Technical Manual

Compact HF SSB DSC Watchreceiver

Overview of RM2152

The RM2152 may have a number of names, depending on whether it is a SAILOR, NORCONTROL, Husun or Sperry product. In this manual, however, only the SAILOR names are used.

The table below shows the different names used for each unit, emphasizing the SAILOR names

Compact HF SSB DSC Watchreceiver RM2152	**SAILOR**	**NORCONTROL**	**Husun**	**Sperry**
	RM2152	RM2152	2152	RM2152

Please Note:

Any responsibility or liability for loss or damage in connection with the use of this product and the accompanying documentation is disclaimed. The information in this quick guide is furnished for informational use only, is subject to change without notice, may contain errors or inaccuracies, and represents no commitment whatsoever. This agreement is governed by the laws of Denmark.

CONTENTS

CONTENTS

1   GENERAL INFORMATION

1.1   INTRODUCTION

Compact HF SSB RM2152 is the DSC and TELEX scanning receiver with built-in DSC and TELEX modem.
It has been developed on the basis of SAILOR's many years of experience with short wave communication equipment.
It has the same high reliability as all SAILOR equipment is known for.
It has been constructed so that it fits in with other units in the Compact Programme 2000.

SAILOR HF SSB PROGRAMME 2000 CONSISTS OF THE FOLLOWING UNITS:

RE2100:   Control unit with integral receiver and exciter.

T2130:   250W PEP SSB transmitter with integral power supply for RE2100.
Supply voltage 24V DC.

AT2110:   250W PEP aerial coupler for outdoor use.

N2160:   12V DC power supply for T2130.

N2161:   110/220/240V AC, 50 Hz power supply for T2130.

N2165:   AC/DC power supply for RM2152

1.2   GENERAL DESCRIPTION

RM2152
-    is an all solid state constructed microcomputer controlled SSB short wave radio modem.

-    covers the frequency range 100 kHz to 30 MHz.

-    is a scanning receiver with integral DSC and TELEX modem.

-    has a special serial input/output (SP-BUS) enabling RM2152 to communicate with the other units in the Compact 2000 programme.

-    is fully synthesized and has a high stability reference oscillator (TCXO).

-    has an- easy-to-read display with controlable backlight.

-    has a push-button keyboard offering an attractive tactile feeling and a safe finger-guide in the metal front. The keyboard is fitted with night-illumination of the lettering.

-    is a fully automatic ARQ telex unit with HF SSB RE2100 and the terminal equipment H2098A/H2099/H1253B. The terminal equipment can be replaced by a personal computer.

-    is a fully automatic DSC unit with HF SSB RE2100.

-    has a read-out in alpha numerical display of received DSC information. Printer not necessary.

-    has easy to understand menu-controlled DSC calls.

1.3   TECHNICAL DATA

SYSTEMS SPECIFICATIONS

Communication protocol	DSC:	CCIR Rec. 493-9 (class A), 541-8. ETS 300 338, IEC 945.
	Telex:	CCIR Rec. 625, 476-3, 490, 491(1978), CCITT Rec. 130.

Other Rec's: In compliance with ETSI, CEPT, MPT, FTZ and FCC.

Modes of operation: ARQ, FEC, SELEC, and DSC.

Line signal: Two tone keyed, 100 baud synchronous.
DSC: 10 unit code, 7 bits information and 3 bits parity.
TELEX: 7 unit code, constant 4B/3Y ratio.

Call codes: DSC: 9 digits station inditification.
TELEX: 5 digits and 9 digits with dual ship ID-codes for individual and group calls.

Keys: All keys are back-illuminated.

Display: " Graphic LCD display with adjustable backlight angle.

Acoustic Alarm: DISTRESS and URGENCY alert, alert for other type of received calls. Warning for wrong or missing entries.

Scanning facilities: 10 scan programmes containing up to 6 different frequencies.

Call stacks: The 5 last received ordinary calls. Not older than 48 hours.
The 20 last received DISTRESS calls. Not older than 48 hours.

Program memory: 384 kilobyte main memory in EPROM.
512 kilobyte volatile RAM.
64 kilobyte Nonvolatile RAM (battery back-up).
32 kilobyte Nonvolatile EEPROM.

RECEIVER SPECIFICATIONS

Receive System: Double conversion super heterodyne 1st IF 70 MHz. 2nd IF 10.73 MHz.

Frequency Range: 100 kHz to 29999.9 kHz.

Antenna impedance: 50 Ω

Frequency Stability: Better than 0.39 ppm.

IF selectivity: Passband ripple better than 1 dB.
3 dB bandwidth at ± 150 Hz to ± 350 Hz.
60 dB bandwidth at ± 750 Hz.

Sensitivity: DSC calling sensitivity   -18 dB/V.
TELEX calling sensitivity -18 dB/V.
(CEPT method of test.)

Adjacent Channel: 40 dB at ± 500 Hz.

Selectivity: (CEPT method of test).

Automatic gain control: Less than 2 dB variation of detector output level for 90 dB input signal variation.
(0 dB/V to 90 dB/V)
Fast attack time and slow decay time.

Blocking:	Better than 55 dB for unwanted signals in the band 1 kHz to 3 kHz away from the wanted signal.
	Better than 75 dB for unwanted signals more than 3 kHz away from the wanted signal.
	(CEPT method of test)
Co-channel rejection:	Less than 6 dB.
	(CEPT method of test).
Intermodulation:	IP3 better than 8 dBm.
	(CEPT method of test).
Spurious and IF Rejection:	Better than 70 dB.
	(CEPT method of test).
Spurious Emission:	Better than 1nW at antenna connector.
Audio Power:	1 Watt into 8 ohm, less than 10% distor.

LOCAL INTERFACE

Printer interface:	Parallel centronics.
Remote control:	CCITT Rec V.10 SPECIAL (RS-423, T-BUS), multidrop addressing for control of transmitter and data equipment control/polling.
Navigator interface:	NMEA 0183.
Terminal interface:	CCITT Rec. V.24/V.28 (rs-232C)
External alarm:	Alarm output, rs-410 type N (open drain).

LINE INTERFACE

Tone frequencies:	1700 ± 85 Hz, accuracy within 0.5 Hz.
Modulation:	Phase-continues AFSK keying.
Frequency stability:	Better than 0.1 Hz.
Filter tracking:	Adaptive tracking within ± 85 Hz.
Decision filtering:	Bit-slicing with multipath correction.
Demodulation filter:	4 pole bessel.
RX-tone input:	Strap selectable internal/external.
	+10 dBm to -20 dBm, continues adjustable, 600 Ohm balanced.
RX dynamic range:	35 dB.
TX-tone output:	+10 dBm to -20 dBm, continues adjustable, 600 Ohm balanced.
Free-signal detection:	Automatic detection and handling of free-signals.
Radio control input:	RS-410 type N.
Radio control output:	RS-410 type N (open drain).

GENERAL

DC power source:	+18Vdc ± 5%, 0.5 Amp.
	-18Vdc ± 5%, 0.2 Amp.
	+9Vdc ± 5%, 0.5 Amp.
Ambient temperature:	-15°C to 55°C operating.
	-20°C to 70°C storage.
Relative humidity:	95% non-condensing.
Vibration:	IEC, CEPT and MPT 1204.
Dimension:	H*W*D, 98 mm * 210 mm * 300 mm.
Weight:	3.7 Kg.

1.4   CONTROLS

37151A

VOL OFF   Volumen control and on/off switch for the mains.

FUNC   Access to the functions <Display>,<Pos>,<Stns>,<Time>,
<Test>,<Options>,<Print> and <Sun>.
<Display>:   Give access to the display set up menu.
<Pos>:   Give access to the postion set menu.
<Stns>:   Give access to key data in the station table.
<Time>:   Give access to set the internal clock.
<Test>:   Give access to the internal/external test menu.
<Options>: Give access to the radiomodem set up menu.
<Print>:   Give access to a printer set up and a print menu.
<Sun>:   Give access to key in the number of sun-spots, used in the MUF-program.

DIS TRESS
Give access to the distress menu or
transmits the distress signal when **distress** and **send** are activated simultaneously.

SCAN
Give acces to the scan menu or to the scan edit menu
when **scan** and then the **edit** key is activated.

2187.5
Give access to select 2187.5 kHz.

RX MSG
Give access to a message book of received DSC calls, distress as well as ordinary calls.
MSG

CALL
Give access to make a DSC call to a telecom. subscriber with keyed in data or
to make any other DSC call when **call** and then the **edit** key is activated.
A distress relay call can be compssed when **call** and then the **edit** key is activated.

EDIT
Used in combination with other keys.
Scan and **edit** give access to edit a scan programme.
Addr book and **edit** give access to edit data storred in the address book.
Call and **edit** give access to compose a DSC call of any kind.

SEND
When activated the DSC call will be transmitted.
Transmits the distress signal when **distress** and **send** are activated simultaneously.

LAST
Next is used to activate the next display menu, **last** is used to activate the previous display menu.

◀
When activated the cursor will move in counter clock-wise direction. If the cursor is placed in a writing   -space and the left arrow is used, the cursor will move one step to the left and the information will be deleted.

▲
When the up/down arrow show in the display menu the up/down key can be used to extend the display menu.

▼
When the up/down arrow show in the display menu the up/down key can be used to extend the display menu.

▶
When activated the cursor will move in the clock-wise direction.

STU 7
Digits from o to 9 or letters from A to Z.

STOP ENT
Terminate a key-in sequence and stop a transmission of a Distress or ordinary DSC call.

DEG .
Set the decimal point or the deg sign.

1.5   PRINCIPLE OF OPERATION AND BLOCK DIAGRAM

MAIN PROCESSOR UNIT

FILTER UNIT

DISPLAY UNIT

This unit contains a graphical LCD display.

SYNTHESIZER UNIT

This unit contains all frequency generating parts.

The reference oscillator which is a temperature compensated crystal oscillator (TCXO) with a frequency of 10,73152 MHz.

The receiver needs two LO-signals. These signals are generated in two separate PLL's, one having output frequencies from 70 MHz to 100 MHz and the other having output frequency of 59,26912 MHz. The synthesizer which covers from 70 MHz to 100 MHz is a fractional synthesizer with a resolution of 10 Hz. This PLL is used as LO-injection to the first mixer at the receiver front end.

RECEIVER FRONT END UNIT

This unit contains input protection circuit, input filters, 1st mixer and 70 MHz IF filter.

The input filter is a mixture of lowpass, highpass and bandpass filter to obtain max. performance in the entire band from 100 kHz to 30 MHz.

The mixer is a FET mixer with high level LO-injection to give the mixer good high signal quality. This mixer converts the incoming radio signal to a 70 MHz IF signal. The mixer is followed by a 70 MHz bilitic quartz filter with a bandwith of 15 kHz.

RECEIVER UNIT

This unit contains all necessary circuits to convert the 70 MHz IF signal to an audio signal.

The 70 MHz IF signal from the front end is fed to the second mixer which converts the signal to a 10,73 MHz second IF signal. This 2nd IF signal is fed through a high order monolitic quartz filter to the input of the 10,73 MHz IF amplifier. The gain of this amplifier is regulated from the AGC amplifier/detector. The IF amplifier is followed by a ceramic filter to reduce the wideband noise. From the ceramic filter the signal is fed to the signal detector, which operates as an SSB demodulator. The AF signal from the demodulator is fed through a lowpass/highpass filter unit to an amplifier from which the output signal is about 0 dBm/ 600 ohm.

POWER UNIT

This unit produces all the necessary supply voltages for the modules in RM2152.

The input voltages from N2165 is +18V, -18V and +9V. These voltages pass through seven series regulators to produce the necessary supply voltages to RM2152.

BLOCK DIAGRAMME

RF in/out
to T2130

RECEIVER FRONT END (MODULE 2)

0.385MHz Lowpass Filter
0.385-1.6MHz Bandpass Filter
1.6-4.5MHz Bandpass Filter
4.5-9MHz Bandpass Filter
9-18MHz Bandpass Filter
18-30MHz Bandpass Filter

Mute
Rx/Tx Switch
Highpass Filter
30MHz Lowpass Filter
1.st Mixer
Filter 70MHz
1.st LO Buffer
Shift reg.

LO I: Rx 70-100 MHz

RECEIVER (MODULE 1)

2.nd Mixer
Telex Filter
IF AMP
300kHz BW
IF AMP
Demodulator
1950Hz LP Filter
1450Hz HP Filter
600 ohm Buffer

$F_{LO2} = 59.26912MHz$
$Fc = 10.73152MHz$

2.nd Lo-buffer
AGC Buffer
AGC Detector
AGC AMP
Shift Register
A0 A1 A2 A3 A4 A5 A6 A7

Hang Time AGC
Hang Time AGC

KEYBOARD UNIT (MODULE 6)

DISPLAY UNIT (MODULE 7)

+5.7V
LCD DISPLAY
LED BACKLIGHT
VIEWING ANGLE
D/A Converter
D/A Converter
DELAY 1
HEX REGISTER
ARDY
DELAY 2

ON/OFF
SPEAKER VOL
+5.7V   -5.7V
BL
FROM MAIN PROCESSOR

MAIN PROCESSOR (MODULE 4)

WATCH DOG
MICRO-PROCESSOR 80188
DEMULTI-PLEXER
PROM
EEPROM
SRAM
DRAM
BATTERY SUPPLY
MULTI-PLEXER
TIMER
I/O ADDRESS DECODER
PROGRAMABLE INTERVAL TIMER

POWER UNIT (MODULE 8)

+9V
-18V
+18V

+5VA
+5VB
+5.5V BL
-15VA
-15VB
+15VA
+15VB

-BATT

I/O BUFFER DISPLAY
I/O BUFFER KEYBOARD
I/O BUFFER SPI

DATA
CLOCK
RECEIVER
FRONT END
SYNTHESIZER

CLOCK
LED INDICTORS
STRAP FIELD
PARALLEL INTERFACE

SYNTHESIZER (MODULE 3)

TCXO
Buffer
2nd Divider
Reference Divider
Phase detector
Loop Filter

100-92.5MHz VCO I
92.5-85MHz VCO II
85-77.5MHz VCO III
77.5-70MHz VCO IV

VCO-Buffer
LO-Buffer
Rx/Tx Switch
Rx
Ex

Control logic
Prescaler buffer
Prescaler

Current Mirror
A/D Converter
Programmed divider
Modulus Control Logic

1/n Curr. Logic
Fraction register
Adder overflow
Sum latch clock
Shift reg.

