

OPERATING MANUAL

YAESU MUSEN CO., LTD.

C.P.O. BOX 1500

TOKYO, JAPAN

DH6SAU

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HF FIELD PORTABLE MANPACK TRANSCEIVER

FT-70



GENERAL DESCRIPTION

The FT-70 series HF field portable manpack transceivers are designed to provide reliable, convenient short- and medium-range communications under rugged field conditions. The frequency-synthesized, all solid-state circuitry and die-cast anodized aluminum front panel and battery pack make a highly portable, semi-weatherproof station weighing less than six kilograms, providing up to ten watts of multi-mode transmitter output power (5W on AM) between 2 and 30 MHz, and reception down to 500 kHz.

Channel selection from the front panel is by either an 11-channel rotary switch (FT-70F, diode-matrix presettable), or thumbwheel switches (FT-70G) with 100 Hz resolution. Synthesized, broad-band circuitry minimizes moving parts and tuning requirements, while automatically selected bandpass filters ensure high performance, sensitivity and pure spectral output. The FT-70F version can be programmed for semi-duplex operation.

Flexible operation for optimum communications under a wide range of propagation conditions are assured by SSB (USB, or optional LSB), semi break-in CW and AM modes, selectable from the front panel, along with high/low power selection and all-mode receiver squelch. Convenient operation is further facilitated by an operator-switchable noise blanker, multi-function meter (showing receive signal strength, relative transmit power or battery/supply voltage), and receiver offset (clarifier) control. A transmitter tune switch is provided to simplify zero-beating by other stations, and tuning of the optional FC-70P preset antenna tuner or FC-70M wideband manual antenna tuner.

Please read this manual carefully to become familiar with the controls and functions of the FT-70.

SPECIFICATIONS

General

Frequency Coverage

Receive: 0.5000 to 29.9999 MHz
Transmit: 2.0000 to 29.9999 MHz

Frequency Control

Digital PLL Synthesizer, 100 Hz steps
FT-70G: 6-digit thumbwheel switches
FT-70F: 6-digit preset diode matrix

Modulation Modes

USB (A3J/J3E), LSB w/ optional filter
A3H (H3E)
CW (A1/J2A) radiotelegraphy

Antenna Impedance

50 ohms, unbalanced

Number and Type of Channels

FT-70G: continuous coverage from 2 to 29.9999 MHz (simplex), plus 0.5 - 2 MHz (receive only)
FT-70F: 11 preset, simplex or semi-duplex

Power Source Type and Voltage

Attachable FNB-70 12V, 4Ah Ni-Cd battery, or NC-70 Power Supply/Charger, or other external DC source of 13.8V +10%/-15% @4A. (All optional)

Current Consumption

(Amperes)

	@12V	@13.8V
Receiving:	0.47	0.5
Transmitting:		
USB,LSB,CW (LOW)	2.3	2.4
" " " (HIGH)	3.7	3.3
A3H (LOW)	1.7	1.8
" (HIGH)	2.5	2.6

Grounding

Negative ground

Operating Temperature Range

-10 to +50°C (14 to 122°F)

Case Size (HxWxD, mm)

w/o battery: 87 x 242 x 277
w/ battery: 87 x 242 x 319

Weight (Approx)

w/o battery: 3.5 kg (7.7 lb)
w/ battery: 5.8 kg (12.8 lb)

Transmitter

Power Output	(HIGH)	(LOW)
USB, LSB, CW	10W	4W
A3H	5W	2W

Modulation Methods

USB,LSB: balanced modulator
A3H: early stage, low level

Harmonic Radiation

below -50dB

Carrier Suppression

50dB or better

Unwanted Sideband Suppression

50dB or better

Transmit Audio Characteristic

-6db from 350 to 2650 Hz @25°C

Third Order IMD

below -31dB

Frequency Stability

within ±150 Hz

-6dB Bandwidth

3 kHz (USB, LSB) @25°C

Microphone Impedance

600 ohms

Tune Signal Offset

1500 Hz

Receiver

Circuit Type

Dual conversion superheterodyne

Intermediate Frequencies

47.055 and 10.700 MHz

Sensitivity (for 10dB S+N:N, or better)

	0.5-2 MHz	2-30 MHz
USB,LSB,CW:	4uV	0.4uV
A3H	15uV	1.5uV

Selectivity (-6/-60dB)

2.4kHz/5.0kHz @25°C

Image Ratio

1st IF: 80dB or better
2nd IF: 70dB or better

IF Rejection

1st IF: better than 50dB below 2 MHz
better than 60dB above 2 MHz

2nd IF: 70dB or better

Audio Output Power (typical)

1.5W into 8 ohms with 10% THD

Audio Output Impedance

4 to 16 ohms

Clarifier Adjustment Range

±300 Hz or more

OPTIONAL ACCESSORIES

YH-70 Telephone-type Handset

10F2.4DL LSB Filter (req'd for LSB mode)

CSC-70 Carrying Case, Backpack-style, Dark Olive Canvas with shoulder straps and four compartments.

FNB-70 Ni-Cd Battery Pack, Attachable, requires NC-70 Charger (D3000437)

NC-70 3-Speed Charger for FNB-70, and AC/DC Power Adapter for FT-70. Requires 100/110/120/200/220 or 234VAC

YA-70 All-Band Field-Portable Tripod Antenna Kit, 5m maximum height, collapsible to 1.2m. Includes all wires and Canvas Carrying Case to match transceiver's. Requires FC-70M or FC-70P Tuner

RSL-70 3-section Whip Antenna for operation above 15 MHz with FC-70P tuner.

FC-70M Manual All-Band Antenna Tuner for YA-70 Antenna, with cable. Recommended especially for FT-70G

FC-70P 11-channel presettable All-Band Antenna Tuner for YA-70 Antenna. Recommended especially for FT-70F

SUPPLIED ACCESSORIES

MH-17A8 Handy Splashproof Speaker/Microphone (M3090051)

DC Power Cord/Plug/Fuse Holder (T9016106)

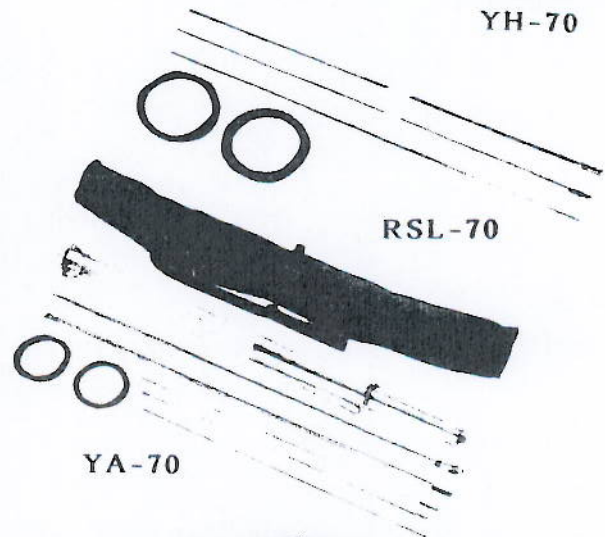
Spare Fuse (6A) (Q0000012)

Plug for KEY jack (P0090007)

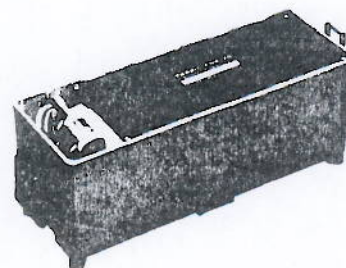
Channel Card (for F model only, R7114500A)



