

Abstract

The installation instruction shall be used when installing the Multi Carrier Power Amplifier MCPA 50/100W with the RBS 884.

Application

This document can be a part of the site installation of the RBS 884 library.

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1 Introduction

This part describes the information contained in the manual and the conventions used in its presentation.

1.1 Revision Information^[J1]

This is the first issue of the manual.

1.2 About this manual

This manual contains the information required to install, troubleshoot, and maintain the MCPA Multi Carrier Power Amplifier 50/100 W. The manual has references to the RBS 884M Installation and Maintenance manual.

It is assumed that before the manual is used to perform any of these activities at a Radio Base Station 884M (RBS 884M), the following actions have to be completed:

- RBS884 installation (if not, read this manual anyhow)
- DC power supply (27V) to MCPA must have been made available

The manual is divided into the following parts:

Introduction

A description of the contents of the manual and how the manual can be used.

System Description

A description of the MCPA equipment hardware and the available configurations.

Installation

Procedures for the installation, powering up and adjustment of MCPA equipment on site.

Cabling

Procedure for the cabling of the MCPA and HPC/LPS units.

Maintenance

Procedures for basic troubleshooting and replacement of faulty items of equipment.

The target audience for the manual is RBS 884M site installation and site maintenance personnel.

The procedures in the manual are normally intended to be performed in the order presented.

1.3 Document information

1.3.1 Terminology

Abbreviations

AC/DC	Power supply
HPC	High Power Combiner
DPX	Duplex Filter
MCPA	Multi Carrier Power Amplifier
MCU	Measuring Coupler Unit
MSC	Mobile Telephony Switching Center
NC	Normally Closed
NO	Normally Open
RF-IN	RF input signal to the MCPA
RF-OUT	RF output signal from the MCPA
RTP	Research Triangle Park, NC, USA
TRX	Transceiver Unit
TXBP	TX Bandpass filter
MCU	Measuring Coupler Unit
RFTL	Radio Frequency Test Loop

1.4 Safety Consideration

1.4.1 High Frequency

The radio base station contain equipment that generates high frequency electromagnetic field during operation to which the following warning applies.

WARNING

HIGH FREQUENCY ELECTROMAGNETIC FIELDS

The transmitter antenna and directly connected equipment generate high frequency electromagnetic fields during operation. The high energy density can cause damage to the eyes and certain tissues in the human body on persons exposed to the radiation close to the antenna.

The station must be switched off when working with the transmitter antenna. Avoid being close to the antenna when the station is in operation.



High frequency warning symbol

Following applicable warnings from the responsible telecommunication authority.

1.4.2

ESD

CAUTION

Electro Static Discharge

To avoid accidental damages while handling printed circuit boards, it is recommended to wear a wrist strap connected to earth via a protective resistor. Circuit boards must be kept in antistatic packing material during storage and transportation.



ESD warning symbol

Practically all electronic components used in the RBS equipment are susceptible to electrostatic discharges, ESD. The discharge of an electrostatic voltage exceeding 600 volt against a component will be damaging for the component, also when it is mounted on a circuit board.

Discharges of electrostatic voltages below 4000 volt are normally not sensed or in any other way realized by the person causing the discharge.

Normal movements by a person wearing synthetic garments, for example, can cause the generation of electrostatic voltages of above 10.000V!.

The components are damaged by an electric breakdown of the ultra thin insulating layers in the integrated circuits (typically 0,0001mm). The damage can be either acute and lead to instant failure of functions or it can be latent and will then materialise only after a lapse of time which may be up to several years!

1.4.3 High Voltage

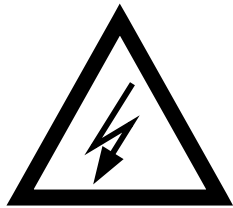
The radio base station contains equipment that generates high voltages during operation to which the following warning applies.

WARNING

HIGH VOLTAGE

All installation of power cables and units shall be performed by authorized personnel.

Only authorized personnel with enough knowledge of the RBS system and units are allowed to work with the different units. It is not allowed to open incased units.



Warning Symbol for high voltage

Follow applicable warnings from the responsible authority.

1.5 Legal Information

Note:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interface in which case the user will be required to correct the interference at his own expense.

NO MODIFICATIONS: Modifications to this device shall not be made without the written consent of Ericsson, Incorporated. Unauthorized modifications may void the authority granted under Federal Communications Commissions Rules permitting the operation of this device.

