

MINI-LINK

ICM-C

User's Manual

ICM-C

User's Manual

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1. Introduction

1.1 ICM-C

The ICM-C is an EMC proof indoor access module for connection to MINI-LINK 15, 23, 26 or 38 radio. It shall be used for non-protected installations (1+0) for 2, 2x2, 8 or 2x8 Mbps traffic.

The ICM-C can be equipped with lightning protection. The ICM-C can also be equipped with a preconverter for long cables and power supply other than standard 48 V.

The ICM-C has interfaces for balanced and unbalanced traffic.

The ICM-C has two alarm LEDs for local supervision and connection for the computer/pocket terminal and service telephone.

In the following text the ICM-C will only be called ICM.

1.2 Safety Requirements


Electrical Safety

This equipment meets the requirements for class I EN 60950 and EN 41003. For electrical safety the DC power supply shall have reinforced insulation to the mains supply. All external connections are SELV (Safety Extra Low Voltage) except for the DC power connection when fed by a 60 V supply.

Service Personnel

Installation and service must be done by personnel having appropriate technical training and experience necessary to be aware of hazards during installation and/or service and of measures to minimize any danger to themselves or any other person.

Safety Precautions

- Follow all warnings and instructions in the manual.
- This symbol  appears in the manual and identifies conditions or practices that are hazardous or affect safe operation of the equipment.
- Access to equipment in use shall be restricted to service personnel.
- Do not use any installation components (screws, nuts etc.) other than those enclosed with the equipment or recommended by the MINI-LINK manufacturer.
- Ensure that the installation instructions, including required tightening torques for bolted joints, are followed and that appropriate tools (preferably the recommended tools) are used.
- Use adequate safety devices (helmet, gloves, safety cables etc.) when working on or around the mast. Be aware of the risk of falling objects. Consider the safety catch when hoisting the antenna and radio.

Microwave Radiation

No dangerous levels of microwave radiation exist outside the antenna feeder. However, the body shall not be exposed to the radiation in front of the antenna (<0.5 m from the feeder) for a long time (>6 minutes), see ENV 50166-2.

The transmitter should be switched off before disassembling the equipment, to avoid microwave radiation.

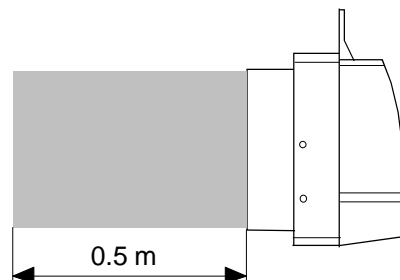


Figure 1-1. Restricted area.

1.3 How to Use the Manual

This document gives an overall explanation of the facilities of the ICM. For information about MINI-LINK radio, see separate manual.

The manual includes the following chapters:

1. Introduction

Introduction introduces the ICM and the User's Manual.

2. Technical Description

Technical Description describes the functionality and construction of the ICM. The description of ICM is divided into a mechanical and an electrical part.

3. Installation

Installation describes step by step how to install MINI-LINK radio with ICM.

4. Operation and Maintenance

Operation and Maintenance describes how to use the ICM.

5. Spare Parts List

Spare Parts List holds a list of recommended spare parts and ordering codes for ICM.

6. Block Diagram

Block Diagram shows the block diagram for ICM.

7. Technical Data

Technical Data includes the technical data necessary when installing and operating the ICM.

8. Appendices

Appendices holds one document:

- Failure Report

2. Technical Description

2.1 Mechanical Description

The ICM consists of two electrical boards fitted in an EMC shielded cabinet. The mounting brackets enables installation in 19" rack. Additional mounting frames are available for wall mounting.

All fixed external connections are made to the backside of the cabinet.

Temporary connections of computer, pocket terminal or service telephone is made to a connector on the front of the cabinet. This connector is covered by a lid when not used.

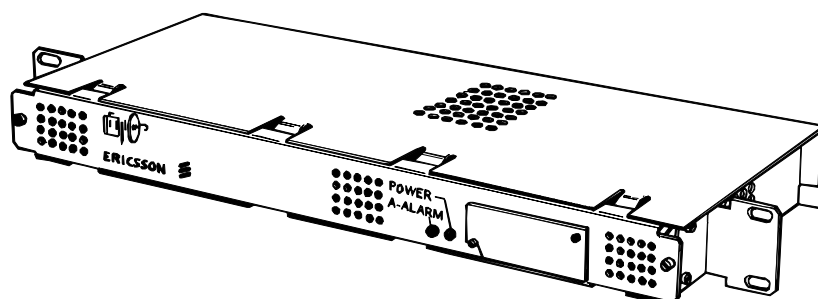


Figure 2-1. ICM.

2.2 Electrical Description

The ICM contains two electrical boards; the Connection board and the Interface board. The Connection board is mounted at the rear of the cabinet and the Interface board is mounted transversely to the Connection board.

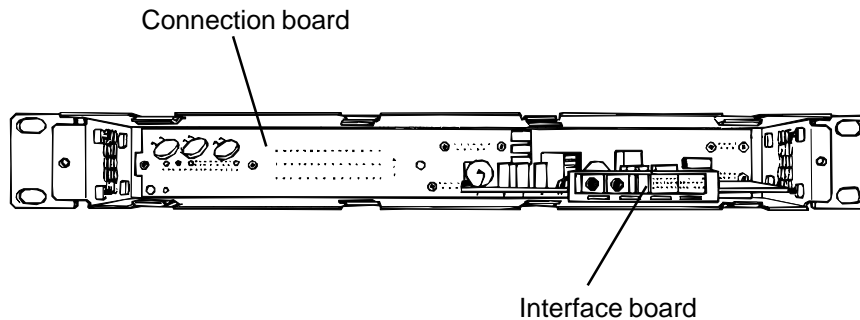


Figure 2-2. ICM, when the front panel is removed.

The Connection board holds connectors for fixed connections to MINI-LINK radio and user interfaces. Both balanced and unbalanced traffic interface is available. The Connection board comes in two versions; with and without lightning arrestors.

The Interface board holds LEDs for local supervision and connectors for temporary connections of computer, pocket terminal and service telephone. It also carries relays for alarm outputs.

The Interface board comes in two versions; with and without preconverter. The preconverter is used for installations with long cables between MINI-LINK radio and ICM and/or 24 V power supply. The preconverter converts primary supply voltage 20-58 V to 63 V DC.

3. Installation

3.1. Introduction

This instruction describes the installation of ICM and MINI-LINK radio.

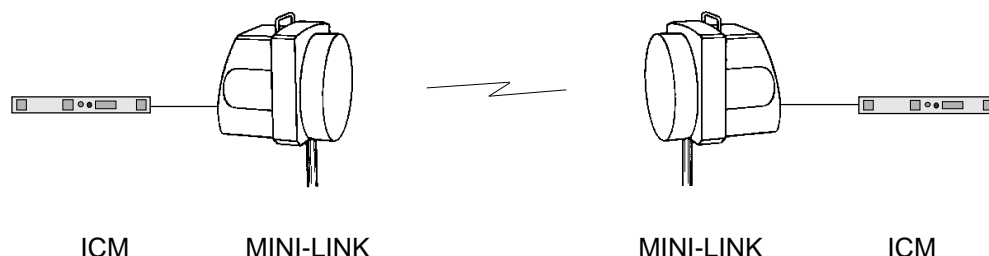


Figure 3-1. A MINI-LINK hop with ICM.

A hop (radio link connection) with MINI-LINK radio and ICM consists of 2 pcs MINI-LINK radio, 2 pcs ICM and cables for installation.

The steps required to install a MINI-LINK 1+0 hop with ICM are as follows:

- STEP 1** Perform the initial settings for the MINI-LINK radio on one site (if applicable).
- STEP 2** Mount the MINI-LINK radio and antenna.
- STEP 3** Perform the initial settings for the ICM (if applicable).
- STEP 4** Mount the ICM.
- STEP 5** Assemble and connect the cables between MINI-LINK radio and ICM.
- STEP 6** Assemble and connect the cables between ICM and external equipments.
- STEP 7** Turn on the power.
- STEP 8** Set the frequency.
- STEP 9** Install the MINI-LINK radio, antenna and ICM on the remote site.
- STEP 10** Align the antennas.
- STEP 11** Set the software in the MINI-LINK radios (if applicable).
- STEP 12** Perform a functional test.
- STEP 13** Start up the system.

The software in the MINI-LINK radios can be set via a computer/pocket terminal connected to the radio or the ICM.

Detailed description, step by step, is given on the following pages.

3.2 Installation Tools and Instruments

The following tools and instruments are required for installation of MINI-LINK radio and ICM.

- Crimping tool for D-sub connectors, LSD 319 11 or LSD 319 12 (with magazine)
- Crimping tool for power pins, LSD 319 80
- Insertion/Extraction tool, LSY 139 02
- Computer with software MINI-LINK MNM, MSM or MIM, or pocket terminal (optional)
- Voltmeter
- Stripping pliers
- 32 mm ring wrench
- 26 and 27 mm open jaw wrench (included in delivery)
- 28 mm open jaw wrench
- 6 mm Allen key (M8)
- For SMZ connectors:
 - Cutting pliers
 - Crimping tool, LSD 319 81 (or LSD 319 79)
 - Dynamometric wrench
- 16 mm ring and open jaw wrench
- Compass
- Torx screwdriver TX 10 (M3) for mounting of fixed attenuator
- Torx screwdriver TX 20 (M4) for dismounting of radio module and change of polarization
- Lubricating substance for outdoor screws and nuts, for example Stucarit 309 (blue). Manufacturer: E. Epple o Co, Seidenstrasse 55, D-7000 Stuttgart, Deutschland.
- For severe conditions, sealing substance, for example OKS 2020. Manufacturer: Omnikote GmbH, Triebstrasse 9, D-8000 München, Deutschland. To be applied around waveguide interfaces (note: must be applied outside after connection).

3.3 Initial Settings for MINI-LINK Radio

STEP 1

See MINI-LINK Radio Module User's Manual section 3.4 Initial Settings for information.

3.4 Mounting of MINI-LINK Radio and Antenna

STEP 2

See MINI-LINK Radio Module User's Manual section 3.8.1-3.8.3 for information.

3.5 Initial Settings for ICM

STEP 3

3.5.1 Preparation of SMZ Connectors for Unbalanced Traffic

Only applicable for unbalanced traffic.

The small metall covers in front of the connectors for the unbalanced traffic must be removed before connection. Only remove as many covers as required for connection of the unbalanced traffic.

BB IN 1 = traffic channel 1 in

BB IN 2 = traffic channel 2 in (only 2x2 and 2x8 Mbps)

BB OUT 1 = traffic channel 1 out

BB OUT 2 = traffic channel 2 out (only 2x2 and 2x8 Mbps)

- Remove the covers using a cutting pliers.

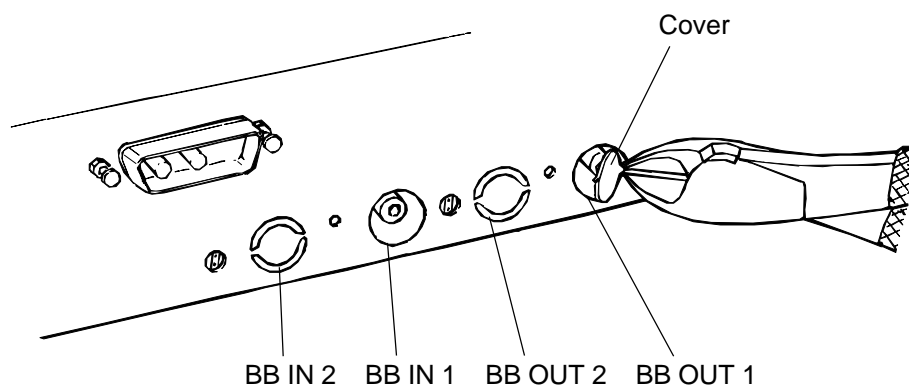


Figure 3-2. Preparation of SMZ connectors.

3.5.2 Grounding of Cable Shield for Unbalanced Traffic

The shield for the coaxial cables carrying traffic signals to/from ICM are normally grounded in the ICM. However in case of ground problems, the shield for the incoming signals can be disconnected from ground by removing the jumpers BB1 IN and BB2 IN, see the figure below.