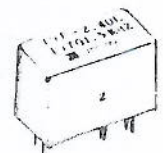
YH-70



YA-70



FNB-70



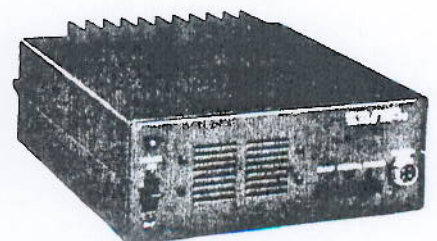
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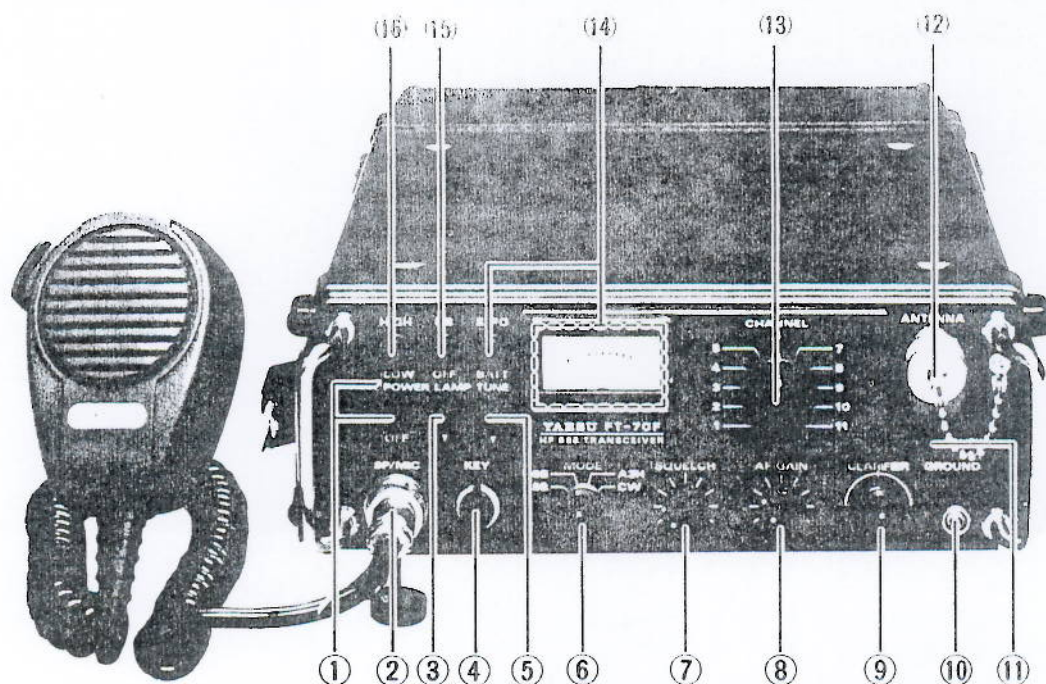
FC-70M



FC-70P



NC-70



FT-70F FRONT PANEL

(1) POWER Switch and Indicator

This switch turns the transceiver on and off. When ON, the indicator lights if the power source (either the attached FNB-70 battery pack or external DC supply) is properly connected and charged. When OFF, no current is drawn from the power source.

(2) SP/MIC Jack

This 8-pin jack is for connection of the supplied speaker/microphone or optional handset.

(3) LAMP Switch

When pressed and held down, this switch turns on the pilot lamp inside the meter if the FNB-70 battery is used as the power source. A spring inside the switch returns it to the off position. If the transceiver is powered by a different source the meter lamp is always on when the set is on, and this switch has no function.

(4) KEY Jack

This 1/4-inch 2-contact phone jack is for connection of a telegraph key required for radiotelegraph transmission. Keep the rubber cap in place whenever a key is not being used.

(5) TUNE Switch

This spring-loaded switch can be pressed and held down for test transmission, such as for adjusting an antenna tuner or to allow another station to "zero beat", as described later in the Operation section.

(6) MODE Selector

This knob selects the operating mode for receiving and transmitting: LSB (lower sideband); USB (upper sideband); A3H (AM) and CW (radiotelegraphy). Note that an optional LSB filter is required for operation in this mode, and a telegraph key must be connected to the KEY jack for CW transmission, while a microphone or handset must be connected to the SP/MIC jack for LSB, USB or A3H transmission.

(7) SQUELCH Control

This knob sets the receiver squelch level in all modes. When set properly, the receiver will remain silent until a signal above the squelch level is received. See the Operation section for details of proper adjustment.

(8) AF GAIN Control

This knob sets the audio volume of the receiver in the speaker or handset.

(9) CLARIFIER Control

This knob allows slight adjustment of the receiving frequency to tune in signals for optimum clarity.

(10) GROUND Terminal Post

If an earth ground connection point is available at the operating site, this terminal may be connected to it to provide improved performance and safety.

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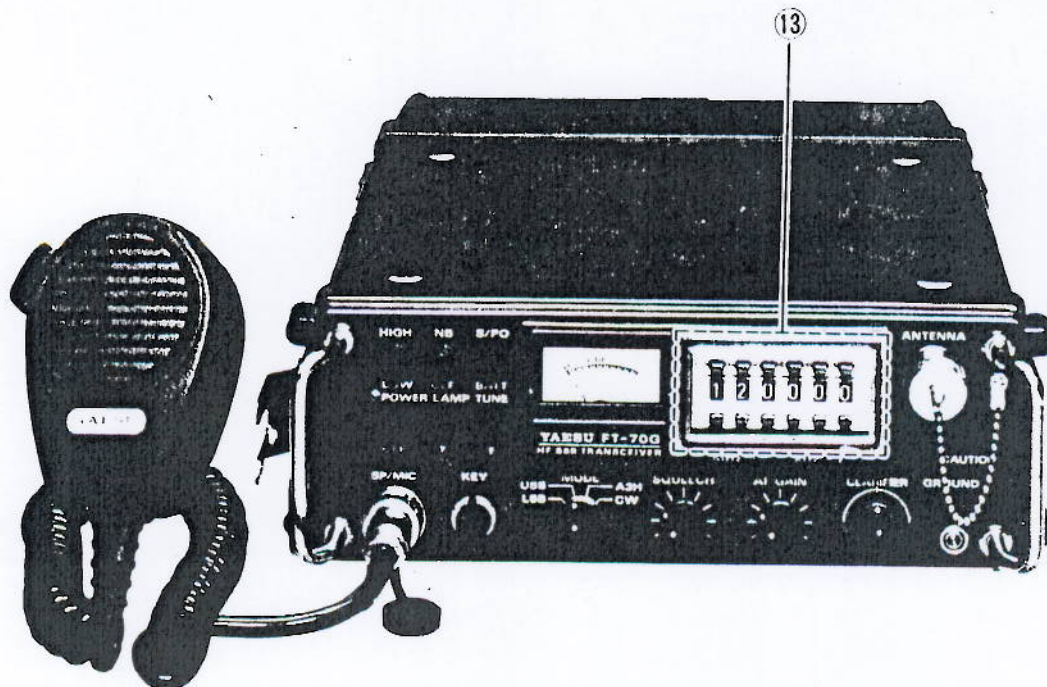
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FT-70G FRONT PANEL

(11) CAUTION Indicator Lamp

This lamp lights when improper transmission is attempted: either outside of the acceptable frequency range (2-30 MHz) or with an improperly matched antenna or ground/counterpoise. It will also light in the event of an internal problem with the frequency synthesizer. No signal is actually transmitted if this lamp is lit.

(12) ANTENNA Jack

This jack accepts the antenna feedline or coaxial jumper to the antenna tuner, if used. Use only a type PL-259 (type M) plug and coaxial cable. Proper impedance is 50 ohms. When the transceiver is not in use, keep the cap on this Jack to protect it from dirt and corrosion: antenna connections must be clean for proper performance.

(13) CHANNEL Selector Knob (FT-70F) or Thumbwheel Switches (FT-70G)

On the FT-70F the knob at this location selects the operating channel, 1 - 11.

On the FT-70G, the six thumbwheel switches select the operating frequency, which must be between 2 and 30 MHz (020000 and 299999) for transmission, or 0.5 and 30 MHz (005000 and 299999) for reception.

(14) Meter and S/PO - BATT Switch

If this switch is in the S/PO position, the meter indicates relative received signal strength (on the upper "S - dB" scale) during reception, and relative transmitter power output at the ANTENNA jack (on the lower "Po" scale) during transmission.

