting base
- Connection of cables
- Connection of external antenna
- Mounting the radio cabinet on the mounting base

Antenna System Tests

Describes the site specific antenna tests that should be performed on site.

Site Installation Tests

Describes the site specific tests that should be performed on-site.

RBS Site Integration

Describes how to integrate an RBS site into a network.

Maintenance

Describes first line Maintenance. This means that swap repair is carried out on site and that only replaceable units are handled.

Glossary

Contains abbreviations and acronyms used in the text.

1.1 Product Overview

The RBS is a GSM EDGE micro base station for both indoor and outdoor micro cell applications. It is a small yet complete station, with transceivers, switching functions and transmission.

The RBS can be mounted on a mast/pole as easily as it can be fitted to a wall.

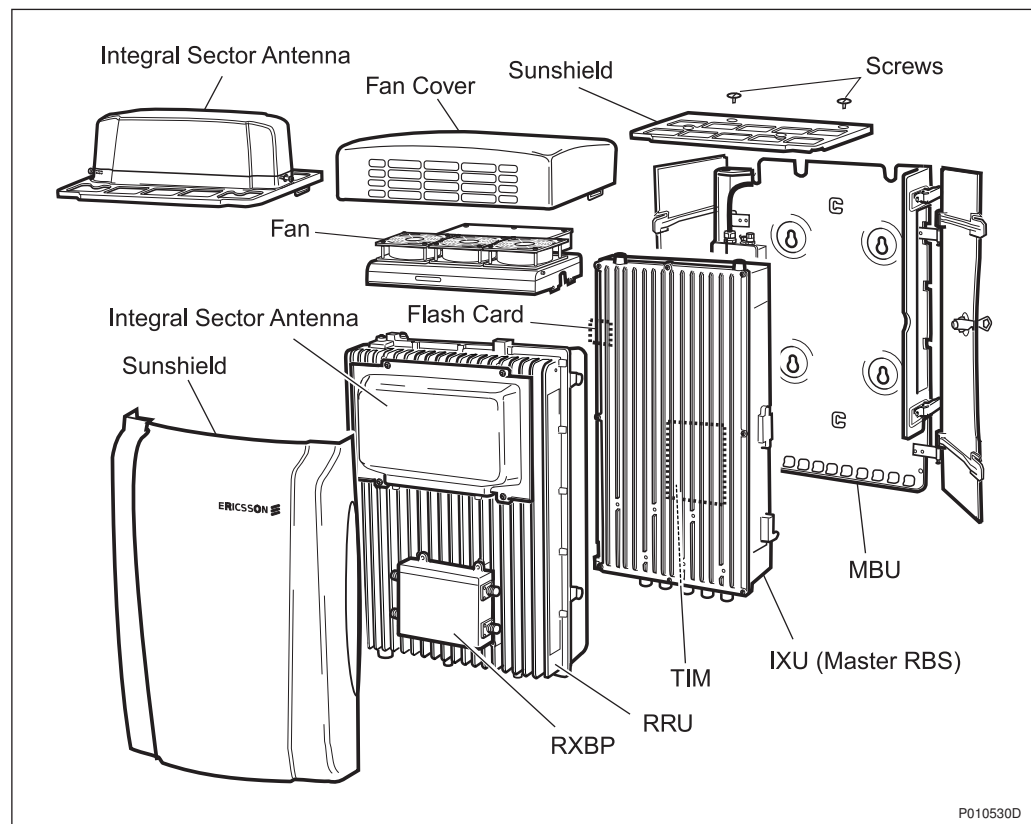


Figure 1 RBS Overview

IXU	Interface and Switching Unit
MBU	Mounting Base Unit
RRU	Remote Radio Unit
RXBP	RX Bandpass Filter
TIM	Transmission Interface Module

External optional battery backup is possible, as well as the option of having integrated antennas within the base station.

1.2 Target Groups

This section describes the target group for this manual, which is all personnel involved in activities relating to the installation and integration of an RBS site.

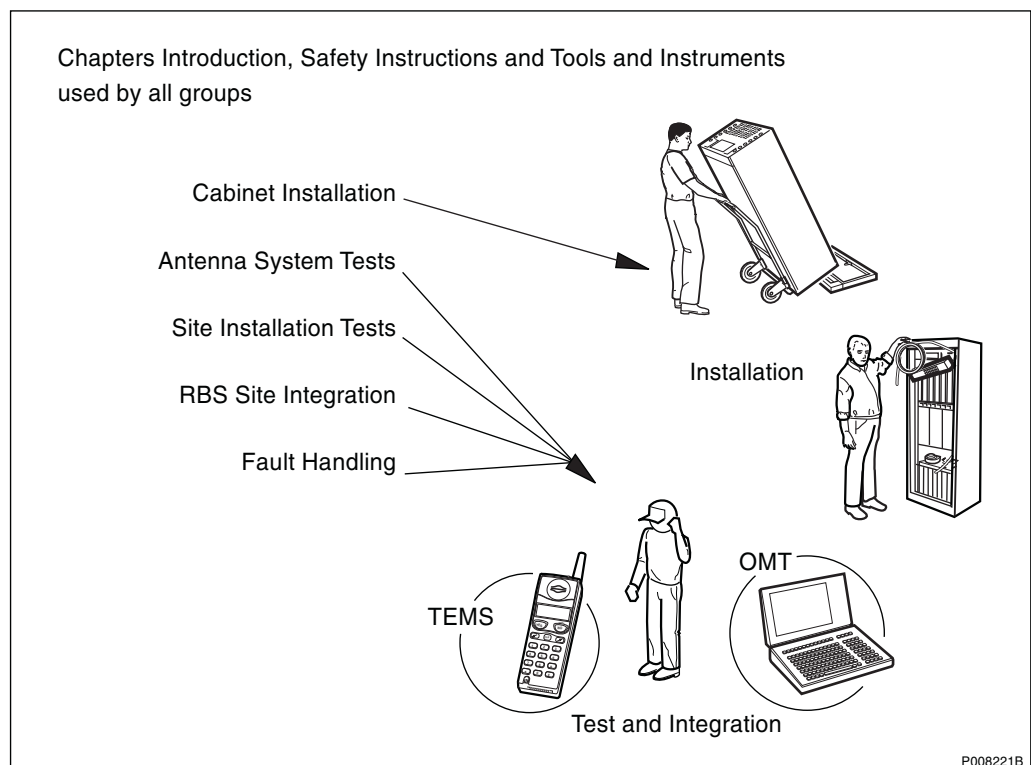


Figure 2 Chapters Related to Specific Target Groups

During the whole Radio Site Implementation (RSI) process and the product's life cycle, the target groups require documents in addition to the above mentioned manuals to complete the work.

Qualifications for Installation Personnel

Ericsson recommends that installation personnel possess the following skills:

- Technical college or equivalent education with an emphasis on electrical engineering
- Familiarity with the equipment used during the installation process
- Knowledge of antenna systems
- Appropriate training and medical certificate for working at heights
- Good understanding of technical English

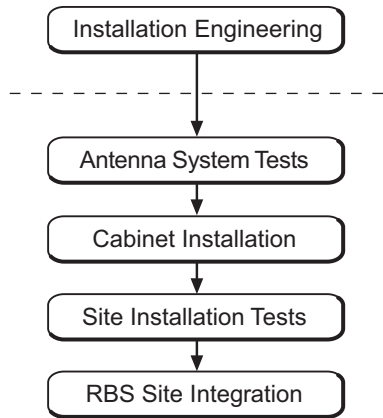
Qualifications for Test and Integration Personnel

Ericsson recommends that testing and integration personnel possess the following skills:

- Basic Ericsson RBS 2000 Operation and Maintenance knowledge. Personnel should be familiar with the tools and instruments recommended in the chapters *Antenna System Tests*, *Site Installation Tests*, and *RBS Site Integration*.
- Basic GSM knowledge
- Basic RBS 2000 knowledge
- Good understanding of technical English

1.3 Installation and Integration Process Overview

This section describes the overall Installation and Integration process. This process covers the work that follows the Installation Engineering process: testing the antenna system, installing the cabinet, performing site installation tests, and integrating the site into the network. A process overview is shown below.

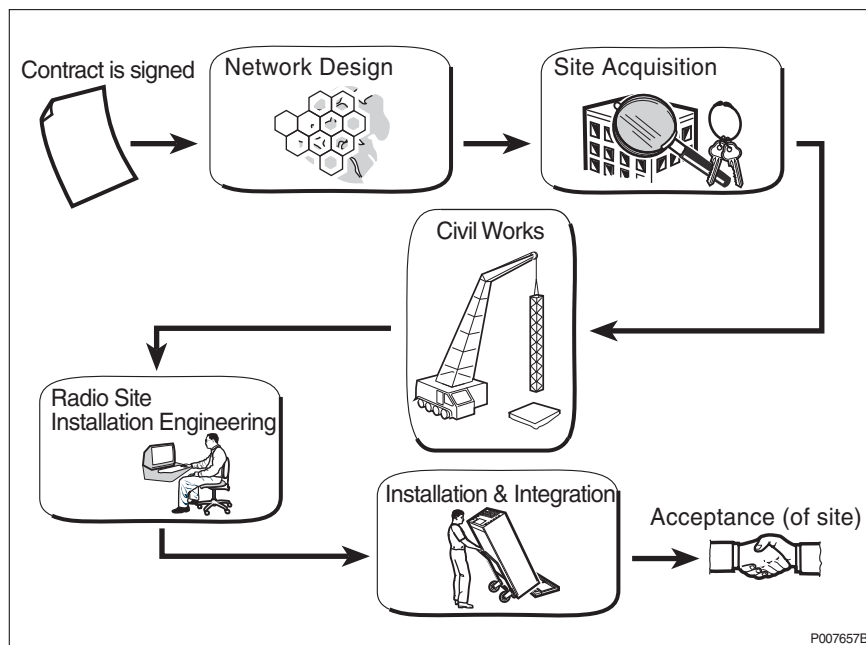


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Figure 3 The Installation and Integration Process

1.4 Radio Site Implementation Process

This section describes the overall Radio Site Implementation process, of which the Installation and Integration process is a part. The Radio Site Implementation process covers the work from the initial stages of receiving an order, planning and designing the entire network, to installing the RBS sites and integrating them into the network.



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Figure 4 The Radio Site Implementation Process

For further information about the planning process, see:



Network Planning Process

The Network Planning process consists of the following activities:

- Dimensioning of network
- Dimensioning of equipment for radio, transmission, switching, operation and maintenance
- Defining and ordering market adaptation products, for example programs for national signalling towards the public telephone network
- Measurement of radio frequency and interference
- Producing digital maps and data

Site Acquisition

The Site Acquisition process is performed in close cooperation with the Civil Works process and, to some extent, with the Engineering process.

The Site Acquisition process consists of the following activities:

- Searching for sites and obtaining a site appraisal
- Outlining the site design and evaluating the cost
- Negotiating and signing leasing contracts
- Handling permits and arranging a handover to the Engineering personnel

Civil Works

The Civil Works process is performed in close cooperation with the Site Acquisition process and the Engineering process.

The Civil Works process consists of the following activities:

- Preparing a detailed civil works design of the site
- Updating the costs for the site construction
- Arranging the site construction
- Performing a site inspection and handing over an as-built document to the Engineering personnel

Engineering

The Engineering process begins when the Site Acquisition and Civil Works processes are complete.

The Engineering process consists of the following activities:

- Measuring and collecting information about sites
- Designing the antenna and radio configuration, and producing cable drawings
- Making drawings showing the positions of the antenna and RBS equipment
- Defining areas of responsibility between the purchaser and the contractor
- Producing site-specific information in the Site Installation Documentation.

For more information about the results from the site engineering process, see:



*Radio Site Installation
Engineering Manual*

EN/LZT 302 069

Installation and Integration

The work involved in this process is performed by installation personnel, and test and integration personnel.

Installation personnel are responsible for the following activities:

- Installing the antenna system
- Installing the RBS
- Earthing the RBS
- Connecting a power supply to the RBS
- Connecting the antenna system to the RBS
- Installing cable ladders and cable ducts
- Installing battery backup
- Installing PCM cables

The test and integration personnel are responsible for the following activities:

- Performing the tests specified in the contract and integrating the site
- Troubleshooting if tests indicate a fault

- Recording the test results in the Site Installation Documentation, which is returned to the engineering personnel

1.5 RBS Library Overview

For information on the RBS library and other manuals related to the RBS, see:



RBS 2000 Library Overview

LZN 302 73

1.6 Release History

This is the first release of this manual.

2 Personal Health and Safety Information

2.1 Introduction

This document presents the personal health and safety information that applies when working with Ericsson system products. The instructions included are mandatory to ensure personal safety while working with Ericsson system products.

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

For information on product safety for Ericsson system products, see:



*System Safety Information,
Ericsson System Products*

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Local Regulations

Local regulations, first and foremost national regulations, override the information in this document. Where applicable local regulations are not available, the information herein prevails.

Product Exclusion Indication

The information in this document covers personal health and safety aspects of all Ericsson system products. As all the information does not apply to a specific product, the readers must familiarize themselves with the potential hazards indicated on the product they are working with to understand which document parts apply to their product.

2.1.1 Target Group

The target group for this health and safety information is personnel who work with Ericsson products. All personnel who work with engineering, installation, test, and operation and maintenance of Ericsson products must familiarize themselves with this information.

2.1.2 Educational Requirements

The safety instructions in the relevant manuals or documents require that persons performing work on Ericsson products have the necessary education,

training and competence required to perform work correctly. For certain work, additional or special training may be required, for example authorization for Authorized Service Providers (ASP). ASP is an Ericsson certification procedure.

A good understanding of technical English is required, or of the language that the information is presented in, to ensure that these and other instructions can be understood and complied with.

2.2 Hazard Symbols and Admonitions

This section presents the types of admonitions and hazard symbols used in all Ericsson documentation. There are three levels of personal health and safety admonitions that indicate risk to persons: danger, warning and caution. Hazard symbols are used to indicate these and to present various other hazards.

The admonition levels for personal health and safety are presented in order of severity, with danger being the highest level, warning the intermediary and caution the lowest. When admonitions are encountered anywhere in a document, the information included should be read and any instructions should be followed.

2.2.1 Personal Health and Safety Admonitions

Personal health and safety admonitions are used to indicate hazardous activities and are normally preceded by the common hazard symbol shown in the figure below, or in specific cases by specialized symbols, see *Section 2.2.2 Special Hazard Symbols on page 11*.



Figure 5 Safety Hazard Symbol

The hazard symbol is common for all three admonition levels. The three admonition levels are defined below:

Danger!	Indicates that there is an imminent hazard that is likely to result in death or serious injury.
	Note: Danger can be accompanied by other symbols depending on the country of operation.
Warning!	Indicates that there is a potential hazard that could result in death or injury.
Caution!	Indicates a hazard that could result in minor or moderate injury.

2.2.2 Special Hazard Symbols

This section presents special hazard symbols used to indicate the risk of chemical, electric shock, fire, heat, laser and Radio Frequency (RF) exposure hazards:



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Figure 6 Chemical Hazard Symbol



P002645A

Figure 7 Electrical Hazard Symbol



P010385A

Figure 8 Fire Hazard Symbol



P010274A

Figure 9 Heat Hazard Symbol



P010341A

Figure 10 Laser Hazard Symbol



P002644A

Figure 11 RF Exposure Hazard Symbol

2.3 General Safety Precautions

This section presents general safety precautions to ensure that persons are not injured when working with equipment.

