

# FURUNO

## INSTALLATION MANUAL

**INMARSAT FLEET F33  
SHIP EARTH STATION**

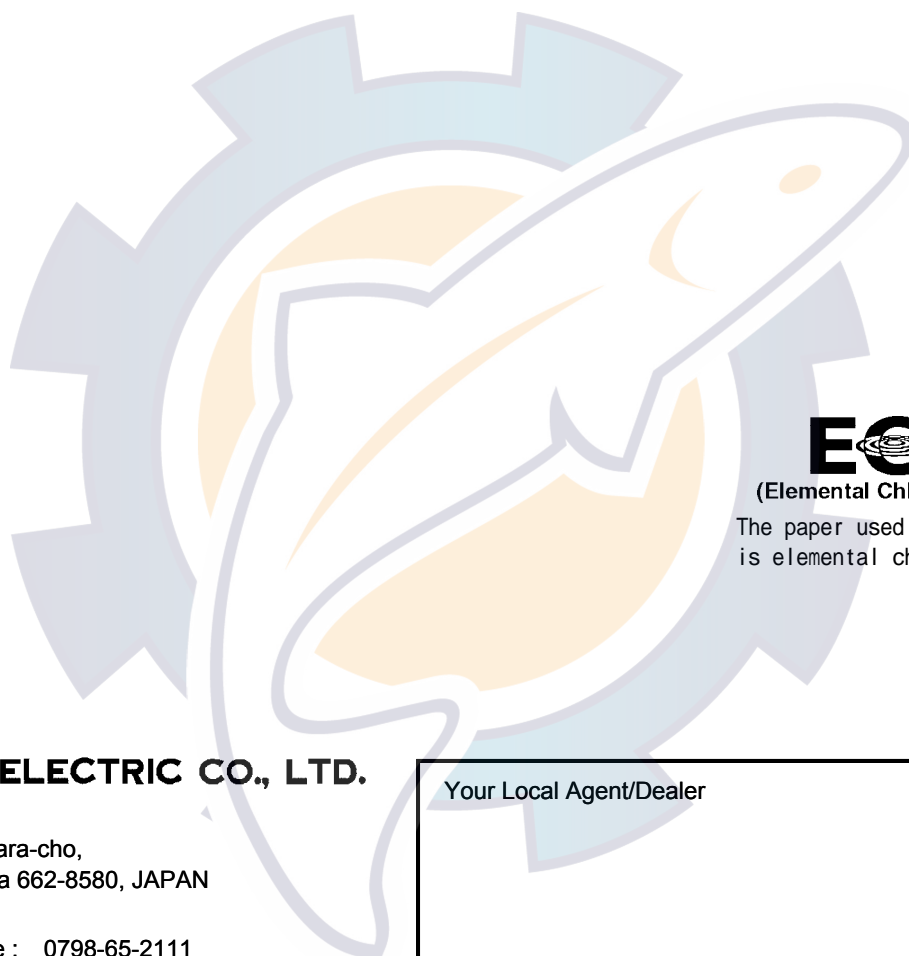
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**MODEL FELCOM 30**

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**FURUNO ELECTRIC CO., LTD.**  
NISHINOMIYA, JAPAN



**ECF**

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\*IME56470B00\*



# SAFETY INSTRUCTIONS



## WARNING



**Do not open the equipment unless totally familiar with electrical circuits and service manual.**

### ELECTRICAL SHOCK HAZARD

Only qualified personnel should work inside the equipment.



**Do not approach the radome closer than 1 m when it is transmitting.**

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

RF power density on antenna aperture	distance
100W/m <sup>2</sup>	0.35 m
25W/m <sup>2</sup>	0.65 m
10W/m <sup>2</sup>	1.00 m



**Turn off the power at the mains switchboard before beginning the installation. Post a sign near the switch to indicate it should not be turned on while the equipment is being installed.**

Fire, electrical shock or serious injury can result if the power is left on or is applied while the equipment is being installed.



## WARNING



**Ground the equipment to prevent electrical shock and mutual interference.**

**Confirm that the power supply voltage is compatible with the voltage rating of the equipment.**

Connection to the wrong power supply can cause fire or damage the equipment.

**Keep the following compass safe distances.**

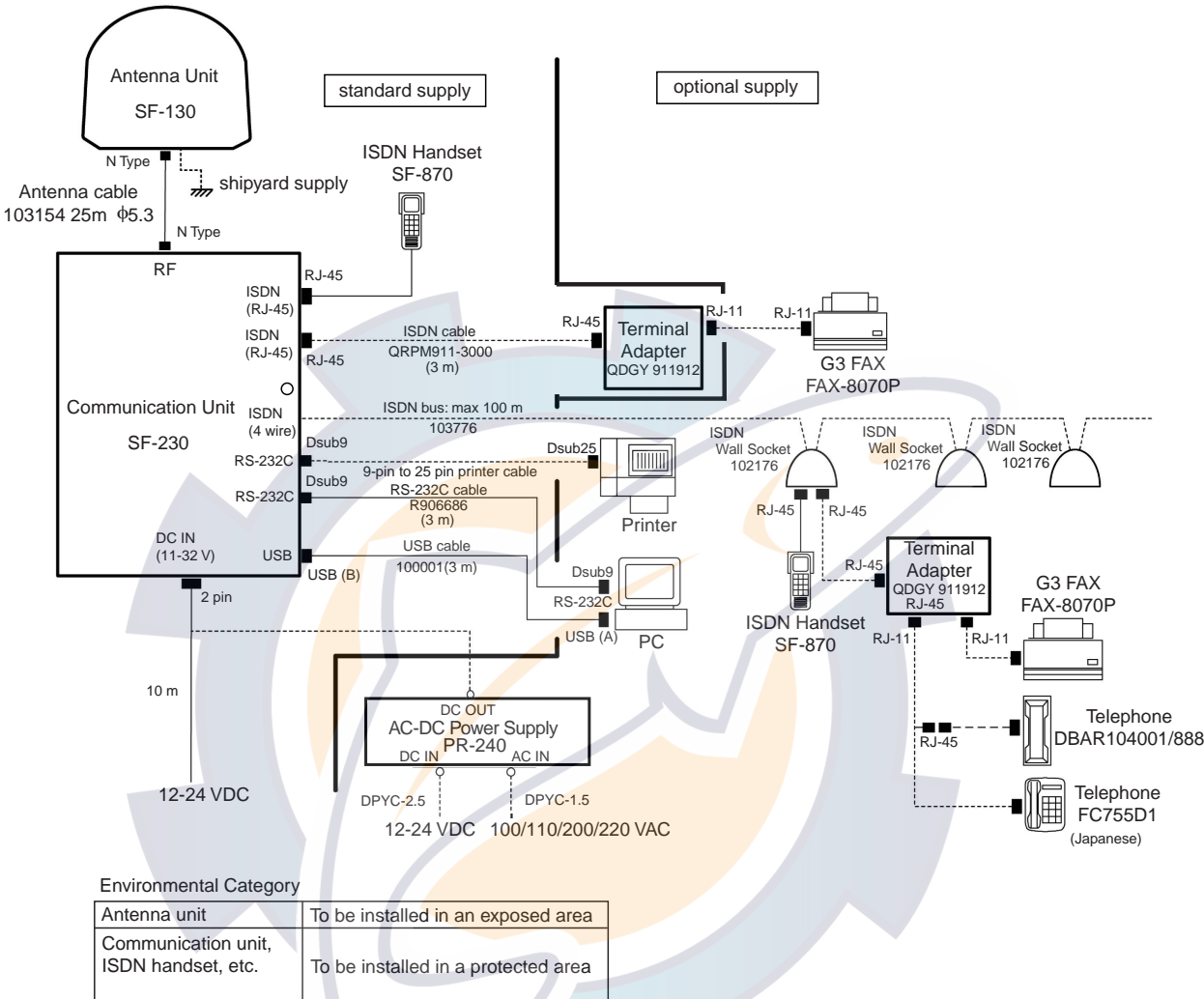
	Standard	Steering
Antenna Unit	0.75 m	0.45 m
Communication Unit	0.30 m	0.30 m
ISDN Handset	0.30 m	0.30 m
Facsimile	1.00 m	0.65 m
Telephone	1.30 m	0.80 m

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# SYSTEM CONFIGURATION



# EQUIPMENT LISTS

## Standard Supply

Name	Type	Code No.	Qty	Remarks
Antenna Unit	SF-130	—	1	w/cable 103154 (25 m)
Communication Unit	SF-230	—	1	
ISDN Handset	SF-870	—	1	
Terminal Adapter	QDGY911912	000-147-698	1	
Installation Materials*	CP16-03200	000-150-697	1	
	CP16-03210	000-043-445	1	
Accessories	FP16-03000	000-043-466	1	CD-ROM for communication unit

\*: See lists at the back of this manual.

## Optional Supply

Name	Type	Code No.	Qty	Remarks
Facsimile	FAX-8070P	000-043-443	1 set	For CE type, w/CP16-02601
	FAX-2850	000-043-438		w/CP16-02601
	MFC-4800J	000-043-439		Japanese version
Drum Unit	DR-10J	000-146-598	1	For above facsimile
Toner Cartridge	TN-10J	000-146-599	1	For above facsimile
Telephone	FC755D1	000-433-690	1 set	w/CP16-00511, 00512
Antenna Cover	QB05-1801	100-079-480	1	
Modular Jack Box	OP16-10	000-043-278	1	Box type
	OP16-11	000-043-279	1	Flush mount type
Modular Jack Set	OP16-13	000-043-228	1	
2-pair cable	CO-SPEVV-SB-C 0.2x2P	000-120-792	1	For ISDN connection, 10 m
		000-120-794		For ISDN connection, 20 m
		000-120-214		For ISDN connection, 30 m
		000-132-827		For ISDN connection, 40 m
		000-132-826		For ISDN connection, 50 m
1-pair cable	CO-SPEVV-SB-C 0.2x1P	000-110-681	1	For analog telephone, 10 m
		000-138-789		For analog telephone, 20 m
		000-138-790		For analog telephone, 30 m
		000-138-791		For analog telephone, 40 m
		000-138-792		For analog telephone, 50 m
Serial Printer	ML280S	000-150-443	1	

Optional supply (con't)

Name	Type	Code No.	Qty	Remarks
Transformer	0P16-25	004-446-850	1	Transformer E-300+cable 100VAC→220VAC (300VA) For FAX-2850 or FAX-8070P
Analog Telephone	DBR104001/888	000-147-693	1	
Terminal Adapter	QDGY911912	000-147-698	1	
ISDN Wall Socket	102176	000-147-699	1	
ISDN Handset	SF-870	000-043-252	1	
Incoming Indicator	KK-893-3977	000-148-478	1	For analog telephone line
Transformer	SD-221	000-139-903	1	For Facsimile MFC-4800J
Signal Cable	S16-4-15	004-446-970	1	Cable 103776
Antenna Cable	105052	000-150-706	1	50 m
Antenna Cable	QTZC502012	000-150-708	1	140 m
AC/DC Power	PR-240-CE	000-053-373	1	
Cable (LAN)	FR-FTPC-CY *10m*	000-147-472	1	10 m
Cable (LAN)	FR-FTPC-CY *20m*	000-147-473	1	20 m
Cable (LAN)	FR-FTPC-CY *30m*	000-147-474	1	30 m
ISDN Cable (3m)	QRRM911111-3000	000-150-709	1	
ISDN Cable (10m)	QRRM911111-10000	000-015-711	1	

# 1. PLANNING

## 1.1 Placing the Antenna Unit

### General

Interfering objects (especially metallic objects such as masts) near the antenna can, in the worst case, prevent reception or transmission. Further, RF radiation from the antenna will affect the human body. Keep these and the following guidelines in mind when selecting a mounting location for the antenna unit.

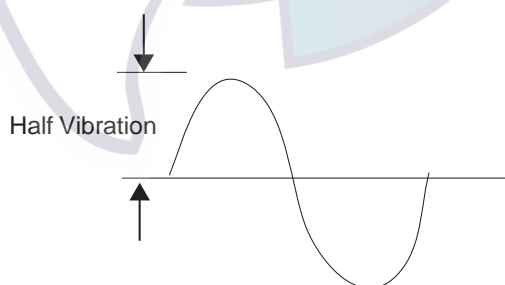
### Secure unobstructed path in all directions

The ideal mounting location secures an unobstructed path between the antenna unit and the satellites, from horizontal to zenith. In other words, whatever the direction the antenna unit is pointing there are no interfering objects within the main beam (16°). While this might be feasible on some vessels, on others it is impossible due to space considerations. The antenna unit should be located at least 3 meters away from masts having a diameter less than 15 centimeters.

### Select a location low in vibration

The maximum permissible vibration amplitude in three axis direction should be as shown in the table below. Consult with the shipyard to determine the mounting location which meets the requirements shown in the table.

Freq. Range	Max. Amplitude
4 to 10 Hz	2.54 mm (max. 9.8 m/s <sup>2</sup> )
10 to 15 Hz	0.76 mm (max. 6.86 m/s <sup>2</sup> )
15 to 25 Hz	0.40 mm (max. 9.8 m/s <sup>2</sup> )
25 to 33 Hz	0.23 mm (max. 9.8 m/s <sup>2</sup> )

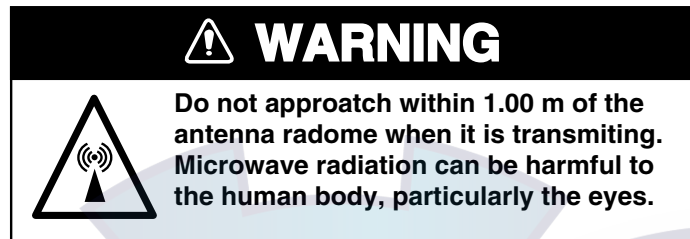




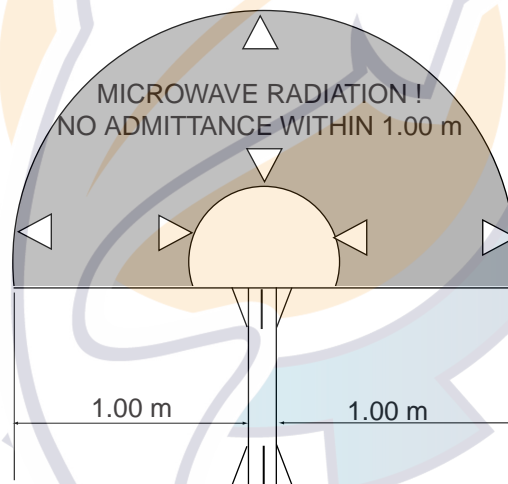
**Locate away from passengers and crew**

Radio waves can be harmful to the human body. Since safe distances vary by country and ship construction there is no uniform formula for calculating safe distance. However, below are general guidelines.

- Personnel should not approach an area in which the radiation level is higher than  $10 \text{ W/m}^2$ , i.e., within 1.00 m from the radome surface.



- Construct a protection fence around the antenna unit so that personnel can not approach the antenna unit within 1.00 m. Also, to alert personnel not to approach the antenna unit, attach the caution labels (supplied as installation materials) to any bulkhead which is at the position of 1.00 m from the antenna unit.



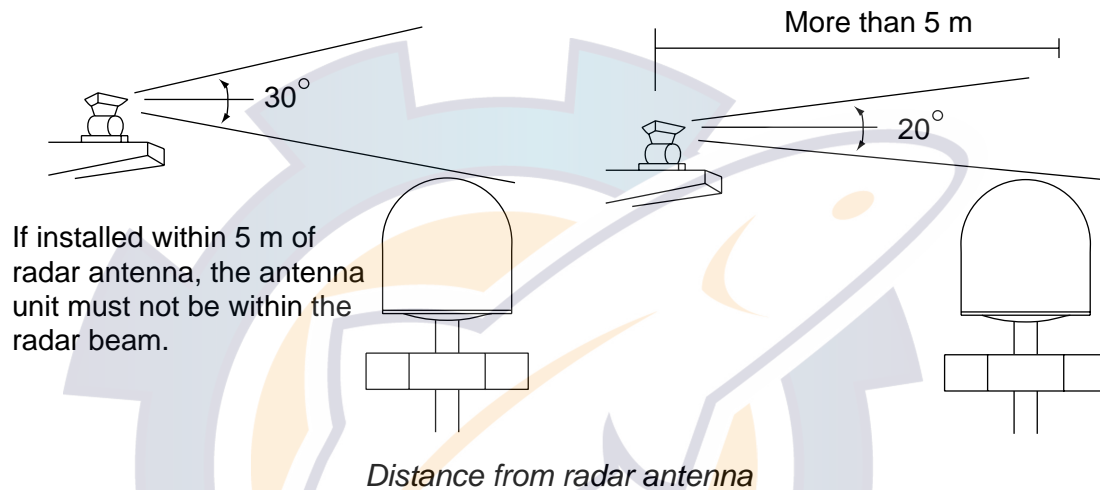
### **Minimum distance from other antennas**

#### ***HF antennas, communication/navigation antennas:***

The antenna should be at least 5 meters from a HF antenna. VHF, satellite navigation antenna and other communication antennas should be at least 4 meters away.

#### ***Radar:***

The antenna should be at least 5 meters away to protect the low noise amplifier in the radar antenna. However, if this distance cannot be secured be sure the antenna is not within the radar beam.



### **Compass safe distance**

Locating the antenna unit too close to a compass can affect compass performance. The compass safe distance is 0.75 meters, steering compass, 0.45 meters, standard compass.

### **Other mounting guidelines**

Other important mounting guidelines are

- Locate the antenna unit away from exhaust stacks (foreign material on the radome can interfere with reception and transmission).
- Keep the unit away from heat sources.
- Locate the unit away from places where fuels and chemical solvents are stored.
- Keep in mind the length of the cable from the communication unit is maximum 100 meters.

## 1.2 Designing the Antenna Mast

### General

To facilitate servicing, construct a mast of 1500 mm in height and 60 mm in diameter. (See page 5.) The paragraphs which follow provide guidelines for selection and construction of the mast. Refer to the drawing at back of this manual.

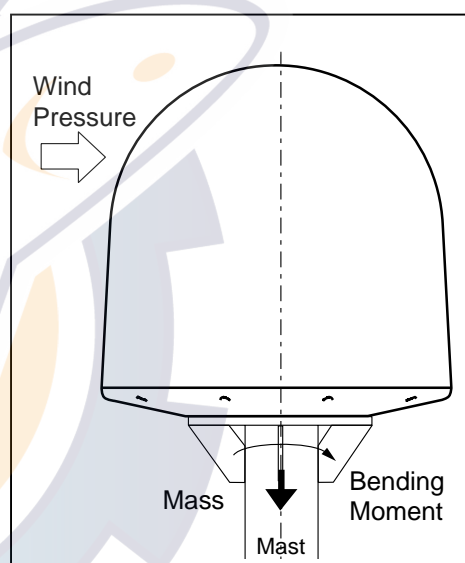
### Guardrail, platform

Fit the mast with a guardrail and platform (or steps), for serviceman's safety. (In most installations the serviceman stands on the platform while checking the radome. Thus this distance should be secured for ease of servicing.) The guardrail should be as high as possible for sufficient safety.

### Mast strength

The mast material must be sufficiently strong to meet the demands of the marine environment. It should satisfy the following requirements.

- It must be able to support radome mass plus at least 2.5 cm of ice and snow. Special consideration should be given if the unit is operated in areas of heavy snow or freezing temperature.
- Mast bending moment must be able to withstand expected maximum pitching, rolling and wind pressure.
- To prevent resonance at low frequencies (about 5 Hz), four stays can be fixed between the mast and the mounting base.

