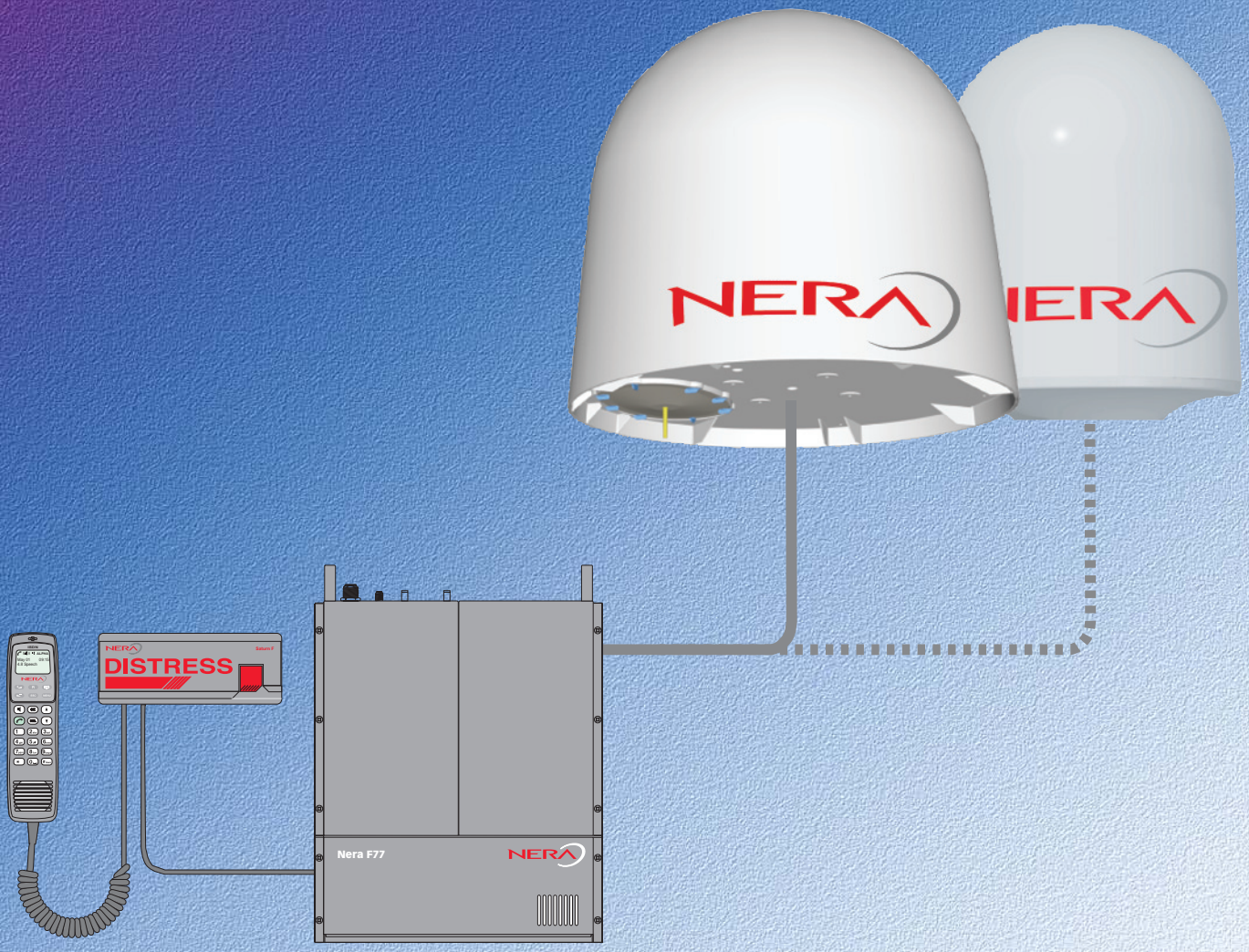
Back to Start Page

Nera F77
Installation Manual



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Full Ahead to 128K

NERA
enabling a wireless future

Safety Warnings, Cautions and Warranty

General

To avoid interference, do not run cables parallel to AC wiring, or near fluorescent lights or other high magnetic or electrical fields. Interference from this kind of sources causing equipment to be faulty or fail working properly will automatically void warranty conditions. Access to the interior of the equipment shall be made by a Nera qualified technician only.

The equipment shall be installed by a Nera SatCom approved Installation & Service Agent.

Warranty is not valid until the "Nera Satcom AS Warranty Certificate" (at the back of the Registration and Warranty Certificate booklet enclosed with the equipment) is signed by the approved Installation & Service Agent, and returned to Nera SatCom.

Grounding

Grounded AC power socket shall be installed near the equipment and shall be easily accessible. Connection to all type of equipment meant for operation of the unit should be done while the unit is powered off. Peripheral equipment using mains shall be connected to a grounded AC power socket.

Cables and connections

Cables longer than 5 metres must be shielded. All peripheral equipment must be grounded.

Cables exceeding their maximum lengths require special arrangements, cable extenders, short haul modems etc.

- ISDN telephone	100 m	0.22 mm^2 min
- Analogue telephone	150 m	0.22 mm^2 min
- USB	5 m	Standard cable
- RS-232	3 m	Standard cable
- RS-422	100 m	0.22 mm^2 min

Always follow the installation guidelines described later in this manual for each type of interface.

Ventilation of the Below Deck Equipment

Ambient temperature range: 0 - 45°C.

To ensure adequate cooling of the MCU a 10 cm unobstructed space must be maintained above and below the unit.

When wallmounted, ensure sufficient space above the MCU to permit removal of the Modem Unit and Power Supply Unit.
*See "**Placing the Main Communication Unit (MCU)**".*

Failure to comply with the above rules for installation will automatically void the warranty.

A MEMBER OF CIRM

SAFETY INSTRUCTION

WARNING

ELECTRICAL SHOCK HAZARD

Do not open the equipment.

Only qualified personnel should work inside the equipment.

Do not approach the radome closer than 5 meters when it is transmitting.

The radome emits radio waves which can be harmful to the human body, particularly the eyes.

Leave the equipment powered while underway.

Distress cannot be communicated unless the equipment is powered.

Do not disassemble or modify the equipment.

Fire, electrical shock or serious injury can result.

WARNING

Turn off the power immediately if water leaks into the equipment or the equipment is emitting smoke or fire.

Continued use of the equipment can cause fire or electrical shock.

Do not place liquid-filled containers on the top of the equipment.

Fire or electrical shock can result if a liquid spills into the equipment.

Do not operate the equipment with wet hands.

Electrical shock can result.

Keep heater away from equipment.

Heat can alter equipment shape and melt the power cord, which can cause fire or electrical shock.

Any repair work must be done by a Nera approved Regional Service Centre.

Improper repair work can cause electrical shock or fire.

Use the proper fuse.

Fuse rating is shown on the equipment. Use of a wrong fuse can result in damage to the equipment.

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Rev Date: February 2006 | Publication No.: 101442 (Rev. 1.3)

Below Deck Equipment - BDE

Main Control Unit

The **Nera F77 Main Communication Unit (MCU)** - which constitutes the major electronic part - is designed for wall or desktop installation. The MCU supplies 48 VDC power to the ADE through the coaxial cable.
The MCU may be equipped with AC *or* DC power supply.
The AC mains input is 100 - 240 VAC ±10%.
The DC input is 20 - 32VDC with an alternative input for automatic switchover in case of main input failure.

The power requirement is approx. 40 W in receive/idle mode, and approx. 150 W in transmit mode.

A CD supplied with the equipment contains a program for control and operation from PC. *See the Nera F77 - User Manual.*

Nera ISDN Handset

The **Nera ISDN Handset** keypad and built-in display allows dialing and control of the MCU and antenna.

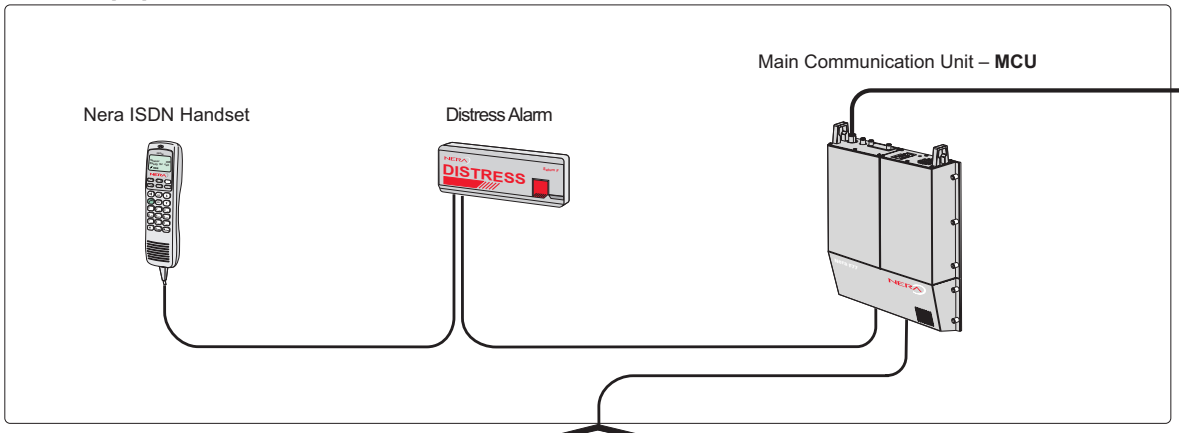
Distress Alarm

The **Distress Alarm Unit** together with the **Nera ISDN Handset** provides remote activation of an alert transmission and indication of incoming distress calls.

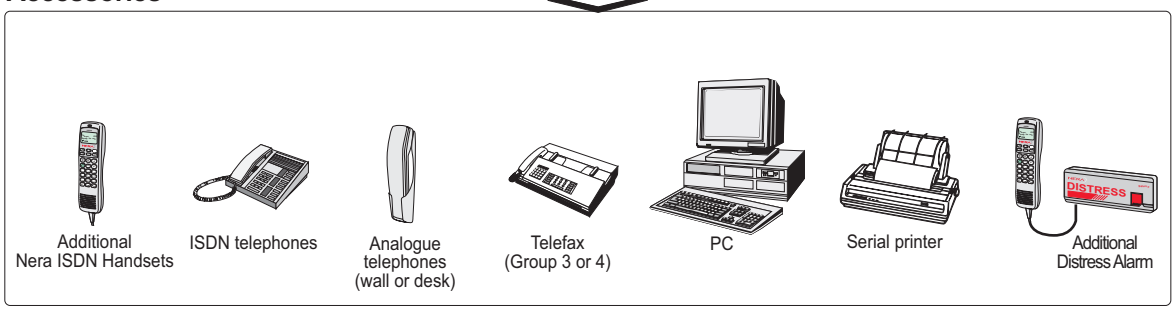
Accessories

- Additional Nera ISDN Handsets
- ISDN telephones
- Analogue DTMF telephones
- Group 3 and Group 4 telefax
- PC
- Printer w/RS-232 serial interface
- One additional Distress Alarm Unit (DA)

Basic Equipment



Accessories

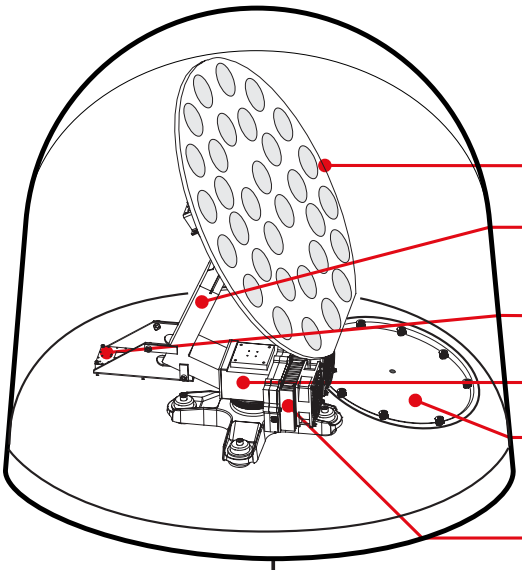


Above Deck Equipment - ADE

The Nera F77 Above Deck Equipment consists of:

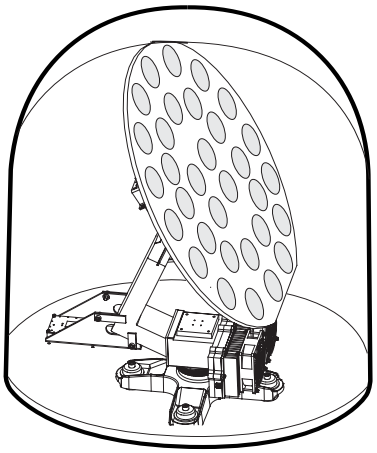
- Servo stabilized antenna dish with RF-Transceiver
- Mast mounted radome, or
- Deck mounted radome

Mast mounted radome
(cutaway view)



BDE - ADE coaxial cable

Deck mounted radome
(cutaway view)



Total of equipment connected:

7 ISDN devices (2 with Distress Alarm Unit)
8 Analogue devices
1 RS-232 device
1 RS-232 or RS-422 device
1 USB device

Placing the Antenna

Radome type

Nera F77 is delivered either with mast mounted or deck mounted radome. *See previous page.*

The mast mounted version includes a hatch which provides access for service and repair, whereas on the deck mounted version the radome top must be lifted off before servicing.

Avoiding obstructions

The antenna has a beamwidth of ±7.5 degrees and ideally requires a free line of sight in all directions.
Any obstruction will cause blind sectors, resulting in signal degradation or even loss of communication with the satellite.

Degradation of the satellite signal can only be completely avoided by placing the antenna higher than any obstructions. This is often not feasible and a compromise must be made to reduce the number of blind sectors and cost of installation.

The degree of signal degradation depends on the size of the obstructions; the distance to them must therefore be considered.

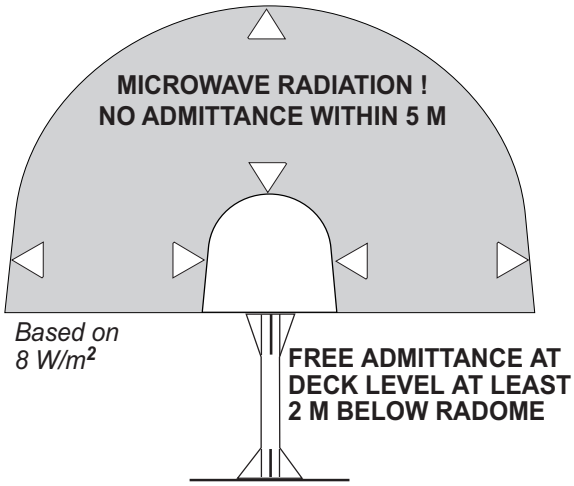
Preferably, all obstructions within 3 m of the antenna should be avoided. Obstructions less than 15 cm in diameter can be ignored beyond this distance.

Radiation precautions

Passengers should not be admitted in areas closer than 5 m from the antenna.

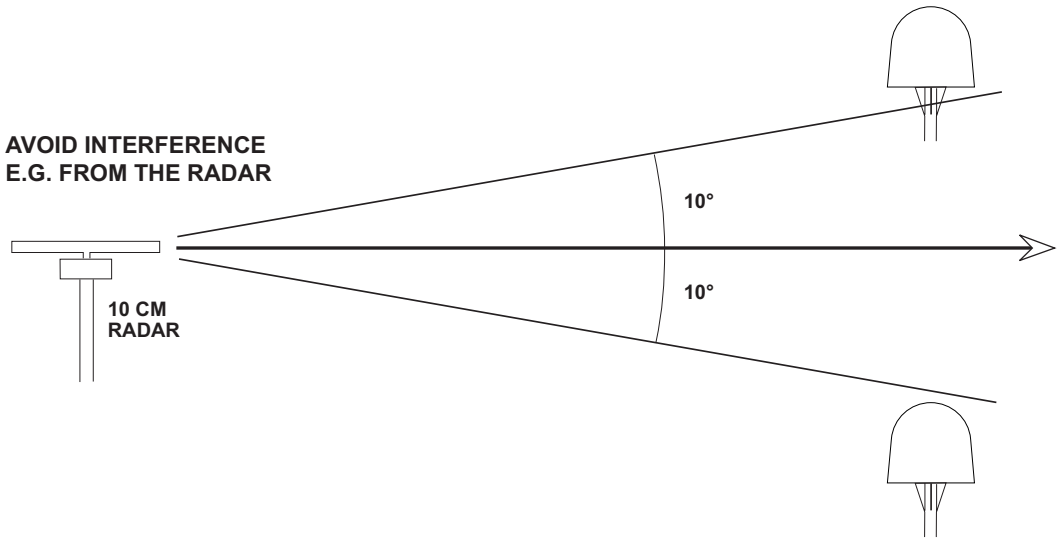
However, no restrictions are required when the antenna radome is installed at least 2 m above the highest point accessible to passengers.

Personnel should not be close to the antenna for periods of more than 1 hour per day without switching off the RF transmitter.



Avoiding interference

Do not locate the antenna close to interfering signal sources, or in such a position that the source (e.g. radar-antenna) radiates directly into the Nera F77 antenna.



The Above Deck Equipment (ADE) should be separated as far as possible from other transmitters, and preferably by at least 5 m from the antenna of other communication or navigation equipment, such as the antenna of the satellite navigator, the VHF antenna, radar equipment, or other Inmarsat equipment.

Compass safe distance

For installation on British or Norwegian vessels, the antenna should be located at a distance of at least 1.0 metres from the magnetic steering compass. Be aware that requirements may vary from one country to another.

Other precautions

Do not place the antenna close to the funnel, as smoke deposits will then eventually degrade antenna performance.

The antenna should be installed so that severe vibration and shock are avoided.

Designing the Antenna mast (mast mounted version)

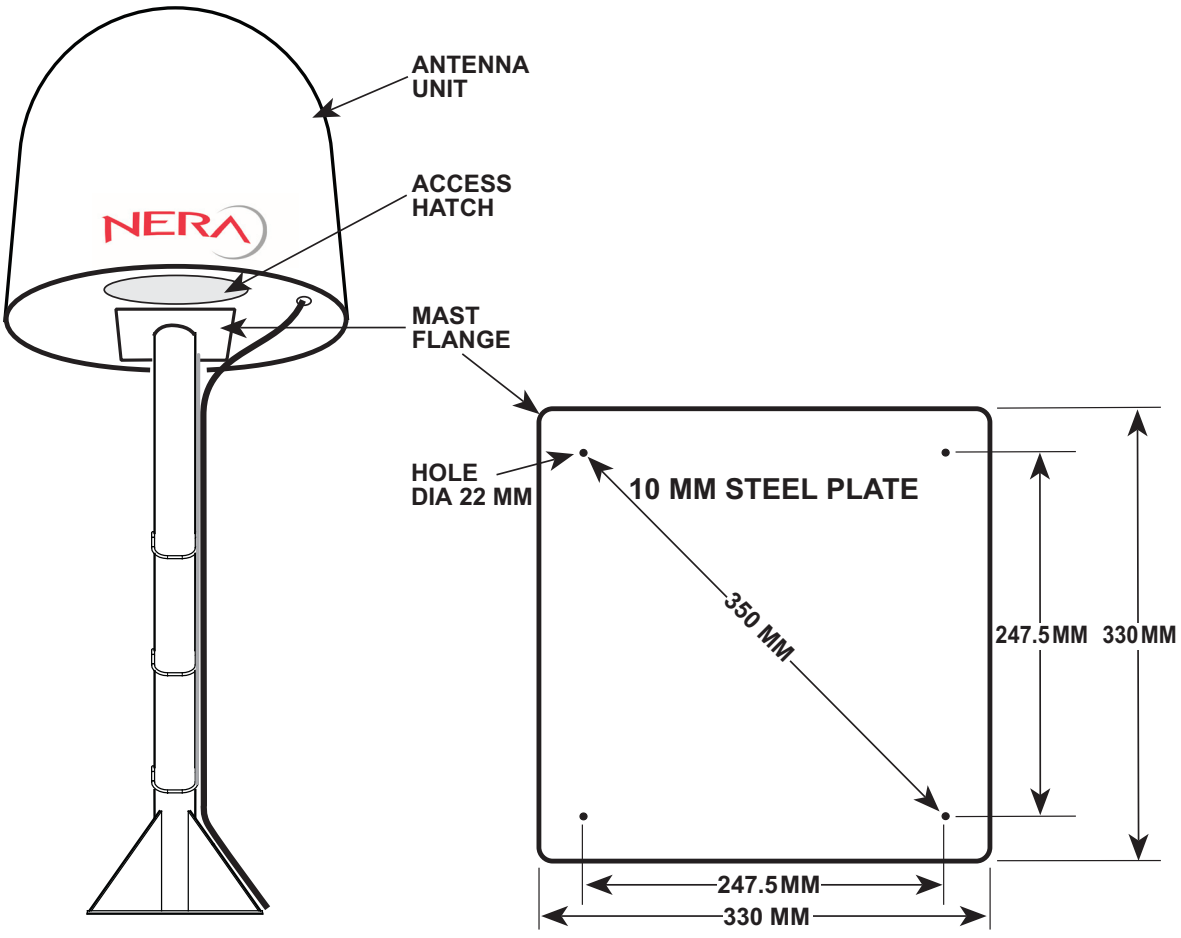
The mast must be designed to carry the weight of the antenna unit, approximately 59 kg. It must be able to withstand wind forces of up to 120 knots on the radome as well as the onboard vibration levels. The radome is 1.076 m high and has a maximum diameter of 1.165 m.

The top end of the mast should be fitted with a flange with holes matching the bolts extending from the bottom of the radome. *See figure below.* The flange must not be so large as to interfere with the hatch at the bottom of the antenna unit.

NOTE: *On ships with excessive vibration the mast must be supported by stays or other adequate means.*

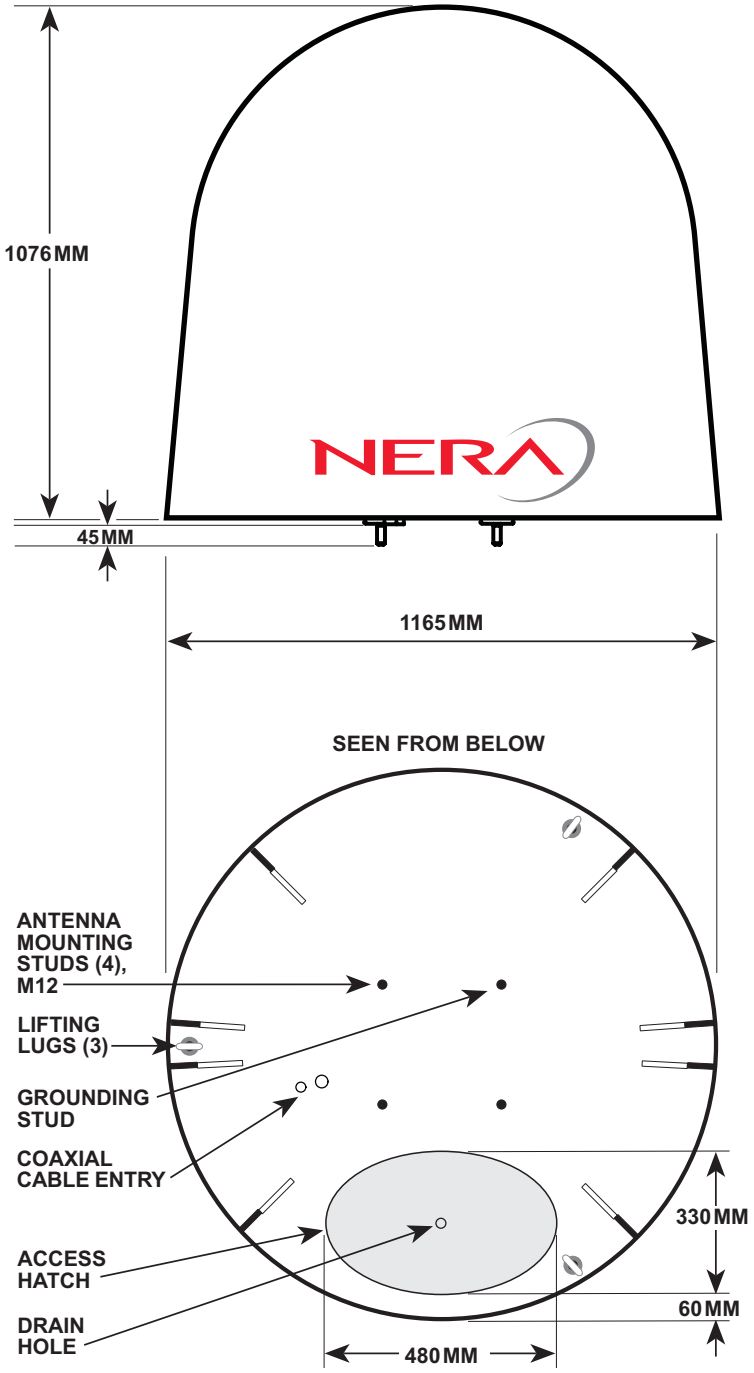
If the height of the mast makes it necessary to climb up to the antenna unit, a ladder must be provided on the mast column. A guard rail must be attached to the upper section for safety purposes. If the height of the mast exceeds approximately 4.5 metres, an access platform should be attached to the mast approximately 1 metre below the radome bottom.