In order not to violate the FCC certification of this MCPA, a filter must be used between the MCPA output and the antenna. The filter attenuation must greater or equal to:

Frequency range (MHz)	Attenuation (dB)
910 – 1788	45
1788 – 2700	20

If the MCPA is used together with the RBS 884 micro and installed according to this manual, the filter requirement is automatically fulfilled. If the MCPA is used for any other purpose: contact Ericsson.

1.6 Support

For technical assistance, please contact your local Ericsson office. If further technical assistance is needed, please contact:

Ericsson Radio Access AB
Antenna Near Products
P.O. Box 11
SE-164 93 Stockholm

Telephone: +46 8 757 15 00
Fax: +46 8 757 13 69
Help Desk: E-mail: anhelp@rsa.ericsson.se

2 System Description

2.1 General

This part of the manual describes the Multi Carrier Power Amplifier (MCPA) equipment hardware and the available configurations.

2.2 RBS 884 Micro 800 MHz with MCPA

The RBS 884 Micro 800 MHz with MCPA is a standard RBS 884 Micro equipped with a Multi Carrier Power Amplifier (MCPA) for higher output power in one cell. The MCPA and the HPC/LPS are separate units and can be mounted below the main cabinet.

2.3 Definitions

- Micro Base Cabinet (MBC):
One cabinet and its internal equipment, supporting one complete cell or a part of one cell.
- Micro Base (MB):
One node in the network supporting one or more microcells. Consists of one or more Micro Base Cabinet(s) (MBC), placed at the same physical location.
- Radio Cabinet Group (RCG):
A group of transceivers/combiners connected to the same Radio Frequency Test Loop (RFTL).
- Alarm:
An alarm in the Mobile Service Switching Centre (MSC). Shown on an alarm display, in the MSC.
- Fault signal:
A signal from the MCPA. Can be used to initiate a fault signal or an alarm i MSC depending on parameter settings in the exchange.
- RBS 884M.
Name for the small, low power version of the RBS884-family.
- Cabinet:
RBS 884M 19 inch cabinet.
- Equipment Cabinet
Complete Cabinet for installation of three RBS cabinets and one MCPA unit.

2.4 Installation Configurations

2.4.1 General

The Multi Carrier Power Amplifier amplifies transmitter signals within a broad band. The MCPA 100W solution includes two MCPA units, two MCPA front panels, one HPC/LPS unit and two cabinet fan units.

The MCPA 50W solution includes one MCPA unit, one MCPA front panel and one cabinet fan unit.

The MCPA shall be mounted in one available position and is equipped with an alarm signal to indicate abnormal operation of the equipment cabinet.

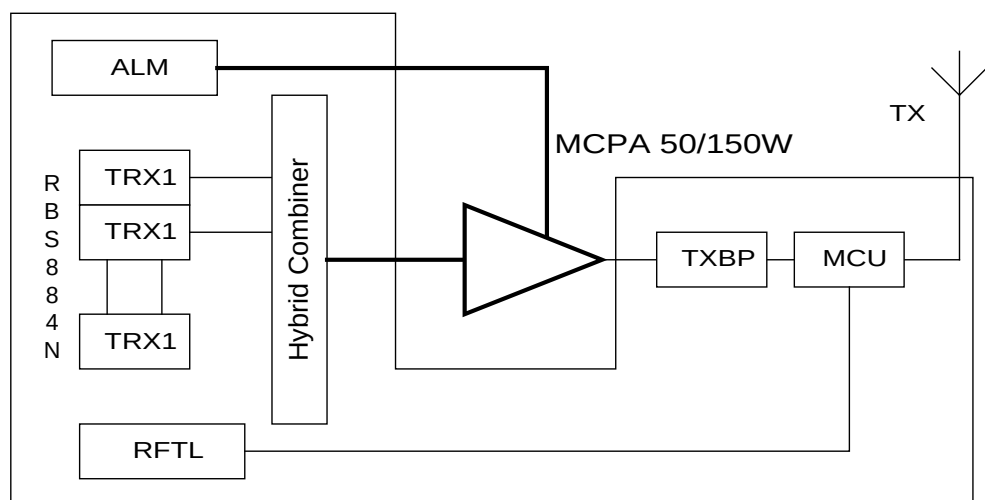
The MCPA output power is nominally 50W per MCPA. The 100W MCPA solution gives 4W per carrier at 24 carriers at the MCPA output.