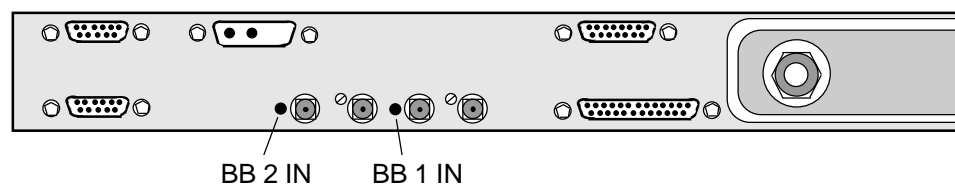


Figure 3-3. Backside of ICM with ground jumpers for coaxial cable shield.

3.6 Mounting of ICM

STEP 4

3.6.1 Mounting of ICM in 19" Rack

- Fit the ICM into the rack as shown in the figure and tighten the four screws.

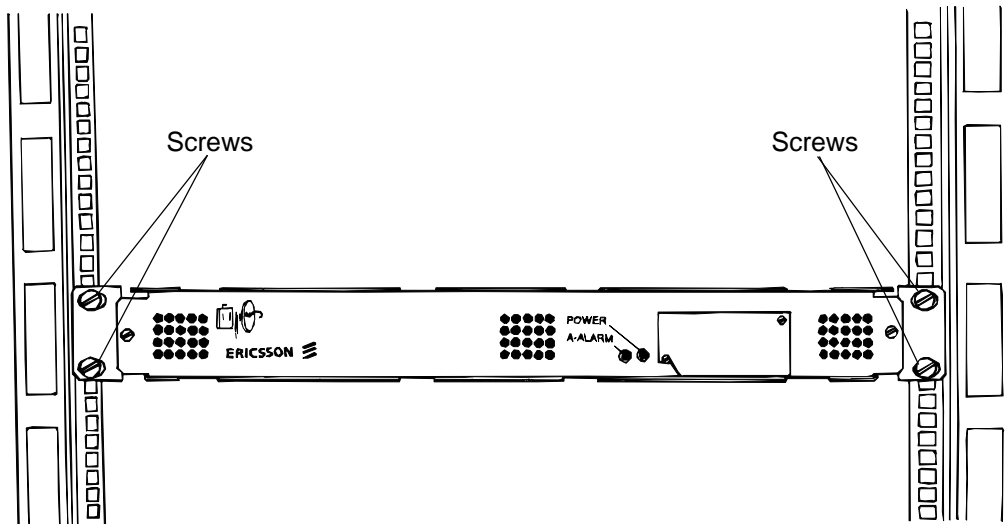


Figure 3-4. Mounting of ICM in 19" rack.

3.6.2 Wall Mounting of ICM with Mounting Frame SXK 111 0258/4

- Mount the two plates to the brackets using the 8 screws.

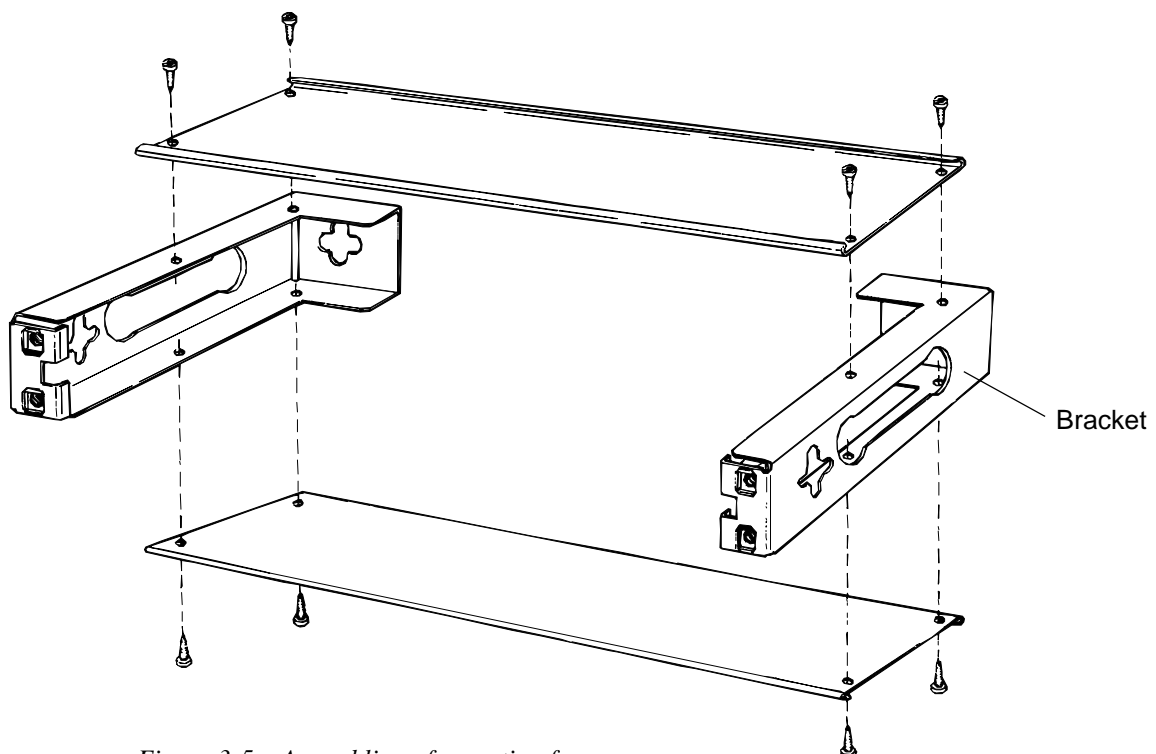


Figure 3-5. Assembling of mounting frame.

- Fasten the mounting frame to the wall using the two screws.

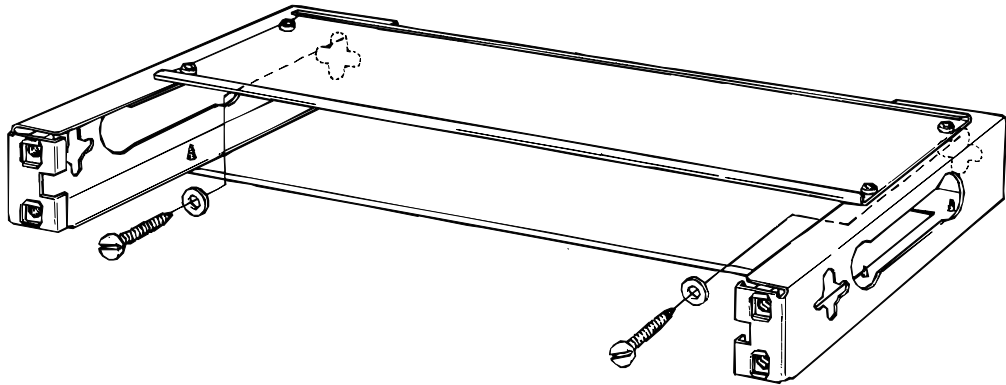


Figure 3-6. Wall mounting of mounting frame.

- Mount the ICM to the mounting frame using the four screws.
- Use a cable with cable lug, screw, washer and nut (M4-M8) to ground the mounting frame to the station ground as shown in the figure.

Note: The articles required are not included in delivery.

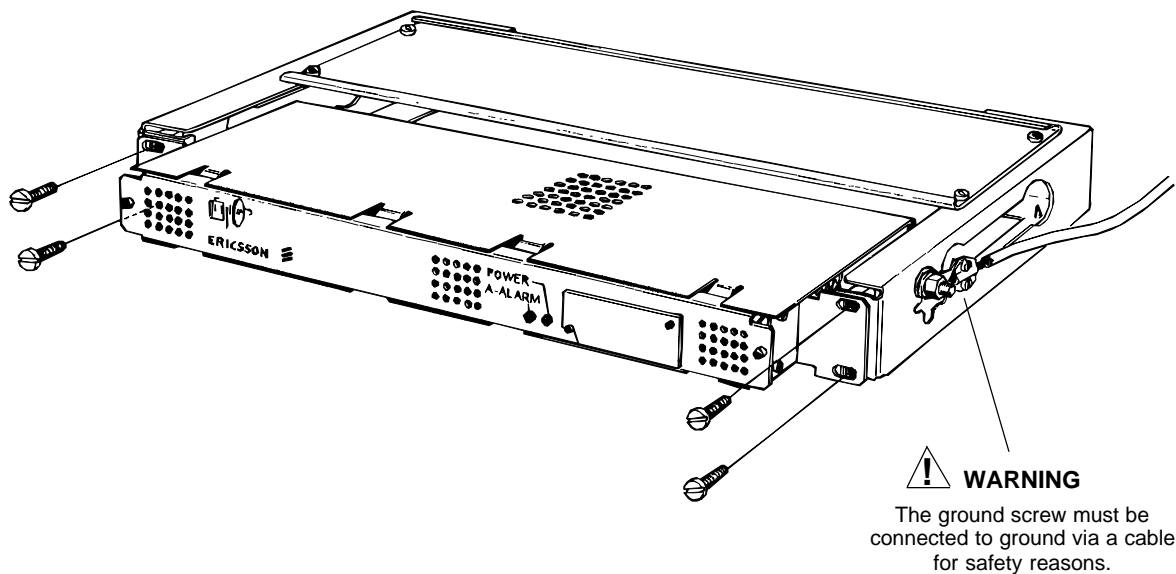
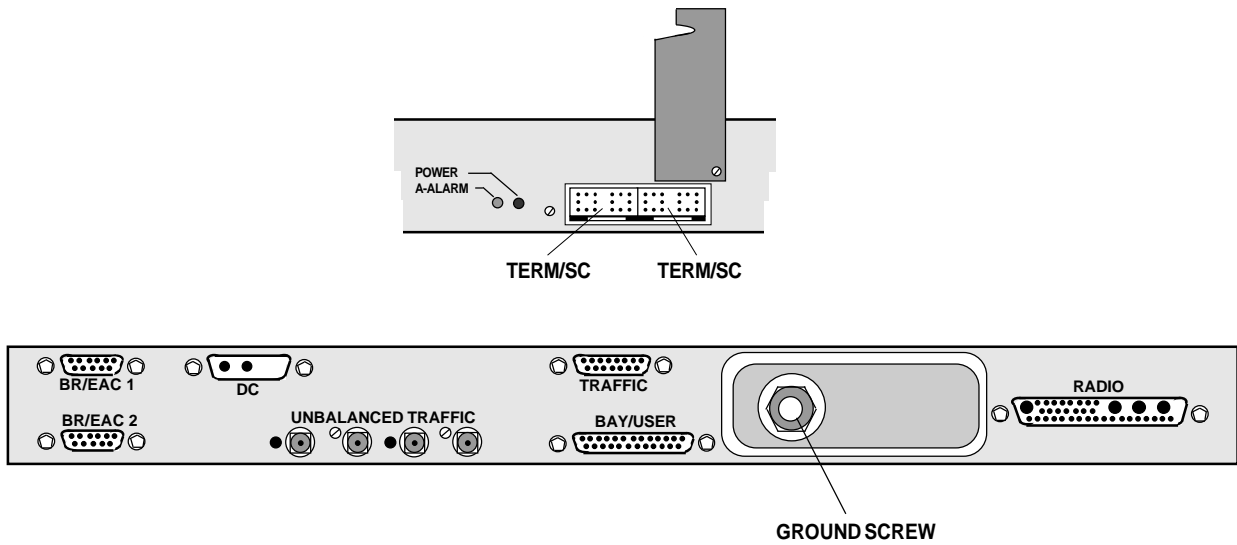


Figure 3-7. Mounting of ICM to the mounting frame.

As an alternative the mounting frame SXX 111 0258/3 can be used for wall mounting. This frame can house three ICM-C or one SMM-C.

3.7 Description of Connections

This section describes the connections to be made for the ICM.



Plug	Used for
RADIO	To/from radio.
BAY/USER	BAY alarms, computer interface, service channel and User In/Out.
DC	Power supply
BR/EAC 1 and BR/EAC 2	EAC and service channel branching for connection to other MINI-LINK equipment on the same site.
TRAFFIC	Balanced traffic in and out.
UNBALANCED TRAFFIC	Unbalanced traffic in and out (hidden behind covers).
Ground screw	Connection to ground.
TERM/SC x 2 (front connection)	Temporary connections of computer/pocket terminal and service telephone.

Figure 3-8. Description of connections to ICM.

3.8 Cabling

3.8.1 Introduction

Cables are required for the following connections:

- between external equipment and ICM
- between ICM and MINI-LINK radio
- between MINI-LINK equipment on site (network cabling).