- Items of jewelry, for example rings, watches and necklaces should be removed as they can catch on moving parts, or when lifting equipment.
- Pay attention to the hazard labels and other information labels on products.

- Never remove or cover hazard symbols as this can endanger persons working with the product.
- Only use the tools described, in the manner indicated, in instructions.

2.4 Electric Shock Hazards

This section provides information and instructions relating to equipment operating on voltage that entails an electric shock hazard.

Note: This information only applies to products marked with the electric shock hazard symbol.

The term Electric Shock Hazard is defined below:

Electric Shock Hazard	Hazard at voltage equal to or above 42.4 V peak or 60 V DC.
------------------------------	---



Danger!

Electric shock risk. Avoid both direct and indirect contact with parts connected to mains power as this is likely to be fatal. Switch off the mains power before starting work.



Danger!

Improper electrical installation may cause fire or electric shock that is likely to be fatal. Only a qualified and authorized electrician is permitted to install or modify electrical installations.

Note: Only qualified electricians are allowed to work directly with equipment that presents an electric shock hazard.

Note: AC mains installation must be carried out according to local regulations.

2.4.1 Safety Precautions for Working with Electrical Equipment

The following precautions must be observed when working with electrical equipment:

- The AC mains is switched off.

- Equipment exposed to moisture is protected with a tent or other equipment.
- Power cables are installed according to instructions.
- Installed cables are always clearly marked with labels.
- All personnel are familiar with and understand the warning signs on equipment.
- Only tested electrical tools are used.
- Holes are never drilled in equipment, or walls, without ensuring that there are no concealed cables.

2.5 Energy Hazards

This section provides information on how to avoid energy hazards.

The term energy hazard is defined below:

Energy Hazard Hazard at a stored energy level of 20 J or an available continuous power level of 240 VA.

2.5.1 Batteries

This section provides instructions and information on the proper handling of batteries.

Note: Where Ericsson is not the supplier of battery equipment, see the manufacturer's information on battery safety.



Caution!

Improper handling of batteries can result in the batteries short-circuiting, which can result in serious injury due to high energy levels. Exercise the necessary care when working with batteries.

Lithium Batteries



Warning!

Switching poles when replacing lithium batteries can result in an explosion that can lead to injury. Always ensure that lithium batteries are connected to the right poles.

2.5.2 Capacitors and Uninterruptible Power Systems

This section provides information on how to avoid energy hazards in Capacitors and Uninterruptible Power Systems (UPS).



Warning!

High energy levels are present in this unit. Improper handling of the unit can lead to short circuiting that can result in serious injury. Exercise care when working with this unit.

Note: Some capacitors and UPSs have energy levels above 240 VA. If this is the case this is indicated on the product with a voltage hazard.

2.5.3 Safety Precautions for Avoiding Energy Hazards

The following precautions must be observed when working with batteries and other units that present an energy hazard:

- All metallic objects worn, such as wrist watches, rings, bracelets, and so on are removed.
- Disconnect the charger power supply until the work is complete.
- Only use insulated tools.

2.6 Fire Hazard

This section provides instructions and information on safety precautions for preventing fire.



Warning!

In the event of a fire, evacuate the building or equipment site and raise the fire alarm at the closest alarm point, or call the emergency number. Do not re-enter a burning building under any circumstances.



Warning!

Heater in operation. Do not block the heater vents or place combustible materials close to the unit, as this can cause a fire that can endanger life.

2.6.1 Fire Precautions

Note: When working with the installation or maintenance of equipment that involves interfering with the fire sectioning of a building, this should be carried out as quickly as possible.

Fire can spread to neighboring rooms. When working on equipment cable ducts, channels and access holes might have to be opened, thereby interfering with the fire sectioning of the building. The instructions below have to be followed when work has been completed to restore the building's fire sectioning:

1. Close the cable ducts and fire doors (if applicable) as soon as possible.
2. Seal cable ducts according to the regulations for the building.
3. Minimize the amount of inflammable material.
4. Remove empty packaging material from the equipment site.
5. Check that there is a functioning powder or carbon dioxide fire extinguisher for electric apparatus at the equipment site.

2.7 Heat Hazards

This section describes how to avoid injury from hot surfaces or hot air in equipment.



Caution!

Parts inside this equipment attain high temperatures during normal operation, which can cause burns to the skin if touched without heat protective clothing. Always use heat protective clothing when working with equipment containing hot surfaces, or switch the equipment off and allow it to cool before starting work.



Caution!

A heater, producing hot air, is in use in this equipment. Direct contact with hot air can lead to burns. When the heater is in operation, avoid close contact with the heater air evacuation vent.

2.8 Mechanical Hazards

This section provides information on mechanical hazards in equipment containing sharp edges or rotating blades.



Caution!

Sharp metal edges may exist that can cause cuts to the skin or clothing. Wear protective gloves when handling this equipment.



Caution!

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

2.9 Radio Frequency Exposure Hazards

This section provides instructions and information on potential hazards related to radio frequency (RF) electromagnetic field (EMF) exposure from fixed radio transmitters (as opposed to mobile phones).

2.9.1 General RF Safety Information



Caution!

Excessive RF exposure can result in potentially adverse health effects. If it is suspected that RF exposure limits may be exceeded, ensure that transmitting antennas are switched off, or reduce output power whilst working with, or near, antennas.

Note: RF exposure limits are specified by national and international health authorities in standards, regulations or guidelines. The limits include wide safety margins to protect from potentially harmful tissue heating.

2.9.2 RF Safety for Installation and Maintenance Personnel

It is important that all personnel working with the installation and maintenance of transmitting equipment and antennas have basic knowledge regarding RF safety. They must have been informed or trained to be observant of potential risks of RF exposure exceeding specified safety limits, and be aware of precautionary measures necessary for differing situations.



Caution!

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



Caution!

Always be aware of other RF transmission antennas located close to the antenna you will be working with. If the RF exposure level is unknown, contact the equipment operator or ensure that measurements are done to verify that levels are below specified safety limits before starting work.



Caution!

Broken or disconnected RF cables can lead to exposure levels reaching, or exceeding, specified safety limits. Repair or reconnect cables before starting work.

Note: Working outside of the main transmission direction of ordinarily configured antennas is in most situations possible, since the RF exposure does not normally reach specified safety limits in these directions.

2.10 Laser Hazards

This section provides information on working with products that have devices that communicate through optical fibres using laser.

Note: This information only applies to products marked with the laser hazard symbol, stating the class of laser in use.

2.10.1 Class 1 Laser

This section provides information on working with equipment containing Class 1 laser.

Products containing a Class 1 laser, according to IEC/EN 60825, are safe to use and therefore have no requirements for cautions or warnings during operation or maintenance procedures.

2.10.2 Class 3 Laser

This section provides information on working with equipment containing Class 3 laser.



Danger!

Never look directly into the end of a fiber optic cable, or other laser source. Equipment that transmits laser light can cause permanent eye damage. Switch off the laser before starting work on laser equipment.

Safety Precautions for Working with Class 3 Laser

The following precautions must be observed when working with products containing a Class 3 laser hazard symbol:

- Never look into the light emitting end of a functioning optical fibre.
- Switch off units producing the laser signal before disconnecting an optical fibre.

2.11 Chemical Hazards

This section provides information on chemical hazards that can be present in products.

2.11.1 Beryllium Oxide Hazard

This section provides information on Beryllium Oxide (BeO). BeO is a restricted substance that is contained in certain components in some Ericsson products. If a product contains BeO, this is clearly marked on the unit containing BeO. The BeO hazard symbol is shown in the figure below.



Figure 12 BeO Hazard Symbol

Note: This information only applies to products marked with the BeO symbol.



Danger!

This product contains Beryllium Oxide (BeO), which can cause injury to skin or mucous membranes severe enough to endanger life or cause permanent injury. BeO dust is created by chafing, filing, or breakage and is extremely dangerous if inhaled, even for only a few seconds. Particles penetrating the skin through wounds or abrasions are liable to cause chronic ulcerations. Do not handle components containing BeO without protection.

Symptoms of BeO Poisoning

Symptoms of BeO poisoning are respiratory distress, cyanosis (grey-blue discoloration of the skin and mucous membranes), or both. These symptoms may develop within a week, or after a period of several years.

Safety Precautions for Working with Components Containing BeO

The following precautions must be observed when working with components containing BeO:

- Do not carry loose components in pockets, bags, or containers, or tamper with them in any way that could cause breakage or disintegration.
- Do not apply excessive heat during soldering.
- Do not break open components for inspection.
- Store components in their original packaging and do not mix them with other components.
- Ensure that components do not become mechanically damaged.
- Use care when replacing defective components.
- Do not blow on exposed surfaces due to the danger of BeO dust.
- In case of accident, or if you feel unwell, seek medical advice immediately and show the label where possible.

2.11.2 Battery Acid Hazard

This section provides information on chemical hazards related to lead-acid batteries.



Caution!

Excessive heat can cause battery casing to soften and warp, potentially allowing acid to escape. In contact with the skin, acid can cause injury, and if breathed in, can affect the airways. Use protective equipment when replacing batteries.



Caution!

Batteries can leak electrolyte if improperly handled. Electrolyte in contact with skin or eyes can cause injury. In the event of electrolyte injuries, rinse the affected area with water and seek medical attention immediately. Use protective equipment when replacing batteries.

Safety Precautions for Working with Lead-acid Batteries

The following precautions must be observed when working with lead-acid batteries:

- Eye wash facilities, and protective gloves or aprons are available.

2.11.3

Gas Explosion Hazard

Open-cell lead acid batteries can give off gases that in the event of a fire can cause an explosion that is likely to be fatal. All battery areas must be adequately ventilated and protected from fire.



Danger!

Do not use open-cell lead acid batteries. Open-cell lead acid batteries give off hazardous gases that, if ignited, can cause an explosion that is likely to be fatal.

2.12

Other Hazards

This section includes safety instructions and rules for the following hazards:

- Handling Heavy Goods

- Working at Height

2.12.1 Handling Heavy Goods

This section provides instructions and rules for handling heavy goods.

Note: Follow local regulations for safety clothing and safety equipment for hoisting and moving goods.

Falling Objects



Warning!

Risk for falling objects, work at height in progress. Falling objects can cause serious injury or even be fatal. Always wear a helmet and avoid standing in the danger area.

Overloading



Warning!

Overloading, or other wrong use of lifting devices, can cause serious injury to anyone hit by falling equipment. Do not create an angle exceeding 90° between lifting straps as this increases the strain on them and can cause them to snap.



Caution!

The equipment is heavy. Lifting the equipment without the aid of a lifting device can cause injury.

Unsecured Equipment



Caution!

Tip risk! Unsecured equipment can tip over if not secured properly, causing injury to personnel. Secure products with a high center of gravity as soon as possible to avoid accidents.

2.12.2

Working at Height

This section provides information about working at height.

For information on climbing instructions for working at height, see:



Safe Climbing

LZY 213 715/02

Safety Precautions for Working at Height

The following precautions must be observed when working at height:

- Personnel have the appropriate training and medical certificate.
- A full-body safety harness and safety helmet are available.
- Adequate protective clothing, essential in cold and wet weather, is available.
- All lifting devices are tested and approved, and ready for use.
- All personnel in the area are wearing helmets.

3 System Safety Information

3.1 Introduction

This document presents the system used for presenting system safety information for Ericsson products. The instructions included are mandatory to ensure product safety while working with Ericsson products.

Local regulations must be taken into consideration. The system safety information in this document is in addition to local regulations.

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

For information on personal health and safety for Ericsson system products, see:



*Personal Health and Safety
Information, Ericsson System
Products*

124 46–2885

Local Regulations

Local regulations, first and foremost national regulations, override the information in this document. Where applicable local regulations are not available, the information herein prevails.

Product Exclusion Indication

The information in this document covers system safety information for all Ericsson system products. As all the information does not apply to a specific product, the readers must familiarize themselves with the potential hazards indicated on the product they are working with to understand which document parts apply to their product.

3.1.1 Target Group

The target group for this system safety information is personnel who work with Ericsson products. All personnel who work with engineering, installation, test, and operation and maintenance of Ericsson products must familiarize themselves with this information.

3.1.2 Educational Requirements

The product safety instructions in the relevant manuals or documents require that persons performing work on Ericsson products have the necessary education, training and competence required to perform work correctly. For certain work, additional or special training may be required, for example authorization for Authorized Service Providers (ASP). ASP is an Ericsson certification procedure.

A good understanding of technical English is required, or of the language that the information is presented in, to ensure that these instructions can be understood and complied with.

3.2 Admonitions and Safety Symbols

This section presents the types of admonitions and safety symbols used in all documents for Ericsson system products. There are two types of system safety admonitions that indicate risk to products: Do! and Stop!. When admonitions are encountered anywhere in a document, the information included should be read and any instructions should be followed.

The figures below show the symbols used to indicate product safety admonitions:



Figure 13 Do Safety Symbol



Figure 14 Stop Safety Symbol

The terms Do! and Stop! are defined below:

Do! Indicates an action that must be performed to prevent equipment damage, software corruption, data loss or service interruption.

Stop! Indicates that action must be avoided to protect equipment, software, data or service.

The term "Note" is used to present important information that might otherwise be overlooked.

3.2.1 Special Hazard Symbols

This section presents special hazard symbols used to indicate the risk of Electrostatic Discharge (ESD):



Figure 15 Electrostatic Discharge Hazard Symbol

3.3 Batteries

This section provides information on damage that can be caused to products containing batteries that are damaged.

3.3.1 Overheated Batteries



Caution!

Do! Check batteries for signs of overheating. The casing surrounding overheated batteries can be soft and warped. Replace damaged batteries according to instructions.

If it is suspected that batteries are overheated, check the following:

- The internal temperature of the equipment is below +60°C (140°F).
- Batteries have not leaked.

Corrective Actions

1. Replace overheated batteries.
2. Treat leakages from batteries as described in Section 3.3.2 Treating Hazardous Waste from Leaks on page 27.

3.3.2 Treating Hazardous Waste from Leaks



Caution!

Do! Check batteries for acid leakage. Acid can corrode the product. Replace leaking batteries according to instructions.

In case of spillage of hazardous substances, there should always be sufficient absorbers or neutralizing materials available on site. There is a danger of spillage occurring when installing, removing, replacing or servicing batteries. The absorbers and neutralizing materials must be suitable for the hazardous substances involved. Typical neutralizing agents are shown in Table 1 on page 28.

Table 1 Typical Neutralizers

Typical Neutralizers	Chemical Compound
Baking soda (bicarbonate)	NaHCO_3
Sal soda	$\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$
Soda ash	Na_2CO_3

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

3.4 Electrical Installation

This section provides information on ensuring that AC and DC powered products are not damaged due to improper installation.



Caution!

Stop! Do not install or modify AC or DC powered equipment unless you are a qualified and authorized electrician. Improper installation work can seriously damage the equipment.

3.4.1 Safety Precautions for Working with Electrical Installations

The following precautions must be observed when working with electrical installations:

1. Ensure that approved circuit breakers or fuses are installed.
2. Ensure that the cables used have a sufficient cross-sectional area in accordance with product requirements and local laws and regulations.
3. Ensure that conductors are connected according to the connection diagram.
4. Label the cables correctly.
5. Check the installation work upon completion.

3.5 Electrostatic Discharge

This section provides information and instructions on Electrostatic Discharge (ESD) product safety. ESD is defined below.

