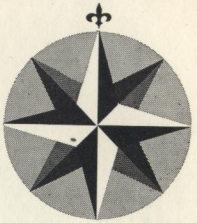
INSTRUCTION MANUAL

Sailor TYPE 26D

A/S S. P. RADIO
AALBORG - DENMARK

WILDER & SØRENSEN PRINTED IN DENMARK PHØNIX-TRYKKERIET . AABYHØJ

INSTRUCTION MANUAL



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INDEX

IMPORTANT.

In a situation of distress it is of the utmost importance that maximum transmitter range be effected. This can only be accomplished when the transmitter is tuned and the 3 trimmer settings for each of the operating frequency channels are recorded in the three spaces provided directly above the crystal frequency on the Channel Selector Dial. See in this instruction Book dealing with installation, channel tuning and operation.

A. Specifications of SAILOR 26D

I. General Features of Transmitter:

11 – Channel Crystal controlled telephony transmitter designed specifically for marine use (CO-PA). Built-in transistorized modulator with »Speech-Limiter«. Built-in transistorized D.C. converter for operation of the transmitter directly from the existing power supply of the vessel.

All welded rust-resistant steel cabinet with a greyish-green baked hammer-tone lacquer finish.

Control knobs and other fittings are of bright chromium plated solid brass and form-resistant plastic.

Height 38 cm (15 inches).
Width 32 cm (12¾ onches).
Depth 15 cm (6 inches).
Weight approx. 15 kg (33 lbs.).

II. Applications:

Telephony communication between ships and coastal stations (simplex or duplex operation).

Telephony inter-communication between ships (simplex or duplex operation).

Internal control aboard ship through ship control loudspeakers. Hailing of other ships by means of the external fitted hailer.

III. Transmitter stages:

P. A. stage.
Oscillator stage.
Modulator push pull output stage.
Modulator driver stage.
Modulator 2nd L.F. stage.
Modulator 1st L.F. stage.
Speech-Limiter.
D.C. converter.
Full wave rectifier bridge.
Polarity fuse.
Meter diode.

Both the P. A. and oscillator stages utilize valves for operation, transistors and diodes are used in all other stages. For type

numbers of above mentioned components, please see schematic diagram.

IV. Transmitter connections:

For operation of the equipment the following connections are made:

1. TRANSMITTER AERIAL lead-in is connected to insulated stand-off terminal located on the front of the transmitter. All types of existing ship aerials may be used, but for optimum performance it is recommended that the aerial should be of considerable length and mounted as high as conditions permit.

2. RECEIVING AERIAL coaxial lead-in is connected to the appropriate socket on the transmitter for change-over relay control.

3. RECEIVER aerial output socket on the transmitter is connected to the receiver aerial input socket.

4. LOUDSPEAKER circuit it also controlled by the transmitter change-over relay and the speaker plug is connected accordingly

5. RECEIVER loudspeaker socket from the transmitter change-over relay is coupled up directly to the loudspeaker socket located on the receiver.

6. HAILER, if desired, may be connected for control messages and hailing. Impedance 12 ohm. Effective output up to 20 watts.

   The »hailer« output terminals located on the side of the transmitter are fited with a dummy load (Plug in type). This component should only be removed when a hailer system is connected to the »hailer« output terminals.

7. POWER supply of 12 or 24 volts. D.C. is connected direct to input terminals using cable having a cross-sectional area of not less than 10 Sq. mm. for 12 Volt and 2,5 Sq. mm. for 24 Volt. The transmitter can be adjusted to operate on either of these voltages.

8. EARTH connection is made to the hull of the ship (in the case of iron constructed vessels) or to a metal plate of at least

1 Sq metre mounted outside of the hull (when the vessel is of wood construction).

V. Controls:

1. CHANNEL SELECTOR – switches to the desired transmitting frequency. (11 crystal controlled channels). After selecting the desired channel, the remaining tuning controls can then be adjusted in accordance with the figures indicated on the dial located at the rear of the channel selector control knob.

2. FUNCTION SWITCH – selects the type of operation to be used. It has the following positions: »Off« – »Hailer« – »Simplex« and »Duplex«.

3. AERIAL COUPLING – adjusts the coupling of the aerial to the output of the transmitter. Correct setting for this control is also indicated on the dial of the channel selector.

4. AERIAL TUNING COARSE – adjusts aerial tuning. Correct setting for this control is read from the channel selector dial.

5. AERIAL TUNING FINE – this control is also used for aerial tuning and the correct setting is indicated on the channel selector dial. The transmitter meter can also be used for this adjustment.

6. METER SWITCH (Push button) – changes the function of the meter from indicating cathode current of the P.A. stage – to an aerial current meter. This is accomplished by pushing button in.

7. TELEPHONE HANDSET (with transmitter relay control switch) – the transmitter relay performs the following functions simultaneously: Aerial switching, transmitter stand-by/transmit switching and loudspeaker control switching. The relay is controlled by the telephone handset switch.

