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Ericsson GSM System
version R4, R5, R6 and R7

RBS 200

INSTALLATION ENGINEERING MANUAL

Module IE

LZN 302 011 R6A

Uppgjord — *Prepared*	Faktaansvarig — *Subject responsible*	Nr — *No.*		
ERA/LRN/ZG		1/001 51-LZN 302 011 Uen		
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CME 20 RBS 200 IE, List of Documents

1 List of Documents

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ERA/LRN/ZIC (Per Eklund)		1999-09-14	B	

Introduction

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1 Introduction

1.1 Objectives

The manual contains information describing the procedure and all equipment required for planning for the installation of the Base Transceiver System, BTS. This manual is a tool for installation engineering personnel. It is divided into descriptions of the following equipment:

- RBS
- TRI
- Power
- Indoor and outdoor equipment

Sometimes it is, however, necessary to return to the source document to obtain a better understanding.

Refer to the table below:

Table 1

Product Number	Document Designation
LZN 302 006	Installation Manual, Module G
LZN 302 041	Spare Part Catalogue, Module S1
EN/LZB 119 2935	Rules and Methods for Installation Engineering
LZN 302 039	Standard Site Material Catalogue
LZN 302 49	General Installation Instructions

Note Use PRIM for correct and updated information.

Note The IE-module is backwards compatible.

1.2 Required references

- Installation Manual, module G, LZN 302 006.
- General Installation Instructions LZN 302 49. It includes information about:
  - Antenna feeders and jumpers
  - Cable ladders
  - Earthing principles

- Optical Fiber Connectoring Connectoring
- 75 Ohm Coaxial Cable Connectoring
- Recommended Tools

- Power Supply Appendices with the wiring and circuit diagrams; 1/1073-BZZ 207 01 Ux, 2/1073-BZZ 207 01 Ux, 1911-BZZ 207 01 Ux and 1911-BZZ 207 10 Ux have been removed from the manual. See reference page in the chapter.
- Antenna Configuration Guidelines; LV/R-97:029 has been removed from the manual. See reference page in the chapter.
- Ordering Information; 131 62-BZZ 207 01 Uen has been removed from the manual. See reference page in the chapter.

1.3 Audience

The audience for this manual is all Ericsson personnel involved in installation planning. In projects where the customer also participates in the installation process, the manual can also be used by him.

The manual is built up under the assumption that the supervisors and installers have:

- a thorough knowledge of Ericsson material
- basic knowledge of:
  - Radio techniques
  - Antenna techniques
  - Data transmission
  - Speech transmission
- attended courses in:
  - CME system survey
  - Cell planning

1.4 Scope of work

The concept Engineering or Installation planning shall always include at least the following activities:

- Definition of the contract, Bill of Quantity, and so forth, in order to determine the system configuration
- Detailed configuration of each site
- Detailed material planning
- Ordering of material and tools
- Time schedule for the material delivery in relation to the installation schedule
- Production of installation documentation and "as built" drawings to be used in the site specific C- Module

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CE Declaration of Conformity Valid for RBS 200

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1 CE Declaration of Conformity Valid for RBS 200

P001344A

Figure 1 CE Declaration of Conformity

Product type:	HRB 103 306
Model number:	HRB 103 306
	1/HRB 103 020 (RBS 200 Hardware)

The product specified above confirms to the following European and International standards:

EN 60 215/IEC 215	Safety requirements for Radio Transmission Equipment
EN 60 950/IEC 950	Safety Information Technology Equipment including Electrical Business Equipment
pr ETS 300 342, June 1993	Radio Equipment and Systems (RES); Electro-Magnetic Compatibility (EMC) for European digital cellular telecommunications system (GSM) mobile radio and ancillary equipment

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Trouble Report Instruction

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1 Trouble Report on Equipment or on this Manual

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

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

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

1.1 Example of Filled-in Trouble Report

Trouble Report

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

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

03_0179B

Figure 1 Example of filled-in trouble report

1.2 Trouble Report, Blank

Trouble Report

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

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

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Figure 2 Trouble report, blank

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ERA/LRN/ZGC (Leif-Olof Fager)		1999-10-07	B	

System Description

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1 General

The purpose of this document is to describe the different units located in the RBS 200 cabinet.

The functions and relationships between the different hardware units will be explained, and information which is believed to be of special interest for the engineering procedure, has been added. Information considered unnecessary has been excluded.

In consequence, this document contains extracts from several official descriptions which have been adapted to installation planning demands.

However, as system planning requires a great need for information, it is advantageous to have easy access to the following source documents:

- Documentation

  For reasons mentioned above, a list of Supplementary documentation is listed in Chapter 0; "Introduction".

- Traffic flow

  Diagram showing the internal traffic flow is included in the Appendix, found at the end of this document.

- Abbreviations

  A Glossary is included in Chapter 8.

1.1 Definitions

Generally, definitions and abbreviations stated by GSM are used in this document.

However, some clarifications to avoid misunderstandings are necessary.

- Radio Base Station 200 (RBS 200) is an Ericsson product name for the GSM Base Transceiver Station (BTS), based on the GSM specification. It includes all radio and transmission interface equipment needed on a radio site.

- Transceiver Group (TG) is the part which includes all radio equipment connected to one or two transmission antennas.

- Base Transceiver Station (BTS), is the equipment needed to maintain traffic in one cell.

- Base Station Subsystem (BSS), performs the radio related functions of CME 20 and includes BSC and BTSs.

- Operation and Support System is the part of CME 20 that assists the operator in handling the system. It consists of Cellular Maintenance Application System (CMAS), which is part of the product family TMOS. Operation and Maintenance Centers contain workstations and terminals.

2 System structure - summary

2.1 The Ericsson Cellular Mobile Telephone System CME 20

CME 20 is the Ericsson system name for a Pan European cellular mobile telephone system based on GSM specifications.

The CME 20 is the GSM system operating on the 900 MHz band.

CME 20 is separated into three systems:

- Switching System (SS)
- Base Station System (BSS)
- Operation and Support System (OSS)

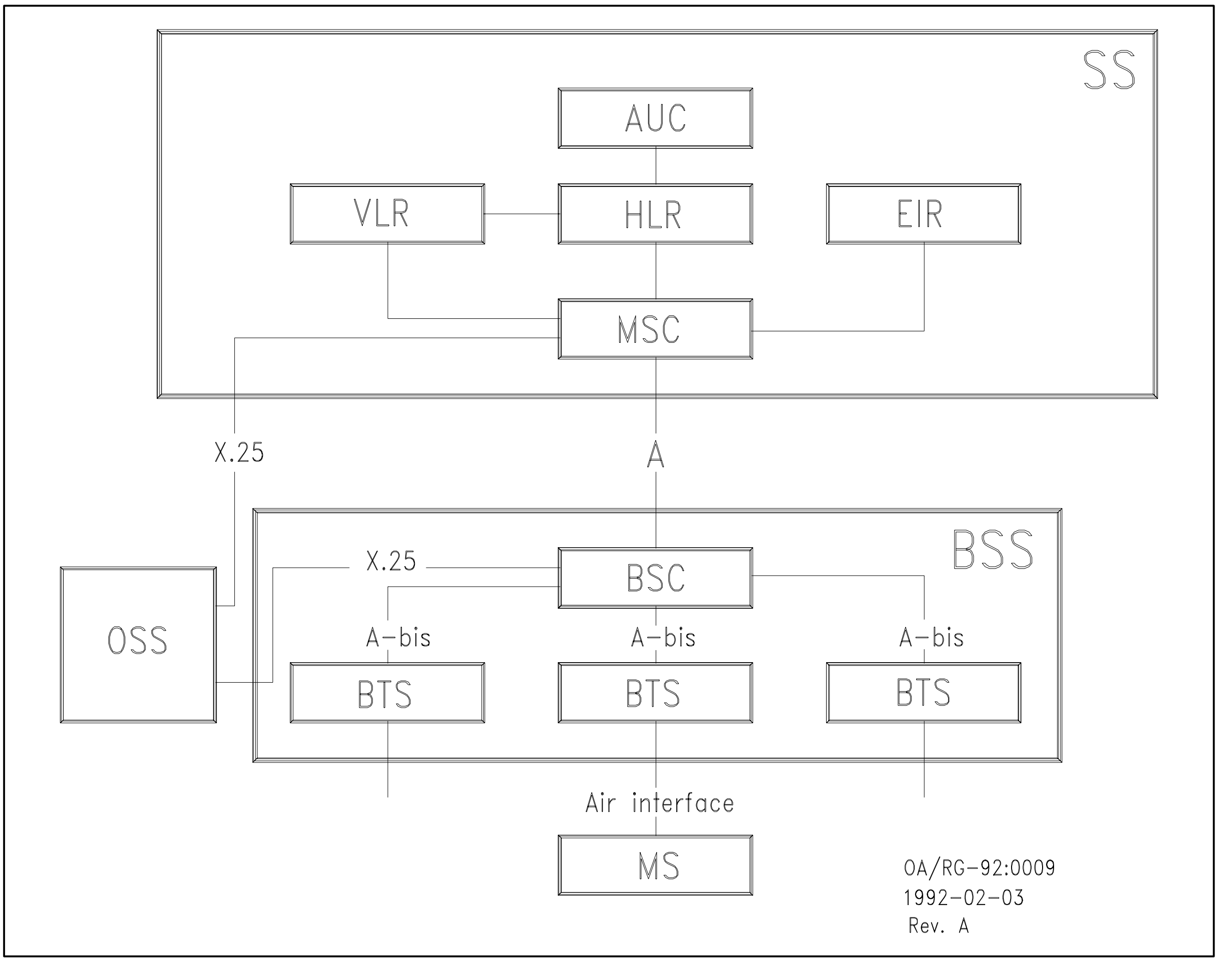


Figure 1 System structure, block schematic

The call processing and subscriber related functions are implemented in the SS, while the radio related functions are concentrated in the

BSS. The OSS supports the operation and maintenance activities required.

2.1.1 Switching System (SS)

The Switching System (SS) is responsible for the switching between the mobile subscribers PLMN and other networks (PSTN/ISDN/ CSPDN/PSPDN).

It handles all call based data such as number analysis, charging and call statistics. It is also responsible for the management of the mobile subscribers and maintains information concerning their locations, required to route a call to the subscriber.

The SS is also responsible for the management of all subscription data and handling of various subscriber services. It also manages the authentication keys and calculates the ciphering key associated with each subscriber.

The Switching System (SS) includes the following network elements, all based on Ericsson standard AXE technology:

- Mobile Services switching Center (MSC)
- Home Location Register (HLR)
- Visitor Location Register (VLR)
- Authentication Center (AUC)
- Equipment Identity Register (EIR)

In CME 20, the VLR and MSC are integrated.

2.1.2 Operation and Support System (OSS)

The OSS is responsible for the centralized and distributed operation and maintenance of the CME 20 network. It works as an intelligent interface between the network elements MSC, BSC and HLR and network operators, ensuring that the handling of configuration parameters, measurements and subscriptions are performed in a consistent and well defined way.

The OSS handles this from a network point of view, thus adding functionality, as compared to the proper operation and maintenance facilities offered by the individual nodes in themselves.

This is done by using a data base oriented network model of CME 20 entities and their properties, including a complete logical model of the radio network environment.

The network elements MSC, BSC and HLR are connected to the OSS via a separate, dedicated O&M network, based on CCITT X.25 links.

As the call processing capabilities of a CME 20 network are not affected by the absence of an OSS, it is possible to operate small networks without an OSS. Large systems will, however, in practice, be too complex to handle without an OSS.

2.1.3 Base Station System (BSS)

The Base Station System (BSS) takes care of all radio related functions in the CME 20 system. The BSS handles radio communication with the Mobile Stations (MS) within the service area, and also takes care of paging and handover procedures for the Mobile Stations.

The BSS is futhermore responsible for the management of all radio network resources and cell configuration data. The BSS also controls the power levels of radio emission both in the base stations and in the mobile stations.

The BSS is made up of the following network elements:

- Base Station controller (BSC)
- Base Transceiver Station (BTS)

The BSC is based on Ericsson AXE technology, whereas the BTS is made up of specialized components.

All allocation of resources and selection of different working modes and states in the BTS is controlled by the BSC. The BTS supervises itself and reports faults to the BSC.

In this document, matters of interest for implementation of the BTS will be dealt with below.

3 Radio Base Station RBS 200

The Radio Base Station RBS 200 is the Ericsson product name for the CME 20 Base Transceiver Station (BTS) operating on the 900 MHz band. It includes all radio and transmission interface equipment needed on a radio site.

The RBS 200 comprises the following major functional units, housed in one or more 19" cabinets, depending on the configuration of the site:

- Transmission Radio Interface (TRI)
- Transceiver Group (TG) or Transceiver Groups (TGs)
- Local Maintenance Terminal (LMT)
- Power Supply system

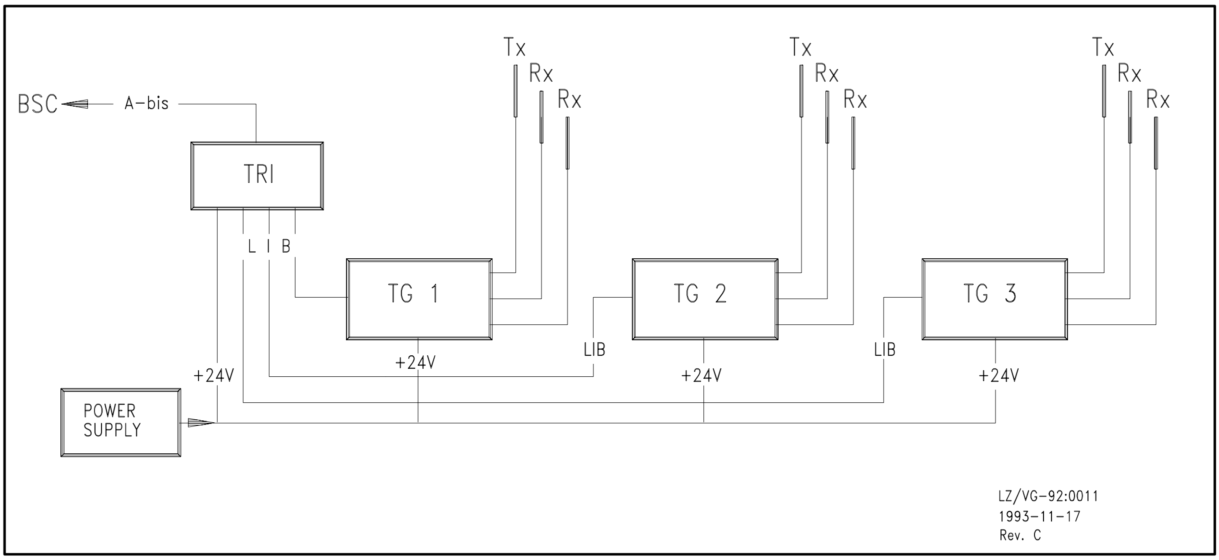


Figure 2 Radio Base Station RBS 200, block diagram

TRI is a switch, providing means to make a flexible connection between the BSC and TG.

LMT, which is a user interface for operation and maintenance functions, can be connected directly to each TG or via the TRI to the BSC.

TG, Transceiver Group, corresponds to the TRXs connected to each other with internal buses (maximum 16).

The Power Supply System includes all power supply equipment at a site.

In the Appendix, a traffic flow of a transceiver group is shown, to facilitate the understanding during the following reading. A brief description of the functional units and hardware build up follows in this chapter.

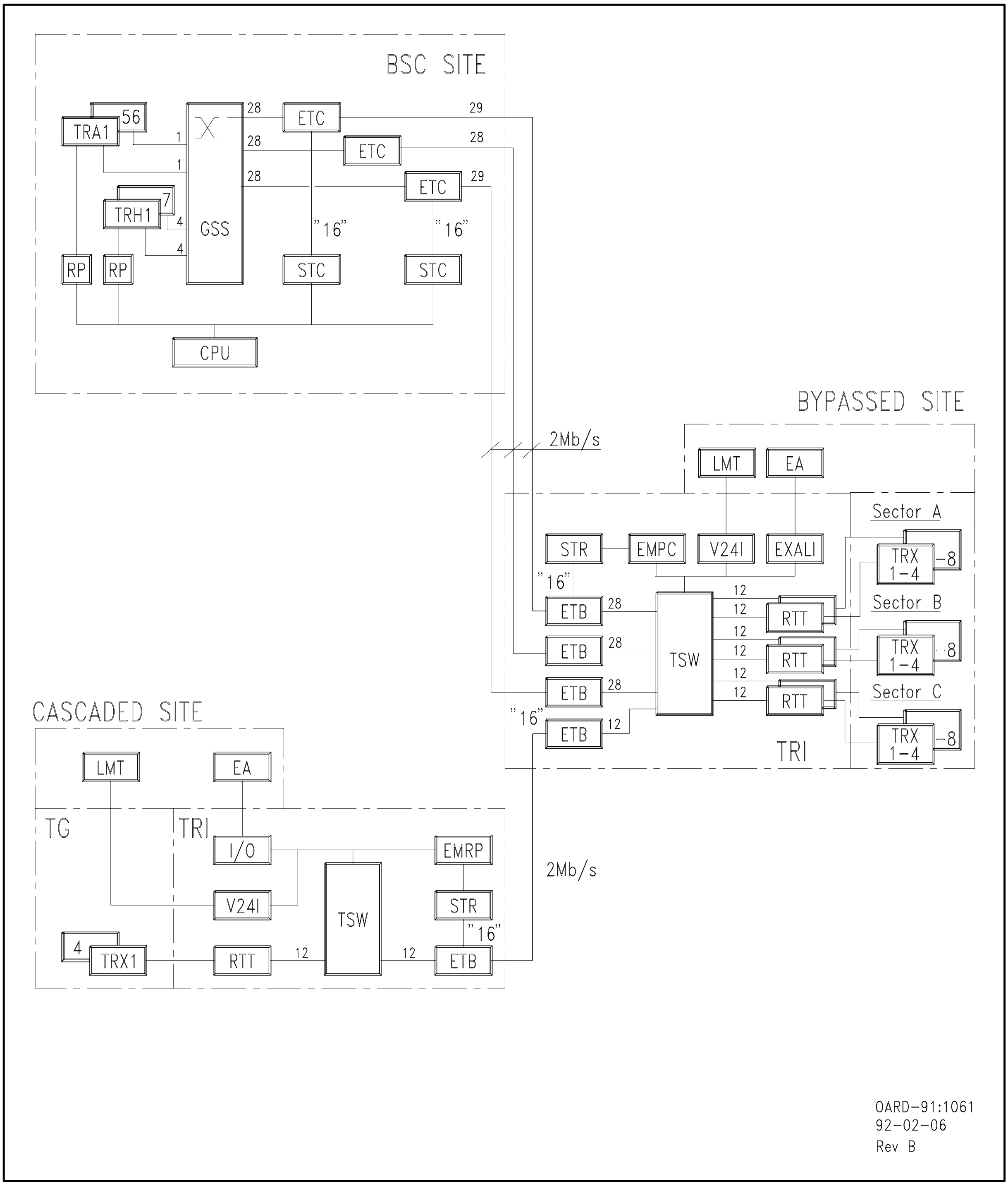


Figure 3 Block diagram

3.1 Transmission Radio Interface (TRI)

See Chapter 2, section 2, TRI, for more detailed information.

Functional unit TRI is a part of the RBS 200 system, handling communication between the BSC and one or more TGs on a radio site.

TRI can also be used as a transmission node for cascaded RBS sites.

The block diagram in figure 3, shows the buildup of the TRI, the interface to the TG and how it communicates with the BSC and other cascaded RBS sites.

TRI communicates with BSC and/or cascaded RBS sites via 2 Mbit/s PCM links in accordance with CCITT Rec. G.703.

On one PCM link, 32 timeslots (TS) are multiplexed. TS 0 is used for synchronization and TS 16 is used for signalling purposes (to control the traffic) which leaves 30 TSs for speech. Each of these 30 TSs, has a bit rate of 64 kbit/s.

TRI offers the possibility to drop and insert individual 64 kbit/s time slots to the base station. The 2Mbit/s PCM link is connected to the Exchange Terminal Board (ETB). One PCM link/one ETB.

TS 16 is extracted from the first ETB and used for control signals via the STR board to the EMPC. The interface board for the Local Maintenance Terminal (LMT) and the I/O board for External Alarms (EXALI), will also use this channel for communication with the BSC.

The remaining TS will be connected to the Time Switch (TSW) and allocated to the Transceivers (TRXs) via RTT. Each TRX requires three time slots (3 x 64 kbit/s) and the Radio Transceiver Terminal (RTT), can handle up to four TRXs.

It is possible to use any remaining time slots for cascaded RBS sites.

Communication with cascaded TRI is handled by additional ETB board(s).

If redundancy of the signalling link is required, then one extra ETB board and STR board are automatically needed. The second STR board takes care of the "new" TS 16.

The TRI is initially equipped for:

- one Power Converter +24 V DC/-48V DC, +5 V DC, -5 V DC.
- one Extension Module Regional Processor (EMPC)
- one Signalling Terminal Regional (STR).
- one Interface board V24.

- one I/O board for connection of max 32 alarms (EXALI).
- one ETB board.
- one RTT board
- one TSW board

Mechanical build up and interconnection of TRI is shown on enclosed assembly drawing, under section Transmission Radio Interface, TRI.

There are eight free board positions in the TRI magazine, of which two are assigned for ETB boards. (See Chapter 2, section 2, TRI)

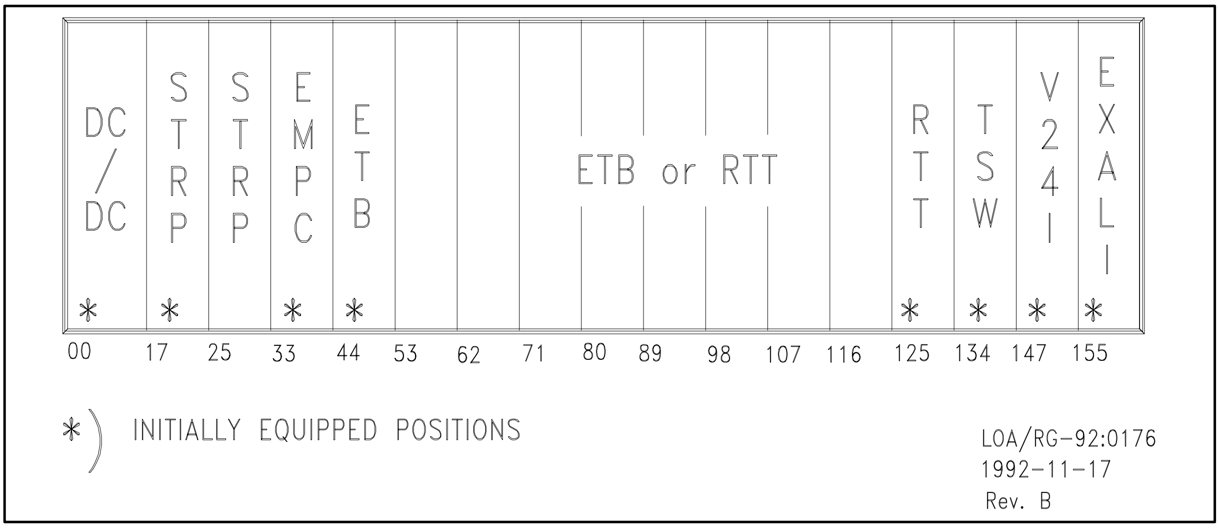


Figure 4 Layout of TRI magazine, initially equipped

3.2 Transceiver Group (TG)

The Transceiver Group, TG is made up of a number of Transceivers, TRXs, interconnected with internal buses, and normally serving one radio cell.

The TG can include up to 16 transceivers (TRXs).

The following block diagram shows one possible configuration of a TG.

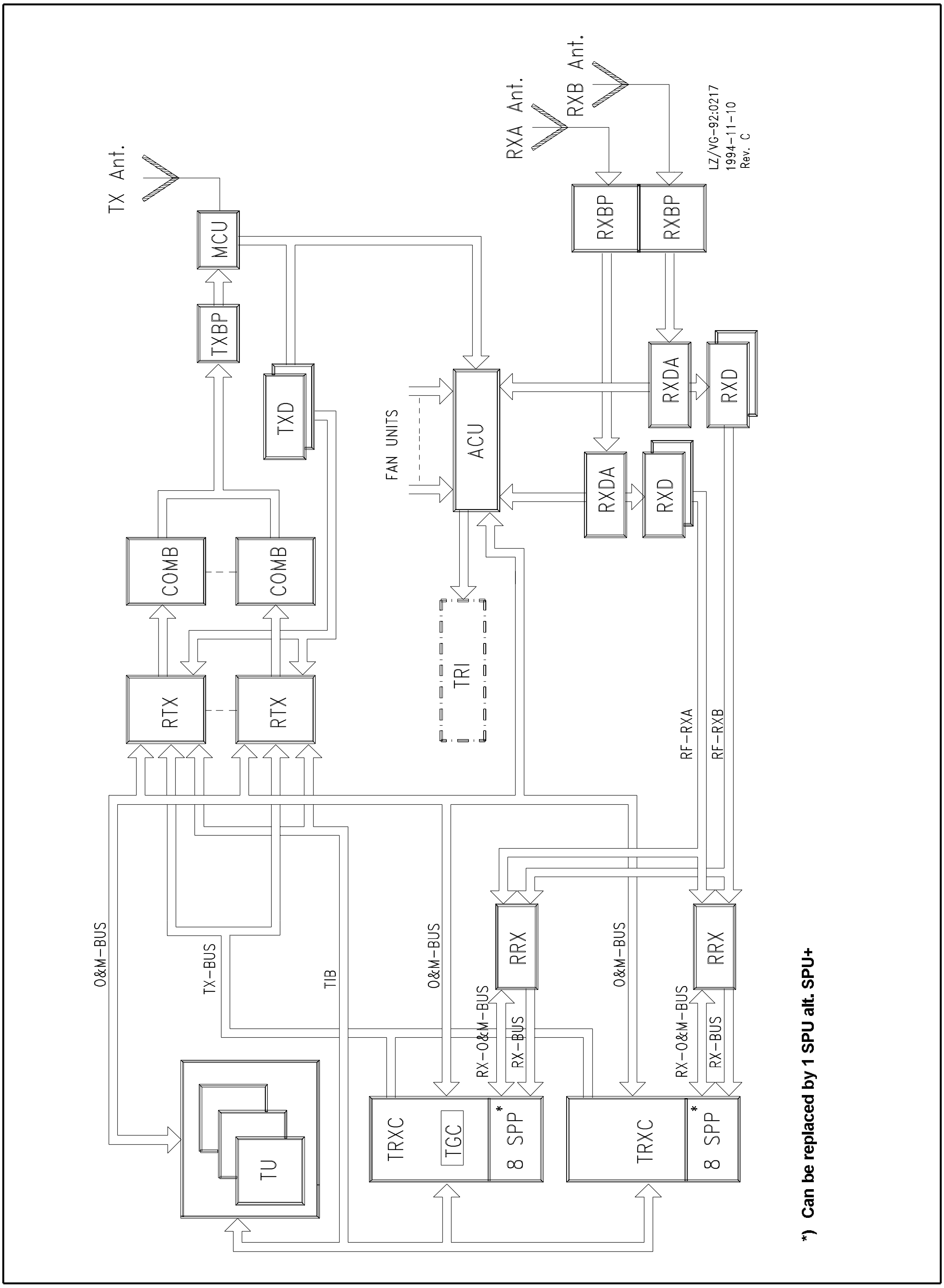


Figure 5 Transceiver Group block diagram

3.2.1 Transceiver, TRX

Each TRX serves eight full rate duplex channels and consists of six different hardware (HW) units:

- one Transceiver Controller (TRXC)
- eight Signal Processing Parts (SPP) alt. one Signal Processing Unit (SPU)
- one Radio Receiver (RRX)
- one Radio Transmitter (RTX)
- one Transceiver Converter (TRXCONV)
- one RTX Power Filter (RTXPF)

A TRX block diagram is shown in figure 6.

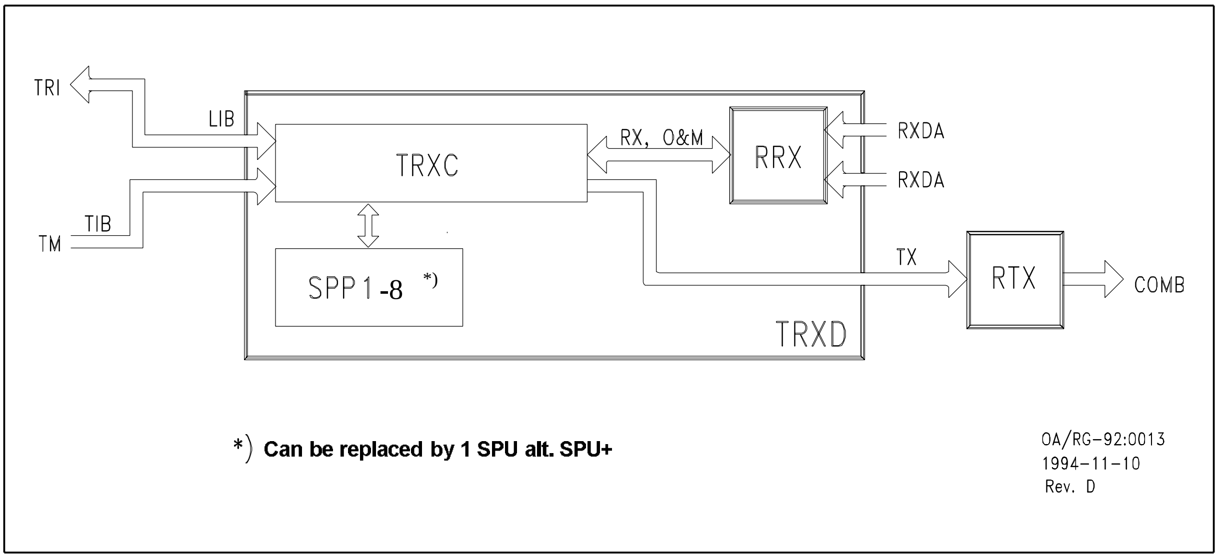


Figure 6 Transceiver, TRX, block diagram

The TRXC, eight SPPs, TRXCONV and RRX are mounted in the same TRXD magazine. RTXs and the RTXPFs are located in the RTX magazine.

One-half of the TRXD magazine includes all digital processing hardware (HW) for one TRX, and is built up with eight signal processing parts (SPP) for encryption/decryption of speech/data, one control part (TRXC) and one DC/DC converter (TRXCONV), which also supplies the RRX with power.

TRXC communicates with TRI and further to BSC on three 64 kbit/s time slots. One time slot is used for control signals while the others are used for speech.

3.2.2 Transcoding

To save transmission capacity between the RBS 200 and the BSC, eight speech channels, each communicating on 16 kbit/s towards the Air Interface, are multiplexed/demultiplexed 4 + 4 into the two 64 kbit/s time slots. In the BSC, they are again multiplexed/demultiplexed in the Transcoder and Rate Adaption Unit (TRAU). See also section Transmission Radio Interface, TRI.

3.2.3 Transceiver controller, TRXC

TRXC is the control part of the TRX. Transceiver Group Controller (TGC) is the software (SW) function which handles common control functions in the TG. Common control functions are distributed in the entire TG but controlled from the TGC. TGC is loaded into all TRXCs for redundancy purposes. Only one TGC function is activated at a time, controlled from the BSC.

3.2.4 Signal Processing Part, SPP

Eight SPPs make up the signal Processing Part of the TRX. The SPP handles communication with TRAU, channel coding/decoding (frame structuring), diversity (equalisation), ciphering/deciphering, etc.

SPP can be used as a control channel or as a speech channel.

3.2.5 Signal Processing Unit, SPU

SPU alt. SPU+

The SPU is the signal processing part of the TRX. It handles communication with the TRAU, channel coding/decoding (frame structuring), diversity (equalisation), ciphering/deciphering etc.

One SPU can handle eight time slots and thus replaces eight SPPs. The SPU channels can be used for control and for speech.

SPU+ with SPE

The SPU+ can be modified with an SPE daughter board (piggy-back) to allow for half-rate function.

SPU++

The SPU++ combines the SPU+ and the SPE functions in one unit.

3.2.6 Radio Receiver, RRX

RRX is the radio part for receiving. RRX is divided into one control part and one radio frequency part.

The radio frequency part consists of two receivers in parallel, providing for space diversity reception.

The RRX comprises two frequency hopping synthesizers, common for the two channels, which work alternately to permit hopping on a time slot basis, see further para. 3.5.

3.2.7 Radio Transmitter, RTX

The transmitter is the radio part for transmitting. The RTX is divided into one control part, one radio frequency part and one power amplifier part.

RTX comprises functions for tuning radio frequency, controlling auto tuning functions when filter combiners are used, and regulating output power. Since the power amplifier is remotely controlled, it is possible to adjust output power from the BSC. Maximum output power is 45 Watts.

RTX contains two frequency hopping synthesizers, which can work alternately, hopping on a time slot basis. See further para. 3.5.

3.2.8 Radio Transmitter Power Filter, RTXPF

When the power is ramped up/down on a time slot basis in the 45 Watt RTX, power supply voltage must be filtered to avoid interference. One RTXPF serves one 45 Watt RTX.

3.2.9 Radio Transmitter Power Booster, RTXPB

The RTXPB combines the RTXPF function with a constant supply voltage of 26.5V DC to the RTX at an input voltage range of +20 V to +32 V DC.

3.2.10 Transceiver Converter, TRXCONV

The TRXCONV converts +24 V DC to +5V DC and +12 V DC for TRX internal use.

For mechanical buildup of the TRXD magazine together with the necessary interconnection, see section Units in BTS in this manual.

3.2.11 Transceiver Tester, TRXT

The Transceiver Tester is used to check the cell functionality during operation. It operates as a Mobile Station directly connected to the Radio Base Station. Signal strength and quality of all traffic channels in specified cells are tested and supervised. Emitted output power and bit error rate are also checked. Untypical status is reported to the BSC. All activities are ordered from the BSC.

A bi-directional passive network provides the necessary signal adaptation to achieve test loop signal levels representative for normal uplink and downlink traffic operation.

One TRXT is used for each cell and consists of two plug-in units: the TRXT M (Master) and TRXT A (Adapter) units.

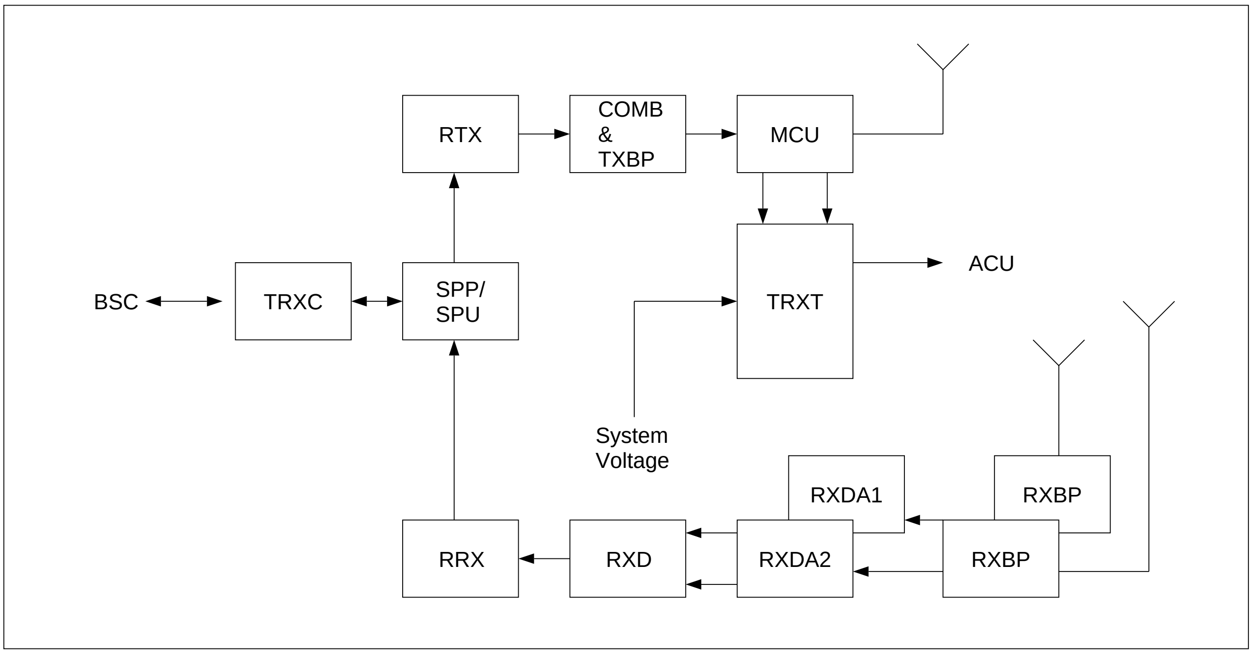


Figure 7 Transceiver Tester, TRXT, block diagram

3.2.12 Timing module, TM

The TM module provides the TG with a timing reference and synchronizing signal, which it derives from the incoming PCM clock. This reference is used to obtain high accuracy for the transmitter and receiver frequencies. TM also takes care of the frame synchronization and the absolute frame number on the air interface.

The Timing Module consists of the Timing Module Connection Board, TMCB and three Timing Units, TUs, for redundancy purpose.

The generated time reference from the TM, is distributed via a Timing Bus TIB, using a 12-pair internal bus cable for connection of TRXC, ACU and RTX in the TG.

If there is more than one TG on a site, the TM in an RBS 200 cabinet can serve as a master, which produces the signal TG sync for other cabinets on the site, including RBS 2202 cabinets.

For further information about co-siting RBS 205 and RBS 2202 cabinets, see:

Co-siting RBS 200/2000 with TG Synchronization	*LZN 302 27*

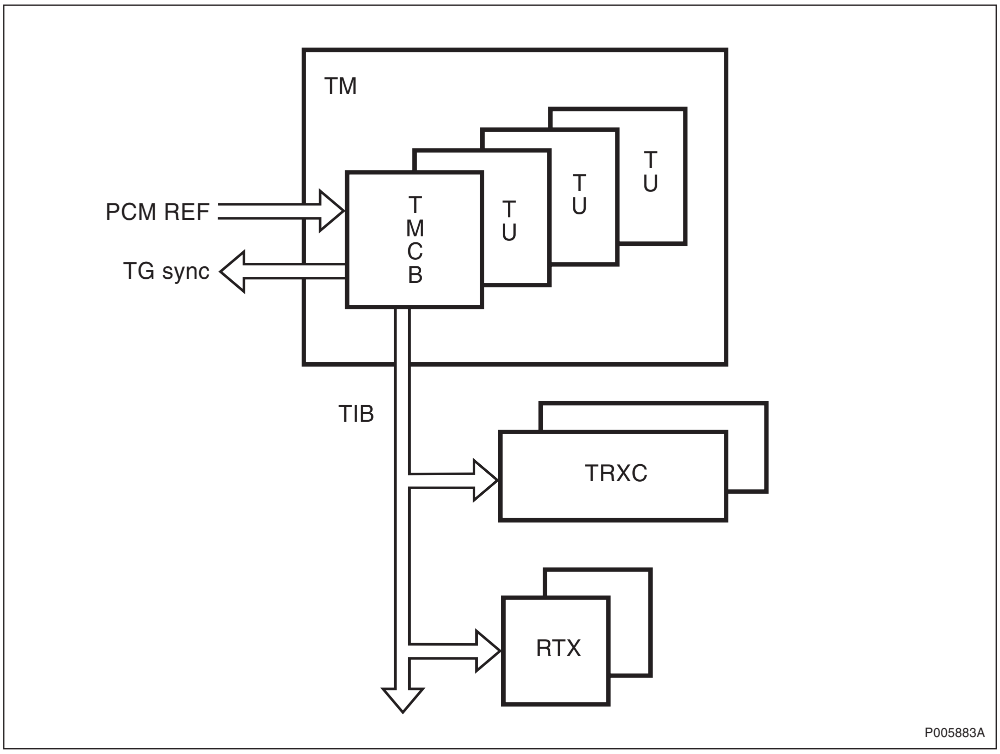


Figure 8 Timing Module (TM) block diagram

3.2.13 Alarm Collection Unit, ACU

The ACU supervises the TG common equipment and reports to the EXALI located in the TRI.

The supervised equipment is:

1. RXDA (1-2)
2. TX antenna
3. Fan units

There is one ACU per TG.

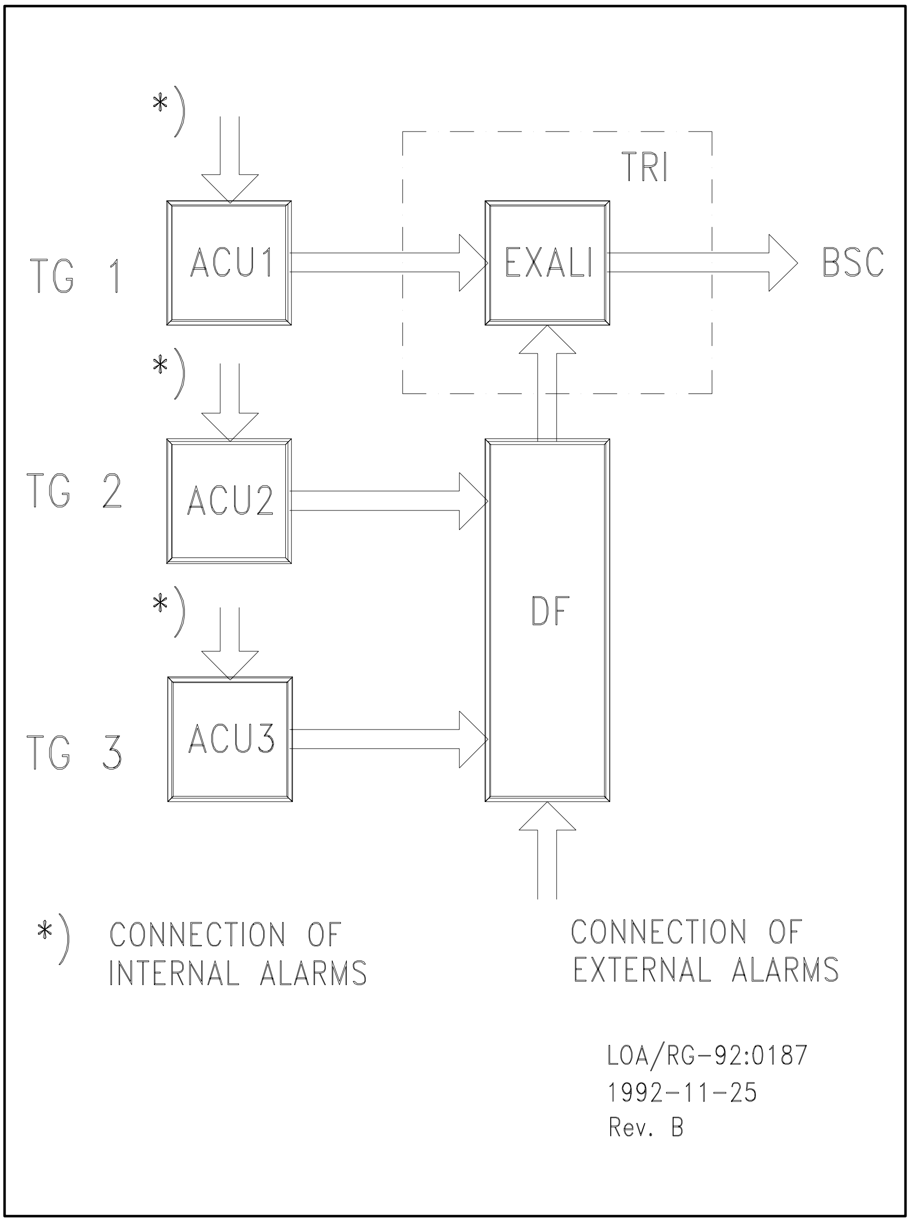


Figure 9 Alarm supervision by the ACU, block diagram

3.3 Transmitter Combining System

Two versions of combiner systems are available, either a hybrid combiner system for connection of maximum four RTXs to a common TX antenna, or a filter combiner system for connection of up to 16 RTXs to a common antenna.

3.3.1 Hybrid Combiner, HCOMB

The Hybrid Combiner is a broad band combining unit, expandable on a modular basis to handle up to four RTXs.

HCOMB comprises two different types of modules: the HCOMB (2TRX) and HCOMB (2+2). If only one or two TRXs are used, the combiner system will look like the left hand side of figure 10. With three or four TRXs the combiner system will look like the right hand side of figure 10. HCOMB (2+2) is used for connection of two HCOMB to one common antenna.

When only one TRX is used, it is possible to prevent the output signal from passing through the HCOMB. By doing so, the output power will be raised, thus increasing the radio coverage area.

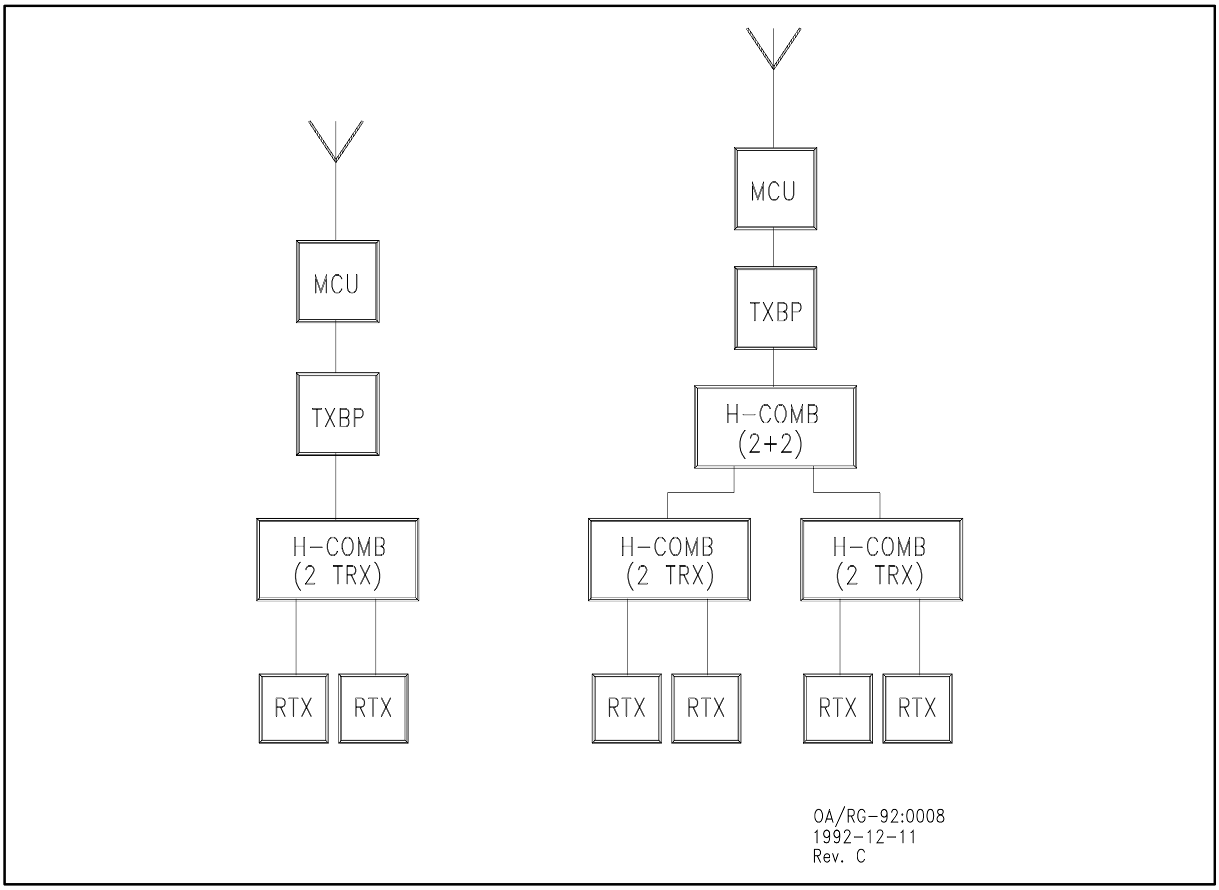


Figure 10 HCOMB with 2 RTXs, left, and 4 RTXs, right

3.3.2 Filter Combiner, FCOMB

The unit contains a two-channel filter combiner. Center frequency of each filter is tuned and controlled by the RTX. Modules are autotuned to facilitate easy system retuning.

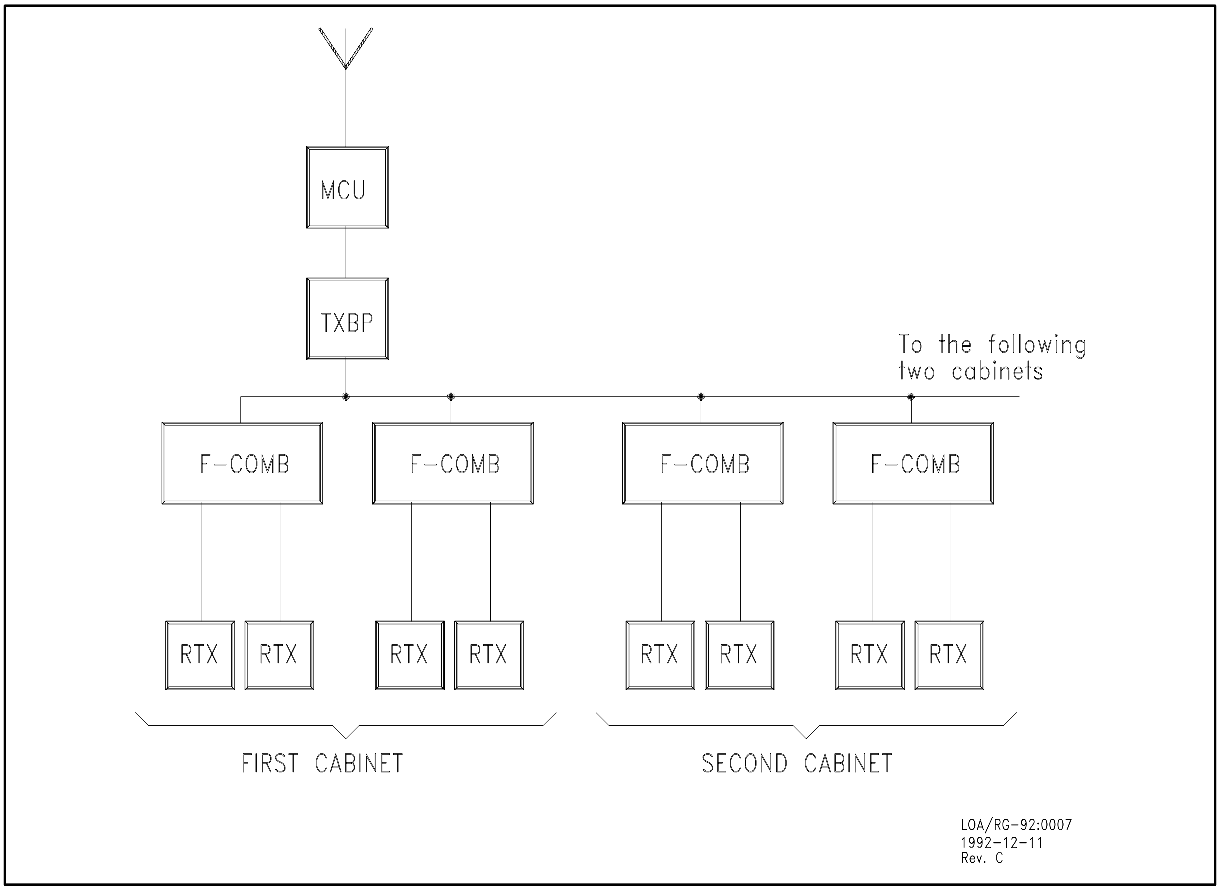


Figure 11 Filter Combiner, F-COMB

3.3.3 Transmitter Bandpass Filter, TXBP

The purpose of the filter is to attenuate transmitter noise and intermodulation products outside the transmitter band. Max. transmitted power is 500 Watts.

3.3.4 Measuring Coupler Unit, MCU

The MCU is a directional coupler. MCU supplies TXD with an RF signal, representing forward power, and the ACU with RF signals, representing forward and reflected power, used for TX antenna supervision. The ACU reports an alarm if the ratio between forward and reflected power (VSWR) differs from the preset value.

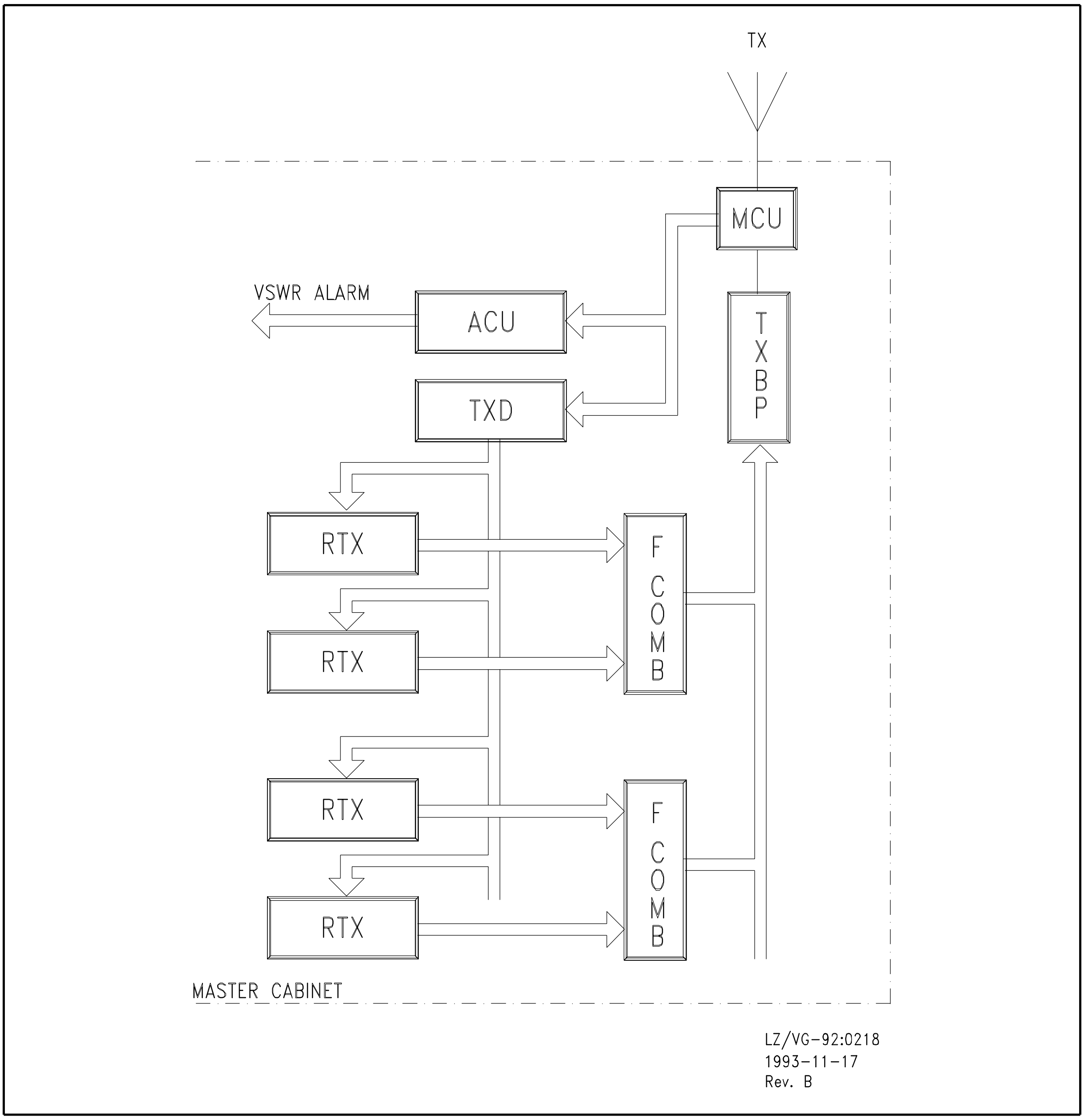


Figure 12 Measuring Coupler Unit, MCU, block diagram

3.3.5 Transmitter Divider, TXD

The transmitter divider TXD, distributes coupled forward RF-power from the MCU to the RTX units, see figure 12. Signals are used by the combiner control function to adjust the center frequency of the filter combiner.

3.4 Receiver Multicoupling System

The main parts of the receiver system are Receiver Bandpass Filter (RXBP), Receiver Divider Amplifier (RXDA) and Receiver Divider (RXD), used to filter, amplify and divide the RX-antenna signals to feed the receivers.

Diversity

If diversity is selected, RXDA, RXD and RXBP have to be doubled. In a non-diversity configuration the specific RX-antenna can be omitted.

3.4.1 Receiver Divider Amplifier, RXDA

RXDA amplifies and distributes received antenna signal to the passive RXDs.

The RXDA consists of two, low noise amplifiers and a passive 4-way divider. The amplifier is supervised by an alarm circuit, with the possibility to send two different alarms to the ACU.

The RXDA board is installed in the master cabinet of the TG.

3.4.2 Receiver Divider, RXD

RXD contains a passive divider, which provides an isolated distribution of the receiver antenna signal coming from the RXDA. The RXD splits up the signal to serve four RRXs.

The RXD is installed in each cabinet in the TG.

3.4.3 Receiver Bandpass Filter, RXBP

RXBP is located first in the receiver link. The RXBP has a bandwidth covering 890 to 915 MHz. Two filters are needed when receiver diversity is selected.

3.4.4 RXBP with extended bandwidth

As an alternative, a filter with an extended bandwidth, 872 to 910 MHz, can be used. This filter is used when sharing the RX-antenna with an ETACS system (co-siting).

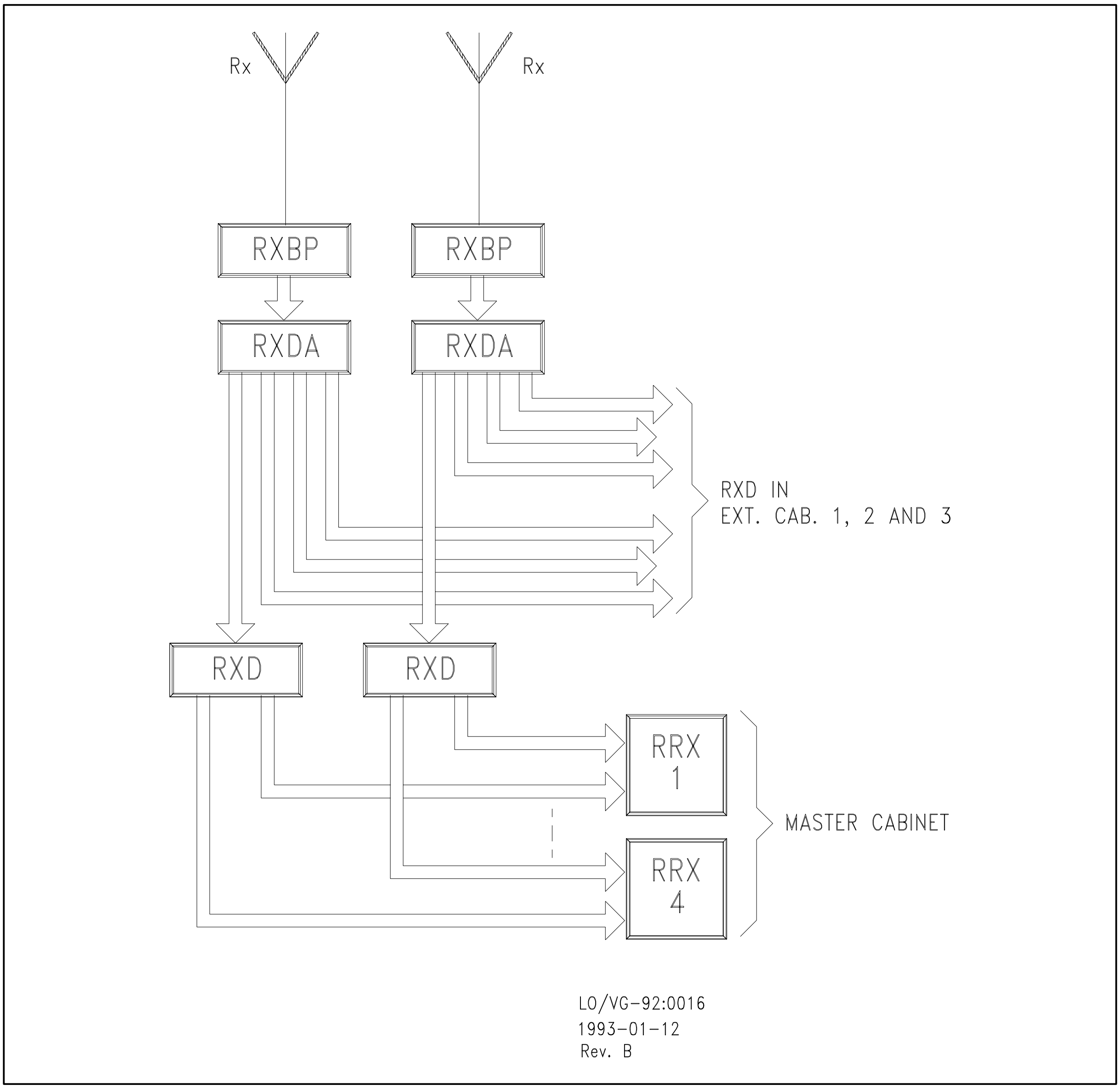


Figure 13 Receiver Multicoupling System, block diagram

3.5 Frequency Hopping

Frequency hopping is provided on a slot by slot basis according to GSM 05.02. To achieve this, the system must be able to transmit and receive on a different frequency for each time slot in the air interface.

The BSC controls the frequency hopping function and informs the BTS which channels are hopping and which are not. It also informs the BTS of the frequency change pattern. When frequency hopping is provided in the system, the BCCH (control channel) must be non-hopping.

Frequency hopping for reception

The receiver channel with the RXDA and RXD units has enough bandwidth to cover the receiver frequencies. The RRX is equipped with two frequency hopping synthesizers to obtain frequency hopping on a time slot basis.

3.5.1 Frequency hopping with hybrid combiners

When the number of RTXs is small, a wide band hybrid combiner can be used and the frequency hopping can be utilized in a similar way as for reception; with an RTX with two hopping frequency synthesizers. Each channel belongs to an allocated RTX, which changes frequency along a specified pattern for every time slot.

Hybrid combiners must be provided when synthesizer hopping is used. Characteristic for the HCOMBs is that they attenuate the signal for each TRX pair connected. Due to this loss, a maximum of four TRXs can be connected when using HCOMB.

3.5.2 Baseband hopping with filter combiners

When many RTXs are connected to the same transmitter antenna, a filter combiner must be used to reduce the loss of power. Each FCOMB is tuned to a narrow frequency band, making it impossible for the RTX to perform frequency hopping. There must be one RTX per frequency needed.

Frequency hopping with FCOMBs is called Baseband Hopping, the principles which allow each RTX to send a fixed unique frequency and routing the data on the transmitter bus to different RTXs for every TS. The result will be the same on the transmitter antenna as for the synthesized frequency hopping.

3.6 Power Supply System

Three different alternatives for power supply are used in the RBS 200 system, namely:

- System input voltage 230 V AC
- System input voltage +24 V DC
- System input voltage -48 V DC to -60 V DC

The Radio Base Station RBS 200 is designed to be supplied with + 24 V DC, internally distributed in each cabinet. The maximum load of a fully equipped cabinet will be about 1200 W.

The power supply for the RBS 200 system is recommended to be designed with a battery backup supply dimensioned for at least 15 minutes operation without mains supply. Without batteries, the BTS must be reloaded from the BSC, even after a short mains failure.

3.6.1 System Input Voltage 230 V AC

The RBS 200 will in most cases be fed from existing mains voltage supply:

230 V AC, 50-60 Hz.

The power supply system consists of:

- Power Supply Unit, PSU
- Power Control Unit, PCU
- Internal Distribution Unit, IDM
- Battery and Interconnection Unit, BIM
- Battery rack with batteries

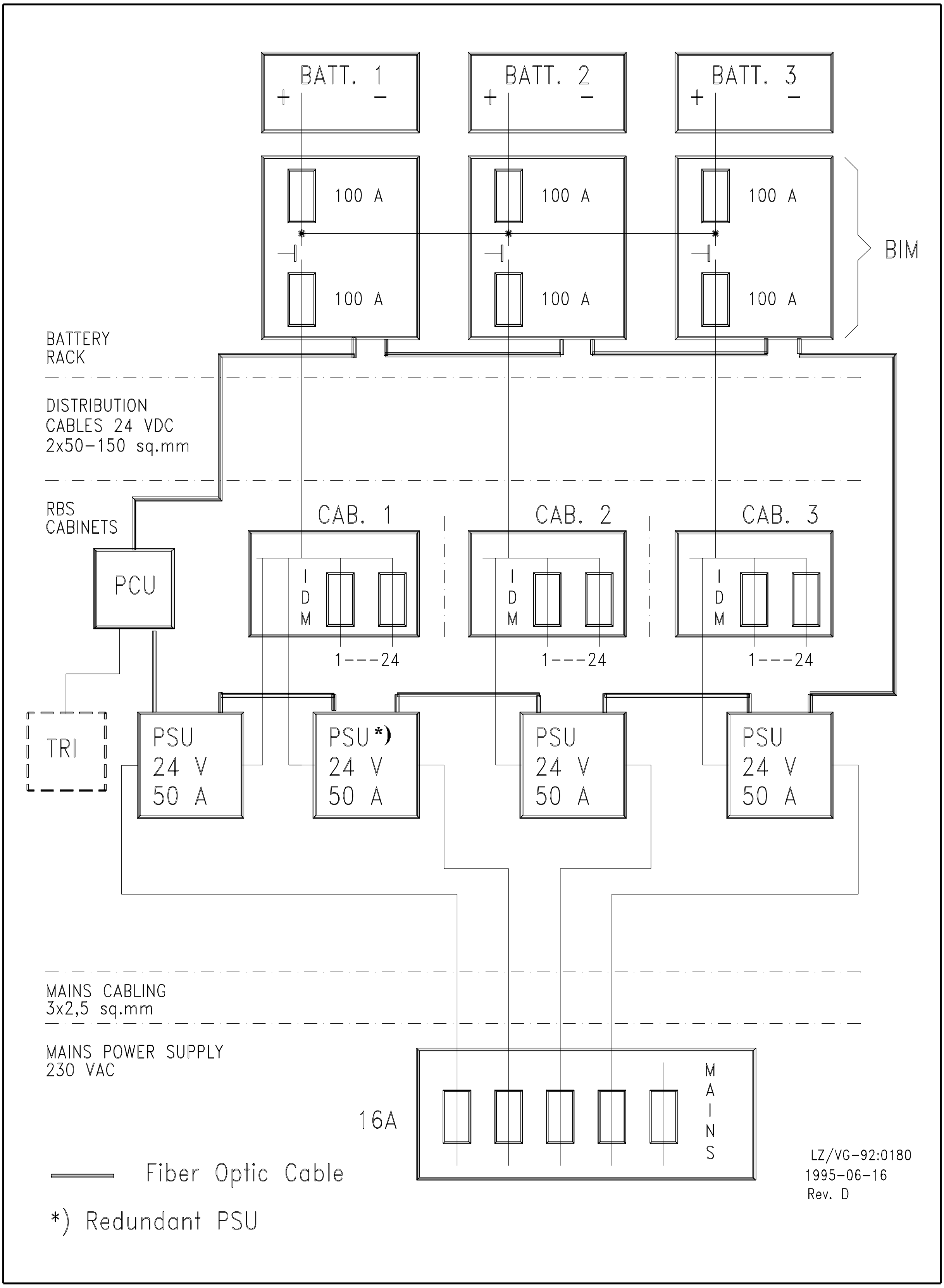


Figure 14   System input voltage 230 V AC, block diagram

3.6.2 Power Supply Unit, PSU

The PSU converts the incoming 230 V AC mains to controlled +24 V DC, and an output power of 1200 Watts.

The +24 V DC is distributed to the IDM for internal power distribution in the cabinet, while the cabinet is connected to ground. Each PSU is fed from the mains supply via a 16 A distribution fuse.

If redundancy is required, a second PSU is installed in the first cabinet.

3.6.3 Power Control Unit, PCU

A Power Control Unit (PCU) for alarm collection and control of voltage levels etc. is implemented as a separate unit in the same cabinet as the TRI. The PCU will act as an interface to the EXALI in the TRI, presenting Summary Alarms to the BSC.

The PCU communicates with the PSUs and the BIM unit on a 9600 baud serial bus, using a fiber optic cable as transmission media. All units shall be connected in a serial loop, using prefabricated cables. Maximum distance between two units is 30 m, while location of the battery racks has to be in the range of 30 m.

The input and output signals between the PCU and the connected power units are shown in the table in figure 15.

The PCU is provided with a display, showing the actual voltage or total consumption of the system. It is also provided with three LEDs for indication of alarms and/or working status according to the table.

Alarms from the PCU to the TRI are provided via free make or break contacts on five relays, categorized as follows:

- A 1 Summary Alarm for immediate action (Break contact)
- A 2 Summary Alarm for action within 24 hours (Make contact)
- O 1 Observation Alarm, abnormal situation (Make contact)
- Mains Fault (Break contact)
- Under-voltage Alarm (Break contact)

	PCU	PSU	BIM	IDM	RELAY	ALARM TYPE
System on	G	G		G		
Output voltage	——►					
Load sharing	——►					
Unit on	——►					
Unit off	——►					
Contactor on	———	——►				
Contactor off	———	——►				
Change default value [1]	———	——►				
Output voltage	D ◄——					
Output power	D ◄——					
Faulty unit alarm	◄——	R				A2
High voltage alarm	◄——	R				A2
Mains failure	◄——	R				A2
Limited output power	◄——	Y				O1
Unit off	◄——	Y				O1
Faulty unit	◄——		R			A1
Contactor de-energised	◄——		R			A1
Batt.fuse blown	◄——		R			A1
Undervoltage 1	◄——		R			A1
Undervoltage 2	◄——		R			UV
Check of def.value [1]	D ◄——	———				
Check of actual load [1]	D ◄——	———				
Check of batt.voltage [1]	D ◄——	———				
Fuse blown						A2
Faulty PCU						A1
Alarm output blocked G,Y,R						O1

[1] Optional facility
——► Control signal
◄—— Alarm signal

G = Green LED
Y = Yellow LED
R = Red LED
UV = Under voltage
D = DISPLAY

Figure 15 Alarm presentations, Control functions and Summary Alarms in the Power Supply System

3.6.4 Battery and Interconnection Module, BIM

BIM is designed to protect the batteries and the connections to the cabinets.

A maximum of three modules can be fitted into one shelf. The BIM controls the contactor and communicates with the PCU.

The module has one 100 A battery fuse, one 100 A cabinet fuse and a contactor for battery power cutout in the event of an undervoltage.

In the event of undervoltage (+19 V DC), the power from the battery is cut out to avoid discharging the battery too deeply. If this function fails, the contactors release automatically when the system voltage has been less than +19 V DC for about 15 s. If the control unit fails, the batteries are automatically reconnected, when the system voltage rises to +23.5 V DC for about 15 s.

The battery and cabinet fuses initiate an alarm only when blown, not in the OFF position.

3.6.5 Internal Distribution Module, IDM

The IDM contains 24 pcs. 10-20 A fuses, and is located in the top of the cabinet. The fuses are not supervised, but a blown fuse is indicated by the load it feeds. The IDM also comprises a control board for supervision of the cooling fans.

Connection facilities for battery cables (max. 2x150 mm^2) and incoming mains supply are also provided in the IDM.

The cables are connected at the top of the cabinet.

To make the system high-ohmic, the distribution cables have a standard length of 3 m and a standard area of 0.80 mm^2. In this way the internal impedance of the cable becomes five times higher than the internal impedance of the power supply plant. Accordingly, in the event of a short circuit in a distribution point, the voltage at the common feeding point will not fall below the permissible value of the powered equipment.

3.6.6 Battery Rack

A battery rack, designed for housing the sealed batteries, will provide the power supply backup.

The 24 V DC power distribution cables between the battery rack and the RBS 200 cabinet shall, if possible, not be installed together with the signalling cables to avoid interference.

3.7 System input voltage +24 V DC

+24 V DC can be connected to the BTS. It is recommended that the power source is of the uninterrupted type. Connection point is the battery terminals on the IDM unit.

The system voltage is +27 V DC at the BTS connection point. The voltage drop must be taken into account when dimensioning the distribution cables.

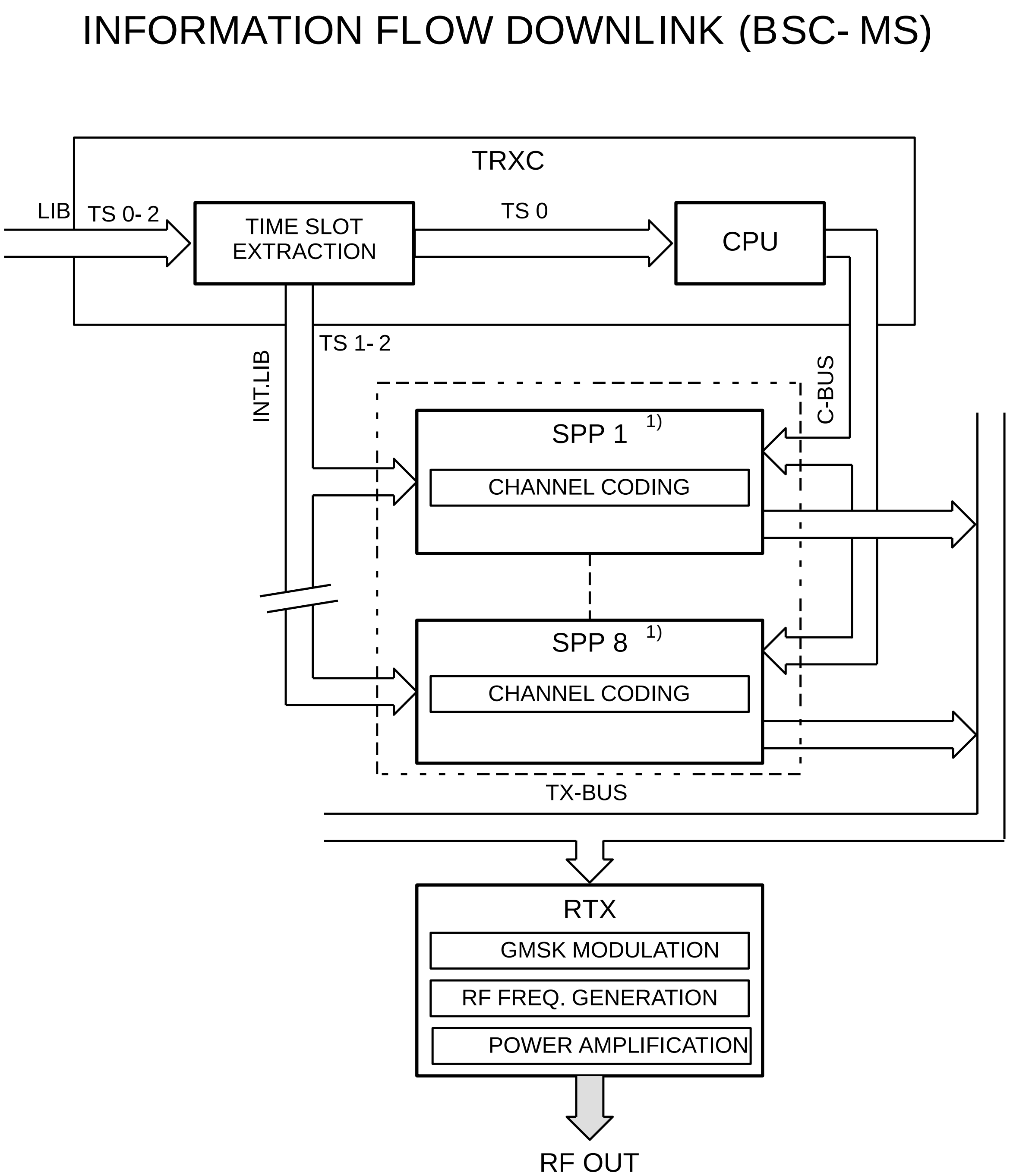
3.8 System input voltage -48 V DC

A DC/DC converter converts incoming DC voltage >-48 V DC, < -60 V DC to +27 V DC. Connection point are the battery terminals on the IDM unit.

The voltage drop must be taken into account with regard to cable length/area and input voltage.

4 Appendix

4.1 Traffic flow



1) 8 SPPs can be substituted by 1 SPU alt. SPU+

Figure 16

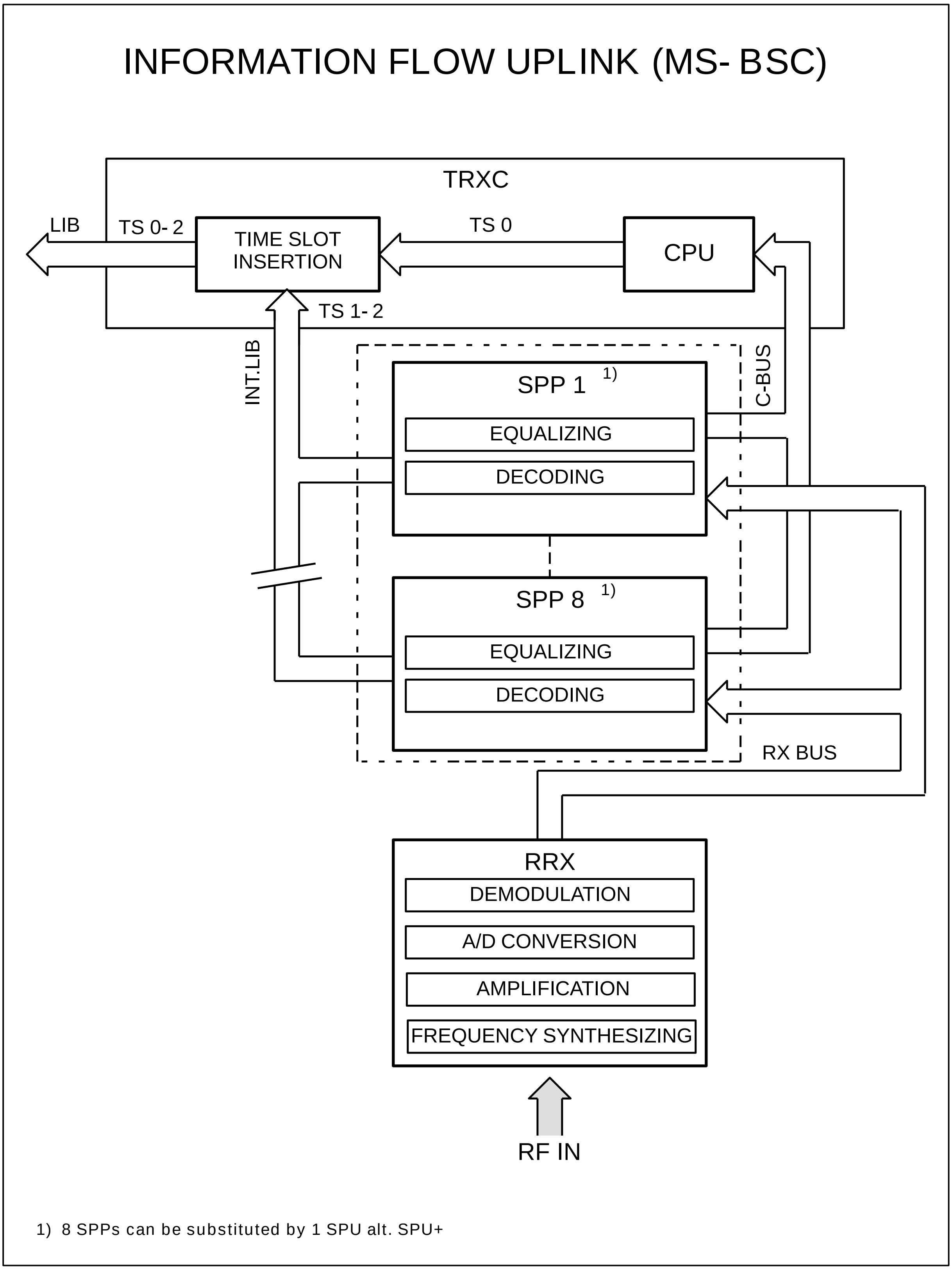
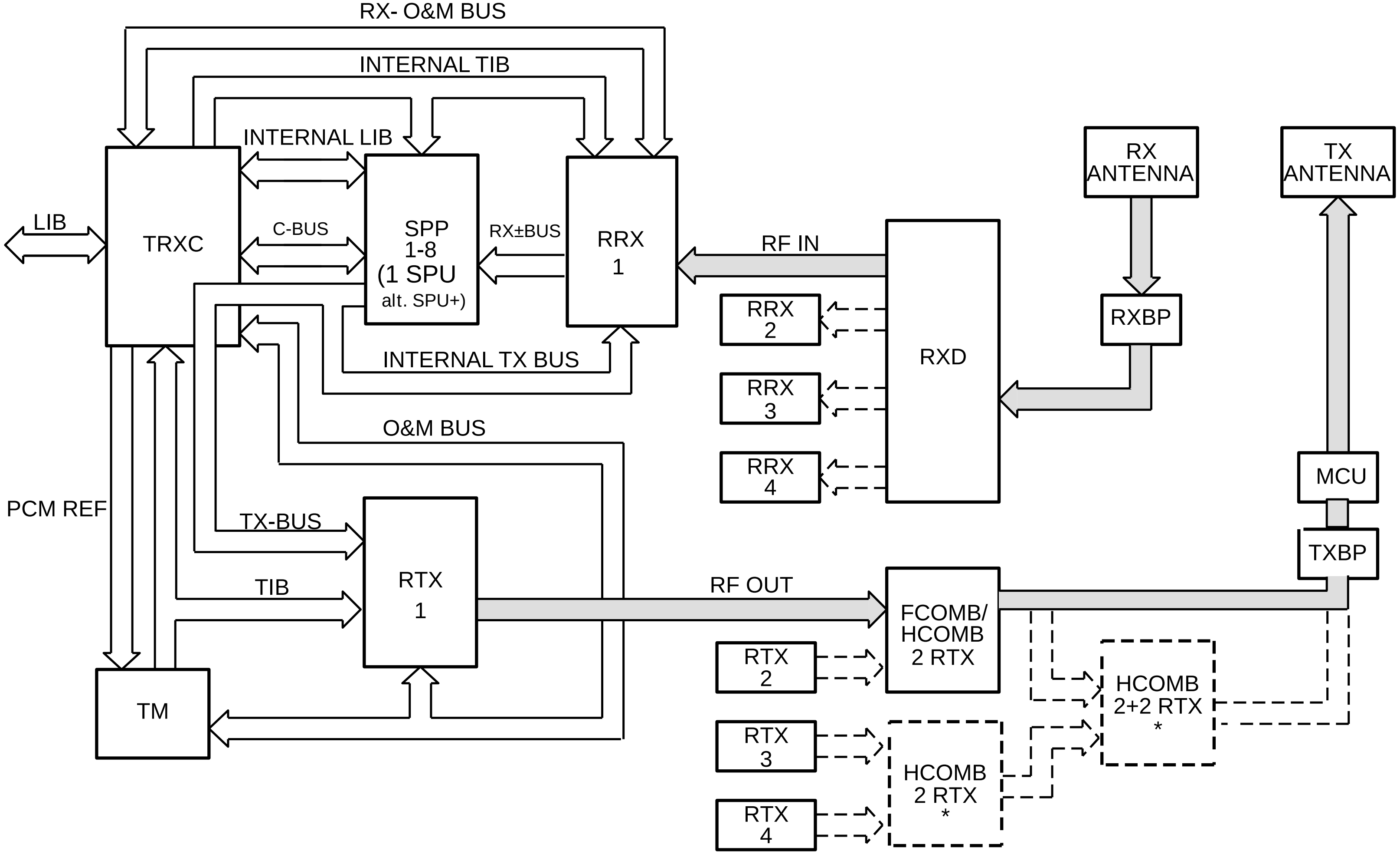

INFORMATION FLOW UPLINK (MS- BSC)
TRXC
LIB
TS 0- 2
TIME SLOT INSERTION
TS 0
CPU
TS 1- 2
INT.LIB
C-BUS
SPP 1 1)
EQUALIZING
DECODING
SPP 8 1)
EQUALIZING
DECODING
RX BUS
RRX
DEMODULATION
A/D CONVERSION
AMPLIFICATION
FREQUENCY SYNTHESIZING
RF IN
1) 8 SPPs can be substituted by 1 SPU alt. SPU+

Figure 17

Figure 18

RBS 200 RF INTERNAL SIGNAL DISTRIBUTION



ERICSSON

CAPTION LIST

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Product Description

RBS 200
Installation
Engineering Manual

Uppgjord — *Prepared*	Faktaansvarig — *Subject responsible*	Nr — *No.*		
ERA/LRN/ZG ERAWAIN		1/1551-COH 109 2015/11 Uen		
Dokansv/Godk — *Doc respons/Approved*	Kontr — *Checked*	Datum — *Date*	Rev	File
ERA/LRN/ZGC (Leif-Olof Fager)		1999-10-06	B	

RBS Cabinet

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1 Mechanical data

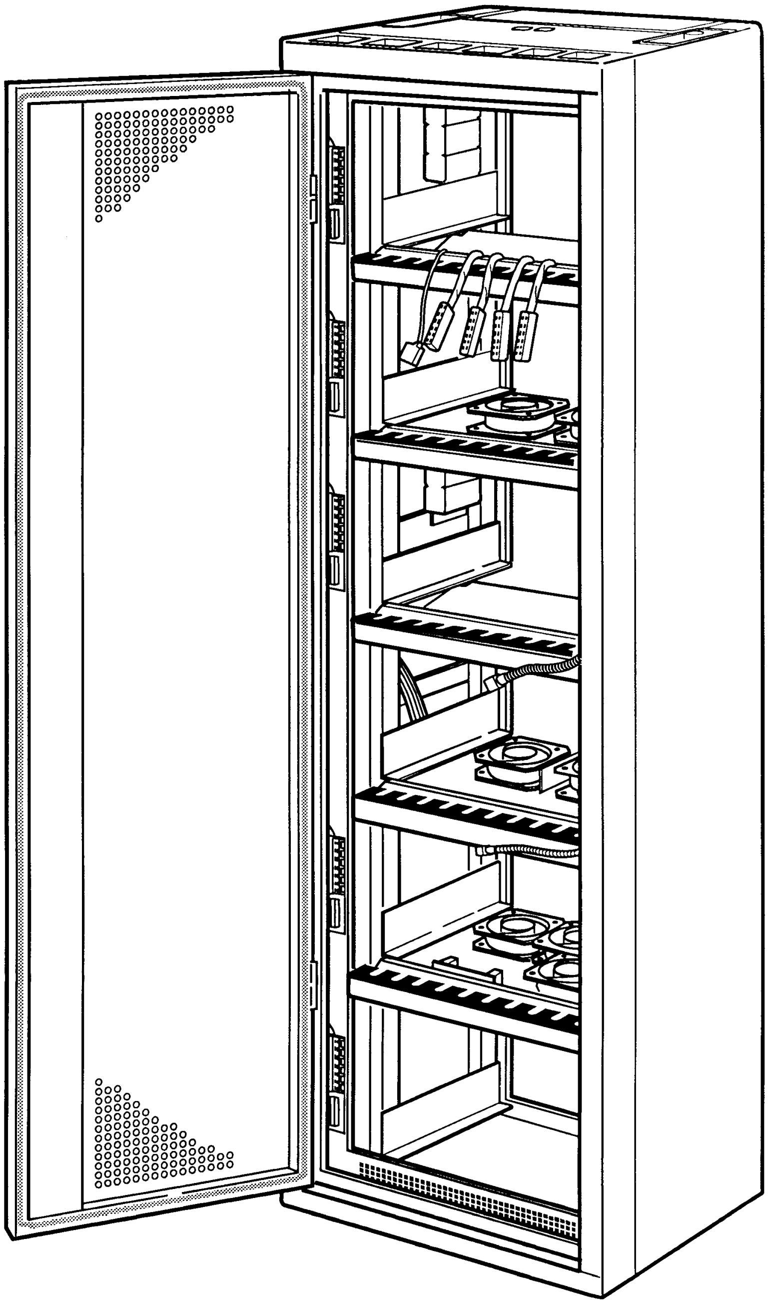


Figure 1 RBS 200 cabinet mechanical layout

The mechanical layout of the cabinet for 19" magazines used for the RBS 200 system is shown in figure 1.

Dimensions:

- height: 1970 mm
- depth: 400 mm
- width: 602 mm

Weights:

- partly equipped on delivery: <120 kg
- fully equipped after installation: <250 kg

The door is left-hand hinged on delivery. However, it can be changed on site.

All cabinet units are designed for front connection. The cabinets can therefore be installed either side by side in a row, or back to back. For further information see Chapter 5, Guidelines for site installation.

There are two versions of the cabinet floor, one with 4 fastening holes and one with 3 fastening holes.

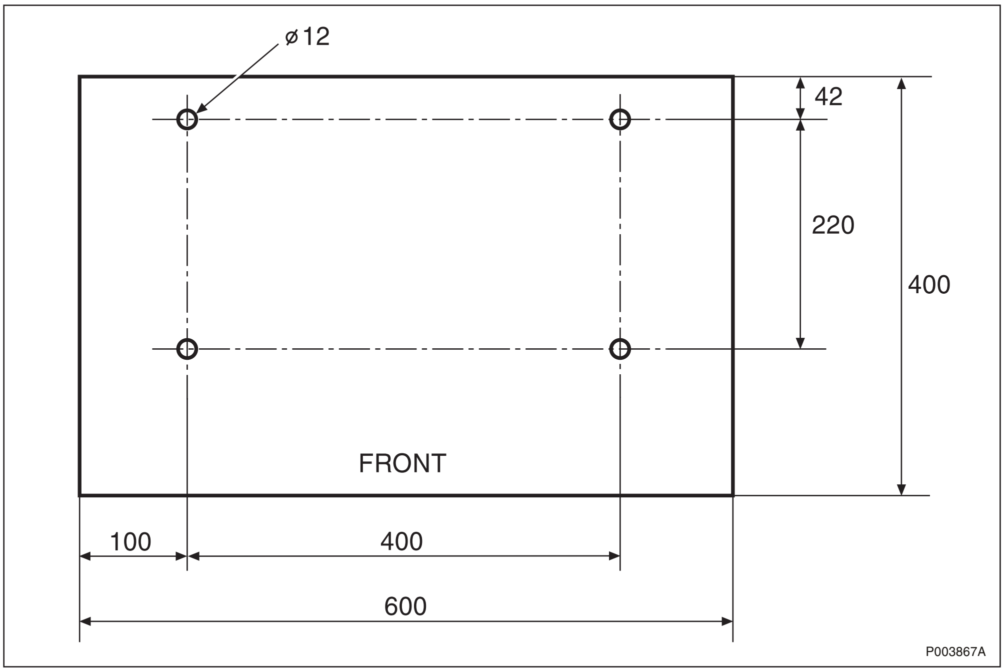


Figure 2 Guide for making a drill template drawing, 4-hole version

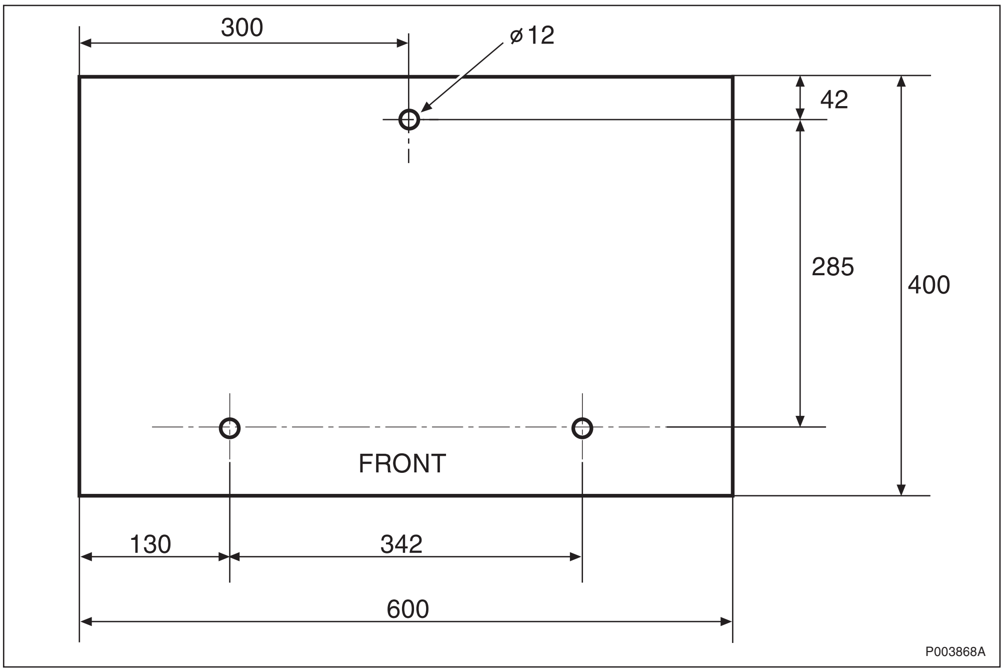


Figure 3 Guide for making a drill template drawing, 3-hole version

2 Cabinet designation system

2.1 Designation of hardware positions

To facilitate the location of hardware units during installation and maintenance activities, the RBS 200 cabinet is divided into a coordinate system.

See figure 4.

2.1.1 Cabinet height vertical division

Division into levels 00 to 12.

2.1.2 Equipment shelf horizontal division

Division left to right from 01 to 84.

TRI magazine: Division left to right from 00 to 160.

2.1.3 Vertical cable shafts

Designations left (L) and right (R) are used for equipments located in the vertical cable shafts on either side of the equipment shelves.

2.1.4 Location designation format

Hardware

A hardware position in the cabinet is designated by a parameter in the following format:

VV/HH where:

VV = Vertical level 00 - 12

HH = Horizontal position 01 - 84 or 00 - 160 for the TRI magazine

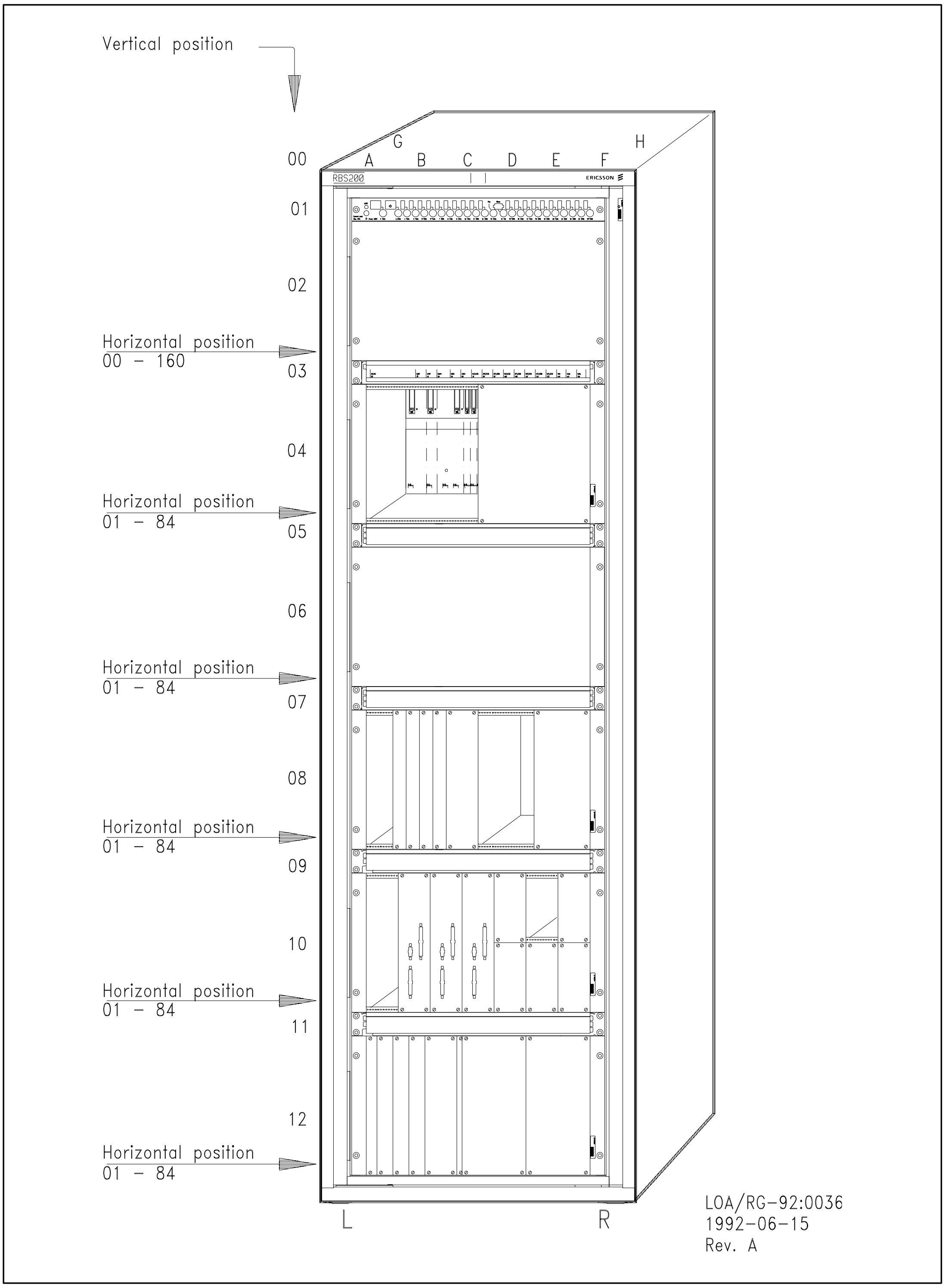


Figure 4 Cabinet hardware positions

Printed circuit board

The principle for the location parameter is shown in figure 5.