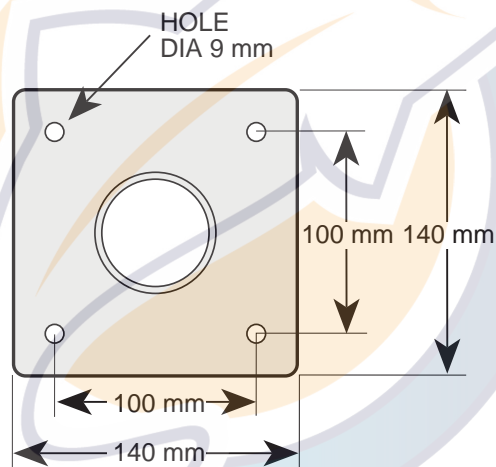


Item	Mass
Antenna unit mass	8 kg $\pm$ 10%
Platform, guardrail mass	
Expected ice and snow	
Maximum wind pressure (at wind speed 75 m/s)	1654.9 N

### Mounting pole and mounting base

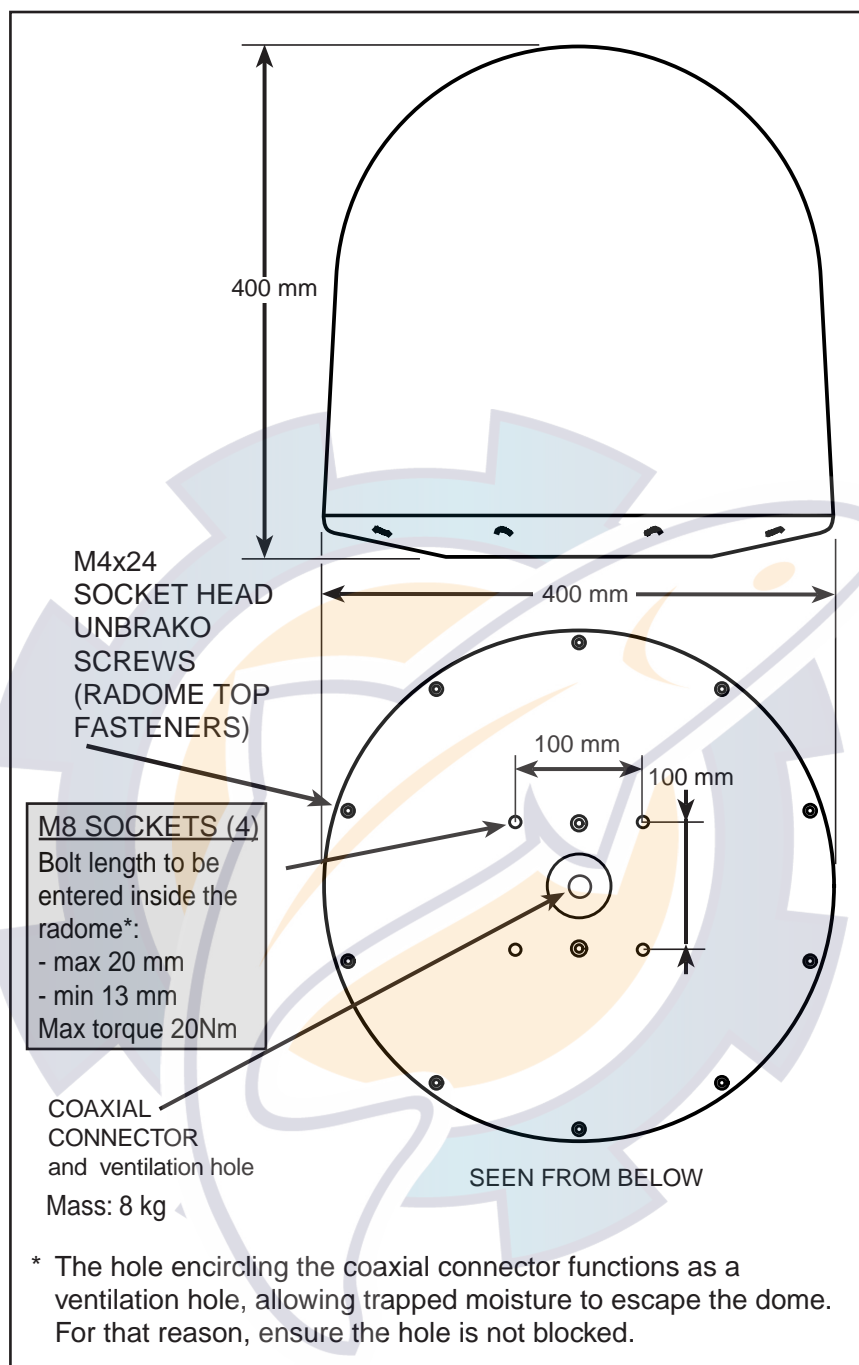
In order to ensure long life for the antenna electronics and mechanics, the antenna must be installed properly on a specially designed pole with suitable flange and rubber gasket. Below are guidelines for installation of the mounting pole and mounting base.

- The pole serves the purpose of protecting the coax cable and its N-type male connector where it joins the N-type female connector at the bottom of the dome. Further, it is a very important part of the ventilation system of the dome; the hole in the pipe allows trapped moisture to escape from the dome.
- The face of the mounting base should be flat as possible (tolerance: within 2 millimeters of the horizontal plane).
- The mounting base should be parallel with ship's horizontal plane (tolerance:  $\pm 1^\circ$ ).
- The fixing bolts of the mounting base should be parallel with the ship's keel line (tolerance:  $\pm 2^\circ$ ).
- Weld a ground bolt (stainless steel, M10x40, local supply) to the mast within 50 cm of a fixing bolt on the antenna unit. The length of the ground wire (local supply) is 50 cm.

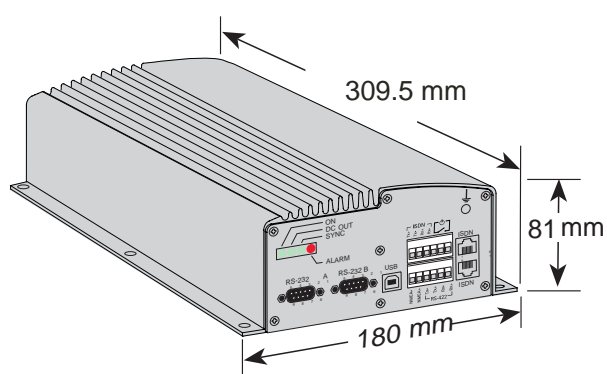


*Mounting pole and mounting base*

## 1.3 Mounting Dimensions of Units

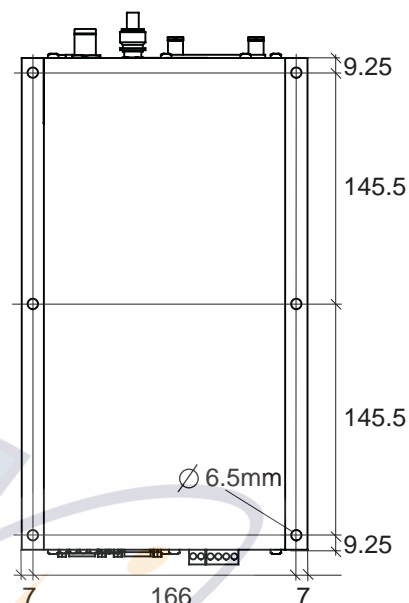


# Communication unit

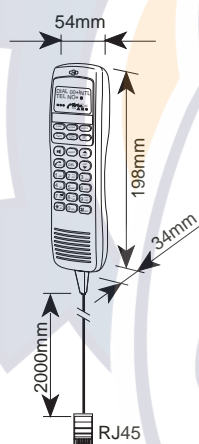


Notice:  
Secure free space of at least 15 cm around the CU for adequate cooling, and to allow removal of unit for service.