VI. Technical data:

Input: 40 watts.
Output: 15–20 eatts.
Modulation: 300–3000 c/s AM. with »Speech-Limiter«.
Frequencies: 11 crystal controlled channels between 1.6 and 4 mc/s.

Frequency stability: better than 0.02%.
Current consumption with 12 V.D.C. input:

stand-by 2.5 A. Transmit 7–10 A.
with 24 V.D.C. input:
stand-by 1.25 A. Transmit 4–7 A.

VII. Dimensional drawing – see rear of Manual.

Scematic diagram – see rear of Manual.

B. Installation of SAILOR 26 D

I. Preliminary preparations:

Before installation, transmitter is adjusted to the correct operating voltage supply (12 or 24 V.D.C.) and the desired crystal are inserted. The transmitter is tuned as described under section D. (Servicing of Sailor 26 D).

II. Installing of equipment:

The transmitting aerial wire should be between 10–20 meters in length (32-65 ft.) and mounted as high and free as possible. Insure that good quality insulators are used at the ends. Joints should be soldered. Aerial down-lead wire is connected to the insulated stand-off terminal on the transmitter marked »AERIAL TRANSMITTER«.

Examples of various aerial types are shown in Fig. 1 a – b – c – d and e.

The receiving aerial down-lead is to be connected to the socket on the side of the transmitter marked »AERIAL«. Further connection is also made from the socket marked »RECEIVER« (adjacent to the aerial socket) to the receiver aerial input socket using coaxial cable. This completes the wiring necessary for receiver aerial relay switching. The receiving aerial should be mounted as far away as possible from the transmitter aerial to avoid interference when using duplex operation. If the aerials cannot be placed to avoid interference is it advisable to fit a filter to the receiving aerial input circuit (for example Sailor Duplexfilter Type 26 E).

The receiver loudspeaker plug is connected to the socket marked »SPEAKER« on the transmitter side cover. Connections are also made from receiver's speaker socket to the socket marked »RECEIVER« on the transmitter side cover. Receiver loudspeaker circuit switching is now controlled by the transmitter relay.

Internal control loudspeakers or hailerspeaker aboard the ship can be connected to the socket marked »Hailer«. (Impedance 12 ohms. Output 20 watts).

The power supply is connected preferably direct from the battery to the terminal posts marked »POWER« located on the sidecover using cable with a cross-sectional area of not less than 10 Sq. mm. for 12 Volt and 2,5 Sq. mm. for 24 Volt. Transmitter

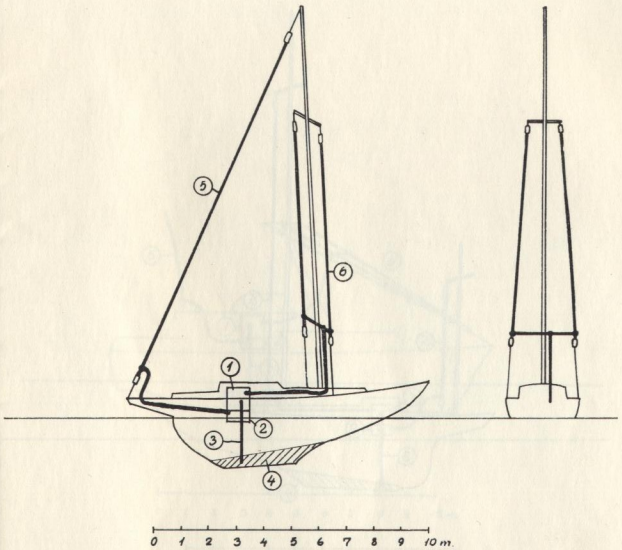


Fig. 1 a

Example of aerial installation on a single-mast sailing boat.

1. Sailor Transmitter 26 D.
2. Sailor Receiver 46 T.
3. Earth lead of copper cable as short as possible, and having a cross-sectional area of not less than 10 Sq. mm.
4. Lead keel is employed as the actual earth, fasten the earth lead to keel bolt.
5. Stern stay is used as receiving aerial, insure that high-tensile strength insulators are used. The lead-in wire should be of a high quality coaxial cable and can be led below deck.
6. Transmitting aerial of insulated copper should have a cross-sectional area of not less than 6 Sq. mm. Use large transmitter insulators, and if possible keep the aerial at least 100 mm. (4 inches) from other parts of the ship. Lead-in wire can be led below deck but stand-off insulators should be used. If the lead-in is carried along the mast (as outlined in the sketch) then stand-off insulators should also be used.