2nd Divider
Reference Divider
Phase detector
Loop Filter
VCO 1
VCO 2
VCO-Buffer
LO-Buffer
Rx

Prescaler buffer
Programmed divider
Prescaler

FILTER BOARD (MODULE 5)

POWER SUPPLY on/off
+18V
-9V
+18V

Tx MOD
RX*TX
FcK 4785Hz +-80Hz Rx mix
Mix 2
Fo = 3170Hz
Mark filter
-5V ANL
-7.5V

W1
RX OUT
GAIN
W6
OVER LOAD
TX EN
TX out

LINE IN
LINE OUT
HTX
SPKR CLK
SPKR GATE

Tx level
Fo = 3000Hz
Space filter
DEMOD
SELECT
PETIME
Tx OUT

EXT. SPEAKER
RX MUTE

TRANS-MITTER CONTR.

HTX
SPEAKERGATE
TX EN
RX/TX
LATCH SELECT

+15V

2 X USART
USART
I/O BUFFER

SP-BUS INTERFACE
SERIAL INTERFACE
OPTO-COUPLER

-5.7V Regulator
VCC

SP-BUS
RS-232C CONSOLE
NMEA INTERFACE
PRINTER

TO DISPLAY
BL
+15VA
-15VA
+5VA

AF TO AMP
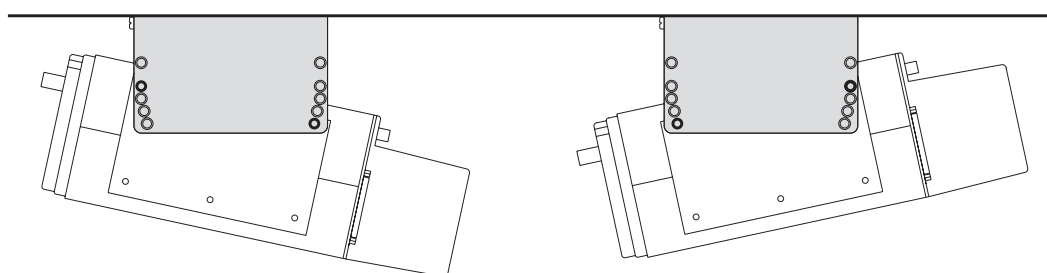VOL. CONTROL
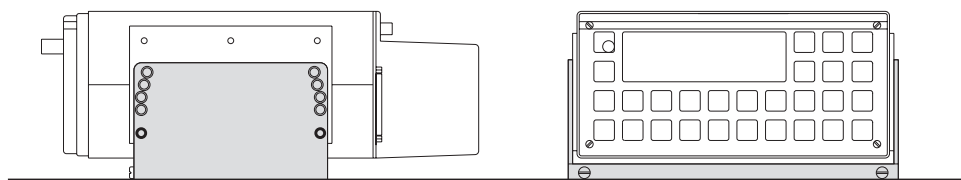AF FROM AMP

INTERNAL LOUDSPEAKER

37146

CONTENTS

2   INSTALLATION
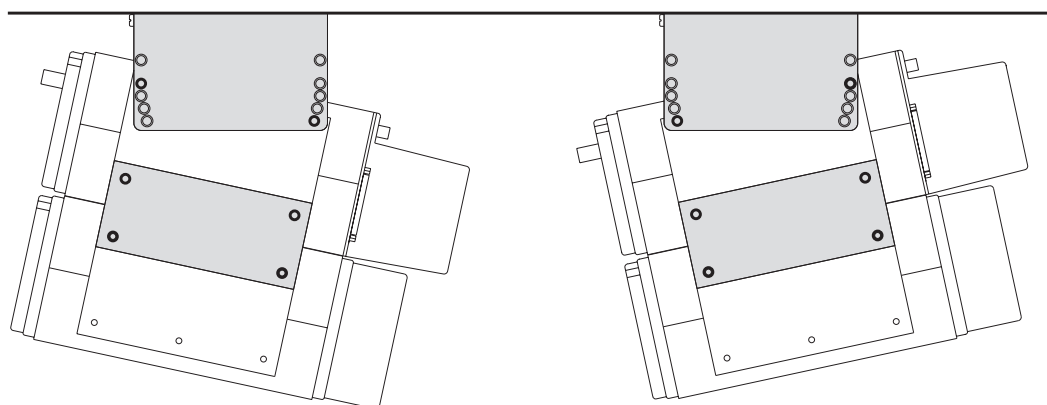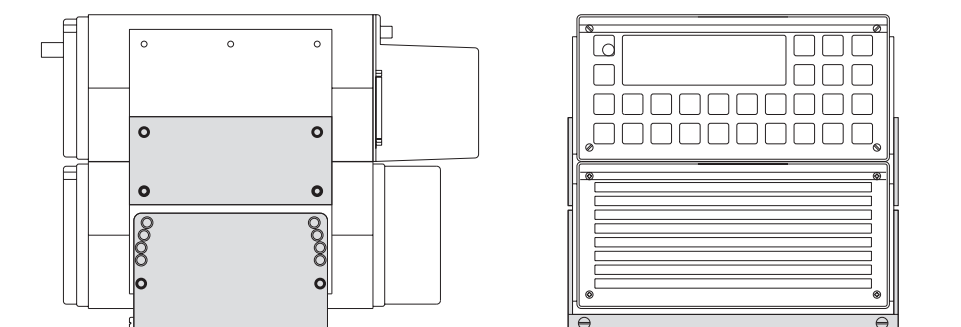
2.1   MOUNTING POSSIBILITIES
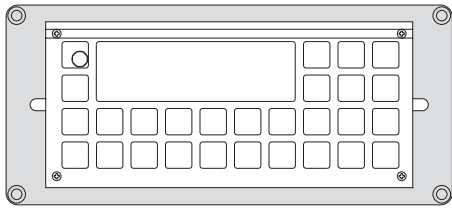
TABLETOP AND DECKHEAD

27434

Mounting bracket H2055 which offers the same possibilities for the loudspeakers H2054 and H2074.
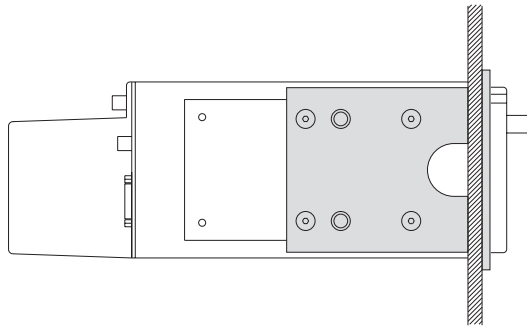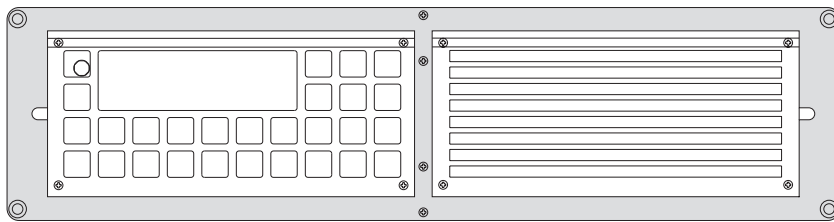

27435

Mounting kit H2068 and H2055

BULKHEAD AND CONSOLE

27436

Mounting kit H2063 which offers the same possibilities for the loudspeakers H2054 and H2074.

27437

Mounting kit H2062 or
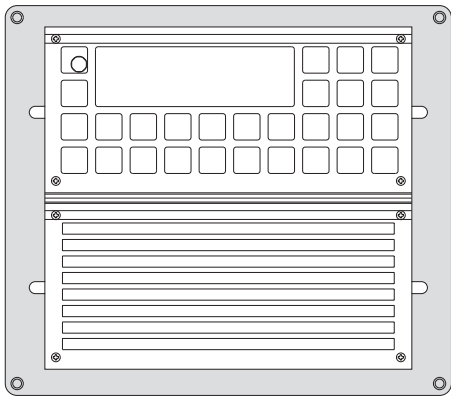
27438
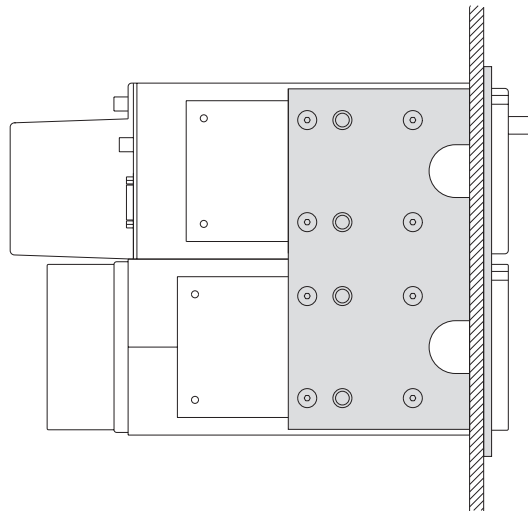
Mounting kit H2064.

IN CONJUNCTION WITH OTHER SAILOR EQUIPMENT
Look up the INSTALLATION section for the SAILOR unit in question.

2.2   DIMENSIONS AND DRILLING PLAN

UNIVERSAL MOUNTING BRACKET H2055
permits a wide variety of installation possibilities, such as tabletop, bulkhead or deckhead. For other possibilities such as console installation, the 19" rack or all units in the Compact programme assembled on the bulkhead, see special information concerning installation of the Compact programme.
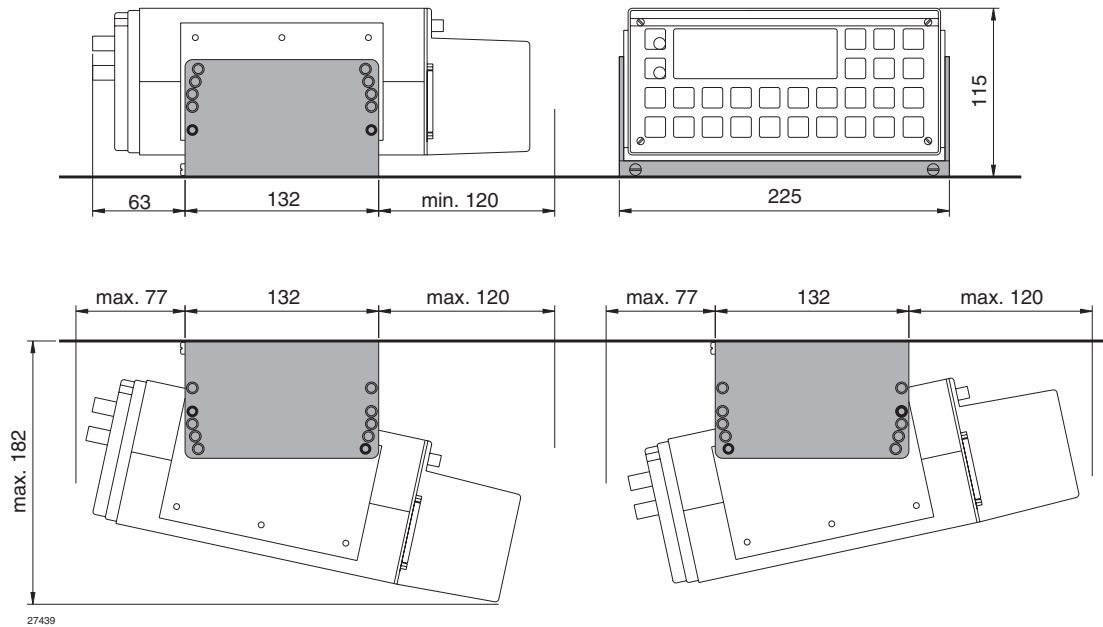
27439

WEIGHT
Mounting kit H2055:   1.5 kg
Loudspeaker H2054:   5.5 kg
Loudspeaker H2074:   4.0 kg
HF SSB RM2152:   4.0 kg