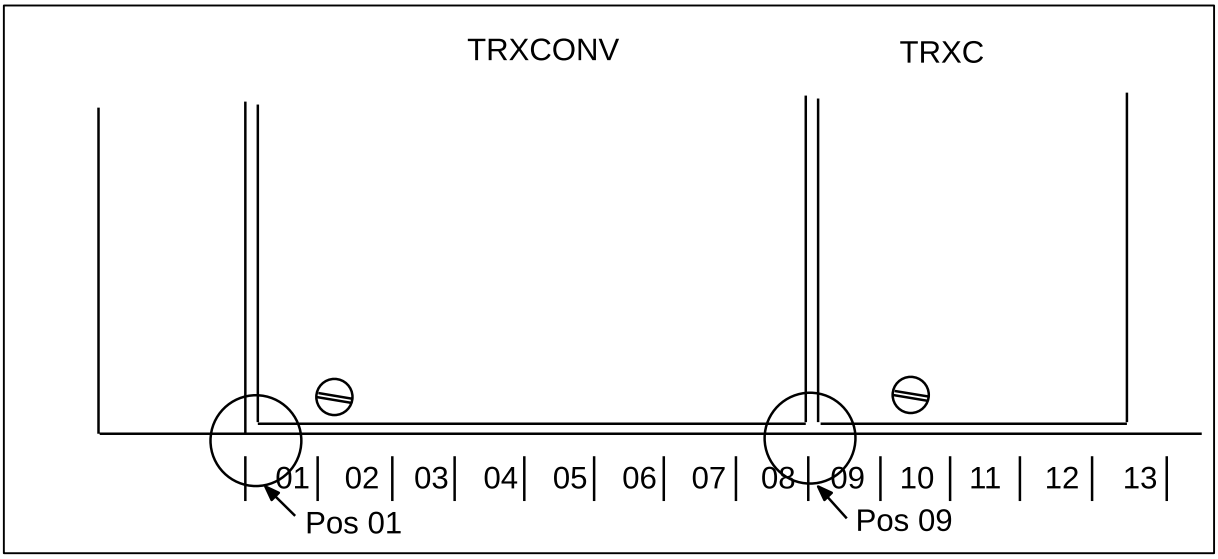


Figure 5 Location parameter principle for the printed circuit boards

The figure shows part of a TRXD magazine with the printed circuit boards TRXCONV and TRXC.

Assuming that the TRXD magazine is located at vertical level 04, VV in the format **VV/HH** is 04.

The horizontal position HH is denoted by the position of the left hand side space occupied by each board.

Thus the location parameters for the boards are:

TRXCONV 04/01

TRXC 04/09

2.2 Designation of internal cabling

2.2.1 All magazines except the TRI

Once the physical position in the cabinet is determined, the connection points for each cable must be defined.

This is achieved by adding a second parameter to the hardware position parameter. The two parameters are separated by an asterisk, giving a set of parameters with the following format:

VV/HH*CC where:

CC = cable connection point parameter

Parameter CC is in most cases given in plain text, corresponding to the marking on the circuit board front. For connection to the O&M

Bus/TIB connector on the TRXC board shown in figure 5, the complete parameter is:

04/09*O&M,TIB

2.2.2 TRI magazine

Here the parameter CC is defined in a different way, due to the lack of written information on the circuit board fronts.

In this case the magazine is subdivided into two vertical levels, designated A and B. Each level corresponds to a front connector on the circuit boards, which in turn is divided further into 4 connector positions shown in figure 6.

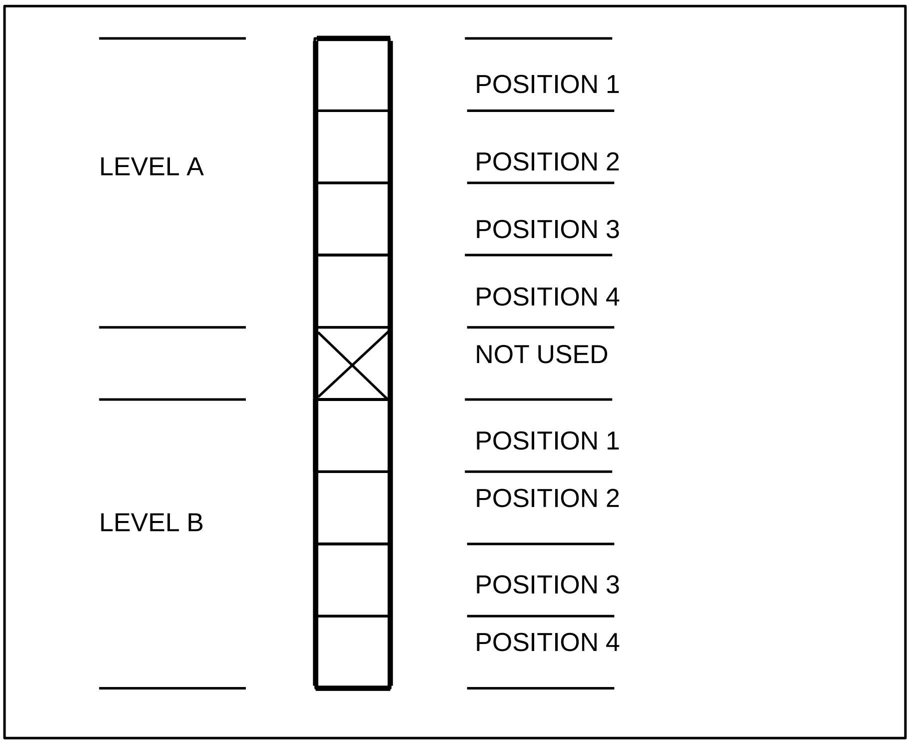


Figure 6 Board front connector designations in the TRI magazine

Assuming that the circuit board in figure 6 is located in the horizontal position HH = 60 of the TRI magazine (VV = 02), and a cable is to be connected to Level B position 1, the complete designation is:

02/60B*1

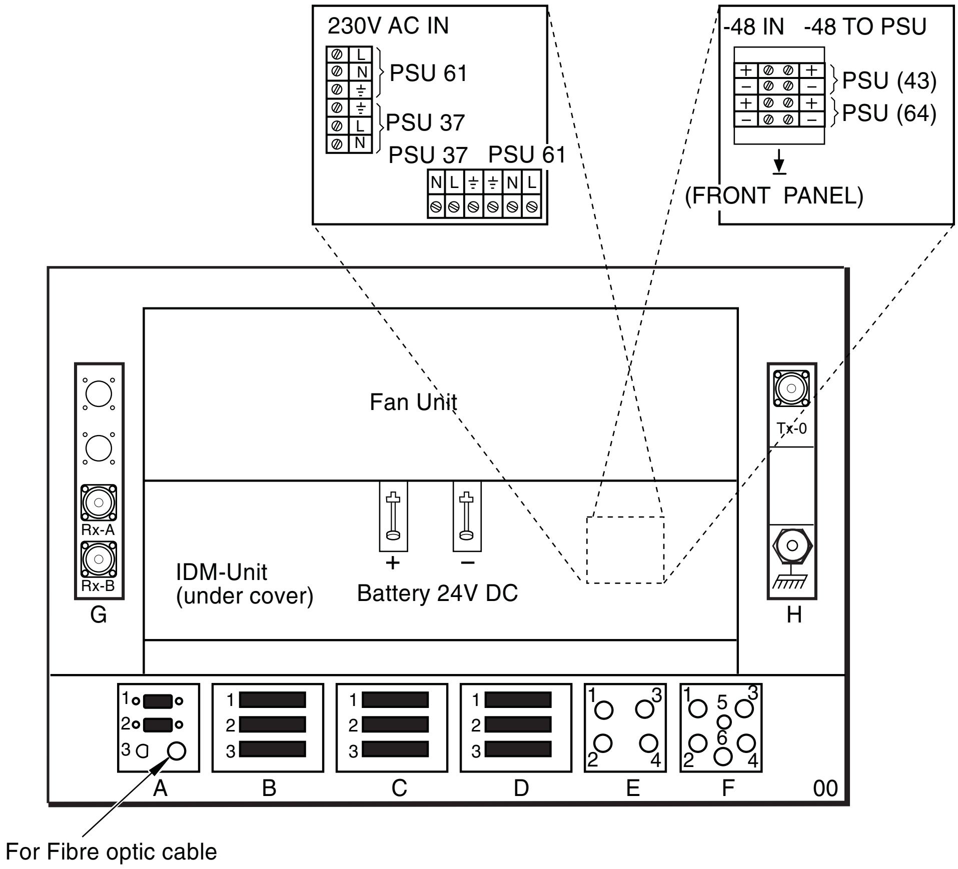
2.3 Cabinet identity and connection point parameters

As TRI signals are distributed between cabinets, information concerning the cabinet identity needs to be specified. By adding the cabinet identity (ZZ) to the hardware and connection point parameters, a set of parameters with the following format is obtained:

ZZ*VV/HH*CC , where ZZ = Cabinet identity A1, B1 or C1.

2.4 Designation of cabinet connection field

All cabling between the TRI, filter units and power supply is implemented via the cabinet connection field CCF, located on top of each cabinet. The connection field is provided with eight sets of cable connection points. These sets are designated A to H. See figure 7.



A1 = TG SYNC (ESB)	C1 = LIB BUS CAB. A1	*) E1 = PCM INPUT 1	120 ohm
A2 = TG SYNC (ESB)	C2 = LIB BUS CAB. B1 (A2)	E2 = PCM OUTPUT 1	120 ohm
A3 = RF out	C3 = LIB BUS CAB. C1 (A3)	E3 = PCM INPUT 2	120 ohm
B1 = EXTERNAL ALARM	D1 = LIB BUS CAB. A2 (A4)	E4 = PCM OUTPUT 2	120 ohm
B2 = EXTERNAL ALARM	D2 = LIB BUS CAB. B2	**) F1 = PCM INPUT 1	75 ohm
B3 = LIB TRXD 1-4	D3 = LIB BUS CAB. C2	F2 = PCM OUTPUT 1	75 ohm
		F3 = PCM INPUT 2	75 ohm
		F4 = PCM OUTPUT 2	75 ohm
		F5 = PCM INPUT 3	75 ohm
		F6 = PCM OUTPUT 3	75 ohm

*) if more than 2 ETB cards,
2 contact boxes E (SVK 107 2436/1) are needed.

**) if more than 3 ETB cards,
2 contact boxes F (SVK 107 2435/1) are needed.

P005505A

Figure 7 Maximum disposition of connection field on top of cabinet

3 Product structure RBS200

3.1 Definitions and terminology

TG Transceiver Group. Corresponds to the TRXs connected to each other via internal buses (maximum 16).

M-cabinet Master cabinet. The first cabinet in a TG. The M-cabinet houses four TRXs. A 3-sector site requires three M-cabinets.

E-cabinet Extension cabinet. The 2nd, 3rd and 4th cabinet in a TG. Denoted E1, E2, and E3. See figure 8.

Note When installed on site, the cabinets are denoted A1, A2, etc. as shown in figure 8.

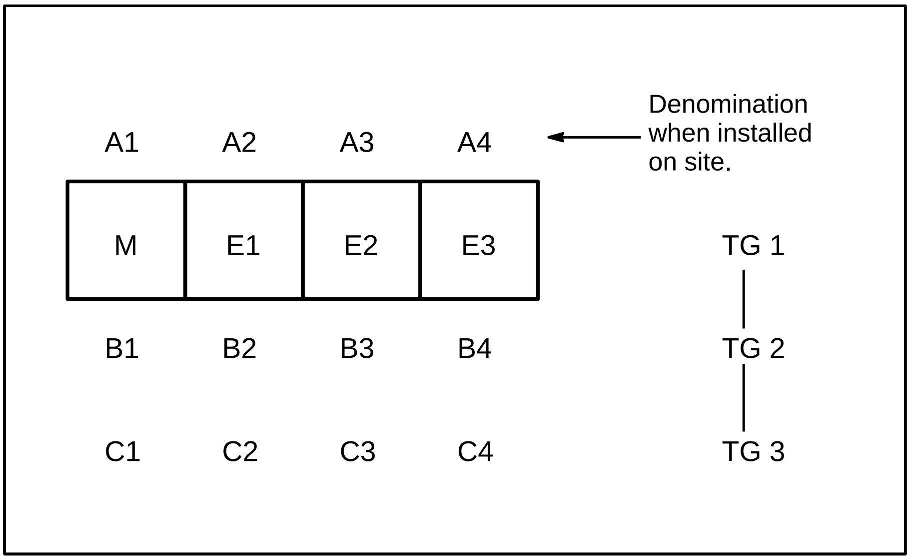


Figure 8 M-cabinet and E-cabinet arrangement

3.2 Product structure

The top level structure is shown in figure 9.

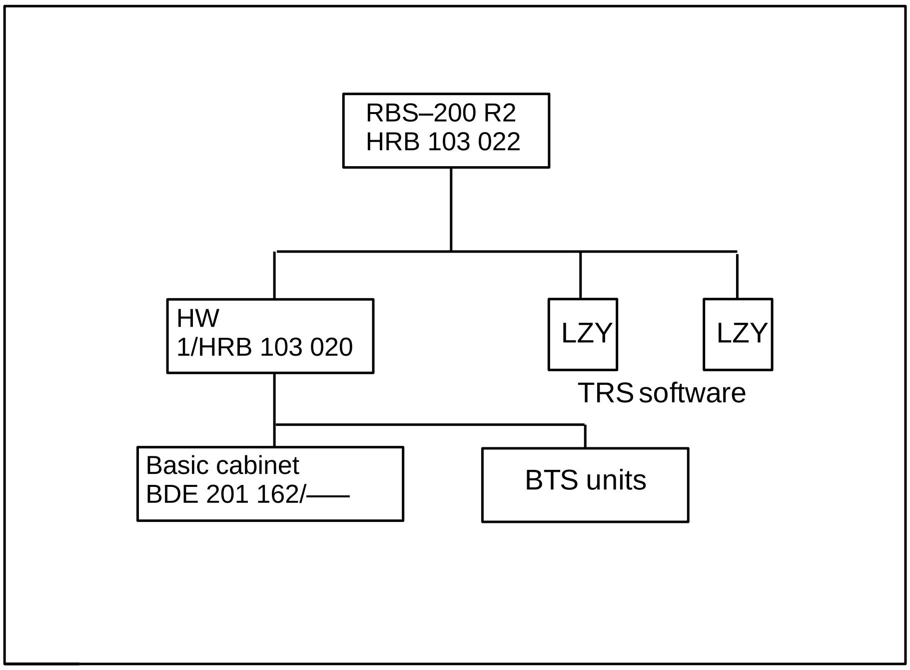


Figure 9 Top level structure

The product number BDE 201 162/— is the basic cabinet. The index number, here indicated by —, defines the cabinet type: Master or Extension cabinet.

A great number of cabinet versions are available. These cabinets are equipped differently depending on the combination of filters, type of combiners, magazines, etc.

For more detailed information, see Chapter 4, Dimensioning and ordering.

3.3 Index register

The different combinations of functions will result in a basic cabinet BDE 201 162/— with a specific corresponding index, see table 1.

3.3.1 Product support

Please note that all cabinet versions are not supported. For information, contact the LX department at ERA, Kista.

Table 1 Index Register

Master/ Extension cabinet	RXBP type	Power Supply	COMB/Filter type	Receiver Diversity	Index
M	Std	24	F4	No	/101
M	Std	24	F4	Yes	/102
M	Std	24	F6	No	/103
M	Std	24	F6	Yes	/104
M	Std	24	H	No	/105
M	Std	24	H	Yes	/106
M	Std	230	F4	No	/107
M	Std	230	F4	Yes	/01 A12
M	Std	230	F6	No	/109
M	Std	230	F6	Yes	/05 E12
M	Std	230	H	No	/111
M	Std	230	H	Yes	/112
M	Std	-48	F4	No	/113
M	Std	-48	F4	Yes	/04 D12
M	Std	-48	F6	No	/115
M	Std	-48	F6	Yes	/116
M	Std	-48	H	No	/117
M	Std	-48	H	Yes	/118
M	Ext	24	F4	No	/119
M	Ext	24	F4	Yes	/03 C12
M	Ext	24	F6	No	/121
M	Ext	24	F6	Yes	/122
M	Ext	24	H	No	/123
M	Ext	24	H	Yes	/124
M	Ext	230	F4	No	/125
M	Ext	230	F4	Yes	/126
M	Ext	230	F6	No	/127
M	Ext	230	F6	Yes	/128
M	Ext	230	H	No	/129
M	Ext	230	H	Yes	/130

Master/ Extension cabinet	RXBP type	Power Supply	COMB/Filter type	Receiver Diversity	Index
M	Ext	-48	F4	No	/131
M	Ext	-48	F4	Yes	/132
M	Ext	-48	F6	No	/133
M	Ext	-48	F6	Yes	/134
M	Ext	-48	H	No	/135
M	Ext	-48	H	Yes	/136
E1-E3	-	24	F	-	/201
E1-E3	-	230	F	-	/202
E1-E3	-	-48	F	-	/203

4 Delivery structure

All cabinets are delivered in two parts:

- **A-package:**

  The precabled cabinet with relevant filter and magazines inserted together with the cables that have to be installed on site.

- **B-package:** Units that have to be inserted into the magazines during installation on site.

The above two packages form a complete cabinet.

For detailed information, see following section 5, and 6, respectively.

5 Master cabinet BDE 201 162/101-136

5.1 General

This section describes the delivery structure of the M-cabinet and the position of all units possible, covered by index numbers /101 - /136.

To obtain the exact product number and type of the cabinets included in a specific delivery, refer to the index numbers in table 1.

Plug-in units are delivered separately, and must be installed on site.

The diagrams for internal cabling cover index numbers /101 - /136.

The pre-installed cables are shown in the cable list. They are also evident from the labelling. Regarding labelling, see Chapter 4, section 4 in the G module.

Note Cabling diagrams and Cable lists are described in Chapter 2, section 4, Cabling and earthing.

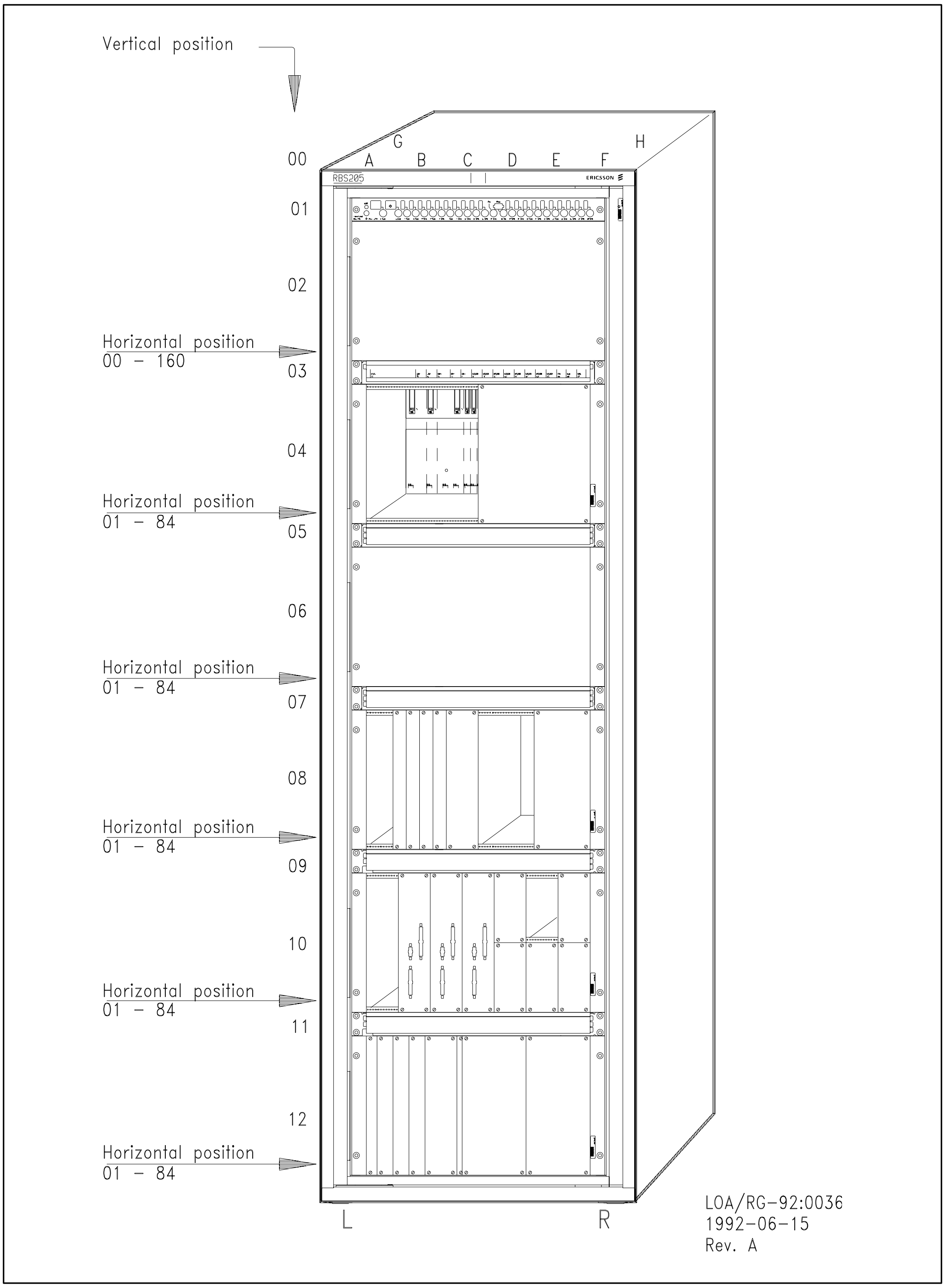


Figure 10 Cabinet BDE 201 162/–, hardware positions

5.2 Delivery structure of master cabinet BDE 201 162/101-136

On delivery, the cabinet is equipped with magazines and cables according to the index number, and located as shown in figure 11 and table 2.

Table 2 Printed circuit board vertical positions

Vertical pos.	Item
02	Dummy front SDK 107 61/6 (in TRI position)
04	Magazine TRXD BFL 119 71/3
06	Dummy front SDK 107 61/6 (in TRXD position)
08	Magazine F-combiner BFL 119 72/3 [1)]
08	Magazine H-combiner BFL 119 72/2 [1)]
10	Magazine RTX BFL 119 71/5
12	Magazine TM/PSU, BFL 119 73/1 [1)];
12	Magazine TM/PSU, BFL 119 74/1 [1)]
12	Magazine TM/PSU, BFL 119 76/1 [1)]
L 02	Filter unit RXBP (A) KRF 101 18/01
	Filter unit RXBP ext. (A) KRF 101 19/01
L 06	Filter unit RXBP (B) KRF 101 18/01
	Filter unit RXBP ext. (B) KRF 101 19/01
R 02	Filter unit MCU KRF 121 03/01 [1)]
R 06	Filter unit TXBP KRF 101 16/01 [1)]
R 06	Filter unit TXBP KRF 101 17/01 [1)]
R 04	Filter unit MCU KRY 121 01/01 [2)]

[1)] specified by the index number.

[2)] included in TXBP KRF 101 xx/01 and KRF 201 089/1.

Note The TRI magazine (vert. pos. 02) is included in the TRI delivery.

The second TRXD magazine (vert. pos. 06) is delivered only if the number of TRXs is >2.

5.2.1 Cabling

The number and type of cables to be installed is dependant on the index number.

Preinstalled cables are all cables that can be installed in the factory without interfering with the later insertion of the units.

Cables that have to be installed on site, are included in the delivery as a separate package.

See Chapter 2, section 4; Cabling and earthing, for more detailed information.

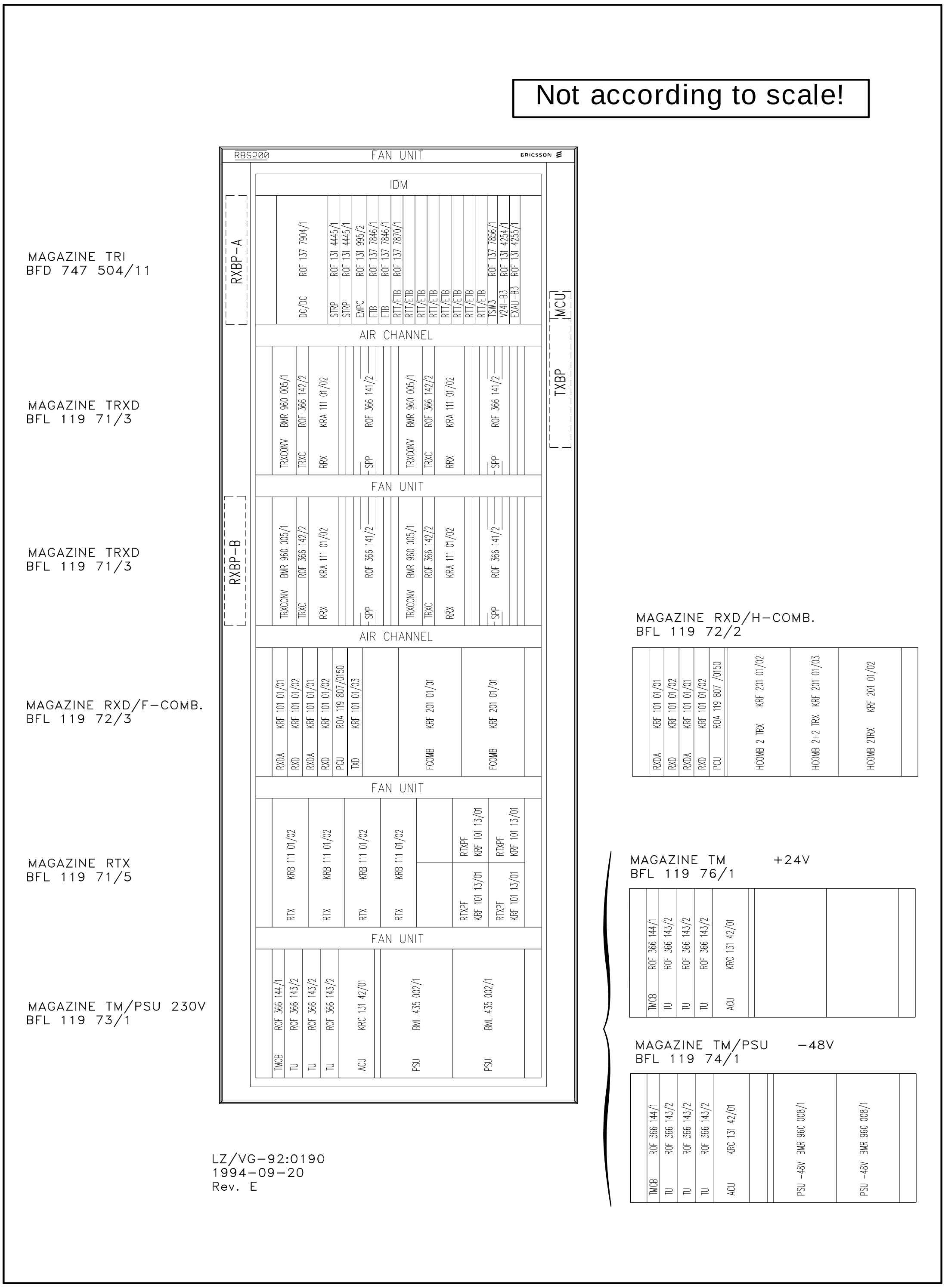


Figure 11 RBS 200 Master cabinet, fully equipped

5.3 Delivery structure - units

Refer to Chapter 4, Dimensioning and ordering.

6 Extension cabinet BDE 201 162/201-203

6.1 General

This paragraph describes the delivery structure of the E-cabinet. It also describes the position of all possible units, covered by index / 201- /203.

The example shows a fully equipped cabinet.

To obtain the exact configuration included in a specific delivery, refer to the index number.

Plug-in units are delivered separately, and must be installed on site.

See table 1, Index Register.

The internal cabling diagrams cover index /201 - /203.

For information regarding labelling, see Chapter 3, section 4 in the G-module.

Pre-installed cables are shown in the cable list.

Note Cabling diagrams and cable lists are described in Chapter 2, section 4, Cabling and earthing.

6.2 E-cabinet types

The E-cabinet is positioned as No. 1, 2 or 3 in the cabinet row, as shown in figure 12.

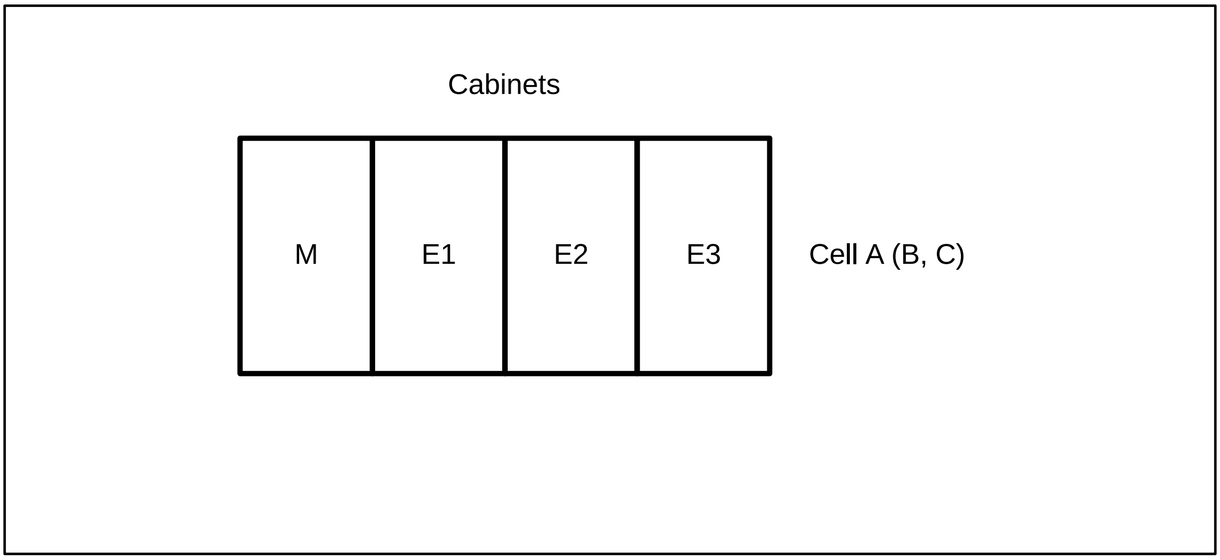


Figure 12 Master and Extension cabinets

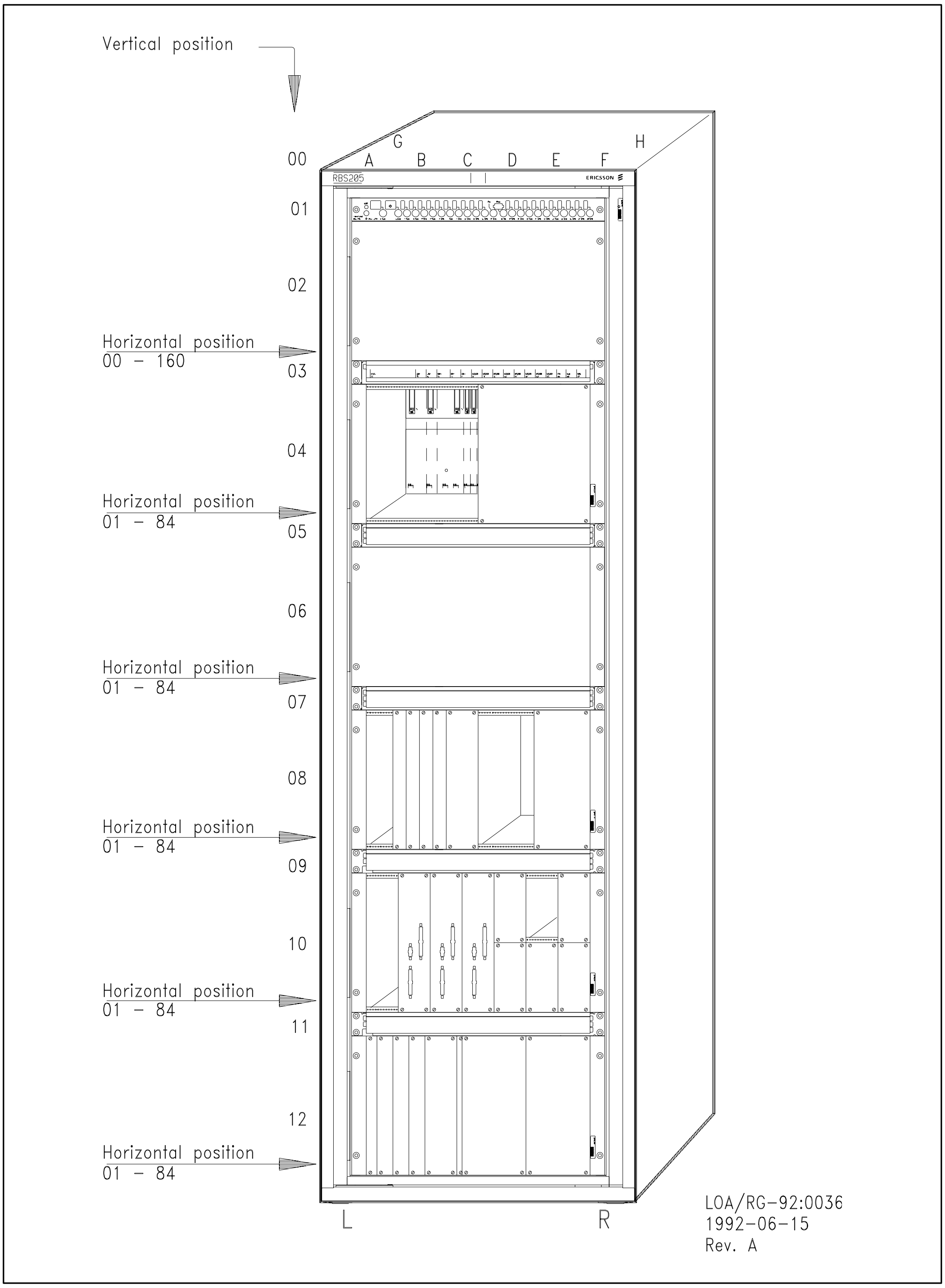


Figure 13 Cabinet BDE 201 162/–, hardware positions

6.3 Delivery structure of extension cabinet BDE 201 162/ 201-203

The cabinet is equipped with magazines and cables according to specified index. The items are located as shown in figure 14 and table 3.

Table 3

Vertical pos.	Item
02	Dummy front SDK 107 61/6 (in TRI position)
04	Magazine TRXD BFL 119 71/3
06	Dummy front SDK 107 61/6 (in TRXD position)
08	Magazine F-combiner BFL 119 72/3
10	Magazine RTX BFL 119 71/5
12	Magazine TM/PSU 230V AC BFL 119 73/1
12	Magazine TM/PSU -48V DC BFL 119 74/1

Note When using +24V DC, mount a dummy front in vertical position 12.

6.3.1 Cabling

The number and type of cables to be installed depends on the index number.

Preinstalled cables are all cables that can be installed in advance without interfering with units being installed later.

Cables that have to be installed on site are included in the delivery as a separate package.

6.4 Delivery structure - units

Refer to Chapter 4, Dimensioning and ordering.

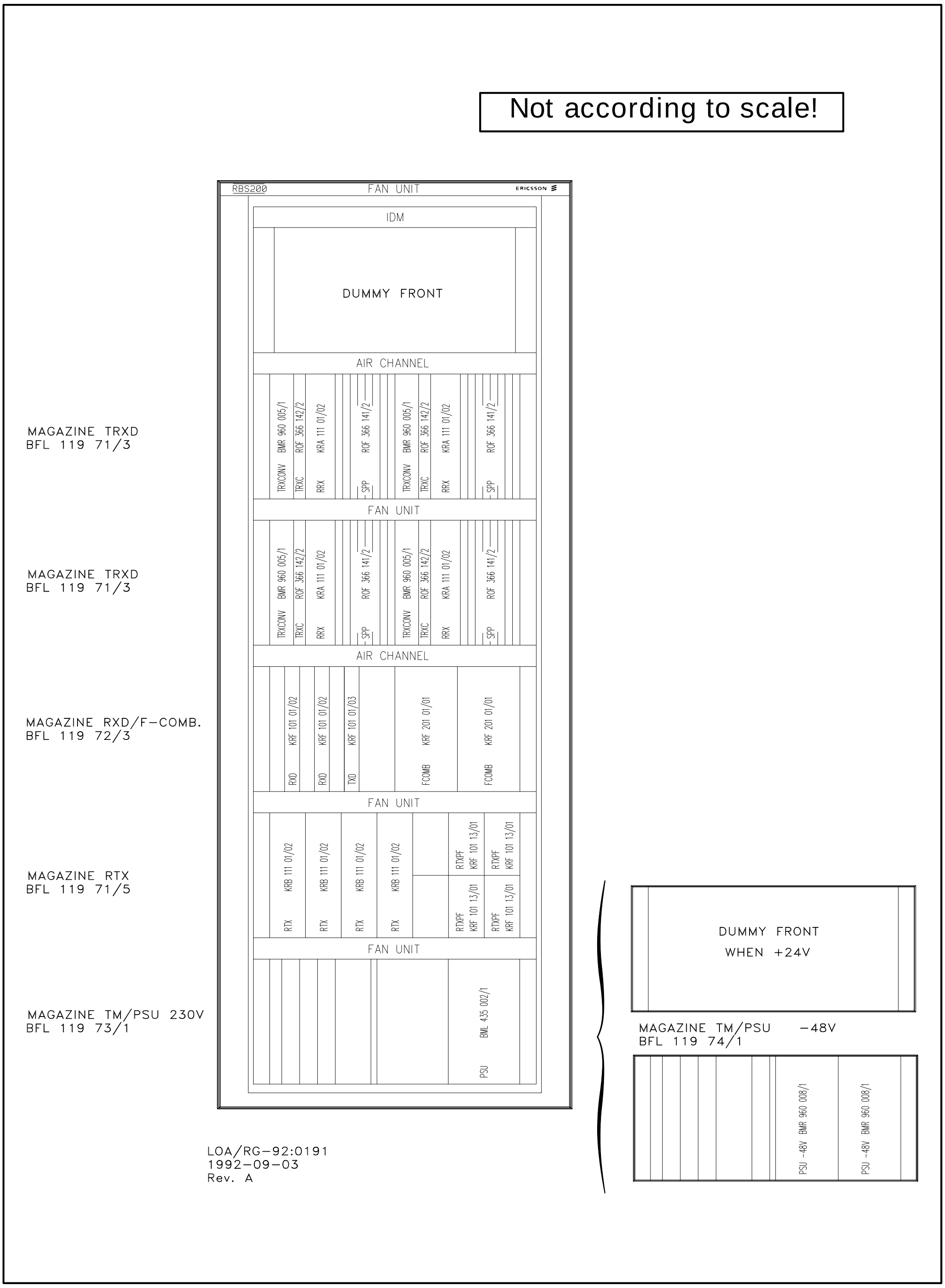


Figure 14 RBS 200 Extension cabinet, fully equipped

7 Extension kit

Cables and mechanical parts needed to connect a Master cabinet to an Extension cabinet are included in three separate kits.

Uppgjord — *Prepared*	Faktaansvarig — *Subject responsible*	Nr — *No.*		
ERA/LRN/ZG ERAWAIN		2/1551-COH 109 2015/11 Uen		
Dokansv/Godk — *Doc respons/Approved*	Kontr — *Checked*	Datum — *Date*	Rev	File
ERA/LRN/ZGC (Leif-Olof Fager)		1999-10-06	B	

RBS Units

Contents **Page**

1 Cabinet standard equipment

Note *For updated information use PRIM.*

1.1 Internal Distribution Module, IDM BMG 663 002

The IDM unit is always mounted in the cabinet, pos. 01.

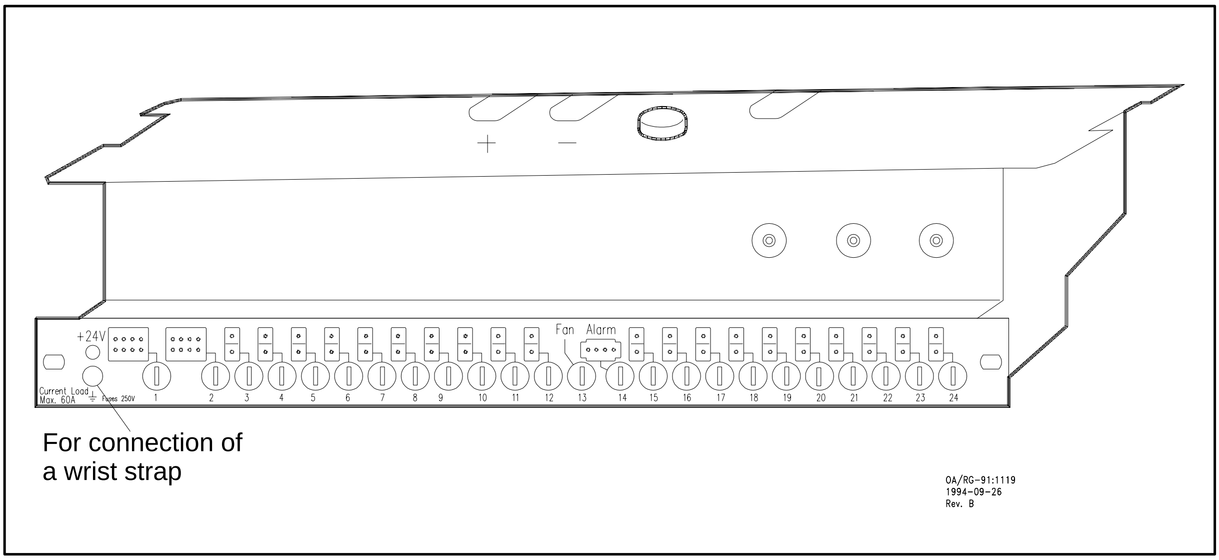


Figure 1 The IDM unit

The IDM unit contains:

- A connection field for: external power, 230V AC -48V DC, +24V DCBattery powerfrom the top of the cabinet, pos. 00
- A distribution field in pos. 01, which distributes +24V DC via 24 pcs. 10-20A glass fuses to units and fans.
- Earthing point for electrostatic discharge, ESD, see figure 1. For connection of a wrist strap such as LYB 250 01/14, see figure 2.
- Control board for fans in pos. 00 for supervision via alarm connections in pos. 01 J*14.

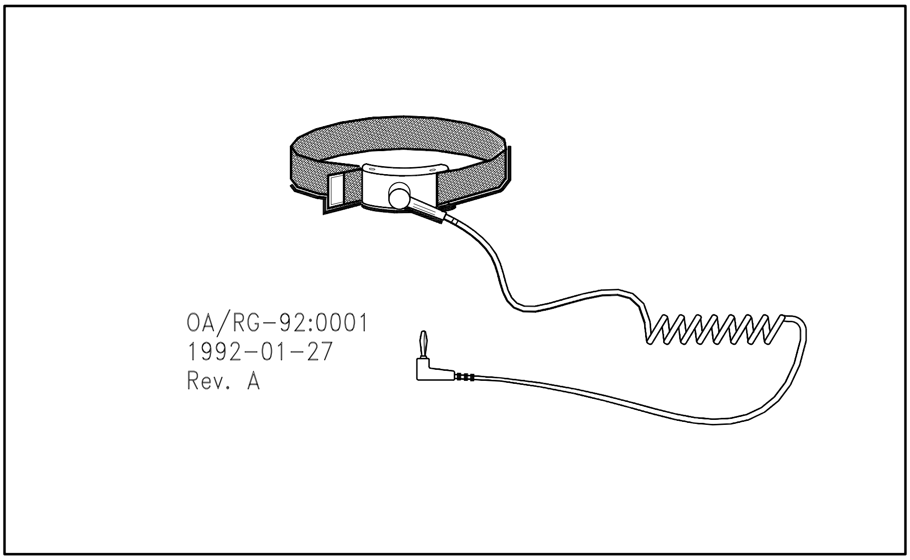


Figure 2 ESD Wrist strap LYB 25 001/14

1.2 Cabinet bus

The CCB boards ROA 119 8535/3 are the connection field for vertical and horizontal bus cable plugs. See figure 3.

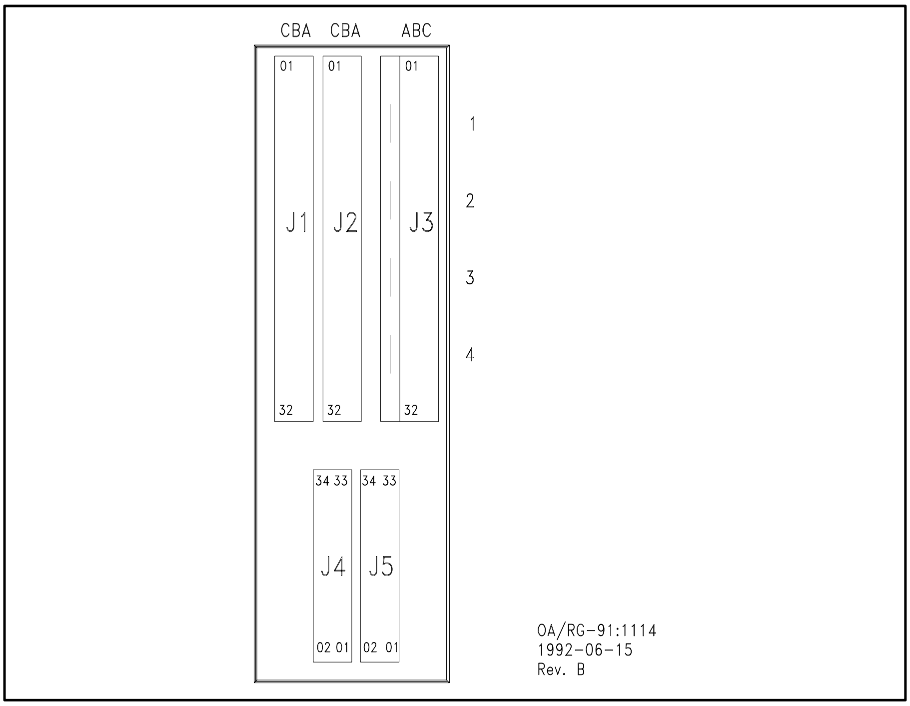


Figure 3 A CCB board ROA 119 8535/3

CCB boards with vertical bus cables and plugs are factory installed according to table 1 and figure 4.

Table 1

figure 4 Item	Product Number	Designation		Pcs.	Note
a	RPM 513 352/1	Conn. cable	CCB-CCB	3	1)
b	RPM 513 352/2	Conn. cable	CCB-CCB	1	1)
c	RPM 513 393/1	Conn. cable	O&M/TIB	1-2	1) 2)
d	RNV 991 2005/1	Str. Plug	TXBUS	14	1)
e	RNV 403 215/1 Str.	Plug Top	CCB	1	1)
f	RNV 403 215/2 Str.	Plug Low	CCB	1	1)
g	ROA 119 8535/3	Board	CCB	5	1)
h	RPM 513 394/1	Conn. cable	OM/TIB-TRXC	2-3	2)
i	RPM 513 395/1	Conn. cable	OM/TIB-RTX	1	
k	RPM 513 391/1	Conn. cable	TX/BUS-TRXC	1	
l	RPM 513 390/1	Conn. cable	TX/BUS-TRXC	1	
m	RPM 513 392/1	Conn. cable	TX/BUS-RTX	1	

[1] Factory installed

[2] 2 pcs if extension cabinet is installed

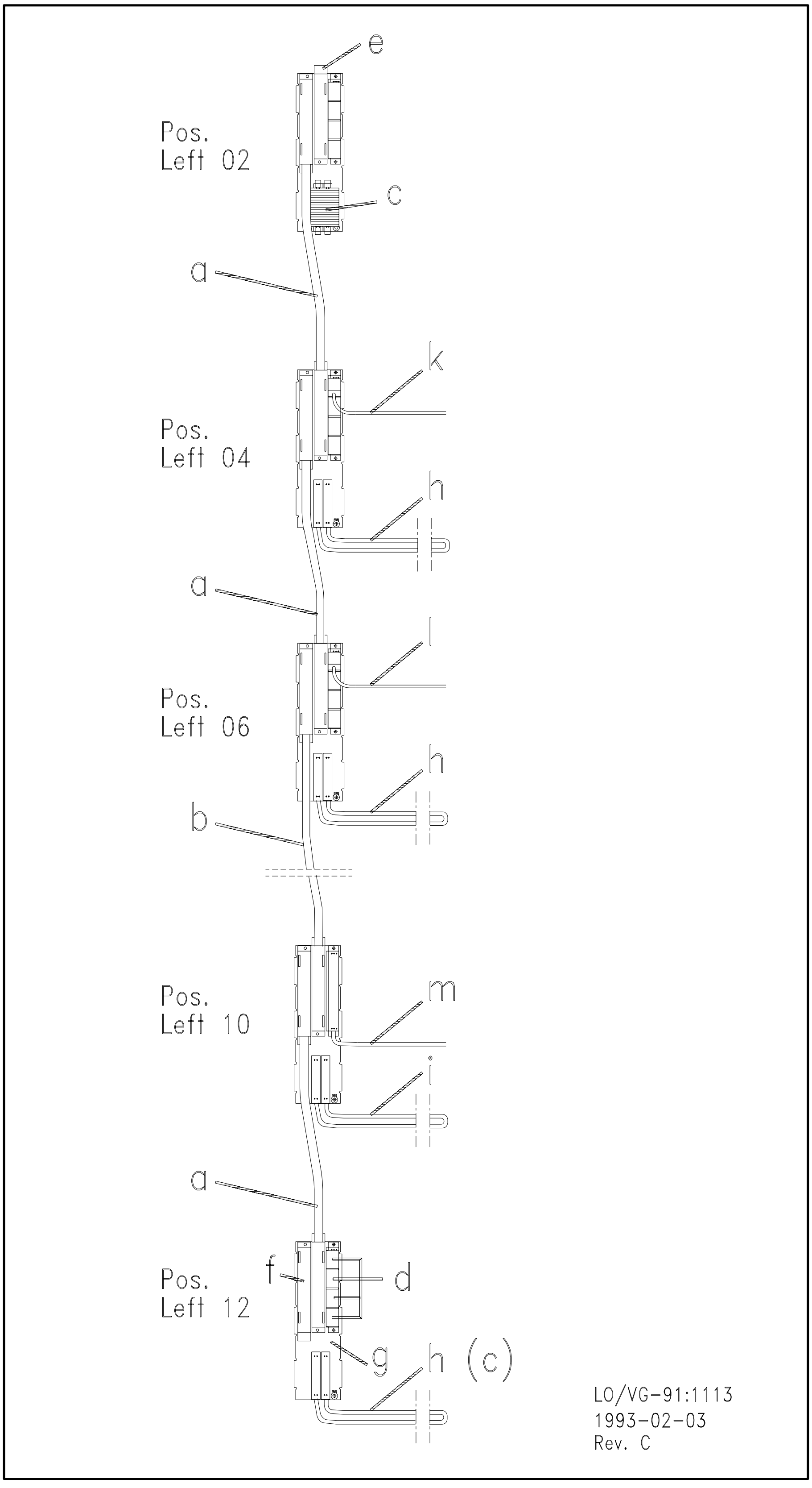


Figure 4 CCB connection cables and plugs

1.3 Filter units RXBP

Filter units are located on the left hand side of the cabinet, as seen from the front of the cabinet. Each filter unit is fastened with four screws.

The two filter units RXBP(A) and RXBP (B) are usually installed on delivery. Each filter unit includes an RXBP filter and a mounting plate.

- Remove shelves, magazines and fan units if work has to be done on the filter unit.

Two types of filter units are available:

- Standard filter, KRF 101 18/01, frequency 890-915 MHz.
- Extended filter, KRF 101 19/01, frequency 872-910 MHz.

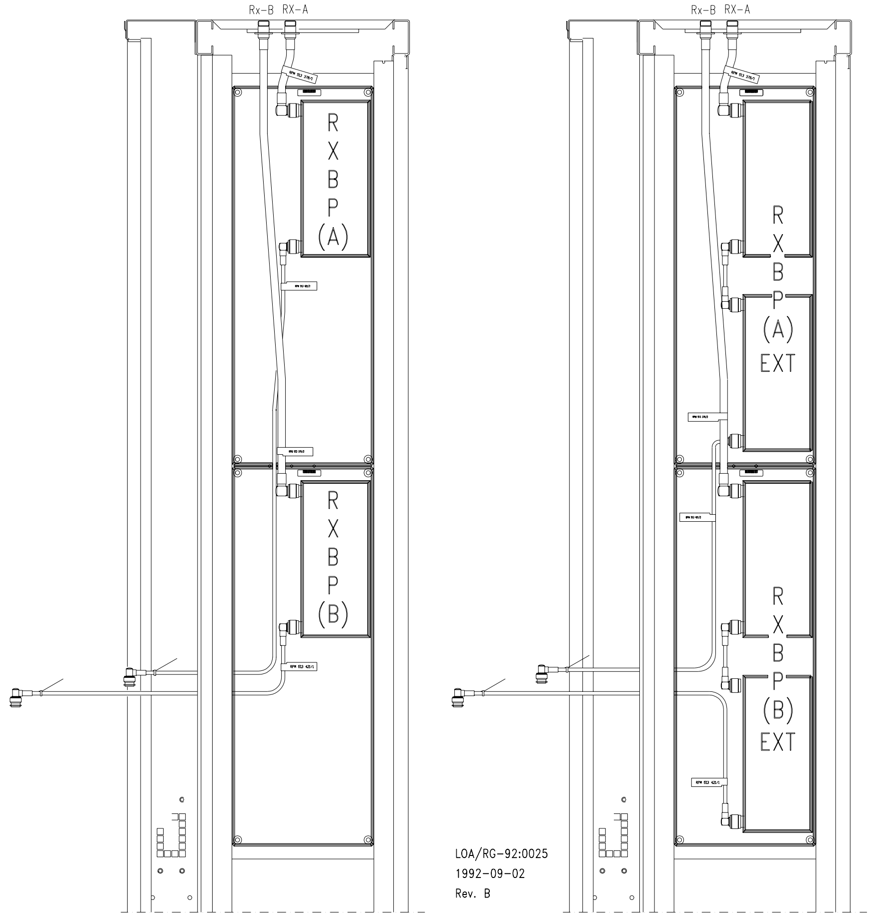


Figure 5 Filter units RXBP, KRF 101 18/01 (left) and KRF 101 19/01 (right)

1.4 Filter unit TXBP

A 4-pole filter, KRF 101 16/01, usually used for filter combiners, and 6-pole filter, KRF 201 089/1, used for hybrid combiners.

The filter unit is located on the right hand side of the cabinet, as seen from the front of the cabinet. The filter unit is fastened with four screws.

Filter unit TXBP is usually installed on delivery and includes a TXBP filter and a Measuring Coupling Unit (MCU) on a mounting plate.

- Remove shelves, magazines, and fan units if work has to be done on the filter unit.

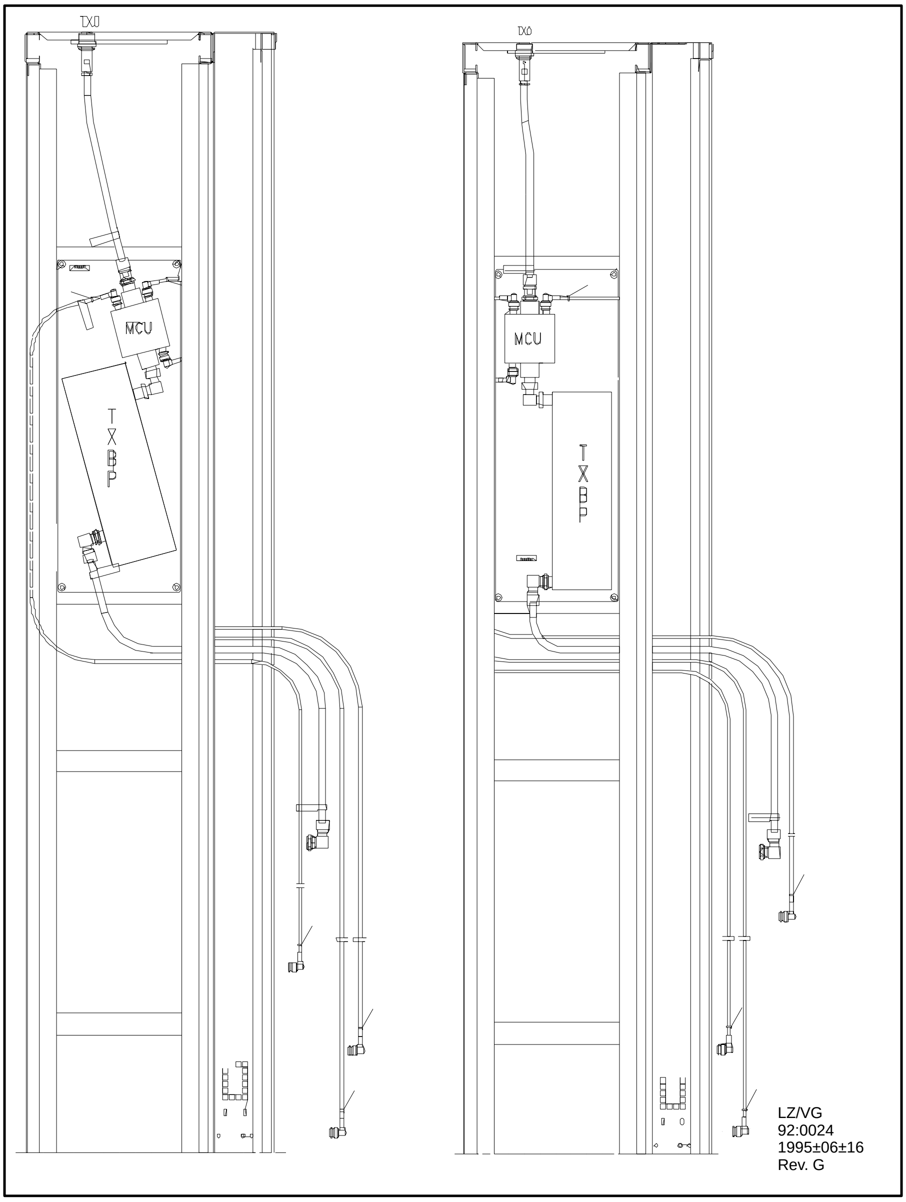


Figure 6 Filter unit TXBP, KRF 101 16/01 (left) and KRF 201 089/1 (right)

1.5 Fan units

The cabinet contains four fan units with two type of fans, see table 2 and figure 8. Fan units are factory installed.

Table 2 Type of fan units

Pos.	Fan unit	Pcs	Fan type	Pcs.
00	BKV 301 229/1	1	BKV 301 216/10	4
05	BKV 301 232/1	1	BKV 310 216/11	2
09	BKV 301 230/1	1	BKV 301 216/11	2
11	BKV 301 231/1	1	BKV 301 216/11	4

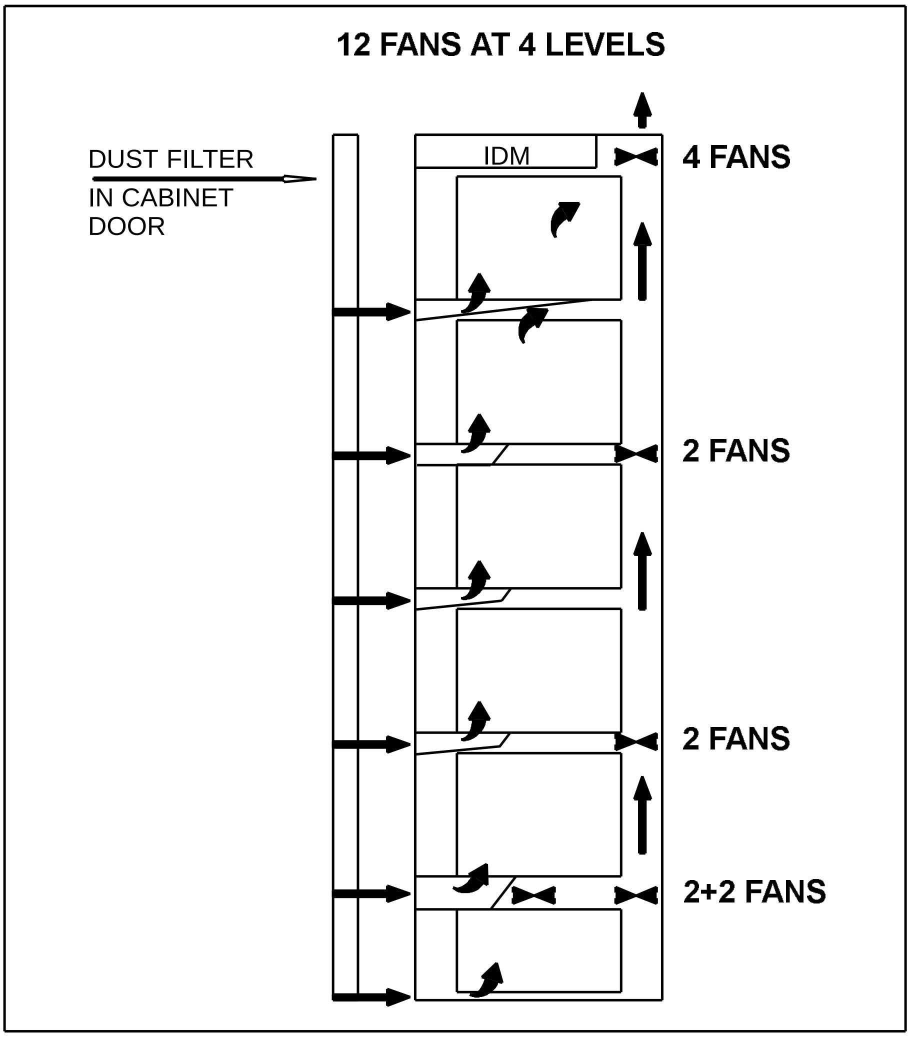


Figure 7 Rack ventilation

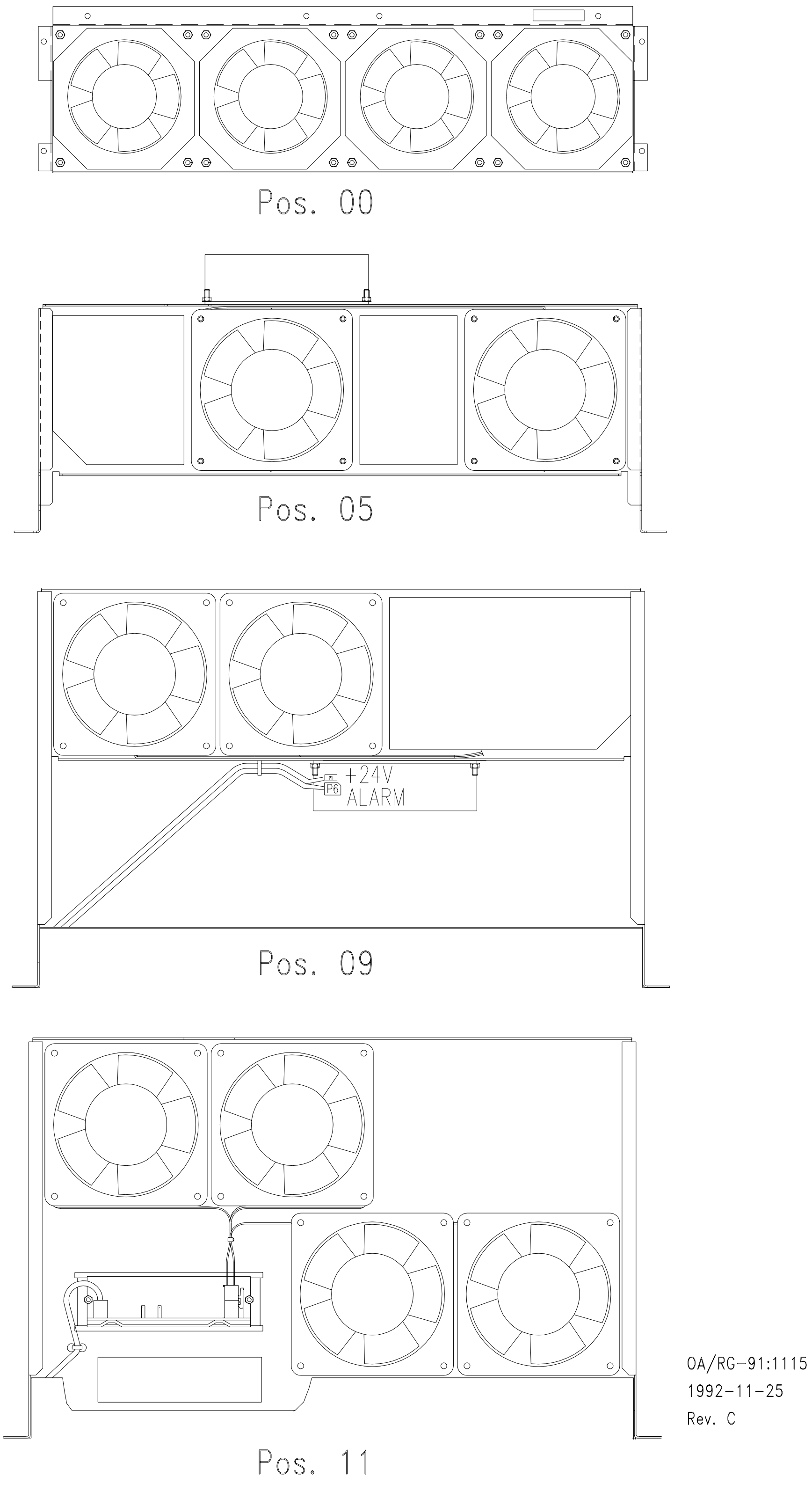


Figure 8 Fan units

1.5.1 Fan Control Unit, FCU ROA 119 3065/1 & FCU Super, FCUS KER 131 101/1

Fan Control Unit (FCU) or Fan Control Unit Super (FCUS) for the fans in pos. 00 is placed in the IDM module, while the FCUs for the other fans are mounted in each fan unit.

Fan Control Unit Super, FCUS KER 131 101/1

All cabinets produced after the turn of the year 94-95 will have a Fan Control Unit Super, FCUS mounted in pos. 01 of the IDM unit.

The FCUS makes it possible to lower the sound level generated in the fan unit in pos. 00.

By pressing the button on top of the cabinet, the sound level is lowered from 65 dBA to 60 dBA, thus providing a better working environment for the service personnel.

Remaining fan units in the cabinet are not affected.

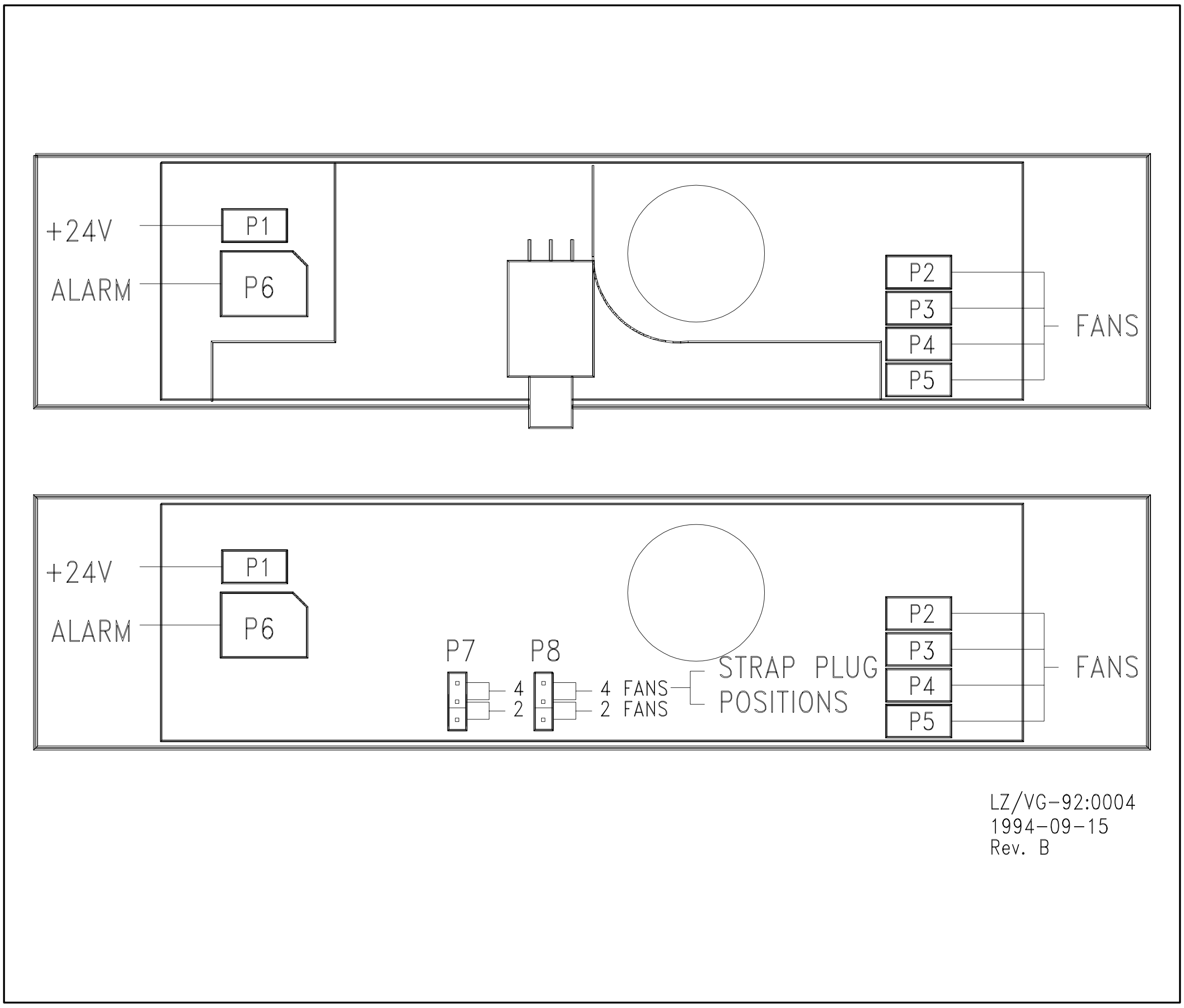


Figure 9 FCUS for four fans (top), and FCU for two or four fans (bottom)

2 Master cabinet, fully equipped

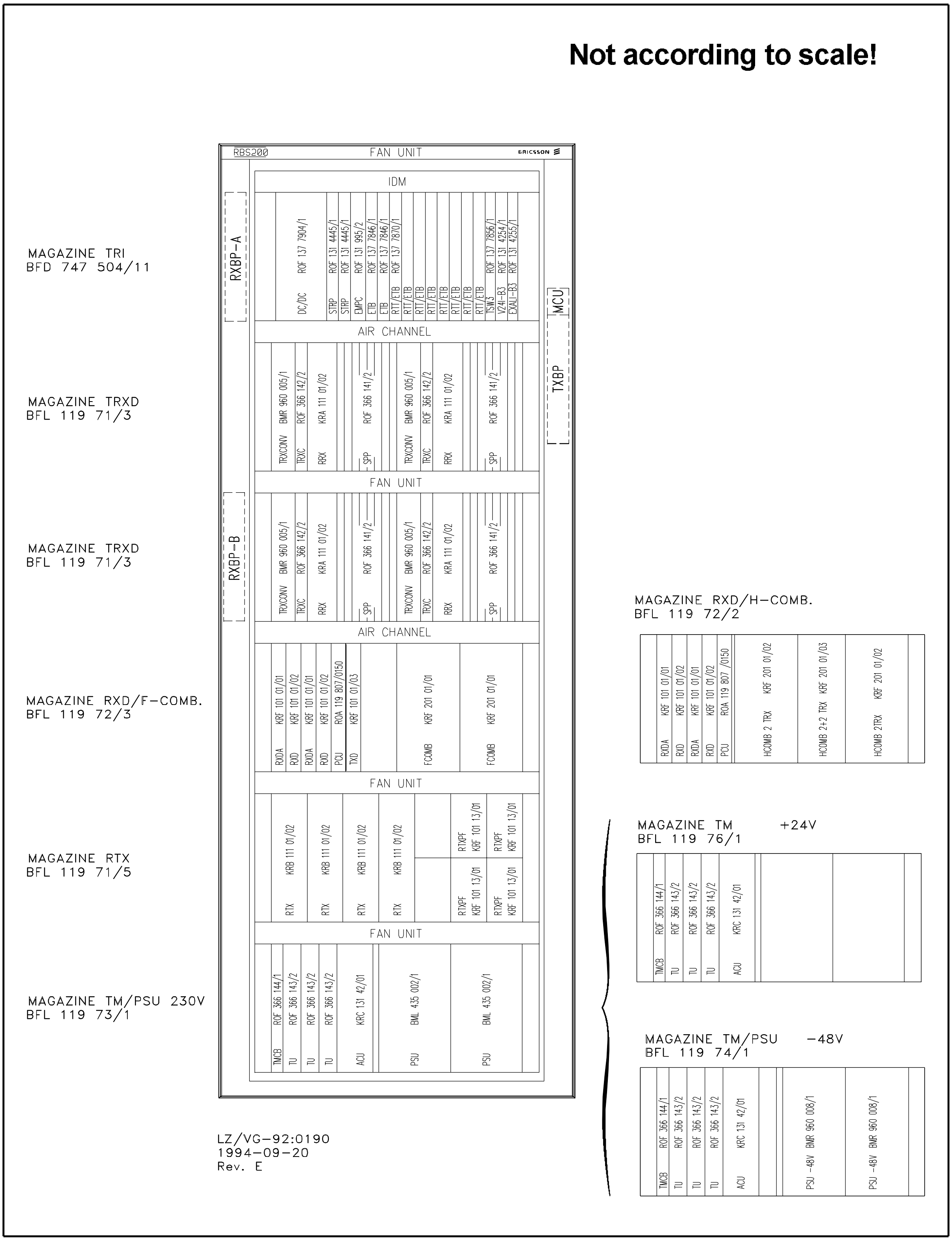


Figure 10 Master cabinet, fully equipped

3 Extension cabinet, fully equipped

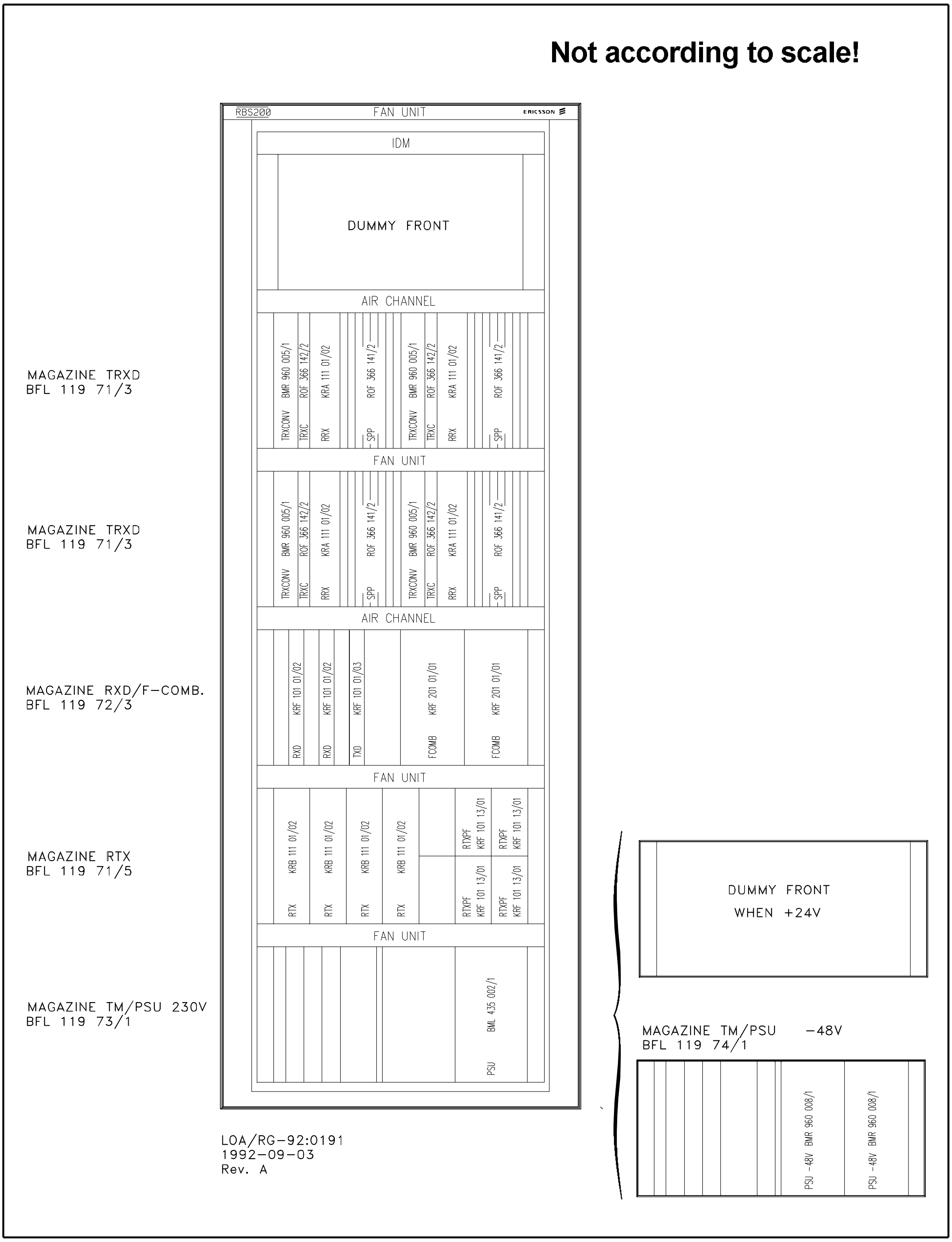


Figure 11 Extension cabinet, fully equipped

4 Equipping magazines with PCBs and units

4.1 TRXD magazine BFL 119 71/3 (with SPP boards)

The magazine is designed for mounting two complete sets of circuit boards for TRXD function.

The magazine can be installed in the cabinet pos. 04 and 06. The magazine shall be equipped as shown in table 3 and figure 10.

Table 3 Summary of circuit boards and units (from the different packages) needed for this magazine:

Product Number	Designation	Quantity		Note
		1 TRX	2 TRXs	
BMR 960 005/1	TRX converter	1	2	
ROF 366 142/2	TRXC unit	1	2	
KRA 111 01/03	Receiver, RRX	1	2	
ROF 366 141/-	Signal processor, SPP	8	16	1)
SDK 107 60/42	Dummy front	1	-	

1) Not included in the TRX delivery package.

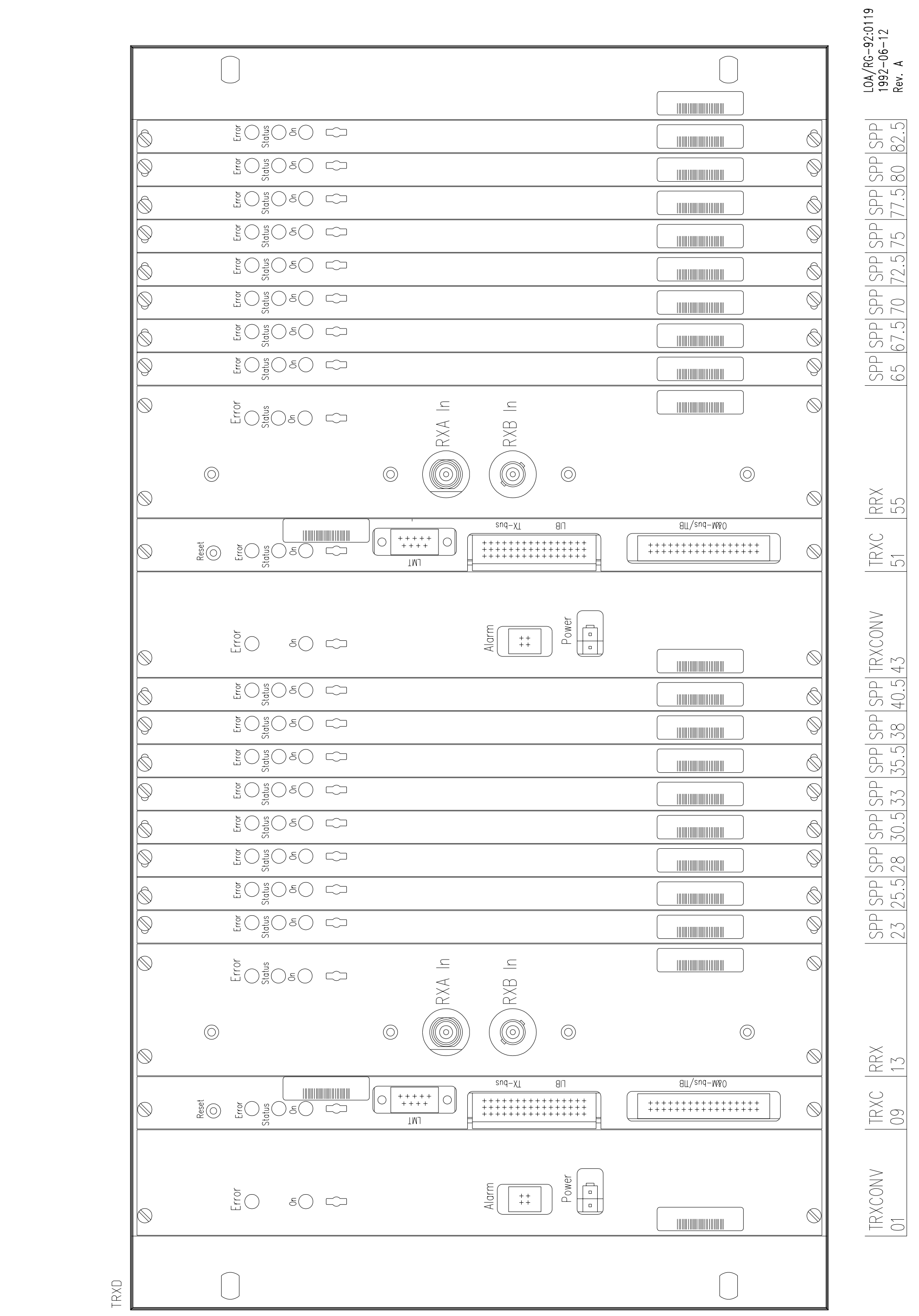


Figure 12 The TRXD magazine equipped with SPP boards

4.2 TRXD magazine BFL 119 71/3 (with SPU, SPU+/SPE, SPU++ boards)

The magazine is designed for mounting two complete sets of circuit boards for TRXD function.

The magazine can be installed in the cabinet, pos. 04 and 06. The magazine shall be equipped as shown in table 4 and figure 11.

Table 4 Summary of circuit boards and units (from the different packages) needed for this magazine:

Product Number	Designation	Quantity	
		1 TRX	2 TRXs
BMR 960 005/1	TRX converter	1	2
ROF 366 142/2	TRXC unit	1	2
KRA 111 01/03	Receiver, RRX	1	2
ROF 366 284/-	Signal processor, SPU	1	2
SDK 107 60/16	Dummy front	1	2

Screws 80/SBA 331 030/1006 are used for mounting units in the magazine.

The TRXD magazine vertical positions in the cabinet:

- position 04 for TRXD/RRX 1 and 2
- position 06 for TRXD/RRX 3 and 4.

Mount dummy front SDK 107 61/06 on unequipped magazine positions.

If antenna diversity is not used, equip RXB positions with 50 ohm terminators ZRB 107 0107/001.

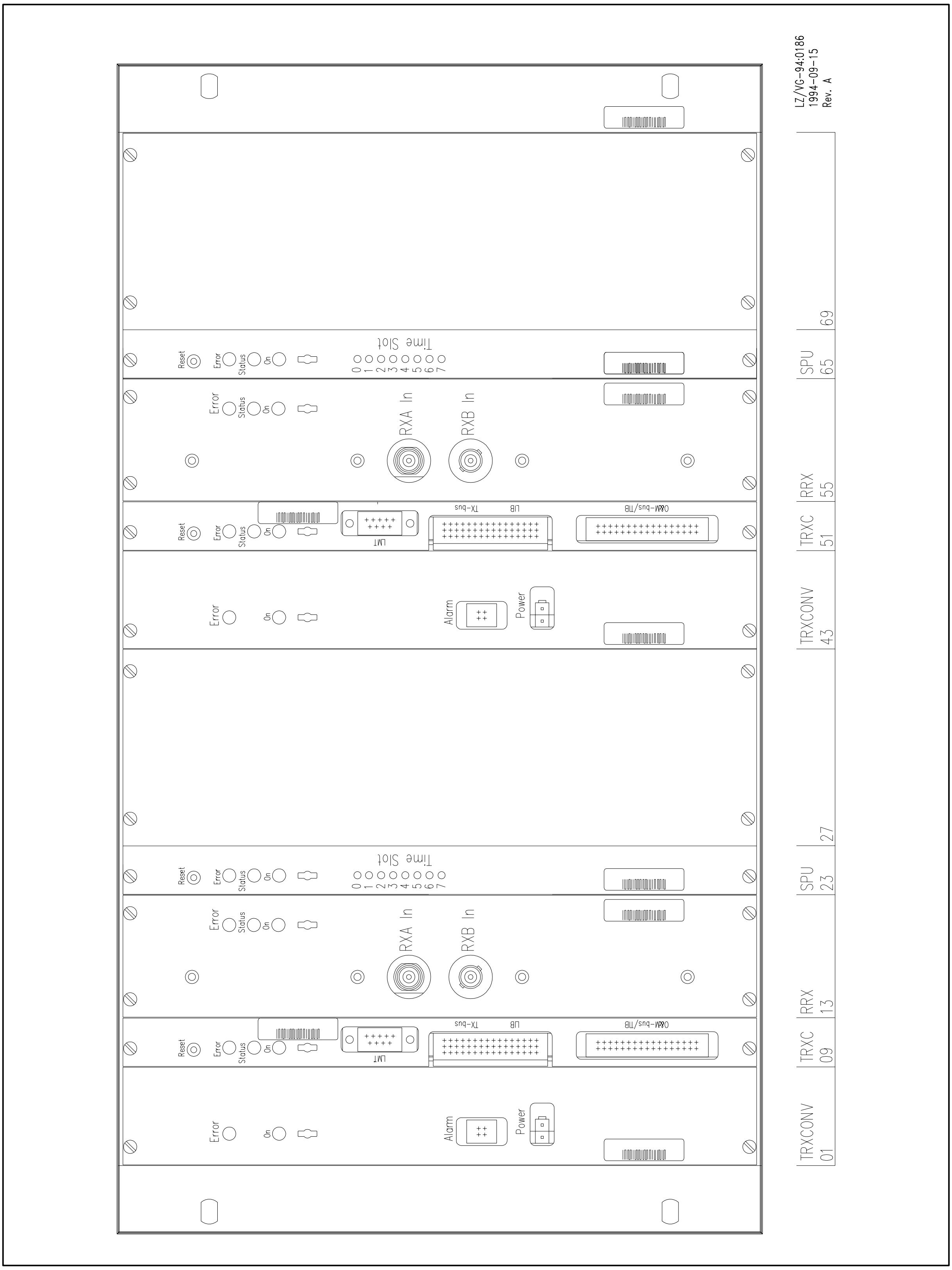


Figure 13   TRXD magazine equipped with SPU boards

4.3 H-COMB magazine BFL 119 72/2

Hybrid-Combiner magazine is designed for mounting receiver multi-couplers for up to 4 receivers with diversity and combiners for up to 4 transmitters.

The magazine can be equipped as shown in table 5.

Table 5 Units included in the magazine

Product number	Designation	Note
KRF 101 01/01	Rec. Multicoupler RXDA	1)
KRF 101 01/02	Rec. Divider RXD	1)
KRF 101 01/02	H-Combiner 2 TRX	
KRF 101 01/03	H-Combiner 2+2 TRX	
ROA 119 807/0150	Power Control Unit, 230 V	2)
SDK 107 60/01	Dummy front	
SDK 107 60/05	Dummy front RXD, PCU	
SDK 107 60/16	Dummy front H-Comb 2+2 TRX	
SDK 107 60/21	Dummy front H-Comb 2 TRX	

[1] 2 x RXDA, 2 x RXD in case of receiver diversity.

[2] 1 PCU per site. In case of a sectorized site, a dummy front SDK 107 60/5 is fitted in this position in cabinets B1 and C1.

Screws 80/SBA 331 030/1006 are used for mounting units in the magazine.

H-Combiner magazine shall be installed in the cabinet in vertical position 08.

RXDAs located in positions 08/01 and 08/11 shall be equipped with 50 ohm terminators ZRB 107 0107/001 delivered with the units, for unconnected high-level outputs HL2 - HL4.

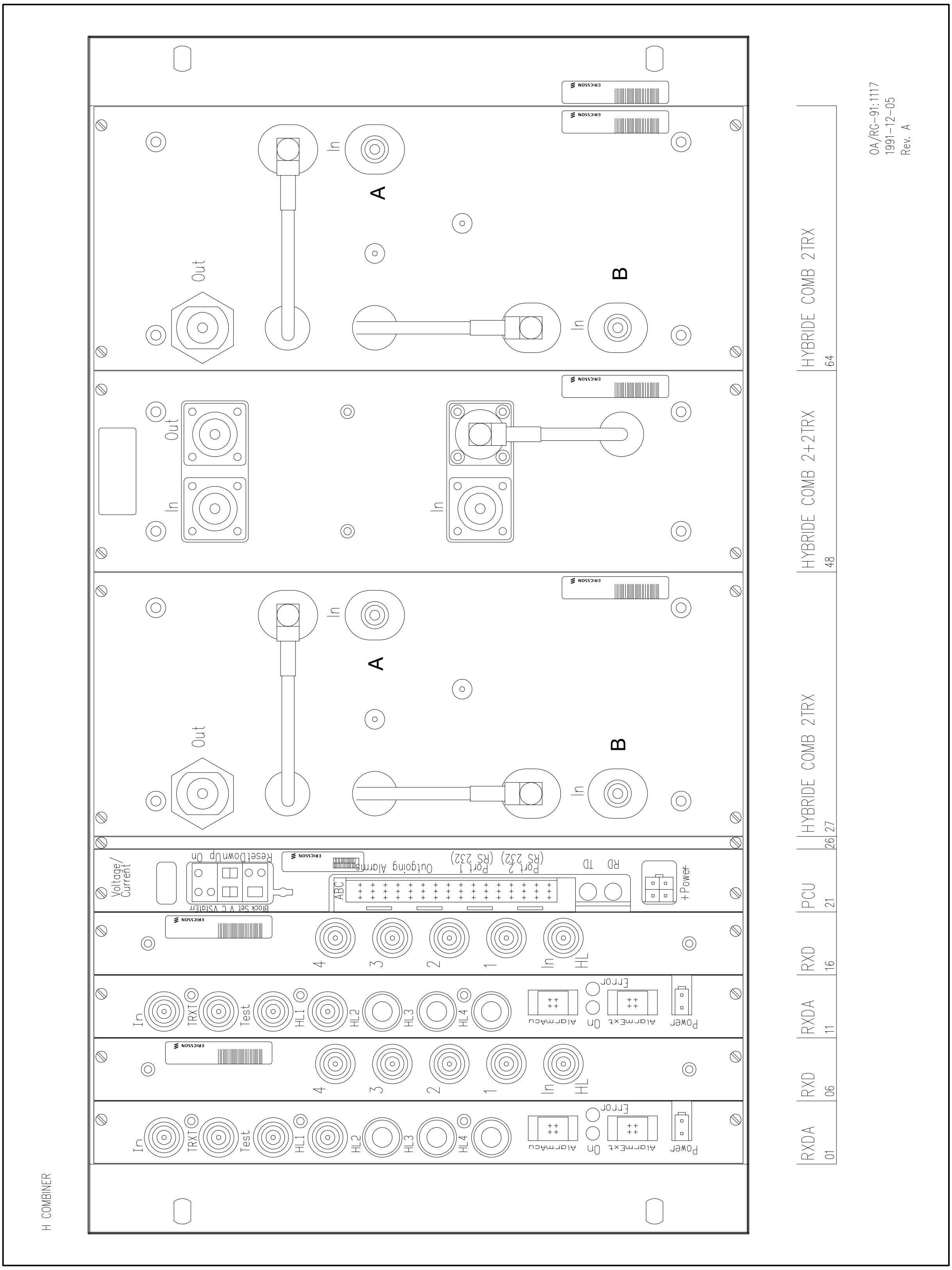


Figure 14 The H-COMB magazine equipped

4.4 F-COMB magazine BFL 119 72/3

Filter-combiner magazine (R) is designed for mounting receiver multi-couplers for up to 16 receivers with diversity, filter combiners and transmitter divider for up to 4 transmitters.

Table 6 Summary of units included in the magazine

Product number	Designation	Note
KRF 101 01/01	Rec. Multicoupler RXDA	1)
KRF 101 01/02	Rec. Divider RXD	1)
KRF 101 01/03	Transm. Divider TXD	
KRF 201 01/01	F-Combiner 2 TX	
ROA 119 807/0150	Power Control Unit	2)
SDK 107 60/05	Dummy front RXDA, RXD, PCU, TXD	
SDK 107 60/12	Dummy front	
SDK 107 60/21	Dummy front F-Comb	

1) RXDA installed in the master cabinet of each TG 2 x RXDA, 2 x RXD if receiver diversity

2) 1 PCU per site (230V AC only).

Screws 80/SBA 331 030/1006 are used for mounting units in the magazine.

F-combiner magazine (R) shall be installed in the cabinet vertical position 08.

RXDAs located in position 08/01 and 08/11 shall be equipped with 50 ohm terminators ZRB 107 0107/001, delivered with the units, for unconnected high-level outputs HL2 - HL4.

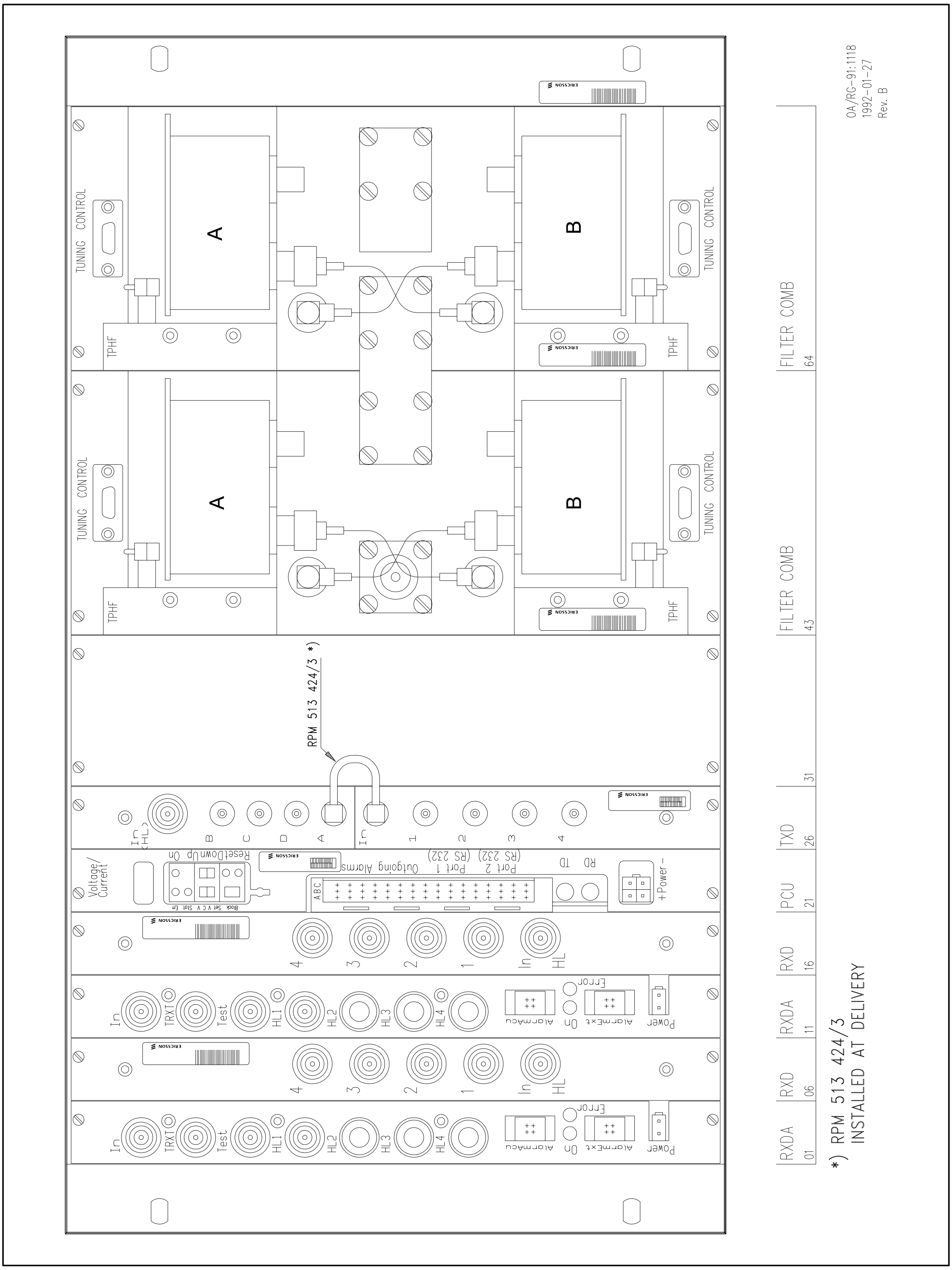


Figure 15 The F-COMB magazine (R) equipped

4.5 Adapter, end-links and U-links

Adapter KRY 101 1352/1 and end-link RPM 113 13/01 are mounted with four stainless steel screws, type MCS 4 x 16.