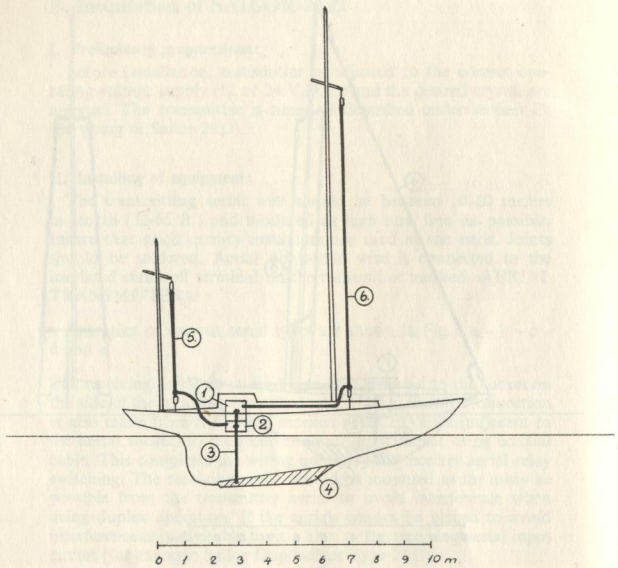


Fig. 1 b

Example of aerial installation on a two-mast sailing boat.

1. Sailor Transmitter 26D
2. Sailor Receiver 46T.
3. Earth lead of copper cable as short as possible, and having a cross-sectional area of not less than 10 Sq. mm.
4. Lead keel is employed as the actual earth, fasten the earth lead to keel bolt.
5. Receiving aerial to aftermost mast. Lead-in wire of high quality coaxial cable, which can be led below deck.
6. Transmitting aerial to main mast. Use insulated copper wire having cross-sectional area not less than 6 Sq. mm. Use large transmitter insulators and if possible keep the aerial at least 100 mm. (4 inches) from other parts of the ship. Lead-in wire can be below deck but stand-off insulators must be used.

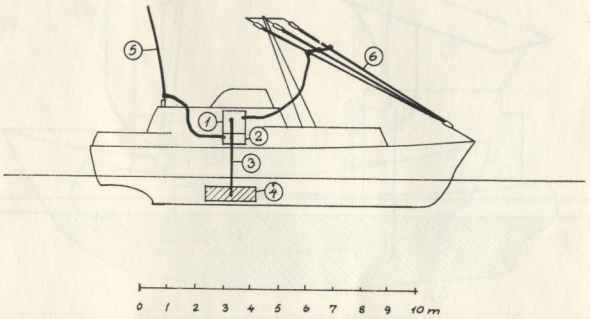


Fig. 1 c

Example of aerial installation on a motor yacht.

1. Sailor Transmitter 26D.
2. Sailor Receiver 46T.
3. Earth lead of copper cable as short as possible, and having a cross-sectional area of not less than 10 Sq. mm.
4. Earth plate of copper having area of 1–2 Sq. metres and mounted on the outside of the hull below the water line. Connect the earth wire to a bolt which has been brazed onto the earth plate.
5. Receiving aerial (for example a whip aerial) of approx. 5 metres long (16½ feet) is mounted as far away as possible from the transmitter aerial. Lead-in wire to be of the shielded type (good quality coaxial cable).
6. Transmitting aerial of copper having cross-sectional area of at least 6 Sq. mm. Use large transmitter insulators and if possible keep the aerial at least 100 mm. (4 inches) from other parts of the ship. If there is a risk of the aerial touching other parts of the ship use insulated aerial wire instead of bare copper wire.

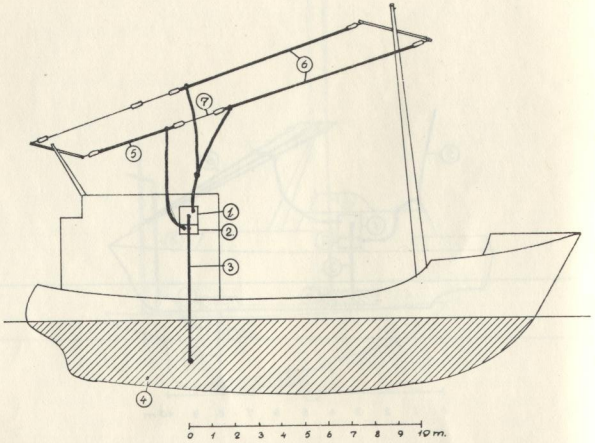


Fig. 1 d
Example of aerial installation for the steel constructed »Cutter« type craft.

1. Sailor Transmitter 26D.
2. Sailor Receiver 46T.
3. Earth lead of copper cable as short as possible, and having a cross-sectional area of not less than 10 Sq. mm.
4. Steel hull employed as earth. Fasten earth lead to hull using a machine bolt or similar device.
5. Receiving aerial mounted as far apart as possible from the transmitting aerial. Lead-in wire of the shielded type (good quality coaxial cable).
6. Transmitting aerial of copper having cross-sectional area of at least 6 Sq. mm. Use large transmitter insulators and if possible keep the aerial at least 100 mm. (4 inches) from other parts of the ship.
7. Spacing line between transmitting and receiving aerials.