Mass: 3kg

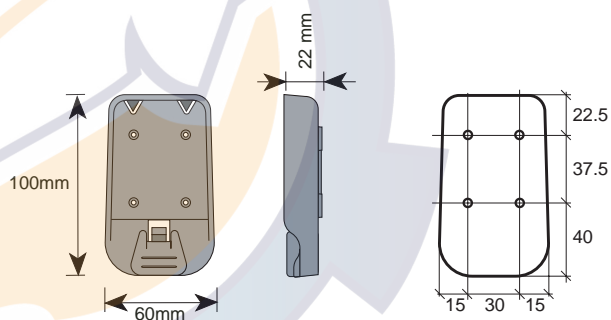


## ISDN Handset



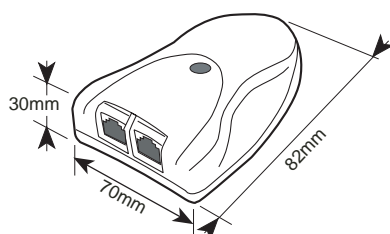
Mass: 0.3 kg

## Handset holder/cradle

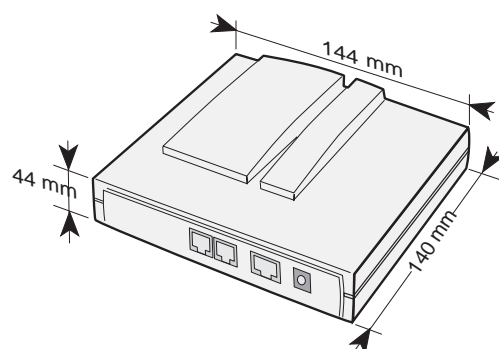


Mass: 0.06kg

## ISDN wall socket (option)

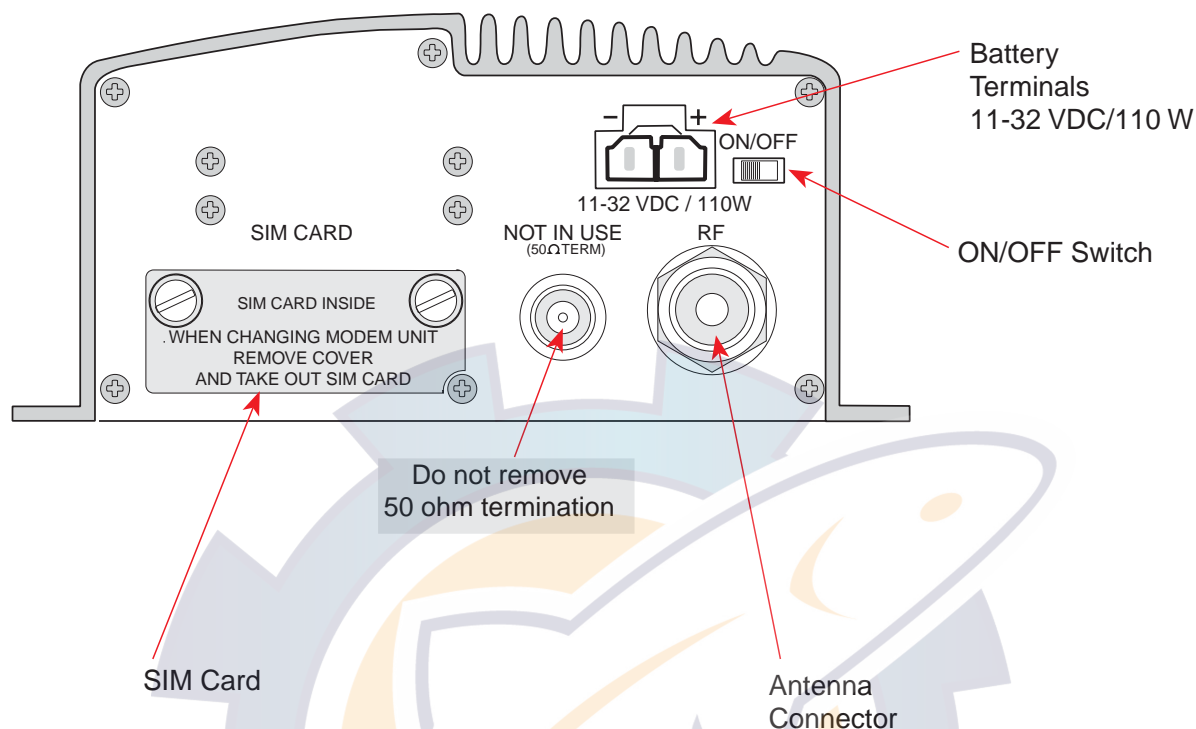


## Terminal Adapter

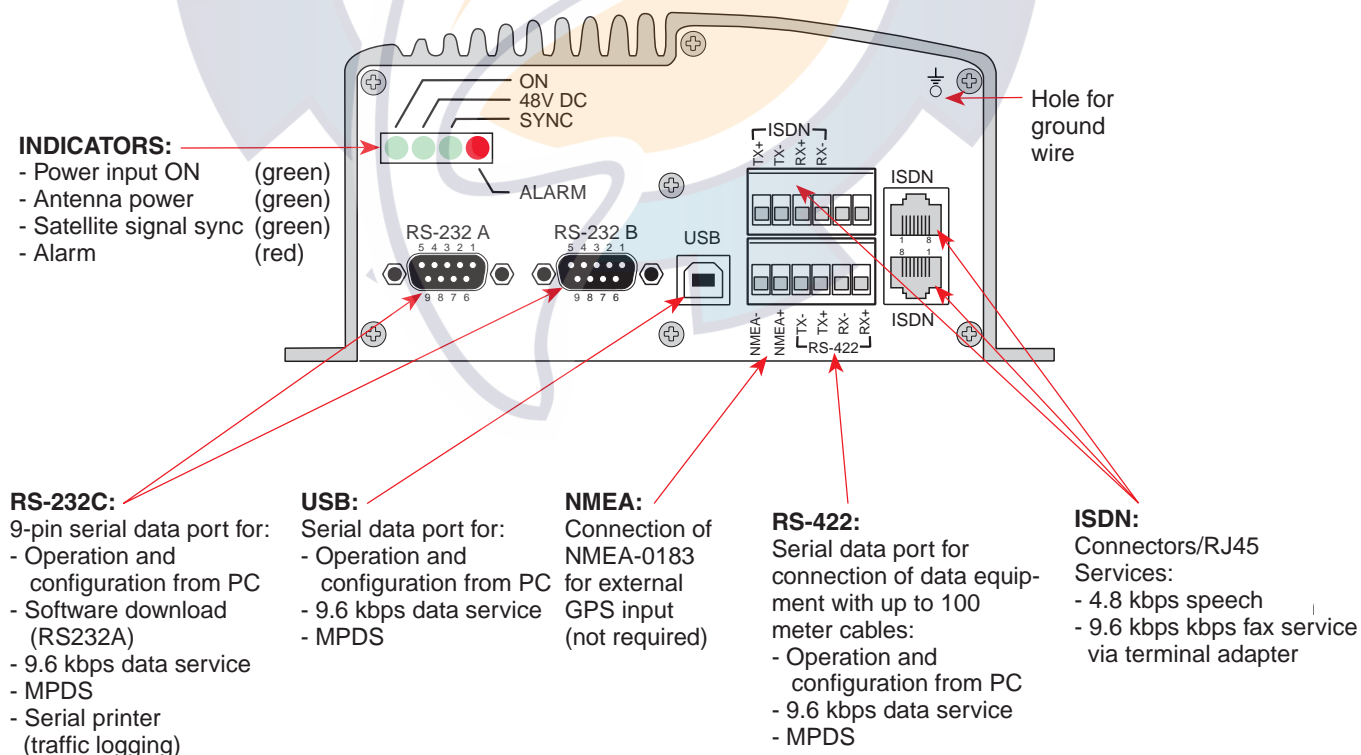


## 1.4 Communication Unit Connectors

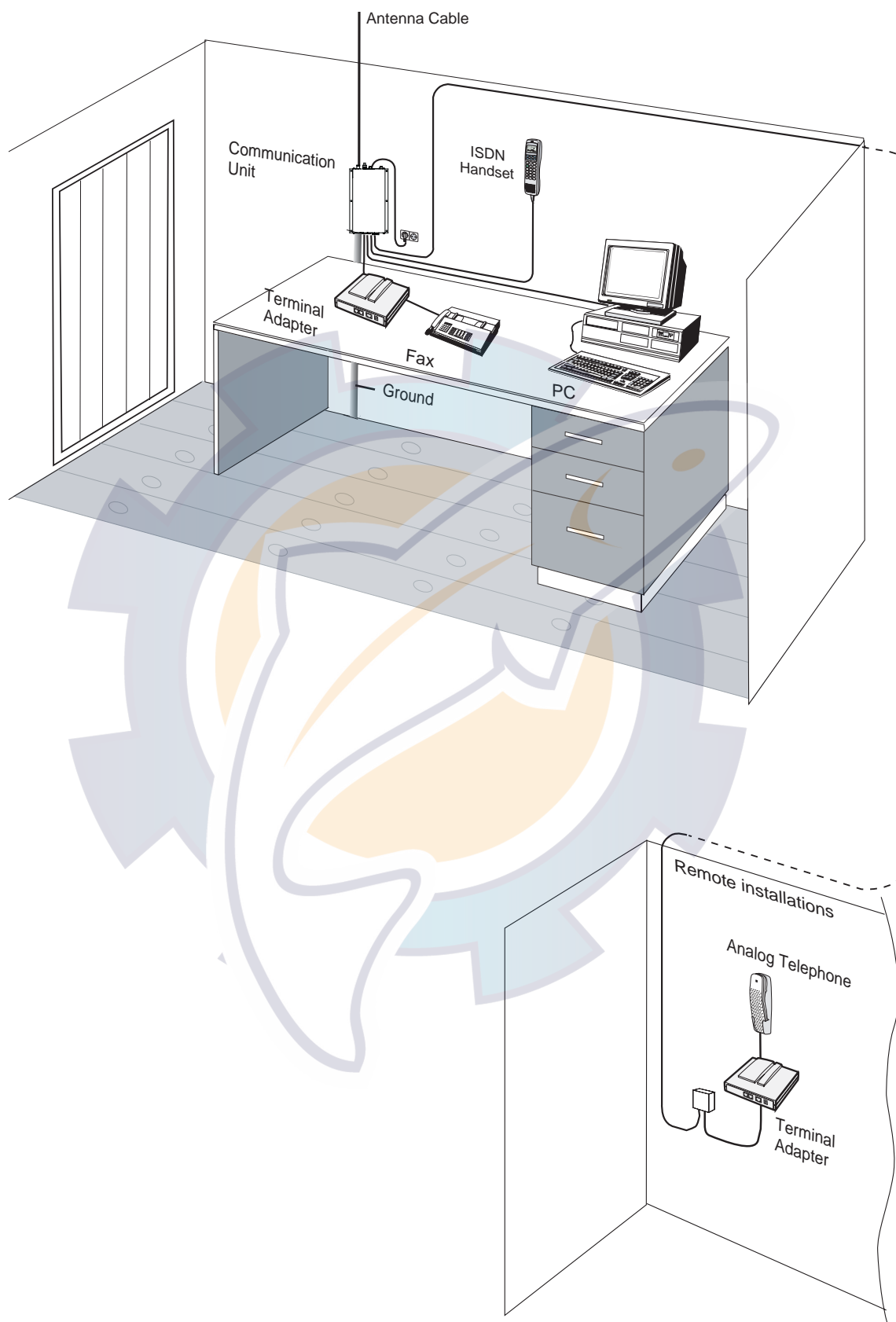
### Rear connector panel



### Front connector panel

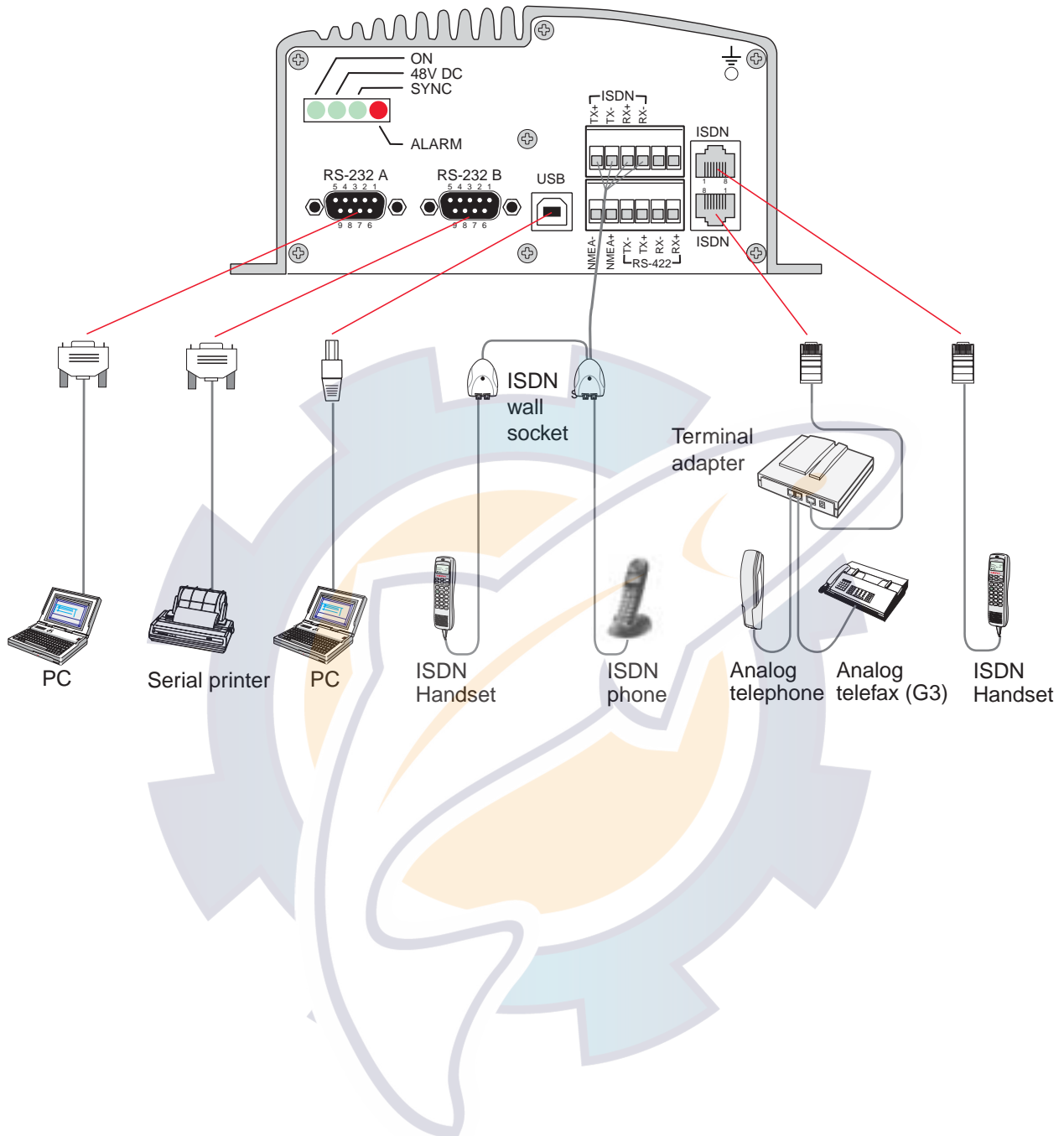


## 1.5 Examples of Installation





## Connection examples



## 1.6 Placing Units

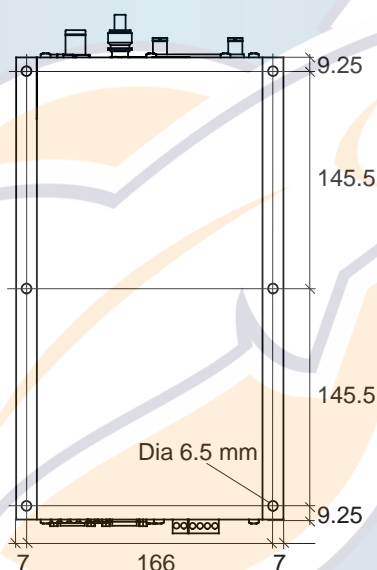
### Placing the communication unit

The communication unit should be placed in a ventilated area. To ensure adequate cooling for the unit, a 10 cm unobstructed space must be maintained above and below the unit. A space of 10 cm above the unit is also required to allow removal of units.

Locating the communication unit too close to a compass can affect compass performance. The compass safe distance is 0.30 meters for both steering and standard compasses.

For grounding, see pages 13 and 18.

Six holes through the unit's mounting plate allow the unit to be fixed to a bulkhead or a desktop.

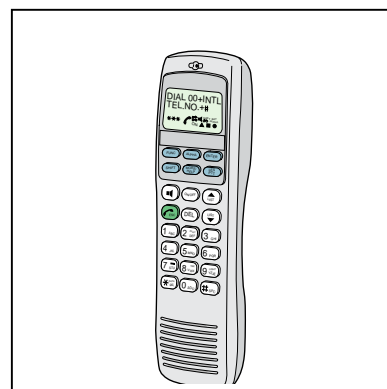


### Placing the ISDN handset

The ISDN handset functions as a display and communication unit for alert transmission. It may also be used for normal voice communication. Up to two (2) ISDN handsets may be connected in series. The units may be installed anywhere onboard the vessel.

Four separate ISDN ports are available on the communication unit as RJ45 jacks or screw terminal blocks.

Max cable length: 100 m, 4x0.22 mm<sup>2</sup>.



## Placing the terminal adapter

The terminal adapter may be installed almost anywhere. However, install it where vibration is minimal and locate it away from heat sources.

## Placing the ISDN handset as a standard telephone

The ISDN handsets may be installed as standard telephones. The units may be installed anywhere onboard the vessel.

Four separate ISDN ports are available on the communication unit as RJ45 jacks or screw terminal blocks.

## Placing the telefax (option)

A digital telefax (Group 4) can be connected to one of the ISDN outlets, or to an ISDN bus for transfer at 64 kbps rate.

An analog telefax (Group 3) should be connected to the Terminal Adapter

## Placing the PC (user supply)

A PC w/ISDN card can be connected to one of the ISDN outlets, or to an ISDN bus for 64 kbps rate data communication for installation up to 100 m away from the communication unit.

With the PC connected to the USB/RS-232/RS-422 port it can also be used for control and configuration of the Communication Unit.

This requires that the vtLite Marine program accessible on the FELCOM CD is installed. Connection to the USB/RS-232/RS-422 port also allows 64 kbps data transmission. See the PC's user's manual.



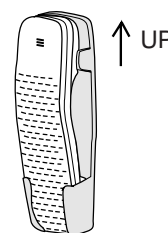
Cable lengths:

- ISDN port: See "ISDN telephones/equipment" on page 27.
- USB port: 3 m
- RS-232 ports: 3 m
- RS-422 port: 100 m

## Placing analog telephones (option)

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

The analog telephone DBAR104001/888 (option) should be installed on a bulkhead.



## 1.7 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 supplied washers and nuts and running a ground wire (local supply) between an antenna fixing stud on the antenna unit and a ground stud (local supply) bolted to the mast. Coat the antenna fixing stud and ground stud with silicon sealant. For details, see page 17.

### Antenna cable

The antenna coaxial cable normally has a solid or meshed metal screen which must be terminated to ground both at the antenna pedestal and at the communication unit. The supplied cable is 25 meters; lengths of 50 m and 140 m are optionally available. If the ground potential level at the two points differ, the communication unit passing through the screen of the coaxial cable can be quite strong. The antenna cable screen constitutes a heavy gauge wire, which is capable of conducting large amounts of current.

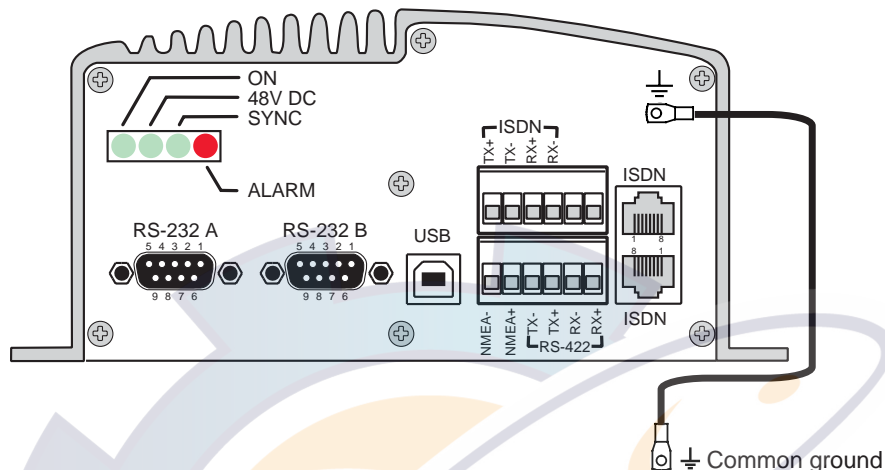
### Below deck equipment

The communication unit must be provided with a good electrical connection to the ship's hull for grounding. This is obtained with the supplied ground wire. "Location and grounding of units" on page 18.

## **Mains ground**

Mains ground is secured to the common grounding point through the external supply. It is therefore important to use the same mains branch for additional equipment connected to the communication unit (Fax, PC w/printer, etc.).

See also “Location and grounding of units” on page 18.



## **1.8 Laying Cables**

### **General**

The coaxial cable for connection between the communication unit 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.

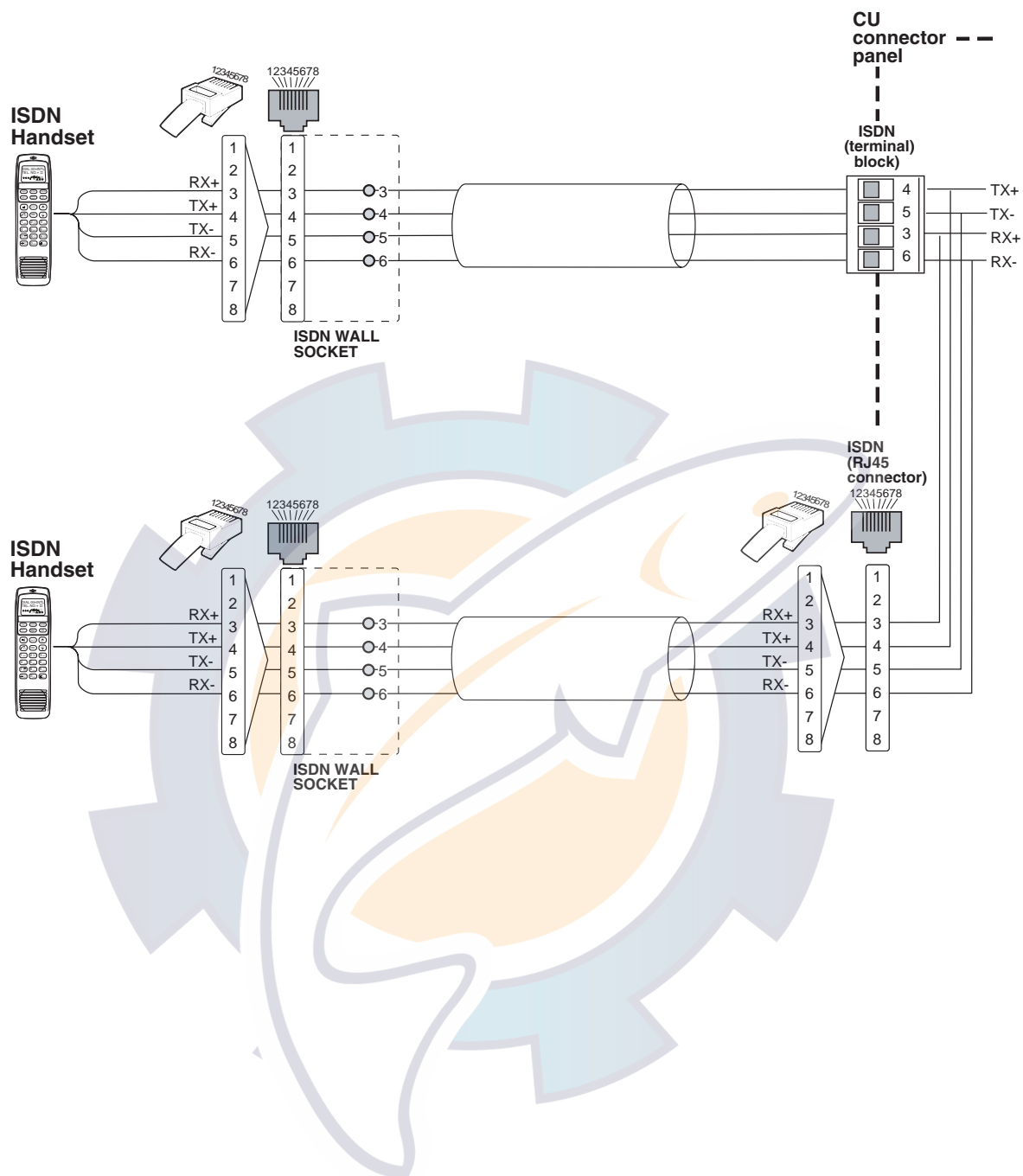
### **At the communication unit**

The coaxial cable from the antenna unit should be given a free end of approximately 0.5 m at the communication unit location.

### **ISDN telephone, telefax or analog 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 connection box.

## 1.9 Telephone Wiring





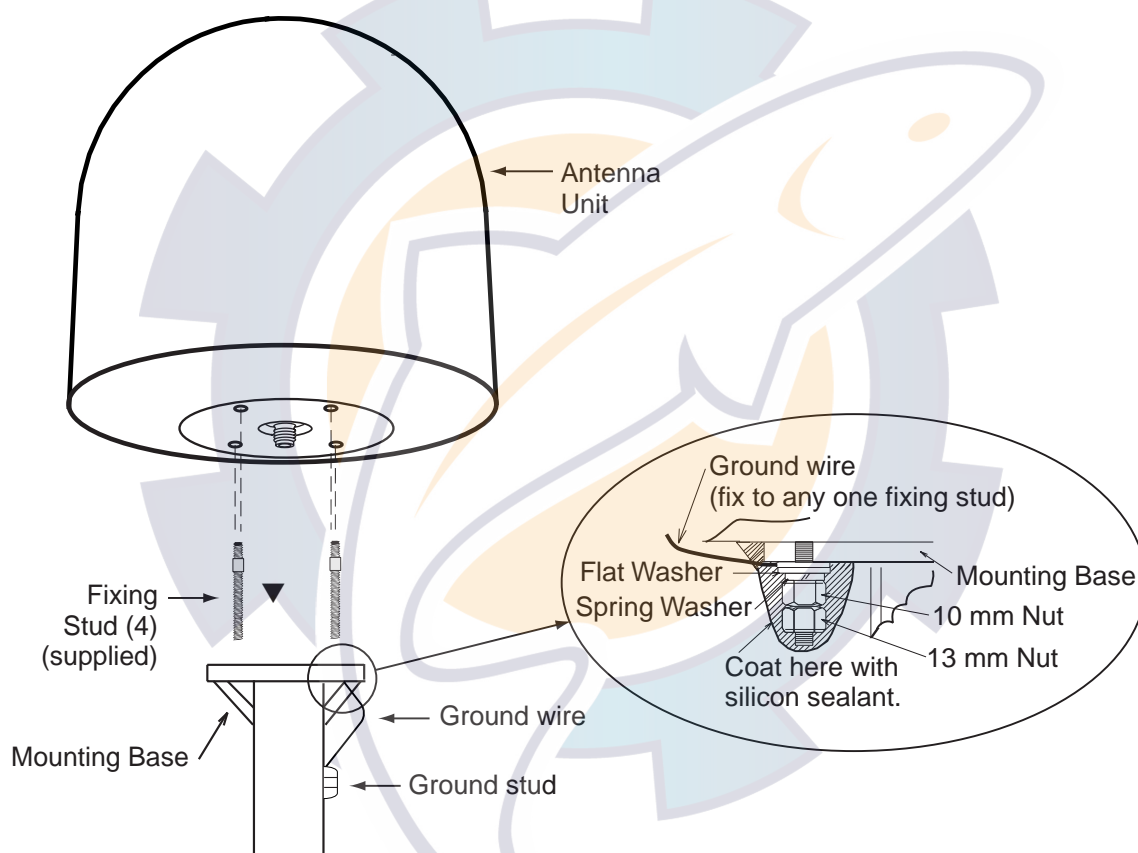
## 2.2 Installing the Above Deck Equipment (ADE)

### Unpacking

Unpack the antenna unit carefully so as not to damage it. Check it for damage.

### Mounting procedure

1. Place the antenna unit on the mounting base.
2. Fix the antenna unit to the mounting base with supplied fixing studs, nuts and washers.
3. Coat exposed nuts, fixing studs and washers with silicon sealant, to prevent electrolytic corrosion. Also, coat all holes for radome base fixing bolts with silicon sealant.
4. As shown below, run a ground wire (local supply) between any one fixing stud and a ground stud (local supply) welded to the mast.



**Note:** Do not use a rubber gasket on the mounting base. The face of the mounting base should be flat as possible (tolerance: within 2 mm of the horizontal plane). If tolerance is more than 2 mm, insert a metal spacer between the antenna bottom and the mounting base.

### Attach electromagnetic wave caution labels

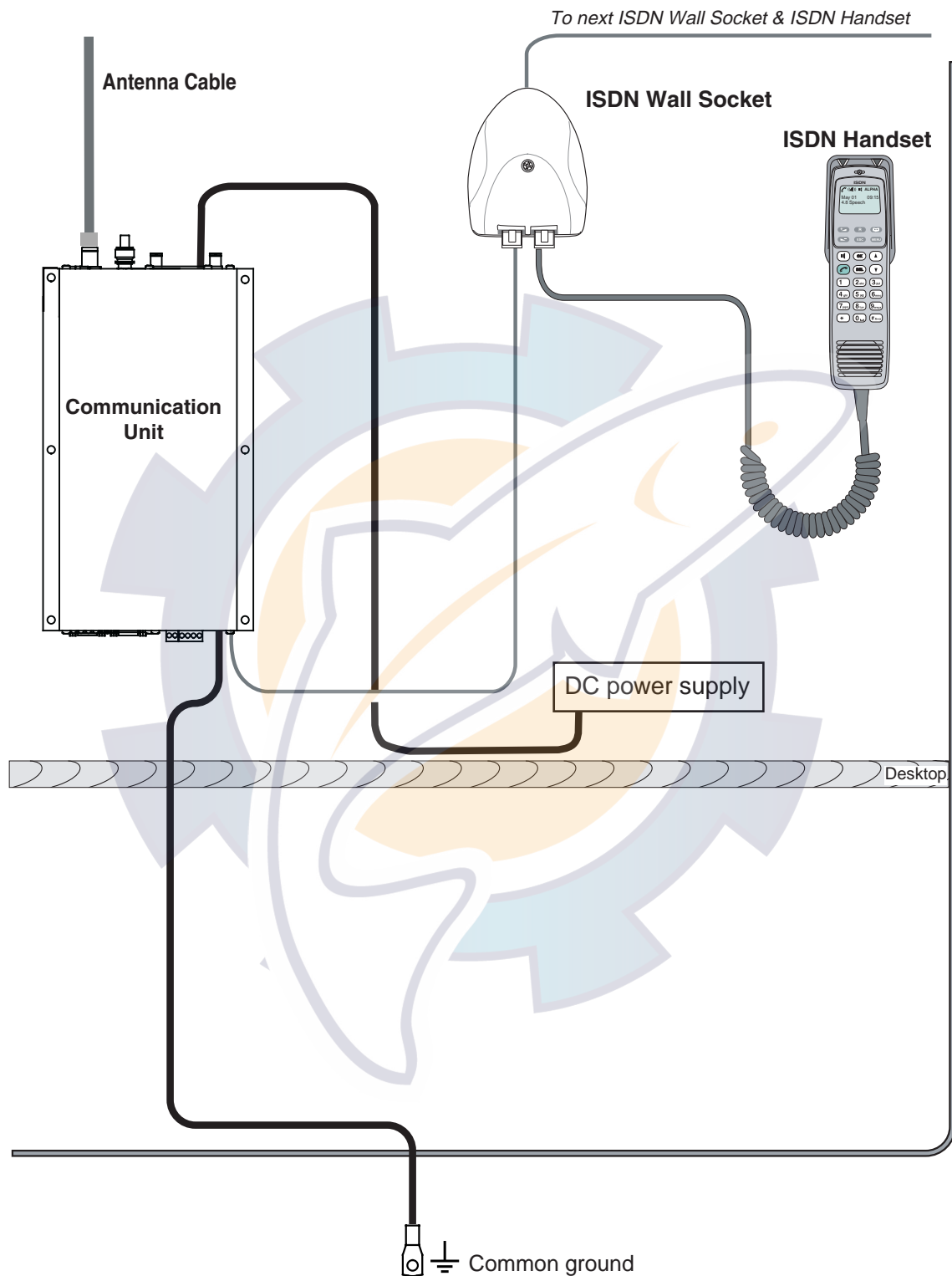
Labels which warn of electromagnetic waves are supplied with the installation materials. Attach them to the following locations:

- Attach one to the radome mast where it can easily be seen.
- Attach other to a conspicuous location in any stairwell leading to the deck where the antenna unit is installed.