4 pcs ø6.5 mm
4 pcs ø4.5 mm

27440

27441

4 pcs M5x8
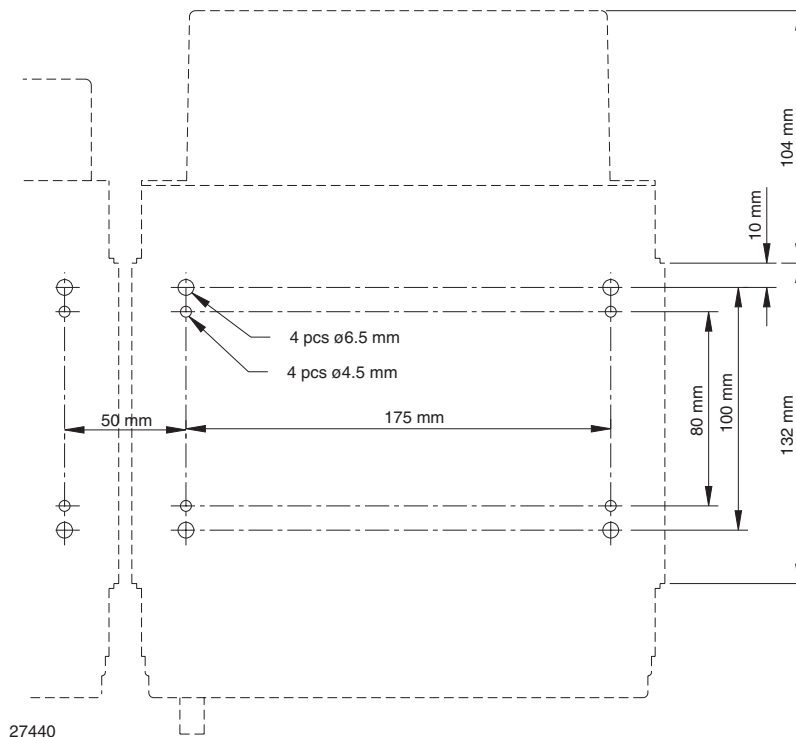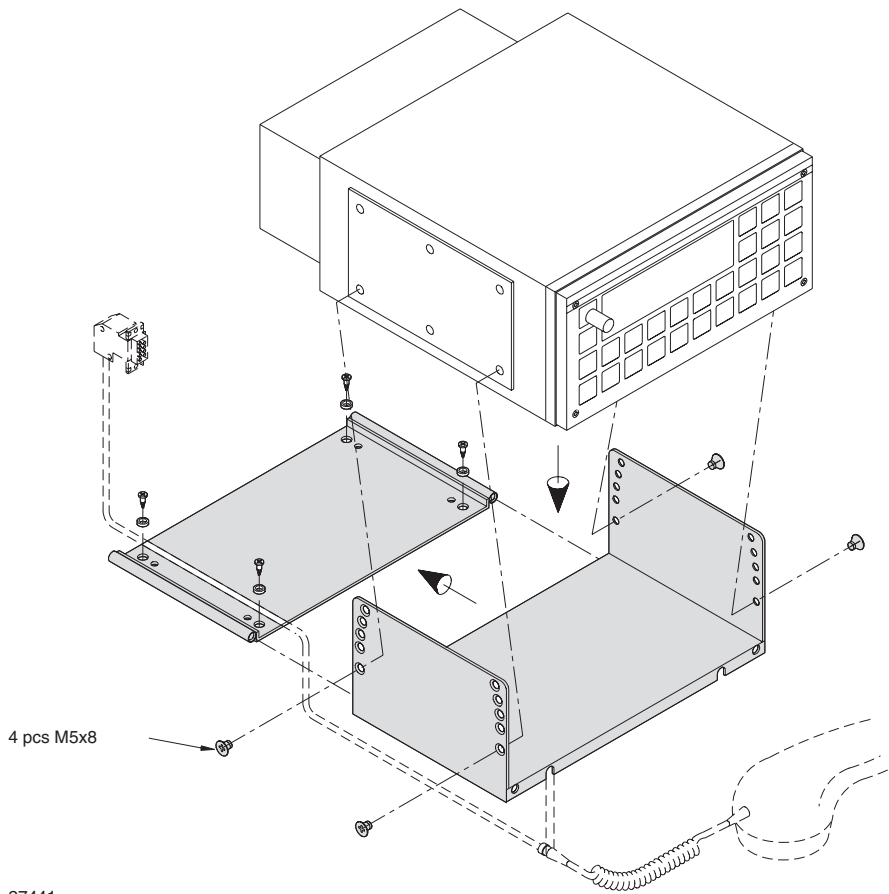
WEIGHT
Lashing kit H2068:	1.5 kg
Mounting kit H2055:	1.5 kg
Loudspeaker H2054:	5.5 kg
Loudspeaker H2074:	4.0 kg
HF SSB RM2152:	4.0 kg

MOUNTING KIT H2068 AND H2055
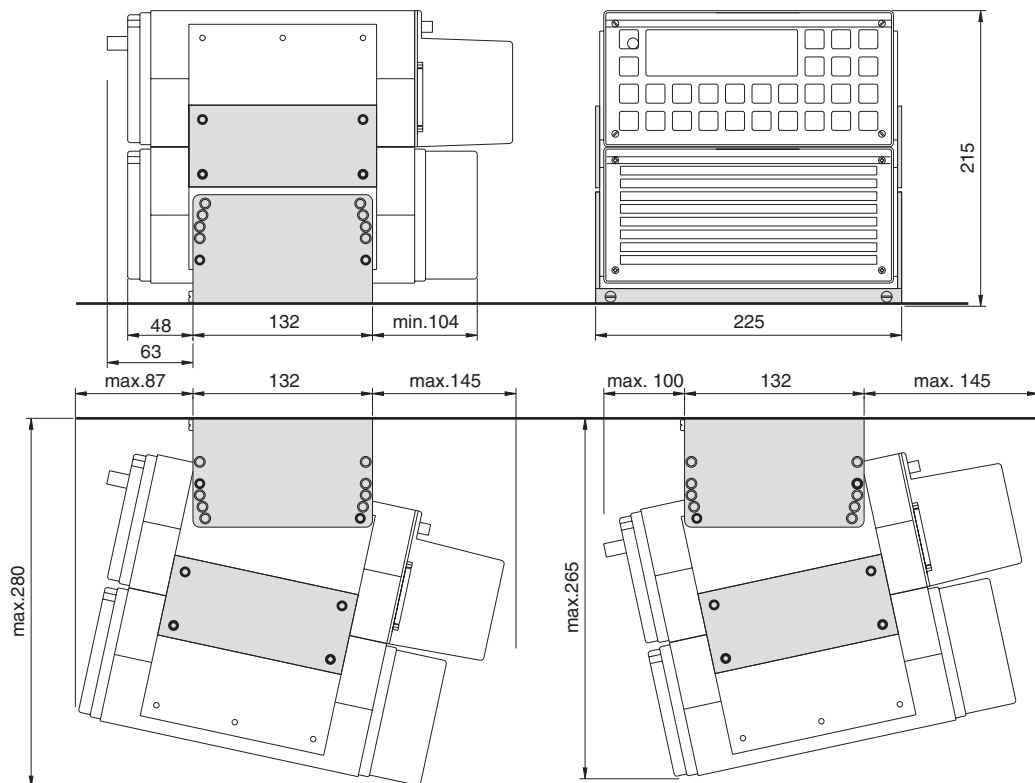
27442

MOUNTING KIT H2063
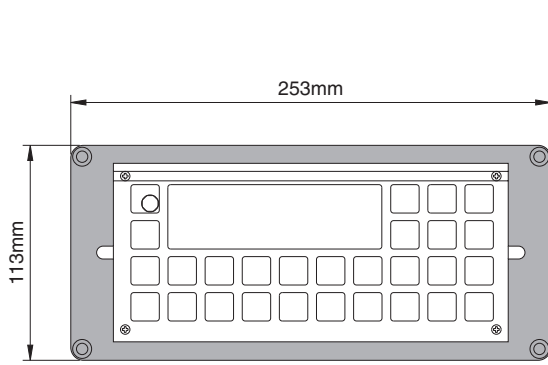
27443A
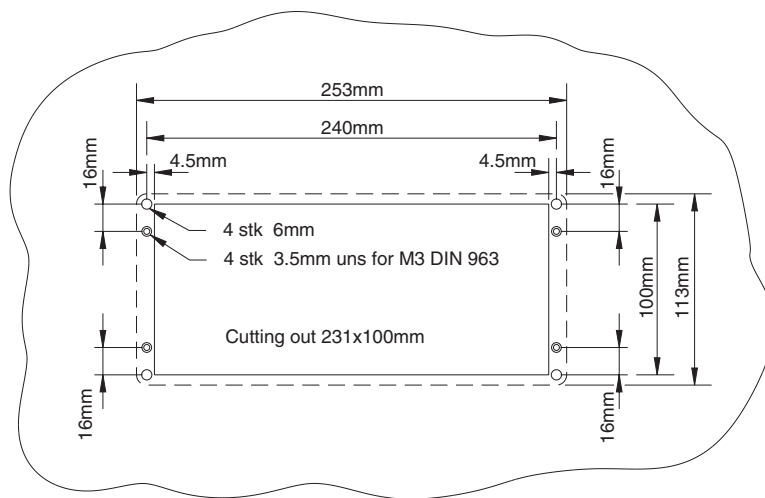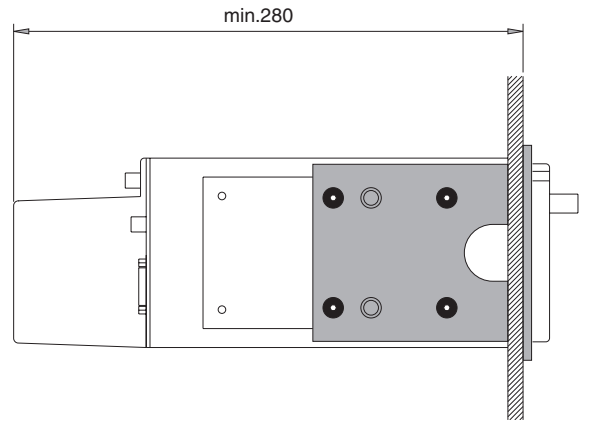
min.280

253mm

113mm

27444A

253mm

240mm

16mm   4.5mm   4.5mm   16mm

4 stk 6mm

4 stk 3.5mm uns for M3 DIN 963

Cutting out 231x100mm

100mm   113mm

16mm   16mm

Free distance must be kept to allow free air circulation ambient temperature max. 40°C.

WEIGHT
Mounting kit H2063:   1.0 kg
Loudspeaker H2054:   5.5 kg
Loudspeaker H2074:   4.0 kg
HF SSB RM2152:   4.0 kg

4 pcs M3x30
4 pcs cover
8 pcs M5x8

4 pcs M5x30

MOUNTING KIT H2064

27446A
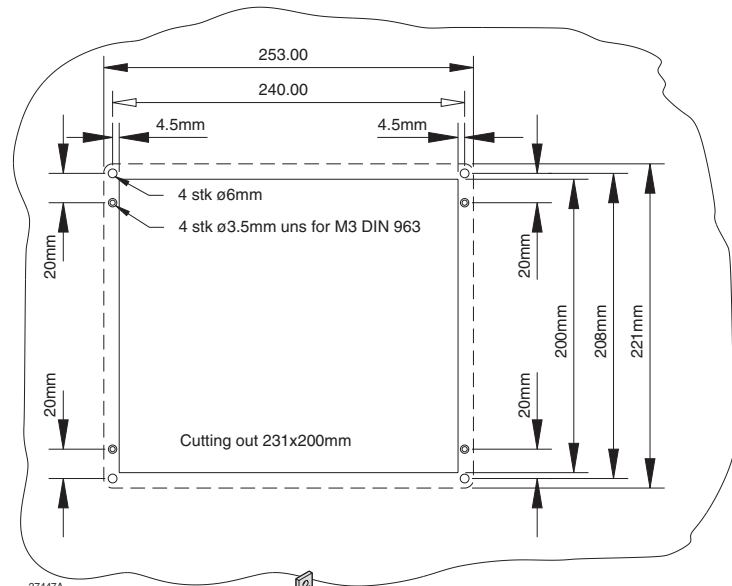
253.00

240.00

4.5mm   4.5mm

4 stk ø6mm

4 stk ø3.5mm uns for M3 DIN 963

20mm

20mm   20mm

20mm   20mm

200mm   208mm   221mm

Cutting out 231x200mm

27447A

min.280

221mm

253mm

Free distance must be kept to allow free air circulation ambient temperature max. 40°C.

WEIGHT
Mounting kit H2064:   1.5 kg
Loudspeaker H2054:   5.5 kg
Loudspeaker H2074:   4.0 kg
HF SSB RM2152:   4.0 kg

4 pcs M3x30
8 pcs cover
16 pcs M5x8

4 pcs M5x30

27448

MOUNTING KIT H2062

473mm

121mm

27449

min.280

473mm
460mm
225.5mm   225.5mm
20mm   20mm
4.5mm
4 stk ø6mm   2 stk ø3mm
8 stk ø3.5mm uns for M3 DIN 963
100mm   108mm 121mm
6mm
10mm   10mm
6mm
20mm   Cutting out 451x100mm   20mm
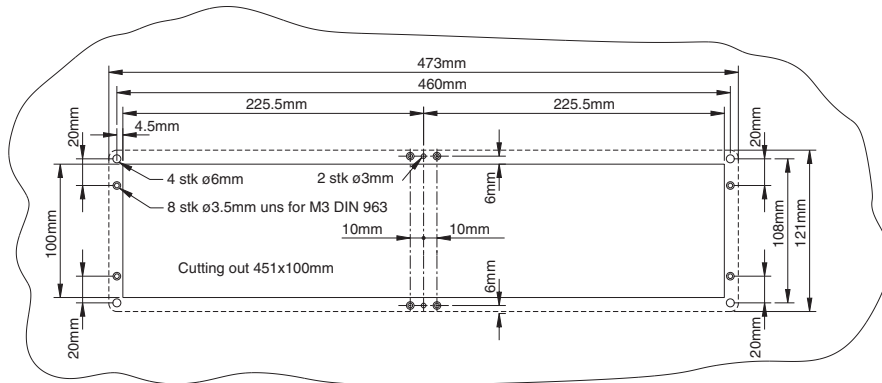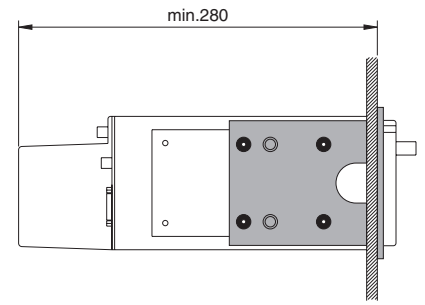
27450
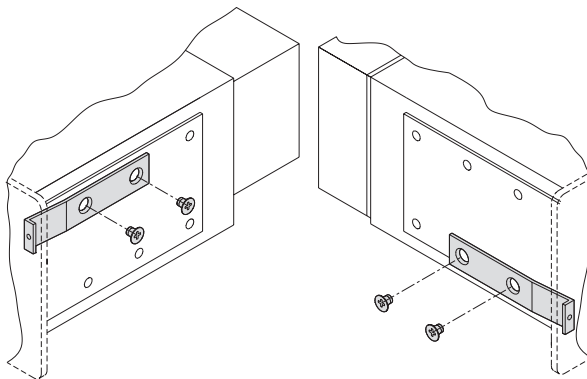
27451

Free distance must be kept to
allow free air circulation ambient
temperature max. 40°C.