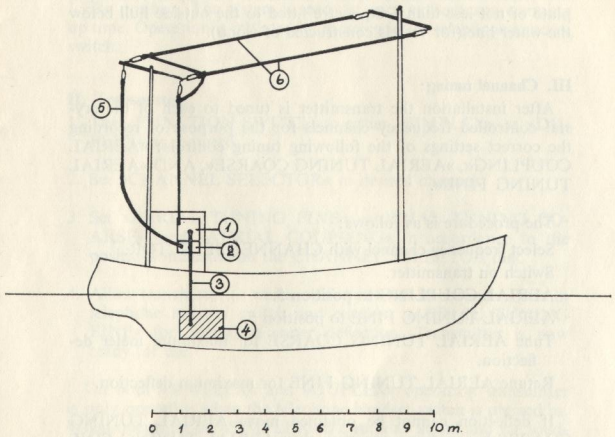


Fig. 1 e
Example of aerial installation for the wood constructed »Cutter« type craft.

1. Sailor Transmitter 26D.
2. Sailor Receiver 46T.
3. Earth lead of copper cables as short as possible, and having a cross-sectional area of not less than 10 Sq. mm.
4. Earth plate of copper having area of 1–2 Sq. metres and mounted on the outside of the hull below the water line. Connect the earth wire to a bolt which has been brazed onto the earth plate.
5. Receiving aerial mounted as far apart as possible from the transmitting aerial. Lead-in wire of the shielde type (good quality coaxial cable).
6. Transmitting aerial of copper having cross-sectional area of at least 6 Sq. mm. Use large transmitter insulators and if possible keep the aerial at least 100 mm. (4 inches) from other parts of the ship.

Input voltage adjustments is covered under section »D« (Servicing of Sailor 26 D).

The earth wire from terminal post marked »Earth« shall be a 50 mm (2 inches) wide copperband, and is connected to the hull of the vessel (in the case of iron constructed vessels) or to a metal plate of not less than 1 Sq. metre fitted to the outside hull below the water line (for vessels constructed of wood).

III. Channel tuning:

After installation the transmitter is tuned to each of the crystal controlled frequency channels for the purpose of recording the correct settings of the following tuning controls: »AERIAL COUPLING«, »AERIAL TUNING COARSE«, AND »AERIAL TUNING FINE«.

The procedure is as follows:

Select frequency channel with CHANNEL SELECTOR.

Switch on transmitter.

AERIAL COUPLING to position 5.

AERIAL TUNING FINE to position 5.

Tune AERIAL TUNING COARSE for maximum meter deflection.

Retune AERIAL TUNING FINE for maximum deflection.

If deflection cannot be obtained move AERIAL TUNING COARSE up or down one step, then AERIAL TUNING FINE can be readjusted for maximum meter deflection.

With METER SCWITCH button held in, readjust AERIAL TUNING FINE. The transmitter is now correctly tuned for that particular frequency channel. This tuning procedure is carried out on all channels and the tuning control settings are recorded in the columns provided for on the dial of the channel selector switch in following order: AERIAL TUNING FINE«, »AERIAL TUNING COARSE«, »AERIAL COUPLING«. The dial cover can be removed by removing the channel selector knob together with the four corner screws. Under certain operating conditions when using an extra long aerial it is necessary to insert one or both of the 100 pF condensers into the aerial circuit (see Fig. 4). For optimum performance this adjustment should no be overlooked.

C. Operating of SAILOR 26 D

I. Amplifier system (Audio):

In using the transmitter amplifier system for aboard messages or for haling of other ships the function switch is set at the »HAILER« position. The system is ready at once without any warming up time. Operation is initiated by pressing in the telephone handset switch.

II. Transmitter:

1. Turn FUNCTION SWITCH to either »SIMPLEX« or »DUPLEX« as required.

2. Set »CHANNEL SELECTOR« to desired channel.

3. Set »AERIAL TUNING FINE«, »AERIAL TUNING COARSE«, and »AERIAL COUPLING« in accordance to the positions indicated on the CHANNEL SELECTOR dial.

4. Allow transmitter to warm up for at least 30 seconds. Press in telephone handset switch and readjust »AERIAL TUNING FINE« for maximum meter deflection. Transmitter is now ready for use.

On both »SIMPLEX« and »DUPLEX« operation transmitter is only operative when the telephone handset switch is pressed in. When operating on »SIMPLEX« the receiver aerial and the loudspeaker circuits are disconnected by the transmitter relay whilst transmitting. Always use »SIMPLEX« operation when both stations operate on the same frequency. On »DUPLEX« operation the operator can listen and transmit simultaneously providing the transmitting and receiving frequencies are far enough apart.

NOTE: *Never* change positions of »CHANNEL SELECTOR«, »AERIAL TUNING COARSE«, and »AERIAL COUPLING« controls whilst transmitting e. g. (with telephone handset switch pressed in).

D. Servicing of SAILOR 26 D

I. Circuit description:

The RF circuit of the transmitter consists of a crystal-controlled oscillator stage followed by a class »C« operated P.A. stage which is anode-screen grid modulated.

