

H.F Receiving Systems

RECEIVING AERIAL MATCHING AND SWITCHING

Matching Units

HA 21 and HA 10 series

CERTAIN types of aerial terminating in open-wire feeders require matching to screened feeders for leading into the receiver building. Marconi aerial matching units form a convenient and efficient means of achieving this.

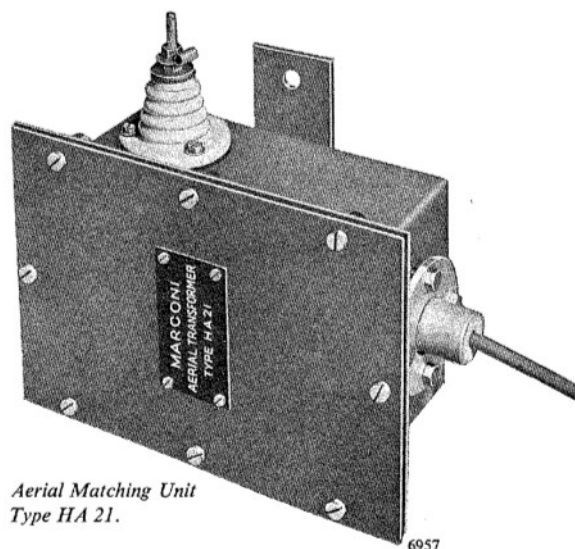
Typical of these is the *Matching Unit Type HA21* which provides matching facilities of this nature over a wide band of frequencies, and is adaptable for use with a considerable range of balanced or unbalanced aerial and feeder systems. It consists of a wide-band transformer, moulded in a high-quality synthetic resin and mounted in a small, robust galvanized-iron case with a waterproof cover. The unit is provided with fixing lugs for bolting to the aerial mast or suitable neighbouring object. The open-wire feeders are terminated on porcelain lead-in insulators and provision is made to accommodate a cable gland to suit the output cable employed. Satisfactory operation is maintained in ambient temperatures between -40°C and $+100^{\circ}\text{C}$ and in conditions of high humidity (equivalent to R.C.S 214 Class H1).

There are two windings on the transformer. One is unbalanced and suitable for terminating a line of impedance between 50 and 200 Ω . The other winding which may be either balanced or unbalanced has tapings suitable for terminating a line of impedance between 300 and 1000 Ω . The balance ratio is better than 30 dB, increasing to more than 50 dB on the lower frequencies.

A further range of matching transformers of this nature is produced. These are known as the *HA10 series*, and are of particular use where protection against lightning is required. This is afforded by an arrangement of gas discharge tubes and air-gap arrestors with resistances forming static leaks from the two limbs of the aerial.

The matching arrangements provided by the various versions of the HA10 series are shown in the Data Summary.

Straight-through junction boxes are also available in similar construction. These are suitable, for example, for open-wire connection to a short screened lead-in and include lightning arrestor gear. The following types are made:



Aerial Matching Unit
Type HA 21.

Type 1255: Twin open-wire to twin screened cable.

Type 1583: Single aerial wire to single coaxial cable.

DATA SUMMARY

TYPE HA 21

Frequency range: 1 to 27.5 Mc/s.

Input impedance: 300 to 1000 Ω , balanced or unbalanced.

Output impedance: 50 to 200 Ω , unbalanced.

Insertion loss: Not greater than 2 dB over the full frequency range.

Note: The loss in the transformer is the ratio in dB of the maximum power available from the source to the power actually delivered to the output load. This includes both mismatch losses and the power losses in the transformer.

Dimensions:

Height	Width	Depth	Weight
7 $\frac{3}{8}$ in.*	5 $\frac{3}{8}$ in.†	3 $\frac{1}{2}$ in.	5 lb
(18.7 cm)	(13.7 cm)	(8.9 cm)	(11 kg)

* Without cable gland.

† Case only: 8 $\frac{1}{2}$ in. (21.6 cm) over insulators.

HA 10 SERIES

Frequency ranges:

Type HA 11 1 to 30 Mc/s.

Type HA 12 1 to 25 Mc/s.

Type HA 13 1 to 30 Mc/s.