Be aware that requirements may vary from one country to another.



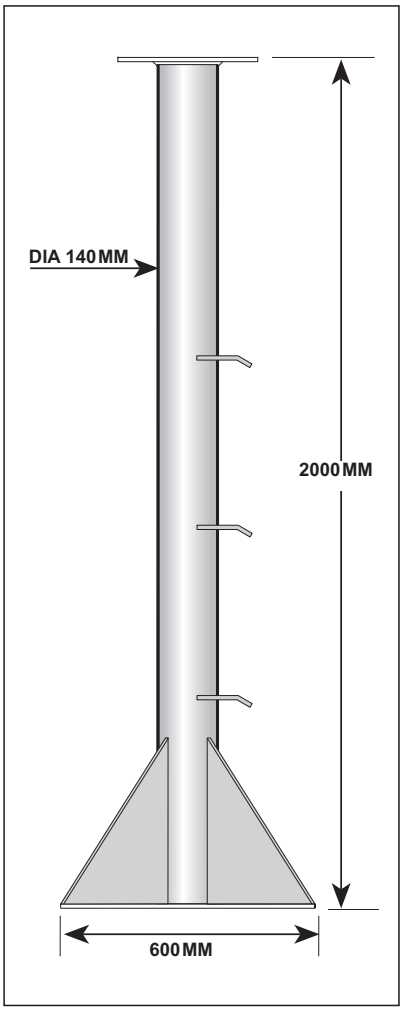
Antenna Unit Mounted on Mast

Outline dimensions of Antenna radome (mast mounted version)



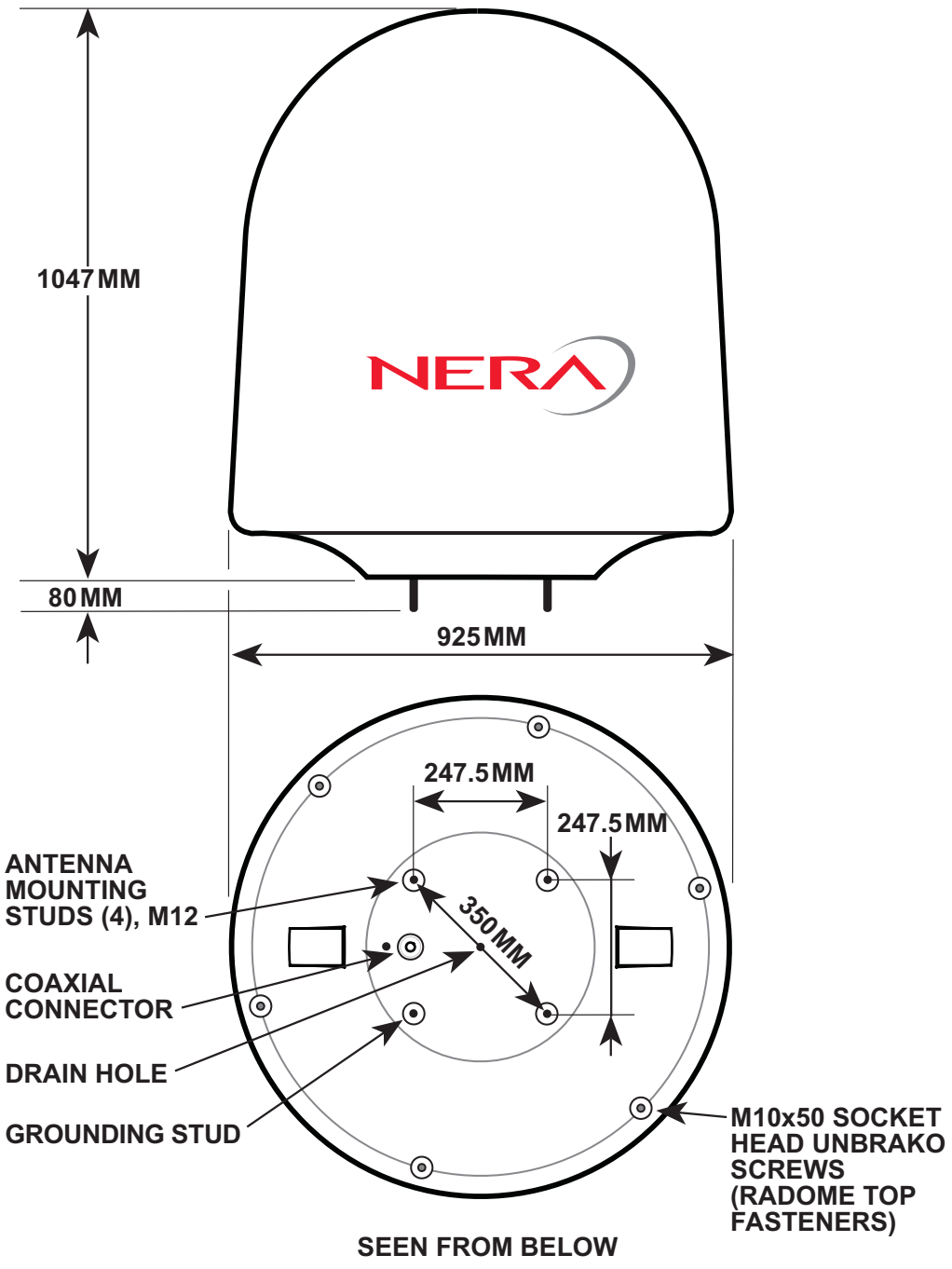
Weight: approx. 59 kg

Optional steel
Antenna Mast, R906569
Weight: 85 kg



For welding onto deck

Outline dimensions of Antenna radome (deck mounted version)

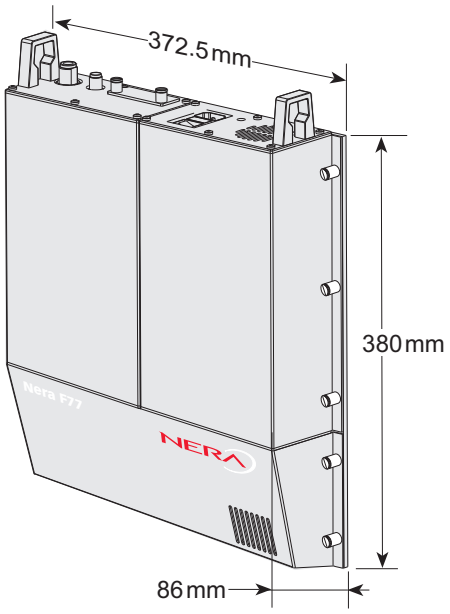


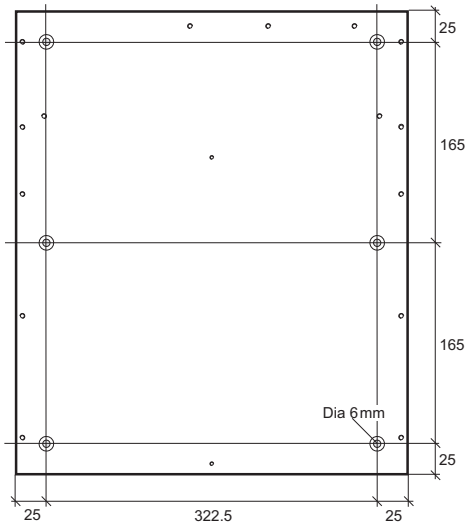
Weight: approx. 45 kg

Physical characteristics of main units

Main Communication Unit (MCU)

100141 w/**AC** power unit,
105660 w/**DC** power unit

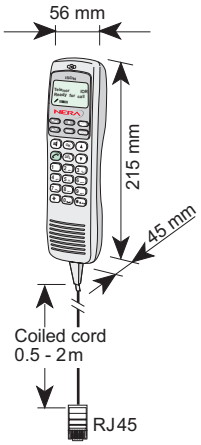




Weight: 7 kg

ISDN Handset

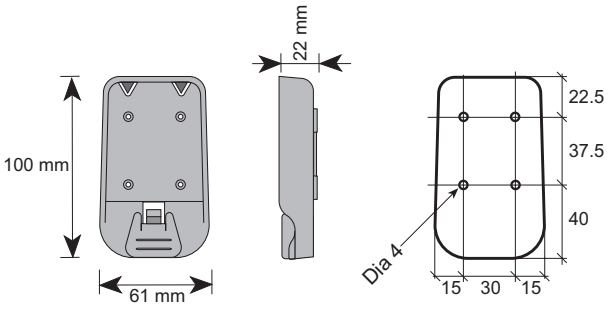
101654



Weight: 0.3 kg

Handset holder/cradle

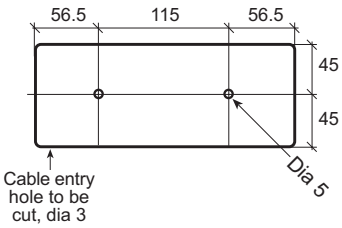
QSXA911394
(for ISDN Handset)



Weight: 0.06 kg

Distress Alarm Unit

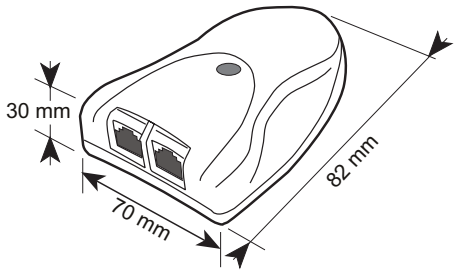
100154

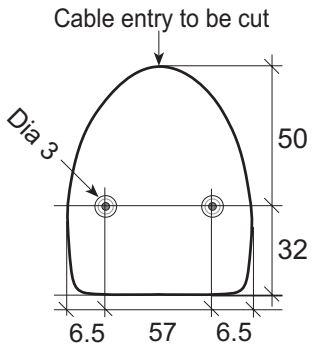


Weight: 0.3 kg

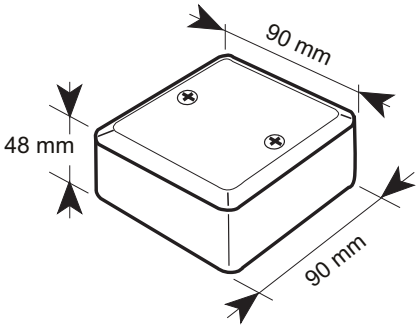
Physical characteristics of main units cont'd

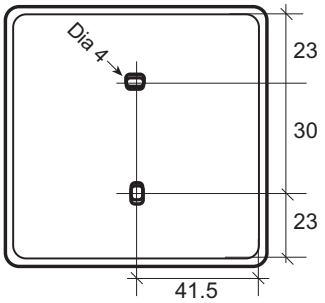
ISDN wall socket (option)
102176



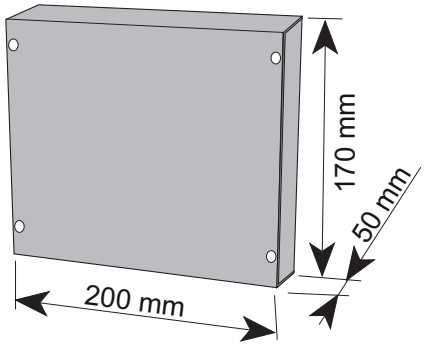


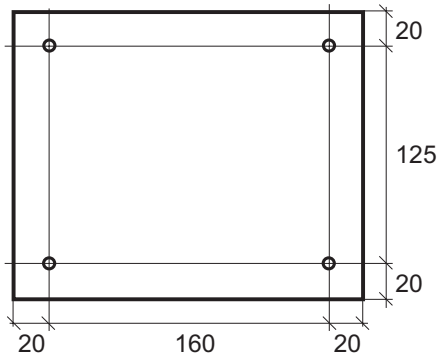
ISDN junction box (option)
102174





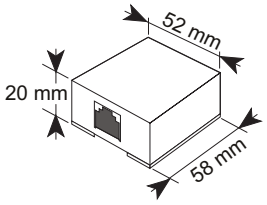
Connection box (option)
QUFC 911 918

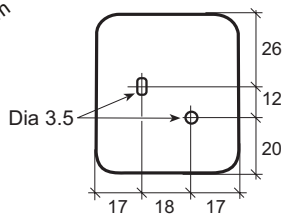




Weight: 0.6 kg

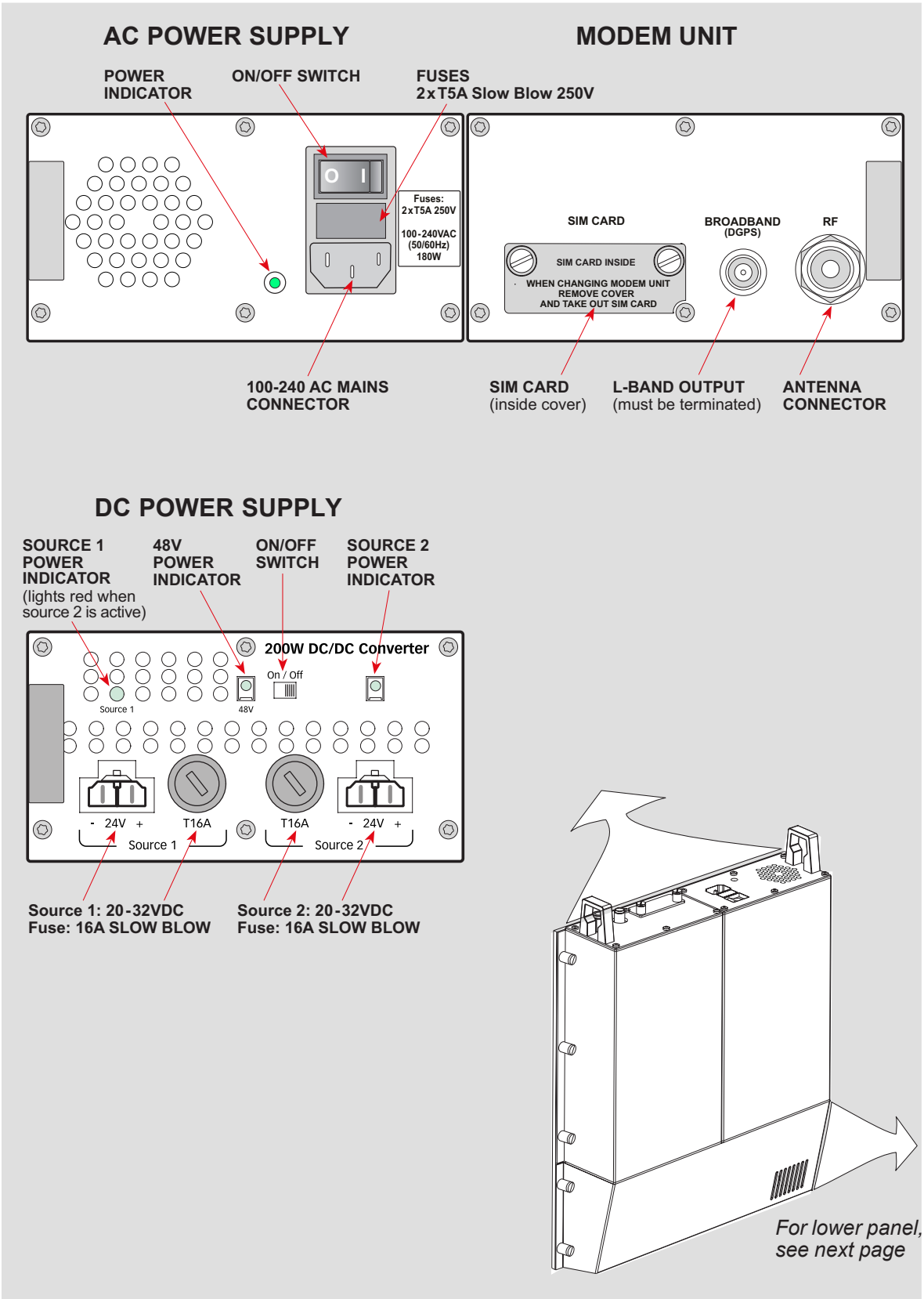
Analogue telephone/telefax wall socket (option)
R 906 676/1





MCU connectors

Upper connector panel



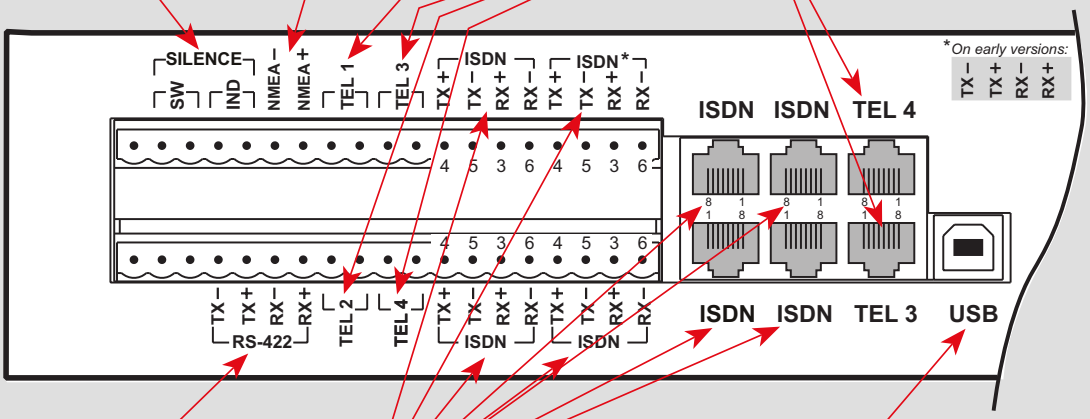
MCU connectors

Lower connector panel

SILENCE:
Connection of "Radio Silence Box"

NMEA:
Connection of NMEA-183 input

Screw terminal blocks TEL 1 - 4, and additional **RJ45** connectors for **TEL 3** and **4:**
Connection of 2W analogue telephones and G3 fax



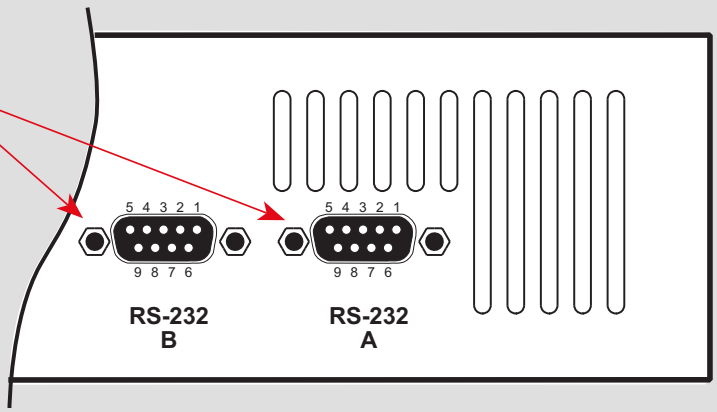
RS-422:
serial port for connection of data equipment with up to 100 metres cables:
- 64 kbps data
- MPDS
- operation and configuration from PC

ISDN:
Connectors/RJ45
Services:
- 4.8 kbps compressed speech
- 64 kbps speech
- 64 kbps data service (UDI)
- 128 kbps data service (UDI)
- 56 kbps data service (V110)
- 110 kbps data service (V110)
- 64 kbps audio service (3.1 kHz)

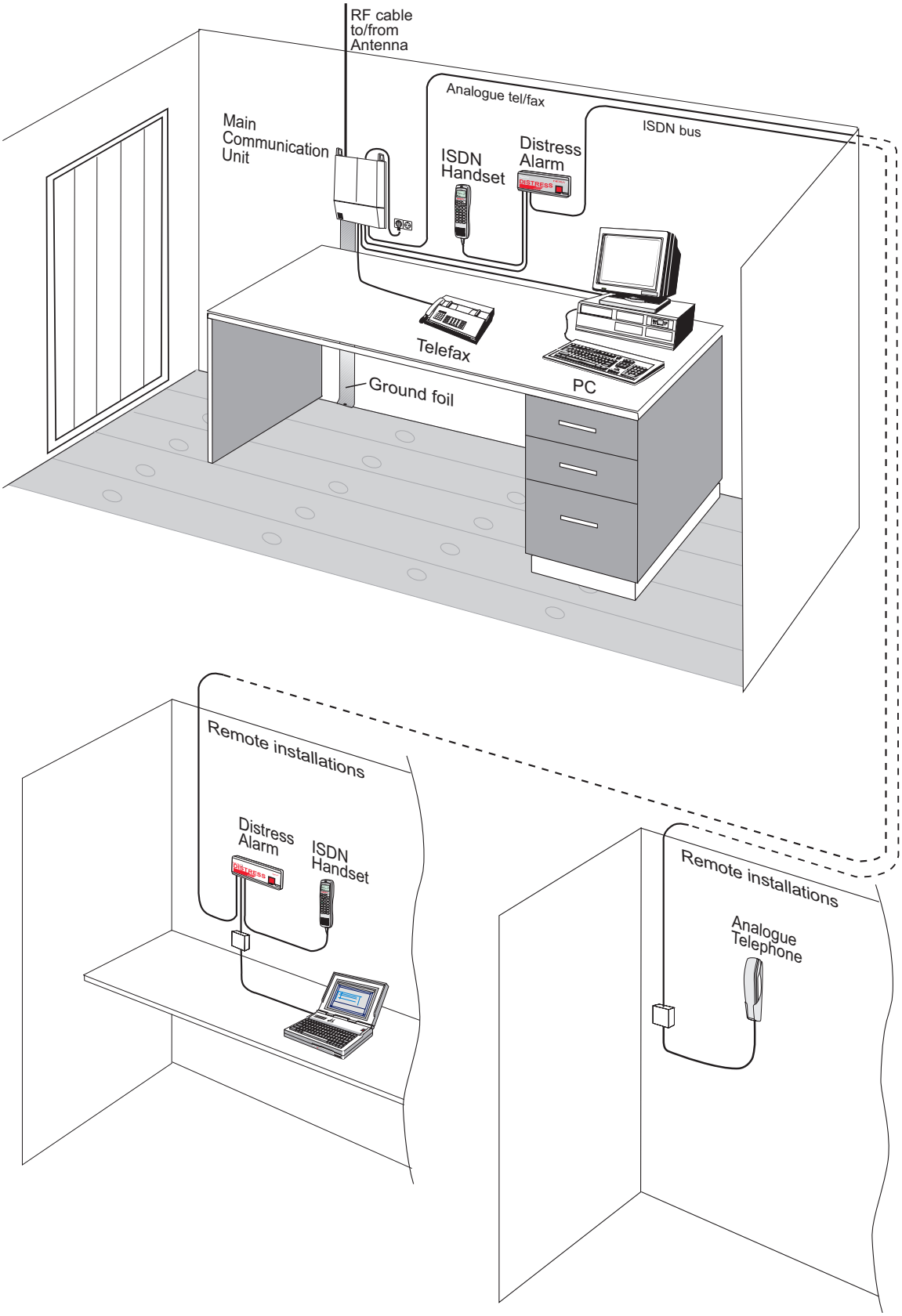
Note! Use shielded ISDN cable

USB:
serial data port for:
- operation and configuration from PC.
- 64 kbps data service (UDI)
- MPDS

RS-232:
9-pin serial data ports for:
- operation and configuration from PC.
- software download (RS-232A)
- 64 kbps data service (UDI)
- MPDS
- serial printer

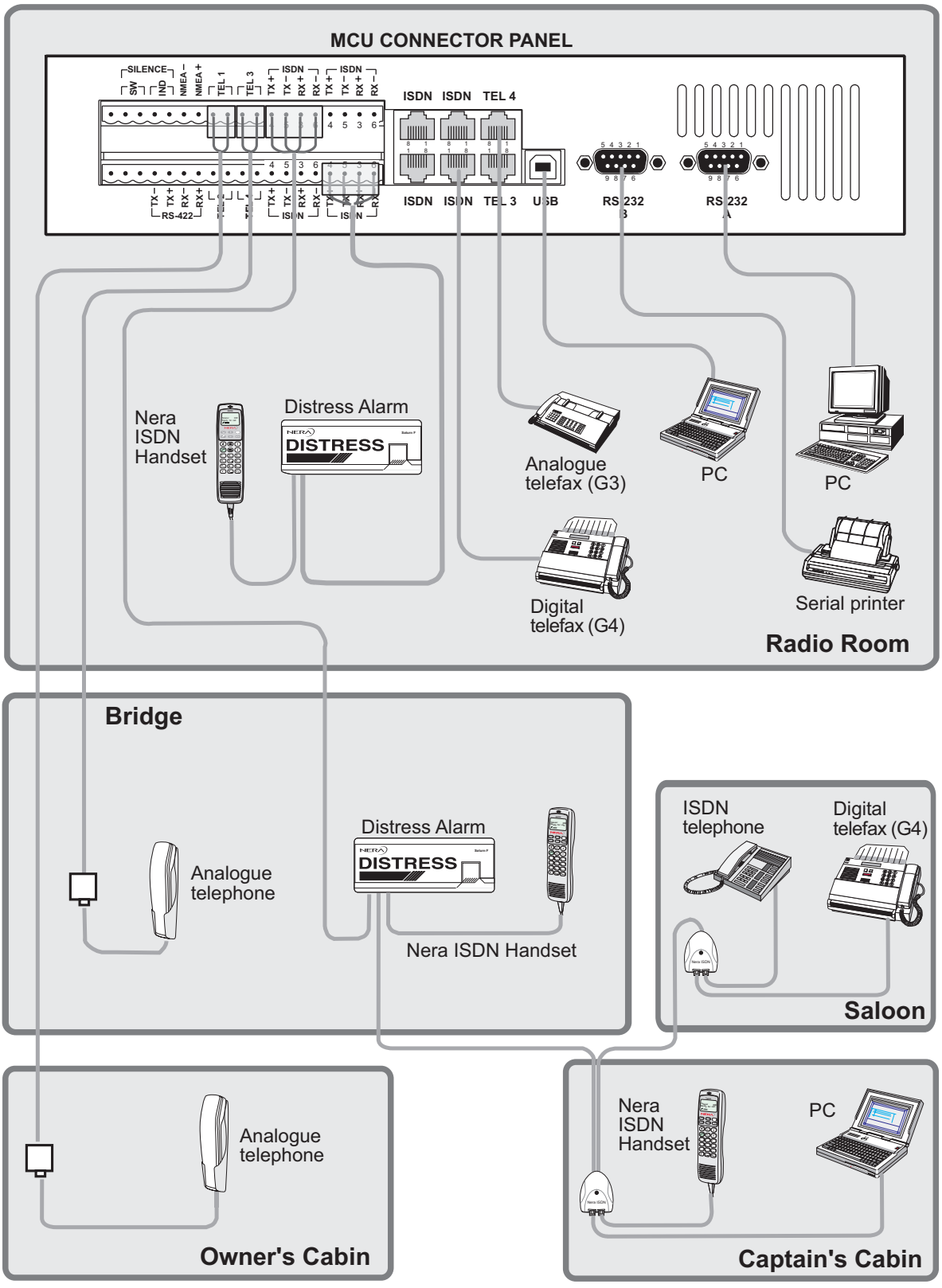


Example of BDE installation



Example of Nera F77 installation cabling arrangement

The installation includes four Nera ISDN Handsets (two w/Distress Alarm Unit), Group 3 and 4 telefaxes, PC w/printer, Data Equipment and two Analogue Telephones.