The MCPA is an optional product and fit to the RBS 884M program. The MCPA shall be connected between the micro base Hybrid Combiner (HC) and the duplex filter (DPX).

The MCPA input are connected to a signal splitter.

The input carrier level is 3dBm + 25dBm. Maximum average input signal is +33 dBm.

The function is amplifying RF signals from the HC and feed it to the antenna via Measuring Coupler Unit, (MCU).



Figur 1 MCPA environment

2.5 Included Equipment in the mounting kit.

The MCPA can be installed as single (50W) or double (100W). When single MCPA is used no HPC/LPS unit is required.

The following equipment are included in the installation kits for 50W and 100W respectively.

50W mounting kit NTM 20269/1

- One autenator
- One angle connector
- One front panel
- One cabinet fan unit
- Cable
- One alarm cable

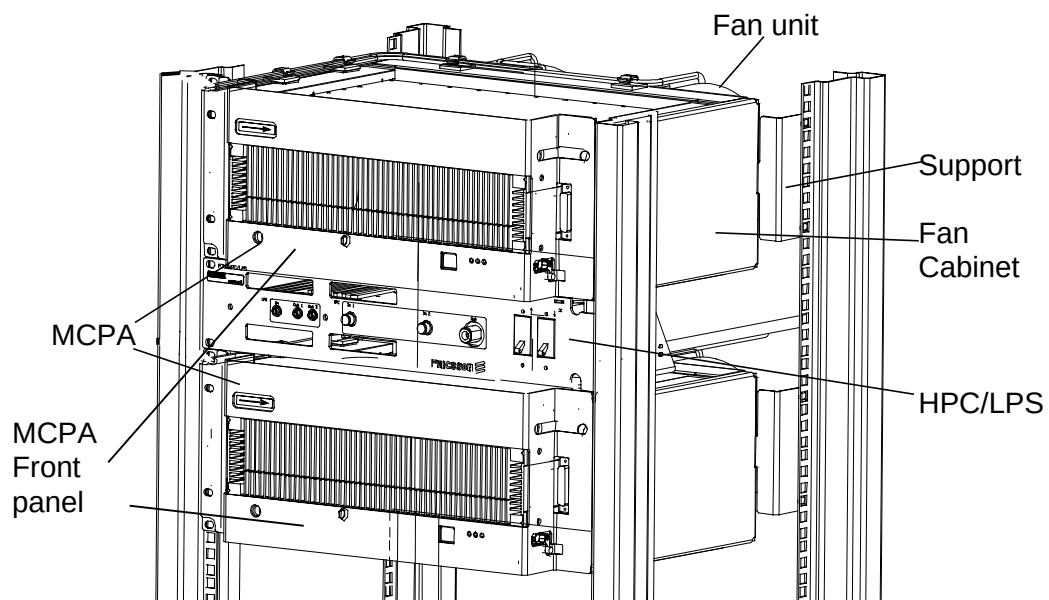
100w installation kit NTM 20269/2

- Two MCPA front panels
- Two cabinet fan units
- Alarm cable kit NTM 20269/3

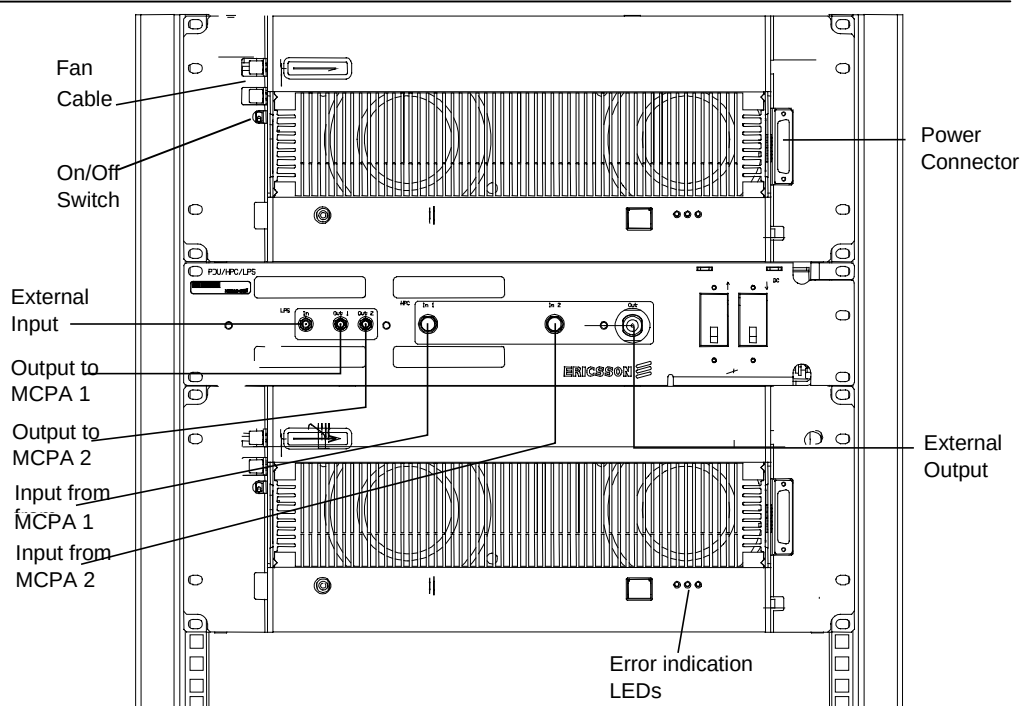
Mounting kit NTM 20269/3

2.6 MCPA design

The MCPA is a complete stand alone unit with integrated Power Supply, cooling and supervision. The installed MCPA 100W is shown below.



Figur 2. Installed MCPA



Figur 3 Connectors and indicators

2.7

Technical Specification

- Dimensions:
 - Width: 19" rack mounting
 - Depth: 14"
 - Height: 11"
- Weight: 47 kg totally
- Weight one MCPA: 17 kg
- Frequency range: 869 - 894 MHz
- Power Supply DC: 27V $\pm$ 1V, 1600W
- Power: 50W per MCPA (100W totally)
- Output Power: 4W per carrier, 24 carriers

2.8

Connectors

RF INPUT	coaxial SMA
RF OUTPUT	coaxial TNC
RF TEST	coaxial SMB

ALARM INTERFACE
and Control

9 Pole male D-SUB, type RPT 403 147/109

TEST & TRIM
only for authorized personell

8 Pole modular, type RNV 403 22/008

DC POWER IN

5 Pole male D-SUB, type RPT 403 140/001

FAN 1 & 2

4 Pole Molex, type RPV 403 109/04

2.9

Indicators

Status	Yellow	Light when start up, flashing when RF signal is on.
Error	Red	Flashing when start up, light steady at error.