ESD A static electric charge accumulates when a body rubs against clothes, slides against a chair, when shoes rub against a floor, or when ordinary plastics are handled, and so on. The electrostatic charge can remain for a considerable length of time and is discharged when the body comes into contact with conductive material.

An ESD wrist strap must be used when working with ESD sensitive components, even in equipment rooms fitted with ESD protective floor covering. Although ESD floor covering reduces the risk of ESD, if the wrong type of shoes are used, or if the person is already charged when they enter the room, the floor covering in itself does not protect from this, and therefore an ESD wrist strap must be used.

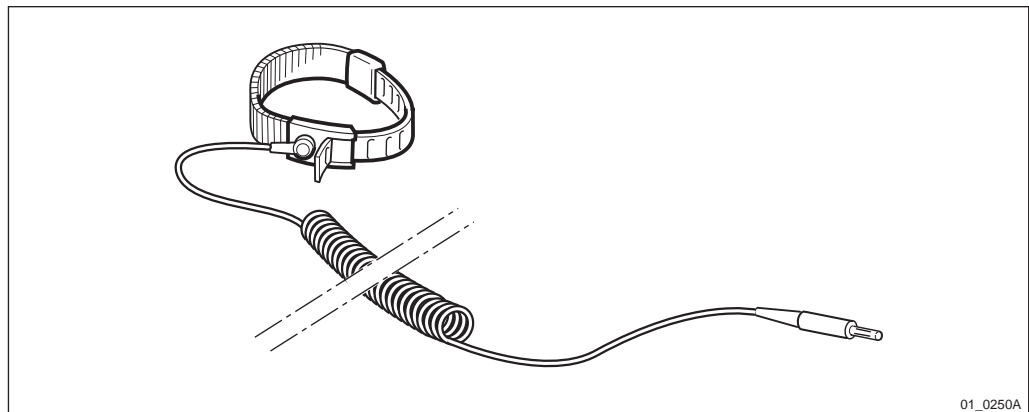


Figure 16 ESD wrist strap

The ESD wrist strap contains a resistor with resistance greater than $1\text{ M}\Omega$ in the cable to protect the operator. The resistance value is low enough to discharge the electrostatic voltage. The ESD wrist strap must be connected to ground.

Instructions for ESD Wrist Strap Use

1. Place the ESD wrist strap around your wrist and insert the connector at the other end to the ground (earth) terminal on the equipment.
2. Always use the wrist strap when and where its use is required.

Note: Test the ESD wrist strap regularly.

3.5.1 Handling Printed Board Assemblies and IC Components

Note: Treating all components as if they are ESD sensitive, whether they have IC components or not, reduces the risk for ESD and significantly reduces the operating time between failure.



Caution!

Stop! This product contains components sensitive to ESD. Use an approved ESD wrist strap, connected to the product grounding point, to avoid damaging these components.



Caution!

Do! Always use an approved ESD wrist strap when working with sensitive equipment. Damage to components mounted on printed board assemblies can occur if an ESD wrist strap is not used.

3.5.2 Storing and Transporting Printed Board Assemblies and IC Components

When storing or transporting printed board assemblies or IC components, ensure one of the following:

- The item is stored or transported in its original packaging, or in other anti-ESD material.
- The item is stored or transported in a conductive material, or a special IC carrier that either short-circuits or insulates all leads of the components.

3.6 Equipment Handling

This section provides information on how to avoid damage to products when handling them.



Caution!**Do!**

Tip risk! This equipment has a high center of gravity without all units installed. Secure the equipment before opening the door.



Caution!

Stop! Never lift a unit by the cables as this can damage the equipment.

3.7

Ground Connection

This section provides information on product grounding (earthing) safety.

Note: The terms “grounding” and “earthing” are synonyms.



Caution!

Do! Products not connected to ground risk being damaged by overvoltage or overcurrent. Always connect products to ground according to instructions.

3.8

Lightning Protection

This section provides information on protecting products from damage due to lightning where a lightning protection system is available.



Caution!

Do! Connect products to the lightning protection system to protect the equipment from transient surges.

4 Tools and Instruments

This section contains lists of all tools and instruments recommended for the complete installation of the RBS 2109.

4.1 Tools for Installation of RBS 2109

Table 2 Basic Tools for Installation

Description	Specification
Adjustable spanner 10"	-
Drilling machine	-
Knife ⁽¹⁾	-
Measuring tape ⁽¹⁾	6 m
Pen	-
Screwdrivers ⁽¹⁾	Torx: T20 and T30
Screwdrivers	3 mm and 5.5 mm
Side cutting pliers ⁽¹⁾	-
Snip nose pliers	-
Socket set ⁽¹⁾	10 – 19 mm
Spirit level ⁽¹⁾	-
Torque wrench	5 – 25 Nm
U wrenches ⁽¹⁾	13 mm, 16 mm, 17 mm, 20 mm and 22 mm
Wire stripper ⁽¹⁾	0.2 – 6 mm ²

(1) Included in Personal Tool Set, Product Number LTT 601 135/1.

Table 3 Special Tools for Installation

Description	Specification	Product Number
Crimping tool set	for grounding	LTT 601 86
Torque wrench	for N connector	LSS 103 25/1
Torque wrench	for TNC connector	LTT 601 93

4.1.1 Documentation

The following documents are required for the installation procedure:

- Completed and approved record prepared during site preparation
- Site Installation Documentation (prepared by the Installation Engineering department)



*Standard Site Material
Installation Instructions*

EN/LZT 720 0014

4.2 Equipment for Antenna System Tests

Table 4 Test Equipment for Antenna System Tests

Description	Specification	Product Number
Antenna Tester Set	Anritsu Site Master S331C	LPK 102 101/8

The Anritsu Site Master S331C is recommended for the Antenna System Tests, but the following Site Master models can still be used if available: S251A/B and S331A/B for GSM 800/900/1800/1900 antenna systems.

4.2.1 Documentation

The following documents are required for the antenna system tests:

- Site Installation Documentation
- A test record

For more detailed information on the Anritsu Site Master, see:



*Anritsu Site Master User's
Guide (included in Antenna
Tester Set)*

Note: Instructions for Site Master models S251A/B and S331A/B for GSM 800/900/1800/1900 antenna systems are not included in this document. When using any of these models ensure that all necessary accessories are included. See:



*Standard Tools and Equipment
Catalogue*

LZT 720 0013

4.3 Equipment for Site Installation Tests

Table 5 Test Equipment for Site Installation Tests

Description	Specification	Product Number
Fluke 79 III	Multimeter	LPK 102 024/3
OMT Kit	OMT Kit and SW cable	NTM 201 2289/15
Torx T20 ⁽¹⁾	Torx screwdriver	-

(1) Included in Personal Tool Set, product number LTT 601 135/1.

4.3.1 Documentation

The following documents are required for the site installation tests:

- A completed test record from antenna system tests
- A test record for site installation tests



OMT User's Manual (included in OMT Kit) EN/LZN 720 0001

4.4 Equipment for RBS Site Integration

Table 6 Test Equipment for RBS Site Integration

Description	Specification	Product Number
Loop forward/ backward board	Transmission test board	LPY 107 757/1
TEMS Kit	GSM 800/1900	FAB 801 2524
TEMS Kit	GSM 900/1800/1900	FAB 801 2523

4.4.1 Documentation

The following document is required for the RBS site integration:



TEMS Investigation GSM Manual (included in TEMS Kit) LZT 108 2684

4.5 Equipment for Maintenance

Table 7 Basic Tools for Maintenance

Description	Specification
Adjustable spanner 10"	-
Knife ⁽¹⁾	-
Screwdrivers ⁽¹⁾	Torx: T20 and T30
Screwdrivers	3 mm and 5.5 mm
Side cutting pliers ⁽¹⁾	-
Snip nose pliers	-
Socket set ⁽¹⁾	-
Torque wrench ⁽¹⁾	5-25 Nm
U wrenches ⁽¹⁾	13 mm, 16 mm and 17 mm, 20 mm and 22 mm
Wire stripper ⁽¹⁾	0.2-6 mm ²

(1) Included in Personal Tool Kit, product number LTT 601 135/1.

Table 8 Special Tools for Maintenance

Description	Specification	Product Number
Fluke 79 III	Multimeter	LPK 102 024/3
OMT Kit	-	NTM 201 2289/15
Torque wrench	for N connectors	LSS 103 25/1
Torque wrench	for TNC connectors	LTT 601 93

4.5.1 Documentation

The following documents are required for the maintenance work:



OMT User's Manual (included in OMT Kit)

EN/LZN 720 0001



RBS 2308, RBS 2309, RBS 2109 and EBB-06 Hardware Reference Manual

EN/LZT 720 0058

4.6 Kit Specifications

For a specification of all required kits, see:



*Standard Tools and Equipment
Catalogue*

EN/LZT 720 0013

5 Installation of RBS

5.1 Introduction

This document describes how to install the RBS 2109.

Target Group

The target group for this instruction is personnel involved in the installation of an RBS.

5.2 Preconditions

This section provides preconditions that must be met before starting the installation work.

Note: Specific preconditions exist for wall and pole mounting.

Documentation

This section presents additional documents required for the installation procedure.

Ensure that the following documents are available:

- Completed and approved record prepared during site preparation
- Site Installation Documentation (prepared by the Installation Engineering department)



Standard Site Material Installation Instructions EN/LZT 720 0014

General Preconditions

Before starting site work, ensure the following:

- Site access permission received
- Ordered RBS, equipment, specified tools and other necessary facilities have been delivered
- Site power is available
- Site Grounding Point is available

Note: The terms earthing and grounding are synonymous.

- Transmission line from the BSC is available
- During outdoor installation, protection for the RBS is available in case of bad weather

Note: After installation, if the surrounding temperature changes between hot and cold, then to avoid humidity damage the RBS must not be left without power for more than 48 hours.

To switch on the RBS, see *Chapter Site Installation Tests*:

If any of the above preconditions cannot be complied with, then contact the site supervisor or person responsible for the activity that has been missed.

Additional Preconditions for Wall-Mounted RBS

Before installing the RBS on a wall, ensure that the following preconditions are met:

- The type of fasteners are suitable for the kind of wall material on which the RBS is to be mounted
- The contact surfaces on the Mounting Base Unit (MBU) are supported by the wall. If not, then a wall bracket is required

If any of the above preconditions cannot be complied with, then contact the site supervisor or person responsible for activity that has been missed.

Additional Preconditions for Pole-Mounted RBS

Before installing the RBS on a pole, ensure that the following preconditions are met:

- The pole must have the required diameter 60 – 114 mm
- A wall bracket is available
- A mast fixture set is available

If any of the above preconditions cannot be complied with, then contact the site supervisor or person responsible for activity that has been missed.

5.3 Torque Settings

This section presents the recommended torque values to be used when installing the RBS.

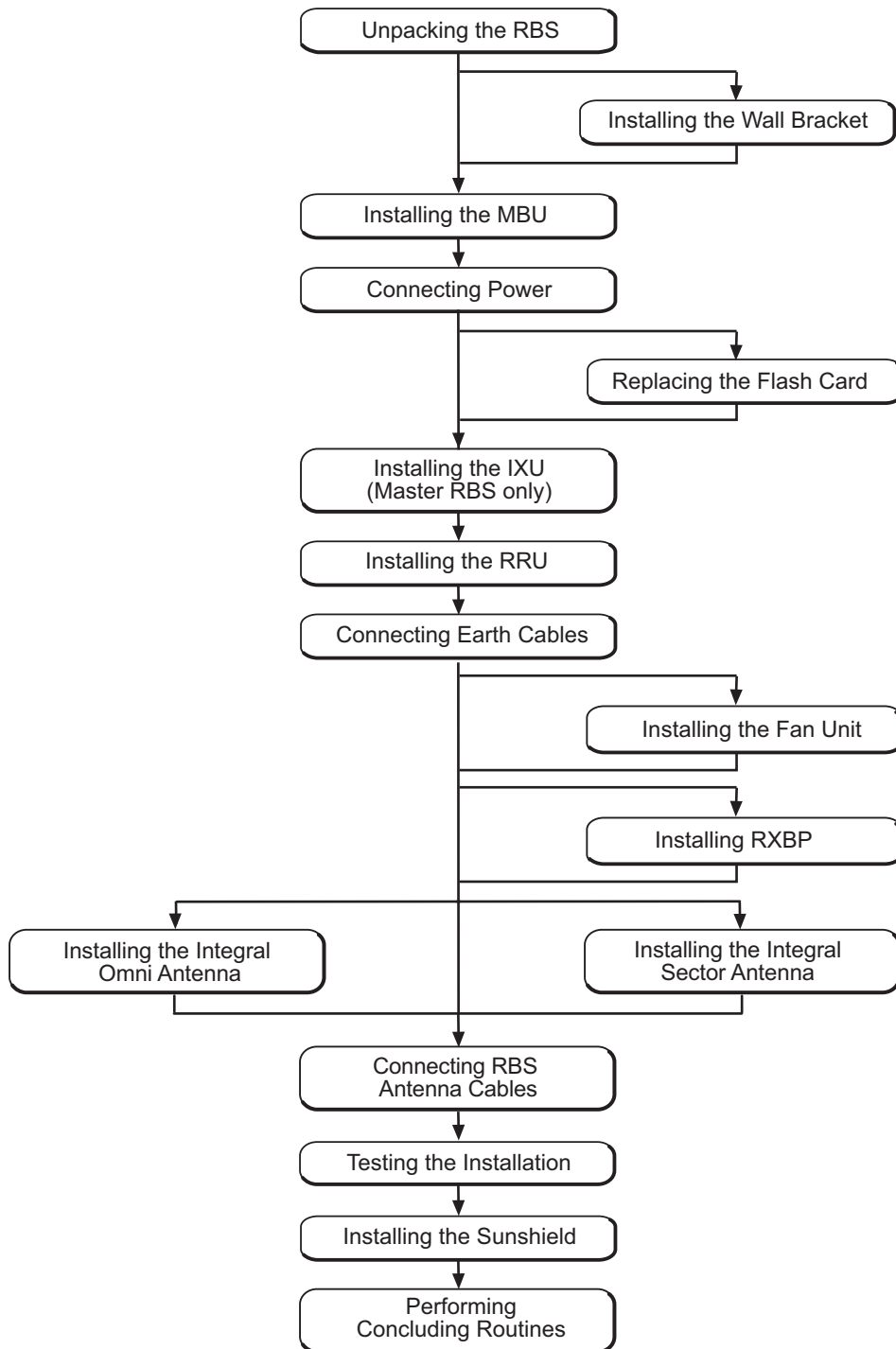
The tools needed for the installation are found in *Chapter Tools and Instruments*.

Table 9 Recommended Torque

Dimension	Torque				Notes
	Ncm	Nm	lbf-in	lbf-ft	
M3	110 +/- 7	-	9.7 +/- 0.6	-	-
M3	80 +/- 7	-	7.1 +/- 0.6	-	Reduced torque for plastic covers
M4	260 +/- 15	-	23.1 +/- 1.3	-	-
M4	170 +/- 15	-	15.1 +/- 1.3	-	Reduced torque for captive screws
M6	-	8.8 +/- 0.5	-	6.5 +/- 0.4	-
M8	-	21 +/- 1.3	-	15.5 +/- 1	-
M10	-	41 +/- 2.5	-	30.2 +/- 1.8	-

5.4 Installation Procedure

This section describes the installation procedure for the RBS.