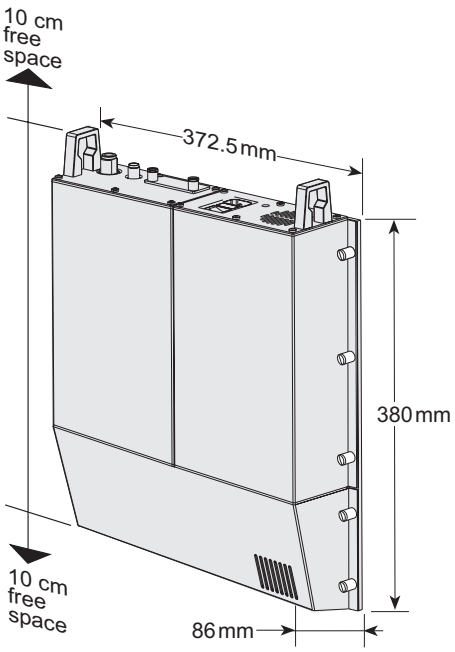
Placing the Main Communication Unit (MCU)

Ventilation

The Main Communication Unit should be placed in a ventilated area. To ensure adequate cooling of the MCU a 10 cm unobstructed space must be maintained above and below the unit.

Distance

A space of 10 cm above the MCU is also required to allow removal of units.



Falling water

The MCU must not be mounted in such a way that there is danger of falling water hitting the connector panel. If such an installation is impossible, a protection cover is recommended installed above the MCU.

Grounding

*For grounding, see "**Grounding considerations**" and "**Location and grounding of units**".*

Temperature

Ambient temperature range 0^{O}-45^{O} C.

Mounting

The MCU is manufactured as a cabinet for wall or desktop installation with dimensions as shown. Six holes through the MCU mounting plate allows the unit to be secured to the wall or desk top.

Placing the Distress Alarm Unit & Nera ISDN Handset

The Distress Alarm Unit is operated in conjunction with a Nera ISDN Handset.

Control

The Nera ISDN Handset functions as a display and communication unit for alert transmission. It may also be used for normal voice communication.

Distress Alarm Units

Up to two (2) Distress Alarm Units, together with Nera ISDN Handsets, may be connected in series. The units may be installed anywhere onboard the vessel.

Connection

Four separate ISDN ports (part of the ISDN bus) are available on the MCU as RJ45 jacks or screw terminal blocks.

Max cable length: 100 m

*See "**ISDN telephones/equipment** and **ISDN cable lengths**".*

Placing the Nera ISDN Handset as a standard telephone

The Nera ISDN Handsets may be installed as standard telephones without Distress Alarm units.

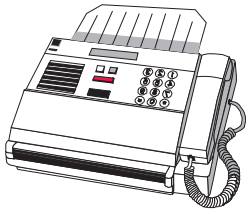
Location

The units may be installed anywhere onboard the vessel. Four separate ISDN ports are available on the MCU as RJ45 jacks or screw terminal blocks.

Placing the telefax machine

Digital fax

A digital telefax (Group 4) can be connected to the ISDN bus for transfer at 64 kbps rate.



Analogue fax

An analogue telefax (Group 3) can be connected to the TEL4 port (default 9.6 kbps fax). (3.1 kHz audio can also be used for Group 3 fax, providing typically 14.4 kbps transfer speed.)

Placing the PC

Distance to PC

A PC w/ISDN card can be connected to the ISDN bus for 64 kbps rate data communication up to 100 m away from the MCU.

Control & configuration

A PC connected to the USB/RS-232/ RS-422 port can also be used for control and configuration of the Main Communication Unit. This requires that the vtLite Mobile program accessible on the Nera F77 CD is installed.

Data service

Connection to the USB/RS-232/RS-422 port also allows 64 kbps data transmission.

See the User Manual.

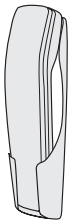
Cable lengths:

- ISDN port: } see ***"ISDN telephones/equipment "*** and ***"ISDN cable lengths"***
- USB port:
- RS-232 ports:
- RS-422 port:

} see ***"Appendix 8, cable pinouts"***

Placing analogue telephones

Analogue 2-wire telephones can be installed anywhere onboard the vessel.



Analogue ports

Four separate analogue ports TEL1-TEL4 are available on the MCU. TEL3 and TEL4 are in addition available as RJ45 jacks.

Number of telephones

Two telephones can be connected in parallel on each line, providing a maximum of **eight** analogue telephones.

Grounding considerations

A successful installation of a maritime satellite terminal must take into account the noisy environment in which the equipment shall operate.

Electrical noise

The electrical environment on board a ship is usually quite noisy. Powerful electrical installations cause voltage variations and transients, as well as low and high frequency noise. Radio and radar equipment radiate radio frequency signals which frequently impregnate cables on board with unwanted interference.

Ground plane

Most ships have a steel hull. One should think that the steel construction of the ship would constitute a good ground plane. This is often not quite true. Rust, other forms of corrosion, paint and grease, often prevent a good ground connection. A consequence of this is that high energy power distribution on board a ship can cause significant ground potential differences.

Antenna unit

Adequate grounding of the Antenna Unit depends on the fastening bolts making good contact with the top flange of the mast. This is obtained by removing paint and using enclosed toothed washers and nuts*.*
*See "**Outline dimensions of the antenna radome . . ,**"*

Antenna cable

The screen of the antenna coaxial cable must be terminated to ground both at the antenna pedestal and at the MCU. The antenna cable will automatically be terminated to ground when connected provided the Antenna and the MCU are properly installed.

Below Deck Equipment

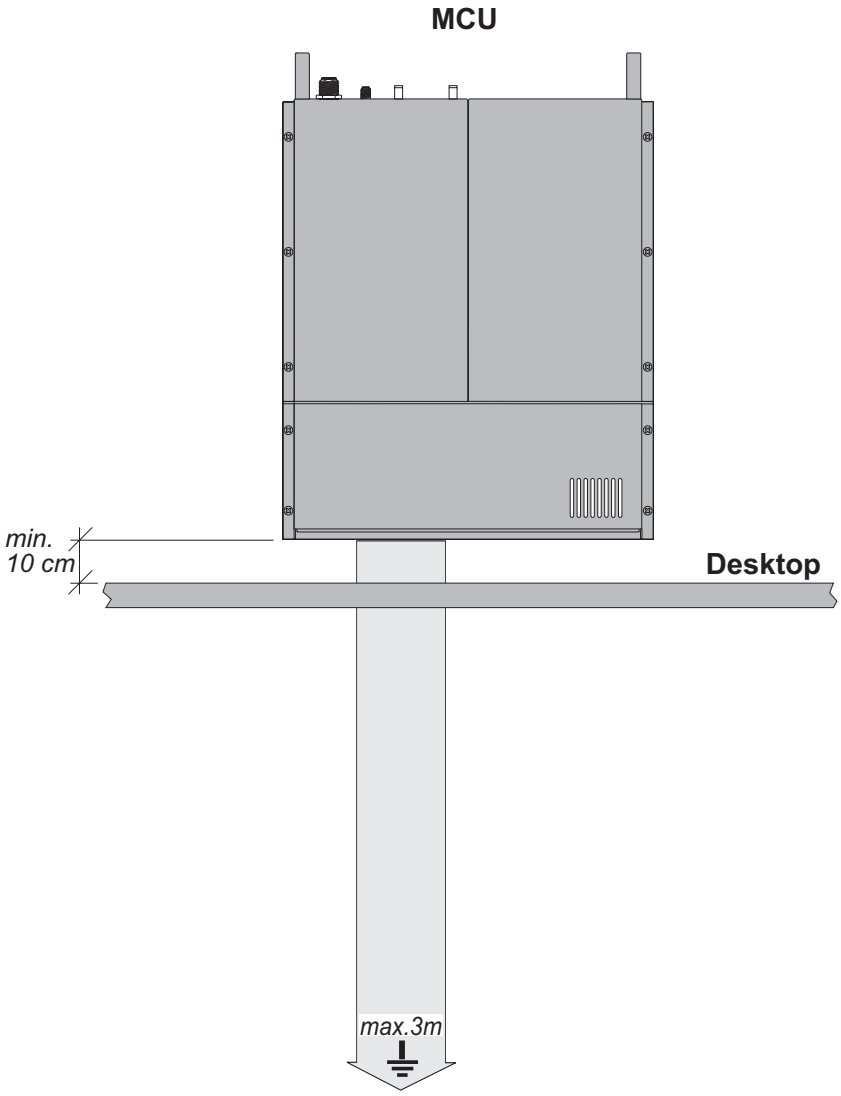
The MCU must be provided with a good electrical connection to the ship's hull for grounding. This is obtained by using *copper foil*. (*See Installation: "**Location and grounding of units**".)* Length of copper foil/10 cm should not exceed 300 cm. The foil should be connected to ship's hull (deck or roof) by hard-soldering (or screws) to steel.

Mains power/ground

Mains ground must be checked against the common grounding point (MCU mounting plate). It is important to use the same mains branch for additional equipment connected to the MCU (fax, PC w/printer etc.).

Grounding considerations cont'd

Location of the MCU for best possible grounding.
*See also **INSTALLATION**: "**Location and grounding of Units**".*



Laying cables

General

The coaxial cable for connection between the MCU and the Antenna Unit should, if possible, be laid before the equipment arrives. Make sure sufficient length of cable is ordered.

Where exposed to mechanical wear (on deck, through bulkheads etc.), the cable should be protected by steel pipes. Standard procedures should otherwise be followed for cabling in ship installations.

Special attention to existing safety regulations is required if the cable passes through zones where there may be flammable or explosive gases. Use suitable gasproof cable glands or bushings.

Double screen 50 ohm coaxial cable must be used. The maximum length of the coaxial cable is limited by the DC and RF loss through the cables (including pigtails):

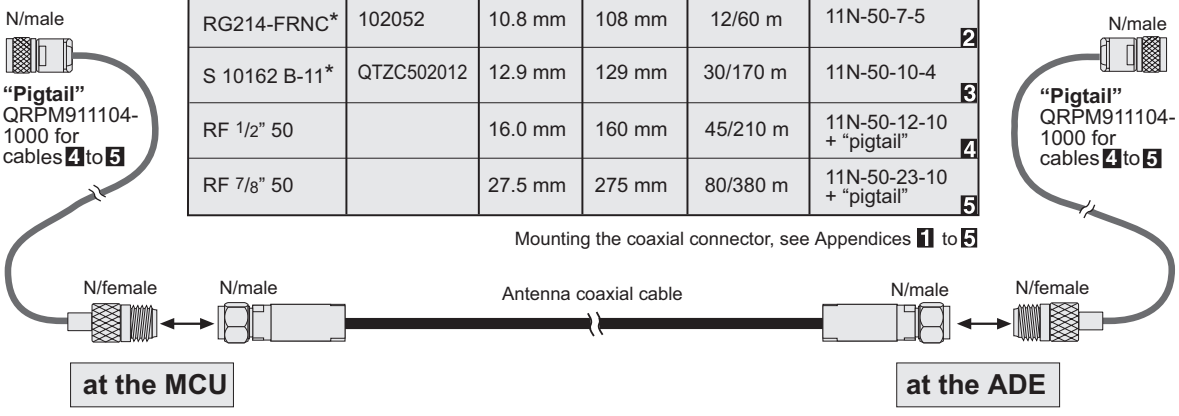
Maximum DC loss: R loop 2.0 ohm
Minimum/maximum RF attenuation at 1.6 GHz: 4/23 dB
Maximum power consumption:
- transmit mode 150W
- receive mode 40W

The table below lists suitable double screened coaxial cables between MCU and ADE:

* Halogen-free/flame retardent/low smoke

Antenna cable	Nera part no.	Diameter	Bending radius	Min/max. length for 4/23dB	Suitable coaxial connectors
RG223	R906551/1	5.3 mm	53 mm	7/30 m	11N-50-3-54 1
RG214-FRNC*	102052	10.8 mm	108 mm	12/60 m	11N-50-7-5 2
S 10162 B-11*	QTZC502012	12.9 mm	129 mm	30/170 m	11N-50-10-4 3
RF 1/2" 50		16.0 mm	160 mm	45/210 m	11N-50-12-10 + "pigtail" 4
RF 7/8" 50		27.5 mm	275 mm	80/380 m	11N-50-23-10 + "pigtail" 5

Mounting the coaxial connector, see Appendices 1 to 5



At the Antenna Unit

A free end of approximately 1.5 m of the antenna cable above the radome bottom should be provided for connection to the coaxial connector in accordance with the installation instructions in "***BDE - Connecting the coaxial cable to the MCU***".

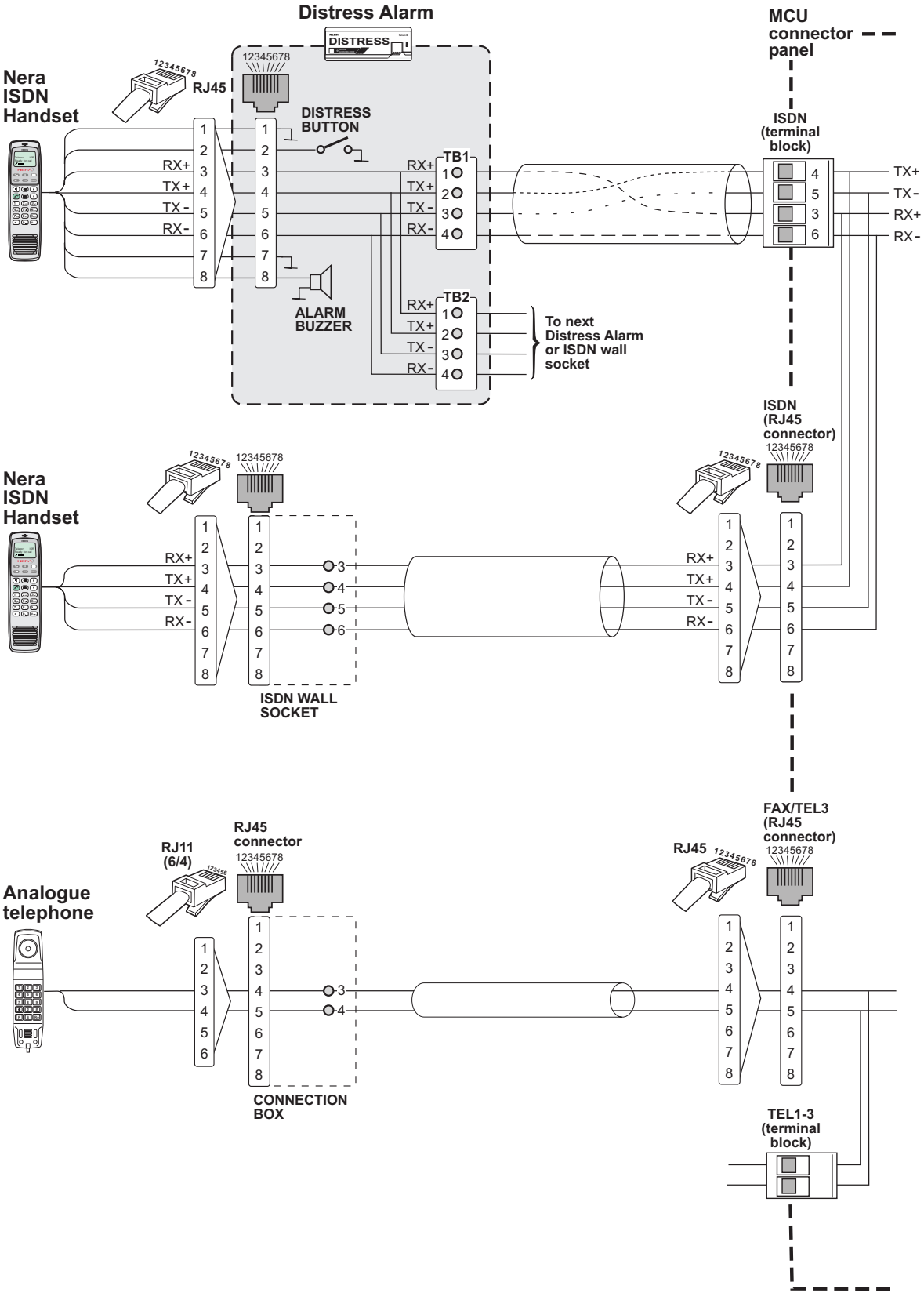
At the Main Communication Unit

The coaxial cable from the Antenna Unit should be given a free end of approximately 0.5 m at the MCU location.

Nera ISDN Handset, Distress Alarm Unit, telefax or analogue telephone

Choose the position for the required wall sockets and lay the cables leaving a free end of 0.5 m. Also allow a free end of 0.5 m at the Termination Box.

Telephone wiring



Unpacking

Open all boxes supplied and check the contents with the enclosed packing list. Inspect units and parts for possible transport damage.

Installing the Above Deck Equipment (ADE)

Mast mounted version

Installation on the mast

The ADE radome is furnished with 3 lifting lugs accessible from underneath the radome, *see figure below*.

The radome is delivered with a rope attached to the lugs, ready for lifting of the ADE by crane.

Remove the straps fastening the radome to the transport pallet. Carefully start lifting the ADE.

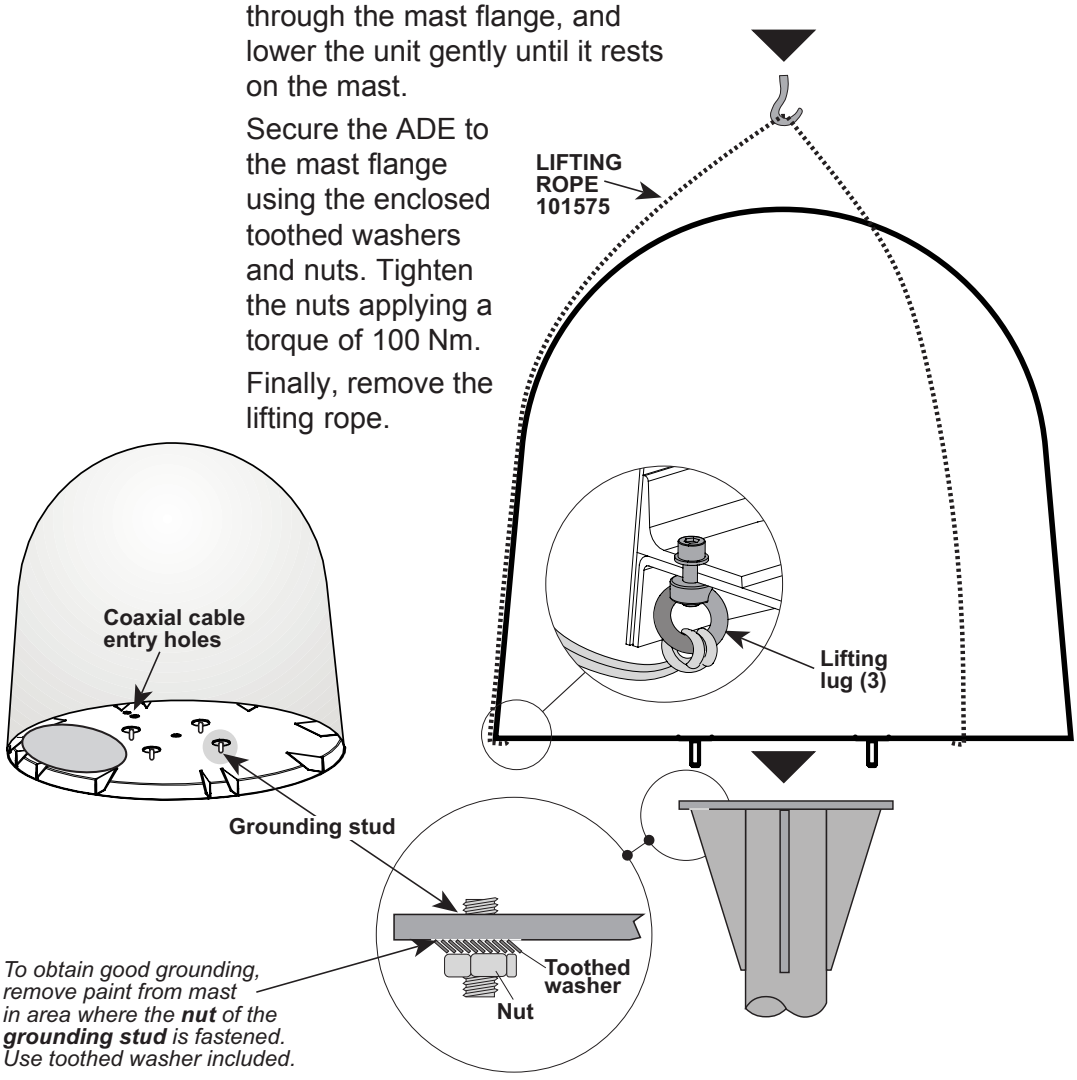
WARNING! ***Personnel must not pass underneath the ADE during hoisting operations.***

WARNING! ***Watch your hands!***

Align the bolts extending down from the bottom with the holes through the mast flange, and lower the unit gently until it rests on the mast.

Secure the ADE to the mast flange using the enclosed toothed washers and nuts. Tighten the nuts applying a torque of 100 Nm.

Finally, remove the lifting rope.