For the U-link KRY 101 1442/1, eight screws type MCS 4 x 22 are used.

1. Do not tighten screws on any one side before all screws have been put in place and tightened by hand.

2. Tighten the screws crosswise to 1 Nm using a torque wrench.

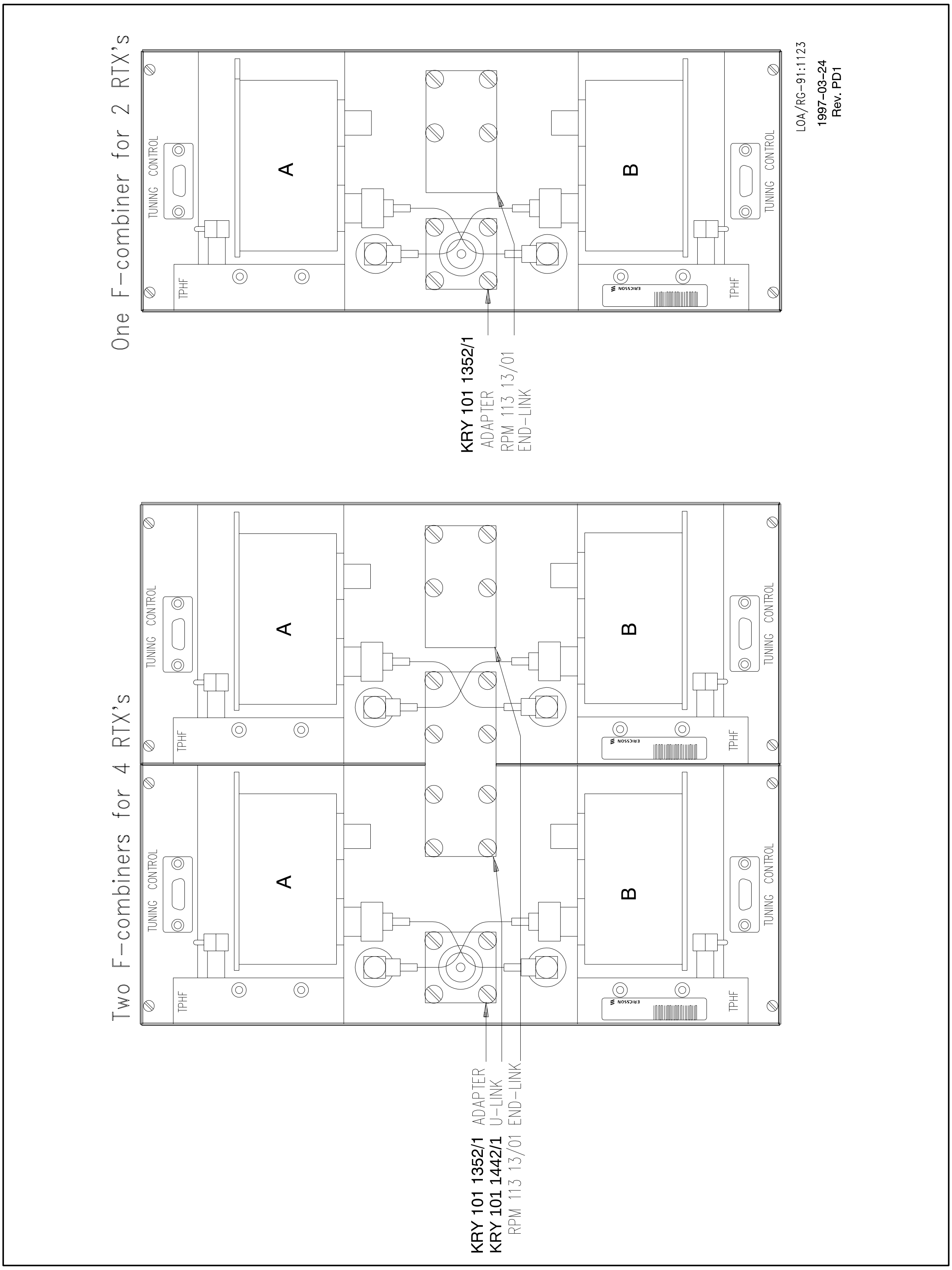


Figure 16 Using adapter, end links and U-links

4.6 RTX magazine BFL 119 71/5

The RTX magazine is designed for mounting of up to 4 transmitters with an output power of 45 W each.

The magazine is designed for mounting the following units:

- Transmitter RTX 45 W
- Transceiver Tester TRXT M,A (Optional)
- Power Filter RTXPF alt. Power Booster RTXPB.

This magazine can be equipped in several configurations depending on function:

Table 7 Units to be included in the magazine

Product number	Designation	Note
KRB 111 01/02	Transmitter RTX 45 W	
KRF 101 13/01	Power Filter RTXPF	
KRF 101 13/02	Power Booster RTXPB	1)
SDK 107 65/1	Dummy front RTX	
SDK 107 66/1	Dummy front RTXPF	
KRC 131 45/01	Transc. Tester TRXT A	2)
KRC 131 46/01	Transc. Tester TRXT M	2)
SXA 120 1827/1	Dummy Front TRXT	2)

[1] Alternative to the Power Filter, RTXPF

[2] Optional, only installed in the Master cabinet in each cell

Screws 80/SBA 331 030/1006 are used for mounting units in the magazine.

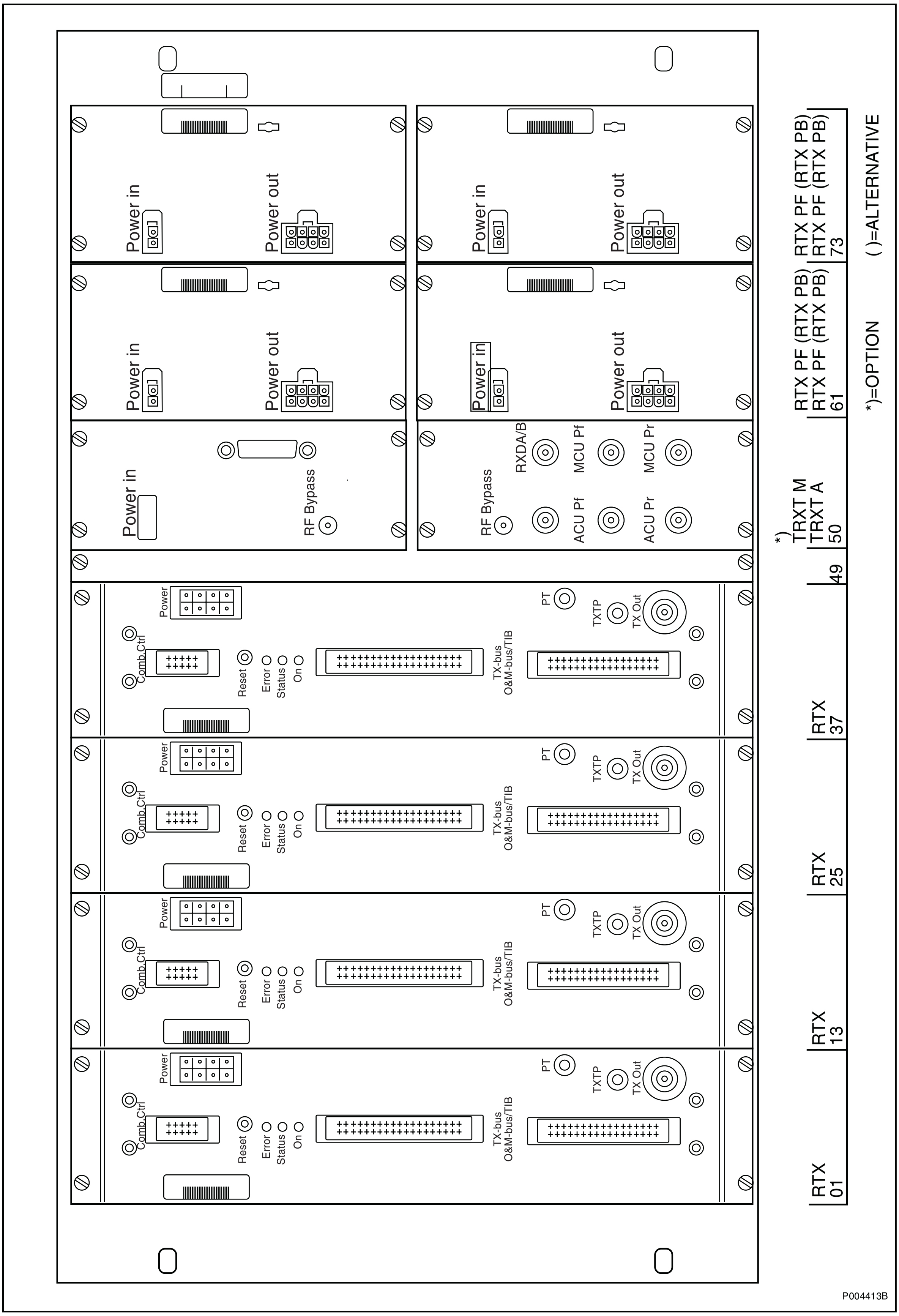


Figure 17 The RTX magazine, equipped

4.7 TM/PSU magazine BFL 119 73/1 (230V AC)

The magazine is designed for mounting of the following units:

- Timing Module Connnection Board, TMCB
- Timing Unit, TU
- Alarm Collection Unit, ACU
- Power Supply Unit(s), PSU 230V AC.

This magazine can be equipped in several configurations depending on magazine function.

The magazine can be equipped as shown in table 8 (max. configuration).

Table 8 Summary of units included in the magazine

Product number	Designation
KRC 131 42/01	Alarm Collection Unit, ACU
ROF 366 144/1	TM Conn. Board, TMCB
ROF 366 143/2	Timing Unit, TU
BML 435 002/1	Power Supply Unit, PSU 230
SDK 107 60/04	Dummy front, TMCB
SDK 107 60/02	Dummy front
SDK 107 60/06	Dummy front, TU
SDK 107 60/24	Dummy front, PSU
SDK 107 60/12	Dummy front, ACU

Screws 80/SBA 331 030/1006 are used for mounting units in the magazine.

TM/PSU magazine shall be installed in cabinet position 12.

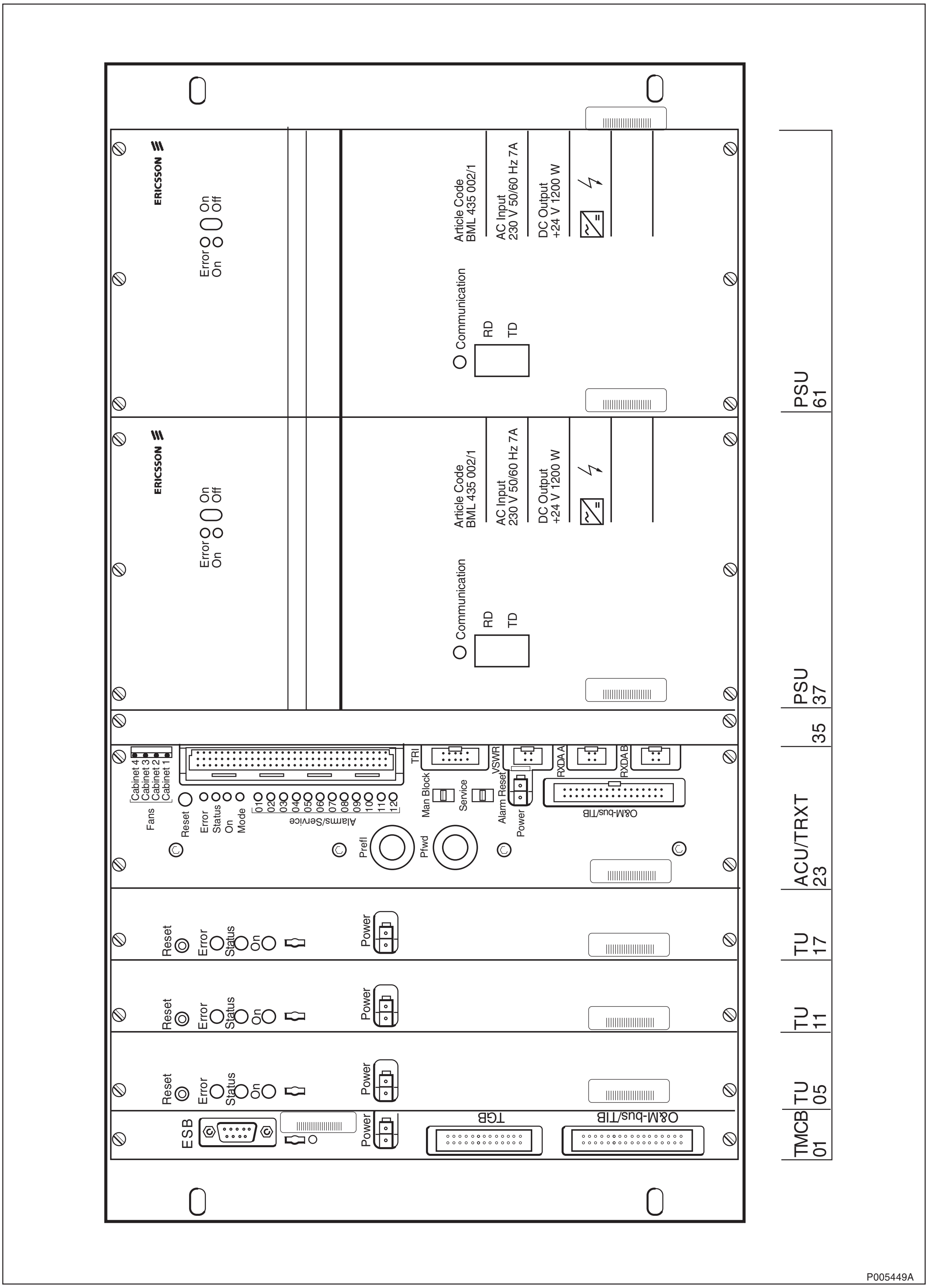


Figure 18 The TM/PSU magazine equipped (230 V AC)

4.8 TM magazine BFL 119 76/1 (+24V DC)

The magazine is designed for mounting the following units:

- Timing Module Control Board, TMCB
- Timing Unit, TU
- Alarm Collection Unit, ACU

The magazine can be equipped as shown in table 9 (max. configuration).

Table 9 Summary of units included in the magazine

Product number	Designation
KRC 131 42/01	Alarm Collection Unit, ACU
ROF 366 144/1	TM Contr. Board, TMCB
ROF 366 143/2	Timing Unit, TU
SDK 107 60/02	Dummy front
SDK 107 60/04	Dummy front, TMCB
SDK 107 60/06	Dummy front, TU
SDK 107 60/12	Dummy front, ACU
SDK 107 60/24	Dummy front,

Screws 80/SBA 331 030/1006 are used for mounting of the units in the magazine.

TM magazine is used when central +24V DC power supply is available. The magazine is installed in position 12.

Dummy front SDK 107 61/06 is mounted when the magazine is not installed.

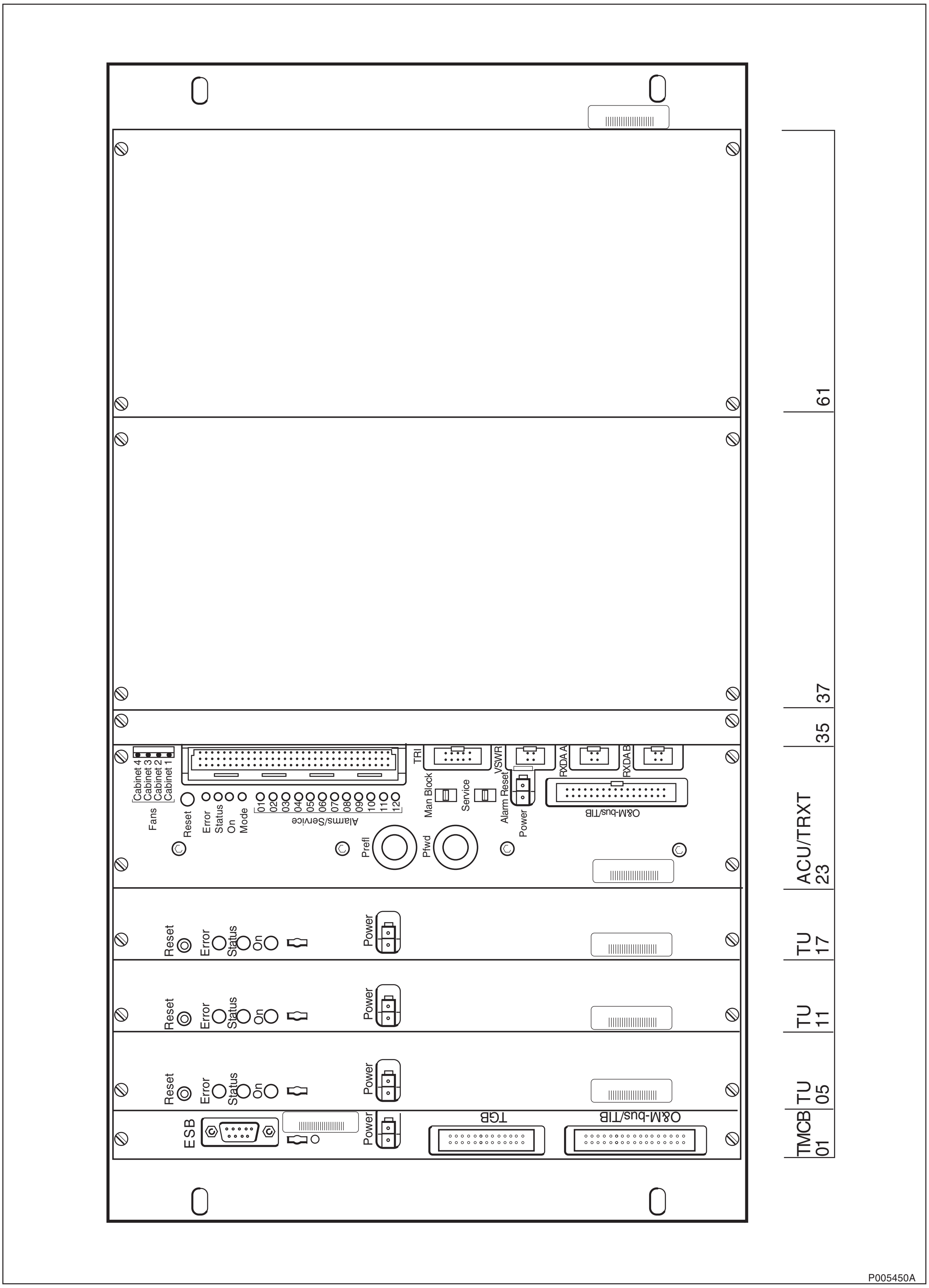


Figure 19 The TM magazine equipped (+24 V DC)

4.9 TM/PSU magazine BFL 119 74/1 (-48V DC)

The magazine is designed for mounting the following units:

- Timing Module Control Board, TMCB
- Timing Unit, TU
- Alarm Collection Unit, ACU
- Power Supply Unit(s), PSU 48.

This magazine can be equipped in several configurations depending on magazine function.

The magazine can be equipped as shown in table 10.

Table 10 Summary of units included in the magazine

Product number	Designation
KRC 131 42/01	Alarm Collection Unit, ACU [1)]
ROF 366 144/1	TM Contr. Board, TMCB [1)]
ROF 366 143/2	Timing Unit, TU [1)]
BMR 960 009/1	Power Supply Unit, PSU (-48V DC) [2) 3)]
SDK 107 60/04	Dummy front, TMCB
SDK 107 70/01	Dummy front
SDK 107 60/06	Dummy front, TU
SDK 107 60/21	Dummy front, PSU
SDK 107 60/12	Dummy front, ACU

[1)] Installed in the master cabinet in each TG.

[2)] 2 pcs. per cabinet (1300 W)

[3)] There is also an older version: BMR 960 008/1 (1100W)

Screws 80/SBA 331 030/1006 are used for mounting of the units in the magazine.

The TM/PSU magazine shall be installed in cabinet position 12.

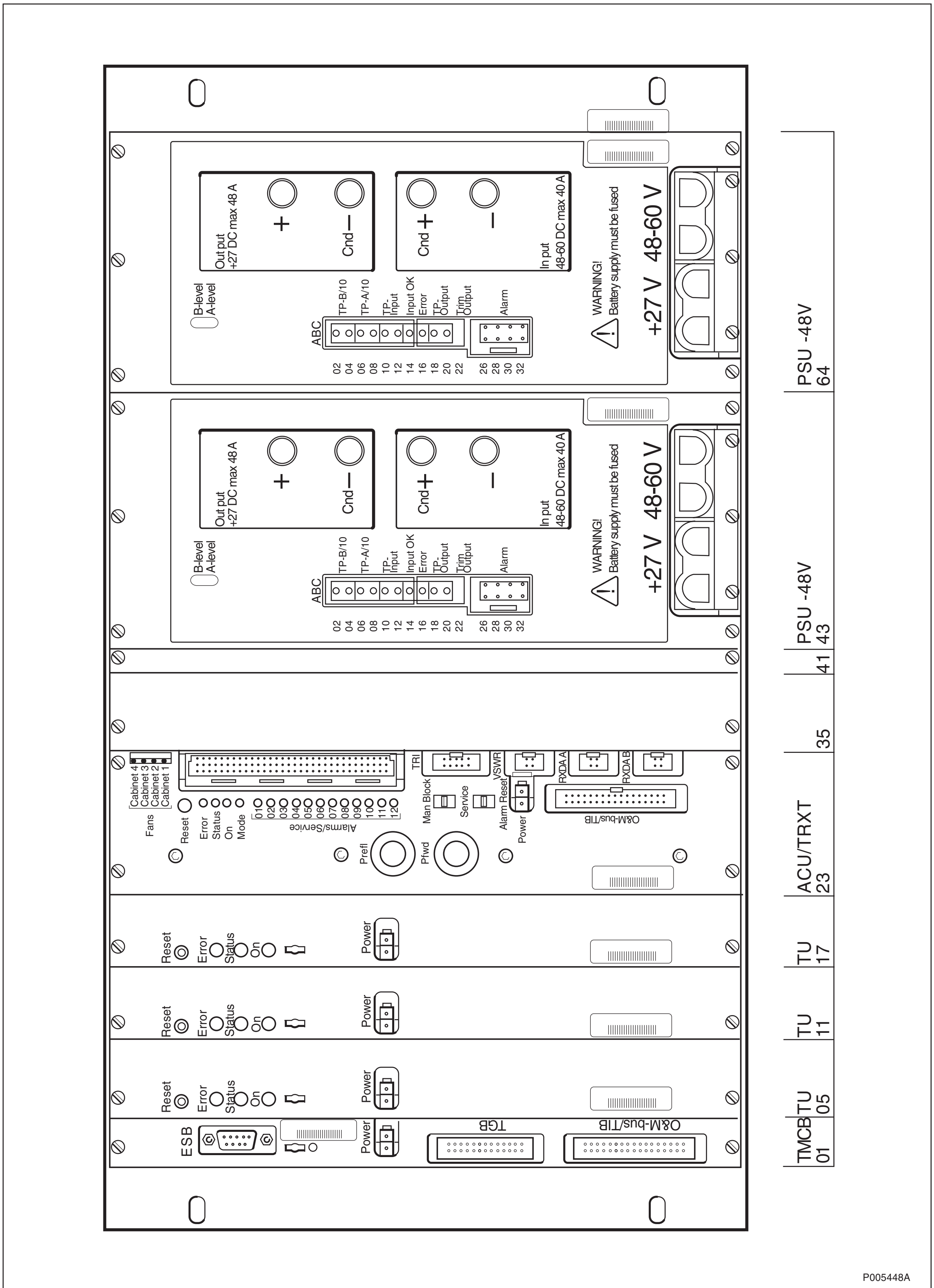


Figure 20 The TM/PSU magazine equipped (-48 V DC)

4.10 TRI magazine BFD 747 504/11

The magazine contains equipment for communication between radio equipment on site and the Base Station Controller (BSC).

The TRI magazine is designed in conventional BYB mechanics with additional brackets and cover to fit the 19" cabinet mechanics.

The product TRI exists in /11, /22 and /33 versions.

For further information see Section 2.2, *Transmission Radio Interface*.

See also PRIM for updated information.

Table 11 Summary of units included in the magazine

Product number	Designation
ROF 137 7904/1	DC/DC converter
ROF 131 4445/1	STRP board
ROF 131 995/2	EMPC board
ROF 137 7846/1	ETB board
ROF 137 7870/1	RTT board
ROF 137 7856/1	Time Switch TSW3
ROF 131 4254/1	V.24 interface
ROF 131 4255/1	Alarm board EXALI
TSR 204 0201/500	Bus cable
RNV 991 223/004	Terminator strap
RNV 991 712/001	Reset strap
RNV 321 0111	Address strap

Install TRI magazine in position 02.

When TRI is not used, mount dummy front SDK 107 61/06.

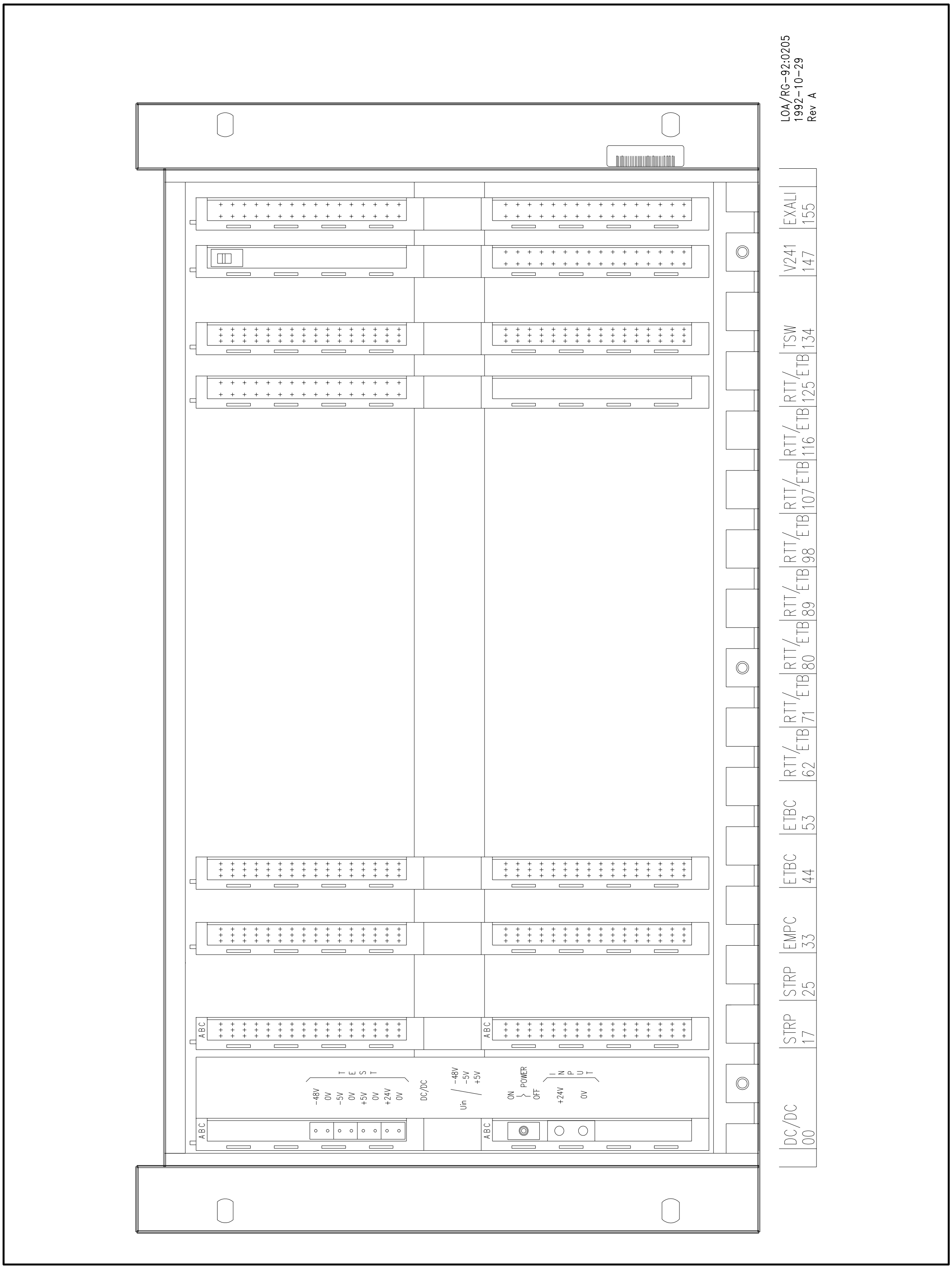


Figure 21 The TRI magazine equipped

CAPTION LIST

Document No.	
22/001 53-LZN 302 011	
Date	Rev
99-09-21	B

Transmission Radio Interface, TRI

RBS 200
Installation
Engineering Manual

Transmission Radio Interface, TRI	0
Connection of a Second TRI	1
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	9

Uppgjord — *Prepared*	Faktaansvarig — *Subject responsible*	Nr — *No.*		
ERA/LRN/ZI QRAJOJO		3/1551-COH 109 2015/11 Uen		
Dokansv/Godk — *Doc respons/Approved*	Kontr — *Checked*	Datum — *Date*	Rev	File
ERA/LRN/ZGC Leif-Olof Fager		1999-10-21	B	

Transmission Radio Interface, TRI

Contents **Page**

1 Transmission system - General

The digital 2 Mb/s system(s) between the Base Station Controller (BSC) and the Radio Base Station (RBS) is/are normally provided by the local telephone administration. The transmission system can be realized by means of radio link, coaxial cable, pair cable or optical fiber.

Each 2 Mb/s system is terminated in an Exchange Terminal Board (ETB) located in the TRI. For configurations where a single 2 Mb/s system is too small, a transmission system of higher capacity may be needed. In this case multiplex equipment will be required. The standard channel and transmission capacities for different multiplex equipment are shown in table 1.

Table 1

Order	Number of Channels	Mbit/s
1st	30	2.048
2nd	120	8.448
3rd	384	34.368

Signalling between BSC and TRI is done on time slot 16 in one of the 2 Mb/s systems.

On sites where the full 2 Mb/s system(s) capacity is not used, the TRI can be Drop/Insert connected. This will allow the spare capacity to be passed on to a second TRI via an additional ETB via a cascade connection.

Where two TRIs are cascade connected by a single 2 Mb/s system, an additional 1st order multiplex is required at the BSC to establish a signalling link to the second TRI.

Connection of the transmission system to the ETB may be done either by a 75 ohm coaxial cable or a 120 ohm pair cable.

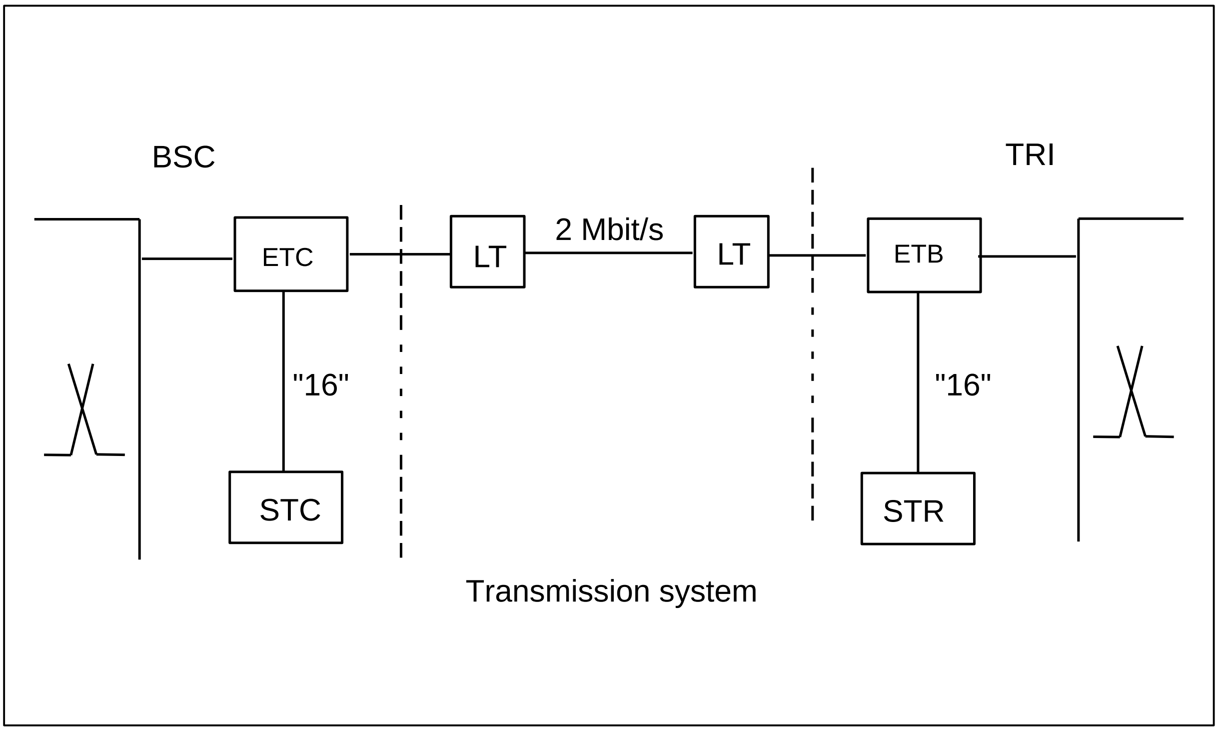

Figure 1 BSC - TRI via single 2Mbit/s connection

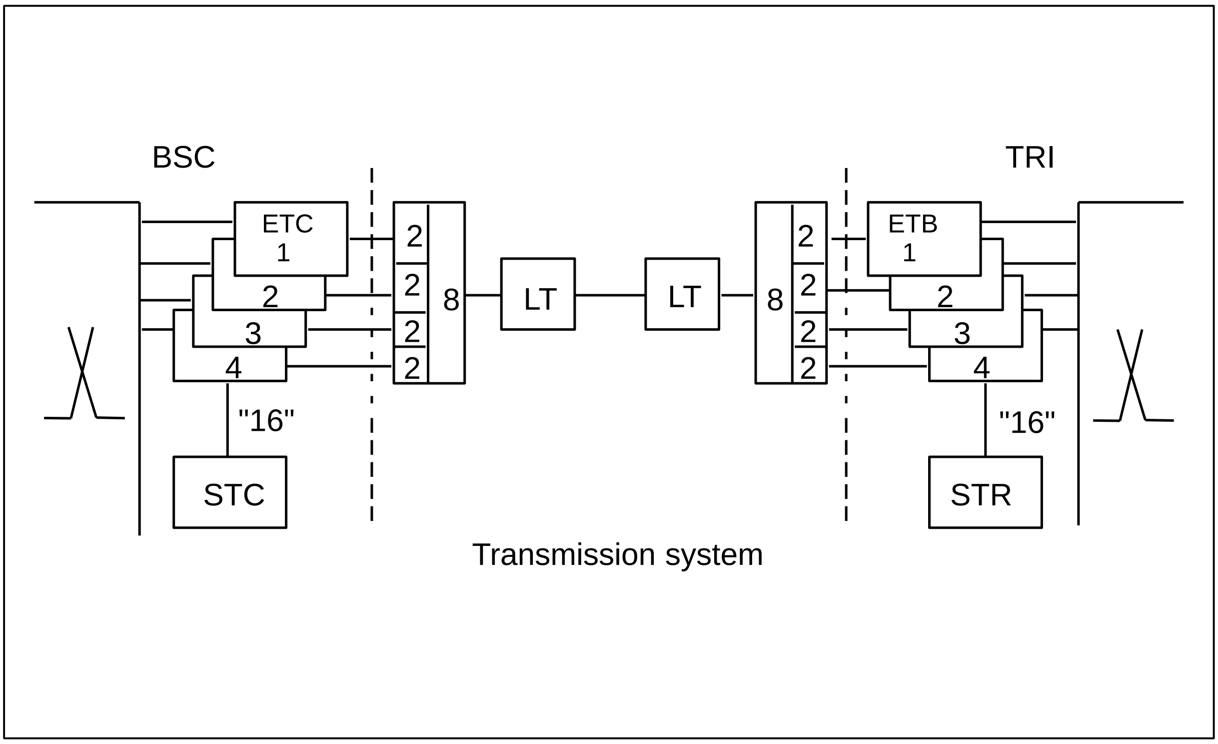

Figure 2 BSC - TRI via an 8Mbit/s transmission system

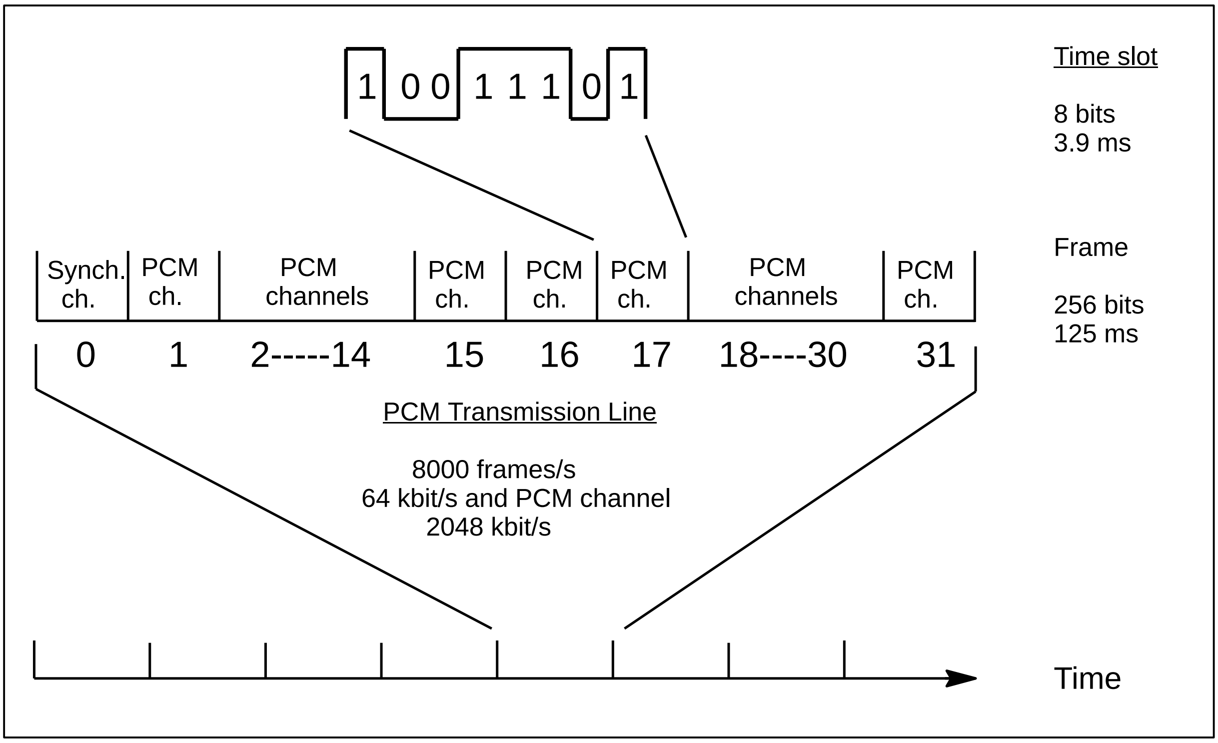

Figure 3 Function of a 2 Mbit/s connection

1.1 The PCM process

The analogue signal is sampled. Each sample value is represented by a binary code of 8 bits. There are 256 predetermined binary code levels.

Sample rate is 8 kHz thus giving a bit rate of 8000 x 8 bits=64 kbits/s.

A single channel digital link shall include:

- Sampling: Measure the analogue signal.
- Quantizing: Allocate one of 256 different values to the sample.
- Coding: Every quantized value is represented by an 8 bit binary code.

In a first order PCM system, 32 of the channels described above are multiplexed on one PCM link at a bit rate of 2.048 Mbits/s.

Channel 0 is used for synchronization and channel 16 for signalling, which leaves 30 channels for speech and data transmission.

2 Main characteristics

TRI has the following main characteristics:

- Digital cross-connect between BSC and BTS.
- Semi-permanent connections between 64 Kb/s channels in different 2 Mb/s systems.
- Drop/Insert configuration for economic utilization of transmission capacity (cascade connections).
- Connection of external alarms.
- Connection of local I/O terminal.
- Redundant signalling link (optional).
- Modular expansion, ETB and RTT.

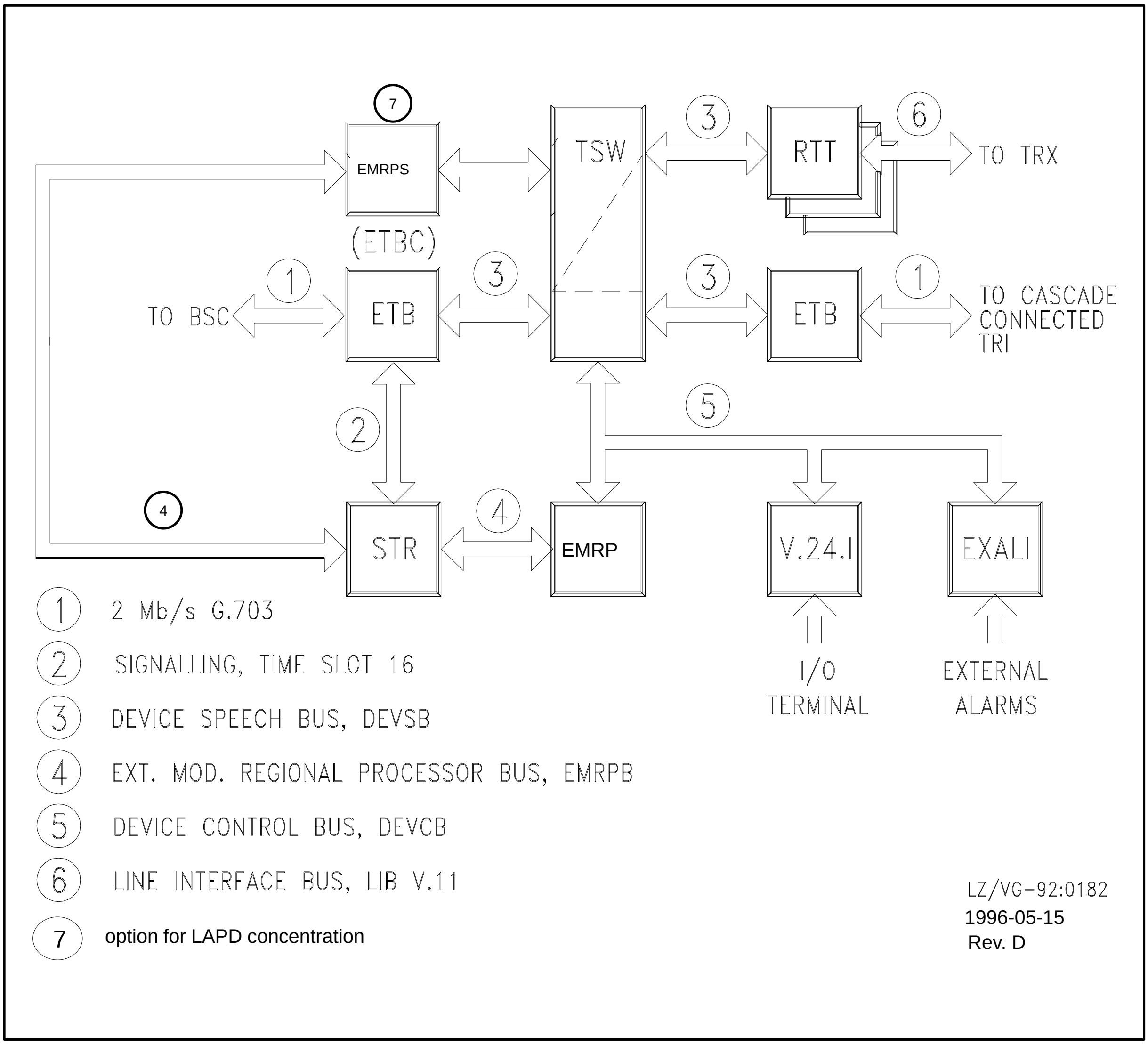

Figure 4 TRI block diagram

2.1 Transcoding

Transcoding is a function which converts 13 kb/s data used in the GSM speech coder into the 64 kb/s format used in terrestrial transmission systems and vice versa.

Transcoding is located in the BSC (remote transcoding).

A sub-multiplex function in the BTS will allow four traffic channels to be transmitted over a single 64 kb/s channel.

Channel Allocation:

Each TRX requires three timeslots (3 x 64 kb/s).

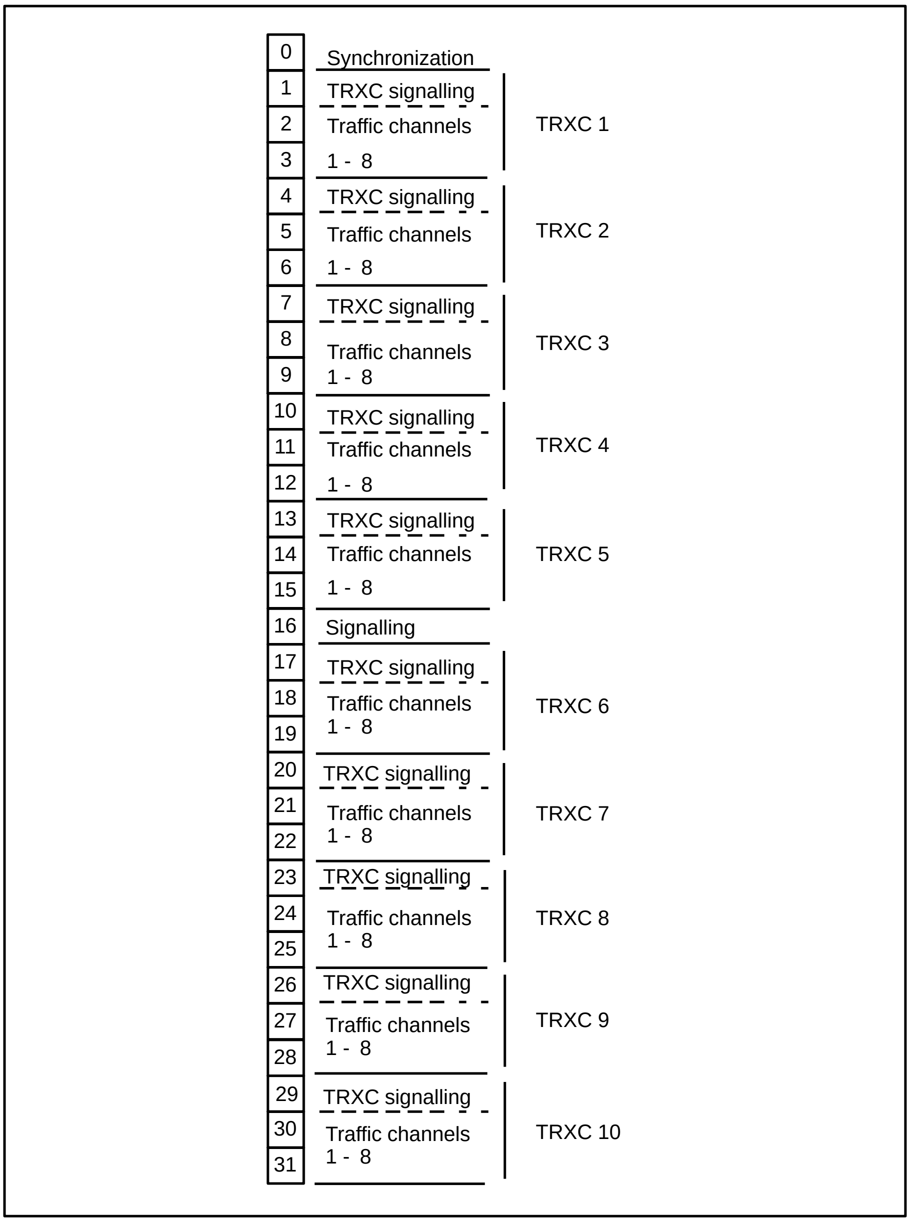

Figure 5 Example of time slot channel allocation

Channel Allocation with LAPD concentration.

LAPD concentration allows signalling to 2, 3 or 4 TRXs on one time slot. With four TRXs per concentrator, the channel allocation will be according to figure 6.

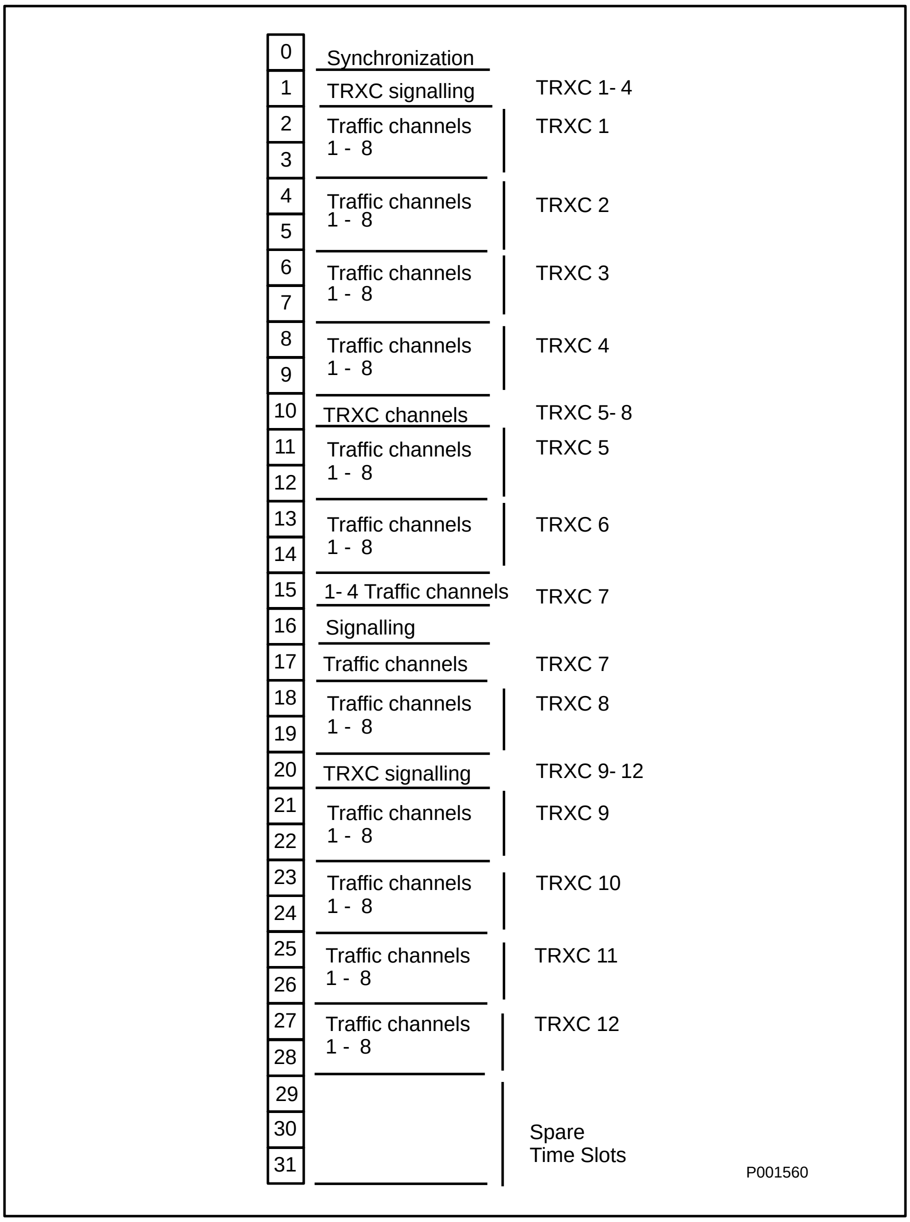

Figure 6 Example of time slot channel allocation with 4:1 concentration

3 TRI Magazine BFD

TRI magazine is designed in conventional BYB mechanics with additional brackets and covers to fit the 19" rack construction.

The magazine is equipped differently depending on the site configuration but is delivered equipped as a completely mounted unit. Boards that are included in the TRI are shown in table 2. Configure according to the specified site demands.

For the correct configuration, see Chapter 4, Dimensioning and ordering.

Note For detailed and updated information use PRIM.

Table 2 Units included in the TRI magazine

Product number	Description
ROF 137 7904/1	DC/DC converter
ROF 131 4445/1	STRP board
ROF 131 995/2	EMPC board
ROF 137 7846/1	ETB board
ROF 137 7870/1	RTT board
ROF 137 7856/2	TSW Time Switch
ROF 131 4254/1	V.24 Interface
ROF 131 4255/1	EXALI Alarm board
TSR 204 0201/500	Bus cable
RNV 991 223/004	Terminator strap
RNV 991 712/001	Reset strap
RNV 321 0111	Address strap
ROF 131 8217/1	EMRPS board

TRI magazine shall be installed in cabinet position 02.

When TRI is not used, mount a dummy front SDK 107 61/06 on cabinets B1 and C1.

Old version of TRI: See section 7, Revision information TRI.

Nr — *No.*		
		3/1551-COH 109 2015/11 Uen
Datum — *Date*	Rev	File
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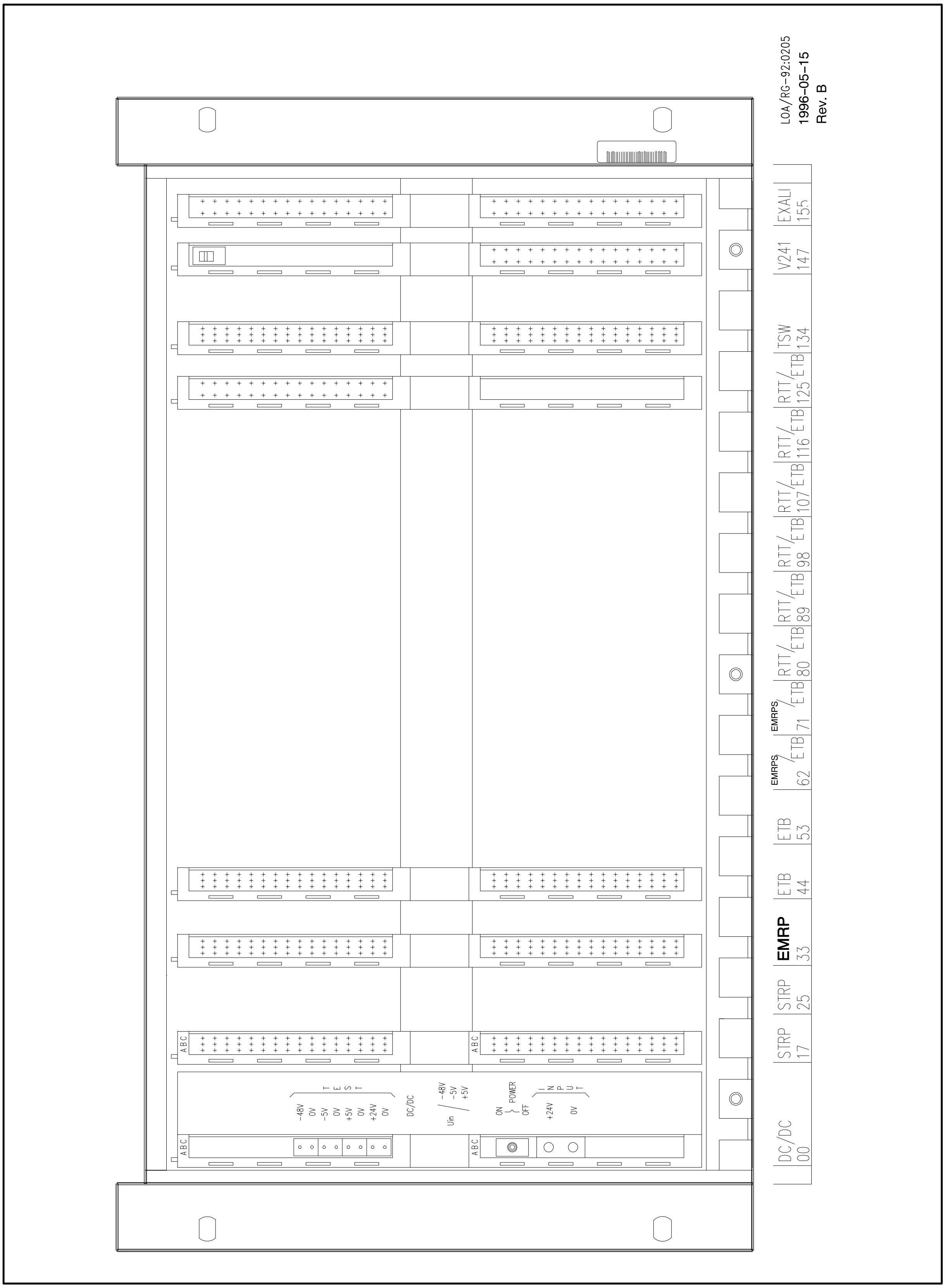

Figure 7 The TRI magazine, new version.

3.1 Positions in Magazine

Basic assigned positions are shown in table 3:

Table 3

Unit	Pos.	with redundancy	free positions
DC/DC	00		
STR	17	25	
EMRP	33		
EMRPS	62		62-116
ETB	44	53	62-116
EXALI	155		
V24I	147		
TSW	134		
RTT	125		62-116

Positions 44 and 53 are reserved for the specific site where TRI is located. Signalling between ETB and STR is only possible when placed in this position.

3.1.1 Free positions

Positions 62-116 can be equipped with either ETB, RTT or EMRPS.

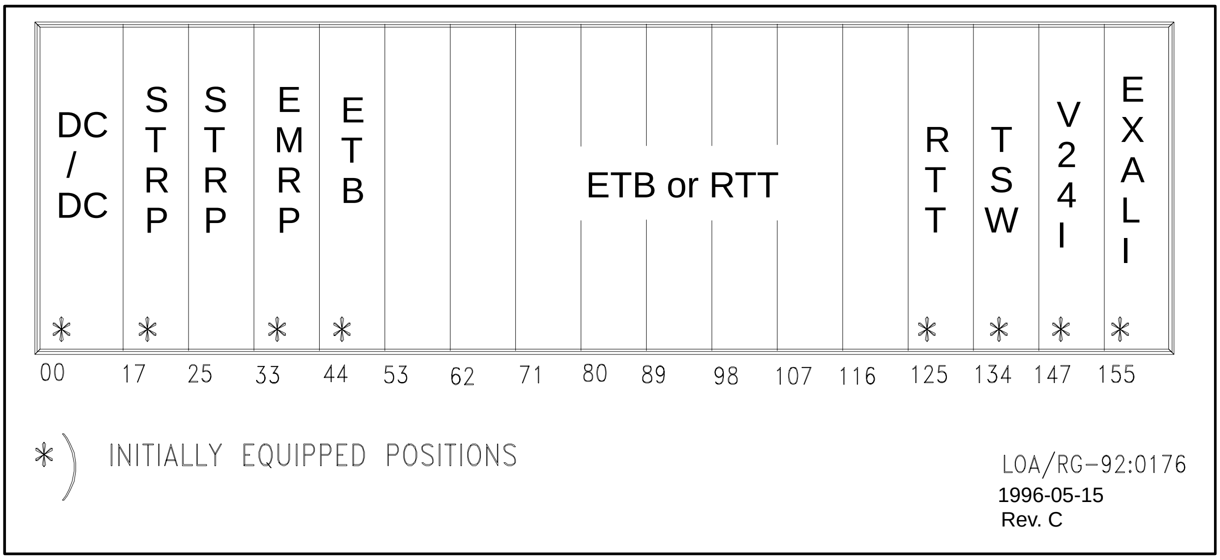

Figure 8 Layout of TRI magazine, initially equipped

3.2 Limitations

- Each ETB can handle maximum 10 TRXs and one 2 Mb PCM link. One ETB can handle 12 TRXs (13 TRXs) with LAPD concentration.
- Each RTT can handle maximum four TRXs and one cabinet.
- Each STR can handle one TS 16.
- Each EXALI can handle 32 alarms.
- Maximum 10 free positions for ETB, EMRPS and/or RTT boards.
- Normally 3 (expandable to 6), 75 ohm PCM connections/cabinet.
- Normally 2 (expandable to 4), 120 ohm PCM connections/cabinet.S Maximum 6 cabinets per TRI (Sector Site).
- If more than 6 cabinets, install a second TRI cabinet.
- Maximum four TRIs (sites) in cascade.
- EMRPS handles 31 time slots which can be configured freely for LAPD concentration.

3.3 ETB - ROF 137 7846/1

Each 2 Mb PCM link requires one ETB board. ETB boards can be placed from positions 44 and 53 and onwards towards the right.

The ETB board at position 44 functions as an ETBC, which means TS 16 is extracted and sent to the STR board from here.

If redundancy has been specified on the signalling link, a second ETB will be required and should be inserted in position 53. Each ETB can handle maximum 10 TRXs or 32 timeslots (TSs). One ETB can handle 12 (13) TRXs with LAPD concentration.

Positions 44 and 53 are reserved for the own site. Nine positions, 44 -116, can be equipped with ETBs. When starting to equip, begin with position 44 and work towards the right.

3.3.1 75 ohm PCM cabling

Each ETB requires:

1 pc.	RPM 513 363/1	75 ohm internal coaxial cable.
2 pcs.	RPM 513 339	75 ohm external coaxial cable.

If more than 3 ETB boards are required, then the 120 ohm connecting box at the top of the cabinet must be replaced by:

1 pc.	SXK 107 2435/1	Connecting box

DF

When terminating the PCM coaxial cable in the DF, the following equipment must be installed:

SXA 120 165	Holder for 6 pcs. RNT 403 113
RNT 403 113	Female connector 1/RPM 513 339
RPT 158 53	Male connector 1/RPM 513 339

3 pcs. PCM links can be connected to the above DF material.

3 pcs. SXA 120 165 can be located in the DF NTM 201 249/1.

Maximum distances:

with 75 ohm coax. cable between input term. point and TRI approx. 250 m;

with 5.6 mm^2 cable approx. 400 m.

3.3.2 120 ohm PCM cabling

Each ETB requires:

1 pc.	RPM 513 423/1	120 ohm internal pair cable.
2 pcs.	RPM 513 349	120 ohm external pair cable.

If more than two ETB boards are required, then the 75 ohm connecting box at the top of the cabinet must be replaced with:

1 pc.	SXK 107 2436/1	Connecting box DIN

DF

When terminating the PCM pair cable in the DF, the following equipment must be installed:

SXA 120 164	Holder for 4 pcs. RNT 40305/03
RNT 403 05/03	Female connector 1/RPM 513 349
RPT 403 08/03	Male connector I/R

2 pcs. PCM links can be connected to the above DDF.

3 pcs. SXA 120 164 can be located in DF NTM 201 249/1.

Maximum distance:

with 120 ohm pair cable between input terminal point and TRI approx. 200 m.

3.4 STR - ROF 131 4445/2

This unit handles the TS 16 (signalling and traffic control). One STR is required.

Position:

If only one STR is needed, insert it in position 17. If more than one is needed, put the second STR in position 25.

3.4.1 Cables

1 pc./STR	TSR 204 0201/500 bus cable is required.

3.4.2 Redundancy

If redundancy is required on the signalling link, use a second STR. An extra ETB is also required.

Maximum two STRs per TRI.

3.5 EMRP - ROF 131 995/7

The unit handles the information to and from the STR, EXALI, V24 and the TSW.

EMRP is always located at position 33.

One EMRP is always included in the basic delivery configuration.

3.6 RTT - ROF 137 7870/1

RTT board is the interface between the TSW and TRX. It connects the TSs from the TSW and distributes them in a fixed pattern of 4, 2Mb/s interfaces, one per TRX.

table 4 shows distribution of timeslots in the RTT.

Table 4

Interface No.	TS
1	0-8
2	9-17

3	18-26
4	27-31

3.6.1 TS-distribution in RTT

In each interface only the first three TSs contain information to be used when setting up the semi-permanent connection through the TRI.

Extracted timeslots are mapped on the first positions in the 2Mb/s interfaces. See figure 9.

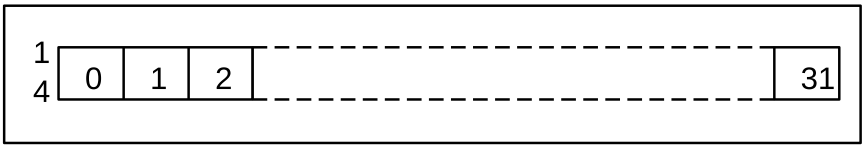

Figure 9

TS 0 =	TRX signalling
TS 1-2 =	Traffic channels 1-8
TS 3-31 =	"Don’t care" information

3.6.2 RTT - TRX interface

RTT can support one TG, comprising four TRXs (located in the same cabinet).

Positions:

RTT shall be located from position 125 and onwards towards the left. Ten positions are available, but in practice only six will be used.

Cables

Each RTT requires:

1 pc.	RPM 513 364/1	Internal cable

As the RTT also serves TRXs located in other cabinets, a line interface bus cable (LIB) is needed between the cabinets. See section LIB bus.

3.7 TSW - ROF 137 7856/2

TSW distributes individual TSs either to the different RTT boards or to other ETB boards with which it may be cascaded.

Position:

Always located in position 134.

3.8 V24 I/O - ROF 131 4254/1

Allows communication with BSC via FIOL software.

Position:

Always located in position 147.

3.9 EMRPS - ROF 131 8217/1

Contains LAPD concentration. Allows signalling to more than one TRX on a TS.

Position:

Recommended to be inserted in pos. 62, however it can be inserted in pos. 62-125.

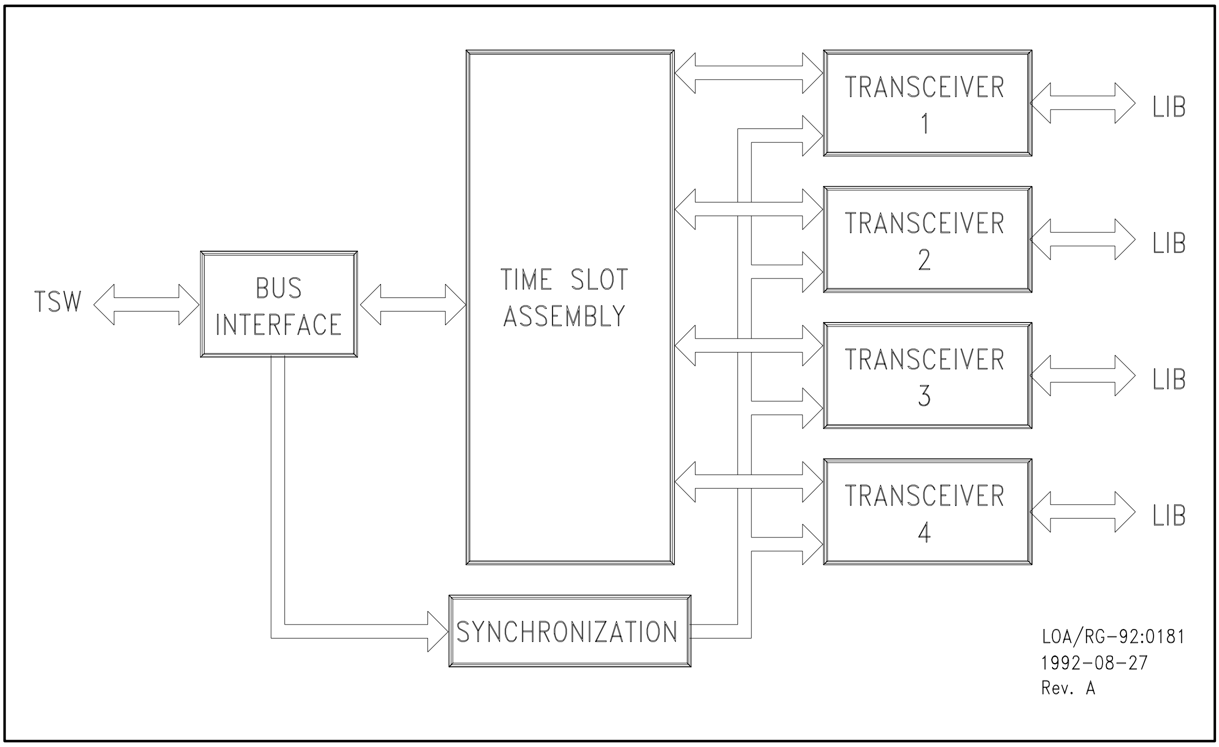

Figure 10 RTT block diagram

3.10 EXALI - ROF 131 4255/1

Board for connecting 32 (0-31) external alarms. The alarm board accepts either open or closed contacts. The selected contact function has to be programmed in the BSC. See Chapter 2, section 4, Cabling and earthing.

Position:

Located at position 155.

Int. Cable:

RPM 513 364/1; 1 pc./EXALI

See also Chapter 2, section 5, Alarm handling.

Ext. Cable:

RPM 513 338 shall be used between EXALI and DF; 1 pc.

Cable is prefabricated with a connector at one end only. Total length is 15 meters.

3.11 LIB-bus

Line interface bus (LIB) is the connection between TRX units and RTT boards. Consequently, the LIB bus connects the A1 cabinet (where the TRI is located) with other cabinets on site. Due to the limited number of LIB bus outlets, maximum six cabinets can be connected to TRI

Following cables are available:

RPM 513 336/500	LIB cable
RPM 513 336/1800	LIB cable
RPM 513 336/6500	LIB cable

Depending on configuration, different lengths of cable will be needed.

/500 is always required. It connects the first RTT board to the first four TRXs in the first cabinet. This cabinet is always designated A1.

/1800 is used between cabinets A1 and A2 .

/6500 is used between A1 and B1, C1, B2 and C2, etc.

3.12 TM-bus

TM-bus cable is required only on sector sites. TM-bus provides time synchronization between the different Transceiver Groups (TG). TM-bus must be terminated in cabinets A1 and C1 with bus terminators.

RPM 513 337/	TM synchronization cable
RPT 403 801/01	TM Bus terminator

TM bus must be terminated in the first and last M-cabinet (A1 and B1 or A1 and C1).

3.13 Dimensioning the TRI

It is important to consider the following information before dimensioning the TRI:

- Number of TRXs
- Number of cabinets
- Redundant signalling link
- 75 ohm or 120 ohm PCM link
- Network plan
- Cascaded sites
- See Chapter 4, section 2, Dimensioning and Ordering for detailed planning and ordering of the TRI.

4 TRI cables

There are two types of cables specified; Internal cables (used within the cabinet) and External cables. See Chapter 2, section 4, Cabling and earthing.

4.1 PCM-link cables

Two types of cables are used, 75 ohm coaxial cable and 120 ohm pair-cable.

The cabinet has a standardized configuration with possible outlets for connecting two PCM links with 120 ohm pair-cable and three PCM links with 75 ohm coaxial cable.

A maximum of four PCM links via 120 ohm pair-cable, or six PCM links via 75 ohm coax can be connected. In both cases, the outlet on the top has to be changed on site.

See also paragraphs 3.3.1 and 3.3.2.

4.2 TRI cabling

Table 5

Product No.	Designation	From	To CCF/ 1)
RPM 513 364/1	Alarm cable	EXALI	CCF/B1
RPM 513 364/1	RTT cable	RTT	CCF/D1-3
RPM 513 363/1	75Ω PCM cable	75Ω/ETB	CCF/F1-6
RPM 513 423/1	120Ω PCM cable	120Ω/ETB	CCF/E1-4
RPM 513 389/1	Power cable	24V DC/DC	CCF/IDM
TSR 204 0201/500	STR cable	EMPC	STR

Table 6

Product No.	Designation	From cabinet	To cabinet
RPM 513 336/500	LIB bus cable	A1	A1
RPM 513 336/1800	LIB bus cable	A1	A2
RPM 513 336/6500	LIB bus cable	A1	A3,B1-3,C1-3
RPM 513 338	Alarm cable	A1	DF
RPM 513 339	75Ω PCM cable	A1	DF
RPM 513 349	120Ω PCM cable	A1	DF

Table 7 Plugs and terminators

Product number	Description
RNV 991 223/004	Bus terminator
RNV 991 712/001	Reset plug
RNV 321 0111	Address plug
RPT 403 801/1	TM Bus terminator

5 Delivery Configuration

Six (6) different TRI configurations are available:

		STR	ETB	RTT	EMRPS
1.	BFD 747 504/11	1	1	1	
2.	BFD 747 504/22	2	2	2	
3.	BFD 747 504/33	2	3	3	
4.	BFD 747 504/11	1	1	1	1
5.	BFD 747 504/22	2	2	2	1
6.	BFD 747 504/33	2	3	3	1

The BFD magazine is built up in BYB mechanics. For adaption to 19" mechanics, an adaption kit BFL 119 71/1 is included in the above BFD delivery.

5.1 Product specification BFD 747 504/XX

Items 1-14 are included in the BFD delivery.

Items 15-24 must be ordered separately.

5.2 Product specification BFD 747 504/XX

Note In table 8, mechanical items are excluded. For detailed information use PRIM.

Table 8

Item	Product no.	Description	/11	/22	/33	/111	/122	/133
1	ROF 137 7904/1	Circuit board DC/DC	1	1	1	1	1	1
2	ROF 137 995/7	Circuit board EMRP	1	1	1	1	1	1
3	ROF 137 7856/2	Circuit board TSW	1	1	1	1	1	1
4	ROF 131 4254/1	Circuit board V24-B3	1	1	1	1	1	1
5	ROF 131 4255/1	Circuit board EXALI-B3	1	1	1	1	2	2
6	ROF 131 4445/2	Circuit board STRP	1	2	2	1	2	2
7	ROF 137 7846/1	Circuit board ETB/ETP1-3	1	2	3	1	2	3
8	ROF 137 7870/1	Circuit board RTT	1	2	3	1	2	3
9	ROF 131 8217/1	Circuit board EMRPS	0	0	0	1	1	1
10	TSR 204 0201/ 500	Bus cable/STRP	2	2	2	4	4	4
11	RNV 991 223/004	Bus termination	2	2	2	2	2	2

12	RNV 991 712/001	Reset tool	1	1	1	1	1	1
13	RNV 321 0111	Address plug	1	1	1	0	0	0
14	RNV 991 03/xx	Strapping plug	0	0	0	1	1	1
15	RPM 513 364/1	Int. cable EXALI-CCF [1)]	1	1	1	1	1	1
16	RPM 513 364/1	Int. cable RTT-CCF	1	2	3	1	2	3
17	RPM 513 363/1	Int. cable, 75 ohm/ETB-CCF	1	2	3	1	2	3
18	RPM 513 423/1	Int. cable, 120 ohm/ ETB-CCF	1	2	3	1	2	3
19	RPM 513 389/1	Int. cable, 24V DC/DC-IDM	1	1	1	1	1	1
20	RPM 513 336/500	Ext. cable, LIB-cable	1	1	1	1	1	1
21	RPM 513 336/ 6500	Ext. cable, LIB-cable	1-2	Acc. to site config	Acc. to site config	Acc. to site config	Acc. to site config	Acc. to site config
22	RPM 513 338	Ext. cable, Alarm	1	Acc. to site config	Acc. to site config	Acc. to site config	Acc. to site config	Acc. to site config
23	RPM 513 339	Ext. cable, 75 ohm	2	4	6	2	4	6
24	RPM 513 349	Ext. cable, 120 ohm	2	4	6	2	4	6

1) CCF=Cabinet Conn. field

6 Block Diagrams

6.1 Block diagram - MUX in back to back configuration

When several sites are to be connected over one 2 Mbit/s link, a MUX in back to back configuration must be used. With this solution several TS 16 can be connected over the same PCM link. See figure 11 and figure 12.

6.2 Block diagram - Transit site and cascaded site

The diagram shows a TRI magazine, maximum equipped with four ETBs and six RTTs and the necessary TSs, see figure 13. Do not connect more than four TRIs in cascade.

Note Remember that a transmission medium (Opto Cable, Radio Link, MUX equipment etc) between the BSC and BTSs, is always required. Maximum transmission distance between two ETBs is approx. 300 m.

6.3 Block diagram - LAPD concentration

Concentration of three, non-concentrated LAPD links is shown in figure 15.

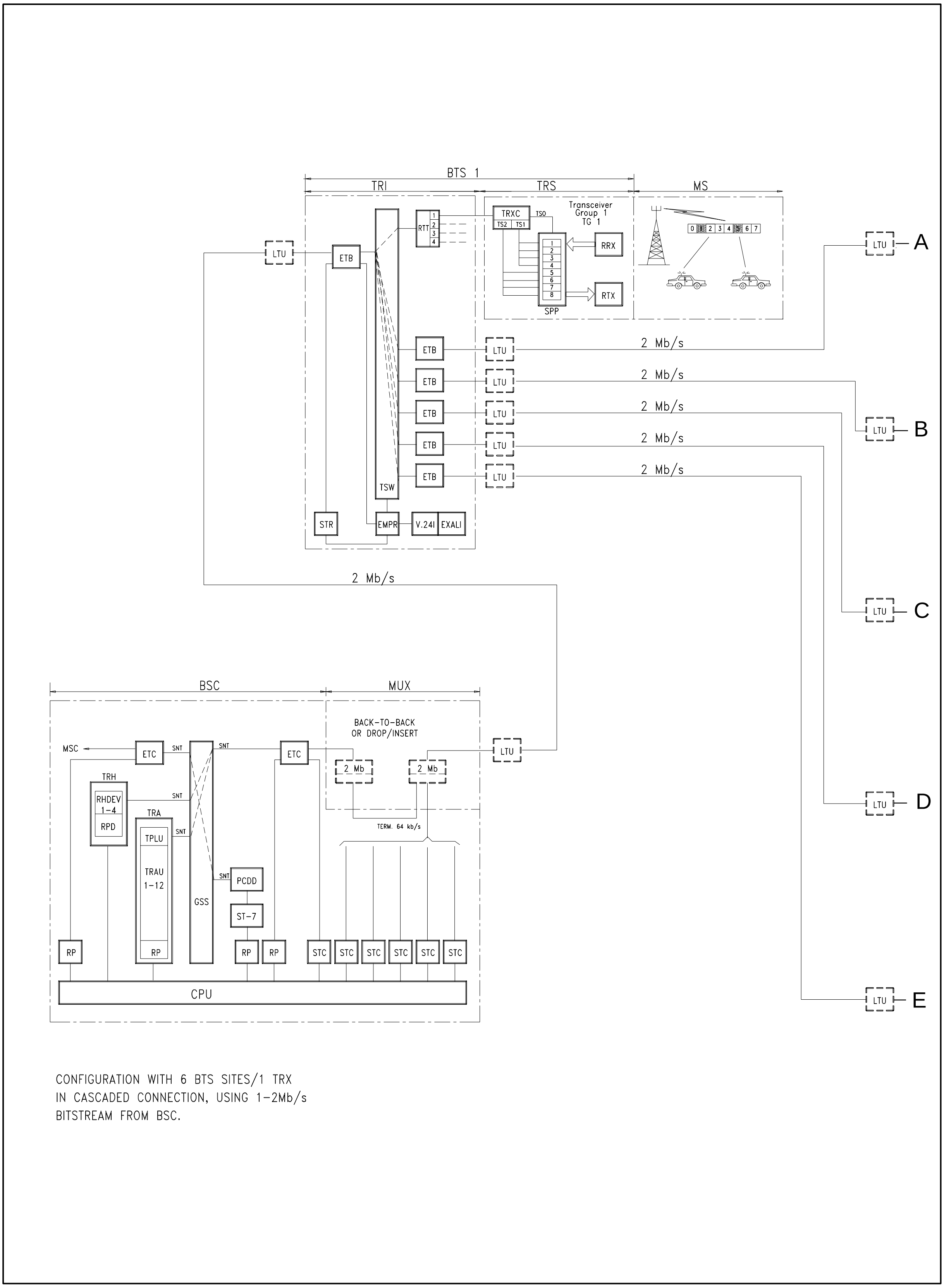

Figure 11 BSS hardware overview, block diagram (left part)

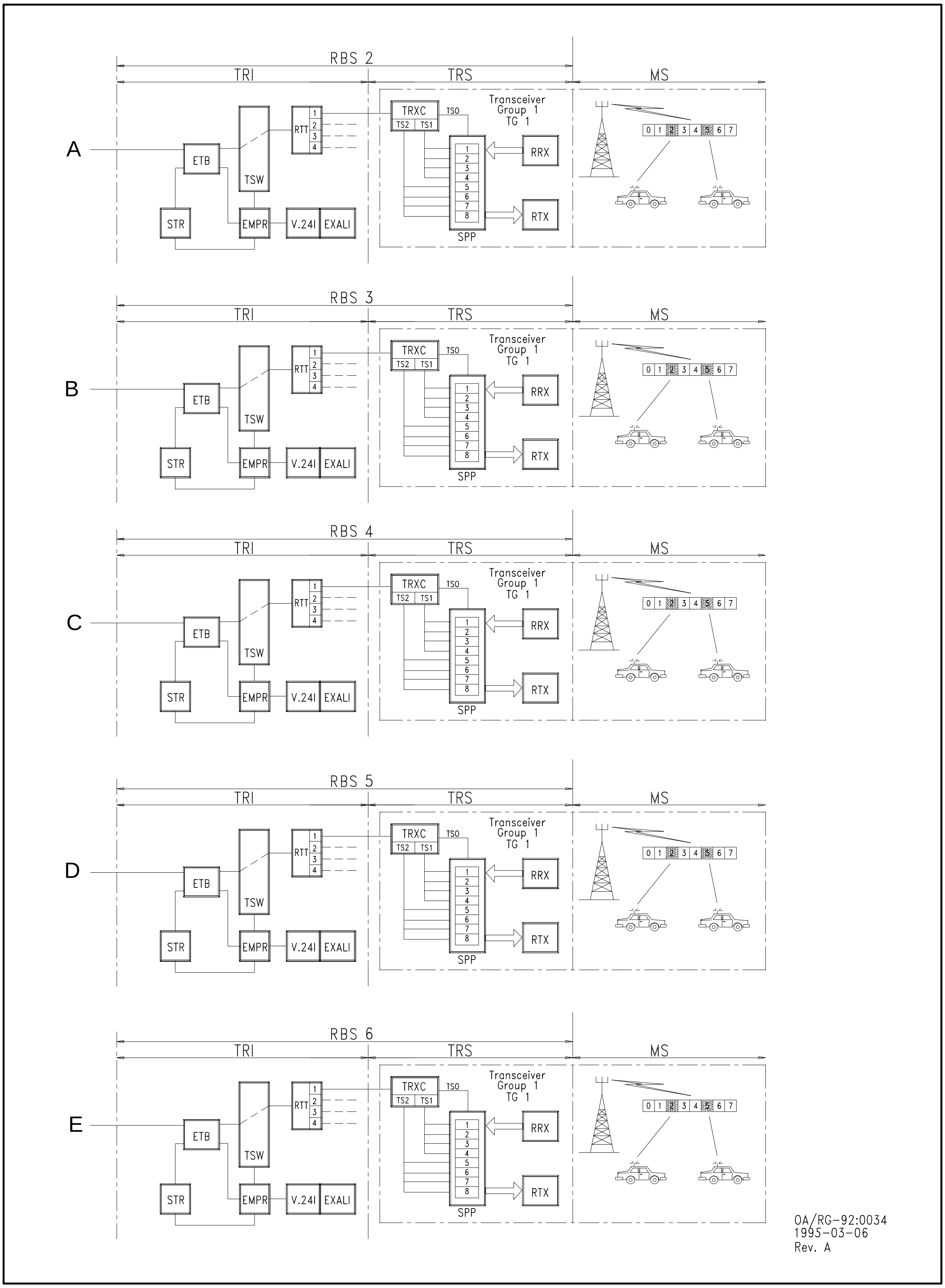

Figure 12 BSS hardware overview, block diagram (right part)

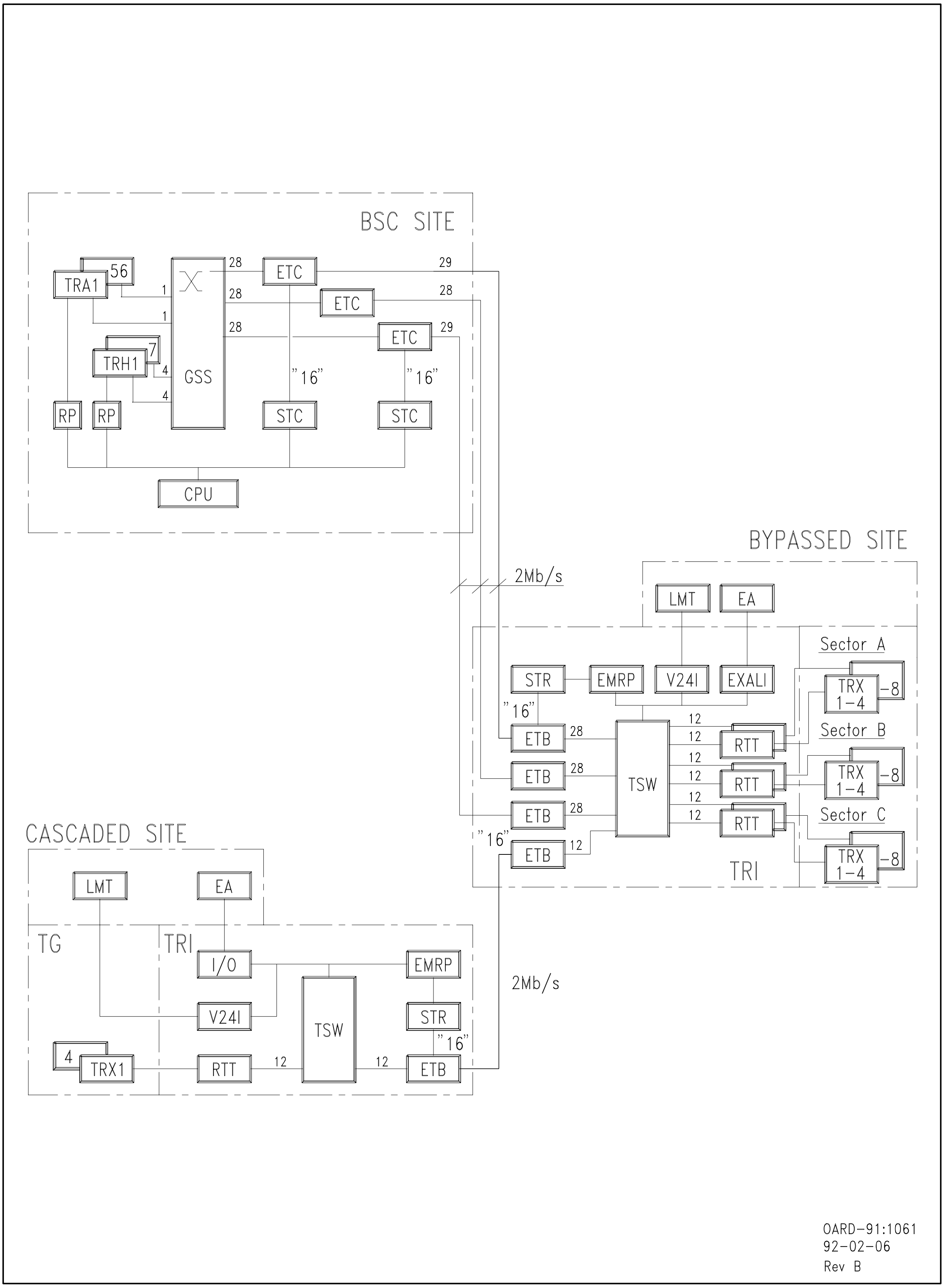

Figure 13 Bypassed and cascaded site, block diagram

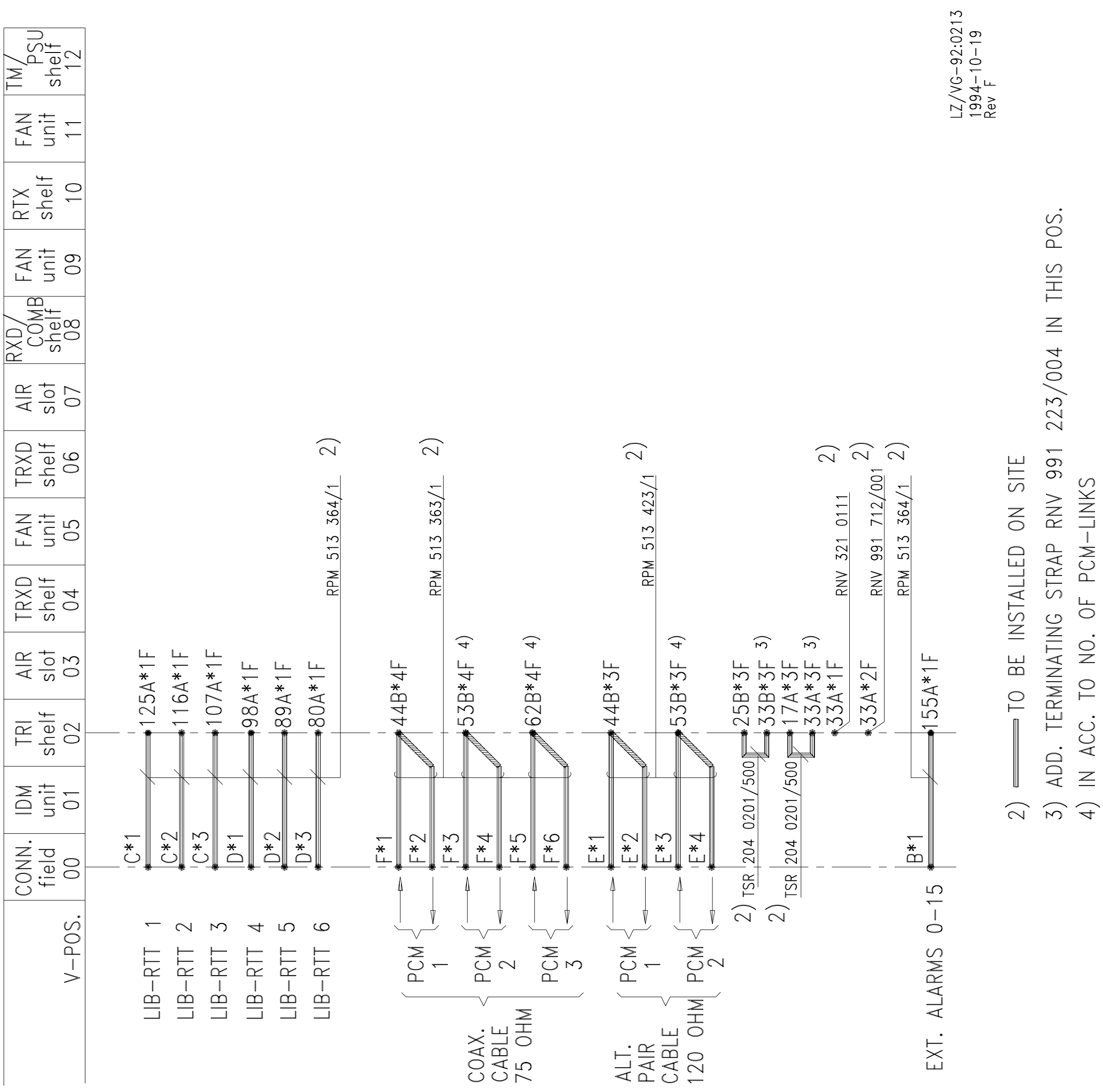

Figure 14 Cabling diagram for TRI (general)

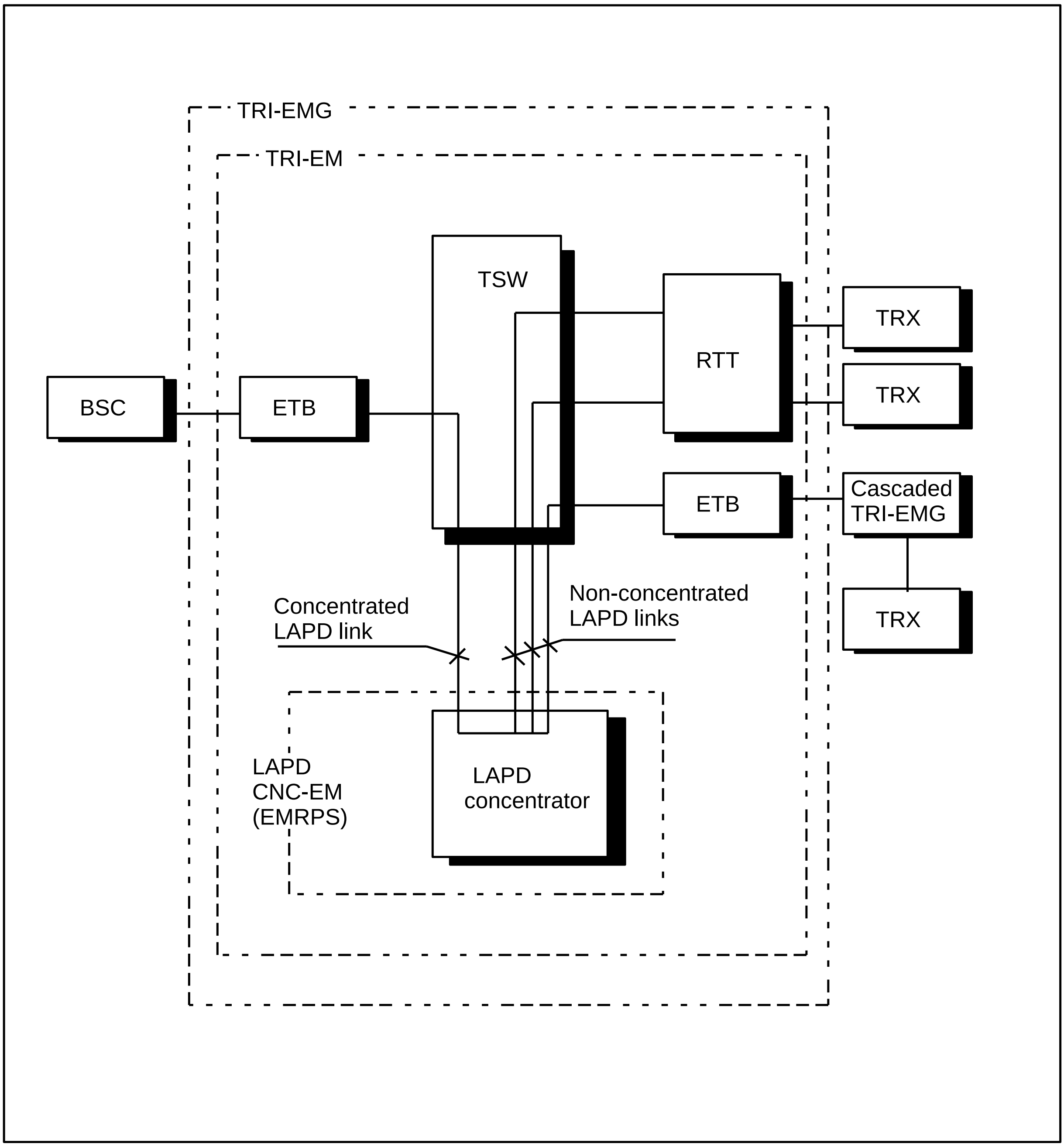

Figure 15 Connection of three non-concentrated LAPD links to one concentrated LAPD link.

7 Revision information TRI

All equipped magazines manufactured before July 1992 were delivered under the temporary number BFL 119 71/1 including:

- ’original’ equipped magazine BFD 747 504/33 (from external supplier)
- adapter brackets (mounted)

On these magazines you can see at least two different labels:

One (containing original BFD product number, R state and Bar code) is positioned on top of the magazine, partly covered by the front plate. The other is positioned on the gables or brackets (containing the temporary BFL product number, R state and Bar code).

Today, brackets are moved into the structure for the BFD 747 504/11, /22 and /33 and the product number BFL 119 71/1 is no longer used on deliveries. Only one supplier is used.

7.1 Positions in the old magazine BFL 119 71/1

Basic assigned positions are shown in figure 16.