The oscillator is of the Pierce-Colpitts type with the crystal connected between grid and chassis. Exitation voltage for succeeding stages is taken from an untuned RF choke in the oscillator anode through a 100 pF condenser to the grid.

The P.A. valve is class »C« operated, grid bias voltage being derived from the grid excitation voltages. The cathode current of the P.A. valve can be measured by means of the inserted measuring resistor by the transmitter meter. P.A. valve is parallel fed through the RF choke and coupled to the tank circuit through the RF choke and coupled to the tank circuit through a 2000 pF condenser. The tank circuit is designed as a pi network with fixed tuning condensers.

Tuning by parallel coupling of trimming coils over a part of the tank coil and part of the tank coil being shorted out. Each channel has an individual trimming coil. The selection of the trimming coil and the position of the tank coil short-out tap are dually controlled by the CHANNEL SELECTOR. The aerial tuning is coupled to the tank circuit through the low impedance side of the pi network which consists of series connected condensers. The degree of coupling is determined by condenser selection, controlled by the AERIAL COUPLING switch.

Aerial tuning comprises two tapped self-inductive coils which are series connected, windings of which can be shorted out in stages by rotary switches (AERIAL TUNING COARSE) and (AERIAL TUNING FINE). Aerial current can be measured by the transmitter meter through a current-transformer and a diode rectifier.

Transmitter modulator is completely transistorized. The output from the carbon michrophone on the telephone handset is connected through a potentiometer to the base of the 1st AF transistor thereby regulating the sensivity of the modulator. Between the 1st and 2nd AF transistor is a limiter-arrangement using zener diodes succeeded by a low-pass filter for smoothing. In the base circuit of the 2nd AF transistor is a potentiometer which adjusts

the modulator's output voltage and thereby the transmitter's degree of modulation. The driver transistor output from the drive transformer controls the output stage.

The push-pull output stage consists of two power transistors in class »B« operation. There are two windings on the secondary of the output transformer, one is for transmitter modulation connection, the other for hailer connection.

A D.C. converter is incorporated in the power supply section of the transmitter for developing transmitter anode voltages. The D.C. converter consists of two power transistors in a multivibrator arrangement. The arrangement contains a small drivertransformer, which is alternately driven to saturation, and the power output transformer.

The power output transformer and the modulation transformer are both designed to permit operation on both 12 and 24 volts. The primary taps of these transformers are individually adjusted by means of connecting-links to facilitate this dual voltage operation. (See »D« III Power supply conversion). The transmitter's relay system employs the necessary power contacts for transmitter »On«/»Off« switching. Additional contacts of the unit carry out receiver aerial and loudspeaker switching.

II. Crystal change-over:

When installing new crystals, re-trimming of the transmitter is carried out as follows:

Channel Selector number for the new crystal is selected.

The new crystal is inserted in the holder of the corresponding channel of the oscillator stage.

Remove P.A. stage valve. Locate P.A. trimmer coil compartment, and short-out section of the P.A. coil. (These sections are adjacent).

Solder lug conncections from P.A. trimmer-coil and short-out selection of P.A. coil are then made for the channel desired to the P.A. coil taps in accordance with the table below and Fig. 2.

NOTE: Channel numbers of the P.A. trimmer compartment are clearly marked.

Start transmitter, set »AERIAL COUPLING« control to position »0«.

P.A. trimming coil for the channel in question is then adjusted for minimum deflection of the transmitter meter.

The frequency of the new crystal can now be recorded in the appropriate column of the CHANNEL SELECTOR dial.

Adjustment of the arial tuning controls can now be carried out as described under section »B« Installation of Sailor 26D III Channel tuning.

P. A. Coil Tap Table

Frequency Range (kc/s)	P.A. Coil Tap. (Trimmer Coil)	P.A. Coil Tap (short out section)
1580–1630	S	
1620–1680	R	
1670–1730	Q	
1720–1800	P	
1790–1880	O	
1840–1960	N	
1920–2050	M	
2040–2160	L	Q
2140–2280	K	P
2260–2410	I	O
2400–2600	H	N
2560–2790	G	M
2760–3050	F	L
2990–3350	E	K
3160–3750	D	I
3700–3900	D	F
3900–4300	C	F

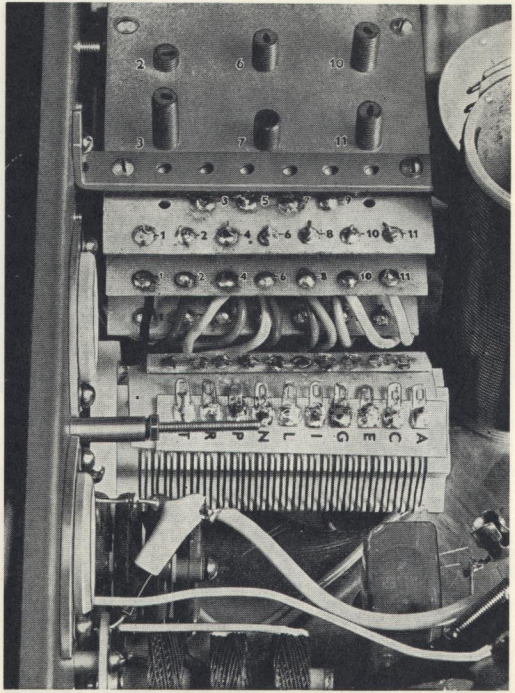


Fig. 2

III. Power Supply Conversion:

The transmitters from the factory are normally adjusted to operate from a power supply of 24 volts D.C. For 12 volt D.C. operation, power supply conversion is carried out by shifting connector-links on the D.3. converter power transformer, the modulation transformer, and on the soldering panel which is located between the front plate and the sub-assembly of the transmitter. (See fig. 3 and 4).