Installing the Above Deck Equipment cont`d

Deck mounted version

Installation on the mast

The deck mounted radome is delivered with a rope, ready for lifting of the ADE by crane or similar.

Carefully start lifting the ADE.

WARNING!

Personnel must not pass underneath the ADE during hoisting operations.

WARNING!

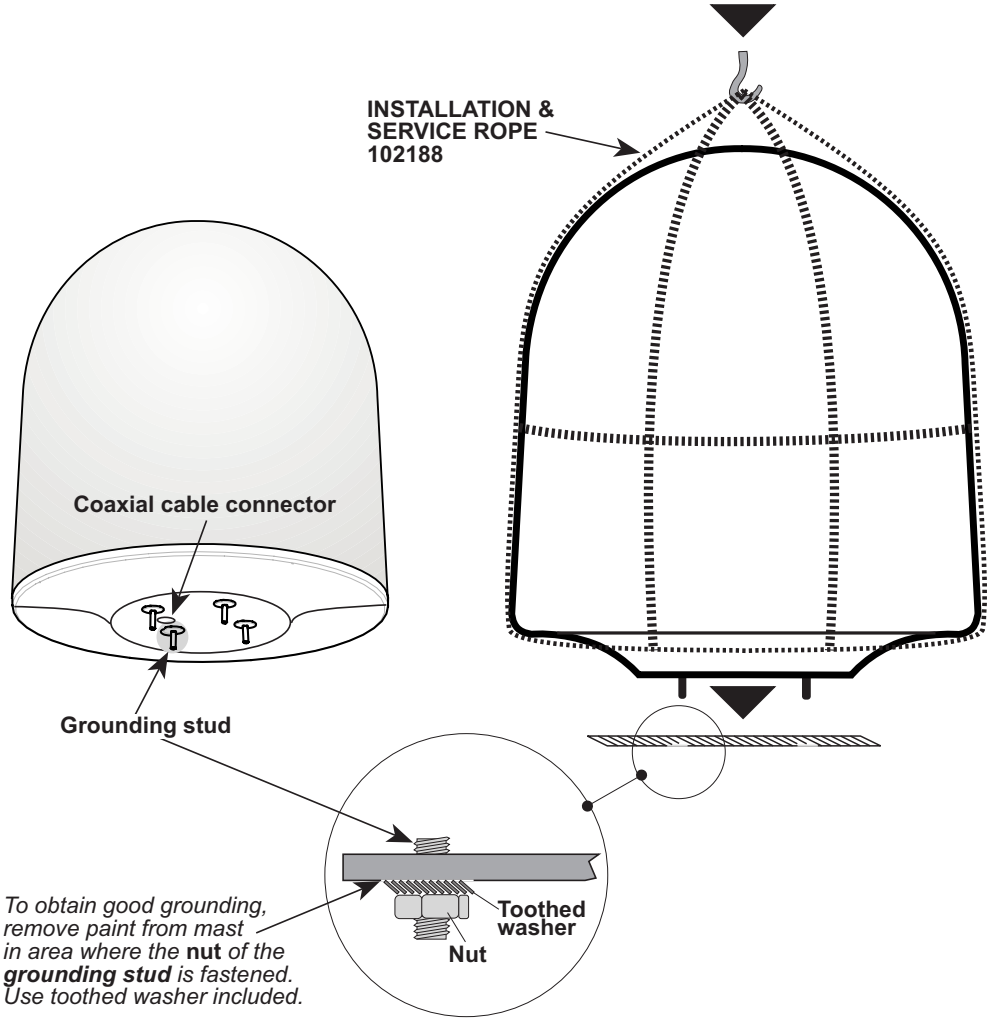
Watch your hands!

Align the bolts extending down from the bottom with the holes drilled through the fixing structure, and lower the unit gently until it rests properly.

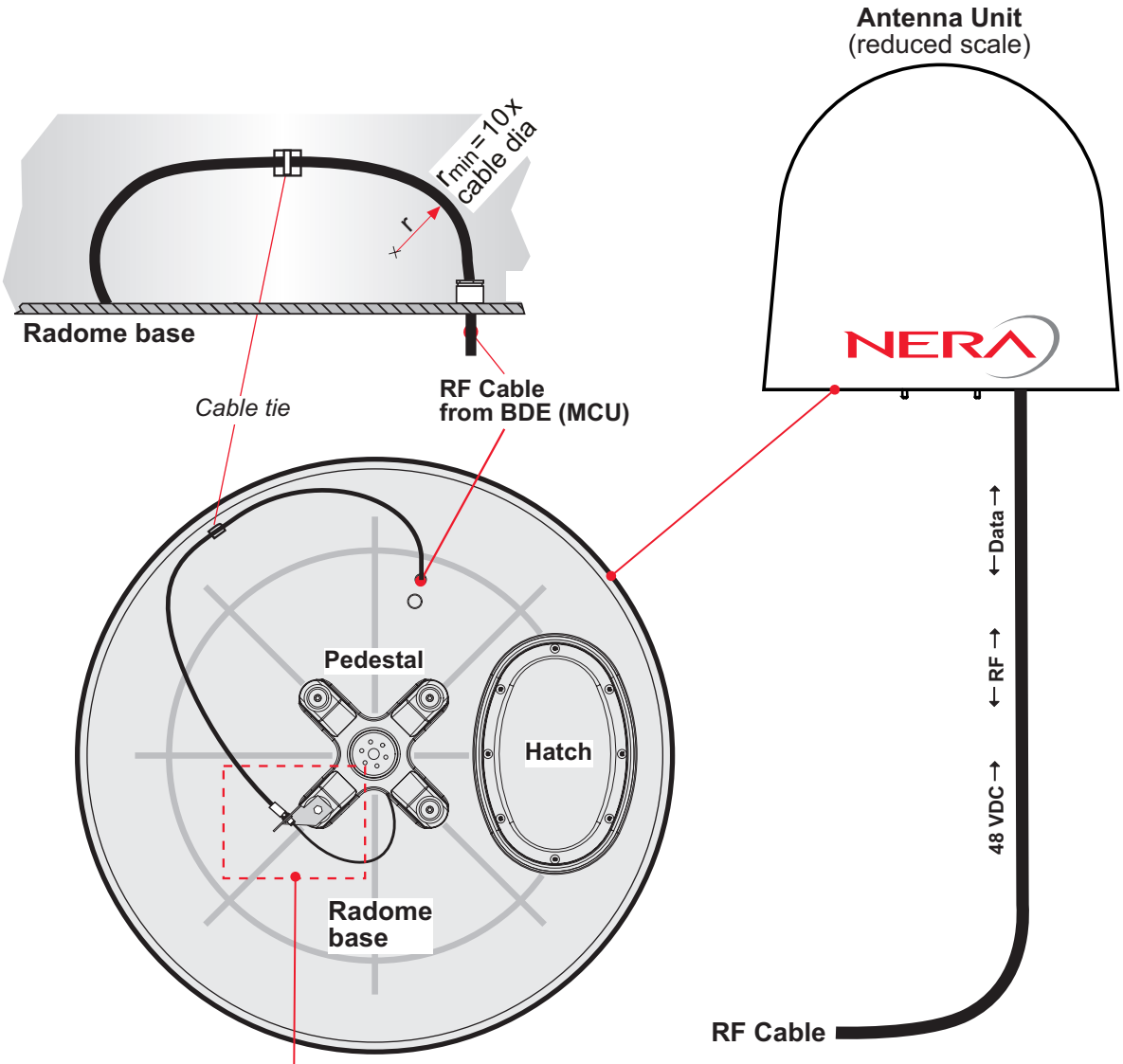
Secure the ADE using the enclosed toothed washers and nuts. Tighten the nuts applying a torque of 100 Nm.

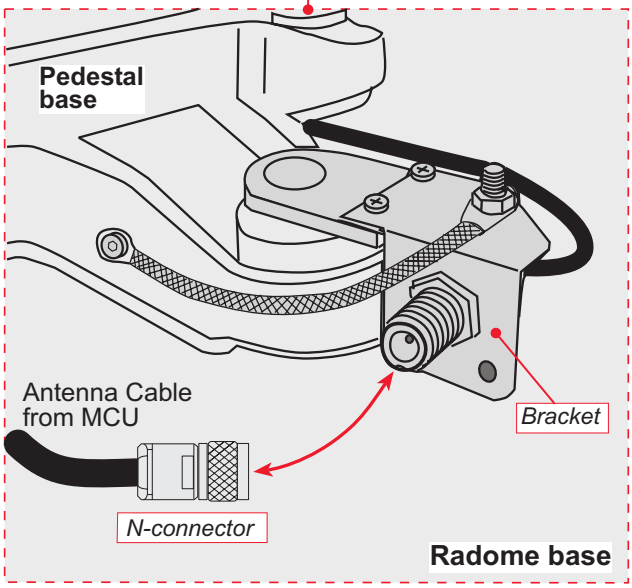
Finally, remove the rope.

Keep the rope for hoisting the antenna down for service.



ADE - Connecting coaxial cable to Mast Mounted Antenna





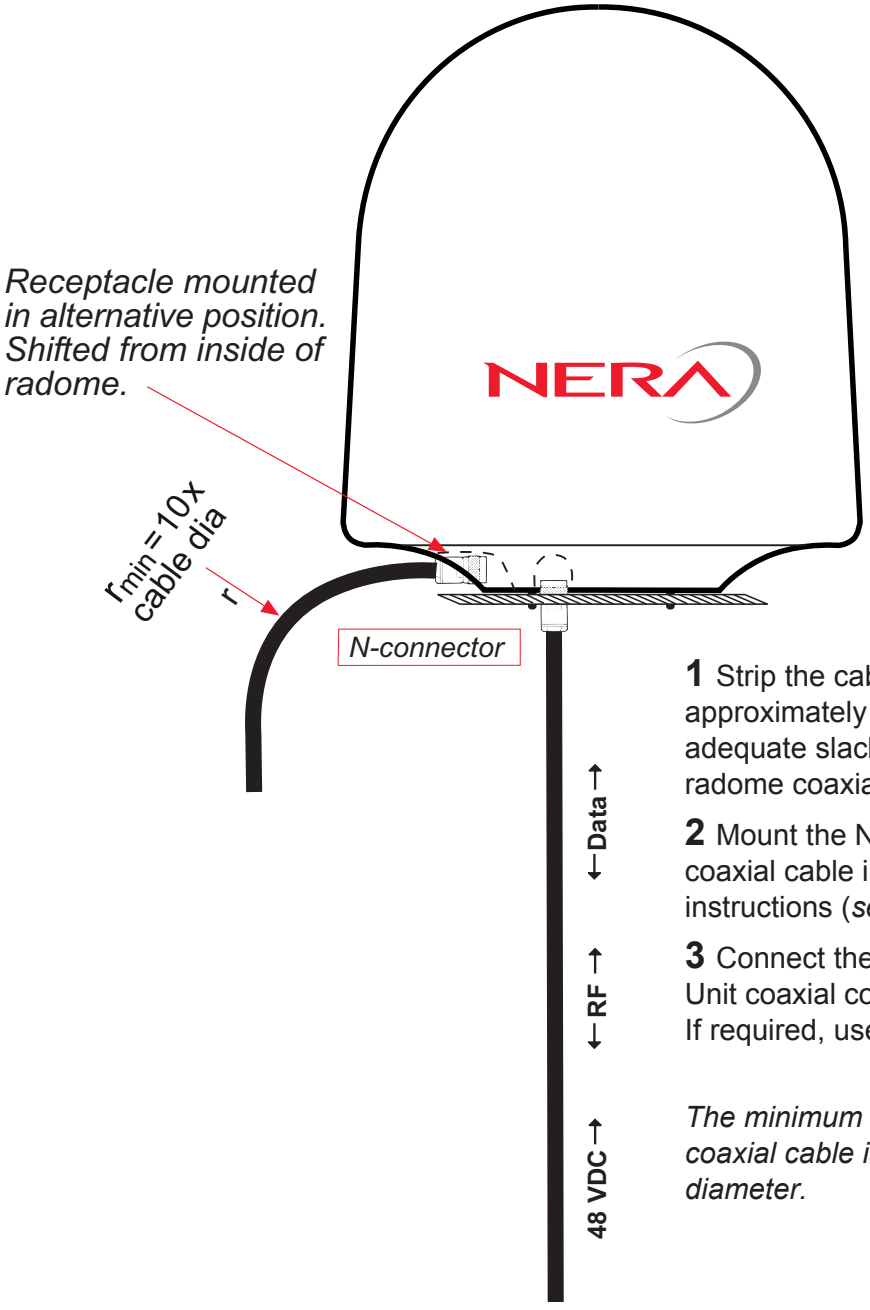
1 Strip the cable leaving a free end of approximately 1 metre, ensuring adequate slack for connection to the radome coaxial socket, as shown.

2 Mount the N-type connector to the coaxial cable in accordance with the instructions (*see Appendices 1 – 6*).

3 Connect the RF plug to the Antenna Unit coaxial connector as shown.

The minimum bending radius of the coaxial cable is 10 times the cable diameter.

ADE - Connecting coaxial cable to Deck Mounted Antenna



1 Strip the cable leaving a free end of approximately 1 metre, ensuring adequate slack for connection to the radome coaxial socket, as shown.

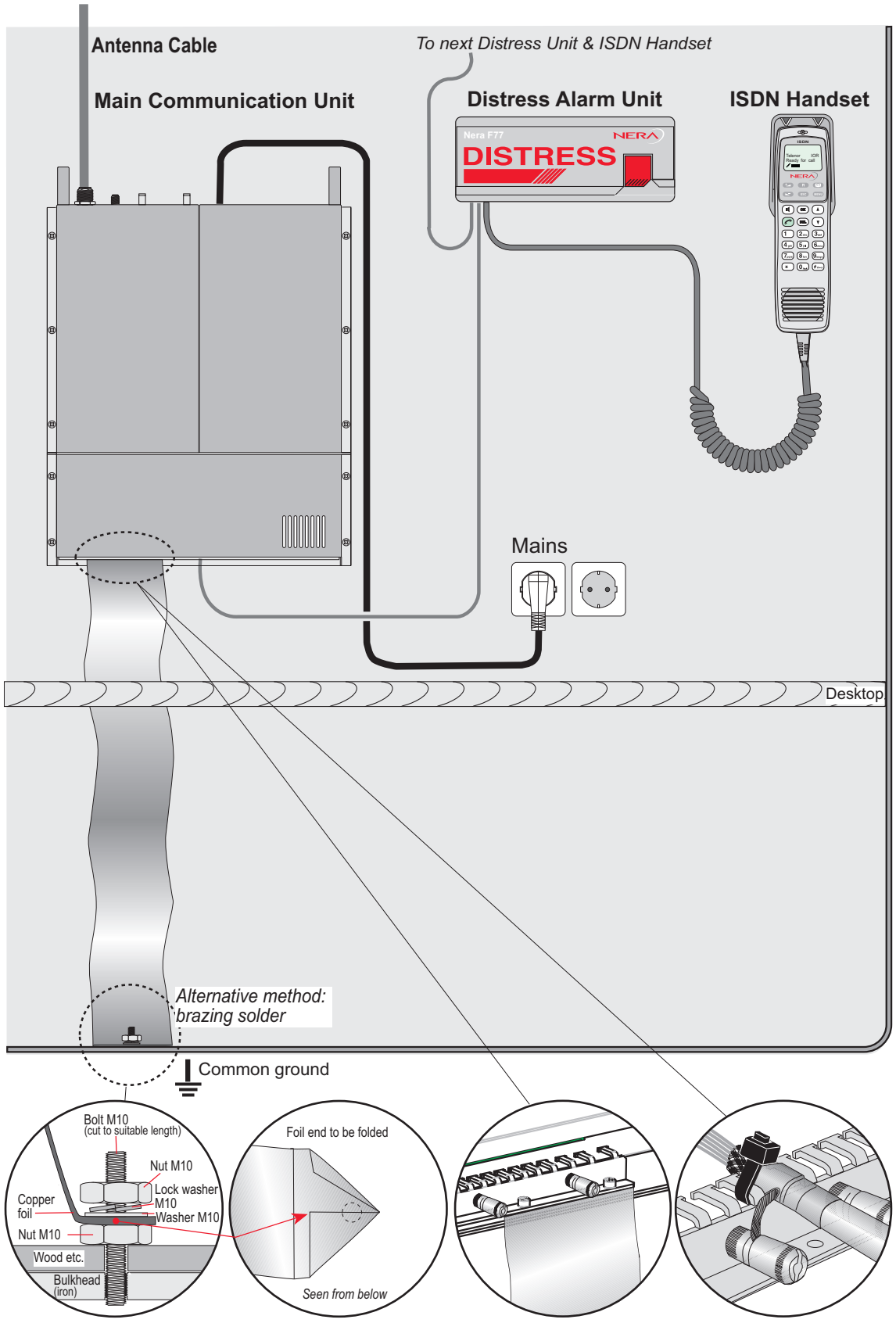
2 Mount the N-type connector to the coaxial cable in accordance with the instructions (*see Appendices 1 – 6*).

3 Connect the RF plug to the Antenna Unit coaxial connector as shown. If required, use a coax angle adapter.

The minimum bending radius of the coaxial cable is 10 times the cable diameter.

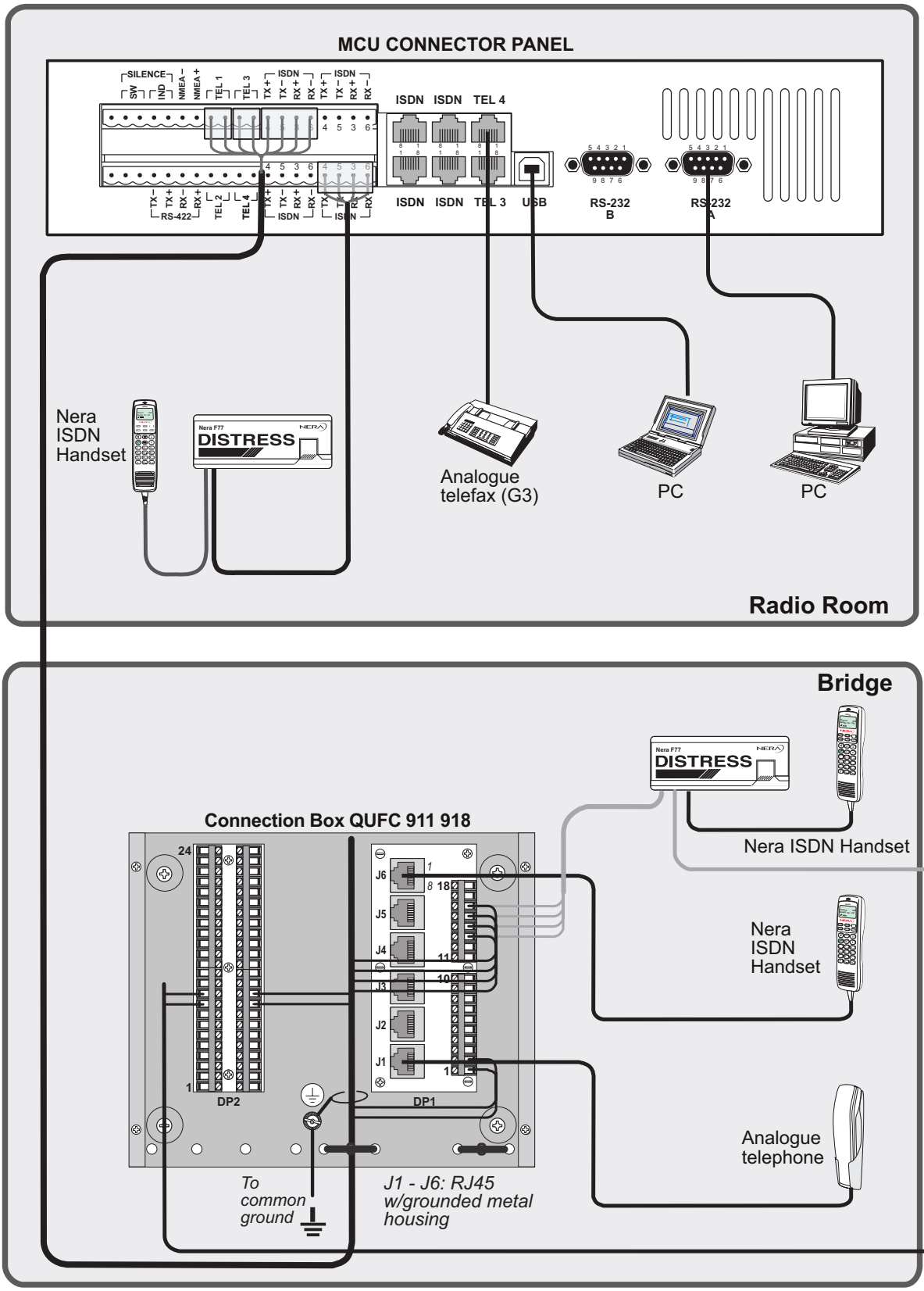
Installing the Below Deck Equipment (BDE)

Location and grounding of units



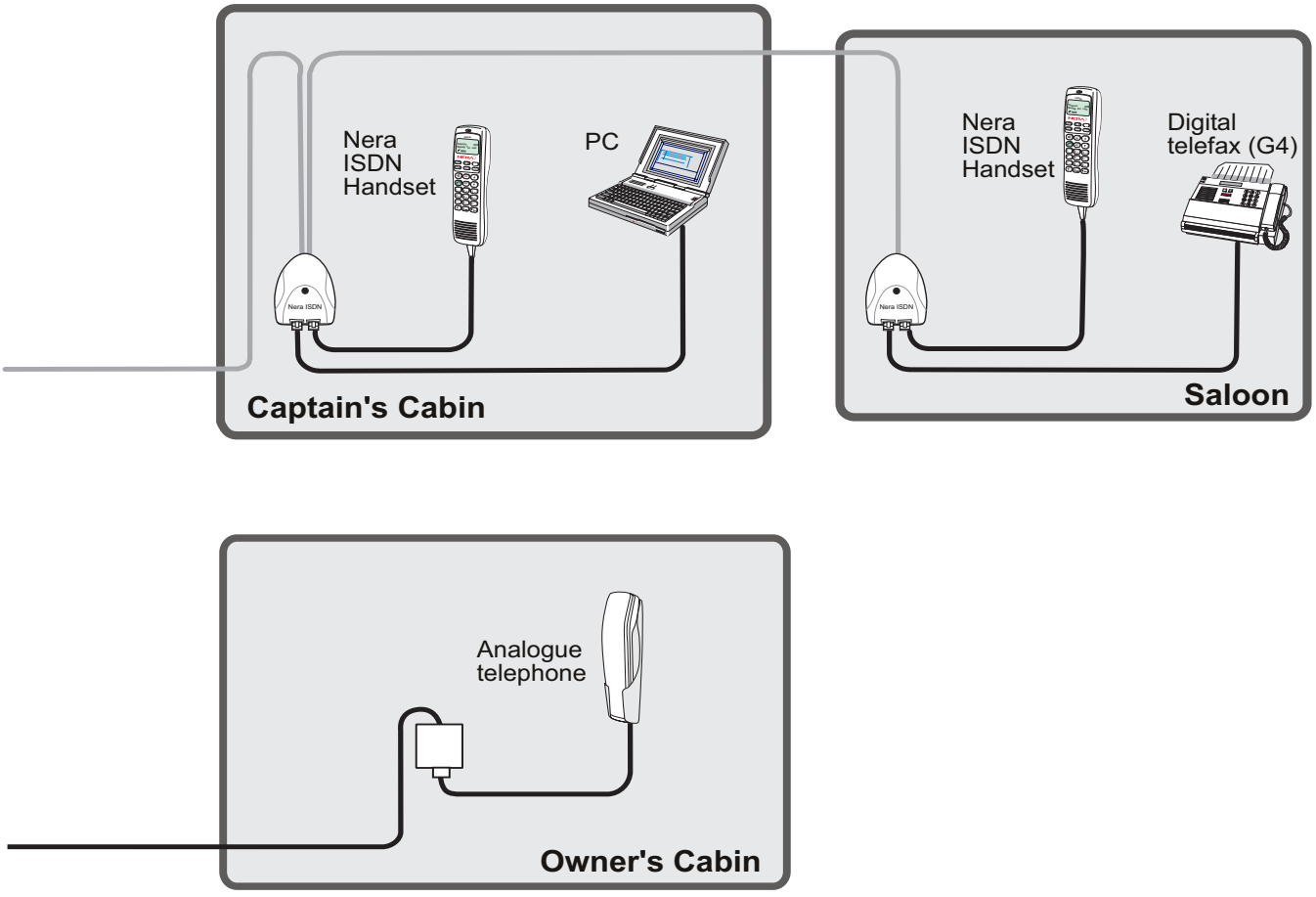
BDE - Example of local or near-by installation

The installation includes five Nera ISDN Handsets (two w/Distress Alarm Unit), Group 3 and Group 4 telefaxes, PC and two analogue telephones using connection box.