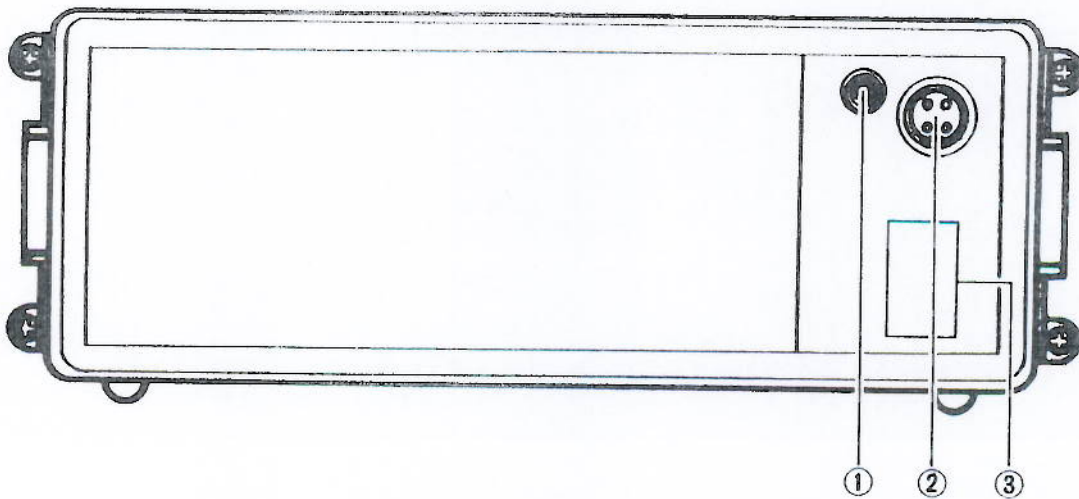
If the switch is in the BATT position the meter indicates the relative supply voltage from the battery or external supply. For proper operation, the meter should indicate in the green "Vcc" zone during reception and transmission.

(15) NB (Noise Blanker)

This switch activates the noise blanker to suppress impulse noise picked up by the receiver. When not needed, this switch should be turned off for best clarity.

(16) HIGH/LOW Switch

This switch selects high or low transmitter power output. Use the low power setting whenever possible to conserve battery charge life.



FT-70F/G REAR PANEL

(1) EXT SP

This 2-contact 1/8-inch mini phone jack is provided for an optional external speaker when the FT-70 is powered from a source other than the FNB-70 battery pack. Connection to this jack disables the speaker output at the front panel SP/MIC jack.

(2) DC 13.8V

This 4-pin jack is for connection of the power source: normally, the FNB-70 battery pack, which has the proper connector. If any other power source is connected here care must be taken to ensure that it is between 12 and 15 volts DC, capable of supplying 4 amperes, and includes a 6-amp safety fuse.

(3) ACC (Covered cutout)

This cutout is provided for installation of an accessory jack for operator's special, non-standard requirements.

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SETUP AND INSTALLATION

The FT-70 is designed primarily for field portable operation using the FNB-70 Rechargeable Ni-Cd Battery pack and either the FC-70M Manual Antenna Tuner (with the FT-70G) or the FC-70P Preset Antenna Tuner (with the FT-70F), and the YA-70 Tripod or RSL-70 Whip Antenna Kit. The NC-70 Charger for the FNB-70 battery includes a loudspeaker and capability of powering the transceiver while the battery is being charged.

Before putting the transceiver and accessories in the carrying case for the first time, the battery should be given a full charge. Follow steps (4) and (5) of the "Battery Charging" procedure below.

The battery connection cable on the FNB-70 includes a fuse holder with a 6A fuse. If the battery is short-circuited, this fuse will blow. **Replace only with a 6A fuse.**

The battery pack is connected and attached to the rear of the FT-70 as shown in Figure 1, and the transceiver is then kept in the large compartment of the canvas carrying case.

The antenna tuner is kept in the separate wide, thin compartment above the transceiver, and is connected via the short coaxial jumper cable to the ANTENNA terminal on the transceiver (Figure 2).

During transport, the YH-17A8 Speaker/Microphone or optional YH-70 handset is kept in the small compartment behind (or below) the antenna tuner, and the RSL-70 or three small whip section of the YA-70 antenna are slipped into the loop beside the tuner.

The encircling strap (Figure 3) is then tightened to secure the pack. (The remaining compartment on the side of the carrying case is not required for standard accessories, and may be used as the operator desires.)