Before changing the power supply from 12 VDC operation to 24 VDC it is important to set the modulation potentiometer to its minimum position, it can be readjusted for 100% modulation after voltage changeover has been completed.

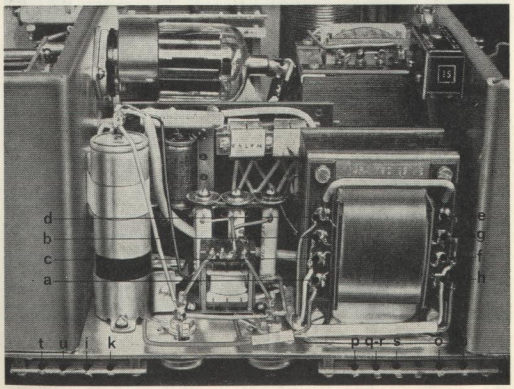


Fig. 3

For 24 V power supply, short-circuit following terminals: c–b, g–f, u–i.
For 12 V power supply, short-circuit following terminals: a–c, b–d, e–g, f–h, i–k, n–o, p–q, s–r, u–t.

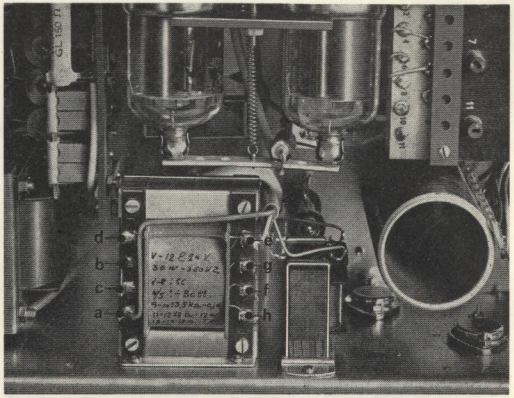


Fig. 4

For 24 V power supply short-circuit following terminals: c–b, g–f.
For 12 V power supply short-circuit following terminals: a–c, b–d, e–g, f–h.

IV. Single Aerial Operation:

Normally transmitters from the factory are adjusted for two aerial operation which means an independent aerial is used for transmitting. Although the receiver aerial is conveyed through the transmitter, the function of the relay insures that the receiver aerial is cut off whilst transmitting and thus prevents overloading of the receiver. However, on some ships it may be difficult to place more than one good aerial, in which case single aerial operation can quite readily be carried out. These modifications allow single aerial switching from transmitter to receiver. The aerial is connected to the insulated stand-off terminal located on the front of the transmitter and recoupling of leads on top of intermediate assembly. (See Fig. 5).

With single aerial the transmitter can only be used for »SIMPLEX« operation. If a second aerial, even of limited capabilities can be erected, it should be used as the receiving aerial and is connected accordingly in the normal manner. »DUPLEX« operation would then be available, and the receiver will automatically use the »second« aerial when working »Duplex«.