P012638A

Figure 17 The RBS Installation Process

5.4.1 Unpacking RBS

Unpack the RBS on-site. To avoid damage, the RBS should *not* be unpacked elsewhere and then transported to site.



Caution!

Stop! This product contains components sensitive to ESD. Use an approved ESD wrist strap, connected to the product grounding point, to avoid damaging these components.

In order to avoid damage to components due to electrostatic discharges during unpacking, personnel must not come in contact with the connectors of the RBS.

Ensure that the correct material has been delivered. If the material is damaged, complain immediately to the supervisor or the transport company.

5.4.2 Installing the Wall Bracket

Note: This section is only applicable for walls with very rough surfaces or when the RBS is to be mounted on a pole.

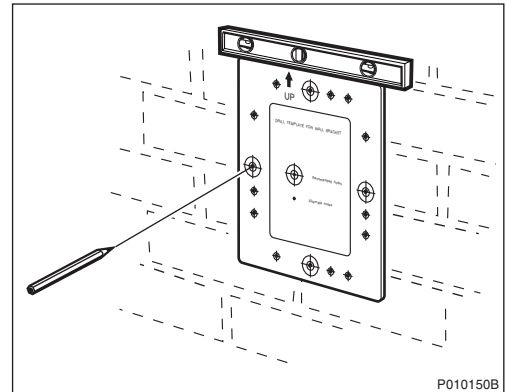
This section describes how to install the wall bracket.

The wall bracket is for use as a complement to the mounting interface of the Mounting Base Unit (MBU). Typical applications are rough surfaces and other conditions where the mounting interface for the MBU is not flat. The plate must also be used if the RBS is to be installed on a pole. *See applicable section below.*

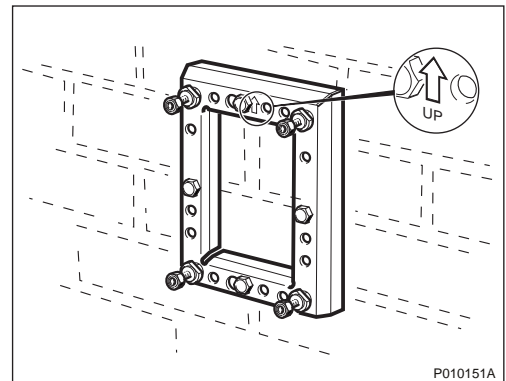
5.4.2.1 Installing the Wall Bracket on a Wall (Alternative)

- 1 Place the drilling template in the position where the RBS is to be located.
- 2 Use a spirit level to check that the drilling template is horizontal.
- 3 Mark the position of the holes to be drilled.

Note: The wall bracket must not be used as a drilling template, to avoid damaging the rust protection surface.



- 4 Remove the template and drill the holes for the fasteners.
- 5 Install the wall bracket and secure it in position with all the screws provided.



- 6 Loosen the four nuts, on which the MBU is to be hung, until only a few threads remain exposed.

5.4.2.2 Installing the Wall Bracket on a Pole (Alternative)

1. Choose the appropriate holes. See *Figure below*.

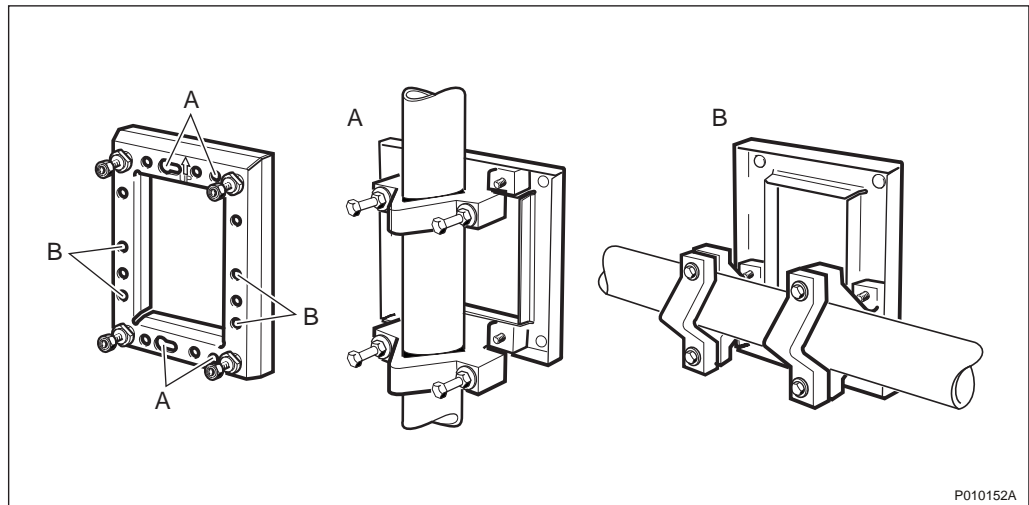


Figure 18 Installation Alternatives

- A** Holes used for vertical poles
- B** Holes used for horizontal poles

2. Ensure that the washers are mounted correctly and attach the two clamps with the screws and washers. See Figure below.

Note: Ensure that the recess is attached in the correct direction.

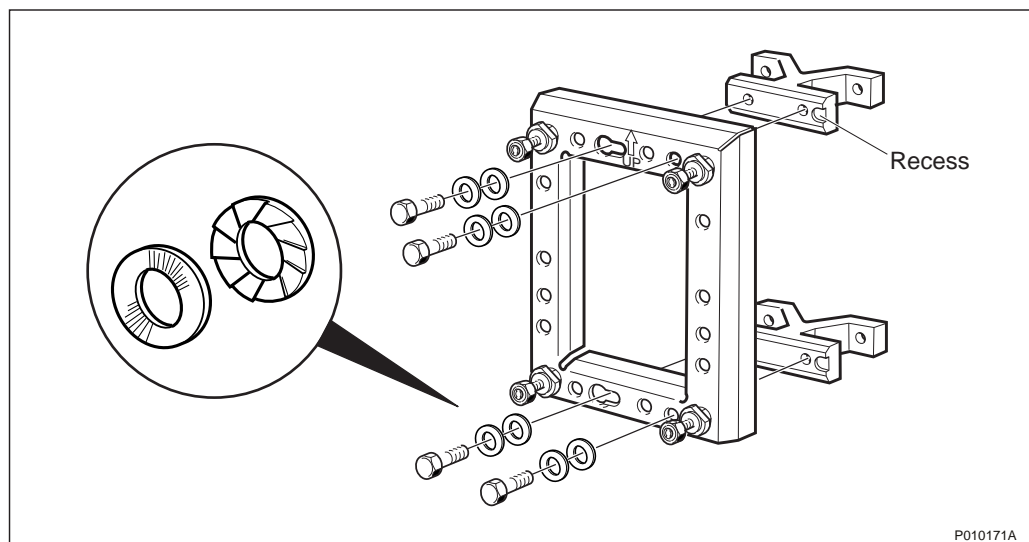


Figure 19 Fastening Clamps to the Wall Bracket

3. Position the wall bracket on the pole and mount the clamps, tightening the screws alternately to avoid bending them. Ensure that the washers are mounted correctly.

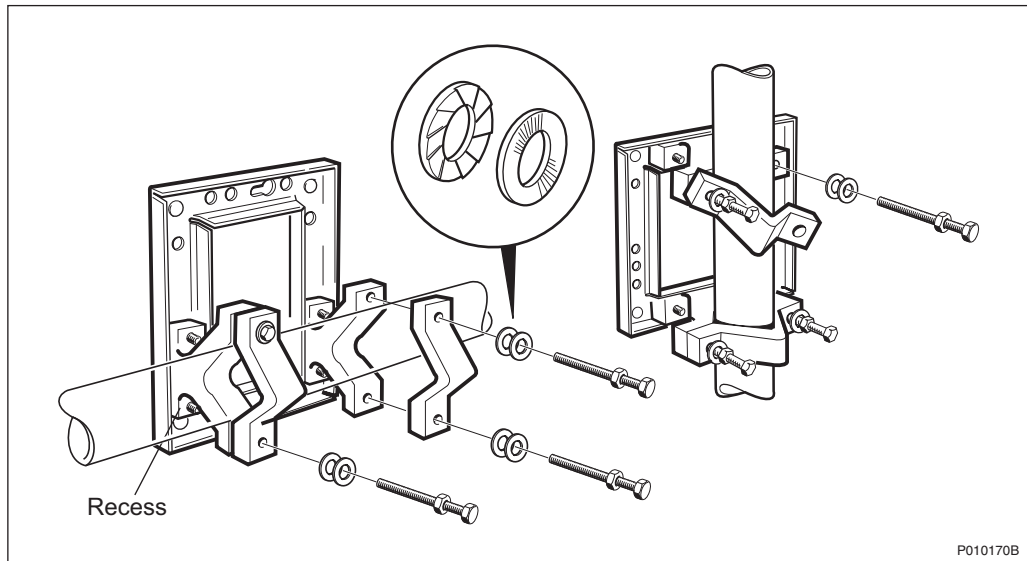


Figure 20 Installing the Wall Bracket on the Pole

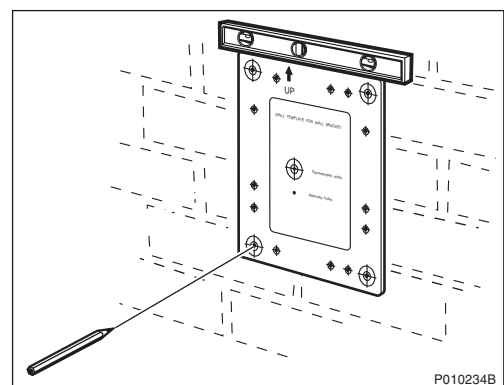
5.4.3 Installing the MBU

This section describes how to install the Mounting Base Unit (MBU) on a wall or wall bracket.

5.4.3.1 Installing the MBU on a Wall

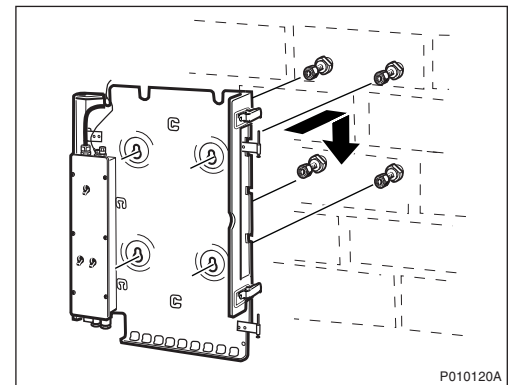
- 1 Place the drilling template in the position where the RBS is to be situated.
- 2 Use a spirit level to check that the drilling template is horizontal.
- 3 Mark the position of the applicable holes to be drilled.

Note: To avoid damaging the rust protection surface, the MBU must not be used as a drilling template.



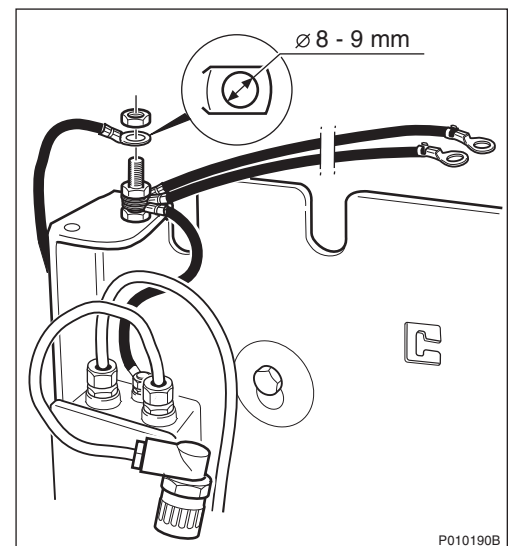
- 4 Remove the template and drill holes for the fasteners most suitable for the wall material.
- 5 Insert the fasteners and tighten them, remembering to leave enough threads protruding to hang the MBU on.

- 6 Hang the MBU on the bolts, applying just enough downward pressure to ensure that the screws fit in the keyholes.



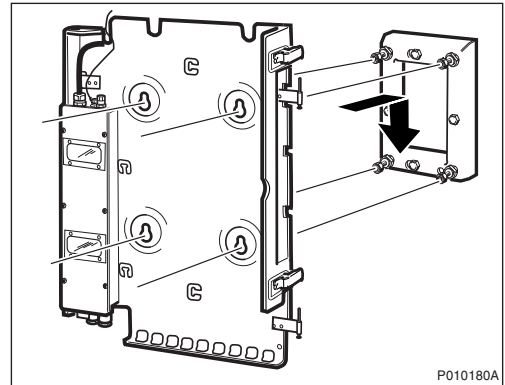
- 7 Tighten the four bolts.
- 8 Connect site earthing to the MBU.

Note: In configurations with more than one RRU and a 2-wire DC Supply, an extra earthing cable must be connected between the RBSs.



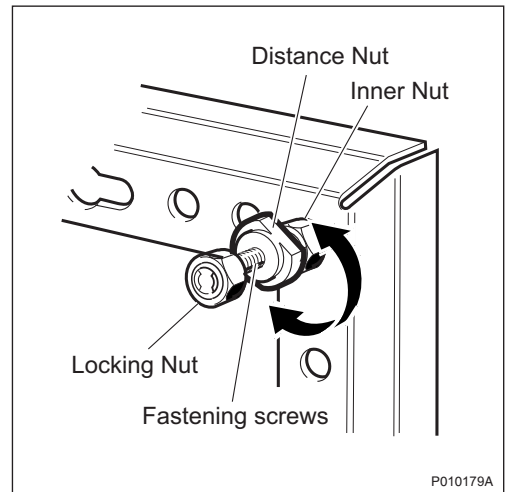
5.4.3.2 Installing the MBU on a Wall Bracket

- 1 Install the MBU on the four screws situated on the wall bracket. Ensure that the fastening screws are properly fitted in the key holes.



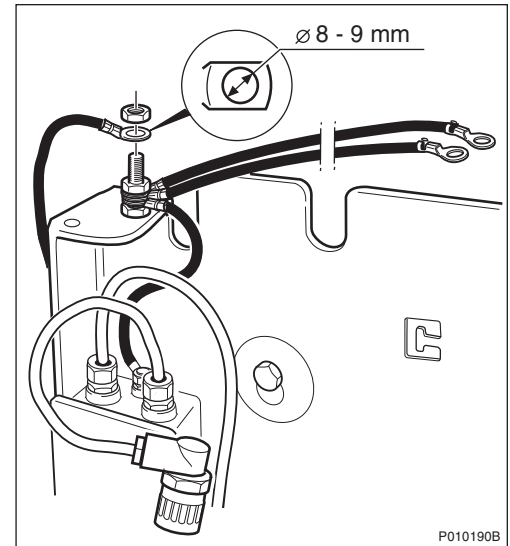
- 2 Use a spirit level to check that the MBU is positioned vertically.
- 3 If the MBU is not in a vertical position then inclination can be corrected by adjusting the four distance nuts on the wall bracket. To do this, the MBU must be removed. Leave the locking nuts on the fastening screws.

Note: Do not loosen the inner nuts. The inner nuts secure the fastening screws to the wall bracket.



- 4 When the wall bracket is correctly adjusted, put back the MBU and tighten the four locking nuts.
- 5 Connect site earthing to the MBU.

Note: In configurations with more than one RRU and a 2-wire DC Supply, an extra earthing cable must be connected between the RBSs.



5.4.4 Connecting Power

This section describes how to connect the power cable(s) to the RBS. The section includes instructions for both AC and DC cables.



