



Sailor

Sailor

INSTRUKTIONSBOG FOR
SAILOR H 198

INSTRUCTION BOOK FOR
SAILOR H 198

INSTRUKTIONSBUCH FÜR
SAILOR H 198

INSTRUCTIONS POUR
SAILOR H 198

INSTRUCCIONES PARA
SAILOR H 198



A/S S. P. RADIO · AALBORG · DENMARK

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Fig. 1 Tuning facilities

Fig. 2 Installation, Land station

Circuit diagram

A. OPERATION

I T122, Telephony

1. Turn SUPPLY SWITCH to STAND BY. Lamp in CHANNEL SELECTOR will light.
2. Set SIMPLEX-DUPLEX toggle switch to desired mode.
3. Select desired frequency with CHANNEL SELECTOR.
4. Turn SUPPLY SWITCH to ON but not until 30 sec. after having set SUPPLY SWITCH to STAND BY.
5. If red lamp (TUNING) on CONTROL UNIT lights, wait until it goes out.
6. Set MODE SELECTOR to desired transmitting mode (A3H, A3J or A3A).
7. Take handset out of its bracket. Both on simplex and duplex, transmitter will start only when handset key is pressed.

II T122, Distress Call

1. Set CHANNEL SELECTOR to DISTRESS 2182.
2. Turn SUPPLY SWITCH to STAND BY.
3. Set POWER REDUCTION to 1/1.
4. Set SIMPLEX-DUPLEX to SIMPLEX.
5. Set SUPPLY SWITCH to ON (but not until 30 sec. after having set SUPPLY SWITCH to STAND BY).
6. Keep MODE SELECTOR constantly in TEST ALARM position. Operate PRESS TO SEND ALARM button.

Aerial current meter will now show a reading, thereby indicating that the distress signal is being transmitted.

7. Keep MODE SELECTOR in TEST ALARM position for approx. 30 sec. (distress signal cuts out automatically after 45 sec.).
 8. Release MODE SELECTOR and take handset out of its bracket.
 9. Press handset key and make distress call (mayday, mayday, etc.)
- Auto alarm can be monitored acoustically in the handset by turning MODE SELECTOR to TEST ALARM position (avoid pressing red button marked PRESS TO SEND ALARM as this will cause the

alarm signal to be transmitted.

Note: Aerial current is read on the meter on the CONTROL UNIT. MODE SELECTOR should be in TUNE position (not until after lamp on CONTROL UNIT has gone out).

III T121, T126 and T128, Telephony

1. Press STAND BY button.
2. Select desired frequency with CHANNEL SELECTOR and SECTION SWITCH.
3. Press SIMPLEX or DUPLEX button (but not until 30 sec. after having pressed STAND BY button).
4. Set POWER to FULL.
5. If red lamp (TUNING) on CONTROL UNIT lights, wait until it has gone out.
6. Select transmitting mode by pressing either the A3A, A3J or A3H button (A3J = SSB, A3H = AM).
7. Take handset out of its bracket. Both on simplex and duplex, transmitter will start when handset key is pressed.

IV T121, T126 and T128, Distress Call

1. Turn CHANNEL SELECTOR all the way to the left (pointer at 2182 DISTRESS).
2. Press STAND BY button.
3. Press SIMPLEX button (but not until 30 sec. after having pressed STAND BY button.)
4. Press TEST ALARM and ALARM buttons simultaneously and keep them depressed for approx. 30 sec. (distress signal cuts out automatically after 45 sec.).
5. Release TEST ALARM and ALARM buttons.
6. Take handset, press handset key and make distress call (mayday, mayday, etc.).

The auto alarm can be monitored acoustically in the handset by pressing the TEST ALARM button (not also the ALARM button as

this will cause the distress signal to be transmitted).

Aerial current is read on the meter on the CONTROL UNIT.

The TUNE button on the transmitter should be depressed (not until after lamp on CONTROL UNIT has gone out).

B. DESCRIPTION OF THE H198

The H198 with its associated CONTROL UNIT is an aerial tuner for use in conjunction with the T121, T122, T126 and T128 transmitters. The H198 is required only in cases where it is impossible to place the transmitter in close proximity to the aerial base point.

It should be noted that an installation without an aerial tuner should always be preferred where practicable.

A separate receiving aerial should always be used with the H198. The H198 aerial tuner is intended for outdoor mounting.

A CONTROL UNIT belongs to the aerial tuner. This unit is a box which should be mounted in close proximity to the transmitter. The front of the box carries an aerial current meter which shows aerial current at the aerial base point, and a red lamp which lights as long as the tuner's automatic channel-switching system is operating; the transmitter is cut off while the lamp lights. Circuitwise, the aerial tuner consists of an aerial coil and a loading capacitor.

The aerial coil is composed of coil elements L102, L103, L104 and an adjustable ferrite-core coil for each channel.

The tuner's programmable drum switch enables a choice of coil size for each channel, fine adjustment being performed with the ferrite-core coil provided for each channel.

The drum switch also enables selection of taps on the coupling capacitor for each channel.

Drum programming (tune-up) procedure will appear from Section E.

The tuner incorporates, for use during tune-up, an aerial current meter M101 as well as a motor switch S102 and power switch S103.

Switch S102 when in the OFF position removes power from the tuner's

stepper motor; in the MAN position the stepper motor and hence also the drum are running continuously whilst in the AUT position the stepper motor will automatically set the drum to the same channel as that to which the transmitter is set.

Switch S103 when in the OFF position cuts off the transmitter; in the RED and FULL positions the transmitter operates at reduced and full power, respectively (with the transmitter's POWER switch at full power).

Diode D101 serves to cut off the transmitter while the stepper motor is running (it overrides S103).

Switch S101 is mechanically coupled to the contact drum.

When the transmitter's channel drum is at, say Q, +24 (+12) V DC will be present at lead Q and consequently also at the stepper motor until the drum is at channel Q, whereupon current is cut off (MOTOR SWITCH at AUT). The +24 (+12) volts for, in this case lead Q, is obtained from switch S201, which is mounted in the transmitter and mechanically connected to the latter's CHANNEL SELECTOR.

In the CONTROL UNIT for the H198 is a male connector J301 which, via female connector J201 and the multicable coming from the transmitter (see Section C), connects the CONTROL UNIT and transmitter to each other. The CONTROL UNIT connects to the aerial tuner through a 24-conductor 0,25 sq. mm multicable.

Leads A to Q inclusive transmit position information between S201 and S101.

The aerial tuner's POWER switch when in the OFF position breaks, via relay RE301, the 18 V supply to the transmitter's BAL. MIXER, and by so doing cuts off the transmitter.

In the RED position, a load is placed across the 600 kHz input to the transmitter's BAL. MIXER via relay RE302 and resistor R303, thereby reducing the transmitter output.

Aerial current meter M301 in the CONTROL UNIT is in series with M101 in the aerial tuner. The sensitivity of both meters can be adjusted with P301.

Lamp LA301 lights when the transmitter is cut off, either because S103 is at OFF or because the stepper motor is running.

C. MODIFYING SAILOR SSB TRANSMITTERS FOR THE H198

These modifications must be carried out to enable the transmitter to be remotely controlled from the aerial tuner with respect to reduced power as well as stopping and starting the transmitter while tuning up the H198.

The modifications moreover will make channel switching in the H198 fully automatic and synchronous with the transmitter.

The following change must be made for the respective transmitters:

I. Modifying the T122 for the H198

(see Installation Sketch page 7 and 8)

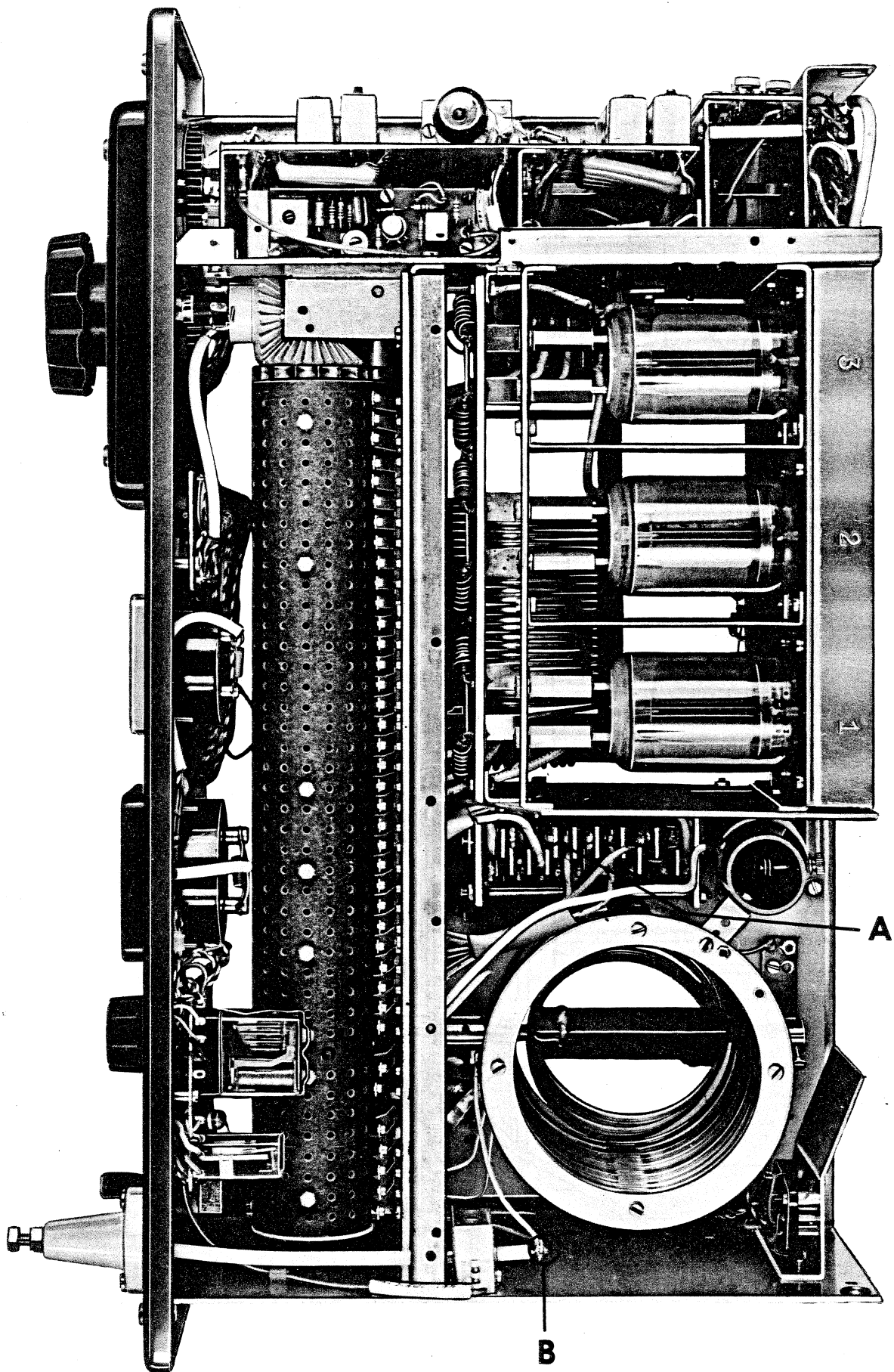
1. Set the channel selector to channel A (2182 kHz).
2. Remove the cover from the driver and take off the switch plug-in shaft which runs through the driver (do not forget to remove the cotter pin at the gear wheel on the transmitter's front panel).

Unscrew the drive level unit by removing the two screws located on the aluminium wall facing the PA valves and the screw with the long distance pipe located at the top of the drive level unit. Thereafter tip the drive level unit out. Push the coaxial cable coming out of the wiring harness which is provided, in through the hole marked A. Solder the inner conductor to the drive level unit's circuit board at the junction of R518/R519 (22-ohm and 39-ohm resistors) and solder the coaxial braiding to the other coax cable braids. Mount the drive level unit in its place and fasten the plug-in shaft.

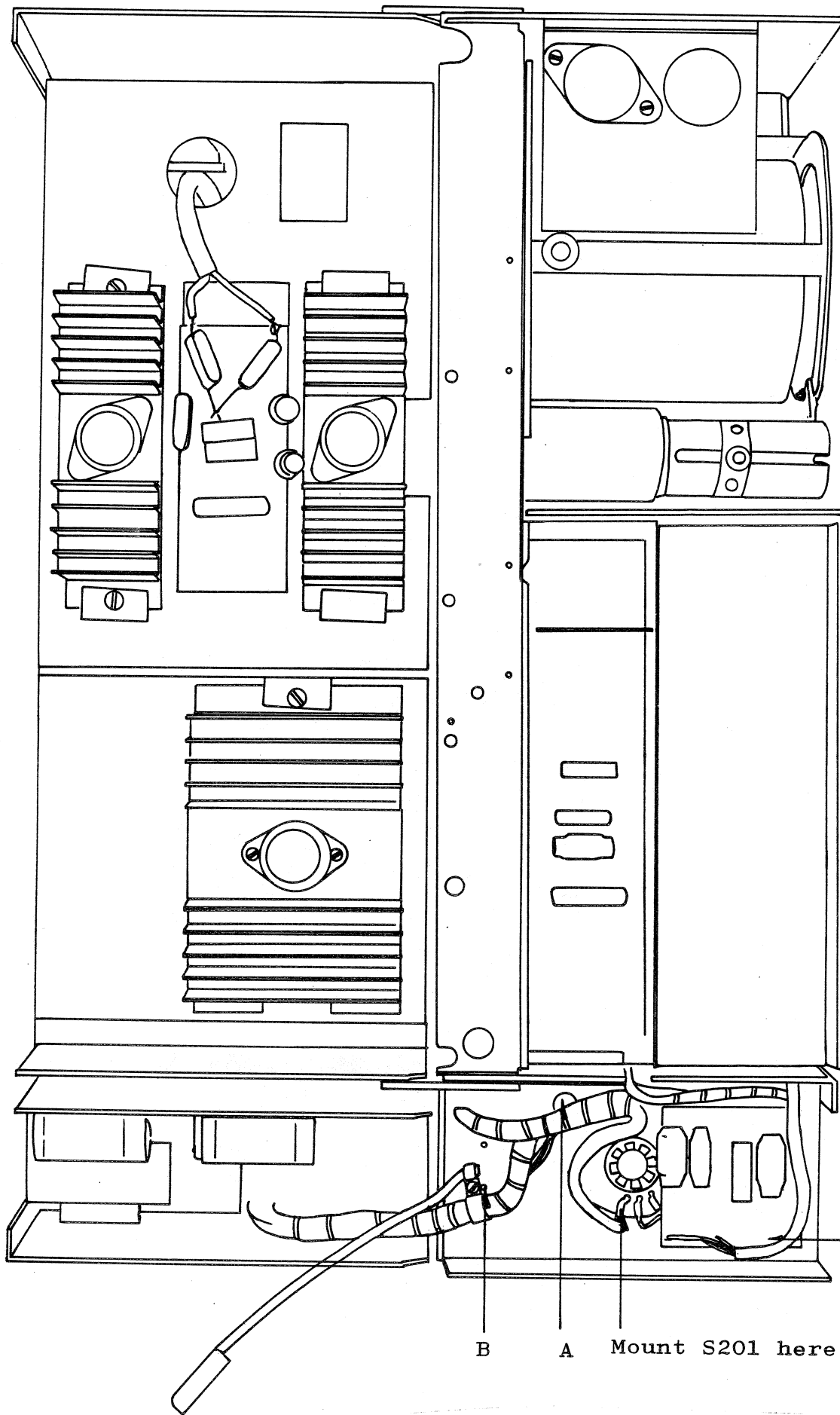
3. Unscrew circuit board P021 and remove screws and distance pipes. Mount new screws (3 MG⁺ x 32 mm) and new distance pipes, 10 mm long, on the front and 2 x 8 mm on the back of P021.