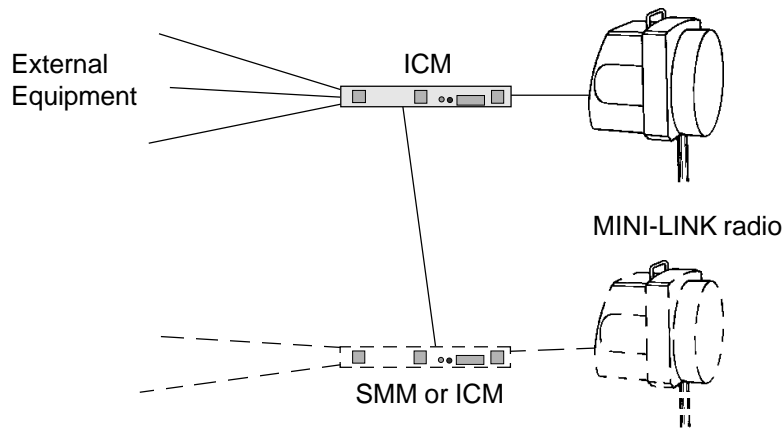


Figure 3-9. Cable connections to ICM.

For connection to MINI-LINK radio, multicable supplied by ERICSSON is recommended.

Connection between MINI-LINK equipment on site is required for sites with more than one radio in a MINI-LINK operation and maintenance network.

3.8.2 Cabling between ICM and MINI-LINK Radio

Multi cable TFR 463 11 or TFR 463 13 is recommended for connection between ICM and MINI-LINK radio.

All facilities offered by the MINI-LINK system are available when using TFR 463 13. TRF 463 11 is an alternative when most but not all of the facilities shall be used (service channel network, wake up received, modem connect, call in/out and user in/out are not connected).

TFR 463 11 contains:

- 4 balanced pairs for traffic (attenuation <14 dB/km for 2 Mbps, ≤29 dB/km for 8 Mbps)
- 2 pairs for DC supply (resistance 14 Ω/km)
- 7 pairs for other interfaces (DC resistance ≤55 Ω/km)

TFR 463 13 contains:

- 4 balanced pairs for traffic (attenuation <14 dB/km for 2 Mbps, ≤29 dB/km for 8 Mbps)
- 2 pairs for DC supply (resistance 14 Ω/km)
- 12 pairs for other interfaces (DC resistance ≤55 Ω/km)

Maximum cable length for multicable

The following 3 items must be considered:

1. Maximum total cable length in traffic cables and multi cables=6 dB/A

A=cable attenuation at half bit rate in dB/m.

For multicable: A=14 dB/km for 2 Mbps and A=29 dB/km for 8 Mbps.

For TZC 750 24: A=23 dB/km for 2 Mbps and A=45 dB/km for 8 Mbps.

Maximum cable length for multi cable	2 Mbps	400 meters
	8 Mbps	200 meters

2. For ICM **without preconverter** the minimum required supply voltage, 39 V at the radio module, must be considered. Minimum supply voltage versus cable length can be read from the diagram in the figure on the following page.

Power supply requirement (39-72 V) must be measured at the radio.

For ICM without preconverter

Minimum power supply voltage versus cable length can be read from the diagram in the figure below.

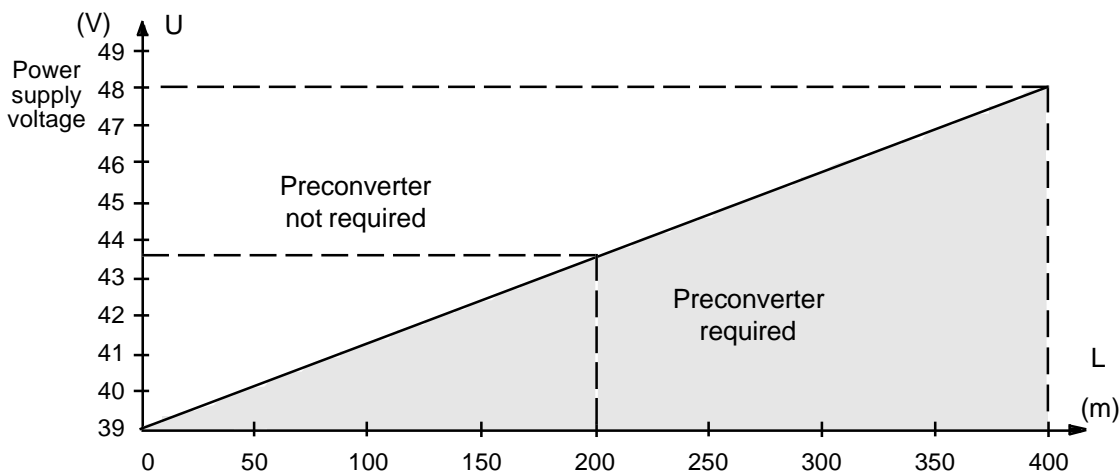


Figure 3-10. Minimum supply voltage versus cable length for connection between ICM without preconverter and MINI-LINK.

- 3. Maximum total cable length for EAC at one site is 1200 m.
All cable lengths shall be included, also the multicables between the MINI-LINK radio and the ICM, see figure 3-12.

3.8.3 Power Supply

Shielded twisted pair-cable with a cross section of 1.2-1.3 mm² (AWG16) is recommended.

Power supply to ICM and MINI-LINK shall be connected to ICM plug DC via fuse as shown in the figure below.

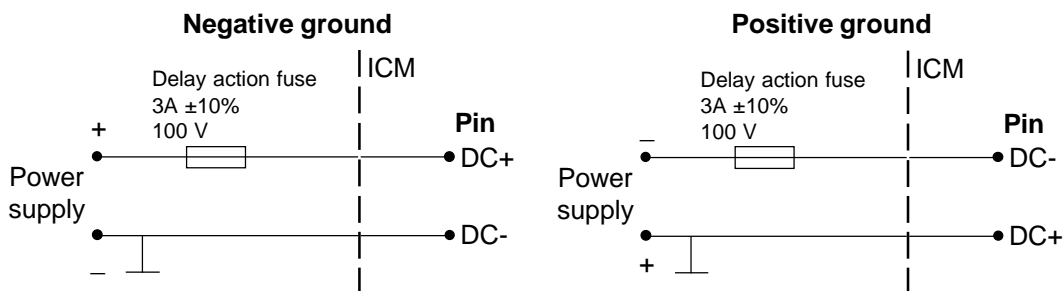


Figure 3-11. How to fuse the power supply for the ICM and radio.

3.8.4 Traffic Signals

Cable Type for Balanced Traffic

Shielded twisted pair-cable 120Ω with a cross section of 0.2-0.5 mm² (AWG 20-24) together with connector kit included in delivery, is recommended. As an option a shielded twisted pair-cable 120Ω with a cross section of 0.14 mm² (AWG 26) can be used. Connector kit SXX 111 565/1 (not included in delivery) should be used with this cable.

Cable Type for Unbalanced Traffic

Coaxial cable 75Ω type TZC 750 24 or equivalent is recommended.

Maximum Cable Length

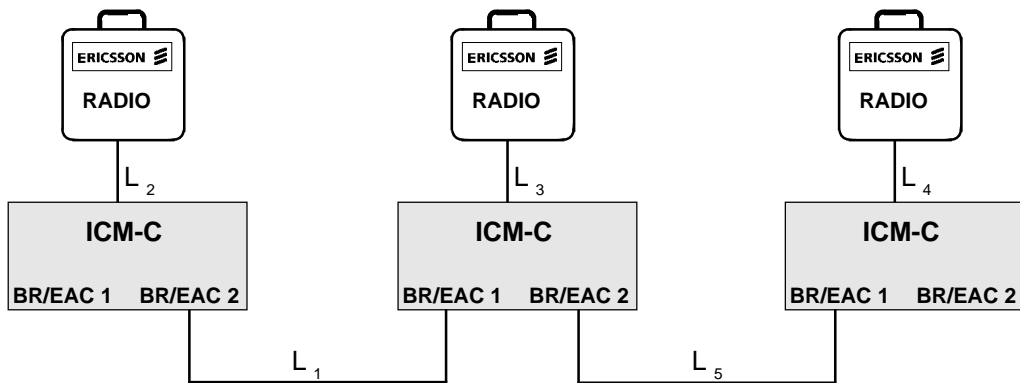
See section "3.8.2 Cabling between ICM and MINI-LINK Radio" for information.

3.8.5 Supervision Network Cabling

If more than one MINI-LINK radio is installed on the site, the EAC (External Alarm Channel) must be connected to the other MINI-LINK equipment on the site for supervision of the network.

Note: If you want to build a service channel network, the service channel branching ports must be connected to the other MINI-LINK equipment on site. Multicable TFR 463 13 must be used for cabling to radio.

The connectors BR/EAC 1 and BR/EAC 2 are used for network cabling.



$$\text{Total cable length: } L_1 + L_2 + L_3 + L_4 + L_5 < 1200 \text{ m}$$

Figure 3-12. Network cabling.

Shielded twisted pair-cable containing wires with a cross section of 0.2-0.5 mm² (AWG 20-24) is recommended.

Maximum cable length at one site is 1200 m. All cable lengths shall be included, also the multicables between the MINI-LINK radios and the ICM, see the figure above.

Maximum 32 SMMs or 26 SMMs and 6 ICM can be connected per site.

3.8.6 Operation and Maintenance

The following interfaces are used for operation and maintenance:

- RS232 Terminal Interface
- Alarms
- User In/Out
- Wake-Up Received
- Modem Connect
- Service Channel
- Call In/Out

Shielded twisted pair cable with a cross section of 0.2-0.5 mm² (AWG 20-24) together with connector kit included in delivery, is recommended. As an option a cable with a cross section of 0.14 mm² (AWG 26) can be used. Connector kit SXX 111 565/1 (not included in delivery) should be used with this cable.

RS232 Terminal Interface for Pocket Terminal, Computer or Modem

Maximum recommended cable lengths for the terminal interface is 30-300 m depending on the electrical environment.

Terminal Interface is available in plug BAY/USER for fixed installations and in the front plugs for temporary installations. The two front connectors are identical.

Alarms

TX alarm and RX alarm from radio and A-alarm from ICM are available in connector BAY/USER.

User In/Out

Two user inputs and two user outputs can be connected to the ICM. Multicable TFR 463 13 must be used for cabling to radio.

Wake Up Received

Wake Up Received can be available in connector BAY/USER, but is not connected for the standard cabling of TFR 463 13 and TFR 463 11 to radio.

For use of Wake Up Received see section 3.9.1.

Modem Connect

Modem Connect is available in the connector BAY/USER. Multicable TFR 463 13 must be used for cabling to the radio.

Service Channel

The service channel is connected to the ICM via the multicable. For a point to point use of service telephone, just connect the equipments to the radio or ICM. Service channel equipment is connected to service channel 1 in front connector or connector BAY/USER.

Service Channel Nets

For building of service channel nets, branching is connected to service channel 2 in plug BR/EAC 1 or plug BR/EAC 2. Multicable TFR 463 13 must be used for cabling to radio.

Note I: For 2x2 and 2x8 Mbps radio modules, the service channels must be wired for branching if a service channel net shall be built, see section 3.4.2 in the Radio Module User's Manual.

Note II: The service channel equipment must be connected to an SMM or an ICM where the BR/EAC 1 port is not used.

Call In/Out

Multicable TFR 463 13 and supervision network are required for connection of Call In/Out.

Call In signal from the service telephone equipment can be sent from the MINI-LINK radio via the ICM to the Call Out ports on all other equipments in the MINI-LINK net.

Further Information

For further information on Operation and Maintenance interfaces consult chapter 4 in this manual and chapter 4 in user's manual for the radio.

3.8.7 Ground Connection

The ground screw on the ICM shall be grounded via a cable with a cross section of at least 16 mm².

3.8.8 Connector Kits

The ICM delivery holds the following connector kits:

SXK 111 0259/3

- 1 complete 32+4 pin D-sub connector for radio.
- 1 complete 3-pin D-sub connector for DC.
- 1 cable lug for ground connection.
- 3 label holders for marking of connectors.
- 3 pieces of marking type.
- 5 straps for fixing the label holder to the cables.
- 1 meter insulating cable protection.

2x SXK 111 0260/5

- 1 complete 9 pin D-sub connector for BR/EAC 1 and 2.