Danger!

Electric shock risk. Avoid both direct and indirect contact with parts connected to mains power as this is likely to be fatal. Switch off the mains power before starting work.



Danger!

Improper electrical installation may cause fire or electric shock that is likely to be fatal. Only a qualified and authorized electrician is permitted to install or modify electrical installations.

Note: Protective Earth must be connected to the earth terminal when connecting power supply.

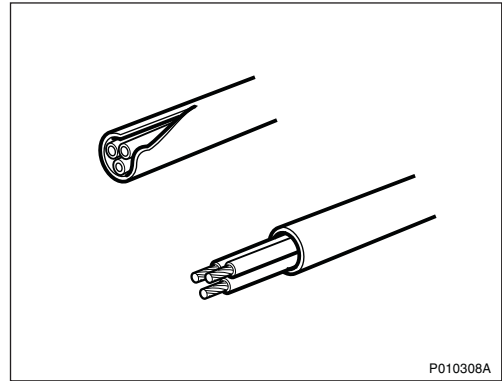
The Protective Earth terminal is located in the MBU, indicated by the earth symbol, see *the Figure below*.



Figure 21 Protective Earth

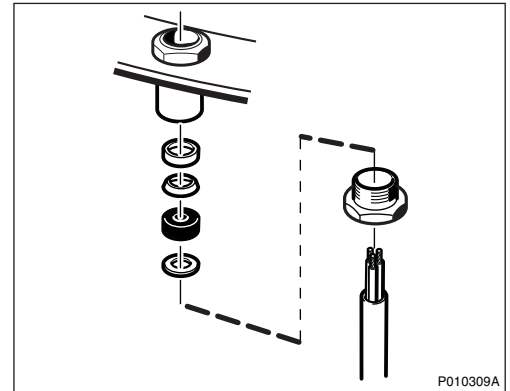
Note: Protective Earth connection is essential.

- 1 Remove the MBU cover from the MBU.
- 2 Cut the cable to the appropriate length.
- 3 Remove the cable insulation and strip the conductors.

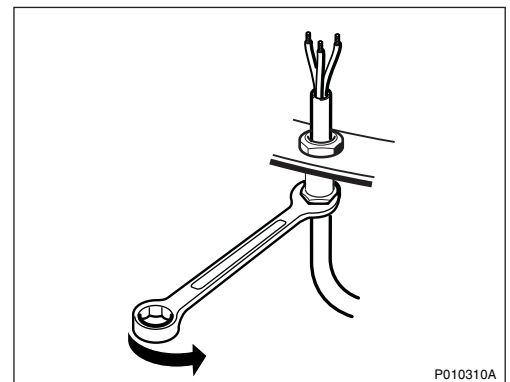


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- 4 Mount all cable inlet parts.



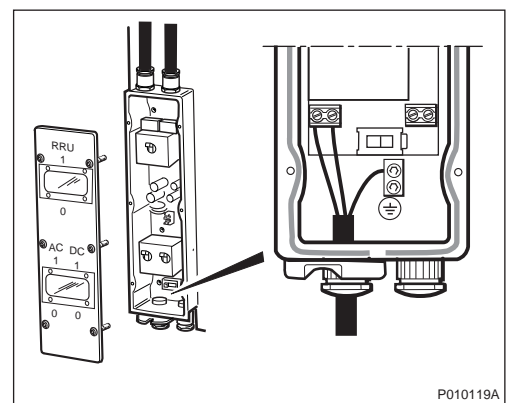
- 5 Route the cable into the inlet and tighten the cable gland.



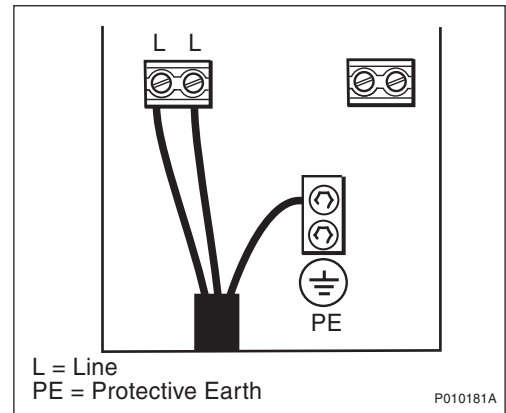
5.4.4.1 Connecting AC Mains

This section describes how to connect AC Mains cable (if applicable).

- 1 Ensure that the site power is turned off.
- 2 Connect the AC cable to the dedicated terminals.



- 3 Ensure that the protective earth is properly connected.

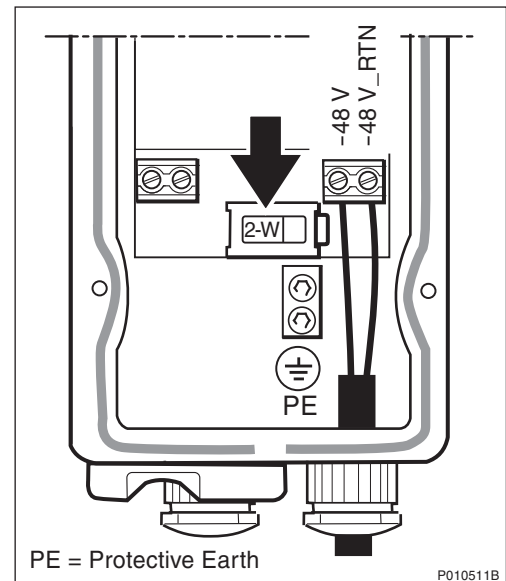


- 4 If DC is not to be connected, put back the MBU cover onto the MBU.

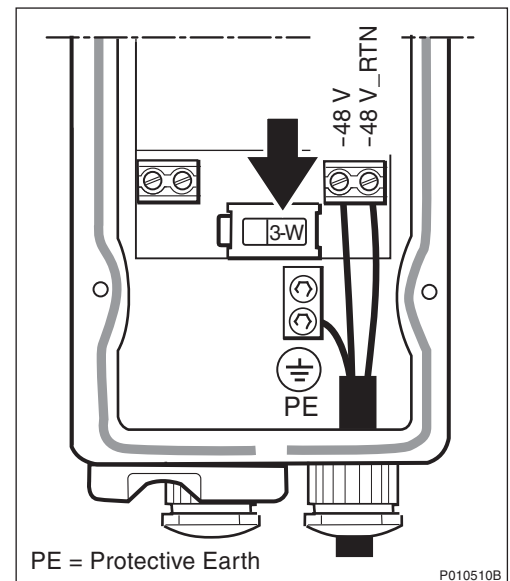
5.4.4.2 Connecting DC Supply

This section describes how to connect the DC supply cable (if applicable).

- 1 Ensure that the site power is turned off.
- 2 Connect the DC cable to the dedicated terminals. If 2-wire is used, set the ground selector to 2-W.



- 3 If 3-wire is used, set the ground selector to 3-W.



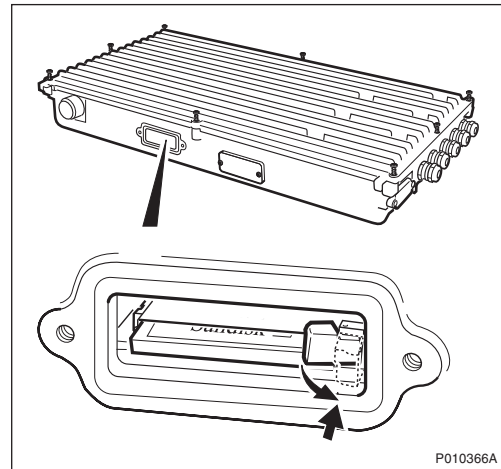
- 4 Ensure that the protective earth is properly connected.
- 5 Put back the MBU cover.

5.4.5 Replacing the Flash Card (Optional)

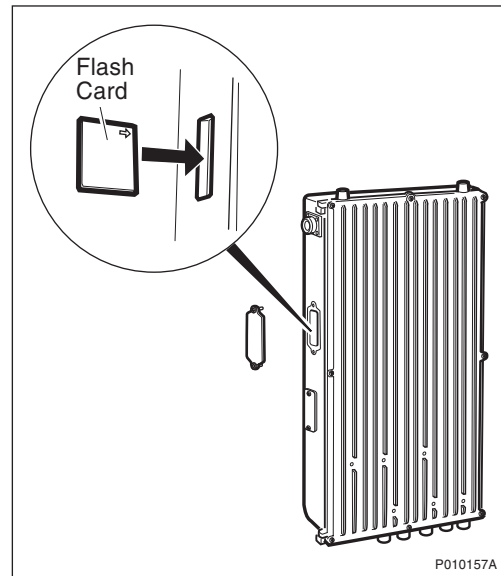
This section describes how to replace the existing flash card in the IXU. This is done only if a flash card, preloaded with site specific data, is provided.

For information about preloading the flash card, see *Chapter Maintenance*.

- 1 Remove the cover. Remove the existing flash card by pulling up the adjacent black plastic lever and then pushing it down to eject the card.



- 2 Insert the new flash card, push it in, and reset the release lever (ensuring that the card is in position).



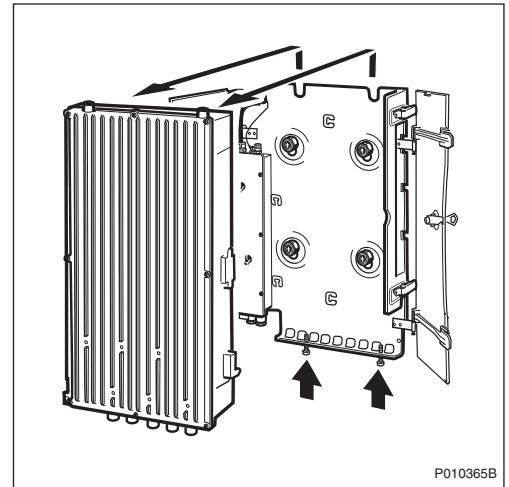
- 3 Put back the cover.

5.4.6 Installing the IXU (Master RBS Only)

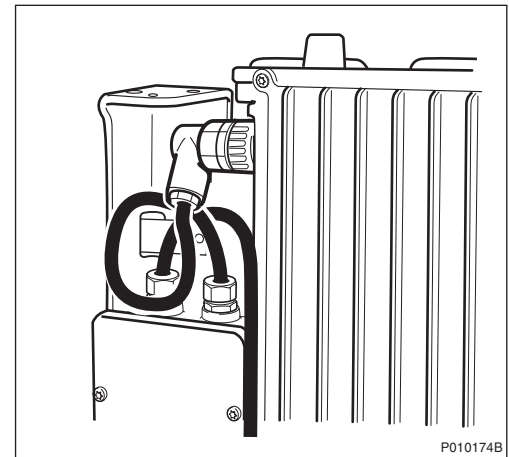
This section describes how to install the Interface and Switching Unit (IXU) on the MBU.

Note: This section is valid only for the master RBS. IXU is not used in extension RBSs.

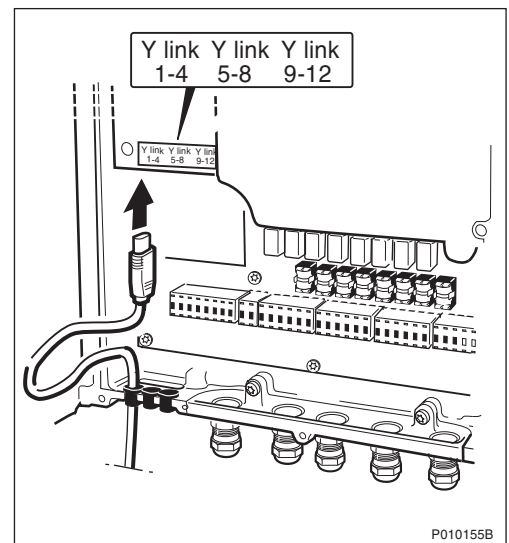
1. Hook the IXU onto the MBU, and secure it with the two screws under the MBU.



2. Connect the IXU AC/DC cable.



3. Loosen the eight screws on the IXU and open the cover.
4. Connect the Y link cable to the applicable connection port on the IXU, see *Table below*.



Note: Dummy plugs must be inserted in the unused cable inlets.

Table 10 Y link Connection Port

RBS	Connection Port
RRU 1	Y link 1 – 4
RRU 2	Y link 5 – 8
RRU 3	Y link 9 – 12

Connecting External Cables

This section describes how to connect different external equipment, for example MINI LINK™ or transmission, see *Figure below*.

Note: To simplify the cable connections, the connection frame on the IXU can be removed.

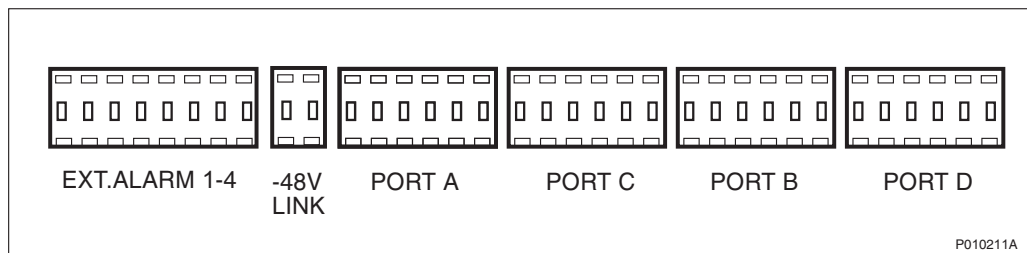
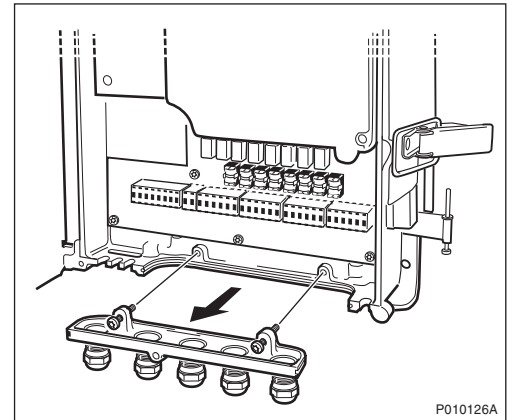
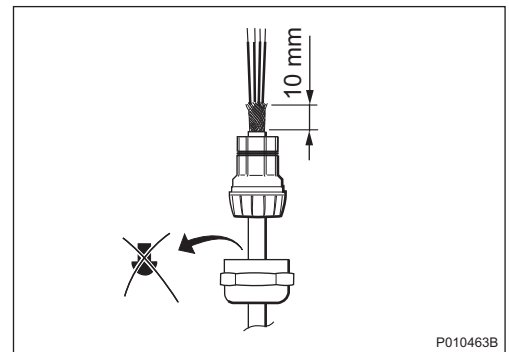


Figure 22 Connection Ports on the IXU

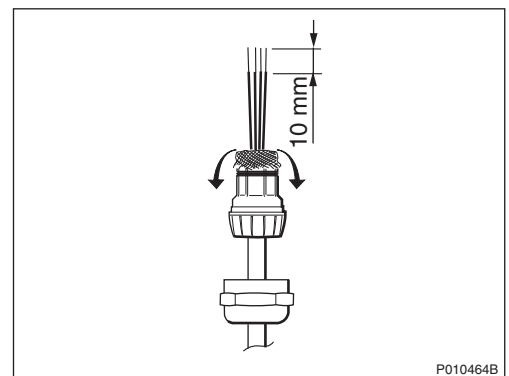
- 1 Remove the connection frame from the IXU.



