



10 kW HF ISB Transmitters *Types HS 71 and HS 72*



THESE TRANSMITTERS, which exemplify the most advanced practice in transmitter design, provide the following services:

- a. Telegraphy on CW and FSK (A1 and F1).
- b. Independent Sideband Operation (A3b).

The drive equipment is external and provides either independent sideband modulation or telegraph keying at 3.1 Mc/s and suitable RF oscillator signals for frequency changing in the transmitter.

A suitable modulator is available if DSB operation is required.

The Type HS 71 is manually operated whereas the Type HS 72 provides fully automatic tuning and selection of any one of six pre-set frequencies. In all other respects the two transmitters are identical.

FEATURES

Tuning over the whole range without change of components.

Air cooling throughout, with dust filtering.

Envelope feedback to reduce distortion.

Double screening of power stages, resulting in reduction of indirect radiation and of cooling air noise.

Compact assembly with good access for servicing and full safety interlocking.

CONSTRUCTION

Housed in an enclosure formed of unit sections with accessibility through front and rear doors, the transmitter assembly presents a pleasing symmetrical appearance. There are four bays, the left-hand two containing the rectifiers and power

control equipments while the two right-hand bays house the low power and auxiliary transmitting circuits and main output stage. The cooling blower is external to the transmitter. The external ISB drive equipments available for use with these transmitters are described on pages 315 and 317. For details of the primary RF drive equipment, keying unit, monitor unit, etc., see page 321. These 7-ft cabinet equipments may be situated in any convenient position near the transmitter. The equipment is designed for tropical use within an ambient temperature up to 40°C (high humidity) or 45°C (dry heat).

CIRCUIT

Drive is obtained from an external crystal oscil-

lator and applied *via* a harmonic generator to a balanced mixer stage. The balanced mixer also accepts a 3.1 Mc/s modulated signal from the ISB drive equipment or a 3.1 Mc/s keyed signal from the drive keying unit and converts this to the radiated frequency. The mixer is followed by two stages of RF amplification.

The output from the low-power stages is amplified by two tetrode stages, each comprising two valves in parallel, followed by the penultimate stage which utilises a single triode connected as a grounded-grid amplifier. The final stage is two parallel-connected grounded-grid triodes inductively coupled to a balanced 600 Ω output circuit.

The main power stages are enclosed units and are further screened by the transmitter enclosure.

DATA SUMMARY

Nominal power output (to aerial feeder):

- 9–10 kW min. peak envelope power on ISB (A3b).
- 7 kW on CW on/off telegraphy (A1 and F2).
- 7 kW on FSK telegraphy (F1).
- 3.5 kW on DSB telephony (A3).

Frequency range: 4–27.5 Mc/s.

Alternative version 2.5–20 Mc/s.

Output impedance:

600 Ω balanced with 2:1 standing wave ratio. Special edition also available to provide 50 Ω unbalanced.

Harmonic radiation: Less than 20 mW.

Noise level: Better than –50 dB relative to peak envelope power on ISB.

Non-linear distortion (ISB): Third order intermodulation product not greater than –36 dB relative to either of two equal testing tones for any power level up to full PEP.

Input level: Nominal 0.1 W from primary drive and 0.25 W from ISB or keyed telegraph drive (3.1 Mc/s).

Carrier compression: Less than 1.5 dB for any level of single-frequency signal up to –6 dB relative to peak sideband power.

Power supply: 380–420 V three-phase 50 c/s AC mains, normally four-wire. Voltage regulation $\pm 6\%$, frequency tolerance $\pm 2\frac{1}{2}\%$. Arrangements can be made for operation from 60 c/s.

Power consumption: CW mark 21 kW, space 10 kW. FSK 21 kW. ISB 18 kW PEP with 0.9 power factor.

Dimensions:	Height	Width	Depth
	7 ft 6 in.	10 ft 7 in.	3 ft 9 in.
	(2.28 m)	(3.2 m)	(1.13 m)

Overall performance on ISB telephony using Type HD 51 and Type HD 21 drive equipment:

Frequency tolerance: 10 parts in 10^6 over the temperature range 10–40°C, ambient.

Frequency response: Level within 2 dB from 100–6000 c/s.

Overall performance on telegraphy using HD 20 series drive equipment:

Frequency tolerance: 10 parts in 10^6 over the temperature range 10–40°C, ambient.

Maximum keying speed: 200 bauds.

Keying potentials: ± 10 V into 2000 Ω .

Frequency shift: 200–1000 c/s.

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