⁺MG = metric thread.

4. Mount the new switch deck on top of the existing switch deck, using the 3 MG x 16 mm screws and 5 mm distance pipes which are provided. Place the distance pipes between the two switch decks. Note that the switch tongue must be opposite the red/brown lead on the new switch deck when the channel selector is in the A position (2182 kHz).
5. Relieve the wiring harness of pull by means of the cable clamp which is provided, and a 3 MG x 10 mm screw. Screw the cable clamp into the hole marked B.
6. Solder the red lead from the wiring harness to the two yellow leads on P021.
Solder the black lead from the wiring harness to the two green leads on P021.
7. Unsolder the orange lead from P021 and solder it to one of the orange leads from the wiring harness.
Slide the length of flexible insulating tubing which is provided, in over the soldered junction. The tubing when subjected to radiant heat from a soldering iron will shrink to form a firmly fixed insulating sleeve.
8. Solder the other orange lead from the wiring harness to the terminal made available under item 7 above.
9. Take out all screws in contact drum positions 26-39 inc.
10. Disconnect all leads going to terminal B on fig. "Top view, upper part" in this book (page 7).
11. Solder a teflon insulated lead between terminal A and B (same fig.).
12. Tuning the Pi network is done as advised in chapter C TUNING in the T122 instruction book. (Remember to disconnect the RG8U Coax cable on the front of the transmitter.)



Top view, upper part



Orange
Black
Red

P021

B

A

Mount S201 here

II. Modifying the T121 for the H198

(see Installation Sketch page 11)

1. Set the channel selector to the A position (2182 kHz).
2. Remove the two knurled nuts and the epoxy lock panel.
Replace the two distance pipes located on the top side of the existing switch deck with 5 mm distance pipes.
Check that the CHANNEL SELECTOR is in position A (2182 kHz) and on the new switch deck the switch tongue must be in position with the red/brown lead.
Mount the new switch deck on top of the existing one so that the side with only one contact faces outwards.
Mount 4 mm distance pipes on top of the new switch deck and put the epoxy lock panel and knurled nuts back in place. The cable clamp which is provided should be used to relieve the wiring harness of pull and placed under the bottom one of the knurled nuts.
3. Connect the coaxial cable coming from the wiring harness to the drive level unit's circuit board as that the inner conductor goes to the junction of R518/R519 and the cable braiding is soldered to the other cable braids.
4. Unsolder the orange lead from the BAL. MIXER and replace with one of the orange leads from the wiring harness.
5. Solder together the other orange lead from the wiring harness and the lead which was unsoldered under item 4 above.
Slide the length of flexible insulating tubing which is provided, in over the soldered junction.
6. Connect the red lead from the wiring harness to the heavy black lead (0,40 sq. mm) on the PA circuit board .
Likewise connect the black lead from the wiring harness to the heavy green lead on the PA circuit board.
7. Remove the lead from between the variometer and the aerial relay. Unsolder, at the variometer, the lead going from contact 36 (phosphor bronze spring) to the variometer and connect

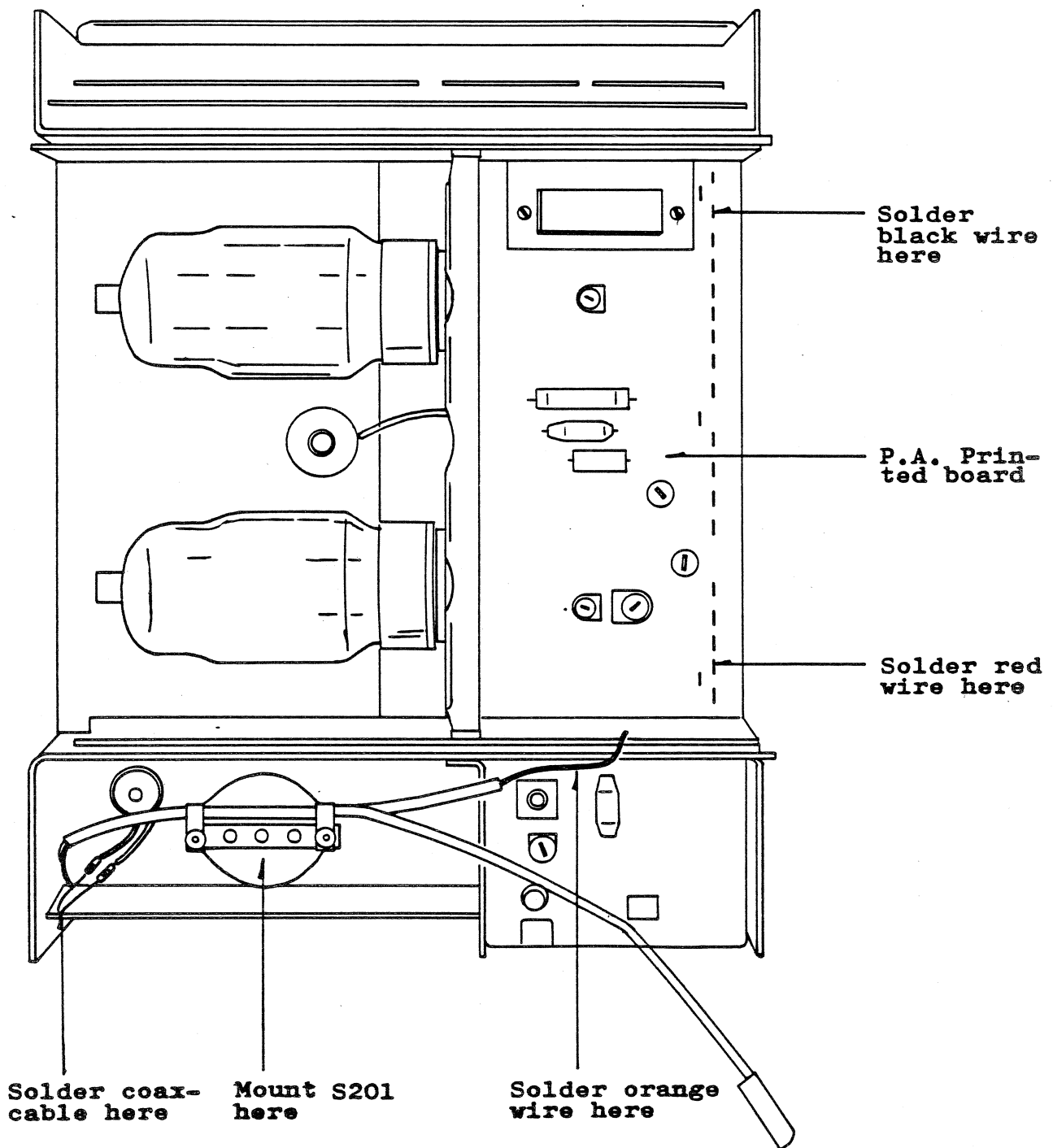
it to the transmit contact of the aerial relay.

Tuning up the Transmitter into a 50-ohm Dummy Load

8. Connect a 50-ohm dummy load (min. 50 W) to the transmitter's aerial outlet and to the chassis screw adjacent to the aerial outlet on the transmitter's front panel. The dummy load must be connected through a short length of 50-ohm coaxial cable.
9. Tune the transmitter in the normal manner, as described in the Instruction Manual, except that item C IV should be altered to read as follows:

IV. Adjustment of LOAD and FINAL DRIVE

10. Put screws in contact 29 of all channels and remove contact screws from positions 19 to 28 and 30 to 36 incl.
11. Set TEST SWITCH to LOAD. Set POWER REDUCTION to FULL.
12. With the TUNE button depressed, successively touch the test prods to contacts 19 to 28 incl., and put a contact screw in the position which brings the TEST METER reading to the right of the 0 line but as close to it as possible.
13. Set 1002 to FINAL DRIVE (with POWER REDUCTION still at FULL).
14. On the right side of the transmitter are 16 potentiometers - one for each main channel.
With the TUNE button depressed, adjust the potentiometer for the main channel in question until the TEST METER pointer reads 1 - 4 (right half of scale).
15. Having performed the above items for all main channels, set S1002 to TRANSMIT. Then mount the transmitter in its cabinet and check all channels.



III Modifying the T126 for H198

(see Installation Sketch page 15)

1. Set the channel selector to the A position (2182 kHz).
2. Remove the two knurled nuts and the epoxy lock panel.
Replace the two distance pipes located on the top side of the existing switch deck with 5 mm distance pipes.
Check that the CHANNEL SELECTOR is in position A (2182 kHz) and on the new switch deck the switch tongue must be in the position with the red/brown lead.
Mount the new switch deck on top of the existing one so that the side with only one contact is facing outwards.
Mount 4 mm distance pipes on top of the new switch deck and put the epoxy lock panel and knurled nuts back in place. The cable clamp which is provided should be used to relieve the wire harness of pull and it is placed under the bottom of one of the knurled nuts.
3. Connect the coaxial cable coming from the wire harness to the drive level unit's circuit board as that the inner conductor goes to the junction of R510/R511 and the cable braiding is soldered to the other cable braids.
4. Unsolder the orange lead from the BAL. MIXER and replace with one of the orange leads from the wire harness.
5. Solder together the other orange lead from the wiring harness and the lead which was unsoldered under item 4 above.
Slide the length of flexible insulating tubing which is provided, in over the soldered junction.
6. Connect the red lead from the wire harness to the socket pin no 2 of V603.
Likewise connect the black lead from the wire harness to the socket pin no 2 of V606.
7. Remove the lead from between the variometer and contact 32. The lead from L703 (upper variometer winding) to the aerial outlet must be removed too.
Connect the supplied lead 115 mm between the aerial outlet and the stand off on the chassis plate between the variometer and the P.A. tubes (the 50-ohm outlet).

Tuning up the Transmitter into a 50-ohm Dummy Load

8. Tune the transmitter in accordance with chapter C.
In section IV remark that the load step 50-ohm is connected to the aerial outlet, and no screws in the contacts 19 - 32 incl.
9. Connect a 50-ohm dummy load (min. 200 W) to the transmitter's aerial outlet and to the chassis screw adjacent to the aerial outlet on the transmitter's front panel. The dummy load must be connected through a short length of 50-ohm coaxial cable.
10. Adjust drive-level, leave S1002 in position TRANSMIT and instal the transmitter in its cabinet.

IV Modifying the T128 for the H198 (see Installation Sketch page 16)

1. Set the channel selector to the A position (2182 kHz).
2. Remove the two knurled nuts and the epoxy lock panel.
Replace the two distance pipes located on the top side of the existing switch deck with 5 mm distance pipes. Check that the CHANNEL SELECTOR is in position A (2182 kHz) and on the new switch deck the switch tongue must be in the position with the red/brown lead.
Mount the new switch deck on top of the existing one so that the side with only one contact is facing outwards.
Mount 4 mm distance pipes on top of the new switch deck and put the epoxy lock panel and knurled nuts back in place. The cable clamp which is provided should be used to relieve the wire harness of pull and it is placed under the bottom one of the knurled nuts.
3. Connect the coaxial cable coming from the wire harness to the drive level unit's circuit board as that the inner conductor goes to the junction of R518/R519 and the cable braiding is soldered to the other cable braids.
4. Unsolder the orange lead from the BAL. MIXER and replace with one of the orange leads from the wire harness.
5. Solder together the other orange lead from the wiring harness and the lead which was unsoldered under item 4 above. Slide the length of flexible insulating tubing which is provided,

in over the soldered junction.

6. Connect the red lead from the wire harness to the socket pin no 2 of V802.

Likewise connect the black lead from the wire harness to one of the solder terminals D on the P.A. print.

7. Remove the lead from between the variometer and the aerial relay. Unsolder, at the variometer, the lead going from contact 36 (phosphor bronze spring) to the variometer and connect it to the transmit contact of the aerial relay.

Tuning up the Transmitter into a 50-ohm Dummy Load

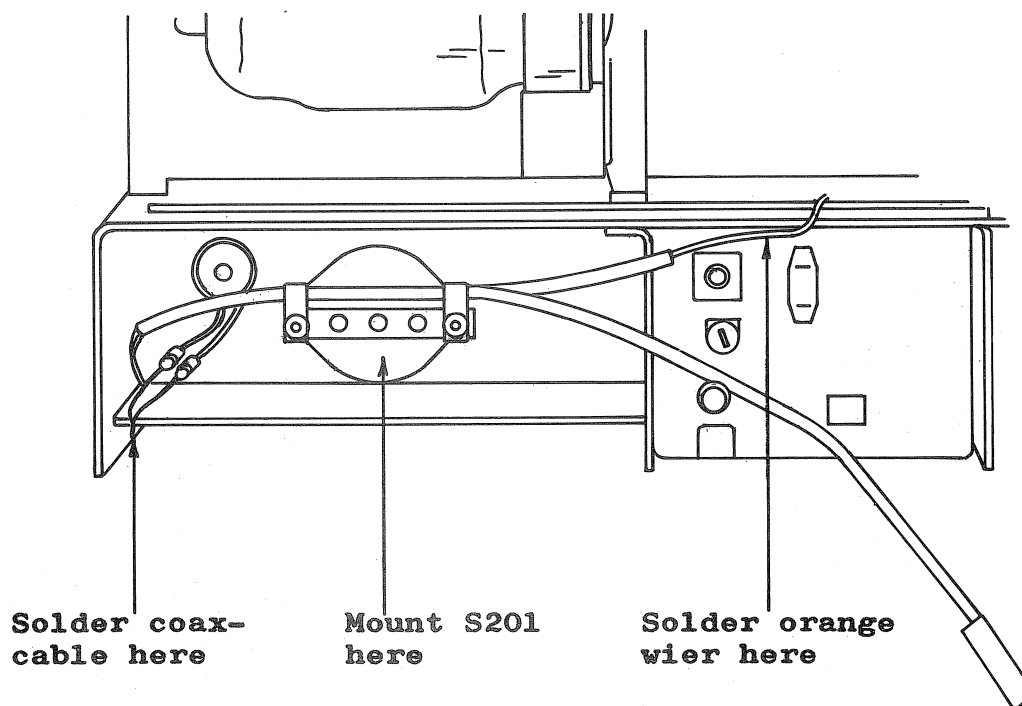
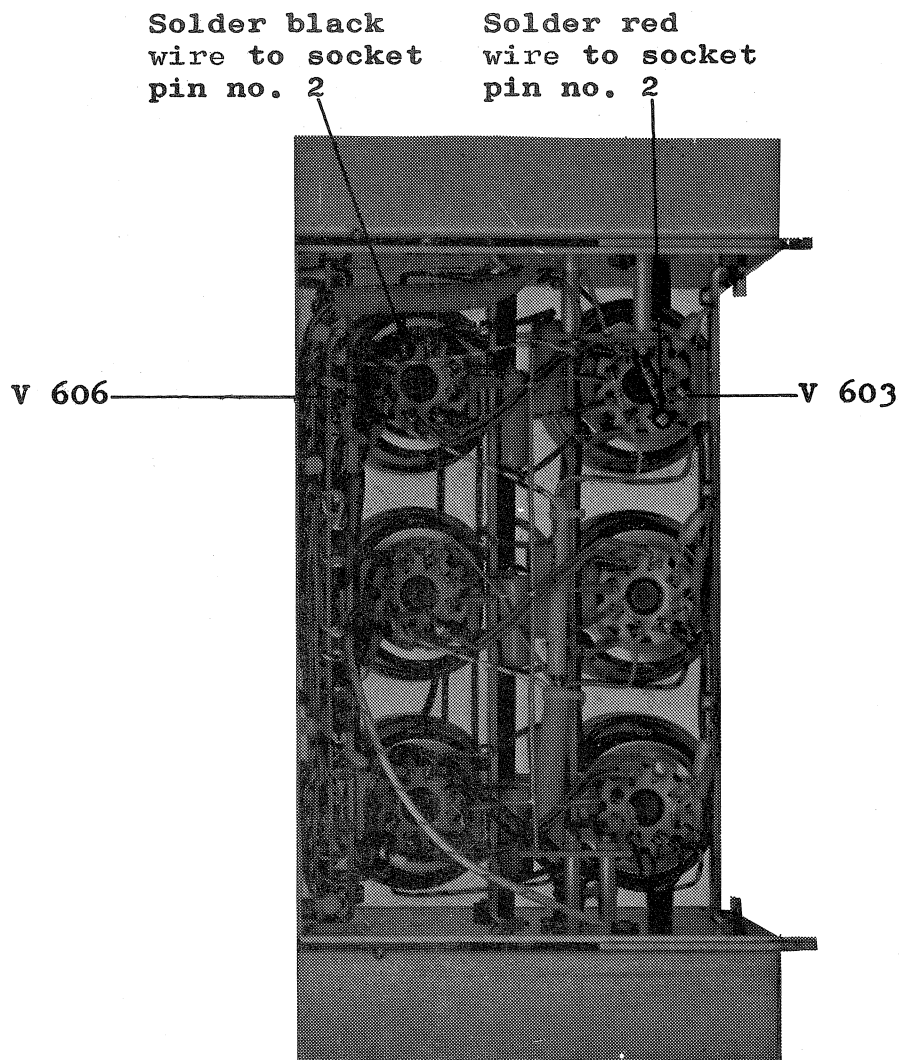
8. Connect a 50-ohm dummy load (min. 100 W) to the transmitter's aerial outlet and to the chassis screw adjacent to the aerial outlet on the transmitter's front panel. The dummy load must be connected through a short length of 50-ohm coaxial cable.
9. Tune the transmitter in the normal manner, as described in the instruction manual, except that item C IV should be altered to read as follows:

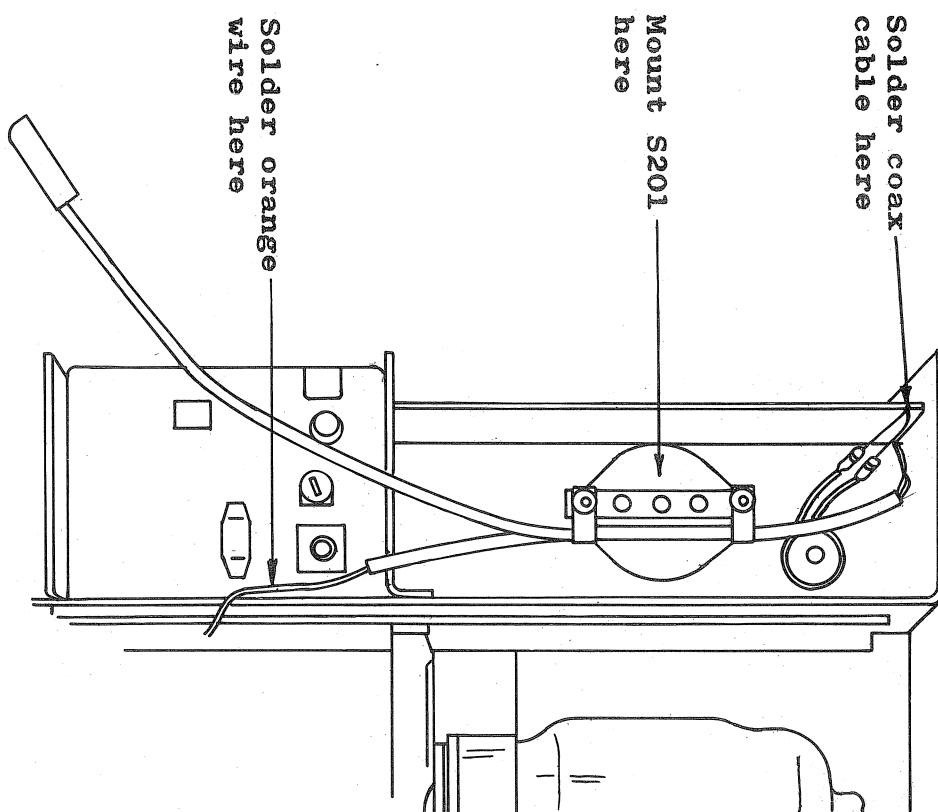
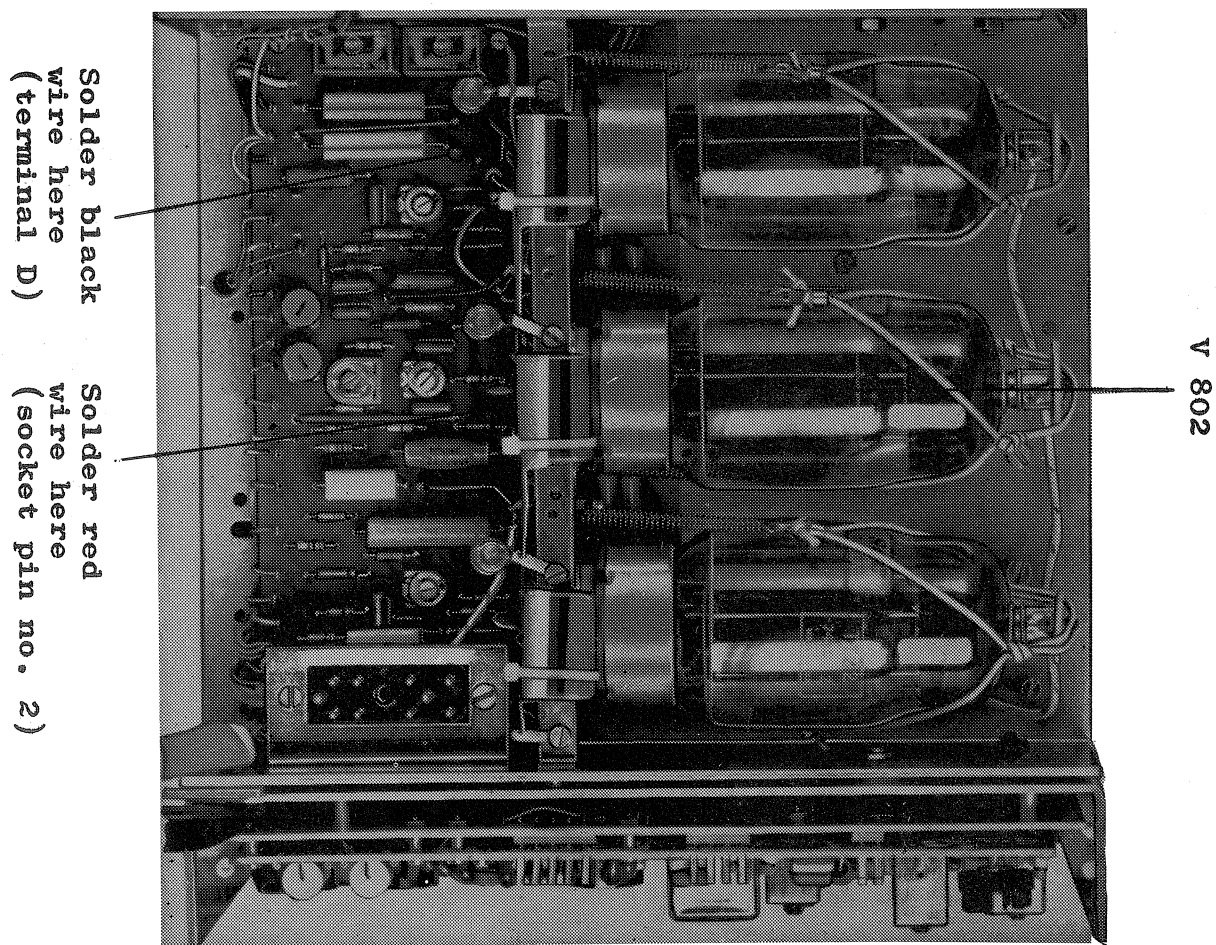
IV Adjustment of LOAD and FINAL DRIVE.

10. Put screws in contact 29 of all channels and remove contact screws from positions 19 to 28 and 30 to 36 incl.
11. Set TEST SWITCH to LOAD. Set POWER REDUCTION to FULL.
12. With the TUNE button depressed, successively touch the prods to contacts 19 to 28 incl., and put a contact screw in the position which brings the TEST METER reading to the right of the 0 line but as close to it as possible.
13. Set S1002 to FINAL DRIVE (with POWER REDUCTION still at FULL).
14. On the right side of the transmitter are 16 potentiometers one for each main channel.

With the TUNE button depressed, adjust the potentiometer for the main channel in question until the TEST METER pointer reads 1 - 4 (right half of scale).

15. Having performed the above items for all main channels, set S1002 to TRANSMIT. Then mount the transmitter in its cabinet and check all channels.





D. AERIAL AND EARTH

I. Transmitting Aerial

The H198 aerial tuner may be operated in conjunction with normally occurring aerials of lengths between 10 metres and $0.18 \frac{300}{f_{\max}}$ metres, where f_{\max} is the highest transmitting frequency in MHz.

A normally very applicable type of aerial is a whip aerial mounted on a bracket vertically above the aerial tuner. The total length of the whip aerial and the down-lead between the whip and the bottom of the down-lead should then be 10 - 13 metres.

The aerial may also be a conventional wire-type aerial, suspended either vertically or so that it does not differ from the vertical plane by more than $30 - 35^\circ$.

In this case, too, the length should be 10 - 13 metres; best results will always be obtained when the aerial is made as long as possible.

In general it may be said that the aerial is too long if tune-up problems are encountered at high frequencies, and too short if problems occur at low frequencies.

II. Receiving Aerial

The receiving aerial (a separate receiving aerial must always be installed), should be a conventional whip or wire aerial, 5 metres in length or longer.

The down-lead between aerial and receiver should be a coaxial cable of approx. 150 ohms impedance, say a type K150; a rule-of-thumb says that the length of the coaxial cable should not exceed that of the aerial.

III. Earth Connection

The installation must always have an RF earth connection at the aerial tuner. For the connection between tuner and earth use min. 0.5 x 50 mm copper strip, connected to the aerial tuner

at the earth terminal in the bottom of the box. Always make the connection between the tuner and RF earth as short as possible; it is also important to place the tuner as close to earth as possible.

The following types of RF earth may be used:

On Vessels

Connect the earth lead to the terminal in the bottom of the H198 box.

As earth lead use copper strip not less than 0.5 x 50 mm in size, connecting it in iron vessels, to the hull; in wooden vessels, to a metal plate not less than 1 sq. m in size, placed on the outside of the hull below the water line. On sailing vessels having an outside ballast keel the earth lead may be connected to a keel bolt, and the vessel's keel can function as earth. The earth strip should be as short as possible and run direct to the earth plate, ballast keel or iron hull:

At Land Stations

A so-called star earth should always be used at land stations. Constructional details appear from Fig. 2.

On Large Vessels, Oil Platforms etc.

When mounting the aerial tuner on large iron structures, the earth strip should be connected directly to the nearest structural member. It is best if the tuner is mounted as close to the iron structure as possible and centrally at a place where the structural elements come as close as possible to forming a horizontal plane, or a star having a mean radius of not less than 10 metres. (See also the preceding section about star earth).

E. INSTALLATION

After having modified the transmitter as described in section C above and mounted it in its place (see transmitter instruction manual), perform the following:

Installing the CONTROL UNIT

Mount this unit close to the transmitter so that the operator can see the aerial current meter and the tuning lamp. Mount the aerial tuner close to the aerial base point. From the earth terminal, in the bottom of the aerial tuner box, run a copper strip not less than 0.5 x 50 mm in size through the shortest possible path to the RF earth of the installation. Between the CONTROL UNIT and the aerial tuner run a 24-conductor 0.25 sq. mm multicable and solder it to the multiconnector (J301) inside the CONTROL UNIT and to the two rows of terminals inside the aerial tuner (J101 and J102). Cable connections are shown in the diagram.

In order to reduce the voltage drop in the S conductor of the multicable (-24 V DC or -12 V DC as the case may be), three of the 24 conductors of the cable should be connected together. Maximum permissible cable length is 200 metres for 24 V DC and 50 metres for 12 V DC.

For the connection between the aerial tuner and the transmitter, use type RG8/U coaxial cable. This cable should of course be made as short as possible, but where local conditions seem to call for a longer cable, lengths up to 200 metres may be employed. Connect the coaxial cable to the transmitter with the inner conductor going to the aerial outlet and the braid to the chassis screw close to the aerial outlet on the front of the transmitter.

On the aerial tuner, the cable should be connected as shown in Fig. 1.

F. H198 TUNE-UP PROCEDURE

1. Remove cover from aerial tuner and set both switches (MOTOR

and POWER) to OFF.

2. Start transmitter at full power on desired channel and lock MODE SELECTOR in TUNE position (for T122, by pressing the wedge which is provided, in between the fuse cover and the knob; for T121, by pressing the plastic fork which is provided in between the back of the front panel and the TUNE button).
3. Rotate the drum of the aerial tuner so that the desired channel letter faces the operator (this is done by means of the MAN and OFF positions of the MOTOR switch).

Put screws in the following channel numbers:

Frequency	Contact Numbers
1.6 - 2.6	1, 2, 28, 29, 38 and 40
2.6 - 4.2	28, 29, 38 and 40

4. Turn MOTOR switch to AUT and check that drum rotates until desired channel number is opposite contacts.
5. Make contact between contact 7 and the drum by pressing one of the U-shaped alignment tools in between contact and drum (open end of U facing the drum).
6. Turn POWER knob to RED.
7. Find, by making contact with the alignment tools, that contact combination out of those listed below which provides maximum meter reading.
 - (a) one of contacts 30 - 38.
 - (b) 41 and one of contacts 30 - 38.
 - (c) 39 and one of contacts 30 - 38.
 - (d) 41 and 39 as well as one of contacts 30 - 38.

If max. reading either is not obtained, or is obtained in the 41 - 39 - 30 combination, remove screw from contact 29

(C_A) and repeat item (d) above.

(If it is still impossible to obtain a maximum, the aerial is too long).

8. (Read NOTE at the bottom of this step).

Turn POWER to FULL ^x and, with the screw in question (out of the 16 screws marked A to Q) perform fine adjustment for max. meter reading (it may be necessary to correct the contact screw, one step, in the 30 - 39 contact row).

NOTE: As long as the aerial tuner is not completely tuned up, the transmitter should run for only the shortest possible time (max. 30 sec.) at a time at full power; therefore return the POWER switch to the OFF position as quickly as possible after adjustment.

9. Thereafter find, by shifting the contact pin from contact 7 to one of the contacts numbered 3 to 10 incl., which one of those contacts will provide max. aerial current with the aerial current carefully adjusted for maximum as described under item 8 above.
10. Put screws in the contact positions found as described, and with the screw in question (one of the 16 screws marked A to Q) perform fine adjustment to absolutely maximum aerial current with the MOTOR switch at AUT and the POWER switch at FULL. This completes the tuning of this channel.
11. Set POWER switch to OFF and repeat for the next channel the procedure covered by items 2 - 11 inclusive.
12. When the last channel has been tuned up, set MOTOR switch to AUT and POWER switch to FULL.
13. Thereafter set the transmitter's TEST switch to LOAD and watch the TEST METER reading for each of the channels which have been tuned up.
Readings should stay inside the range ± 3 ; if this is not the case, first perform fine adjustment with the particular slotted-head screw (out of the 16 in the aerial tuner); if this is not sufficient, repeat items 5, 6, 7, 8 and 9 above.
14. Mount the cover on the aerial tuner.
It is recommended to note the FULL POWER current (MODE SELECTOR at TUNE) for each channel and instruct the user to the effect that it should be checked at intervals. Aerial current is read on the CONTROL UNIT.