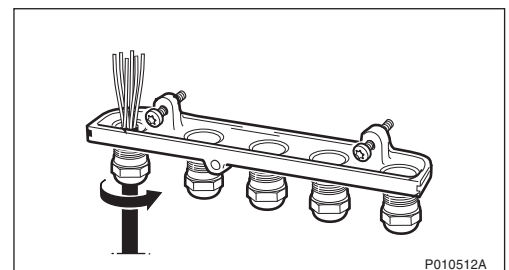
- 2 Remove the cable gland parts and remove the sealing insert. Route the cable through the cable gland parts and strip the cable insulation. Cut the cable screen according to the figure.



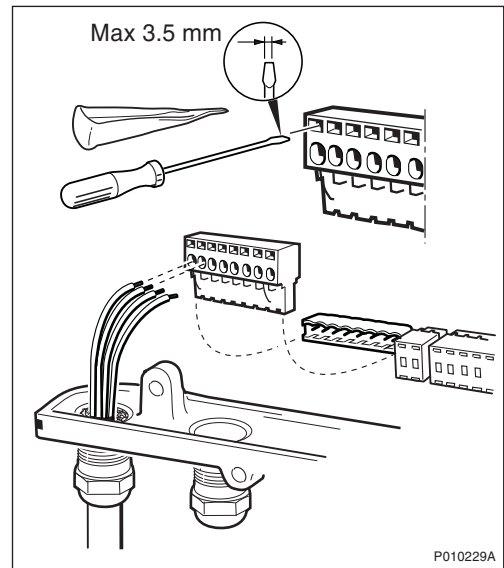
- 3 Strip the conductors and fold back the cable screen over the inner part of the cable gland.



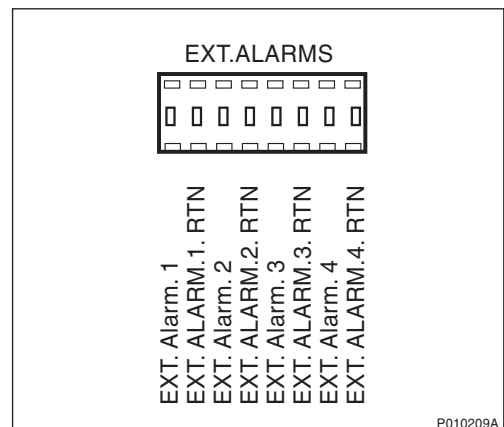
- 4 Insert the cable into the most suitable inlet and tighten the cable gland.



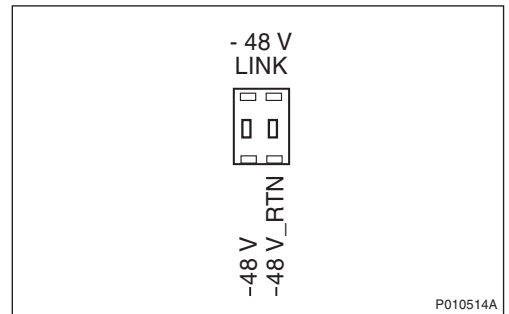
- 5 Strip the conductors and loosen the termination blocks. Fasten the conductors by inserting a screwdriver in the upper slot.



- 6 If applicable, connect the external alarm cables. See also *Figure 22 on page 56*.



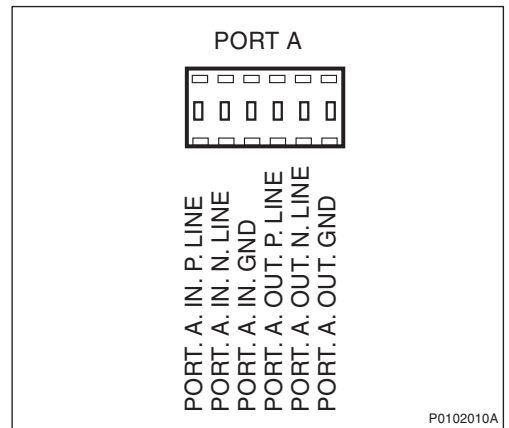
- 7 If applicable, connect the -48 V LINK cable. See also Figure 22 on page 56.



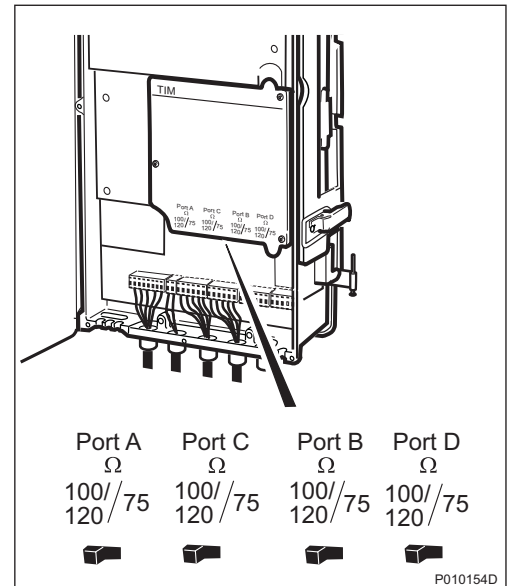
- 8 Connect the applicable transmission cables. The figure shows port A, but is also valid for port C, B, and D.

For information on how to connect and earth PCM lines, see:

- Page 60 for 75 Ω coaxial cable
- Page 61 for 100/120 Ω twisted pair



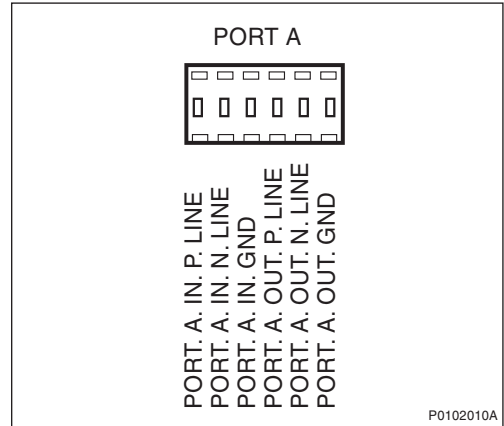
- 9 Put back the connection frame.
- 10 Select transmission impedance for each port, using the selector switches on the underside of the Transmission Interface Model (TIM).



- 11 Close the IXU cover and fasten the screws.

Connecting PCM Coaxial 75 Ω

- 1 Connect the inner conductors to P.LINE and the outer conductors to N.LINE.



- 2 Connect the capacitor included between IN.N.LINE and IN.GND.
- 3 Connect the jumper wire included between OUT.N.LINE and OUT.GND.

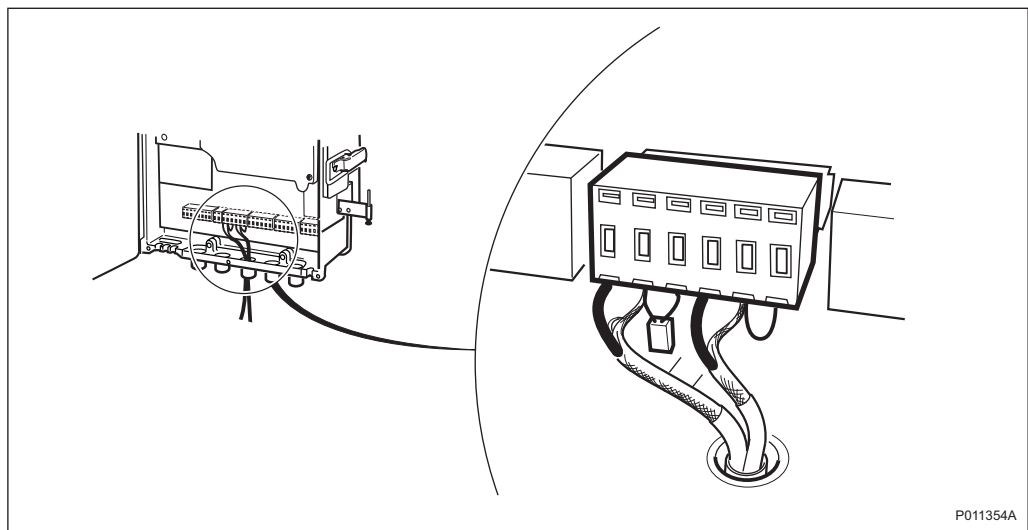
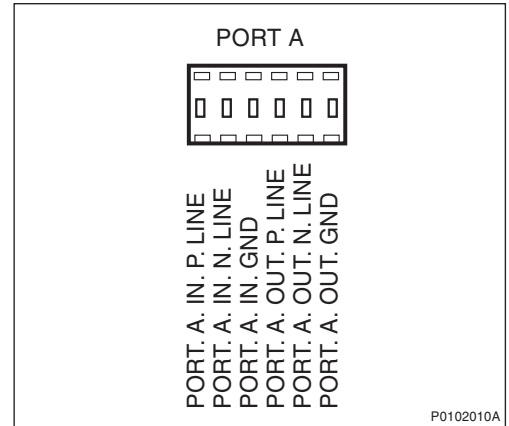


Figure 23 Connecting PCM Coaxial 75Ω

Connecting PCM Twisted Pair 100/120 Ω

- 1 Connect the twisted pairs to P.LINE and N.LINE.



- 2 Earth the cables according to the following instruction:

Inner and outer shield

Connect the inner shield to the terminator block, and the outer shield to the cable gland, see *Figure 24* on page 61.

Outer shield only

Fit the shield to the cable gland, see *Figure 25* on page 62.

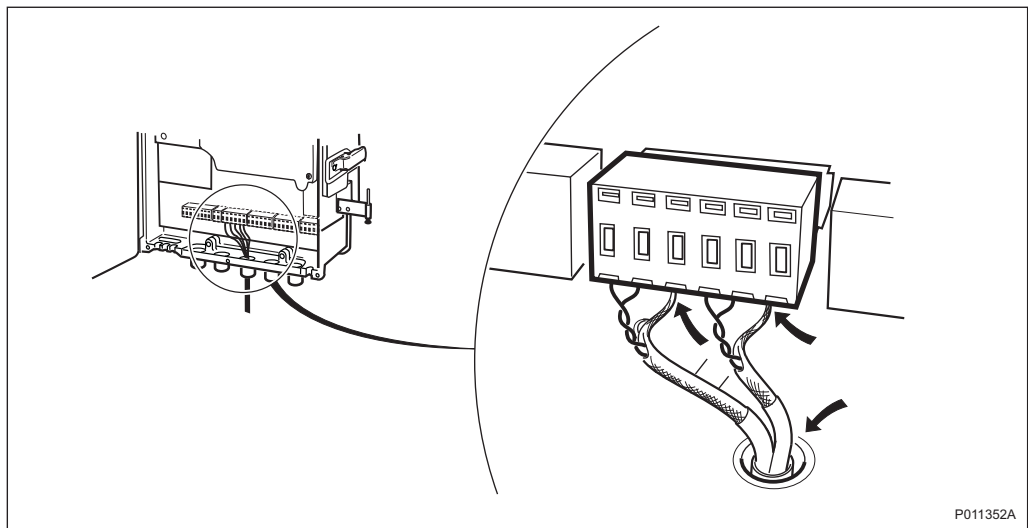


Figure 24 Earthing Inner and Outer Shield

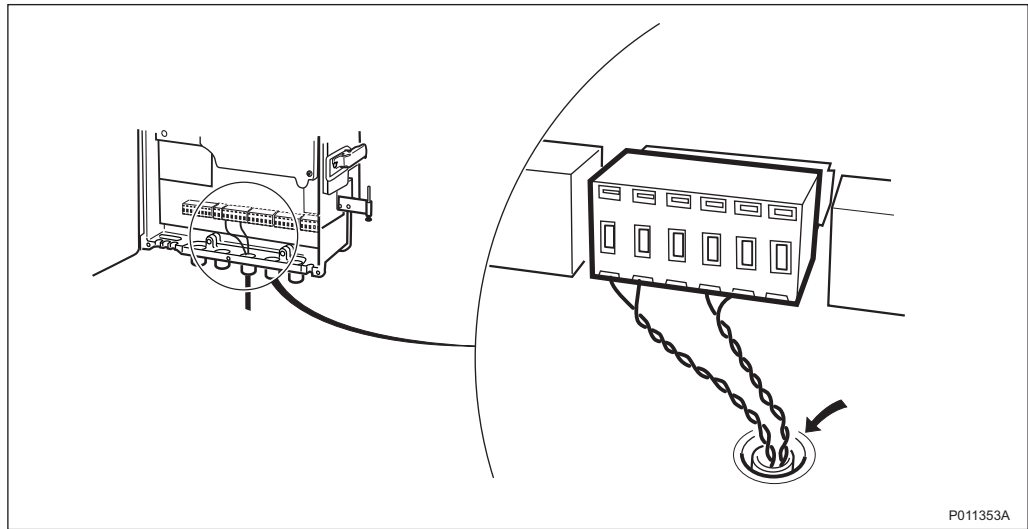


Figure 25 Earthing Outer Shield Only

5.4.7 Installing the RRU

This section describes how to install the Remote Radio Unit (RRU).

Note: To avoid damage, do not place the RRU on its connectors, see *Figure below*.

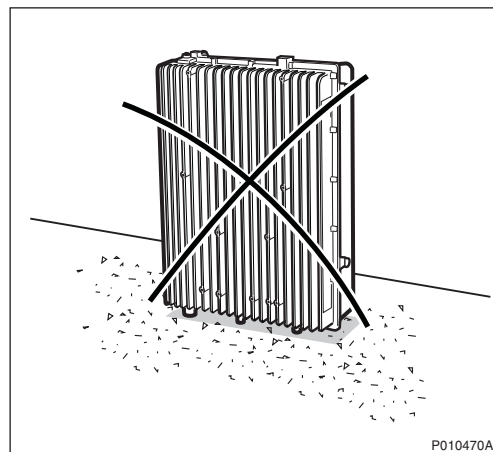


Figure 26 Do Not Place the RRU on its Connectors

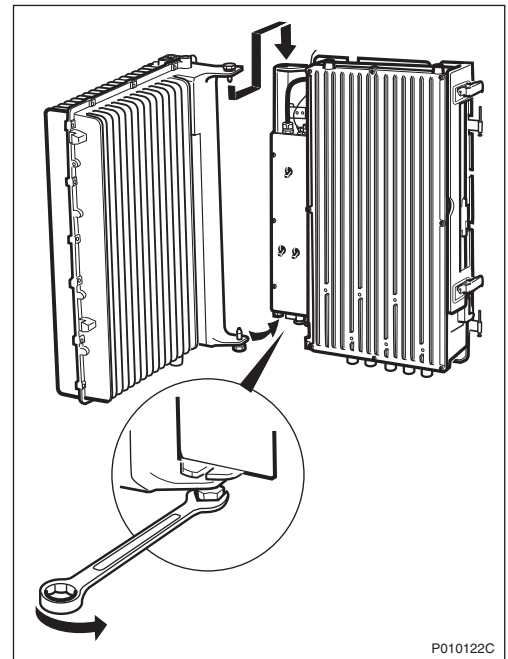
Note: Do not install any equipment on the RRU before mounting it on the MBU.



Caution!