Power	Green	Lit when power is on.

3 Installation

3.1 General

This part of the manual contains procedures for installation of the MCPA equipment on site with cable installation and power up. The MCPA shall be installed at the bottom position of the RBS 884M 19-inch equipment cabinet.

If the MCPA unit shall be installed in an equipment cabinet with RBS Cabinets already installed, the RBS cabinet must be dismounted and before new MCPA is mounted.

3.2 Safety Considerations

3.2.1 Grounding of the MCPA Cabinet

The MCPA-kit cabinets must be connected to the DC power mains through a special power cable min. 16 mm² (Red). A ground cable 16 mm² (Blue) shall be firmly connected to the site grounding system.

DANGER!

Any interruption of the protective (grounding) conductor, or disconnection of the protective ground terminal will cause a potential shock hazard that could result in personal injury.

3.2.2 Radio Frequency Radiation

DANGER!

Radio frequency radiation from an antenna may be a danger to health, causing severe burns to skin and clothing.

Tell the MSC to switch off the transmitters if you work with or near antennas.

3.2.3 Tool List

In the following list, all the tools needs to install the MCPA, to connect the power cable and grounding cables and to perform power up, are shown.

Table 1. Tool list

Product Number	Description
LSA 126 11/30 /70	Torx Screwdriver TX30 + TX20
	Posidrive no. 1, small posidrive no. 0
LTT 601 82	Torque Set with SMA tool (for the coaxial cables)
	DC Voltmeter (for checking the line voltage)
	RF Power measuring equipment
	Cutter
	Metric Tape Measure
LYB 250 01/14	EDS Wrist Strap and Cable
	14 mm block socket wrench

3.3 Installation in an 19-Inch Equipment Cabinet

This section describes the procedure for installing MCPA unit, in a 19-inch equipment cabinet.

Two types of installations are available:

1. Installation in an already, with RBS cabinet installed, 19-inch equipment cabinet.
2. New installation of MCPA in an empty space in a 19-inch equipment cabinet.