WEIGHT
Mounting kit H2062:   1.5 kg
Loudspeaker H2054:   5.5 kg
Loudspeaker H2074:   4.0 kg
HF SSB RM2152:   4.0 kg

8 pcs M3x30
8 pcs M3x8
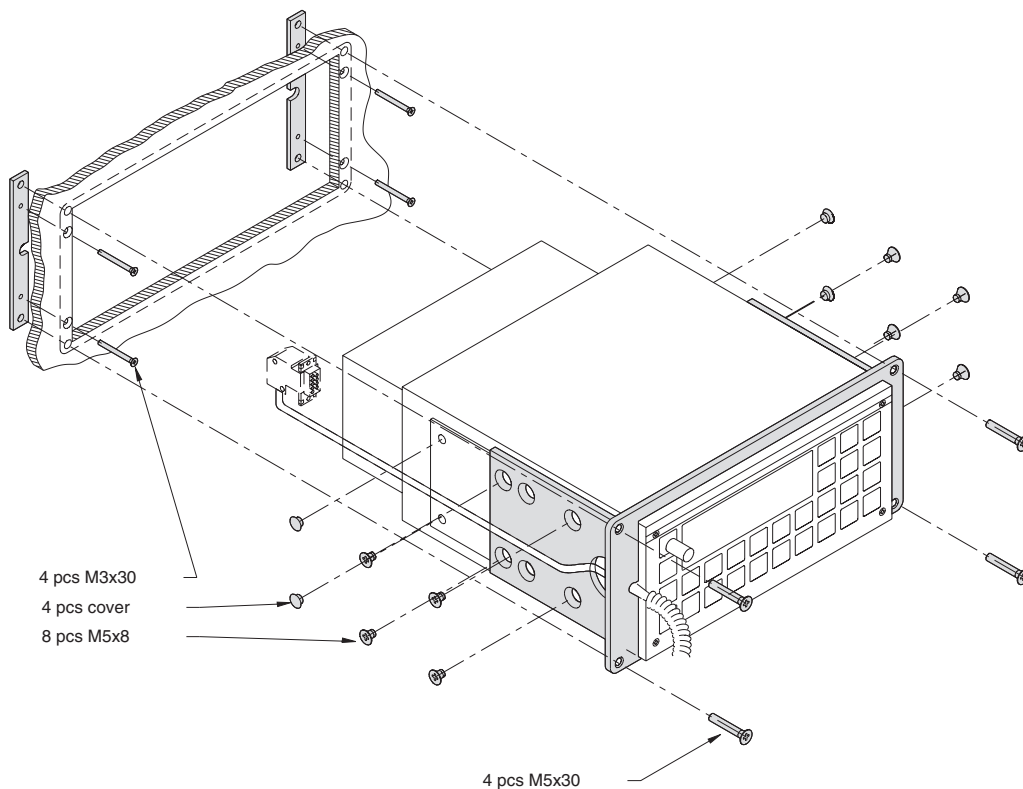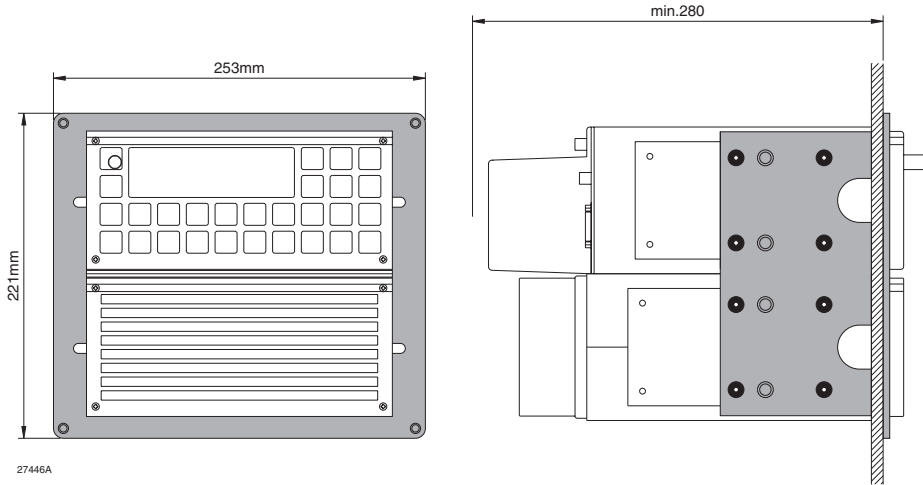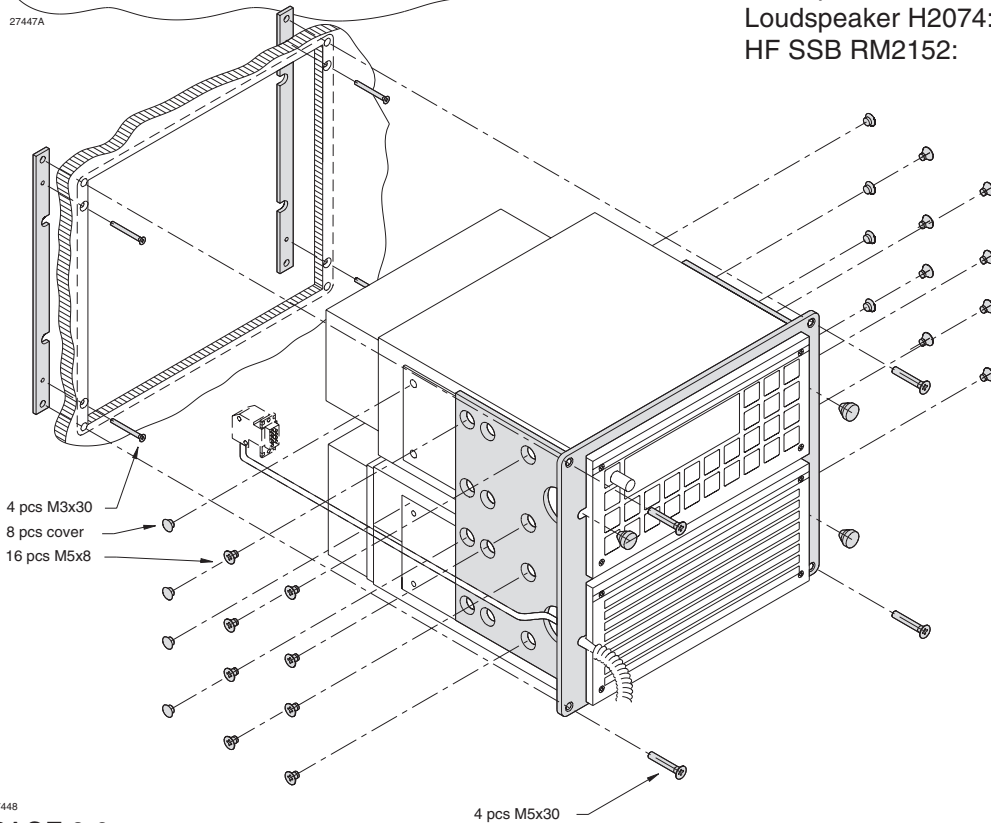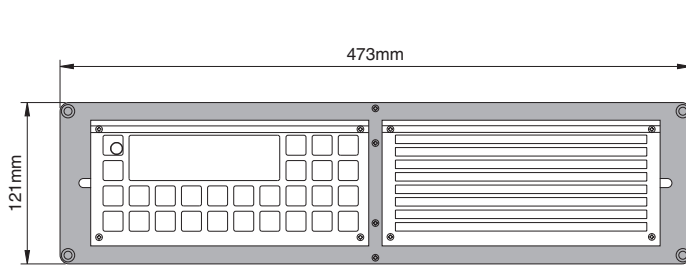12 pcs M5x8

2 pcs M3x30

4 pcs M5x30
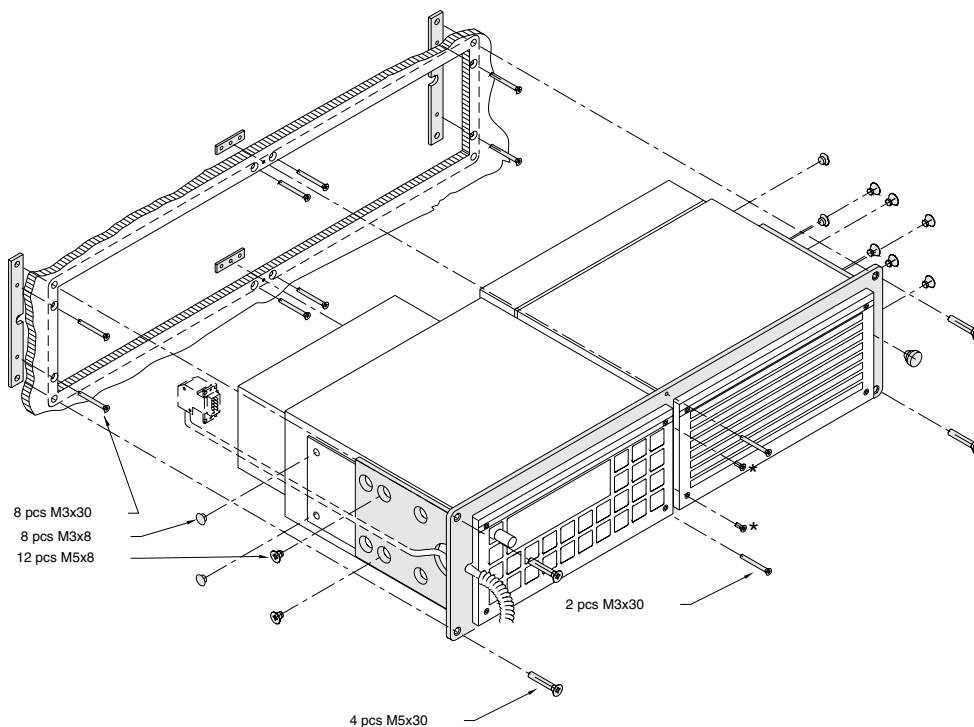
2.3   INSTALLATION INSTRUCTION

The electrical installation of the DSC/Telex modem RM2152, can be carried out as an installation with the power supply N2165, or as an installation using an existing possibility for power supply.

To see what kind of installation you have to use, identify your system among the three following possibilities:

- System that incorporates the 250W transmitter T2130.
  Use the power supply N2165.

- System that incorporates the 600W or 1200W transmitter T2131/T2135.
  Use the internal power supply inside the transmitter.

- System that incorporates the 600W or 1200W transmitter T2131/T2135, but where the capacity of the internal power supply inside T2131/T2135 is already used.
  Use the power supply N2165.

The above mentioned systems are described on the following pages in further details.

An installation guide is given below, and it is advisable to use this guide to make a no problem and proper installation. The installation guide is divided into two different chapters - one for installations including the power supply N2165, and one for installations without the N2165.

If the installation of the DSC/Telex modem RM2152, is carried out in an existing transmitter system please read the chapter 2.3.1 "INSTALLATION OF DSC/Telex modem RM2152 IN EXISTING TRANSMITTER SYSTEMS".

2.3.1   INSTALLATION OF DSC/TELEX MODEM RM2152 IN EXISTING TRANSMITTER SYSTEMS

The Control unit RE2100 and the transmitter T2130 has gone through some changes during the period it has been produced. It is therefor possible that an old installation will not support a system with a DSC/Telex modem RM2152. Depending the ages of the equipment some modifications has to be done in the control unit RE2100 and the transmitter T2130.
There is no change in transmitters T2131 and T2135.

Further information on software and pc. board versions, please refer to part 3 of this manual "Service" chapter "SOFTWARE AND PC. BOARD SUMMARY".

RE2100 UPDATE

The key to find out whether the RE2100 has to be modified or not, is the software version used. There is some overlapping where it is necessary to know the version of the receiver module and the processor module. The table below will give you the information needed.

Present version of RE2100	Necessary changes of RE2100				Ordering information	
SOFTWARE	RECEIVER MODULE PART NO. 625631	EXCITER MODULE PART NO.625634	PROCESSOR MODULE PART NO.625635	SOFTWARE EPROM U06-5	KIT DESCRIP-TION	PART NO.
1084-1084D	Change to version H or higher	Change to version E or higher	Change to version H or higher	Change software to 1086S or higher	Remote control update kit "1A" and 2A for RE2100	726655 and 726656
1085-1085F						
1086-1086D						
1086E-1086F						
1086H-1086R	No change		No change		Remote control update kit "2A" for RE2100	726656
1086S		No change		No change	No change	

T2130 UPDATE

The key to find out whether T2130 has to be modified or not, is the software version used. There is some overlapping where it is necessary to know the version of the connection module. The table below will give you the information needed.

