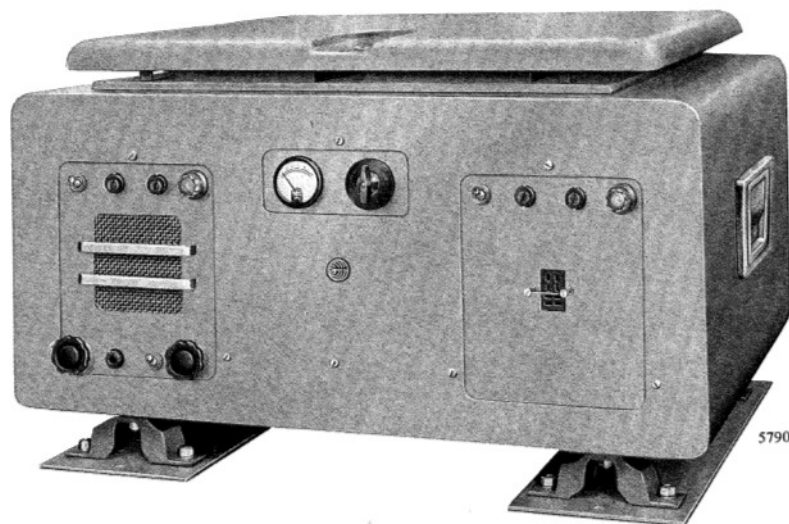




12-Watt Duplex VHF Telephone Equipments *HX 300 Series*



DESIGNED for duplex operation, the HX 300 Series of equipments are amplitude modulated, self-contained VHF transmitter/receivers, giving an RF output of 12 W. They are primarily intended for use on point-to-point links but may be used as control stations working to mobile units.

The transmitter, receiver and power units are built on separate chassis and housed in a sheet metal cabinet fitted with shock absorber mountings. Unit interconnection is by means of plugs and sockets so enabling speedy removal of chassis for servicing purposes.

Two editions of the same basic equipment are available, Types HX 303 and HX 304, their essential difference being in the frequency range covered by the transmitters. These editions are designed for remote operation.

CIRCUITS

Transmitter. The drive is derived from a crystal oscillator which feeds into an amplifier stage a harmonic of the crystal frequency. This is then multiplied and the output capacity coupled to a 'driver' valve. When operating in the lower frequency band, the amplifier is omitted.

The driver valve is a beam tetrode with a balanced output circuit and is capacity coupled to the grids of a twin-tetrode output valve. This valve is arranged in a push-pull circuit, its anode circuit being inductively coupled to a tuned circuit in the aerial coupling unit. This tuned circuit is tapped to match into a $70\ \Omega$ feeder. Capacitive coupling between the balanced anode circuit and the unbalanced coupling circuit is minimised by the inclusion of a Faraday screen. A single stage line amplifier is incorporated.

The modulator consists of two beam-tetrodes in push-pull driven directly by the output of the line amplifier. Anode modulation is employed.

Receiver. The receiver is a crystal-controlled superheterodyne employing double frequency changing.

One RF amplifier stage is followed by two mixer valves, the resultant output being taken through three stages of IF amplification to a double-diode valve which serves as detector and AGC rectifier. The signal then passes through a noise limiter (a double diode) and thence to an AF amplifier before passing through a low-pass filter to the final output stage.

When the equipment is on standby, only the LT is supplied to the transmitter. In the event of a signal being received, however, a trigger unit in the receiver is brought into operation and causes

the HT supplies to be connected. The prevailing condition is indicated by a lamp incorporated in the telephone set. Two DC amplifiers connected in cascade constitute the trigger unit.

Power supplies. The transmitter and receiver each have their own power supply units, the former being built on to a separate chassis which lies between the transmitter and receiver chassis in the main unit, and the latter is built on to the receiver chassis. In both cases a full wave rectifier circuit is employed.

AERIALS

The choice of aerial is largely dependent upon circumstances, but in general, either two Yagi arrays or two centre-fed half-wave dipoles are employed; one aerial being required for the transmitter and one for the receiver. Connection is made by coaxial feeders.

DATA SUMMARY

GENERAL

Frequency ranges: Type HX 303 70–78 Mc/s.

Type HX 304 78–95 Mc/s.

In both equipments the receiver covers 70–95 Mc/s.

Power supplies: 200–250 V, 45–65 c/s single-phase AC mains.

Power consumption: 300 VA.

Dimensions:

Height	Width	Depth	Weight
15 in.	27 in.	18 in.	90 lb
(38.1 cm)	(68.6 cm)	(45.7 cm)	(40 kg)

TRANSMITTER

Power output: 12 W unmodulated carrier capable of 100% modulation.

Spurious radiation: Greater than 70 db below carrier level.

Overall frequency stability: $\pm 0.01\%$ over a temperature range of -10° to 30°C .

AF response: ± 3 db between 300 and 3,500 c/s.

Input level: Not less than -15 dbm into $600\ \Omega$.

RECEIVER

Sensitivity: Input of $2\ \mu\text{V}$ for 12 db signal/noise ratio.

IF bandwidth: Between 45 kc/s and 60 kc/s at 6 db down.

Audio output: 750 W.

AF response: 6db down at 200 and 2,000 c/s.

Spurious response: At least 70 db below response at working frequency.

AGC: For input variation of from $5\ \mu\text{V}$ to 100 mV, change in output does not exceed 6 db.

Marconi

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