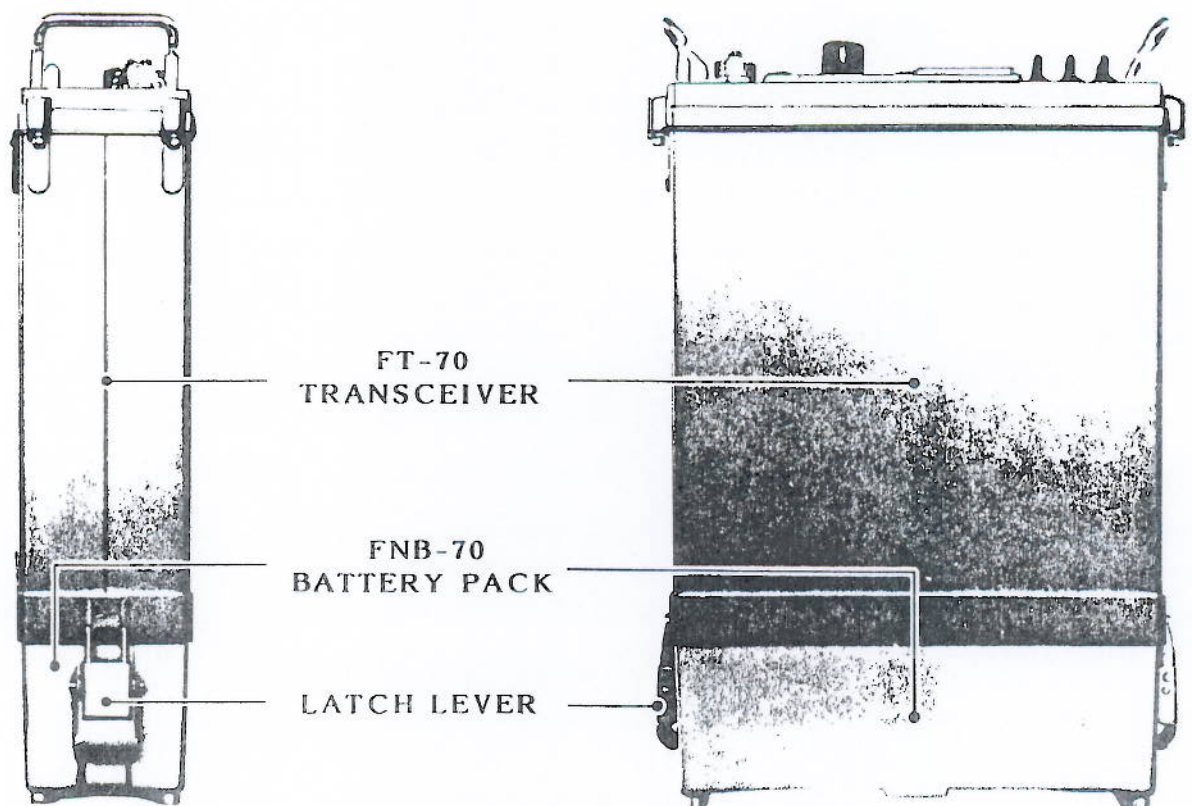


Figure 1

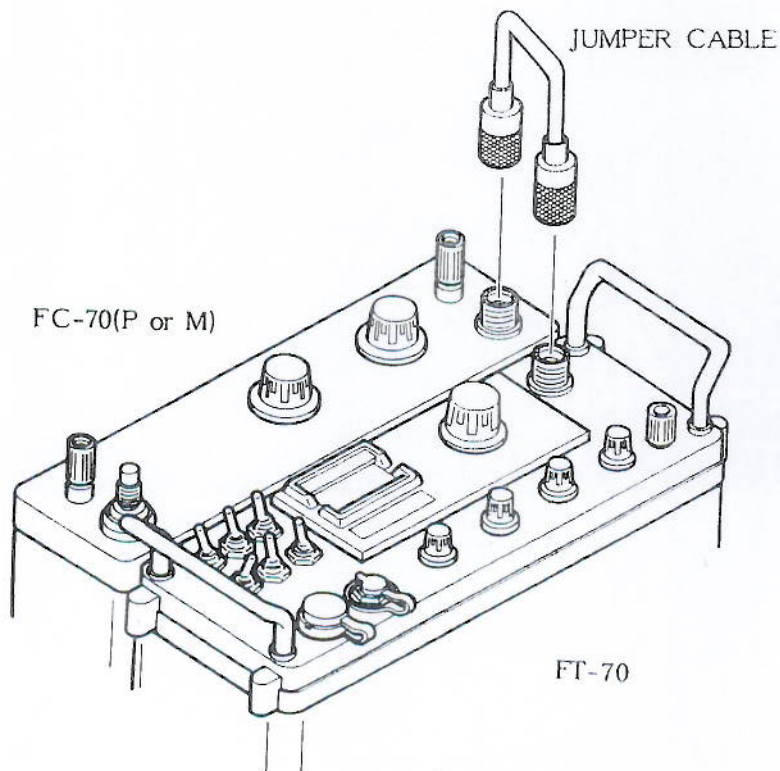
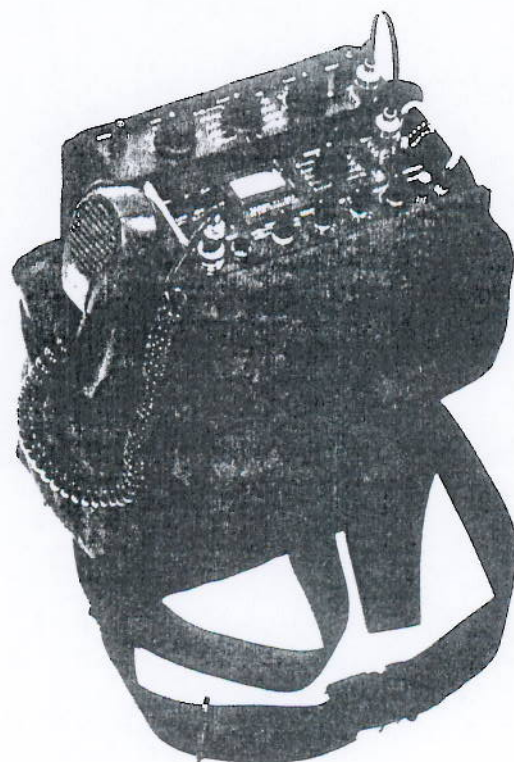