Table 9 Summary of units included in the magazine

Product number	Designation
ROF 137 7882/1	DC/DC converter
ROF 131 4445/1	STRP board
ROF 131 995/2	EMPC board
ROF 137 7846/1	ETB board
ROF 137 7870/1	RTT board
ROF 137 7856/11	Time Switch TSW3
ROF 131 4254/1	V.24 interface
ROF 131 4255/1	Alarm board EXALI
TSR 204 0201/500	Bus cable
RNV 991 223/004	Terminator strap
RNV 991 712/001	Reset strap
RNV 321 0111	Adress strap

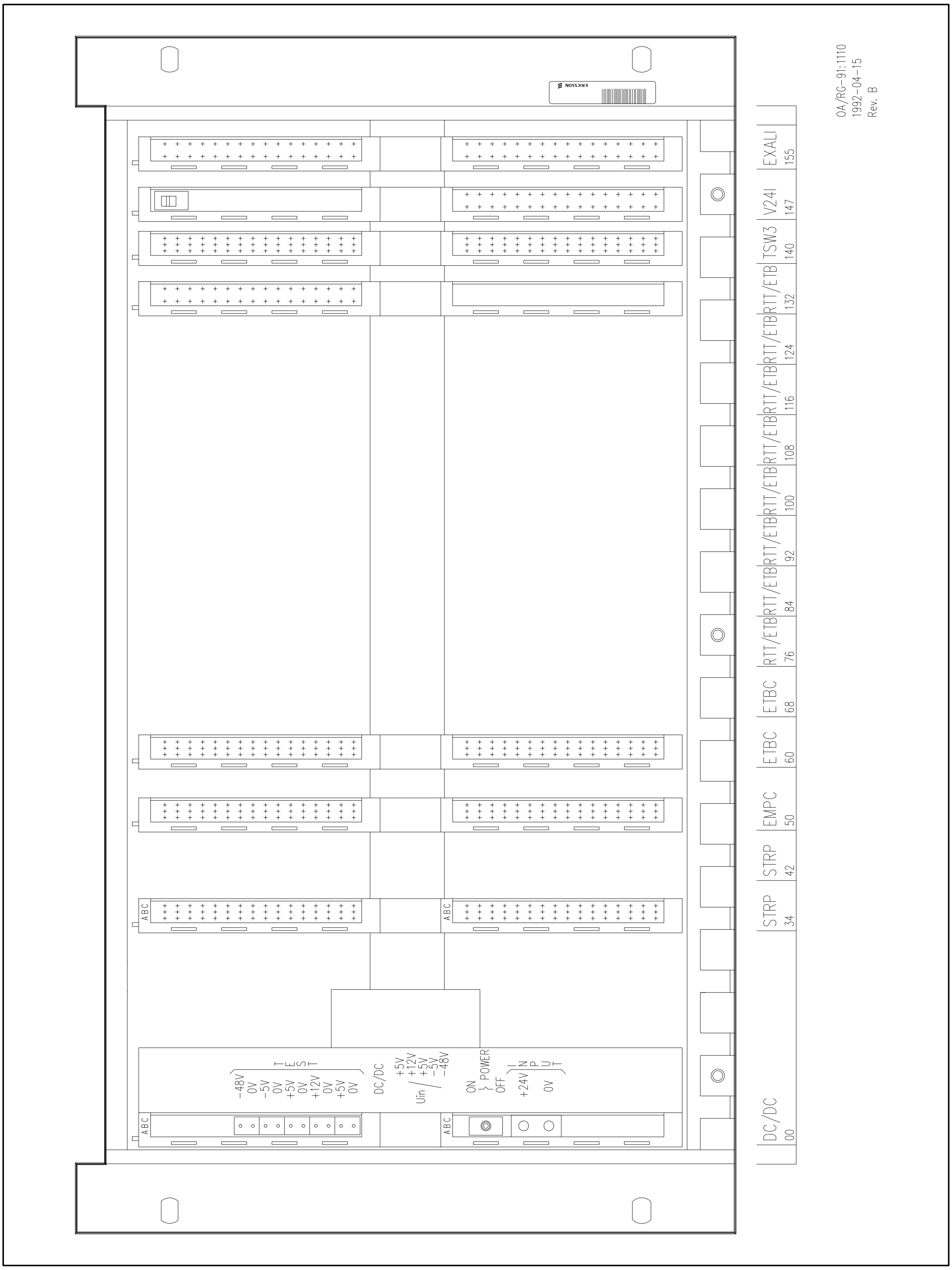

Figure 16 The TRI magazine equipped, old version

Uppgjord — *Prepared*	Faktaansvarig — *Subject responsible*	Nr — *No.*		
ERA/LZ/LI LUGG		1551-BFD 747 504 Uen		
Dokansv/Godk — *Doc respons/Approved*	Kontr — *Checked*	Datum — *Date*	Rev	File
ERA/LZ/TGC (ERABVN)		1997-11-25	B	

Connection of a Second TRI

Contents **Page**

1 Introduction

This document describes Installation Engineering of a second TRI (Transmission Radio Interface) in RBS 200 and RBS 205.

Installation Engineering of RBS units is described in the IE module for RBS 200 and RBS 205.

One TRI can handle up to 24 TRXs (Transceivers) which corresponds to six cabinets. The hardware configuration of a cabinet will in reality allow connection of six cabinet to one TRI.

If more than six cabinets will be installed, a second TRI must be installed in master cabinet B1. TRI-1 and TRI-2 will together have capacity for up to 48 TRXs or 12 cabinets. Two different configuration cases are described: one with up to 36 TRXs and one with up to 48 TRXs.

The two TRIs are connected as two separate EMG (Extension Module Group) to the BSC (Base Station Controller).

The solution in this document is based on the condition that the site has three TGs (Transceiver Groups or Cells).

The TRXs are distributed between the two TRIs in such a way that a TRI fault will not stop the traffic for a whole TG.

2 Block diagrams

2.1 Cabinet layout with two TRIs

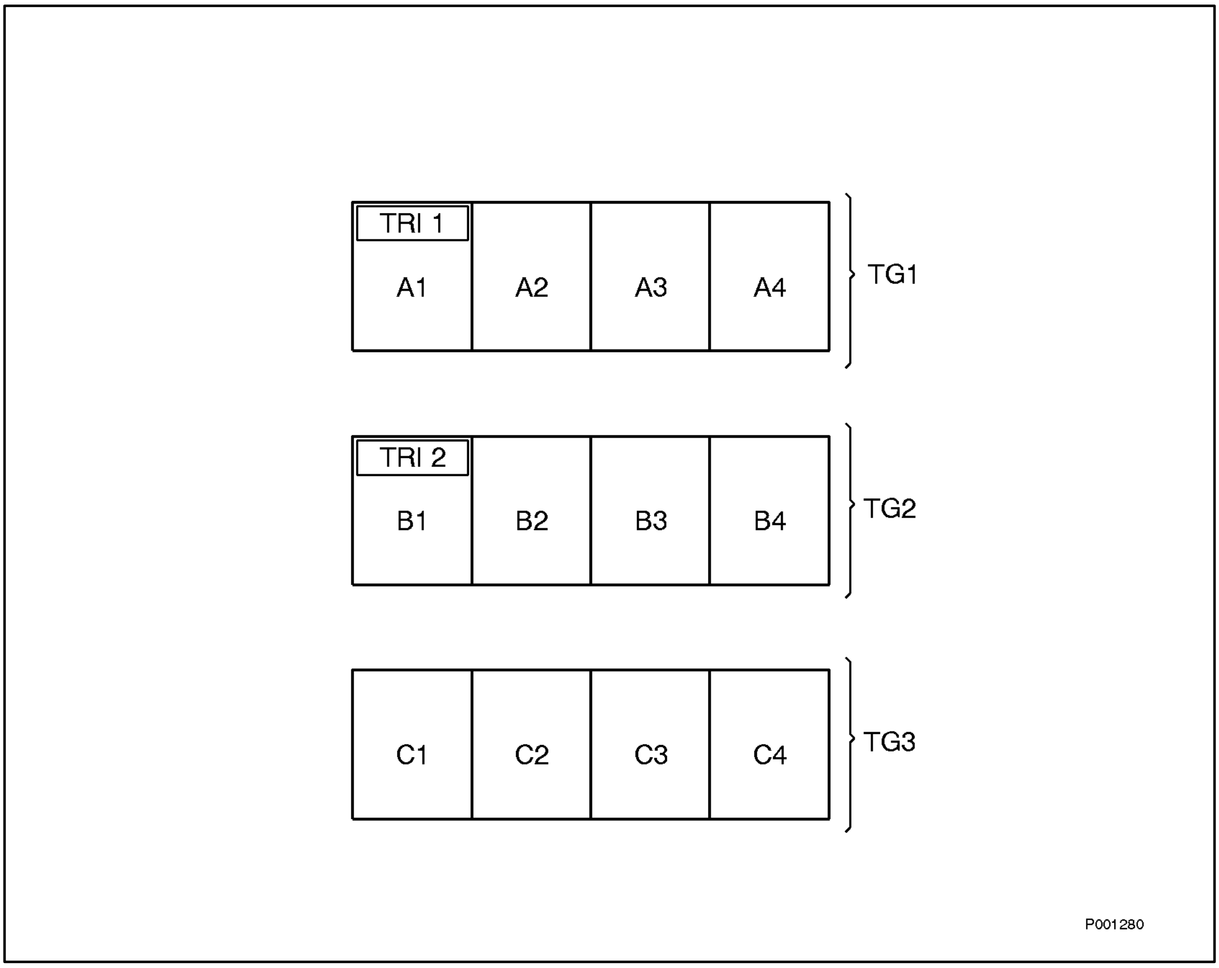

Figure 1 Cabinet layout

2.2 TRI Connections

This block diagram shows how up to 36 TRXs can be connected to two TRIs.

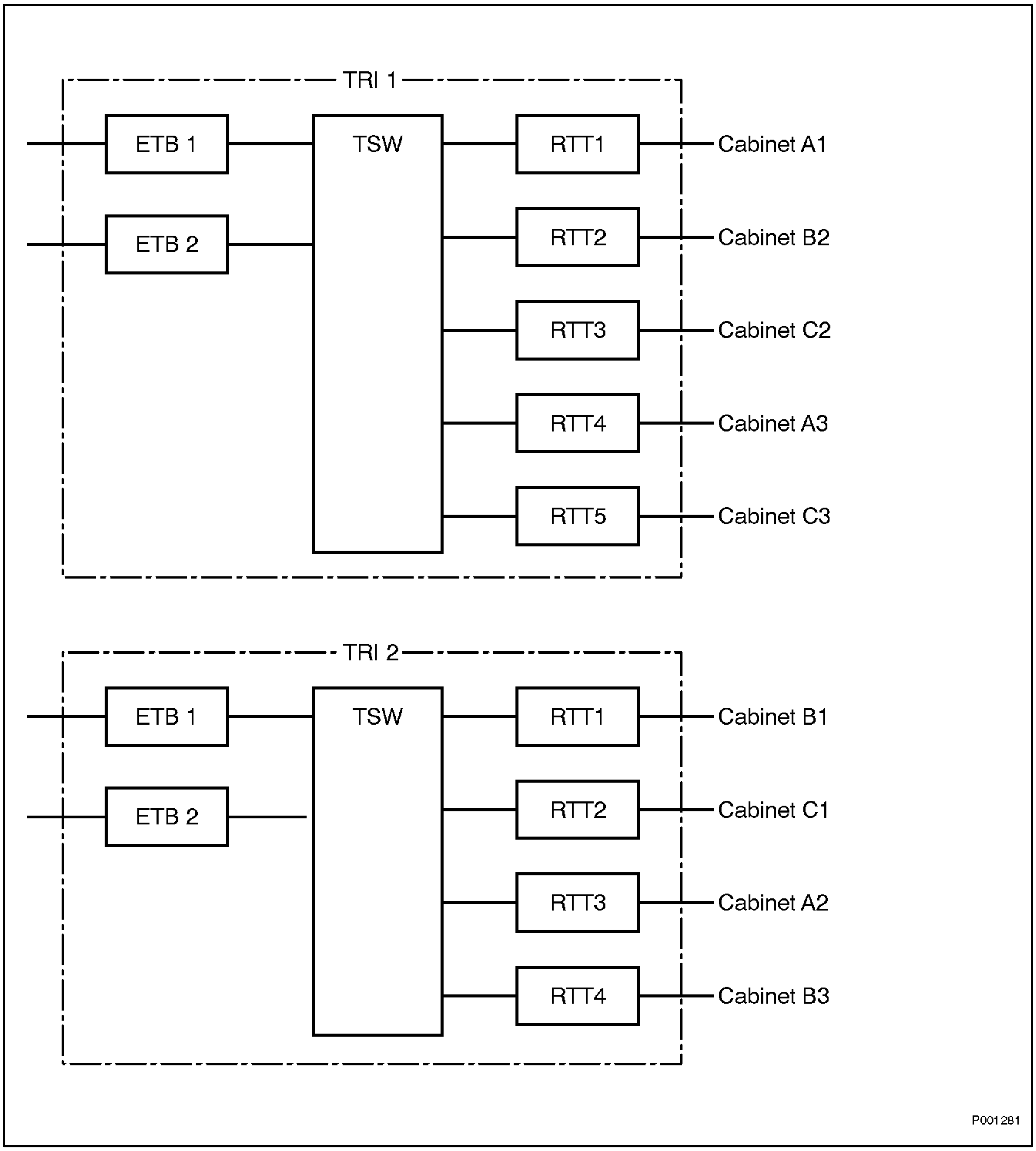

Figure 2 Block diagram 36 TRX

This block diagram shows how up to 48 TRXs can be connected to two TRIs.

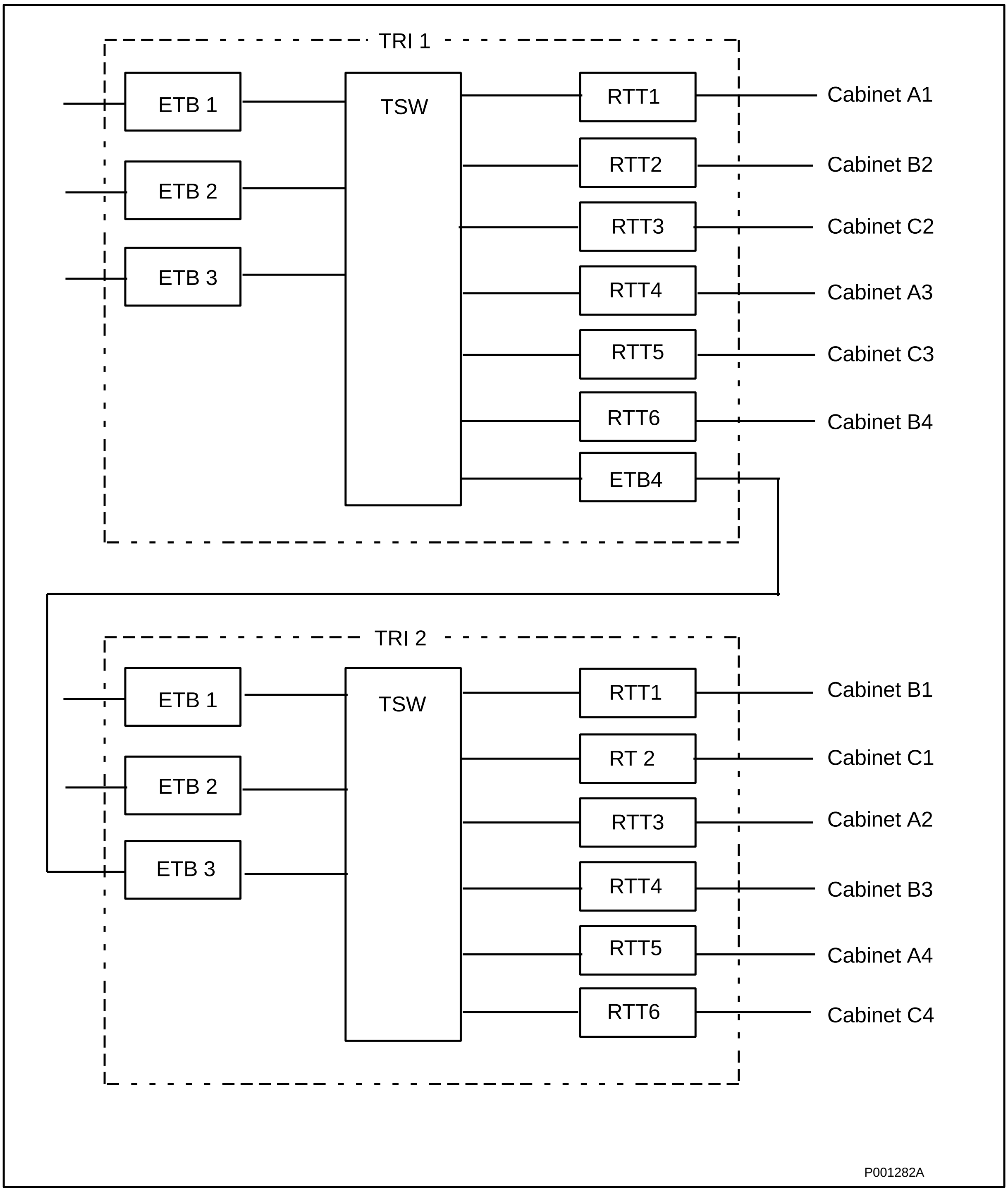

Figure 3 Block diagram 48 TRX

The ETB4 in TRI-1 and ETB3 in TRI-2 must not be connected as synchronisation inlet. The ETBs at the two first device positions in the two TRIs are used as synchronisation inlets.

2.3 Connections for TRI with LAPD concentrators

This block diagram shows how up to 36 TRXs can be connected to two TRIs when LAPD concentration is used.

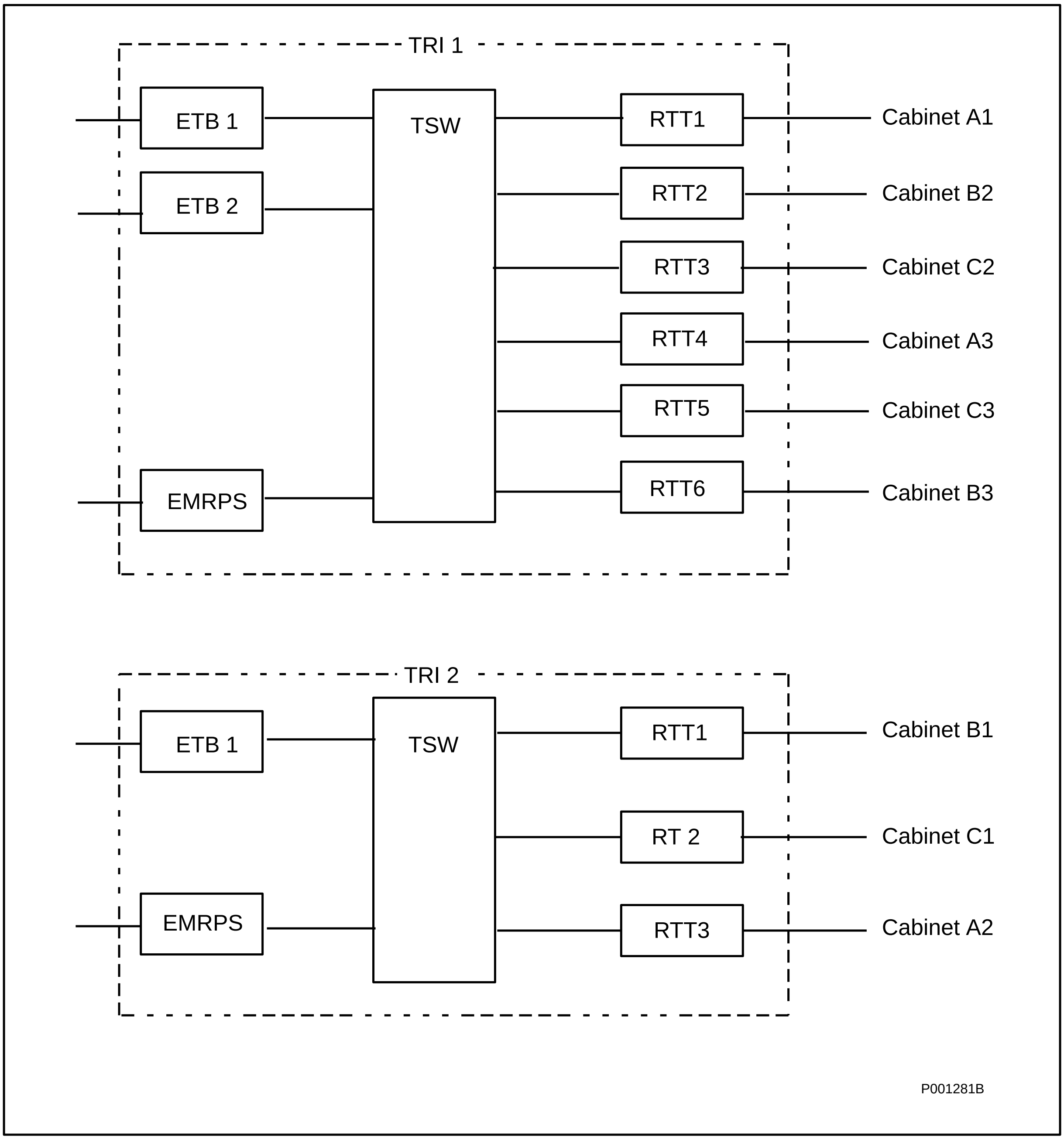

Figure 4 Block diagram 36 TRX

This block diagram shows how up to 48 TRXs can be connected to two TRIs when LAPD concentration is used.

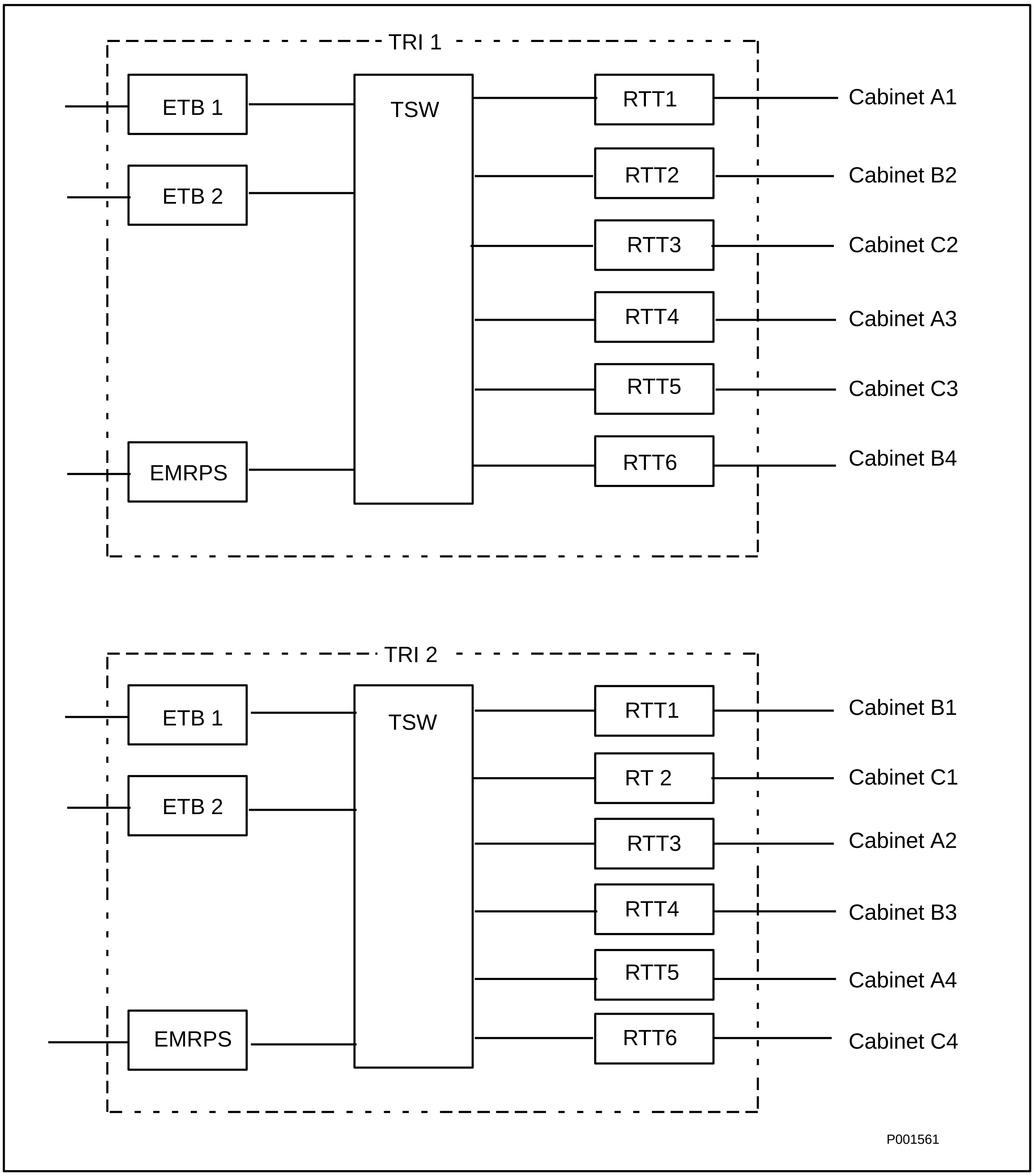

Figure 5 Block diagram 48 TRX

3 Ordering information

The dimensioning is based on the magazine BFD 747 504/11, which is basically equipped with:

- 1 ETB for 30 time slots or 10 TRX
- 1 RTT for 4 TRX in the same cabinet
- 1 STRP

3.1 Dimensioning rules

- ETB 30 TS (Time slots) or 10 TRX
- RTT 4 TRX or one cabinet
- STRP TS 16 (signalling link)

Start with BFD 740 504/11 and add necessary boards.

Add one extra STRP if redundancy of the signalling link is required.

Investigate the type of transmission system that is used, 75 ohm coaxial lines or 120 ohm balanced pair cable.

Add a connection box on the cabinet top if more than:

- 3 PCM links (75 ohm) or
- 2 PCM links (120 ohm)

are connected.

3.2 Dimensioning table

Table 1

Signalling link	Non redundant				Redundant				
No. of TRXs	36		48		36		48		
TRI-	1	2	1	2	1	2	1	2	
TRI Basic set	1	1	1	1	1	1	1	1	BFD 747 504/11
ETB board	1	1	3	2	1	1	3	2	ROF 137 7846/1
RTT board	4	3	5	5	4	3	5	5	ROF 137 7870/1
Cable RTT	5	4	6	6	5	4	6	6	RPM 513 364/1
75 ohm cable ETB - cab. top	2	2	4	3	2	2	4	3	RPM 513 363/1

75 ohm cable Cab. top - DF	4	4	8	4	4	4	8	4	RPM 513 339/1
Connector				2				2	RPT 158 53
Connection box 75 ohm			1				1		SXK 107 2435/1
DF holder for 6 pcs 75 ohm cables	1	1	2		1	1	2		SXA 120 165
120 ohm cable ETB - cab. top	2	2	4	3	2	2	4	3	RPM 513 423/1
120 ohm cable Cab. top - DF	4	4	8	2	4	4	8	2	RPM 513 349
Connector				2				2	RPT 403 08/03
Connection box 120 ohm			1	1			1	1	SXK 107 2436/1
DF holder for 4 pcs 120 ohm cables	1	1	2	1	1	1	2	1	SXA 120 164
STRP board					1	1	1	1	ROF 131 4445/2
Cable +24 V DC TRI - IDM	1	1	1	1	1	1	1	1	RPM 513 389/1
Alarm cable EXALI - Cab. top	1	1	1	1	1	1	1	1	RPM 513 364/1
LIB cable	1	1	1	1	1	1	1	1	RPM 513 336/500
LIB cable	4	3	5	5	4	3	5	5	RPM 513 336/6500

4 Ordering information for LAPD concentration

The dimensioning is based on the magazine BFD 747 504/111, which is basically equipped with:

- 1 ETB for 30 time slots or 10 TRXs
- 1 RTT for 4 TRXs in the same cabinet
- 1 STRP
- 1 EMRPS

4.1 Dimensioning rules

- ETB 30 TSs (Time slots) or 12 TRXs
- RTT 4 TRXs or one cabinet
- STRP TS 16 (signalling link)

Start with BFD 740 504/111 and add necessary boards.

Add one extra STRP if redundancy of the signalling link is required.

Investigate the type of transmission system that is used, 75 ohm coaxial lines or 120 ohm balanced pair cable.

4.2 Dimensioning table

Table 2

Signalling link	Non redundant				Redundant				
No. of TRXs	36		48		36		48		
TRI-	1	2	1	2	1	2	1	2	
TRI Basic set	1	1	1	1	1	1	1	1	BFD 747 504/111
ETB board	1		1	1	1		1	1	ROF 137 7846/1
RTT board	5	2	5	5	5	2	5	5	ROF 137 7870/1
Cable RTT	6	3	6	6	6	3	6	6	RPM 513 364/1
75 ohm cable ETB - cab. top	2	1	2	2	2	1	2	2	RPM 513 363/1
75 ohm cable Cab. top - DF	4	2	4	4	4	2	4	4	RPM 513 339/1
DF holder for 6 pcs 75 ohm cables	1	1	1		1	1	1		SXA 120 165

120 ohm cable ETB - cab. top	2	1	2	2	2	1	2	2	RPM 513 423/1
120 ohm cable Cab. top - DF	4	2	4	4	4	2	4	4	RPM 513 349
DF holder for 4 pcs 120 ohm cables	1	1	1	1	1	1	1	1	SXA 120 164
STRP board					1	1	1	1	ROF 131 4445/2
Cable +24 V DC TRI - IDM	1	1	1	1	1	1	1	1	RPM 513 389/1
Alarm cable EXALI - Cab. top	1	1	1	1	1	1	1	1	RPM 513 364/1
LIB cable	1	1	1	1	1	1	1	1	RPM 513 336/500
LIB cable	4	3	5	5	4	3	5	5	RPM 513 336/6500

5 Cabling diagrams

5.1 Cabling diagram for TRI 1

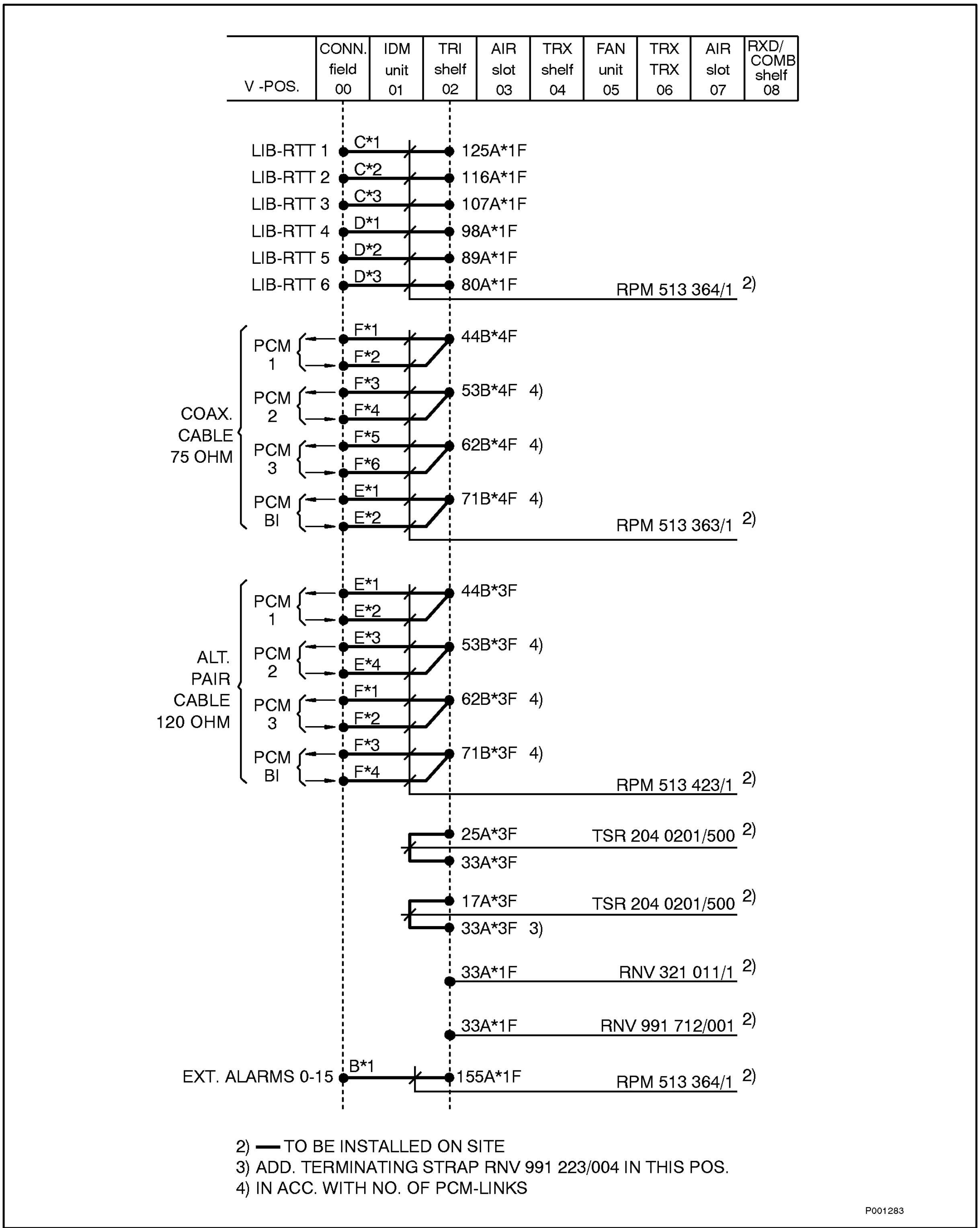

Figure 6 Cabling diagram for TRI 1

5.2 Cabling diagram for TRI 2

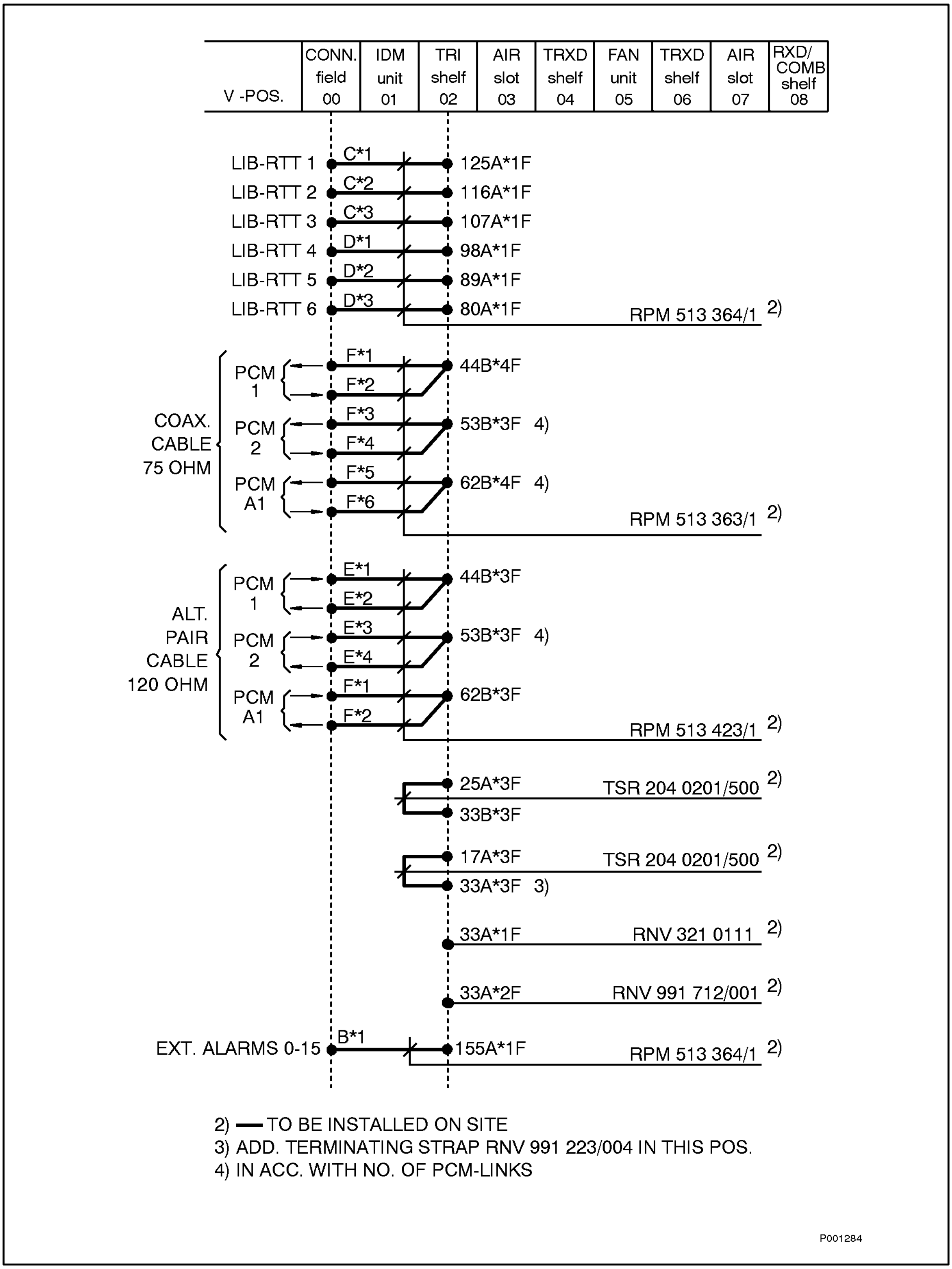

Figure 7 Cabling diagram for TRI 2

5.3 Cabling diagram: LIB-bus and PCM

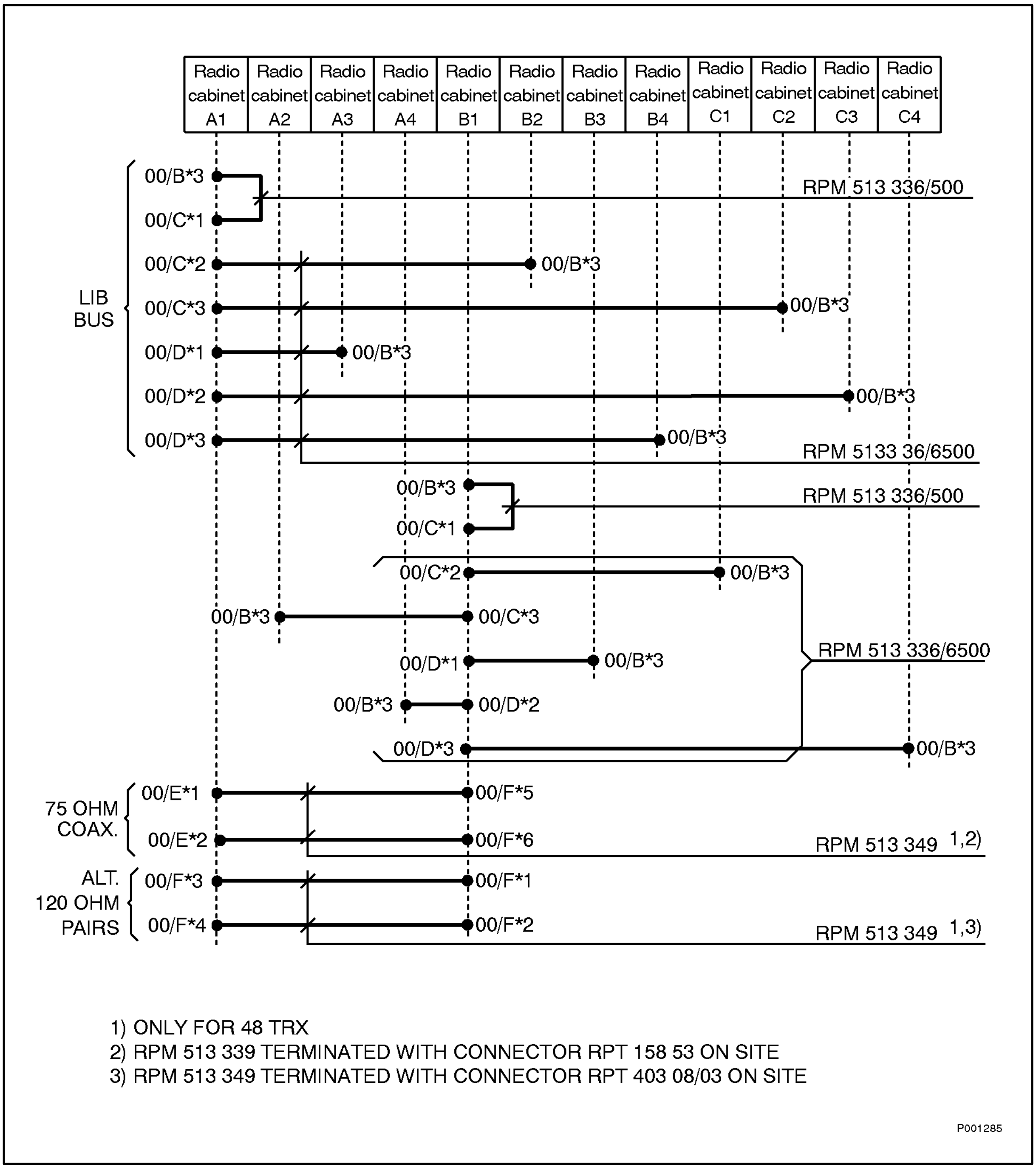

Figure 8 Cabling diagram: LIB-bus and PCM

5.4 Cable layout drawing: LIB-bus

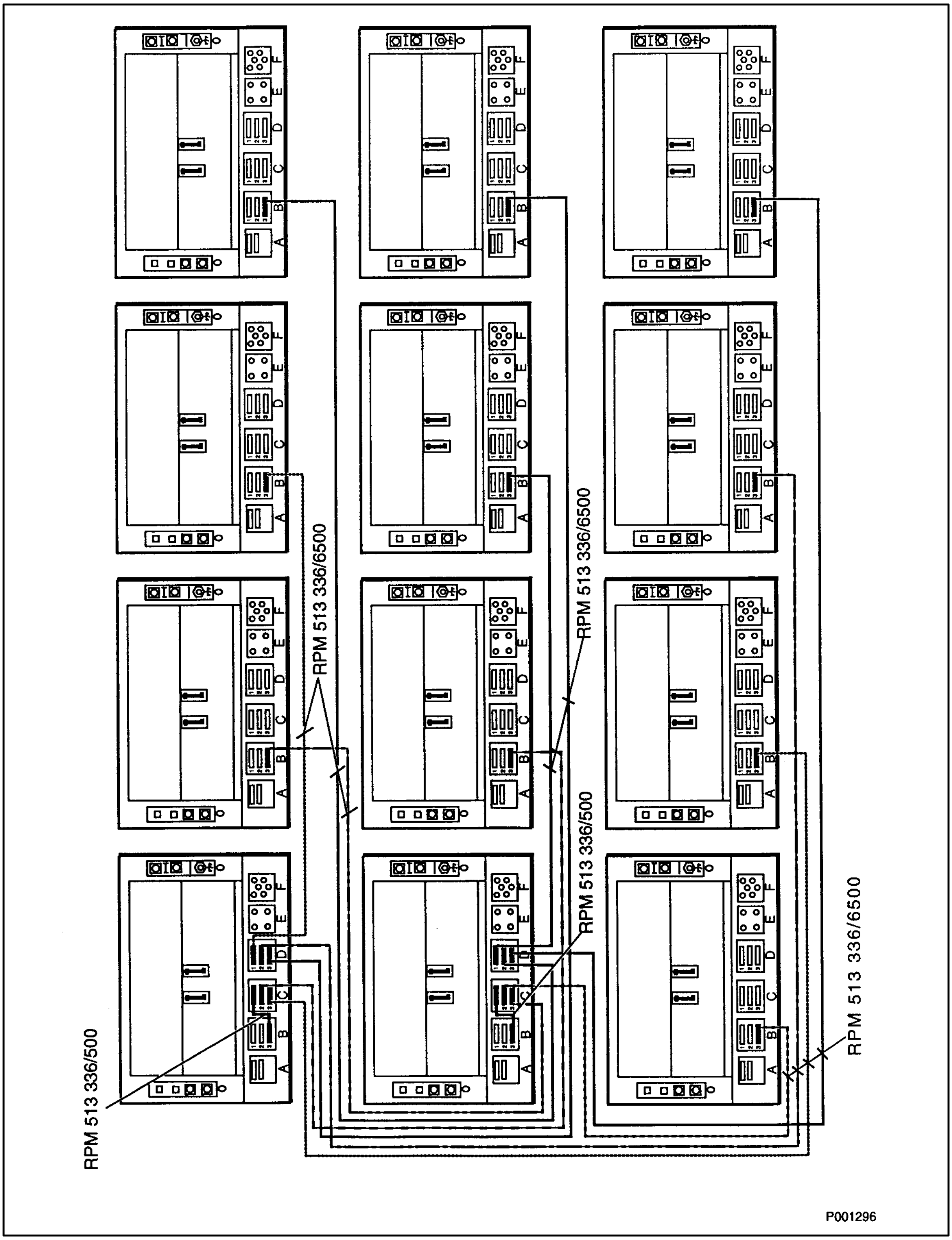

Figure 9 Cabling diagram: LIB-bus and PCM

6 Cabling diagrams for LAPD concentration

6.1 Cabling diagram for TRI 1 with LAPD concentration

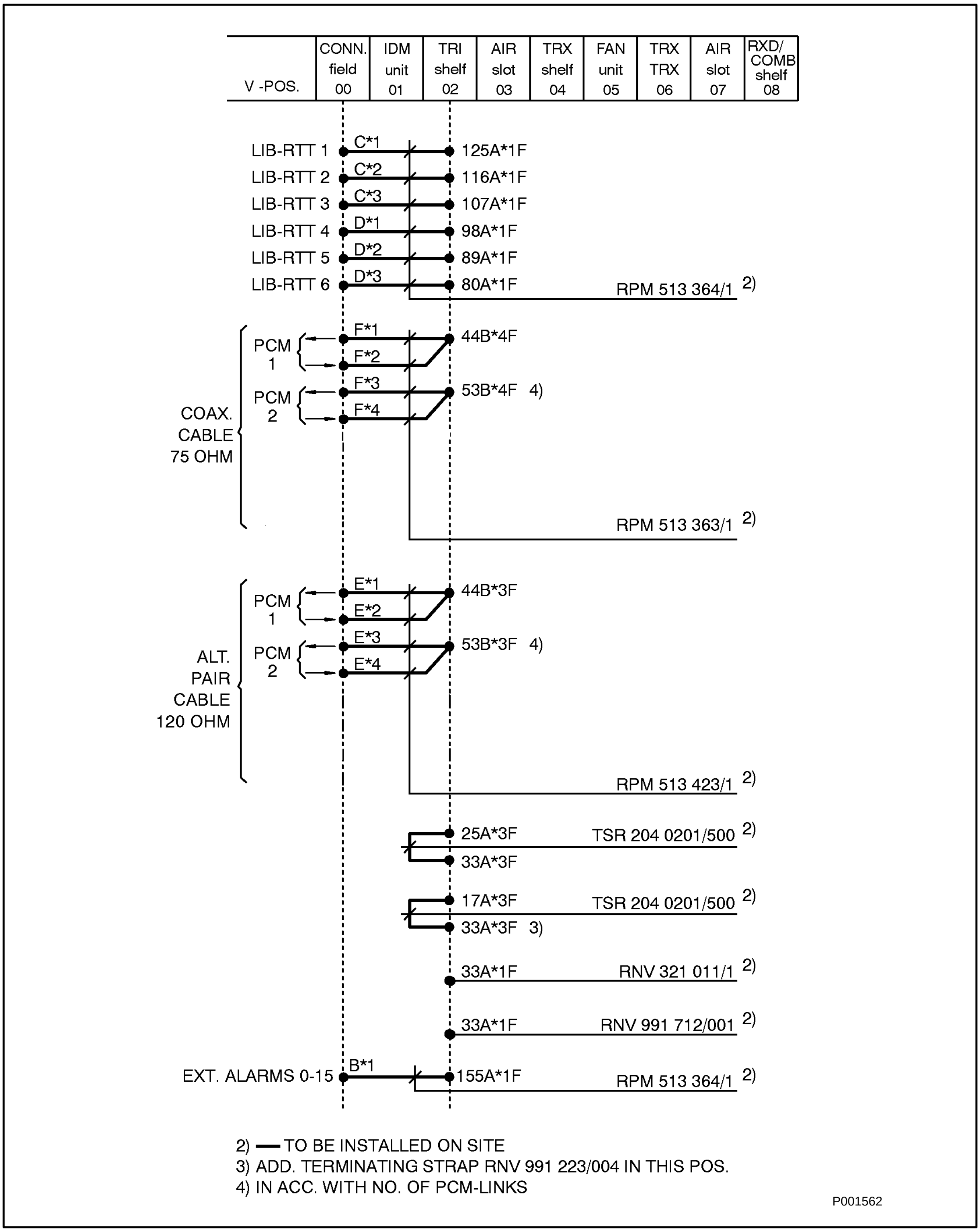

Figure 10 Cabling diagram for TRI 1 with LAPD concentration

6.2 Cabling diagram for TRI 2 with LAPD concentration

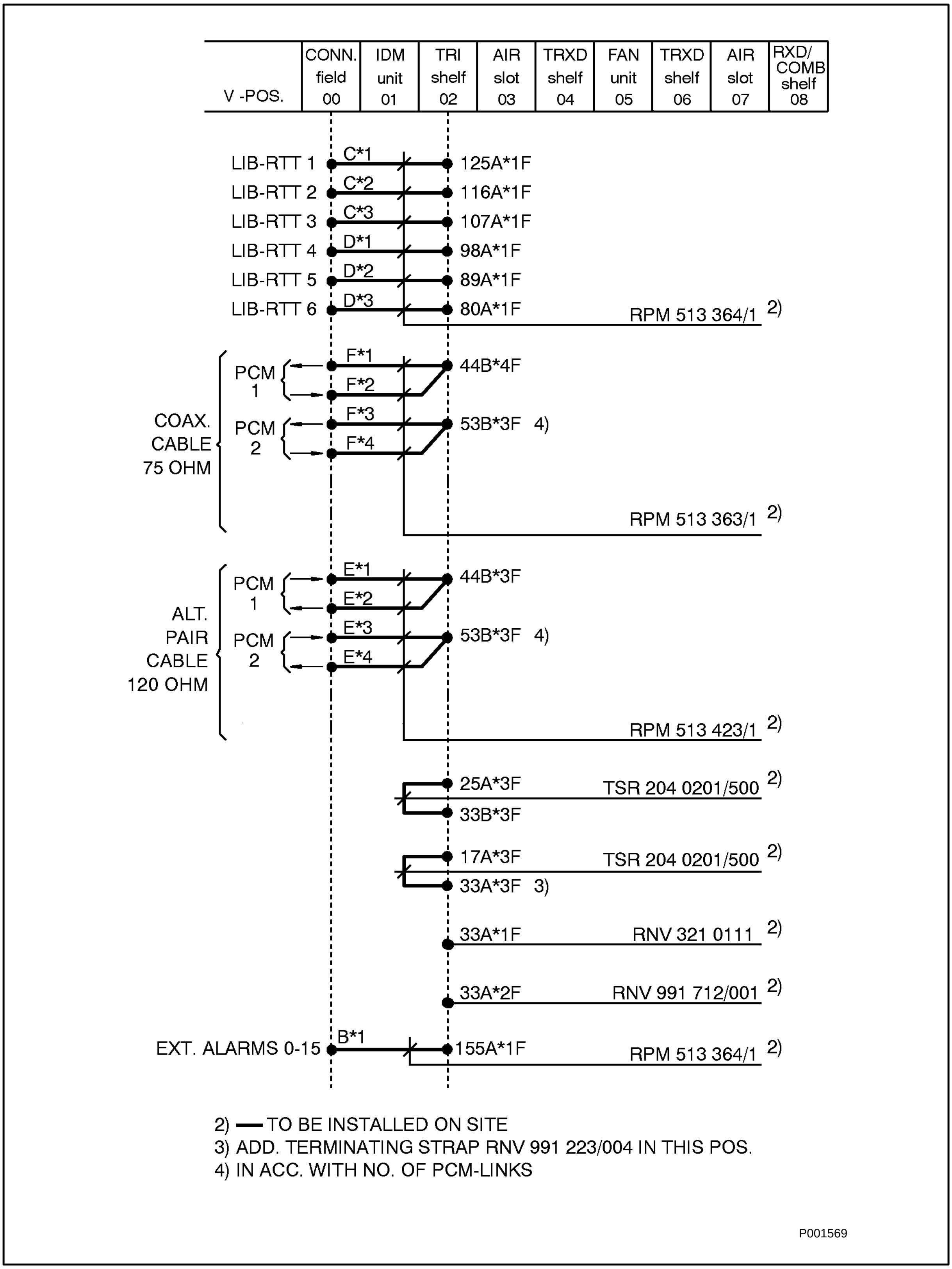

Figure 11 Cabling diagram for TRI 2 with LAPD concentration

6.3 Cabling diagram: LIB-bus and PCM with LAPD concentration

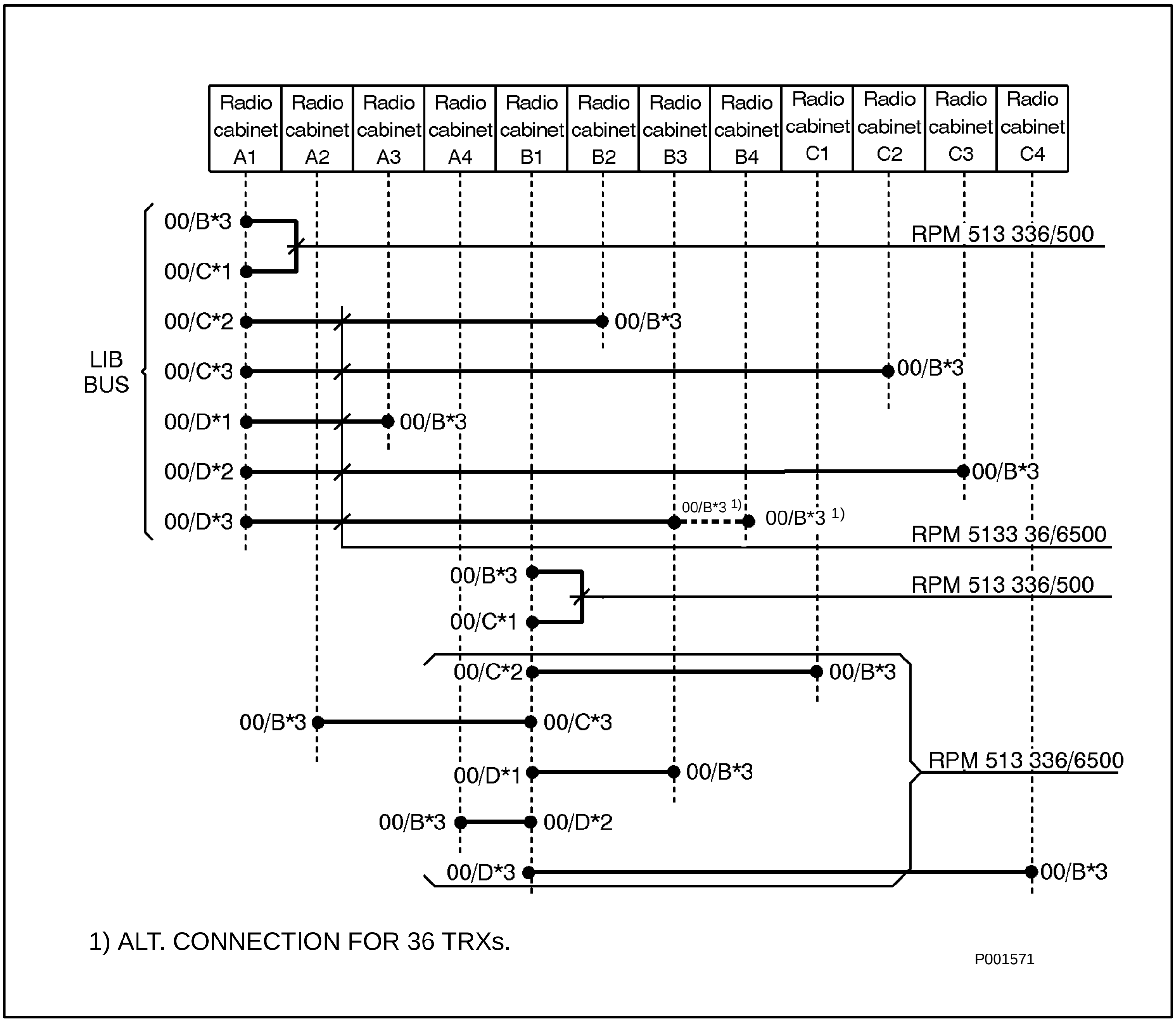

Figure 12 Cabling diagram: LIB-bus and PCM with LAPD concentration

ERICSSON

CAPTION LIST

Document No.	
23/001 53-LZN 302 011	
Date	Rev
99-09-21	B

Power Supply

RBS 200
Installation
Engineering Manual

Power Supply 230V AC	0
Power Supply -48V DC	1
Power Supply +24V DC	2
	3
	4
	5
	6
	7
	8
	9

Uppgjord — *Prepared*	Faktaansvarig — *Subject responsible*	Nr — *No.*		
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ERA/LRN/ZGC Leif-Olof Fager		1999-10-20	B	

Power Supply 230V AC

Contents **Page**

1 General

1.1 System survey

The Power supply system is designed to power the RBS cabinet. The internal supply voltage in the RBS cabinet is +24V DC.

The main components of the system are:

- Power Supply Unit PSU, a 1200W single-phase rectifier. All PSUs included are connected in parallel on the secondary side.
- Power Control Unit PCU, which has all necessary control functions for the complete power system.
- Internal Distribution Module IDM, is the in and outgoing terminal point for the supply voltage.
- Battery and Interconnection Module BIM, is the termination point and control unit for the batteries.
- Battery stand with batteries.

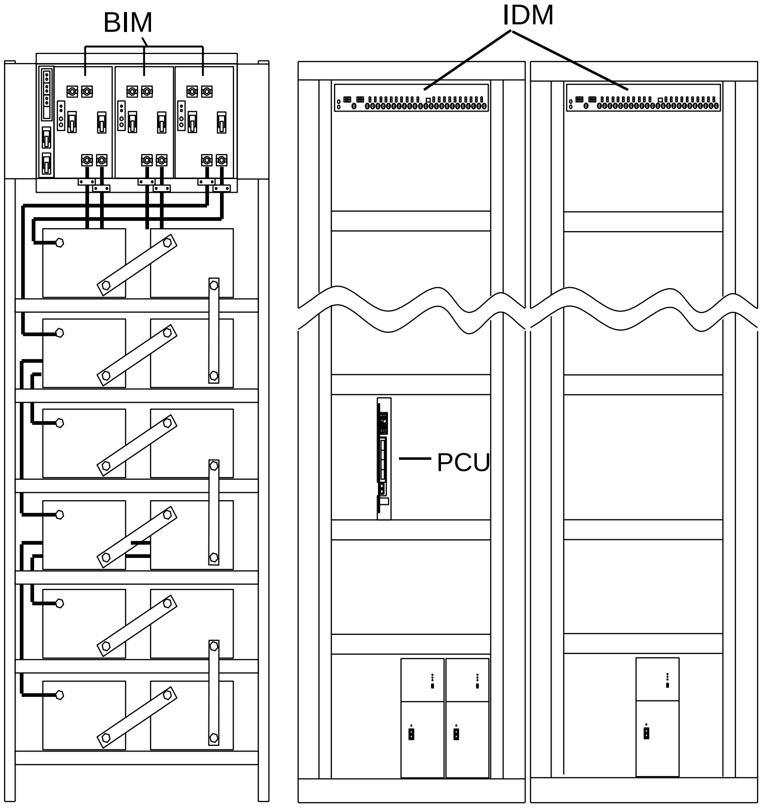

Figure 1 Example of power system

1.2 Function

During normal operation, the system maintains a constant DC voltage across the batteries and the RBS. In the event of mains failure or rectifier failure, the RBS will be powered from the batteries.

The RBS is supplied "high-ohmically" with +24V DC through the Internal Distribution Model, IDM. The feeder cable from the distribution unit to the different consumers is high-ohmic. Refer to para. 1.3.3.

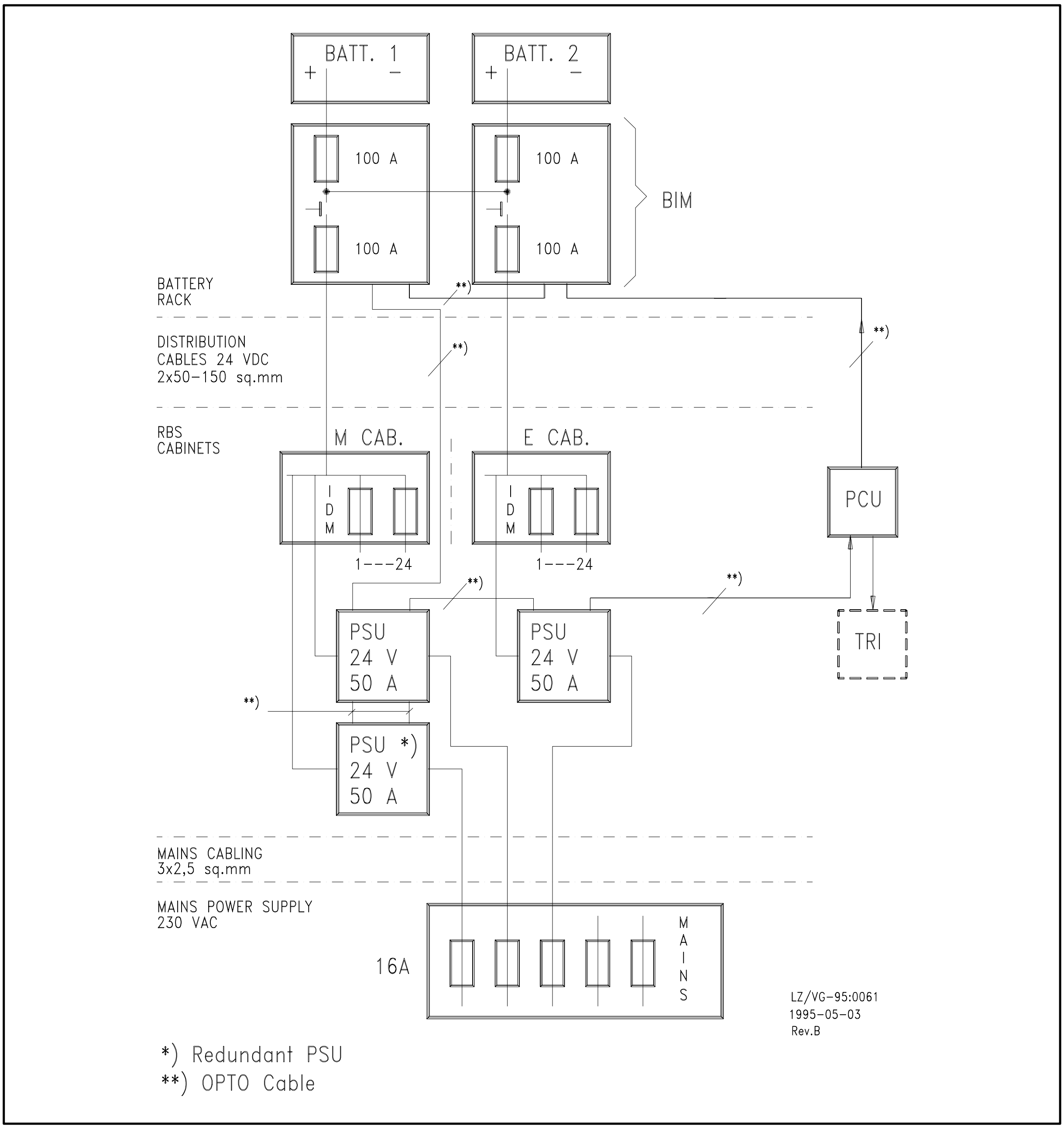

Figure 2 System input voltage 230V AC, block diagram

1.2.1 Supervision and control

The Power Control Unit of the system (PCU) supervises the operational state of the system and communicates with the EXALI board located in the TRI. The PCU has an optic signal interface to rectifiers and BIMs to avoid interference problems. The interfaces are connected in series in a loop.

The control unit supervises and controls the units as follows:

1.2.2 To TRI from PCU

- Refer to paragraph 3, Alarm categories.

1.2.3 From PCU to rectifier

- Setting of desired value of output voltage, to be stored in the rectifier.
- Load sharing.
- Regulation of system voltage.

1.2.4 To PCU from rectifier

- Output voltage.
- Output current.
- Temperature.
- Alarm:
  - Rectifier failure (also fuse failure).
  - Overvoltage (detected in the PCU by measurement of voltage and output).
  - Mains failure.
  - Power limitation.

1.2.5 From PCU to BIM

- Contactor de-energised.
- Contactor energised.

1.2.6 To PCU from BIM

- Contactor de-energised.
- Battery circuit-breaker tripped.
- Rack circuit-breaker tripped.

The control unit has two undervoltage monitors preset at the factory.

Undervoltage monitor 1:

Gives A1 alarm at +22V DC.

Undervoltage monitor 2:

Gives "undervoltage alarm" at +20V DC, and the battery contactor de-energises to avoid over-discharging of the battery, (refer to BIM module, paragraph 1.3.2, for more information).

When a rectifier is defective, the system voltage can exceed +30V DC. The faulty rectifier will be blocked through the control unit, after which the rectifier in question makes one attempt to restart. If the overvoltage remains, the PCU shuts down the rectifier and alarm A2 is initiated.

1.3 Included units

1.3.1 Power Supply Unit BML 435 002/1, PSU

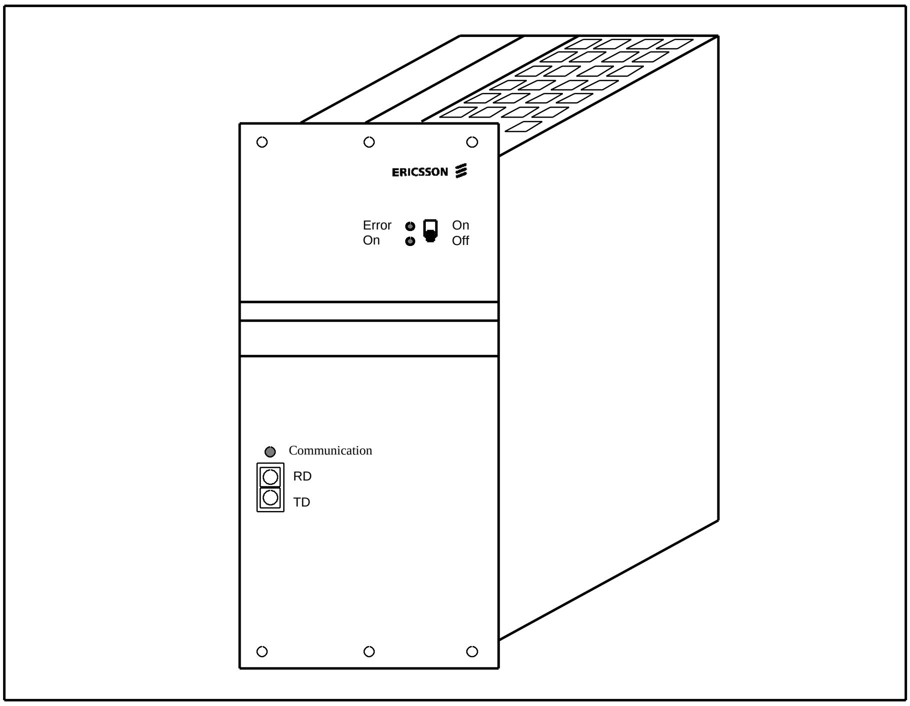

Figure 3 Power Supply Unit BML 435 002/1

Power Supply Unit BML 435 002/1 is used to power the RBS-cabinet. A high frequency 1200 W rectifier converts incoming 230V AC mains voltage, to controlled +24V DC.

The first PSU is always located in pos. 37 in the TM/PSU magazine. The second PSU is located in pos 61. The redundant PSU is always located in the Master cabinet.

1.3.2 Battery and Interconnection Module BIM, BMG 701 013/-

CAUTION

Read Safety Instructions regarding handling of batteries.

The Battery and Interconnection Module, BIM, is designed to protect the connection of a battery and to protect with fuses the interconnection of various cabinets in the system.

The unit comprises one 100 A battery circuit-breaker, one 100 A cabinet circuit-breaker, and a contactor for load cut-out in the event of an undervoltage alarm, in order to prevent over-discharge of the battery.

A maximum of 3 BIM modules and one distribution unit, EFU, (refer to para. 1.3.6) can be fitted into one magazine, interconnected through bars at the rear edge of the magazine.

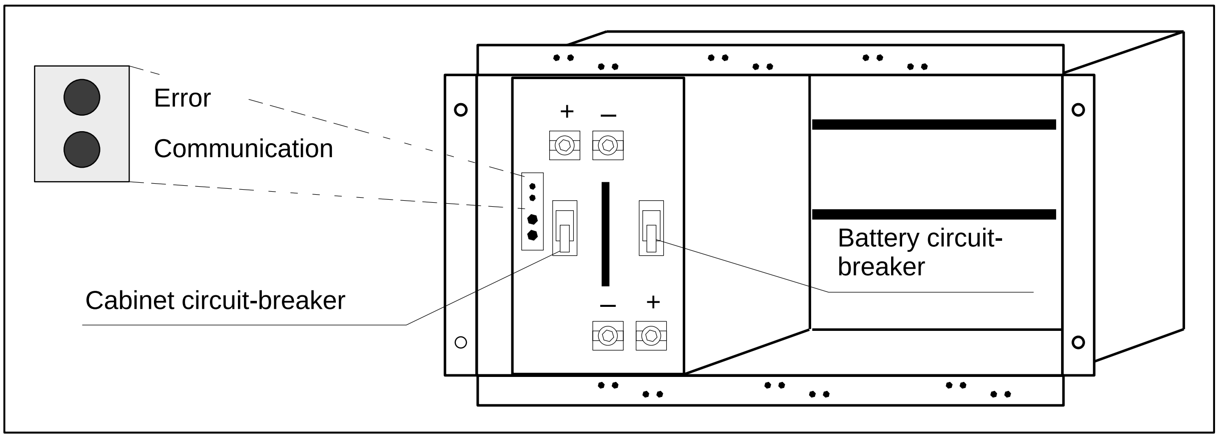

Figure 4 Battery and Interconnection Module BMG 701 013/-

There is also a local computer to supervise the module, control the contactor and communicate with the control unit, (the PCU).

In case of undervoltage (+20V DC) the contactor removes the load to avoid discharging the battery too much. If the control unit fails, the contactors de-energise automatically when the system voltage has been less than +20V DC for about 15 seconds.

When the mains voltage returns, after a mains failure, all the rectifiers start. The output voltage is set to +24V DC, after which the battery contactors energise, which means that the batteries are reconnected.

When the contactors are energised, the voltage rises to normal system voltage, +27V DC.

If the control unit fails, the batteries are automatically reconnected when the system voltage has exceeded +25.5V DC for about 15 seconds.

The battery and cabinet circuit-breakers initiate an alarm only when tripped, not in position "OFF".

1.3.3 alt. Battery and Interconnection Module BIM, BMG 701 014/-

CAUTION

⚠

Read Safety Instructions regarding handling of batteries.

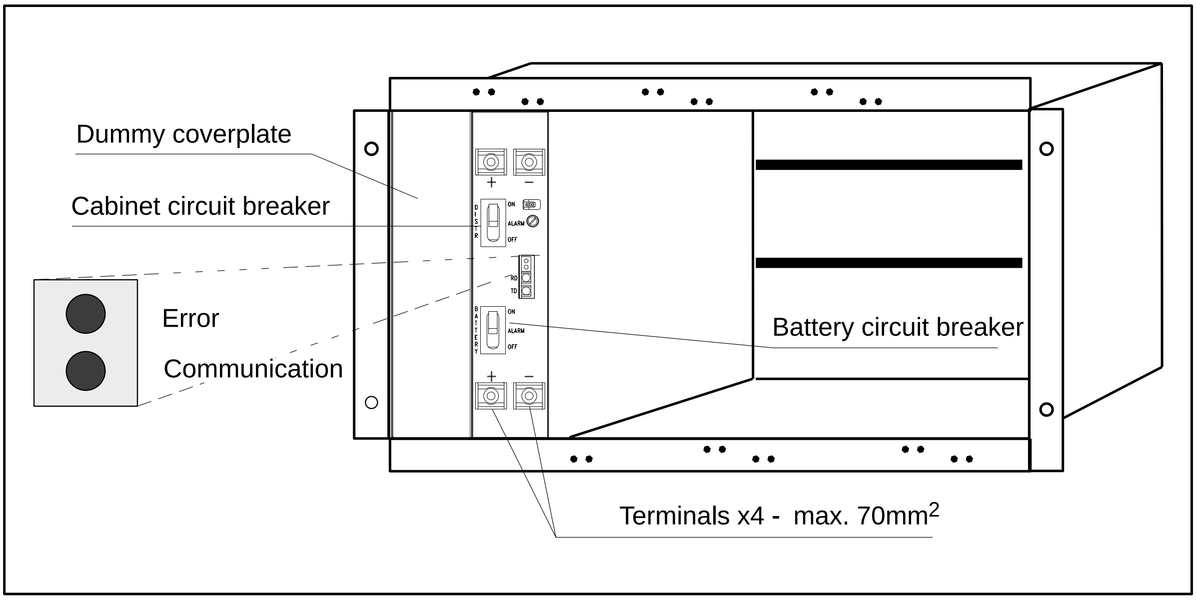

Figure 5 Battery and Interconnection Module BMG 701 014/-

The alt. Battery and Interconnection Module (BIM), BMG 701 014/- is equivalent to the BMG 701 013/-.

Technical specifications are equivalent to BMG 701 013/-.

Note Cables to the terminals on the front panel can be max. 70 mm^2.

1.3.4 Internal Distribution Module BMG 663 002/-, IDM

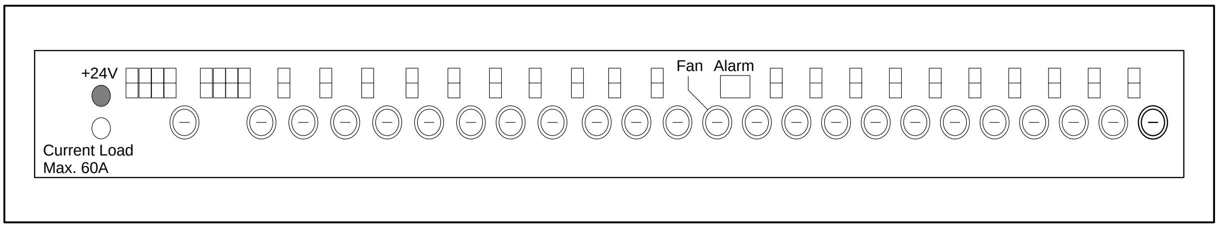

Figure 6 Internal Distribution Module BMG 663 002/-

The distribution unit comprises 21x10A, 2x16A and 1x1A glass-tube fuses and capacitors to filter the +24V DC voltage. The unit also comprises a control board for supervision of cooling fans and an RC-filter for the incoming 230V AC supply.

To make the system "high-ohmic", the distribution cables have a standard length of 3 m and a standard area of 0.80 mm^2.

In this way, the internal impedance of the cable becomes about 6 times higher than the internal impedance of the power supply plant. Accordingly, in the event of a short circuit at a distribution point, the voltage of the common feeding point will not fall below the permissible value of the powered equipment.

1.3.5 Power Control Unit ROA 119 807, PCU

The Power Control Unit (PCU) is the controlling and supervising unit of the power supply system and constitutes the interface between the power units and the communication unit in the RBS-cabinet, the TRI.

On the front of the control unit is a display which shows the system voltage and the total current of the rectifiers in the system.

By means of toggle switches, the voltage, current or the desired voltage value of the system are selected on the display. The desired voltage value is the voltage level at which the rectifiers set themselves.

The desired voltage value can be set to 23.0 - 28.5V DC.

The alarm assembly unit of the control unit has five potential-free output relays, with change-over function for outgoing alarms to the Transmission Radio Interface (TRI).

All the contact pins (3 pcs) of the relay outputs are connected to the pin contact unit at the front of the board. Outgoing alarms are A1, A2, O1, mains failure and undervoltage alarms.

Status is indicated by three LEDs. Green (On) indicates that the control unit is working, yellow (Stat) indicates observation alarm and red (Err) indicates an error condition.

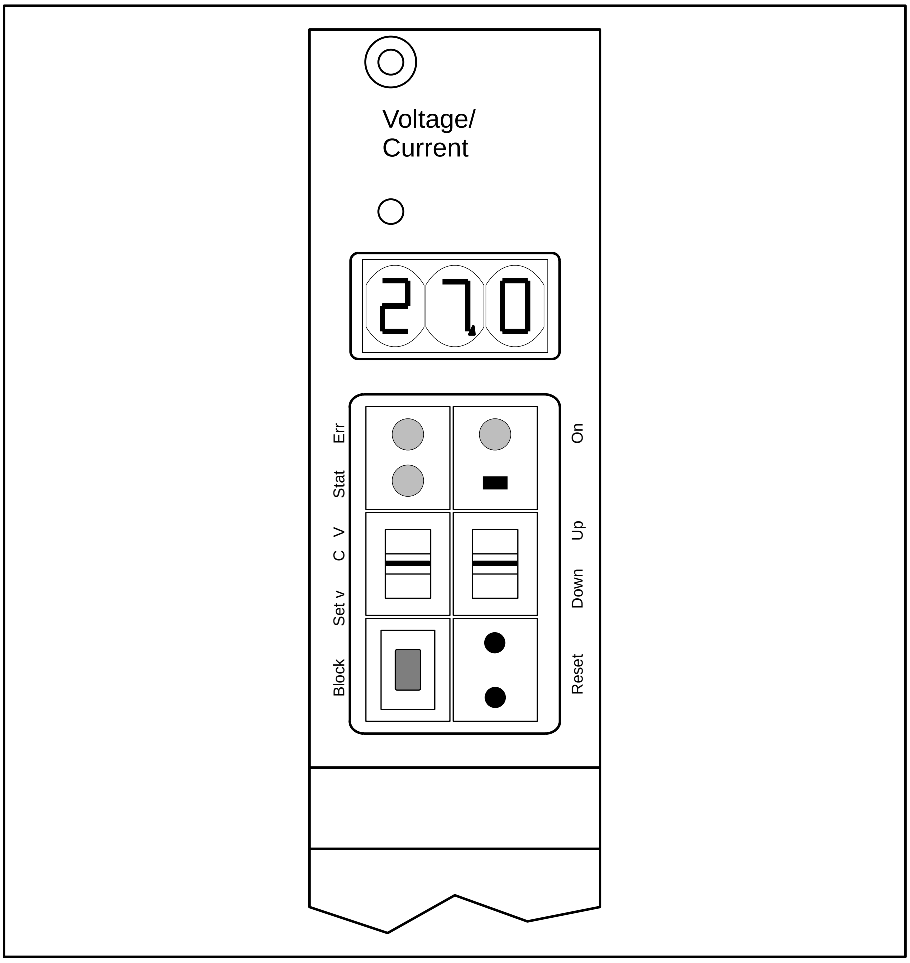

Figure 7 Power Control Unit ROA 119 807

For handling of the PCU, see Installation Manual, Module G, sub-section 6.0.

1.3.6 DC/DC converter BMR 974 101/- (optional equipment)

The DC/DC converter is used for conversion of +24V DC to -48V DC or -60V DC. The unit shall be positioned on a wall near the other equipment and be powered from the EFU, ROA 117 510 through a cable.

The converter comes in a number of different versions, depending on the input and output-voltage, and on the desired output power.

Each DC/DC board, ROA 137 0628/- has an output power of approximately 36W.

Max. four DC/DC boards can be connected to one box, making 144W.

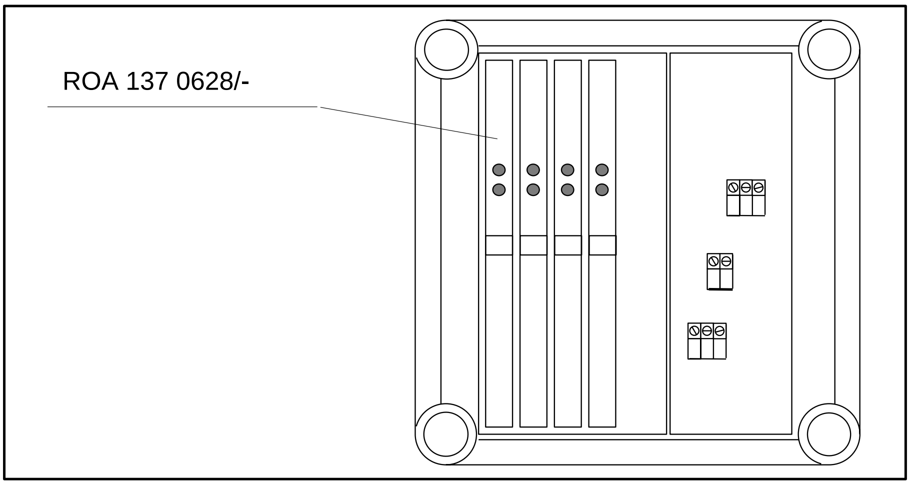

Figure 8 DC/DC converter BMR 974 101/-

1.3.7 External Fuse Unit ROA 117 510/-, EFU (optional equipment)

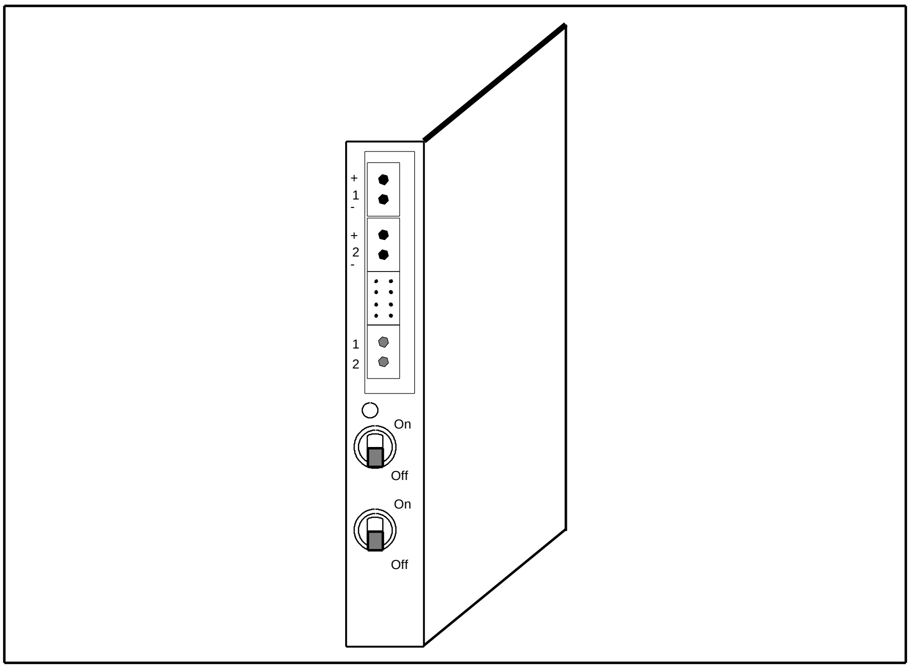

Figure 9 External Fuse Unit ROA 117 510/-

External Fuse Unit, EFU, ROA 117 510 contains 2 x 10 A circuit breakers for high ohmic powering of external units, for instance DC/DC converters. The outlets will be disconnected if the voltage drops to +19.6V ±0.2V DC in order to avoid over-discharging of the batteries, and are reconnected when the system voltage has risen to +24.2V DC.

The LED is illuminated when the circuit breakers are in position "On".

The circuit breakers initiate an alarm in position "OFF", refer to Circuit diagram 1911-BZZ 207 01 Ux.

1.3.8 External Fuse Unit ROA 117 560/-

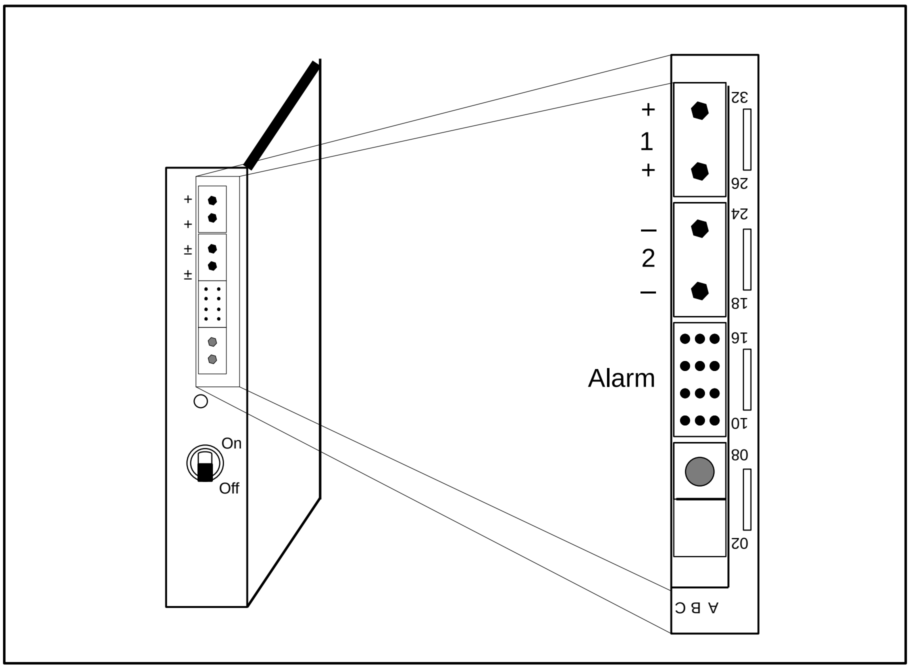

Figure 10 External Fuse Unit ROA 117 560/-

External Fuse Unit, EFU, ROA 117 560 contains 1 x 50 A circuit breaker for high ohmic power to external units, for instance DC/DC converters. The outlets will be disconnected if the voltage drops to +19.6V ±0.2V DC to avoid discharging the batteries too much, and are connected again when the system voltage has risen to +24.2V DC.

The LED shines when the circuit breaker is in position "On".

The circuit breakers initiate alarm in position "Off", refer to Circuit diagram 1911-BZZ 207 01 Ux.

2 Battery back-up

The back-up time is dependent on the battery capacity. Three different battery types together with corresponding Battery stands are available in 29, 134 and 189 Ah configurations.

2.1 Battery stand BKY 261 003 - 29 Ah

The stand houses batteries for 3 x 29 Ah.

One BIM magazine for housing of 3 BIM units can be fitted in the stand.

The stand is delivered as an unmounted set including:

- 2 frames and mounting support for the batteries and BIM magazine
- 4 adjustable feet
- 2 tie bars to stabilize the stand
- 12 runners for installation of batteries.

2.1.1 Dimensions

Height	1500 mm
Width	350 mm
Depth	375 mm
Weigth, incl. batteries	150 kg
Calculated floor load	288 kg/m^2

Note The permitted floor load on site must exceed this value, unless the weight of the stand is distributed over a larger area. See Chapter 5, Guidelines for Site Installations for further information.

2.2 Battery stand BKY 261 002/650 - 3 x 134 Ah

The stand houses batteries for 3 x 134 Ah .

One BIM magazine for housing of 3 BIM units can be fitted in the stand.

The stand is delivered as an unmounted set as described in para. 2.1.

2.2.1 Dimensions

Height	1967 mm
Width	650 mm
Depth	375 mm
Weigth, incl. batteries	400 kg
Calculated floor load	376 kg/m^2

Note The permitted floor load on site must exceed this value, unless the weight of the stand is distributed over a larger area. See Chapter 5, Guidelines for Site Installations for further information.

2.3 Battery stand BKY 261 004/950 - 3 x 187 Ah

The stand houses batteries for 3 x 187 Ah .

One BIM magazine for housing of 3 BIM units can be fitted in the stand.

The stand is delivered as an unmounted set as described in para. 2.1.

2.3.1 Dimensions

Height	1967 mm
Width	950 mm
Depth	375 mm
Weigth, incl. batteries	560 kg
Calculated floor load	418 kg/m^2

Note The permitted floor load on site must exceed this value, unless the weight of the stand is distributed over a larger area. See Chapter 5, Guidelines for Site Installations for further information.

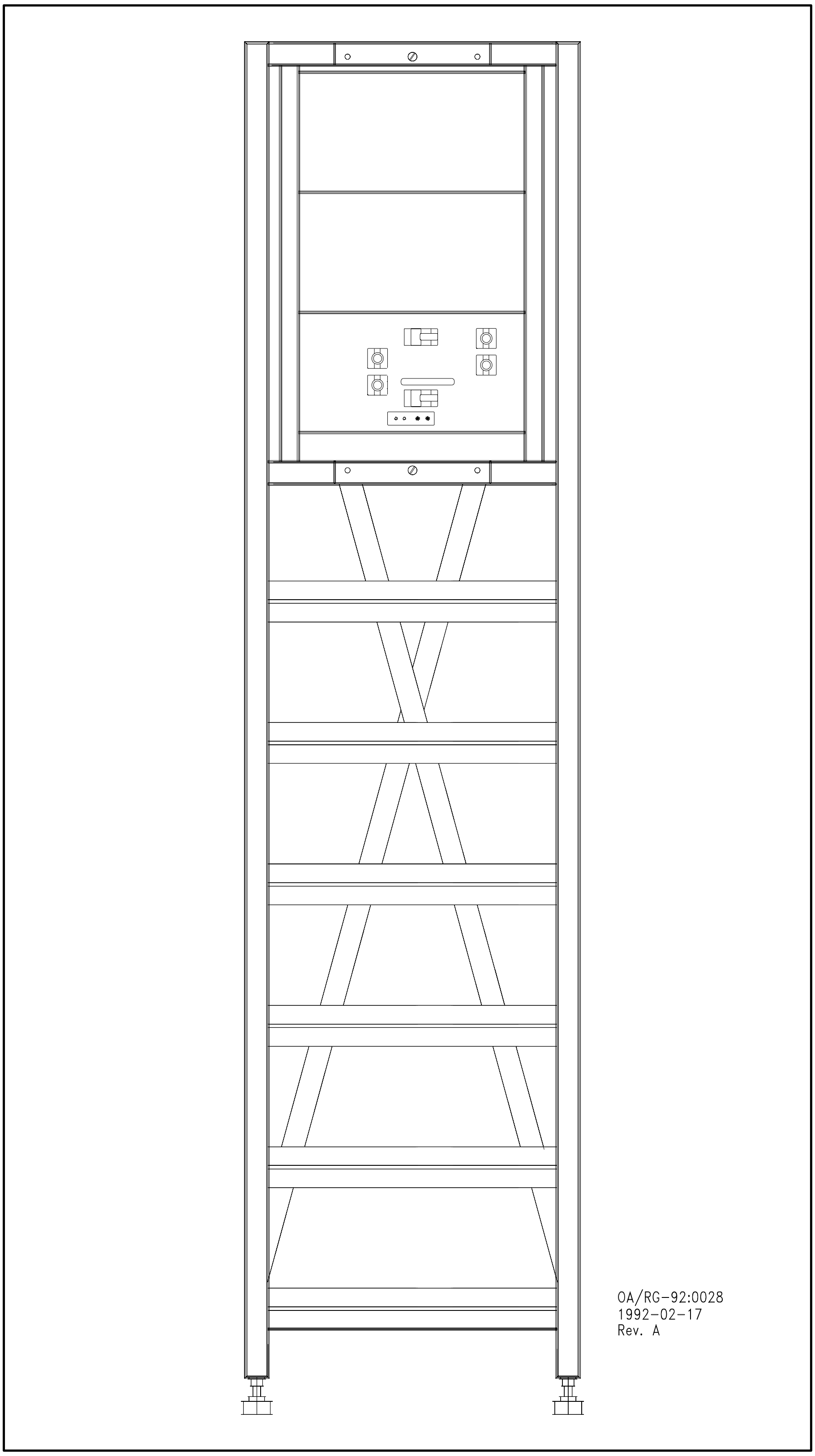

Figure 11 Battery back up stand 3 x 29 Ah, including BIM

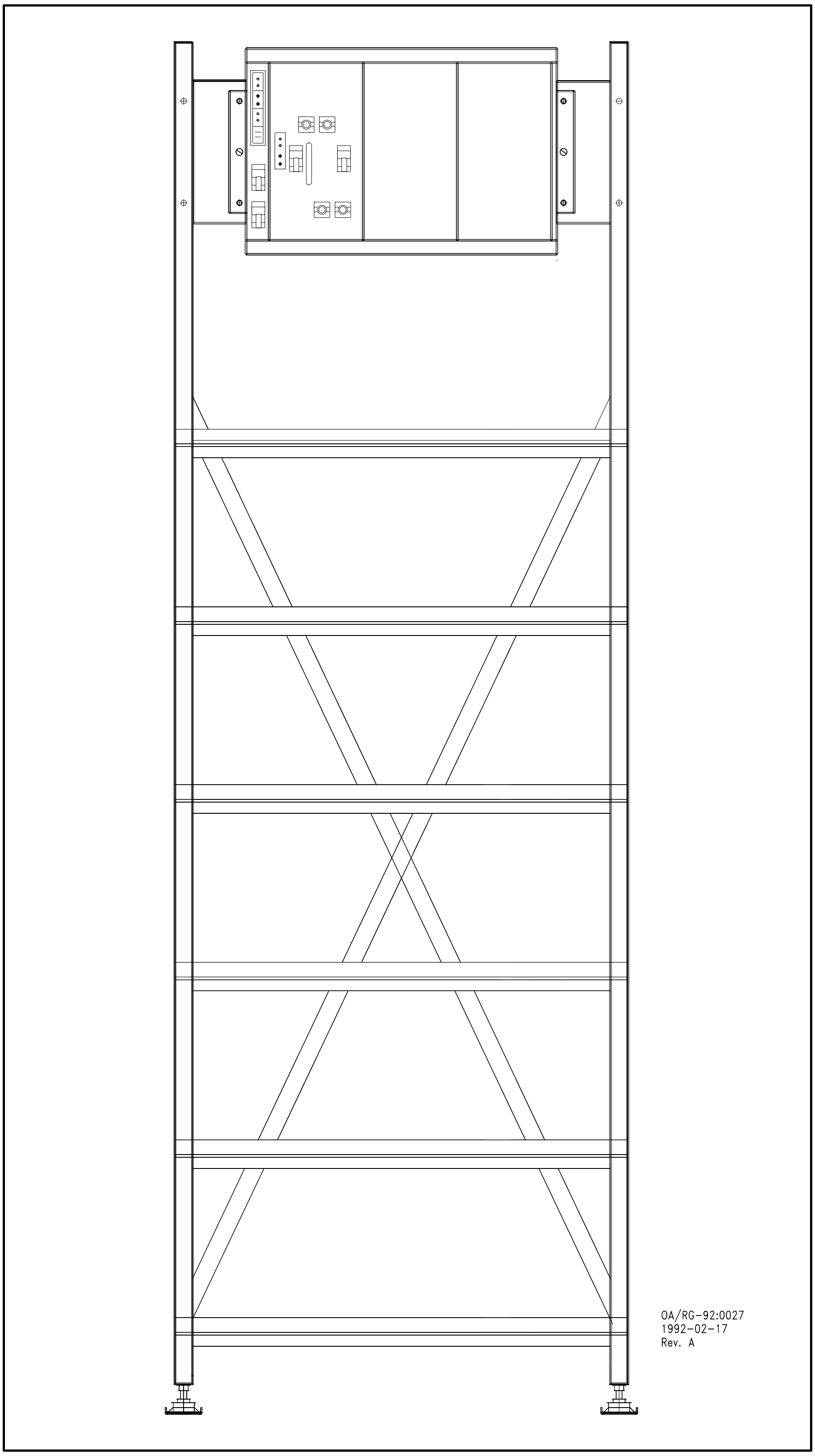

Figure 12 Battery back up stand BKY 261 002/650 3 x 134 Ah or BKY 261 002/950 3 x 187 Ah, including BIM

2.4 Battery distribution cables

The table 1 specifies the maximum distance between RBS and the battery stand at a certain cable area.

Table 1

Length (up to), m	Area mm^2	Product No.
14	50	TFK 100 510/08
20	70	TFK 100 511/08
42	150	TFK 100 514/08

2.5 Internal/External cabling

For further information see Chapter 2, section 4, Cabling and earthing. See also module G, Installation Manual.

2.6 Installation

For further information see module G Installation Manual.

3 Alarm categories

Outgoing alarms from the PCU are constituted by five relays with categories according to table 2 and figure 13. PCU and TRI communicate through connecting cable TSR 901 0197/1700. Refer to Wiring diagram 1/1073-BZZ 207 01.

Table 2

A1 (de-energises on alarm)	Requires immediate action.
A2 (energises on alarm)	Corrective actions during normal working-hours.
O1 (energises on alarm)	Observation alarm for indication of a temporary state.
Mains failure (de-energises on alarm)	Mains failure.
Undervoltage (de-energises on alarm)	The system voltage is below the limit of undervoltage monitor 2.

That the alarm relay de-energises on alarm means that the relay is normally energised.