15. The last thing to do is to adjust the drive level for each channel. This adjustment is done on the transmitter in the following way.

If T122:

- a. Set S2 to position DRIVE LEVEL, POWER REDUCTION control to position 1/1.
- b. Behind the cover for the driver print there are 16 potentiometers - one for each channel. The potentiometer for the actual channel is adjusted, until the pointer on the TEST METER reads 10 on the right half of the dial. (MODE SELECTOR in position AERIAL TUNING).
- c. Mount the screen over the TEST METER. Check, before placing it, that switch S3 is left in the I_{AER} position, and that S2 is left in the LOAD position.

If T121, T126 or T128

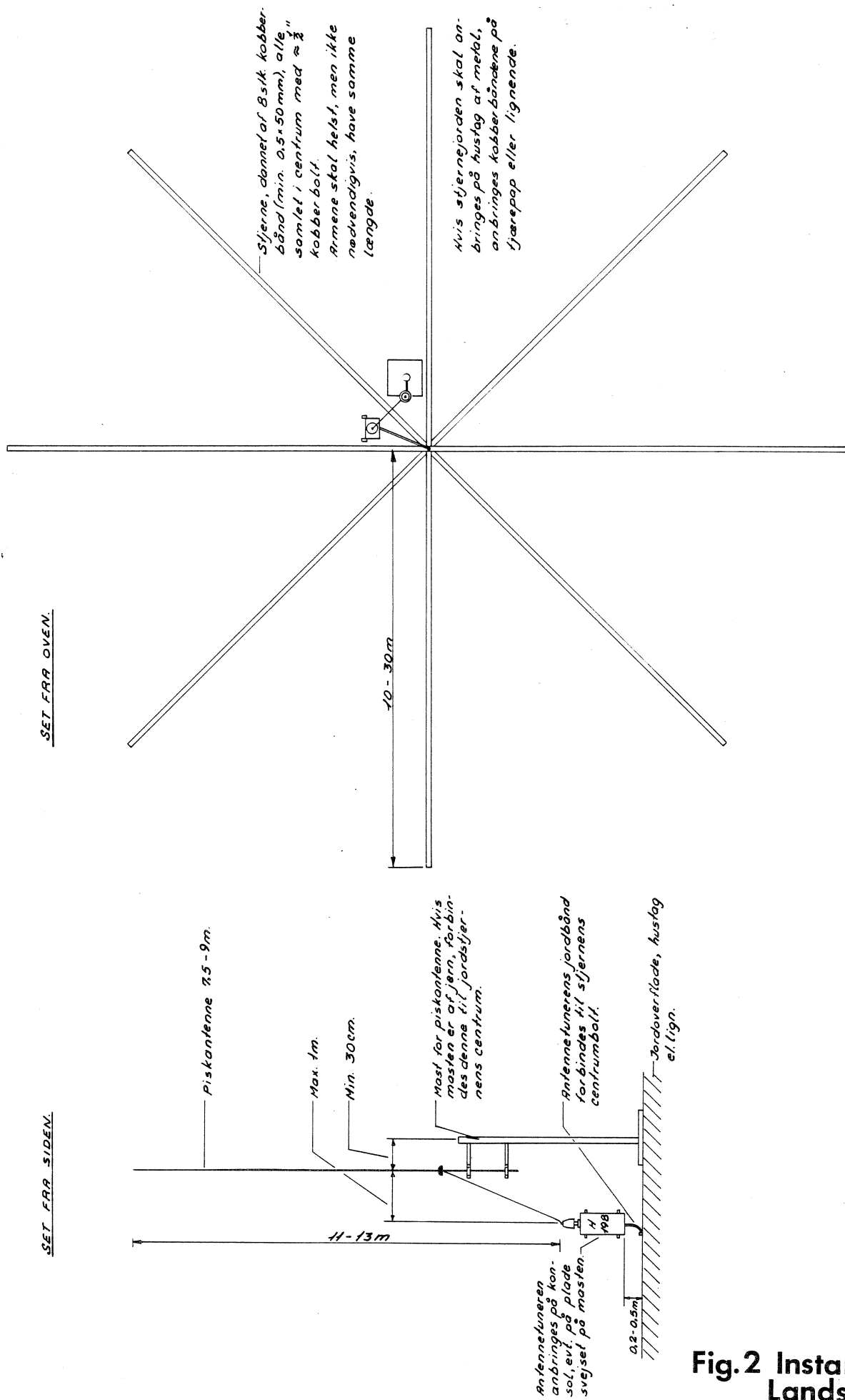
- a. Set S1002 to position FINAL DRIVE (POWER REDUCTION on FULL).
- b. At the right side of the transmitter there are 16 potentiometers - one for each main channel.
With the TUNE knob depressed, the potentiometer for the relevant main channel is adjusted, until the pointer on the TEST METER reads 1-4 (right half of dial).
- c. After having followed the above procedure for all main channels, S1002 is set to position TRANSMIT, and the transmitter is mounted in the case and all channels are tested.

G. TECHNICAL DATA, H198

Frequency range	1.6 - 4.2 MHz
Number of channels	16
Aerial length	10 m to 0.18 λ
Max. transmitter power	400 W PEP
For use with transmitter type	T121, T122, T126 and T128
Max. cable length	200 m
Time required for channel switching	Max. 15 sec.
Type of mounting	Outdoors or indoors

All tuning is automatic when switching channels.

⁺A different type of stepper motor is required for the T121, and T128 at 12 V DC, please state this when ordering.



**Fig.2 Installation
Landstation**

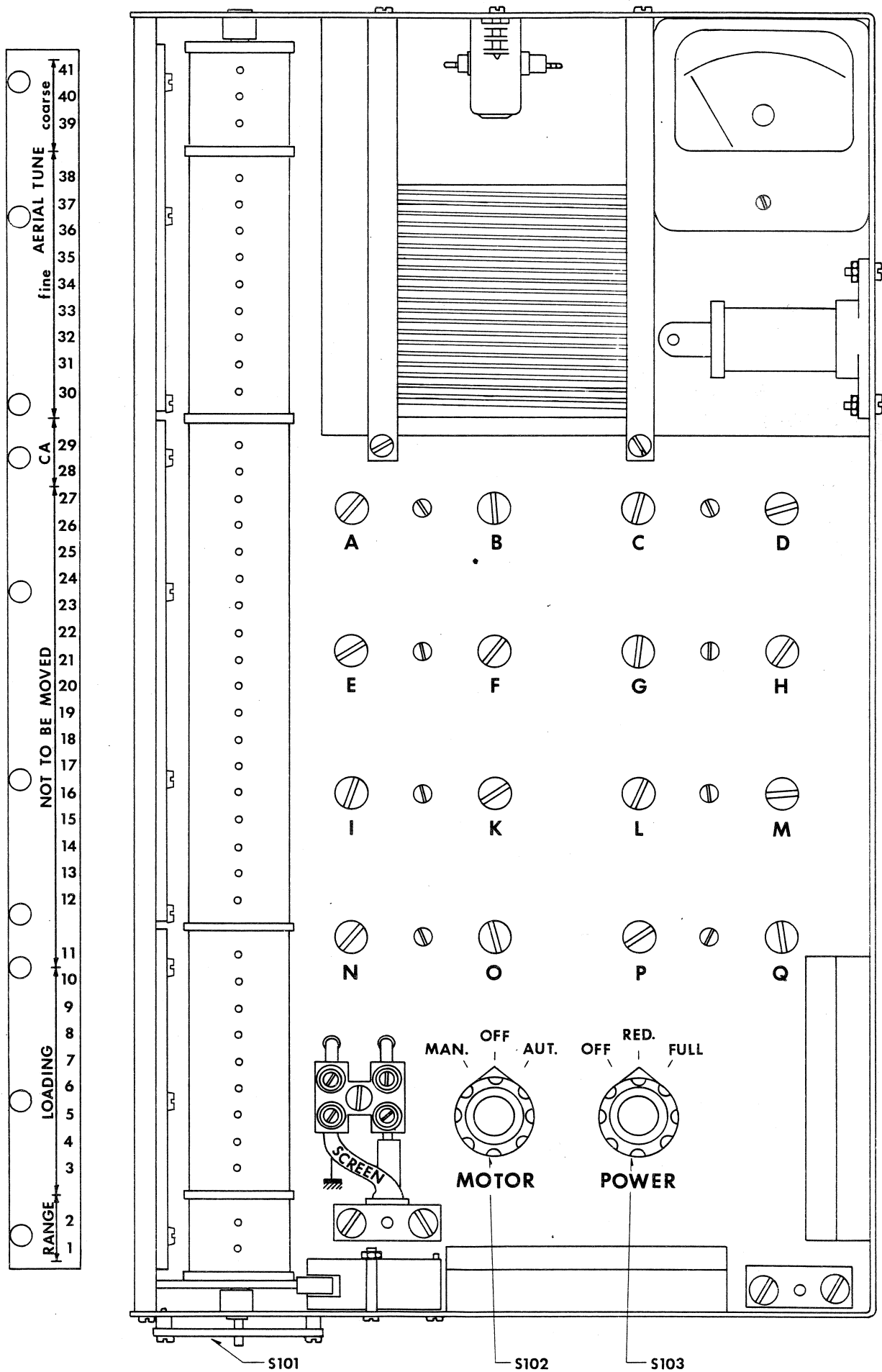
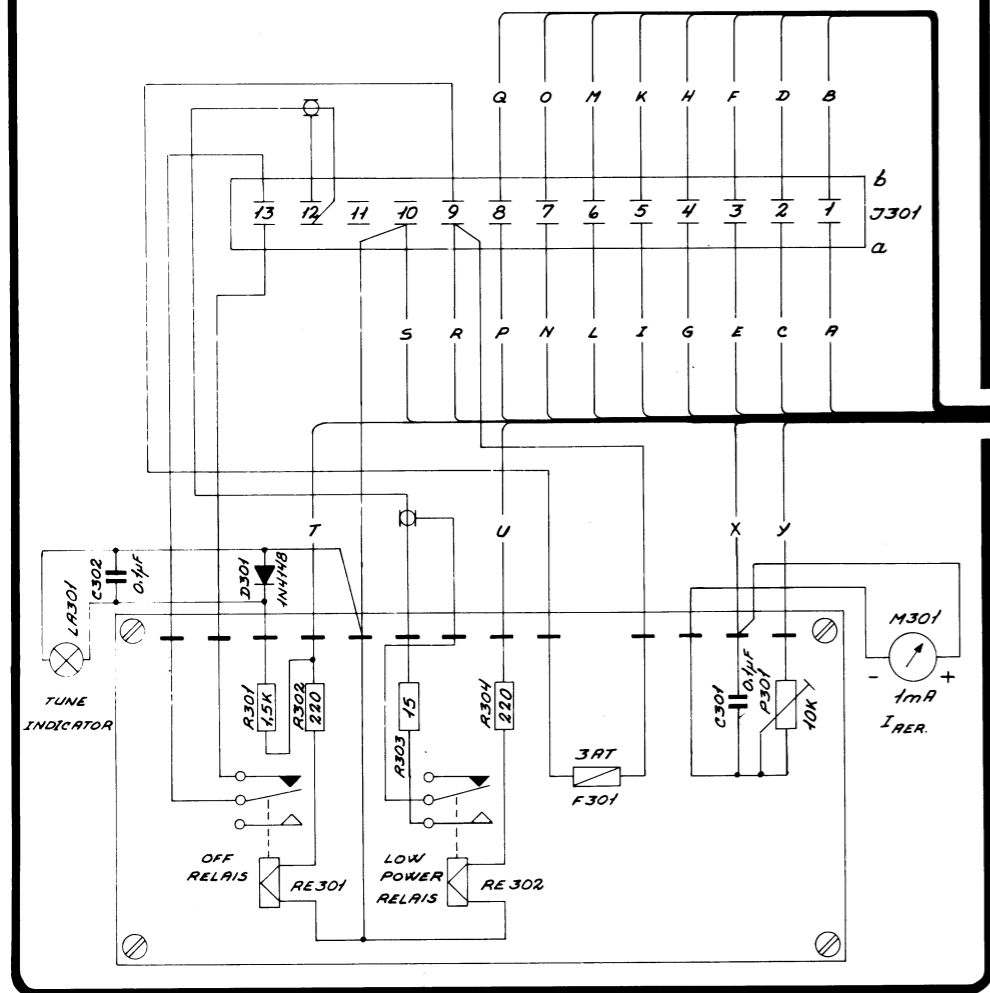
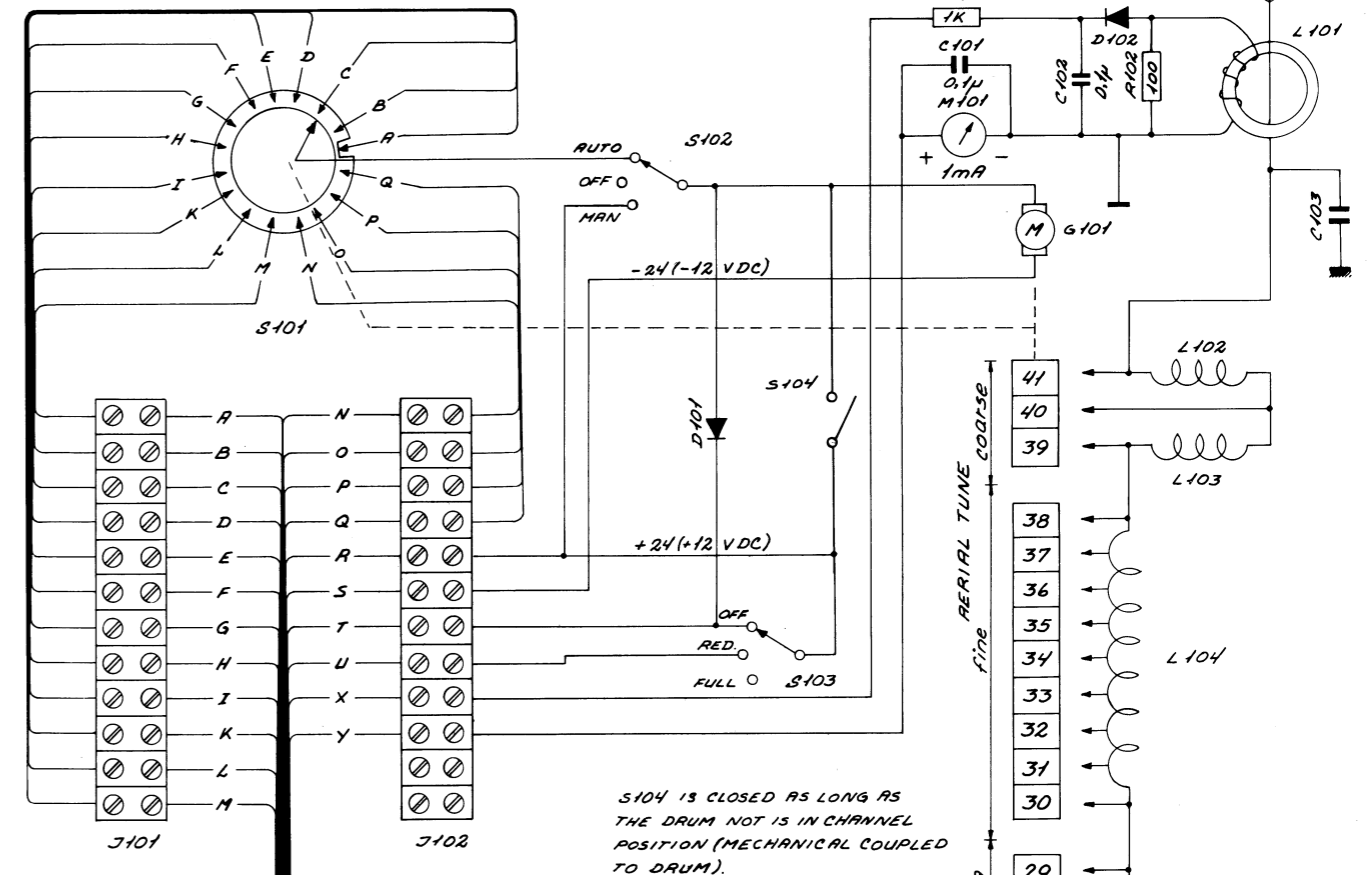