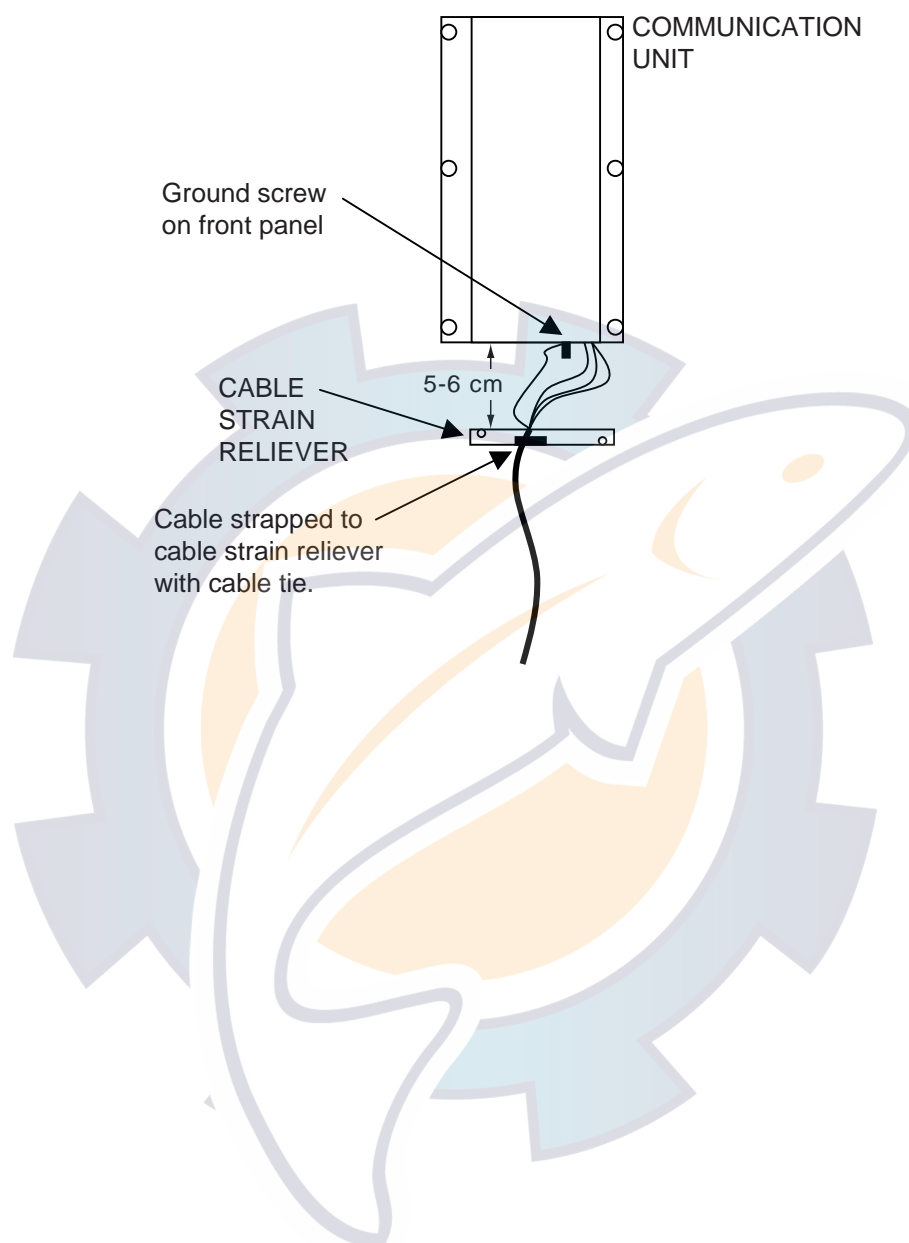
## 2.3 Installing the Below Deck Equipment (BDE)

### Location and grounding of units



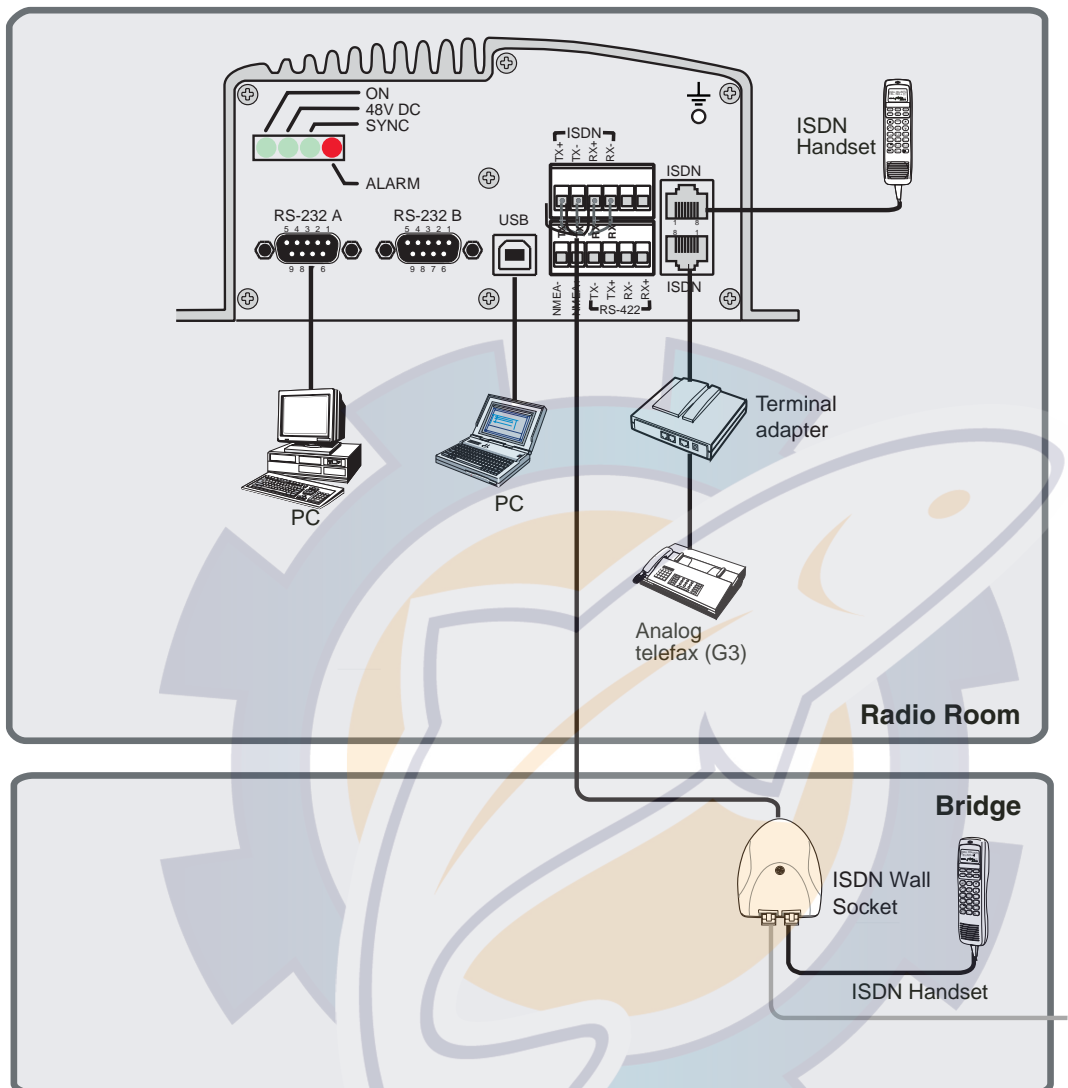
## Installation of cable strain reliever

The cable strain reliever is mounted 5-6 cm below the communication unit's front panel and directly to a bulkhead. The shield of a cable is fastened to a screw on the front panel of the communication unit.



## Example of local or nearby installation

The installation includes four ISDN handsets, Group 3 and Group 4 telefaxes, and three PCs.

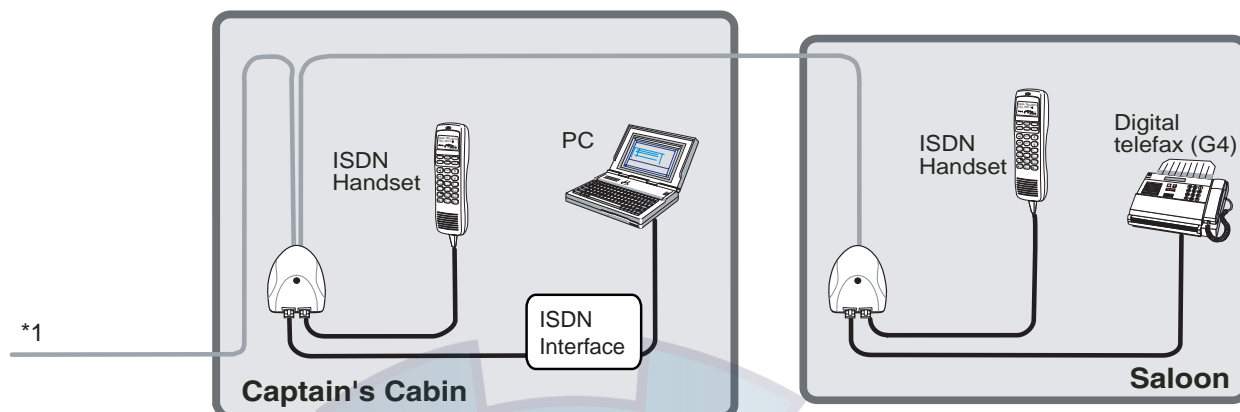


\*1

(Next page)

## Example of remote installation

The installation includes two ISDN Handsets connected to the ISDN bus via wallboxes with two 8-pin RJ45 jacks and analog telephone.



## ISDN handset

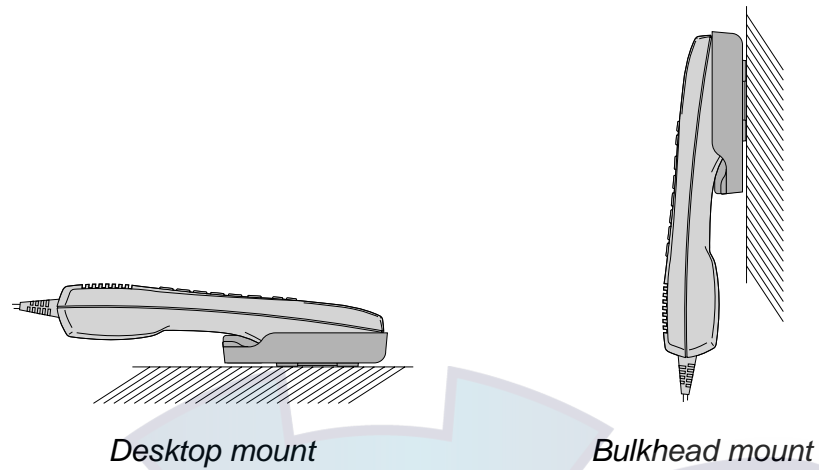
Plug the ISDN handset into the **ISDN** socket located on the connector panel of the CU.

**Note:** It is not recommended to extend the handset cable by more than 6 m.

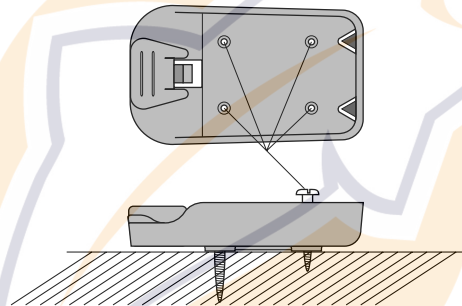


## Handset holder/cradle

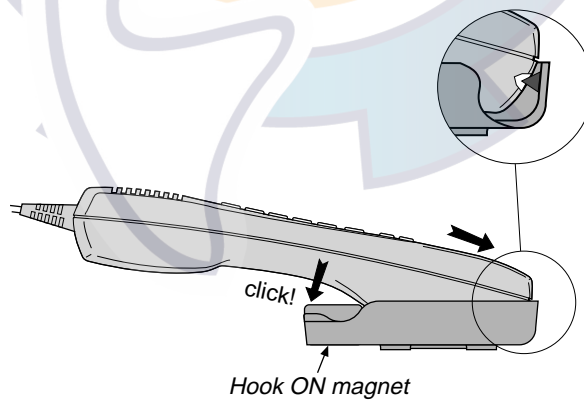
The handset holder/cradle may be mounted on a desktop or a bulkhead.



Attach the holder to the bulkhead or desktop with four 4 mm wood screws or self-tapping screws. (Screws should be supplied locally.)

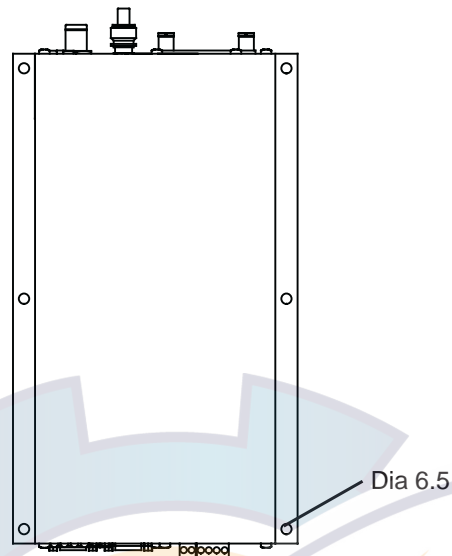


Place the handset on the holder as shown.



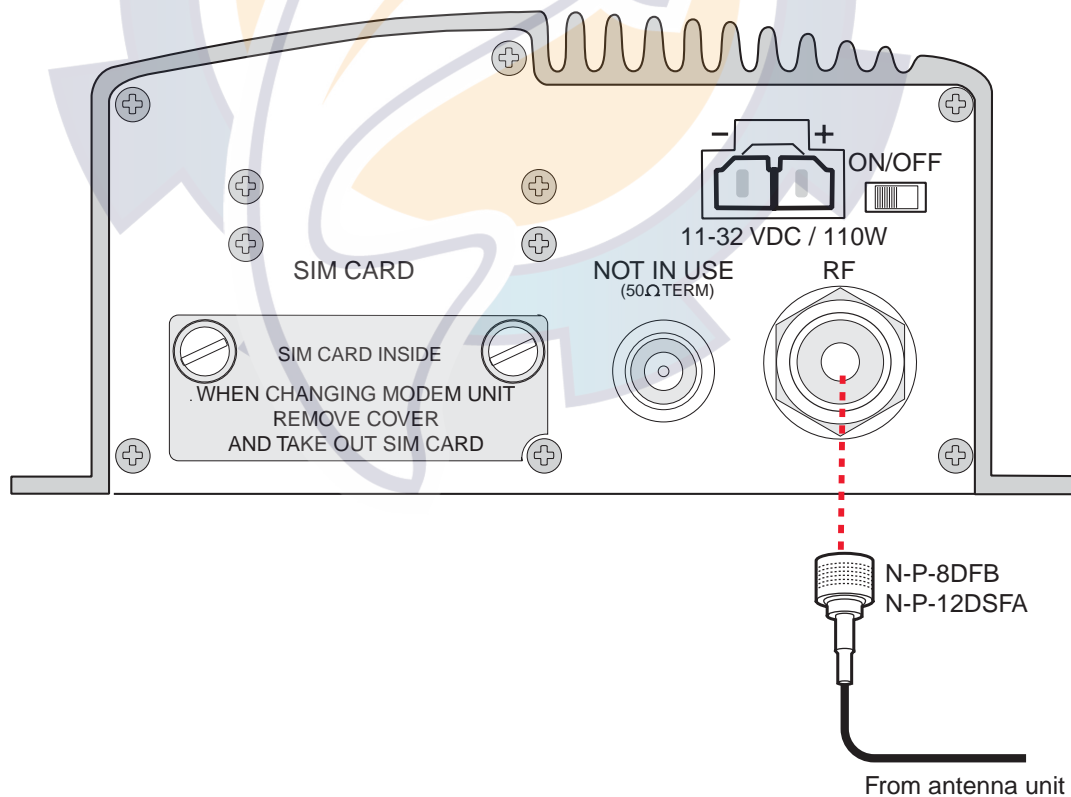
## Mounting the communication unit

Fix the unit to the chosen location with six self-tapping screws.



## Connecting the antenna cable to the communication unit

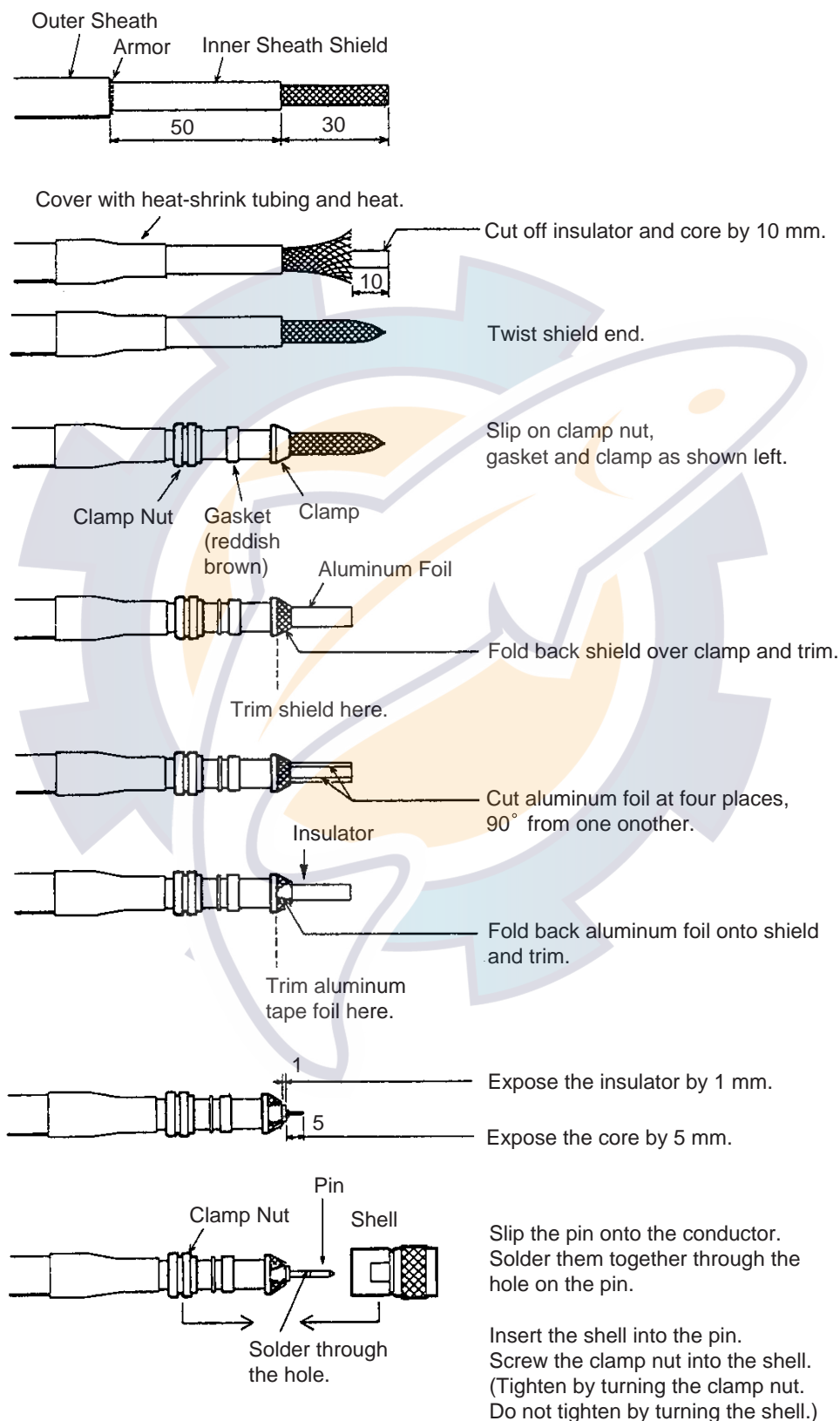
1. Strip the antenna coaxial cable, leaving sufficient slack for connection to the CU.
2. Attach the N-plug to the cable in accordance with the instructions (see the next several pages).