SXK 111 0261/1

- 1 complete 25 pin D-sub connector for BAY/USER.

SXK 111 0260/2 (only for balanced traffic)

- 1 complete 15 pin D-sub connector for traffic.

SXK 111 0261/2 (only for unbalanced traffic)

- 4 complete SMZ connectors for traffic.

3.9 Connection and Assembling of Connectors

STEP 5 and 6

3.9.1 Introduction

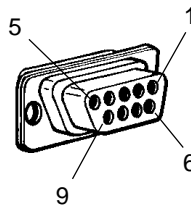
Figure 3-13 and 3-14 show how to connect the necessary equipment for ICM to MINI-LINK radio and external equipment.

When selecting cables, see section 3.8 for information.

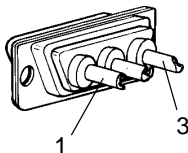
Trimming and assembling of cable TFR 463 11 and TFR 463 13 for connection between ICM and MINI-LINK is described in 3.9.2.

Assembling of connectors for external equipment are described in 3.9.3.

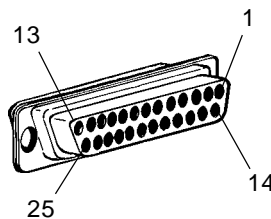
ICM			Other ICM	
External connector	Pin No	Signal	Pin No	
BR/ EAC 1	1	EAC DATA A	1	BR/ EAC 2
	6	EAC DATA B	6	
	2	EAC CLOCK A	2	
	7	EAC CLOCK B	7	
	4	SERV OUT 2 A	4	
	8	SERV OUT 2 B	8	
	5	SERV IN 2 A	5	
	9	SERV IN 2 B	9	
	3	0 V		



ICM			Other ICM	
External connector	Pin No	Signal	Pin No	
BR/ EAC 2	1	EAC DATA A	1	BR/ EAC 1
	6	EAC DATA B	6	
	2	EAC CLOCK A	2	
	7	EAC CLOCK B	7	
	4	BRAN IN 1 A	4	
	8	BRAN IN 1 B	8	
	5	BRAN OUT 1 A	5	
	9	BRAN OUT 1 B	9	
	3	0 V		



External connector	Pin No	Signal
DC	1	DC +
	2	DC -
	3	

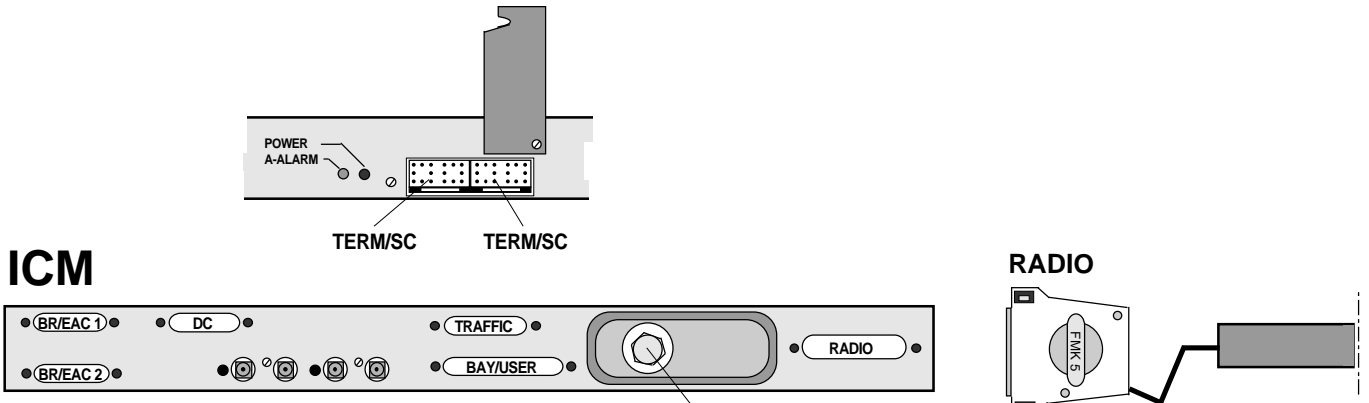


External connector	Pin No	Signal
BAY/ USER	1	A ALARM
	14	NOT USED
	2	TRANSMITTER ALARM A
	15	RECEIVER ALARM A
	3	NOT USED
	16	ALARM RETURN
	4	MODEM CONNECT or * WAKE UP RECEIVED
	17	0 V
	5	RS 232 FROM RADIO
	18	RS 232 TO RADIO
	6	NOT USED
	7	0 V
	19	NOT USED
	8	USER OUT 1 *
	20	USER OUT 2 *
	9	USER IN 1 *
	21	USER IN 2 *
	10	NOT USED
	22	NOT USED
	11	NOT USED
	23	NOT USED
	12	SERV OUT 1 A
	24	SERV OUT 1 B
	13	SERV IN 1 A
	25	SERV IN 1 B

* Only applicable for cabling with TFR 463 13 to radio.

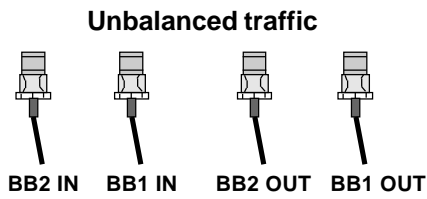
Figure 3-13. External connections to ICM, except for connections to TRAFFIC, TERM/SC and EXTERNAL which are shown in figure 3-14.

Connection of ICM

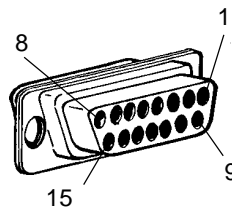


Note: Other external connections are shown in figure 3-13.

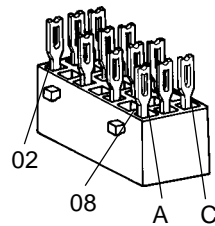
WARNING
The ground screw must be connected to ground via a cable for safety reasons.



Balanced traffic



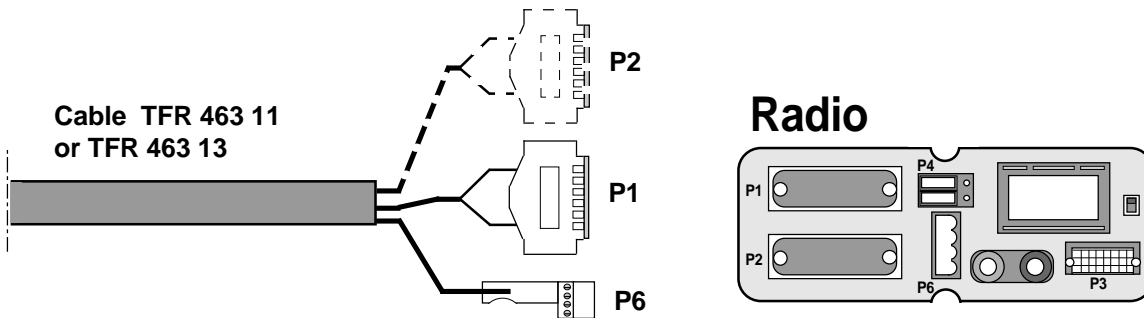
External connector	Pin No	Signal
Traffic	1	BB OUT 1 A
	9	BB OUT 1 B
	2	
	10	
	3	BB OUT 2 A
	11	BB OUT 2 B
	4	
	12	
	5	
	6	BB IN 1 A
	13	BB IN 1 B
	7	
	14	
	8	BB IN 2 A
	15	BB IN 2 B



The two TERM/SC-connections are identical.

External connector	Pin No	A	B	C
TERM/ SC	02	CALL IN *	RS232 FR RADIO	0 V
	03			
	04	SERV IN 1A	RS232 TO RADIO	SERV IN 1B
	05			
	06	CALL OUT *		
	07			
	08	SERV OUT 1A	+ 10 V	SERV OUT 1B

* Only applicable for cabling with TFR 463 13 to radio.



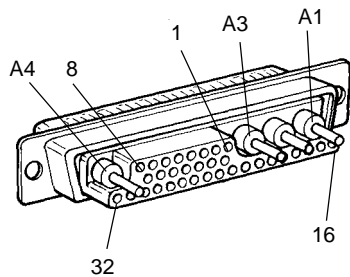
This is a recommended cabling of TFR 463 11 or TFR 463 13. The wires can be used in other ways depending on application.

At the ICM end:

- pin 16, 17, 18, 19, 24, 25, 31, 32, 29, 30, 9, 1, 22, 23, A3, A1, A2 and A4 must always be connected.
- pin 8, 15, 7 and 14 must be connected for service telephone use.
- pin 5, 6, 12 and 13 must be connected for service telephone branching.
- pin 28 can be used for modem connect or wake up received.
- pin 3, 11, 26, 27 are used for external alarm connected to the radio.

It is recommended, but not necessary to connect the unused wires.

Note: The DC wires (A1-A4 in the ICM end, P6 in the radio end) **must not** be mixed up. If they are, the equipment may be damaged.



Note: Following pairs shall be **twisted** all the way down to the contact pins. At least 1 turn/3 cm.

- Pin 16 and 17 (white and blue)
- Pin 18 and 19 (black and green)
- Pin 31 and 32 (white/blue and blue/white)
- Pin 29 and 30 (grey/white and white/grey)
- Pin 9 and 1 (red/blue and blue/red)
- Pin 24 and 25 (yellow and brown)
- Pin 22 and 23 (red and orange)

ICM-C		TFR 463 11 or 463 13		Radio	
External connector	Pin No	Signal	Color	Pin No	External connector
RADIO	16	BB OUT 1A	WHITE	1	P1
	17	BB OUT 1B	BLUE	14	
	18	BB OUT 2A	BLACK	2	
	19	BB OUT 2B	GREEN	15	
	31	EAC CLOCK B	WHITE/BLUE	3	
	32	EAC CLOCK A	BLUE/WHITE	16	
	29	EAC DATA B	GREY/WHITE	4	
	30	EAC DATA A	WHITE/GREY	17	
	9	RS232 FROM RADIO	RED/BLUE	5	
	1	RS232 TO RADIO	BLUE/RED	18	
	28	MODEM CONNECT or WAKE UP RECEIVED	WHITE/BROWN	6	
	4	NOT USED	BROWN/WHITE	19	
	20	TRANSM. ALARM	WHITE/GREEN	8	
	21	RECEIVER ALARM	GREEN/WHITE	20	
	8	SERV OUT 1A	WHITE/ORANGE	9	
	15	SERV OUT 1B	ORANGE/WHITE	21	
	7	SERV IN 1A	RED/ORANGE	10	
	14	SERV IN 1B	ORANGE/RED	22	
	2	CALL IN *	BLACK/ORANGE	11	
	10	CALL OUT *	ORANGE/BLACK	23	
	24	BB IN 2A	YELLOW	12	
	25	BB IN 2B	BROWN	24	
	22	BB IN 1A	RED	13	
	23	BB IN 1B	ORANGE	25	
	A3	0 V	GREY	1	
A1	DC+	PINK	2		
A2	DC-	VIOLET (PURPLE)	3		
A4	+10 V	TURQUOISE (BLUE-GREEN)	4		
27	USER IN 2 *	RED/GREEN	3	P2	
11	USER OUT 2 *	GREEN/RED	16		
26	USER IN 1 *	RED/GREY	4		
3	USER OUT 1 *	GREY/RED	17		
6	SERV OUT 2A *	BLACK/BLUE	9		
13	SERV OUT 2B *	BLUE/BLACK	21		
5	SERV IN 2 A *	RED/BROWN	10		
12	SERV IN 2 B *	BROWN/RED	22		

(*) Only applicable for cable TFR 463 13

Figure 3-14. Connection of ICM to MINI-LINK radio.

3.9.2 Trimming and Assembling of Cables TFR 463 11 and TFR 463 13
 Applies to connector RADIO.

1. Trim and assemble the cable at the radio end as shown in MINI-LINK radio module user’s manual.
2. Measure required cable length between the ICM and the radio, and add approximately 100 mm.
3. Pass 1 metre of insulating cable protection onto the cable and put it away from the end of the cable approximately 1 metre.
4. Strip the jacket approximately 750 mm or as much as required.