Fig. 1 Tuning Facilities

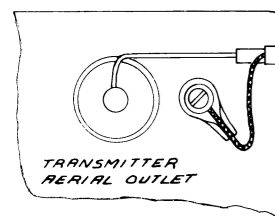
CONTROL UNIT



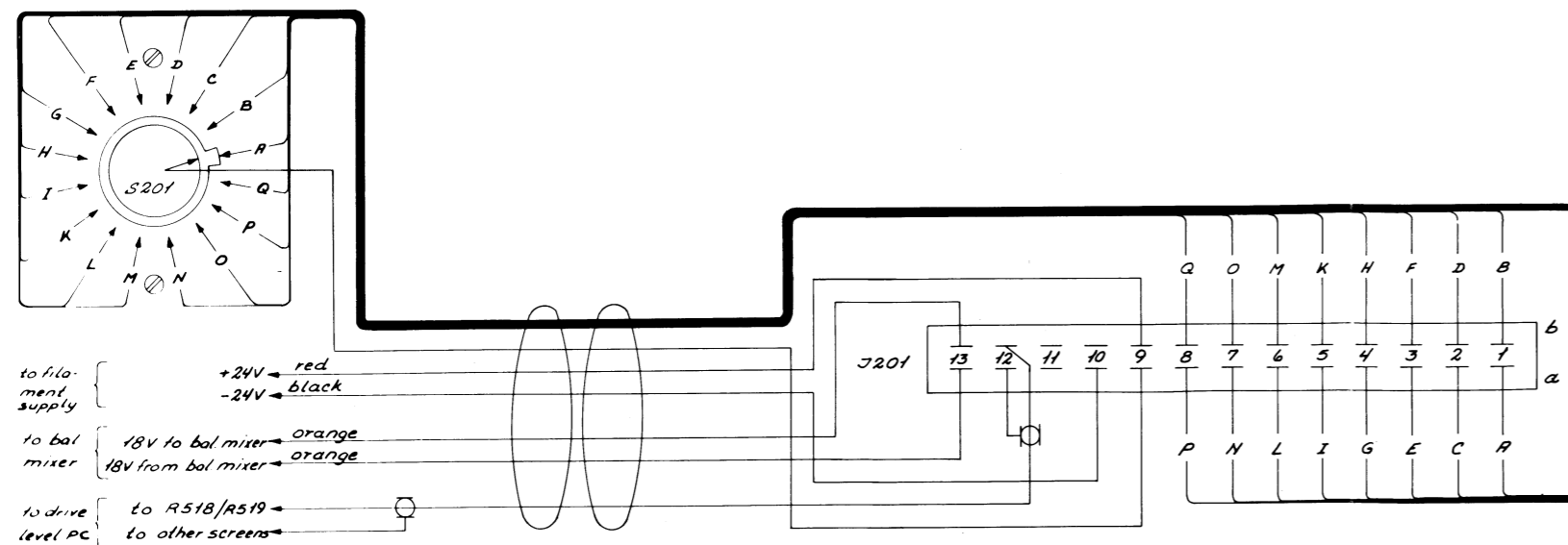
TUNER UNIT



24 lead 0.25" Multicable

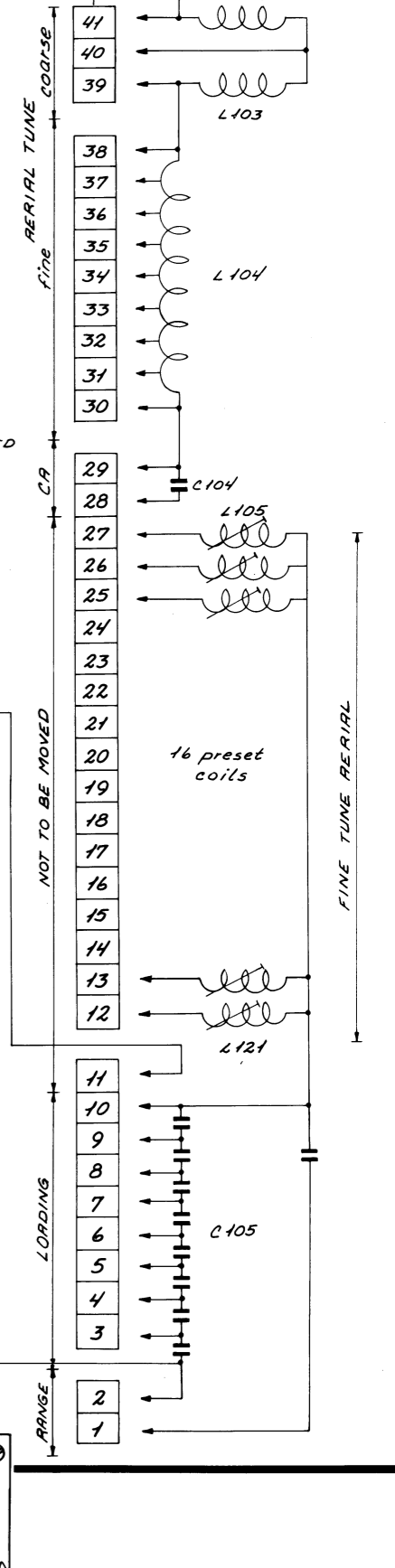


SCHEMATIC FOR AERIAL TUNER H198



WIRING ASSEMBLY FOR TRANSMITTER MODIFICATION

J201 (FEMALE CONNECTOR TO BE CONNECTED WITH MALE CONNECTOR J301 ON CONTROL UNIT).



S.P. RADIO A/S - DK 9200 AALBORG SV - DENMARK
PHONE INT. +45 98 18 09 99
FAX INT. +45 98 18 67 17
TELEX INT. 69789 SPRAD DK

FAX TRANSMISSION

PAGES INCL. THIS
SIDER INCL. DENNE 17

DATE
DATO 1991-07-25

SENT TO
SENDT TIL Transtema Communications AB, Sverige

ATTENTION Hr. Rainer Davidson

I henhold til aftale fremsendes vedlagt kopier fra H198 manual
(fra side 12).

Med venlig hilsen
S.P. Radio A/S

K.E. Dantoft

III Modifying the T126 for H198

(see Installation Sketch page 15)

1. Set the channel selector to the A position (2182 kHz).
2. Remove the two knurled nuts and the epoxy lock panel.
Replace the two distance pipes located on the top side of the existing switch deck with 5 mm distance pipes.
Check that the CHANNEL SELECTOR is in position A (2182 kHz) and on the new switch deck the switch tongue must be in the position with the red/brown lead.
Mount the new switch deck on top of the existing one so that the side with only one contact is facing outwards.
Mount 4 mm distance pipes on top of the new switch deck and put the epoxy lock panel and knurled nuts back in place. The cable clamp which is provided should be used to relieve the wire harness of pull and it is placed under the bottom of one of the knurled nuts.
3. Connect the coaxial cable coming from the wire harness to the drive level unit's circuit board as that the inner conductor goes to the junction of R510/R511 and the cable braiding is soldered to the other cable braids.
4. Unsolder the orange lead from the BAL. MIXER and replace with one of the orange leads from the wire harness.
5. Solder together the other orange lead from the wiring harness and the lead which was unsoldered under item 4 above.
Slide the length of flexible insulating tubing which is provided, in over the soldered junction.
6. Connect the red lead from the wire harness to the socket pin no 2 of V603.
Likewise connect the black lead from the wire harness to the socket pin no 2 of V606.
7. Remove the lead from between the variometer and contact 32. The lead from L703 (upper variometer winding) to the aerial outlet must be removed too.
Connect the supplied lead 115 mm between the aerial outlet and the stand off on the chassis plate between the variometer and the P.A. tubes (the 50-ohm outlet).

Tuning up the Transmitter into a 50-ohm Dummy Load

8. Tune the transmitter in accordance with chapter C.
In section IV remark that the load step 50-ohm is connected to the aerial outlet, and no screws in the contacts 19 - 32 incl.
9. Connect a 50-ohm dummy load (min. 200 W) to the transmitter's aerial outlet and to the chassis screw adjacent to the aerial outlet on the transmitter's front panel. The dummy load must be connected through a short length of 50-ohm coaxial cable.
10. Adjust drive-level, leave S1002 in position TRANSMIT and instal the transmitter in its cabinet.

IV Modifying the T128 for the H198
(see Installation Sketch page 16)

1. Set the channel selector to the A position (2182 kHz).
2. Remove the two knurled nuts and the epoxy lock panel.
Replace the two distance pipes located on the top side of the existing switch deck with 5 mm distance pipes. Check that the CHANNEL SELECTOR is in position A (2182 kHz) and on the new switch deck the switch tongue must be in the position with the red/brown lead.
Mount the new switch deck on top of the existing one so that the side with only one contact is facing outwards.
Mount 4 mm distance pipes on top of the new switch deck and put the epoxy lock panel and knurled nuts back in place. The cable clamp which is provided should be used to relieve the wire harness of pull and it is placed under the bottom one of the knurled nuts.
3. Connect the coaxial cable coming from the wire harness to the drive level unit's circuit board as that the inner conductor goes to the junction of R518/R519 and the cable braiding is soldered to the other cable braids.
4. Unsolder the orange lead from the BAL. MIXER and replace with one of the orange leads from the wire harness.
5. Solder together the other orange lead from the wiring harness and the lead which was unsoldered under item 4 above. Slide the length of flexible insulating tubing which is provided,

in over the soldered junction.

6. Connect the red lead from the wire harness to the socket pin no 2 of V802.

Likewise connect the black lead from the wire harness to one of the solder terminals D on the P.A. print.

7. Remove the lead from between the variometer and the aerial relay. Unsolder, at the variometer, the lead going from contact 36 (phosphor bronze spring) to the variometer and connect it to the transmit contact of the aerial relay.

Tuning up the Transmitter into a 50-ohm Dummy Load

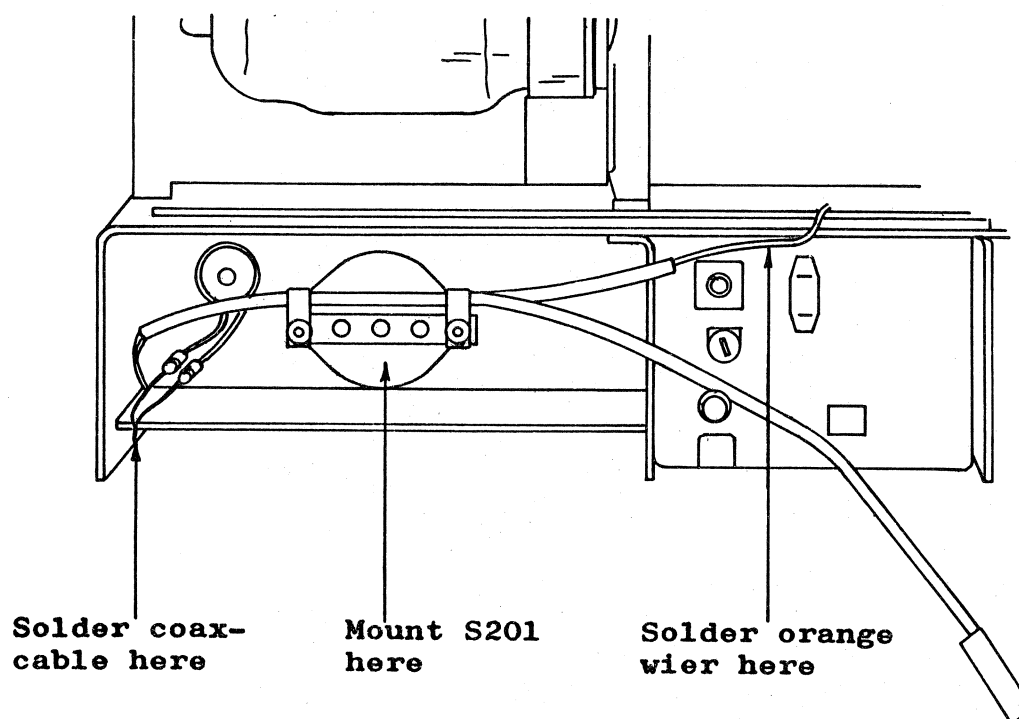
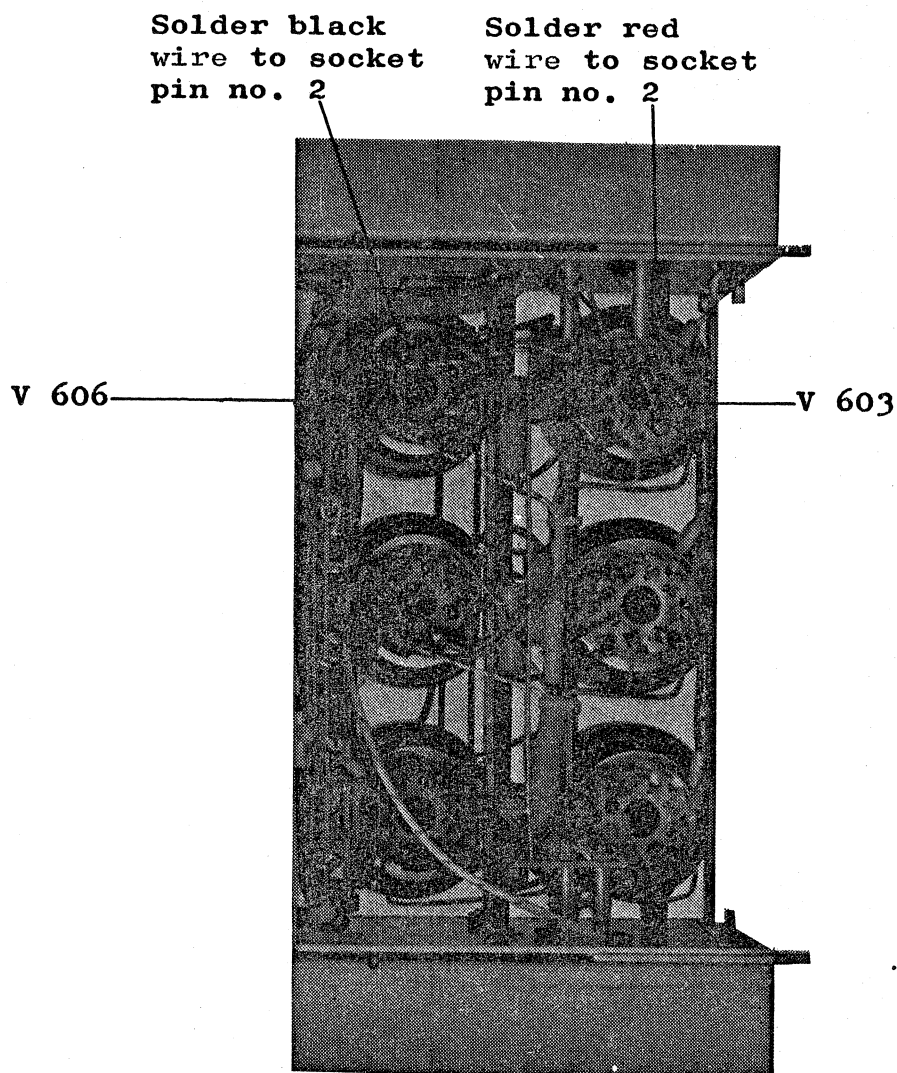
8. Connect a 50-ohm dummy load (min. 100 W) to the transmitter's aerial outlet and to the chassis screw adjacent to the aerial outlet on the transmitter's front panel. The dummy load must be connected through a short length of 50-ohm coaxial cable.
9. Tune the transmitter in the normal manner, as described in the instruction manual, except that item C IV should be altered to read as follows:

IV Adjustment of LOAD and FINAL DRIVE.

