



SAILOR A1
VHF-DSC/Basic VHF
Installation Manual

Introduction

S. P. Radio A/S

For more than half a century S. P. Radio A/S has been the market leader within maritime radio communication.

SAILOR

The communication products and systems of S. P. Radio are recognized under the brand name SAILOR. The Sailor name has become a guarantee of reliable and technologically superior radio equipment, ranging from basic VHF units to satellite systems and complete compact GMDSS solutions.

Products

The SAILOR COMPACT 2000 GMDSS is based on the well proven range of Sailor products specifically developed to meet the GMDSS requirements and supported by a world-wide Certified GMDSS service concept, giving several hundred reasons for shipping companies to choose equipment manufactured by S. P. Radio A/S. Today S. P. Radio A/S is recognized as the world's leading supplier of GMDSS solutions.

The SAILOR COMPACT 2000 GMDSS has already been and still is constantly supplied to a large number of the world's leading shipping companies and national naval fleets. It is a complete GMDSS solution which matches communication and safety needs exactly - regardless of whether you operate with A1, A2, A3 or A4.

The System 4000 GMDSS sets new standards. It is constructed on the basis of our comprehensive experience developing GMDSS equipment. It satisfies all the relevant requirements regarding safety and efficiency. The System 4000 presents a large number of attractive convenience and safety facilities, either as a complete solution or as a series of stand-alone products.

Sailor has a long history as a satellite communications supplier offering a full programme of satellite systems which includes Mini M, SAT-C and a number of stationary satellite systems. Our SAT-B is a breakthrough in maritime aerial technology and reliability. The SAT-B is the best possible choice when high quality speech transmission, top level security and the capacity to deal with large volumes of telex, fax, data and high-speed data (HSD) transmissions are required.

Training certification

Training of deck officers to meet the requirements within the concept of GMDSS, as to operation of equipment and basic understanding of the systems, is an extremely important factor for the overall success-

ful implementation of GMDSS. As a unique initiative for GMDSS solutions, we can supply a complete software training programme for on-board training, to be used as preparation in order to fulfil the GMDSS requirements for obtaining the General Operation Certificate.

Service

A world-wide Sailor GMDSS certified service concept has been established in order to provide the shipping industry with a highly professional and uniform level of service. The Sailor GMDSS Certified Service Centre concept, which is constantly monitored, ensures that replacement units and spare parts are available at all the Sailor Certified Service Centres around the world. Service centres which are in position along all the major shipping routes. Furthermore the Certified Service Centres ensure that technicians with an annually updated training are ready to provide service 24 hours a day, 365 days a year.

Maintenance

Because of the fact that GMDSS equipment has been installed on board ships in order to meet the SOLAS (Safety of Life At Sea) convention, manufacturers and suppliers of GMDSS equipment have a certain responsibility to secure reliable supplies of equipment and spares in the years to come.

Therefore shipowners operating ships both locally and internationally should be fully aware of the importance of fitting GMDSS solutions which will be fully supported by the manufacturer.

It is a firm policy of S. P. Radio A/S, as the world's major manufacturer and supplier of GMDSS solutions, that for both the present GMDSS solutions and for future, alternative product solutions, all Sailor GMDSS systems will be entering the next century, in fully parallel production.

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 manual 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.

Doc. No.: M4800GB0

Issue: D/9949



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1 Technical Specification

Conforms to all relevant international requirements and resolutions as agreed by ETSI, IEC, ITU, and IMO as well as other national requirements. These specifications include ETS 300 162, ETS 300 338, IEC 945, IEC 1097-3 and IEC 1097-7.