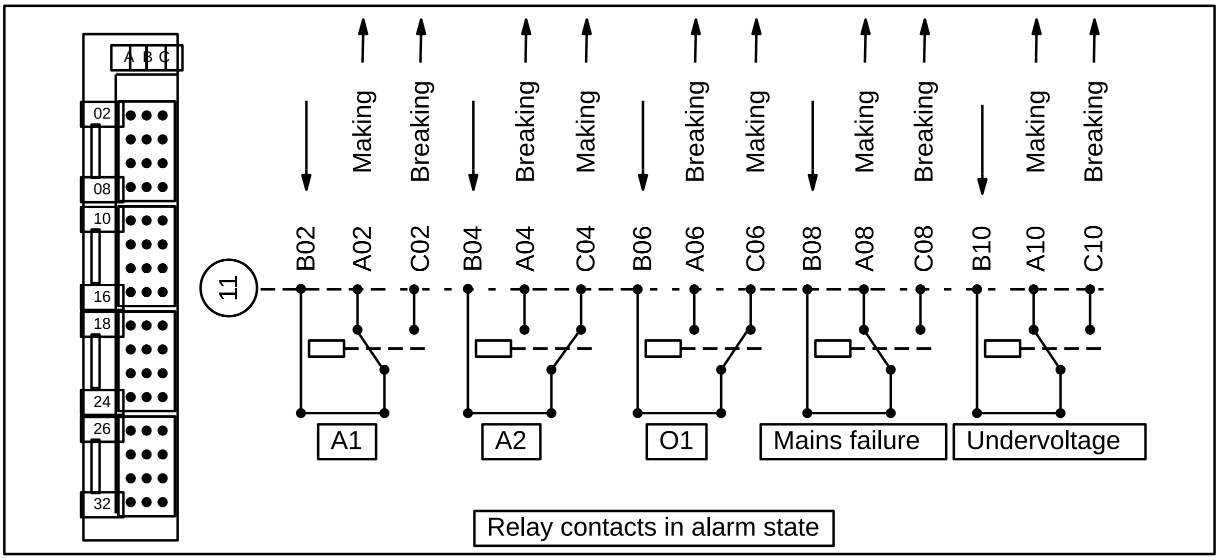

Figure 13 Outgoing alarm terminal block

4 Technical data

4.1 Rectifier BML 435 002/-, PSU

Input data

Mains voltage, single phase	
- nominal	230V AC
- normal voltage variation	208-240V AC
- permissible voltage variation	176-264V AC
Input current, r.m.s. value	<8A
Power factor (50 - 100% load)	> 0.98
Efficiency (50 - 100% load)	> 0.85
Recommended mains fuse	16A
Frequency range	45-65 Hz

Output data

Nominal voltage		+24V DC
Normal voltage		+23V to +28.5V DC
Output		1200W
Output current nominal	at 24V	50A
	at 27V	44.4A

4.2 Power Control Unit ROA 119 807, PCU

Input voltage, nominal	+24V DC
Input voltage, tolerance range	+19 to +31V DC
Communication interface	Opto one-way series bus, baud rate 19200 baud.
Digital outputs	7 change-over potential-free contacts
Undervoltage alarm 1	+22V
Undervoltage alarm 2	+19V
Overvoltage alarm	+30V to +32V

4.3 Interconnection module BMG 701 013/1, BIM

Battery circuit breaker	100A
Cabinet circuit breaker	100A

4.4 Distribution unit BMG 663 002/1, IDM

Distribution fuses	21 x 10A
	2 x 16A
	1 x 1A

4.5 Battery rack

	29 Ah	**134 Ah**	**187 Ah**
Height	1500 mm	1967 mm	1967 mm
Width	350 mm	650 mm	950 mm
Depth	375 mm	375 mm	375 mm
Dist. between shelves	150 mm	250 mm	250 mm
Weight, incl. battery	150 kg	400 kg	560 kg

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Contents **Page**

1 Power Supply Installation and Commissioning

1.1 Power Supply 230V AC, General

Appendices section has been removed from the manual as follows:

1.1.1 Wiring Diagram 1/1073-BZZ 207 01 Ux

This document is not written in SGML format and is therefore not included in this manual. The document must be ordered separately from GASK2. Internet users can print out the documents from Intranet.

1.1.2 Wiring Diagram 2/1073-BZZ 207 01 Ux

This document is not written in SGML format and is therefore not included in this manual. The document must be ordered separately from GASK2. Internet users can print out the documents from Intranet.

1.1.3 Circuit Diagram 1911-BZZ 207 01 Ux

This document is not written in SGML format and is therefore not included in this manual. The document must be ordered separately from GASK2. Internet users can print out the documents from Intranet.

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Power Supply -48V DC

Contents **Page**

1 General

When -48V DC is already available on site (e.g. on telecommunication sites), a DC/DC converter for conversion of -48V DC to +24V DC can be used.

Each cabinet shall be equipped with 2 pcs of DC/DC converters.

The distribution cables shall be dimensioned with regard to required length and permitted voltage drop. See table 1.

The DC/DC converter distribution panel must be equipped with one power ON/OFF switch per converter.

Table 1

Distance to RBS rack (m)	Cable type (mm^2)	Product number	Fuse, min. (A)
10	16	TFK 100 507/08	40
15	25	TFK 100 508/08	40
21	35	TFK 100 509/08	40
30	50	TFK 100 510/08	40
42	70	TFK 100 511/08	40

1.1 Adaptation

The incoming -48V DC is terminated at the IDM, positioned on the cabinet top.

The connectors can take maximum 16 mm^2.

Note *Cables with a larger area must be adapted to 16 mm^2.*

1.2 System overview

Power supply system BZZ 207 10, see figure 1, is designed to power RBS (Radio Base Station) cabinets in a GSM (Global System Mobile) system. The internal supply voltage in the RBS cabinet is +24V DC.

The main components of the system are DC/DC converters (1100W), connected in parallel on the secondary side in order to achieve redundancy, a Capacitor Unit and Distribution Unit(s).

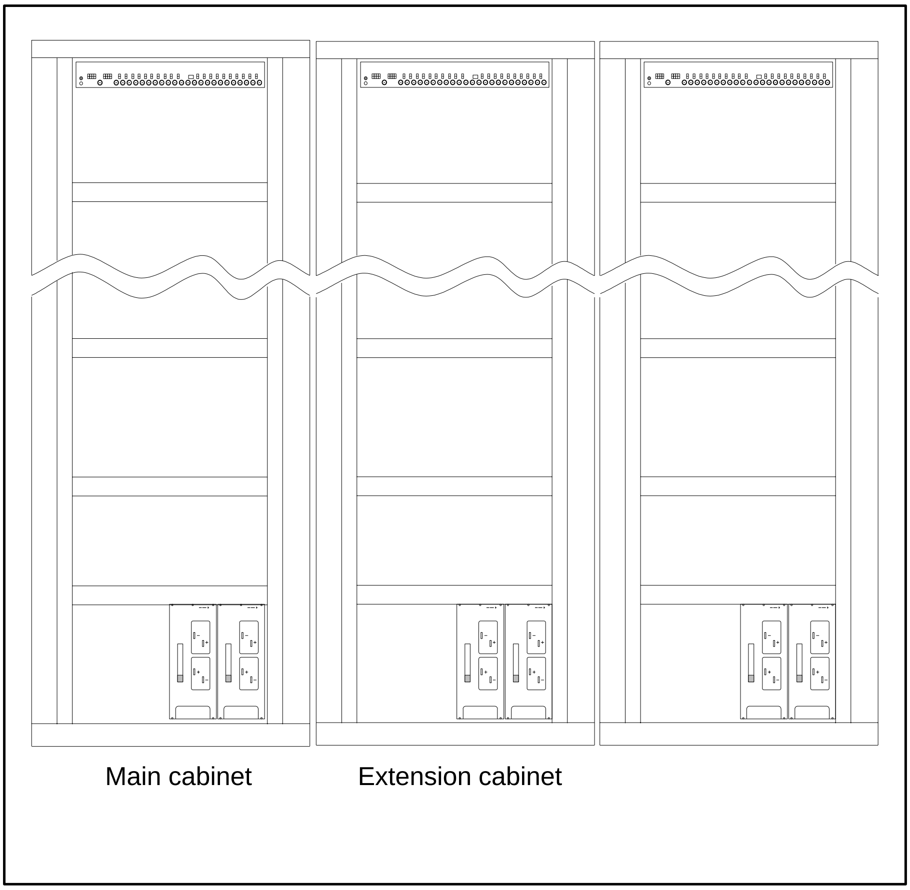

Figure 1 Example of system BZZ 207 10

2 Function

The system converts incoming -48/-60V DC to +24V DC and maintains a constant DC voltage across the telecommunication equipment. On the secondary side, an 0.6 F capacitor protects against transients.

The RBS is supplied high-ohmically with +24V DC through an Internal Distribution Model (IDM). The high resistance is achieved by the feeder cable from the distribution unit to the different consumers.

2.1 Supervision

In the event of an alarm, it is sent by the DC/DC converter of the system to the main communication unit in the RBS cabinet, the Transmission Radio Interface (TRI).

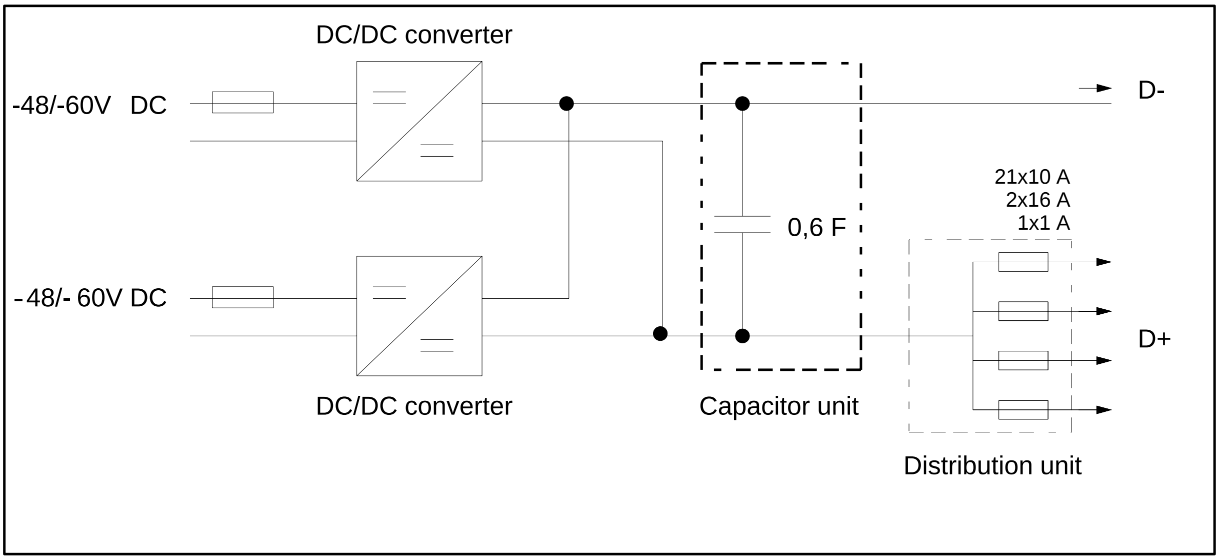

Figure 2 Circuit diagram of power supply system BZZ 207 10

3 Included units

The location of the different units in the cabinets is shown on Wiring diagram 1073-BZZ 207 10 Ux.

3.1 DC-DC converter BMR 960 009/1

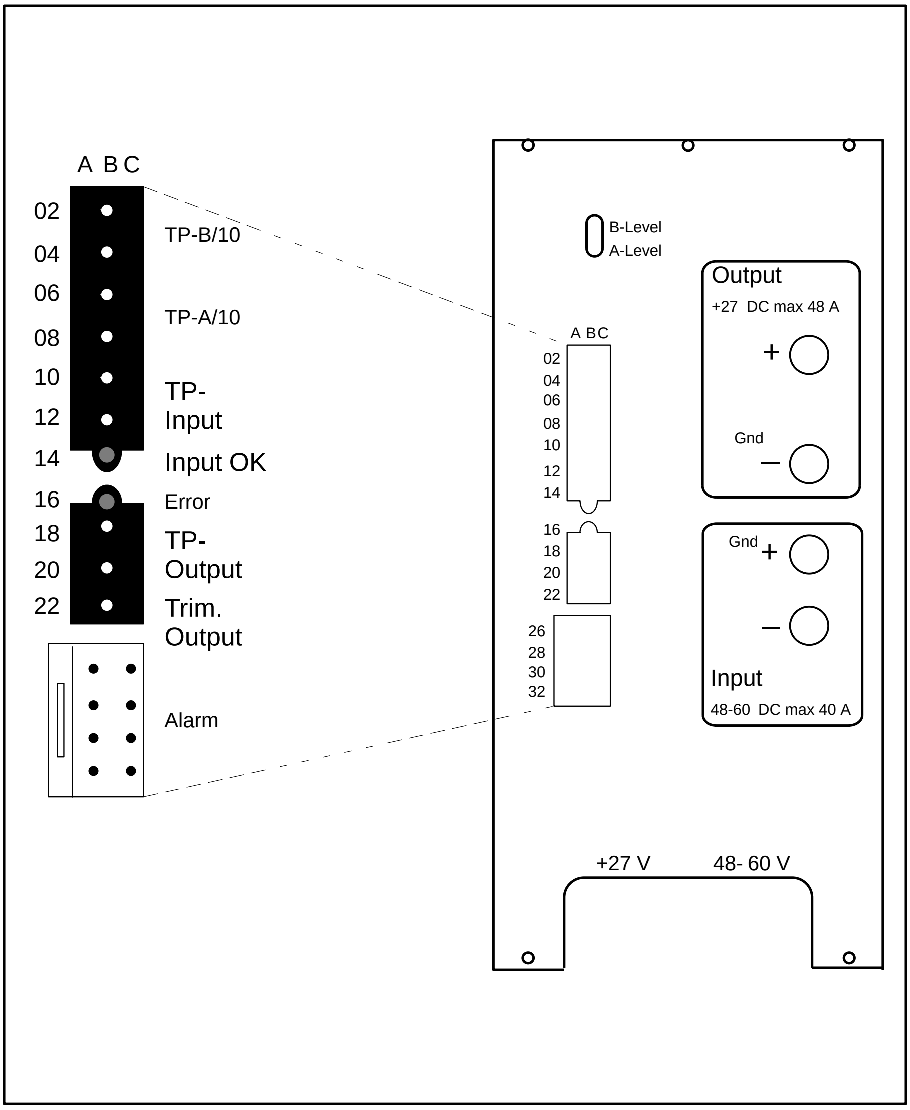

Figure 3 1300W DC-DC converter BMR 960 009/1

The converter, that has an input voltage operating range of -38 to -72V DC, is used for powering the RBS cabinet. It is a high-frequency 1300W DC/DC converter, that converts the nominal -48 to -60V DC to regulated +27V DC. A protective circuit shuts down the DC/DC converter if the input voltage drops below -40V (A-level). The converter restarts automatically when the input voltage exceeds -45V again (B-level).

Alarm is initiated when the input voltage is too low. This is indicated by the LED **Input OK**, which goes off.

Alarm is also initiated when the output voltage deviates more than ±10 % from the set value. This is indicated by the lighted LED **Error**. See figure 4.

Alarms from the converter are sent over relay contacts as shown in figure 4. Relays are normally energised and de-energised in event of an alarm.

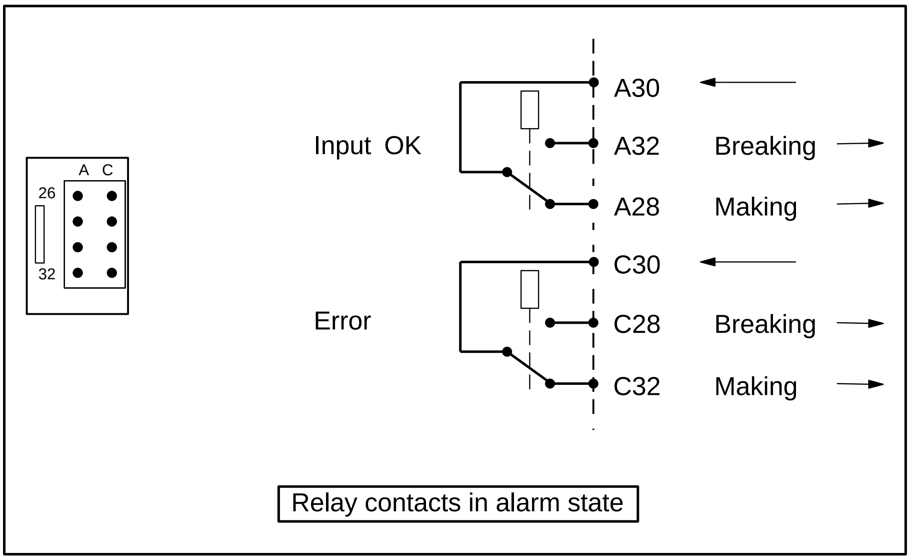

Figure 4 Outgoing alarm terminal block on the DC-DC converter

An older version, BMR 960 008/1, exists. The output power is 1100W.

3.2 Capacitor unit BMK 901 031/1

This unit is used to store energy on the 24V side when the RBS cabinet is powered via DC/DC converters.

The stored energy is used to:

- give sufficient current to blow a fuse in the IDM when a load is short-circuited
- hold the system voltage within specified tolerances during the blow time for the fuse

The Capacitor unit is positioned on the left side of the cabinet, as seen from the front, according to figure 5.

It can be reached from the inside of the cabinet when the magazine and fan units have been removed.

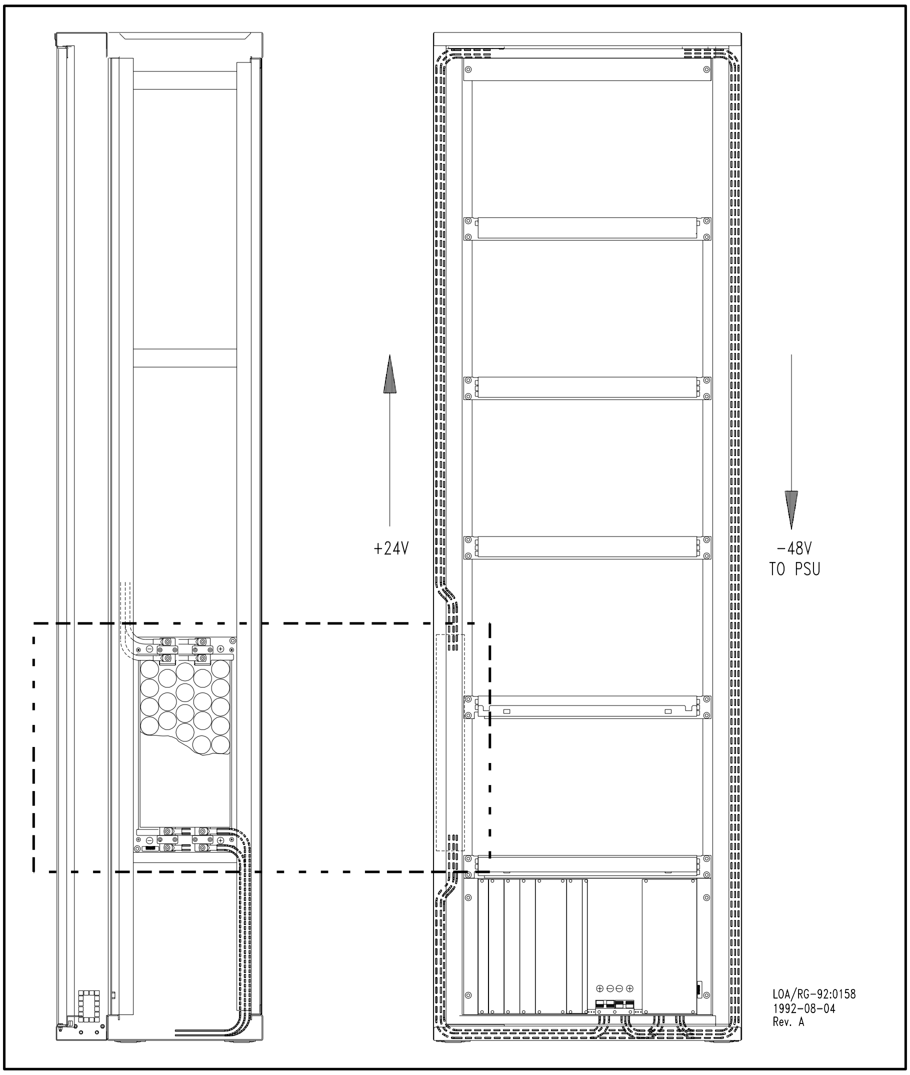

Figure 5 Dashed line shows position of capacitor unit

3.3 Distribution unit BMG 663 002/-

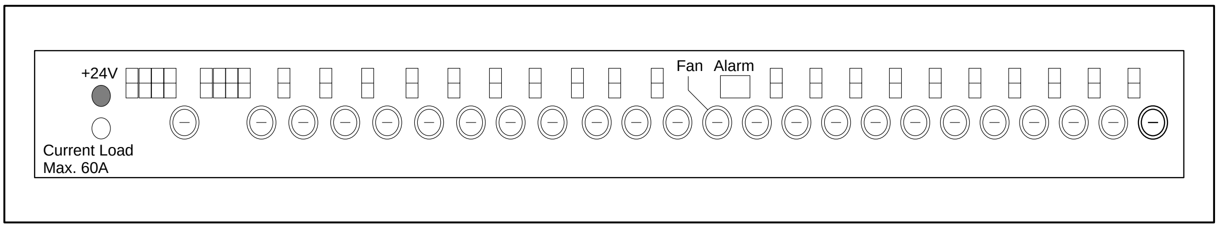

Figure 6 Internal Distribution Module BMG 663 002/-

The distribution unit comprises 21x10A, 2x16A and 1x1A glass-tube fuses and capacitors to filter the +24V DC voltage. The unit also comprises a control board for supervision of the cooling fans.

To make the system "high-ohmic", the distribution cables have a standard length of 3 m and a standard area of 0.80 mm^2.

In this way, the internal impedance of the cable becomes about 6 times higher than the internal impedance of the power supply plant. Accordingly, in the event of a short circuit at a distribution point, the voltage of the common feeding point will not fall below the permissible value of the powered equipment.

3.3.1 Adaptation

The terminals at the IDM can take cables up to 16 mm^2. To connect cables having a larger area, they need to be adapted down to 16 mm^2.

4 Technical data for PSU BMR 009/1

4.1 Input data

4.1.1 Input voltage

	-48/-60V positive ground.
Range	-38V to -72V with no reduction of performance.
Overvoltage	-72V to -80V.

4.1.2 Input current

Normal operation	<35A r.m.s. 1300W.
Battery fuse	The converter shall be fed by a 50A circuit breaker with a break capacity of 4500A.

4.2 Output data

4.2.1 Output power

Output power	>1300W
Output current	48.0A

4.2.2 Output voltage

	+27.3V ±0.1V at I_{ut}=25 A.
Adjustment range	±1.0V by a trim potentiometer positioned on the front.

4.3 Weight

Weight	5.8 kg

Contact EKA, Sweden for more information.

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1 Power Supply Installation and Commissioning

1.1 Power Supply -48V DC, General

The Appendix has been removed from the manual as follows:

1.1.1 Circuit Diagram 1911-BZZ 207 10 Ux

This document is not written in SGML format and is therefore not included in this manual. The document must be ordered separately from GASK2.Internet users can print out the documents from Intranet.

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Power Supply +24V DC

Contents **Page**

1 General

System voltage for the RBS cabinet is +27V DC.

The +24V DC is normally taken from an already existing power supply.

The connection point for the distribution cables are on the cabinet top to the IDM unit.

The distribution panel must be equipped with a power ON/OFF switch.

Note The distribution cables must be dimensioned with regard to required length and permitted voltage drop. See table 1.

Table 1

Distance to RBS rack (m)	Cable type (mm^2)	Product number	Fuse, min. (A)
7	25	TFK 100 508/08	80
10	35	TFK 100 509/08	80
14	50	TFK 100 510/08	80
20	70	TFK 100 511/08	80
42	150	TFK 100 514/08	80

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Cabling and Earthing

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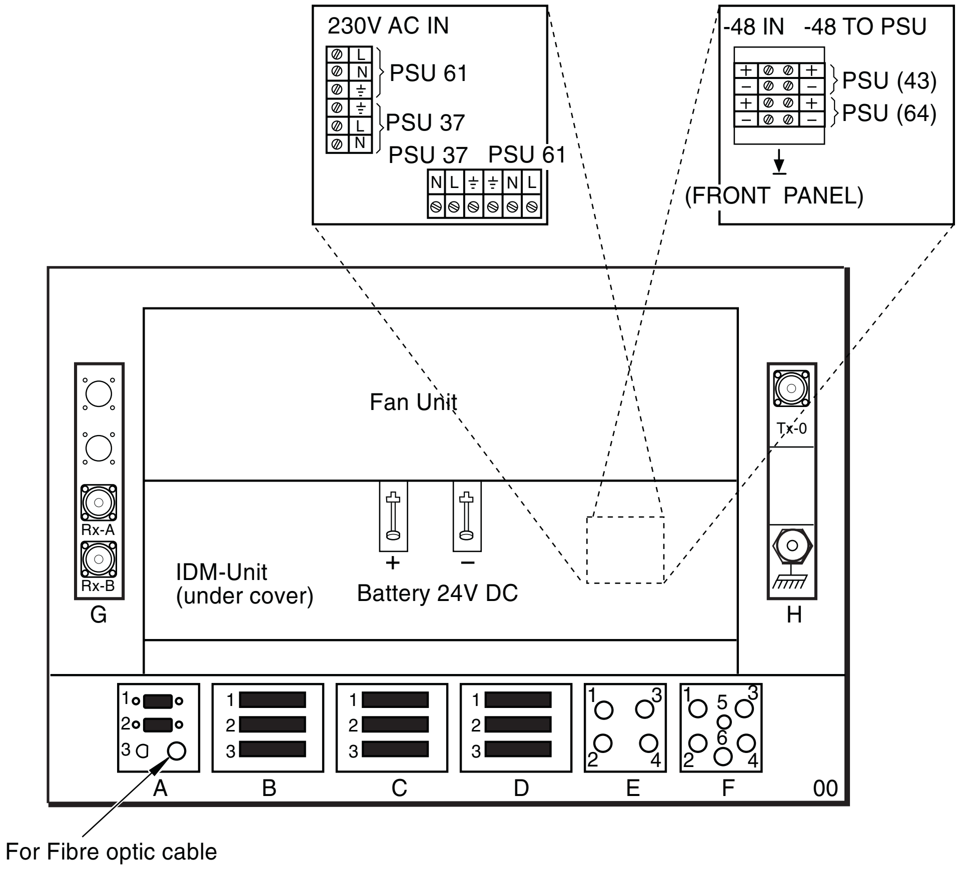
Figure		Page

1 Designation of cabinet connection field

All cabling to/from the TRI, Filter units and Power supply is done via the connection field located on top of each cabinet. The connection field is provided with eight sets of cable connectors for distribution of signals designated A to H, see figure 1.



A1 = TG SYNC (ESB)	C1 = LIB BUS CAB. A1	*)	E1 = PCM INPUT 1	120 ohm
A2 = TG SYNC (ESB)	C2 = LIB BUS CAB. B1 (A2)		E2 = PCM OUTPUT 1	120 ohm
A3 = RF out	C3 = LIB BUS CAB. C1 (A3)		E3 = PCM INPUT 2	120 ohm
B1 = EXTERNAL ALARM	D1 = LIB BUS CAB. A2 (A4)		E4 = PCM OUTPUT 2	120 ohm
B2 = EXTERNAL ALARM	D2 = LIB BUS CAB. B2	**)	F1 = PCM INPUT 1	75 ohm
B3 = LIB TRXD 1-4	D3 = LIB BUS CAB. C2		F2 = PCM OUTPUT 1	75 ohm
			F3 = PCM INPUT 2	75 ohm
			F4 = PCM OUTPUT 2	75 ohm
			F5 = PCM INPUT 3	75 ohm
			F6 = PCM OUTPUT 3	75 ohm

*) if more than 2 ETB cards,
2 contact boxes E (SVK 107 2436/1) are needed.

**) if more than 3 ETB cards,
2 contact boxes F (SVK 107 2435/1) are needed.

P005505A

Figure 1 Cabinet Connection field on top of cabinet

2 External cabling

2.1 General

- For all cabling diagrams, see External cabling, cables and diagrams in section 6 in this document.

2.2 External cabling definition

External cabling is all cabling to/from the RBS 200 cabinet and is divided as follows:

- AC and DC power cabling
- Signal cabling
- Optical fibre cabling
- Alarm cabling
- Antenna feeders and jumpers

For the Antenna feeders and jumpers, see General Installation Instructions.

General Installation Instructions *LZN 302 49*

Nearly all external cables are prefabricated with a fixed length. Cable lengths are adapted to suit all normal site layouts described in chapter 5 in this manual. If distances exceed the prefixed cable lengths, do not forget to order longer cables.

Special care must be taken, when the battery stand and BIM must be located some distance away from the cabinets. The cable area must be changed to avoid voltage drop.

2.2.1 Cable marking

All cables shall be marked. See Installation Manual, Module G, Chapter 3, section 4.

2.3 Power supply cabling, 230V AC

Power Supply Units (PSUs) installed in the RBS 200 cabinets will be fed from a 230V AC, 50-60 Hz supply.

Each RBS 200 cabinet will be connected to a back-up battery supplying the cabinet with +24V DC during a mains power failure.

2.3.1 DC cabling

When connecting the Batteries (+24V DC), two cables shall be used from the BIM module and the connection field in question in IDM.

- BIM 1 serves cabinet A1
- BIM 2 serves cabinet B1
- BIM 3 serves cabinet C1.

2.3.1.1 Battery cable

Selected cable area is dependent on the distance (or more correctly the voltage drop) between BIM and IDM units.

- Use cable types and lengths below to avoid voltage drop:

Table 1

Lmax, m	Area, mm^2	Product No.
14	50	TFK 100 510/08
20	70	TFK 100 511/08
42	150	TFK 100 514/08

Note BIM and IDM cable connectors can take 35 to 150 mm^2.

Maximum length of the optical cable is 30 m.

2.3.2 AC cabling, 3 x 2.5 mm2

The electrical installation comprises a 380/220V mains panel with all wiring to feed lights, air-conditioners, alarm system, service outlets, power supply units in RBS 200 cabinets as well as an earth collection bar.

Mains panel shall be provided with one power ON/OFF switch per power supply unit and include spare units for future expansion, as well as suitable circuit breakers for the other utilities.

Earth connection bar shall be connected to an earth electrode system according to IEC 1024-1. See also section Earthing principles.

Cabling to the power supply unit shall be min. 3 x 2.5 mm^2, run separately to each RBS 200 cabinet. Cables shall have one free end and be long enough to reach the connecting blocks on top of the cabinet.

2.3.3 Optical Fibre Cabling

For supervision and control of the +24V DC power supply system, an optical fiber cable shall be run from the Power Control Unit (PCU) unit to the Power Supply Unit (PSU) and Battery and Interconnection Module (BIM) units, forming a loop back to the PCU unit.

Following units communicate via fiber optics:

- PCU located in the same RBS cabinet as the TRI (A1).
- PSU located in each RBS cabinet.
- BIM located in the BIM Unit in the Battery Rack. The BIM unit can house 1 - 3 BIM modules, one for each RBS 200 cabinet.

Fiber optic cables are delivered prefabricated including connectors for connection to the fiber optic interface on front of the units. The following prefabricated cables are specified:

Table 2

Designation	Product No.
Fiber Optic cable, 500 mm	RPM 982 01/500
Ditto, 1000 mm	RPM 982 01/1000
Ditto, 1500 mm	RPM 982 01/1500
Ditto, 10000 mm	RPM 982 01/10000
Cable set, 30 m	BMY 105 045/1

Cable set BMY 105 045/1, which is prefabricated, including two separately delivered connectors, is used for making the site specific cables for the alarm loop between the battery rack and the RBS 200 cabinet. Before connectorizing, see General Installation Instructions.

General Installation Instructions *LZN 302 49*

Configuration of the power supply system and cables to be used for different configurations are shown in enclosed diagrams.

Fiber Optic Cables used are very thin and must be protected when installed on cable ladders. They must be run through PVC tubes, installed in according to General Installation Instructions.

General Installation Instructions *LZN 302 49*

Note Maximum distance between RBS 200 and BIM is 30 meters.

2.4 + 24V DC

The two distribution cables are connected to the IDM unit terminals on top of the cabinet .

The distribution panel must be equipped with a power ON/OFF switch.

Cable area shall be selected with regard to voltage drop and total cable length, see table 3.

Note, that the 25 mm^2 cable must be adapted.

Table 3

Distance to BTS rack (m)	Cable type (mm^2)	Product number	Fuse, minimum
7	25	TFK100508/08	80 A
10	35	TFK100509/08	80 A
14	50	TFK100510/08	80 A
20	70	TFK100511/08	80 A
42	150	TFK100514/08	80 A

2.5 -48V DC, DC/DC converter

Each cabinet shall be equipped with two DC/DC converters.

The distribution panel must be equipped with one power ON/OFF switch for each converter.

Distribution cables shall be dimensioned with regard to voltage drop and total length, see table 4.

2.5.1 Adaptation

Cables are connected to the IDM unit on the cabinet top. Terminals can only take cables of 16 mm^2 and the connection of a larger cable area needs to be adapted down to 16 mm^2.

Table 4

Distance to RBS rack (m)	Cable type (mm^2)	Product number	Fuse, minimum
10	16	TFK100507/08	40 A
15	25	TFK100508/08	40 A
21	35	TFK100509/08	40 A

30	50	TFK100510/08	40 A
42	70	TFK100511/08	40 A

2.6 Signal cabling

Signal cabling consists of prefabricated cables, as follows:

- LIB cabling
- PCM cabling
- External alarm cabling

Signal cables shall be located in a cable tray installed on the cable ladder.

2.6.1 LIB cabling

LIB cables are delivered as prefabricated shielded cables with connectors on both ends. Cables can in some configurations be longer than needed.

2.6.1.1 LIB-bus

LIB-bus is the interface between RTT and the different TRXs.

Table 5 LIB-bus cables

Cabinet			
From	To	No.	Product No.
A1	A1	1	RPM 513 336/500
A1	A2	1	RPM 513 336/1800
A1	C1, C2	1-4	RPM 513 336/6500
A1	B1, B2	1-4	RPM 513 336/6500

2.6.1.2 Distance

Note Distance between cabinets A1, B1 to C1 is limited, due to length (6.5 m) of cable RPM 513 336/6500.

Maximum permitted length of LIB-Bus cables is 18 m.

2.6.2 PCM cabling

- See also section TRI.

Both 75 ohm coaxial and 120 ohm pair cable can be used.

Type according to existing Transmission system.

2.6.2.1 75 ohm external coaxial cable

RPM 513 339 is a 75 ohm, 15 m prefabricated coaxial cable with one end fitted with a BNC connector and the other end free.

It is possible to connect three 75 ohm PCM links to the Connection box SXK 107 2435/1 (Connection field position F00).

If more than three PCM links are required, an extra Connector box must be installed in the E-position.

2.6.2.2 DDF

The PCM cables terminate in the Digital Distribution Field (DDF).

- Install the following in the DF, if there is need for a DDF:

Table 6

Designation	Product No.
Holder for 6 x RNT 403	SXA 120 165
Connector female, 1/RPM 513 339	RNT 403 113
Connector male, 1/RPM 513 339	RPT 158 53

2.6.2.3 120 ohm PCM cabling, external pair cable

RPM 513 349 is a 120 ohm, 15 m prefabricated pair cable with one open end.

Maximum two 120 ohm PCM links connections are provided for as standard.

If more than two PCM links are required, an extra Connection box SXK 107 2436/1 must be installed in the F-position.

2.6.2.4 DDF

- Install the following details in the DF in case of DDF (which is preferable):

Table 7

Designation	Product No.
Holder for 4 x RNT 40305/3	SXA 120 164
Connector, female, 1/RPM 513 349	RNT 403 05/03
Connector, male, 1/RPM 513 349	RPT 403 08/03

2.6.3 External Alarm cabling

See sub-section 5, Alarm Handling for detailed information.

3 Internal cabling

3.1 General

For all cabling, see Internal cabling diagrams in paragraph 5.1.3 in this document.

Cabling within cabinets may vary, depending on cabinet type and version.

3.2 Internal cabling definition

The internal cabling is all cabling within the cabinet and is defined as follows:

- +24V DC distribution cabling from IDM unit
- Cabinet bus cabling
- Signal cabling to cabinet connection field
- Alarm cabling
- RX cabling.
- TX cabling

Cabinet is delivered with the internal cabling partly installed.

3.3 Power supply distribution cabling

3.3.1 IDM - PSU - IDM

Different cable types are installed depending on whether -48V DC or 230V AC is used. In the event of -48V DC, a capacitor is required between the +24V DC side of the PSU and IDM.

3.3.2 IDM

Internal +24V DC is distributed from the IDM supply. Cables are independent of type of power source and input voltage.

3.4 Cabinet bus cabling

Cable Connection Boards (CCBs), the vertical cabinet bus cabling and the bus terminators are installed on delivery.

CCB boards are mounted in the left cable shaft in the cabinet, one at each rack position. Cabinet bus cabling distributes two separate buses namely:

- TX bus, distributed via jack 3 on CCB board
- TIB/O&M bus, distributed via jack 4 and 5 on CCB board.

3.5 Signal cabling to cabinet connection field on cabinet top

Signal cabling contains:

- Connection of Line Interface Buses (LIB) between TRXC units and RTT boards via the Connection field.
- Connection of 2 MB/s PCM lines, distributed either by 75 ohm coaxial cable or by 120 ohm pair cable.
- Internal cabling in the Transceiver Remote Interface (TRI) magazine.
- Connection of alarm cables from power supply and ACU.

3.6 RX cabling

RX cabling from RX input via bandpass filter is pre-installed and must be connected to multicoupler system and to Radio Receiver (RRX) unit.

3.7 TX cabling

TX cabling from TX outlet via the bandpass filter is installed and must be connected to combiner system and RTX.

3.8 Alarm cabling

See sub-section 5, Alarm handling.

3.9 Cabinet Bus

CCB boards ROA 119 8535/3 is the connection field for vertical and horizontal bus cable plugs. See figure 2.

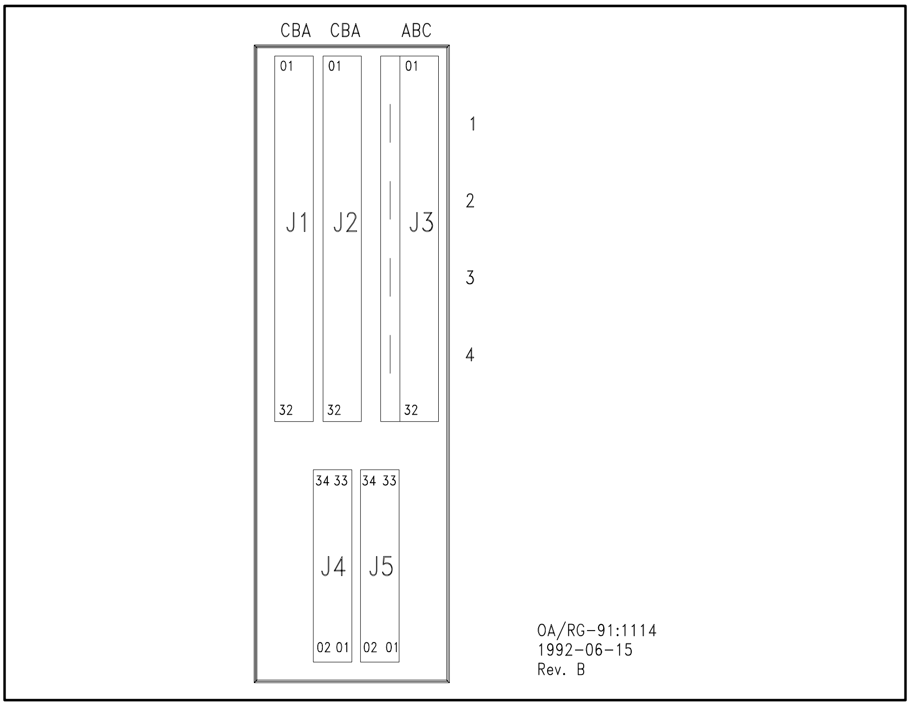


Figure 2 A CCB board ROA 119 8535/3

CCB boards with vertical bus cables and plugs are factory installed as shown in table 8 and figure 3.

Table 8

Fig. 3 item	Product Number	Designation		Pcs	Note
a	RPM 513 352/1	Conn. cable	CCB-CCB	3	1)
b	RPM 513 352/2	Conn. cable	CCB-CCB	1	1)
c	RPM 513 393/1	Conn. cable	O&M/TIB	1-2	1) 2)
d	RNV 991 2005/1	Str. Plug	TXBUS	14	1)
e	RNV 403 215/1	Str. Plug Top	CCB	1	1)
f	RNV 403 215/2	Str. Plug Low	CCB	1	1)
g	ROA 119 8535/3	Board	CCB	5	1)
h	RPM 513 394/1	Conn. cable	OM/TIB-TRXC	2-3	2)
i	RPM 513 395/1	Conn. cable	OM/TIB-RTX	1	
k	RPM 513 391/1	Conn. cable	TX/BUS-TRXC	1	
l	RPM 513 390/1	Conn. cable	TX/BUS-TRXC	1	
m	RPM 513 392/1	Conn. cable	TX/BUS-RTX	1	

1) Factory installed
2) 2 pcs if extension cabinet is installed

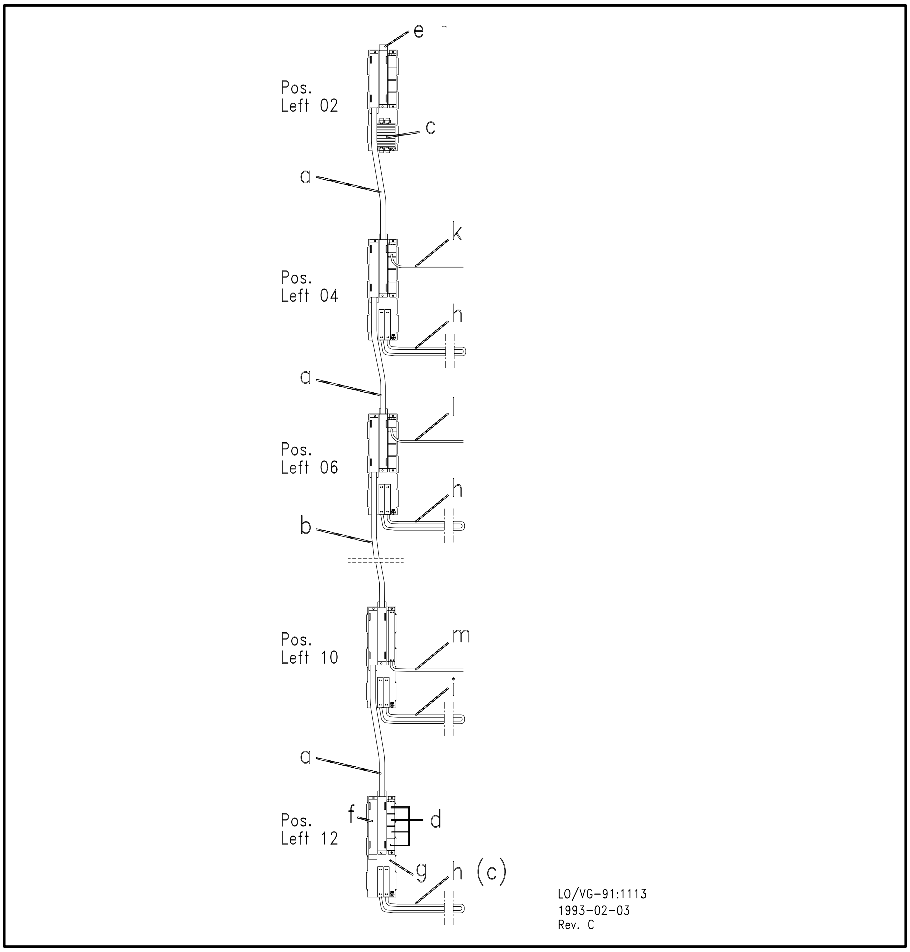


Figure 3 CCB connection cables and plugs

3.10 Extension kit

Cables and mechanical parts needed to connect a Master cabinet to an Extension cabinet are included in three separate kits:

Table 9

Cabinet	Kit Product number
Master - Extension 1	NTM 201 651/01
Extension 1 - Extension 2	NTM 201 652/01
Extension 2 - Extension 3	NTM 201 653/01

4 General earthing principles

The general earthing principles are described in General Installation Instructions.

General Installation Instructions *LZN 302 49*

5 Internal cabling, cables and diagrams

5.1 Master cabinet

5.1.1 Cables included in the manufacturing specification

Table 10 Cables sorted to cable number, Figures 4 to 11.

Product Number	Item	Figure	Vertical pos.	Installed in prod.	Installed on site	Label
RNV 321 011/1	Plug	7			x	1)
RNV 403 215/1	Plug	6		x		1)
RNV 403 215/2	Plug	6		x		1)
RNV 991 712/001	Plug	7			x	1)
RNV 991 2005/1	Plug	6		x		1)
RPM 513 351/1	Power cable	5	R	x		
RPM 513 352/1	Connection cable	6	L	x		1)
RPM 513 352/2	Connection cable	6	L	x		1)
RPM 513 363/1	Coaxial cable	7	R		x	2)
RPM 513 364/1	Connection cable	7	R		x	2)
RPM 513 365/1	Connection cable	11	R	x		
RPM 513 367/1	Coaxial cable	9	L		x	
RPM 513 367/2	Coaxial cable	9	L		x	
RPM 513 368/2	Coaxial cable	8, 10	R		x	
RPM 513 368/3	Coaxial cable	8	R		x	
RPM 513 368/4	Coaxial cable	9	L		x	
RPM 513 368/5	Coaxial cable	9	L		x	
RPM 513 368/6	Coaxial cable	8, 10	R		x	

Product Number	Item	Figure	Vertical pos.	Installed		Label
				in prod.	on site	
RPM 513 368/7	Coaxial cable	8	R		x	
RPM 513 369/1	Connection cable	9	L		x	
RPM 513 370/4	Coaxial cable	8	R		x	2)
RPM 513 370/9	Coaxial cable	9	L	x		2)
RPM 513 370/11	Coaxial cable	9, 10	R	x		2)
RPM 513 372/1	Connection cable	11	L	x		2)
RPM 513 376/1	Coaxial cable	8	L	x		1)
RPM 513 376/2	Coaxial cable	8	L	x		1)
RPM 513 389/1	Power cable	5	R	x		
RPM 513 390/1	Connection cable	6		x		
RPM 513 391/1	Connection cable	6		x		
RPM 513 392/1	Connection cable	6		x		
RPM 513 393/1	Connection cable	6		x		1)
RPM 513 394/1	Connection cable	6		x		
RPM 513 395/1	Connection cable	6		x		
RPM 513 409/1	Power cable	5			x	
RPM 513 421/1	Coaxial cable	8	L	x		2)
RPM 513 421/2	Coaxial cable	8	L	x		2)
RPM 513 423/1	Connection cable	7	R		x	2)
RPM 513 424/1	Coaxial cable	9, 10			x	1)
RPM 513 427/ 1330	Coaxial cable	8	L	x		
RPM 513 424/2	Coaxial cable	9			x	
RPM 513 424/3	Coaxial cable	9			x	1)
RPM 513 425/1	Connection cable	8	L	x		

Product Number	Item	Figure	Vertical pos.	Installed in prod.	Installed on site	Label
RPM 513 432/1	Power cable	5	R	x		
RPM 513 434/2	Power cable	4	L	x		1)
RPM 513 435/2	Power cable	4	L	x		1)
RPM 513 451/1	Connection cable	11	R		x	
RPM 513 453/1	Connection cable	11	R	x		
RPM 513 454/1	Power cable	4	L	x		1)
RPM 513 455/1	Power cable	4	R	x		1)
RPM 513 460/4	Coaxial cable	9, 10	R	x		1)
RPM 513 615/1	Connection cable	11	R	x		2)
RPM 513 619/1	Coaxial cable	9, 10	R	x		2)
RPM 513 620/1	Connection cable	11	R	x		
RPM 513 904/ 02160	ESB cable	11	L	x		2)
RPM 513 935/1	Power cable	5	L	x		2)
TRE 211 048/1	Power cable	4	L	x		2)
TRE 211 048/2	Power cable	4	L	x		2)
TRE 211 049	Power cable	4	R	x		2)
TSR 901 0197/ 1700	Connection cable	11	R		x	
TSR 204 0201/500	Connection cable	7			x	1)

Note Cables shall be labelled at both ends.

Exceptions in table 10:

1) not labelled

2) labelled in one end of the cable only (shelf-side)

5.1.2 Optional TRXT

Table 11 Cables sorted according to cabling diagram, Figure 12.

Product number	Item	Figure
RPM 513 351/1	Power cable 24V	12
RPM 513 370/4	Coaxial cable	12
RPM 513 424/3	Coaxial cable	12

Note If the cabinet will not be fully equipped, cables shall not be installed, or in the case of factory installed cables and bus-cables, the free ends shall be put in the parking position on each magazine.

5.1.3 Internal cabling diagrams

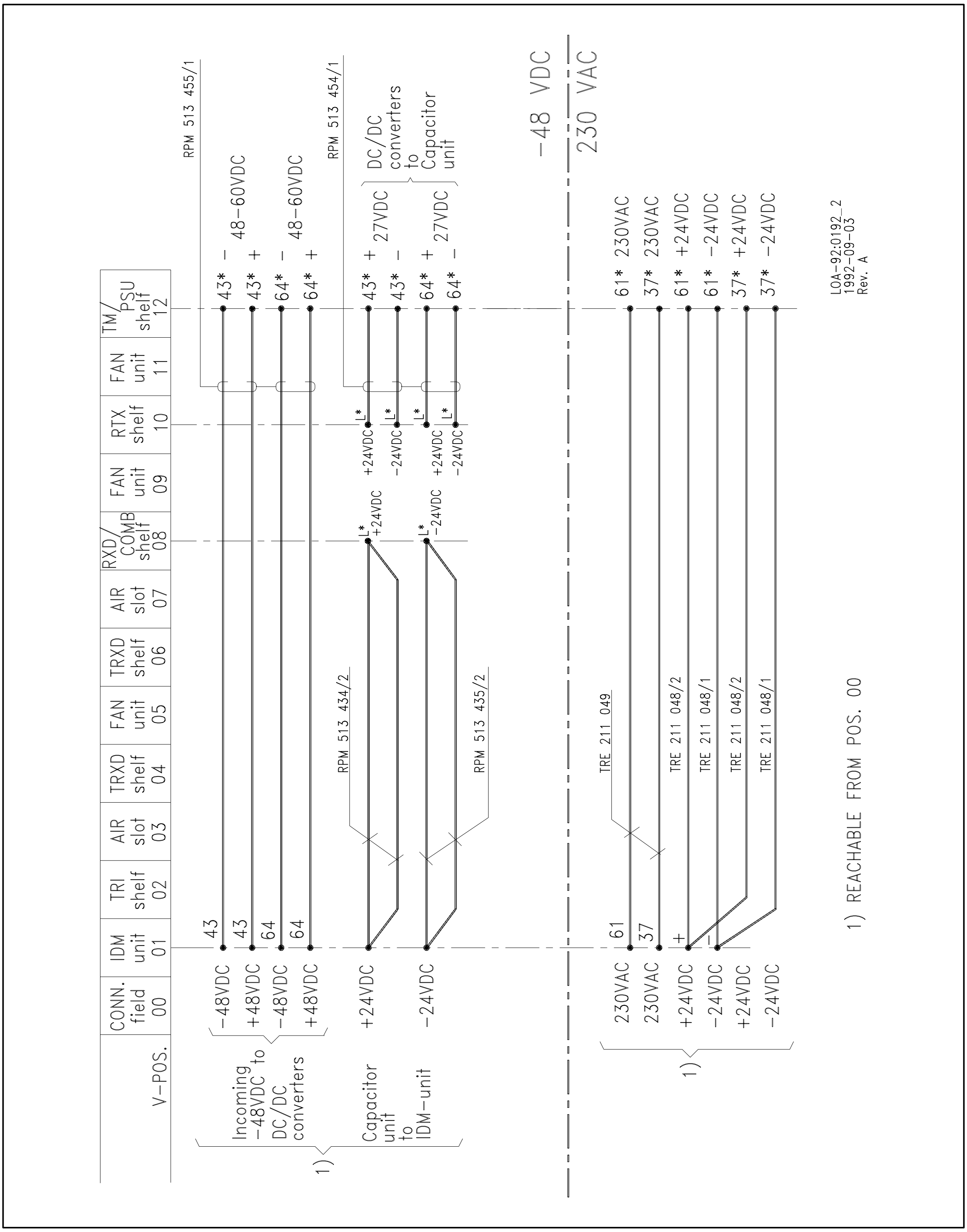


Figure 4 -48V DC and 230V AC distribution cabling diagram (general)

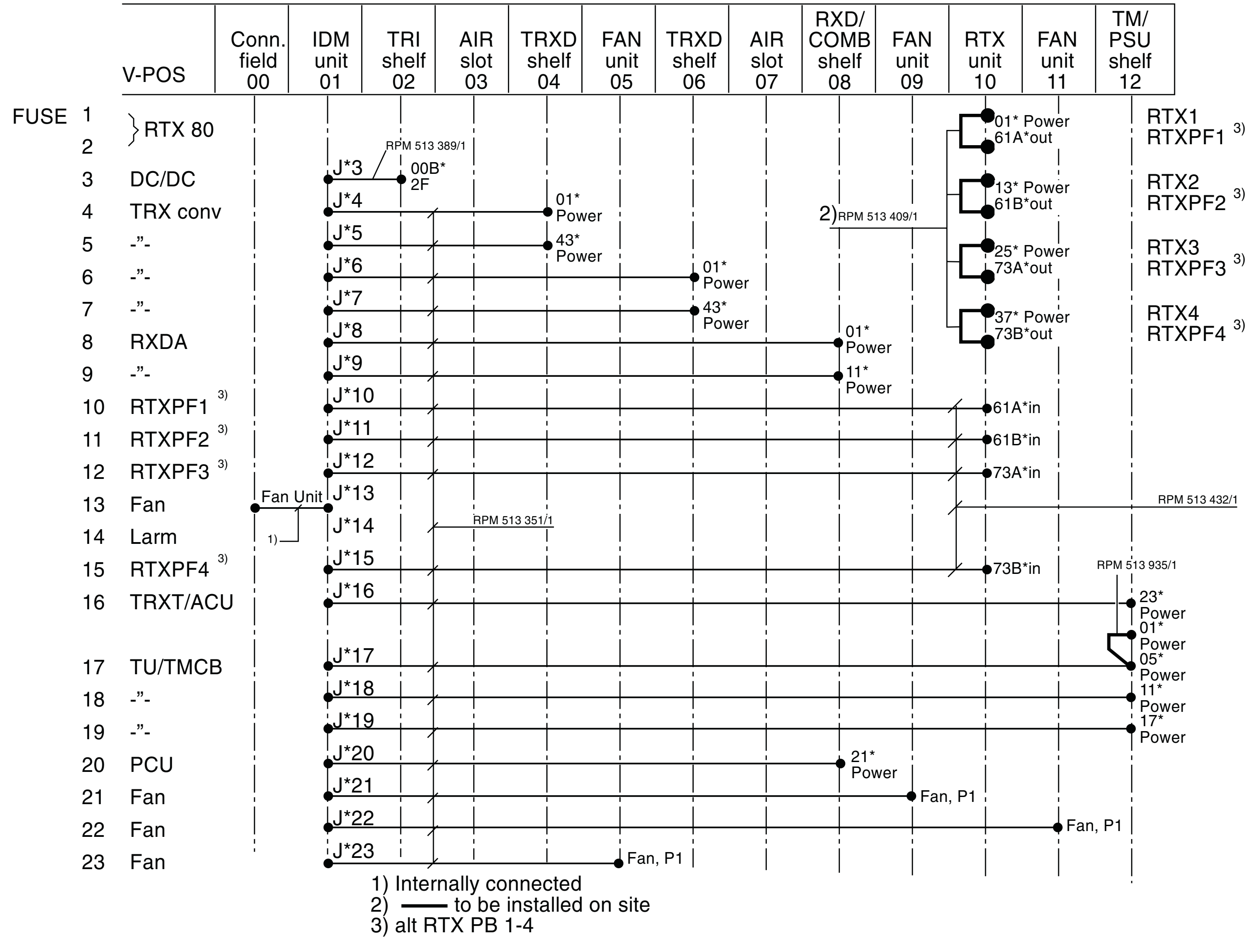


Figure 5 +24V DC distribution cabling diagram (general)

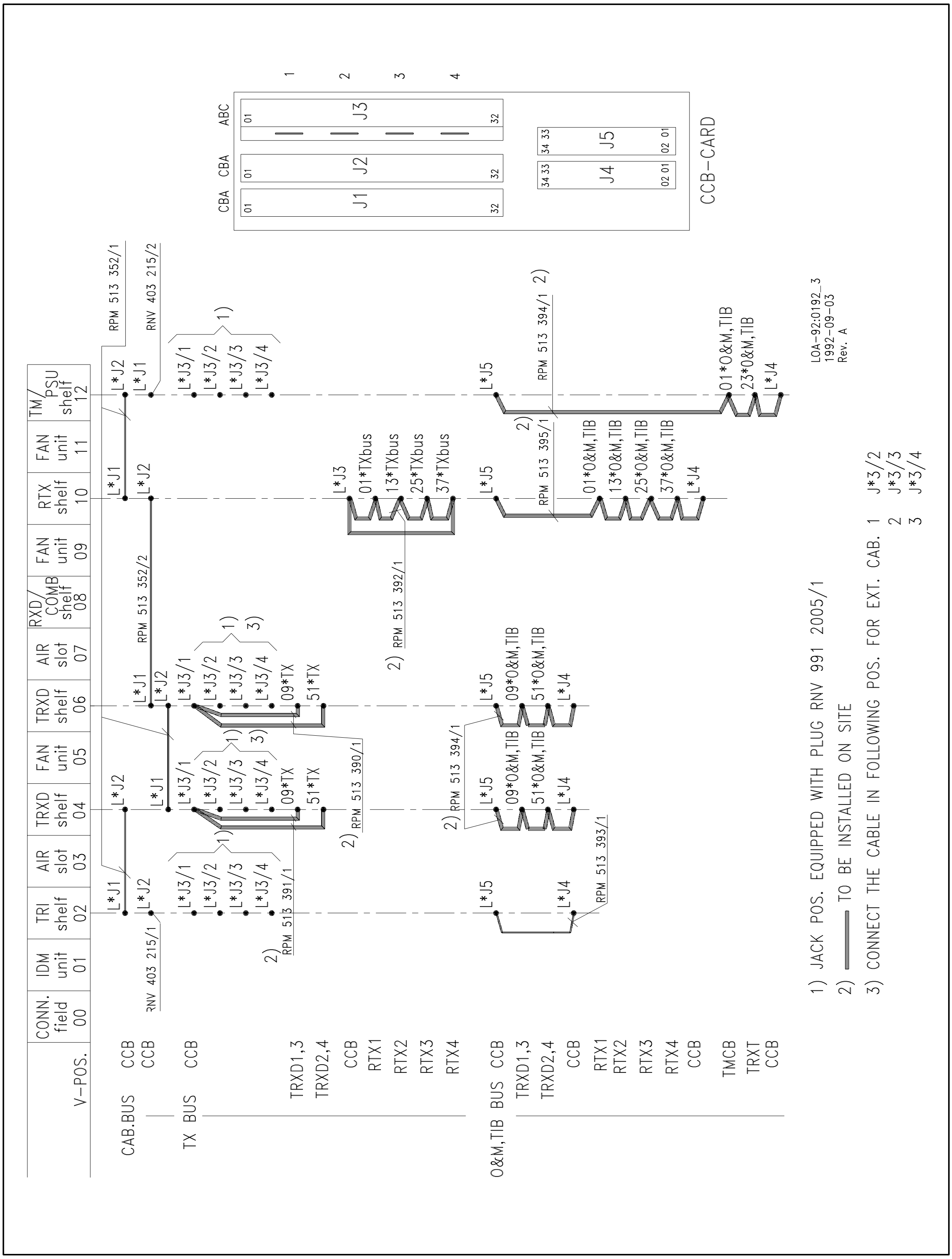


Figure 6 Bus cabling diagram (general)

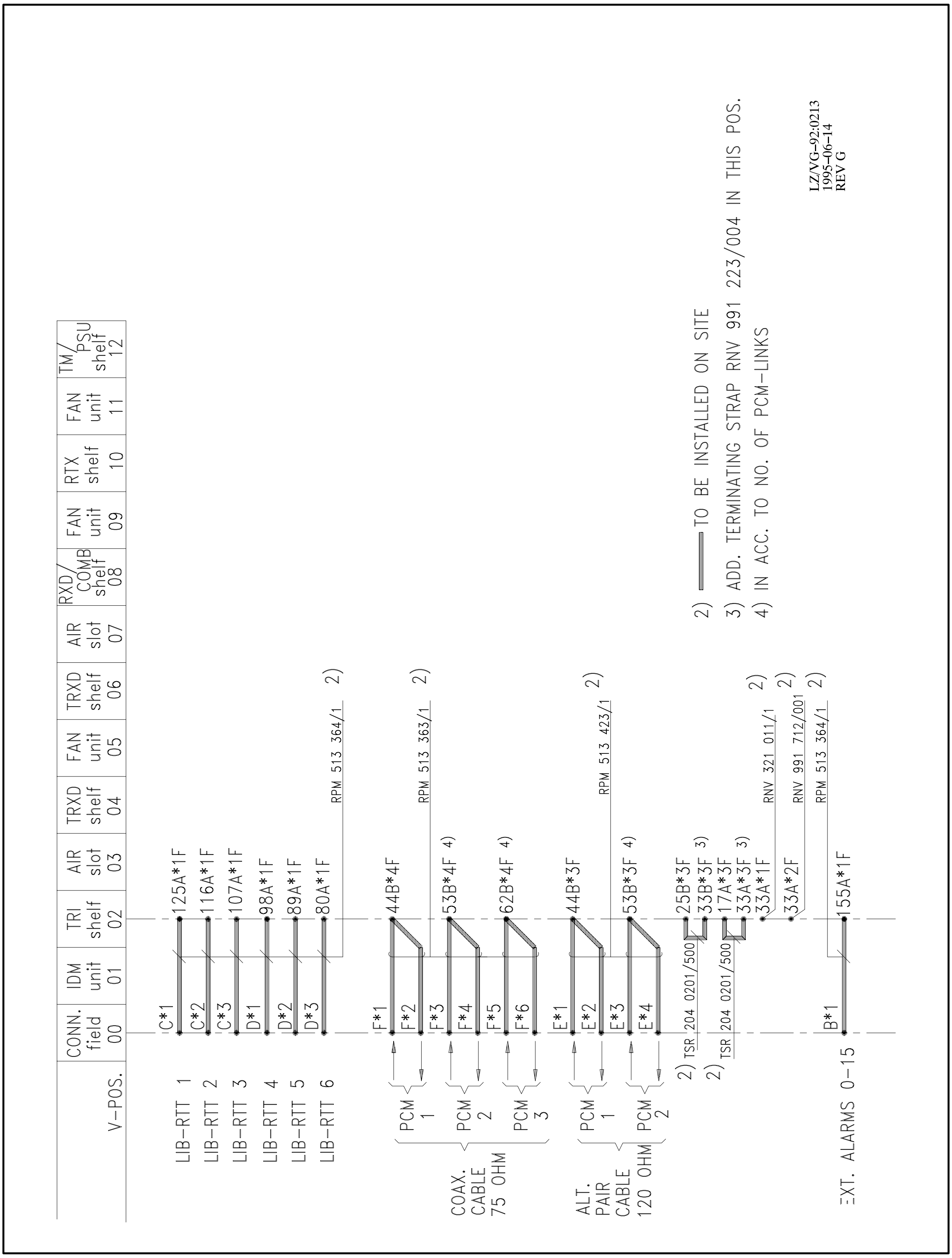


Figure 7 Cabling diagram for TRI (general)

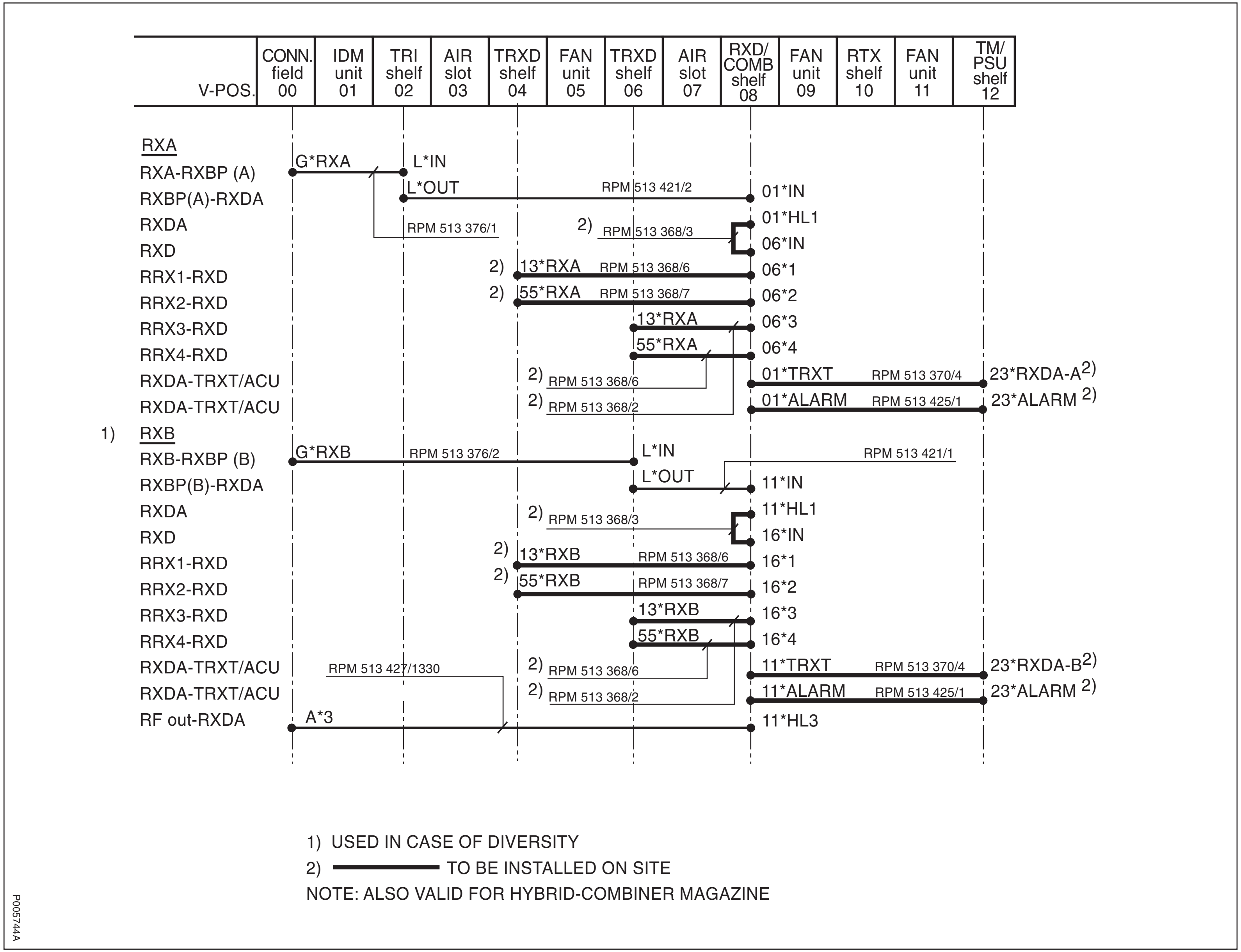


Figure 8 RX cabling diagram (general)

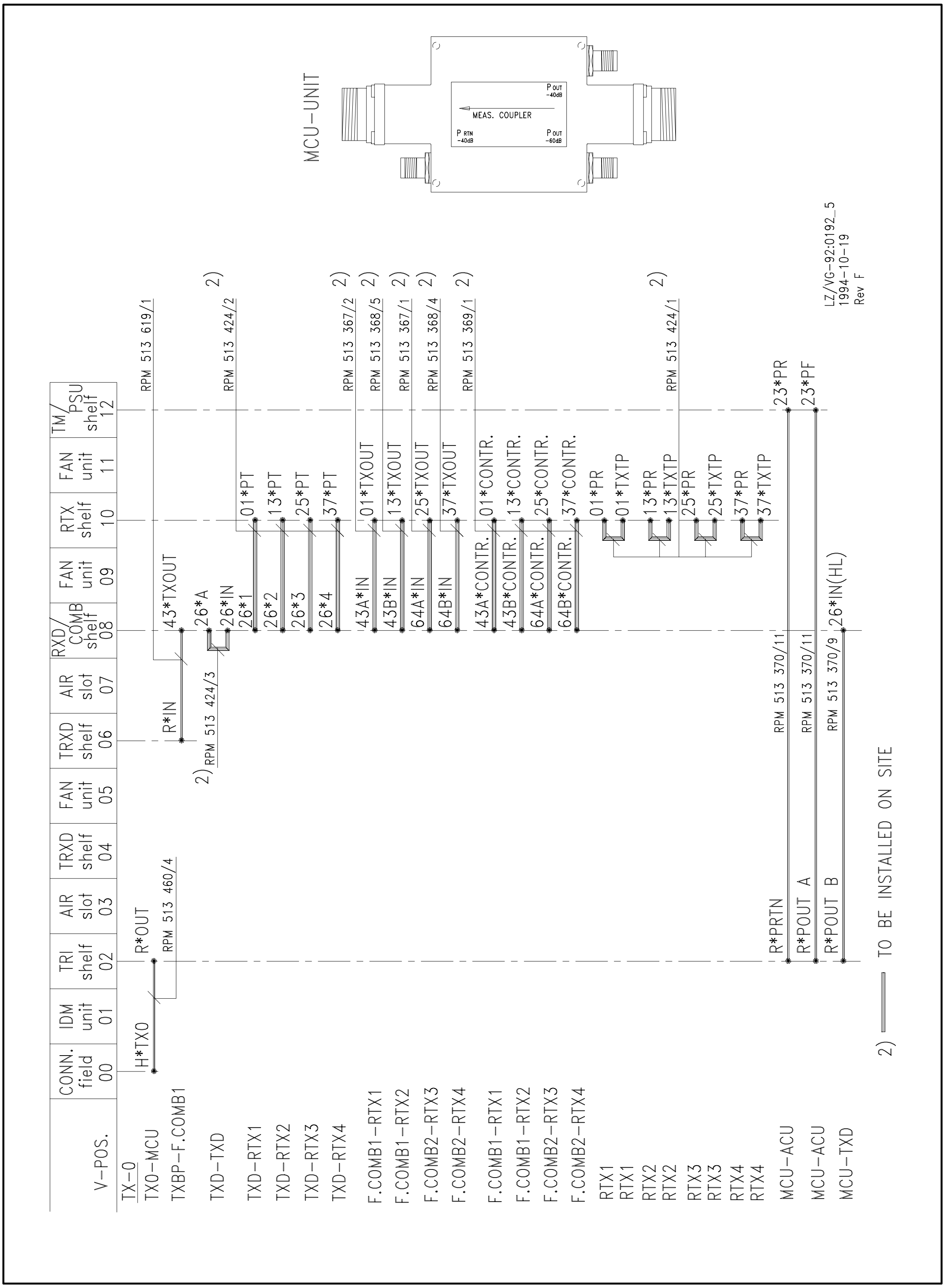


Figure 9 TX cabling diagram (F-combiner)

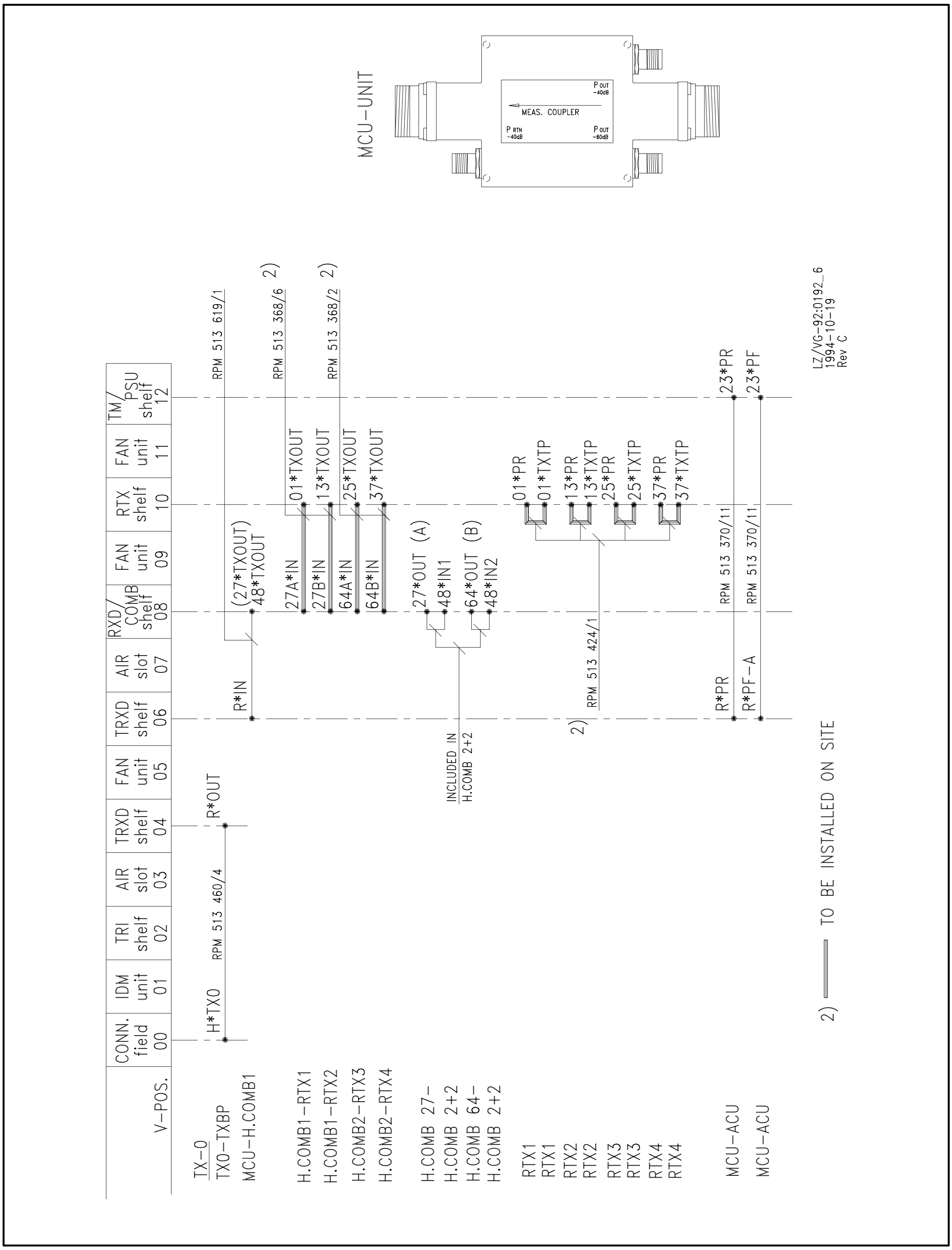


Figure 10 TX cabling diagram (H-combiner)

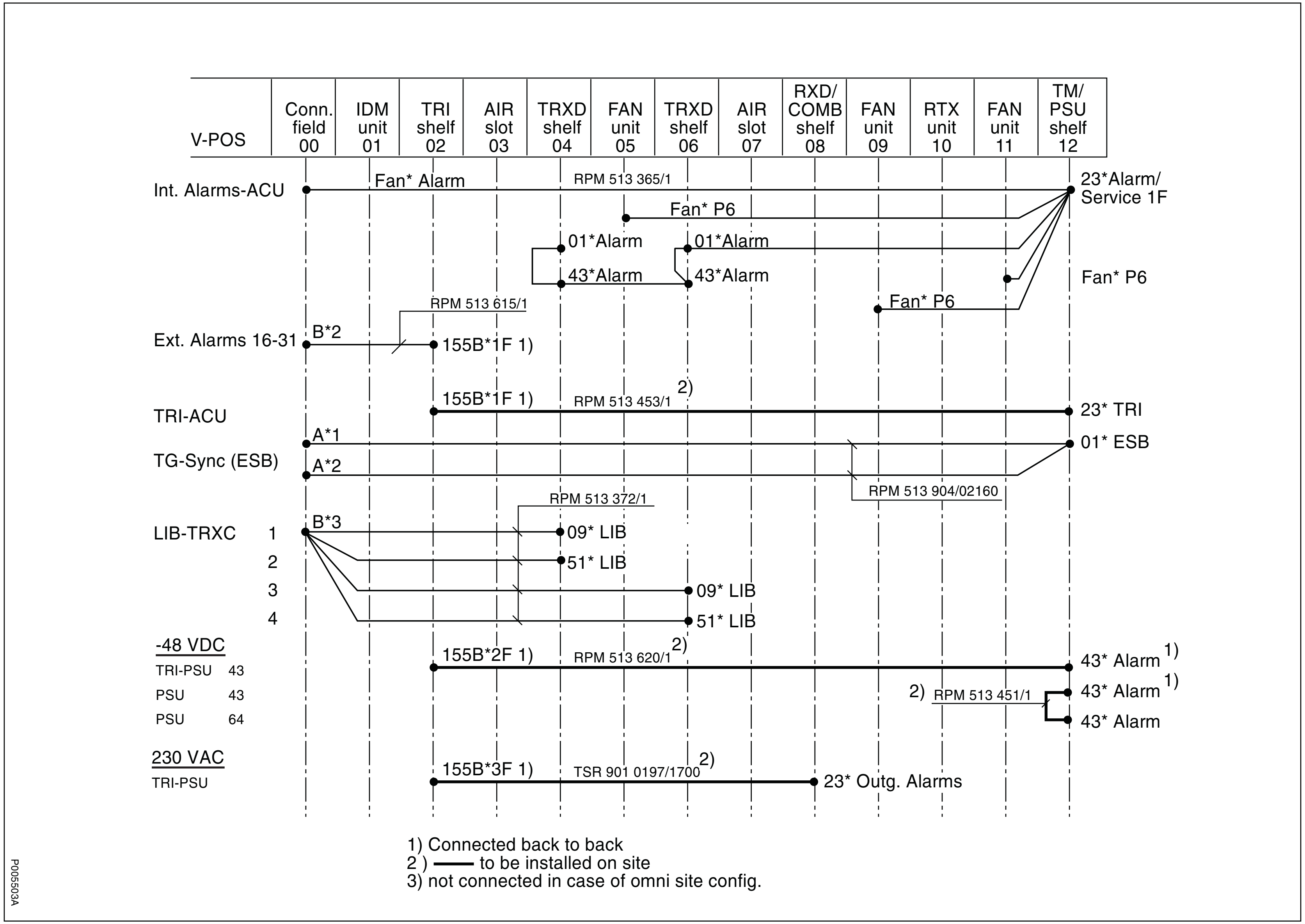


Figure 11 LIB and alarm cabling

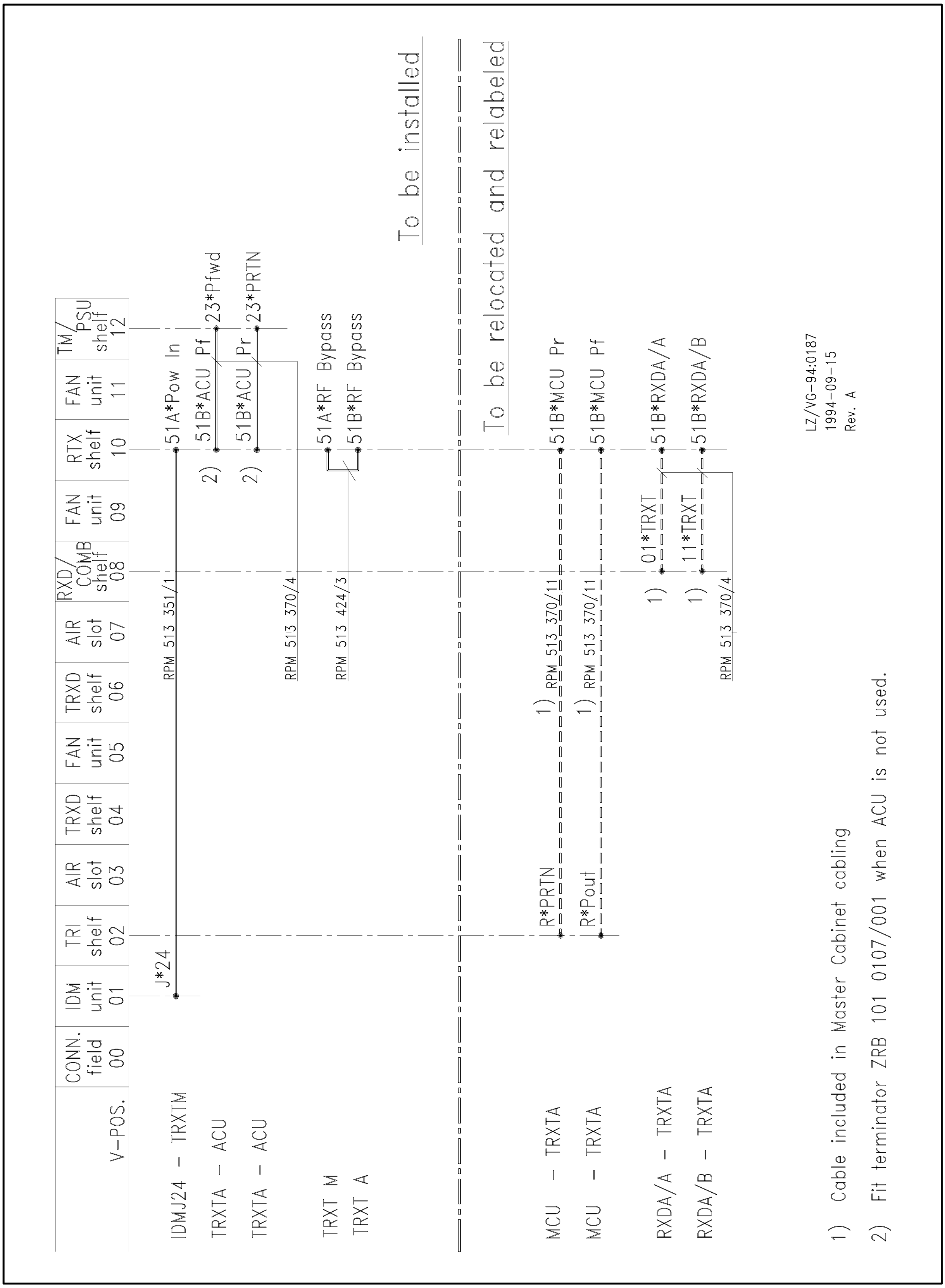


Figure 12 TRXT, internal cabling

5.2 Extension cabinet

5.2.1 Cables included in the manufacturing specification

Table 12 Cables sorted to product number, Figures 13 to 19.

Product Number	Item	Figure	Vertical pos.	Installed		Label
				in prod.	on site	
RNV 403 215/1	Plug	15		x		1)
RNV 403 215/2	Plug	15		x		1)
RNV 991 2005/1	Plug	15		x		1)
RPM 98 201/1500	Connection cable	19			x	
RPM 513 351/1	Power cable	13	R	x		
RPM 513 352/1	Connection cable	15	L	x		1)
RPM 513 352/2	Connection cable	15	L	x		1)
RPM 513 353/1	Connection cable	19			x	
RPM 513 354/1	Connection cable	19			x	
RPM 513 355/2	Connection cable	19			x	
RPM 513 355/3	Connection cable	19			x	
RPM 513 355/5	Connection cable	19			x	
RPM 513 365/1	Connection cable	16		x		
RPM 513 367/1	Coaxial cable	18	R		x	
RPM 513 367/2	Coaxial cable	18	R		x	
RPM 513 368/2	Coaxial cable	17	R		x	
RPM 513 368/2	Coaxial cable	19			x	
RPM 513 368/4	Coaxial cable	18	R		x	
RPM 513 368/5	Coaxial cable	18	R		x	
RPM 513 368/6	Coaxial cable	17	R		x	

Product Number	Item	Figure	Vertical pos.	Installed in prod.	Installed on site	Label
RPM 513 368/7	Coaxial cable	17	R		x	
RPM 513 368/9	Coaxial cable	19			x	
RPM 513 368/10	Coaxial cable	19			x	
RPM 513 369/1	Connection cable	18	R		x	
RPM 513 372/1	Connection cable	16		x		
RPM 513 389/1	Power cable	13	R	x		
RPM 513 390/1	Connection cable	15		x		
RPM 513 391/1	Connection cable	15		x		
RPM 513 392/1	Connection cable	15		x		
RPM 513 393/1	Connection cable	15		x		1)
RPM 513 394/1	Connection cable	15		x		
RPM 513 395/1	Connection cable	15		x		
RPM 513 409/1	Power cable	13			x	
RPM 513 424/1	Coaxial cable	18		x		1)
RPM 513 424/2	Coaxial cable	18			x	
RPM 513 424/3	Coaxial cable	18			x	
RPM 513 424/4	Coaxial cable	19			x	
RPM 513 424/5	Coaxial cable	19			x	
RPM 513 424/6	Coaxial cable	19			x	
RPM 513 429/1	Coaxial cable	19			x	
RPM 513 432/1	Power cable	13	R	x		
RPM 513 434/2	Power cable	14	L	x		1)
RPM 513 435/2	Power cable	14	L	x		1)
RPM 513 451/1	Connection cable	16			x	2)

Product Number	Item	Figure	Vertical pos.	Installed in prod.	Installed on site	Label
RPM 513 451/2	Connection cable	19			x	
RPM 513 454/1	Power cable	14	L	x		1)
RPM 513 455/1	Power cable	14	R	x		1)
RPM 513 615/1	Connection cable	16		x		2)
TRE 211 048/1	Power cable	14	L	x		2)
TRE 211 048/2	Power cable	14	L	x		2)
TRE 211 049	Power cable	14	R	x		2)

Note Cables shall be labelled at both ends.