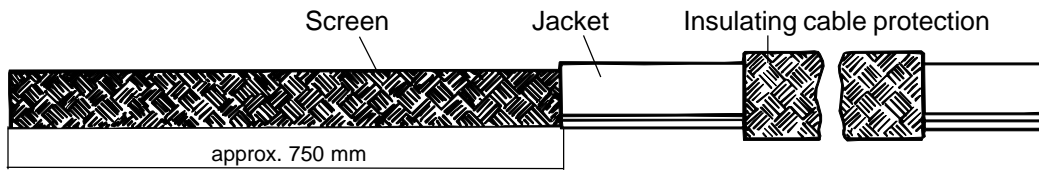


Figure 3-15. Stripping the cable.

5. Pass a ring (the large ring for TFR 463 13 and the smaller for TFR 463 11) onto the cable, under the screen, and pull back the ring and the screen to uncover approximately 350 mm of the aluminium sheet.
6. Fasten a strap approximately 300 mm from the end (to make it easier to work with the wires).
7. Remove the aluminium sheet and plastic sheet to the strap.

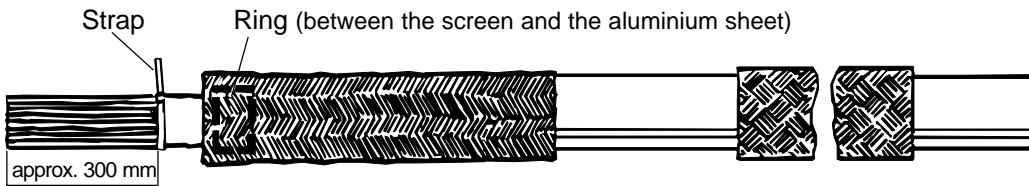


Figure 3-16. Uncovering the wires.

8. Cut the wires approximately 100 mm (to make it easier to pull back the screen, step 22).
9. Place the rubber sleeve (the large sleeve for TFR 463 13, the small for TFR 463 11) on the wires and pull it back to the strap.

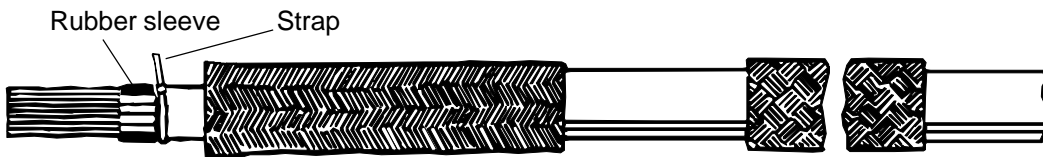


Figure 3-17. Positioning the tube on the wires and cutting the wires.

10. Strip the wires in accordance with the figure.

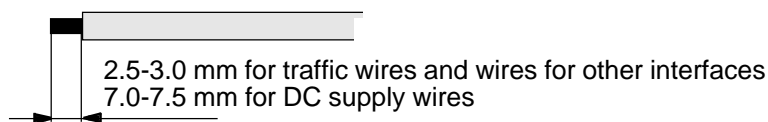


Figure 3-18. Stripping a wire.

11. Insert a contact pin for signal wires in crimp tool LSD 319 11 and tighten gently until the contact pin is fastened.
12. Put in the wire and crimp.

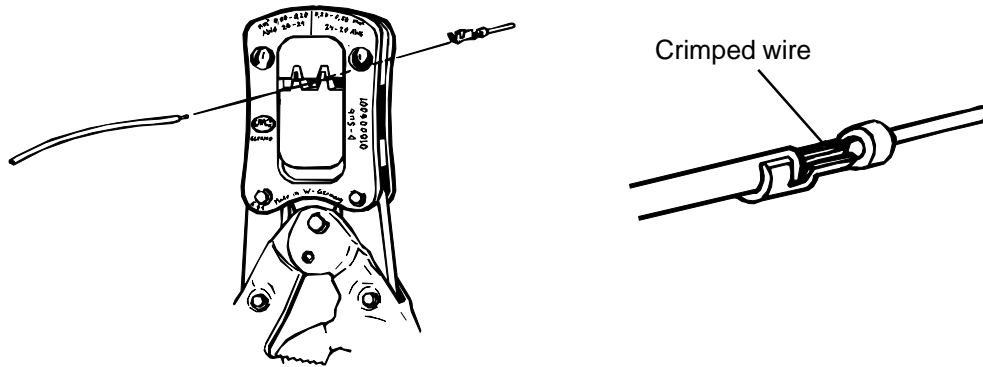


Figure 3-19. Crimping of wire (crimp tool LSD 319 11).

13. Inspect the crimp.
14. Crimp the power wires using LSD 319 80 in position 3 (AWG 16).
(The power wires can be soldered as an alternative).
15. Twist the signal wires in pairs down to the crimp, 2-3 cm per turn.
16. Insert the contact pin into the cavity and make sure the contact pin is fixed.

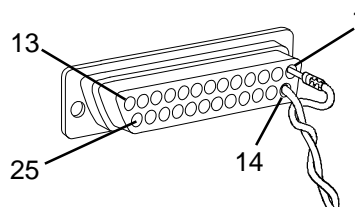


Figure 3-20. Inserting contact pins into cavity.

17. If a contact pin has been inserted in the wrong cavity, place the extraction tool LSY 139 02 in the cavity, positioned as shown in the figure, and press out the contact pin from the opposite side.

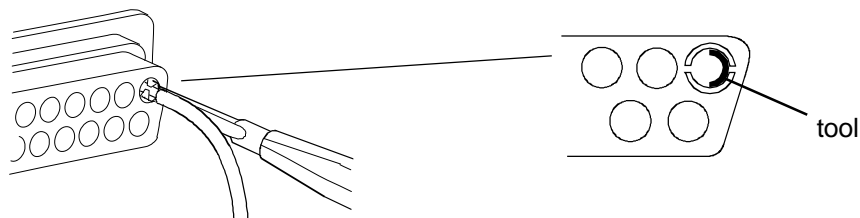


Figure 3-21. Extracting a contact pin from the cavity.

18. Insert the adapter in the contact body in accordance with the figure below.
Note: This only applies for TFR 463 11.

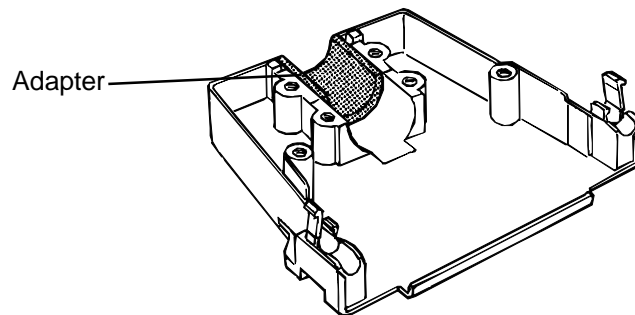


Figure 3-22. Insertion of adapter in contact body.

19. Arrange the wires and pull the rubber sleeve forward until the distance between the rubber sleeve and contact body is approx. 30 mm.
20. Remove the cable clamp and pull the screen and the tube forward to the rubber sleeve.
21. Pull out the screen until it covers the tube.
22. Put down the cable and fix the contact body in the back shell half.
23. Fasten the screen and the tube with the clamp.
24. Fasten the wires and rubber sleeve with the clamp.
25. Insert the locking screws on both sides of the connector and fasten the top.

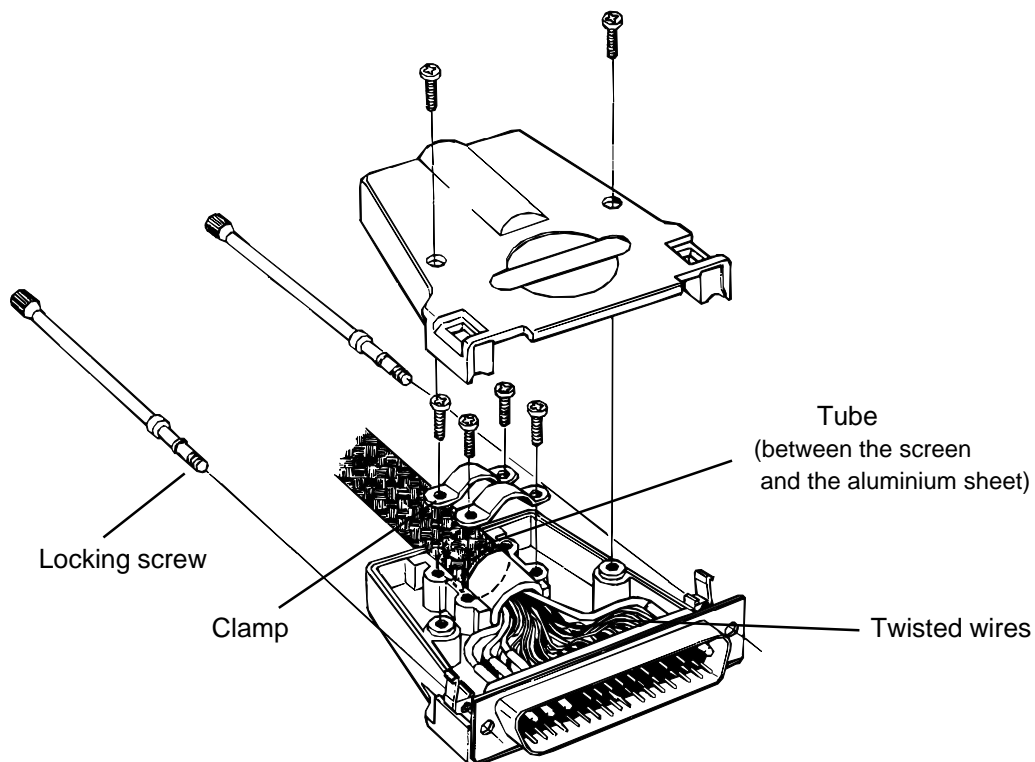


Figure 3-23. Assembling of connector.

26. Pull down the insulating cable protection to the connector and fix it together with a label using a strap. Fix the other end of the insulating cable protection with a strap.
27. Mark the assembled connector by writing on the tape and attach it to the label holder.

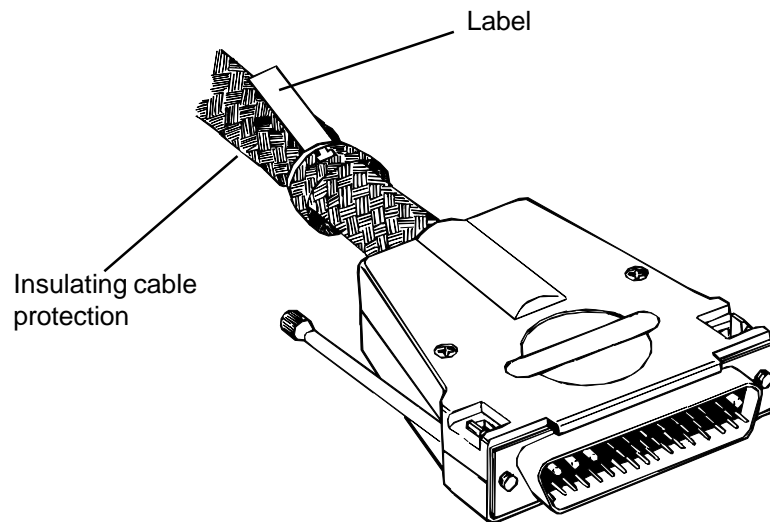


Figure 3-24. Assembled connector.

3.9.3 Assembly Instructions for External Connections

3-pin D-sub Connector

Applies to connector DC.

1. Trim the cable according to the figure.

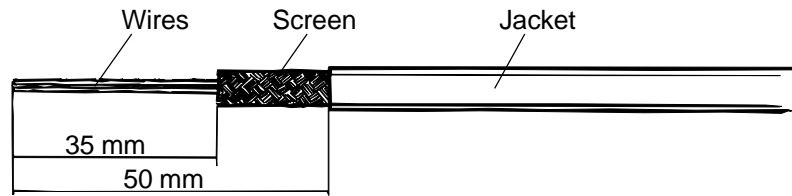


Figure 3-25. Stripping the cable.

2. Strip the wires.

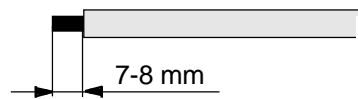


Figure 3-26. Stripping a wire.

3. Crimp (or solder) the contact sleeves to the wires. Use crimping tool LSD 319 80 in position 3 for AWG 16.
4. Insert the contact sleeves into the cavities of the contact body.
5. Fix the contact body in the back shell half.
6. Fasten the wires and screen with the clamp.
7. Fasten the top shell half.