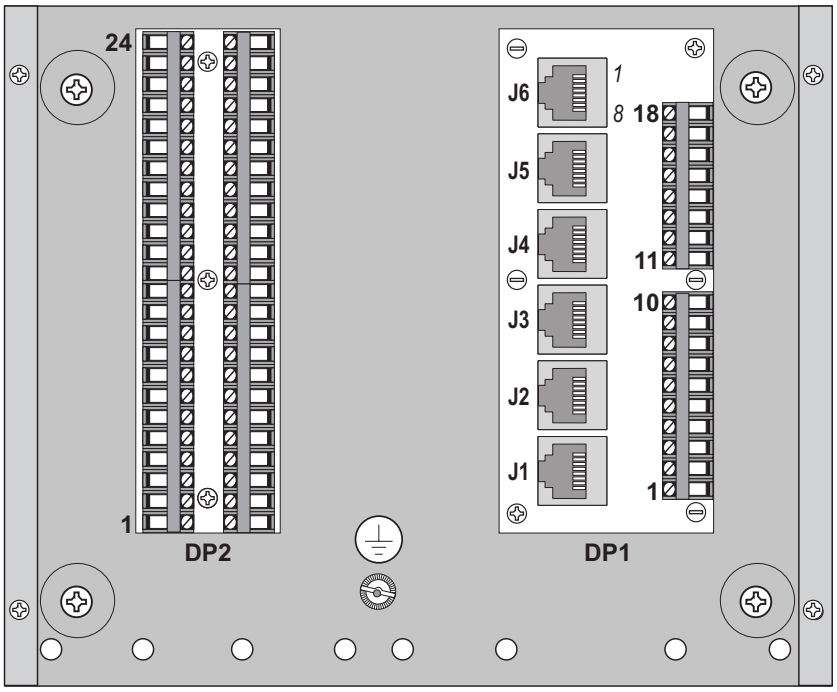
BDE - Example of remote installation

The installation includes two Nera ISDN Handsets connected to the ISDN bus via wall boxes with two 8-pin RJ45 jacks and analogue telephone.

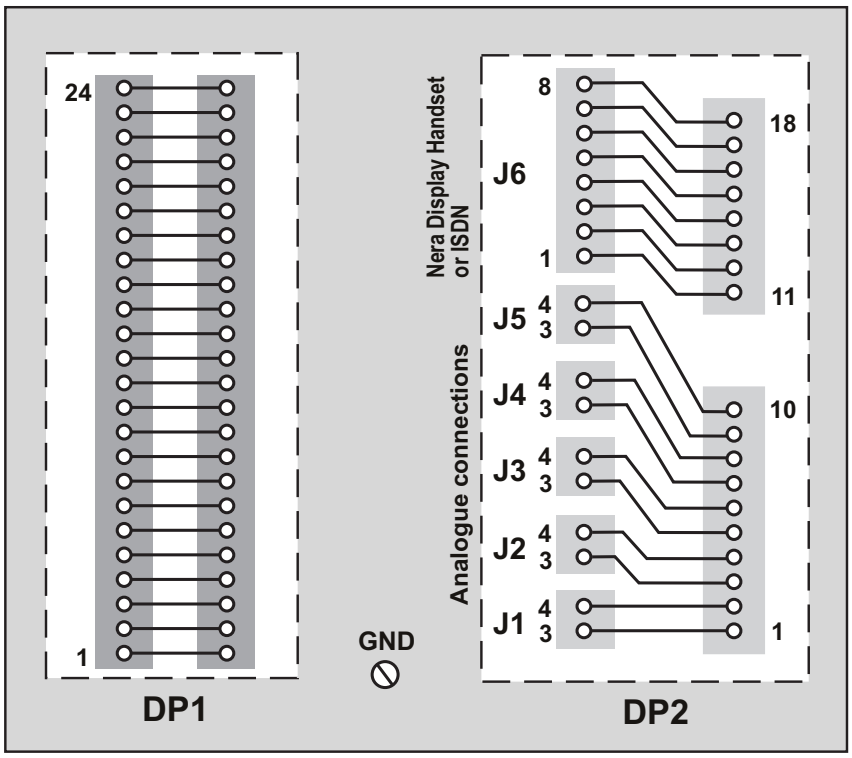


Connection Box QUFC 911 918 (option)

Inside Connection Box



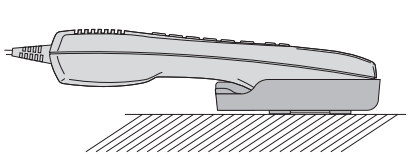
Wiring diagram



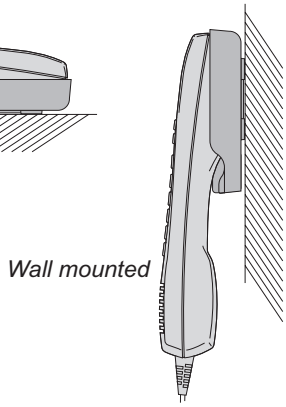
Nera ISDN Handset

The ISDN Handset is to be plugged into the **ISDN** socket located on the connector panel of the MCU, or to the Distress Alarm Unit (if installed).
Note! It is not recommended to extend the handset cable by more than 6 m.

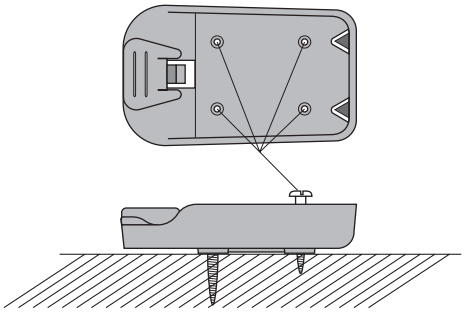
Handset holder/cradle



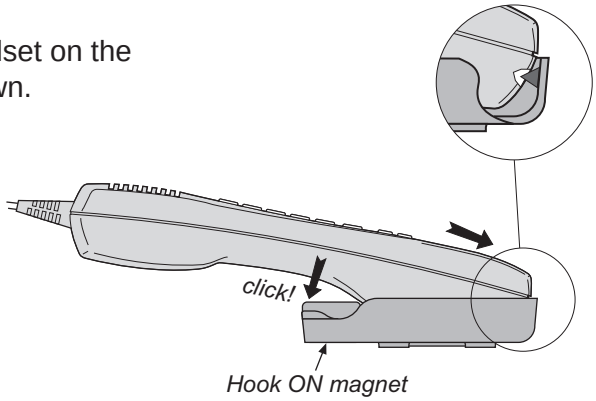
The handset holder/cradle may be desk mounted or wall mounted.



Attach the holder to the wall or desktop with four 4 mm wood screws or tapping screws.

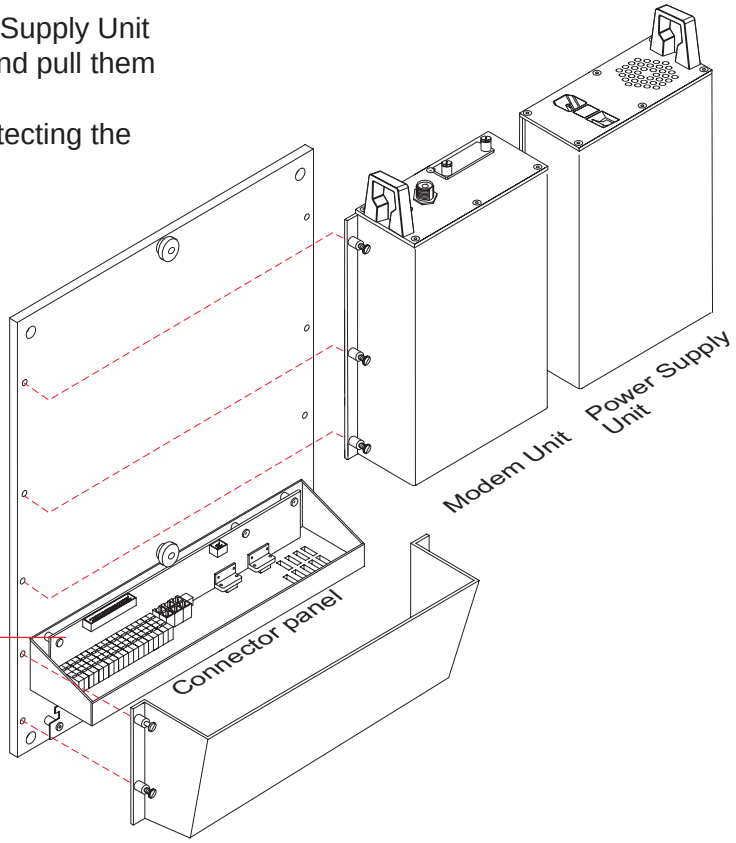


Place the Handset on the holder as shown.



Mounting the Main Communication Unit (MCU)

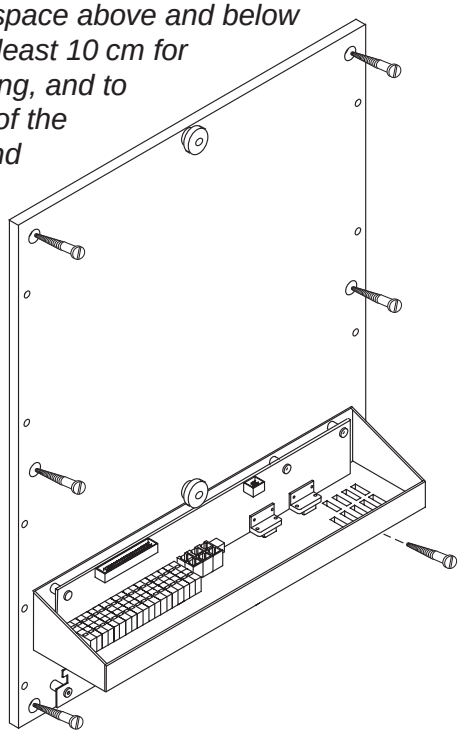
1 Unscrew the Power Supply Unit and the Modem Unit and pull them carefully out.
Remove the cover protecting the connector panel.



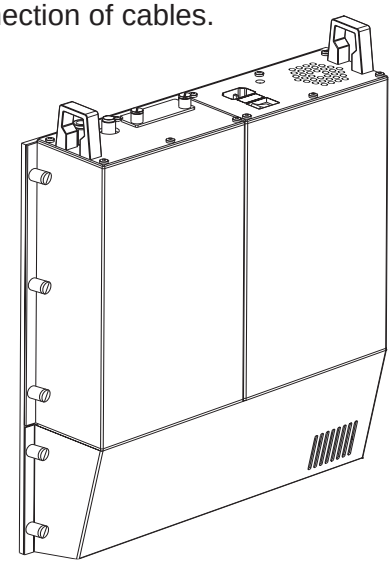
Connector Board (CIB)
Contains:
- Fwd Id
- ISN
- Paid functions

2 Attach the bottom plate to the wall using six wood screws or tapping screws.

Ensure a free space above and below the MCU of at least 10 cm for adequate cooling, and to allow removal of the Modem Unit and Power Supply Unit.



3 Mount the Power Supply Unit and Modem Unit. Remount the connector panel cover after connection of cables.



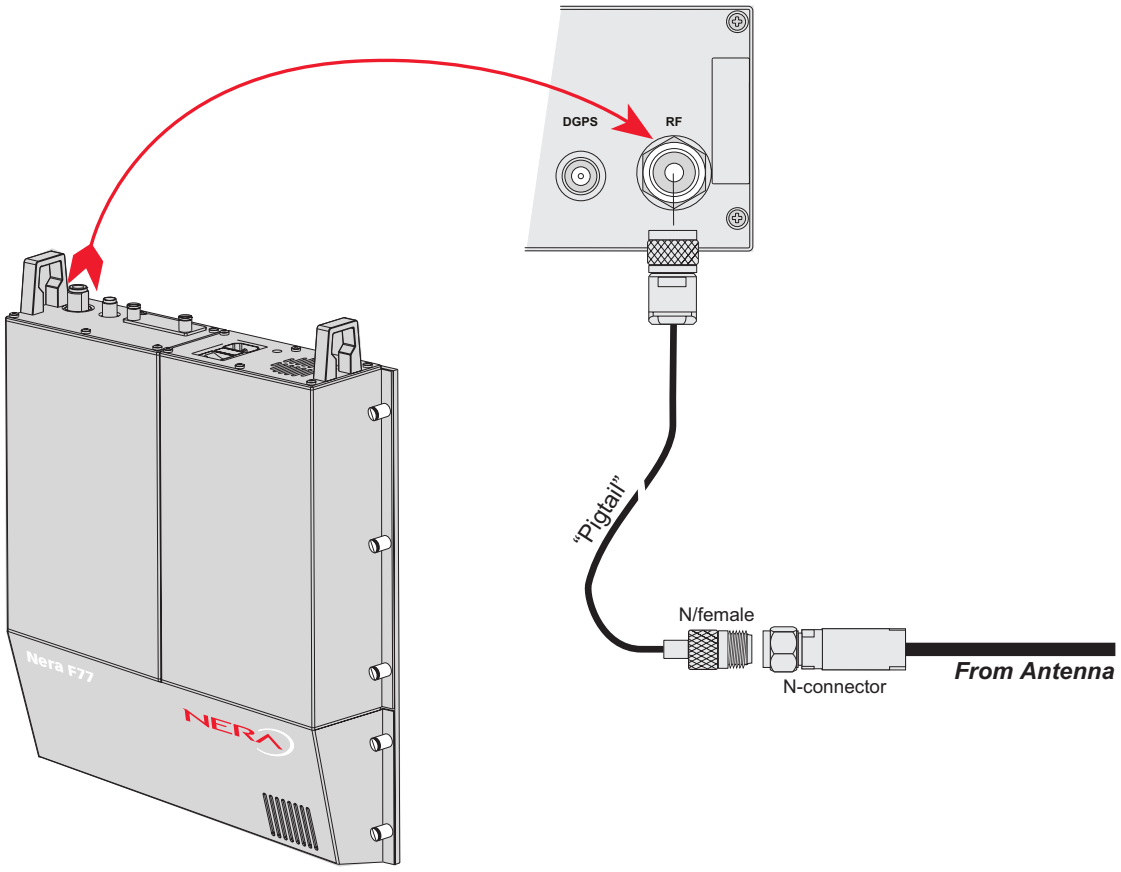
NOTE!
Secure the MCU even when desk mounted.

BDE - Connecting the coaxial cable to the MCU

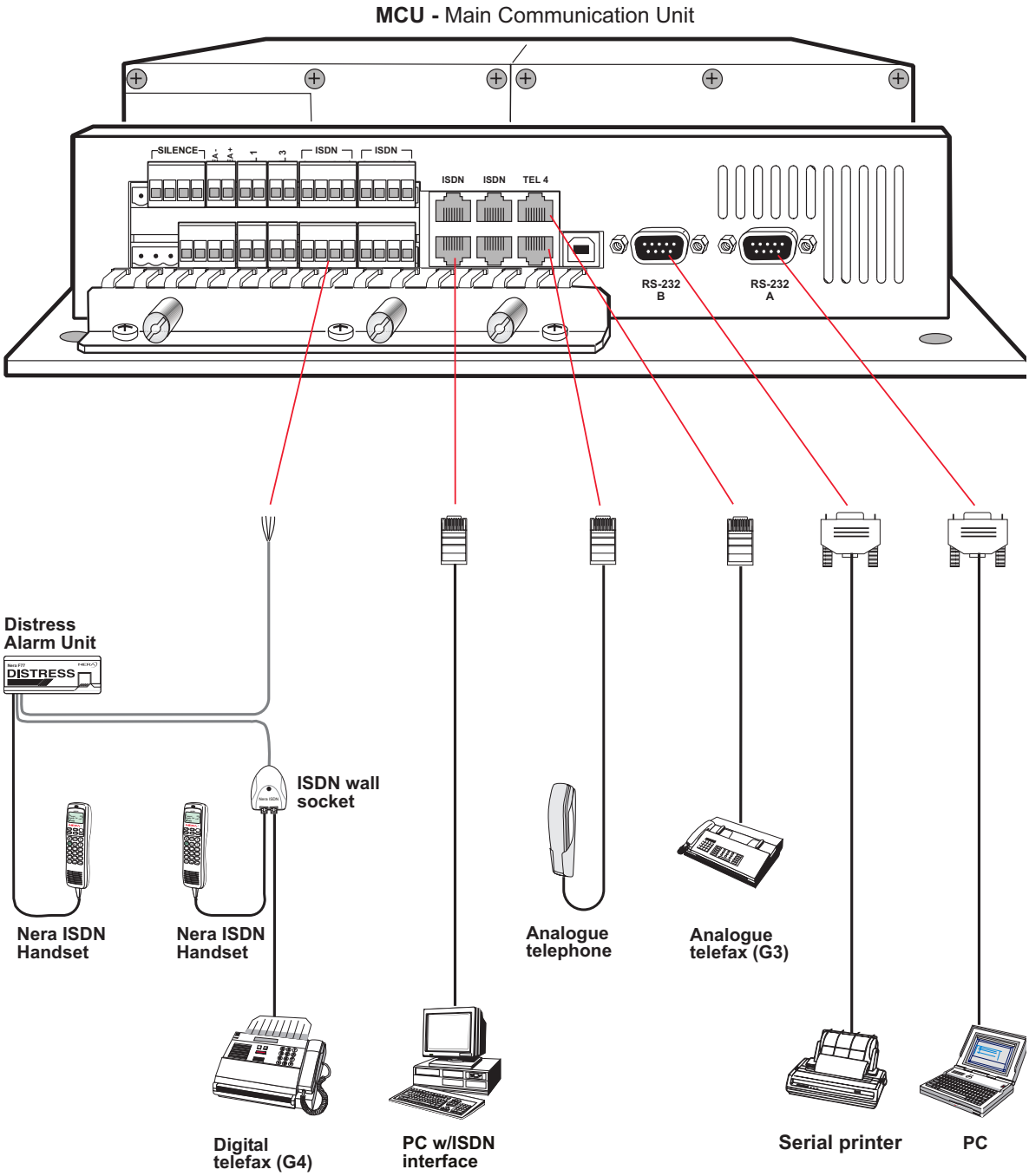
1 Strip the Antenna coaxial cable leaving sufficient slack for connection to the MCU or "pigtail".

2 Mount the N-plug on the cable in accordance with the instructions *(see Appendices 1 - 6).*

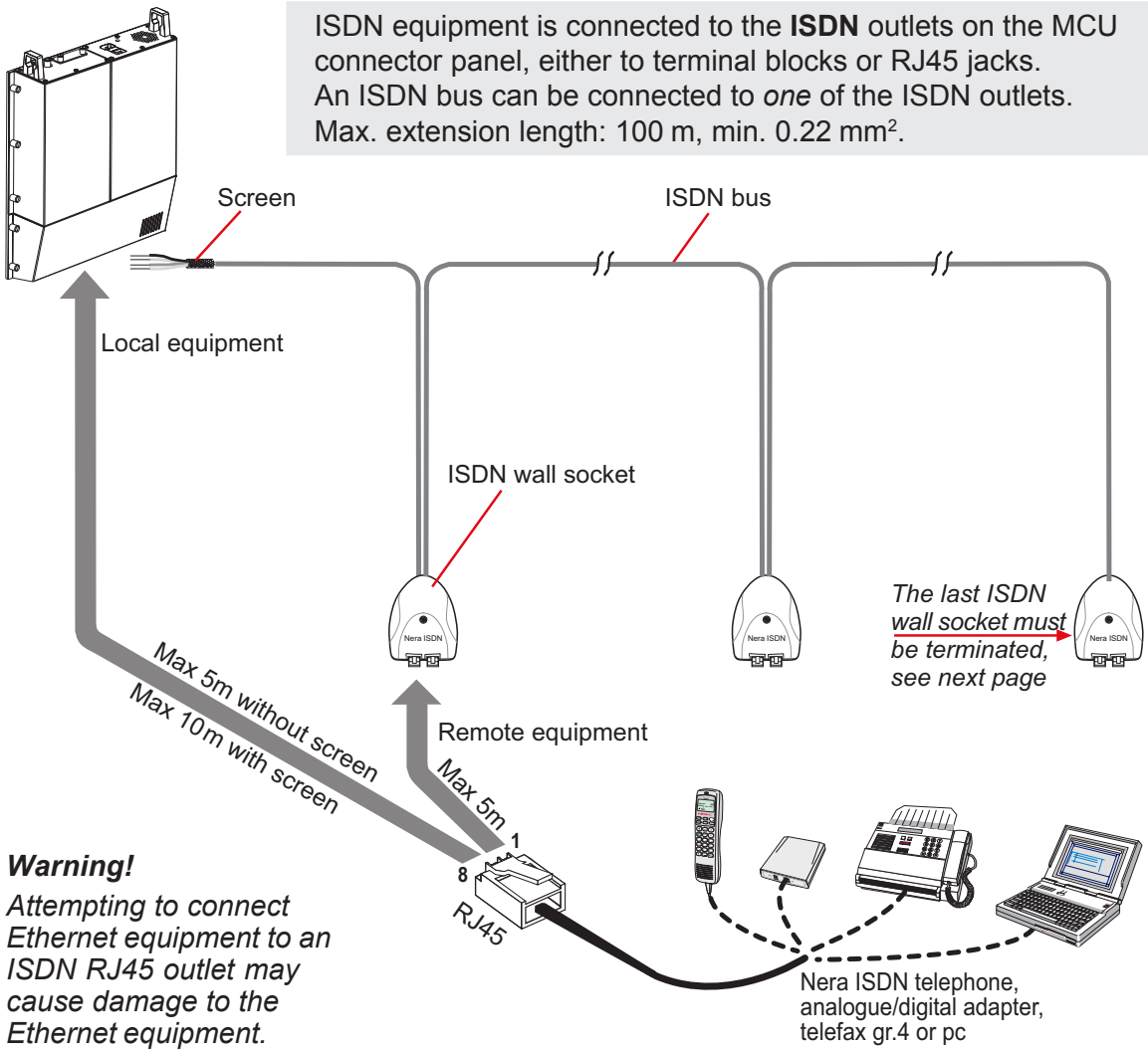
3 For thicker coax cable, use the "pigtail" for connection of the Antenna cable to the MCU.