## N-P-8DFB connector

Attach the connector to the antenna cable as shown below.

(Dimensions in millimeters.)

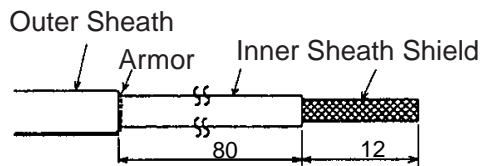


*How to attach the antenna cable connector N-P-8DFB*

## N-P-12DSFA connector

Attach the connector to the antenna cable as shown below.

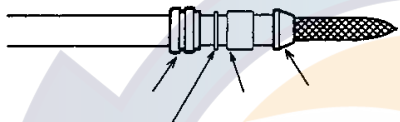
(Dimensions in millimeters.)



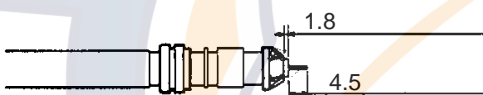
Remove outer sheath and armor by the dimensions shown left.  
Expose inner sheath and shield by the dimensions shown left.



Twist shield end.

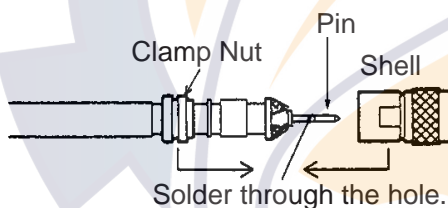


Slip on clamp nut, gasket and clamp as shown left.



Expose the insulator by 1.8 mm.

Expose the core by 4.5 mm.



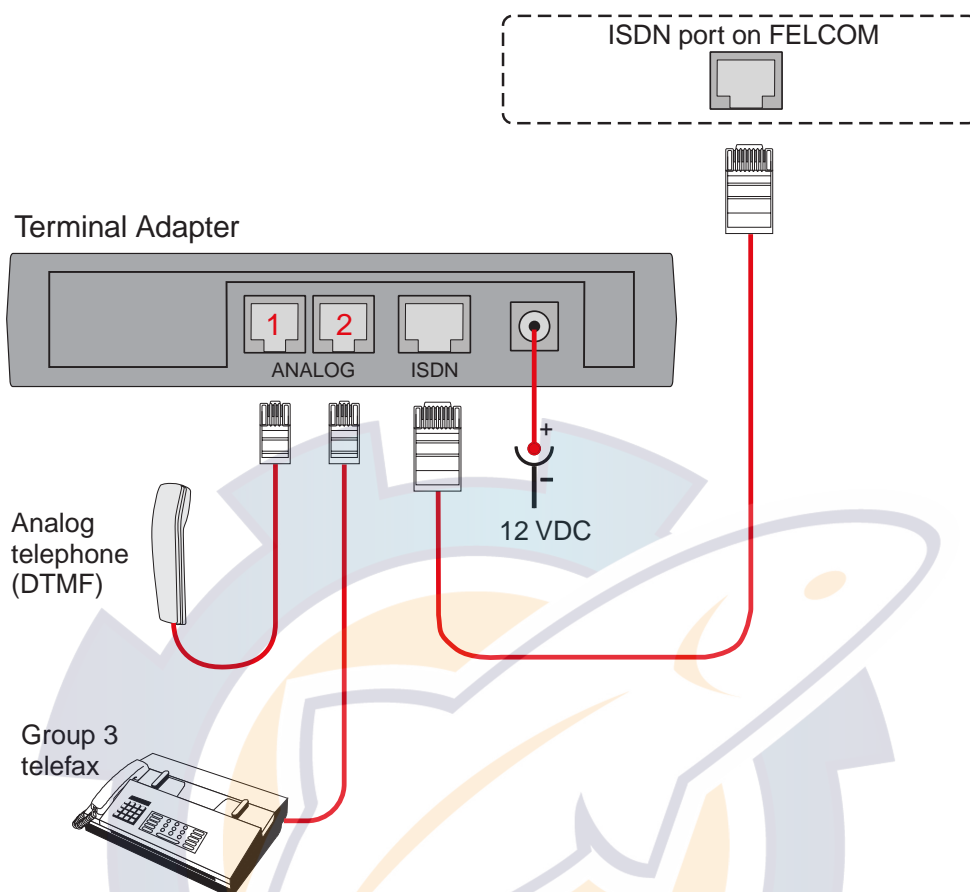
Slip the pin onto the conductor.  
Solder them together through the hole on the pin.

Insert the shell into the pin.  
Screw the clamp nut into the shell.  
(Tighten by turning the clamp nut.  
Do not tighten by turning the shell.)

*How to attach the antenna cable connector N-P-12DSFA*



## Terminal Adapter QDGY911912



**Note:** The AC/DC Adapter supplied with the Terminal Adapter is designed for connection to 230 VAC. If the ship's mains is 100 VAC, use a transformer.

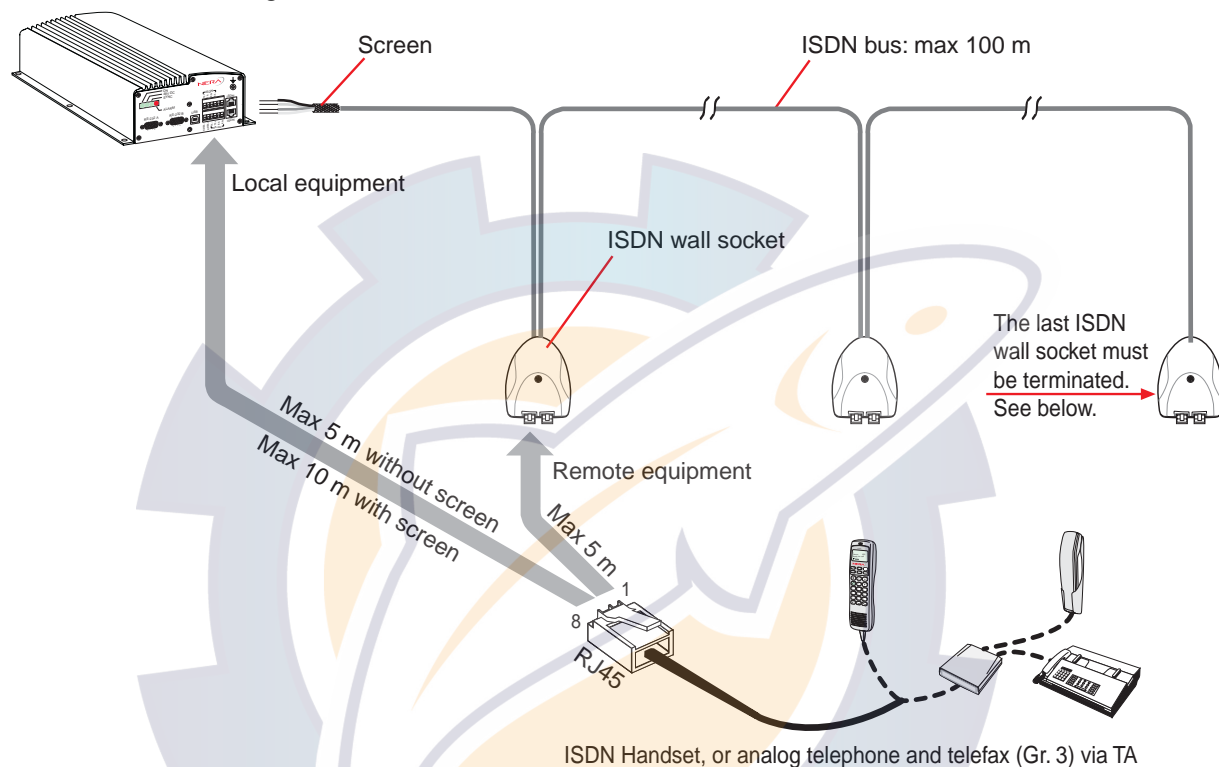
## 2.4 Installing Optional Units

### ISDN telephones/equipment

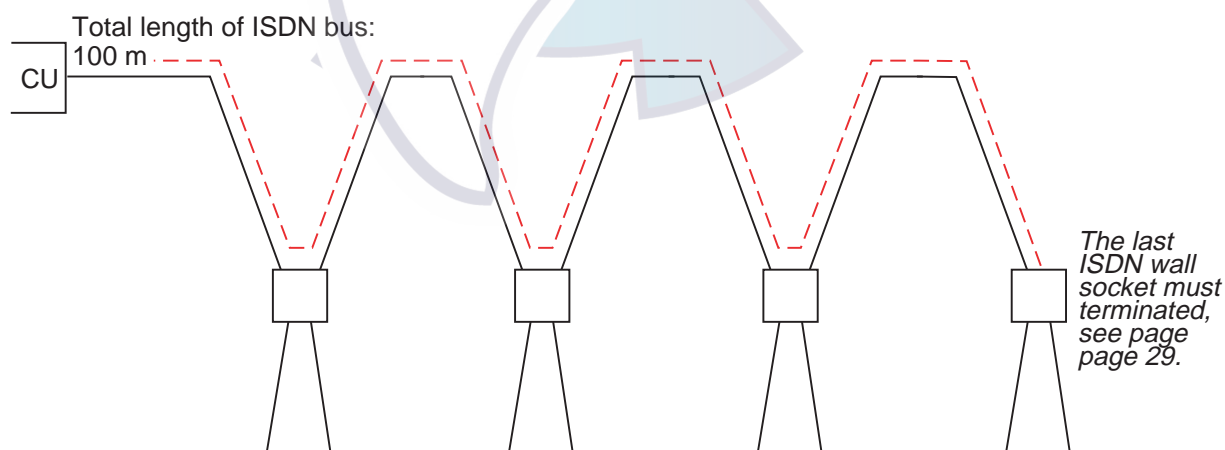
ISDN equipment is connected to the ISDN outlets on the CU connector panel, either to terminal blocks or RJ45 jacks.

An ISDN bus can be connected to *one* of the ISDN outlets.

Max. extension length: 100 m, min. 0.22 mm<sup>2</sup>.

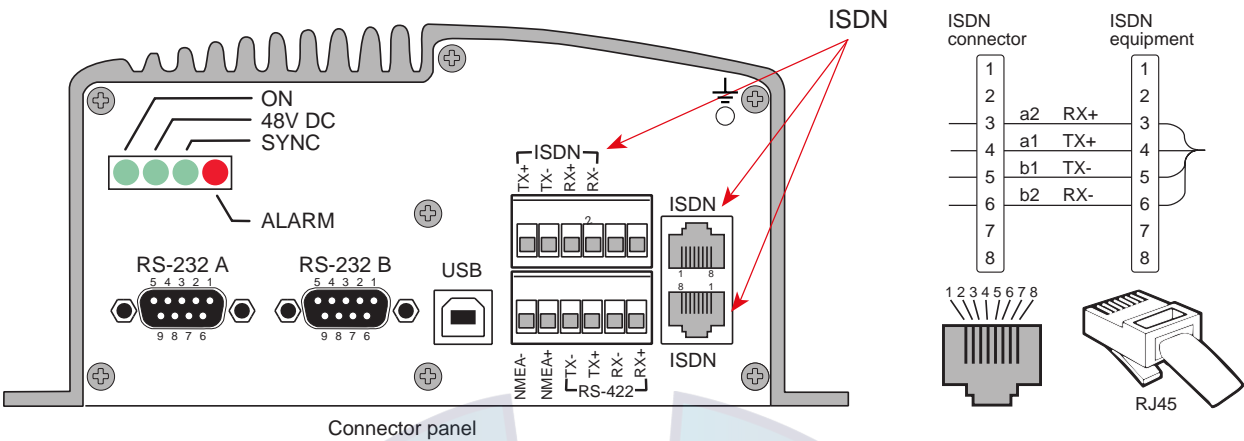


### ISDN cable lengths

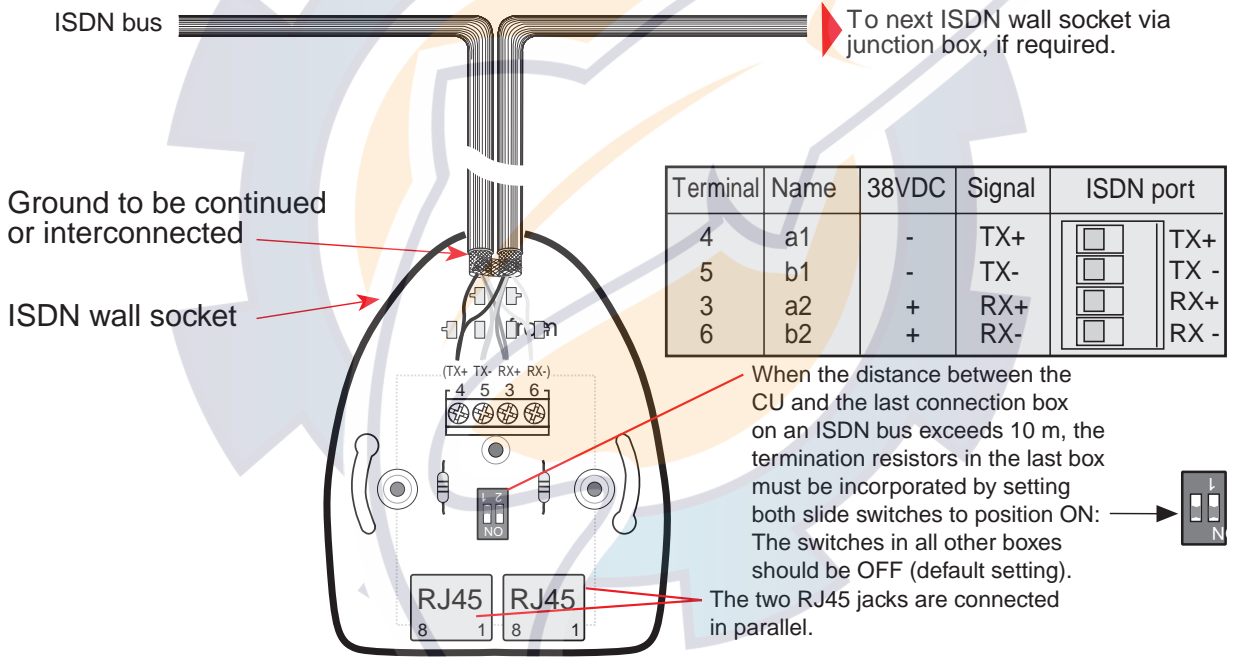


Up to eight ISDN devices may be operated with the FELCOM.

ISDN connectors



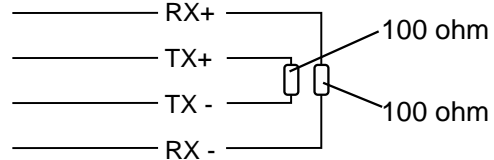
ISDN wall socket



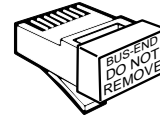
## ISDN bus termination

When longer than 10 meters, the end of the ISDN bus must be terminated by two resistors as shown below. Only one bus/termination per CU.

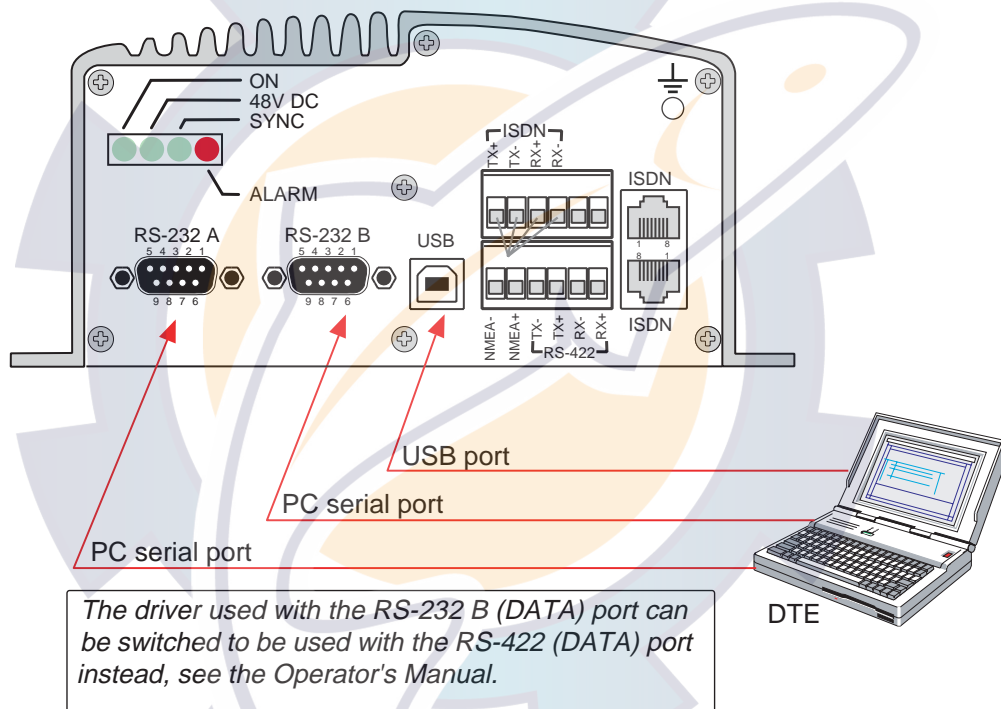
Be aware that only one ISDN cable is permitted to be longer than 10 meters.



Alternative termination:  
ISDN bus end plug

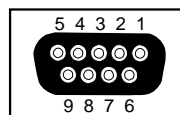


## PC - asynchronous data communication



## 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 FELCOM.*

*Signal source DCE means that the signal goes from FELCOM to the PC.*

## Signal descriptions

### **102 Signal Ground**

Digital ground, return line.

### **103 Send Data**

Data transmitted from DTE (PC) to DCE (FELCOM).

### **104 Receive data**

Data Received from DCE (FELCOM) to DTE (PC).

### **105 Request To Send**

OFF requests DCE (FELCOM) to suspend transmission to DTE (PC).

ON requests DCE (FELCOM) to resume transmission to DTE (PC).

### **106 Clear to send**

OFF indicates that DCE (FELCOM) cannot accept data from DTE (PC).

ON indicates that DCE (FELCOM) is prepared to accept data from DTE (PC).

### **107 Data Set Ready**

Signal from FELCOM 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 FELCOM that when ON indicates that connection is established and received data will be delivered on circuit 104, Received Data.

### **125 Ring Indicator**

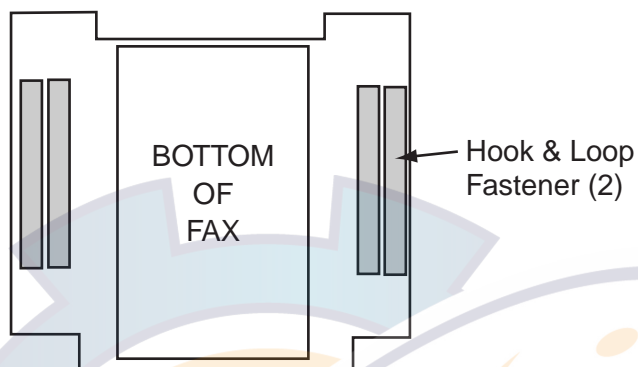
Signal from FELCOM. This signal is used in the Auto answer OFF mode and when ON indicates that an incoming call is in progress. The signal will go OFF when the call is answered by the PC by turning circuit 108 Data Terminal Ready ON.