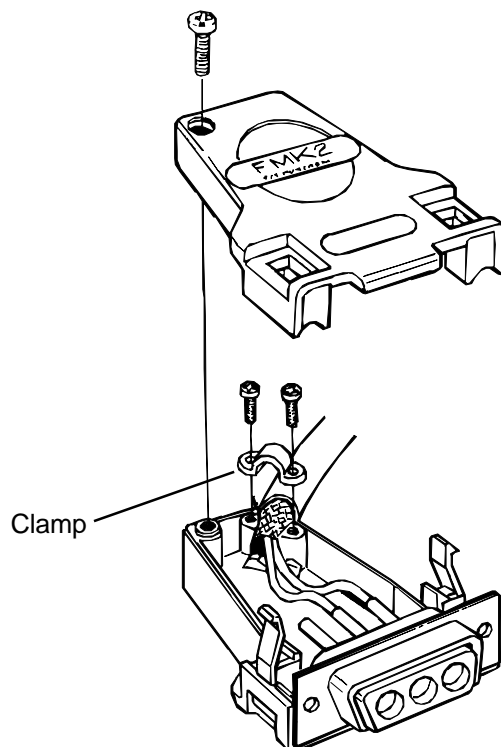


Figure 3-27. Assembling the clamp and shell halves.

8. Put the two screws in the slots on the sliding lock.
9. Fasten the sliding lock to the connector with the screws, in accordance with the figure.
10. Fix a label holder using a strap and mark the assembled connector by writing on the tape and attach it on the label holder.

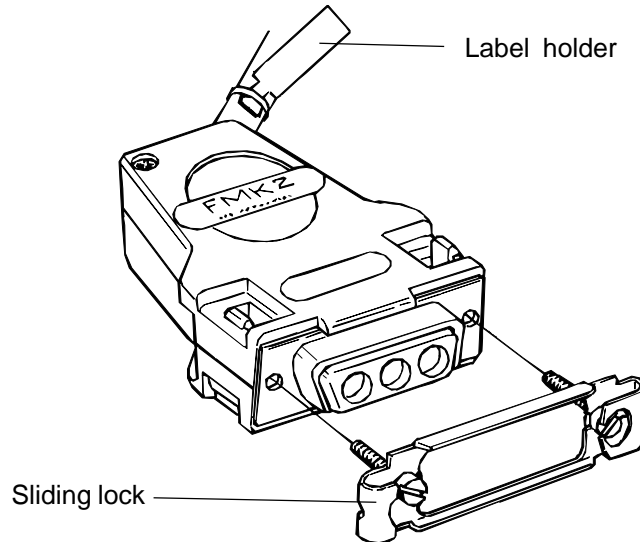


Figure 3-28. Assembling the sliding lock.

Ground the Connection

- Trim the cable and fix it to the cable lug (included in delivery).

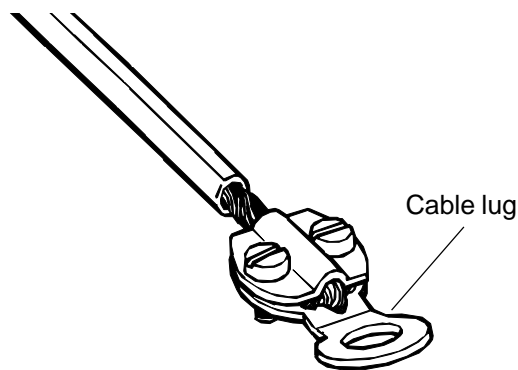


Figure 3-29. Ground connection.

- If required, bend the cable lug.

9-, 15- and 25-pin D-sub Connector

Applies to connectors BR/EAC1, BR/EAC2, BAY/USER and TRAFFIC.

Note: If using cable TFL 481 52, 53 or 54, use connector kit SXX 111 565/1 instead of the kit included in delivery.

1. Strip the wires in accordance with the figure.

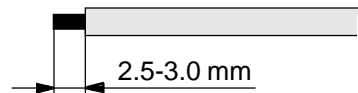


Figure 3-30. Stripping a wire.

2. Insert a contact pin in the crimp tool and tighten gently until the contact pin is fastened.
3. Put the wire in the right position and crimp. (For SXX 111 565/1 use the left position.)

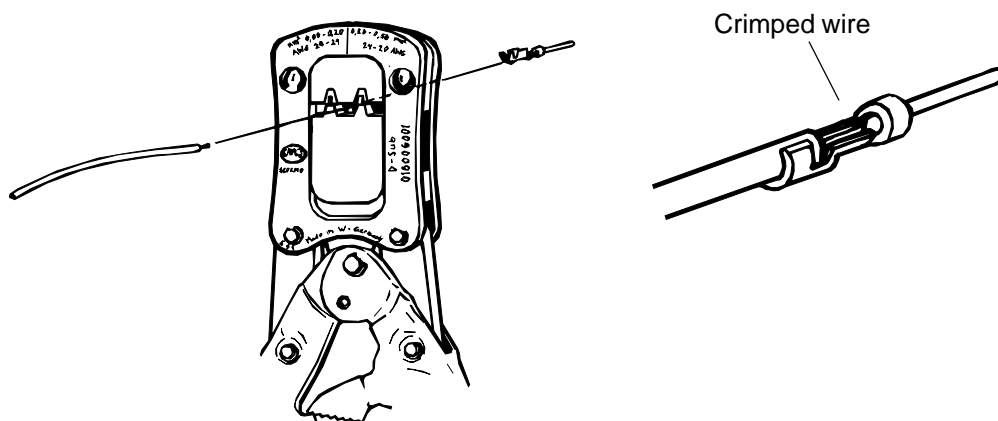


Figure 3-31. Crimping of wire (crimp tool LSD 319 11).

4. Inspect the crimp.
5. Twist all pairs for EAC and traffic down to crimp, 2-3 cm per turn.
6. Insert the contact pin into the cavity and make sure the contact pin is fixed.

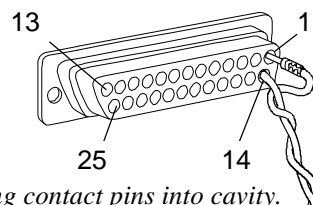


Figure 3-32. Inserting contact pins into cavity.

7. If a contact pin has been inserted in the wrong cavity, place the extraction tool LSY 139 02 in the cavity, positioned as shown in the figure, and press out the contact pin from the opposite side.

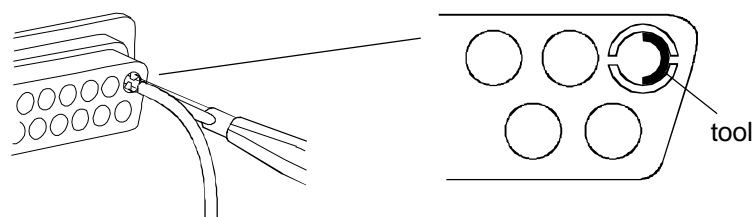


Figure 3-33. Extracting a contact pin from the cavity.

8. Fix the connector body in the back shell half.
9. Fasten the wires and screen with the clamp as shown in the figure below.
10. Fasten the top.

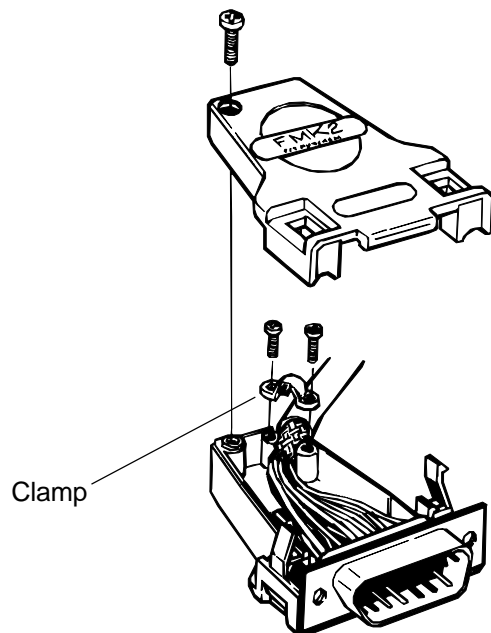


Figure 3-34. Assembling the cover halves and clamp.

11. Put the two screws in the slots on the sliding lock.
12. Fasten the sliding lock to the connector with the screws in accordance with the figure below.
13. Fix a label using a strap and mark the assembled connector by writing on the tape and attach it on the label holder.

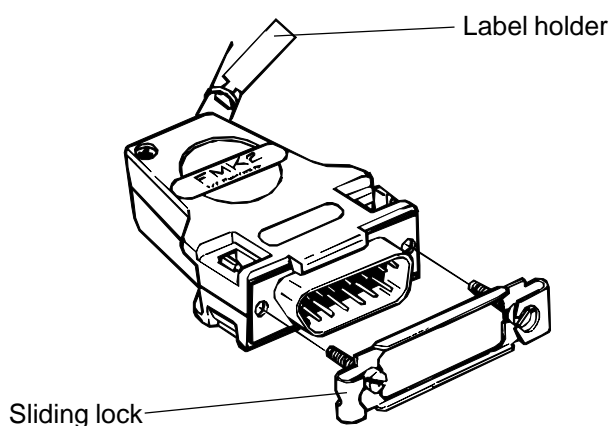


Figure 3-35. Assembling the sliding lock.

SMZ Connectors, using crimping tool LSD 319 81

Applies to coaxial connectors for 75 Ω unbalanced traffic to the I/O interface. The following instructions apply when using crimping tool LSD 319 81 (crimp/crimp). If using LSD 319 79 (crimp/solder), please see next section.

The shrinking tubing included in the kit SXX 111 0261/2 is normally not used.

1. Slip the ferrule over the cable.
2. Strip the wires in accordance with the figure. Be careful not to nick the braid or centre conductor.

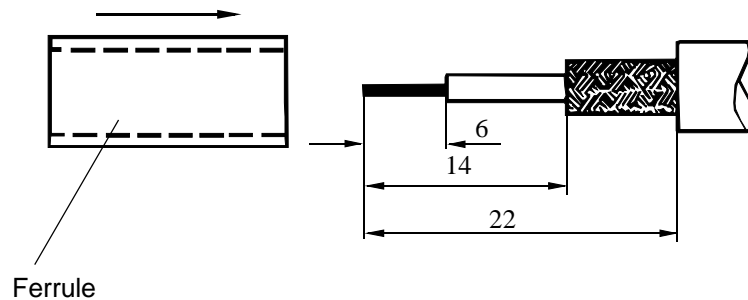


Figure 3-36. Stripping a wire.

3. Insert the trimmed cable into the back end of the rear body. The tubular extension will slide under the shield. Make sure no strands of braid are trapped under the body.
4. Slip the ferrule up to hexagonal face of the rear body and crimp with crimping tool LSD 319 81.

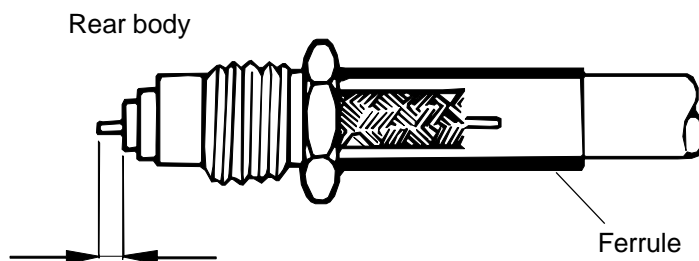


Figure 3-37. Insertion of trimmed cable into back end of rear body.

5. Position the rear insulator as shown in the figure and trim back the centre conductor so that 3.5 mm protrudes from the face of the rear insulator.

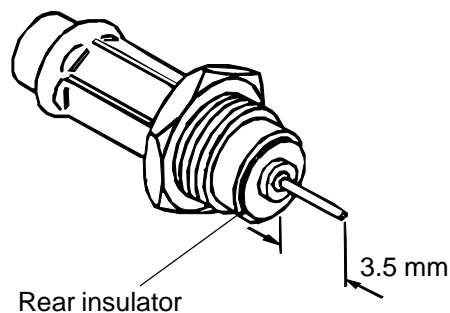


Figure 3-38. Centre conductor protrusion.

6. Position the contact pin over the centre conductor. The wire shall be visible through the inspection hole on the contact pin.
7. Insert the contact pin together with the connector body into the locator of the crimp tool.
Make sure the connector is firmly pushed into the locator and crimp the contact pin.
8. Assemble the front insulator over the contact.