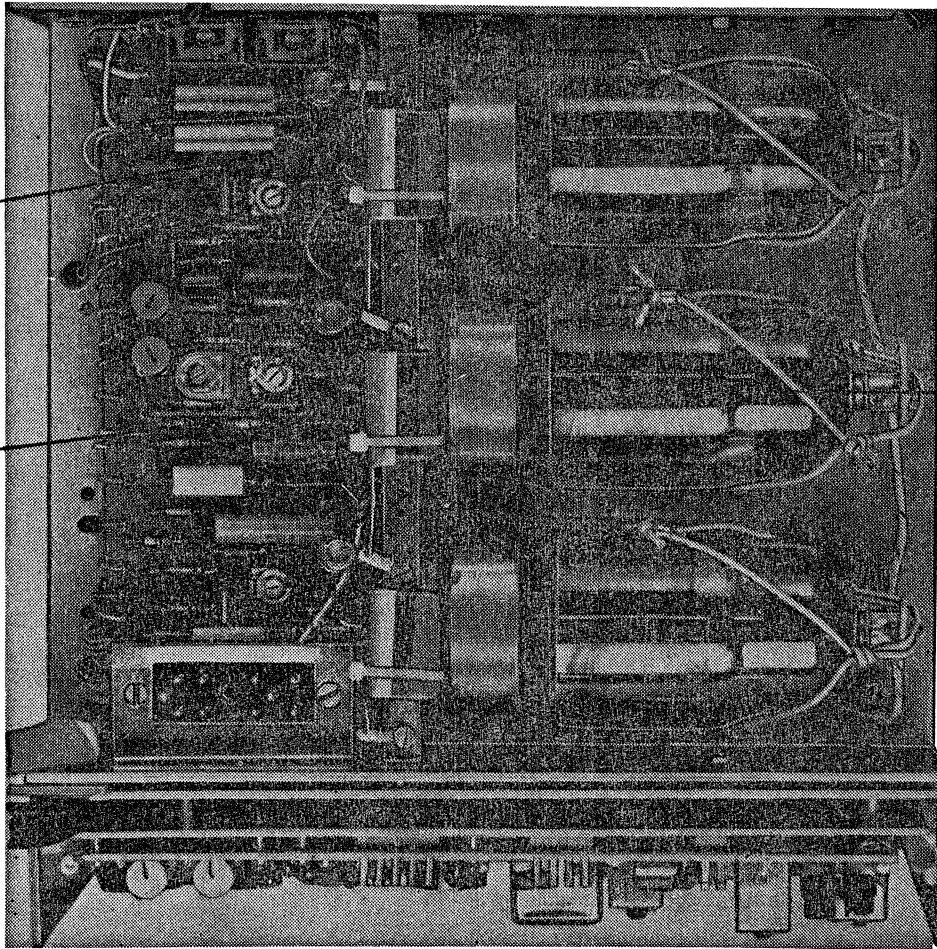
10. Put screws in contact 29 of all channels and remove contact screws from positions 19 to 28 and 30 to 36 incl.
11. Set TEST SWITCH to LOAD. Set POWER REDUCTION to FULL.
12. With the TUNE button depressed, successively touch the prods to contacts 19 to 28 incl., and put a contact screw in the position which brings the TEST METER reading to the right of the 0 line but as close to it as possible.
13. Set S1002 to FINAL DRIVE (with POWER REDUCTION still at FULL).
14. On the right side of the transmitter are 16 potentiometers one for each main channel.

With the TUNE button depressed, adjust the potentiometer for the main channel in question until the TEST METER pointer reads 1 - 4 (right half of scale).

15. Having performed the above items for all main channels, set S1002 to TRANSMIT. Then mount the transmitter in its cabinet and check all channels.

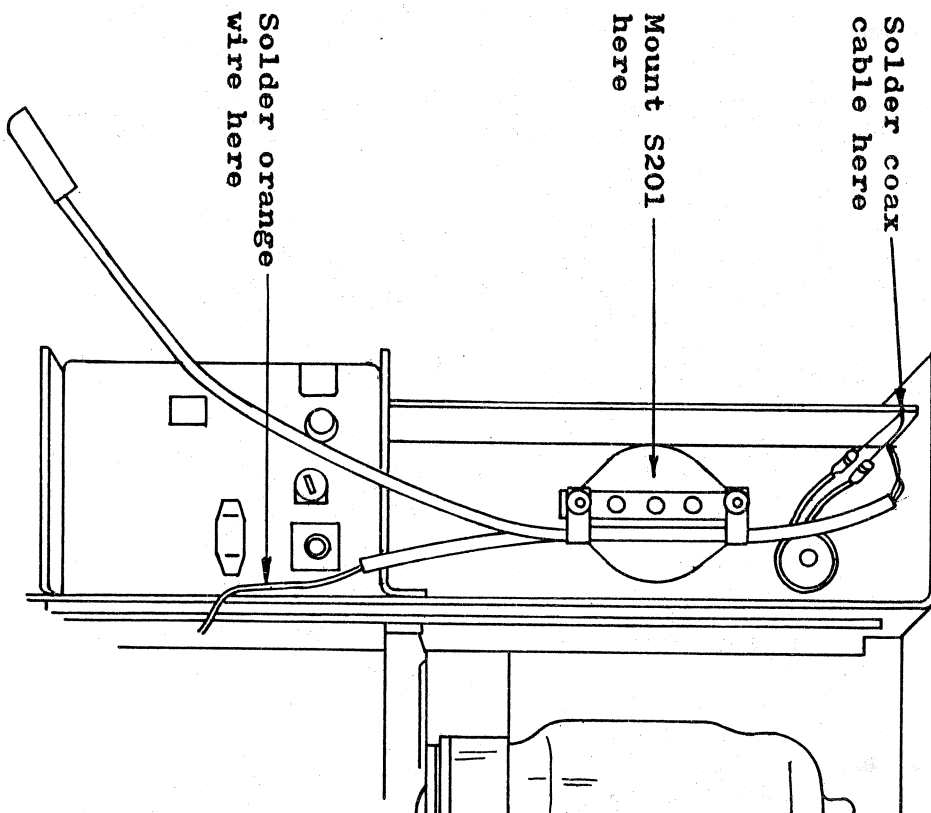


V 802



Solder black
wire here
(terminal D)

Solder red
wire here
(socket pin no. 2)



Solder coax
cable here

Mount S201
here

Solder orange
wire here

D. AERIAL AND EARTH

I. Transmitting Aerial

The H198 aerial tuner may be operated in conjunction with normally occurring aerials of lengths between 10 metres and $0.18 \frac{300}{f_{\max}}$ metres, where f_{\max} is the highest transmitting frequency in MHz.

A normally very applicable type of aerial is a whip aerial mounted on a bracket vertically above the aerial tuner. The total length of the whip aerial and the down-lead between the whip and the bottom of the down-lead should then be 10 - 13 metres.

The aerial may also be a conventional wire-type aerial, suspended either vertically or so that it does not differ from the vertical plane by more than $30 - 35^\circ$.

In this case, too, the length should be 10 - 13 metres; best results will always be obtained when the aerial is made as long as possible.

In general it may be said that the aerial is too long if tune-up problems are encountered at high frequencies, and too short if problems occur at low frequencies.

II. Receiving Aerial

The receiving aerial (a separate receiving aerial must always be installed), should be a conventional whip or wire aerial, 5 metres in length or longer.

The down-lead between aerial and receiver should be a coaxial cable of approx. 150 ohms impedance, say a type K150; a rule-of-thumb says that the length of the coaxial cable should not exceed that of the aerial.

III. Earth Connection

The installation must always have an RF earth connection at the aerial tuner. For the connection between tuner and earth use min. 0.5 x 50 mm copper strip, connected to the aerial tuner

at the earth terminal in the bottom of the box. Always make the connection between the tuner and RF earth as short as possible; it is also important to place the tuner as close to earth as possible.

The following types of RF earth may be used:

On Vessels

Connect the earth lead to the terminal in the bottom of the H198 box.

As earth lead use copper strip not less than 0.5 x 50 mm in size, connecting it in iron vessels, to the hull; in wooden vessels, to a metal plate not less than 1 sq. m in size, placed on the outside of the hull below the water line. On sailing vessels having an outside ballast keel the earth lead may be connected to a keel bolt, and the vessel's keel can function as earth. The earth strip should be as short as possible and run direct to the earth plate, ballast keel or iron hull:

At Land Stations

A so-called star earth should always be used at land stations. Constructional details appear from Fig. 2.

On Large Vessels, Oil Platforms etc.

When mounting the aerial tuner on large iron structures, the earth strip should be connected directly to the nearest structural member. It is best if the tuner is mounted as close to the iron structure as possible and centrally at a place where the structural elements come as close as possible to forming a horizontal plane, or a star having a mean radius of not less than 10 metres. (See also the preceding section about star earth).

E. INSTALLATION

After having modified the transmitter as described in section C above and mounted it in its place (see transmitter instruction manual), perform the following:

Installing the CONTROL UNIT

Mount this unit close to the transmitter so that the operator can see the aerial current meter and the tuning lamp. Mount the aerial tuner close to the aerial base point. From the earth terminal, in the bottom of the aerial tuner box, run a copper strip not less than 0.5 x 50 mm in size through the shortest possible path to the RF earth of the installation. Between the CONTROL UNIT and the aerial tuner run a 24-conductor 0.25 sq. mm multicable and solder it to the multiconnector (J301) inside the CONTROL UNIT and to the two rows of terminals inside the aerial tuner (J101 and J102). Cable connections are shown in the diagram.

In order to reduce the voltage drop in the S conductor of the multicable (-24 V DC or -12 V DC as the case may be), three of the 24 conductors of the cable should be connected together. Maximum permissible cable length is 200 metres for 24 V DC and 50 metres for 12 V DC.

For the connection between the aerial tuner and the transmitter, use type RG8/U coaxial cable. This cable should of course be made as short as possible, but where local conditions seem to call for a longer cable, lengths up to 200 metres may be employed. Connect the coaxial cable to the transmitter with the inner conductor going to the aerial outlet and the braid to the chassis screw close to the aerial outlet on the front of the transmitter.

On the aerial tuner, the cable should be connected as shown in Fig. 1.

F. H198 TUNE-UP PROCEDURE

1. Remove cover from aerial tuner and set both switches (MOTOR

and POWER) to OFF.

2. Start transmitter at full power on desired channel and lock MODE SELECTOR in TUNE position (for T122, by pressing the wedge which is provided, in between the fuse cover and the knob; for T121, by pressing the plastic fork which is provided in between the back of the front panel and the TUNE button).
3. Rotate the drum of the aerial tuner so that the desired channel letter faces the operator (this is done by means of the MAN and OFF positions of the MOTOR switch).

Put screws in the following channel numbers:

Frequency	Contact Numbers
1.6 - 2.6	1, 2, 28, 29, 38 and 40
2.6 - 4.2	28, 29, 38 and 40

4. Turn MOTOR switch to AUT and check that drum rotates until desired channel number is opposite contacts.
5. Make contact between contact 7 and the drum by pressing one of the U-shaped alignment tools in between contact and drum (open end of U facing the drum).
6. Turn POWER knob to RED.
7. Find, by making contact with the alignment tools, that contact combination out of those listed below which provides maximum meter reading.
 - (a) one of contacts 30 - 38.
 - (b) 41 and one of contacts 30 - 38.
 - (c) 39 and one of contacts 30 - 38.
 - (d) 41 and 39 as well as one of contacts 30 - 38.

If max. reading either is not obtained, or is obtained in the 41 - 39 - 30 combination, remove screw from contact 29

(C_A) and repeat item (d) above.

(If it is still impossible to obtain a maximum, the aerial is too long).

8. (Read NOTE at the bottom of this step).

Turn POWER to FULL ^x and, with the screw in question (out of the 16 screws marked A to Q) perform fine adjustment for max. meter reading (it may be necessary to correct the contact screw, one step, in the 30 - 39 contact row).

NOTE: As long as the aerial tuner is not completely tuned up, the transmitter should run for only the shortest possible time (max. 30 sec.) at a time at full power; therefore return the POWER switch to the OFF position as quickly as possible after adjustment.

9. Thereafter find, by shifting the contact pin from contact 7 to one of the contacts numbered 3 to 10 incl., which one of those contacts will provide max. aerial current with the aerial current carefully adjusted for maximum as described under item 8 above.
10. Put screws in the contact positions found as described, and with the screw in question (one of the 16 screws marked A to Q) perform fine adjustment to absolutely maximum aerial current with the MOTOR switch at AUT and the POWER switch at FULL. This completes the tuning of this channel.
11. Set POWER switch to OFF and repeat for the next channel the procedure covered by items 2 - 11 inclusive.
12. When the last channel has been tuned up, set MOTOR switch to AUT and POWER switch to FULL.
13. Thereafter set the transmitter's TEST switch to LOAD and watch the TEST METER reading for each of the channels which have been tuned up.
Readings should stay inside the range ± 3 ; if this is not the case, first perform fine adjustment with the particular slotted-head screw (out of the 16 in the aerial tuner); if this is not sufficient, repeat items 5, 6, 7, 8 and 9 above.
14. Mount the cover on the aerial tuner.
It is recommended to note the FULL POWER current (MODE SELECTOR at TUNE) for each channel and instruct the user to the effect that it should be checked at intervals. Aerial current is read on the CONTROL UNIT.

15. The last thing to do is to adjust the drive level for each channel. This adjustment is done on the transmitter in the following way.

If T122:

- a. Set S2 to position DRIVE LEVEL, POWER REDUCTION control to position 1/1.
- b. Behind the cover for the driver print there are 16 potentiometers - one for each channel. The potentiometer for the actual channel is adjusted, until the pointer on the TEST METER reads 10 on the right half of the dial. (MODE SELECTOR in position AERIAL TUNING).
- c. Mount the screen over the TEST METER. Check, before placing it, that switch S3 is left in the I_{AER} position, and that S2 is left in the LOAD position.

If T121, T126 or T128

- a. Set S1002 to position FINAL DRIVE (POWER REDUCTION on FULL).
- b. At the right side of the transmitter there are 16 potentiometers - one for each main channel.
With the TUNE knob depressed, the potentiometer for the relevant main channel is adjusted, until the pointer on the TEST METER reads 1-4 (right half of dial).
- c. After having followed the above procedure for all main channels, S1002 is set to position TRANSMIT, and the transmitter is mounted in the case and all channels are tested.

