



100W p.e.p H.F S.S.B Transmitter/Receiver

Type H 4000

THE H 4000 is suitable for speech, c.w and for carrying telegraph and facsimile signals over distances up to approximately 500 miles; it can be supplied for fixed or mobile operation. By using single sideband (s.s.b) modulation, maximum range is obtained without the high powers associated with double sideband (d.s.b) equipment.

S.S.B equipment cannot normally be used in conjunction with d.s.b equipment because the carrier is suppressed on transmission and 're-inserted' in the receiver. The H 4000 is compatible with stations using d.s.b since the full carrier can be radiated with the s.s.b modulation and, at the same time, 'carrier re-insertion' in the receiver can be switched off for the reception of d.s.b signals.

The H 4000 is also suitable for c.w operation and sockets for a morse key and headphones are provided.

The operating frequencies are determined by plug-in crystals and tuned circuits. Any channel can be assigned to any frequency in the band 1.6-15 Mc/s; the transmit and receive frequencies need not be the same. Upper sideband operation is normally used, but lower or upper can be selected by suitable choice of crystals.

Features

Transistorized, except for high power stages in transmitter.

Single sideband or compatible a.m.

Compact and lightweight; for fixed or mobile applications.

Suitable for all climatic conditions.

Low power consumption.

CIRCUITS

The receiver is fully transistorized, uses a conventional single superheterodyne circuit with carrier re-insertion (for s.s.b reception) before the detector. A wide range automatic gain control system is employed and a mechanical filter, tuned to the intermediate frequency, provides selectivity.

The transmitter has a transistorized audio-frequency amplifier feeding a low level balanced modulator working at the same i.f. as the receiver. The mechanical filter selects one sideband and the resulting signal is amplified and converted to the radiated frequency. Only four valves are used in the high level stages of the transmitter.

The two basic versions of the H 4000, one for mains operation the other for batteries, only differ in their power modules. The a.c. module can be set to 115 or 230 V and the d.c. module to 12, 24 or 32 V.

Only six controls are needed for speech communications. When the correct channel has been selected, signals can be heard on the built-in loudspeaker. A 'clarifier' control is adjusted for clearest reception. To transmit, a push switch on the microphone is depressed. Both input and output can be connected to external equipment via 600 Ω lines.

Data Summary

Frequency range: 1.6-15 Mc/s.

Transmitter output power: 100 W p.e.p.

Carrier suppression: <40 dB.

Unwanted sidebands: <50 dB.

Intermodulation: <26 dB.

Other spurious emissions: <40 dB, relative to either of two equal test tones.

Frequency stability: $\pm 1:10^6$ between -30 and $+60^\circ\text{C}$, better than $\pm 1:10^6$ per month long term.

Receiver sensitivity (s.s.b): 0.5 μV for 12 dB signal/noise.

Receiver selectivity (s.s.b): Bandwidth > 2 kc/s at -6 dB point, < 6 kc/s at -60 dB point.

Receiver a.g.c.: Output rises less than 12 dB for signals from 10 μV to 1 V.

Transmitter automatic load control: 20 dB excess input produces less than 1 dB increase in output above p.e.p.

A.F. response: 350-2400 c/s (s.s.b).

A.F. input: (1) 25 mV (approximately) at high impedance. (2) -15 dBm in 600 Ω .

A.F. output: (1) 2 W for loudspeaker. (2) 10.8 dBm in 600 Ω . (3) 50 mW for handset.

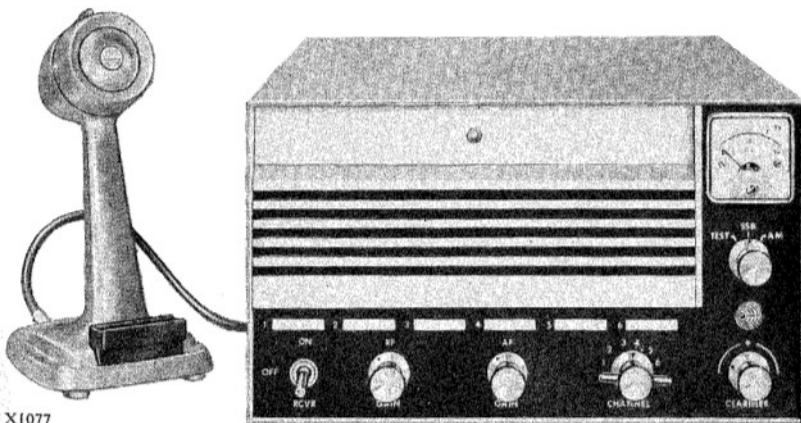
Aerial connection: 50 Ω unbalanced.

Power supplies: (1) 115 or 230 V, 50-60 c/s a.c. (2) 12, 24 or 35 V d.c.

Power consumption: (1) Receiver 15-35 VA, standby 50-70 VA, transmit 165-180 VA, on a.c. mains. (2) Receive 0.15-1.7 A, standby 8.0-9.5 A; transmit 15-16 A from 12 V d.c. supply.

Dimensions:

Height	Width	Depth	Weight
7 in.	10 $\frac{3}{4}$ in.	13 $\frac{3}{4}$ in.	22-25 lb
(17.8 cm)	(27.3 cm)	(35 cm)	(10-11.4 kg) depending on version.



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