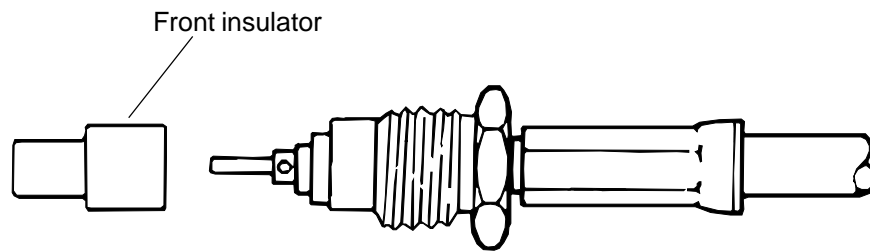


Figure 3-39. Assembling of front insulator.

9. Slip the front body onto the rear body and tighten with torque of 1 Nm, using an adjustable spanner (up to 10 mm).

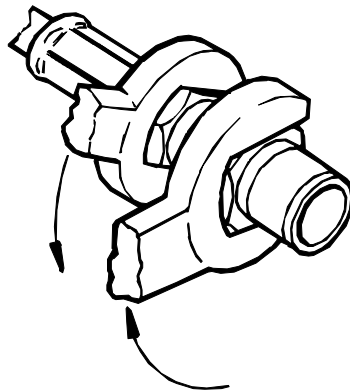


Figure 3-40. Assembling of front and rear bodies.

SMZ Connectors, using crimping tool LSD 319 79

Applies to coaxial connectors for 75 Ω unbalanced traffic to the I/O interface. The following instructions apply when using crimping tool LSD 319 79 (crimp/solder). If using LSD 319 81 (crimp/crimp), please see previous pages.

The shrinking tubing included in the kit SXX 111 0261/2 is normally not used.

1. Slip the ferrule over the cable.
2. Strip the wires in accordance with figure. Be careful not to nick the braid or centre conductor. Tin the centre conductor. Do not over tin!

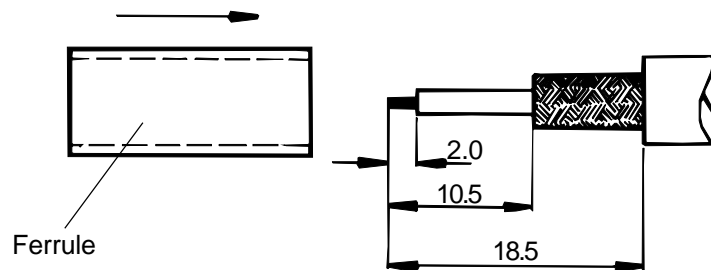


Figure 3-41. Stripping a wire.

3. Insert the trimmed cable into the back end of the rear body. The tubular extension will slide under the shield. The tinned end of the centre conductor should protrude 0.75 mm from the face of the insulator.
4. Slip the ferrule up to hexagonal face of the rear body and crimp with crimping tool LSD 319 79.

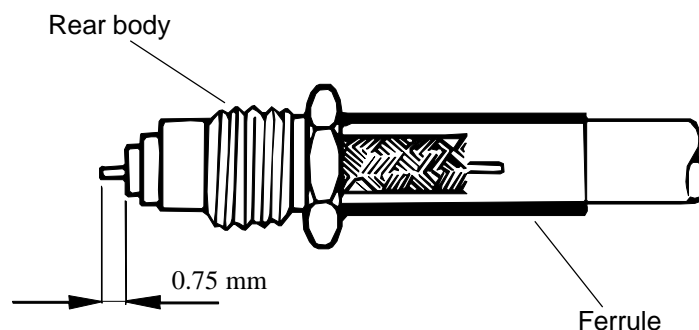


Figure 3-42. Insertion of trimmed cable into back end of rear body.

5. Add a 2 mm long slug of 24 SWG 60/40 Tin/Lead solder to the bore of the contact pin.
6. Assemble the contact pin onto the centre conductor with the shoulder of contact flush with insulator as shown. Heat to make soldered connection.

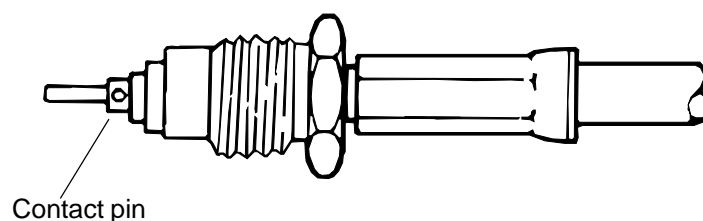


Figure 3-43. Assembling of contact pin.

7. Assemble the front insulator over the contact pin.

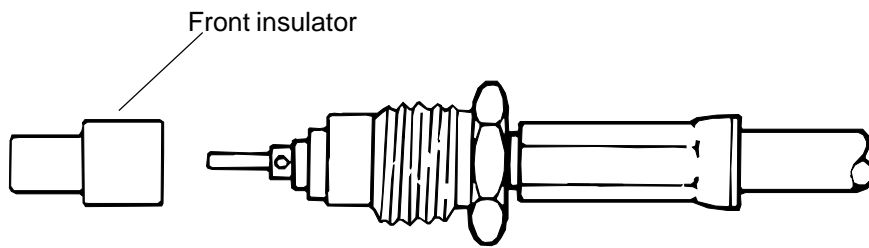


Figure 3-44. Assembling of front insulator.

8. Slip the front body onto the rear body and tighten with torque of 1 Nm, using an adjustable spanner (up to 10 mm).

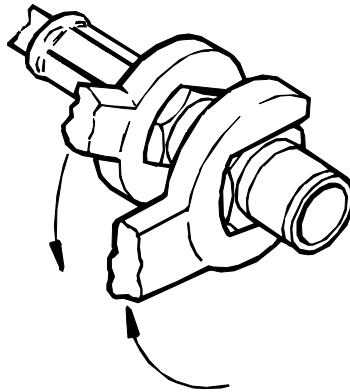


Figure 3-45. Assembling of front and rear bodies.

BYB Multipin Connector

Applies to connector TERM.

- Strip the cable and the wires.

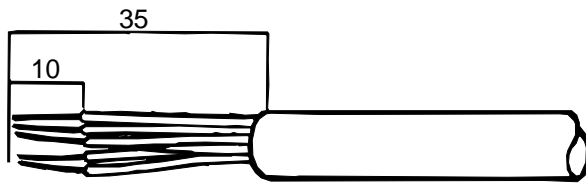


Figure 3-46. Stripping of the cable and the wires.

- Solder the wires to the soldering tags.
- Assemble the cover halves and cable lock.
- Fix the label to the cable according to figure.
- Mark the assembled connector by writing on the tape and attach it on the label holder.

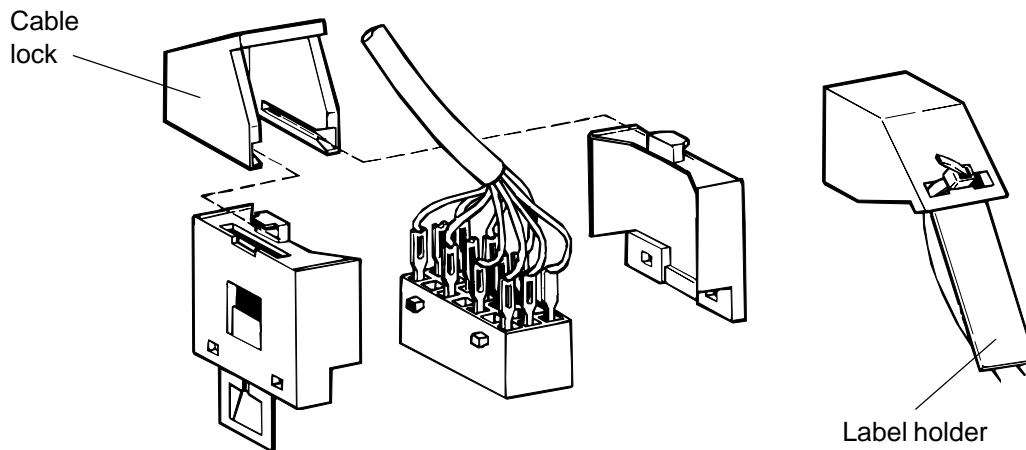


Figure 3-47. Assembling of BYB multipin connector.

3.10 Turning on the Power**STEP 7**

Turn the power on for the MINI-LINK radio and ICM.

3.11 Setting the Frequency**STEP 8**

Set the frequency in accordance with MINI-LINK Radio Module User`s Manual section 3.9 Frequency Setting.

3.12 Installation of the MINI-LINK Radio, Antenna and ICM on the Remote Side**STEP 9**

Install the MINI-LINK radio, antenna and ICM on the remote side in the same way.

3.13 Aligning the Antennas**STEP 10**

Align the antennas in accordance with MINI-LINK Radio Module User`s Manual section 3.10 Alignment.

3.14 Software Settings for MINI-LINK Radios

STEP 11

Set the software for the MINI-LINK radios in accordance with MINI-LINK Radio Module User's Manual section 3.1.1 Software Settings.

3.15 Functional Checking

STEP 12

3.15.1 Preparations

The ICM and the MINI-LINK shall be installed on both sides before making the tests.

Connect traffic or pattern generator and BER detector to the ICMs.

Analog Measurements

Measure the AGC-level for the radios. Transform the AGC level in volts to RF input level in dBm using the curve in MINI-LINK Radio Module User's Manual, section 3.10.2.

3.15.2 Functional Testing

- Check the LEDs on the ICM. Green LED should be ON and red LED OFF. If not check the power supply, cabling and alarms from the radio.

3.15.3 Functional Testing using PC with MNM

- Connect the PC to one of the terminal ports on the ICM.
- Check that both MINI-LINK radios are "OK". If not check the software settings and EAC cabling.

3.15.4 Functional Testing using Pocket Terminal

- Connect the pocket terminal to one of the terminal ports on the ICM.
- Select TRMA and check that there are no alarms from the radio (a "b" in any position is acceptable).
- Select TRMB and check that there are no alarms from the radio (a "b" in any position is acceptable).
- In case of malfunction check cabling and software settings.

3.15.5 Line-Up Record

Find the document "MINI-LINK Line Up Record" in the MINI-LINK Radio Module User's Manual chapter 8.

Fill in name of the site, local configuration and settings for the radio in the Line Up Record.

Record the result of the checks.

3.16 Starting Up the System

STEP 13

After installation, clear the alarm buffer and wake-up signals and reset performance monitoring using computer or pocket terminal. Follow the list below. See Pocket Terminal User`s Manual for instructions.

- Connect computer or pocket terminal to the ICM.
- Reset performance and restore CSS for near radio.
- Reset performance and restore CSS for far radio.
- Check that the radios are “OK”.

4. Operation and Maintenance

4.1 Local Supervision

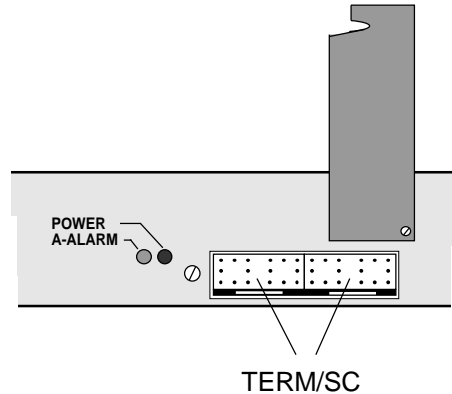


Figure 4-1. Local supervision from the ICM front.

- A-ALARM (red) - indicates TX- or RX-alarm from MINI-LINK radio.
- POWER (green) - is normally lit, turns OFF at power supply failure at radio.
- TERM/SC - is used for connection of computer, pocket terminal or service telephone. Both connectors are identical.

4.2 Computer or Pocket Terminal

By connecting a computer or pocket terminal to one of the terminal ports on the ICM, alarm and status signals in the MINI-LINK radios can be read. See the user's manual for the MINI-LINK radio for further information.

The ICM has three parallel terminal ports, one at the rear for fixed installations of computers (see chapter 3) and two at the front for temporary connection of computer or pocket terminal.

4.3 Service Telephone

A service telephone for talking with the far end, can be connected to one of the front connectors of the ICM.

4.4 BAY Alarms

The following alarms are available as relay outputs. Refer to chapter 7 for technical data.