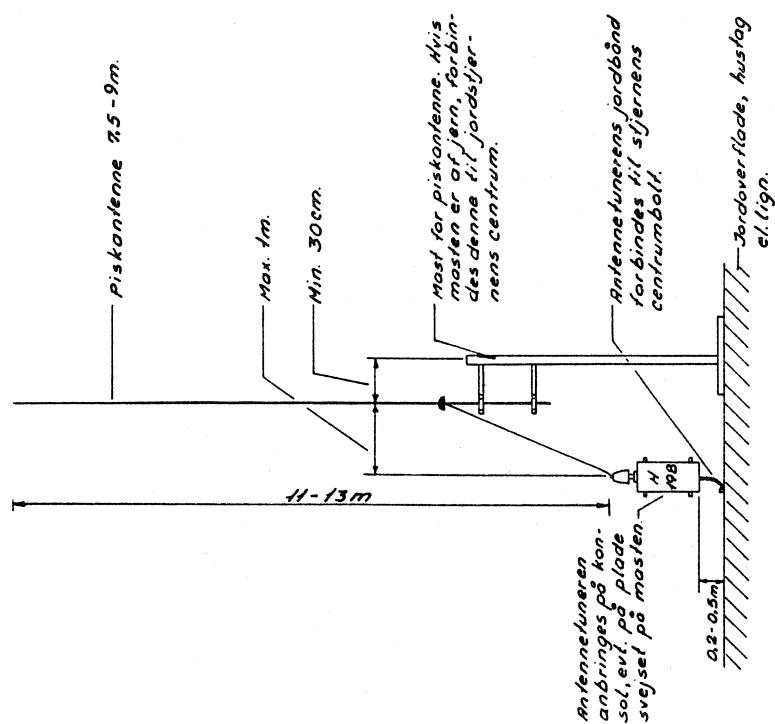
G. TECHNICAL DATA, H198

Frequency range	1.6 - 4.2 MHz
Number of channels	16
Aerial length	10 m to 0.18 λ
Max. transmitter power	400 W PEP
For use with transmitter type	T121, T122, T126 and T128
Max. cable length	200 m
Time required for channel switching	Max. 15 sec.
Type of mounting	Outdoors or indoors

All tuning is automatic when switching channels.

⁺A different type of stepper motor is required for the T121, and T128 at 12 V DC, please state this when ordering.

SET FRA SIDEN.



SET FRA OVEN.

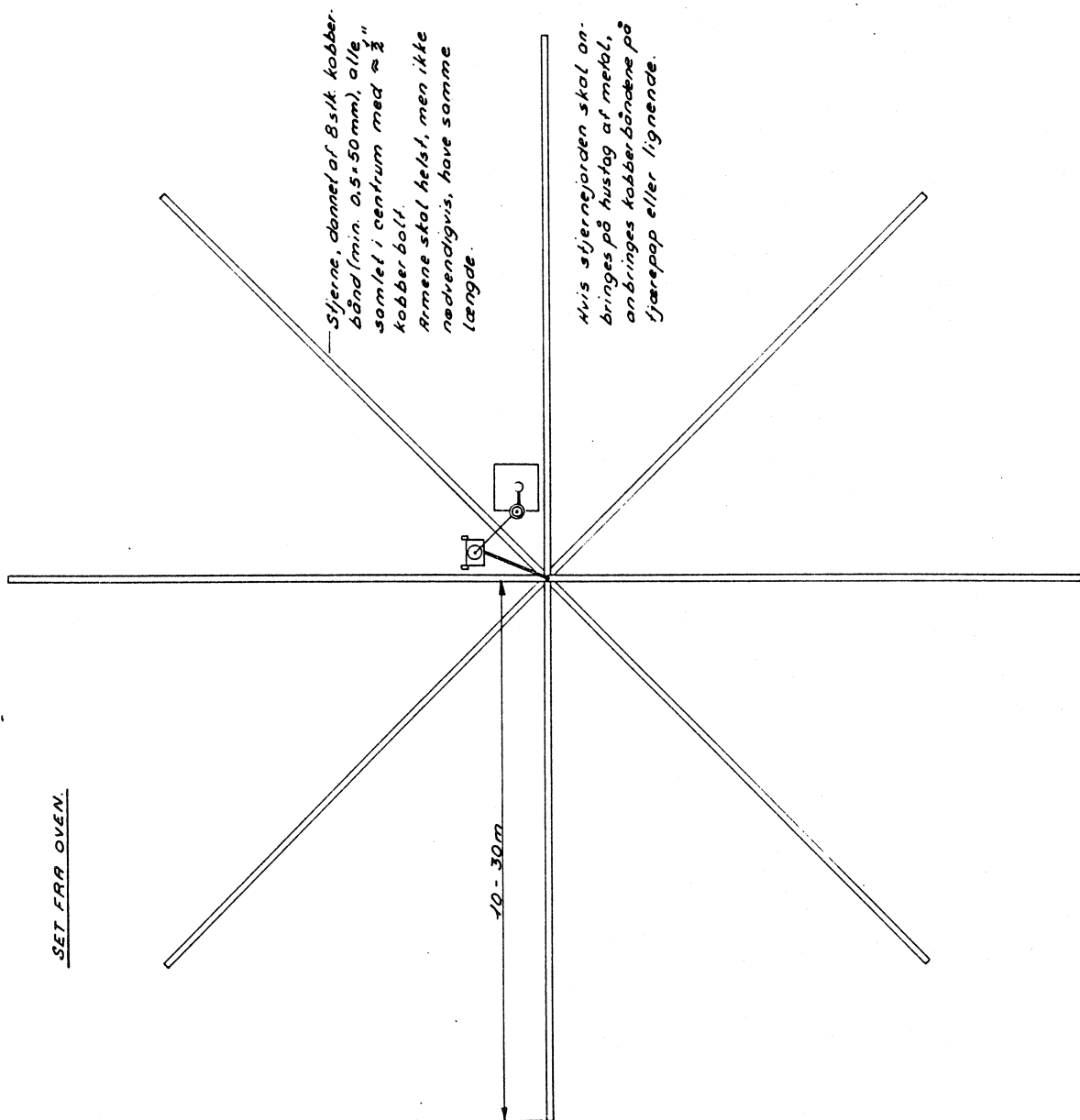


Fig.2 Installation Landstation

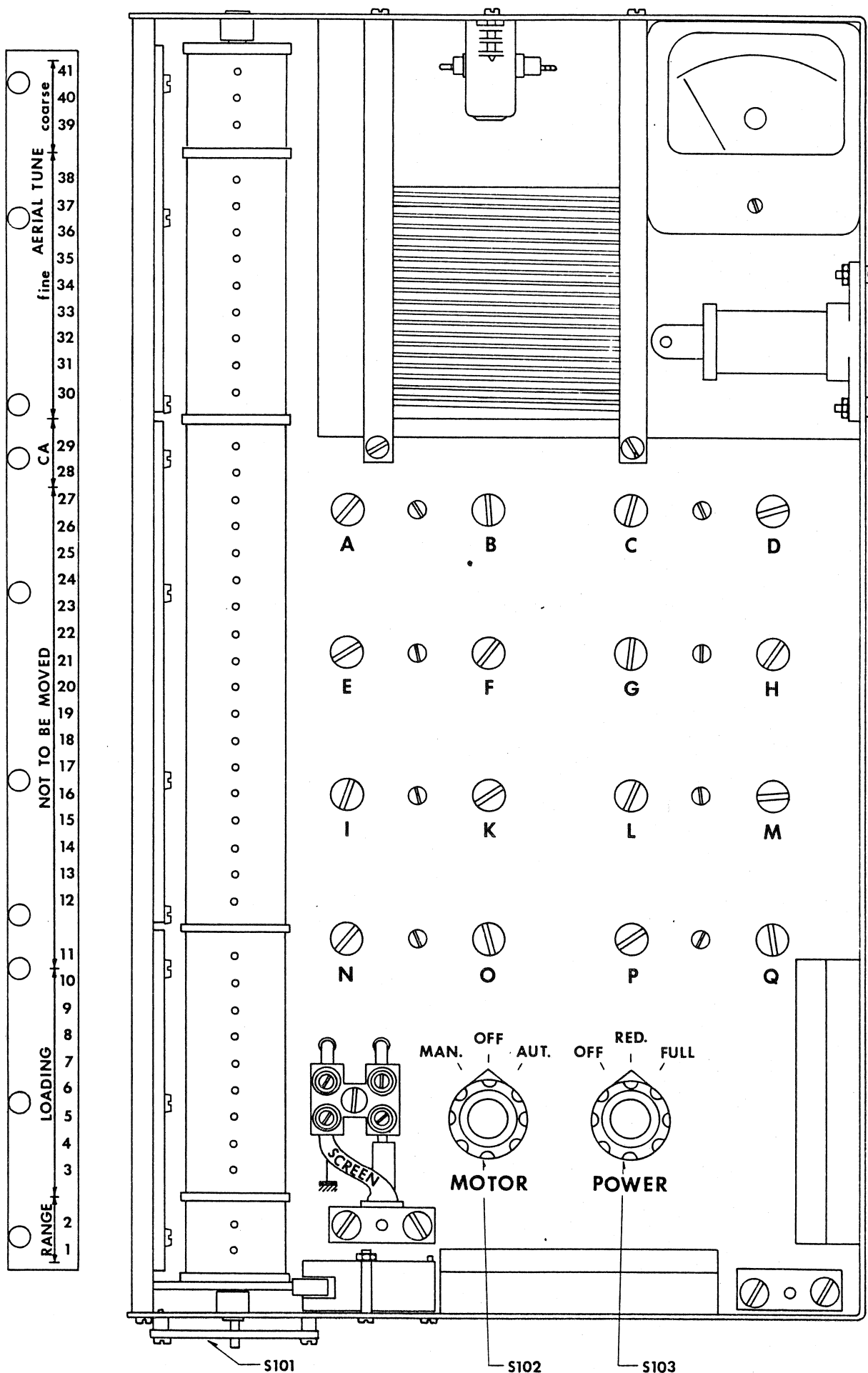
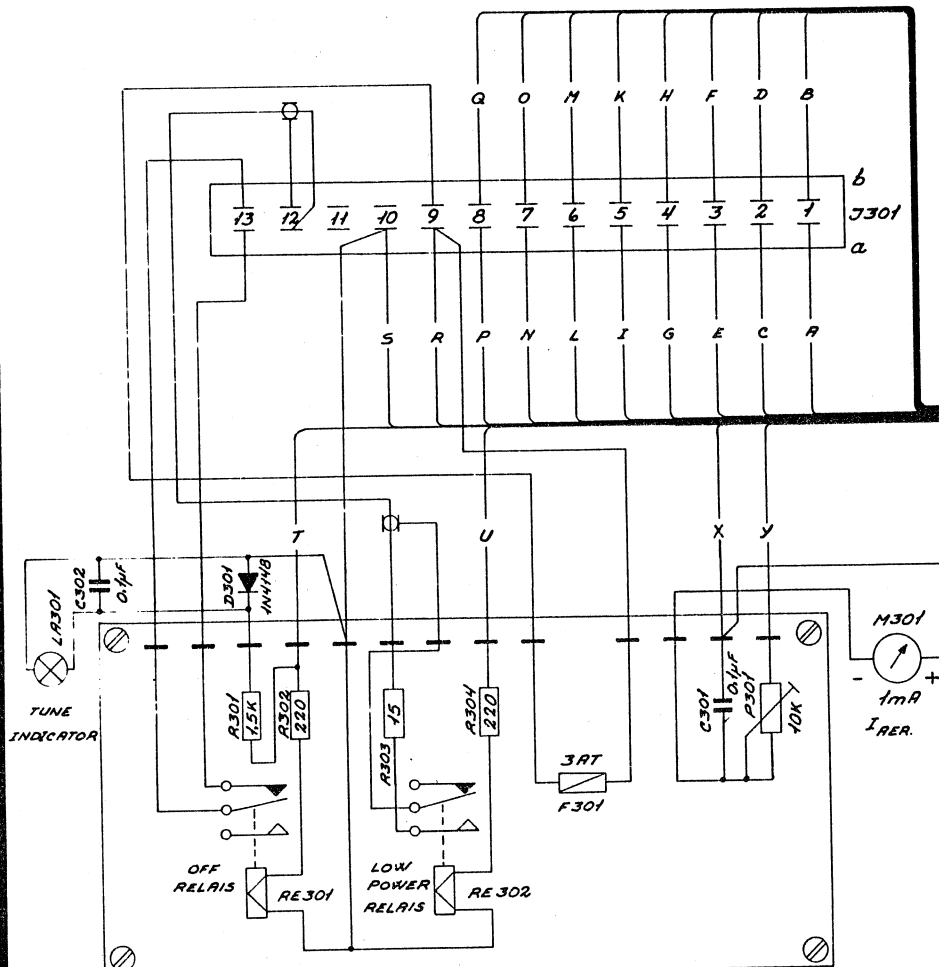
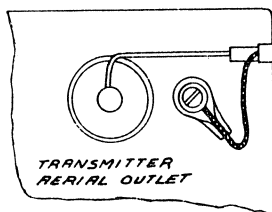