Figure 2



FT-70F/FC-70M/FNB-70/MH-17_{A8}/CSC-70

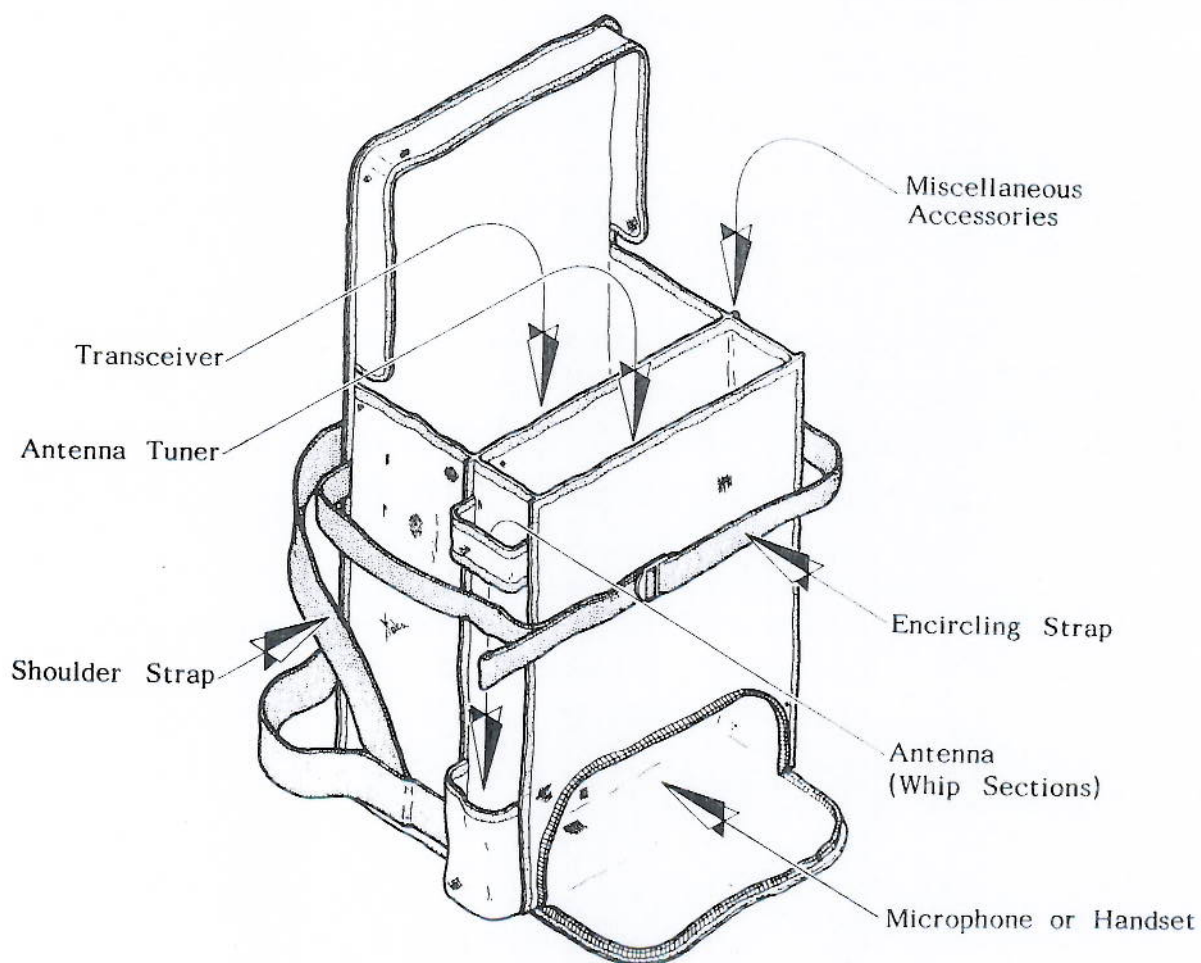


Figure 3

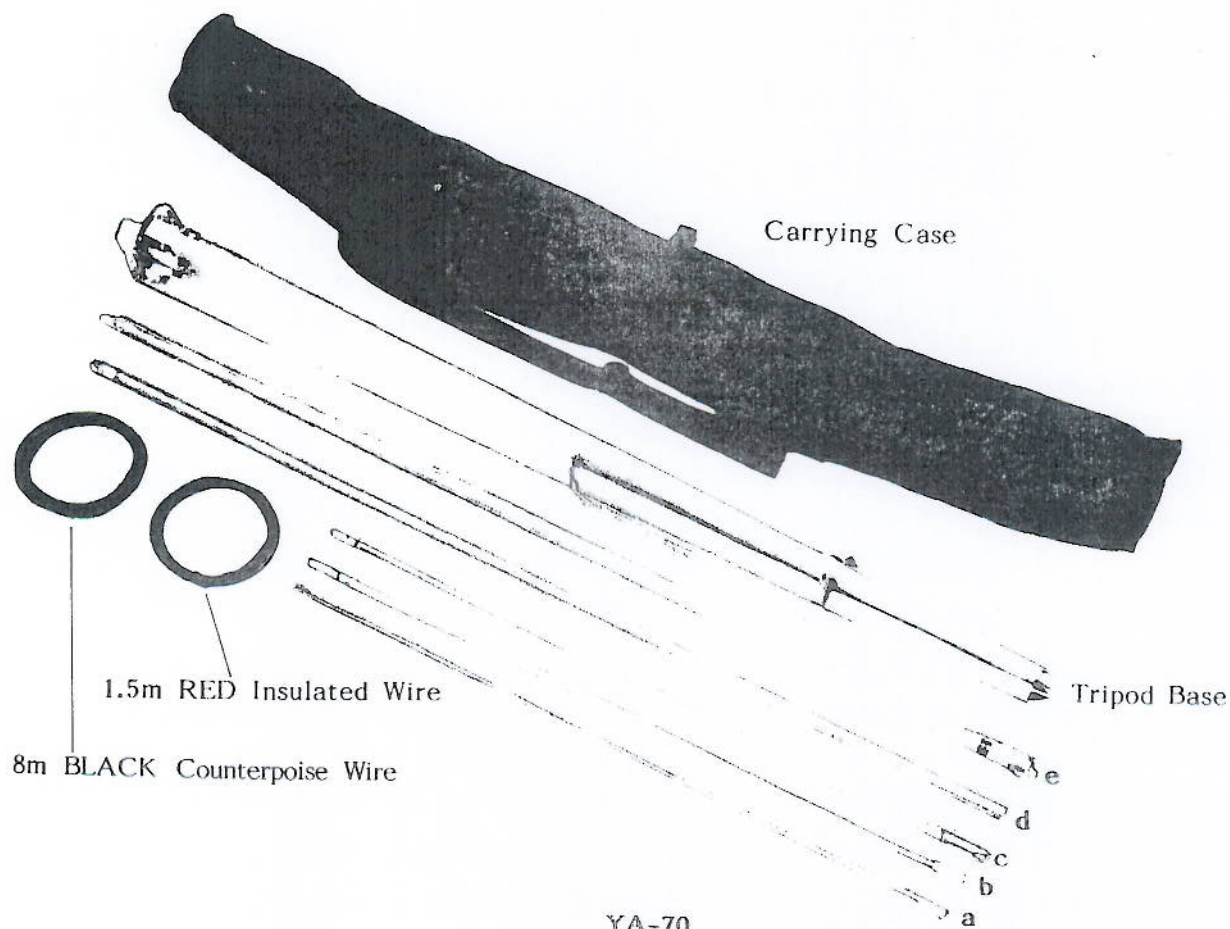
Field Operation

As much as other factors permit, the field station should be set up in the clear, as far as possible from trees, metal or wire fences, buildings or other obstacles. In uneven terrain, the antenna should be set up at the highest location possible: especially during daylight or for communications over long distances.

The steps required to set up a station in the field are to (1) set up the antenna, (2) connect the antenna to the antenna tuner and the microphone or handset to the transceiver, (3) select the operating channel and tune the antenna. These are described in greater detail below and in the "Operation" section. If problems are encountered with antenna tuning, or if other stations cannot hear you, refer to the "Antenna Guidelines" paragraphs at the end of this section.

NOTE: If using the FC-70P presettable antenna tuner on channels above 15 MHz, only the RSL-70 or thin whip sections of the YA-70 are needed, and these can be attached directly to the tuner as shown in Figure 6 (page 13): the Tripod Base of the YA-70 is not required in this situation (although the counterpoise wire is still must be connected for operation).

It is recommended that the transceiver and antenna tuner be kept inside the carrying case at all times in the field, except when recharging the battery. Also, the protective covers over the SP/MIC, KEY and ANTENNA jacks should be kept in place whenever plugs are not actually installed in the jacks, and the rubber cover over the thumbwheel tuning switches (FT-70G only) should never be removed.



YA-70

Battery Charging

When fully charged, the FNB-70 battery pack can power the transceiver for about 7.5 hours under normal operating conditions (10% transmit, 10% receive, 80% squelched standby). After that time the meter on the FT-70, when set to monitor battery voltage, will drop below the safe level when the transmitter is activated, and the battery must be recharged. If continuous portable operation for more than one discharge period is required, keep one or more extra battery packs or cell sets handy and fully charged.

The FNB-70 battery pack should only be recharged using the NC-70 Charger/Adapter. The NC-70 provides selection of QUICK and NORMAL charging rates, and a TRICKLE rate to maintain a battery that is fully charged. The NC-70 includes special safety circuits which prevent damage to the battery while charging at optimum efficiency, and includes the capability of powering the FT-70 while charging the battery, and an external speaker. An emergency power feature is also provided to switch transceiver operation from the NC-70 to the battery if AC power fails.

Use the following procedure to recharge the battery.

CAUTION

The NC-70 is wired for operation from a specific AC voltage, indicated on a label near the AC power jack on the rear. Connecting the NC-70 to any other voltage may cause permanent damage to the Charger and void the warranty.

Similarly, the NC-70 includes a fuse in a holder in the rear panel. This is either 3A (for 100 - 120 VAC) or 2A for (200 - 234 VAC). If the power indicator on the NC-70 fails to light, the fuse is likely blown. Replace only with the same type of fuse removed.

It is unsafe to recharge the battery if the ambient temperature is below 0°C or above 40°C, and recharging the battery at temperatures near these extremes may shorten battery life. Optimum charging temperature is 25°C.

Charging Procedure:

- (1) Disconnect the coaxial jumper cable from the ANTENNA jack on the transceiver, and remove the microphone or handset, if connected. Loosen the encircling strap on the case.
- (2) Using the chrome side handles, carefully lift the transceiver from the case and place it upright on a flat surface (battery pack at the bottom).
- (3) Unlatch the battery pack on both sides of the transceiver. Using care to avoid pulling on the power cables, lift the transceiver slightly and place it flat next to the battery pack (Figure 4). The interconnecting wires allow only a few inches of separation. Unscrew the battery cable at the rear of the transceiver.
- (4) If the NC-70 is not already connected to the AC mains, make certain that the voltage label on the back of the NC-70 matches the local AC mains voltage, and plug it in at this time.
- (5) Connect the battery cable plug to the charging jack on the front of the NC-70 Charger, and then switch on the Charger. The green TRICKLE lamp will light to indicate proper connection. Press the NORMAL or QUICK button to select the charging rate:

NORMAL: 8 hours or less
QUICK: 2 hours or less

In the NORMAL and TRICKLE modes the transceiver may also be operated from the NC-70. Connect the power cable from the rear of the NC-70 to the DC 13.8V jack and plug the NC-70 speaker cable into the EXT SP jack on the rear of the transceiver (Figure 5). The meter lamp on the transceiver will be lit during operation from the NC-70.

If the QUICK charge mode is selected, the transceiver will not receive any supply voltage from the NC-70 until the battery is charged. In both QUICK and NORMAL modes, as soon as the battery is charged the NC-70 will automatically switch over to the TRICKLE mode.

Whenever time permits, use the NORMAL mode to prolong battery life. The FNB-70 can be recharged approximately 500 times using this mode, but fewer times using the QUICK mode.

Battery Storage

When not in use, the Ni-Cd cells in the FNB-70 will self-discharge at a gradual rate. If discharged below a certain level, the cells may no longer be capable of recharging. For this reason, the battery pack should never be allowed to completely discharge.

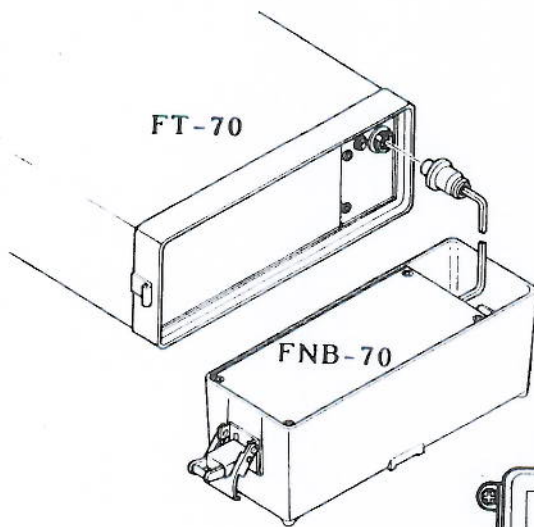


Figure 4

Always after use, recharge the FNB-70 completely before storing. If the set is just to be stored overnight or for a few days, keep the FNB-70 on the charger in the TRICKLE mode, which caps off the charge received in the QUICK and NORMAL modes, and prevents self-discharge.

If a battery pack is to be stored for a longer period, first make certain that it is charged completely at room temperature, and then store the battery at the lowest possible temperature (below 0°C is fine for long term storage). Remove the battery every six months and allow it to warm up to room temperature completely, and then recharge it in the NORMAL mode before returning to storage. When removing a battery from cold storage, always allow it to warm up thoroughly before recharging or using to power the transceiver.