Present version of T2130		Necessary changes of T2130		Ordering information	
SOFTWARE EPROM U01-3	CONNECTION BOARD PART NO. 625646	CONNECTION BOARD PART NO. 625646	SOFTWARE EPROM U01-3	KIT DESCRIP-TION	PART NUMBER
1083-1083E	Versions A,B,C,D,E & F	Change to version G or higher	Change to version P or higher	Remote control update KIT ""1A"" for T2130	726665
1083G-1083O	Versions G or higher	No change		EPROM U01-3 with software 1083P or higher	726103

If the connection board 625646 contains 4 connector strips with the writing ST1, ST2, ST3 and ST7, it is version G, and therefore it is only the software at the processor module which must be changed.

2.3.2   INSTALLATION GUIDE FOR RM2152 USED AS DSC WATCH RECEIVER

Cable and wiring is illustrated in chapter "2.4 ELECTRICAL CONNECTIONS AND ASSEMBLING".

1.   In an installation with a 250W transmitter T2130 the radiointerface, plug at the back of RM2152 shall be connected to the power supply N2165, and from the power supply the wires:

        S.P. BUS-interrupt
        AF to TX
        AF to TX com.
        TX-KEY
        GND

        Shall be connected to the transmitter T2130 connection board.

        In an installation with a 600/1200W transmitter T2131/T2135 the radiointerface plug at the back of RM2152, can be connected directly to the connection board in the transmitter. the following connections are necessary:

        S.P. BUS-interrupt
        AF to TX
        AF to TX com.
        TX-KEY
        +18V
        -18V
        +9V
        GND

        If the installation consist of a watch receiver and a radiotelex modem only one of this units can be connected directly to the transmitter. The other radio unit shall be connected through a power supply N2165. Further information concerning cabling please consult the chapter 2.4 " ELECTRICAL CONNECTIONS AND ASSEMBLING ".

2.   The S.P.BUS shall be connected to RE2100 or to the transmitter T2130.
        The serial S.P.BUS must be terminated with 50 Ohm in each end of the cable. In all units there is a strap, which terminates the cable with 50 Ohm, in case the strap is fitted. A 50 Ohm strap is always mounted from factory, this strap must therefore be removed in case the unit is not mounted in the end of the S.P.BUS cable.
        In RM2152 the 50 Ohm strap is placed at the main processor module and is called W5.

3.   The handset holder to RE2100 shall have a switch to indicate whether the handset is placed in the holder or not. The handset holder has SP No. 726233.

4.   The RX antenna input terminal shall be connected to a separate antenna, through the receiver protection unit H1223.

5.   The NMEA navigation interface can be connected to a GPS unit.

        The printer interface can be connected to a printer

6.   Check the software version, check if the versions are in agreement with the list in part 3 of this manual "Service" chapter "SOFTWARE AND PC. BOARD SUMMARY".
        There shall be agreement between the software versions of RE2100. the transmitter (T2130/T2131/T2135) and DSC modem RM2152.

7.   Is a GMDSS ALARM UNIT C2149 connected to the system, it shall be connected to the power supply N2165 or to the connection board in T2131/2135.

        Check that the software in the C2149 have the right version number, this information can be found in part 3 of this manual "Service" chapter "SOFTWARE AND PC. BOARD SUMMARY".

8.   The Watch receiver RM2152 is from factory set to work with S.P. BUS-address number 2. This
         has to be programmed into RE2100.

         Turn on RE2100.

         On RE2100   Press **0** and **1** (ABC) simultaneously.

         The display show:

         Key in **0** **7** (STU) and **2** (DEF)

         The display show:

         Key in **1** (ABC)

         The display show:

         Activate **ENT** (STOP)

         The display show:

         This SP-menu **07-2** can be entered at any time and be used to control that the SP-BUS works
         properly. The zero in the TX display line is changed to a one if the SP-BUS works

         On RE2100 activate the **CLARIF** (TUNE) key to leave the SP menu.

9.   Switch on the watch receiver RM2152 and control that the display menu after the initializing
         menu show the following menu.

         RM 2152
         DSC Watch Receiver

         Is the indication of type different from RM2152 then
         please refer to part 3 of this manual "Service" for information how to
         change to type RM2152.

10.   Verify that the SP-BUS setting in the watch receiver RM2152 is correct.
         Turn on the RM2152 and wait until the displaymenu show the scan running menu.

         Activate **FUNC** : and the displaymenu change to.

```
Display·Pos·Stns·Time
Test·Options·Print·Sun
```

         Select the Options menu and activate the **NEXT** key,

         the display menu change to.

```
Options:                    ↕
MID numbers
```
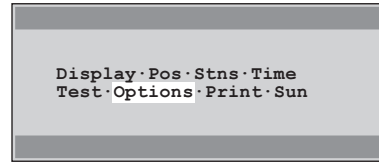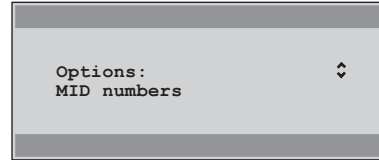
         Use the up/down arrow key until the displaymenu show.

```
Options:                    ↕
Control interface
```
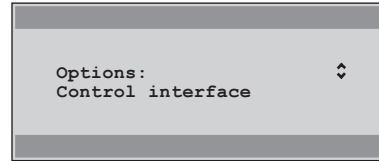
         Activate the **NEXT** key, the displaymenu change to.

```
Type:
T-BUS·SP-BUS·Non
```
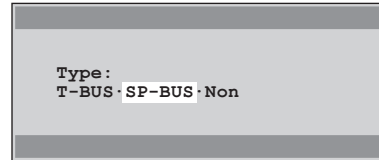
         The SP-Bus is chosen for serial communication

         activate the **NEXT** key, the displaymenu change to.

```
Bus address:
2·3·4·5·6
```
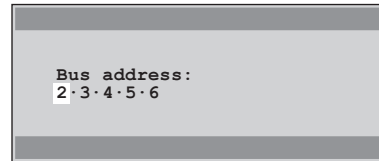
         The SP-Bus address number 2 is blinking, indicating that SP-Bus address 2 is chosen.
         Is another type or address choosen, it is necessary to correct this, please refer to part 3 of this
         manual "Service" " for information how to change to SP-Bus and to address 2.

11.   The Self-identification number **(MID)** has to be programmed into the watch receiver RM2152.
         Please refer to part 3 of this manual "Service"" for information how to programme the ships
         identifications number.

         Control the ships identifications as illustrated below.
         Turn on the RM2152 and wait until the display menu show the scan running menu.

         Activate **FUNC** and the displaymenu change to.

```
Display·Pos·Stns·Time
Test·Options·Print·Sun
```

0135

Select the Options menu and activate the `NEXT` key,

the displaymenu change to.

```
Options:            ⬍
MID numbers
```
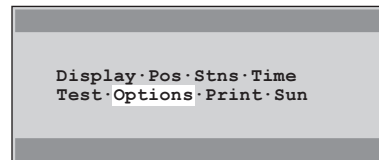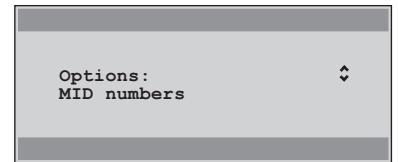
Activate the `NEXT` key, the displaymenu will show

the ships identification number.

```
Ship MID: <219123456>
```
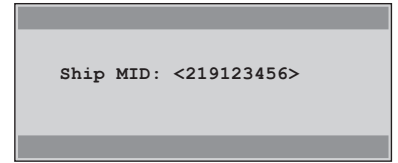
Activate the `NEXT` key, the displaymenu will display

the ships group call number

```
Grp1 MID: <023456789>
```
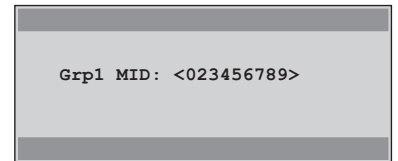
Activate the `NEXT` key the displaymenu change to a

menu which display the second group call number.
The ship can have up to four group call numbers and
you can display this numbers in the next three menus,
before the displaymenu again change to
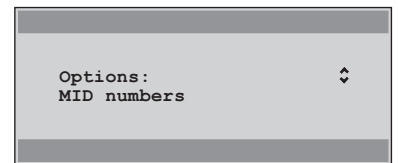
The set up of the DSC watch receiver is now completed.

```
Options:            ⬍
MID numbers
```

12.   To make sure that the system works again:

Use the external test function to send a DSC test call to a coaststation. The called coaststation
shall be enclosed into the stations table.

2.3.3   INSTALLATION GUIDE FOR RM2152 USED AS DSC/TELEX RECEIVER

Cable and wiring is illustrated in chapter "2.4 ELECTRICAL CONNECTIONS AND ASSEMBLING".

1.   In an installation with a 250W transmitter T2130 the radiointerface plug, at the back of radiotelex
modem RM2152 shall be connected to the power supply N2165, and from the power supply the
wires:

> S.P. BUS-interrupt
> AF to TX
> AF to TX com.
> TX-KEY
> GND

Shall be connected to the connection board in transmitter T2130.

In an installation with a 600/1200W transmitter T2131/T2135 the radiointerface plug at the back of RM2152 can be connected directly to the connection board in the transmitter. the following connections are necessary:

        S.P. BUS-interrupt
        AF to TX
        AF to TX com.
        TX-KEY
        +18V
        -18V
        +9V
        GND

If the installation consist of a watch receiver and a radiotelex modem only one of them can be connected directly to the transmitter. The other radio unit shall be connected through a power supply N2165. Further information concerning cabling please consult the chapter 2.4 " ELECTRICAL CONNECTIONS AND ASSEMBLING ".

2.   The S.P.BUS shall be connected to RE2100 or to the transmitter T2130.
        The serial S.P.BUS must be terminated with 50 Ohm in each end of the cable. In all units there is a strap, which terminates the cable with 50 Ohm, in case the strap is fitted. A 50 Ohm strap is always mounted from factory, this strap must therefore be removed in case the unit is not mounted in the end of the S.P.BUS cable.
        In RM2152 the 50 Ohm strap is placed on the main processor board and is called W5.

3.   The handset holder to RE2100 shall have a switch to indicate whether the handset is placed in the holder or not. The handset holder has SP No. 726233.

4.   The RX antenna input terminal shall be connected to a separate antenna, through the receiver protection unit H1223.

5.   The console plug on the RM2152 shall be connected to the message terminal H2098 console plug (COM.1).

6.   The NMEA navigation interface can be connected to a GPS unit.

7.   The printer can be connected to the radiotelex modem or the message terminal.
        For safety reasons the printer shall be connected to the radiotelex modem.
        The Keyboard shall be connected to the message terminal.

8.   The message terminal and the monitor shall be connected to a 24VDC power supply and the message terminal and the monitor shall be interconnected.

9.   Check the software version, check if the versions are in agreement with the list in part 3 of this manual "Service" chapter "SOFTWARE AND PC. BOARD SUMMARY".
        There shall be agreement between the software versions of RE2100. the transmitter (T2130/T2131/T2135), the DSC/radiotelex modem RM2152 and the Message terminal H2098A to get the system to work properly.

10.   Is a GMDSS ALARM UNIT C2149 connected to the system, it shall be connected to the power supply N2165 or to the connection board in T2131/2135.

        Check that the software in the C2149 have the right version number, this information can be found in part 3 of this manual "Service" chapter "SOFTWARE AND PC. BOARD SUMMARY".

11.   The radiotelex modem RM2152 has to work with S.P. BUS address number 3, this has to be programmed into RE2100.

        Turn on RE2100.

On RE2100   Press **0** and **1** simultaneously.

The display show:

Key in **0** **7** and **3**

The display show:

Key in **2**

The display show:

Activate **STOP ENT**

The display show:

This SP-menu **07-3** can be entered at any time and be used to control that the SP-BUS works properly. The zero in the TX display line is changed to a one if the SP-BUS works

On RE2100 activate the **TUNE CLARIF** key to leave the SP menu.

12.   Switch on the Radiotelex modem RM2152 and control that the display menu after the initializing menu show the following menu.

        Is the indication of type different from RM2152 then please refer to part 3 of this manual "Service" " for information how to change to type RM2152.

```
                              RM 2152
                          DSC/Telex Receiver
```
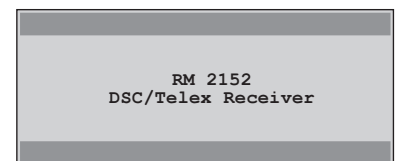
13.   The Radiotelex modem RM2152 is from factory set to work at SP-BUS address number 2. This has to be changed to SP-BUS address 3. For information how to change the SP-BUS address please refer to part 3 of this manual "Service" ".

14.   The Self-identification numbers for **DSC** (MID), **TELEX** as well as the **answerback** has to be programmed into the Radiotelex modem RM2152. For information how to programme the Self-identification numbers into the Radiotelex modem RM2152, please refer to part 3 of this manual "Service" ".

15.   To control that the setting of the radiotelex modem RM2152 is done correct, the settings can be displayed.

        Activate the key **F3** and the Radiotelex menu will be displayed.

Select the **OPTION** menu and activate the **Enter** key, the OPTION menu will be displayed.

Select the **TERMINAL MODE** menu and activate the **Enter** key. the TERMINAL MODE menu will be displayed.