3.3.1 Installation of MCPA

Recommended place for the MCPA installation is the lower part in the cabinet. For dismounting of installed equipment please refer to the RBS 884M Installation and Maintenance Manual.

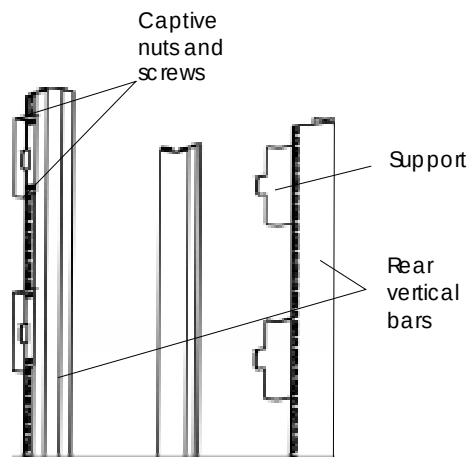
In the mounting kit NTM 20269/1/2/3 for the MCPA, all the materials needed for mounting the MCPA in the 19-inch equipment cabinet, such as captive nuts supports, bolts, and fun unit are included.

Caution!

Use only the designed bolts (included in the grounding and mounting kits) for insertion in the RBS cabinets and MCPA unit. The equipment inside the cabinet unit can be damaged if the bolt used is too long.

3.3.1.1 Mounting of support for fan cabinet {TC "Mounting of support for fan cabinet"}

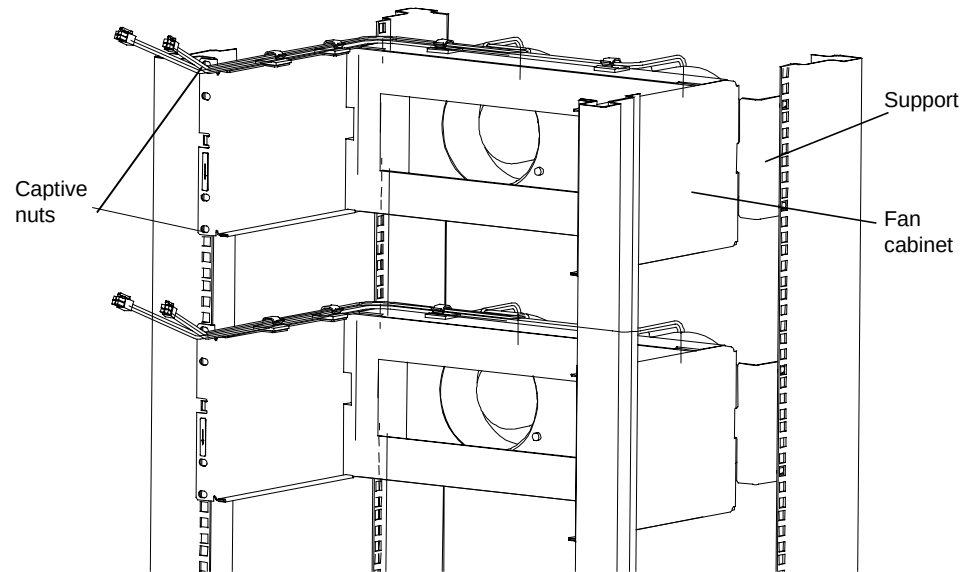
Two supports shall be mounted at the rear vertical bars for each fan cabinet. The supports are used as guide pin for the fan cabinet.



Figur 4 Mounting of supports at the rear vertical bars

3.3.2 Mounting of brackets including fan unit

For the brackets including fan unit mount captive nuts, four nuts at each side of each bracket as described in the next steps. See the following figure.



Figur 5 Mounting captive nuts for the cabinet right side angle brackets in the 19-inch equipment cabinet

1. Mount eight captive nuts for the upper of the fan cabinet (four of the captive nuts are used for MCPA) in the front vertical bars.
2. Mount the upper fan cabinet. Note that the guide pin at the supports shall be put in the two locating slots at the back of the fan cabinet.
3. Mount screws at the front, two at each side, in the uppermost and lowermost screw-holes.
4. Mount eight captive nuts for the lower fan cabinet. Start at hole four below the upper cabinet of the vertical bar.
5. Mount the lower fan cabinet as described above.

3.3.2.1

Installation of Mains power cables

The MCPA:s shall be feeded with +27V. Two cables with min. 16 mm² area shall be used, one red for +27V and one blue for ground. The maximum length of the cables must not exceed 10 m.