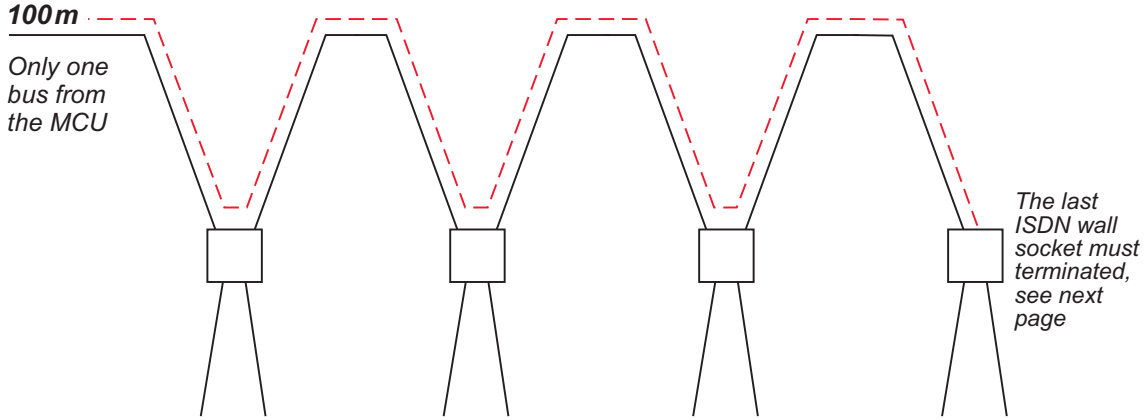
Examples of Below Deck Equipment



ISDN telephones/equipment

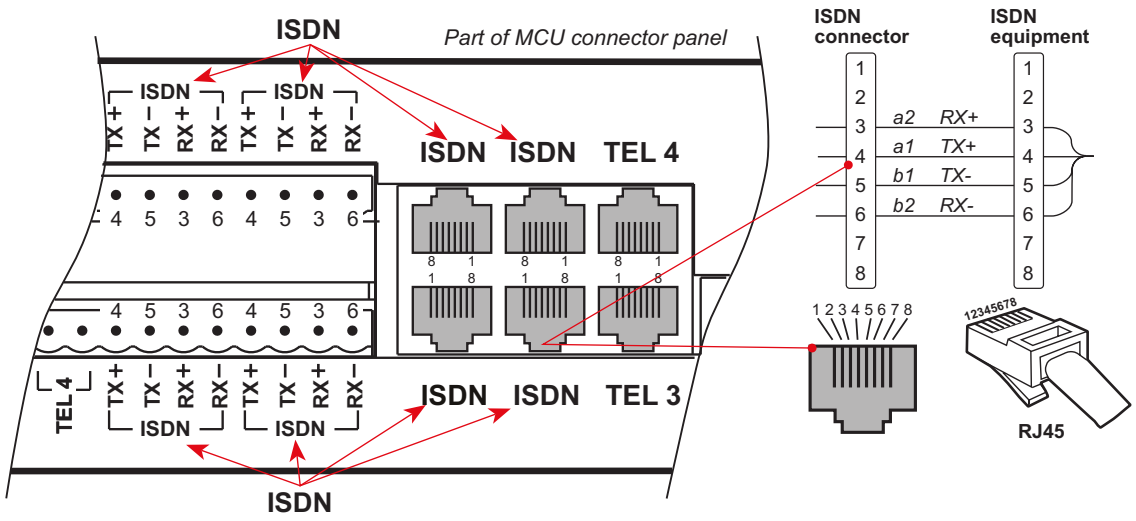


ISDN cable lengths

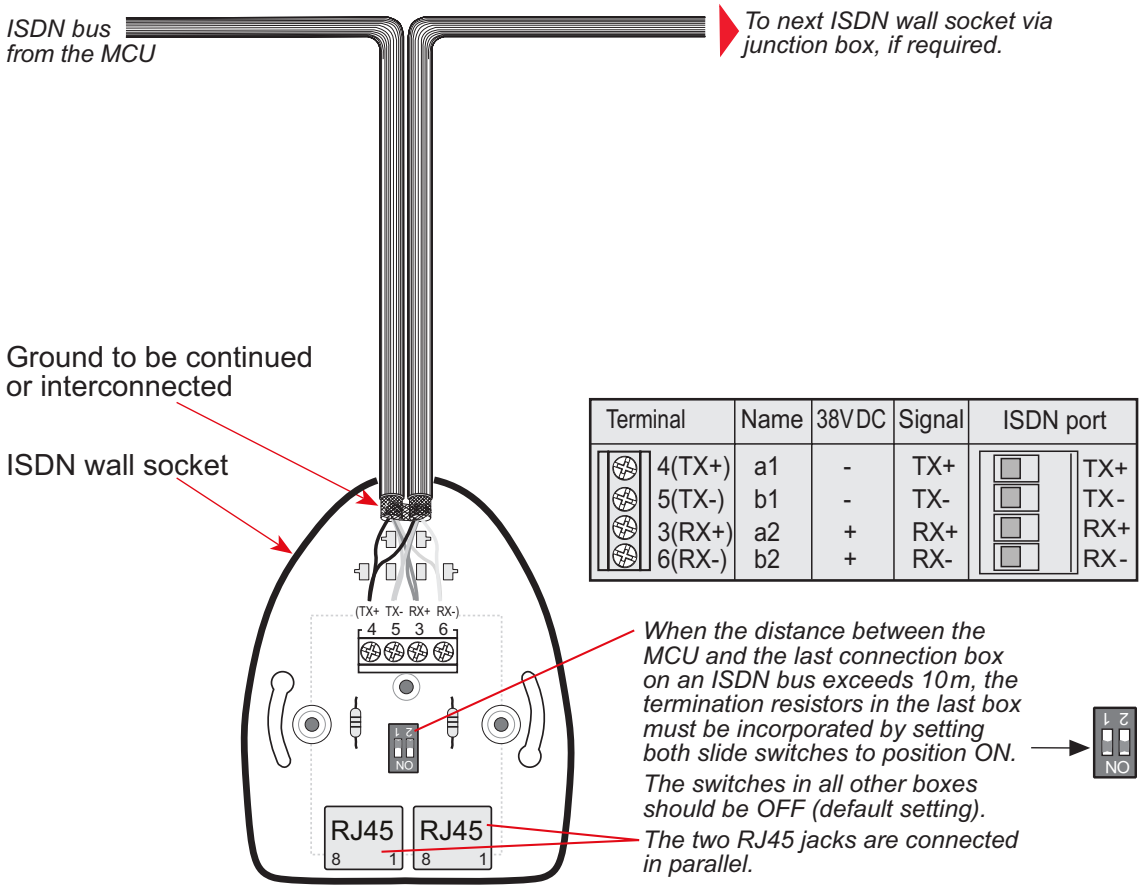


Up to 7 ISDN devices can be operated with Nera F77.

ISDN telephones/equipment cont'd



ISDN wall socket

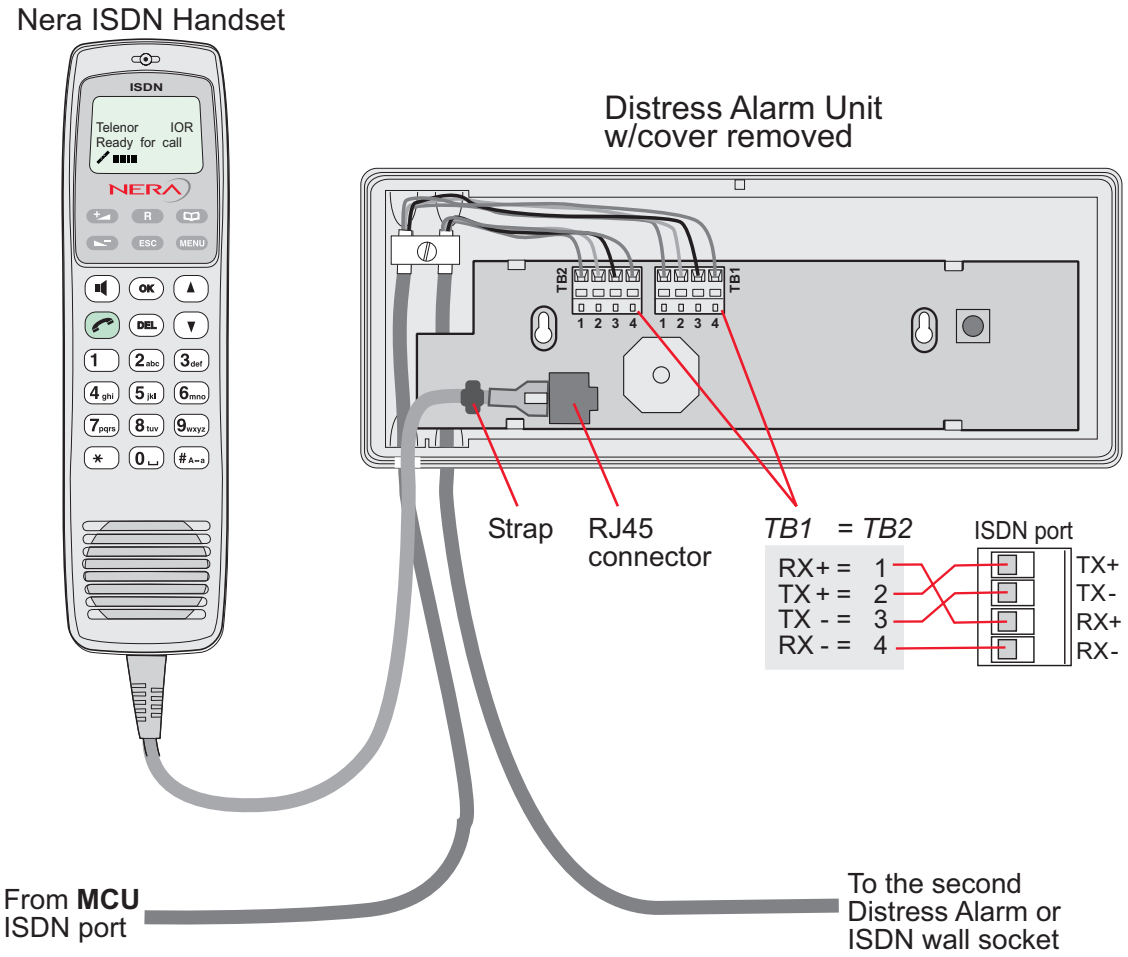


Terminal	Name	38VDC	Signal	ISDN port
4(TX+)	a1	-	TX+	TX+
5(TX-)	b1	-	TX-	TX-
3(RX+)	a2	+	RX+	RX+
6(RX-)	b2	+	RX-	RX-

Distress Alarm Unit

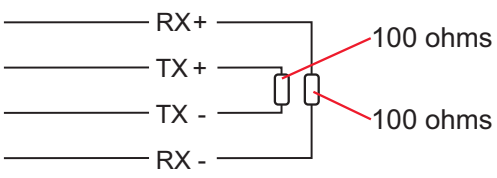
The Distress Alarm Unit is connected to the ISDN bus/connector on the MCU. The maximum number of Distress Alarm Units is limited to *two*.

When connected to the Distress Alarm Unit, in addition to regular ISDN voice service the ISDN Handset will also include the capability for Distress handling (Transmit & Receive).

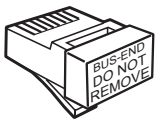


ISDN bus termination

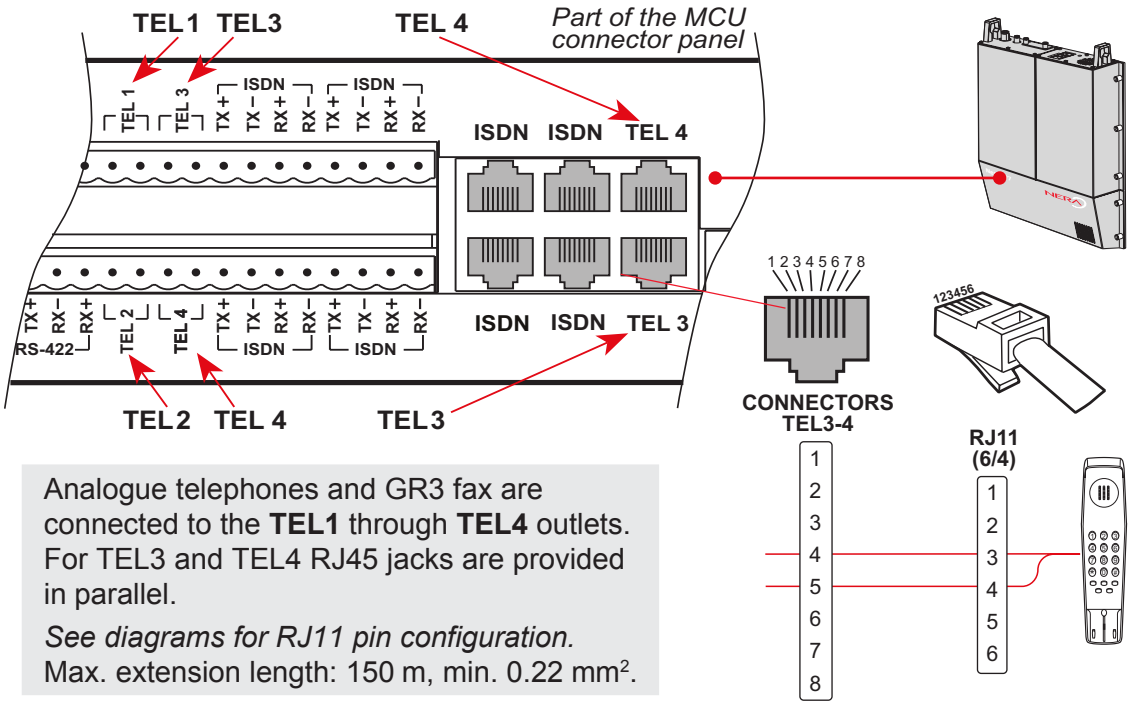
When longer than 10 metres, the end of the ISDN bus must be terminated by two resistors as shown below. Only one bus/termination per MCU.
Be aware that only one ISDN cable is permitted to be longer than 10 metres.



Alternative termination:
ISDN bus end plug



Analogue telephones



Analogue telephones and GR3 fax are connected to the **TEL1** through **TEL4** outlets. For TEL3 and TEL4 RJ45 jacks are provided in parallel.

See diagrams for RJ11 pin configuration.

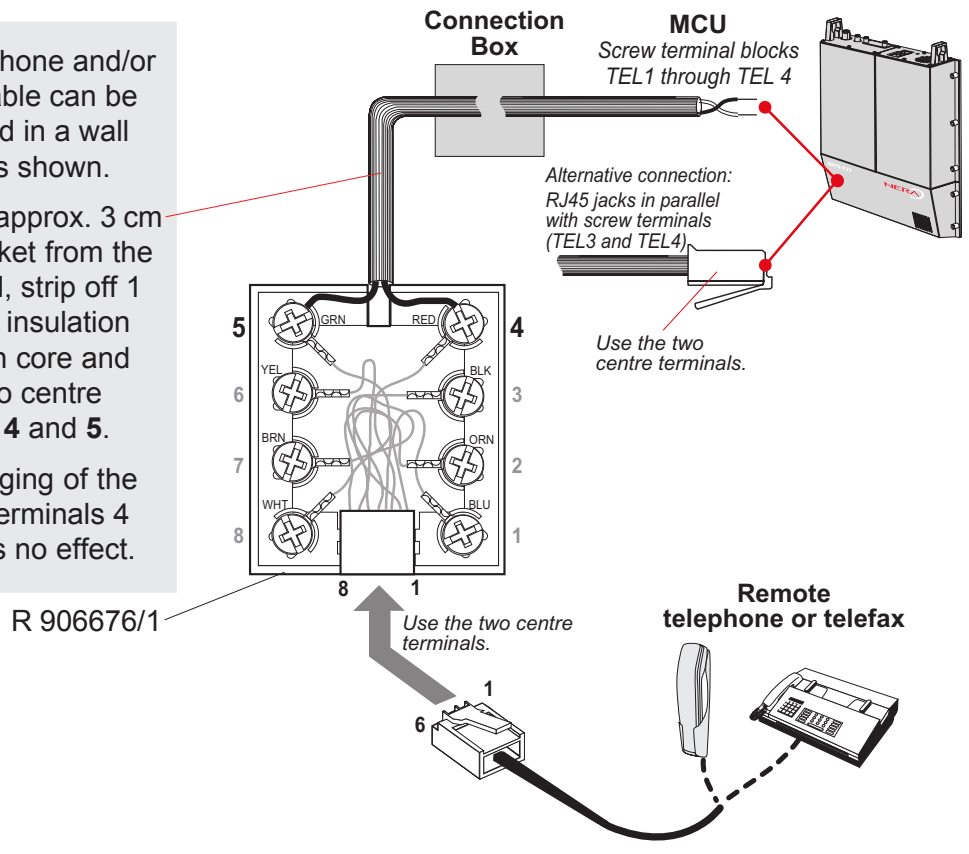
Max. extension length: 150 m, min. 0.22 mm^2.

Wall socket for analogue telephone/telefax gr.3 (option)

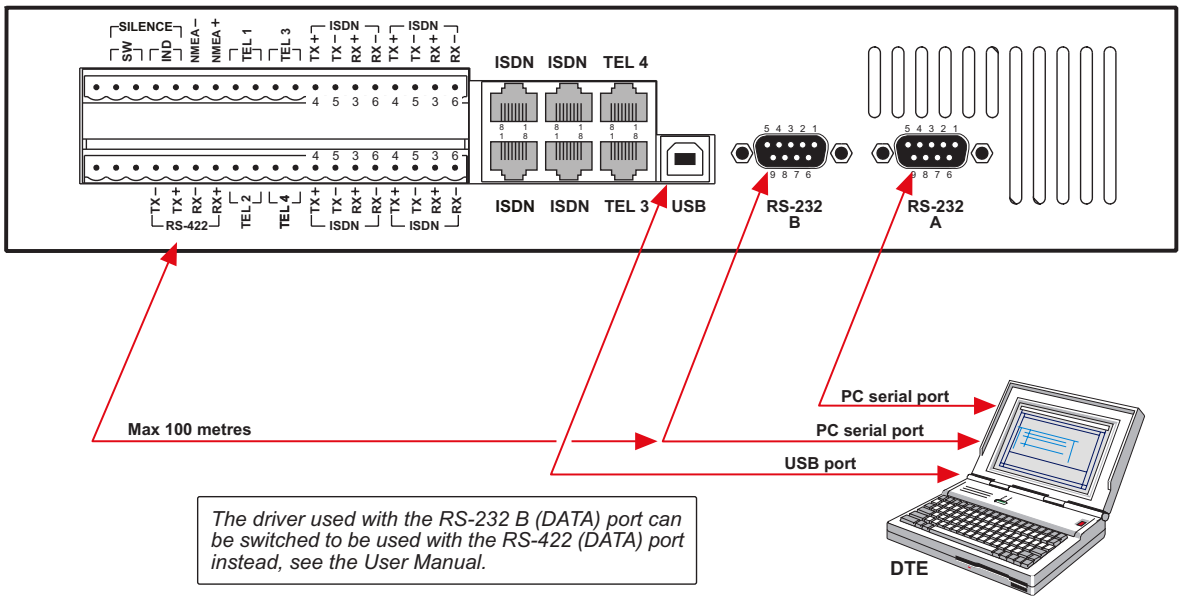
The telephone and/or telefax cable can be terminated in a wall socket, as shown.

Remove approx. 3 cm of the jacket from the cable end, strip off 1 cm of the insulation from each core and connect to centre terminals **4** and **5**.

Interchanging of the wires at terminals 4 and 5 has no effect.



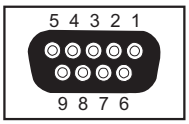
PC - asynchronous data communication



The driver used with the RS-232 B (DATA) port can be switched to be used with the RS-422 (DATA) port instead, see the User Manual.

RS-232 connector pin assignments

Pin number	*Mne-monic*	*Circuit*	*DIN*	*CCITT circuit*	*Signal source*	*Description*
1	CD			109	DCE	Carrier detect
2	RXD	BB	D1	104	DTE	Received Data
3	TXD	BA	D2	103	DCE	Transmitted Data
4	DTR			108	DTE	Data terminal ready
5	GND			102		Signal ground
6	DSR			107	DCE	Data set ready
7	RTS	CA	S2	105	DTE	Request To Send
8	CTS	CB	M2	106	DCE	Clear To Send
9	RI			125	DCE	Ring indicator



Signal source DTE means that the signal goes from the PC to Nera F77.

Signal source DCE means that the signal goes from Nera F77 to the PC.

Signal descriptions

102 Signal Ground
Digital ground, return line.

103 Send Data
Data transmitted from DTE (PC) to DCE (Nera F77).

104 Receive data
Data Received from DCE (Nera F77) to DTE (PC).

105 Request To Send
OFF requests DCE (Nera F77) to suspend transmission to DTE (PC).
ON requests DCE (Nera F77) to resume transmission to DTE (PC).

106 Clear to send
OFF indicates that DCE (Nera F77) cannot accept data from DTE (PC).
ON indicates that DCE (Nera F77) is prepared to accept data from DTE (PC).

107 Data Set Ready
Signal from Nera F77 that when ON indicates that a data call setup is in progress.

108 Data Terminal Ready
Signal from PC. This signal is used in the Hotline mode and indicate when going from OFF to ON that the PC wants to make a data call. The PC clears the call by setting the signal from ON to OFF.

109 Receive Signal Indicator
Signal from Nera F77 that when ON indicates that connection is established and received data will be delivered on circuit 104, Received Data.

125 Ring Indicator
Signal from Nera F77. This signal is used in the Auto answer OFF mode and when ON indicates that an incoming call is in progress. The signal will go OFF when the call is answered by the PC by turning circuit 108 Data Terminal Ready ON.

NMEA-0183 input sources (complies with IEC 61162-1)

Intended for backup GPS. The internal GPS located in the antenna will always be used as the primary source. If the primary source is not receiving GPS signals, the external GPS input will be used (if enabled).

NMEA-0183 input is not required for operation of Nera F77.

The NMEA-0183 (ver. 3.00) input is a 4 - 15 V current loop interface located on the connector panel of the MCU.

Data input format: Baud rate 4800
Data bits 8, parity none, stop bit 1
Heading input is not required

Recognized GPS time, position and fix data format:

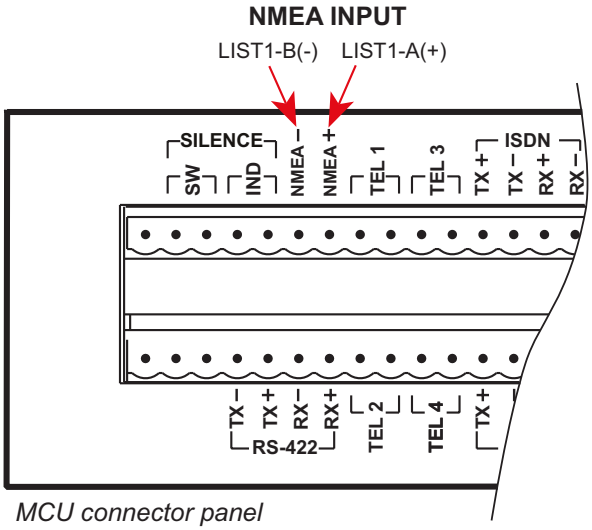
$--GGA,hhmmss.ss,llll.ll,a,yyyyy.yy,a,x,xx,x.x,x.x,M,x.x,M,x.x,xxxx*hh<CR><LF>

- *UTC of position*
- *Latitude - N/S*
- *Longitude - E/W*
- *GPS quality indicator*
- *Number os satellites in use, 00-12, may be different from the number in view*
- *Horizontal dilution of precision*
- *Altitude re: mean-sea-level (geoid), meters*
- *Geoidal separation, meters*
- *Age of differential GPS data*
- *Differential reference station ID, 0000-1023*

Recognized NMEA-0183 data format:

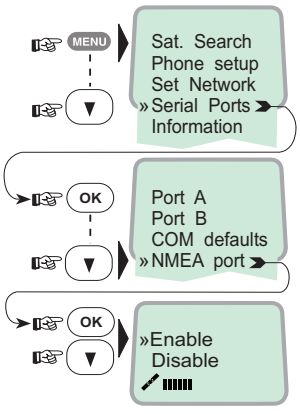
$--RMC,hhmmss.ss,A,llll.ll,a,yyyyy.yy,a,x.x,x.x,xxxxxx,x.x,a,a*hh<CR><LF>

- *UTC of position fix*
- *Status: A=Data valid, V=Navigation receiver warning*
- *Latitude, N/S*
- *Longitude, E/W*
- *Speed over ground, knots*
- *Course over ground*
- *Date: ddmmyy*
- *Magnetic variation, degrees E/W*
- *Mode indicator*



MCU connector panel

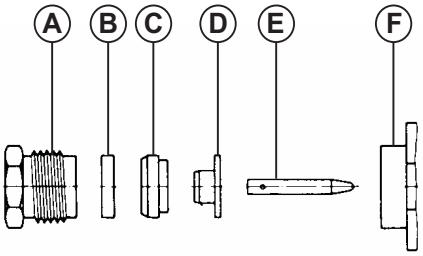
External NMEA is activated from the Nera ISDN Handset:

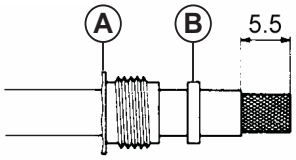


Mounting connector type 11N-50-3-54 (for cable RG223/U)

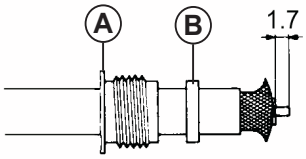
Tools and materials required:

- Stanley blade
- Scissors
- Solder Sn/Pb 60/40 activated rosin flux
- Spanner
  - 7 mm (74 Z-0-0-38)
  - 8 mm (74 Z-0-0-16)
  - 13 mm (74 Z-0-0-37)

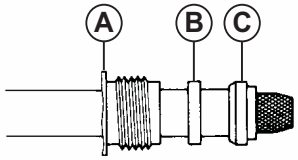




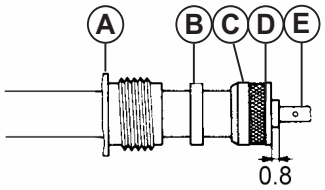
Slide **nut A and gasket B** onto cable.
Prepare cable according to diagram.
Caution: Do not damage braid.