Exceptions in the table:

1) not labelled

2) labelled in one end of the cable only (shelf-side)

5.2.2 Internal cabling diagrams

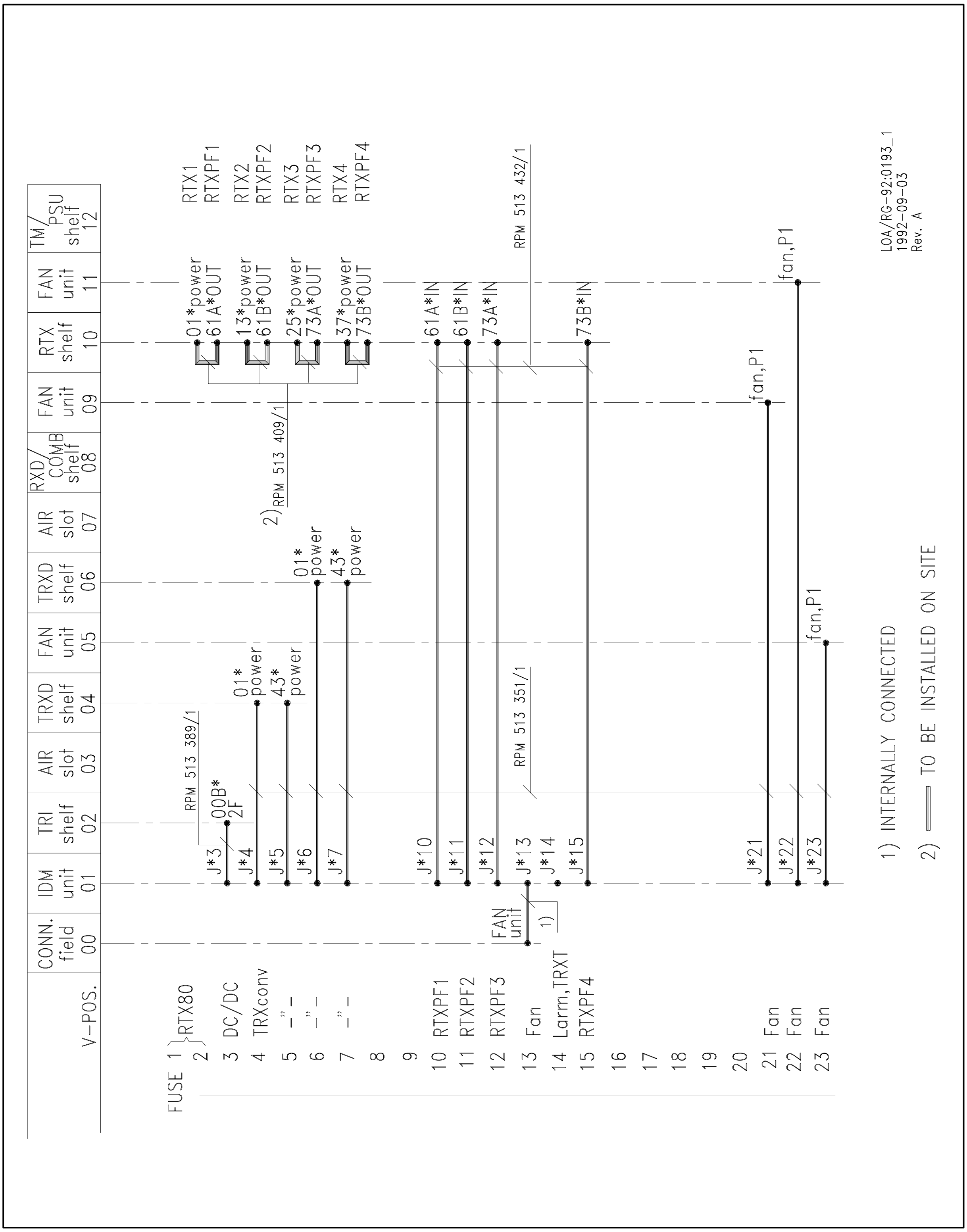


Figure 13 +24V DC distribution cabling diagram (general)

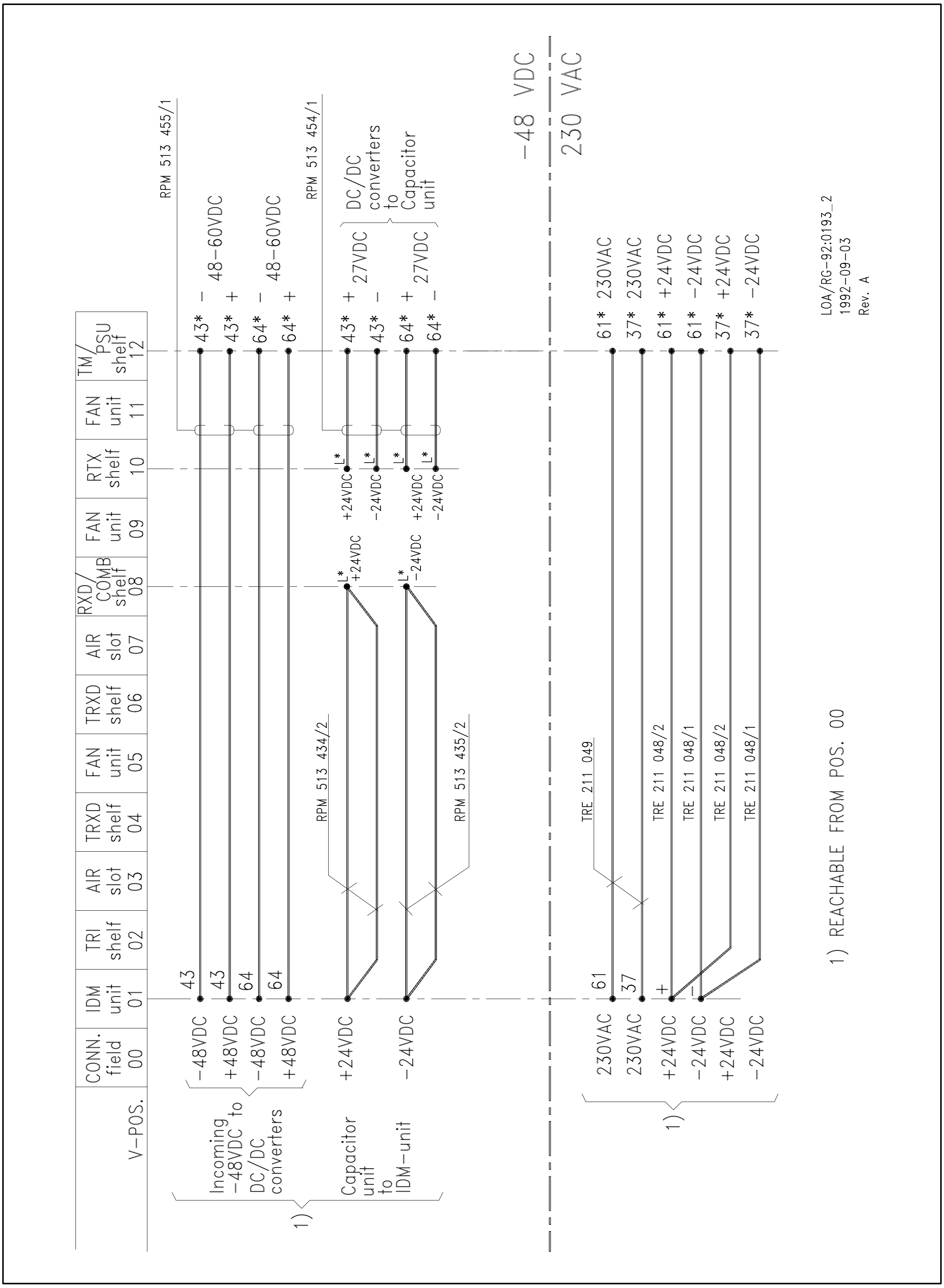


Figure 14 Power supply cabling (230V AC, -48V DC)

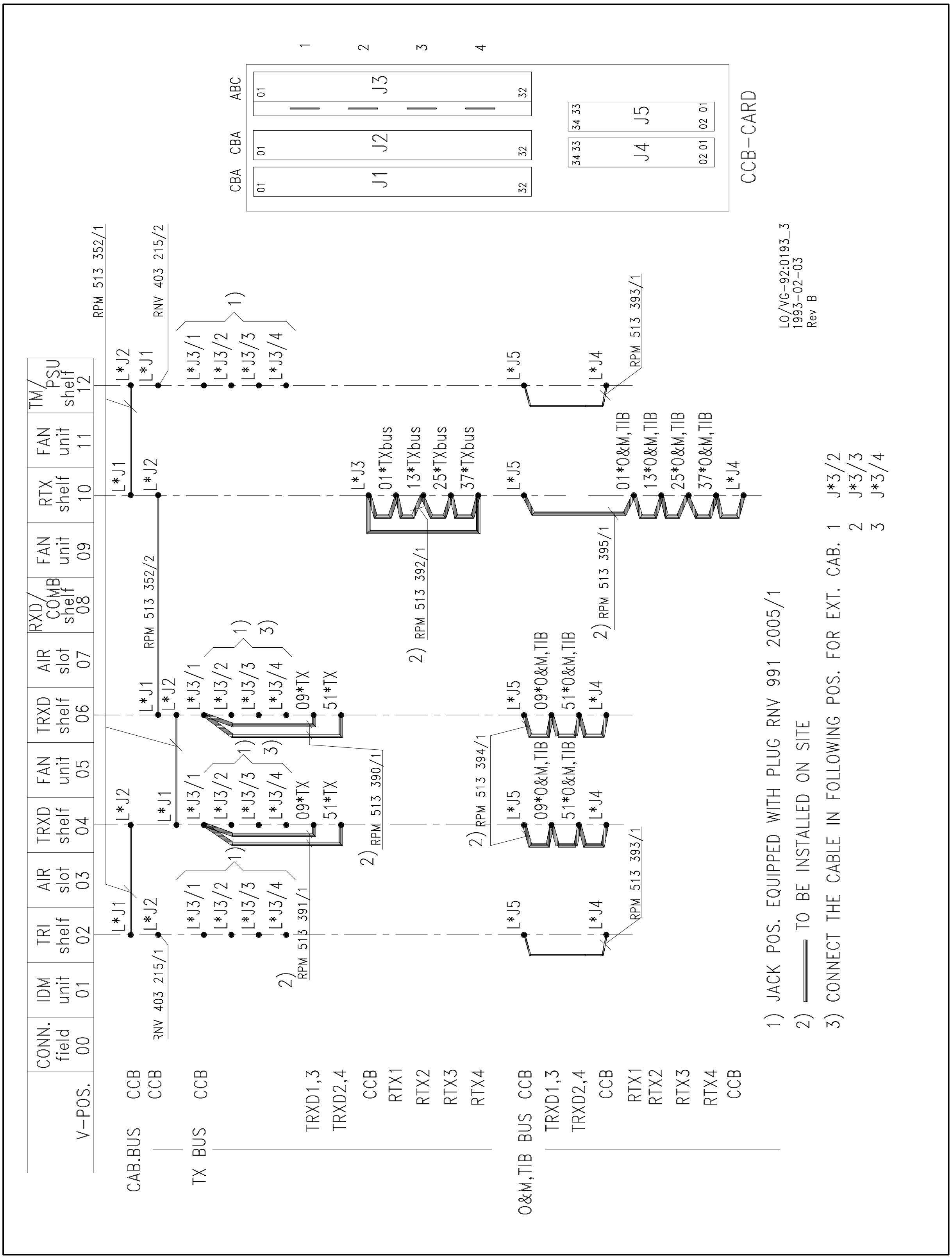


Figure 15 Bus cabling diagram (general)

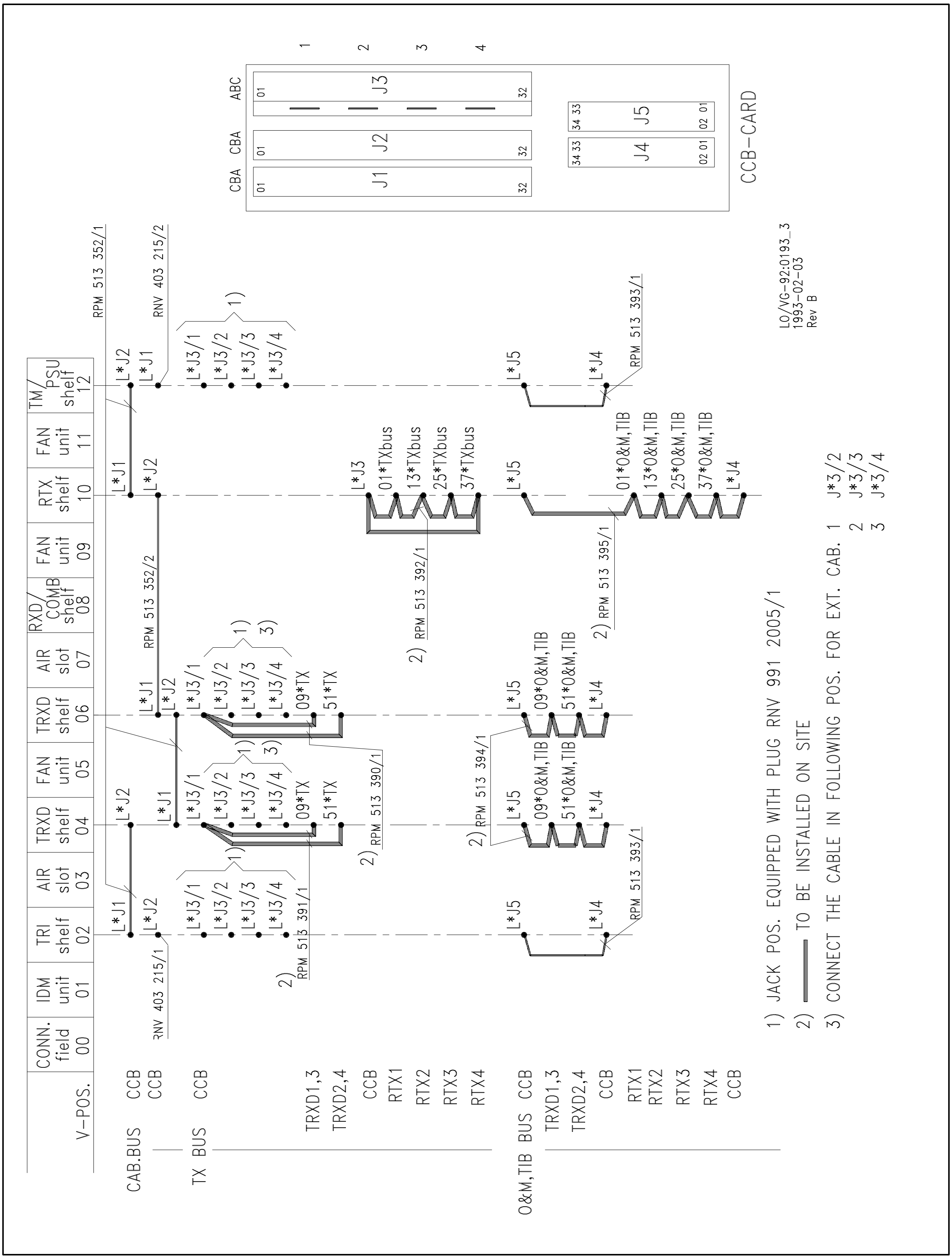


Figure 16 LIB and alarm cabling

Nr — *No.*		
4/1551-COH 109 2015/11 Uen		
Datum — *Date*	Rev	File
1999-10-22	B	

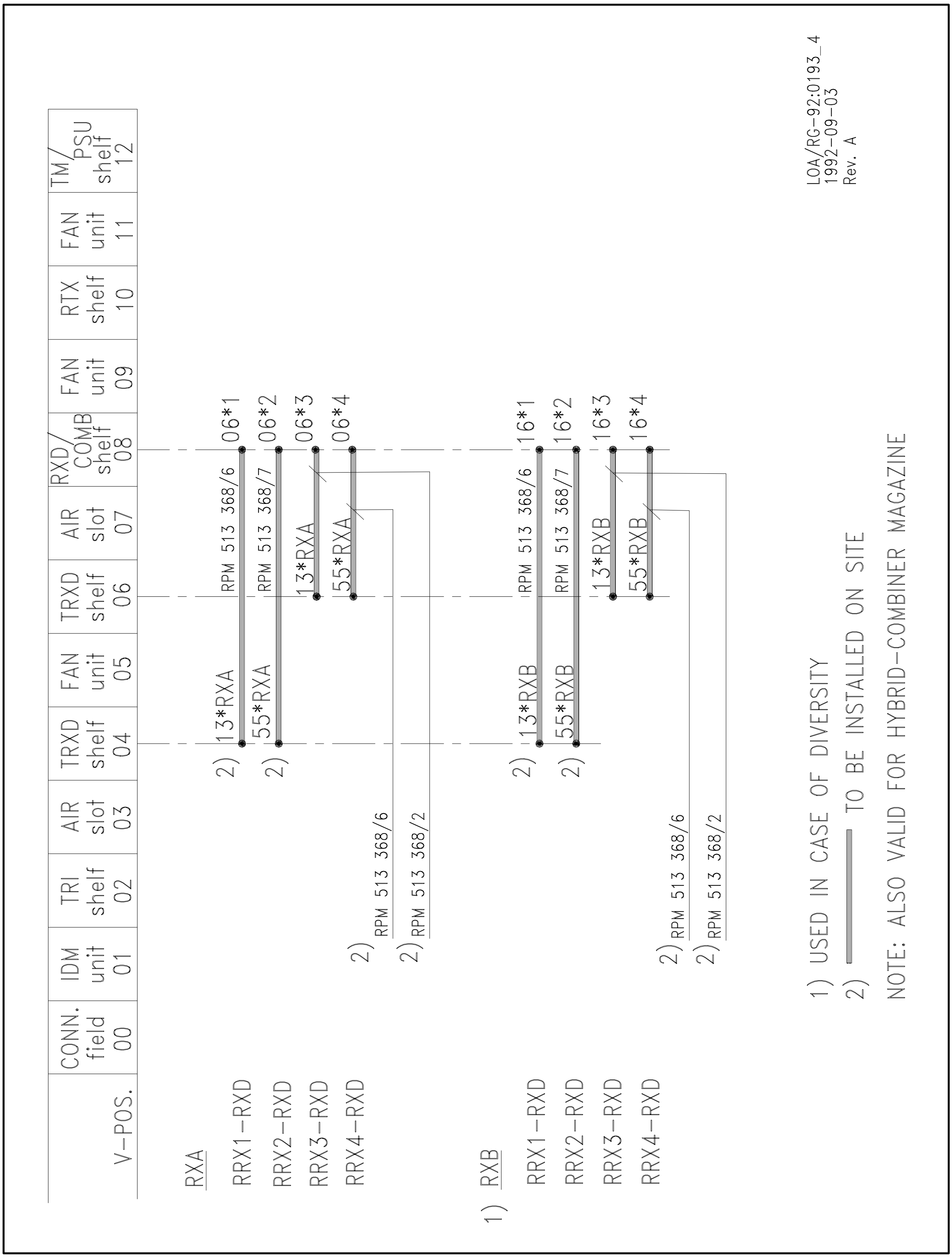


Figure 17 RX cabling diagram

Nr — *No.*		
4/1551-COH 109 2015/11 Uen		
Datum — *Date*	Rev	File
1999-10-22	B	

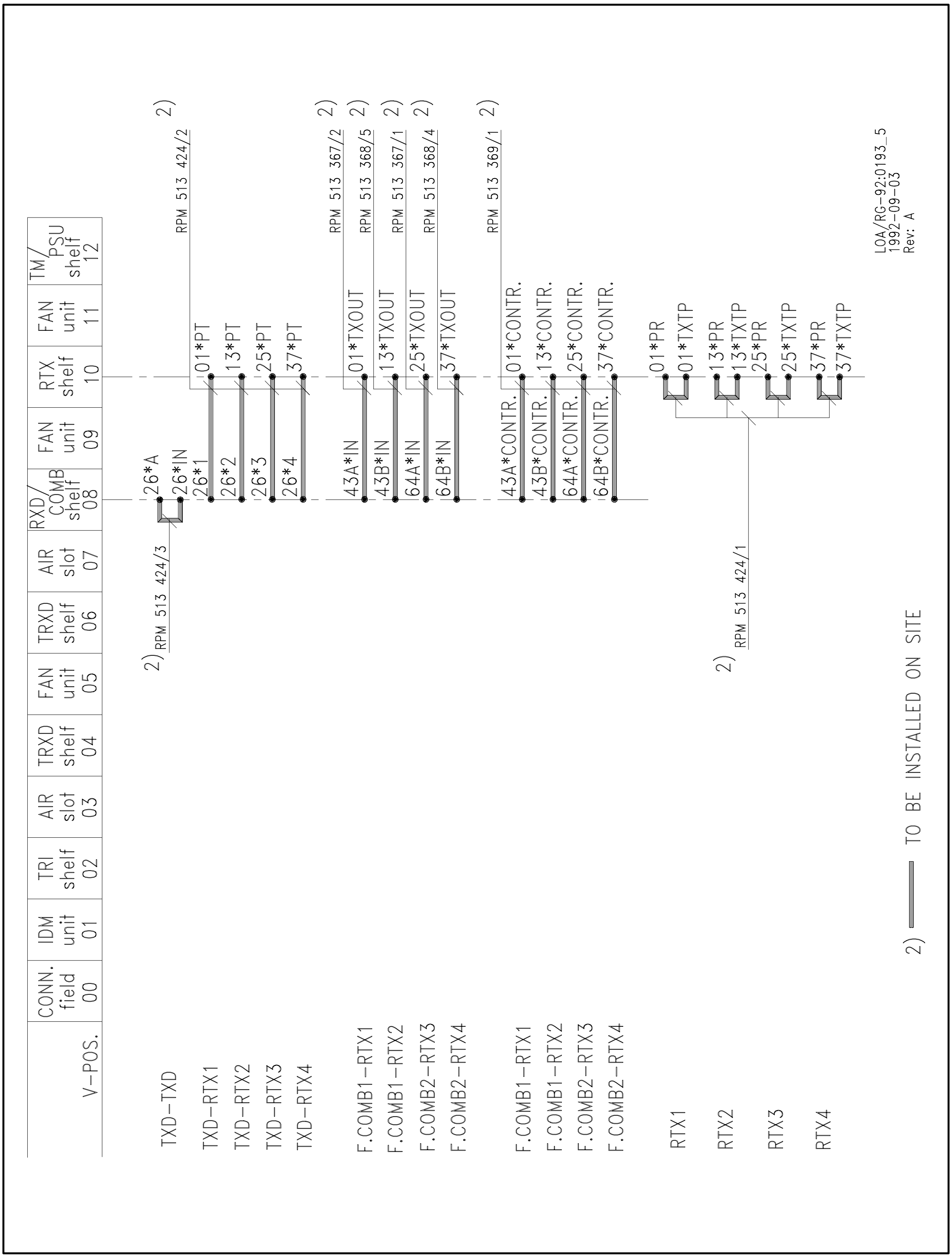


Figure 18 TX cabling diagram, F-comb

ERICSSON

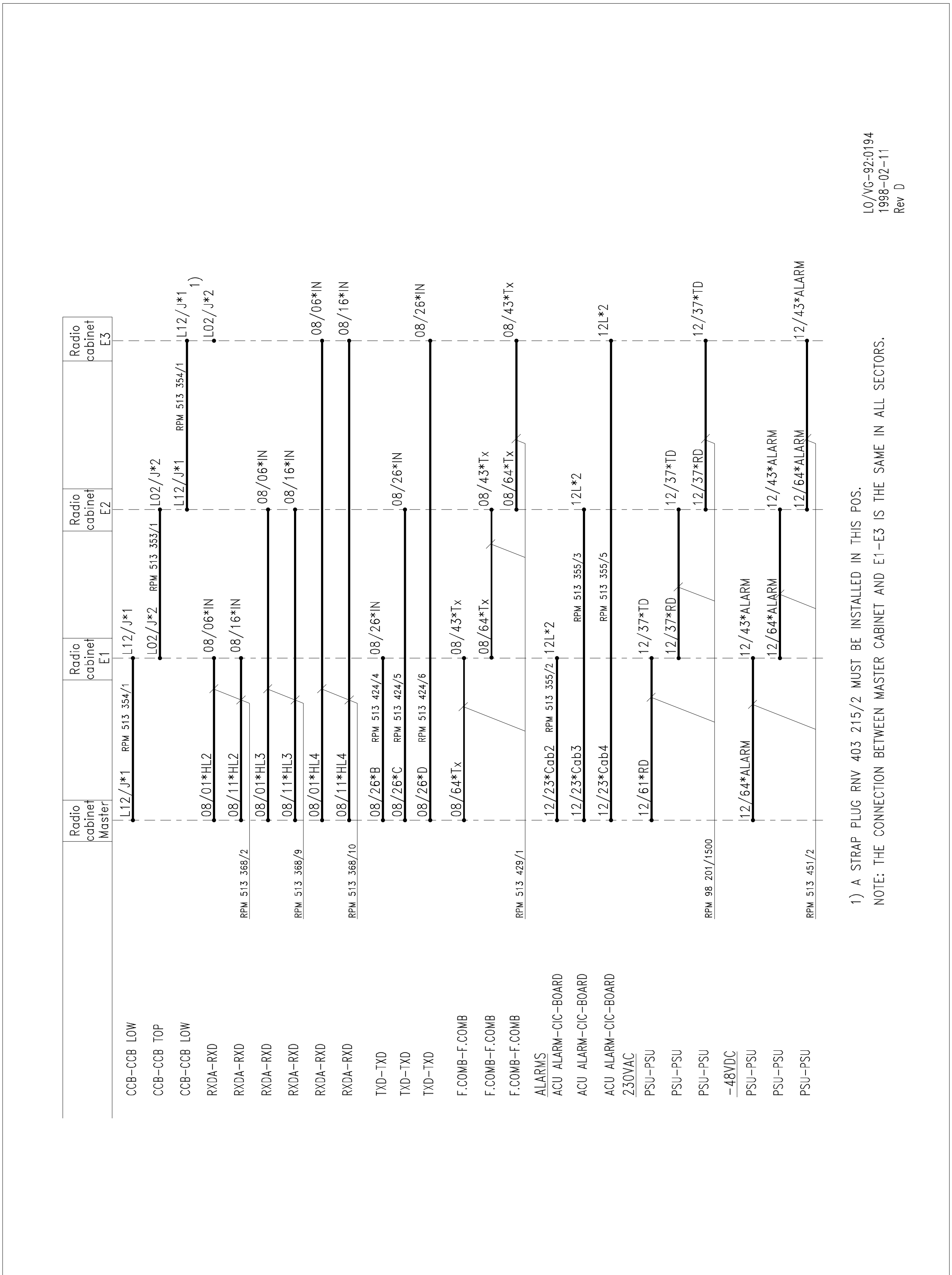


Figure 19 Connection of Master to Extension Cabinets 1, 2 & 3

5.3 5.3 Master to Extension cabinet

Cables and mechanical parts needed to connect a Master cabinet to an Extension cabinet are included in three separate kits:

Table 13

Cabinet (Right-hand mounting)	Kit Product number
Master - Extension 1	NTM 201 864/01
Extension 1 - Extension 2	NTM 201 865/01
Extension 2 - Extension 3	NTM 201 866/01
Master - Extension 1	NTM 201 871/01

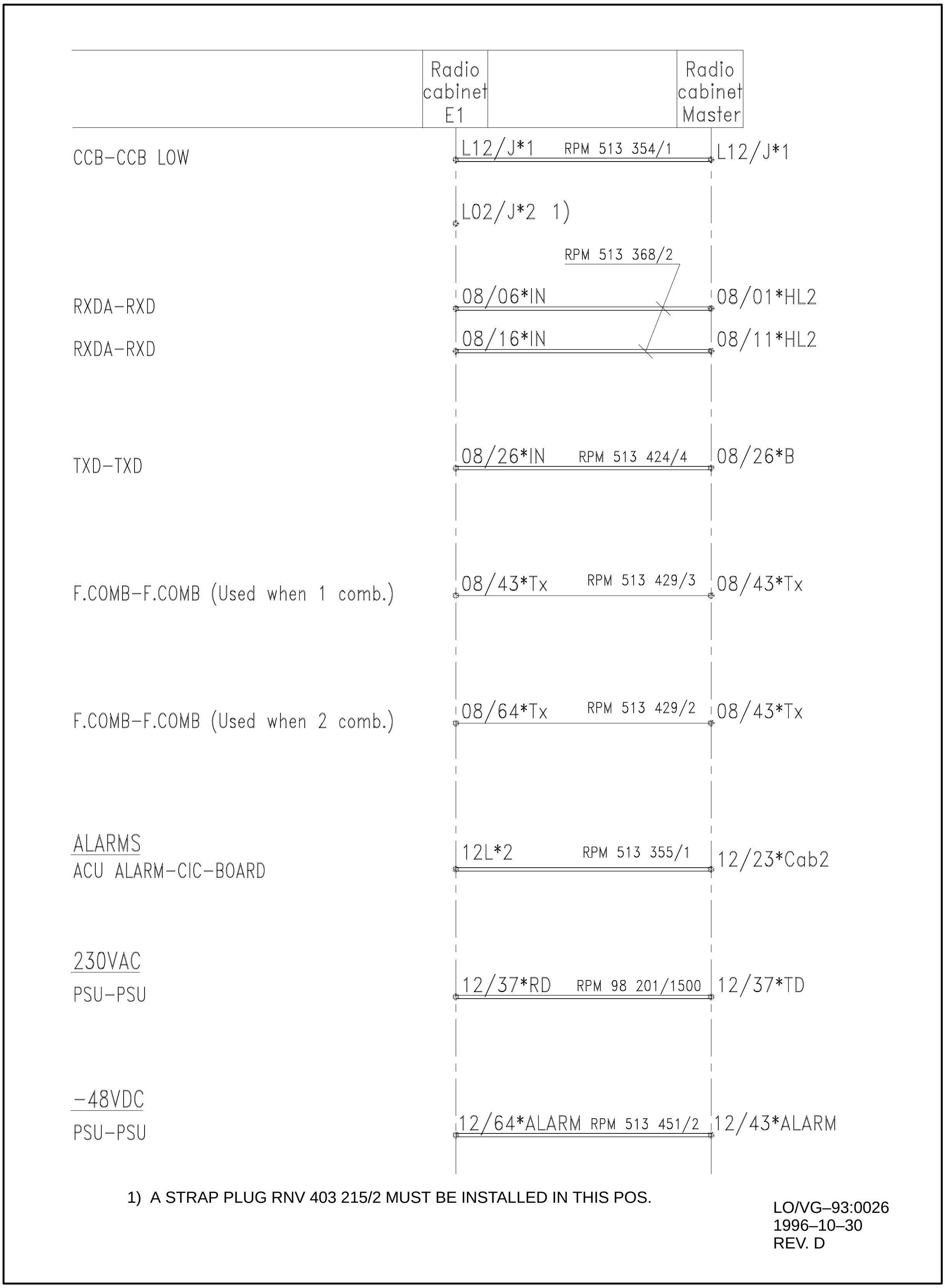


Figure 20 Connection of Master to Extension Cabinet 1

6 External cabling, cables and diagrams

6.1 External cables

The number of cables to be used is according to the site specification.

Table 14

Type of cable	Product number
LIB Bus	RPM 513 336/500
LIB Bus	RPM 513 336/6500
External alarms	RPM 513 338
PCM Transmission 75 Ω	RPM 513 339
PCM Transmission 120 Ω	RPM 513 349 alt. RPM 513 698/15000
Power system (230V AC)	
BIM-DISTR	TFK 100 510/08
PSU-BIM	BMY 105 045/1
PSU-PSU	RPM 98 201/1500
PSU-PSU	RPM 98 201/500
PSU-PSU	RPM 98 201/10000
Alarm-EFU	TSR 202 0111/15000 [1)]
EFU-DF	TSR 211 0203/15000 [1)]
Alarm-RTP	TFK 250 201/08 [2)]
RTP-DF	TSR 211 0203/1500 [2)]

[1)] when EFU is used

[2)] when RTP is used

6.2 Signal and bus cabling

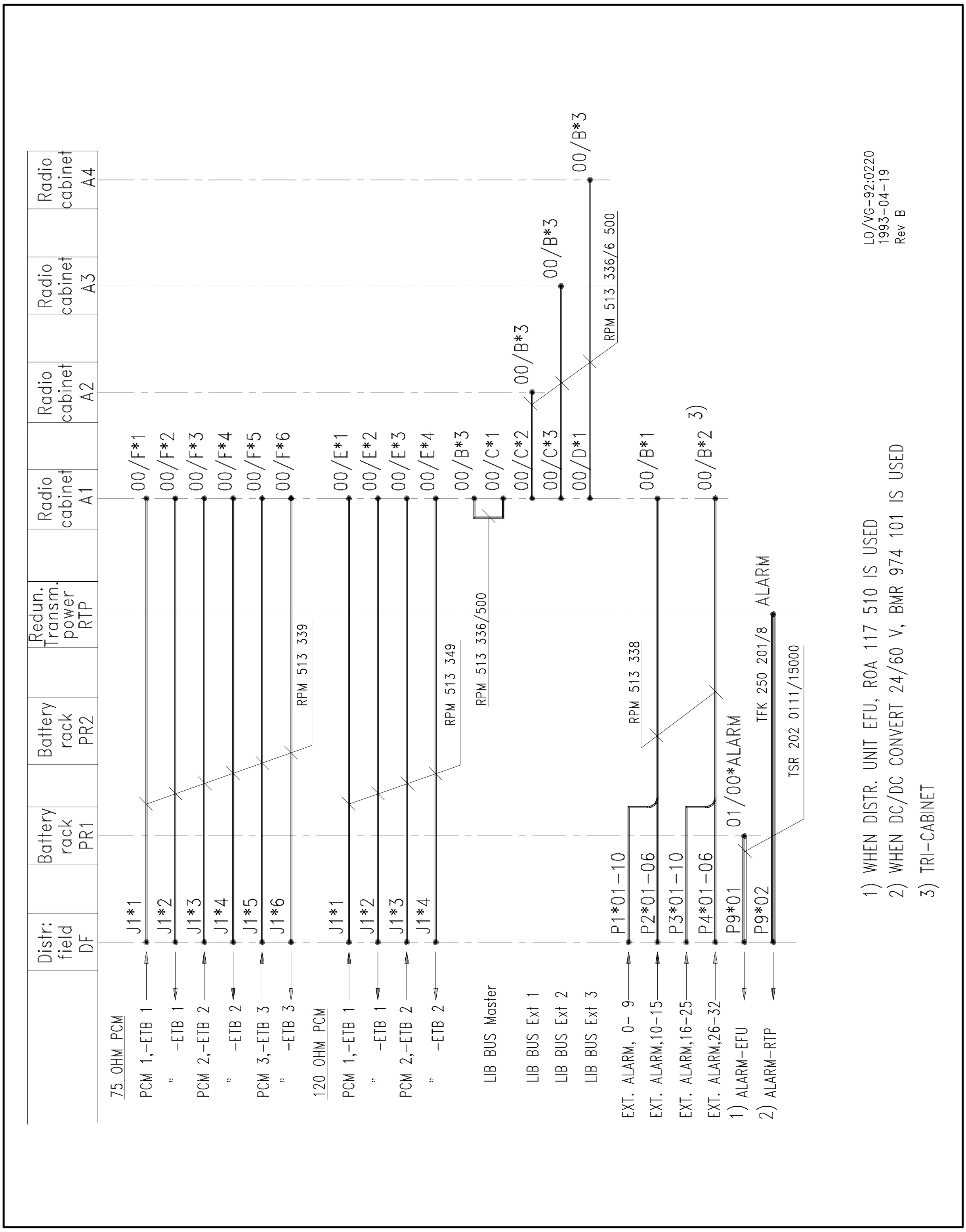
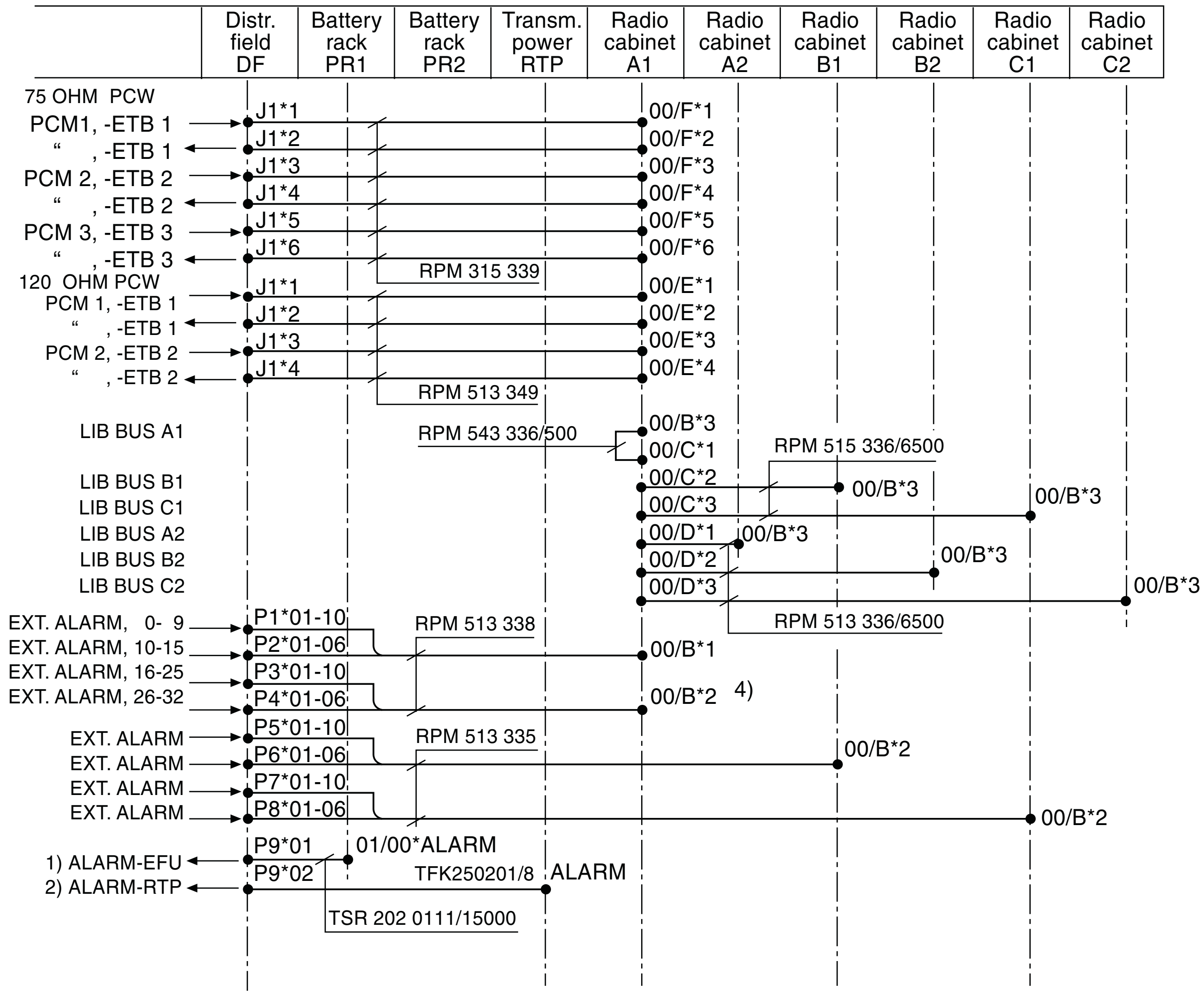


Figure 21 Signal cabling, 1 cell configuration



1) WHEN DISTR.UNIT EFU, ROA 117510 IS USED
2) WHEN DC/DC CONVERT 24/60 V, BMR 974 101 IS USED
3) TM BUS TERMINAT PLUG RPT 403 801/01
4) TRI-CABINET

P005898A

Figure 22 Signal cabling, 3 cell configuration

6.3 Power supply cabling

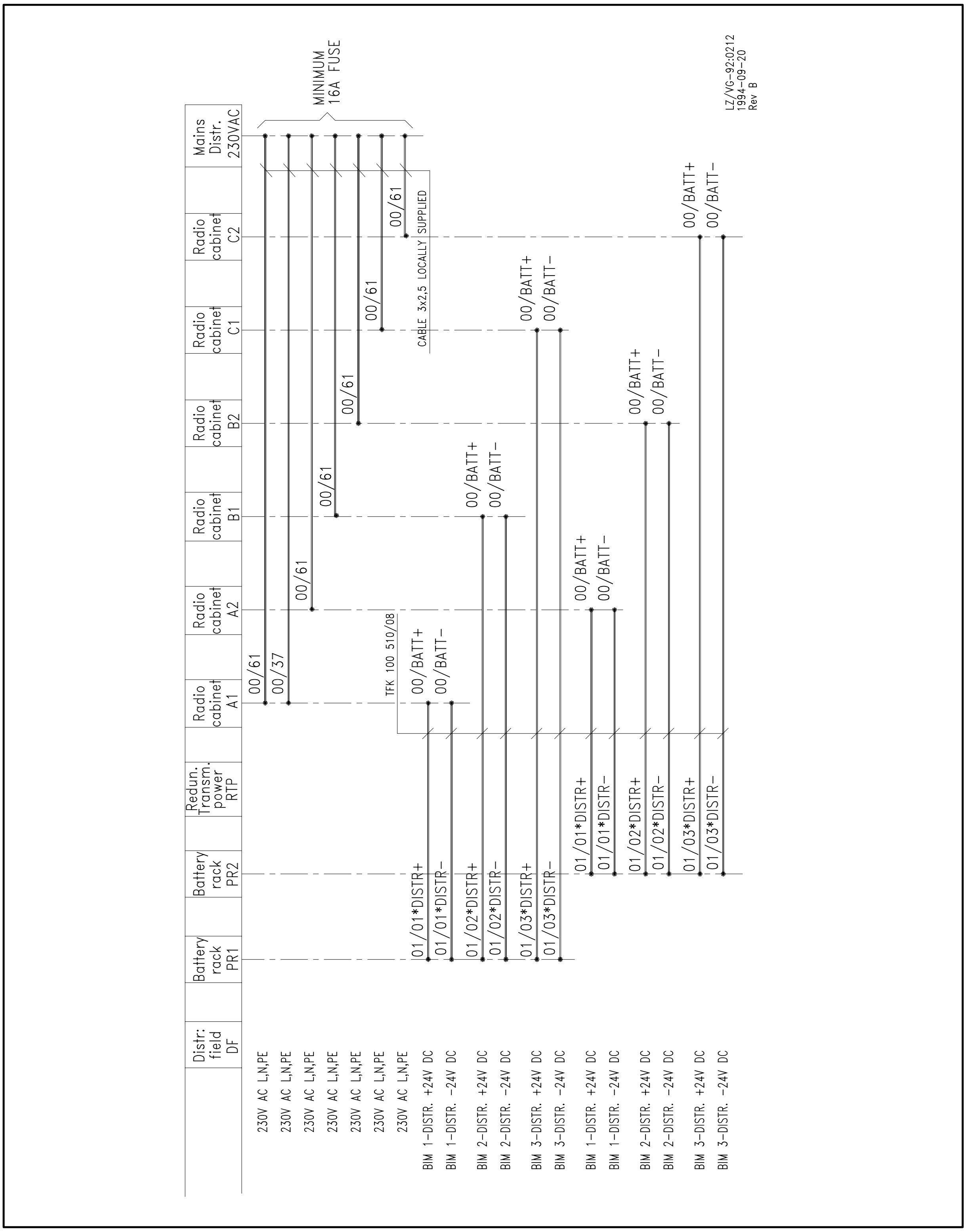


Figure 23 External Power supply 230V AC

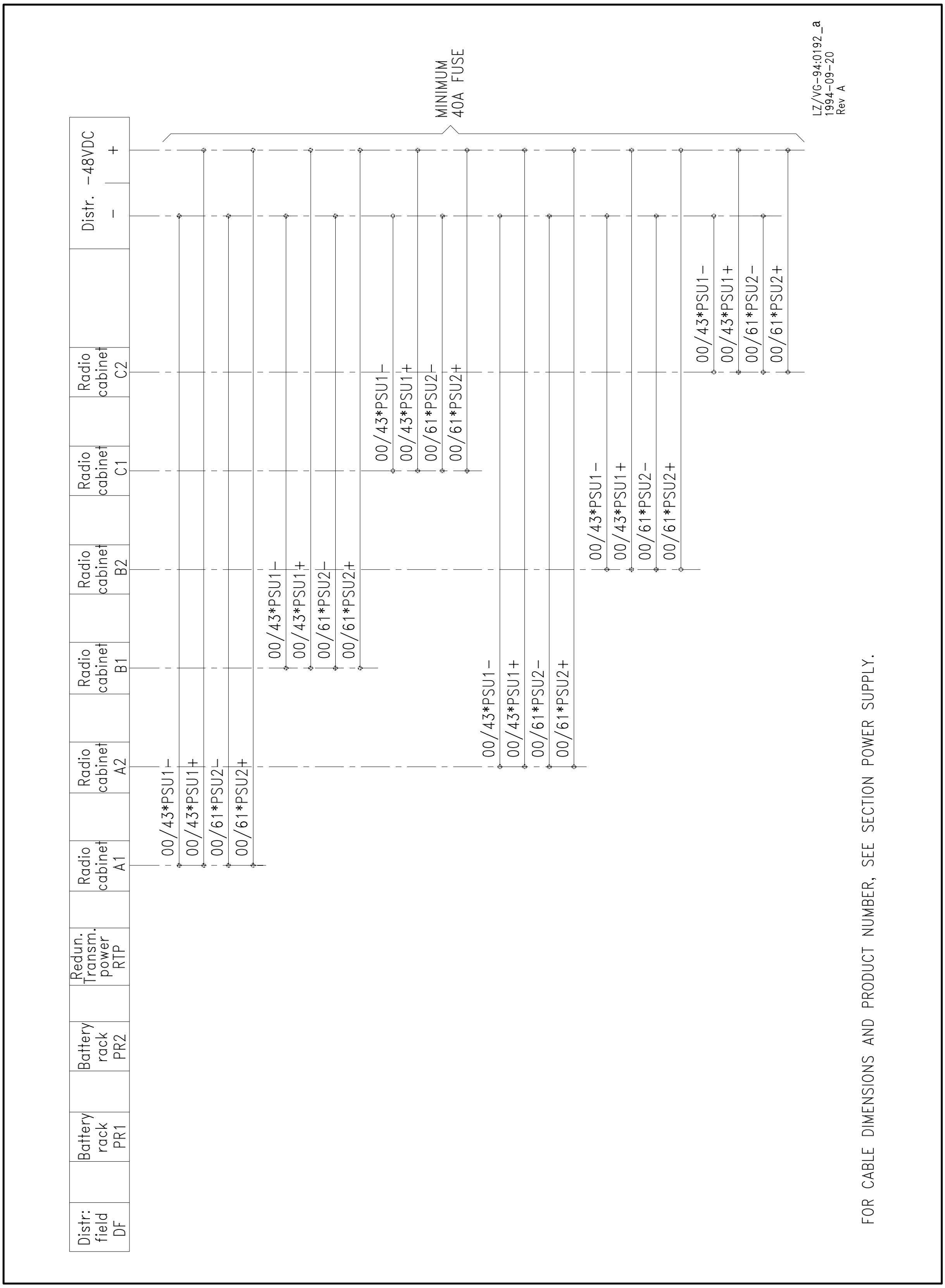


Figure 24 External Power supply -48V DC

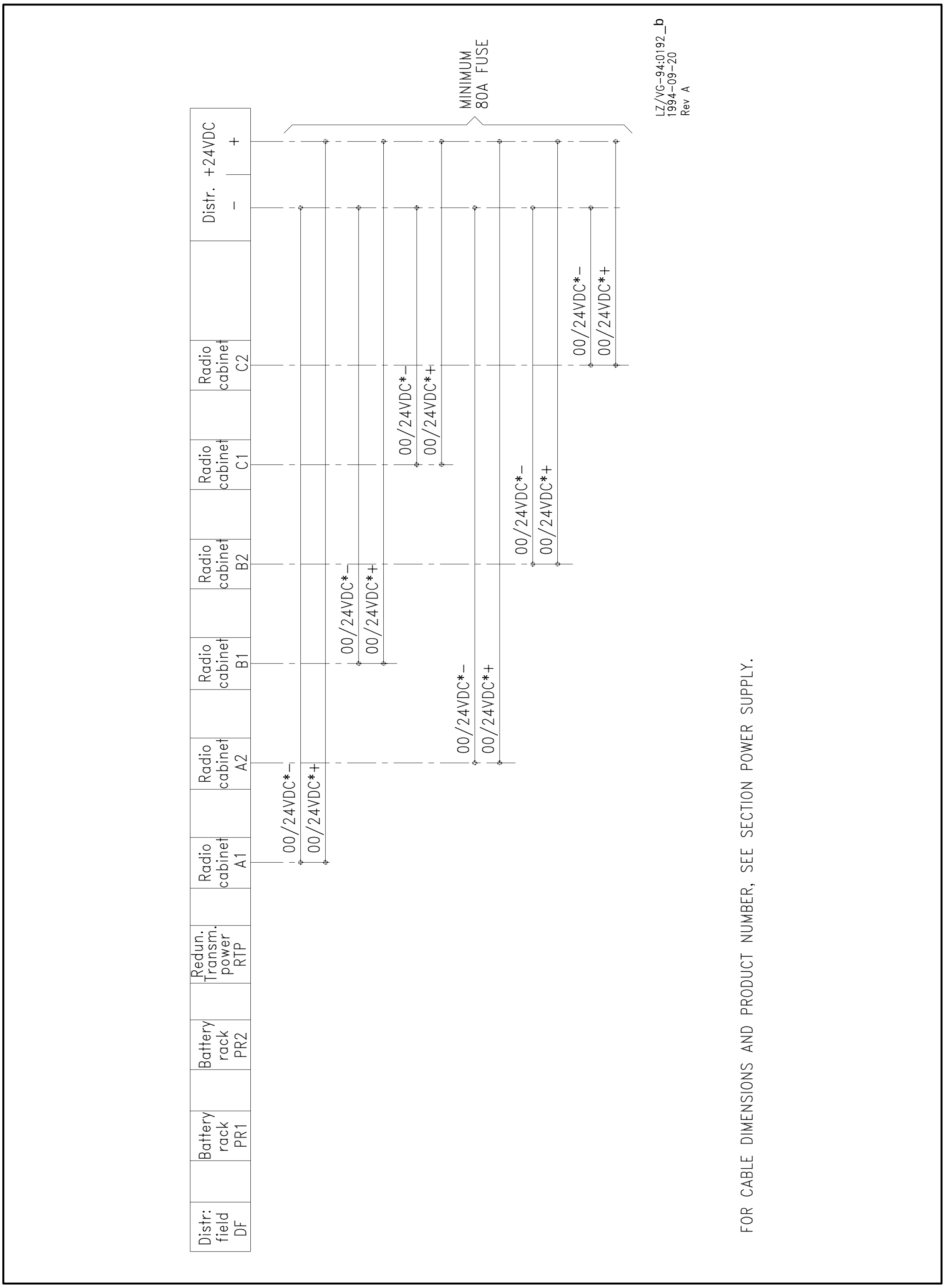


Figure 25 External Power supply +24V DC

Uppgjord — *Prepared*	Faktaansvarig — *Subject responsible*	Nr — *No.*		
ERA/LZ/TG PIAH		5/1551-COH 109 2015/11 Uen		
Dokansv/Godk — *Doc respons/Approved*	Kontr — *Checked*	Datum — *Date*	Rev	File
ERA/LZ/TGC (ERABVN)		1998-02-03	A	

Alarm Handling

Contents **Page**

1 Introduction

Two types of alarms are defined: Internal and External alarms.

Internal alarms come from the RBS equipment.

External alarms come from other optional equipment installed on site, e.g. fire alarms, high/low temperature, mains failure etc.

The internal alarms are collected and handled by the Alarm Collection Unit, ACU, while external alarms are connected via the DF directly to the EXALI board in the TRI, see figure 1.

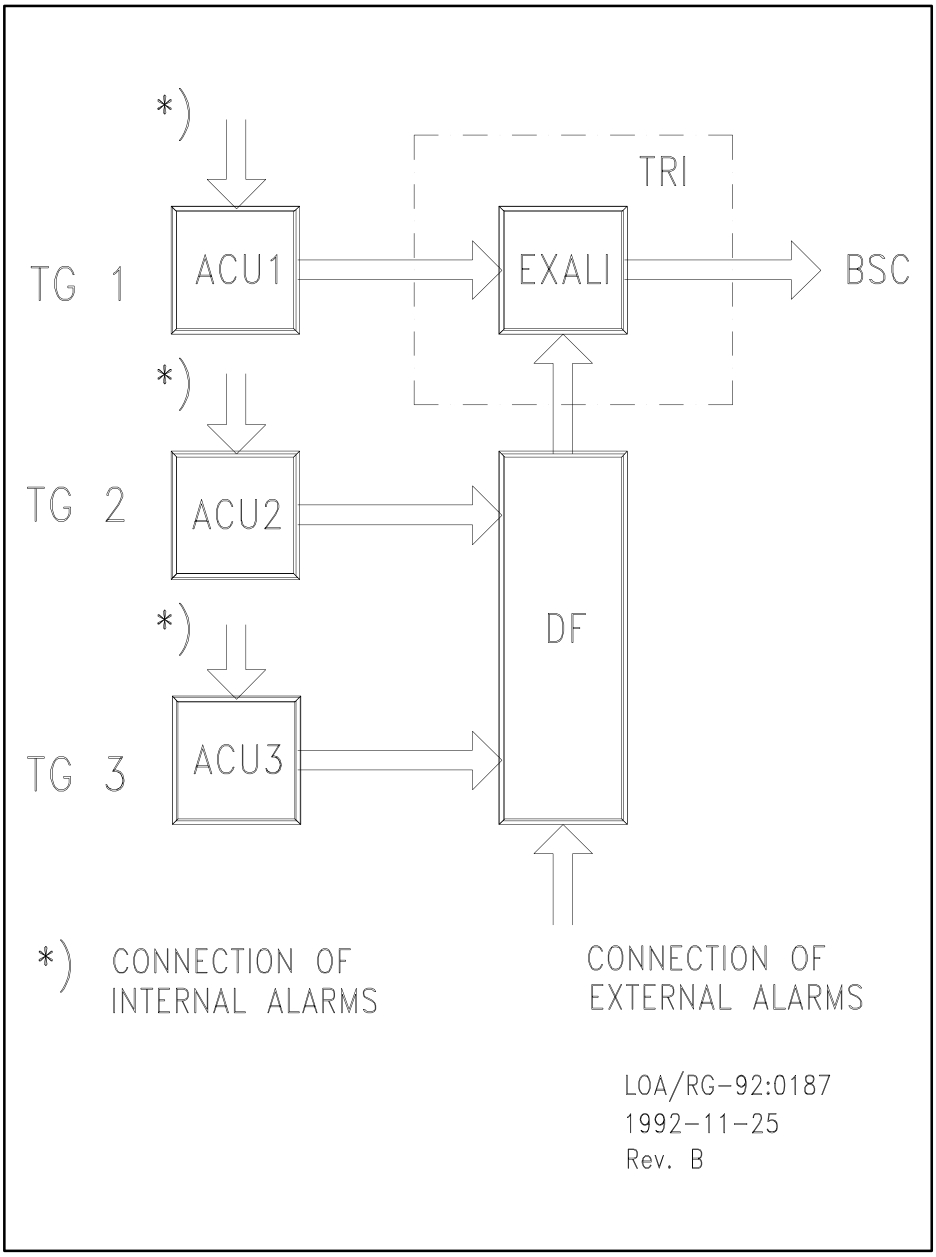


Figure 1 Principle drawing for connection of internal and external alarms

2 Alarm Collection Unit, ACU

ACU is located in the TM/PSU magazine at position 23, see Chapter 2, section1, RBS units. The first cabinet in each TG (A1, B1, C1) requires an ACU. If alarms are detected, they will be reported to the BSC via the EXALI board located in the TRI.

Three types of objects within a TG are monitored:

- Transmitter antenna
- Receiver Divider Amplifiers, RXDAs
- Fan Cassettes, 4 pcs.

Four alarm connections are needed to the TRI: one for the TX-antenna, one for the fan and another two for the RXDAs, depending on whether the alarm is classified as high or low severity, Class 1 or Class 2 Alarm.

In addition, alarm will be sent to the TRI, if ACU is faulty, or disconnected (power failure). Alarm status is displayed on the ACU itself. This alarm status can only be reset manually on site.

Alarms can be blocked/deblocked by manual operation. Blocking status is indicated on the ACU. The ACU is automatically deblocked after a restart or a timeout.

Faults will be localized down to actual Replacement Unit. Due to limitations in the number (32) of available External Alarm Inputs, the fault location will be indicated on site only.

2.1 Alarm Coding

Alarm inputs to EXALI, EA1, EA2, EA3, EA4 are driven by opto-couplers located on the ACU board. The alarm coding is as follows:

Table 1

EA1	EA2	EA3	EA4	Alarm Condition	Alarm Class
Closed	Closed	Closed	No alarm		
Open	Open	Open	Open	ACU fault/ Disconnected	
Open	-	-	-	VSWR	A1
-	Open	-	-	RXDA1	A1
-	-	Open	-	RXDA2	A2
-	-	-	Open	Fan	A2

2.2 Supervision of the TX Antenna

ACU measures the difference between total forward and reflected signals to/from the TX antenna via MCU and uses them to calculate VSWR. VSWR alarm threshold is set via an on-site configuration procedure.

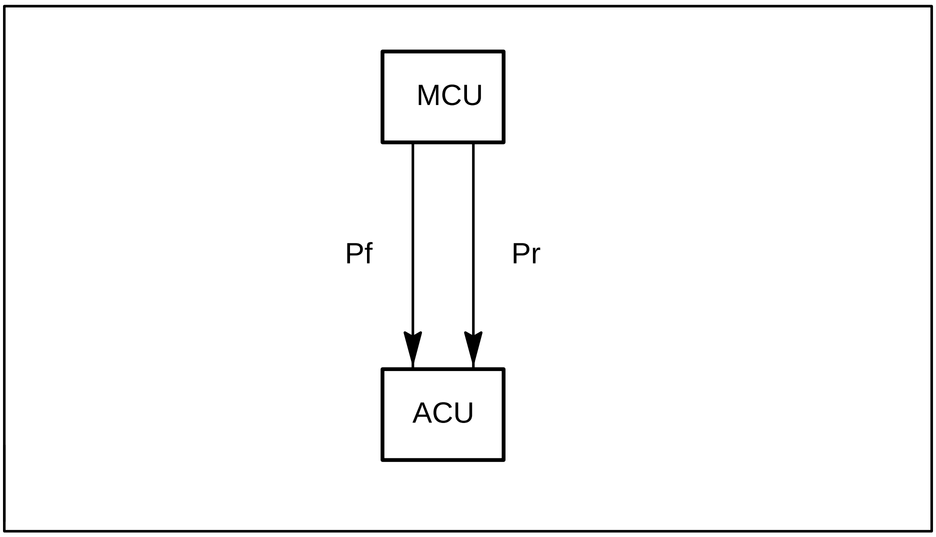


Figure 2 Transmitter antenna supervision

2.3 Supervision of the RXDAs

TG can be equipped with one or two RXDAs. Each RXDA has two amplifiers in parallel which are separately supervised.

2.3.1 One RXDA Connected

If one or both amplifiers fail, an Alarm (high severity) is sent to EXALI.

2.3.2 Two RXDAs Connected

If only one out of the four amplifiers fails, an Alarm (low severity) is sent to TRI.

If two or more of the four amplifiers fail, an Alarm (high severity) is sent to EXALI.

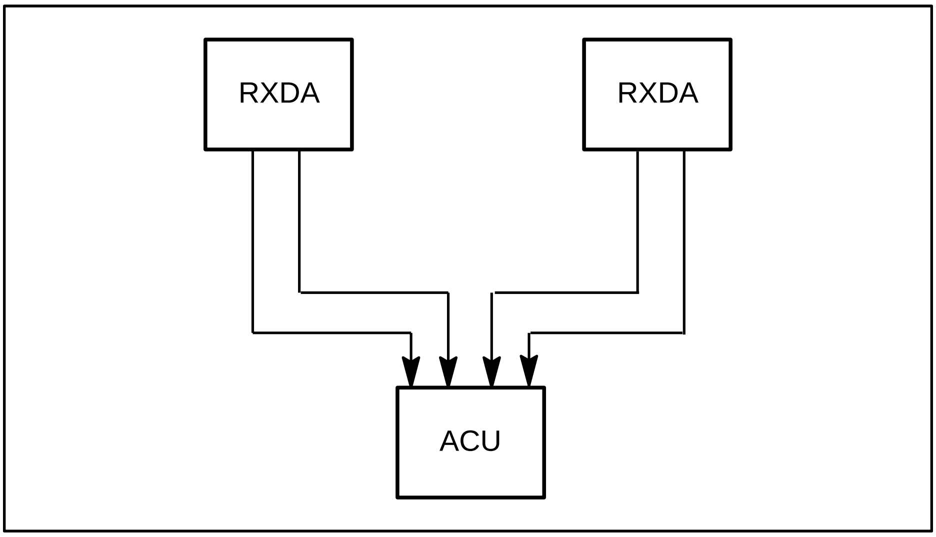


Figure 3 Supervision of RXDAs

2.4 Supervision of Fan Cassettes

Each cabinet has four Fan Cassettes. Alarm is issued by the ACU if an alarm signal is generated in any of the Fan cassettes.

2.5 ACU Self-Supervision

If a fault occurs in the ACU itself, the ACU will be reset. All alarm conditions from supervised objects are cleared after a reset, but the ACU alarm condition is maintained until the ACU has restarted successfully.

ACU restarts automatically after a reset, but if too many restarts have occurred the restart is inhibited.

2.6 Interfaces

TRI distributes alarms to the BSC from a maximum of three TGs. Each TG has four alarm connections to the EXALI board located in the TRI according to the following list:

1. VSWR Alarm
2. RXDA Alarm Class 1
3. RXDA Alarm Class 2
4. Fan Alarm

There is a total need of 12 alarm connections to the EXALI board. Up to 32 alarms can be connected to the EXALI board.

Fault in the ACU, or a disconnected ACU, is indicated as active alarms on all four connections.

2.6.1 A and B-Connectors, EXALI

There are two connectors, A and B, on the front handling 16 alarms each.

Connector A is connected by means of an internal cable RPM 513 364/1 to the cabinet connection field outlet B1.

Connector B is connected by means of cable RPM 513 615/1 to the cabinet connection field outlet B2.

Internal alarms from the Master cabinet itself, where the EXALI is located, must be possible to connect directly to Connector B. This is achieved by means of a fork connector RNV 324 0401 on cable RPM 513 615/1. The connector is of an open back type and the alarm cables from the ACU and the PSU/PCU are connected directly to the RNV 324 rear side.

Unfortunately, this means that alarm inputs already occupied on the B-connector are wired to the DF. To avoid connection to terminals already occupied, these terminals shall be marked. See the G-module, section 3.0.

The use of connector B depends on actual power configuration: 230V AC, +24V DC or -48V DC, as described in para. 3 Alarm cabling.

2.7 ACU Indicators Legend

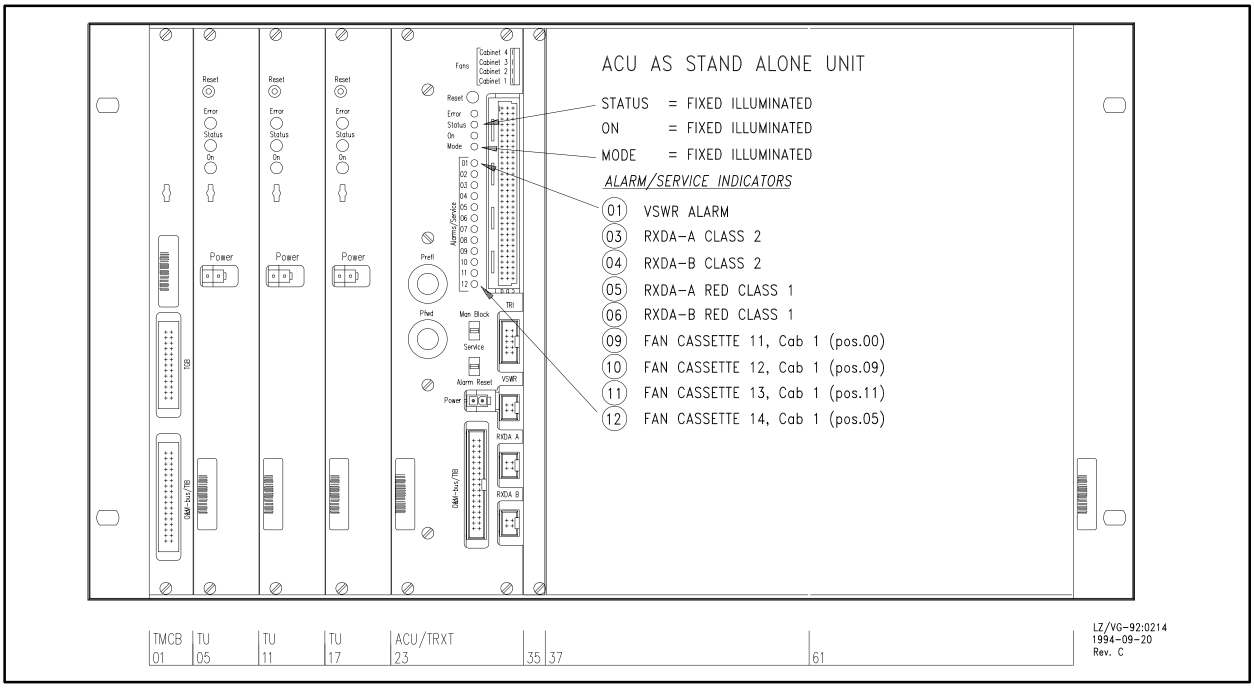


Figure 4 ACU indicators

3 Alarm Cabling

Number of alarm inputs available for external alarms, differs depending on selected power alternative and number of cells, in accordance with table 2.

Table 2

Power Supply	Number of External Alarms Available		
	1 cell site	2 cell site	3 cell site
230 V AC	23	19	15
+24 V DC	28	24	20
-48 V DC	26	20	14

3.1 +24 V DC Power Supply, Recommended Alarm Connections

Table 3 External alarms

EXALI Input	Description		Distribution Frame Cross-Connection To	From
0	Used as required by customer		P1/01a,b	
1			P1/02a,b	
2			P1/03a,b	
3			P1/04a,b	
4			P1/05a,b	
5			P1/06a,b	
6			P1/07a,b	
7			P1/08a,b	
8	Cell C ACU 3 *1)*		P1/09a,b	P7/01ab
9			P1/00ab	P7/02ab
10			P2/01ab	P7/03ab *1)*
11			P2/02ab	P7/04ab
12	Cell B ACU 2 *1)*		P2/03ab	P5/01ab
13			P2/04ab	P5/02ab
14			P2/05ab	P5/03ab
15			P2/06ab	P5/04ab
16	1: VSWR		P3/01ab	

17	2: RXDA (1)	Cell A	P3/02ab	
18	3: RXDA (2)	ACU 1	P3/03ab	
19	4: FAN ALARM		P3/04ab	
20			P3/05ab	
21			P3/06ab	
22			P3/07ab	
23			P3/08ab	
24			P3/09ab	
25			P3/00ab	
26	Used as required		P4/01ab	
27	by customer		P4/02ab	
28			P4/03ab	
29			P4/04ab	
30			P4/05ab	
31			P4/06ab	

[1)] Alarms coming from sectors B and C.

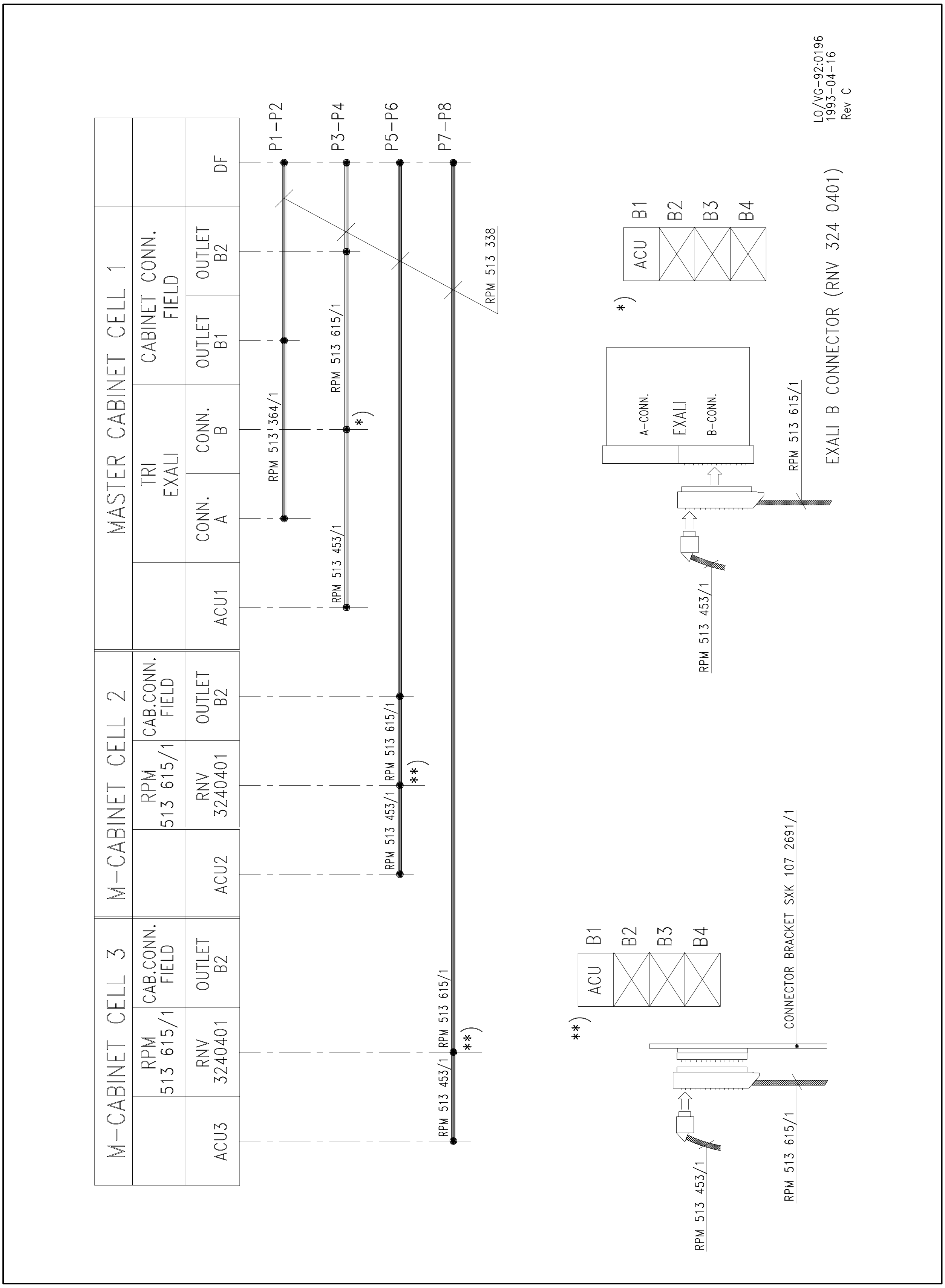


Figure 5 +24 V DC alarm connection cabling diagram

3.2 -48 V DC Power Supply, Recommended Alarm Connections

Table 4 External alarms

EXALI Input	Description		Distribution Frame Cross-Connection To	From
0			P1/01a,b	
1			P1/02a,b	
2			P1/03a,b	
3			P1/04a,b	
4	Used as required		P1/05a,b	
5	by customer		P1/06a,b	
6			P1/07a,b	
7			P1/08a,b	
8			P1/09a,b	P7/01ab
9	Cell C		P1/00ab	P7/02ab
10	ACU 3 *1)*		P2/01ab	P7/03ab *1)*
11			P2/02ab	P7/04ab
12			P2/03ab	P5/01ab
13	Cell B		P2/04ab	P5/02ab [1)]
14	ACU 2 *1)*		P2/05ab	P5/03ab
15			P2/06ab	P5/04ab
16	1: VSWR		P3/01ab	
17	2: RXDA (1)	Cell A	P3/02ab	
18	3: RXDA (2)	ACU 1	P3/03ab	
19	4: FAN ALARM		P3/04ab	
20	PSU2		P3/05ab	P5/05ab
21			P3/06ab	P5/06ab
22	1: INPUT TO	PSU1	P3/07ab	
23	2: OUTPUT FROM		P3/08ab	
24	PSU3		P3/09ab	P7/05
25			P3/00ab	P7/06
26	Used as required		P4/01ab	
27	by customer		P4/02ab	

28			P4/03ab	
29			P4/04ab	
30			P4/05ab	
31			P4/06ab	

[1] Alarms coming from sectors B and C

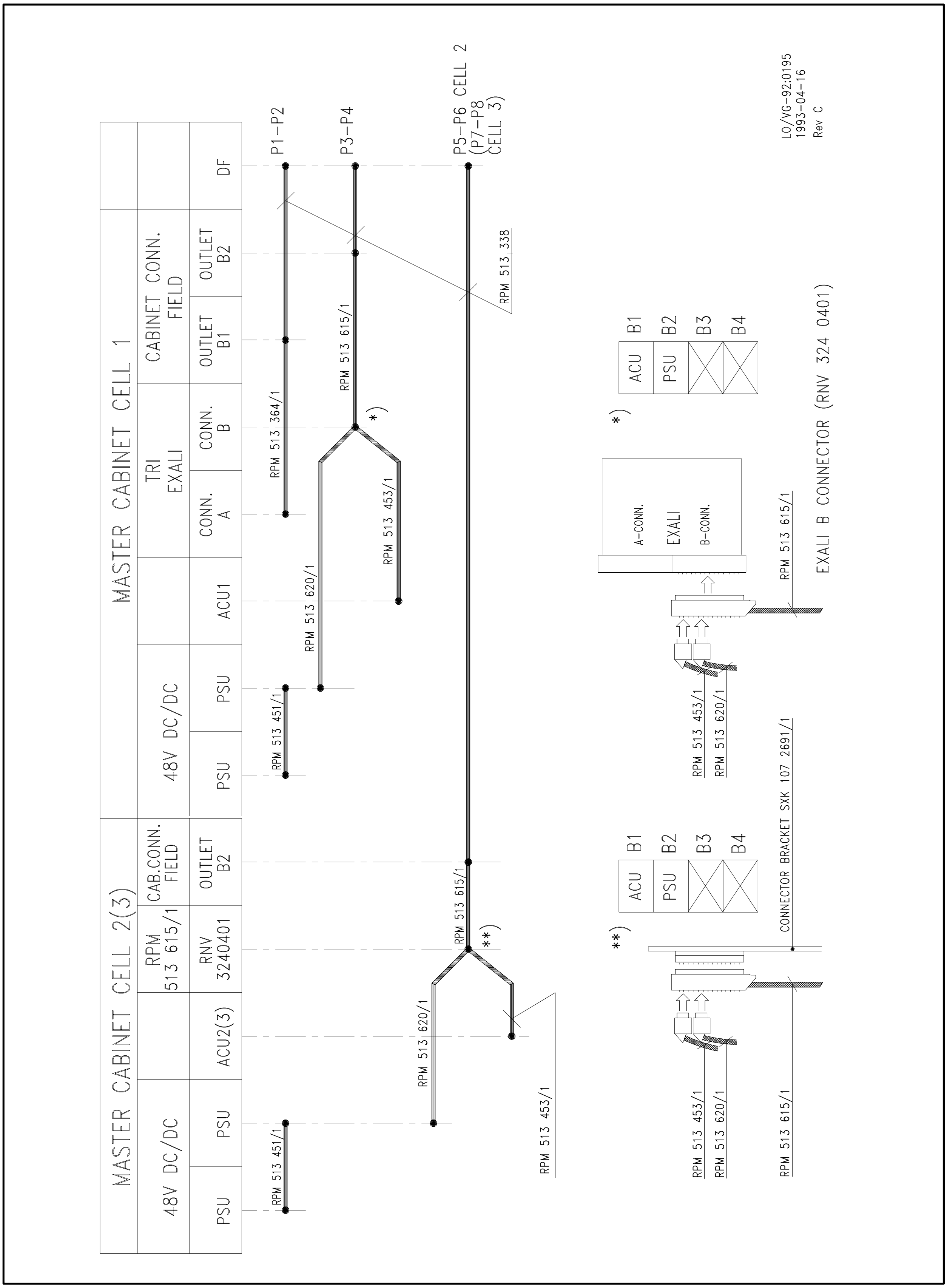


Figure 6 -48 V DC alarm connection cabling diagram

3.3 230 V AC Power Supply, Recommended Alarm Connections

Table 5 External alarms

EXALI Input	**Description**		**Distribution Frame Cross-Connection To**	**From**
0			P1/01a,b	
1			P1/02a,b	
2			P1/03a,b	
3			P1/04a,b	
4	Used as required		P1/05a,b	
5	by customer		P1/06a,b	
6			P1/07a,b	
7			P1/08a,b	
8			P1/09a,b	P7/01ab
9	Cell C		P1/00ab	P7/02ab
10	ACU 3 *1)*		P2/01ab	P7/03ab *1)*
11			P2/02ab	P7/04ab
12			P2/03ab	P5/01ab
13	Cell B		P2/04ab	P5/02ab [1)]
14	ACU 2 *1)*		P2/05ab	P5/03ab
15			P2/06ab	P5/04ab
16	1: VSWR		P3/01ab	
17	2: RXDA (1)	Cell A	P3/02ab	
18	3: RXDA (2)	ACU 1	P3/03ab	
19	4: FAN ALARM		P3/04ab	
20			P3/05ab	
21	Used as required		P3/06ab	
22	by customer		P3/07ab	
23			P3/08ab	
24	Alarm A2; Power supply		P3/09ab	
25	Alarm A2, Power supply		P3/00ab	
26	Observation O1, Power supply		P4/01ab	
27	Alarm from Mains supply		P4/02ab	

28	Under-voltage alarm, Power supply		P4/03ab	
29	Used as required		P4/04ab	
30	by customer		P4/05ab	
31			P4/06ab	

[1)] Alarms coming from sectors B and C

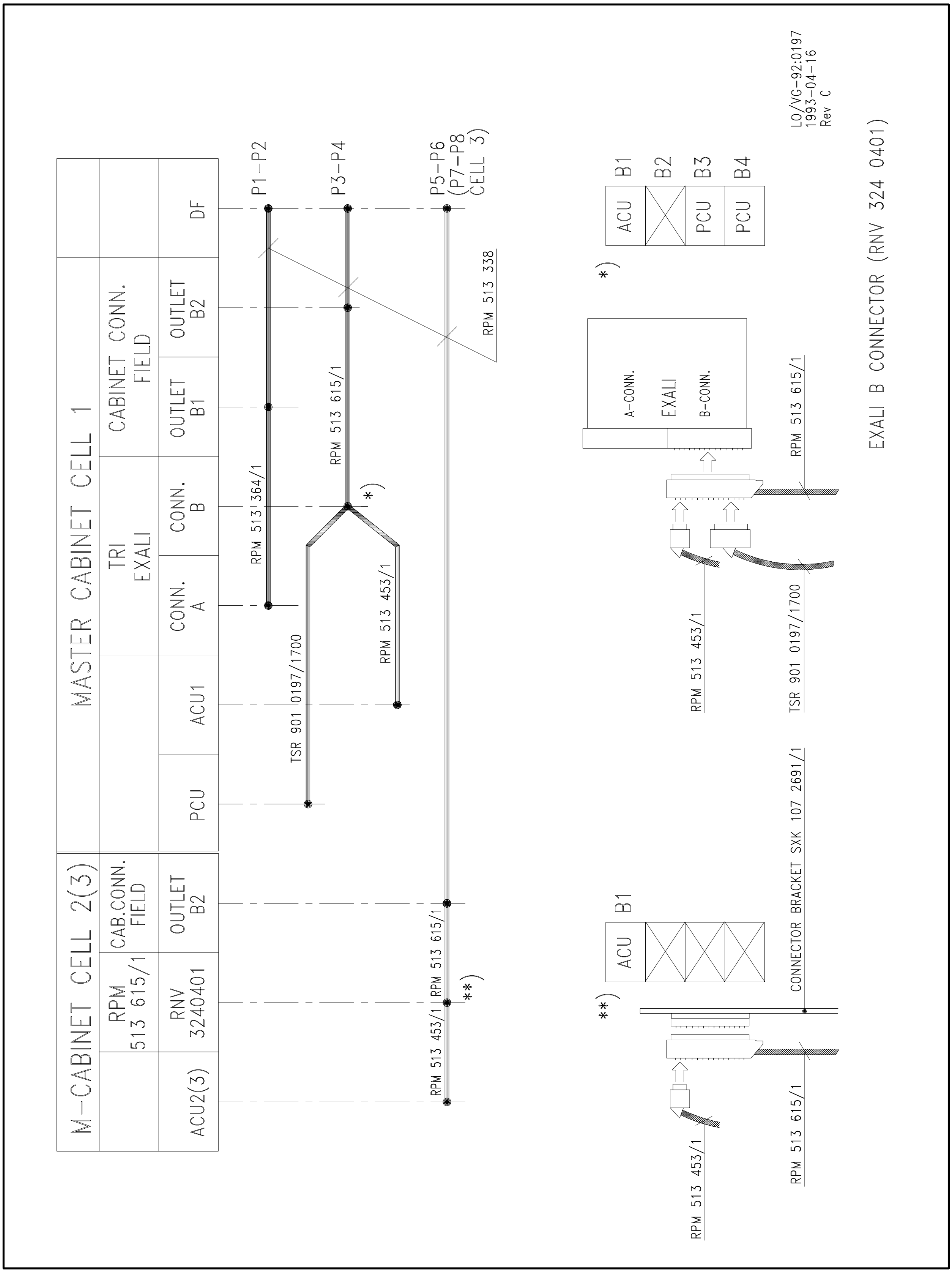


Figure 7 230 V AC alarm connection cabling diagram

4 External Alarm Cabling

All external alarms are wired to the DF by means of cable RPM 513 338. 2 pcs. of this cable are required to connect all 32 alarms. The cable is fitted with a connector in one end, while the other end is free. Total length is 15 metres.

The system accepts both open and closed contacts at failure. The convention used will be set in the BSC.

It is recommended that optional equipment is provided with a switching contact.

It is also essential that alarms are separately wired, to avoid interaction on each other.

Connection diagram and disposal plan of alarms are shown in para. 6 Distribution Frame.

4.1 CIC Board

For the transferring of fans and TRXCs alarms from an Extension cabinet to the Alarm Control Unit ACU in a Master cabinet, a CIC board has to be mounted in every Extension cabinet. The CIC board works as a junction between the alarm collecting cable in the Extension cabinet and the ACU in the Master cabinet.

All material needed for installing the CIC board and the cabling is included in the extension kit.

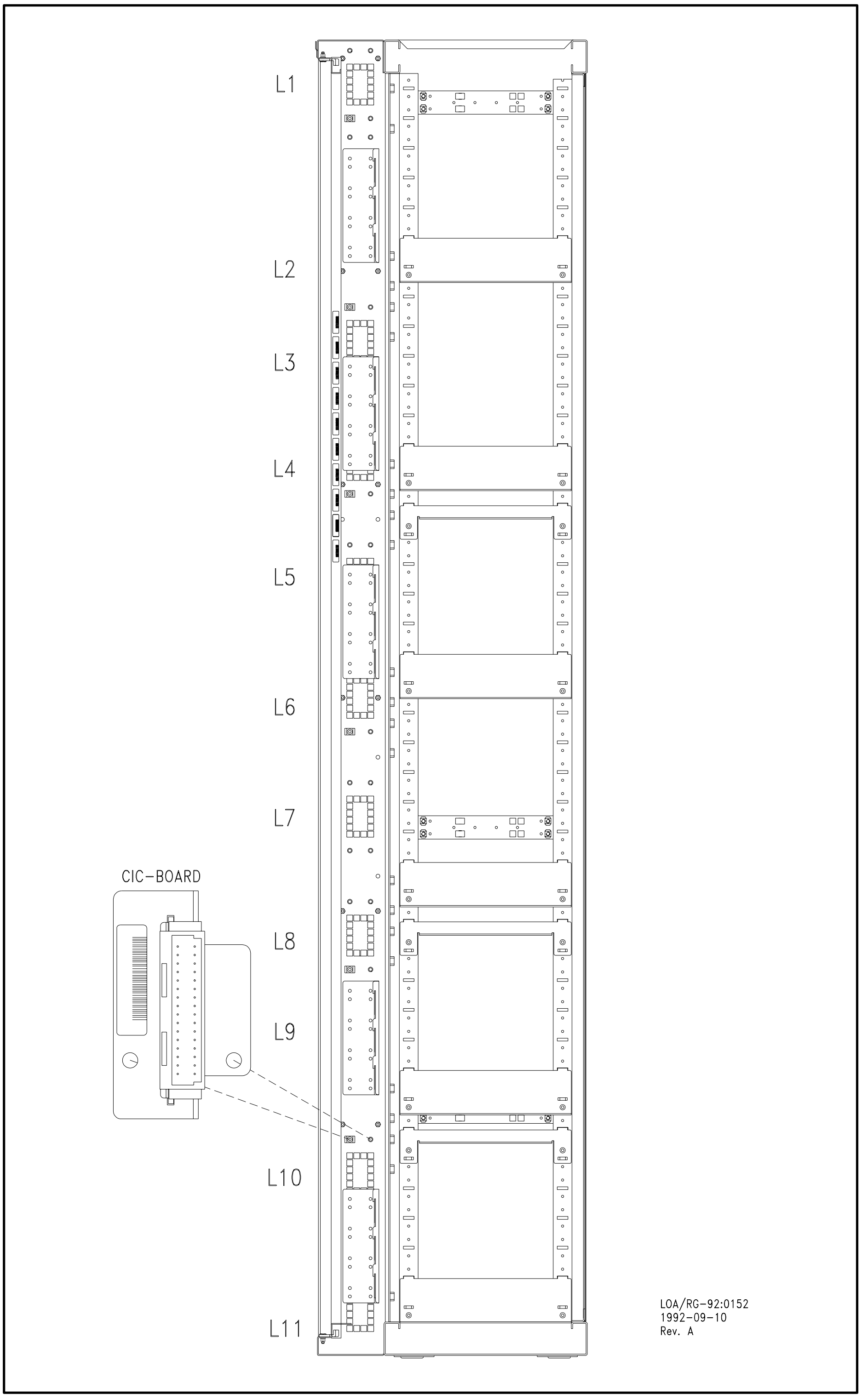


Figure 8 Mounting the CIC board

5 Alarm Cabling Diagrams

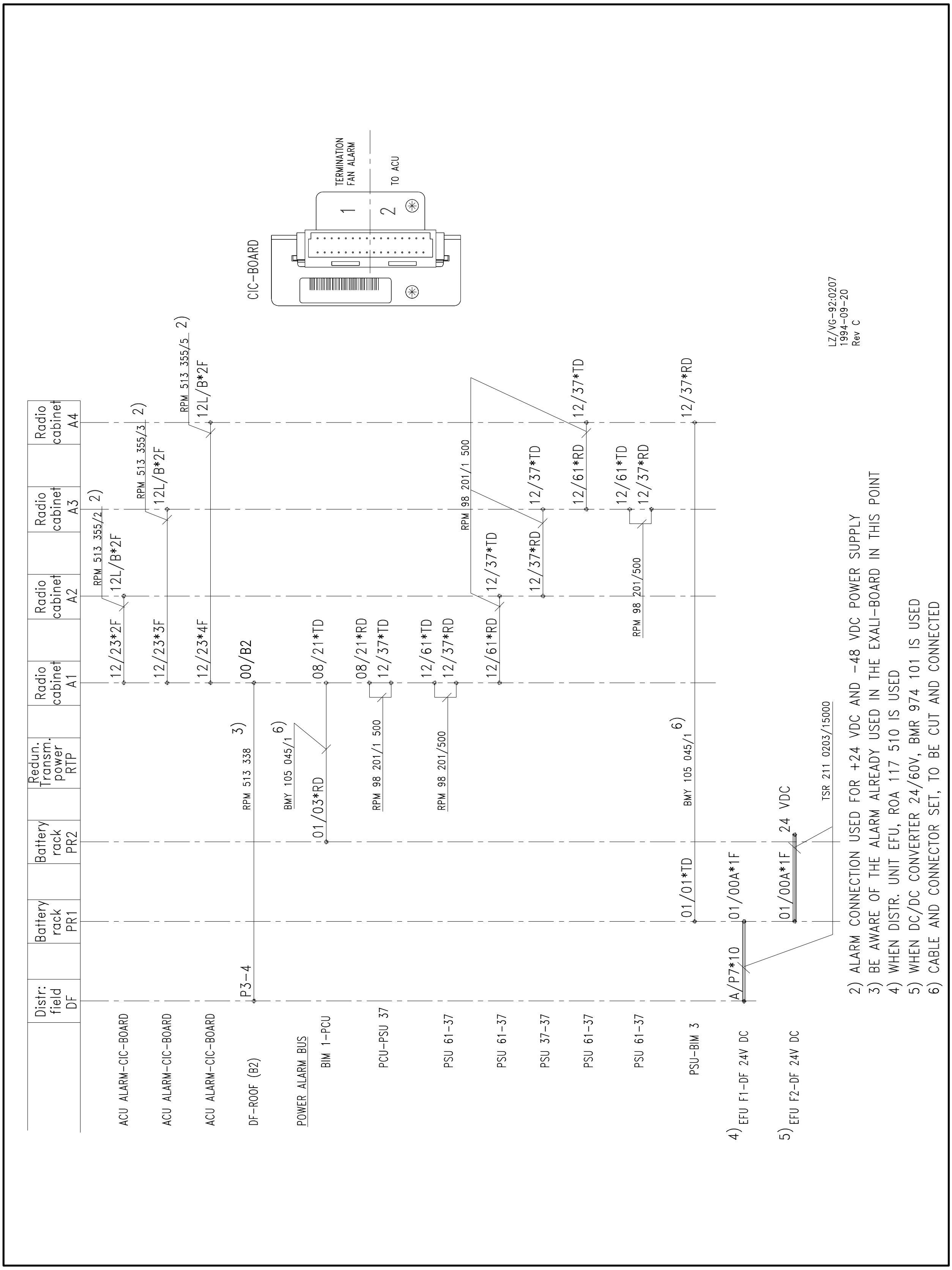


Figure 9 Alarm cabling 230 V AC (1 cell site)

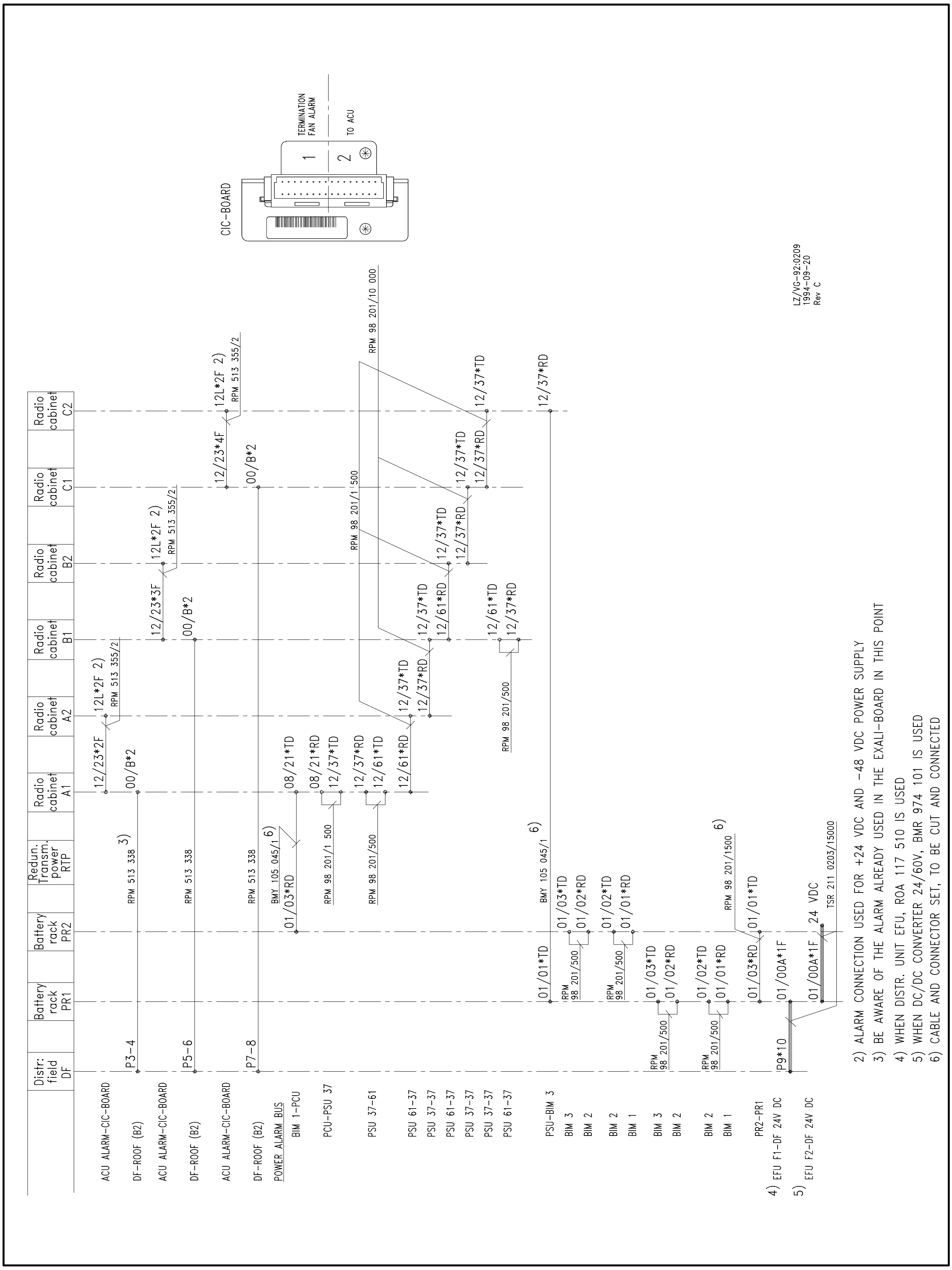


Figure 10 Alarm cabling 230 V AC (sector site)

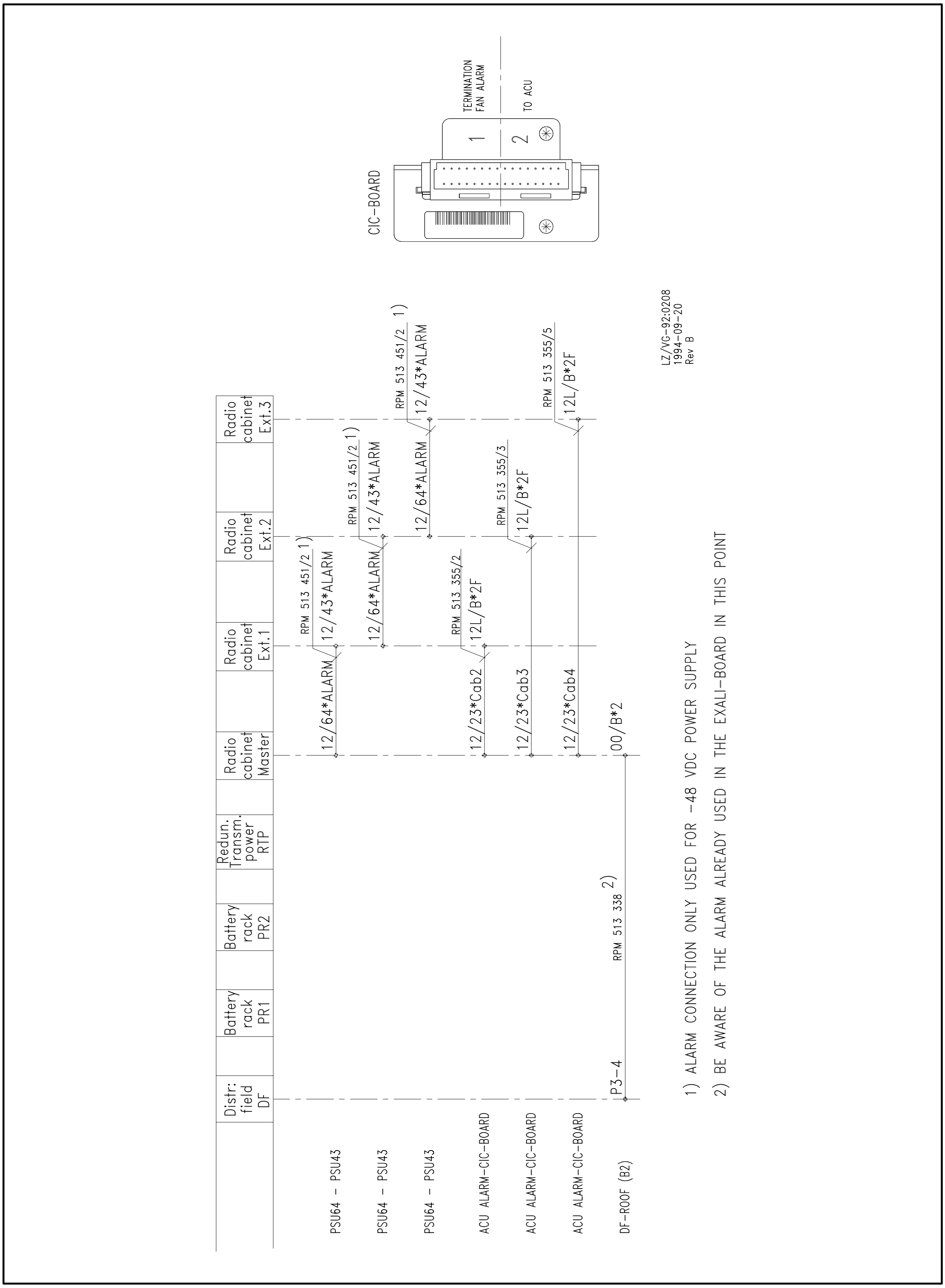


Figure 11 Alarm cabling -48 V DC and +24 V DC (1 cell site)

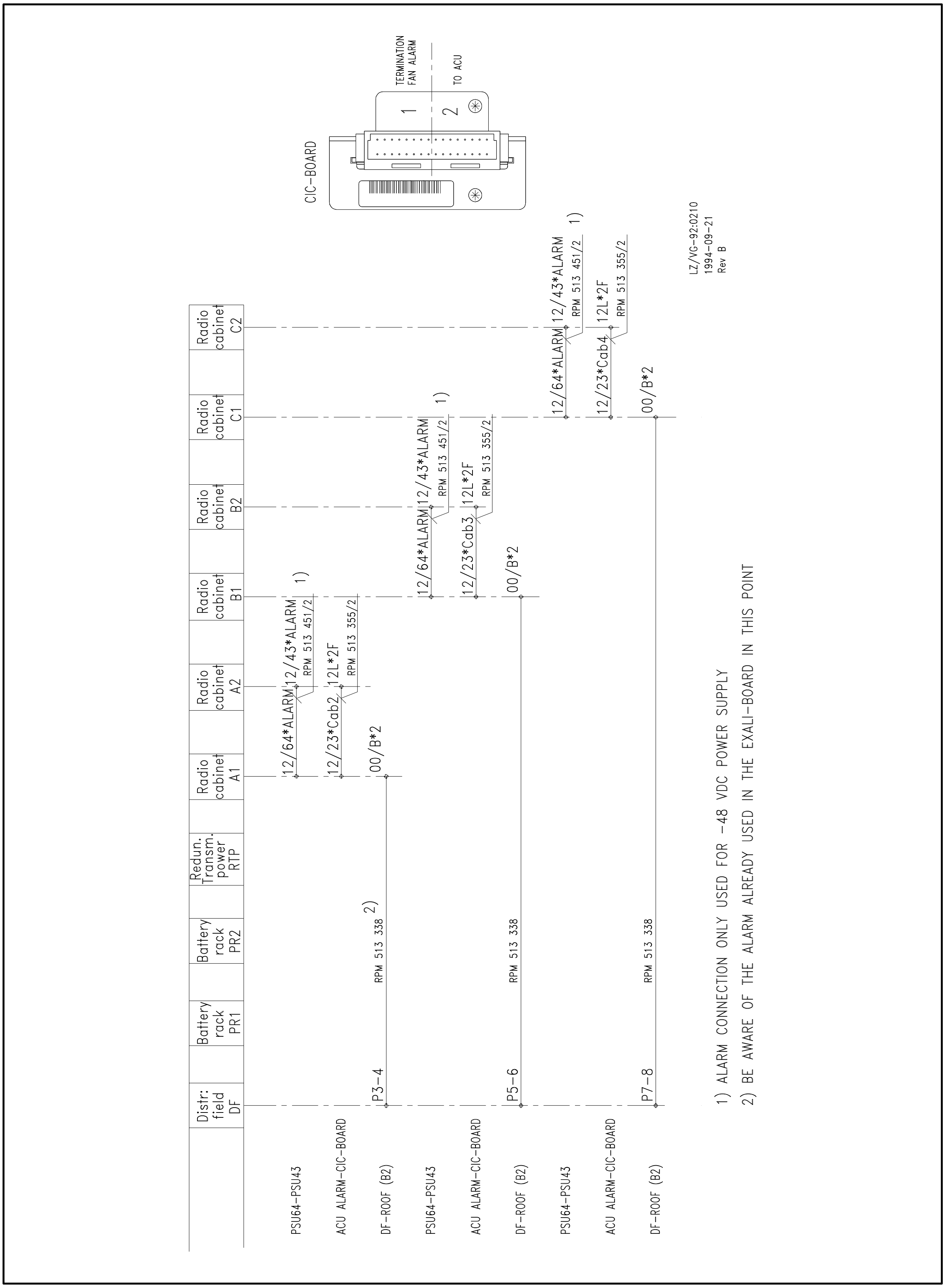


Figure 12 Alarm cabling -48 V DC and +24 V DC (sector site)

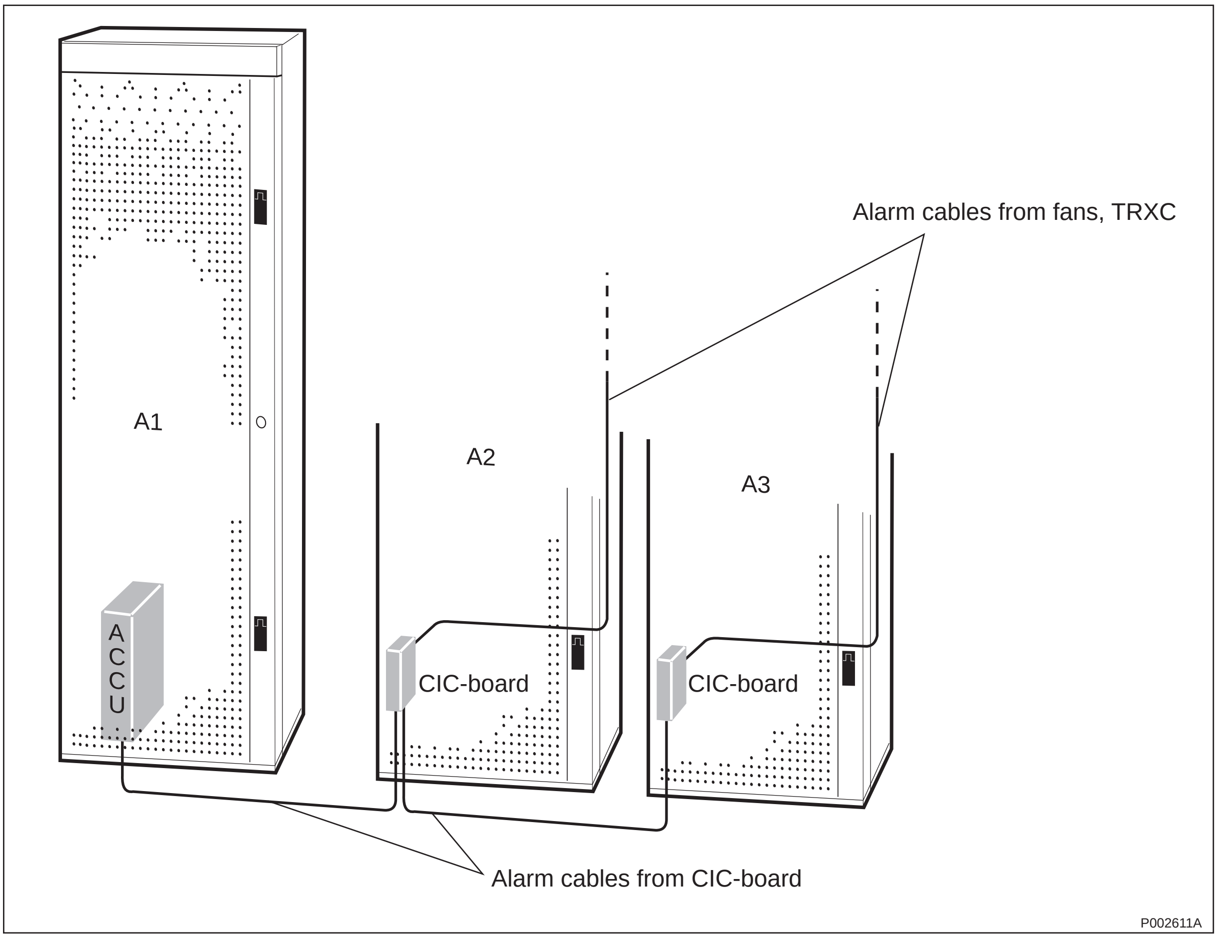


Figure 13 Alarm connections between ACU and CIC board

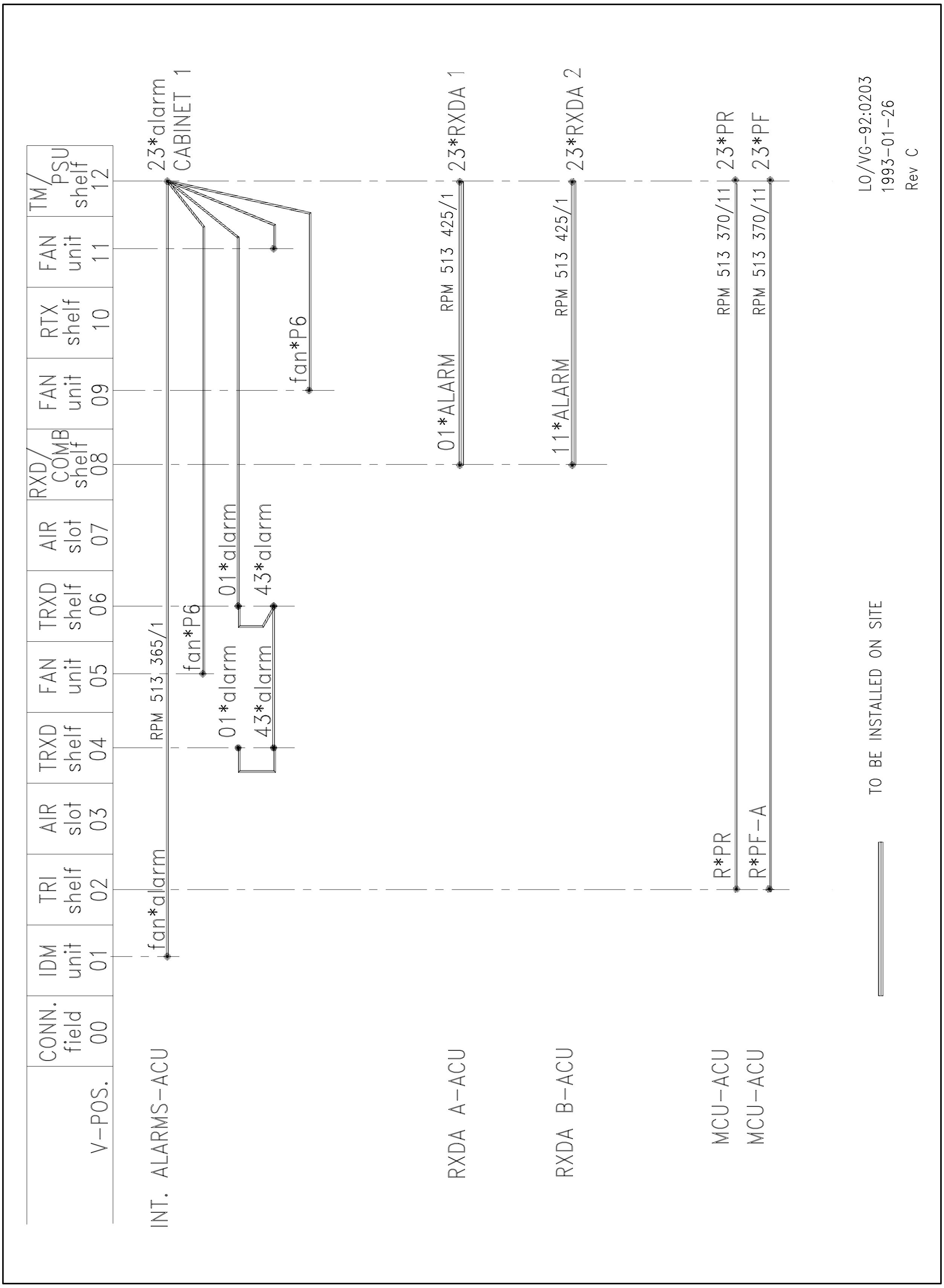


Figure 14 Cabling for the ACU, master cabinet

6 Distribution Frame, DF

Please observe that the colour code can vary.