Note!

If two MCPA is used (100W) two cables for +27V and ground must be installed.

The mains power cables shall be mounted with a power connector type xxxx.

1. Strip the shield of the cables about 10 mm at the connection end.
2. Mount one connector metal sheet on each cable.

3. Mount the metal sheet in the connector housing with the red cable in + and the blue cable in -pole.
4. Connect the extra power adapter cable xxxx to the mains power connector for MCPA1 (and 2).
5. The mains power cables shall be inserted in the cabinet from the rear and be pass through to the front of the cabinet above HPC/LPS for MCPA1 and below HPC/LPS for MCPA2.
6. Attach the power cables by use of cable straps at the rear of the cabinet, in suitable position.

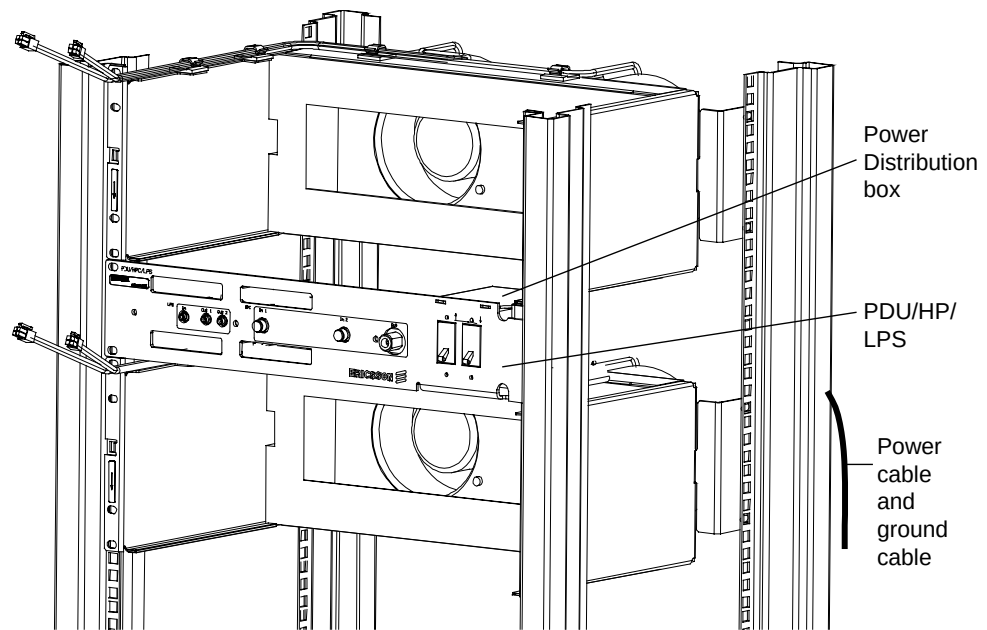
3.3.2.2

Mounting of HPC/LPS{TC "Mounting of PU/HPC/LPS"}

The HPC/LPS shall be mounted between the two fan cabinets.

1. Mount four captive nuts for the HPC/LPS in the front vertical bars, two nuts at each side.
2. Before mounting the HPC/LPS, the power cables must be mounted, see section 3.3.4.2
3. Mount the cables on the HP/LPS-unit as described in section 4 before the HPC/LPS unit is mounted in the cabinet.
4. Mount the HPC/LPS by use of four screws at the front panel.

Figure Mounting of HPC/LPS with cables. Note the cable layout.



Figur 6 HPC/LPS mounting

3.3.2.3

Mounting of MCPA front cover

The MCPA shall be mounted with a front cover which is included in the installation kit, before they are installed in the fan cabinets.

1. Mount the front cover to the front of the MCPA.
2. Mount the four screws (two at each side) of the front cover.

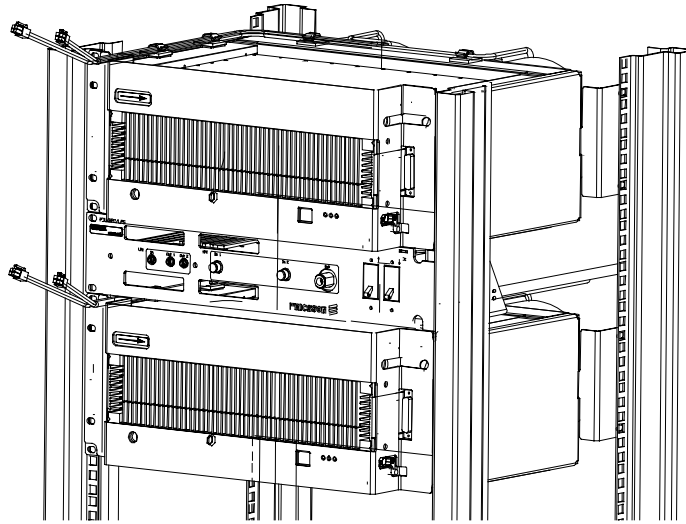
Note.