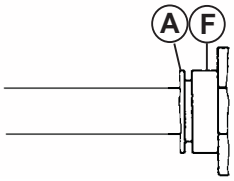
Push braid back and widen it slightly, but do not comb it out. Cut off dielectric 1.7 mm perpendicular to cable axis.



Taper braid towards center conductor.
Position braid **clamp C** so that its shoulder fits against cable sheath.



Fold back braid over **clamp C** and trim overlapping braid.
Slide **clamp D** underneath the braid.
Check dimension of 0.8 mm.
Heat inner **contact E** using a soldering iron (approx. 40 W) and flow small amount of tin into bore. Push cable inner conductor into bore, immediately remove soldering iron to prevent melting of the dielectric.

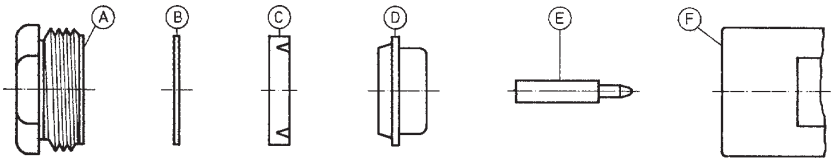


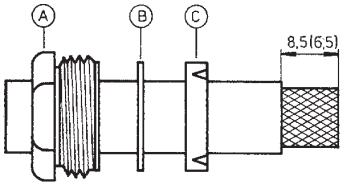
Push prepared cable into **connector body F** and tighten **nut A**.
Do not rotate cable in connector body.

Mounting connector type 11N-50-7-5 (for cables RG214/Ethernet 06230)

Tools and materials required:

- Stanley blade
- Scissors

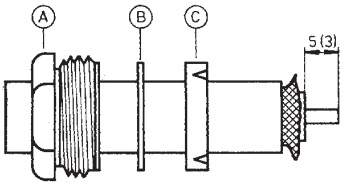




Slide **nut A, washer B and gasket C** onto cable. Remove 8.5 mm (6.5 mm for angle plugs) of jacket without damaging the braid.

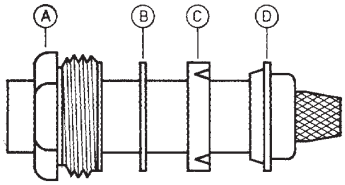
Cables with double braid: Remove 9 mm (7 mm for angle plugs) of jacket.

Armoured cables: Slide two-piece armour clamp onto cable, instead of nut A. Remove 29 mm (27 mm for angle plugs) of armour.

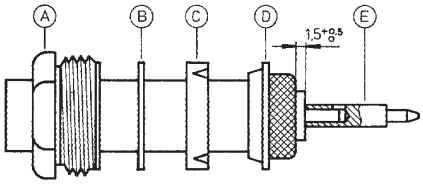


Push braid back and widen it slightly, but do not comb it out. Cut off dielectric 5 mm (3 mm for angle plugs) from end, even and perpendicular to cable axis.

Caution: Do not damage centre conductor.

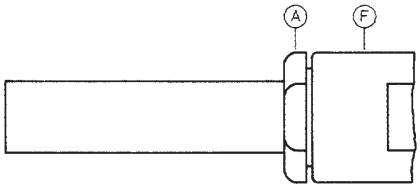


Taper braid towards centre conductor. Position **clamp D** so that its shoulder fits against cable jacket.



Fold back braid over **clamp D** and cut it off in front of the clamp rim. Check dimension of 1.5 mm. Tin centre conductor of cable.

Heat contact pin or bush E with a soldering iron of approx. 250 W. Tin bore hole sufficiently. Insert centre conductor into hole and remove soldering iron quickly in order to prevent dielectric from deformation.



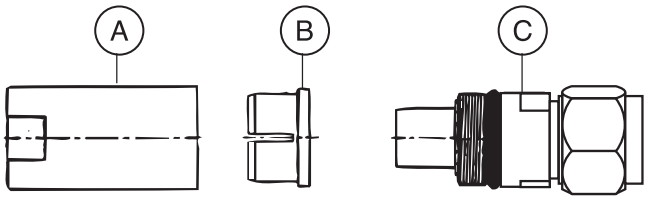
Insert connector body. Screw in and tighten **nut A** with wrenches of 16 mm, type 74Z 0-0-3, until rubber **gasket C** is split. Do not distort cable and connector body.

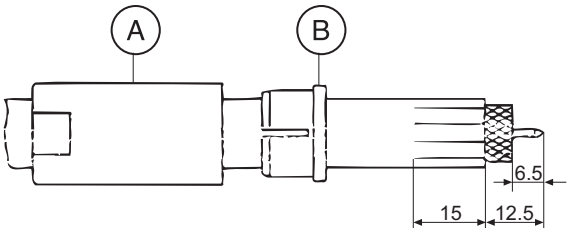
Armoured cable: Finally, screw on and tighten armour clamp.

Mounting connector type 11N-50-10-4 (for cable S10172 B-11)

Tools and materials required:

- Stanley blade
- File
- Spanners (18, 20, 22 mm)
- Sand paper (300 or 400)
- Scissors





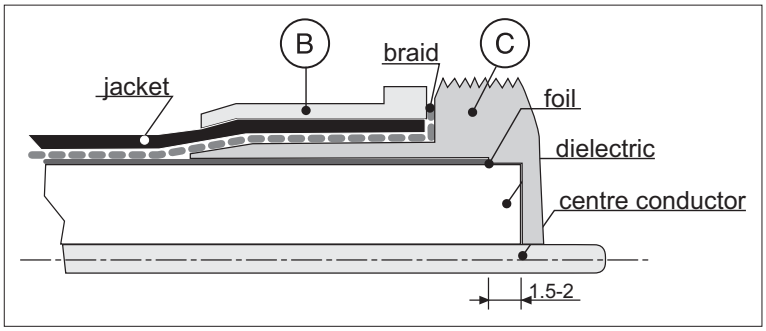
Slide **body A** and **ring B** over cable.

Prepare **cable** according to figure. *CAUTION: Do not damage **braid**.*

Trim edge of **centre conductor** with file.

Cut **jacket** 6-8 times lengthwise 15 mm. *CAREFUL: Do not damage **braid**.*

IMPORTANT: Clean **centre conductor** with sand paper. All dielectric remainders must be removed.



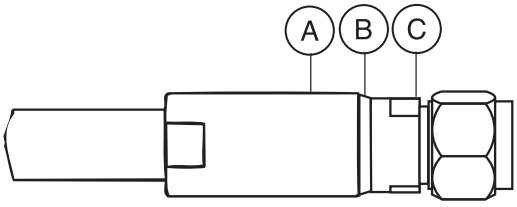
Open **jacket** CAREFULLY and push **sleeve of body C** *between* **foil** and **braid**.

Slide **clamp ring B** to **sleeve C**. Observe the distance 1.5-2 mm.

Cut **braid** along **sleeve C.**

Cut **jacket** lengthwise 6-8 times.

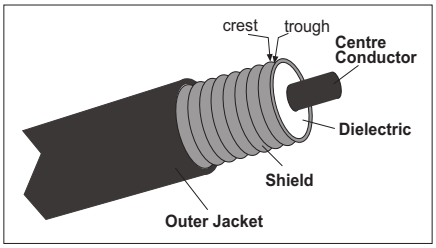
Cut off protruding foil to front of **sleeve C**.

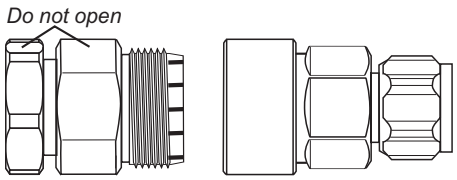


Push **body A** over **clamp ring B**.

Screw **body D** onto **body A** and tighten with spanner. Torque 19 Nm.

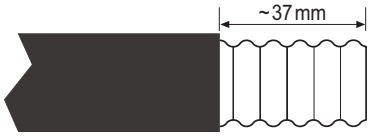
Mounting connector type 11N-50-12-10 (for cable RF 1/2" 50)





Tools and materials required:

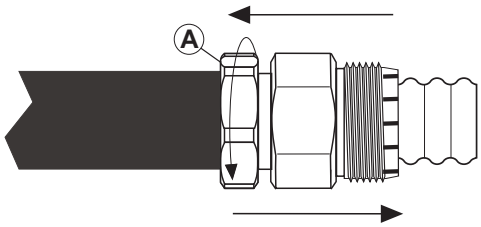
- Spanners, 22 mm and 24 mm
- Metal saw
- Knife
- Screwdriver
- Measure
- Abrasive paper
- File



Correctly prepared cable

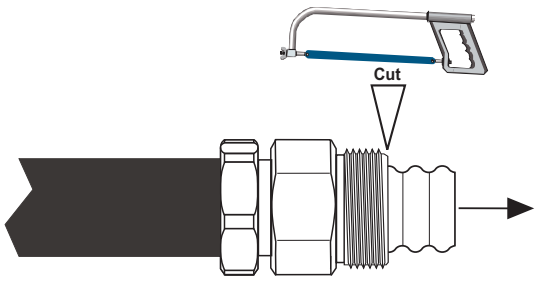
Preparing the cable

- Cut the **Cable** in a trough perpendicularly to the cable axis.
- Remove approx. 37 mm of **Outer Jacket**. *IMPORTANT: Do not damage shield.*



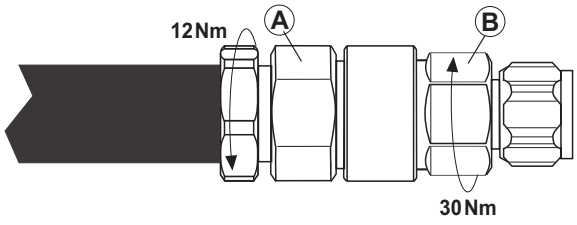
Mounting the connector

- Slide the **Cable Entry (A)** over the cable into the **third trough** in the corrugation. (See figure.)
- Pull the Cable Entry as far as the stop.
- Tighten the back ring of the cable entry manually.
- Verify the correct position of the Cable Entry; if necessary pull forward as far as the stop.



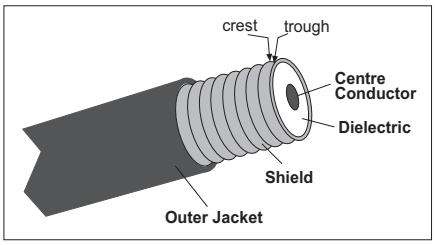
- Saw off the cable carefully along the cable entry as indicated. *Do not damage the centre conductor*
- Chamfer the centre conductor
- Clean the centre conductor carefully with abrasive paper

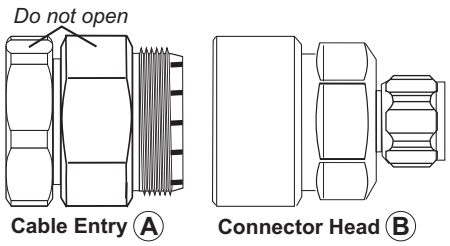
- Using the screwdriver, press the dielectric away from the outer conductor tube to ensure good contact when entering the connector head.
- Screw the **Cable Entry (A)** and **Connector Head (B)** tightly together with a torque of approx. 30 Nm.
- Tighten the back nut of the **Cable Entry (A)** with a torque of approx. 12 Nm.



Note! If exposed to extreme environmental conditions, especially icy conditions, the connector pair should be completely covered with a cold shrink tube (e.g. SUHNER 74 Z-0-0337 or selfvulcanizing tape for added protection.

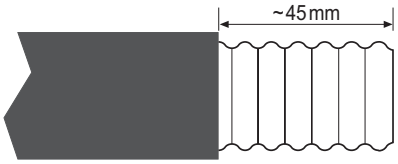
Mounting connector type 11N-50-23-10 (for cable RF 7/8" 50)





Tools and materials required:

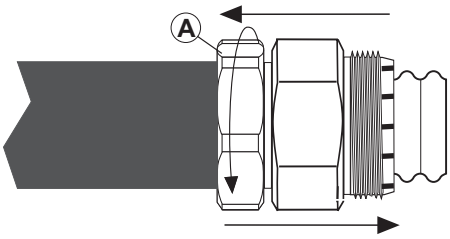
- Spanners, 30 mm and 36 mm
- Metal saw
- Knife
- Countersink
- Screwdriver
- Measure
- Wire brush



Correctly prepared cable

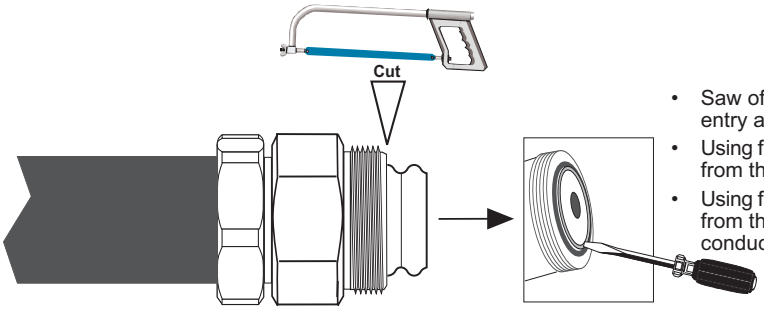
Preparing the cable

- Cut the **Cable** in a trough perpendicularly to the cable axis.
- Remove approx. 45 mm of **Outer Jacket**. *IMPORTANT: Do not damage shield.*

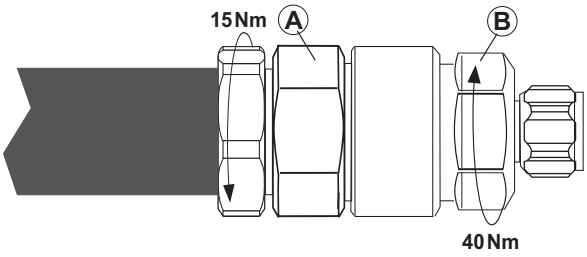


Mounting the connector

- Slide the **Cable Entry (A)** over the cable into the **second trough** in the corrugation. (See figure.)
- Pull the Cable Entry forward as far as the stop.
- Tighten the back ring of the cable entry manually.
- Verify the correct position of the Cable Entry; if necessary pull forward as far as the stop.

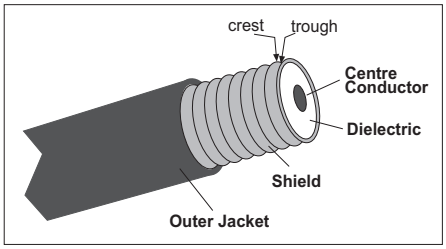


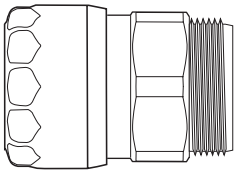
- Saw off the cable flush with the cable entry as indicated.
- Using f.ex. a screwdriver, remove burrs from the centre conductor.
- Using f.ex. a screwdriver, remove burrs from the the dielectric and the outer conductor.
- Using the screwdriver, press the dielectric away from the outer conductor tube to ensure good contact when entering the connector head.
- Screw the **Cable Entry (A)** and **Connector Head (B)** tightly together with a torque of approx. 40 Nm.
- Tighten the back nut of the **Cable Entry (A)** with a torque of approx. 15 Nm.



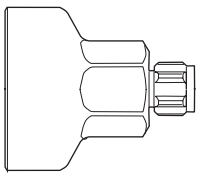
Note! If exposed to extreme environmental conditions, especially icy conditions, the connector pair should be completely covered with a cold shrink tube (e.g. SUHNER 74 Z-0-0338 or selfvulcanizing tape for added protection.

Mounting connector type 11N-50-32-2/11N-50-42-2 (for cables RF 1 1/4"/15/8" 50)





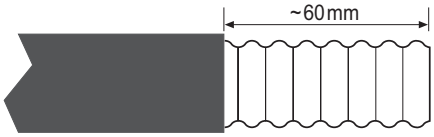
Cable Entry (A)



Connector Head (B)

Tools and materials required:

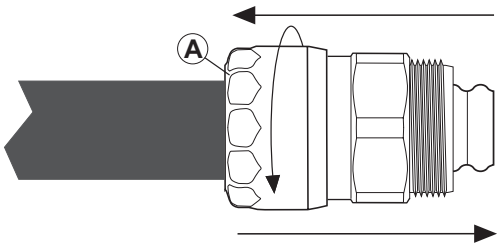
- Metal saw
- Knife
- Stanley blade
- Countersink
- Monkey wrenches (2)
- Screwdriver
- Wire brush
- Measure



Correctly prepared cable

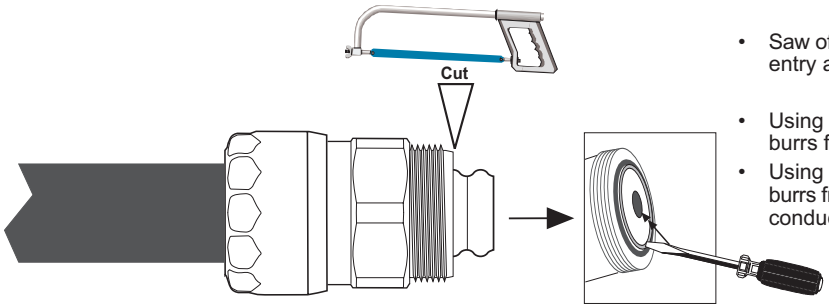
Preparing the cable

- Cut the **Cable** in a trough perpendicularly to the cable axis.
- Remove approx. 60 mm of **Outer Jacket**. *IMPORTANT: Do not damage shield.*

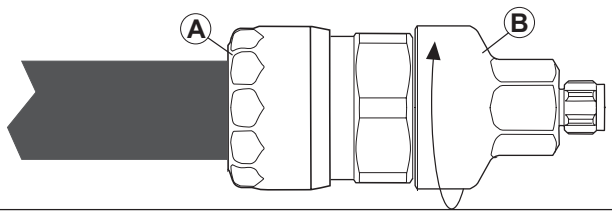


Mounting the connector

- Slide the **Cable Entry (A)** over the cable into the **second trough** in the corrugation. (See figure.) To verify the correct position of the Cable Entry, pull the cable entry as far as the stop.
- Tighten the back ring of the cable entry manually until the cable entry is fixed on the cable.



- Saw off the cable flush with the cable entry as indicated.
- Using f.ex. a screwdriver, remove burrs from the centre conductor.
- Using f.ex. a screwdriver, remove burrs from the dielectric and the outer conductor.



- Using the screwdriver, press the dielectric away from the outer conductor tube to ensure good contact when entering the connector head.
- Screw the **Cable Entry (A)** and **Connector Head (B)** tightly together with a torque of approx. 60 Nm.

  IMPORTANT! Only the connector head should be rotated.

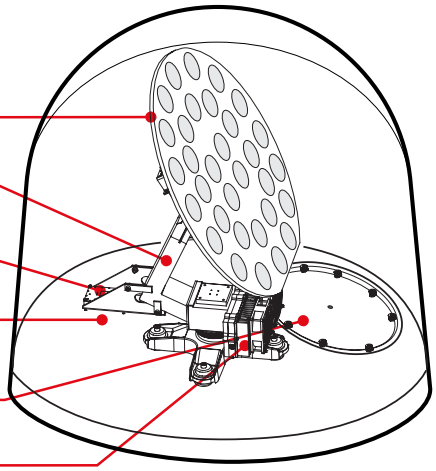
Note! If exposed to extreme environmental conditions, especially icy conditions, the connector pair should be completely covered with a cold shrink tube (e.g. SUHNER 73 Z-0-0339 or selfvulcanizing tape for added protection.

Main items

The list may be changed without notice.

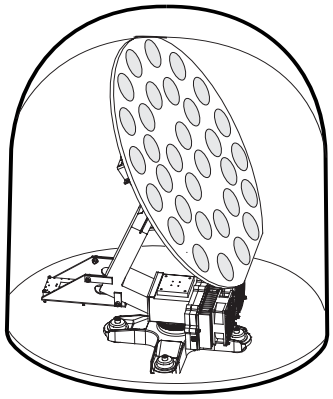
Above Deck Unit, QUFF911911

Mast mounted radome
(cutaway view)



Above Deck Unit, 101993

Deck mounted radome
(cutaway view)



Below Deck Equipment w/accessories,
- QUFC911964 w/AC power unit
- 105568 w/DC power unit

Main Communication Unit (MCU) w/AC power unit	100141
AC mains cable for F77 MCU	101818
Main Communication Unit (MCU) w/DC power unit	105660
DC input cable for F77 MCU	102528
Distress Alarm Unit	101154
Cable for DA, 4 x 0.22, 10 m	
Nera ISDN Handset incl. cable	101654
Radiation hazard warning sign	R906527/1
Coax cable RG-214-FRNC (40m)	102052
N-plug for coaxial cable GR-214 (2pcs)	11N-50-7-5
RS232 cable, 9-pin M to 9-pin F (3m)	R906686
Nera F77 Installation Manual	101442
Nera F77 Installation Check List	101443
Nera F77 User Manual (incl. CD)	101444
Nera F77 Brief Operating Instruction	101445

Main items cont`d

Nera F77 Telephone Distress Call	101446
Activation Inst.Marine	QLZT911009
Registration and Warranty Certificate	100175
F77 BDE grounding/mounting kit	101987

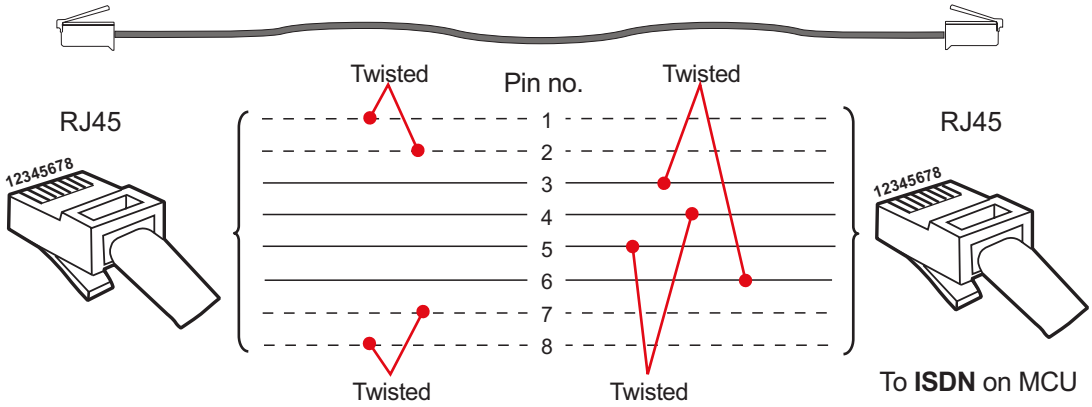
Nera F77 spare parts (service kit)

Rotary Joint incl. top cover	101746
Tracking Module	101854
Combined LNA incl. 4 matched coaxial cables	105581
Cable for gearbox (grey cable)	101767
Cable from controller to Buffer & TX Notch Unit	101768
Cable between LNA/buffer and TX Notch Filter	101771
TX Coaxial Cable, RG-58 (1.2m)	101772
Microswitch	101779
Jumper Cable RG-223/U (from Rotary Joint to ADE coax contact)	101775
Tilt Sensor and Rate Sensor Unit	101969
Belt (black) for step motors (Z=151)	100776
GPS Antenna Assembly	100545
RF Transceiver	QUFC911965
Fan for Transceiver	100891
F77 AC Power Supply Unit complete (110/220V AC to 48V DC)	100149
F77 DC Power Supply Unit complete (20-32V DC to 48V DC)	104259
MUB board incl. base plate bracket	102195
ISDN / Analogue Terminal Adapter incl. base plate	102196
Strap for F77 FAR Radome Installation & Service (lifter)	102188
Fuse 5x20 (5A slow)	NGH24104/5
Fuse 6.3x32 (16A slow)	105535
Screw M3.5 x 9.5 cylinder head, selftapping, torx, A4	QSBF121035-0095
Screw M3.5 x 9.5 CNTRS, torx, A4	QSBF128035-0095
Nera ISDN Handset	101654
Various screws for Nera F77 ADE	102197