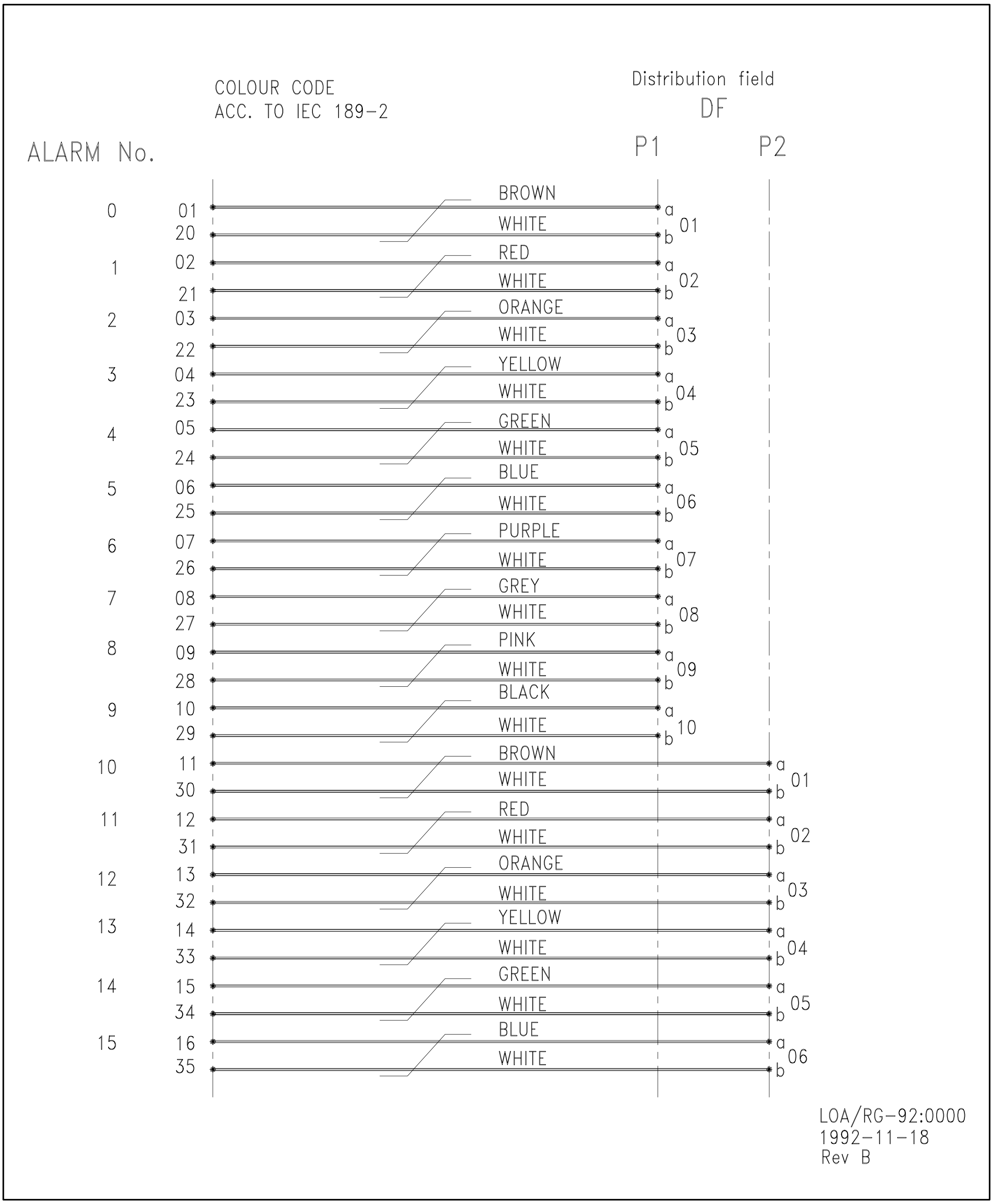


Figure 15 External alarm number and connection of cable RPM 513 338 to Distribution Frame

Nr — *No.*		
5/1551-COH 109 2015/11 Uen		
Datum — *Date*	Rev	File
1998-02-03	A	

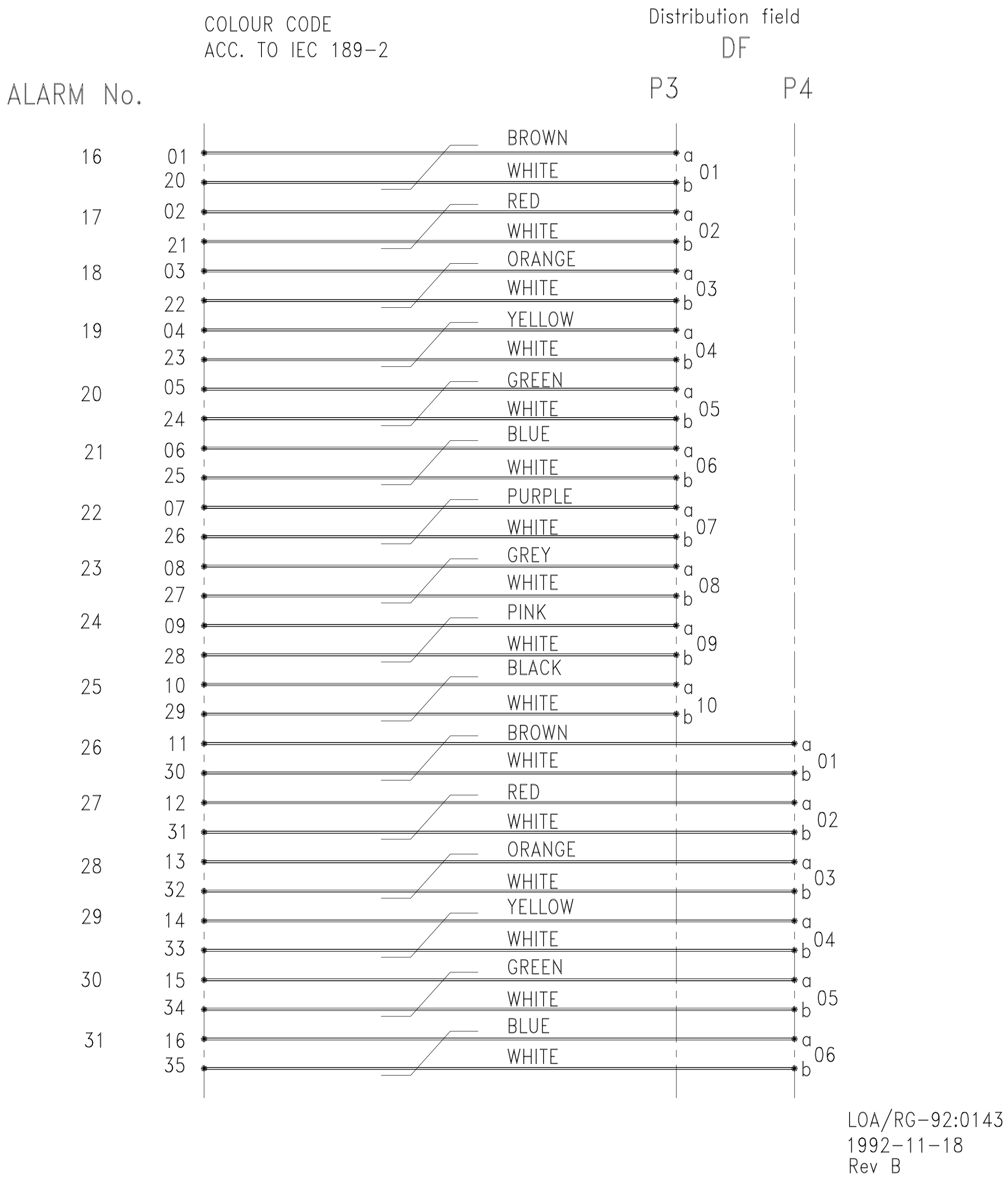


Figure 16 External alarm number and connection of cable RPM 513 338 to Distribution Frame

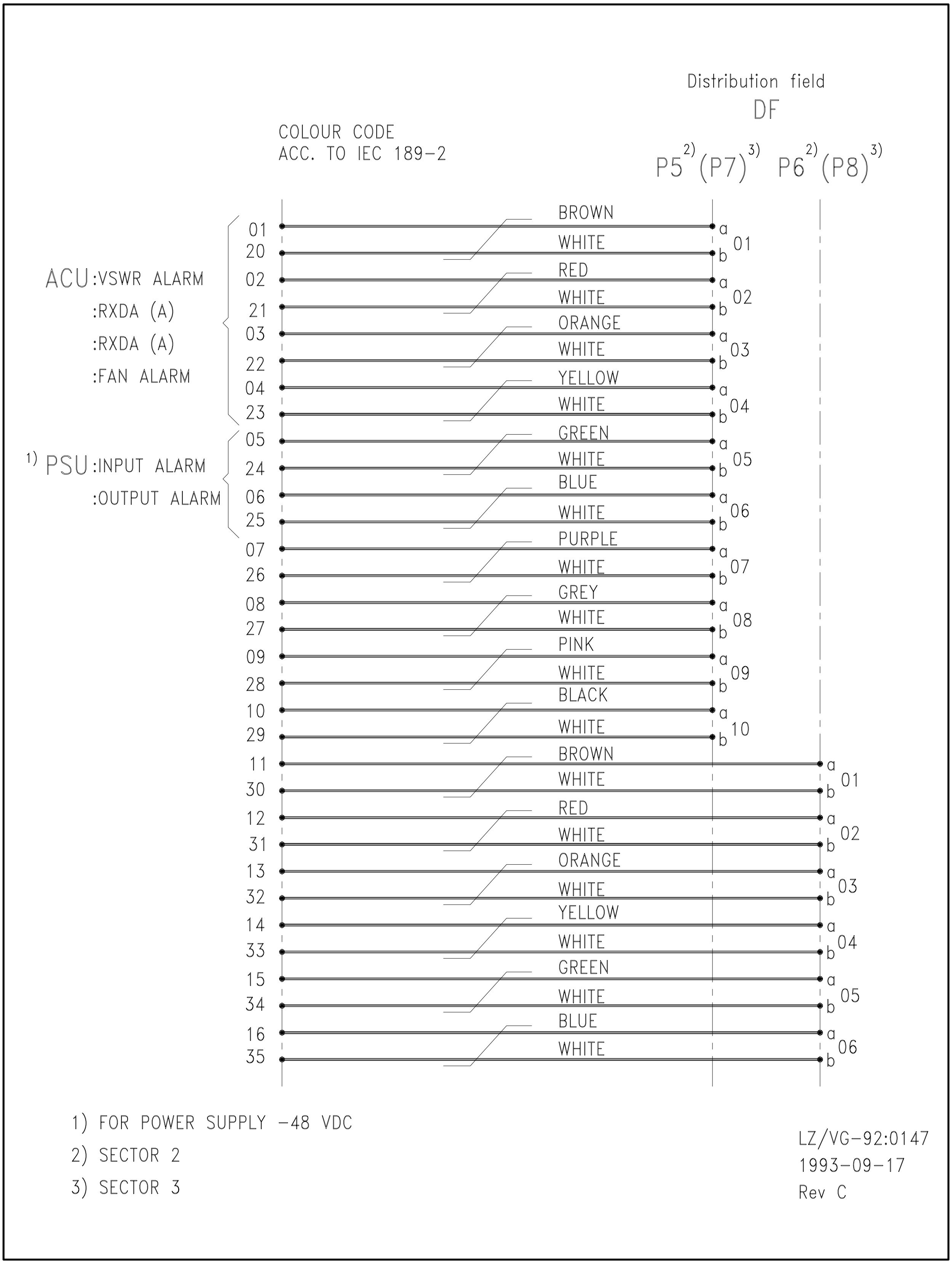


Figure 17 External alarm number and connection of cable RPM 513 338 to Distribution Frame

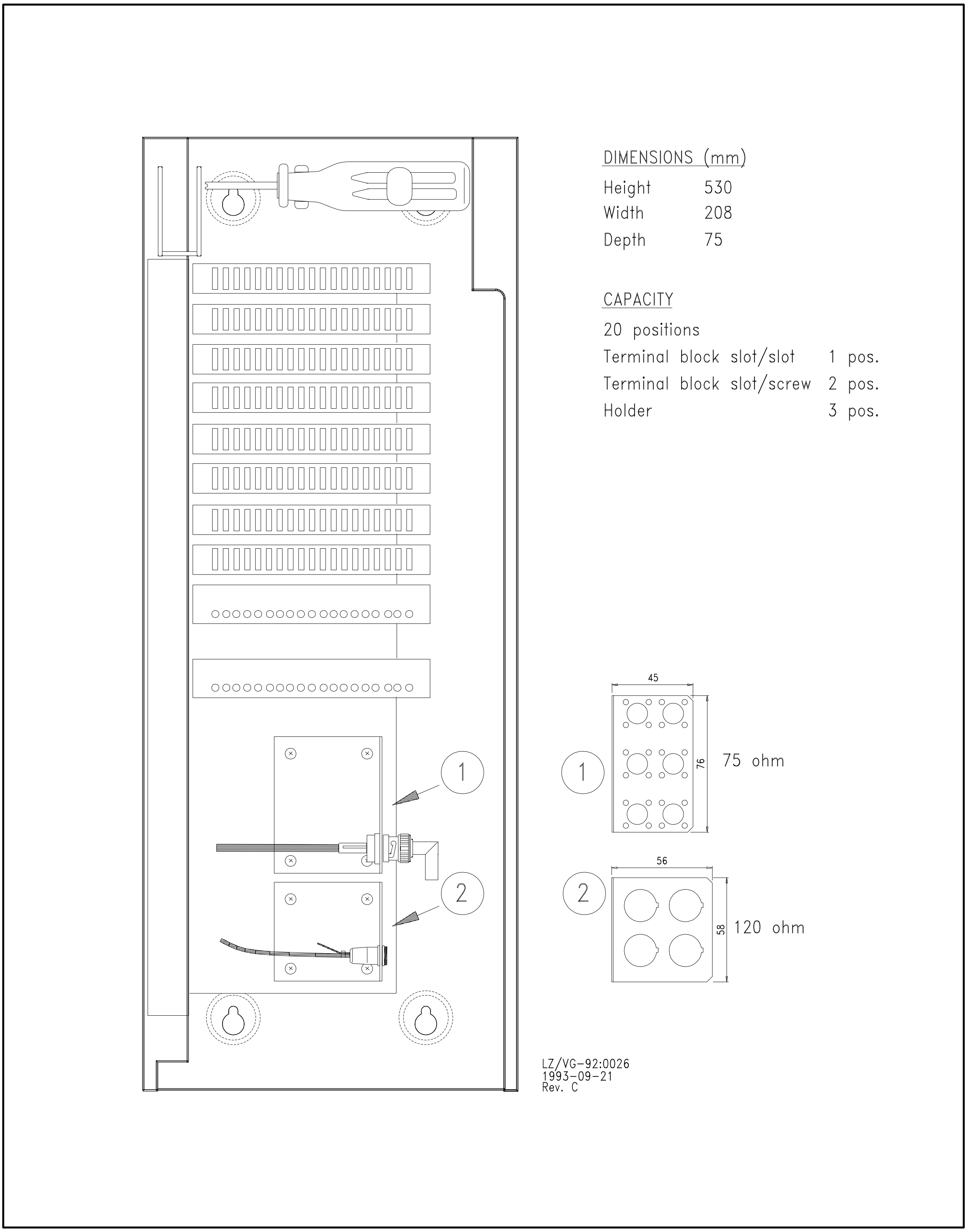


Figure 18 External alarm number and connection of cable RPM 513 338 to Distribution Frame

Uppgjord — *Prepared*	Faktaansvarig — *Subject responsible*	Nr — *No.*		
ERA/LZ/LI GUG		6/1551-COH 109 2015/11 Uen		
Dokansv/Godk — *Doc respons/Approved*	Kontr — *Checked*	Datum — *Date*	Rev	File
ERA/LZ/TGC (ERABVN)		1998-02-04	A	

Co-siting

Contents **Page**

1 Introduction

Co-siting is operating the Radio Base Station RBS 200 in GSM together with radio base stations in TACS/ETACS or NMT RS 900/9000 system on the same site as a trade-off between saving resources and maintaining optimal operating conditions for the systems.

This section describes the following co-siting applications:

- GSM RBS 200 - TACS 883 interconnected combiner
- GSM RBS 200 - TACS/ETACS 883 with diplexer
- GSM RBS 200 - TACS 881 (RX only)

1.1 GSM and TACS common equipment

Common equipment for GSM and TACS can be:

- TX equipment
- RX equipment
- Measuring/Alarm equipment

At co-siting applications a measuring point, normally used in the GSM cabinet, can be moved to the TACS cabinet.

It is also important to know the signal levels from and to the system in question.

1.2 Operating cases

Operating cases 2 and 3 are described here.

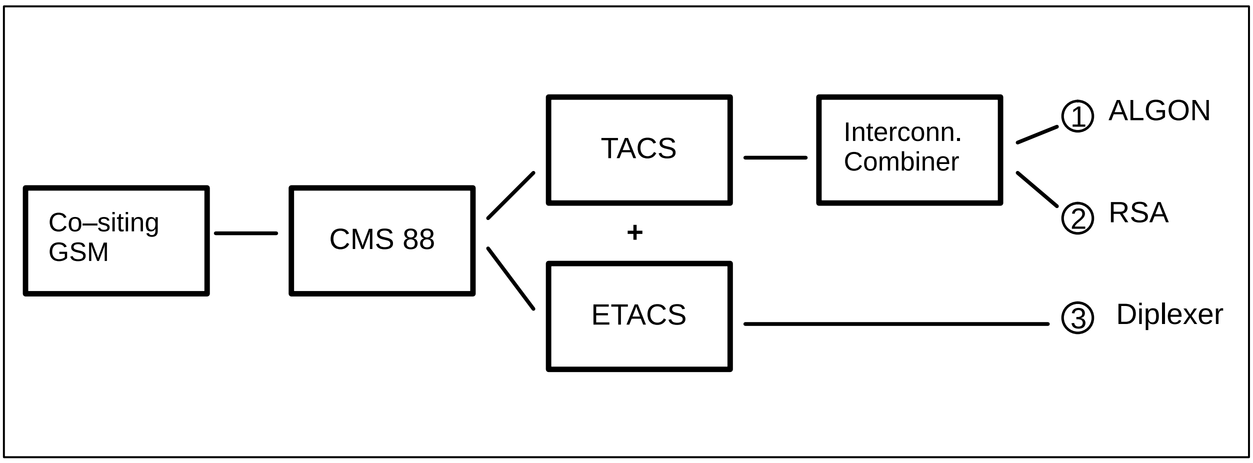


Figure 1 Co-siting block schematic

1.3 Extended co-siting information

1.3.1 Co-siting TACS/ETACS

- Function specification 15/155 17-HRB 103 02 Uen Rev D 1992-10-06.

2 Installation planning

2.1 General rules

2.1.1 General

When planning you must have a good knowledge of RF signals e.g. of attenuation of the RF signals when connecting.

This description is only valid for the connection of one cell GSM - TACS. Before planning the co-siting for more cells, it is therefore important to understand the build-up of TACS.

Please contact ERA operation division before planning co-siting of systems.

2.1.2 Co-siting panel

Restrictions on how the co-sited base stations can be positioned in relation to each other on a site, vary according to the implemented co-siting functions.

To connect the co-siting base stations a co-siting panel has to be used. This panel is installed between the GSM master cabinet and the co-siting cabinet. The co-siting panel maintains the electromagnetic compatibility between the cabinets and is a connection point for cables.

2.1.3 Co-siting to the left or right of the RBS 200 cabinet

It is to prefer that the co-siting cabinet is positioned to the left of the RBS 200 as the extension of the RBS 200 with a second cabinet to the right is more easily done.

2.1.4 Floor planning

Co-siting GSM - TACS via an interconnected combiner demands that a side by side installation is made.

When co-siting via diplexer/external MCU/channel tester (for TACS), distance limits for the equipment must be considered.

2.1.5 Extension of the co-siting

Planning the co-siting shall also include the consequences of a possible extension of GSM or TACS. There can be floor space problems when, for example, the first TACS cabinet shall be moved and a third GSM cabinet shall be installed in its place.

2.1.6 External co-siting equipment

Some co-siting specific units are placed outside the co-sited cabinets.

2.1.7 Sharing power supply

EMI and EMC specifications of each of the co-sited systems restrict the characteristics of the power supply in order to prevent the systems from disturbing each other.

2.2 Co-siting GSM/TACS

2.2.1 Site installation, general

Before planning co-siting with TACS, make clear if the ETACS frequency band shall be used or not. That is because it is not possible to connect GSM with ETACS on a combiner level. In that case you have to use a diplexer on the TX side.

On the RX side an RXBP extended filter has to be used in the GSM cabinet in some cases, depending on if and which ETACS frequency band is used. This is because of the need of a 5 MHz guardband between GSM RX and ETACS TX.

TACS	RX	890 - 910	TX	935 - 950 (960) *)
ETACS	RX	872 - 910	TX	917 - 925 (935) *)
GSM	RX	890 - 915	TX	935 - 960
GSM RXBP extended	RX	872 - 910 (912)		

*) depending on hardware

2.2.2 Configuratons

The configurations described below follow the Function Specification 15/155 17-HRB 103 02. Other solutions are possible but are not described here.

2.2.2.1 GSM-TACS

Verified configurations are:

- 1 GSM cabinet + 2 TACS cabinets
- 2 GSM cabinets + 1 TACS cabinet

Limits of the configurations:

- The MCU has a maximum input power of 500 W.
- If more than 2 TACS, a too long combiner chain is obtained, causing flank frequencies problems.

2.2.2.2 GSM-TACS + ETACS

Verified configurations are:

- 1 GSM cabinet + 2 TACS cabinets + 2 ETACS cabinet

Limits of the configurations above:

- No interconnection of combiners are allowed, as the GSM combiner does not cover the ETACS bandwith.
- An RXBP extended must be used on the GSM cabinet. The receiver band is moved down 3 MHz. The reasons are that ETACS, when applicable, transmits down to 917 MHz and that GSM receives up to 915 MHz.
- When TX co-siting: A Diplexer and external MCU must be installed. The Diplexer demands a 2.5 MHz guard-band between the two TX (GSM and TACS) input signals.

This means that it can be necessary to make a new frequency plan. If so, the TACS equipment must be retuned.

2.2.3 Alarms

Alarm signals in GSM:

	Measuring point
VSWR	MCU
FANS	FCU
RX-alarms	RXDA 1 and RXDA 2

Alarm signals in TACS:

	Measuring point
VSWR, low power	MCU
RX-alarms	MC-A
	MC-B

Alarm presentation:

Do consider in which system, GSM or TACS, a specific alarm shall be presented.

2.2.4 Signals between co-sited systems, RF signals, alarms and channel tester

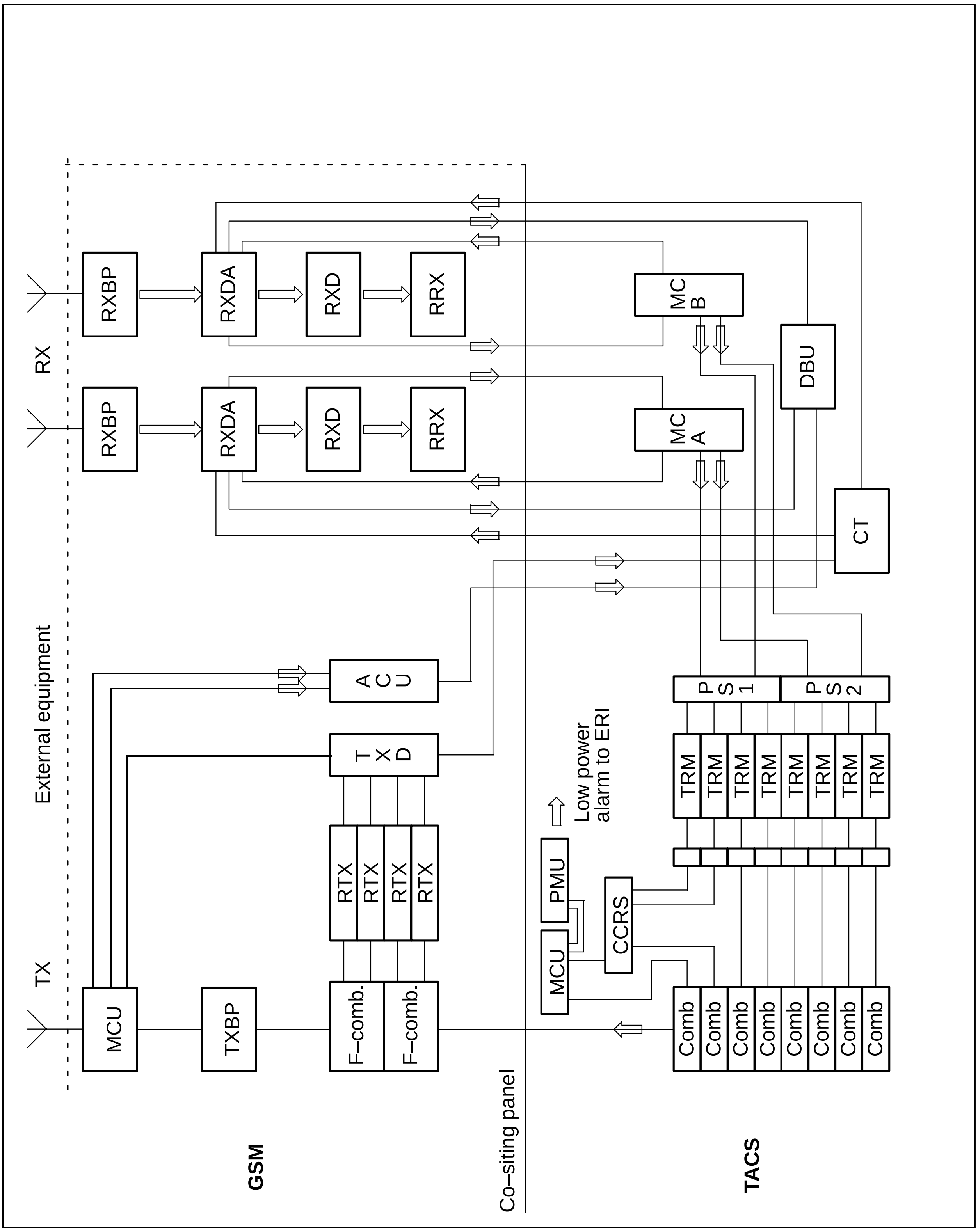


Figure 2 GSM - TACS block diagram

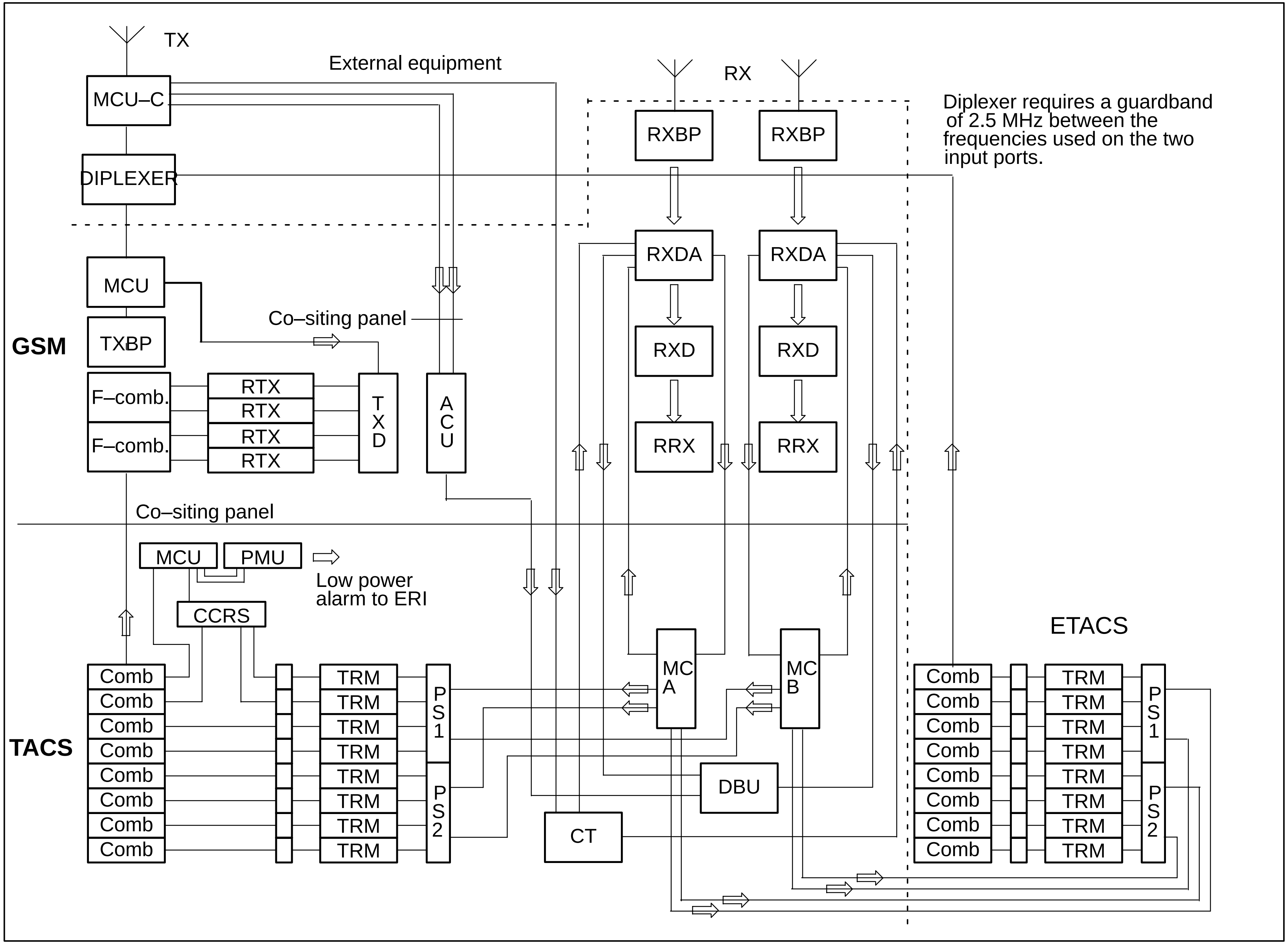


Figure 3 GSM - TACS/ETACS block diagram

2.2.5 RF cables

Cable for connection of RX and CT signals is RG 223/U. Attenuation approx. 0.4 dB/m.

2.2.6 GSM and TACS channels

The maximum number of channels for a co-sited system (interconnected combiners) is:

16 TACS (40 W) and 4 GSM (45 W) or

8 TACS and 8 GSM

One of the limits is 500 W on RBS 200 MCU on the TX side.

When diplexer is used for ETACS (to combine GSM - TACS/ETACS), it is possible to get more output power from that radio cell (16x40 W TRM ETACS).

2.2.7 Distance to external equipment

When diplexer is used (ETACS) the maximum length for the alarm connection of MCU Pf/Pr is 2000 mm due to the attenuation from MCUC to ACU in RBS 200 cabinets (max. 5 dB total ACU to MCUC).

2.2.8 Channel Tester in TACS system

When the maximum length between the CT and the GSM cabinet is 20 m (RG223/U), the cables which connect the MCU/MC on TACS today can be reused.

Calculated levels for CT from/to TACS:

CT RX 1-9	Input level -67 to -80 dB
CT TXA-B 1-3	Output level max. 12 dB

Calculated levels for CT from/to GSM:

CT output to CT RX	-47 dB measured at co-siting panel

Calculated levels from extern MCUC to CT RX:

TACS freq.	-73 to -74 dB
ETACS freq.	-69 to -70 dB

Today the TACS MCU has an output level of -60 dB and a maximum cable length of 12-20 m without attenuator or 0-8 m with 10 dB attenuator.

2.2.9 How to extend GSM

To install the second RBS 200 cabinet, the second TACS cabinet, Ch 9 - 16, shall be moved.

2.2.10 TACS PMU alarms

The TACS PMU will only maintain low power alarms and the measuring coupler is used between the CCRS and one combiner to monitor the control channel. For installation see figure 4.

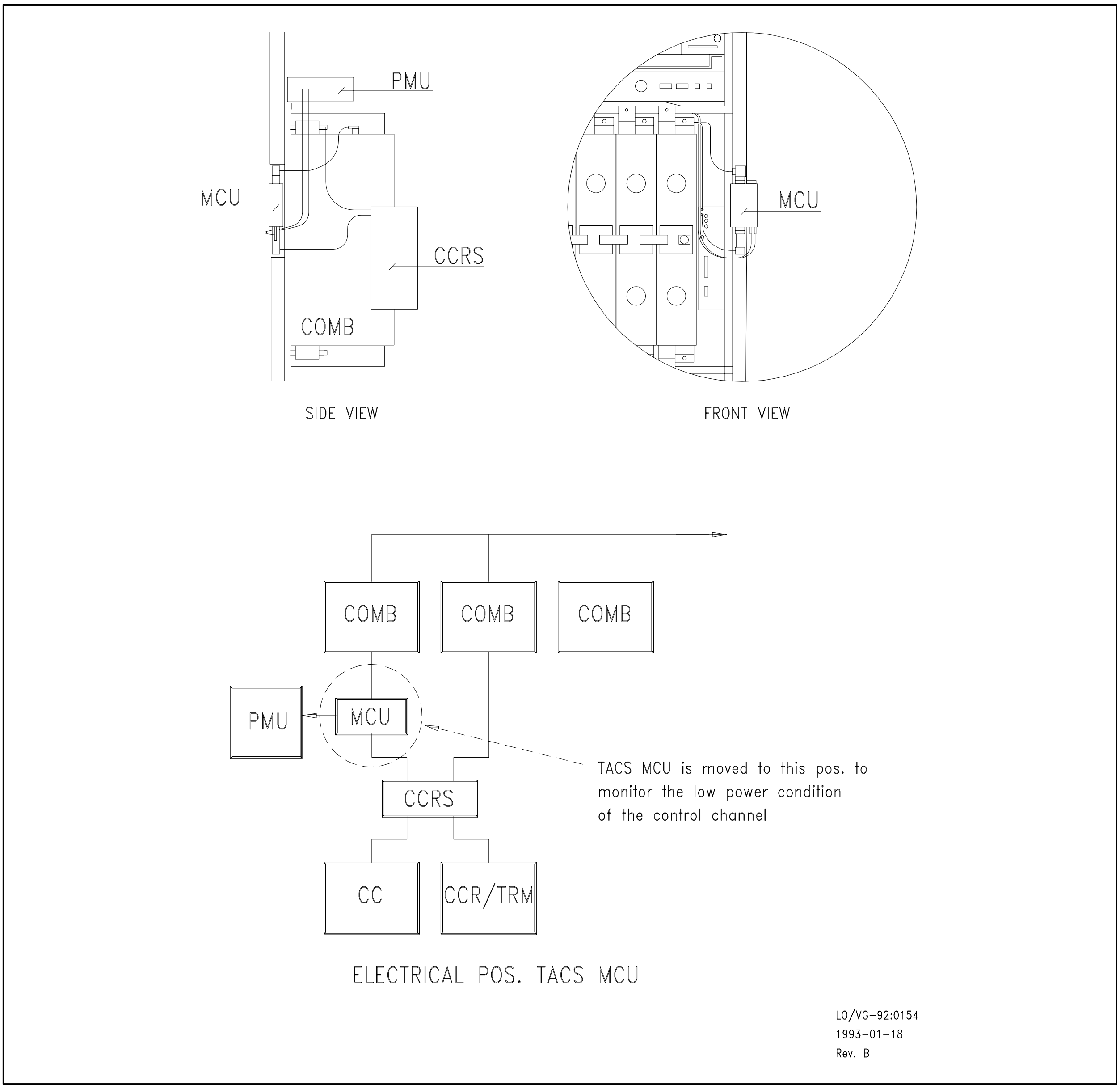


Figure 4 TACS MCU for low power alarm

3 RBS co-siting TACS

3.1 Principle layout

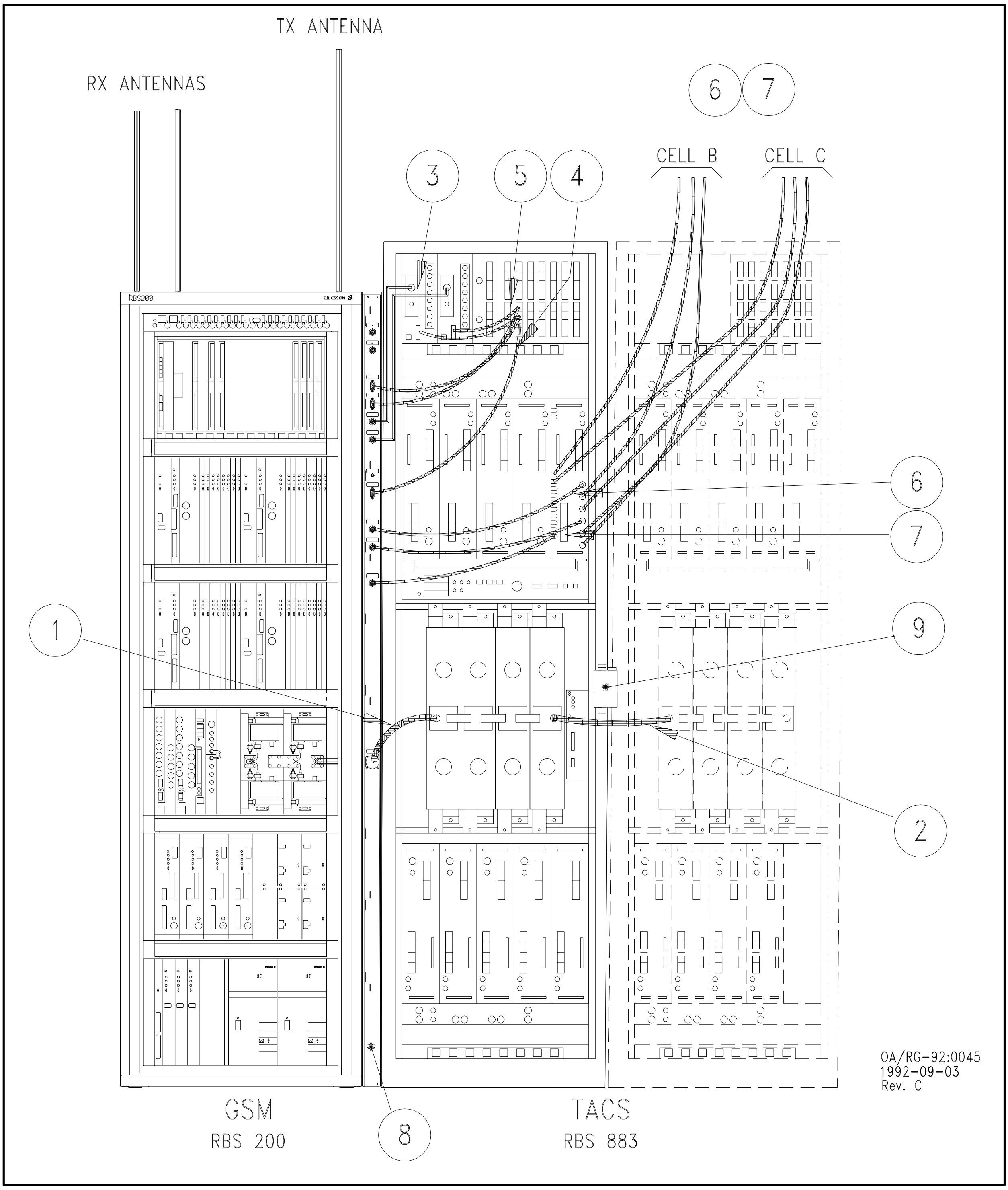


Figure 5 RBS 200 cabinet BDE 201 162/– co-siting TACS 883

3.2 Cabling diagram

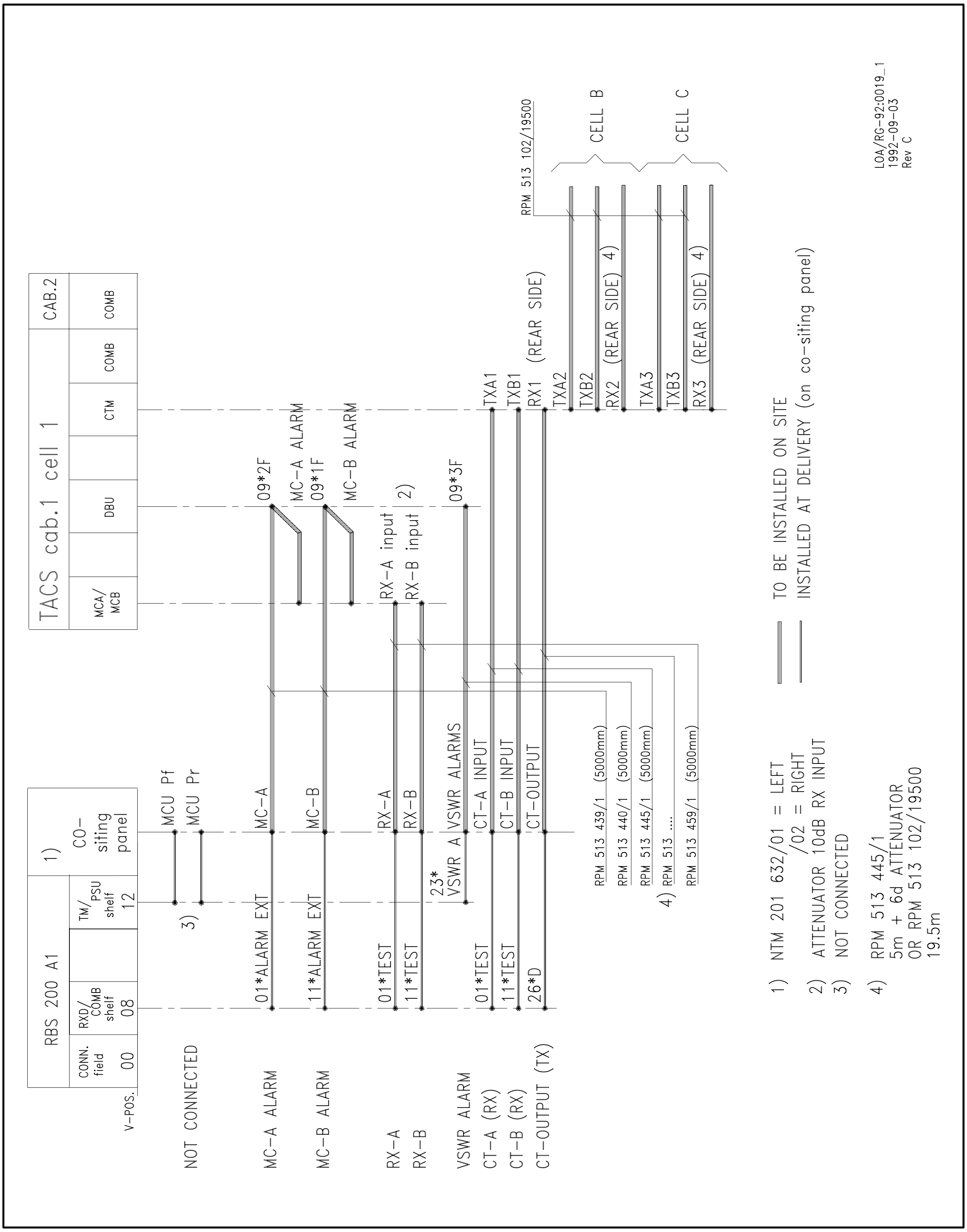


Figure 6 RBS 200 cabinet BDE 201 162/– co-siting TACS 883

3.3 PMU low power alarm cabling diagram

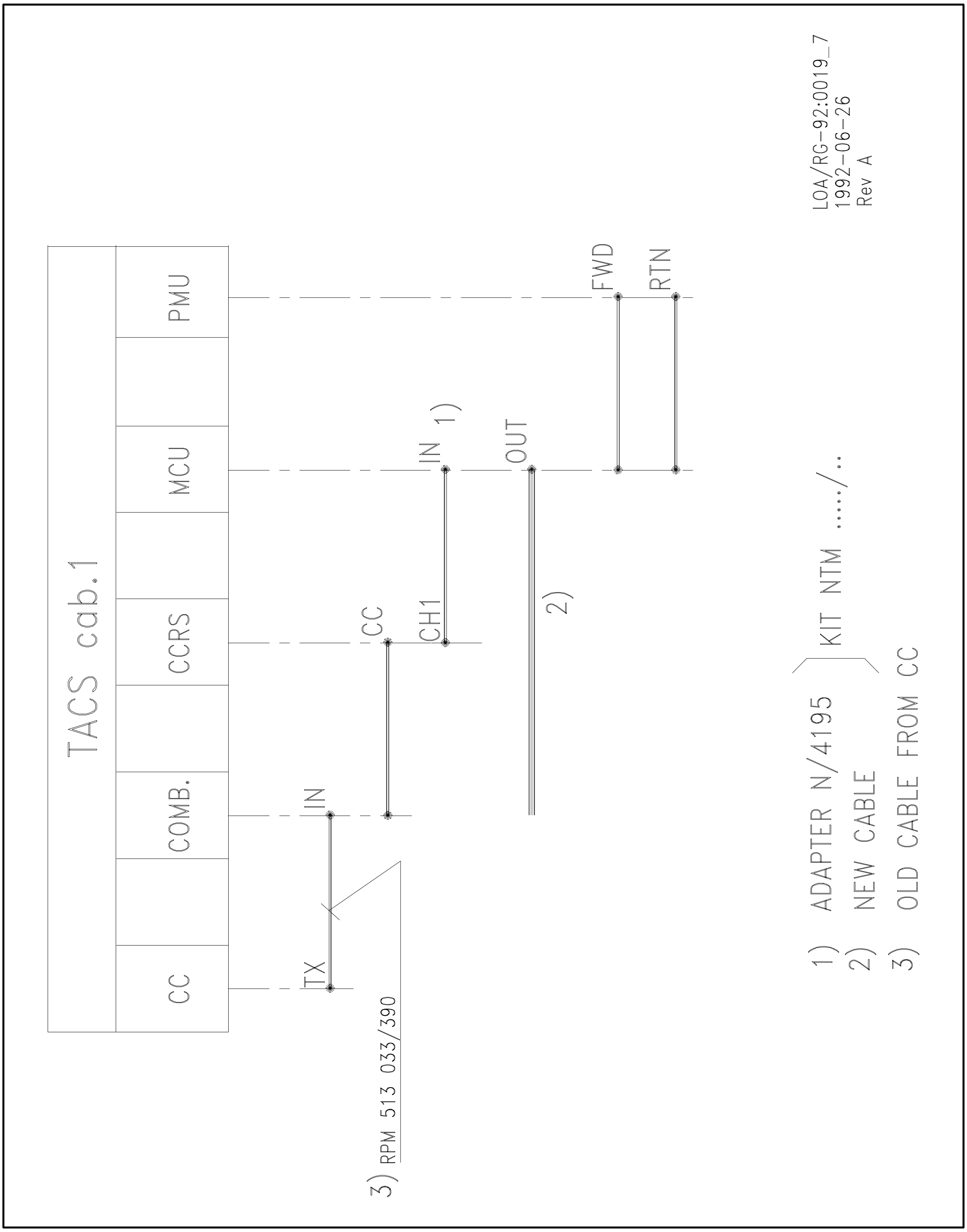


Figure 7 RBS 200 cabinet BDE 201 162/– co-siting TACS 883

4 RBS co-siting TACS/ETACS

4.1 Principle layout

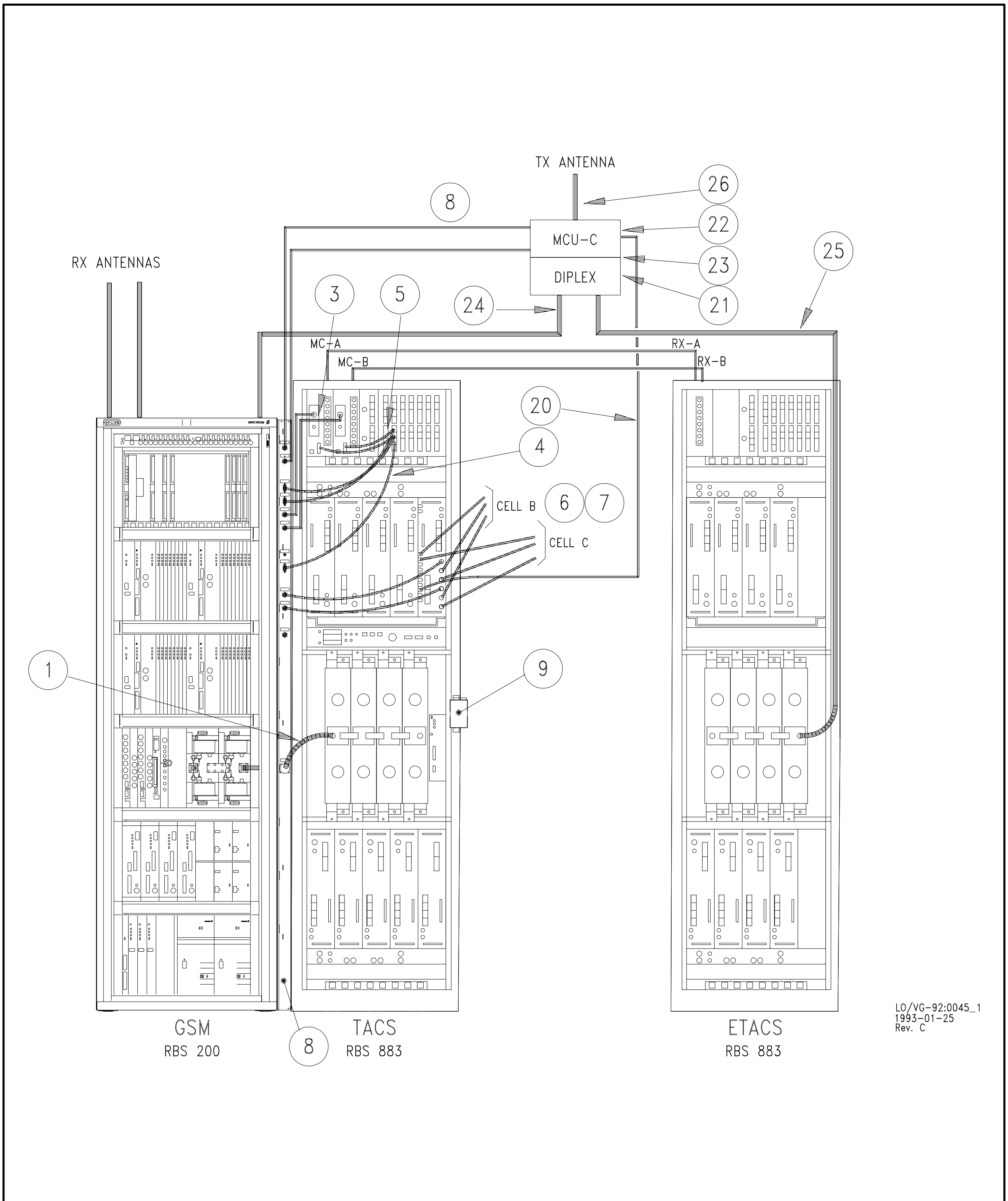


Figure 8 RBS 200 cabinet BDE 201 162/– co-siting TACS/ETACS

4.2 Cabling diagram

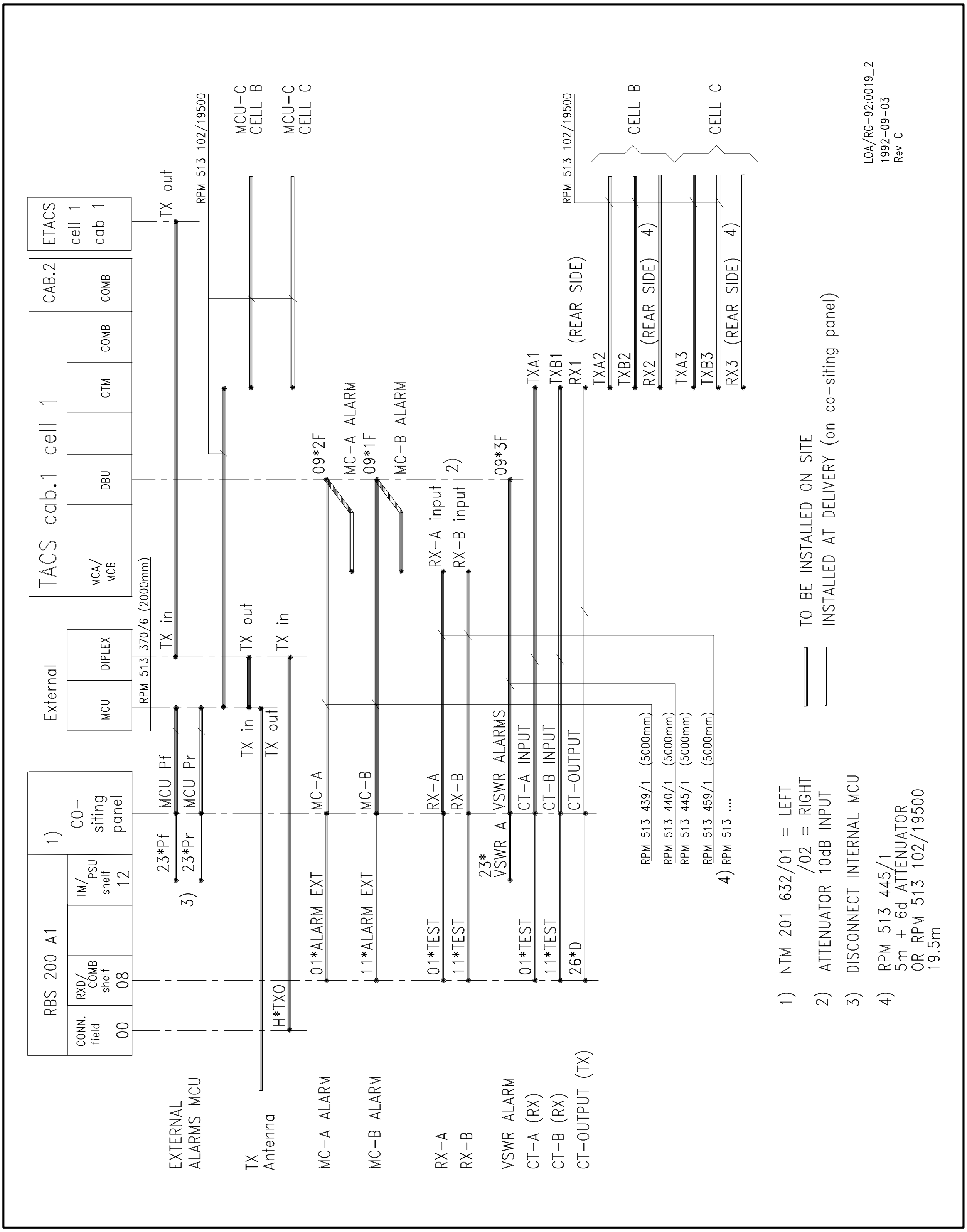


Figure 9 RBS 200 cabinet BDE 201 162/– co-siting TACS/ETACS

5 Combiner connection

5.1 Cabling diagram

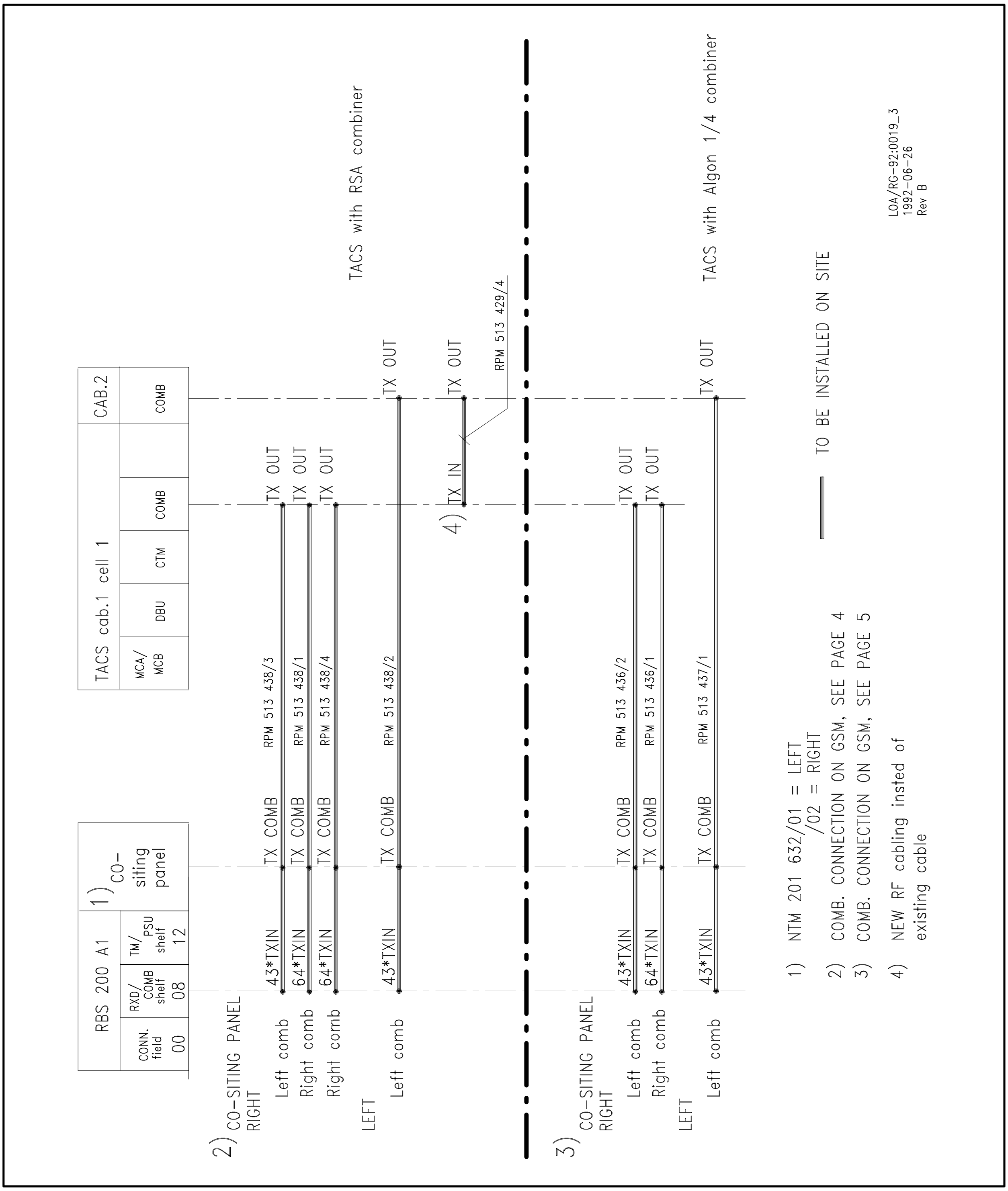


Figure 10 RBS 200 cabinet BDE 201 162/– co-siting TACS:RSA or Allgon 1/4 combiner

5.2 Combiner allocations and connections

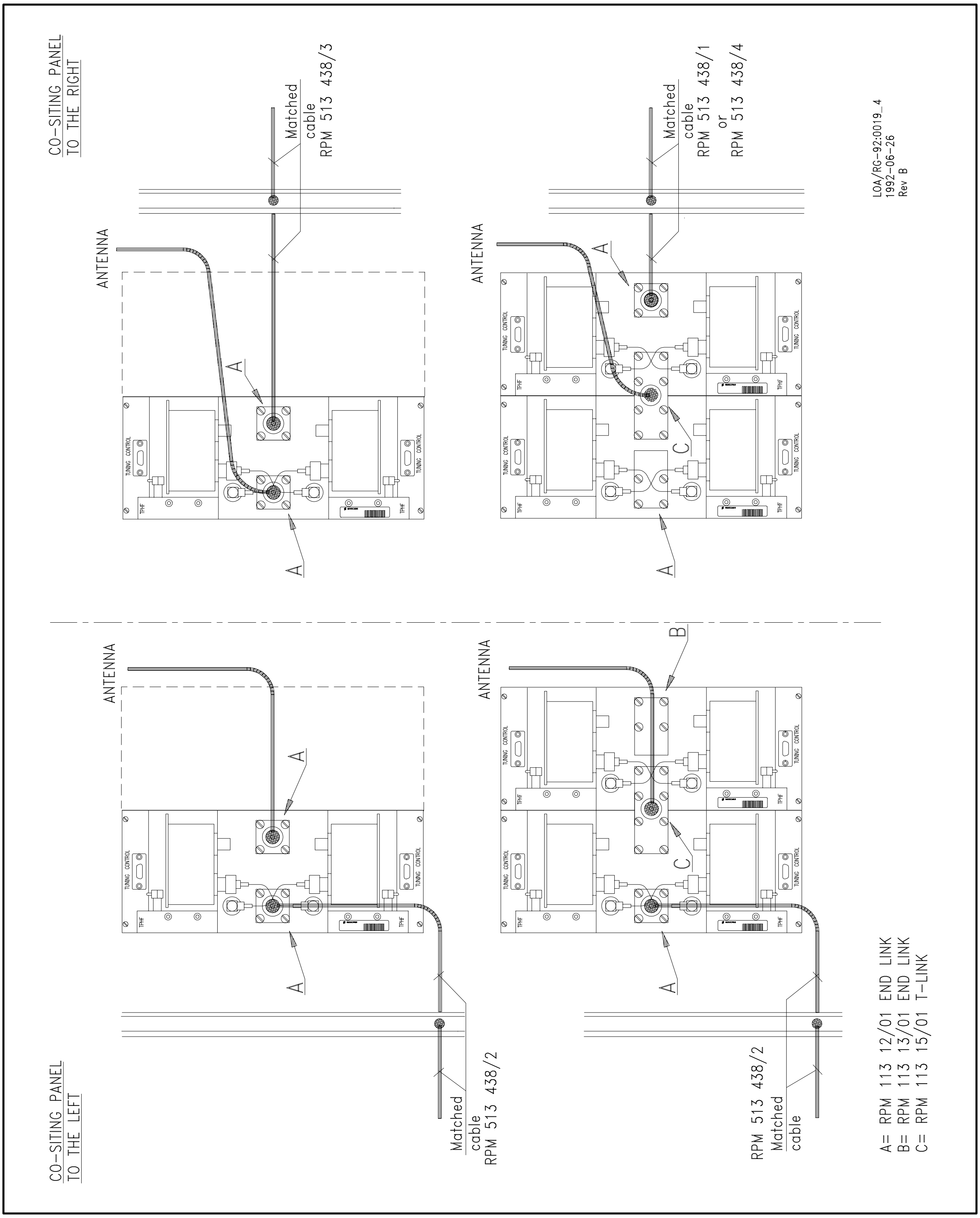


Figure 11 RBS 200 cabinet 201 162/– co-siting TACS:RSA combiners

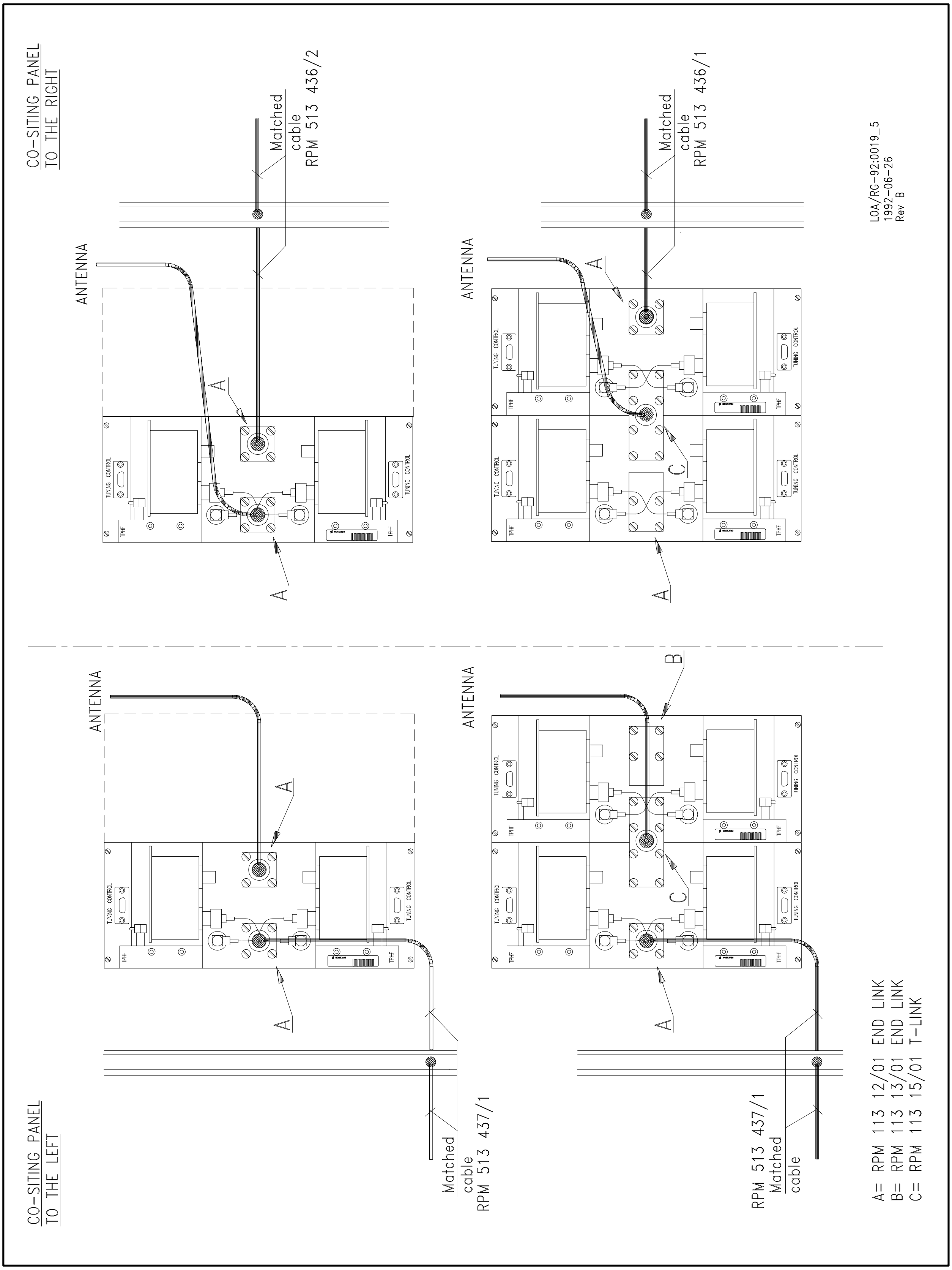


Figure 12 RBS 200 cabinet 201 162/– co-siting TACS:Allgon 1/4 combiners

6 RBS co-siting TACS

6.1 Cabling diagram

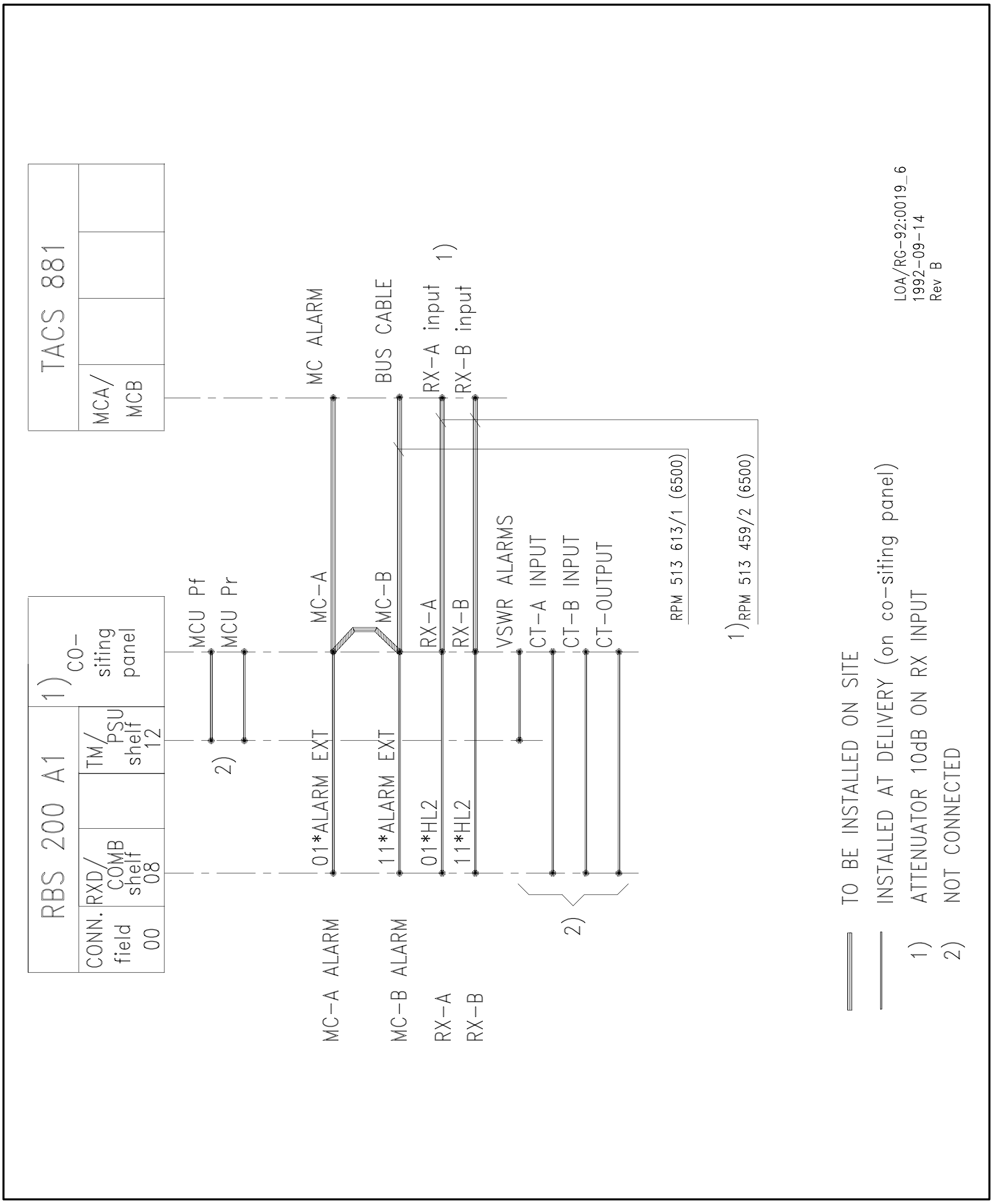


Figure 13 RBS 200 cabinet BDE 201 162/– co-siting TACS 881

7 Equipment specification

7.1 TACS 883

Table 1 Materials according to drawing OA/RG-92:0045

Item	Product no.	Designation	Comment
1			for Algon combiners in TACS
	RPM 513 436/1	Combiner Cable, right	
	RPM 513 436/2	Combiner Cable, right	
	RPM 513 437/1	Combiner Cable, left	
			for RSA combiners in TACS
	RPM 513 438/1	Combiner Cable, right	
	RPM 513 438/2	Combiner Cable, left	
	RPM 513 438/3	Combiner Cable, right	
	RPM 513 438/4	Combiner Cable, right extension	for Italy only
	RPM 113 12/01	Combiner conn. End link	one combiner (GSM)
	RPM 113 15/01	Combiner conn. T-link	two combiners (GSM)
2	RPM 513 429/4	Cable	TACS combiner
3	RPM 513 459/1	Cable, 5000 mm	
	6810.17 A Suhner	Attenuator, 10 dB	
	53 N-50 0 1/133 Suhner	Angle N/N	
4	RPM 513 440/1	Cable, 5000 mm	VSWR alarm
5	RPM 513 439/1	Cable, 5000 mm	MC alarms
6	RPM 513 445/1 or	Cable, 5000 mm	CT input
	RPM 513 102/19500	Cable, 20000 mm	CT input
7	RPM 513 445/1 +	Cable, 5000 mm	CT output

	6806.26 A Suhner +	Attenuator, 6 dB	
	53 TNC-50-0-1 Suhner or	Angle adaptor	
	RPM 513 102/19500	Cable, 20000 mm	TACS standard, without atten.
8	NTM 201 632/01	Co-panel, left	
	NTM 201 632/02	Co-panel, rigth	
9	NTM — —/-including:	Kit	PMU low power alarm (for RSA combiner)
	31N-4195-50-12/139	adaptor	
		cable with:	
	4195	male angle connector	
	RG400/U	cable, 450 mm	
	Suhner	N male angle connector	

7.2 TACS 883 + ETACS 883

7.2.1 TACS 883

Table 2 Materials according to drawing OA/RG-92:0045-1

Item	Product no.	Designation	Comment
1			for Algon combiners in TACS
	RPM 513 436/1	Combiner Cable, right	
	RPM 513 436/2	Combiner Cable, right	
	RPM 513 437/1	Combiner Cable, left	
			for RSA combiners in TACS
	RPM 513 438/1	Combiner Cable, right	
	RPM 513 438/2	Combiner Cable, left	
	RPM 513 438/3	Combiner Cable, right	
	RPM 513 438/4	Combiner Cable, right extension	for Italy only
	RPM 113 12/01	Combiner conn. End link	one combiner (GSM)
	RPM 113 15/01	Combiner conn. T-link	two combiners (GSM)

2	RPM 513 429/4	Cable	TACS combiner
3	RPM 513 459/1	Cable, 5000 mm	
	6810.17 A Suhner	Attenuator, 10 dB	
	53 N-50 0 1/133 Suhner	Angle N/N	
4	RPM 513 440/1	Cable, 5000 mm	VSWR alarm
5	RPM 513 439/1	Cable, 5000 mm	MC alarms
6	RPM 513 445/1 or	Cable, 5000 mm	CT input
	RPM 513 102/19500	Cable, 20000 mm	CT input
7	RPM 513 445/1 +	Cable, 5000 mm	CT output
	6806.26 A Suhner +	Attenuator, 6 dB	
	53 TNC-50-0-1 Suhner or	Angle adaptor	
	RPM 513 102/19500	Cable, 20000 mm	TACS stand., without attenuator
8	NTM 201 632/01	Co-panel, left	
	NTM 201 632/02	Co-panel, rigth	
9	NTM — —/-including:	Kit	PMU low power alarm (for RSA combiner)
	31N-4195-50-12/139	adaptor	
		cable with:	
	4195	male angle connector	
	RG400/U	cable, 450 mm	
	Suhner	N male angle connector	

7.2.2 ETACS 883

Diplexer for ETACS is used.

Table 3 Materials according to drawing OA/RG-92:0045-1

Item	Product no.	Designation	Comment	
20	RPM 513 370/6	Cable, 2000 mm	MCU Pf/Pr 3 pcs CT out	
21	Not specified	Filter	Diplexer	
22	KRY 121 02/01	Measure coupler	MCUC (GSM)	*)
23	RPM — —/-	Cable	MCU-Diplexer, antenna jumper	*)
24	RPM — —/-	Cable	Diplexer-GSM, antenna jumper	*)
25	RPM — —/-	Cable	Diplexer-ETACS, antenna jumper	*)
26	RPM — —/-	Cable	MCU-feeder, antenna jumper	*)

*) Not yet available

7.3 TACS 881

Table 4 Materials according to drawing OA/RG-92:0019

Item	Product no.	Designation	Comment
	RPM 513 459/2	Cable, 6500 mm	RX
	6810.17 A (Suhner)	Attenuator, 10 dB	
	RPM 513 613/1	Cable, 6500 mm	MC alarms
	NTM 201 632/01	Co-siting panel, left	
	NTM 201 632/02	Co-siting panel, right	

8 Space requirements

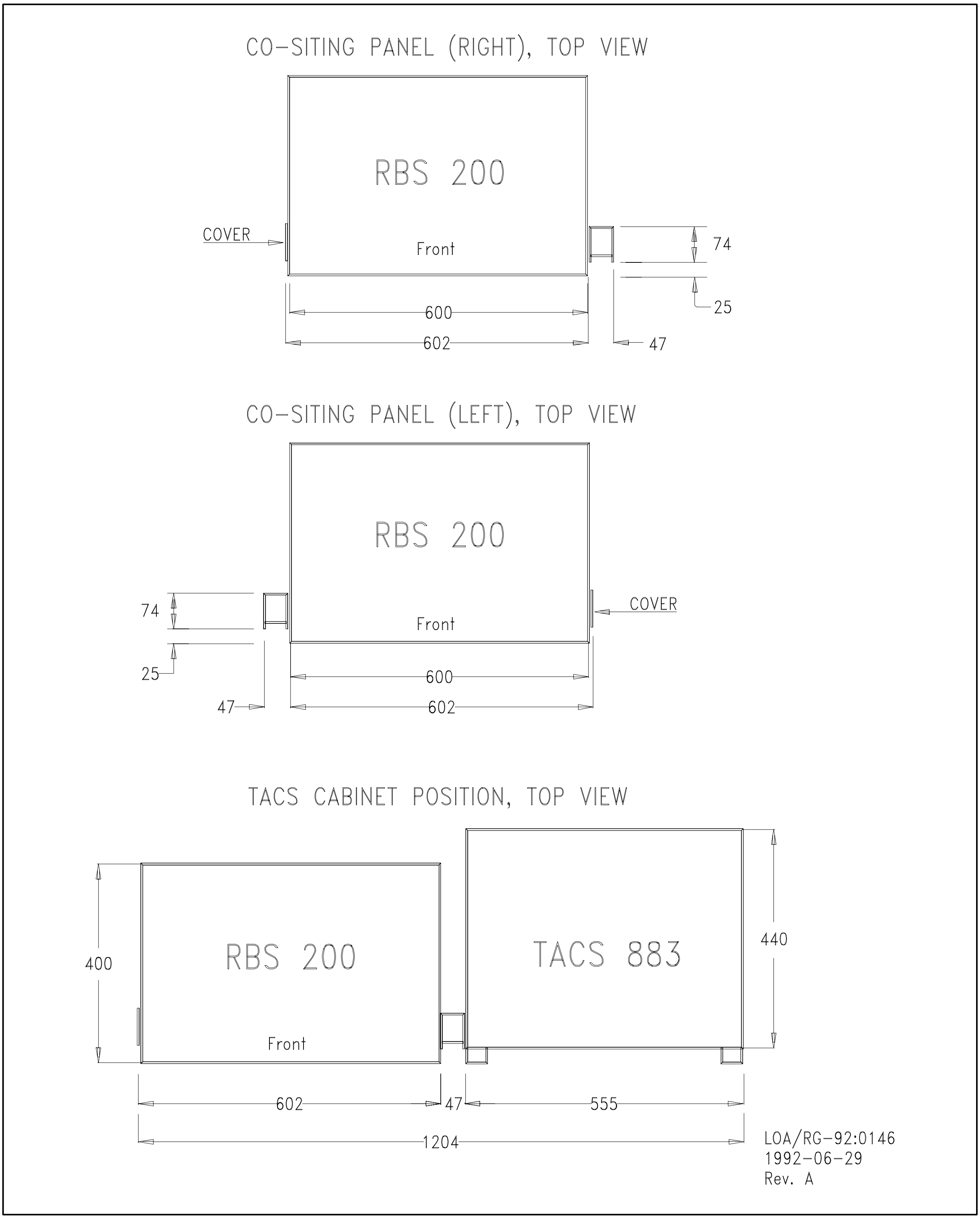


Figure 14 Co-siting space requirements

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CAPTION LIST

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Antennas

RBS 200
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Antennas

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1 Antenna feeders and jumpers

The type of feeder used at a site is based on the output power available, the length of the feeder, the antenna gain, the Effective Radiated Power (ERP) required and environmental demands.

Mainly three different sizes are used in the CME 201 system, normally using foam as dielectric material. The length of the cable(s) will depend on local conditions. It is therefore advisable to calculate how this will affect the total loss in the antenna system.

When planning the runways for feeders, the bending radius of the cables must be considered. Furthermore, the fire retardant characteristics of the feeders must be considered to meet the safety regulations.

The physical appearance of the cables may vary between makes, and it is thus important that the requirements for connectors, hangers, adaptors and earthing kits are based on the manufacturers recommendations.

For installation of Feeders and Jumpers,see General Installation Instructions, LZN 302 49.

2 Antenna mounting

2.1 General

Antenna applications are many and varied, making it difficult to provide a simple yet general description on how to do the mounting. The best way is to give the job to a company experienced in antenna installations.

It is of utmost importance that the mounting job is always done in a professional manner, so that the antenna installation will be firmly in place. All mounting hardware used in the installation must be approved by us before the installation is begun, and we must have access to inspect the antenna mounting after the installation has been completed.

With regards to the antenna supports, these are to have been previously strength tested and also corrosion protected according to environmental demands, as presented in Ericsson standards 1025-115 for different climates. Naturally, another compatible standard may be used.

As a rule, use supports and other hardware purchased from reliable and reputable manufacturers and suppliers. Results from strength tests and corrosion protection programs can then be easily checked when required.

Both strength and environmental specifications can be requested from ERA.

See General Installation Instructions, LZN 302 49.

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SG/ERA/LRN/ZG Josefin Sjödin 850 45464		1999-08-31	B	4/001 59-LZN 302 011 Uen
Godkänd — *Approved*				Tillhör/referens — *File/reference*
ERA/LRN/ZIC (Per Eklund)				

Reference Page

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1 Antennas

The following document has been removed from the manual:

1.1 Antenna Configuration Guidelines; LV/R-97:029

This document is not written in SGML format and is therefore not included in this manual. The document must be ordered separately from GASK2. Internet users can print out the documents from Intranet.

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CAPTION LIST

Document No.	
4/001 53-LZN 302 011	
Date: 99-09-21	Rev: B

Dimensioning & Ordering

RBS 200
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Dokansv/Godk — *Doc respons/Approved*	Kontr — *Checked*	Datum — *Date*	Rev	File
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Dimensioning & Ordering, RBS

Contents **Page**

1 Introduction

The purpose of this document is to give guidelines when dimensioning and ordering the RBS 200.

To enable dimensioning, RBS 200 is divided into three parts, as each system has different configuration rules and input criteria:

- RBS equipment 4.0
- Power equipment 4.1
- TRI equipment 4.2

Installation material is described in sub-section 4.3.

1.1 Definitions

TG	Transceiver Group. Corresponds to TRXs connected to each other with internal buses (max. 16). This is equivalent to a cell in most cases.
M-cabinet	Master cabinet. The first cabinet in a TG. It houses four TRXs. Note that a 3-sector site requires three M-cabinets.
E-cabinet	Extension cabinet. Always used when more than four TRXs are required in a TG. The E-cabinets are designated E1, E2 and E3.
Ordering level	Product structure level when ordering the equipment.

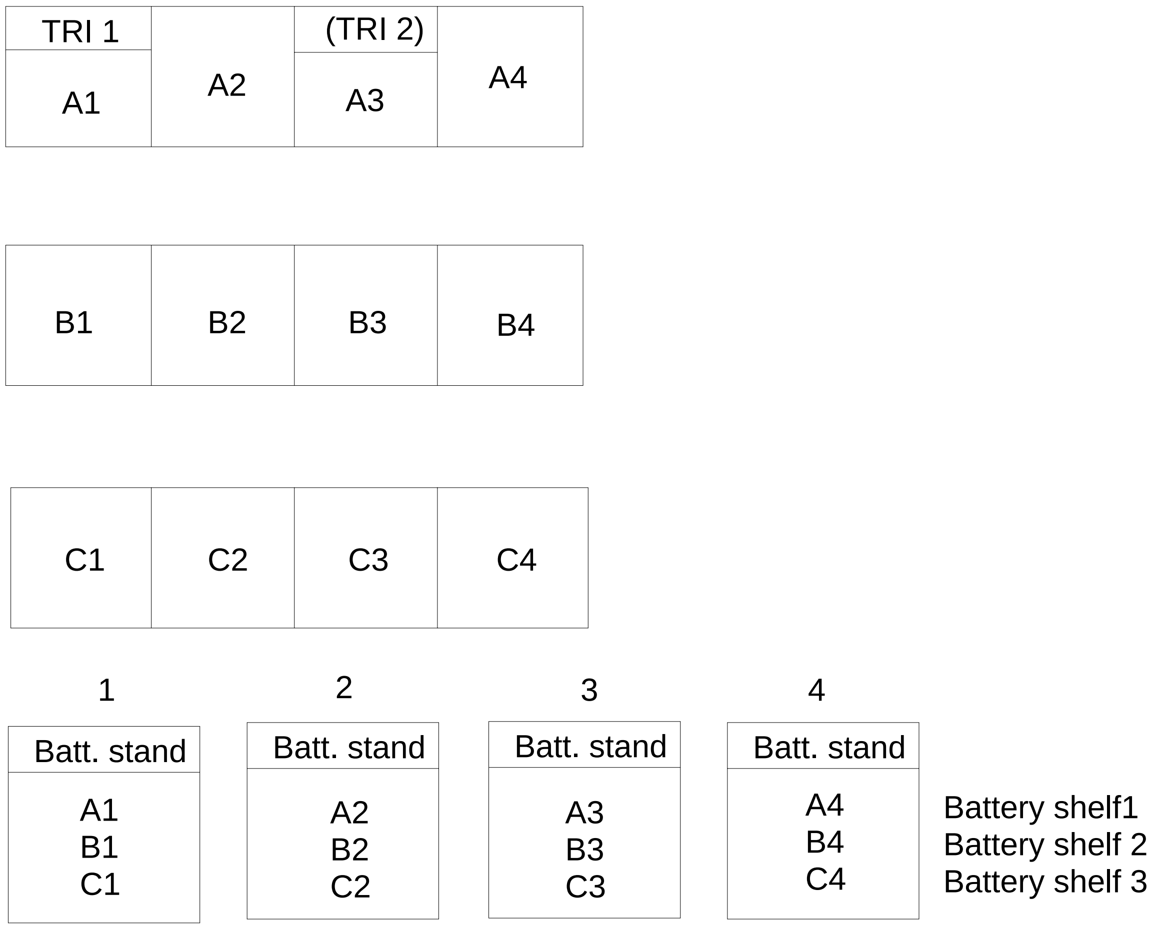

Figure 1 Rack configuration and designations

1.2 Concept

Many Basic Cabinet versions are supported. They are equipped with different combinations of radio filters, magazines and cables in accordance with the options in paragraph 1.4.

The Basic Cabinets are equipped with all internal cables needed for these options with three exceptions:

- Cables for PCU are delivered as a separate item.
- Cables for connections between cabinets are delivered as separate items.
- Cables for TRI are not included except for +24V DC power supply cable.

1.3 Support

Please note that all Basic Cabinet versions are not supported.

1.4 Available options

1.4.1 Number of TRXs

Allowed numbers:	1-16 (with FCOMB)
	1-4 (with HCOMB)

One cabinet houses maximum 4 TRXs.

It is possible to add TRXs afterwards.

1.4.2 Combiner type

1.4.2.1 Filter combiner (FCOMB)

FCOMB results in a low attenuation even in large configurations. It allows connecting up to 16 TRXs to the same TX antenna.

A 4-pole TXBP is mounted in the Master cabinet.

1.4.2.2 Hybrid combiner (HCOMB)

HCOMB allows connecting up to four TRXs to the same TX antenna. For this reason HCOMB is not relevant in any of the Extension Cabinets.

A 6-pole TXBP is mounted in the Master cabinet.

1.4.3 Receiver diversity

Allowed selections:	Yes/Prepared for:
Yes	Two RXBP filters mounted in the Basic Cabinet. Two RXD and two RXDA are included.
Prepared for:	Two RXBP filters mounted in the Basic Cabinet to make an upgrading easy.
No	Only one RXBP is mounted.

1.4.4 +24V DC power

When no Power Supply Unit is ordered (i.e. neither a 230V AC nor a -48V DC PSU), a central +24V DC supply is assumed.

The cabinet is not prepared for any PSU to be plugged in afterwards.

1.4.5 230V AC power

The number of Power Supply Units per TG (0-8) must be ordered.

The number of Power Control Units per TG (0-1) must be ordered.

Please observe, that the power system is site based, which means that the 230V AC resources are shared between all cabinets on the site. For example, the PCU is shared independent of the TG limits and the redundant PSU is also shared. A (n+1) redundancy for up to 3 cabinets is recommended for one PSU. The maximum PSU number is two per cabinet. See further sub-section 1 Power supply.

If a 230V AC PSU is ordered, the cabinet will be equipped with a magazine and cables for 230V AC.

1.4.6 -48V DC power

The cabinet is equipped with cables and a magazine for maximum two DC/DC converters for -48V DC to +24V DC. The cabinet is in this version also equipped with one Capacitor unit.

Two versions of DC/DC converters exist:

1.4.6.1 1100 W

Cannot supply a fully equipped cabinet at full output power.

1.4.6.2 1300 W

Will replace the 1100 W unit later on. Redundancy can be achieved with two PSUs in each cabinet.

1.4.7 TX filter type

1.4.7.1 TXBP 6

Select TXBP 6 together with H-comb. Can also be used together with F-comb.

1.4.7.2 TXBP 4

To be used together with F-comb.

1.4.8 Co-siting panel

Co-sited system can be located to the left or to the right of the TRS. This requires two different co-siting panels, one for each location.

Left-hand location is recommended, since TRS normally expands to the right.

TRS shall always expand in the opposite direction of the co-siting panel.

Choice of panel is independent of cabinet type.

1.4.9 RXBP extended

This is a receiver bandpass filter for co-siting with an ETACS system, where the ETACS multicouplers are cascaded after the TRS RXDAs.

1.4.10 Signal Processing Part, SPP with or without encryption

It is possible to choose a system with or without encryption.

1.4.11 Signal Processing Unit, SPU

Alternative to the SPP. 1 SPU equals 8 SPPs.

1.5 Delivery of equipment

1.5.1 Basic cabinets

Selected options in paragraph 1.4 result in different basic cabinets equipped with different cables, magazines and filters.

Support column indicates that the combination is fully supported (documented and verified) and possible to order.

When using PRIM ordering data, it is not necessary to know the differences between the cabinets in table 1.

Table 1 Master Cabinets and Extension Cabinets

Master/ Exten- sion cabinet	RXBPtype	Power Supply	COMB/ filter type	Diversity	BDE 201 162/ Index	
M	Std	24	F4	No	101	
M	Std	24	F4	Yes [1)]	102	
M	Std	24	F6	No	103	
M	Std	24	F6	Yes	104	
M	Std	24	H6	No	104	
M	Std	24	H6	Yes	104	
M	Std	230	F4	No	107	
M	Std	230	F4	Yes	01	A12
M	Std	230	F6	No	109	
M	Std	230	F6	Yes	05	E12
M	Std	230	H6	No	111	
M	Std	230	H6	Yes	112	
M	Std	-48	F4	No	113	
M	Std	-48	F4	Yes	04	D12
M	Std	-48	F6	No	115	
M	Std	-48	F6	Yes	116	

M	Std	-48	H6	No	117	
M	Std	-48	H6	Yes	118	
M	Ext	24	F4	No	119	
M	Ext	24	F4	Yes	03	C12
M	Ext	24	F6	No	121	
M	Ext	24	F6	Yes	122	
M	Ext	24	H6	No	123	
M	Ext	24	H6	Yes	124	
M	Ext	230	F4	No	125	
M	Ext	230	F4	Yes	126	
M	Ext	230	F6	No	127	
M	Ext	230	F6	Yes	128	
M	Ext	230	H6	No	129	
M	Ext	230	H6	Yes	130	
M	Ext	-48	F4	No	131	
M	Ext	-48	F4	Yes	132	
M	Ext	-48	F6	No	133	
M	Ext	-48	F6	Yes	134	
M	Ext	-48	H6	No	135	
M	Ext	-48	H6	Yes	136	
E1-E3	-	24	F	-	201	
E1-E3	-	230	F	-	202	
E1-E3	-	-48	F	-	203	

1) Includes diversity and prepared for diversity

These units are delivered separately, i.e. not mounted into the cabinets.

To calculate the number of units needed for each cabinet, see table 2. There are separate columns for different numbers of TRXs. The values for a row have to be valid, otherwise the items for that row cannot be delivered.

1.5.2 Other delivery units

Table 2 Other Delivery Units

Unit	Condition	Number of TRXs in Cabinet			
		M1	E1	E2	E3
		1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
TRXD-Magazine; 1/BFL 119 71/3		0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1
TRX 900/45; KRC 121 02/= 1) 5)		1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
TM; KRG 101 01/01		1 1 1 1	0 0 0 0	0 0 0 0	0 0 0 0
ACU; KRC 131 42/01		1 1 1 1	0 0 0 0	0 0 0 0	0 0 0 0
PSU 230V AC; BML 435 002/1 2)	230V AC No red. 230V AC Redund.	1 1 1 1 2 2 2 2	1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1
PCU; ROA 119 807/0150 2)	230V AC & PCU	1 1 1 1	0 0 0 0	0 0 0 0	0 0 0 0
Cable set PCU; BMY 201 071/1 2)	230 VAC & PCU	1 1 1 1	0 0 0 0	0 0 0 0	0 0 0 0
PSU -48V DC 1300 W; BMR 960 009/1	-48V DC No red. -48V DC Redund.	1 1 1 2 2 2 2 2	1 1 1 1 2 2 2 2	1 1 1 1 2 2 2 2	1 1 1 1 2 2 2 2
FCOMB; KRF 201 01/01	FCOMB	1 1 2 2	1 1 2 2	1 1 2 2	1 1 2 2
TXD; KRF 101 01/03	FCOMB	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1
HCOMB (2 TRX); KRF 201 01/02	HCOMB	1 1 2 2	0 0 0 0	0 0 0 0	0 0 0 0
HCOMB (2+2); KRF 201 01/03	HCOMB	0 0 1 1	0 0 0 0	0 0 0 0	0 0 0 0
RXDA; KRF 101 01/01	No diversity Diversity	1 1 1 1 2 2 2 2	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0
RXD; KRF 101 01/02	No diversity Diversity	1 1 1 1 2 2 2 2	1 1 1 1 2 2 2 2	1 1 1 1 2 2 2 2	1 1 1 1 2 2 2 2
Cable set Ext, R 1-2; NTM 201 651/01 3)		0 0 0 0	1 1 1 1	0 0 0 0	0 0 0 0
Cable set Ext, R 2-3; NTM 201 652/01 3)		0 0 0 0	0 0 0 0	1 1 1 1	0 0 0 0
Cable set Ext, R 3-4; NTM 201 653/01 3)		0 0 0 0	0 0 0 0	0 0 0 0	1 1 1 1
Co-siting/L-set; NTM 201 632/01	Co-siting left	1 1 1 1	0 0 0 0	0 0 0 0	0 0 0 0
Co-siting/R-set; NTM 201 632/02	Co-siting right	1 1 1 1	0 0 0 0	0 0 0 0	0 0 0 0
Cable set Ext, L 1-2; NTM 201 871/01 4)		0 0 0 0	1 1 1 1	0 0 0 0	0 0 0 0

1) There are nine possible TRX versions:

KRC 121 02/01 with A5/1 encryption (8 x SPP)

KRC 121 02/03 without encryption (8 x SPP)

KRC 121 02/04 with Battery Booster and A5/1 encryption (8 x SPP)

KRC 121 02/07 with A5/1 encryption (1 x SPU+)

KRC 121 02/08 with A5/2 encryption (1 x SPU+)

KRC 121 02/09 with Battery Booster and A5/1 encryption (1 x SPU+)

KRC 121 02/10 with A5/1 encryption (1 x SPU+) 5)

KRC 121 02/11 with A5/2 encryption (1 x SPU+) 5)

KRC 121 02/12 with Battery Booster and A5/1 encryption (1 x SPU+) 5)

2) See Chapter 6, paragraph 1, 4 and 5 of this manual for information on the Power Supplies.

3) Support for right-hand cabinet expansion.

4) Support for left-hand expansion of co-sited GSM cabinets.

5) SPE board ROA 117 2147/1 for piggy-back mounting onto SPU+ board for half-rate function.

2 Dimensioning and ordering of the RBS

First specify the system configuration and select the available options:

- Master and/or Extension cabinets
- Type of TX filter
- Type of Power Supply
- Diversity

Select the correspondent cabinet type from table 1:

- Specify number of TRXs
- Number of TGs on site

Use table 2 and equip your Master and/or E1 (E2, E3) cabinets with units and cable sets.

Note Please observe, that ordering is managed on TG basis. In the event of a3-sector site the procedure must be repeated once for each cell.

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ERA/LRN/ZI QRAJOJO		131 62-COH 109 2015/1 Uen		
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ERA/LRN/ZGC Leif Olof Fager		1999-10-21	B	

Dimen. and Order., Power Supply

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1 Dimensioning and Ordering the Power Supply

1.1 +24V DC

No specific units must be ordered, but the distribution cables shall be dimensioned with regard to required length and permitted voltage drop.