Write **set -a** and activate the **Enter** key, the CRT show now the settings of the radiotelex modem.

```
                                    | Terminal |
ALARM            = 1        ALPHA         = 0       ANGLE       = 3
ANSWERBACK       = 7E-0D-0A-31-32-33-34-35-7F-20-6F-78-6A-7A-20-7E-36-0A-0D
ARQERROR         = 0        BAUDRATE      = 4800    CAPTURE     = 0
DATABITS         = 8        DELAY         = 3       DIVERSITY   = 2
DWELL            = 4500     ECHO          = 1       ERROR       = 30
FEC4             = 07700    FEC9          = 219000015
FINITE_START     = 0        GRP1          = 000000000
GRP2             = 0        GRP3          = 0       GRP4        = 0
HARDFLOW         = 1        LIGHT         = 3       LINEFEED    = 1
LOG              = 0        MODE          = 111     PARITY      = NO
POLL             = 1        POSITION      = 57N01,009E53
POSTKEY          = 3        POSTMUTE      = 3       PREKEY      = 1
PRINTER          = LPT:     QMIN          = 3       RESTART     = FINITE
RETRY            = 5        RXADDRESS     = 2       RXENABLE    = 1
RXFREQ           = 1700     SEL4          = 07700
SEL9             = 219000015
SOFTFLOW         = 0        SPADDRESS     = 2       SPBUS       = S
STOPBITS         = 1        SUNSPOT       = 120     TERM        = T+T
TIMEZONE         = -1       TRACK         = 1       TXADDRESS   = 3
TXENABLE         = 1        TXFREQ        = 1700
>
```

The set up of the radiotelex modem is now completed.

16.   To make sure that the system works:

1. Use the external test function to send a DSC test call to a coaststation. The called coaststation shall be enclosed into the stations table.

2. Check that the stations table works correct.

3. Send a telex prepared in the editor.
    Remember to check your answerback.

2.4   ELECTRICAL CONNECTIONS AND ASSEMBLING

Cables between RE2100 and the transmitter T2130, the transmitter T2130 and the Antenna coubler AT2110 can be found in the TECHNICAL MANUAL for T2130.

The connection cables for the REMOTE ALARM UNIT C2149 can be found in the TECHNICAL MANUAL for C2149.

The printer interface cable for RM2152 is equal to the printer cable used for RM2152.

2.4.1   HF SSB 250W DC WITH DSC WATCH RECEIVER RM2152 and N2165

CABLES BETWEEN CABINETS:

CABLE 1:   **RM2152 - N2165.**

Factory supplied: Multicable: 10 metres 21 * 0,5 mm^2 Part no. 164.192
Max. length 30 metres.

RM2152	N2165		COLOUR	SIGNAL
P2-5	ST1	ST3		
1	IN	12	BLACK	RX MUTE
2	IN	8	BROWN	ALARM IN
3	IN	13	RED	TX READY
4	OUT	7	PINK	EXT. ALARM
5	SHIELD		SHIELD	GROUND
6	OUT	2	YELLOW	SP INTERRUPT
7	OUT	9	GREEN	ALARM OUT
8	OUT			SCAN STOP
9	OUT	5	BLUE	AF TO TX COMM
10	IN	4	VIOLET	-18V DC
11	IN	5	GREY	+9V DC
12	IN	3	WHITE	+18V DC
13	OUT	1	BROWN/PINK	SUPPLY ON/OFF
14	OUT	9	BROWN/YELLOW	RX MUTE
15	OUT	3	BROWN/GREEN	TX KEY
16	OUT	1	BROWN/GREY	HIGH TENSION
17	OUT	6	WHITE/PINK	
18	OUT	4	WHITE/YELLOW	AF TO TX
19	IN			LINE IN 1
20	IN			LINE IN 2
21	OUT	7	WHITE/GREEN	
22		6	WHITE/BLUE	GROUND
23		14	WHITE/GREY	GROUND
24	OUT	8	GREY/PINK	EXT.SPEAKER
25	IN	2	RED/BLUE	-BATT

CABLE 2:   **T2130 - N2165.**

Multicable: 4 * 0,5 mm^2.   Max. length 30 metres.

N2165	T2130		SIGNAL	T2130
ST4	ST2	ST3		Interconnection board
1			EXT. MUTE	NOTE 1: At T2130 connection board the
2			TX READY	terminals ST2-4 and ST3-6
3			GROUND	must be interconnected.
4			HIGH TENSION	
5	16		SP INTERRUPT	NOTE 2: The shield of the cable betw een
6		5	TX KEY (NOTE 1)	the pow er supply N2165 and
7		7	AF TO TX	the transmitter T2130 must be
8		8	AF TO TX COMM	connected in both N2165 and T2130.

CABLE 3-4:   **BATTERY TO N2165.**

cable: 2,5 mm^2.   Max. length 30 metres.

CABLE 6:   **RM2152 to T2130 SP-BUS.**

cable: RG58C/U coax cable.
Factory supplied: 10 metres RG58C/U coax cable marked blue.   Part no. 527082

The total length of the SP-BUS cable from RE2100 to RM2152 must not exceed 100 metres.

CABLE 7:   **RM2152 to H1223 RF INPUT.**

cable: RG58C/U coax cable.   Max. length 10 metres.
Factory supplied: 3 metres RG58C/U coax cable.   Part no. 506090

CABLE 8:   **RH1223 to RF ANTENNA.**

cable: Triaxial cable H1213.   Max. length 200 metres.

CABLE 9:   **RM2152 to GPS unit (NMEA 183c).**

cable: RG58C/U coax cable.   Max. length 30 metres.

CABLE 10:   **MAINS TO N2165.**

cable: 3 * 1,0 mm^2.   Max. length 30 metres.

CABLE 26:   **C2149 TO N2165.**

cable: Consult chapter 2 in TECHNICAL MANUAL for C2149 for cable dimensions.

CABLES BETWEEN CABINETS:
HF SSB 250W DC WITH DSC WATCH RECEIVER RM2152 AND N2165.
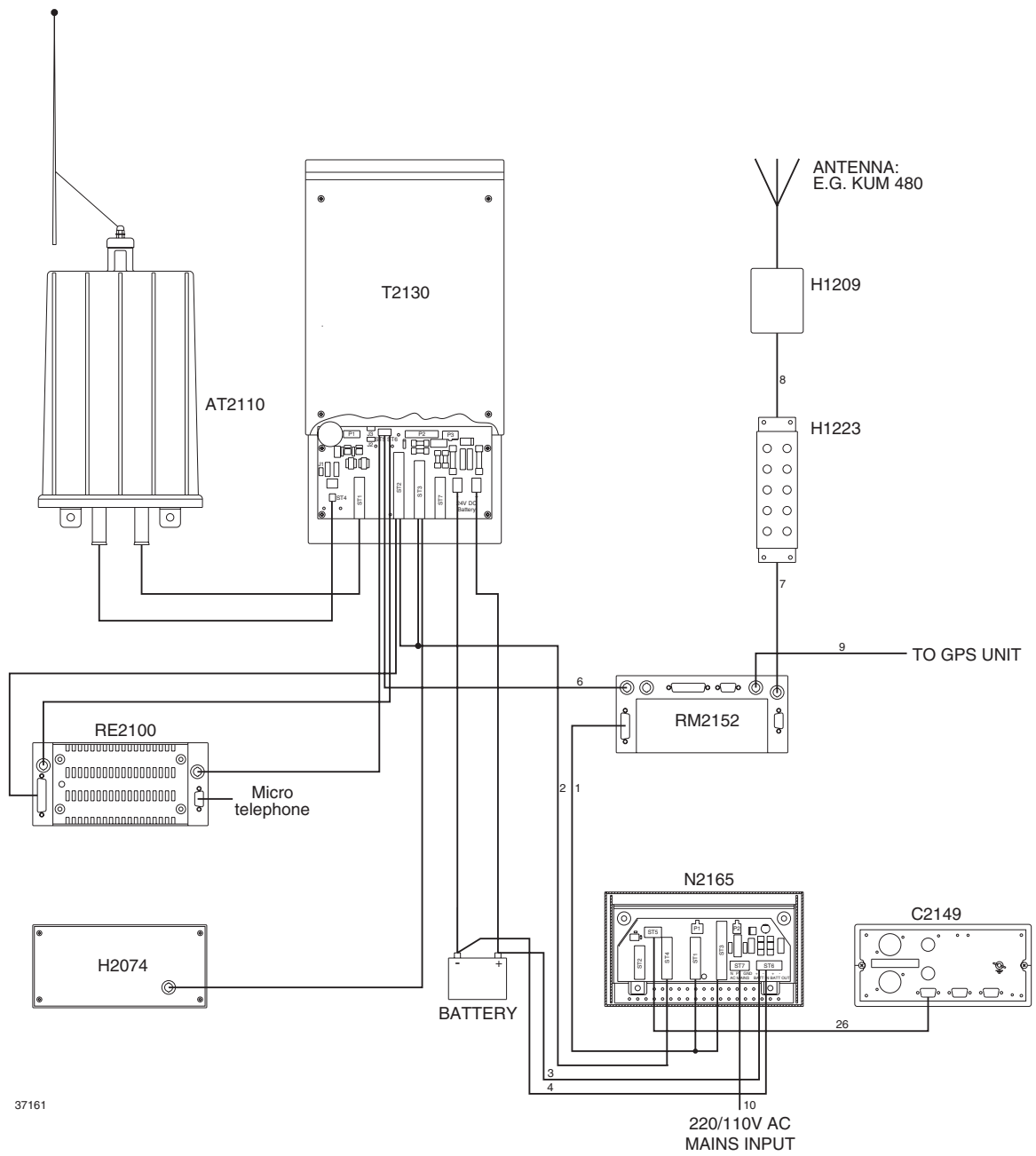
37161

2.4.2 HF SSB 250W DC WITH DSC WATCH RECEIVER RM2152, RADIOTELEX MODEM RM2152 AND N2165.

CABLES BETWEEN CABINETS:

CABLE 1:   **RM2152/51 - N2165.**

Factory supplied: Multicable: 10 metres 21 * 0,5 mm²   Part no. 164.192
Max. length 30 metres.

RM2152		N2165		COLOUR	SIGNAL
P2-5		ST1	ST3		
1	IN		12	BLACK	RX MUTE
2	IN		8	BROWN	ALARM IN
3	IN		13	RED	TX READY
4	OUT		7	PINK	EXT. ALARM
5		SHIELD		SHIELD	GROUND
6	OUT	2		YELLOW	SP INTERRUPT
7	OUT		9	GREEN	ALARM OUT
8	OUT				SCAN STOP
9	OUT	5		BLUE	AF TO TX COMM
10	IN		4	VIOLET	-18V DC
11	IN		5	GREY	+9V DC
12	IN		3	WHITE	+18V DC
13	OUT		1	BROWN/PINK	SUPPLY ON/OFF
14	OUT	9		BROWN/YELLOW	RX MUTE
15	OUT	3		BROWN/GREEN	TX KEY
16	OUT	1		BROWN/GREY	HIGH TENSION
17	OUT	6		WHITE/PINK	
18	OUT	4		WHITE/YELLOW	AF TO TX
19	IN				LINE IN 1
20	IN				LINE IN 2
21	OUT	7		WHITE/GREEN	
22			6	WHITE/BLUE	GROUND
23			14	WHITE/GREY	GROUND
24	OUT	8		GREY/PINK	EXT.SPEAKER
25	IN		2	RED/BLUE	-BATT

CABLE 2:   **T2130 - N2165.**

Multicable: 4 * 0,5 mm².   Max. length 30 metres.

N2165	T2130		SIGNAL	T2130
ST4	ST2	ST3		Interconnection board
1			EXT. MUTE	NOTE 1: At T2130 connection board the
2			TX READY	terminals ST2-4 and ST3-6
3			GROUND	must be interconnected.
4			HIGH TENSION	
5	16		SP INTERRUPT	NOTE 2: The shield of the cable between
6		5	TX KEY (NOTE 1)	the power supply N2165 and
7		7	AF TO TX	the transmitter T2130 must be
8		8	AF TO TX COMM	connected in both N2165 and T2130.

CABLE 3-4:   **BATTERY TO N2165.**

cable: 2,5 mm².   Max. length 30 metres.

CABLE 5:   **RM2152 to RM2152 SP-BUS.**

cable: RG58C/U coax cable.
Factory supplied: 1 metre RG58C/U coax cable marked blue.   Part no. 527115

The total length of the SP-BUS cable from RE2100 to RM2152 must not exceed 100 metres.

CABLE 6:   **RM2152 to T2130 SP-BUS.**

cable: RG58C/U coax cable.
Factory supplied: 10 metres RG58C/U coax cable marked blue.   Part no. 527082

The total length of the SP-BUS cable from RE2100 to RM2152 must not exceed 100 metres.

CABLE 7:   **RM2152 to H1223 RF INPUT.**

cable: RG58C/U coax cable.   Max. length 10 metres.
Factory supplied: 3 metres RG58C/U coax cable marked red.   Part no. 506090

CABLE 8:   **RH1223 to RF ANTENNA.**

cable: Triaxial cable H1213.   Max. length 200 metres.

CABLE 9:   **RM2152 to GPS unit (NMEA 183c).**

cable: RG58C/U coax cable.   Max. length 30 metres.

CABLE 10:   **MAINS TO N2165.**

cable: 3 * 1,0 mm².   Max. length 30 metres.

CABLE 11-12:   BATTERY TO C2149.

cable: 2,5 mm².   Max. length 30 metres.

