



Transmission Ancillaries

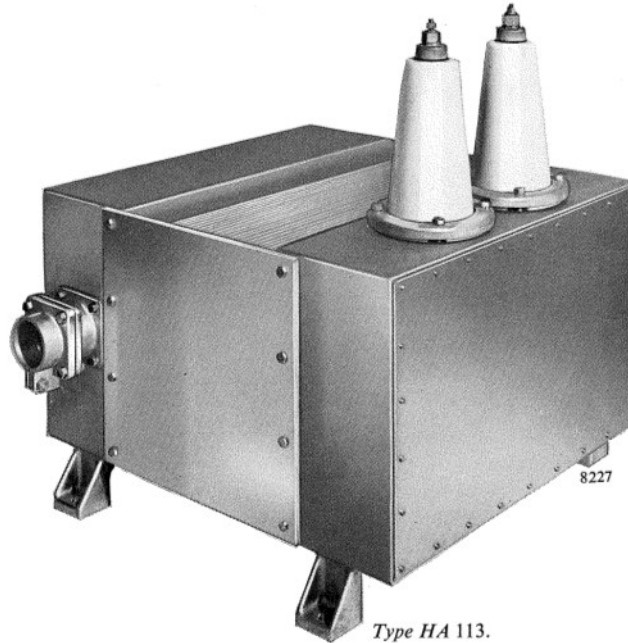
High-power Matching Transformers, Types HA 111, HA 112 and HA 113

These units are suitable for matching open-wire feeders to screened feeders. They consist essentially of a suitable winding on a magnetic core of small dimensions but high permeability and resistivity.

In Type HA 111, the core is bolted inside a cast aluminium case which is oil filled. Type HA 112 is not oil filled, so the core fits into a cylindrical case having large cooling fins. Type HA 113 has a magnetic core consisting of two limbs each formed by stacking a number of flat ferrite rings. These are interleaved with aluminium air-cooling fins. The winding is threaded through the centre of the rings up one limb and back the other.

All types carry two insulators, for terminating the open-wire feeders, and a coaxial socket. Several adaptors are available for accommodating various types of coaxial feeder.

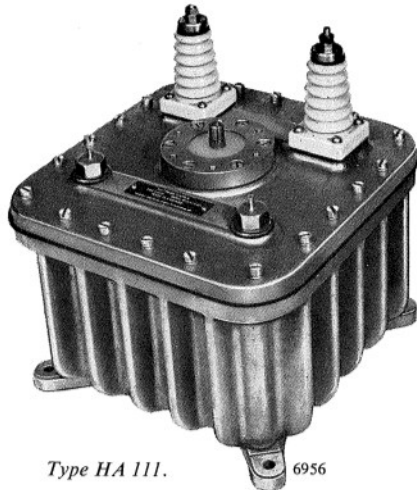
The assemblies are suitable for mounting in any convenient position near the aerial array.



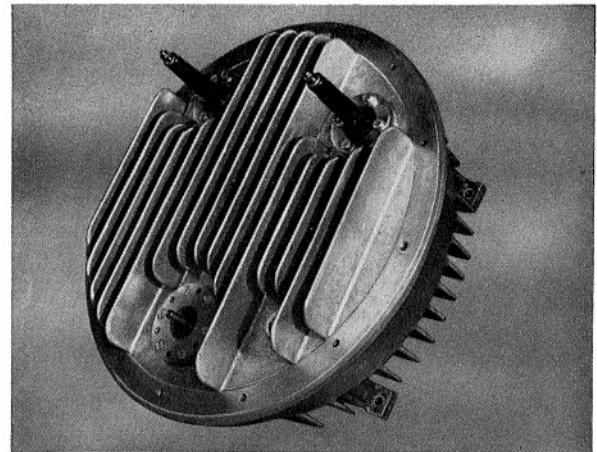
Type HA 113.