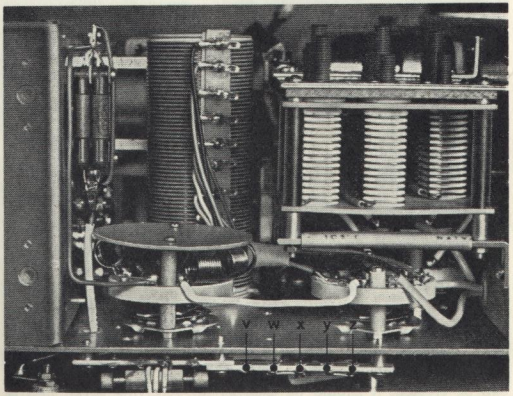
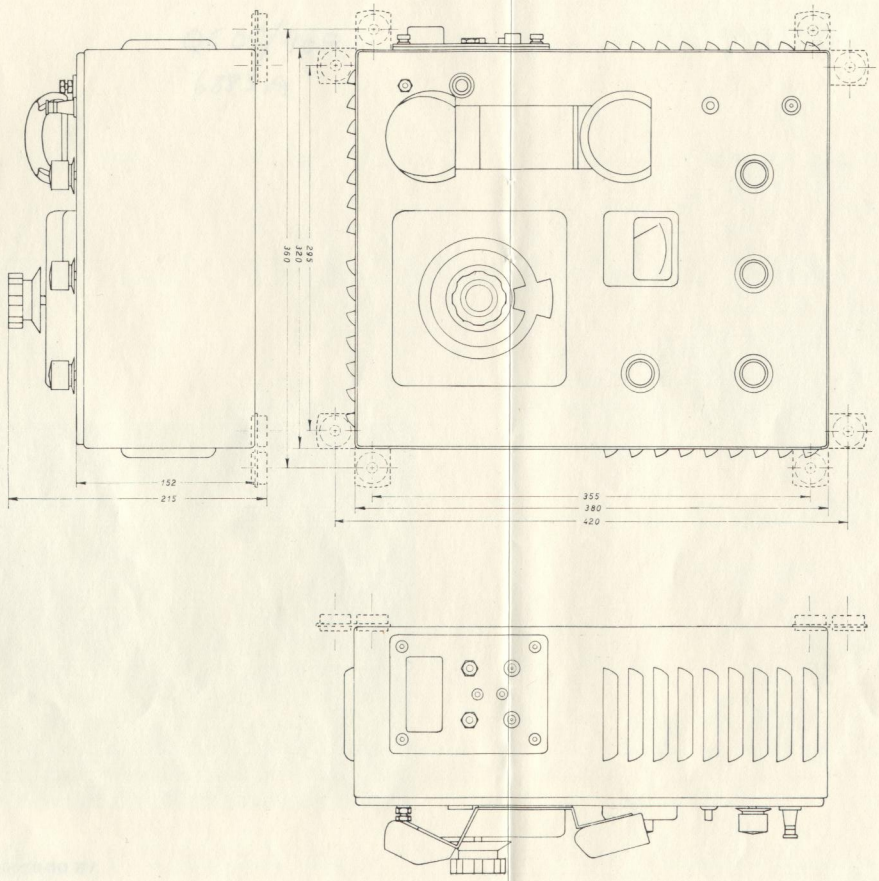


Fig. 5

Two aerial operation, short-circuit following terminals: w–x, y–z.
For single aerial operation short-circuit following terminals: v–w, x–y.

VII DIMENSIONAL DRAWING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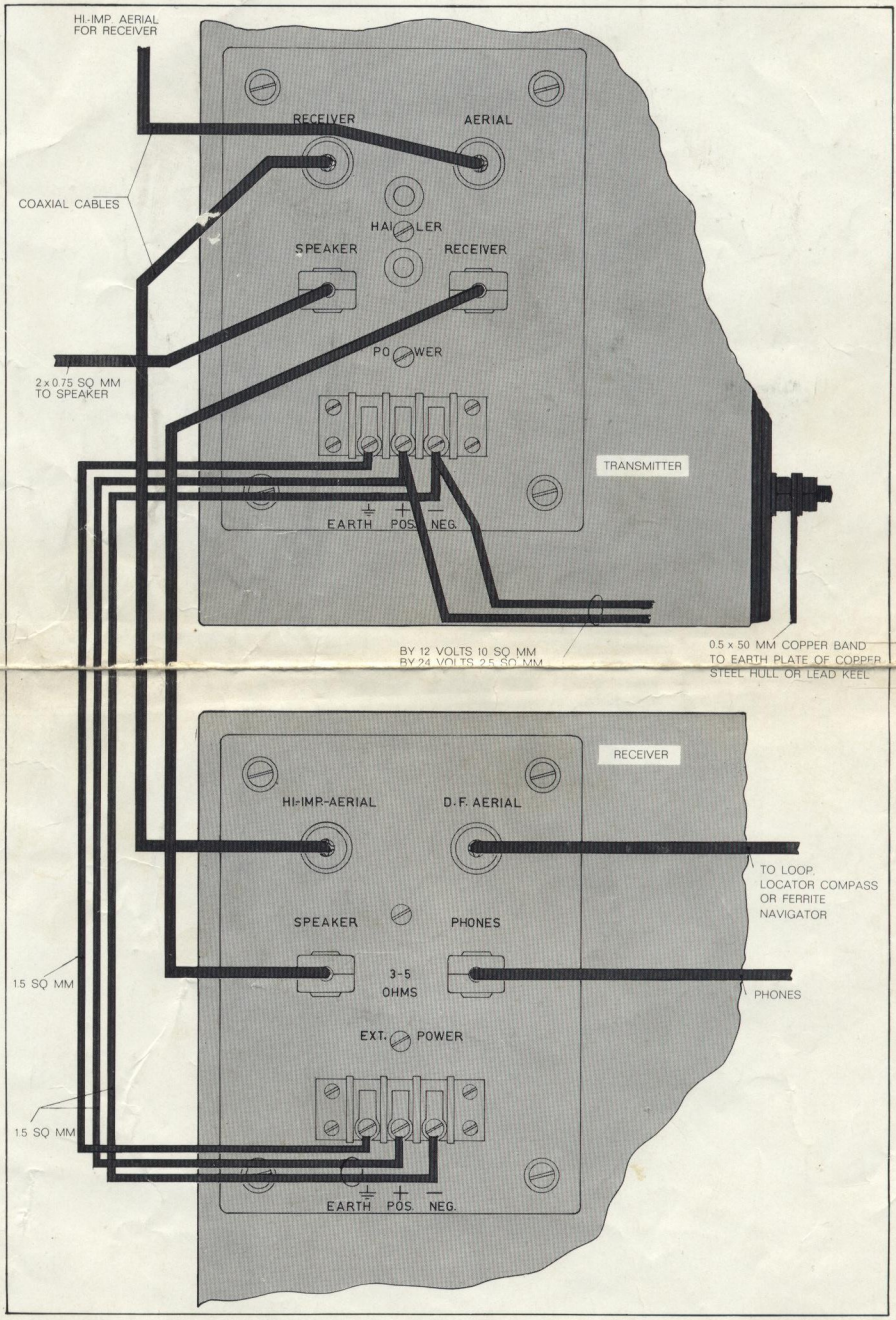