CABLE 13:   MAINS TO N2161.

cable: Consult chapter 2 in TECHNICAL MANUAL for N2161 for cable dimensions

CABLE 14-15-16:   24V DC/BATTERY SUPPLY TO PRINTER(H1253B),
**   MONITOR(H1253B), AND MESSAGE TERMINALH(2098A).**

cable: 3*0.75 mm².   Max. Length 10 metres.
Factory supplied: 2 metres 3*0.75 mm².   Part no. 56.066

CABLE 17:   RM2152 TO H2098A RS232 cable.

cable: 7*0,22 mm².   Max. length 4 metres.
Factory supplied: 1 metre 7*0,22 mm².   Part no. 56.071
The radiotelex moden can be connected to a personal computer (PC) for this use a cable:
Factory supplied: 2 metre RS232 cable with 9/25 (SUB-D).   Part no. 56.063

Pin	Name	Signal description	Direction
1 (8)	DCD	Data Carrier Detect	Input
2 (3)	RxD	# Received Data	Input
3 (2)	TxD	# Transmitted Data	Output
4 (20)	DTR	# Data Terminal Ready	Output
5 (7)	GND	# Ground	
6 (6)	DSR	# Data Set Ready	Input
7 (4)	RTS	Request To Send	Output
8 (5)	CTS	# Clear To Send	Input
9 (22)	RI	# Ring Indicator	Input

(x)   The numbers shown in (brackets) are the corresponding numbers for a 25 pin D-type connector.

The pin marked with a # sign are used in the enclosed communication cable.

CABLE 18:   H2098A TO H1253B video cable.

cable: RG58C/U coax cable.
Factory supplied: 2 metre RG58C/U coax cable.   Part no. 56.072

CABLE 19:   H2098A TO H2099 (keyboard).

Keyboard cable supplied with the keyboard.

CABLE 20:   H1252B TO RM2152 PRINTER cable. (Centronics).

Factory supplied: 1,5 metre standard printer cable.   Part no. 56.013
A special low-impedance cable is available for printer locations up to 20 meters from H2098A.

Pin	Name	Signal description	Direction
1	STRB	Strobe	Output
2	DAT0	Data Bit 0	Output
3	DAT1	Data Bit 1	Output
4	DAT2	Data Bit 2	Output
5	DAT3	Data Bit 3	Output
6	DAT4	Data Bit 4	Output
7	DAT5	Data Bit 5	Output
8	DAT6	Data Bit 6	Output
9	DAT7	Data Bit 7	Output
10	ACKN	Acknowledge	Input
11	BUSY	Busy Signal	Input
12	PE	Paper End (out of paper)	Input
13	SEL	Select	Input
14	ALFD	Auto Line Feed	Output
15	ERR	Error	Input
16	INIT	Initialize Printer	Output
17	SLCT	Select Input	Output
18	GND	Ground	
19	GND	Ground	
20	GND	Ground	
21	GND	Ground	
22	GND	Ground	
23	GND	Ground	
24	GND	Ground	
25	GND	Ground	

CABLE 21-22:   BATTERY TO N2161.

cable: Consult chapter 2 in TECHNICAL MANUAL for N2161 for cable dimensions.

CABLE 23-24:   24V DC/BATTERY SUPPLY TO T2130

cable: Consult chapter 2 in TECHNICAL MANUAL for T2130 for cable dimensions.

CABLE 25:   T2130 TO N2161 SUPPLY ON/OFF.

cable: 1*.22 mm²   Max. length 30 metres.

CABLE 26:   C2149 TO N2165.

cable: Consult chapter 2 in TECHNICAL MANUAL for C2149 for cable dimensions.

CABLES BETWEEN CABINETS:
HF SSB 250W WITH DSC WATCH RECEIVER RM2152, RADIOTELEX MODEM RM2152 and N2165.

ANTENNA:
E.G. KUM 850

ANTENNA:
E.G. KUM 850

T2130

H1209

H1209

H1252B

AT2110

H1223

H1223

20

17

5

9 TO GPS
UNIT

9 TO GPS
UNIT

16
16

6

RE2100

RM2152

RM2152

H1253B

Micro
telephone

15
15

N2165

C2149

N2161

H2099

H2074

H2098A

18

19

14 14

4
3
23
24
25
26

21
22

12
11

10
220/110V AC
MAINS INPUT

13
220/110V AC
MAINS INPUT

BATTERY

37162

0135
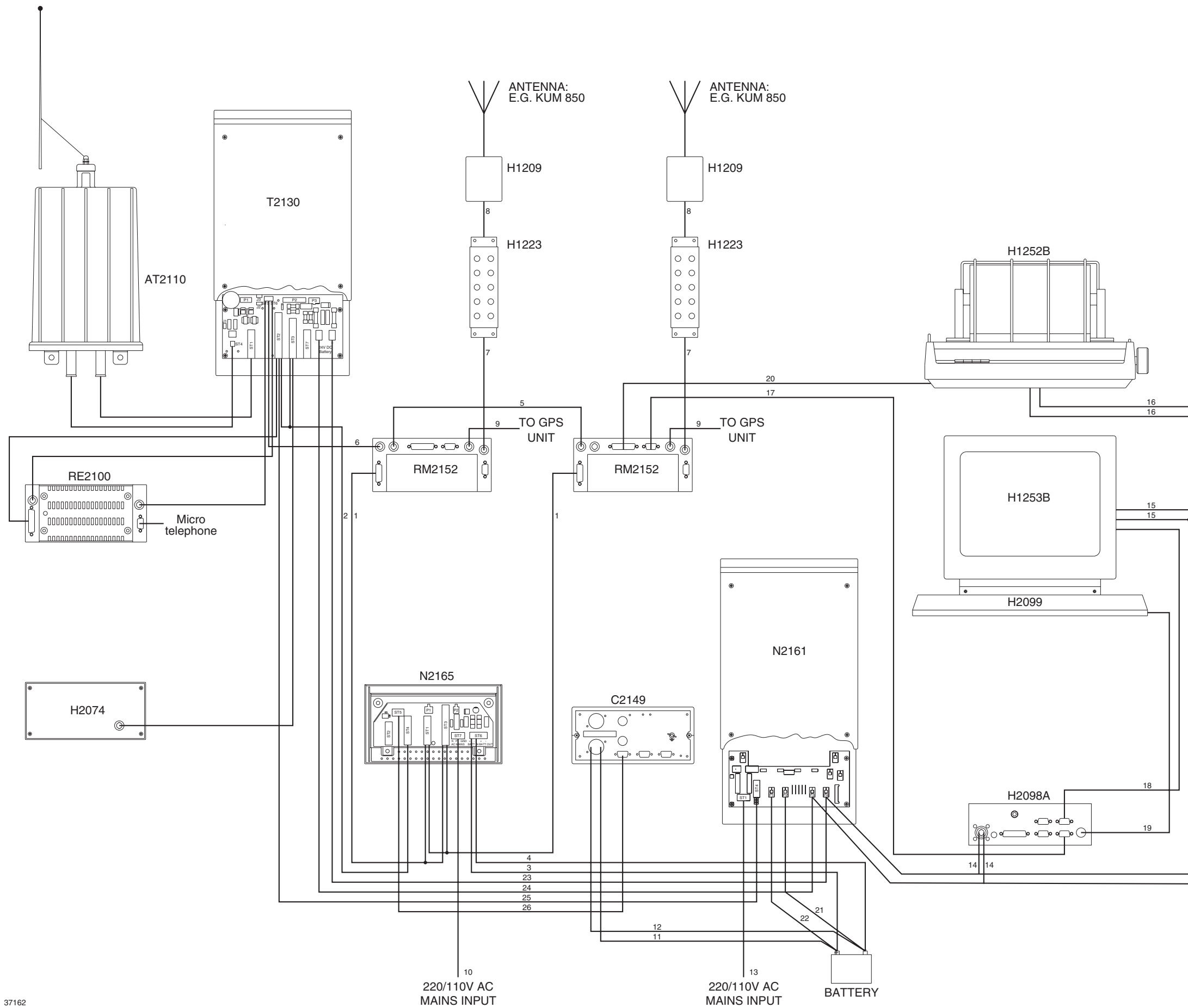
2.4.3   HF SSB 600W AC/DC WITH DSC WATCH RECEIVER RM2152.

CABLES BETWEEN CABINETS:

CABLE 6:   **RM2152 to T2131 SP-BUS.**

cable: RG58C/U coax cable.
Factory supplied: 10 metres RG58C/U coax cable marked blue.   Part.No 527082

The total length of the SP-BUS cable from RE2100 to RM2152 must not exceed 100 metres.

CABLE 7:   **RM2152 to H1223 RF INPUT**

cable: RG58C/U coax cable.   Max. length 10 metres.
Factory supplied: 3 metres RG58C/U coax cable marked red.   Part.No 506090

CABLE 8:   **RH1223 to RF ANTENNA.**

cable: Triaxial cable H1213.   Max. length 200 metres.

CABLE 9:   **RM2152 to GPS unit (NMEA 183).**

cable: RG58C/U coax cable.   Max. length 30 metres.

CABLE 27:   **RM2152 - T2131.**

Factory supplied: Multicable: 10 metres 21 * 0,5 mm^2 Part.No 164.192
Max. length 30 metres.

RM2152	T2135		
P2-5	ST7	COLOUR	SIGNAL
11	1	GREY	+9V
12	2	WHITE	+18V
10	3	VIOLET	-18V
13	4	BROWN/PINK	SUPPLY ON/OFF
25	5	RED/BLUE	-BATT
15	8	BROWN/GREEN	-TX KEY
	9	At T2135 connection board the terminals ST7-2 and ST7-9 must be interconnected.	
18	10	WHITE/YELLOW	AF TO TX
9	11	BLUE	AF TO TX
6	12	YELLOW	SP-BUS interrupt

NOTE: The shield of the cable between the DSC Watch receiver RM2152 and the transmitter T2131 must
be connected in T2131 and in the 25 pol (SUB-D) connector.

CABLES BETWEEN CABINETS:
HF SSB 600W AC/DC WITH DSC WATCH RECEIVER RM2152

2.4.4   HF SSB 600W AC/DC WITH DSC WATCH RECEIVER RM2152, RADIOTELEX MODEM RM2152 AND N2165.

CABLES BETWEEN CABINETS:

CABLE 1:   **RM2152 - N2165.**

Factory supplied: Multicable: 10 metres 21 * 0,5 mm²   Part no. 164.192
Max. length 30 metres.

RM2152		N2165		COLOUR	SIGNAL
P2-5		ST1	ST3		
1	IN		12	BLACK	RX MUTE
2	IN		8	BROWN	ALARM IN
3	IN		13	RED	TX READY
4	OUT		7	PINK	EXT. ALARM
5		SHIELD		SHIELD	GROUND
6	OUT	2		YELLOW	SP INTERRUPT
7	OUT		9	GREEN	ALARM OUT
8	OUT				SCAN STOP
9	OUT	5		BLUE	AF TO TX COMM
10	IN		4	VIOLET	-18V DC
11	IN		5	GREY	+9V DC
12	IN		3	WHITE	+18V DC
13	OUT		1	BROWN/PINK	SUPPLY ON/OFF
14	OUT	9		BROWN/YELLOW	RX MUTE
15	OUT	3		BROWN/GREEN	TX KEY
16	OUT	1		BROWN/GREY	HIGH TENSION
17	OUT	6		WHITE/PINK	
18	OUT	4		WHITE/YELLOW	AF TO TX
19	IN				LINE IN 1
20	IN				LINE IN 2
21	OUT	7		WHITE/GREEN	
22			6	WHITE/BLUE	GROUND
23			14	WHITE/GREY	GROUND
24	OUT	8		GREY/PINK	EXT.SPEAKER
25	IN		2	RED/BLUE	-BATT

CABLE 2:   **T2131 - N2165.**

Multicable: 4 * 0,5 mm².   Max. length 30 metres.

N2165	T2131	SIGNAL	T2131 Interconnection board
ST4	ST7		
1	NC	EXT. MUTE	NOTE 1: At T2130 connection board the
2	NC	TX READY	terminals ST7-2 and ST7-9
3	NC	GROUND	must be interconnected.
4	NC	HIGH TENSION	
5	12	SP INTERRUPT	NOTE 2: The shield of the cable between
6	8	TX KEY (NOTE 1)	the power supply N2165 and the
7	10	AF TO TX	transmitter T2131 must be connected
8	11	AF TO TX COMM	in both N2165 and T2135.

CABLE 3-4:   **BATTERY TO N2165.**

cable: 2,5 mm².   Max. length 30 metres.

CABLE 5:   **RM2152 to RM2152 SP-BUS.**

cable: RG58C/U coax cable.
Factory supplied: 1 metre RG58C/U coax cable marked blue.   Part no. 527115

The total length of the SP-BUS cable from RE2100 to RM2152 must not exceed 100 metres.

CABLE 6:   **RM2152 to T2130 SP-BUS.**

RG58C/U coax cable.
Factory supplied: 10 metres RG58C/U coax cable marked blue.   Part no. 527082

The total length of the SP-BUS cable from RE2100 to RM2152 must not exceed 100 metres.

CABLE 7:   **RM2152 to H1223 RF INPUT**

cable: RG58C/U coax cable.   Max. length 10 metres.
Factory supplied: 3 metres RG58C/U coax cable marked red.   Part no. 506090

CABLE 8:   **RH1223 to RF ANTENNA.**

cable: Triaxial cable H1213.   Max. length 200 metres.