Type HA 14 100 kc/s to 30 Mc/s.

Insertion loss: Not greater than 1.5 dB over the full frequency range.

Impedance matching:

Type HA 11 – Balanced open-wire 600 Ω to coaxial 75 Ω .

Type HA 12 – Balanced open-wire 600 Ω to balanced screened 100 Ω .

Type HA 13 – Balanced open-wire 300 Ω to coaxial 75 Ω .

Type HA 14 – Random vertical aerial to coaxial 75 Ω .

Dimensions:

Height	Width	Depth	Weight
9 $\frac{3}{4}$ in.	7 $\frac{7}{8}$ in.	4 $\frac{7}{8}$ in.	10 lb
(24.8 cm)	(20 cm)	(12.4 cm)	(4.5 kg)

Receiving Aerial Distribution Assembly Type H 2400

For h.f. receiving stations, one or more of these assemblies can be equipped with aerial splitters (or multicouplers), to enable one aerial to be used by a number of receivers, and with aerial switching devices and patching facilities. Some of the units which can be accommodated in this assembly are described below. The selection and arrangement of units can be made to meet particular station requirements.

Passive Splitter Type H 2451

Passive splitters (or multicouplers), consisting of ferrite-cored wideband hybrid transformers, are wideband devices which cover the whole h.f. band. They have the advantage of introducing negligible intermodulation distortion although there is a slight loss in signal level; however, since the noise picked up by the aerial is usually greater than the receiver first circuit noise and is reduced by the same amount as the signal, this is usually acceptable. Two versions of the H 2451 are available, one for feeding two receivers and one for four receivers.

FEATURES

Negligible intermodulation distortion.
Extreme simplicity and reliability.
No mains power required.

DATA SUMMARY

Frequency range: 2–30 Mc/s.
Insertion loss: 2-output version: <3.5 dB.
4-output version: <7 dB.
Input and output impedance: 75 Ω .
Return loss: >15 dB with 75 Ω terminations.
Isolation: >30 dB with 75 Ω terminations.

Active splitters

Various types of active splitter, providing up to eight outputs from one aerial, can also be supplied for mounting in the H 2400 aerial distribution assembly. They use wideband valve or transistor amplifiers to maintain the same signal levels at the outputs as appear at the inputs.

Aerial Switching Matrix Type H 2407

One matrix provides interconnection between six aerials (or outputs from aerial splitters) and six receivers. Two or more matrices can be used to provide twelve or more inputs or outputs.

The H 2407, which uses reed relays as the switching elements, can be controlled from another position in the receiving station or, by using suitable remote control equipment and landlines or a radio relay link, from a remote site. The switching elements are fitted with change-over contacts to enable their operation to be verified by revertive checks at the extended control or remote control point.

One switching matrix occupies a 5½-inch high panel in the H 2400 assembly. The power supply unit for operating the reed relays can also be mounted in the H 2400 cabinet.

FEATURES

Reed relay switching elements for simplicity and reliability.
Revertive check facilities.

DATA SUMMARY

Impedance: 75 Ω .
Insertion loss with switch closed: <1 dB.
Cross-talk with switch open: >45 dB.
Number of control lines required: 37.
D.C. operating power required: 16 V, 3 W maximum.

3-way Aerial Switch Type H 2401

The H 2401 was specially developed for use with the H 2002 series MST receiver which incorporates extended control facilities in the display and control panel. Like the H 2401 switching matrix it uses reed relays and provides a revertive check for extended indication of the position of the switch. Four 3-way switches can be accommodated on one 3½-inch high panel mounted in the H 2400 assembly.

DATA SUMMARY

Impedance: 75 Ω .
Insertion loss with switch open: <0.15 dB.
Cross-talk with switch open: >40 dB.
Number of control lines required: 3.
D.C. operating power required: 16 V, 0.3 W maximum.

Aerial feeder patching panel

Patching facilities in the H 2400 assembly can be provided by a number of panels, each carrying eight pairs of 75 Ω coaxial sockets. The pairs of sockets are so spaced that they may be bridged by using coaxial U-links so that for normal conditions no patching cords are necessary.

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