One of the screws is used for chassis ground cable. See section 4. Cabling.

3.3.2.4

Mounting of MCPA in the fan cabinets

1. Slide in the first MCPA in the upper cabinet.
2. Mount the four screws at the front of the MCPA.
3. Slide in the second MCPA in the lower cabinet.
4. Mount the four screws at the front of the MCPA.

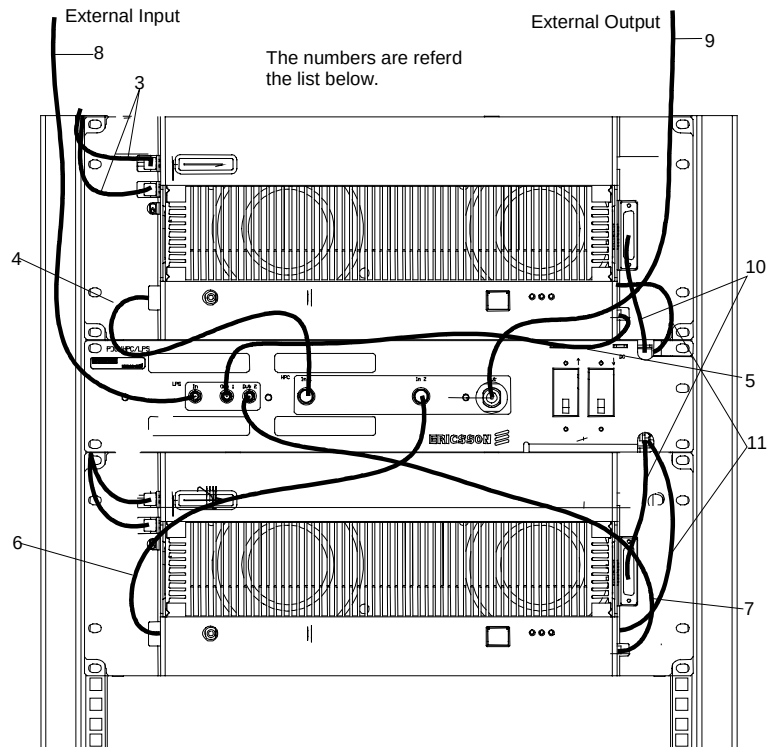


Figur 7 Mounting of MCPA

4

Cabling of the MCPA and HPC/LPS{_{TC}

"Cabling of the MCPA and PU/HPC/LPS"



Figur 8 MCPA HPC/LPS cabling

The MCPA and HPC/LPS shall be cabled as the description below, see figure 12:

1. Connect the two fan cables to the MCPA 1 and 2, connector FAN 1 and FAN 2. (3)
2. Connect the MCPA 1 RF OUT (left side) to the HPC IN 1 connector. (4)
3. Connect the MCPA 1 RF IN (right side) to the LPS OUT 1 connector. (5)
4. Connect the MCPA 2 RF OUT (left side) to the HPC IN 2 connector. (6)
5. Connect the MCPA 2 RF IN (right side) to the LPS OUT 2 connector. (7)
6. Connect the external input cable to the LPS IN connector. (8)
7. Connect the external output cable to the HPC OUT connector. (9)
8. Connect the power cables to the DC-connector on each MCPA. (10)

9. Connect the chassis ground cable to the lower screw for the MCPA front panel, place a locking washer on the screw. (11)
10. If only one MCPA is used. The extra Alarm cable shall be fixed to the cabinet by use of cable strap.

5 Installation Test

The installation shall be tested by power on.

WARNING

The output connector must be connected to the antenna before power on.

1. Put on the power on by pressing the push button on the left side of the MCPA.
2. Check the LED indicators see 2.9.

6 Maintenance

For ordinary maintenance and trouble shooting please refer to RBS 884M Installation and Maintenance Manual.

6.1 Replacement of HPC/LPS

6.2 Replacement of MCPA

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