Fig. 1 Tuning Facilities

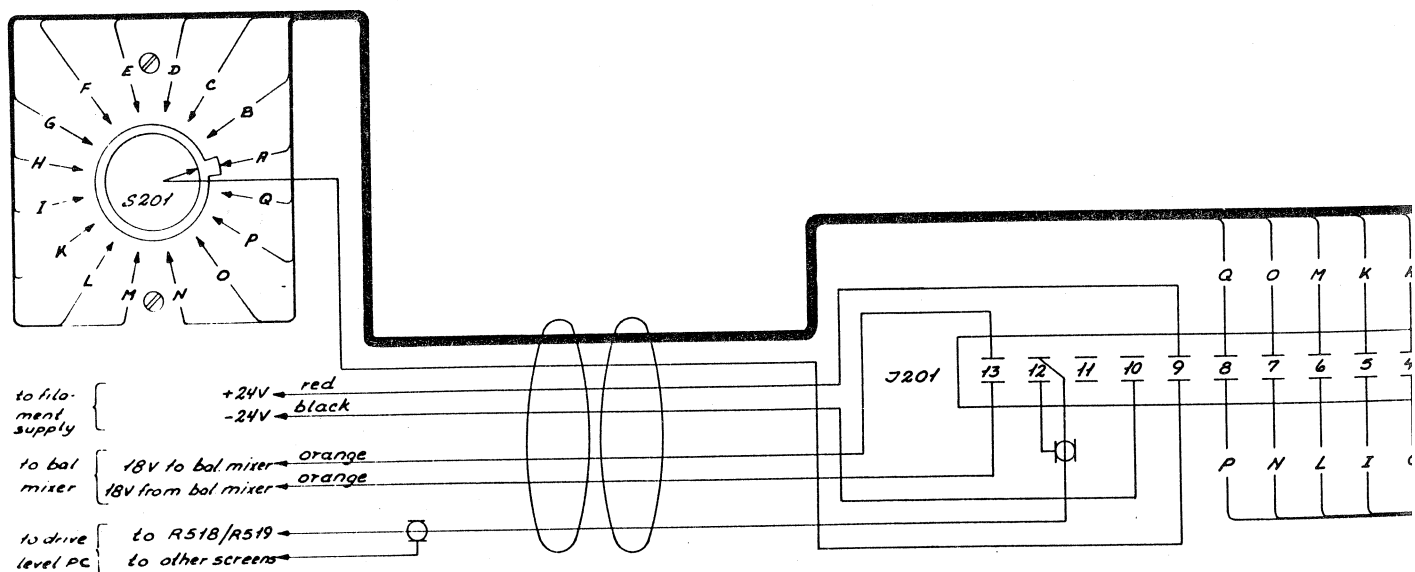
CONTROL UNIT



24 lead 0.25[□] Multicable

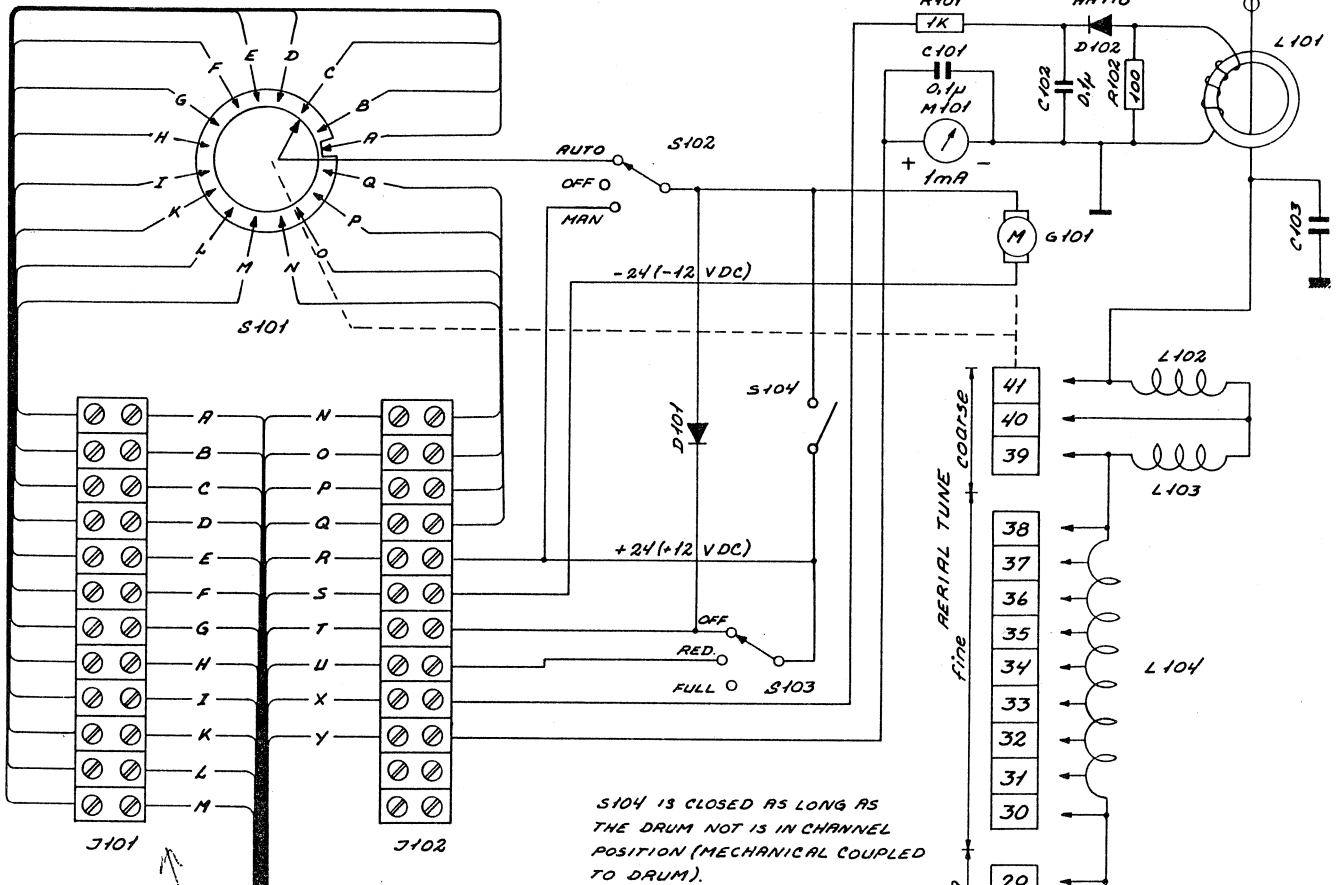


RGB-U



WIRING ASSEMBLY FOR TRANSMITTER MODIFICATION

TUNER UNIT

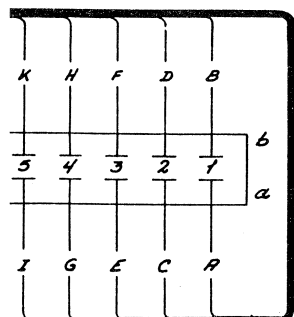


S104 IS CLOSED AS LONG AS THE DRUM NOT IS IN CHANNEL POSITION (MECHANICAL COUPLED TO DRUM).

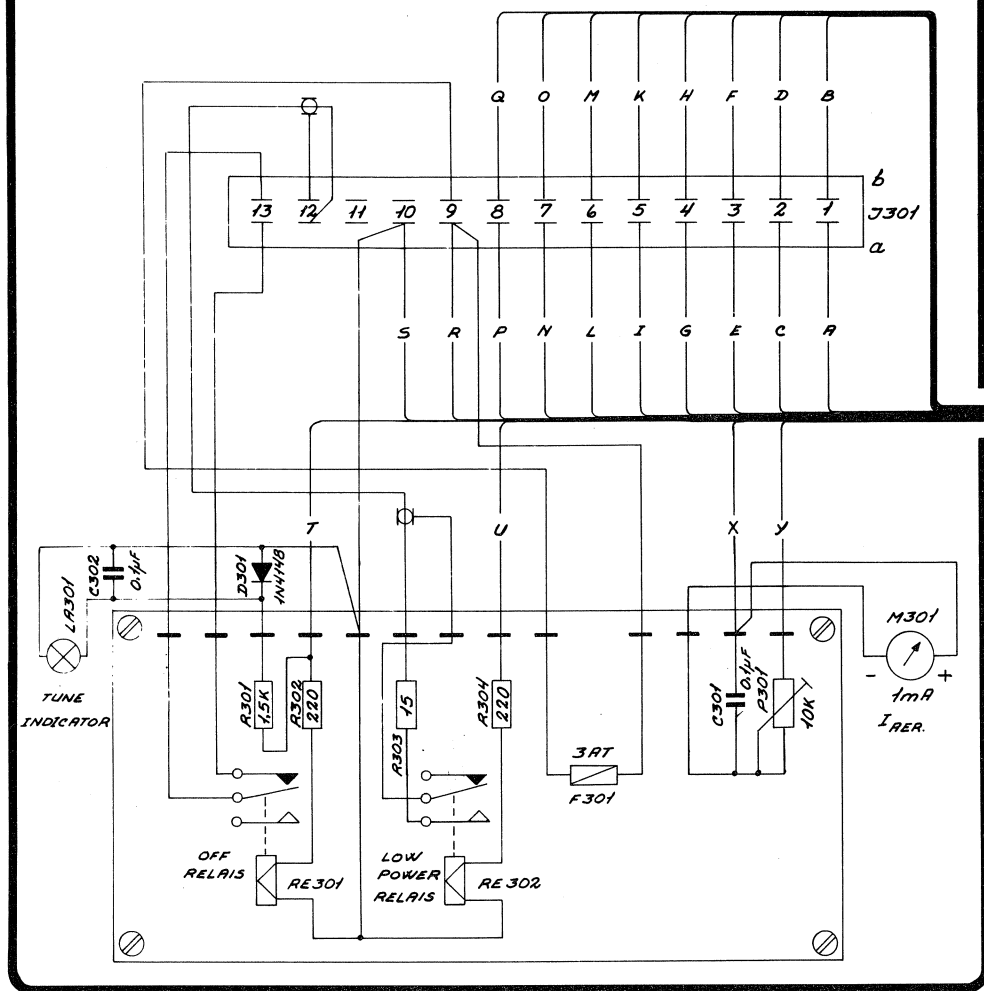
Wieland
Kb 16/12 PA
(Fris Mikkels)

① SCHEMATIC FOR AERIAL TUNER H198

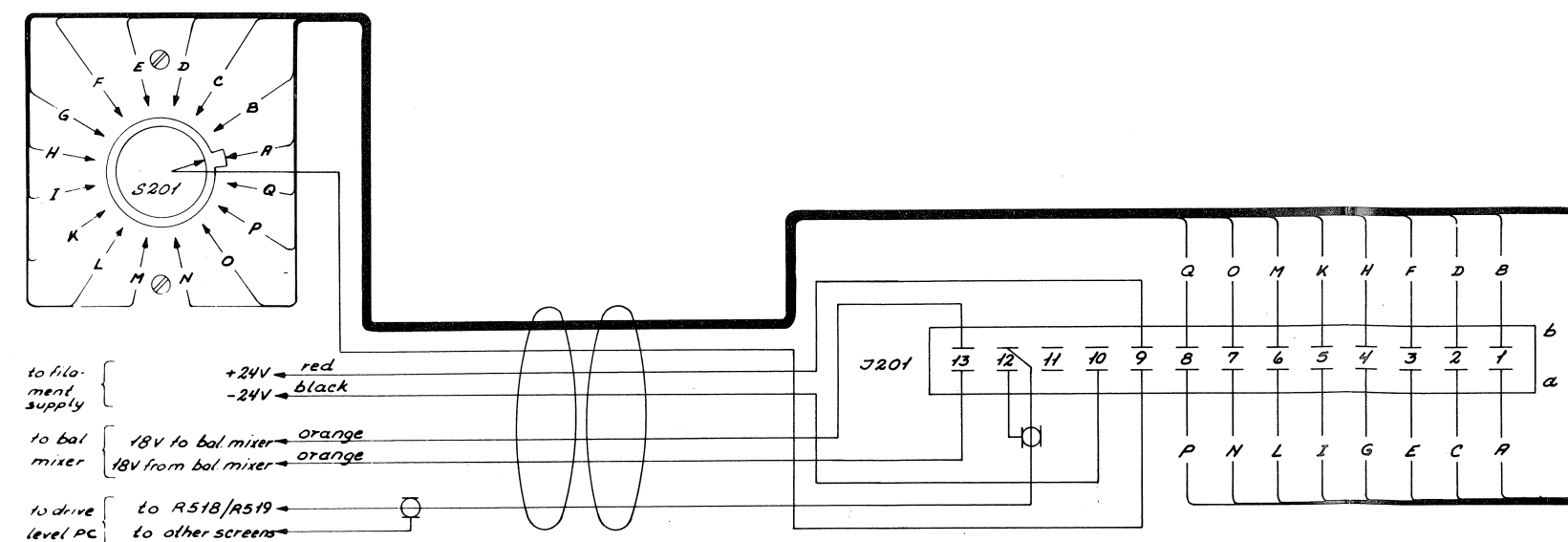
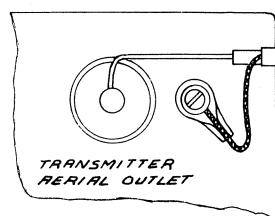
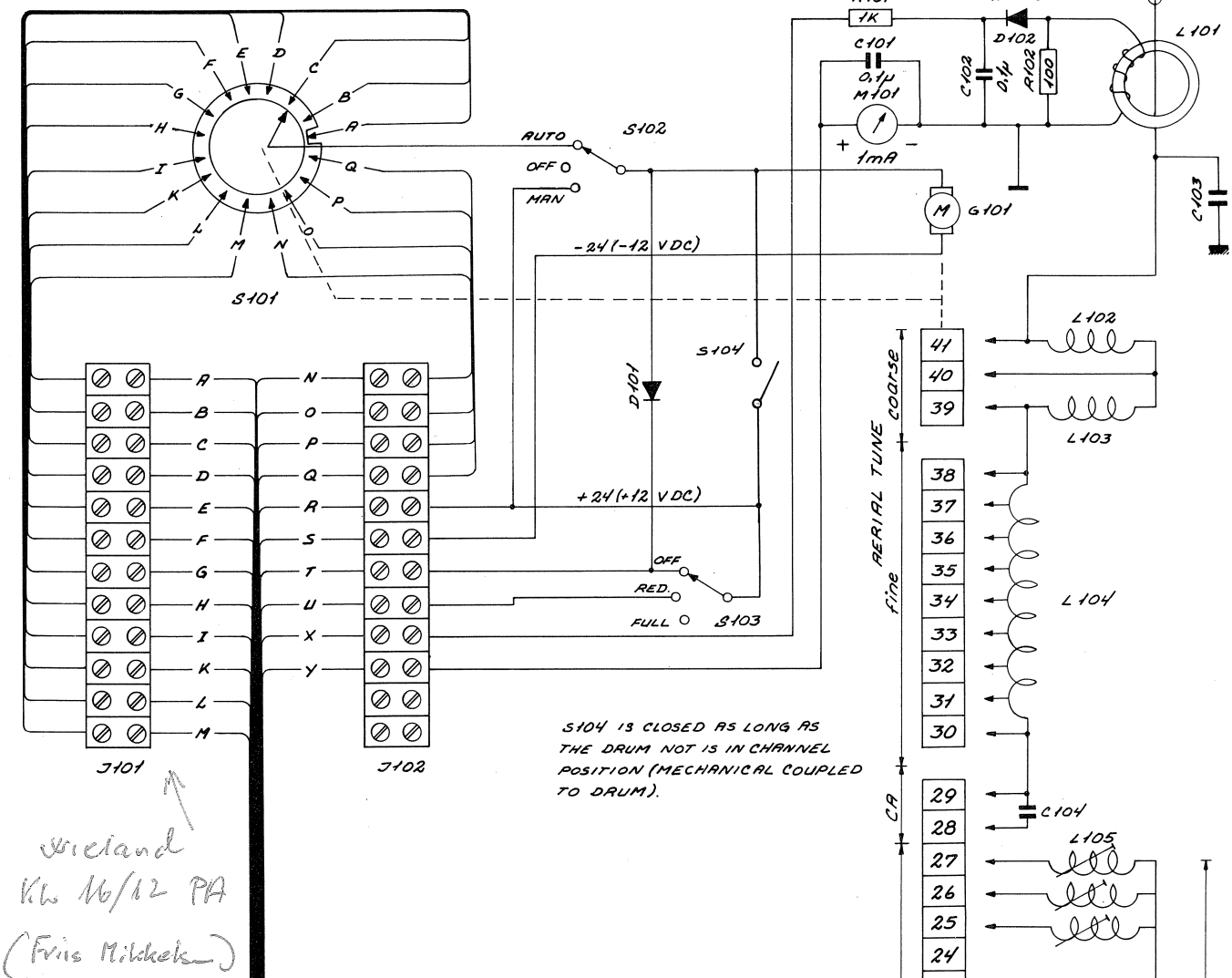
J201 (FEMALE CONNECTOR TO BE CONNECTED WITH MALE CONNECTOR J301 ON CONTROL UNIT).



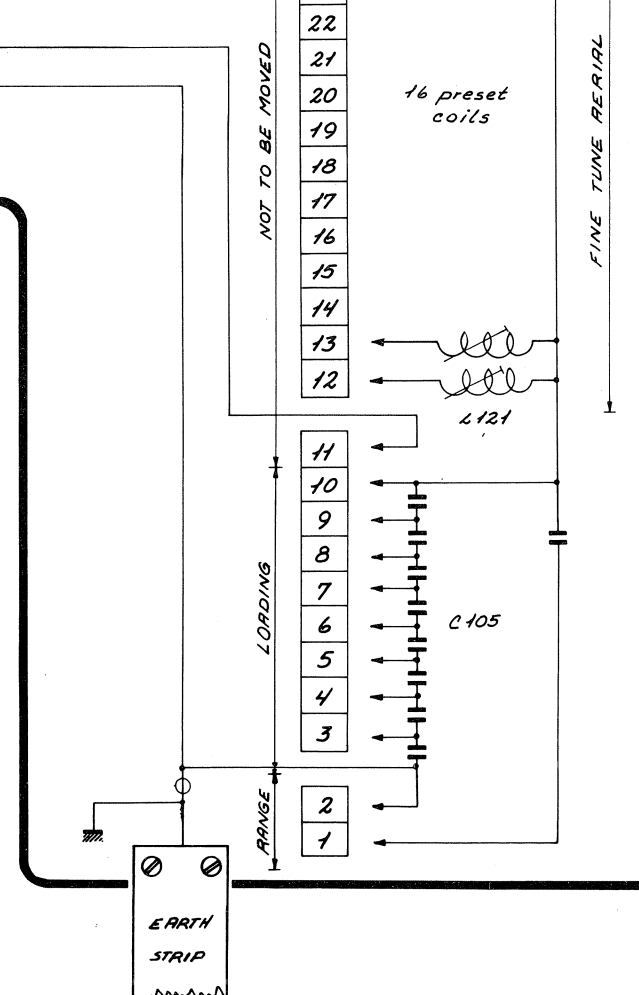
CONTROL UNIT



TUNER UNIT



① SCHEMATIC FOR AERIAL TUNER H198



WIRING ASSEMBLY FOR TRANSMITTER MODIFICATION