500-Watt Single-Sideband HF Transmitter *Type HS21*

THE TYPE HS 21 HF TRANSMITTER has been developed in order to meet the general need for low-power single-sideband transmitter capable of giving a wide selection of transmission frequencies and suitable for operation over intermediate distances.

FEATURES

Twin-channel SSB operation on any one of up to four pre-selected frequencies.

Provision may be made for simultaneous FSK telegraphy on channels not used for SSB transmission.

Local or remote control with complete operating facilities.

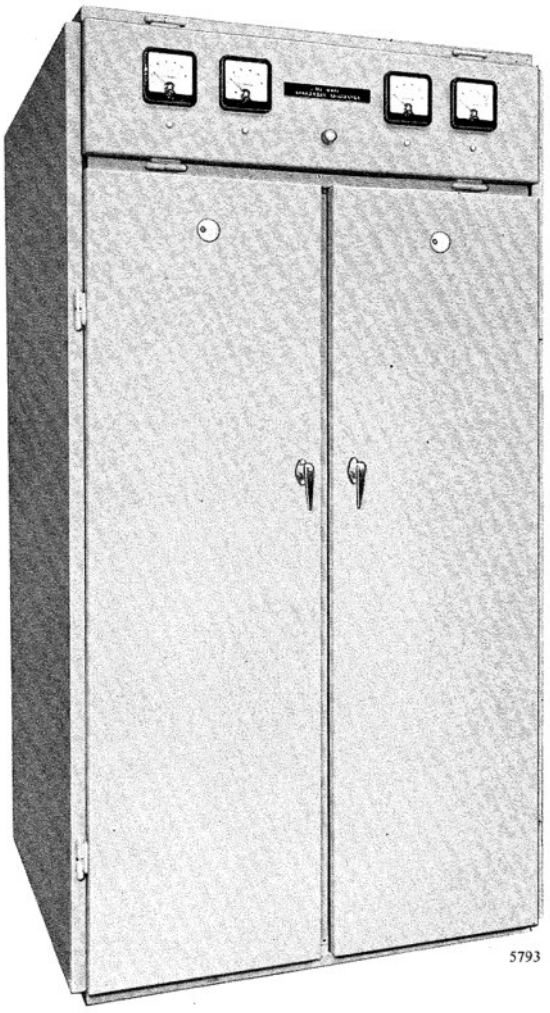
Built-in oscilloscope and monitor unit for setting-up purposes.

GENERAL DESCRIPTION

The complete transmitter consists of a single cabinet in which selected RF units, SSB drive units, FSK units and monitor units are mounted. Power supplies are permanently installed in the lower half of the cabinet.

The transmitter permits operation of one of four frequencies for single-sideband transmission. It is possible to transmit up to two frequency shift signals simultaneously with the single-sideband transmission.

Where remote control is desired, the various switching operations are performed on small remote control units, one for each operator. Each of these permits LT, HT and channel contactors to be operated as well as providing the keying or modulation inputs. Full metering facilities are provided throughout.



SSB Drive Unit

The two speech input signals are fed separately to amplifiers whose outputs are taken to balanced 100 kc/s modulators. These produce upper and lower sidebands corresponding to the input

channels, the carrier being balanced out. Crystal filters stop the unwanted sidebands, the required signals being combined and fed with a pilot carrier to a further balanced modulator, which shifts the centre frequency to 2·15 Mc/s. This output is fed through a selective amplifier to the appropriate RF unit. A built-in valve voltmeter monitors the output level.

RF Unit

A crystal oscillator, followed by a harmonic generator and buffer amplifier, produces the carrier frequency ±2·15 Mc/s, which is mixed with the output of the SSB drive unit in a balanced modulator to produce the final radiated frequency. This signal is fed to a tuned amplifier designed to eliminate unwanted modulation products. These stages are followed by a push-pull penultimate amplifier which feeds a push-pull output stage. On SSB, the grids of this stage, as well as being fed from a low-impedance source, are heavily damped in order to avoid signal distortion.

FSK Unit

The shift circuit in the FSK unit employs the 'FMQ' principle, whereby a crystal working in series resonance is transformed by a quarter wave network to appear as a parallel impedance. A balanced reactance modulator is then used to shift the frequency in a definite and controlled manner. The oscillator operates at 2·15 Mc/s, the shift being controllable between 200 and 1,000 c/s, and is followed by amplifiers which feed the RF unit mixer as in the SSB condition.

Monitor Unit

This unit consists of two sub-units, an oscilloscope and an acceptor unit. By means of these units and two audio test oscillators contained in the SSB drive unit the 'two-tone' waveform may be checked at the output during the setting-up procedure.

Power Supply Units

The transformers are mounted on wheels running on rails in the lower half of the cabinet. Smoothing equipment and rectifiers are mounted in trays above. Comprehensive fusing and overload protection are provided. Sufficient power is available to permit four channels to radiate simultaneously.

DATA SUMMARY

Power rating (to aerial feeder): SSB–500 W PEP. FSK–600 W.

Frequency range: 3–27·5 Mc/s.

Feeder system: 600 Ω balanced or 75 Ω unbalanced.

Frequency stability: ±0·001 %.

Harmonic radiation: To comply with Atlantic City Standards.

Frequency response: Within ±2 db from 250 to 6,000 c/s.

Non-linear distortion: Third order intermodulation product not greater than −25 db relative to either of two equal testing tones.

Pilot carrier noise level: Better than 50 db PEP.

Speech input level: −20 dbm from 600 Ω lines.

FSK: Frequency shift: 200–1000 c/s.
Keying speed; 150 bauds.

Power supply: 200–250 V single-phase, 50–60 c/s AC mains. Voltage regulation ±6%, frequency tolerance ±2½%.

Maximum power consumption: 5·0 kVA max. at 0·8 P.F.

Dimensions:

Height	Width	Depth	Weight
7 ft 2 in. (217 cm)	4 ft (122 cm)	3 ft 9 in. (113 cm)	30 cwt (approx). (1524 kg)

Marconi

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