One ON/OFF power switch per power supply unit must be included in the distribution for each cabinet.

The 25 mm^2 cable must be adapted. The IDM can take 35 - 150 mm^2.

Table 1

Distance to RBS Rack (m)	**Cable Type (mm^2)**	**Product Number**	**Fuse, minimum**
7	25	TFK100508/08	80 A
10	35	TFK100509/08	80 A
14	50	TFK100510/08	80 A
20	70	TFK100511/08	80 A
42	150	TFK100514/08	80 A

1.2 -48V DC DC/DC Converters

1.2.1 Converter Types

Two types of converters exist:

- BMR 960 008/1 PSU 1100W

This converter cannot supply a fully equipped cabinet at full output power.

- BMR 960 009/1 PSU 1300W

This converter replaces the BMR 960 008/1 converter.

1.2.2 Distribution Cables

The distribution cables shall be dimensioned with regard to required length and permitted voltage drop.

One ON/OFF power switch per converter must be included in the distribution for each cabinet.

Cables with a larger area than 16 mm^2 must be adapted.

Table 2

Distance to RBS Rack (m)	Cable Type (mm^2)	Product Number	Fuse, minimum
10	16	TFK100507/08	40 A
15	25	TFK100508/08	40 A
21	35	TFK100509/08	40 A
30	50	TFK100510/08	40 A
42	70	TFK100511/08	40 A

1.3 230V AC Power Supply Unit, PSU BML 435 002/1

A (n+1) redundancy is recommended.

Please observe that the power system is site based, which means that the 230 V AC resources are shared between all cabinets.

The Power Control Unit, PCU and the redundant PSU are also shared independent of the number of cabinets.

Rule:		
PCU	One per Site	
PSU	Master Cabinet only:	2 pcs
	Master + Extension Cabinet:	2 + 1 pcs

1.3.1 Battery Backup

Different types are available for ordering in accordance with Ordering Info 13162-1/HRB 103 304 Uen. Each cabinet has its own battery package.

Select the appropriate material from the Ordering Info.

For battery cables, refer to table 1.

Uppgjord — *Prepared*		Datum — *Date*	Rev	Dokumentnr — *Document no*
SG/ERA/LRN/ZG Josefin Sjödin 850 45464		1999-08-31	B	5/001 59-LZN 302 011 Uen
Godkänd — *Approved*	Kontr — *Checked*			Tillhör/referens — *File/reference*
ERA/LRN/ZIC (Per Eklund)				

Reference Page

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1 Dimensioning and Ordering

The following Appendix has been removed from the manual:

1.1 Ordering Information 131 62-1/HRB 103 304 Uen

This document is not written in SGML format and is therefore not included in this manual. The document must be ordered separately from GASK2. Internet users can print out the documents from Intranet.

Uppgjord — *Prepared*	Faktaansvarig — *Subject responsible*	Nr — *No.*		
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Dokansv/Godk — *Doc respons/Approved*	Kontr — *Checked*	Datum — *Date*	Rev	File
ERA/LZ/TGC (ERABVN)		1998-02-03	A	

Dimensioning and Ordering, TRI

Contents **Page**

1 Dimensioning the TRI

When dimensioning, use the information in Chapter 2, section 2, Transmission Radio Interface TRI.

1.1 General rules

Dimensioning, as described below, is based on magazine BFD 747 504/11, and is basically equipped with:

- 1 ETB
- 1 RTT
- 1 STR

This means that the TRI initially can handle:

ETB	30 TSs or 10 TRXs
RTT	4 TRXs located in the same cabinet

1.2 Redundancy on the signalling link

Add one extra STR and ETB board if redundancy is required. This means that the TRI can handle another 30 TSs.

The system is now able to handle in total:

- 60 TSs or 20 TRXs.

1.3 Time slots (TS)

Another way to calculate the number of required ETB, is to count required number of TS. The criteria is three TSs per TRX.

Example:

12 TRX = 36 TS

which gives two ETB boards.

Number of RTT boards is simply one RTT per four TRXs and cabinet. In the example above, this gives three RTT boards.

1.4 Limitations

List of limitations is shown in the beginning of Chapter 2, section 2, TRI, para. 2.2.

1.5 Cascaded site

If transmission line is to be further connected to another cascaded site, an additional ETB is mandatory.

One reason for the transfer of TS is to utilize the existing connected 2 Mbit/s PCM link more efficiently. If, for instance, only 12 TSs are used on a site, this means that 18 TSs are "left over".

If however, these TSs are cascaded to another suitable site, it results in a better utilization of the 2 Mbit/s line.

Remember, if it is known from the start that spare capacity is necessary due to future expansion, this must be taken into consideration when dimensioning.

1.6 Block diagram - MUX in back to back configuration

Refer to Chapter 2,section 2, TRI, para. 6.1.

1.7 Block diagram - Bypassed and cascaded site

Refer to Chapter 2, 0section 2, TRI, para. 6.2.

Note Remember that a transmission medium (opto cable, radio link MUX equipment etc) between the BSC and BTSs, always is required. Maximum transmission distance between 2 ETBs is 300 m.

1.8 PCM cables

Decide if 75 or 120 ohm cable is required.

Add a connection box on the cabinet top if more than:

3 links (75 ohm) or

2 links (120 ohm)

are connected.

1.9 Rule of thumb - dimensions

ETB	30 TSs or 10 TRXs
RTT	4 TRXs in one cabinet
STR	Time slot 16. 2 STRs and 2 ETBs for signal link redundancy

Start with BFD 747 505/11 and add boards when necessary.

1.10 Alarm cabling - ACU

Note, that if ACU is installed, the alarm cables must be checked and adapted to selected power system.

See section 2.5, Alarm handling for further information.

Table 1 TRI configuration

No. of TRXs	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**Product number**
TRI Basic Set	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	BFD 747 504/ 11
ETB											1	1	1	1	1	1	ROF 137 7846/1
RTT					1	1	1	1	2	2	2	2	3	3	3	3	ROF 137 7870/1
Cable RTT	1	1	1	1	2	2	2	2	3	3	3	3	4	4	4	4	RPM 513 364/ 1
75 ohm cable ETB-Cab. top	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	RPM 513 363/ 1
75 ohm cable Cab. top-DF	2	2	2	2	2	2	2	2	2	2	4	4	4	4	4	4	RPM 513 339
120 ohm cable ETB-Cab. top	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	RPM 513 423/ 1
120 ohm cable Cab. top-DF	2	2	2	2	2	2	2	2	2	2	4	4	4	4	4	4	RPM 513 349
Cable +24 V DCTRI-IDM	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	RPM 513 389/ 1
Alarm cable EXALI-Cab. top	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	RPM 513 364/ 1
LIB cable	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	RPM 513 336/ 500
LIB cable					1	1	1	1	1	1	1	1	1	1	1	1	RPM 513 336/ 6500

Table 2 TRI configuration

No. of TRXs	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**Product number**
TRI Basic Set	1	1	1	1	1	1	1	1	BFD 747 504/11
ETB	1	1	1	1	2	2	2	2	ROF 137 7846/1
RTT	4	4	4	4	5	5	5	5	ROF 137 7870/1
Cable RTT	5	5	5	5	6	6	6	6	RPM 513 364/1

75 ohm cable ETB-Cab. top	2	2	2	2	3	3	3	3	RPM 513 363/1
75 ohm cable Cab. top-DF	4	4	4	4	6	6	6	6	RPM 513 339
Connection box 75 ohm	-	-	-	-	-	-	-	-	SXK 107 2435/1 [1)]
120 ohm cable ETB-Cab. top	2	2	2	2	3	3	3	3	RPM 513 423/1
120 ohm cable Cac. top-DF	4	4	4	4	6	6	6	6	RPM 513 349
Connection box 120 ohm					1	1	1	1	SXK 107 2436/1 [2)]
Cable +24 V DCTRI-IDM	1	1	1	1	1	1	1	1	RPM 513 389/1
Alarm cable EXALI-Cab. top	1	1	1	1	1	1	1	1	RPM 513 364/1
LIB cable	1	1	1	1	1	1	1	1	RPM 513 336/500
LIB cable	4	4	4	4	5	5	5	5	RPM 513 336/6500

[1)] Add one PCE if more than 3 ETB

[2)] Add on PCE if more than 2 ETB

Table 3 TRI configuration, redundant signalling link

No. of TRXs	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**Product number**
TRI Basic Set	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	BFD 747 504/11
ETB	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	ROF 137 7846/1
RTT					1	1	1	1	2	2	2	2	3	3	3	3	ROF 137 7870/1
Cable RTT	1	1	1	1	2	2	2	2	3	3	3	3	4	4	4	4	RPM 513 364/1
75 ohm cable ETB-Cab. top	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	RPM 513 363/1
75 ohm cable Cab. top-DF	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	RPM 513 339
120 ohm cable ETB-Cab. top	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	RPM 513 423/1
120 ohm cable Cab. top-DF	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	RPM 513 349
STR	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	ROF 131 4445/2

Cable +24 V DCTRI-IDM	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	RPM 513 389/1
Alarm cable EXALI-Cab. top	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	RPM 513 364/1

Table 4 TRI configuration, redundant signalling link

No. of TRXs	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**Product number**
TRI Basic Set	1	1	1	1	1	1	1	1	BFD 747 504/11
ETB	1	1	1	1	2	2	2	2	ROF 137 7846/1
RTT	4	4	4	4	5	5	5	5	ROF 137 7870/1
Cable RTT	5	5	5	5	6	6	6	6	RPM 513 364/1
75 ohm cable ETB-Cab. top	2	2	2	2	3	3	3	3	RPM 513 363/1
75 ohm cable Cab. top-DF	4	4	4	4	6	6	6	6	RPM 513 339
Connection box 75 ohm	-	-	-	-	-	-	-	-	SXK 107 2435/1 [1)]
120 ohm cable ETB-Cab. top	2	2	2	2	3	3	3	3	RPM 513 423/1
120 ohm cable Cac. top-DF	4	4	4	4	6	6	6	6	RPM 513 349
Connection box 120 ohm					1	1	1	1	SXK 107 2436/1 [2)]
STR	1	1	1	1	1	1	1	1	ROF 131 4445/2
Cable +24 V DCTRI-IDM	1	1	1	1	1	1	1	1	RPM 513 389/1
Alarm cable EXALI-Cab. top	1	1	1	1	1	1	1	1	RPM 513 364/1

[1)] Add one PCE if more than 3 ETB

[2)] Add on PCE if more than 2 ETB

2 Dimensioning TRI with LAPD concentration

When dimensioning, use the information in Chapter 2, section 2, Transmission Radio Interface TRI.

2.1 General rules

Dimensioning, as described below, is based on magazine BFD 747 504/111, and is basically equipped with:

- 1 ETB
- 1 RTT
- 1 STR
- 1 EMRPS

This means that the TRI initially can handle:

ETB	30 TSs or 12 TRXs
RTT	4 TRXs located in the same cabinet

2.2 Redundancy on the signalling link

Add one extra STR and ETB board if redundancy is required. This means that the TRI can handle another 30 TSs.

The system is now able to handle in total:

- 60 TSs or 24 TRXs.

2.3 Time slots (TS)

Another way to calculate the number of required ETBs, is to count required number of TSs. Depending on concentrator configuration, 2, 3 or 4 TRXs will share one TS for signalling. One TRX requires two TSs for speech.

Example:

12 TRX = 12x2=24 TS for speech

4:1 concentration = 3 TSs for signalling

Total number of TSs = 27

which gives one ETB board.

Number of RTT boards is simply one RTT per four TRXs and cabinet. In the example above, this results in three RTT boards.

One EMRPS board can contain up to 10 concentrators. This number will be limited by the number of available TSs on the EMRPS board. 31 TSs are available on the board. One concentrator needs one TS per TRX, plus one TS for the LAPD link.

Example:

A ratio of 4:1 concentrators needs 4 TSs for the TRXs and 1 TS for the link, for a grand total 5 TSs.

31:5 = 6.2.

The EMRPS board can contain max. 6 pcs., 4:1 concentrators.

They will handle 6x4 = 24 TRXs.

The degree of concentration, 2:1, 3:1 or 4:1, is dependent on the traffic load on the TRX. The configuration is set up in the Data Transcript (DT) for the BSC. A more detailed description of the dimensioning is given in the Ordering Information, 131 62-ANT 239 03 Uen.

2.4 Cascaded site

If transmission line is to be further connected to another cascaded site, an additional ETB is mandatory.

One reason for the transfer of TS is to utilize the existing connected 2 Mbit/s PCM link more efficiently. If, for instance, only 12 TSs are used on a site, this means that 18 TSs are "left over".

If however, these TSs are cascaded to another suitable site, it results in a better utilization of the 2 Mbit/s line.

Remember, if it is known from the start that spare capacity is necessary due to future expansion, this must be taken into consideration when dimensioning.

2.5 Block diagram - MUX in back to back configuration

Refer to Chapter 2, section 2, TRI, para. 6.1.

2.6 Block diagram - Bypassed and cascaded site

Refer to Chapter 2, section 2.2, TRI, para. 6.2.

Note Remember that a transmission medium (opto cable, radio link MUX equipment etc) between the BSC and BTSs, always is required. Maximum transmission distance between 2 ETBs is 300 m.

2.7 PCM cables

Decide if 75 or 120 ohm cable is required.

Add a connection box on the cabinet top if more than:

3 links (75 ohm) or

2 links (120 ohm)

are connected.

2.8 Rule of thumb - dimensions

ETB	30 TSs or 12 TRXs
RTT	4 TRXs in one cabinet
STR	Time slot 16. 2 STR and 2 ETB for signal link redundancy

Start with BFD 747 505/111 and add boards when necessary.

2.9 Alarm cabling - ACU

Note, that if ACU is installed, the alarm cables must be checked and adapted to selected power system.

See Chapter 2, section 5, Alarm Handling for further information.

Table 5 TRI configuration with LAPD concentration

No. of TRXs	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**Product number**
TRI Basic Set	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	BFD 747 504/ 111
ETB													1	1	1	1	ROF 137 7846/1
RTT					1	1	1	1	2	2	2	2	3	3	3	3	ROF 137 7870/1
Cable RTT	1	1	1	1	2	2	2	2	3	3	3	3	4	4	4	4	RPM 513 364/ 1
75 ohm cable ETB-Cab. top	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	RPM 513 363/ 1
75 ohm cable Cab. top-DF	2	2	2	2	2	2	2	2	2	2	2	2	4	4	4	4	RPM 513 339
120 ohm cable ETB-Cab. top	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	RPM 513 423/ 1
120 ohm cable Cab. top-DF	2	2	2	2	2	2	2	2	2	2	2	2	4	4	4	4	RPM 513 349

Cable +24 V DCTRI-IDM	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	RPM 513 389/ 1
Alarm cable EXALI-Cab.top	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	RPM 513 364/ 1
LIB cable	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	RPM 513 336/ 500
LIB cable					1	1	1	1	1	1	1	1	1	1	1	1	RPM 513 336/ 6500

Table 6 TRI configuration with LAPD concentration

No. of TRXs	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**Product number**
TRI Basic Set	1	1	1	1	1	1	1	1	BFD 747 504/111
ETB	1	1	1	1	1	1	1	1	ROF 137 7846/1
RTT	4	4	4	4	5	5	5	5	ROF 137 7870/1
Cable RTT	5	5	5	5	6	6	6	6	RPM 513 364/1
75 ohm cable ETB-Cab. top	2	2	2	2	2	2	2	2	RPM 513 363/1
75 ohm cable Cab. top-DF	4	4	4	4	4	4	4	4	RPM 513 339
Connection box 75 ohm	-	-	-	-	-	-	-	-	SXK 107 2435/1 [1)]
120 ohm cable ETB-Cab. top	2	2	2	2	2	2	2	2	RPM 513 423/1
120 ohm cable Cac. top-DF	4	4	4	4	4	4	4	4	RPM 513 349
Connection box 120 ohm									SXK 107 2436/1 [2)]
Cable +24 V DCTRI-IDM	1	1	1	1	1	1	1	1	RPM 513 389/1
Alarm cable EXALI-Cab.top	1	1	1	1	1	1	1	1	RPM 513 364/1
LIB cable	1	1	1	1	1	1	1	1	RPM 513 336/500
LIB cable	4	4	4	4	5	5	5	5	RPM 513 336/6500

[1)] Add one PCE if more than 3 ETB

[2)] Add on PCE if more than 2 ETB

Table 7 TRI configuration, redundant signalling link and LAPD concentration

No. of TRXs	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**Product number**
TRI Basic Set	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	BFD 747 504/ 111
ETB	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	ROF 137 7846/1
RTT					1	1	1	1	2	2	2	2	3	3	3	3	ROF 137 7870/1
Cable RTT	1	1	1	1	2	2	2	2	3	3	3	3	4	4	4	4	RPM 513 364/ 1
75 ohm cable ETB-Cab. top	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	RPM 513 363/ 1
75 ohm cable Cab. top-DF	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	RPM 513 339
120 ohm cable ETB-Cab. top	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	RPM 513 423/ 1
120 ohm cable Cab. top-DF	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	RPM 513 349
STR	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	ROF 131 4445/2
Cable +24 V DCTRI-IDM	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	RPM 513 389/ 1
Alarm cable EXALI-Cab.top	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	RPM 513 364/ 1

Table 8 TRI configuration, redundant signalling link with LAPD concentration

No. of TRXs	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**Product number**
TRI Basic Set	1	1	1	1	1	1	1	1	BFD 747 504/111
ETB	1	1	1	1	1	1	1	1	ROF 137 7846/1
RTT	4	4	4	4	5	5	5	5	ROF 137 7870/1
Cable RTT	5	5	5	5	6	6	6	6	RPM 513 364/1
75 ohm cable ETB-Cab. top	2	2	2	2	2	2	2	2	RPM 513 363/1
75 ohm cable Cab. top-DF	4	4	4	4	4	4	4	4	RPM 513 339
Connection box 75 ohm	-	-	-	-	-	-	-	-	SXK 107 2435/1 [1)]

120 ohm cable ETB-Cab. top	2	2	2	2	2	2	2	2	RPM 513 423/1
120 ohm cable Cac. top-DF	4	4	4	4	4	4	4	4	RPM 513 349
Connection box 120 ohm									SXK 107 2436/1 [2)]
STR	1	1	1	1	1	1	1	1	ROF 131 4445/2
Cable +24 V DCTRI-IDM	1	1	1	1	1	1	1	1	RPM 513 389/1
Alarm cable EXALI-Cab. top	1	1	1	1	1	1	1	1	RPM 513 364/1

[1)] Add one PCE if more than 3 ETB

[2)] Add on PCE if more than 2 ETB

3 TRI magazine

Ordering Data Key, TRI

TRI Magazine, equipped
BFD 747 504/XX

		DC/DC ROF 137 7904/1	EMRP ROF 131 995/7	TSW ROF 137 7856/2	V24 ROF 131 4254/1	EXALI ROF 131 4255/1	STR ROF 131 4445/2	ETB ROF 137 7846/1	RTT ROF 137 7870/1	Cable STR TSR 204 0201/500	RNV 991 223/004	RNV 991 712/001	RNV 321 0111	EMRPS ROF 131 8217/1	RNV 991 03/xx
1	BFD 747 504/11 INCLUDES:	1	1	1	1	1	1	1	1	1	2	1	1		
2	BFD 747 504/22	1	1	1	1	1	2	2	2	2	2	1	1		
3	BFD 747 504/33	1	1	1	1	1	2	3	3	2	2	1	1		
4	BFD 747 504/111	1	1	1	1	1	1	1	1	4	2	1		1	2
5	BFD 747 504/122	1	1	1	1	1	2	2	2	4	2	1		1	2
6	BFD 747 504/133	1	1	1	1	1	2	3	3	4	2	1		1	2

Figure 1

Uppgjord — *Prepared*	Faktaansvarig — *Subject responsible*	Nr — *No.*		
ERA/LRN/ZG ERAWAIN		3/131 62-COH 109 2015/11 Uen		
Dokansv/Godk — *Doc respons/Approved*	Kontr — *Checked*	Datum — *Date*	Rev	File
ERA/LRN/ZGC (Leif-Olof Fager)		1999-10-04	B	

Dimen. and Order., Suppl. Equip.

Contents **Page**

1 General

1.1 Cabling between cabinets

- Select material required for interconnection of cabinets:

Sector site:

NTM 201 245/4 supplementary equipment.

1 set per 3 TGs and 3 cabinets.

Omni site:

NTM 201 245/3 supplementary equipment.

1 set per site with 1 cabinet.

Master - Extension Cable Set item 4.2.1 - 4.2.3:
Selection on TG basis.

- Also use the information given in:

Chapter 2, section 4, Cabling and Earthing

Chapter 2, section 2, TRI.

1.2 Mechanics for outdoor installation

Mechanics is dependent on site location and configuration.

1.3 Mechanics for indoor installation

Mechanics included in set NTM 201 201/4 is a recommendation.
Material required is dependent on the site configuration.

2 Installation material

2.1 Basic equipment (shall always be delivered):

NTM 201 245/3; Suppl. Equipment, omni site

NTM 201 245/4; Suppl. Equipment, sector site

Table 1

Item	Product number	Description	Omni site, 1 cabinet	Sector site, 3 cabinets
1.1	RPM 513 336/500	LIB cable	1	1
1.2	RPM 513 336/6500	LIB cable	-	2
1.3	RPM 513 338	Ext. alarm cable	2	4
1.4	5/NTM 201 201	Cabinet grounding set	4	6
1.5	SVH 287 001/1	Label set	1	1
1.6	LZY 213 184/103	Label Set, TRI cables	1	1

2.2 Optional equipment

Table 2

Item	Product number	Description	Omni site, 1 cabinet	Sector site, 3 cabinets
2.1	NTM 201 249/1	Distribution Field, DF	1	1

2.3 Antenna feeders

Table 3

Item	Product number	Description	Unit
3.1	SXA 105 3061	LCF 7/8" Cu 2 feeder	M
3.2	SXA 105 3062	LCF 1 5/8" Cu feeder	M

2.4 Feeder connectors

Table 4

Item	Product number	Description	Unit
4.1	5/NTM 201 230/1	Connector kit, 7/8" feeder	Kit: 1 kit/feeder, length 7/8"
4.1.1	SXA 105 3079	Connector, 7/16	2 pcs
4.1.2	SXA 105 3086	Sealing compound, Plast 2000	1 pc

Table 5

Item	Product number	Description	Unit
4.2	5/NTM 201 230/2	Connector kit, 1 5/8" feeder	Kit: 1 kit/feeder, length 1 5/8"
4.2.1	SXA 105 3082	Connector, 7/16"	2 pcs
4.2.2	SXA 105 3086	Sealing compound, Plast 2000	1 pc
4.3	5/NTM 201 230/3	Sealing kit	Kit, 1 kit/TG

2.5 Jumper cables

Table 6

5.1 Antennas: [1)]			
- Kabelmetal LCF 1/2"			
	1m	2m	3m
Connector 7/16-7/16	TSR 951 63/1	TSR 951 63/2	TSR 951 63/3
Connector 7/16-N	TSR 951 64/1	TSR 951 64/2	TSR 951 64/3
5.2 TX Cabinet:			
- Kabelmetal HCF 1/2"			
Connector 7/16-7/16	TSR 951 65/1	TSR 951 65/2	TSR 951 65/3 [2)]
5.3 RX Cabinet:			
- Kabelmetal HCF 1/2"			
Connector N-7/16	TSR 951 66/1	TSR 951 66/2	TSR 951 66/3 [3)]
5.4 Earthing kit:			
NTM 201 219/1 or 2			

Omni site, 1 cabinet:	1) According to site specifications	2) 1 pc.	3) 1 or 2 pcs. in case of diversity
Sector site, 3 cabinets:	1) According to site specifications	2) 3 pcs.	3) 3 or 6 pcs. in case of diversity

2.6 Feeder marking

Table 7

Item	Product number	Description	Unit
6.1	NTM 201 236	Feeder marking, omni	1 pc/omni site
6.2	NTM 201 238	Feeder marking, directional	1 pc/sector site

2.7 External PCM cabling in accordance with local demands and TRI configuration

(numbers in bracets indicate max. configuration)

Table 8

Item	Product number	Description	Unit
-for 75 ohm coaxial cabling:			
7.1	RPM 513 339	Coaxial cable, 75 ohm, 2/ETB	2(12)
-if more than 3 ETB boards:			
7.2	SXK 107 2435/1	Connector box BNC	1
-in case of DDF, install the following in the Distribution Field, DF:			
7.3	SXA 120 165	Holder for 6 x RNT 403 113	1 (2)
7.4	RNT 403 113	Connector, female per 1/RPM 513 339	2 (12)
7.5	RPT 158 53	Connector, male per 1/RPM 513 339	2 (12)
-in case of 120 ohm pair cable:			
7.6	RPM 513 349 alt. RPM 513 698/15000	PCM cable, 120 ohm, 2/ETB	2(8)
-if more than 2 ETB boards:			
7.7.	SXK 107 2436/1	Connector box DIN	1
-in case of DDF, install the following in the Distribution Field, DF:			
7.8	SXA 120 164	Holder for 4 x RNT 403 05/03	1 (2)
7.9	RNT 403 05/03	Connector, female per 1/RPM 513 349	2 (8)
7.10	RPT 403 08/03	Connector, male per 1/RPM 513 349	2 (8)

3 Mechanics for outdoor installation

3.1 Basic installation material outdoor

Table 9

Item	Product number	Description	Unit
1.1	NTM 201 230	Basic inst. material outdoor	1 kit /site

3.2 Antenna fittings

To be decided together with local supplier or ERA.

3.3 Feeder clamp

Table 10

Item	Product number	Description	Unit
3.1	6/NTM 201 230/1	Feeder clamp, 1 coax. 7/8" conn.	Kit
3.2	6/NTM 201 230/2	Feeder clamp, 2 coax. 7/8" conn.	Kit
3.3	6/NTM 201 230/3	Feeder clamp, 3 coax. 7/8" conn.	1 kit/0.8 m dist., 3 feeders
3.4	SXA 105 3055/3 R8	Feeder clamp, 1 5/8"	Kit
3.5	SXA 105 3055/1 R0	Feeder clamp, 14 mm	Kit

3.4 Earthing feeder

Table 11

Item	Product number	Description	Unit
4.1	SXA 105 3092	Earthing kit 7/8"	1/feeder 7/8"
4.2	SXA 105 3093	Earthing kit 1 5/8"	1/feeder 1 5/8"

3.5 Cable glands

Table 12

Item	Product number	Description	Unit
5.1	NTM 201 217	Cable glands	1 kit incl. in NTM 201 230 basic outdoor inst. mat.
5.2	5/NDM 401 01/4	Cable glands	1 kit/site. 1 5/8 kit used for one 5/8" feeder

5.3	NTM 201 267	Cable ladder, 6 m	3 kits incl. in NTM 201 230 basic outdoor inst. mat.
5.4	9/NTM 201 230/1	Earthing wire, outdoor, 40 m	1 kit incl. in NTM 201 230 basic outdoor inst. mat.
5.5	9/NTM 201 230/2	Earthing rod	1 kit incl. in NTM 201 230 basic outdoor inst. mat.

4 Mechanics for indoor installation

4.1 NTM 201 201/4: Recommended for omni or sector site

Table 13

Item	Product number	Description	Quantity
1.1	NTM 201 275	Ladder, 0.400m X 3m, grey, wall & ceiling mounted	5
1.2	4/NTM 201 201/2	Earthing wire set	1
1.3	6/NTM 201 201/2	Cable tray, 2m	6
1.4	7/NTM 201 201	Common inst. material	1
1.5	NTM 201 218/2	Tube kit, (5X3m)	1

4.2 Cables and mechanical detail sets for connection of Master to Extension cabinet 1)

Table 14

Item	Product number	Description
2.1	NTM 201 651/01	Extension set, Master cabinet - Extension cabinet 1
2.2	NTM 201 652/01	Extension set, Extension cabinet 1 - Extension cabinet 2
2.3	NTM 201 653/01	Extension set, Extension cabinet 2 - Extension cabinet 3

1) Support for right hand expansion

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Guidelines for Site Installations

Contents **Page**

1 Introduction

These installation engineering guidelines give general information concerning installation of a Radio Base Station (RBS) with associated equipment.

Selection of equipment is mainly made during system design phase, and these guidelines show how to select the installation method based on system design and local conditions.

Guidelines given shall be considered as information to personnel who have to plan the installation, design various mounting hardware and select installation materials.

2 Space Requirements

An RBS 200 installation comprises a number of cabinets and auxiliary equipment such as air-conditioners, mains panel, main distribution frame and transmission systems, see the site installation example, figure 1.

The cabinets hold the radio equipment and back-up power system and have the following dimensions, see table 1:

Table 1

	Height	**Width**	**Depth**
Radio cabinet	1970	602	400
Battery Stand, 29 Ah	1500	350	375
Battery Stand, 134 Ah	1967	650	375
Battery Stand, 187 Ah	1967	950	375

Radio cabinets can be placed either in a row or back-to-back.

Certain minimum distances must be considered when planning the room layout. This is to allow for a convenient working environment during installation and maintenance activities.

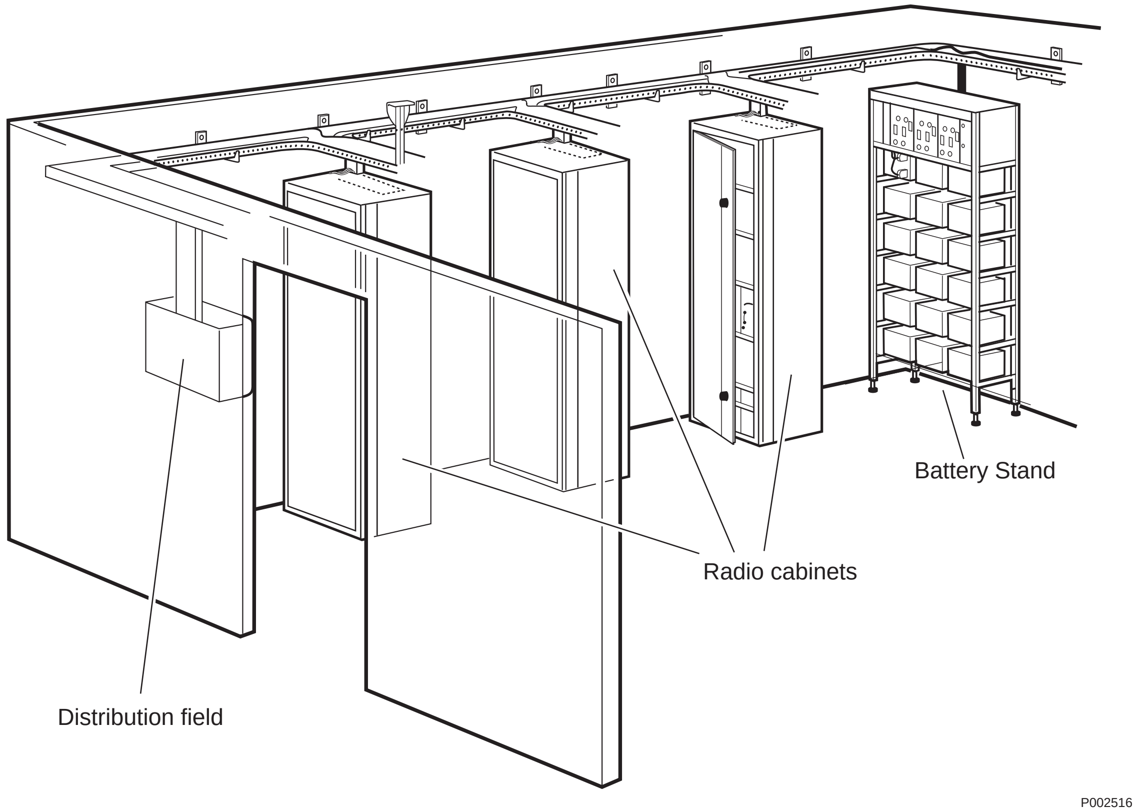

Figure 1 Site installation example

2.1 Transceiver Group Cabinets

Cabinets belonging to the same transceiver group must always be placed in a row beside each other, see figure 2 and figure 3.

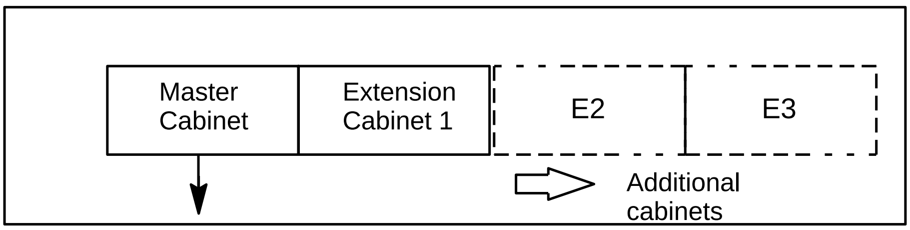

Figure 2 Omni site, one transceiver group

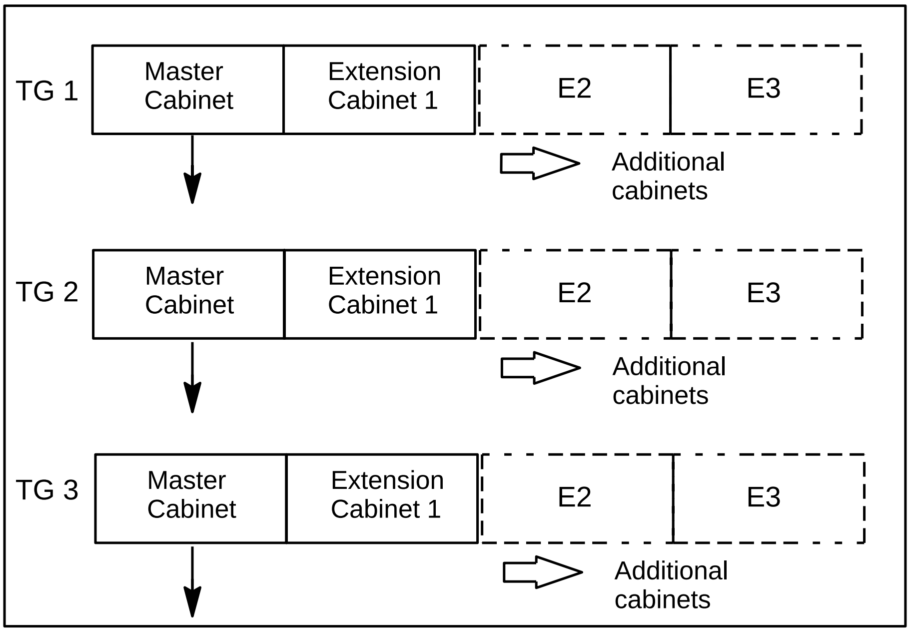

Figure 3 Sector site, three transceiver groups

Note Expansion of the TGs must be done with Extension Cabinets (E-cabinets) placed to the right of the Master Cabinet.

2.2 Distance to Wall and/or Corner

When locating a cabinet against a wall or in a corner, a minimum distance of 10-50 mm shall be provided between the sides of the cabinet and the walls. See figure 4.

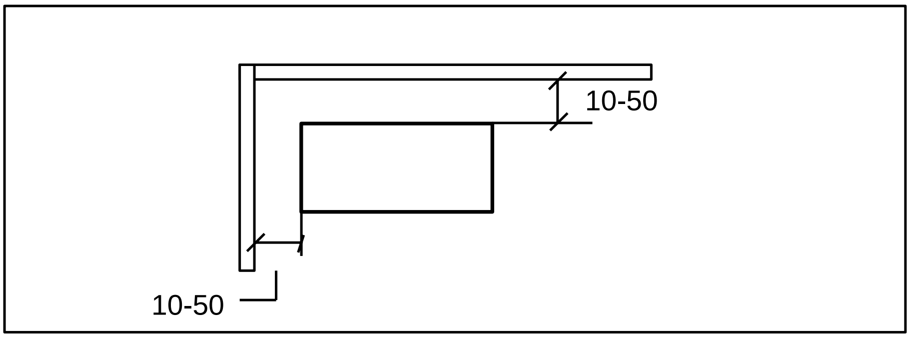

Figure 4 Distance to wall and/or corner

2.3 Double Row Arrangement

At sector sites where double row arrangement is used, a minimum distance of 1000 mm shall be provided between cabinet rows. The same distance also applies when the cabinet front is facing a wall, see figure 5.

Note Due to the combiner chain, configuration is applicable for TGs with one cabinet only.

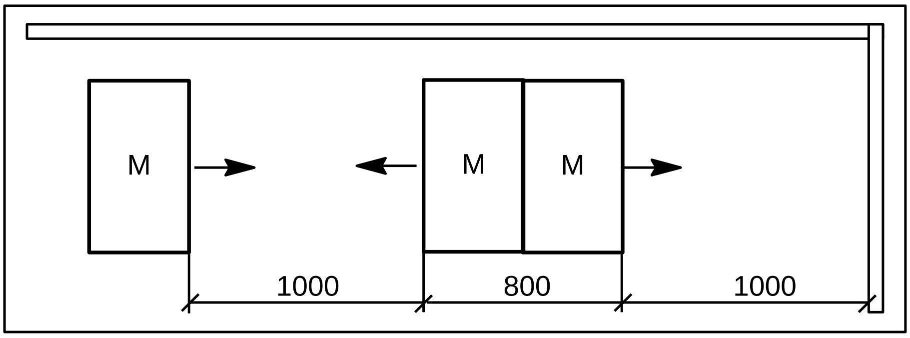

Figure 5 Distances for double-row arrangement

2.4 Reserved Space

As the site may be subject to later expansion with additional cabinets, space must be reserved for this purpose.

Layouts with cabinets belonging to different transceiver groups located beside each other, must therefore not be used. Furthermore an additional distance of at least 800 mm has to be considered to allow for passage, see figure 6.

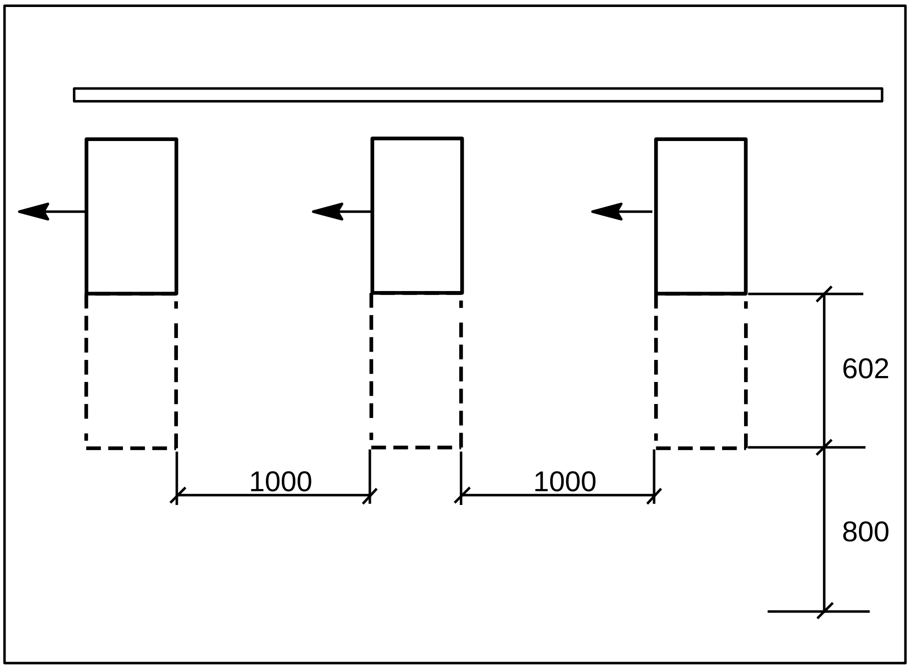

Figure 6 Expansion principle

2.5 Battery Stand

Each Battery Stand contains batteries with fuses for up to 3 radio cabinets. The Battery Stand shall be located at a maximum distance of 15 m away from the radio cabinets to avoid excessive voltage drops in the distribution cables. Battery Stand is preferably located in the vicinity of the mains panel.

Additional Battery Stands are located beside the first unit. Otherwise the same rules as for the radio cabinet apply.

2.6 Ceiling Height

Minimum ceiling height in equipment room is 2.5 m.

It is important that at least 200 mm free space is provided above the cabinet to allow evacuation of cooling air, see figure 7.

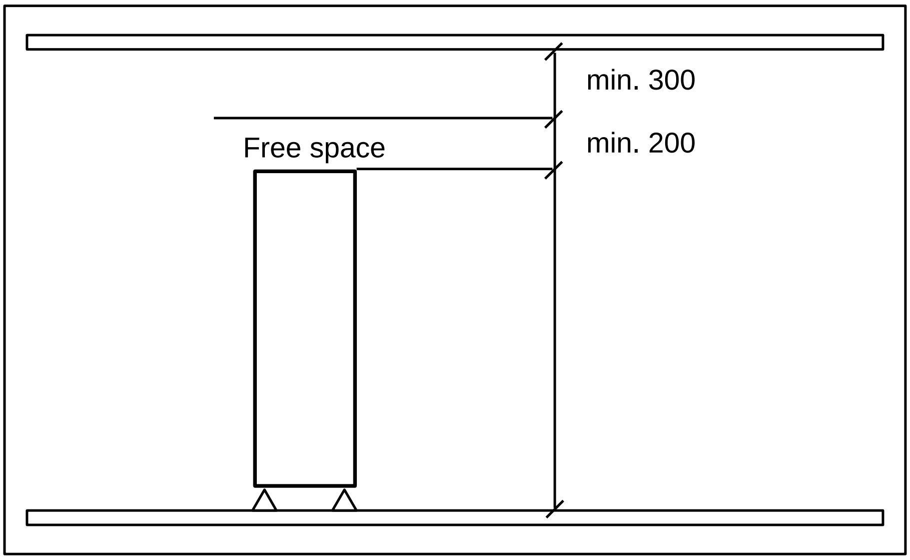

Figure 7 Free space requirements

2.7 Mounting Height of Cable Ladders

Minimum mounting height for cable ladders is 2200 mm leaving at least 300 mm for access to cable runways.

3 Floor, Walls

The floor shall be level. The slope shall not exceed ±3 mm/2 m to allow the adjustable cabinet feet to take up the irregularities.

If a conductive floor is used, the cabinet feet must be isolated from the floor. Raised floors are not required, as all cable entries are located in the cabinet top.

Walls shall be provided with a dust free coating and be able to withstand the weight and pressure of the cable ladders.

3.1 Calculation of Floor Load

When calculating floor load, the following can be used as a guideline.

Average floor load is the total load per floor space expressed in kg/m^2.

Floor space is defined as the total area of the cabinets including aisle space. The floor space for the cabinets will be evident from figure 8.

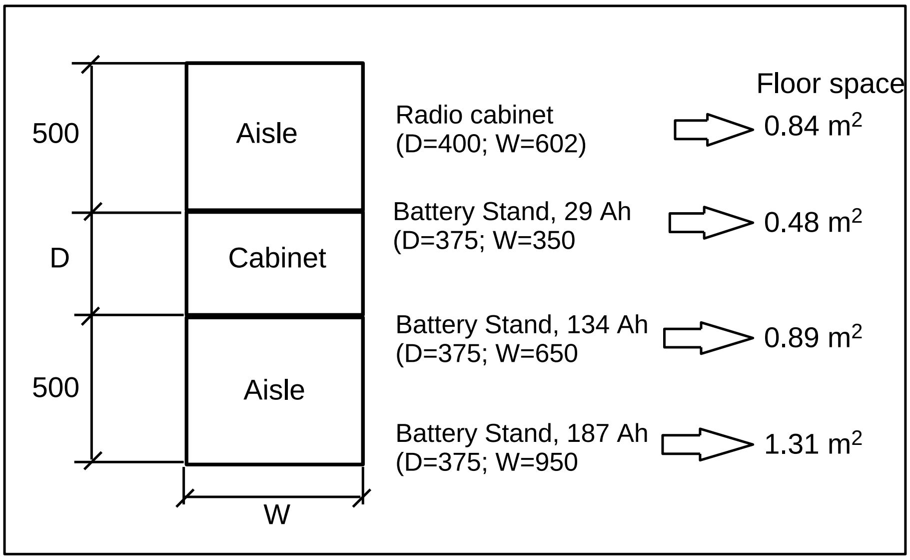

Figure 8 Cabinets floor spaces

The maximum weight of the cabinets is:

The maximum weight of the cabinets is:

Radio cabinet:	250 kg
Battery Stand, 29 Ah:	150 kg
Battery Stand, 134 Ah:	400 kg
Battery Stand, 187 Ah:	560 kg

The maximum floor load generated by each type of cabinet will thus be:

Radio cabinet:	250/0.84 = 298 kg/m^2
Battery Stand, 29 Ah:	150/0.48 = 313 kg/m^2
Battery Stand, 134 Ah:	400/0.89 = 450 kg/m^2
Battery Stand, 187 Ah:	560/1.31 = 428 kg/m^2

4 Doors, Windows

Equipment room shall be provided with a lockable door, wide enough to allow equipment to be moved in, without dismantling.

If the equipment room is provided with windows, it is recommended that these are provided with blinds so that the equipment is not subjected to direct sunlight.

5 Environment, Ventilation

Equipment will generate a considerable amount of heat, typically 1300W per radio cabinet. To keep the temperature within specified limits, an air-conditioning system is required.

When dimensioning the air-conditioning system the scheduled final capacity of the site shall be used as a design parameter.

It is recommended that a redundant air-conditioning system is installed to provide a high availability.

6 Electrical Installation

Electrical installation comprises a 380/220V mains panel with all wiring to feed lights, air-conditioners, alarm system, service outlets, rectifiers etc., as well as an earth collection bar.

Mains panel shall be provided with one 16A automatic circuit breaker per rectifier (PSU) including spare units for future expansion, as well as suitable circuit breakers for the other utilities.

The earth connection bar shall be connected to an earth electrode system according to IEC 1024-1.

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Environmental Requirements

Contents **Page**

1 Operation Conditions

Climatic requirements for of RBS equipment are specified in figure 1. Values refer to RBS during operation.

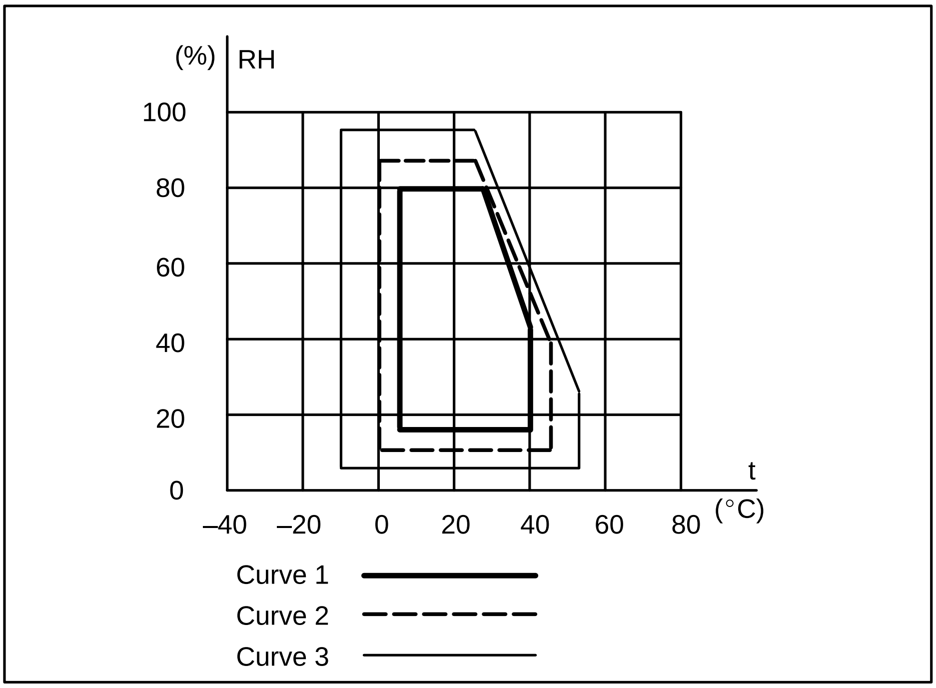

Figure 1 RBS 200 operation areas: Relative humidity as a function of temperature

Limiting Curve 1: Normal operation

Limiting Curve 2: Requirements for safe function

Limiting Curve 3: Requirements for non-destruction

Area within Curve 1 represents conditions during normal service operation, meaning that specified equipment performance is complied with.

Area limited by Curve 2 represents conditions required for safe function. Safe function means that the performance of the equipment is degraded in a specific manner.

Curve 3 determines the limit for non-destruction, which means that the performance of the equipment is degraded in an undefined way, but that no damage of the equipment will occur.

When RBS develops normal operational power, temperature and humidity refer to values 1.5 m above the floor and 1.5 m from the nearest heat-dissipating object. The measuring object is protected from solar radiation and strong ventilation.

2 Electro Magnetic Compatibility (EMC)

RBS 200 fulfills the EMC requirements according to GSM:11.20:12.1.

Within the working group RES9 under ETSI, there is a continuous work to state a new product standard for radio base stations (BTS) etc.

The standard will be developed in co-operation with SENELEC to be valid for the EC and EFTA countries. We have the intention to fulfil the relevant parts of this standard when stated.

ERICSSON

CAPTION LIST

Document No.	
7/001 53-LZN 302 011	
Date	Rev
99-09-21	B

Planning & Documentation Rules

RBS 200
Installation
Engineering Manual

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Installation Planning Procedure

Contents **Page**

1 Installation Planning Procedure Overview

Installation Planning Procedure includes the following two main activities:

- Radio Site Investigation
- Radio Site Installation Engineering

1.1 Radio Site Investigation

This activity includes several Radio site visits. The purpose is to recognize and record everything (sketches, photos) needed for the next process, Radio site installation engineering.

One of the output documents is Radio Site Investigation Report. How this report is made is described in the Manual, Rules and Methods,EN/LZB 119 2935.

See, Rules and Methods for Installation Engineering, EN/LZB 119 2935.

1.2 Radio Site Installation Engineering

This activity, often referred to as the Installation Planning, includes at least the following activities:

- Definition of the Contract, Bill of Quantity etc., in order to determine the system configuration.
- Detailed configuration of each site and production at approved Installation documents.
- Detailed material planning and ordering.
- Schedule for the material delivery related to the installation schedule and access to the sites.
- After the finalized installation production of "as built" documents, (C module).

2 Installation Engineering Input Documents

Typical documents that are needed before the engineering can start are:

- Contract and/or System Description/Design
- Bill of Quantity Documents
- Transmission Network Plan
- Cell Plan
- Radio Site Investigation Report
- Floor Plans
- Subcontractor Quotations (if applicable)

3 Installation Engineering Output Documents

The output documents from the engineering process shall be:

- Detailed Material List
- Installation Documents
- "As built" Drawings (after installation is finished)
- Documents for the Z Module (non-Ericsson material if applicable)

4 Flowchart for an Integrated area

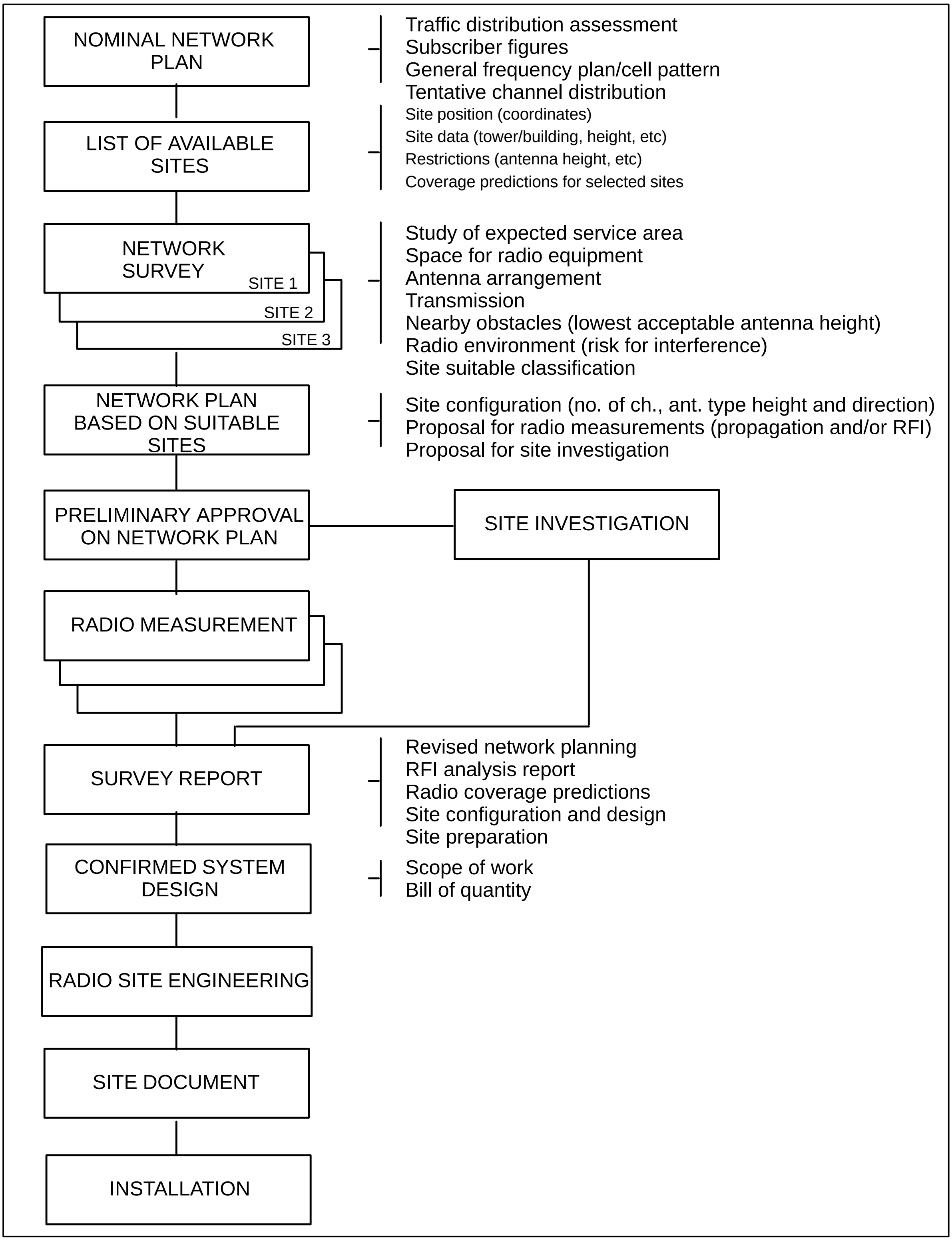

Figure 1

5 Survey Report

As can be seen in section 4, Flowchart for an Integrated area, the objective with the Survey Report, is to provide the basis for a mutual agreement regarding Scope of work and Bill of quantity.

The three activities described in the Survey Report are:

- Network design
- Radio survey report
- Radio/Site investigation report

These activities are accordingly indicated in the flow chart as the embryos resulting in the Survey Report.

The results of the activities mentioned are within the Survey Report divided into three binders with corresponding names. Now we will take a look at the Radio/Site investigation report.

5.1 Radio Site investigation report

This report consists of the following parts:

5.1.1 Site Documents

The objective of this part is to provide a basis for final decisions on:

- Site and tower location (if applicable)
- Suitable space for the equipment
- Location of antennas
- Schematic Radio Base Station design

5.1.2 Site Preparation

In the Site Preparation documents, the responsibility for different activities should be indicated, regarding the following topics:

Preparation document - OUTDOORS

- Antenna tower
- Cable ladder
- Cable inlets for feeders
- Earthing of the tower
- Obstructions light

- Necessary permissions

Preparation document - INDOORS

- Location of the equipment room
- Location of BTS and Battery Stand
- Cable ladders
- Earthing bar
- DC power (if applicable)
- Lights
- Air conditioning
- DF and DDF
- Location of PCM equipment and connections

5.2 Site preparation, example

In the site preparation documents, the responsibility for different avtivities has been indicated with the following letter designations:

- C = activities under responsibility of the customer
- ERA = activities under responsibility of Ericsson Radio Systems

Table 1 Example

Activity	Responsible
Site walls to be painted	C
Making holes for feeders	C
Installation of Cable ladders	ERA
Installation of Earthing bar	C
Mains supply boards including all necessary fuses, according to attached drawing	
Installation of Air conditioning	C
Installation of lightning and service outlets	C
Installation of DF and DDF including:	
Cross connection	ERA
Installation and termination of 2Mbit/s PCM link	C

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Site Documentation Rules

Contents **Page**

1 General

Refer to the document EN/LZB 119 2935 Rules and methods for Installation engineering, when producing the Installation and as-built drawings for the C module.

2 Installation Documents/as-built Document C-module

All documents necessary for the description of the installed equipment on a specific site, are put into a binder named Module C, normally included in the Customer library.

The layout of the C-module is clearly described in the document EN/ LZB 119 2935, Rules and Methods for IE.

Below follows a short description of the documents included in the C-module, together with information regarding buildup of the document number.

Please note that the documents mentioned below, are used as approved installation documents before they, after possible revisions, become final as-built documents in the C-module.

The various types of documents mentioned below shall be seen as a recommendation, as the documents eventually selected can vary due to the specific contractual demands etc.

2.1 Installation Documents

See further EN/LZB 119 2935, Rules and Methods for IE.

3 Numbering Ericsson Products and Documents

See Chapter 7, section 2 for a short introduction to the Ericsson Corporate Standard.

For detailed information refer to:

- Corporate Standards ST 1C Decimal Register, LZB 101 01/1C
- Corporate Standards ST 1D Numbering Rules, Change Rules, EN/LZB 101 01/1D.

Numbering of Ericsson Products and Documents

Contents **Page**

1 Numbering of Ericsson Products and Documents

Ericsson products and documents are clearly and uniquely identified by a product or document number.

This section is intended to provide basic information about the construction and use of the Ericsson numbering system.

For more information, see the reference below.

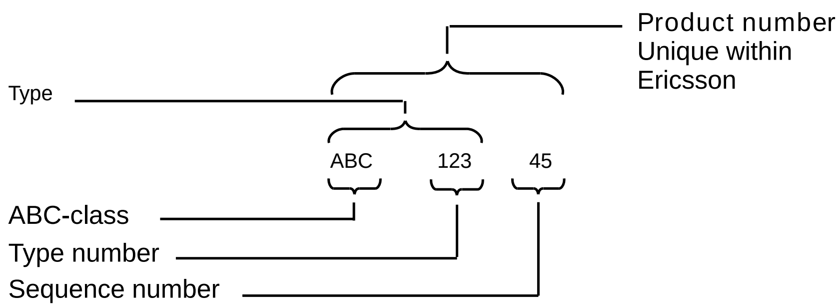
1.1 Product Numbering

Products are numbered with a product number (ABC number) which, in its basic form, consists of three letters followed by a digit group. This number is called the "product number".

The letter group divides products into classes according to use, construction or other essential attributes.

The digit group divides the classes into types, which are further subdivided by means of sequence numbers.

1.1.1 The Structure of a Product Number



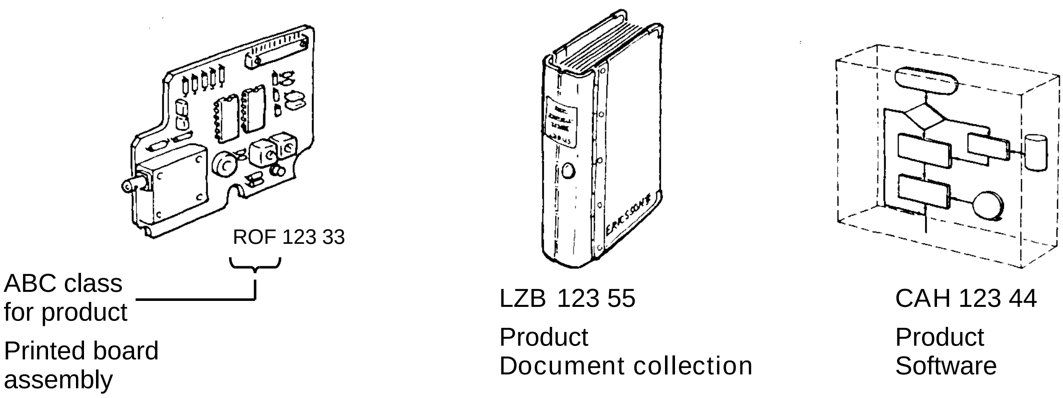


Figure 1 Product numbers

1.2 Document Numbering

Documents are numbered using the decimal class system. A document number consists of a decimal class and an individual number.

The decimal class consists of 4 or 5 digits which classify the contents of the document into a sphere of activity and subject categories.

The individual number is either a product number used to link documents with products, or a sequence number, which is used for documents of a general nature.

1.3 The Structure of a Document Number

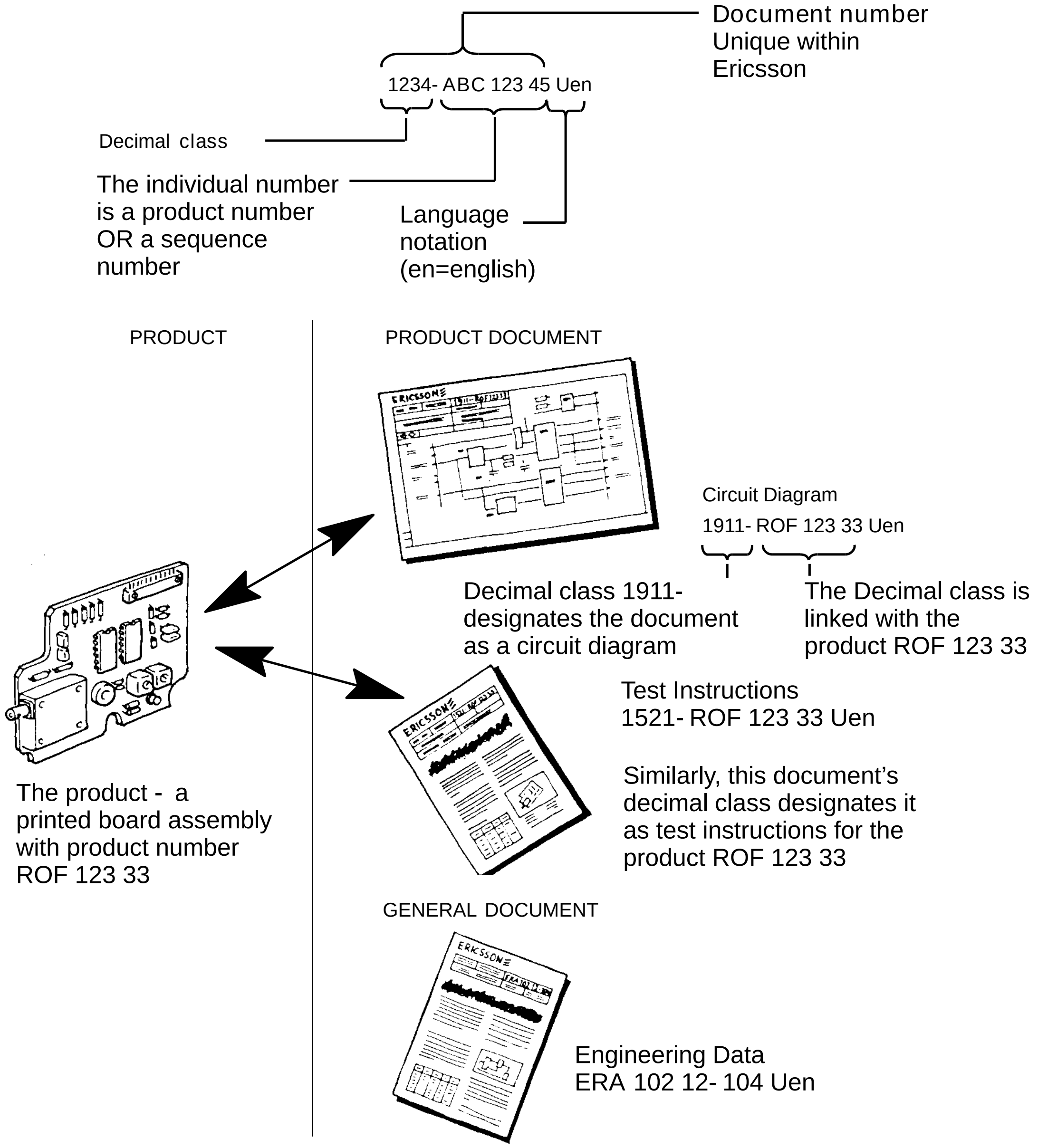


Figure 2 Document numbering

1.4 Product and Document Versions

When a product is changed, for example by the introduction of improvements, simplifications, correction of errors, and so forth, the product number is retained, but a new version of the same product is created.

We must be able to identify these versions of a product so that we know which version has been supplied to a specific customer. This is particularly important with regard to maintenance and spare parts.

It is equally important to be able to quickly decide if a newer version of a product can directly replace an earlier version, or not.

To distinguish between different versions of a product, they are given an R-state marking.

Similarly, different versions of a document are given a Rev-state marking. This means that we can always refer specifically to a certain document or product version.

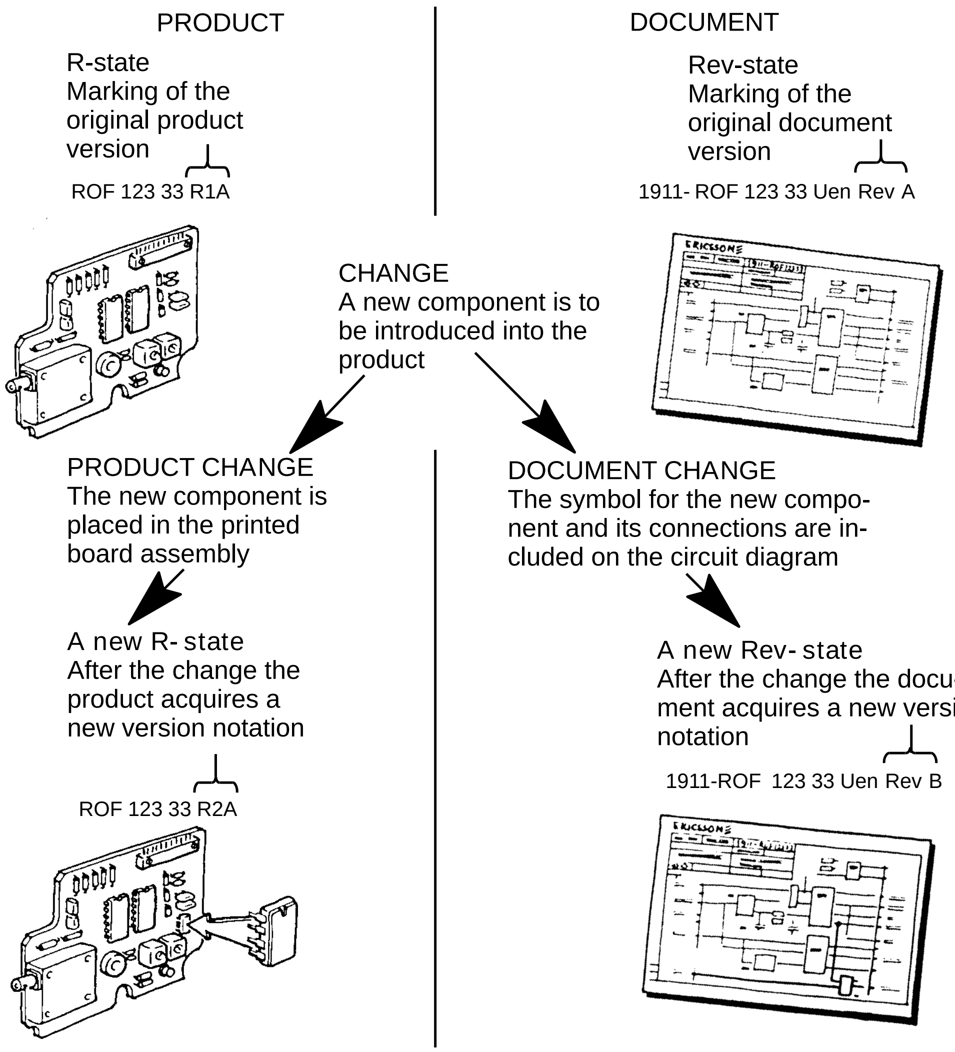


Figure 3 Product and document versions

1.5 Document Survey - The Key to Documentation

A document survey is a highly effective aid in keeping track of all the documents that describe a specific product. A document survey serves two purposes:

- It is a register of all the documents prepared for the product.
- It shows the document revision states (Rev-state) for the various versions (R-state) of the product.

The document survey is tied to the product at most levels of the product structure.

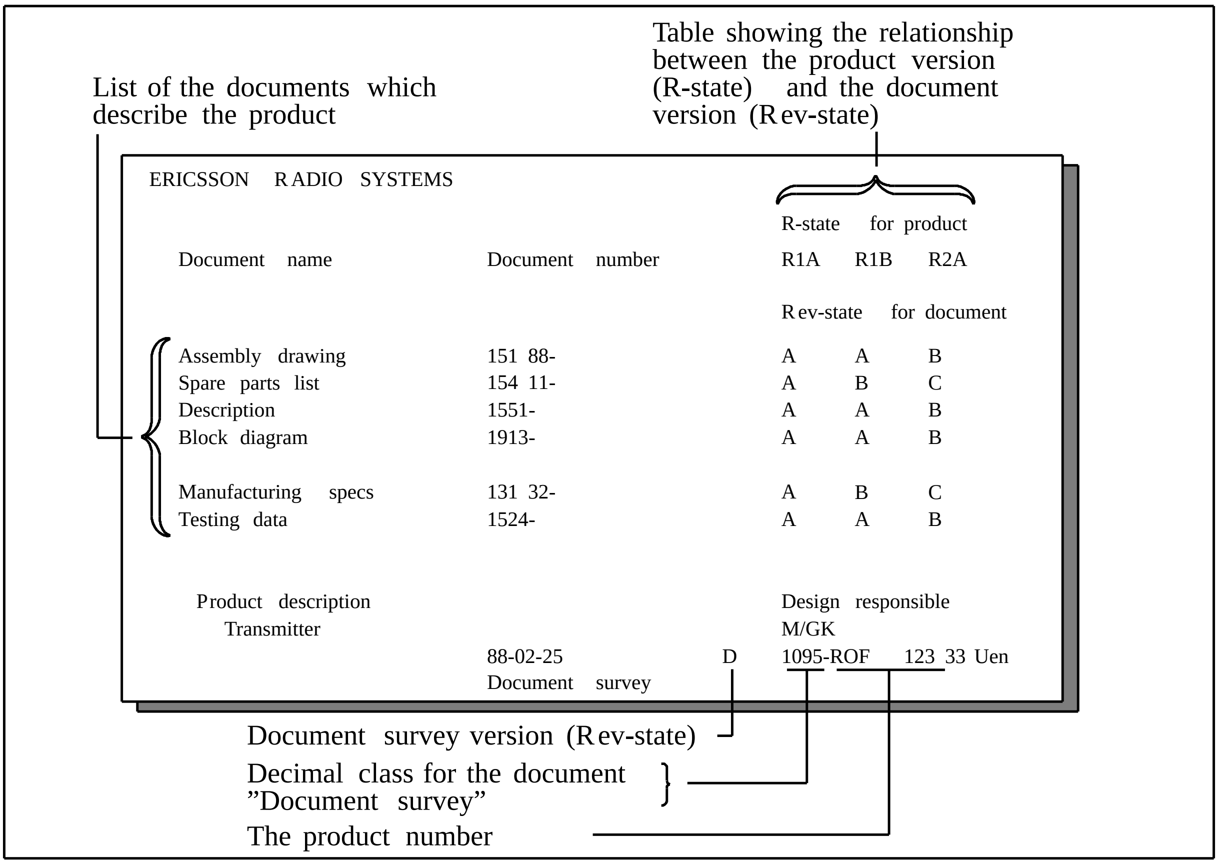


Figure 4 Document survey

1.5.1 For More Information

For more information regarding Ericsson product and documentation numbering, please contact the office below:

Telefonaktiebolaget LM Ericsson: Telephone: +46 8 719 50 11
Corporate Core Unit IM/IT
TV/LME/R
SE-126 25 Stockholm, SWEDEN

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Glossary - RBS 200 series

Contents **Page**

1 General

This glossary lists abbreviations and acronyms that occur in the RBS manuals. Some basic terms and acronyms needed for cross-references are also included in the list.

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

GSM definitions are listed in GSM recommendation 01.04. Definitions of general (mobile) communication terminology are given in CCITT Red book, volume X.

1.1 Terms and abbreviations

An arrow (→) is used to indicate a reference to another entry in this list. Terminology defined by GSM is marked with an asterisk (*).

Glossary

A1	Designation of RBS cabinet Radio cabinets on a site are designated A1, B1, C1, A2 . . ., according to site configuration.
Abis*	GSM standard BSC-BTS interface GSM interface standard defining attributes of the communication between BSC and BTS.
ACB	Alarm Collection Board The ACB is used to cross-connect internal and external alarms.
ACU	Alarm Collection Unit A unit in the TM/PSU and TM magazines that collects and processes common TG alarm signals.
ANP	Antenna Near Part
ARFCN	Absolute Radio Frequency Channel Number
ARU	Alarm Registration Unit
B1	Designation of RBS cabinet → A1
BCCH	Broadcast Control CHannel
BER	Bit Error Rate
BFI	Bit Frame Indication
BIM	Battery Interconnection Module RBS hardware unit for fused connection of batteries to the system and for fused interconnection of power circuits between cabinets.
BITE	Built In Test Equipment
BPC	Basic Physical Channel Denotes the air interface transport vehicle formed by repetition of one time slot on one or several radio frequency channels. If frequency hopping is not enabled, only one frequency is used to convey the BPC. → TS, → RFCH
BS	Base Station

BSC* Base Station Controller

GSM network unit for control of one or several BTSs.

BSS Base Station Subsystem

BTB Bus Terminal Board

The BTB board is used for connecting the internal cabinet bus to units in the cabinet.

BTS* Base Transceiver Station

GSM network unit operating on a set of radio frequency channels in one cell.

Burst* —

A portion of digital information, the physical content, that is transferred within the time interval of one time slot.

GSM defines four burst types:

- AB Access Burst- FB Frequency correction Burst- NB Normal Burst- SB Synchronization Burst

Another fifth burst is defined that may replace an NB when no information is to be transmitted:

- DB Dummy Burst

C1 Designation of RBS cabinet → A1

CE Conformité Européenne

Cabinet bus —

The vertical cabinet bus cabling at the left side of the cabinet distributes the TX and TIB/O&M buses. → TX-bus, → TIB, → O&M-bus

CBCH Cell Broadcast CHannel

CCB Cable Connection Board

Mounted in the left cable shaft of the cabinet, one at each rack position.

CCCH Common Control CHannel

CMAS Cellular Maintenance Application System

CME 20 Ericsson GSM system

Ericsson digital land mobile telecommunication system based on the GSM standards.

COMB Combiner → FCOMB, → HCOMB

DCCH Dedicated Control CHannel

DEVCB DEVice Control Bus

DEVSB DEVice Speech Bus

DF Distribution Field (cabinet)

DFA Distribution Field A in DF

Panel for connection of e.g. external alarms to the TRI.

DFB Distribution Field B in DF

Coaxial connection field used for PCM cabling between DF and the ETB board(s) in the TRI magazine.

DTX Discontinuous Transmission

E1-3 Extension cabinet 1-3

ECU Environmental Control Unit

EFU External Fuse Unit

Distribution unit containing two 10A circuit breakers for powering of external units, for instance DC/DC converters.

EMPC Extension Module Regional Processor

A module in the TRI magazine. → EMRP

EMRP Extension Module Regional Processor

Processor unit in the BSC.

EMRPB Extension Module Regional Processor Bus

ERP Effective Radiated Power

ESB External Synchronization Bus

ESD Electrostatic Discharge

Discharge of static electricity, often in the form of a spark. ESD may damage components such as integrated circuits.

ETB Exchange Terminal Board

Interface board in TRI handling communication with the BSC or cascaded RBS sites.

ETC Exchange Terminal Circuit

Interface in the BSC between group switch and PCM system.

EXALI External Alarm Interface

Board in the TRI magazine.

FCB Fan Control Board

FCCH Frequency Correction CHannel

FCOMB Filter Combiner

RBS hardware unit for connection of several radio transmitters to one common transmitter antenna.

The FCOMB is a narrow-band, motor tuned filter coupler.

GMSK Gaussian Minimum Shift Keying

GSM Global System for Mobile communications

International standard for a TDMA digital mobile communication system. Originally, GSM was an abbreviation for Groupe Special Mobile, which is a European mobile telecommunication interest group, established 1982.

HCOMB Hybrid Combiner

RBS hardware unit for connection of several radio transmitters to one common transmitter antenna.

The HCOMB is a broad-band directive coupler, sometimes named 3-dB Coupler.

IDM Internal Distribution Module

RBS hardware unit for internal distribution and fusing of 24V DC in a cabinet.

IMSI International Mobile Subscriber Identity

Int. TX-bus Internal Transmitter Bus

TG internal bus for interconnection of a TRXC and its subordinated RRX and SPPs.

L1/L2/L3 Layer 1/Layer 2/Layer 3

LAPD Link Access Protocol on D-channel

LAPDm Link Access Protocol on Dm-channel

LIB Line Bus

RBS internal bus for interconnection of a TRXC to a TRI.

LMH Local Maintenance Handler

LMT Local Maintenance Terminal

Terminal equipment (PC) that can be connected to a TG for operation and maintenance activities at site.

LRU Line Replaceable Unit

LU Logical Unit

LU is a class of Managed Objects (MO).

TRS defines four LUs:

- TS Time Slot- RX Receiver- TX Transmitter- TF Timing Function

M1 Master cabinet 1

MCC Multicell Cabinet Configuration

MCU Measuring Coupling Unit

MO Managed Object

A concept used to denote an object, addressed by means of operation and maintenance procedures on Abis OML, in accordance with the TRS operation and maintenance object model.

Two classes of MOs are defined:

- MO TRXC Managed Object Transceiver Controller- MO LU Managed Object Logical Unit

MOI Managed Object Instance

MS Mobile Station

MSC Mobile Switching Center

MTBF Mean Time Between Failure

MTTR Mean Time To Repair

O&M Operation and Maintenance

General term for activities such as configuration, utilization of channels (frequency bands), cell planning, system supervision, hardware and software maintenance, subscriber administration, etc.

O&M-bus Operation and Maintenance bus

TG internal bus for interconnection of all TRXCs, RTXs and a TM.

The O&M-bus is duplicated for redundancy reasons.

OMC Operation and Maintenance Center

OSS Operation Support System

PA Power Amplifier

PCB Printed Circuit Board

RBS hardware substrate for multifaceted electron dispersion to predetermined connectorized junctions.

PCM Pulse Code Modulation

PCU Power Control Unit

RBS hardware unit for control and supervision of the 230V power supply system.

PLMN Public Land Mobile Network

A network, established and operated by an administration or its licensed operator(s), for the specific purpose of providing land mobile communication services to the public. It provides communication possibilities for mobile users. For communication between mobile and fixed users, interworking with a fixed network is necessary.

PR1 Battery rack designation

Battery racks (PR) at one site are designated PR1, PR2 . . ., according to site configuration. → A1

PSU Power Supply Unit

RBS hardware unit for AC/DC conversion, DC/DC conversion and 24V DC supply.

RCCB Residual Current Circuit Breaker

RBS Radio Base Station

All equipment forming an Ericsson base station. RBS, TRS, → BTS

RBS 200 Radio Base Station 200

Indoor version of an Ericsson radio base station based on the GSM 900 MHz standard. An RBS 200 comprises both hardware and software.

RBS 203 Radio Base Station 203

Outdoor version of an Ericsson radio base station for max. 2 TRXs based on the GSM 900 MHz standard. An RBS 203 comprises both hardware and software.

RBS 204 Radio Base Station 204

Outdoor version of an Ericsson radio base station for max. 6 TRXs based on the GSM 900 MHz standard. An RBS 204 comprises both hardware and software.

RBS 205 Radio Base Station 205

Indoor version of an Ericsson radio base station based on the DCS 1800 standard. An RBS 205 comprises both hardware and software.

Receiver Multicoupling System —

Set of RBS hardware units for filtration, amplification and division of received RF signals from one receiver antenna to several radio receivers.

It comprises an RXBP, an RXDA and RXDs.

RF Radio Frequency

RFCH* Radio Frequency Channel

A radio frequency carrier with its associated bandwidth.

RHDEV Remote Handling Device

RRX Radio Receiver

RBS hardware unit for reception and decomposition of received RF signal. → RTX

RTC Remote TransCoder

RTH Remote Transcoder Handler

RTP	Redundant Transmission Power DC/DC converter powered from the External Fuse Unit (EFU).
RTT	Radio Transceiver Terminal Interface board in TRI handling communication with TRXs.
RTX	Radio Transmitter RBS hardware unit for modulation and RF transmission. → TG, → RRX
RTXPB	Radio Transmitter Power Booster Combines the RTXPF function with a constant supply voltage to the RTX. → RTXPF
RTXPF	Radio Transmitter Power Filter Filter to avoid interference caused by the RTX power supply ramping voltage.
RU	Replacement Unit
RX	Receiver Logical Unit associated with the RRX. → LU
RX-A	Receiver antenna A Antenna jacks Rx-A and Rx-B in the connection field at the top of the cabinet provide for Rx-antennas arranged in a space diversity configuration.
RX-B	Receiver antenna B RX-A
RXBP	Receiver Band Pass filter RBS hardware unit for filtration of received RF signals from a receiver antenna. → Receiver Multicoupling System
RXD	Receiver Divider RBS hardware unit for division of received RF signals from an RXDA.→ Receiver Multicoupling System
RXDA	Receiver Divider Amplifier RBS hardware unit for amplification and division of received RF signals from an RXBP. → Receiver Multicoupling System

SACCH Slow Associated Control CHannel

SAPI Service Access Point Identifier

SCH Synchronization CHannel

SDCCH Stand alone Dedicated Control CHannel

SID SIlence Description

SPE Signal Processing Extension

Circuit board for piggy-backing onto SPU+ board to allow for half-rate function.

SPP Signal Processing Part

RBS hardware unit for digital signal processing on one BPC.

SPU+ Signal Processing Unit

The same function as for the SPP. One SPU equals 8 SPPs.

SPU++ Signal Processing Unit

The SPU++ combines the SPU+ and the SPE functions in one unit.

ST Supervisor Tester

STC Signalling Terminal Central

To extend the BSC control functions to remote locations, a pair of signalling terminals STC/STR is used. They provide the transport mechanism for communication with the remote regional processor (EMPC) in TRI.

STR Signalling Terminal Remote →STC

STRP Signalling Terminal Remote Processor

TBA To Be Announced

TBC To Be Confirmed

TBD To Be Decided

TCH Traffic CHannel

TDMA Time Division Multiple Access

Multiplexing of several channels in one common frequency band. Each channel is assigned a certain time division, a time slot, to use.

TDMA frame* —

GSM air interface time frame structure comprising eight time slots. →TS

TEI Terminal End-point Identifier

Terrestrial Lines —

Communication lines between a BSC site and an RBS site, based on the CCITT G.703 standard.

TF Timing Function

Logical unit associated with the TM. → LU

TG Transceiver Group

Set of RBS equipment associated with RF transmission on one common transmitter antenna.

TGC Transceiver Group Control

Application for control of the logical units TX and TF, as well as O&M-bus communication.

TGC is implemented as software running in the TRXC. The TGC application software exists in all TRXCs, though active in one only.

TIB (TIM) Timing Bus

TG internal bus for distribution of synchronization information from a TM to all TRXCs and RTXs.

TM Timing Module

Set of RBS hardware units for generation of high accuracy synchronization information. Comprises a TMCB and TUs.

TMCB Timing Module Connection Board

RBS hardware unit for connection of cables to a TM. → TM

TMOS Telecommunication Management Operation Support

TRAU Transcoder Rate Adaption Unit

TRI Transmission Radio Interface

RBS hardware unit for switching of time slots, and conversion of electrical characteristics between the Terrestrial Lines and the RBS internal LIBs.

TRS Transceiver System

Within the Ericsson GSM system CME20, the Transceiver System (TRS) has been developed to meet the GSM recommendations of a Base Transceiver Station (BTS).

TRS is a functional structure and shall therefore not be seen as a particular set of hardware or software. →RBS

TRS is made up of five subsystems:

- TCS Transceiver Control Subsystem- RTS Radio Transceiving Subsystem- SPS Signal Processing Subsystem- TMS Timing Subsystem- CAB Cabinet Subsystem

TRX* Transceiver

GSM network entity for radio transmission/reception and signal processing, associated with traffic on eight BPCs, that is, all BPCs belonging to one TDMA frame. → RRX, → RTX

TRXC Transceiver Controller

RBS hardware unit for control of eight BPCs, by means of subordinated RRX and SPPs or SPUs.

A TRXC that is TGC host controls the TG common resources, RTXs and the TM.

TRXCONV Transceiver DC/DC Converter

RBS hardware unit for conversion of 24V DC to 5V DC and 12V DC, feeding a TRXC and its subordinated RRX and SPPs.

TRXD Transceiver Digital

Set of RBS hardware units strictly associated with one TRXC, that is, a TRXC, eight SPPs or one SPU and one RRX.

TRXT Transceiver Tester

A functional unit in the TRS system used for testing the functionality of the TRXs.

TS* Time Slot

A 0.577ms time period (TDMA frame subunit) corresponding to 156.25 raw bits of information. The eight time slots of each TDMA frame are numbered 0,..., 7. → Burst

It is also the name of the logical unit associated with the SPP. → LU

TSW Time Switch

TU Timing Unit

RBS hardware unit for generation of high accuracy synchronization signals. → TM

TX Transmitter

Logical Unit associated with the RTX. → LU

TX-bus Transmitter bus

TG internal bus for interconnection of all RTXs to a TRXC. The TX-bus is an extension of an Int. TX-bus.

TXBP Transmitter Band Pass filter

TXD Transmitter Divider

RBS hardware unit for division of transmitted RF signals for feed back to the radio transmitters.

UPSim User Part SIMulator

V24I V.24 Interface

VAD Voice Activity Detector

VLR Visiting Location Register

VSWR Voltage Standing Wave Ratio

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1 Product

RBS 200 Installation and Engineering Manual, IE-module
(LZN 302 011)

2 Revision Information

R-state from R5A to R6A

3 General Information

- Document number of the manual, and associated documents, has been changed to LZN 302 011 (previous document number: EN/LZB 119 1582/1).
- The TMCB unit has been upgraded to enable TG Synch with RBS 2202 cabinets.

3.1 Detailed Information

The following changes and/or revisions have been made:

- Chapter 1, System Description:
  - Section 3.2, Transceiver Group (TG):

    Subsection 3.2.5, Signal Processing Unit SPU, variants SPU+ and SPU++ have been included in this section.

    Subsection 3.2.13,Timing Module, has been updated.
- Chapter 2-0, RBS Cabinet:
  - Figure 7, Connection field, updated.
- Chapter 2-1, RBS Units:
  - Section 5, “Equipping Magazines with PCBs and Units”:

    Subsections 5.1 and 5.2 have been updated.
  - The following figures and associated tables have been updated:

    Figure 17, RTX magazine

    Figure 18, TM/PSU magazine

Figure 19, TM magazine

Figure 20, TM/PSU magazine

- Chapter 2-2-2, Transmission Radio Interface, TRI:
  - Figures have been updated to correct º to " and ± to -.
  - Tables 1, 2 and 9 has changed layout.
- Chapter 2-3-0, Power Supply 230V AC:
  - Figures have been updated to correct ± to -.

Chapter 2-3-1, Power Supply -48V DC:

  - Figures have been updated to correct ± to -.
- Chapter 2-4, Cabling and Earthing:
  - Figure 1, Connection field, updated.
  - The following cabling diagrams and associated tables have been updated:

    Figure 5, +24 V DC Distribution cabling

    Figure 8, RX Cabling

    Figure 11 LIB and alarm cabling
  - Subsection 2.6, Signal cabling:

    TM-bus data have been removed.
  - Subsection 6, External cabling, cables and diagrams:

    The following have been updated:

    Table 15

    Figure 22, Signal cabling, 3 cell configuration
- Chapter 4-1, Dimen. and Order., Power Supply.:
  - Subsection 1.3.1 Battery Backup:

    Reference changed from “Appendix” to “Ordering Info”.

Chapter 4-3, Dimen. and Order., Suppl. Equip.:

– Subsection 2.1, Basic Equipment:

  Table 1 has been updated

- Chapter 5, Guidelines for Site Installation:

  – Correction of spelling and layout.

- Chapter 7-2, Numbering of Ericsson Products and Documents:

  – Figures have been updated to correct ± to -.

Uppgjord — *Prepared*	Faktaansvarig — *Subject responsible*	Nr — *No.*		
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Revision History

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1 Revision History

All documentation has been put into SGML format. Owing to this change, nearly all documents have been assigned new document numbers to enable them to be stored centrally in GASK2. This changeover is also necessary to produce the documentation in Dynatext for electronic publishing and online viewing.

1.1 R4A to R5A

The following changes and/or revisions have been made:

- LIST OF DOCUMENTS; revised from E to F.
- Chapter 0; INTRODUCTION; revised from D to E;

  Power Supply Appendices reference added.

  Antenna Configuration Guidelines reference added.

  Ordering Information reference added.

  TROUBLE REPORT INTRUCTIONS; revised from to A; new document number. Trouble Report form EN/LZT 120 384 Uen has been incorporated into the new document.

- Chapter 1; SYSTEM DESCRIPTION; revised from E to A.
- Chapter 2; PRODUCT DESCRIPTION;

  Section 0; RBS Cabinet; revised from C to A; new document number.

  Section 1; RBS units; revised from E to A; new document number.

  Section 2; Transmission Radio Interface, TRI; revised from C to D.

  – Sub-section 2.2.0; Transmission Radio Interface, TRI; revised from D to A; new document number.

  Section 3; Power Supply;

  – Sub-section 2.3.0.; Power Supply 230V AC; revised from D to A; new document number.

  – Appendices 1/1073-BZZ 207 01 Ux, 2/1073-BZZ 207 01 Ux and 1911-BZZ 207 01

Ux have been removed from the manual. See reference page in the sub-section.

– Sub-section 2.3.1; Power Supply -48V DC; revised from B to A; new document number.

– Sub-section 2.3.2; Power Supply +24V DC; revised from B to A; new document number.

Section 4; Cabling and Earthing; revised from E to A; new document number.

Section 5; Alarm Handling; revised from B to A; new document number.

Section 6; Co-siting; rev. A; new document number.

- Chapter 3; ANTENNAS;

Section 0; Antennas; revised from D to A; new document number.

Section 1; Antenna Configuration Guidelines LV/R-97:029, Rev. A; removed from the manual. See reference page in the section.

- Chapter 4; DIMENSIONING AND ORDERING;

Section 0; Dimensioning & Ordering RBS; revised from E to A; new document number.

Section 1; Dimensioning & Ordering Power Supply; revised from D to A; new document number.

Section 2; Dimensioning & Ordering, TRI; revised from C to A; new document number.

Section 3; Dimensioning & Ordering, Supplementary Equipment; revised from C to A; new document number.

- Chapter 5; GUIDELINES FOR SITE INSTALLATIONS; revised from C to A; new document number.

- Chapter 6; ENVIRONMENTAL REQUIREMENTS; revised from B to A; new document number.

- Chapter 7; PLANNING AND DOCUMENTATION RULES;

Section 0; Installation Planning Procedure; revised from C to A; new document number.

Section 1; Site Documentation Rules; revised from D to A; new document number.

Section 2; Numbering of Ericsson Products and Documents; revised from RA to A; new document number.

- Chapter 8; GLOSSARY; revised from C to A; new document number.
- Chapter 9; REVISION HISTORY; revised from B to C.

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Revision History

Contents **Page**

1 Revision History

1.1 R4A to R5A

The following changes and/or revisions have been made:

- BINDER LABEL; revised from D to E.
- CONTENTS; revised from D to E.
- LIST OF DOCUMENTS; revised from D to E.
- Chapter 0; INTRODUCTION; revised from C to D.
  - First paragraph, Objectives, revised.
  - Rules and Methods for Installation Engineering manual Product number EN/LZB 115 401, changed to EN/LZB 119 2935.
  - *NOTE: The IE-module is backwards compatible* added.
- Chapter 1; SYSTEM DESCRIPTION; revised from D to E.
  - Page 13; heading 3.1; Transmission Radio Interface (TRI);
  - Page 13; See section 5 TRI for more detailed information, changed to, See Chapter 2, section 2, TRI for more detailed information.
- Chapter 2; PRODUCT DESCRIPTION;

  Section 0; RBS Cabinet; revised from B to C.
  - Page 5; The cabinets can therefore be installed either with the rear side against a wall or back to back, changed to, The cabinets can therefore be installed either side by side in a row, or back to back.
  - Page 12; The connection field is provided with eight sets of cable connectors, changed to, The connection field is provided with eight sets of cable connection points.
  - Page 23; For information regarding labelling, see Sub-section 4.4 in the

G-module changed to, For information regarding labelling, see Chapter 3, section 4 in the G-module.

Section 1; RBS units; revised from D to E.

– Page 26; Adapter RPM 113 12/01, changed to Product Number KRY 101 1352/1.

– Page 26; U-link RPM 113 14/01, changed to Product Number KRY 101 1442/1.

– Page 27; Figure 14; RPM 113 12/01, changed to Product Number KRY 101 1352/1.

– Page 26; Figure 14; RPM 113 14/01, changed to Product Number KRY 101 1442/1.

– Page 37; Figure 21; Hybrid Combiner inputs labeled A and B.

Section 2; Transmission Radio Interface, TRI; revised from C to D.

– Sub-section 0; Transmission Radio Interface, TRI; revised from C to D.

– Sub-section 1; Connection of a Second TRI; Circuit board abbreviations, removed.

Section 3; Power Supply;

– Sub-section 0.; Power Supply; 230V AC; revised from C to D.

– Page 3; Contents; 2/1073-BZZ 207 01 Ux; new document.

– Page 10; 1.3.3; alt. BIM, BMG 701 014/3 and text; new addition.

– Appendix;

1/1073-BZZ 207 01 Ux: revised from J to L

2/1073-BZZ 207 01 Ux; new document

1911-BZZ 207 01 Ux; revised from E to F

Section 4; Cabling and earthing; revised from D to E.

- Page 7; 2.2; External cabling definition; Cable lengths are adapted to suit all normal site layouts described in section 11 in this manual, changed to, Cable lengths are adapted to suit all normal site layouts described in chapter 5 in this manual.
- Page 8; AC cabling; Earth collection bar shall provide a resistance to earth of less than 10 ohms, changed to, Earth connection bar shall be connected to an earth electrode system according to IEC 1024-1.
- Page 7; 2.2; Cable marking; See Installation Manual, Module G, section 3.4, changed to, See Installation Manual, Module G, Chapter 3, section 4.
- Page 8; Mains panel shall be provided with one 16 A automatic circuit breaker per power supply unit, etc., changed to, Mains panel shall be provided with one power ON/OFF switch per power supply unit, etc.
- Page 43; Figure 20; revised from C to D.

• Chapter 3; ANTENNAS;

Section 0; Antennas; revised from C to D.

- Page 5; See General Installation Instructions, EN/LZT 123 2680, changed to, see General Installation Instructions, EN/LZB 119 2693/1.

Section 1; Antenna Configuration;

- Document Antenna Configuration, 155 19-COA 109 117 Uen, replaced by new document, Antenna Configuration Guidelines, LV/R-97:029, Rev. A.

• Chapter 4; DIMENSIONING AND ORDERING;

List of Documents; revised from A to B.

Section 0; RBS; revised from D to E.

- Page 12; Table 2; Cable set Ext, L 1-2 NTM 201 671/01,
  Co-siting right, revised to Cable set Ext, L 1-2 NTM 201 871/01.

Section 1; Power Supply;

– Appendix; 131 62-BZZ 207 01 Uen; revised from E to G.

Section 3; Suppl. Equipm.; revised from B to C.

– Page 7; 4.3.1 - 4.3.3; removed.

- Chapter 5; GUIDELINES FOR SITE INSTALLATIONS; revised to C.

  Page 12; Electrical installation; The earth collection bar shall provide a resistance to earth of 10 ohms or less, changed to, The earth connection bar shall be connected to an earth electrode system according to IEC 1024-1.

- Chapter 7; PLANNING AND DOCUMENTATION RULES;

  Section 0; Installation Planning Procedure; revised from B to C.

  – Page 5; See "Rules and Methods for Installation Engineering EN/LZB 115 401", changed to, See "Rules and Methods for Installation Engineering" EN/LZB 119 2935.

  Section 1; Site Documentation Rules; revised from C to D.

  – Page 5; General; Refer to the document EN/LZB 115 401 Rules and methods for Installation engineering, changed to, Refer to the document EN/LZB 119 2935 Rules and methods for Installation engineering, etc...

  – Page 5; 2; The layout of the C-module is clearly described in the document EN/LZB 115 401, Rules and Methods for IE, changed to, The layout of the C-module is clearly described in the document EN/LZB 119 2935, Rules and Methods for IE.

  – Page 5; Installation documents; See further EN/LZB 115 401, Rules and Methods for IE, changed to, See further EN/LZB 119 2935, Rules and Methods for IE.

- Chapter 9; REVISION HISTORY; revised from A to B.