General Information

Normal channels	All int. ch's for 25 kHz operation. Up to 40 private channels.
Opt. channels	All int. ch's for 12.5 kHz operation. Up to 224 ch's with up to 54 private ch's.
Channel spacing	25 kHz / opt. 12.5 kHz
Frequency range	150.8 MHz - 163.6 MHz.
Operating modes	Simplex/Semi-duplex.
Modulation	G3EJN for telephony receiver G2B for DSC signaling
Frequency stability	±10 ppm/ opt. ± 5ppm
Aerial connectors	Standard 50 ohm female, SO239
Temperature range	-15°C to +55°C
Supply voltage	13.2 VDC Nominal
Supply range	10.8 VDC to 15.6 VDC
Supply current	Stand-by 0.14 A Transmitter on 1.5 A (Low power) Transmitter on 5 A (High power)
Transceiver dimen.	H*W*D 55*202*136mm.
Transceiver weight	1.3 kg

Receiver

Sensitivity for: 12 dB SINAD	-119 dBm or 0.25µV p.d.
AF rated power	
Output 1	4 W/ 4 ohms
Output 2	6 W/ 4 ohms
Distortion THD	Below 5%
Signal/noise ratio	Better than 40dB
AF response	- 6dB/octave
Spurious emission	Below 2nW
Spurious resp. att.	More than 70dB

Intermodulation att.	More than 68dB
Blocking	More than 90dB μ V
Co-channel rejection	Better than -10 dB
Adj. ch. selectivity	More than 70dB

Transmitter

RF output power	High 25 W + 0 dB to -0.5 dB Low 0.9 W +0.5 dB to -1 dB
Adj. ch. power	Below -70dBc
Spurious radiation	Below 0.25 μ W
Cabinet radiation	Below 0.25 μ W
AF response	+ 6dB/octave
Distortion	Below 5%
Signal/noise ratio	Better than 40dB

DSC Facilities:

DSC operation	According to Rec. ITU-R M.541-6 and Rec. ITU-R M.689-2
DSC protocol	According to Rec. ITU-R M.493-7 class D
Navigator interface	NMEA 0183, GGA, GLL, ZDA NMEA Input current 8mA type
Symbol error rate below $1 \cdot 10^{-2}$ at Modulation	-119 dBm or 0.25 μ V p.d. 1700 Hz \pm 400 Hz 1200 baud \pm 30 ppm
Frequency error	Below \pm 1 Hz
Residual DSC-mod.	Below -26 dB

2 Installation

Mounting possibilities, dimensions and drilling plan.