## Facsimile FAX-8070P (for CE type) /FAX-2850

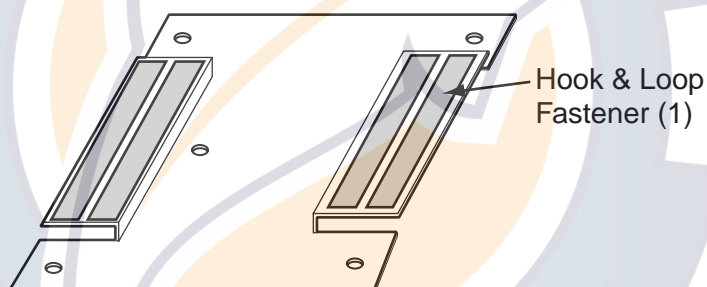
Refer to the drawing below. Use only the installation materials supplied.

**Note:** When ship's main is 110/115 VAC, the optional Transformer E-300 is required.

1. Attach four "rough" hook & loop fasteners (2) to the bottom of the facsimile as shown in the drawing below.



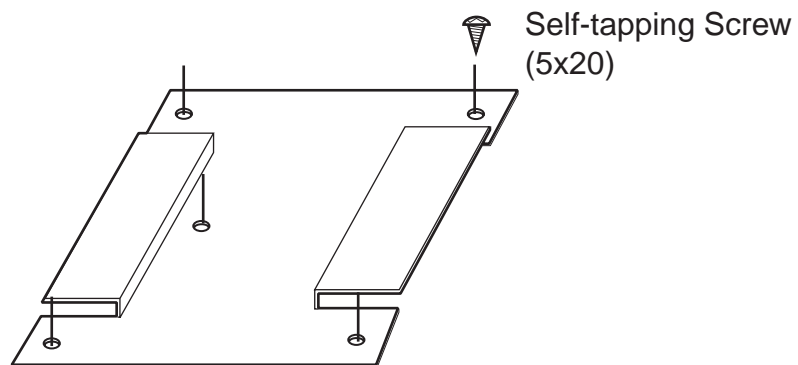
2. Attach four "smooth" hook & loop fasteners (1) to the facsimile fixing plate as shown below.



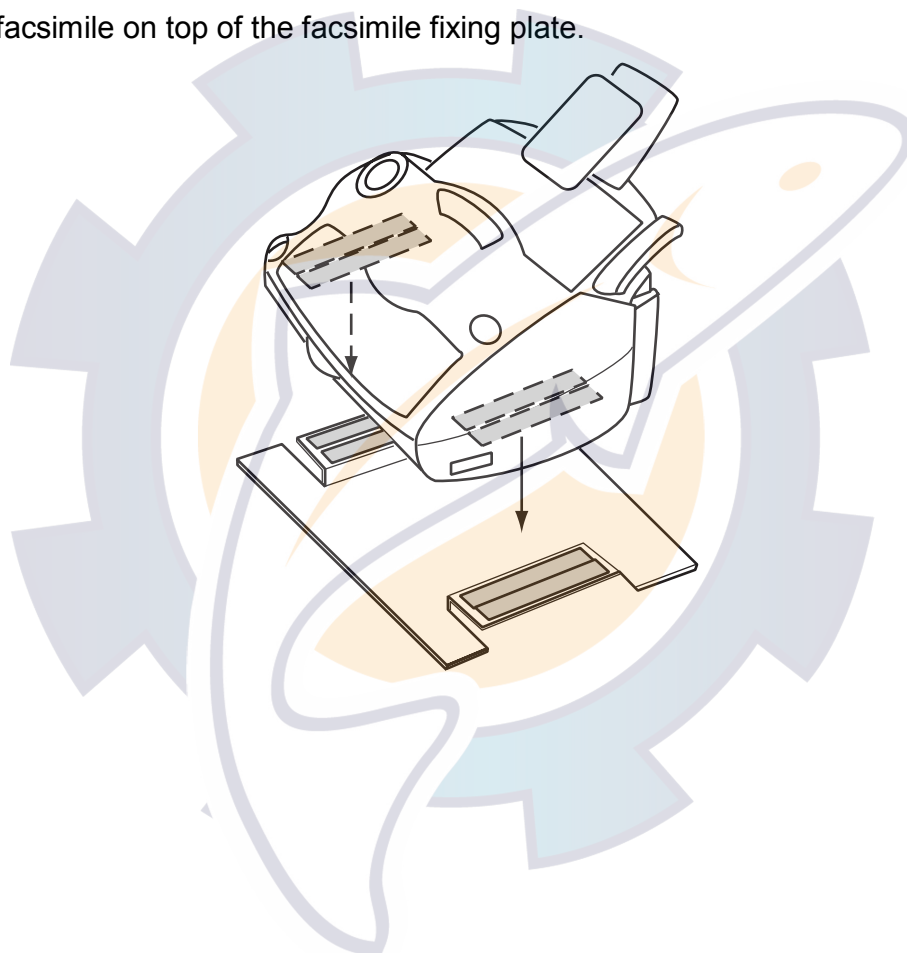
3. Attach the compass safety distance label at the right side as shown below.



4. Fasten the facsimile fixing plate to the mounting location with five self-tapping screws.



5. Set the facsimile on top of the facsimile fixing plate.



## Telephone FC755D1

### General

The telephone can be installed on a desktop or a bulkhead. Select a location where the telephone can easily be operated.

- For installation on a wooden table, use the mounting base and self-tapping screws (supplied).
- For installation on a steel table, fix the telephone with nuts and bolts.
- For bulkhead mounting, use the bulkhead mounting base (supplied with telephone accessories).

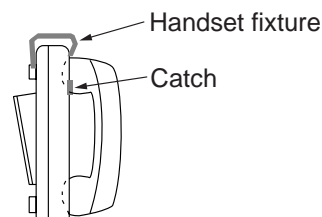
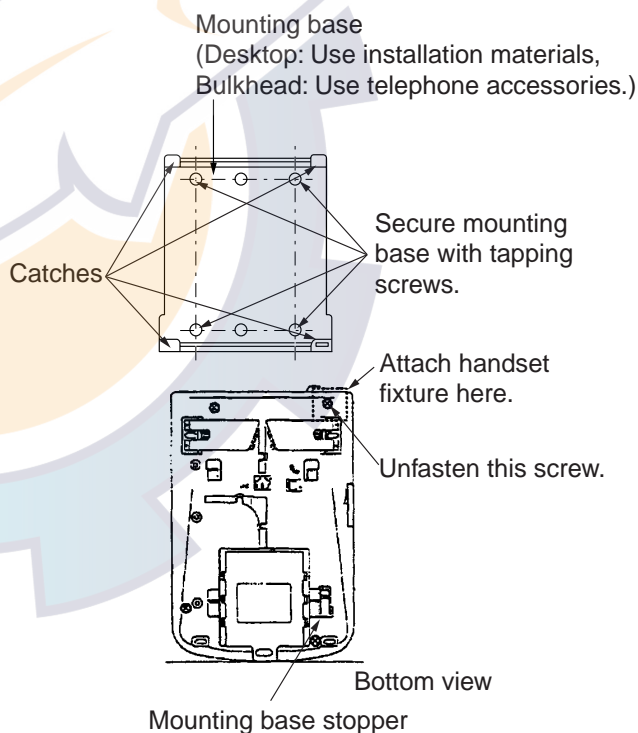
### Mounting location

Select a location where temperature and humidity are moderate and stable. Secure sufficient space around the unit for ease of operation and maintenance.

### Mounting

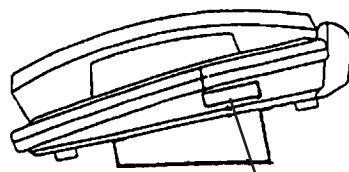
The mounting dimensions are given in the outline drawing at the back of this manual. Determine the mounting location, leaving sufficient space around the unit, and then fix the mounting base to the mounting location. The mounting base is different for bulkhead and desktop mounting, however the mounting procedure is the same for all.

1. Fix the mounting base to the mounting location with four self-tapping screws (4x16).
2. On the underside of the telephone, unfasten the screw shown in the figure. (The screw may be discarded.) Attach vulcanizing tape (supplied) to the handset fixture. Fasten the handset fixture to the underside of the telephone with a screw (3x14, supplied).
3. The catch in the receiver cradle functions to hang up the handset completely. Set the catch in the upward position as shown in left. (To detach the handset from the hanger, slide the handset upward.)





4. Set the telephone to the four catches in the mounting base and then slide it toward you until you hear a click.
5. Attach the "SLIDE" label (supplied) to the handset.
6. Attach English language label (supplied) to the telephone.
7. Attach the label (16-007-6927-0) for compass safe distance as shown below.



Label (16-007-6927-0)

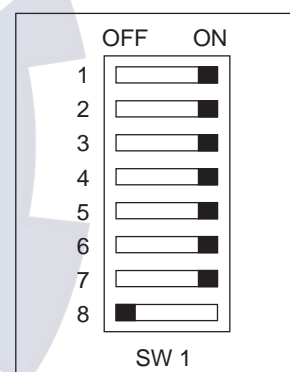
*Telephone, attaching the label*

## Serial printer ML280S

Set the DIP switches in the ML280S as shown below. These switches are under the small cover on the top of the printer. (See the printer's manual for the location.)

Switch bank 1

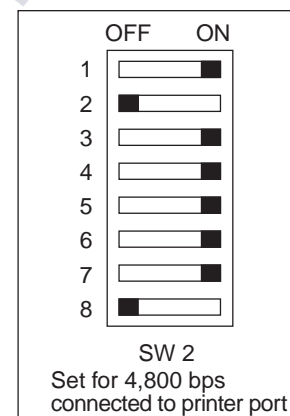
Switch no.	OFF	ON	FUNCTION
1	Even	Odd *	Parity
2	With	No *	Parity
3	7	8 *	Databits
4	X-on/X-off	Ready/Busy *	Protocol
5	Monitor	Circuit *	Test Select
6	Test	Print	Mode Select
7		ON *	Busy line RTS (-9V) pin 4
8	Off *		

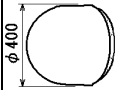
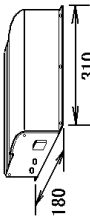
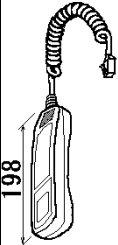
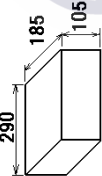
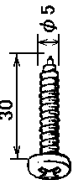

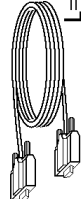




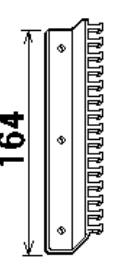

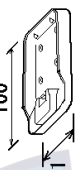
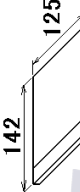
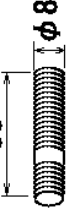


\* Correct setting

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



NAME	OUTLINE	DESCRIPTION/CODE	Q'TY
ユニット			
アンテナユニット		SF-130	1
ANTENNA UNIT		000-043-516	
通信制御ユニット		SF-230	1
COMMUNICATION UNIT		000-043-517	
ISDN/VINド セット		SF-870	1
ISDN HANDSET		000-043-349	
ターミナルアダプタ (箱詰品)			1
TERMINAL ADAPTEER		999-999-052	(*)1
通信制御用工材      COMMUNICATION UNIT    INSTALLATION MATERIALS    CP16-03210			
取付ネジ		QSBF119048-0320	6
FIXING SCREW		000-150-699	
USBケーブル (3M)		100001	1
USB CABLE		000-150-698	
ケーブル組品		R906686	1
CABLE ASSY.		000-148-340	
電源ケーブル		102528	1
POWER CABLE		000-150-696	

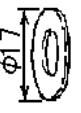
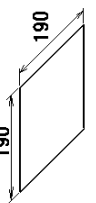

NAME	OUTLINE	DESCRIPTION/CODE	Q'TY
アース線		L3000	1
GROUNDING WIRE		999-999-053	(*)1
ケーブル 金具			1
CABLE STRAIN RELIEVER		999-999-058	(*)1
アース端子ネジ			1
EARTH TERMINAL SCREW		999-999-057	(*)1
ISDN/VINド セット用付属品 ISDN HANDSET ACCESSORIES			
ハンド セットホルダ		QSA9A11394	1
HAND SET HOLDER		000-147-689	
通信制御用付属品 COMMUNICATION UNIT ACCESSORIES			
CD-ROM		1650178	1
CD-ROM		004-447-930	
アンテナ工材 ANTENNA INSTALLATION MATERIALS			
アンテナ固定ボルト		M8X55	4
FIXING STUD		999-999-055	(*)1
バネ座金		M8 SUS304	4
SPRING WASHER		000-864-262	
六角ナット 1 種		M8 SUS304	8
HEX.NUT		000-863-110	

1.コード番号末尾の[\*\*]は、選択品の代表型式/コードを表します。  
CODE NUMBER ENDING WITH "\*\*" INDICATES THE CODE NUMBER OF REPRESENTATIVE MATERIAL.

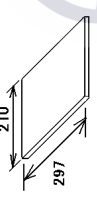
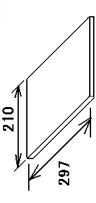
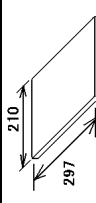
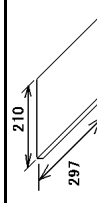
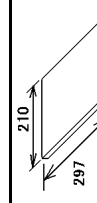
2.(\*)1は、タミ-コードに付き、注文できません。  
(\*)1THIS CODE CANNOT BE ORDERED.

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

NAME	OUTLINE	DESCRIPTION/CODE	Q'TY
------	---------	------------------	------

ミガキ平座金 FLAT WASHER		M8 SUS304	4
		000-864-130	
ハズレク (DANGER) LABEL (DANGER)			1 (*1)
		999-999-054	
アンテナケーブル (25M) ANTENNA CABLE		103154	1
		000-150-697	

図書 DOCUMENT

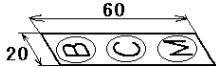
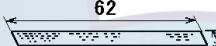
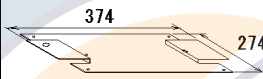
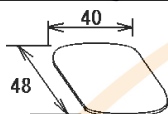
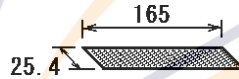
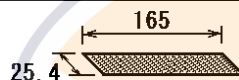
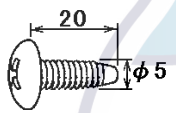
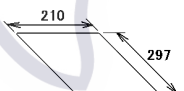
操作要領書 (和) OPERATOR'S GUIDE		OSJ-56470-*	1
		000-150-481 **	
取扱説明書 (和) OPERATOR'S MANUAL		OMJ-56470-*	1
		000-150-477 **	
登録要領書 (和) REGISTRATION FOR SERVICE ACTIVATION		J5-95001-0*	1
		000-807-330	
装備要領書 (和) INSTALLATION MANUAL		IMJ-56470-*	1
		000-150-479 **	
アンテナユニット装備時注意書 CAUTION FOR INSTALLATION		C52-00402-*	1
		000-150-529	

1.コード番号末尾の[\*\*]は、選択品の代表型式/コードを表します。  
CODE NUMBER ENDING WITH "\*\*" INDICATES THE CODE NUMBER OF REPRESENTATIVE MATERIAL.

2.(\*1)は、タミコードに付き、注文できません。  
(\*1)THIS CODE CANNOT BE ORDERED.

**FURUNO**

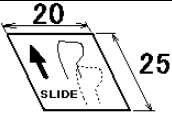
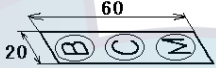
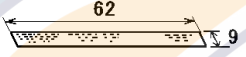
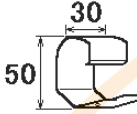
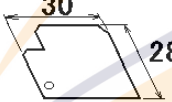
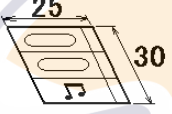

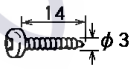
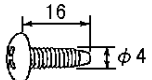
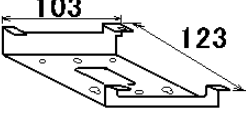
CODE NO.	004-430-050	16AI-X-9407 -2 1/1
TYPE	CP16-02601	

工事材料表 INSTALLATION MATERIALS		For FAX-8070P/2850			用途 / 備考 REMARKS
番号 NO.	名称 NAME	略図 OUTLINE	型名 / 規格 DESCRIPTIONS		数量 Q'TY
1	ハリマーク (INMAR) LABEL (INMAR)		16-007-6919-0		1
			CODE NO.	100-217-010	
2	ハリマーク LABEL		16-007-6927-0		1
			CODE NO.	100-222-480	
3	取付板 MOUNTING PLATE		16-011-3101-1		1
			CODE NO.	100-303-181	
4	フック押え板 HOOK RETENTION PLATE		16-011-3102-0		1
			CODE NO.	100-303-190	
5	マジックテープ (1) ROOP FASTENER (1)		16-011-3103-0		4
			CODE NO.	100-303-200	
6	マジックテープ (2) ROOP FASTENER (2)		16-011-3104-0		4
			CODE NO.	100-303-210	
7	+トラスタビッソネジ +TAPPING SCREW		5X20 SUS304 1ｼﾅ		5
			CODE NO.	000-802-081	
8	FAX取付手順書 FAX INSTALLATION PROCEDURES		C52-00204-A		1
			CODE NO.	000-146-784	

( 略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY. )

**FURUNO**

CODE NO.	004-438-410	16AG-X-9412 -0
TYPE	CP16-00511	1/1

工事材料表 INSTALLATION MATERIALS		For Telephone FC755D1			
番号 NO.	名称 NAME	略図 OUTLINE	型名 / 規格 DESCRIPTIONS	数量 Q'TY	用途 / 備考 REMARKS
1	バリマ-ク (SLIDE) LABEL (SLIDE)		16-007-6405-0	1	
			CODE NO. 100-222-470		
2	バリマ-ク (INMAR) LABEL (INMAR)		16-007-6919-0	1	
			CODE NO. 100-217-010		
3	バリマ-ク LABEL		16-007-6927-0	1	
			CODE NO. 100-222-480		
4	受話器固定具 HANDSET FIXTURE		16-011-7101-1	1	
			CODE NO. 100-273-831		
5	接着テープ VULCANIZING TAPE		16-011-7103-0	1	
			CODE NO. 100-273-940		
6	キーシ-ル LABEL		16-011-7111-0	1	
			CODE NO. 100-273-850		
7	シート (TEL.) SHEET (TEL.)		16-011-7112-0	1	
			CODE NO. 100-273-860		
8	+ナ+ Pタ+ネジ SCREW		3X14 SWCH18A MFZN-2-C	1	
			CODE NO. 000-800-172		
9	+ト+スタ+ビ+ンネジ +TAPPING SCREW		4X16 SUS304 1ｼ	4	
			CODE NO. 000-802-080		
10	壁掛金具 MOUNTING BASE		FC755WM	1	
			CODE NO. 000-808-704		

16AG-X-9412

FURUNO ELECTRIC CO., LTD.  
(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