Cable pinouts

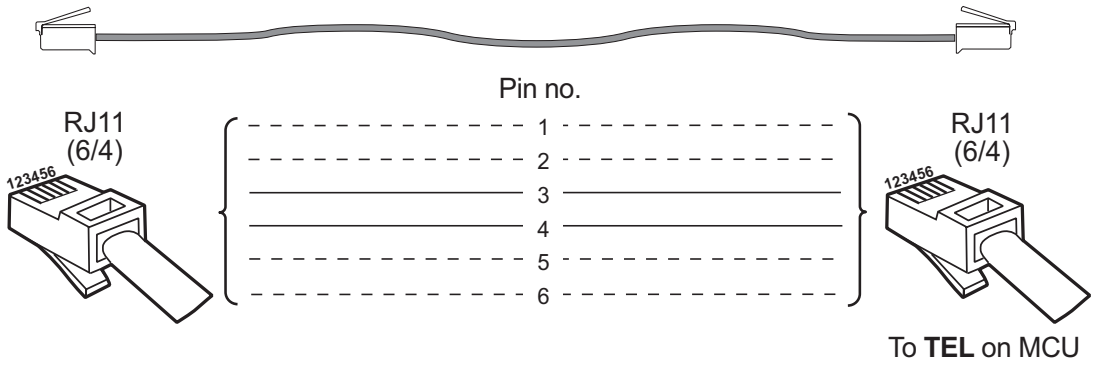
ISDN cable

QRPM 911 111-3000 (3 m) -10000 (10 m)



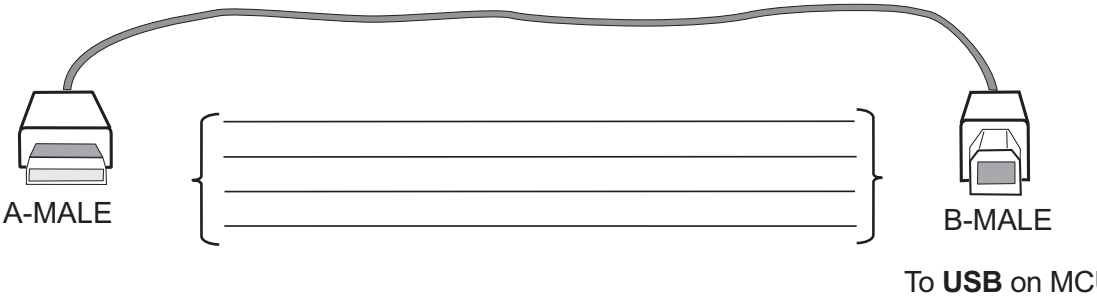
Analogue telephone cable

QRPM 911033-2000 (2 m)



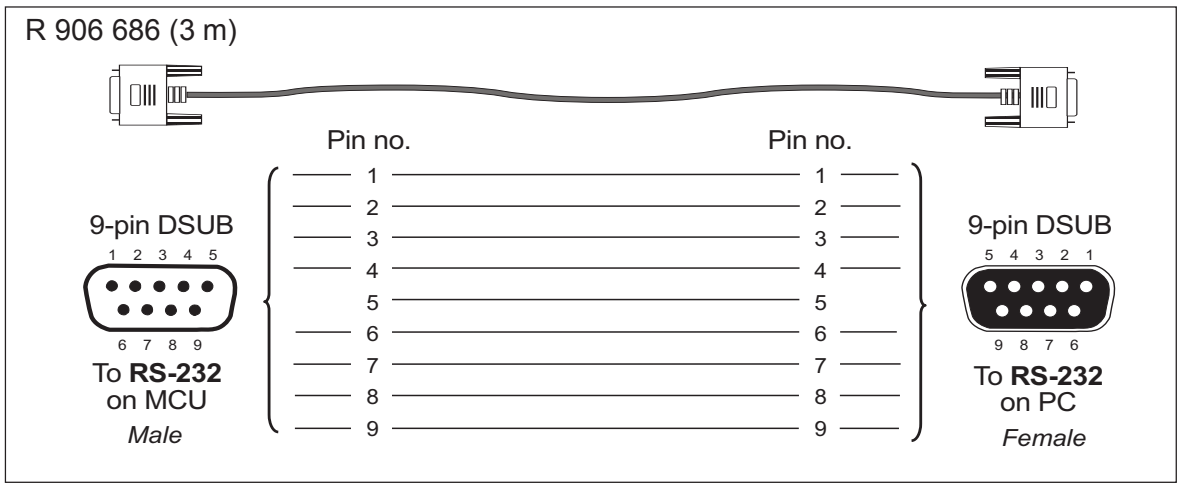
USB cable

100001 (3 m)

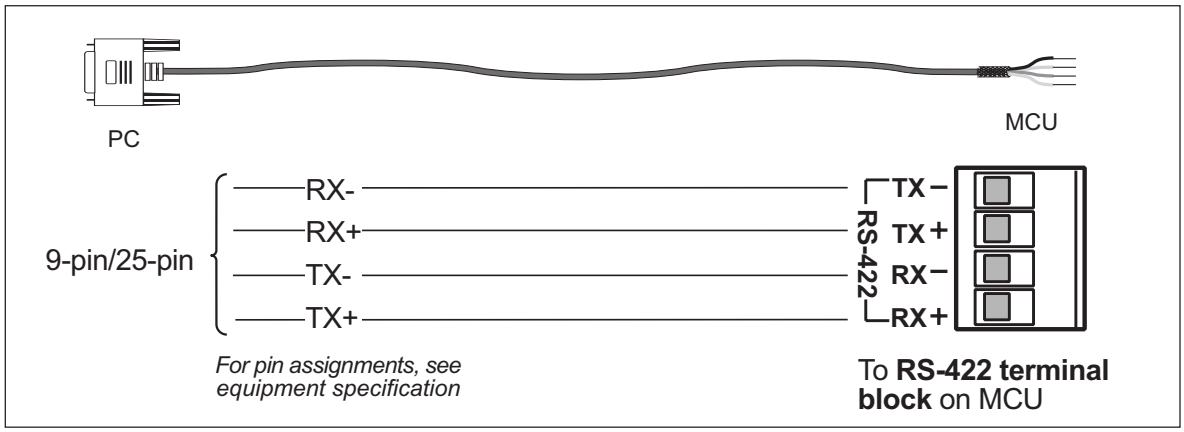


Cable pinouts cont'd

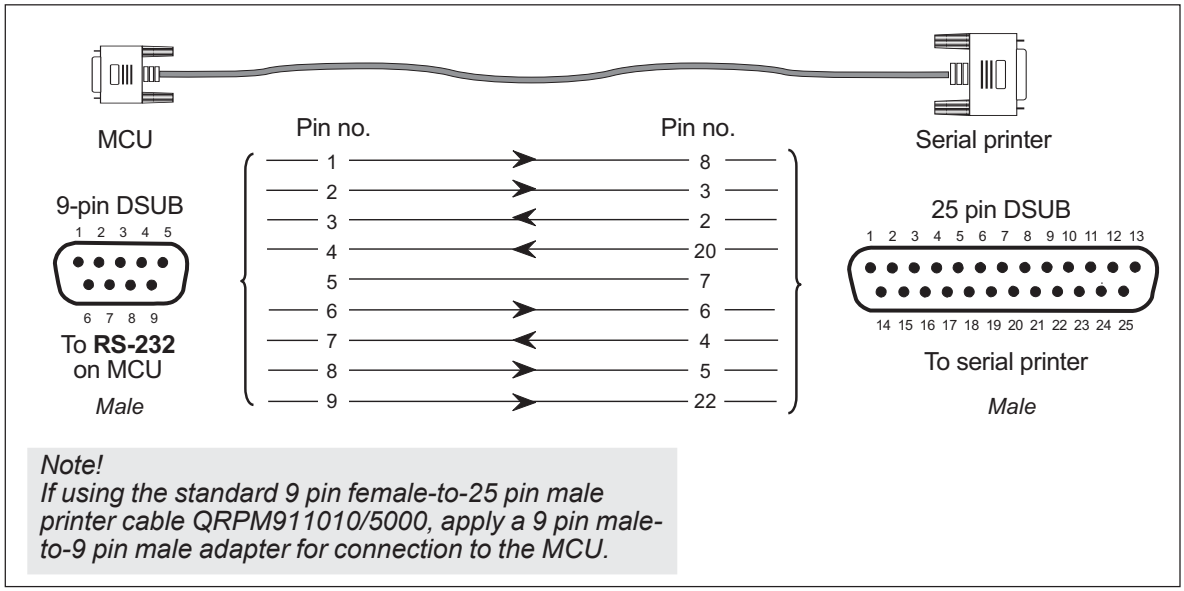
9-pin to 9-pin RS-232 cable



RS-422 cable



9-pin to 25-pin printer cable

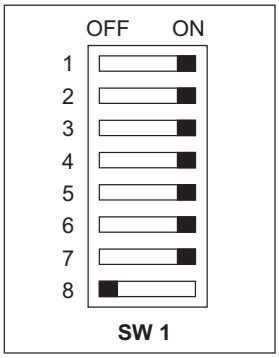


Note!
If using the standard 9 pin female-to-25 pin male printer cable QRPM911010/5000, apply a 9 pin male-to-9 pin male adapter for connection to the MCU.

Serial printer settings

Switch bank 1

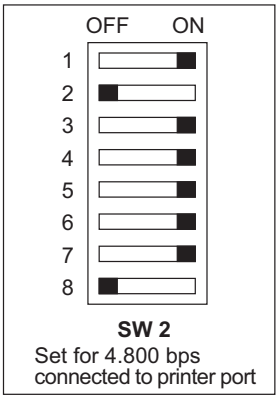
Switch no.	OFF	ON	FUNCTION
1	Even	Odd *	Parity
2	With	No *	Parity
3	7	8 *	Databits
4	X-on/X-off	Ready/Busy *	Protocol
5	Monitor	Circuit *	Test Select
6	Test	Print *	Mode Select
7		ON *	Busy line RTS (-9V) pin 4
8	Off *		



* Correct setting

Switch bank 2

Switch no.	OFF	ON	FUNCTION
1		ON *	Baud rate 4.800
2	Off *		
3		ON *	
4	Invalid	Valid *	DSR I/P signal
5	512 Bytes	32 Bytes *	Buffer Threshold
6	1 sec.	200 ms *	Min. Busy Time
7	High when selected	High at Power on *	DTR Signal
8	*		Not Used



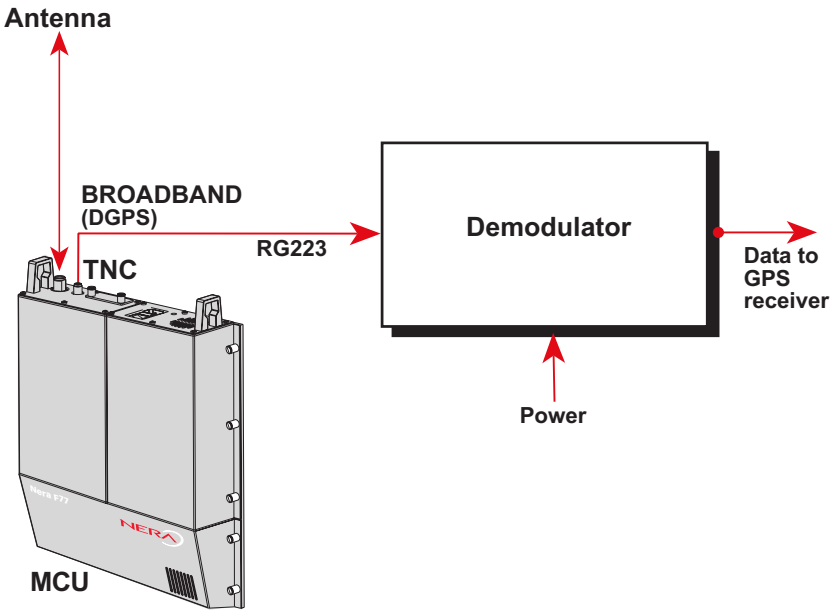
Reception of L-band Broadcast signals

In addition to regular 1.5/1.6 GHz, used for the various Inmarsat systems, the transponders in the satellite also broadcast leased channel info.

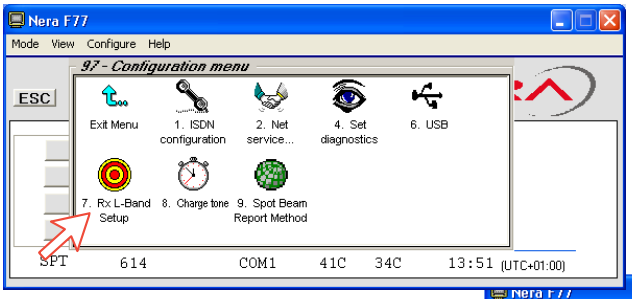
The design of Nera F77 with L-band (1.5/1.6 GHz) signals between ADE and BDE, easily enable insertion of an Inmarsat Demodulator to pick up broadcast RF signals via the **BROADBAND (DGPS)** TNC connector.

Such signals are Differential GPS (GPS corrections), Maritime Chart Corrections, Radio Broadcasting channels, etc.

The diagram below indicates a typical installation for reception of broadcast signals.

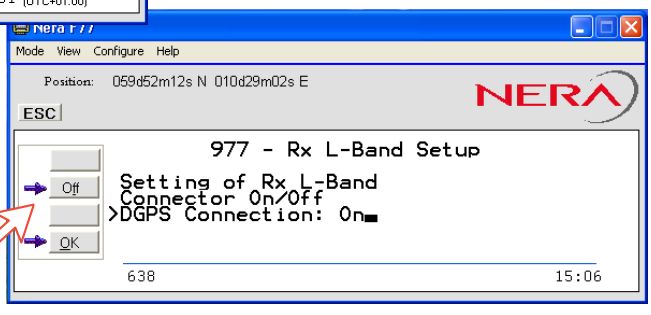


Enabling L-band signal output:



- *Open the **Configuration menu** in the **vtLite Mobile** program.*
- *For installation and operation of vtLite Mobile, see the **User Manual**.*
- *Click **Rx L-Band Setup**.*

*The **Rx L-Band Setup** window allows the **Broadband (DGPS)** output to be switched **On/Off**, as required.*



Activation of "Radio Silence"

A “Radio Silence” function may be activated in the Nera F77 terminal.

The function may be opened from the vtLite Mobile program, via the **Function menu** > **Advanced functions** > **Customize** > **Paid functions**. *See the **User Manual**.*

The “Radio Silence” is specially applicable onboard warships on which, in certain periods, it is required that no radiation shall take place.

The "Radio Silence" function will not affect the satellite tracking.

In addition to opening the “Radio Silence” function an external switch must be installed wired across the **SW** pins of the **SILENCE** connectors.
The **IND** pins of the **SILENCE** connectors may be used for external indication of "Radio Silence".
See below.

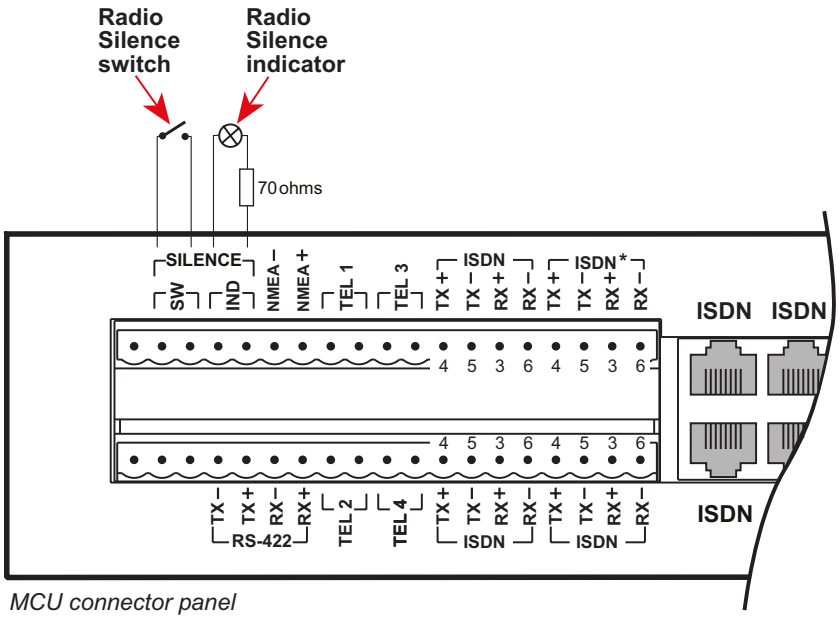
Radio Silence mode

When the “Radio Silence” function is active, and the switch is OPEN (no contact between the **SW** pins of the **SILENCE** connectors) the equipment is inhibited to send, even Distress.

Shortly after the switch is OPENED, an internal relay will flash the "Radio Silence" indicator 3 times followed by steady ON, until the "Radio Silence" switch again is closed.

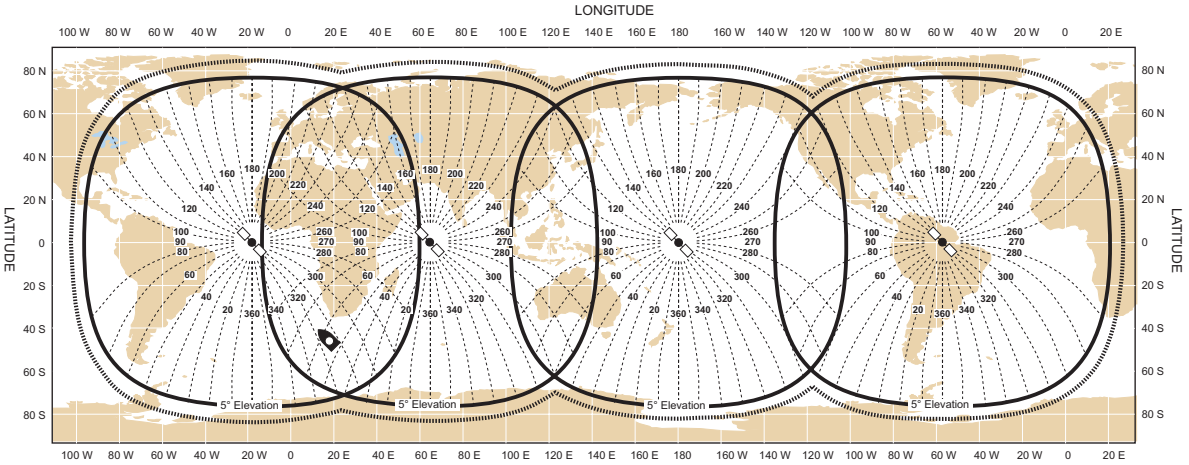
Normal Operation Mode

When the MCU is opened for “Radio Silence” function with the switch CLOSED, (shortcircuit between the **SW** pins of the **SILENCE** connectors) Nera F77 operates as normal.



MCU connector panel

Azimuth Angle Map



Atlantic Ocean East Region AOR–E | Indian Ocean Region IOR | Pacific Ocean Region POR | Atlantic Ocean West Region AOR–W

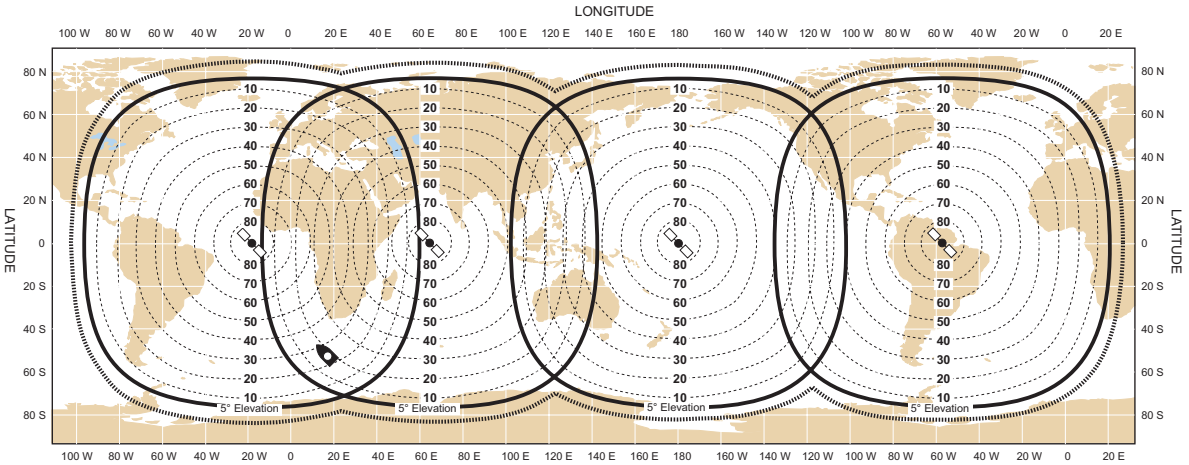
Example:

Azimuth angle for the plotted position

315° for the AOR-E satellite
55° for the IOR satellite

Be careful not to read the wrong angle in areas where two satellites overlap.

Elevation Angle Map



Atlantic Ocean East Region AOR–E | Indian Ocean Region IOR | Pacific Ocean Region POR | Atlantic Ocean West Region AOR–W

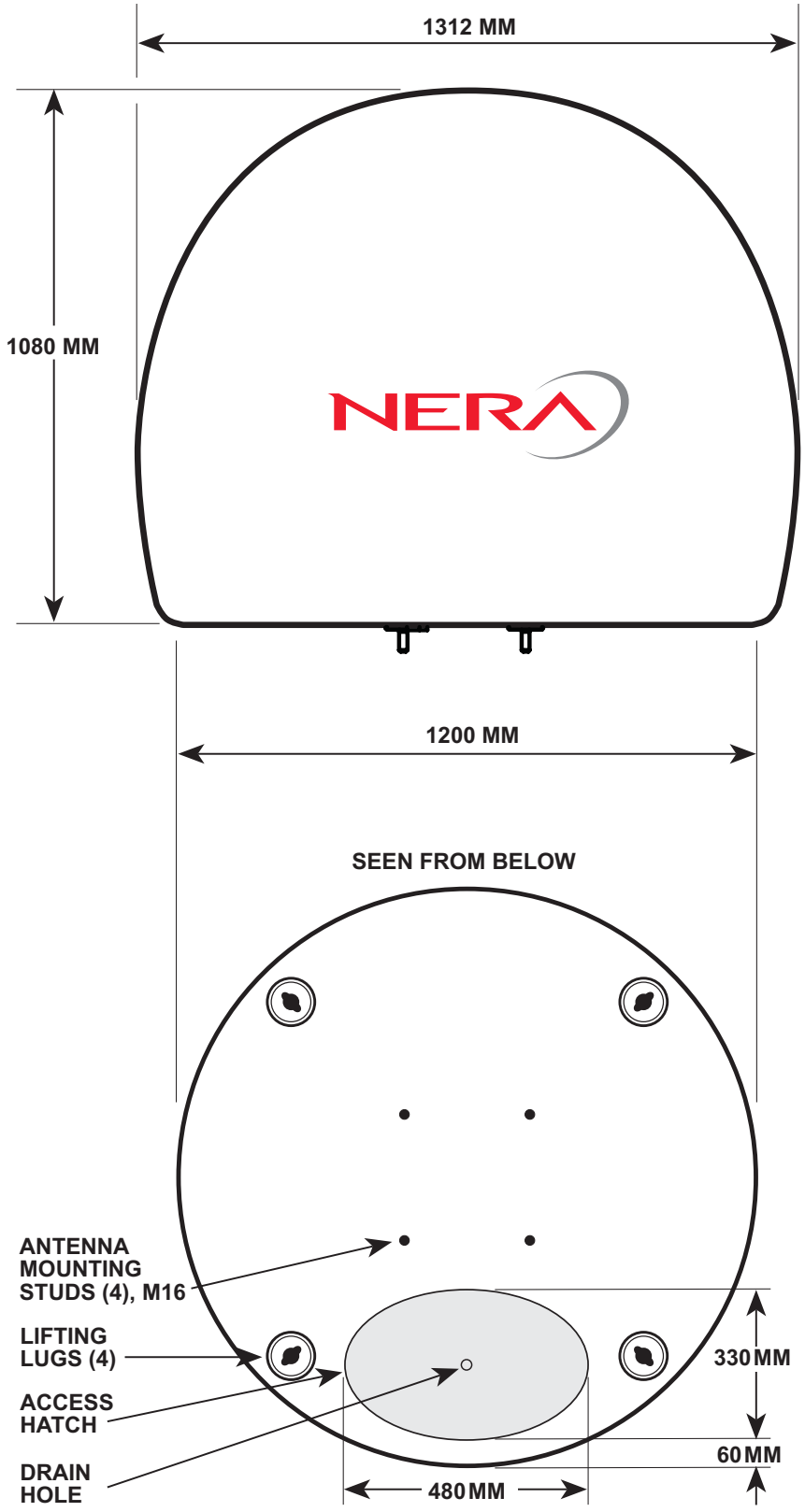
Example:

Elevation angle for the plotted position

24° for the AOR-E satellite
17° for the IOR satellite

Be careful not to read the wrong angle in areas where two satellites overlap.

Previous type radome



Weight: 72 kg

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