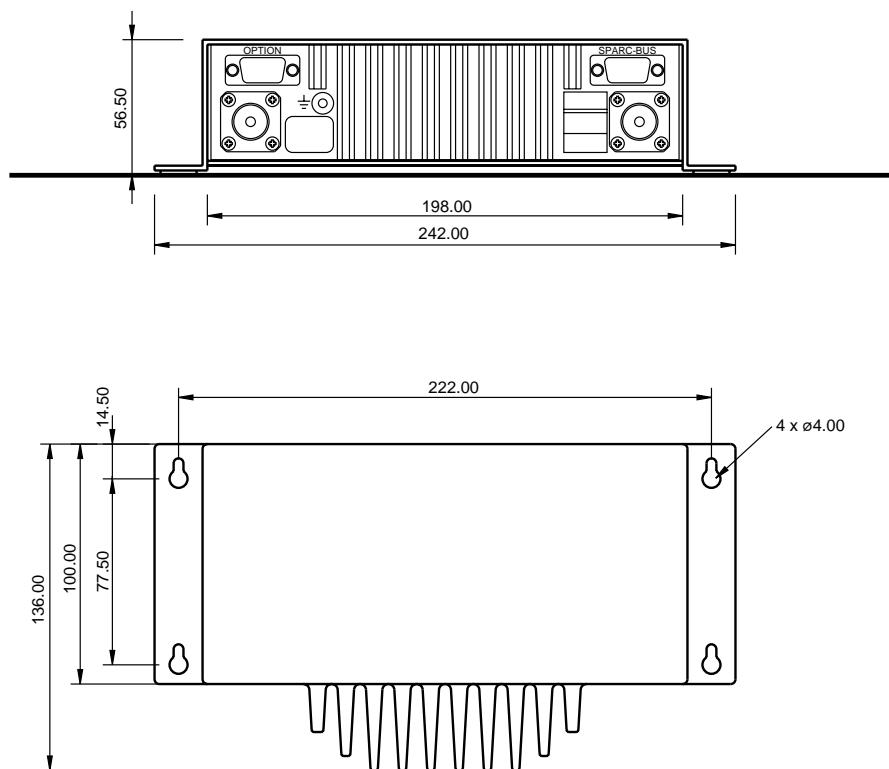
2.1 Mounting Possibilities

Transceiver Unit

The transceiver unit is available in both a one- and a two-aerial version.

A one-aerial DSC transceiver can be converted into a two-aerial version (contact your dealer).

The drawing below shows a two-aerial transceiver unit:



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Weight:

Transceiver Unit 1.3 kg

WARNING:

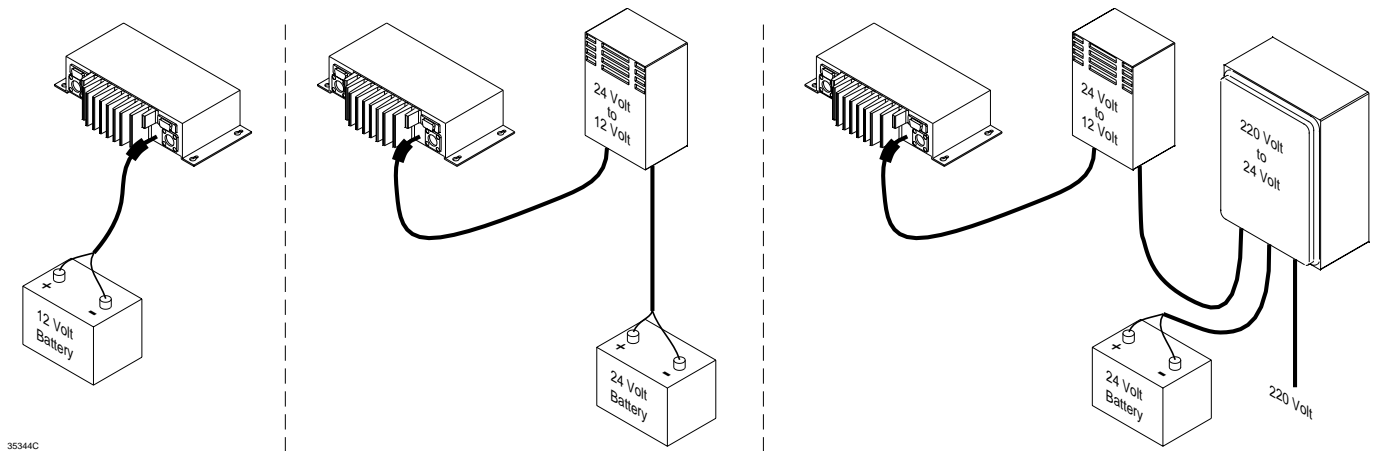
Only use original screws; otherwise you risk short-circuiting the battery ground to the ship ground.

2.2 Power Supply

The standard power supply for the VHF unit is 12V DC.

For 24V DC supply an external power supply with the type number N420 can be used. The N420 is in principle a 24V DC to 13.2V DC serial regulator.

For 110V AC, 127V AC, 220V AC or 237V AC operation, an external power supply with the type number N163S must be used together with N420.



Fuse

The fuse is a standard 10A mini car fuse. There is a spare fuse in the power cable connector.

2.3 Aerial

The transceiver without DSC requires one aerial. The transceiver with DSC is available in both a one- and a two-aerial version.