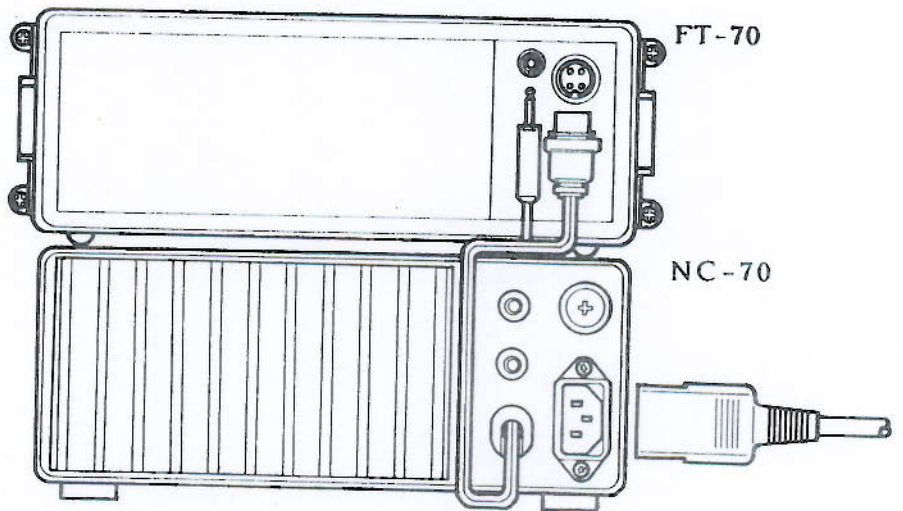
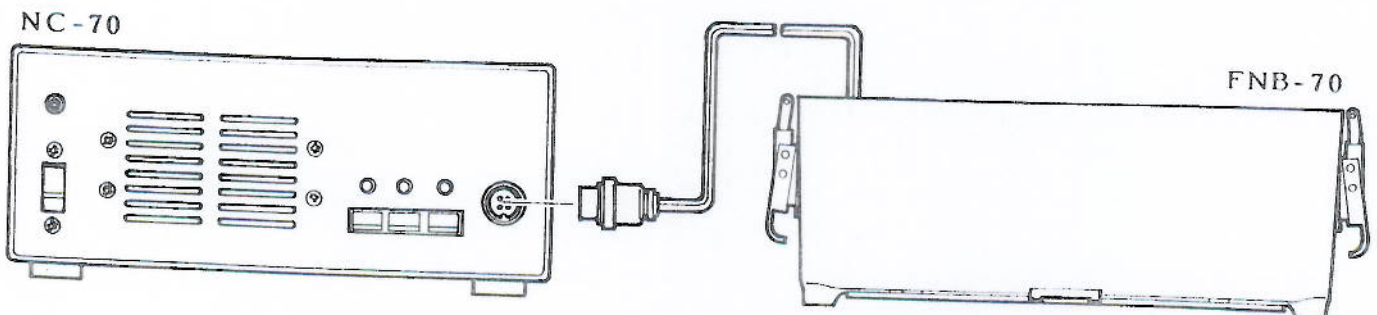


Figure 5



Antenna Setup

The following procedure applies to the most common operating conditions. However, when the FC-70P presettable tuner is used on preset channels above 15 MHz, antenna setup is greatly simplified, as shown in Figure 6 and noted on page 9. In this case, skip steps (1) and (2).

- (1) Remove the wire from the pouch on the antenna carrying case, and the tripod base section from the carrying case. Spread the legs of the tripod at the selected site, and set the transceiver at the side of the antenna away from the direction of desired communication (if known).
- (2) Connect the 1.5m RED insulated wire between the terminal on the bottom of the center of the tripod baseplate and the ANTENNA terminal on the antenna tuner (not on the transceiver).
- (3) Connect one end of the 8m BLACK counterpoise wire to the GROUND terminal on the antenna tuner, and lay this wire out on the ground, extending it radially away from the station as far as possible in the direction of the desired communication.
- (4) Select the required number of antenna sections for the desired operating range:
 - * Below 15 MHz use all 5 sections,
 - * between 15 and 24 MHz use only the three thin top whip sections, and
 - * above 24 MHz use only the two top whip sections.

Screw the selected sections together and then to the top of the Tripod base (or FC-70P if not using the Tripod, above 15 MHz).

- (5) Check to ensure that the coaxial jumper cable is installed between the tuner and the transceiver, and then proceed to the "Operation" section.

In Case of Problems

If you are unable to obtain the indicated peaks on the meter during antenna tuner adjustment, or if the CAUTION lamp on the front panel does not extinguish, double check all connections from the ANTENNA jack on the transceiver, through the tuner to the antenna. Also check the counterpoise connection, and ensure that the correct number of vertical antenna sections are connected for the intended operating frequency, as indicated above.

If the intended operating frequency is near 15 or 24 MHz, you might try adding or removing one element section to or from the antenna, and readjusting the tuner. Note that the "peaks" indicated on the meter during adjustment of the tuner will generally be very sharp at low frequencies, becoming broader at higher frequencies.

If the intended operating frequency is below 15 MHz, and if a good earth ground connection is available (such as a buried water pipe or other metal object), try connecting this to the GROUND terminal on the tuner or transceiver, using the shortest possible connecting wire. At base camp stations, it is a good idea to install an earth ground if none is readily available, by driving a pipe, 2m or more in length, into soft wet soil. Note that this is not mandatory, but can improve performance considerably in some cases.

In cases where the antenna tuner adjustments and resulting meter indications seem okay, but the called station doesn't respond or responds that your signal is too weak even at high power, first try a different channel frequency. In general, low frequencies will be best for short distance communication during the day, but not useful after dark. The antenna tuner must be readjusted when changing channel frequencies.

If you can hear the other station, but he cannot hear you, consider relocating the counterpoise wire, or moving the antenna to a different location. However, remember that the antenna tuner must be readjusted any time the antenna or counterpoise is moved.

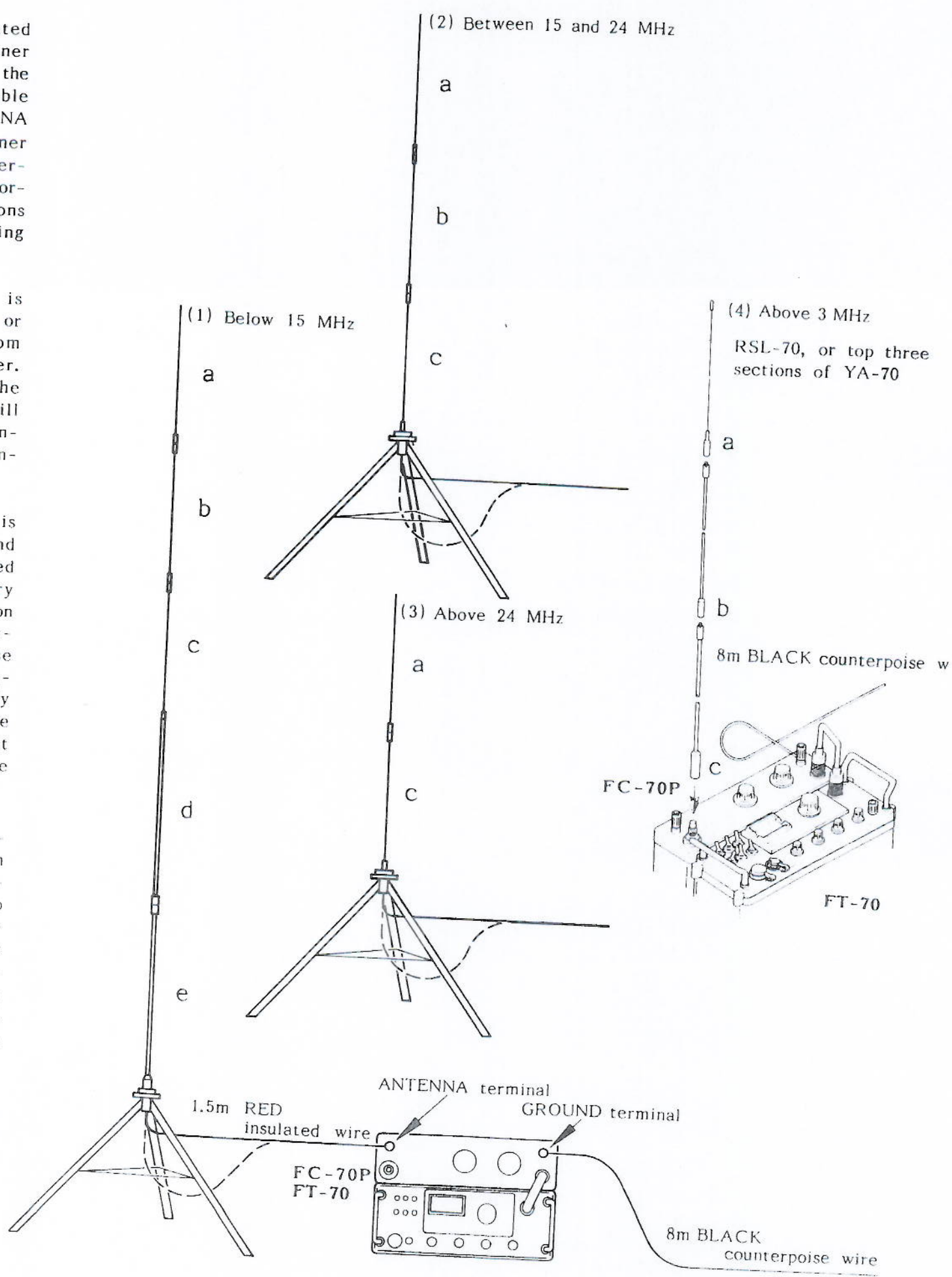
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Before operating the transceiver, follow the installation instructions in the preceding section. If operating from the battery, make certain that it has been recently recharged (especially if new). If powering the FT-70 from the NC-70 Charger, check the connections to the DC13.8V and EXT SP jacks at the rear panel of the transceiver.