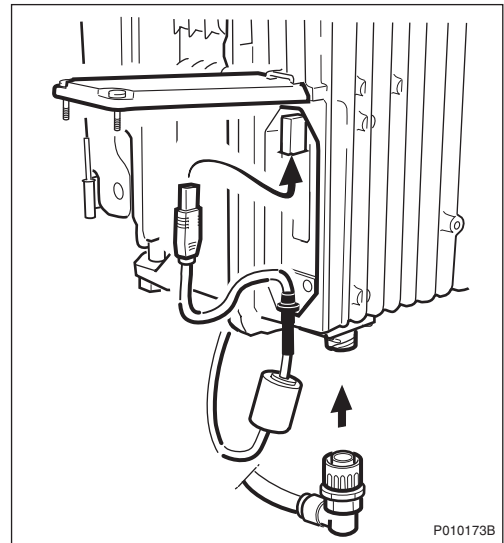
The equipment is heavy. Lifting the equipment without the aid of a lifting device can cause injury.

- 1 Hang the RRU onto the upper hinge. Position the lower hinge and tighten the screw.

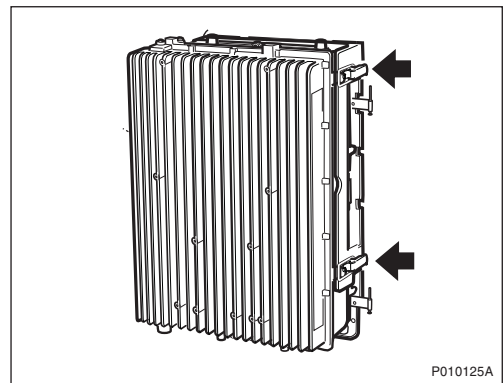


- 2 Remove the protection cover under the RRU.

- 3 Open the left side cover on the RRU, connect the Y link cable and close the cover. Connect the AC/DC cable.



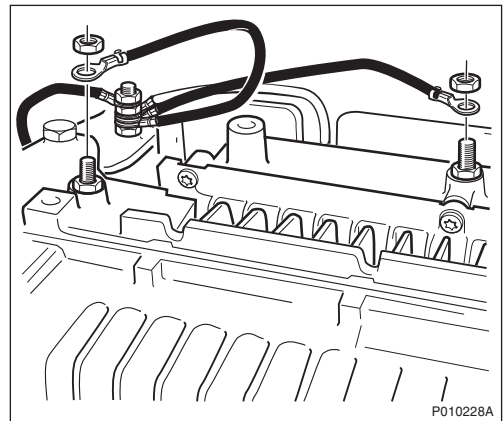
- 4 Close the RRU using the clasps.



5.4.8 Connecting Earth Cables

This section describes how to connect the earth cables to the RRU and the IXU.

- 1 Connect the earth cables from the earthing point to both IXU (master) and RRU.

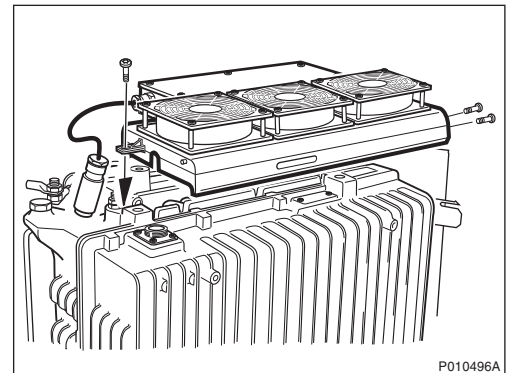


Note: If an Omni Antenna is to be installed on the RRU, the RRU earthing cable must be connected after the omni antenna bracket has been mounted.

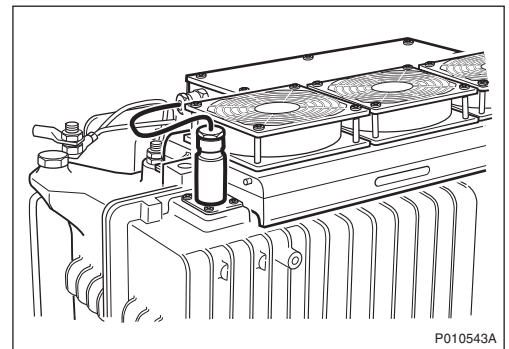
5.4.9 Installing the Fan Unit (Optional)

This section describes how to install the fan unit.

- 1 Install the fan on top of the RRU and fasten the three screws.



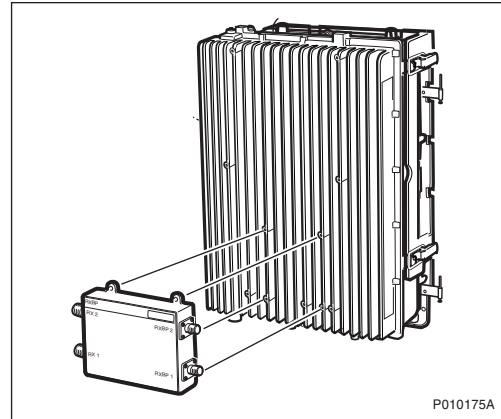
- 2 Connect the power cable to the RRU.



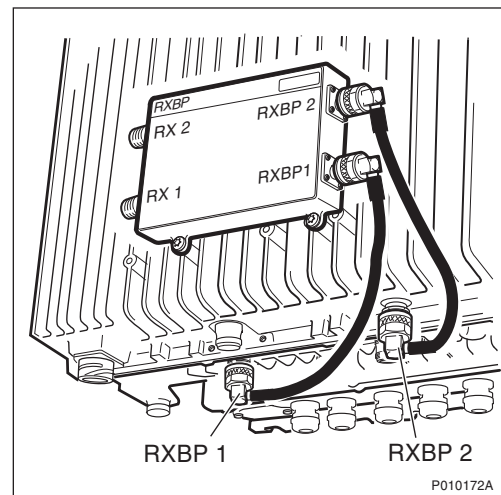
5.4.10 Installing RXBP (Optional)

This section describes how to install the Receiver Band Pass filter (RXBP) on the RRU and how to connect the cables.

- 1 Install the RXBP on the RRU and tighten the screws.



- 2 Connect the first cable from connection port **RXBP 1** on the RXBP to connection port **RXBP 1** on the RRU. Connect the other cable from connection port **RXBP 2** on the RXBP to **RXBP 2** on the RRU.



- 3 Connect the RX antenna cables to connection port **RX 1** and **RX 2** on the RXBP, and tighten with the appropriate torque wrench. See *Table 9 on page 41*.

For more information about antenna connections, see:



Site Installation Documentation

5.4.11 Installing the Integral Omni Antenna (If Applicable)

This section describes how to install the integral Omni Antenna on the RRU.

1. Remove the RRU earthing cable if it has been previously installed. See *Section 5.4.8 Connecting Earth Cables on page 64*
2. Mount the Omni Antenna bracket on top of the RRU, and tighten the captive screws.

3. Install the RRU earthing cable.

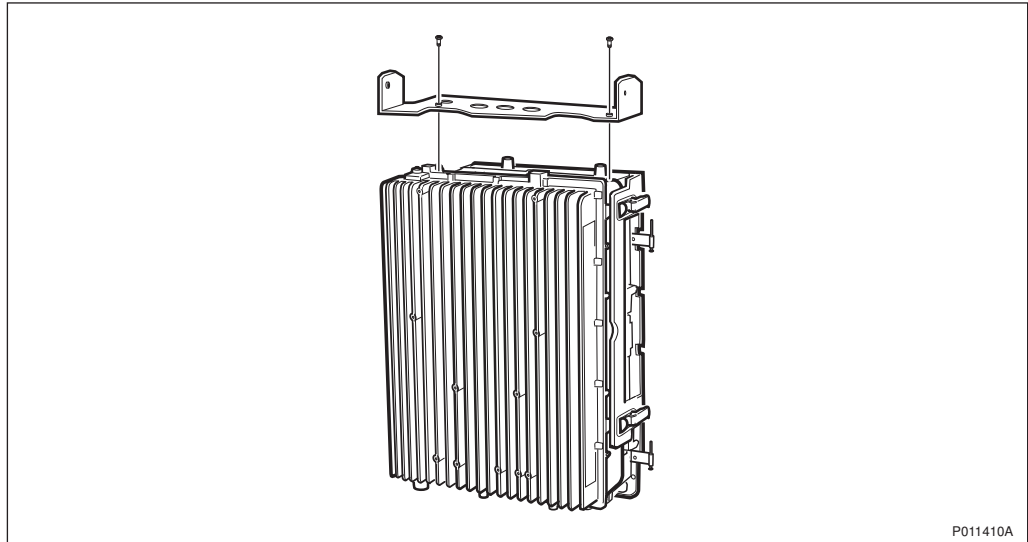


Figure 27 Mounting the Antenna Bracket

4. Attach the antenna on the bracket. Use the two captive screws on each side of the antenna.
5. Route and fasten the antenna cable with two clamps on the right side of the RRU.
6. Secure the antenna with the sunshield, see Section 5.4.15 on page 69.

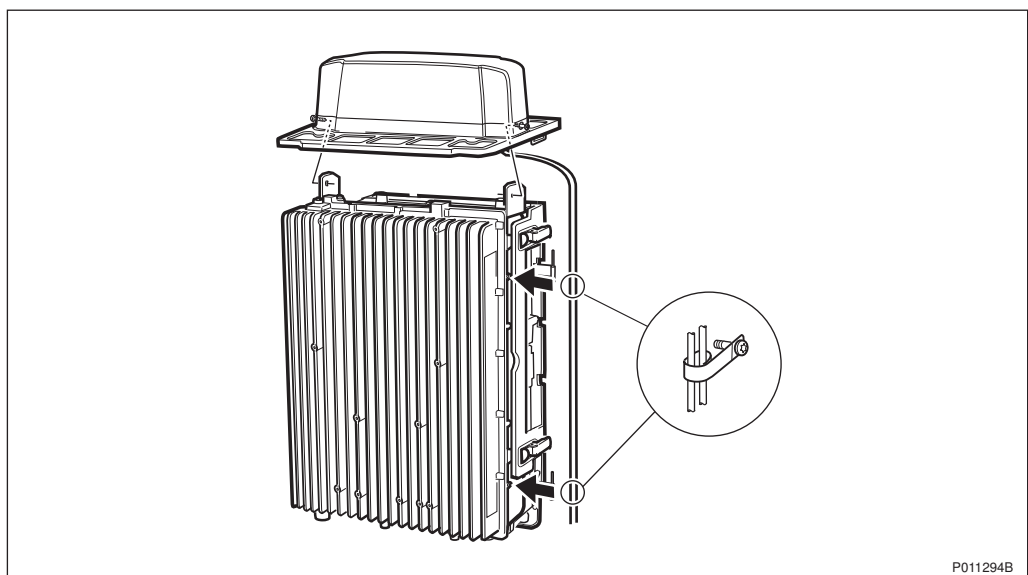


Figure 28 Installing the Omni Antenna

5.4.12 Installing the Integral Sector Antenna (If Applicable)

This section describes how to install a Sector Antenna on the RRU.

1. Attach the Sector Antenna on the front of the RRU. Secure it with four screws.

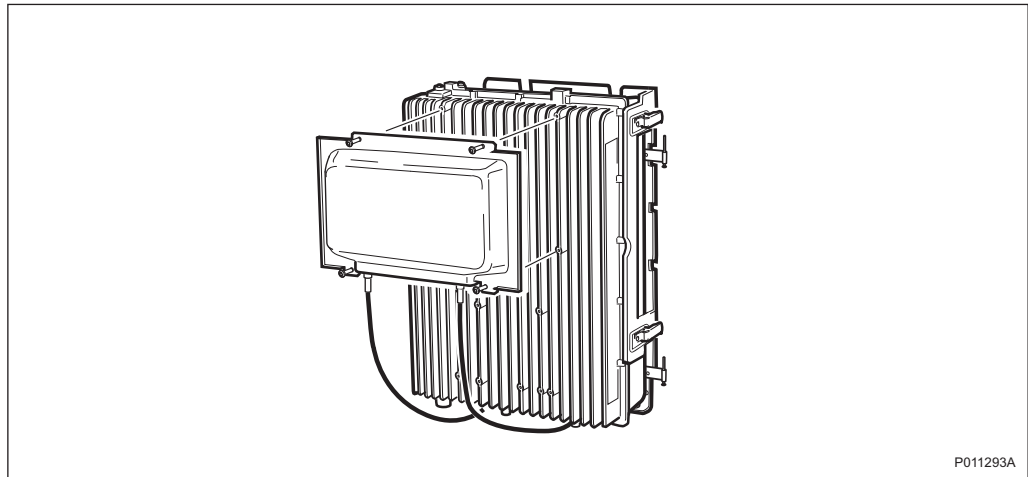
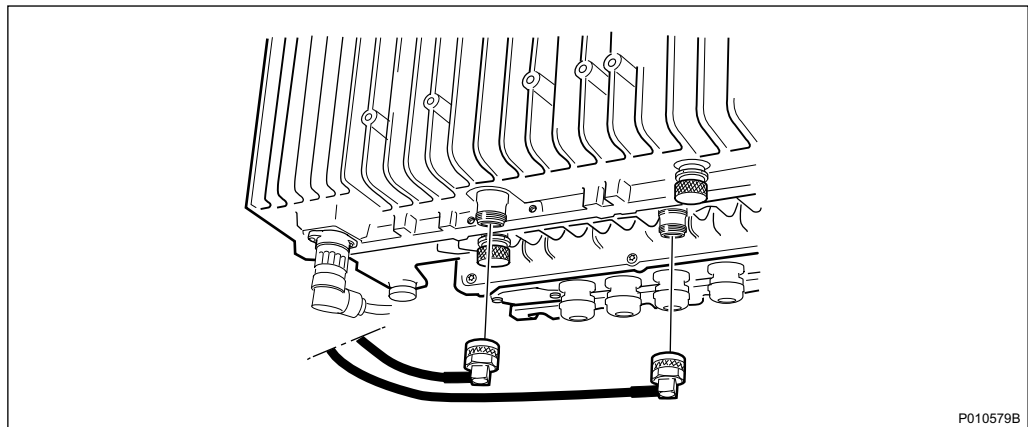


Figure 29 Installing the Sector Antenna

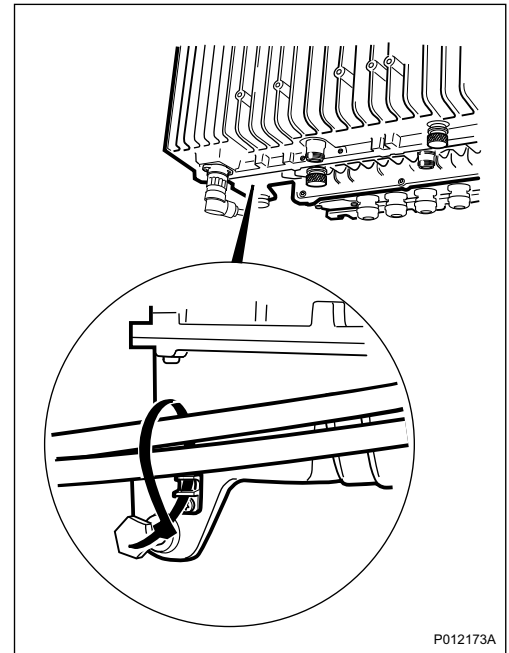
5.4.13 Connecting RBS Antenna Cables

This section describes how to connect antenna cables when a MCB or integral antenna is not used.