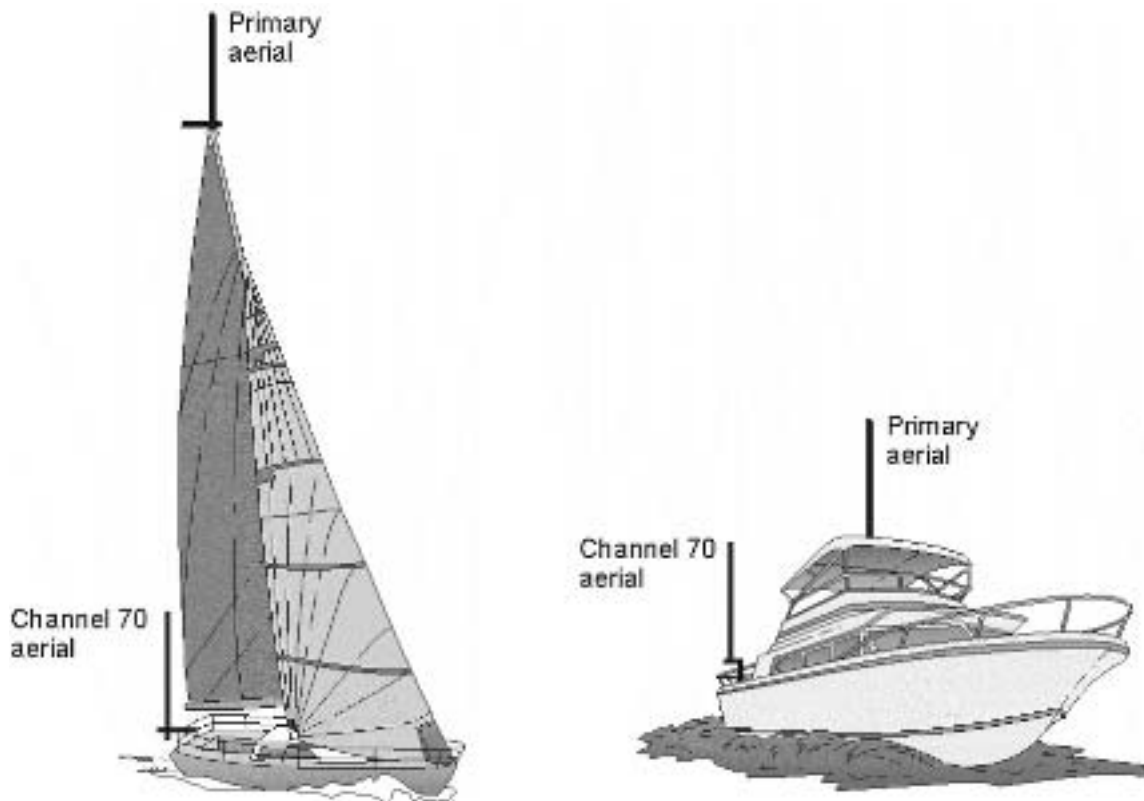
All common 50Ω aerials covering the used frequency range with a reasonable standing wave ratio, max. 1.5, can be used.

Aerials are connected to the set by means of a 50Ω coaxial cable with low loss, e.g. RG213U. For each cable, two PL259 plugs are used, one mounted at each cable end.

2.3.1 Placing the Aerial(s)

Aerials should be mounted in a place that is as high and clear as possible - like the “primary aerials” in the illustration below. The horizontal distance to metal parts must be at least 1m.