	Type HA 111	Type HA 112	Type HA 113
Frequency range:	2-30 Mc/s	5 kW editions 2-27.5 Mc/s 7 kW editions: 4-27.5 Mc/s	4-27.5 Mc/s
Power rating (for matched termination):			
Ambient temperature	2 Mc/s 10 Mc/s 20 Mc/s 30 Mc/s	5-7 kW according to edition	20 kW with 2:1 output SWR
40°C	2 kW 1.15 kW 0.8 kW 0.6 kW		
45°C	1.65 kW 0.98 kW 0.7 kW 0.62 kW		
Transformation ratio:	75/600 Ω and 50/600 Ω unbalanced to balanced	50/600 Ω unbalanced to balanced	50/450 Ω* unbalanced to balanced
Insertion loss:	0.5 dB at 30 Mc/s 0.2 dB at 2 Mc/s	0.2 dB	<0.25 dB
Standing wave ratio:	Not greater than 1.3 for a matched termination		
Limits of operating temperature:	-40°C to +55°C in all cases		
Limits of humidity:	In accordance with BS 2011 category H1 in all cases		
Dimensions:	Height 10 in. (25.4 cm) Width 8½ in. (21.5 cm) Depth 8½ in. (21.5 cm) Weight 28 lb (12.8 kg)	Diameter 1 ft 7 in. (48.5 cm) Height 12 in. (30 cm) Weight 50 lb (22.7 kg)	Height 1 ft 11½ in. (59.7 cm) Width 1 ft 10 in. (55.9 cm) Depth 1 ft 10 in. (55.9 cm)

* A straight tapered open wire transmission line 60 ft. (18.3 m) long is used to transform 450 to 600 ohms.



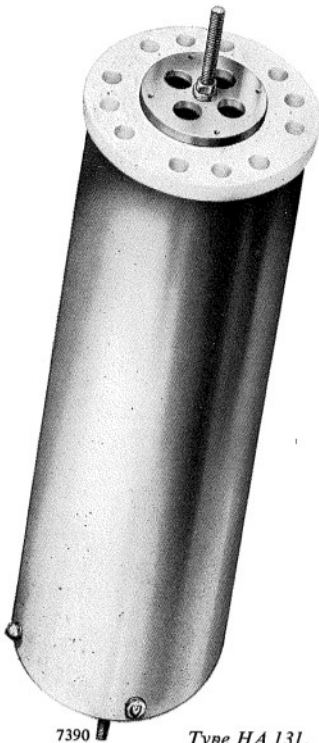
Type HA 111.



Type HA 112.

10 kW Harmonic Filter Type HA131

Interference with television reception in the frequency band 40–70 Mc/s caused by short-wave (4–27.5 Mc/s) communication transmitters has necessitated the design of special filters for the elimination from transmissions of harmonic frequencies within this reception band. Such filters must necessarily be of high-precision construction and also of particular reliability.



Type HA 131.

The Type HA 131 is a 300 Ω low-pass filter conforming adequately with these requirements. The filter cuts off at 29 Mc/s and has a minimum attenuation over the band 40–70 Mc/s of the order of 50 dB.

The effectiveness of the filter in an aerial circuit is subject to the adequate suppression of spurious radiation from other parts of the transmitter.

CONSTRUCTION

The main parts of the filter consist of copper tubing and wire-wound inductors, the tubes forming the capacitors of the filter. The inner tubes and the inductors are assembled on an axial rod consisting of alternate sections of threaded brass rod and insulators. These insulators serve to couple the sections of brass rod and to support the ends of the inductors. The brass rod sections between the insulators are each divided into two parts coupled by threaded brass bushes. By this means the filter can be separated into three parts for the purpose of adjustment. The capacitor and inductor assembly is mounted concentrically within the outer tube. Insulating plates are fixed at either end through which the ends of the brass rod project and to which the rod is secured.

CIRCUIT

The filter consists of three sections, the series arms of which are parallel-tuned circuits and the shunt arms capacitors. The capacitors, which are of the air dielectric type, have large factors of safety to prevent the filter being put out of commission by excessively high voltages such as can occur on transmission lines under certain circumstances. The maximum insertion loss in the pass-band is less than 0.2 dB provided that the standing wave ratio on the feeder is less than 2:1.

These filters are primarily intended to be used with 600 Ω twin-wire feeders. One filter is fitted in series with each feeder.