CABLE 9:   **RM2152 to GPS unit (NMEA 183).**

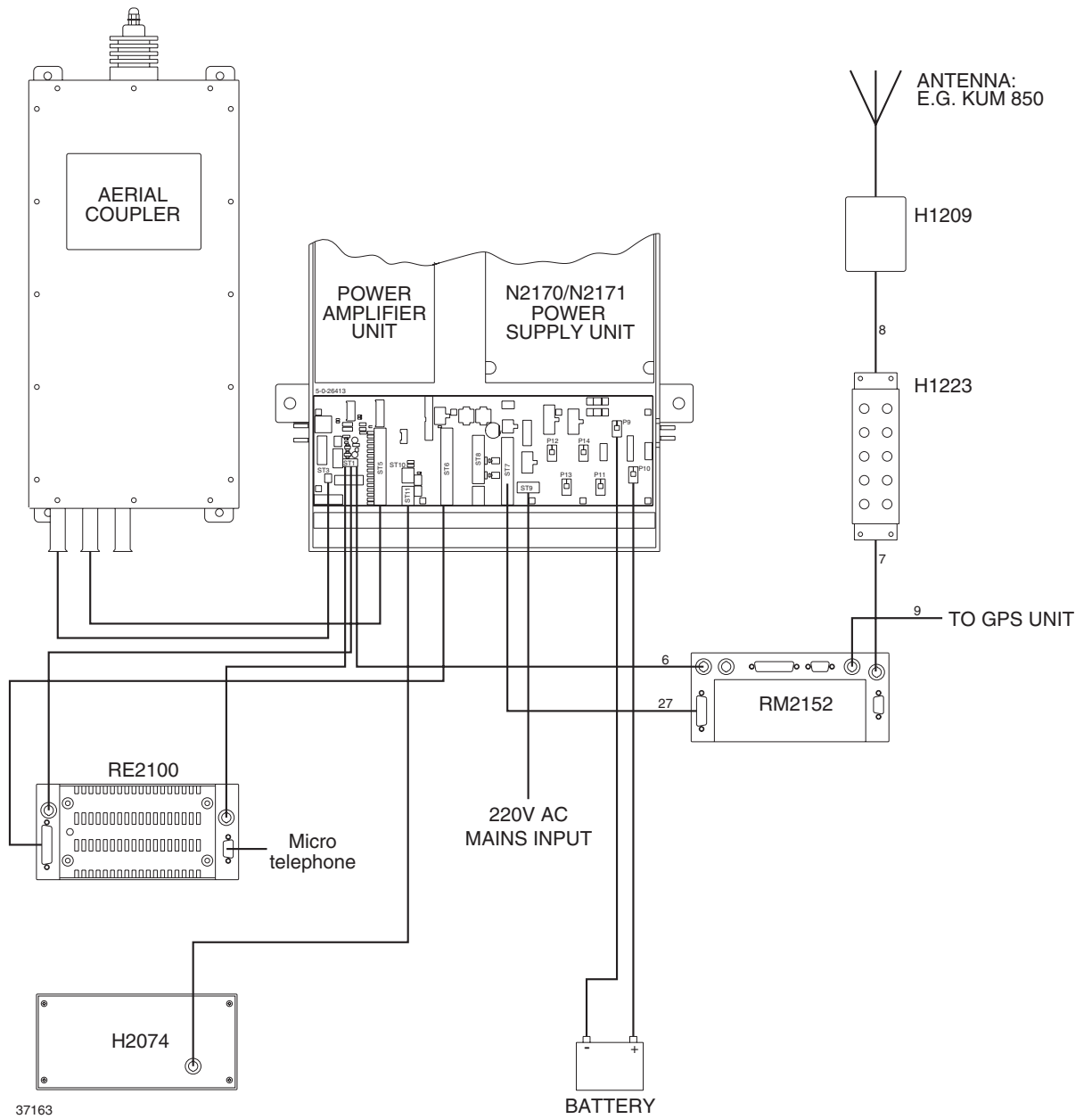cable: RG58C/U coax cable.   Max. length 30 metres.

CABLE 10:   **MAINS TO N2165.**

cable: 3 * 1,0 mm².   Max. length 30 metres.

CABLE 11-12:   BATTERY TO C2149.

cable: 2,5 mm². Max. length 30 metres.

CABLE 14-15-16:   24V DC/BATTERY SUPPLY TO PRINTER (H1253B),
MONITOR (H1253B), AND MESSAGE TERMINALH (2098A).

cable: 3*0.75 mm². Max. Length 10 metres.
Factory supplied: 2 metres 3*0.75 mm². Part no. 56.066

CABLE 17:   RM2152 TO H2098A RS232 cable.

cable: 7*0,22 mm². Max. length 4 metres.
Factory supplied: 1 metre 7*0,22 mm². Part no. 56.071
The radiotelex moden can be cannected to a personal computer (PC) for this use a cable:
Factory supplied:" metre RS232 cable with 9/25 (SUB-D). Part no. 56.063

Pin	Name	Signal description	Direction
1 (8)	DCD	Data Carrier Detect	Input
2 (3)	RxD	# Received Data	Input
3 (2)	TxD	# Transmitted Data	Output
4 (20)	DTR	# Data Terminal Ready	Output
5 (7)	GND	# Ground	
6 (6)	DSR	# Data Set Ready	Input
7 (4)	RTS	Request To Send	Output
8 (5)	CTS	# Clear To Send	Input
9 (22)	RI	# Ring Indicator	Input

(x)   The numbers shown in (brackets) are the corresponding numbers for a 25 pin D-type connector.

The pin marked with a # sign are used in the enclosed communication cable.

CABLE 18:   H2098A TO H1253B video cable.

cable: RG58C/U coax cable.
Factory supplied: 2 metre RG58C/U coax cable. Part no. 56.072

CABLE 19:   H2098A TO H2099 (keyboard).

Keyboard cable supplied with the keyboard.

CABLE 20:   H1252B TO RM2152 PRINTER cable. (Centronics).

Factory supplied: 1,5 metre standard printer cable. Part no. 56.013
A special low-impedance cable is available for printer locations up to 20 meters from H2098A.

Pin	Name	Signal description	Direction
1	STRB	Strobe	Output
2	DAT0	Data Bit 0	Output
3	DAT1	Data Bit 1	Output
4	DAT2	Data Bit 2	Output
5	DAT3	Data Bit 3	Output
6	DAT4	Data Bit 4	Output
7	DAT5	Data Bit 5	Output
8	DAT6	Data Bit 6	Output
9	DAT7	Data Bit 7	Output
10	ACKN	Acknowledge	Input
11	BUSY	Busy Signal	Input
12	PE	Paper End (out of paper)	Input
13	SEL	Select	Input
14	ALFD	Auto Line Feed	Output
15	ERR	Error	Input
16	INIT	Initialize Printer	Output
17	SLCT	Select Input	Output
18	GND	Ground	
19	GND	Ground	
20	GND	Ground	
21	GND	Ground	
22	GND	Ground	
23	GND	Ground	
24	GND	Ground	
25	GND	Ground	

CABLE 26:   C2149 TO N2165.

cable: consult chapter 2 in TECHNICAL MANUAL for C2149 for cable dimensions.
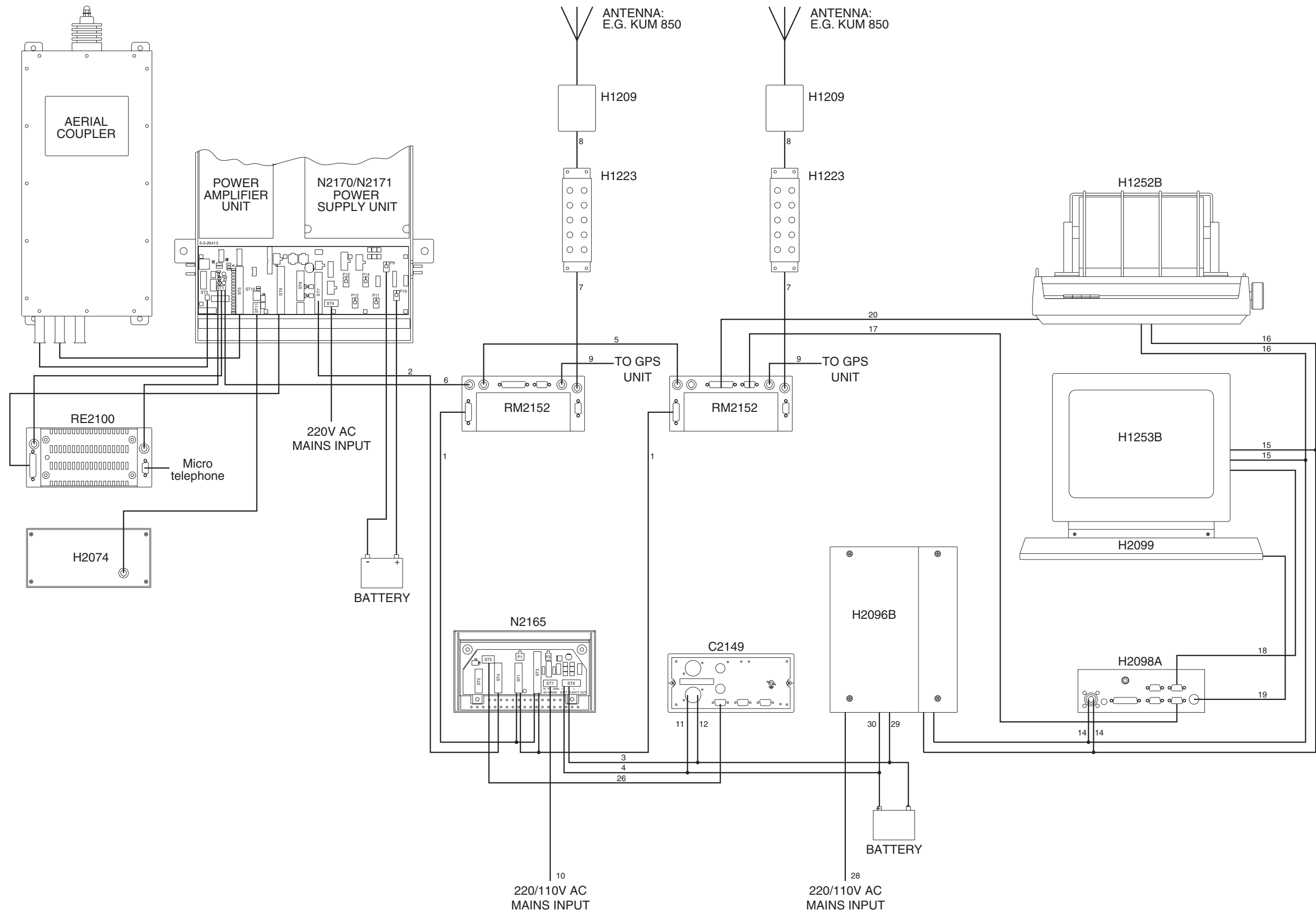
CABLE 28:   MAINS TO H2096B.

cable: 3 * 1,0 mm². Max. length 30 metres.

CABLE 29-30:   BATTERY TO H2096B.

cable: 2,5 mm². Max. length 30 metres.

CABLES BETWEEN CABINETS:
HF SSB 600W AC/DC WITH DSC WATCH RECIVER RM2152, RADIOTELEX MODEM RM2152 AND N2165.

ANTENNA:
E.G. KUM 850

ANTENNA:
E.G. KUM 850

AERIAL COUPLER

POWER AMPLIFIER UNIT

N2170/N2171 POWER SUPPLY UNIT

H1209

H1209

H1223

H1223

H1252B

H1253B

H2099

RE2100

Micro telephone

220V AC MAINS INPUT

TO GPS UNIT

RM2152

TO GPS UNIT

RM2152

H2074

BATTERY

N2165

C2149

H2096B

H2098A

BATTERY

220/110V AC MAINS INPUT

220/110V AC MAINS INPUT

2.5   APPENDIX

2.5.1   ANSWERBACK CHARACTER SETTING

The character codes used when entering the answerback sequence are based on the ASCII-code and CCITT rec. F.130.

Each character is represented by a 2-digit/letter code as follows:

Digits

Char	ASCII	Char	ASCII
0	30	5	35
1	31	6	36
2	32	7	37
3	33	8	38
4	34	9	39

Letters

Char	ASCII	Char	ASCII
A	61	N	6E
B	62	O	6F
C	63	P	70
D	64	Q	71
E	65	R	72
F	66	S	73
G	67	T	74
H	68	U	75
I	69	V	76
J	6A	W	77
K	6B	X	78
L	6C	Y	79
M	6D	Z	7A

Special characters

Char	ASCII
Carriage return	0D
Line feed	0A
Figure shift	7E
Letter shift	7F
Space	20

2.5.2   MAIN PROCESSOR BOARD VERSION 4 DIP SWITCHES

DIP SWITCH **S1** MAIN PROCESSOR PRINTED CIRCUIT VERSION 4 and higher.

No	OFF	ON
1	Use of SP-BUS	Use of T-BUS
2	Use of SP-BUS	Use of T-BUS
3	Not used	
4	Don't initialize EEPROM	Initialize EEPROM
5	Scan all distress frequencies when in Watch Receiver mode (RM2150)	Scan only 2187.5 kHz when in Watch Receiver mode (RM2150)
6	Not used	

DIP SWITCH **S2** MAIN PROCESSOR PRINTED CIRCUIT VERSION 4 and higher.

No	OFF	ON
1	Only for factory test	Normaly used
2	DSC/Radio Telex modem (RM2151)	DSC/Watch Receiver (RM2150)
3	Only for factory test	Normaly used
4	Function mode of	Function mode on

2.5.3   MAIN PROCESSOR BOARD VERSION 3 DIP SWITCHES

DIP SWITCH **S1** MAIN PROCESSOR PRINTED CIRCUIT VERSION 3.

No	OFF	ON
1	Not used	
2	Don't initialize EEPROM	Initialize EEPROM
3	Scan all distress frequencies when in Watch Receiver mode (RM2150)	Scan only 2187.5 kHz when in Watch Receiver mode (RM2150)
4	Not used	

DIP SWITCH **S2** MAIN PROCESSOR PRINTED CIRCUIT VERSION 3.

No	OFF	ON
1	Only for factory test	Normaly used
2	DSC/Radio Telex modem (RM2151)	DSC/Watch Receiver (RM2150)
3	Only for factory test	Normaly used
4	Function mode of	Function mode on

Technical Manual

ECI