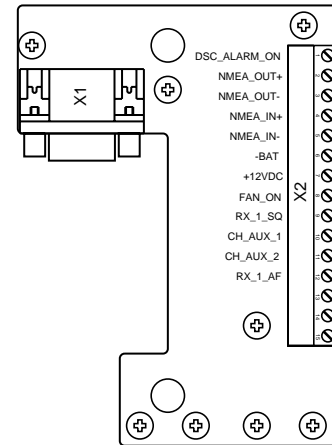
When using two aerials, the primary aerial must be placed at a higher level than the channel-70 aerial:



2.4 Options Connector Box H4992

Options connectors

Transceiver unit X2	Twisted Name	Option box pair	X1,X2
pin 1	DSC_ALARM_ON		1
pin 2	NMEA_OUT+1	1	Optional
pin 3	NMEA_OUT-1	1	Optional
pin 4	NMEA_IN+	2	4
pin 5	NMEA_IN-	2	5
pin 6	-BAT_0VDC	3	6
pin 7	+12VDC	3	7
pin 8	FAN_ON		8
pin 9	RX_1_SQ		9
pin 10	CH_AUX_1		10
pin 11	CH_AUX_1		11
pin 12	RX_1_AF		12
pin 13	N.C.		13
pin 14	N.C.		14
pin 15	N.C.		15



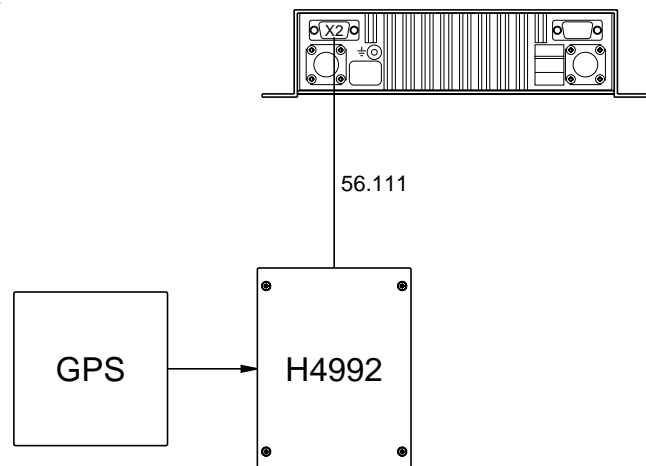
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To connect a GPS to the VHF transceiver, connect the GPS signal lines to the options connector pin_4 (NMEA_IN+) and pin_5 (NMEA_IN-).

Alternatively the GPS can be connected directly to the transceiver by means of a 15-pole high density D-sub in the same pins as those mentioned above.

Make sure to use the 15 to 15-pole adaptor between the transceiver and the 15-pole high density D-sub.

The two parts (part no. 78.775) are supplied with the radio.



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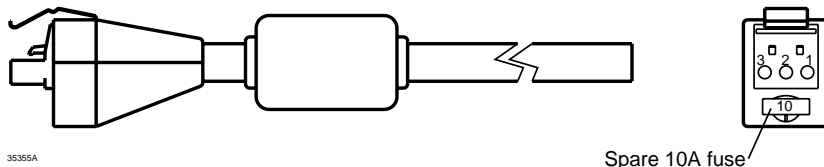
2.5 Cable Length

The cable length specified below is the absolute maximum length.

2.5.1 Power Cable

Number	Supply	From	To	Wire mm2	Max. length
56.112	+12 volt	BATTERY	RT4800/01	2.5	1.5 metres
	+12 volt	BATTERY	RT4800/01	5.0	3 metres

Note: The cable length from battery to N420 depends on the wire thickness, but the voltage at the cable end at N420 should not be less than 18 volt.



Pin no.	Name	Colour
Pin 1	SUPPLY_ON	Blue *
Pin 2	+BAT	Red
Pin 3	-BAT	Black

* NB! The blue wire is **only** to be used in connection with N420.

2.6 Electrical Connections

2.6.1 Power Connectors

Power connector

Transceiver unit	Name	Battery	N420
pin 1	SUPPLY_ON	NC	SUPPLY_ON
pin 2	+Battery, +12VDC	+	+12V
pin 3	- Battery, 0VDC	-	0V

2.7 Compass Safety Distance

Unit	Standard	Steering
Transceiver	0.3 m	0.3 m
Handset	1.1 m	0.6 m
N420	0.6 m	0.3 m
N163S	1.2 m	0.7 m



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