Connect the MH-17A8 Speaker/Microphone or Handset to the SP/MIC jack on the front panel. For CW (radiotelegraph) transmission, a key must also be connected to the KEY jack.

Make certain that the antenna has been installed as described in the preceding section, and is connected properly through the Antenna Tuner to the ANTENNA jack on the FT-70.

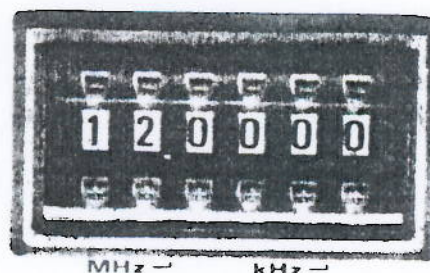
Frequency Selection

On the FT-70F, the 11 channel frequencies are preprogrammed at the factory or by your Yaesu dealer. However, it is still important that the operator be familiar with what frequencies, or at least frequency range(s) are installed in order to set up the antenna properly. The channel card chained to the front panel is provided for this purpose. Just rotate the channel selector on the front panel to select the desired channel, and skip to the "Presettings" paragraph below.

On the FT-70G, operating frequency is selected by the six thumbwheel switches on the front panel. Each thumbwheel switch selects one digit of frequency, beginning with 10's of MHz (Megahertz) at the left, to 100's of Hz (Hertz) at the right. For example, 12345.0 kHz (kilohertz), which is equal to 12.3450 MHz, would be indicated as [1] [2] [3] [4] [5] [0] in the thumbwheel windows.

Note: keep the soft rubber protective cover in place over the thumbwheel switches at all times; it is flexible enough to allow operation of the switches, and is necessary to protect the mechanism.

To change a thumbwheel digit, press the small button just above the window to step the digit lower, or the button just below the window to step the digit higher. If [9] is indicated and you press the button below the window to step up, [0] will appear, and vice-versa; you must remember to add one to the next digit on the left if you step up, or subtract one if you step down. Notice that the leftmost switch is limited to 0, 1 or 2, since the FT-70G does not operate above 29.9999 MHz: this switch cannot be turned one full revolution.



In USB, LSB and A3H modes, the frequency indicated on the thumbwheel switches is the carrier frequency of the transmitter and receiver. In the CW mode, however, the indicated frequency is 1.5kHz below the actual transmitted and received carrier frequency, so as to provide a 1.5kHz beat note audible to the operator.

Presettings

Preset the controls and switches as follows until you become familiar with the functions of each:

- * POWER switch OFF
- * MODE selector: as desired (LSB requires optional filter)
- * SQUELCH control: fully counterclockwise
- * AF GAIN control: fully counterclockwise
- * CLARIFIER control: center (12 o'clock)
- * HIGH-LOW switch: LOW (down position)
- * NB switch: OFF (down position)
- * S/PO-BATT switch: BATT (down position)

Power Up

Turn the POWER switch on. The red indicator next to the switch should light and the meter deflect to the small green zone (lowest scale). If the FT-70 is being powered by the NC-70, the meter lamp will also be lit. If the meter does not deflect to the green zone, the power supply voltage is incorrect: immediately turn the POWER switch OFF and correct the problem before proceeding.

Receiver Operation

Rotate the AF GAIN control clockwise until noise (or a signal) can be heard in the speaker. Set the S/PO-BATT switch to the S/PO (upper) position. If a signal is present, the meter will now give a relative indication of signal strength (S-units, on the topmost scale). This is convenient for comparing the strengths of different signals, or signals at different times and locations. If operating portable in the dark, press the LAMP switch at any time to activate the meter lamp.

Antenna Tuner Adjustment

The following two paragraphs describe only coarse adjustment of the FC-70P and FC-70M Antenna Tuners, adequate for receiving purposes, and as a preliminary step to the finer adjustment required for transmitting and described in the "Transmitter Operation" section later.

If using the FC-70P Preset Antenna Tuner, make certain that the CHANNEL selection on the Tuner matches that on the FT-70F, and adjust the FINE TUNE control on the Tuner for maximum noise or signal strength as heard in the speaker or observed on the S-meter. This must be done whenever changing channels. (If the FT-70G is used with the FC-70P, the operator should know what frequencies the channel settings of the Tuner are preset for, and what frequencies he must set the transceiver to for proper operation).

If using the FC-70M, set the BAND selector on the Tuner to the range corresponding with the operating channel. Preset the TUNE control to center (12 o'clock position), and then preadjust the LOAD control for a peak in received noise or signal.

Next adjust the TUNE control back and forth, again for a peak. Repeat alternating adjustment of the LOAD and TUNE controls for optimum reception. These controls must be readjusted whenever changing channels.

Squelch Adjustment

After adjusting the antenna tuner for peak signal or noise, when only noise is heard, turn the SQUELCH control clockwise just to the point where the speaker is silenced. When a signal appears above the noise level, it will be heard in the speaker. This feature is not only convenient in muting the noise, but serves to extend battery charge life. Do not set the SQUELCH control much beyond the point where the noise is silenced, however, as that will decrease the sensitivity of the receiver to weak signals. Before changing the receiving channel, return the SQUELCH control fully counterclockwise, and reset it as just described after selecting the new channel and retuning the antenna.

Clarifier Adjustment

If the audio quality of a received signal is unclear, adjust the CLARIFIER control. Remember, however, to always return this control to the center position when changing channels.

Noise Blanker

If impulse-type noise is present on the receiving channel, set the NB (Noise Blanker) switch on (up). This will eliminate some types of noise entirely, and have varying degrees of effect on other types. However, the noise blanker also introduces some distortion on received signals, so it should be switched OFF unless actual overall improvement of signal reception is found. Note that this overall improvement must be determined by ear, and not by the S-meter, because the noise blanker may actually decrease the S-meter indication while increasing signal readability. Always switch the noise blanker off when changing channels.

Transmitter Operation

CAUTION: Never transmit without an antenna connected. See the "Installation" section for details of antenna connection.

Before transmitting, perform the procedures described above for coarse adjustment of the antenna tuners. Make sure that the HIGH-LOW switch is set to LOW, and select either the CW or USB mode for fine adjustment of the antenna tuner. This will be done by observing the S/PO meter while holding the TUNE switch down and adjusting the antenna tuner for peak meter deflection (also hold the LAMP switch down to light the meter if doing the adjustment in darkness). Pressing the TUNE switch down causes high current to be drawn by the transmitter, and subsequent heating of the components, so limit your tune-up times to 30 seconds each, maximum. If more time is required for tuning, wait for a minute or so between tune-up times.