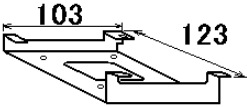
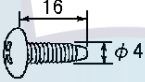
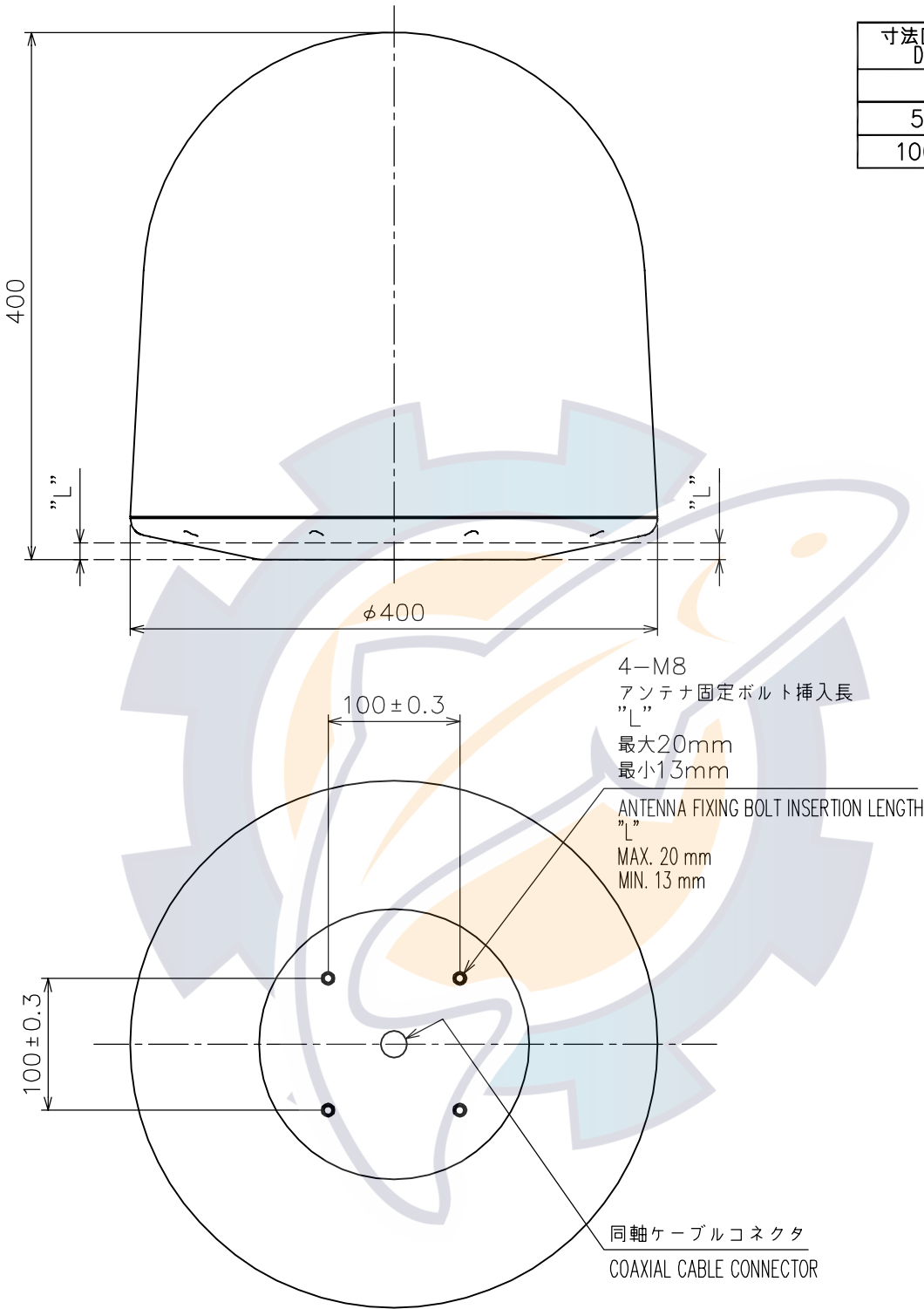
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		TYPE	CP16-00512		
<b>工事材料表</b> INSTALLATION MATERIALS		For Telephone FC755D1			
番 号 NO.	名 称 NAME	略 図 OUTLINE	型名 / 規格 DESCRIPTIONS	数量 Q'TY	用途 / 備考 REMARKS
1	取付板 MOUNTING BASE		16-011-7102-0	1	
			CODE NO. 100-273-840		
2	+トラスタップ・ソネジ +TAPPING SCREW		4X16 SUS304 1ｼｭ	4	
			CODE NO. 000-802-080		

表 1 TABLE 1

寸法区分 (mm) DIMENSIONS	公差 (mm) TOLERANCE
$L \leq 50$	$\pm 1.5$
$50 < L \leq 100$	$\pm 2.5$
$100 < L \leq 500$	$\pm 3$

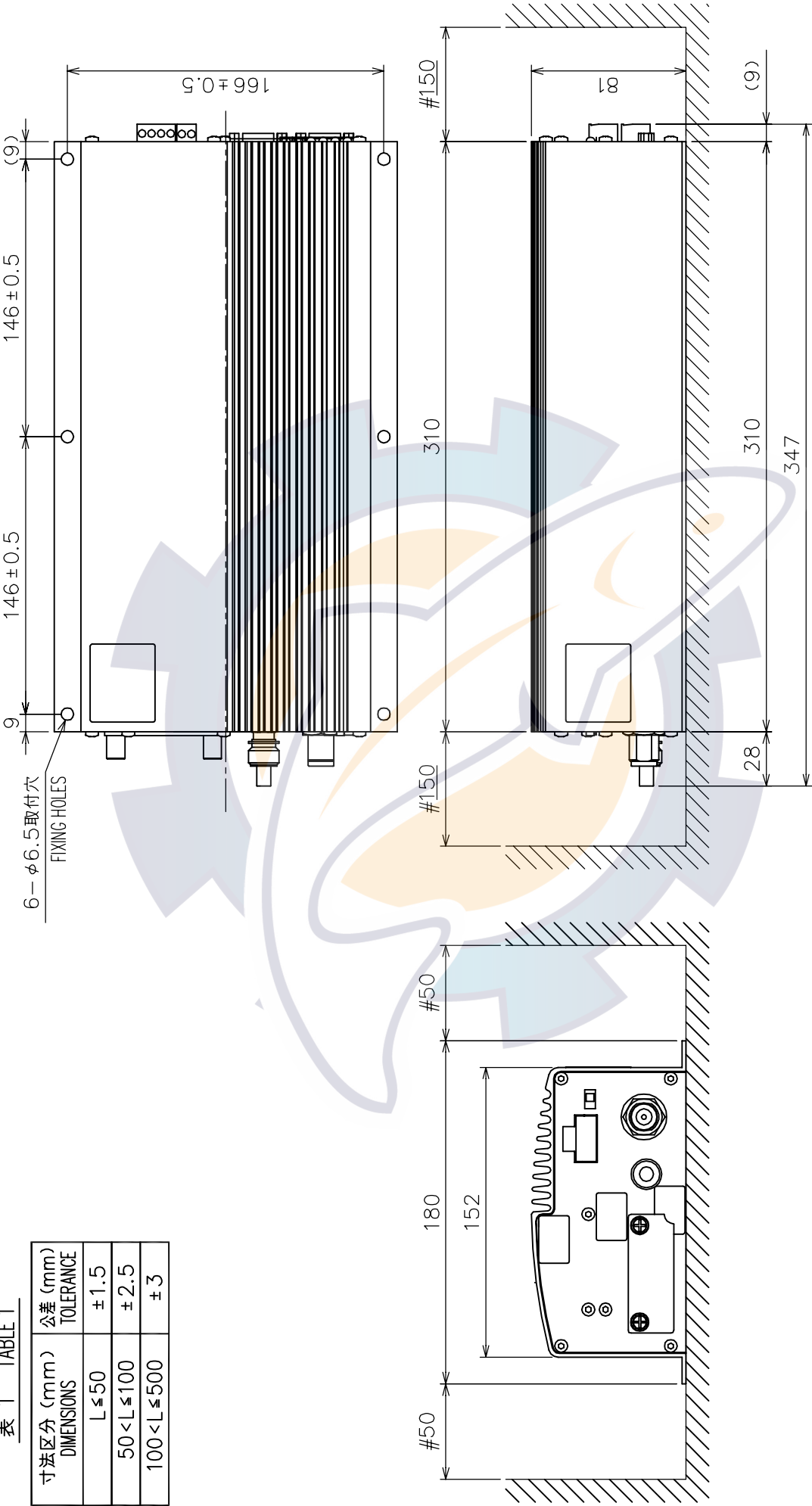


- 注 記 1) 取付用ネジはM8アンテナ固定ボルトを使用のこと。  
2) 指定外の寸法公差は表1による。
- NOTE 1. USE M8 ANTENNA FIXING BOLTS SUPPLIED.  
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.

DRAWN	Mar. 3, '05 E. MIYOSHI		TITLE	SF-130
CHECKED	TAKAHASHI. T		名称	アンテナユニット
APPROVED	Y. Hatai	FELCOM 30		外寸図
SCALE	1/5	MASS 9.2 $\pm 10\%$ kg 質量にケーブルは含まない。 MASS W/O CABLE.	NAME	ANTENNA UNIT
DWG.No.	C5647-G02-C	16-019-130G-3		OUTLINE DRAWING

表 1 TABLE 1

寸法区分 (mm) DIMENSIONS	公差 (mm) TOLERANCE
L ≤ 50	±1.5
50 < L ≤ 100	±2.5
100 < L ≤ 500	±3

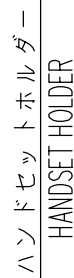


- 注 記 1) # 印寸法は最小サービス空間寸法とする。  
2) 指定外の寸法公差は表 1 による。
- NOTE 1. #. MINIMUM SERVICE CLEARANCE.  
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.

DRAWN	Nov. 25, '04 E. MIYOSHI	TITLE	SF-230/SF-250
CHECKED	TAKAHASHI, T	名称	通信制御ユニット (床置き装備)
APPROVED	Y. Hatai	外寸図	
SCALE	1/3 MASS ±10% 3.0 kg	NAME	COMMUNICATION UNIT (DECK MOUNTING)
DWG No.	C5647-G01-A		OUTLINE DRAWING



公差 (mm) TOLERANCE	寸法区分 (mm) DIMENSIONS
±1.5	L ≤ 50
±2.5	50 < L ≤ 100
±3	100 < L ≤ 500



注記  
1) 指定なき寸法公差は表 1 による。

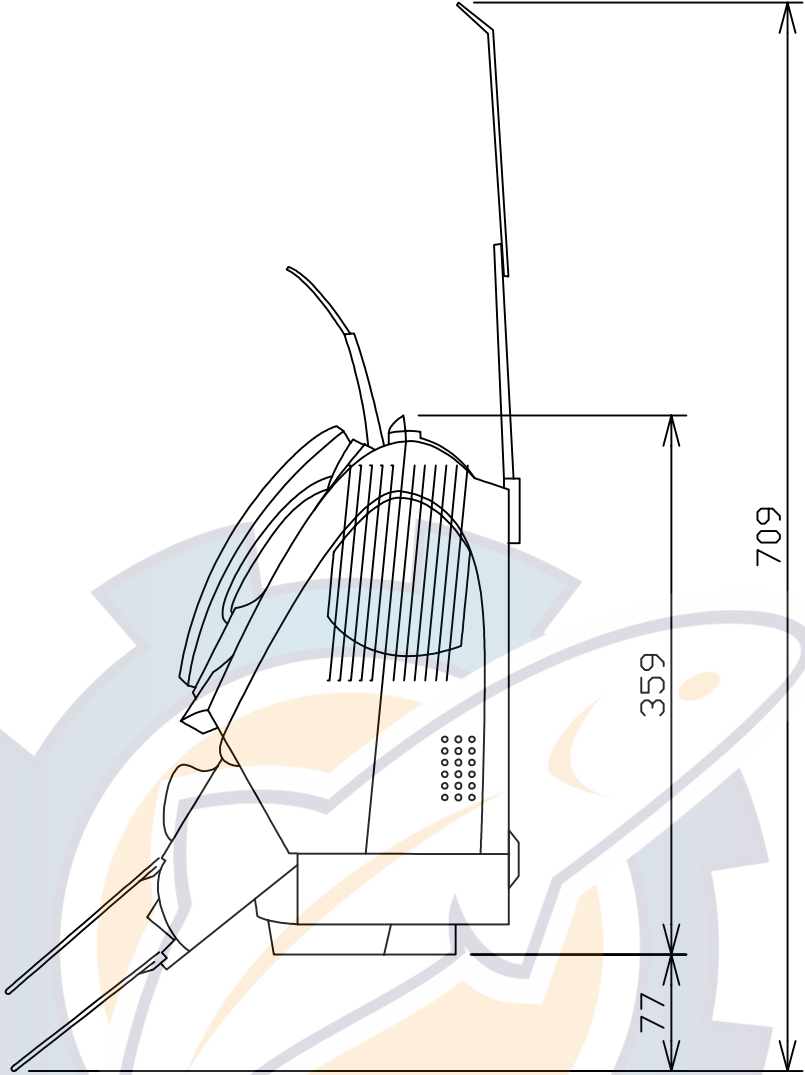
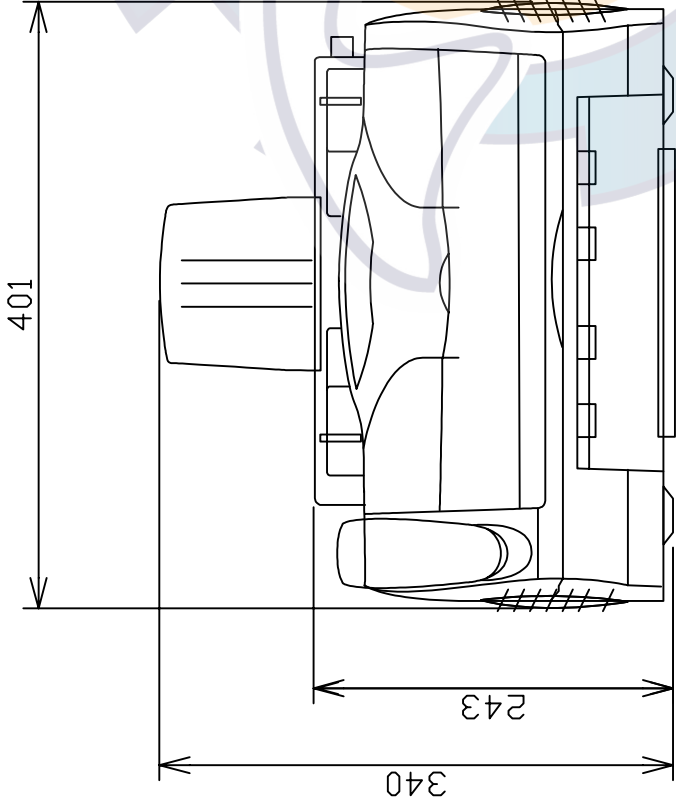
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.

DRAWN	Nov. 5, '04	E. MIYOSHI			TITLE	SF-870
CHECKED		TAKAHASHI, T			名称	ISDNハンドセット
APPROVED		Y. Hatai				外寸図
SCALE	1/2	1/32	0.36	1/16	NAME	ISDN HANDSET
DWG.No.	C5634-G02-B		16-016-800G-0		OUTLINE DRAWING	

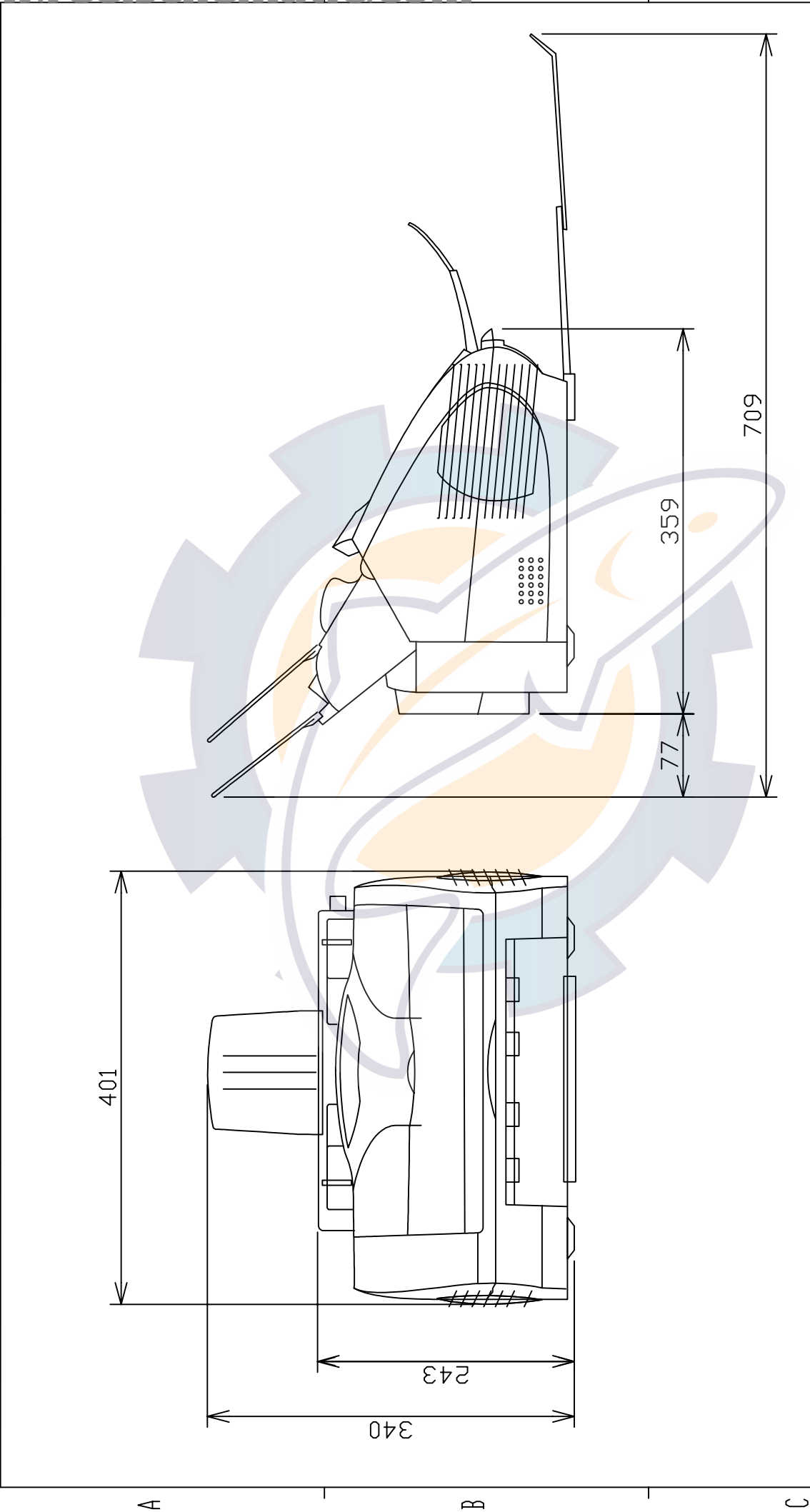
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3