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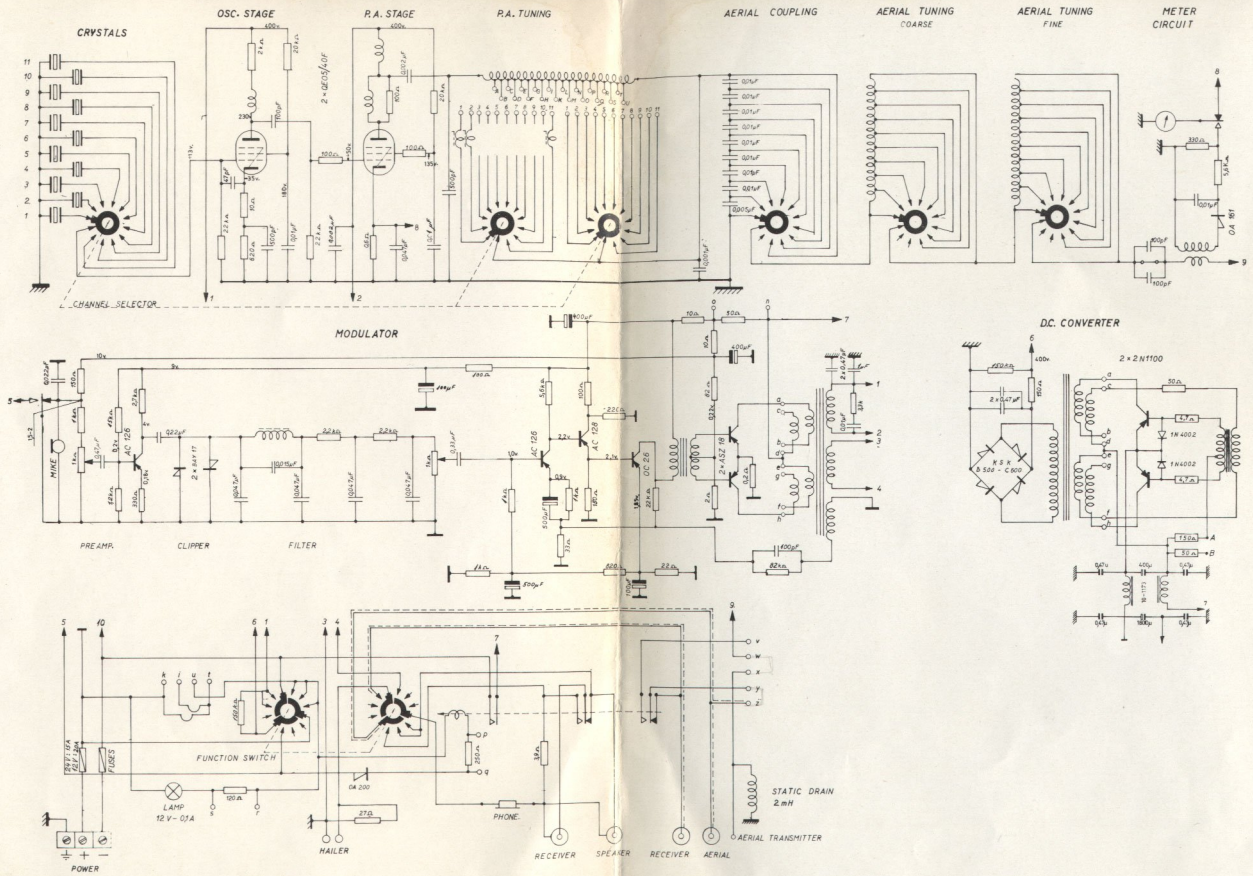

Dette diagram omfatter SAILOR 26D, serie J
This diagram refers to SAILOR 26D, series J
Dieses Schaltchema betrifft SAILOR 26D, Serien J
Ce schéma comprend SAILOR 26D, série J
Este diagrama comprende SAILOR 26D, serie J