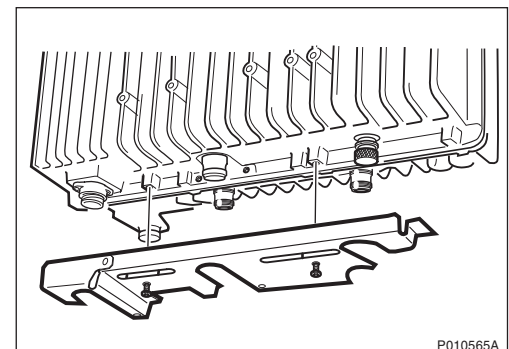
- 1 Connect the RBS jumpers to connection port **TX(/RX) 1** and **TX(/RX) 2**, and tighten with the appropriate torque wrench. See *Table 9 on page 41*.



- 2 Strap the cables using the appropriate cable tie anchor.



- 3 Install the protective cover under the RRU.



5.4.14 Testing the Installation

The RBS is now ready for the site installation tests.

The site installation tests should be performed directly after the completion of the RBS installation, see *Chapter Site Installation Tests*.

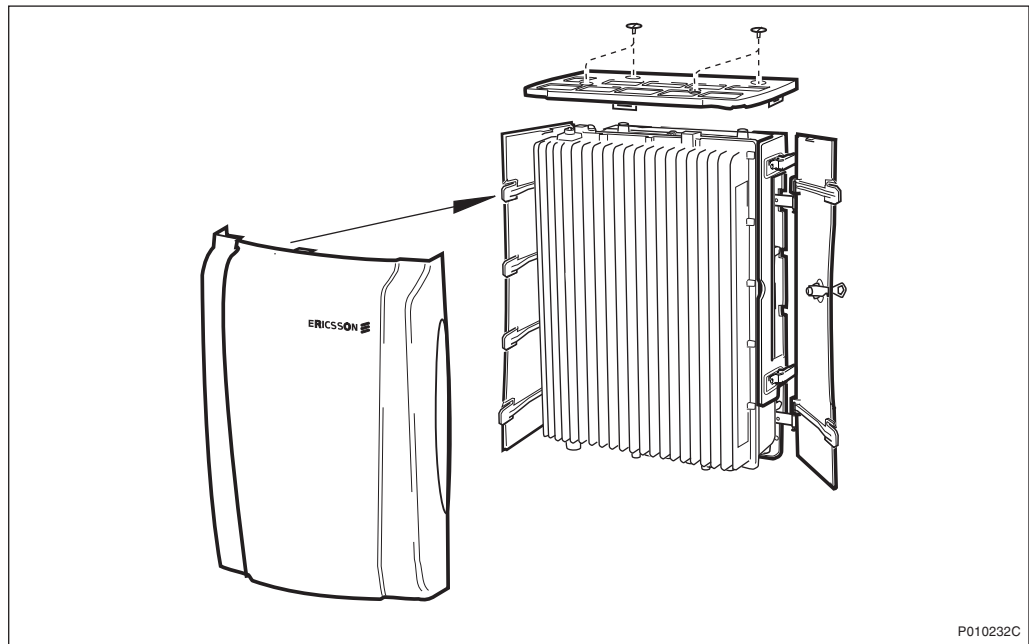
After the installation and integration testing is completed, return to *Section 5.4.15 on page 69*.

5.4.15 Installing the Sunshields

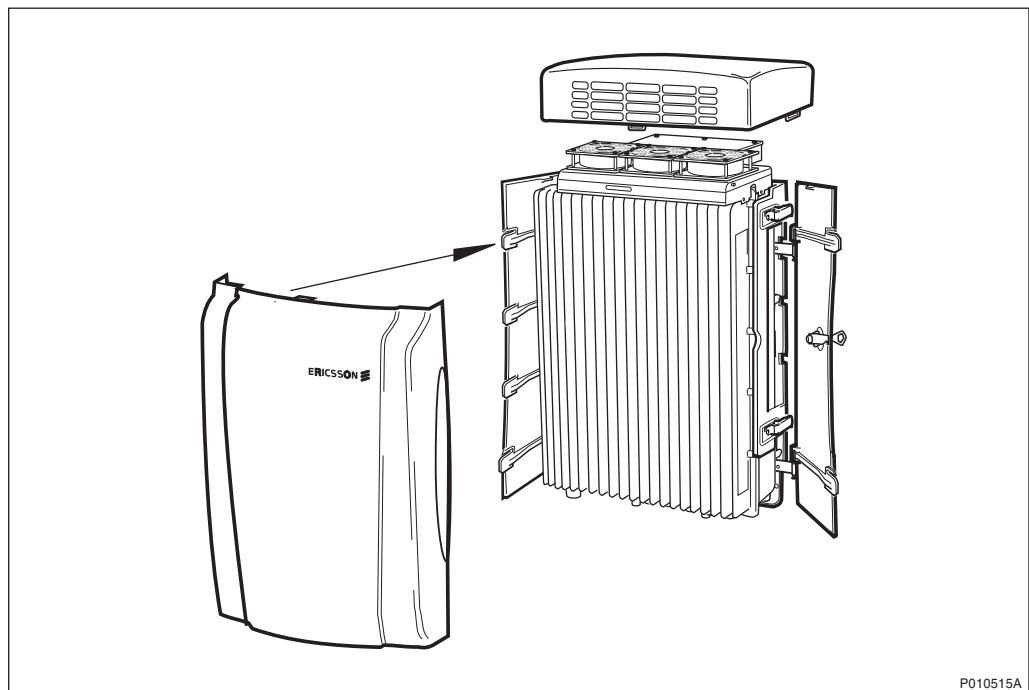
This section describes how to install the sunshields.

Different sunshields are used depending on whether or not components are installed on the front of the RRU.

1. If the fan unit or integral Omni Antenna are not used, install the top sunshield and fasten two screws either to the RRU or the IXU. See *Figure below*.



2. If the fan unit is used, install the fan cover on top of the RRU. See *Figure below*.



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

5.4.16 Performing Concluding Routines

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

Note: Ericsson strongly advises that when cleaning up after installing the RBS, the personnel performing the installation pay particular attention to the environment. Primarily, recycle all waste materials that can be recycled and sort waste so that it can be disposed of according to local regulations.

Table 11 Objects to Be Recycled or Disposed of After RBS Installation

Item	Sort or Recycle?
Cable insulation from crimping, brazing or welding	Sorted with plastics
Packing chips	
Foam	
Polystyrene	
Bubble plastic	
Cable tie clippings	
Paper and wood	Paper recycling
Waste metal from cable ladders	Recycled or sorted as metals
Pieces of cable	
Nuts, bolts, washers and screws	

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

5.4.16.1 Updating the Site Installation Documentation

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

5.4.16.2 Performing Final Checks

Before leaving the site, make sure that the following tasks have been completed:

Table 12 Checklist

Check the following:		OK
1	All cables are properly routed and connected.	
2	All sunshields are properly installed.	
3	The site is clear of waste materials.	
4	The Site Installation Documentation is updated.	
5	The modified Site Installation Documentation has been handed over to the person responsible for the site.	
6	The RBS is powered up if the surrounding temperature changes between hot and cold and the RBS installation is not completed within 48 hours. ⁽¹⁾	

(1) See Chapter Site Installation Tests.

6 Antenna System Tests

This chapter describes the tests, Distance To Fault (DTF) and Standing Wave Ratio (SWR), used to verify the antenna system installation. The tests also include measuring the feeder length to calculate feeder system loss and delay.

The tests described are valid for the following GSM 800/1900 antenna systems:

- Passive antenna system (no TMA)
- Antenna system with Dual Duplex Tower Mounted Amplifier (ddTMA)

Equipment for Antenna System Tests

The Anritsu Site Master S331C is recommended for the tests described in this chapter.

The following Site Master models can be used, if available:

- S120A for GSM 800
- S235A for GSM 1900
- S251A/B for GSM 800/1900
- S331A/B for GSM 800/1900

Note: Instructions for these older instruments are not included in this manual.

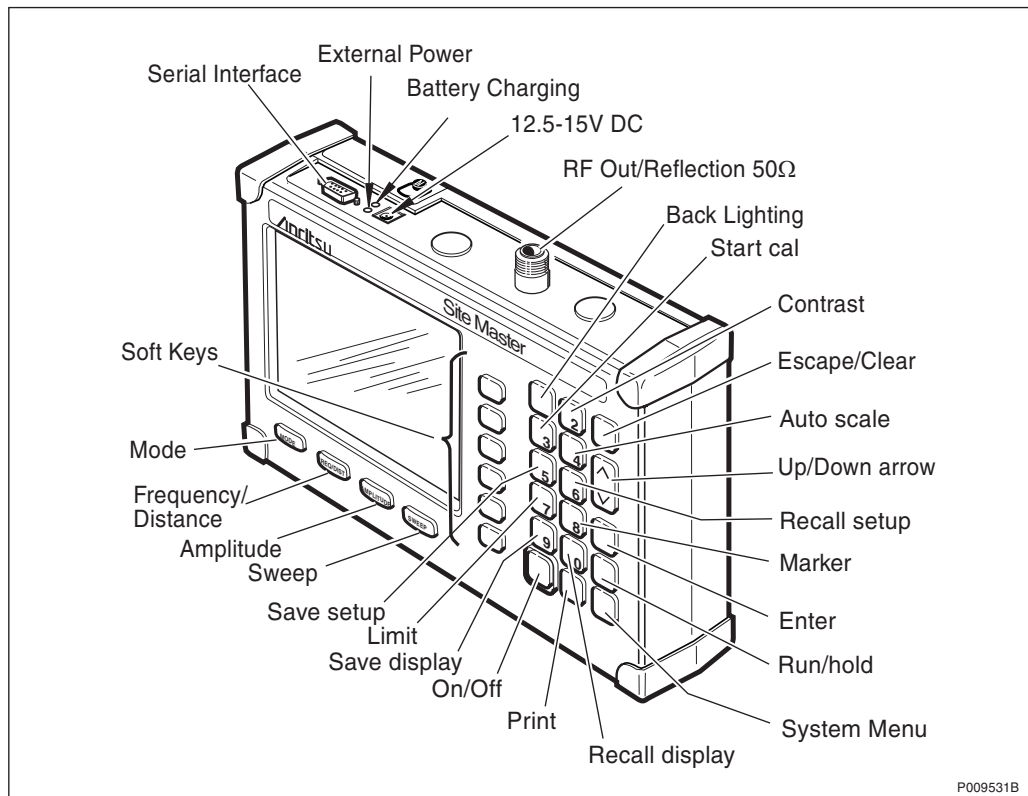


Figure 30 Anritsu Site Master S331C

The keys mentioned in the instructions in this chapter are shown in the figure above. In the instructions a “key” is marked with the text describing its function, while a “soft key” has its text displayed on the screen (next to the key).

For more detailed information on the Anritsu Site Master, see:



Anritsu Site Master User's Guide

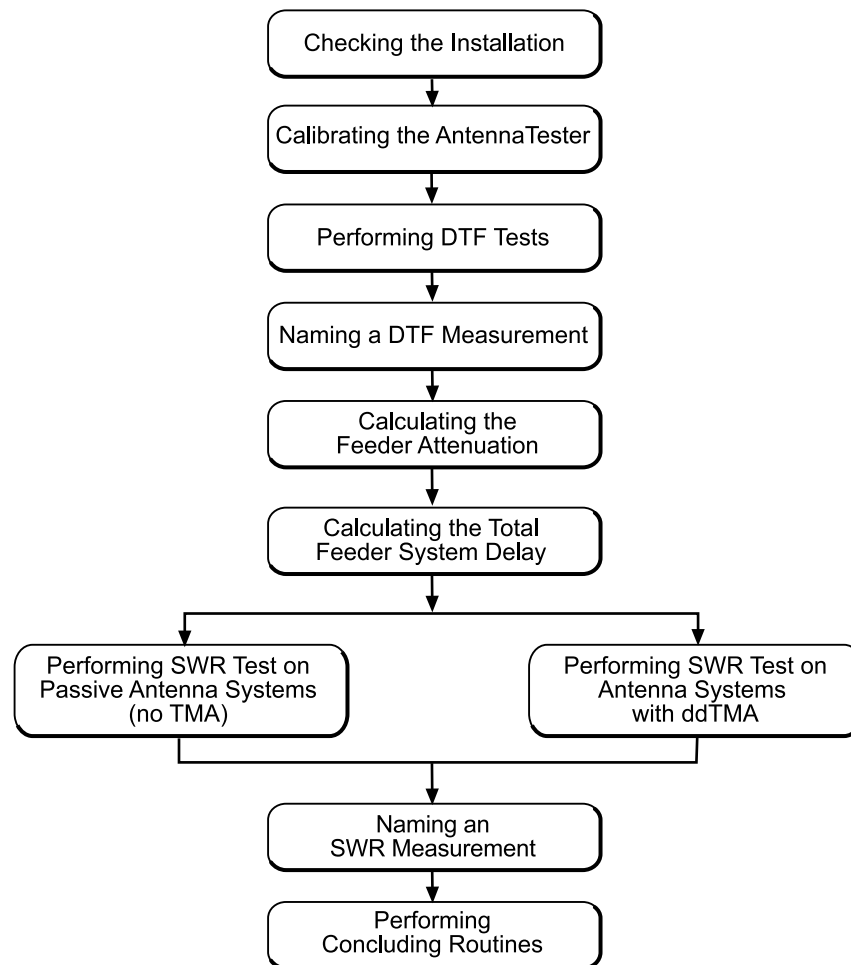
Preconditions

Before starting the tests, ensure the following:

- For the DTF Tests, that the installation of feeder cables with jumpers is complete prior to testing
- For the SWR Test, that the connection of antennas, feeder cables with jumpers and, if applicable, ddTMA is complete prior to testing. Ericsson recommends that the connectors are not covered with sealing tape until all testing is complete.
- A test record for recording the test results is available

Work Process for Antenna System Tests

This section describes the order in which to perform the tests. When the exit criteria for each procedure are fulfilled, the tester enters the results in the test record, then returns to the work process for the next step.



P010283B

Figure 31 Work Process for Antenna System Tests

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

6.1 Checking the Installation

This section describes how to check that the antenna system installation is correct.

1. Verify that the installation is installed in accordance with the *Site Installation Documentation*.
2. Check that all cables or connectors are free of damage, and that all cables (feeders and jumpers) are properly marked.
3. Check that all connectors are properly connected and tightened.
4. Check that the bend radius specification of all feeders and jumpers has not been exceeded.
5. Verify the antenna directions against the *Site Installation Documentation*. Consider magnetic influences from nearby metallic objects and deviations from magnetic north when using the compass.
6. Check that the correct cable is connected to the correct antenna.

If TMAs are used, check that bias injectors are installed on each feeder.

7. Record remarks, if any, in the test record and forward them to the person responsible for the site installation.

Note: If a TMA is used, mixing the jumpers or feeder cables damages the TMA. Verify that the cable markings are correct.

6.2 Calibrating the Antenna Tester

This section describes how to calibrate the Site Master, to achieve accurate Test results and to compensate for Test Port Extension Cables.

The calibration includes selecting and setting the frequency range before the calibration, performing the calibration and entering the cable parameters in the Site Master.

Note: The Site Master must be calibrated each time the frequency range is changed.

The Site Master also needs to be calibrated if one of the following messages is shown in the display: "CAL OFF" or "↑°C".

6.2.1 Selecting Frequency Range

This section describes how to select and set the correct frequency range in the Site Master.

1. Press the **FREQ/DIST** key.
2. Press the **F1** soft key.