The effective operation of the filter in the presence of secondary sources of radiation from the transmitter, due to inefficient screening and decoupling, varies according to the phase relationship between these unwanted radiations and those from the aerial. It can be shown that in certain conditions such a filter can prove ineffective – and even of negative value – where such radiations exist. Hence the necessity for effective screening of the transmitter and effective decoupling of the power supplies is emphasized. For adequate efficiency of operation a restriction of secondary radiation sources to less than one-tenth thousandth of the aerial radiation (after filtering) should be aimed at.

Data Summary

Frequency of cut-off: 29 Mc/s.

Attenuation: Greater than 50 dB over the frequency band 40–70 Mc/s.

Insertion loss over the passband: 0.2 dB max.

Feeder standing wave ratio: 2:1 max.

Input impedance: 300 Ω. (2 filters required for 600 Ω balanced feeders.)

Power rating (per pair of filters on 600 Ω feeders):

7 kW on CW	} with convection cooling.
10–12 kW PEP on ISB	
20 kW on CW	} with forced-air cooling 40 cu.ft./min.
30 kW PEP on ISB	

Dimensions:

Length 15 in. (38 cm)

Diameter 4¼ in. (12 cm)

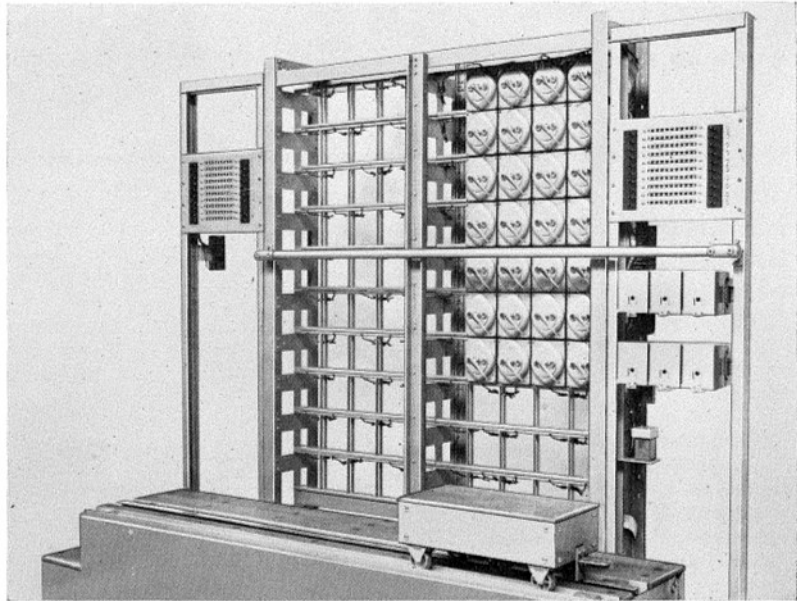
Weight 10 lb (4.54 kg)

Coaxial Feeder Switch Series, Type HA 150

For applications where it is desired to feed a number of transmitters to selected outputs, the 2-inch coaxial feeder switch series, Type HA 150, has been developed. The basic switch unit consists of a cast aluminium box, measuring approximately 6 in. square by 3 in. deep, on the back of which four 2-inch coaxial feeders or feeder links may be terminated. The front of the box provides a bearing for the switch rotor shaft and the operating handle. Auxiliary contacts are operated when the switch is moved, and may be connected into interlock or switch position indicating circuits.

Any number of identical switch units may be linked together by the special feeder links to build up a feeder exchange. In this way a matrix may be formed, so that each horizontal row can, for example, be connected to the output feeder of a separate transmitter, and each vertical row to an individual outlet. To prevent the possibility of the same transmitter being connected to more than one outlet, or one outlet to more than one transmitter, a mechanical interlock system is used. No switch can be moved until two keys have been inserted and turned in the barrel locks at the front of the switch. Once the switch has been operated the keys are trapped and cannot be used to free any other switch.

The switches are normally supplied in economical blocks of five mounted on a frame for building up into an exchange, but blocks of other numbers can be supplied as required.



7950

A coaxial feeder exchange of the HA 150 series.

Data Summary

Power handling capacity:

20 kW continuous rating.
30 kW p.e.p.

Frequency range: Up to 30 Mc/s.

Nominal impedance: 50 Ω .

Dimensions:

Height 6 in. (15 cm)
Width 6 in. (15 cm)
Depth 4½ in. (11.5 cm)

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