The CAUTION lamp below the ANTENNA jack on the transceiver will light if the antenna or antenna tuner is far out of adjustment. If, by adjusting the tuner as described below, it is not possible to have this lamp extinguish or to obtain the deflection peaks on the meter, the antenna and or ground/counterpoise configuration must be changed. This must be done experimentally, following the guidelines in the "Installation" section.

If using the FC-70P, very little adjustment (of the FINE TUNE control) should be required after the coarse receiving adjustment described previously. Press the TUNE switch down and move the FINE TUNE control back and forth while watching for a peak on the meter (should be to about "5" on the middle PO scale).

If using the FC-70M, adjustment requires adjusting both the LOAD and TUNE controls alternately for peak output. If the FT-70F is used with this tuner, it is important to confirm that the BAND selector on the tuner is set to correspond with the TX frequency indicated on the Channel Card chained to the front panel (not the RX frequency). First preset the LOAD control on the tuner fully counterclockwise, and then press the TUNE button down and turn the LOAD control clockwise until the meter shows a peak. Next adjust the TUNE control on the tuner for a peak on the meter.

Adjust the LOAD control slightly again, and then the TUNE control again. The meter should peak at about "5" on the middle PO scale if the antenna is set up properly.

After the tuner has been adjusted so that the meter is peaked at mid-range (and the CAUTION lamp is off), release the TUNE switch and set the MODE selector to the desired mode (if necessary). Now to transmit, just press the PTT button on the microphone or handset and talk in a clear, normal volume. If the called station does not respond, or indicates that your signal is too weak to understand, you can move the HIGH/LOW power switch to HIGH (the meter should deflect to about "8" on the PO scale when the TUNE switch is pressed: representing 10 watts output power). However, keep in mind that the battery charge life will be considerably shortened if the HIGH power position is used often. Also, remember that under difficult conditions, speaking louder into the microphone is not likely to improve communications, while speaking slowly and clearly, with repetition, can prove very effective.

In the USB and LSB modes, the PO meter only deflects (slightly) while speaking into the microphone. In the A3H mode, the PO meter will deflect to about "3" with LOW power, or about "6" with HIGH power whenever the PTT switch is closed, but may fluctuate a little while speaking.

For CW operation, the FT-70 includes semi break-in keying, in which the transmit/-receive switching occurs automatically. While the key is closed the transmitter will be active, and when the key is kept open for a second or so, the receiver will be activated. The volume of the sidetone signal produced when transmitting CW, and the transmit hang time, can be adjusted internally by your Yaesu dealer (VR1006 and VR1010, respectively, on the RF/IF Unit).

Battery Charge Checking

During operation, check the battery charge occasionally by moving the S/PO-BATT switch to the BATT position. Activate the transmitter and note whether the meter continues to deflect into the green Vcc zone. If not, recharge the battery right away (do not continue to operate with a low battery, as this can permanently destroy it).

For maximum battery charge life, follow these guidelines:

- * Squelch the receiver noise when monitoring a clear channel for an expected call.
- * Always make sure the antenna tuner is properly adjusted for peak output, and that the CAUTION lamp is off when transmitting.
- * Use LOW transmitter power whenever possible, switching to HIGH power only when necessary.
- * Prepare your message before sending, and keep transmissions as short as possible.
- * Check the battery charge regularly, and follow the recharging instructions (in the previous section) carefully.

VERSION NOTICE

The FT-70GH transceiver is the 25-watt version of the FT-70G. Installation, operation and specifications of these versions are identical, except as follows:

- (1) The antenna jack on the FT-70GH is located on the right side of the bottom panel, rather than on the front panel (as on the FT-70G).
- (2) The FC-70M and FC-70P antenna tuners and the CSC-70 carrying case cannot be used with the FT-70GH. Also, the power supply section of the NC-70 Battery Charger cannot be used to power the FT-70GH for transmission.
- (3) Differences in Specifications between FT-70GH and FT-70G:

Power source, Type and Voltage

Attachable FNB-70 12V, 4Ah Ni-Cd battery pack
or external 13.5V, 8A (continuous) DC supply

Case size

w/o Battery: 242 x 87 x 321mm
w/Battery: 242 x 87 x 363mm

Current consumption

Receiving: 0.4A

Transmitting:	<u>Low</u>	<u>High</u>
LSB, USB, CW	3.3A	7.0A
A3H	2.8A	3.6A

Weight (approx)

w/o Battery: 4.4 kg
w/Battery: 6.7 kg

Power output	<u>Low</u>	<u>High</u>
LSB, USB, CW	10W	25W
A3H	5W	12W

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C.P.O. BOX 1500

TOKYO, JAPAN

Specifications

Mains source voltage:
100/110/117/200/220/234 VAC, 50/60 Hz

Weight:
6 kg

Case size (WHD):
220 x 80 x 280(mm)

Battery type (for charging):
12V, 4Ah Ni-Cd (10 "D" cells)

Charging current:
Normal: 800mA
Quick: 3.3A
Trickle: 150mA

Charge time (timers):

Normal: 8 hours (@ 0 to +40°C)
Quick: 2 hours (@ +5 to +40°C)
Trickle: continuous (@ 0 to +40°C)

DC Power Supply:

DC output voltage: 13.8V
Output current: 4.2A maximum
Temperature range: -10 to +40°C

Loudspeaker output and drive impedance:
2W maximum, 8 ohms

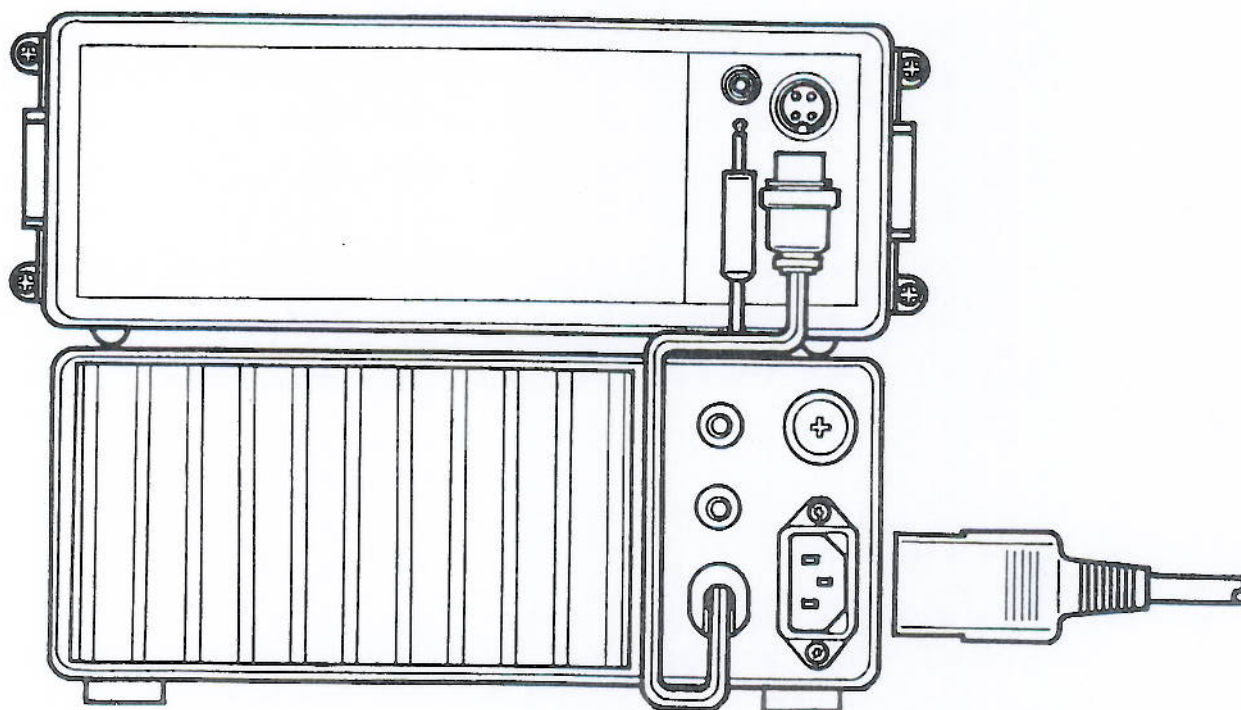


Figure 1