2



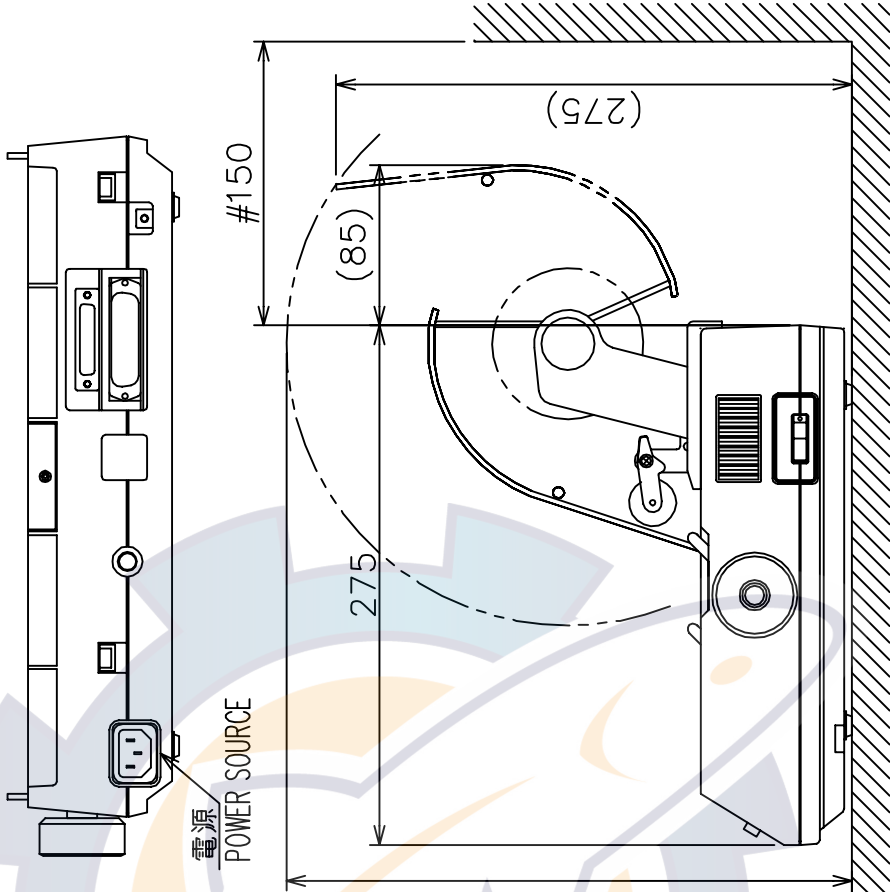
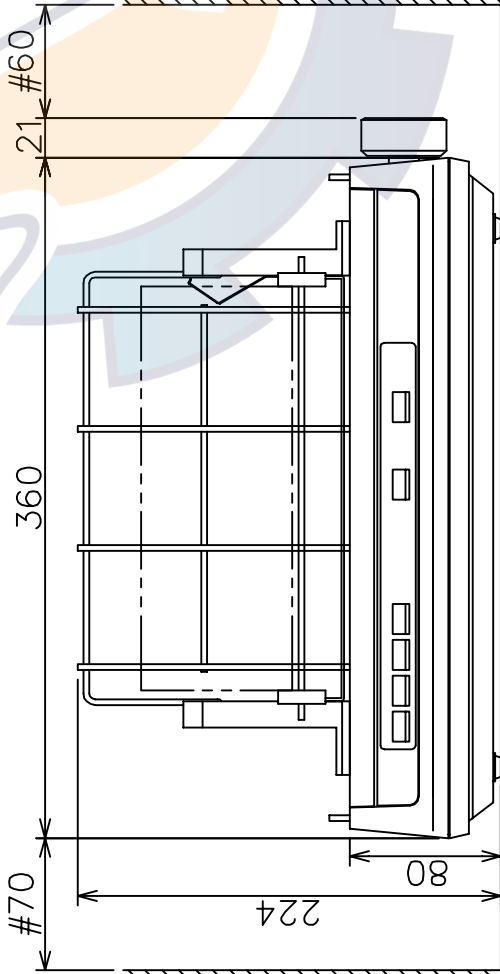
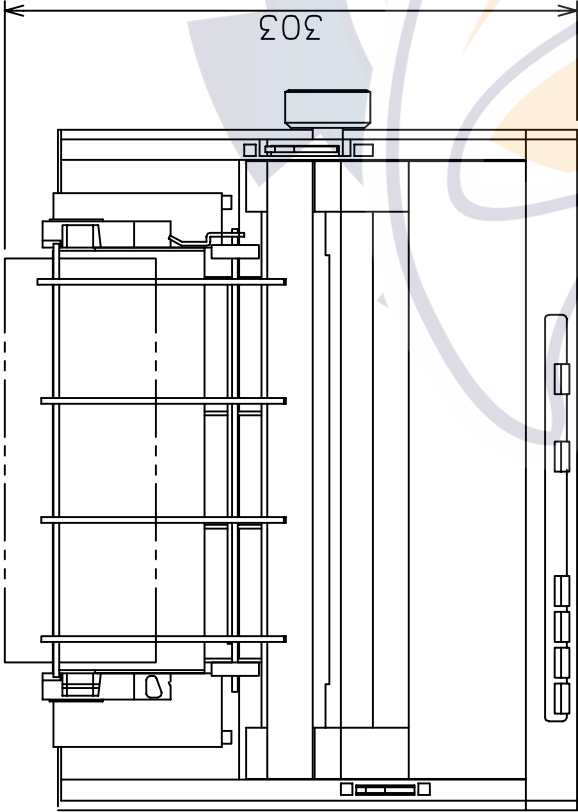
DRAWN	Oct. 18 '02	I. YAMASAKI	TITLE	FAX-2850 / MFC-4800J
CHECKED	Oct. 18 '02	Y. KIMURA	名称	ファクシミリ
APPROVED	Oct. 18 '02	y. Kimura	外寸図	
SCALE	1/5	MASS 7.5 kg	NAME	FACSIMILE
DWG No.	C5624-G15-A		OUTLINE DRAWING	



DRAWN	Dec. 9 '02	I. YAMASAKI	TITLE	FAX-8070P
CHECKED	Dec. 9 '02	Y. KIMURA	名 称	ファクシミリ
APPROVED	Dec. 12, '02	Y. Kimura	外寸図	
SCALE	1/5	MASS 7.5 kg	NAME	FACSIMILE
DWG No.	C5624-G16-A			OUTLINE DRAWING

表1 TABLE 1

寸法区分 (mm) DIMENSIONS	公差 (mm) TOLERANCE
L ≤ 50	±1.5
50 < L ≤ 100	±2.5
100 < L ≤ 500	±3



電源  
POWER SOURCE

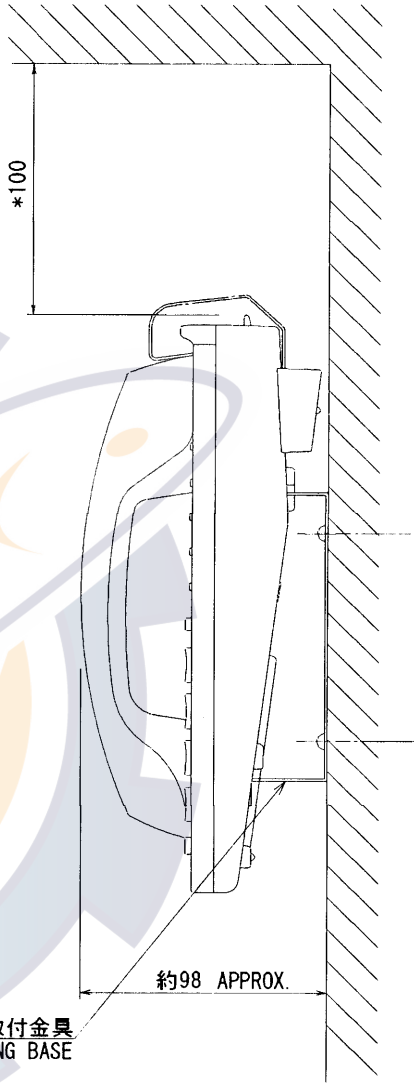
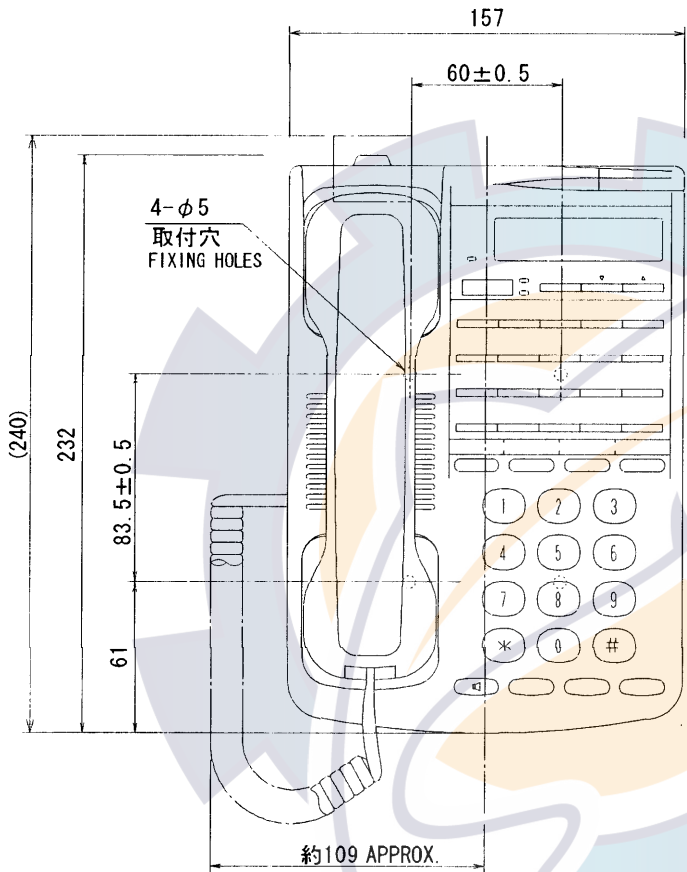
注 記 1) 指定外の寸法公差は表 1 による。  
2) # 印は最小サービスクリアランスとする。

NOTE 1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.  
2. # MINIMUM SERVICE CLEARANCE.

DRAWN	Feb. 4 '05 E. MIYOSHI	TITLE	ML280S
CHECKED	TAKAHASHI, T	名 称	プリンタ
APPROVED	Y. Hatai	外寸図	
SCALE	1/4 MASS 5.7 kg	NAME	PRINTER
DWG.No.	C5634-G10-A	16-016-500G-0	OUTLINE DRAWING

範囲 DIMENSION	公差 TOL.
$L \leq 50$	$\pm 1 \text{ mm}$
$50 < L \leq 100$	$\pm 1 \text{ mm}$
$100 < L \leq 500$	$\pm 1 \text{ mm}$

表 1  
TABLE 1



注 記

- 1) 指定外の寸法公差は表 1 による。
- 2) \* : 推奨するサービス空間寸法。
- 3) 取付にはトラスタッピンネジ4x16 SUS304を使用のこと。

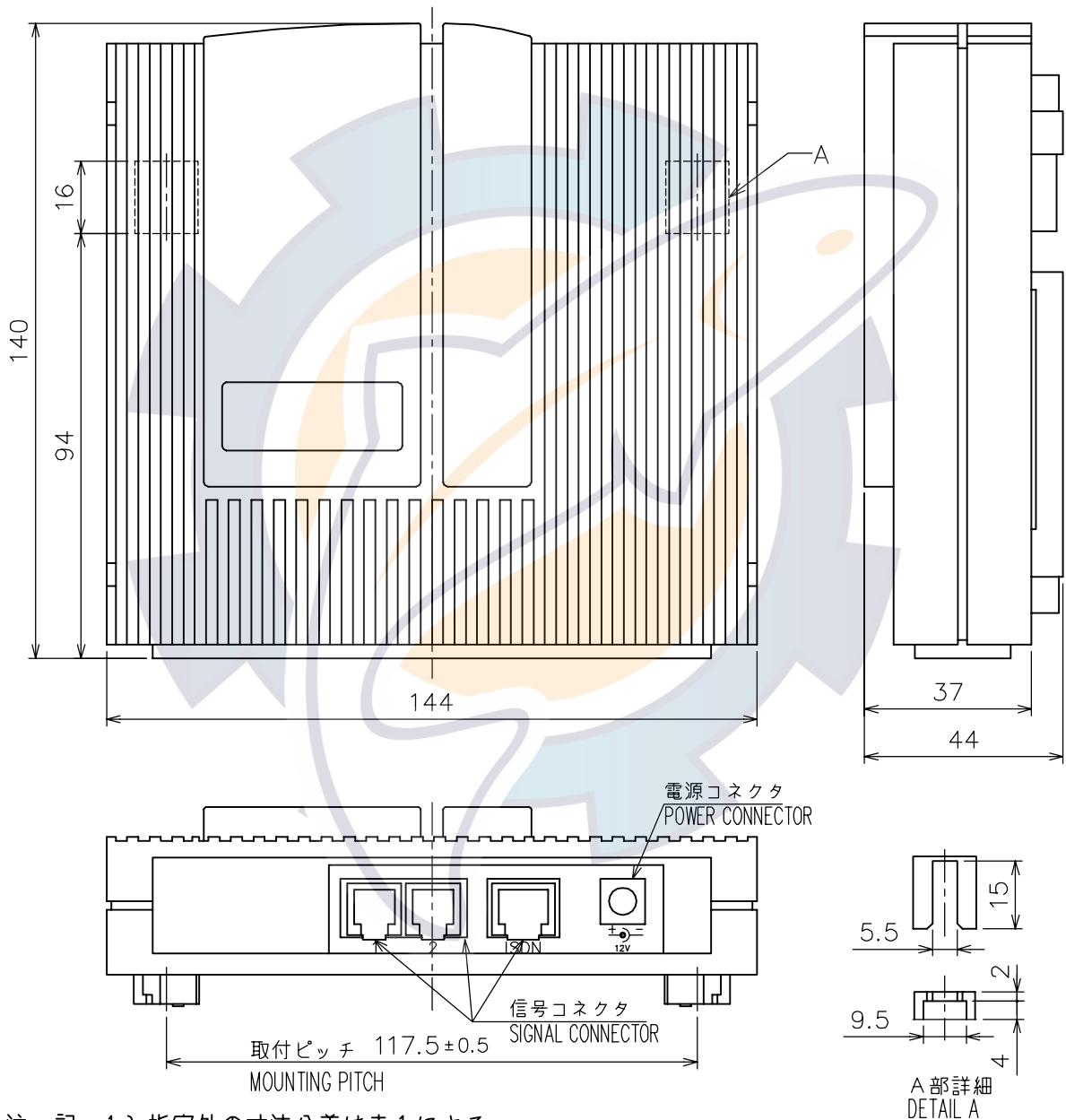
NOTE

1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
2. \*: RECOMMENDED SERVICE CLEARANCE.
3. USE TAPPING SCREWS 4x16 SUS304 FOR FIXING THE UNIT.

DRAWN July 26 '00 T. YAMASAKI		TYPE FC755D1
CHECKED July 27 '00 Y. Kuri		名称 電話機 (壁掛装備)
APPROVED July 27 '00 Y. Kuri	FELCOM 81	外寸図
SCALE 1/3	MASS 0.83 ±10% kg	NAME TELEPHONE (BULKHEAD MOUNT)
DWG. No. C5589-G19- B	16-011-710G- 0	OUTLINE DRAWING

表1 TABLE 1

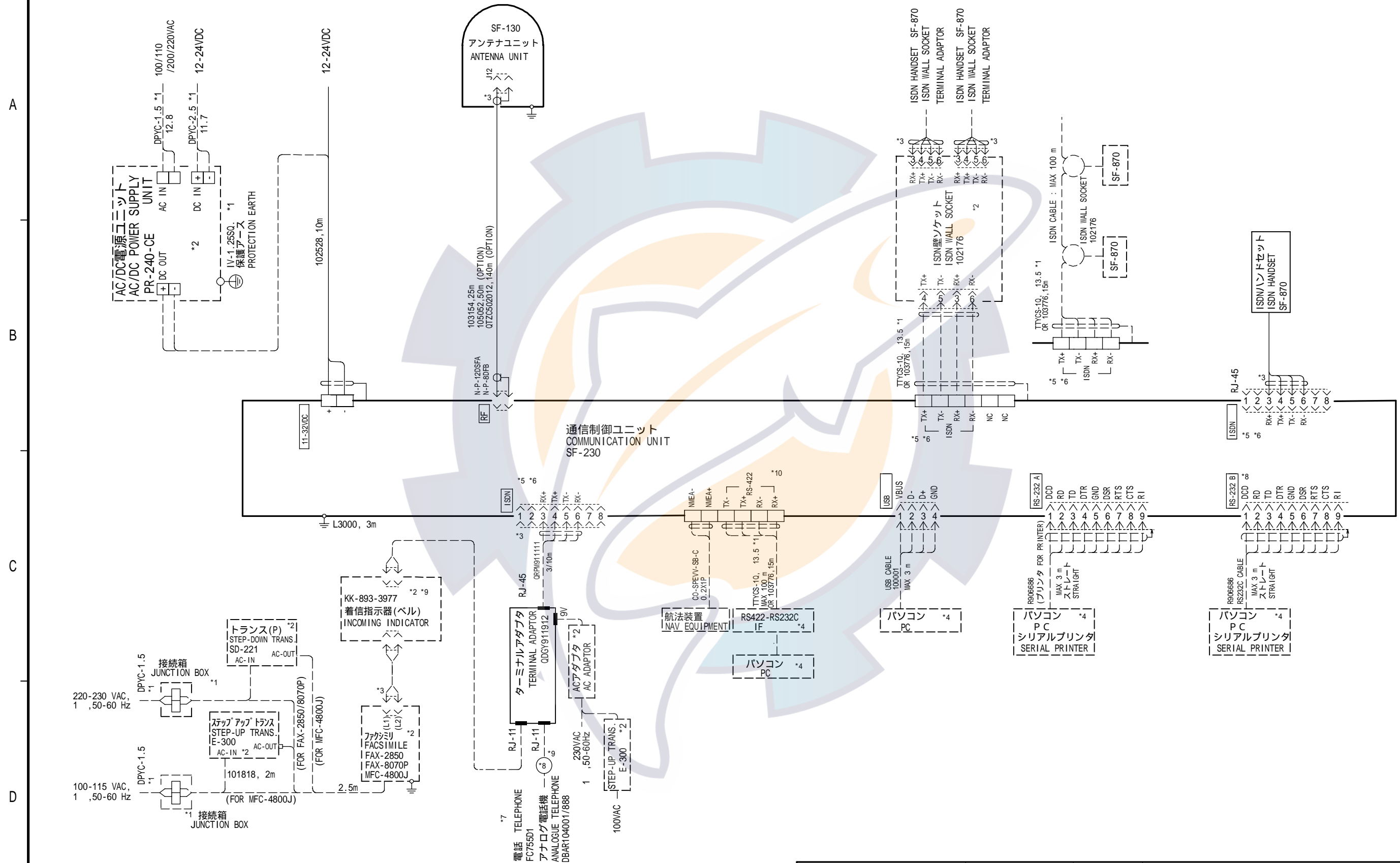
寸法区分 (mm) DIMENSIONS	公差 (mm) TOLERANCE
L ≤ 50	± 1.5
50 < L ≤ 100	± 2.5
100 < L ≤ 500	± 3



注 記 1) 指定外の寸法公差は表 1 による。  
2) 取付には、トラスタップピンネジ呼び 4 を使用のこと。

NOTE 1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.  
2. USE SELF-TAPPING SCREWS  $\phi 4$  FOR FIXING THE UNIT.

DRAWN Nov. 5, '04 E. MIYOSHI		TITLE QDGY911912
CHECKED TAKAHASHI. T	FELCOM 30	名称 ターミナルアダプタ
APPROVED Y. Hatai	FELCOM 50 FELCOM 70	外寸図
SCALE 1/1.5	MASS 0.3 ±10% kg	NAME TERMINAL ADAPTOR
DWG.No. C5634-G09- B	16-016-400G-0	OUTLINE DRAWING



注記: \*1: 造船所手配 SHIPYARD SUPPLY  
NOTE: \*2: オプション OPTION  
\*3: プラグは工場にて取付済 PLUG FITTED AT FACTORY.  
\*4: ユーザー手配 USER SUPPLY

\*5: 1つのポートの総ケーブル長は100m. CABLE LENGTH FOR ONE PORT IS 100 m.  
\*6: ISDN同等機器を接続 ISDN OR EQUIVALENT CAN BE CONNECTED.  
\*7: 電話同等機器を接続 TELEPHONE OR EQUIVALENT CAN BE CONNECTED.

\*8: 着信指示器 (KK-893-3977) を挿入可能 INCOMING INDICATOR CAN BE INSERTED.  
\*9: 着信指示器は直列または並列に接続可能 INCOMING INDICATOR CAN BE CONNECTED IN PARALLEL OR IN SERIES.  
\*10: RS-422またはRS-232Cをメニューで選択可能 RS-422, RS-232C SELECTABLE FROM MENU.

DRAWN Mar. 3 '05 D. MILLS	TITLE FELCOM 30
CHECKED TAKAHASHI .T	名称 インマルサットFLEET F33 船舶地球局
APPROVED Y. Hatai	相互結線図
SCALE MASS kg	NAME INMARSAT FLEET F33 MES
DWG No. C5647-C01- B	INTERCONNECTION DIAGRAM