- A-alarm, generated for transmitter or receiver alarm from MINI-LINK radio.
- TX-alarm from MINI-LINK radio
- RX-alarm from MINI-LINK radio.

4.5 User In/Out

Two User Inputs and two User Outputs are provided in the MINI-LINK radio. See the user's manual for MINI-LINK radio for details on User In/Out.

5. Spare Parts List

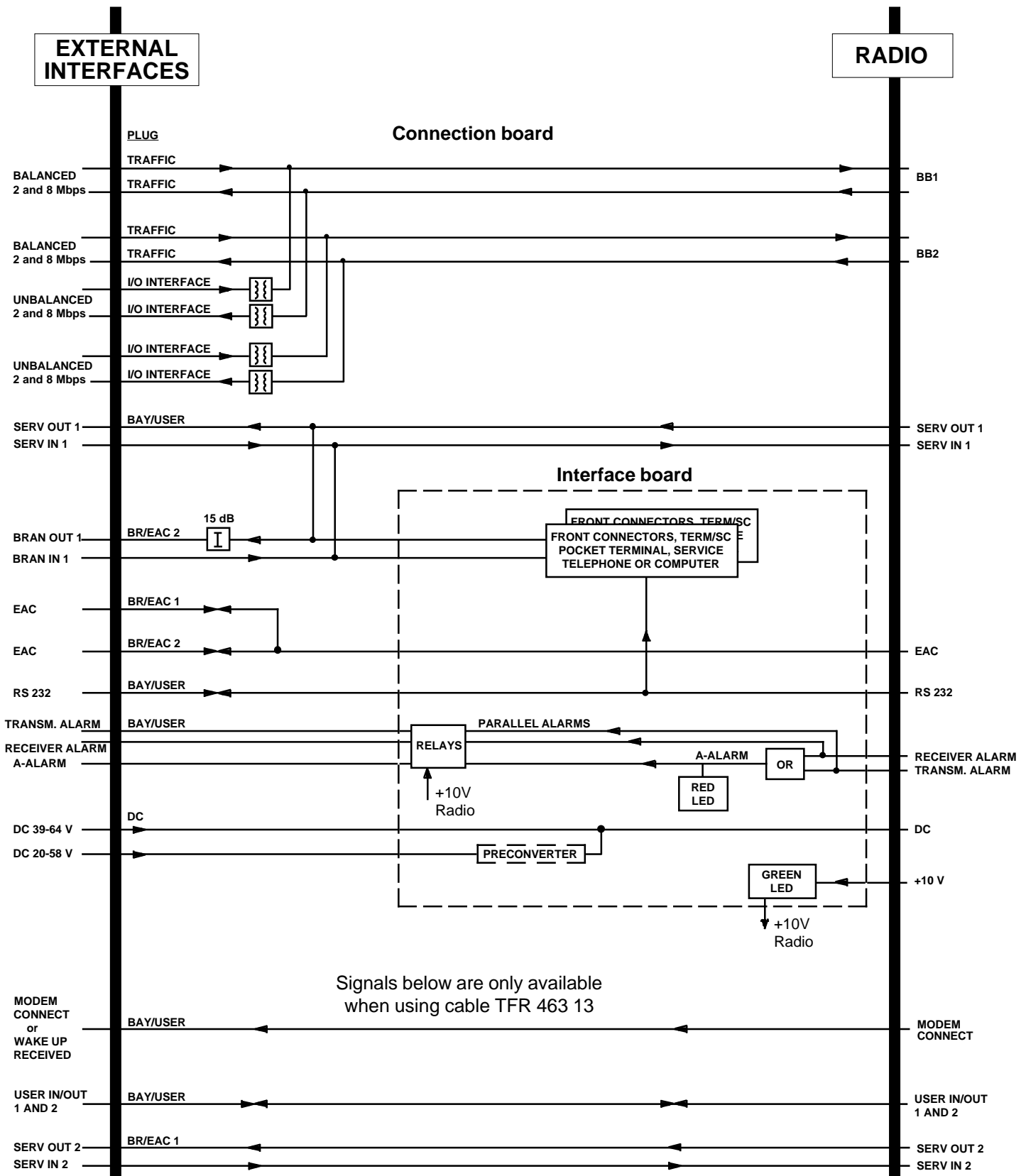
This chapter contains a recommended spare parts list and the ordering codes for ICM-C.

Ordering Code for ICM-C		
M L 2 9 0 4 0 3 Z / C D E F		
Letter	Code	Description
Z	1	For 39-72 V power supply
	2	For 20-58 V (includes preconverter)
C	0	D-sub connectors for balanced traffic
	1	SMZ connectors for unbalanced traffic
D	0	No lightning protection
	1	Lightning protection
EF	00	No option
	02	Only connectors for Radio and DC included (that is SXX 111 0259/3).

Note: The standard version holds cable connectors for all connections.

Spare Parts List		
Article Code	Description	Note
UKZ 104 010/1	ICM-C	Without lightning protection, without preconverter.
UKZ 104 010/2	ICM-C	Without lightning protection, with preconverter.
UKZ 104 010/3	ICM-C	With lightning protection, without preconverter.
UKZ 104 010/4	ICM-C	With lightning protection, with preconverter.
SXX 111 0259/3	Connector kit	Includes D-sub connectors for radio, power supply and cable lug.
SXX 111 0260/2	Connector kit	Includes one 15-pin D-sub connector for balanced traffic.
SXX 111 0260/5	Connector kit	Includes one 9-pin D-sub connectors for BR/EAC.
SXX 111 0261/1	Connector kit	Includes one 25-pin D-sub connector for BAY/USER.
SXX 111 0261/2	Connector kit	Includes four SMZ connectors for unbalanced traffic.
Accessory		
SXX 111 0258/3	Wall mounting kit	Houses three ICM-C or one SMM-C.
SXX 111 0258/4	Wall mounting kit	Houses one ICM-C.

6. Block Diagram



7. Technical Data

7.1 Environmental Requirements

Ambient operation temperature: -5°C to +55°C

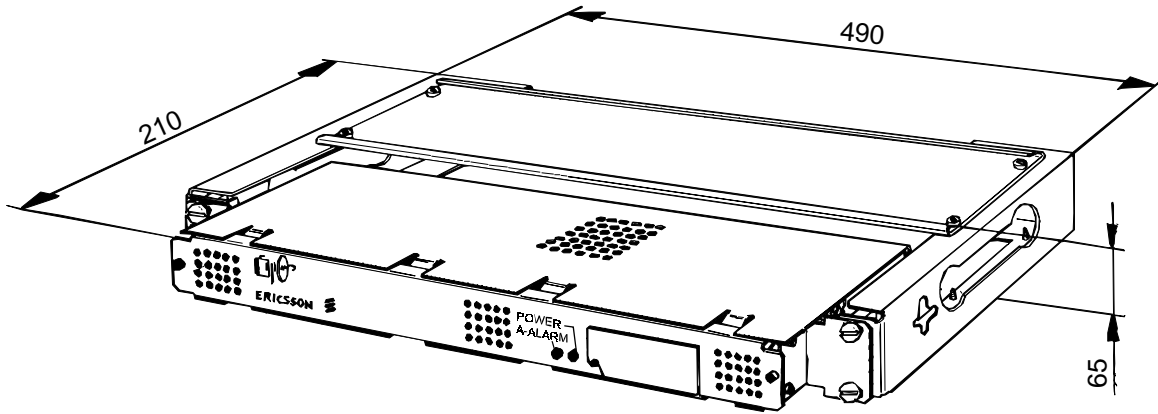
Relative humidity: 5-90 %

7.2 Mechanical Data

Dimensions:	H x W x D	Wall	65x490x210 mm
		Rack''	43x483x135 mm

Weight: 2.0 kg

Wall



Rack''

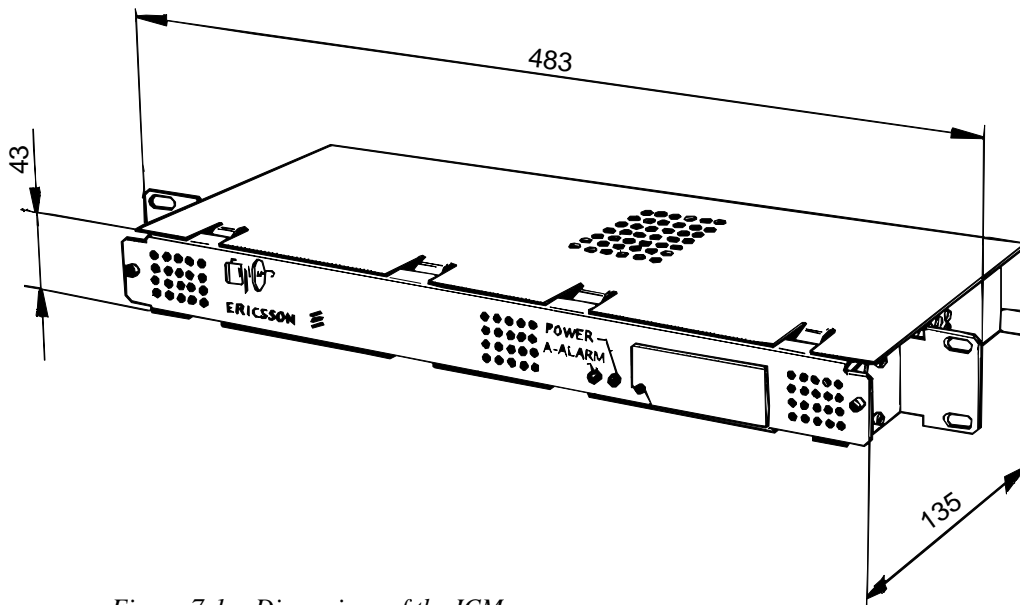


Figure 7-1. Dimensions of the ICM.

7.3 Power Supply**MINI-LINK radio and ICM without preconverter**

Input voltage at the MINI-LINK radio: 39-72 V DC

Power consumption:	MINI-LINK 15, 23, 26	30 W
	MINI-LINK 38	34 W

MINI-LINK radio and ICM with preconverter

Input voltage at the ICM: 20-58 V DC

Power consumption:	MINI-LINK 15, 23, 26	34 W
	MINI-LINK 38	39 W

7.4 Baseband Interfaces

According to CCITT G.703.

2 and 8 Mbps: balanced 120 Ω and unbalanced 75 Ω

7.5 Service Channel and Branching Interfaces

Branching is only available when using multicable TFR 463 13.

Frequency range: 0.3 - 3.4 kHz

Impedance: 600 Ohms

Input signal level: -11 dBr (Serv In 1, Bran In 1, Serv In 2)

Output signal level:

Telephone interface: +4 dBr (Serv Out 1)

Branching interface: -11 dBr (Bran Out 1, Serv Out 2)

7.6 Terminal Interface

Type: V.24 / V.28 (RS 232C)

Format for pocket terminal: Asynchronous, 7 bit ASCII, odd parity, one stop bit.

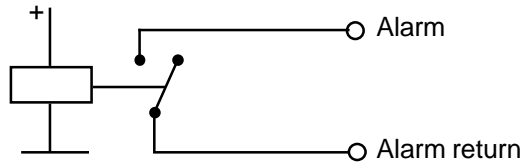
Format for Direct Access Mode: Asynchronous, 8 bit, no parity, one stop bit.

Bit rate: 1200 bps

7.7 Alarm and Control Outputs

Applicable for the following interfaces at connector BAY/USER:

- A-alarm, Transmitter alarm, Receiver alarm



Contact rating:

DC: 100 V, 1 A, 30 W

AC: 125 V, 1 A, 60 VA

Alarm State: closed

The alarm outputs have a common alarm return.

- User Out 1 and 2, Call Out, Wake Up Received and Modem Connect are available when using multicable TFR 463 13 for cabling to radio.

See the user's manual for MINI-LINK radio for technical data.

7.8 Control Inputs

Call In and User In 1 and 2 are available when using multicable TFR 463 13 for cabling to radio.

See the user's manual for MINI-LINK radio for technical data.

Contents

8. Appendices

- Failure Report

MINI-LINK Failure Report

Date of report: _____

After repair return to:

Goods address	Invoice address
---------------	-----------------

Failure report

Unit name	Part No	Serial No
Cause of failure	Date of failure	
Fault Description		

Location of failing unit

Site name		
Name of opposite site		
MINI-LINK type no	Transmit frequency (MHz)	Traffic type
Start of operation, date	Latest previous failure on same site, date	

Signature: _____

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