



HF Automatic Aerial Matching System

Designed and produced by Marconi Italiana, Genoa, Italy

THE PURPOSE OF this equipment is to effect automatic matching between the output of an HF communications transmitter and a 50 Ω aerial feeder. Matching is effected by servo systems which sample the amplitude, phase and standing-wave ratio of the output from the transmitter and vary the aerial circuit accordingly.

The system is designed principally for use with Transmitter/receivers Types TR50A and TR 50D (see page 221).

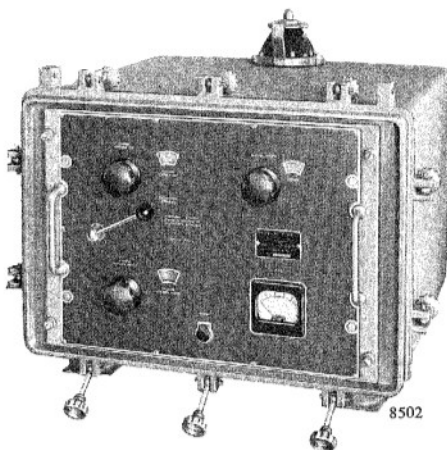
Features

- High-precision automatic matching over the range 1.5–24 Mc/s.
- Capable of working with any transmitter of 50 Ω output and 20 to 100 W output power.
- Remote control from compact unit adjacent to the transmitter.
- Intercommunication facilities between matching unit (at aerial site) and control unit.
- Provision for automatic locking-on after tuning.

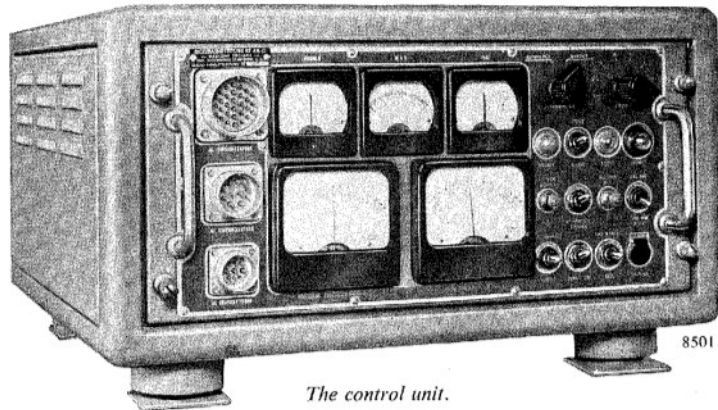
EQUIPMENT

The equipment consists of (a) an aerial matching unit, sited near to the aerial and containing RF matching circuits and measuring bridges, and (b) a control unit, situated adjacent to the transmitter, containing servo mechanisms, detectors and control and indication devices.

The aerial matching unit is housed in a cast, waterproof box. Controls, for manual



The aerial matching unit.



The control unit.

operation when necessary, are accessible on the front panel upon removal of the front of the box. The unit is still rainproof when the front of the box is removed.

The control unit is mounted in a light metal case from which it is easily removable by releasing front panel screws. All controls, connectors and indicating meters are on the front panel.

Both units are mounted on shock absorbers.

OPERATION

The signal from the transmitter is fed to the aerial matching unit via 50 Ω coaxial cable. It passes via a standing-wave indicator, amplitude detector and phase detector to an RF auto-transformer. The amplitude detector controls a servo-motor, which drives the slides of the auto-transformer to present an impedance of 50 Ω .

A second servo-motor, which is controlled by the output from the phase detector, regulates a variable inductance and variable capacitor in series with the aerial to balance out the reactive components.

A third servo-motor drives a circuit selection switch on the matching unit. This switches fixed inductance and capacitance into circuit appropriate to the frequency of operation, and is controlled by a similar switch on the control unit.

Remote position indicators on the front of the control unit show the angular position of the shafts of the variable reactive components.

In addition to fully automatic matching, facilities are included in the control unit to permit manual operation of the servo-

mechanisms. By forward/reverse switches, they can be driven to give any desired matching condition. Standing-wave ratio, amplitude and phase meters on the control unit, together with the position indicators referred to above, enable this to be done speedily and accurately.

In the event of failure of automatic or remote control circuits, manual adjustment of the aerial circuit can be effected at the front panel of the aerial matching unit.

Data Summary

Frequency range: 1.5 to 24 Mc/s.

Input impedance: 50 Ω (60 or 75 Ω to special order.)

Aerial: Normally whip antennae 26 to 39 ft (8–12 m).

Power handling capacity: 20 to 100 W.

Standing-wave ratio: 1.3 to 1.5.

Matching efficiency: At least 70%.

Power supplies: 110–260 V, 50–60 c/s.

Dimensions:

Height	Width	Depth	Weight
<i>Aerial matching unit</i>			
1 ft 8 $\frac{3}{4}$ in.*	1 ft 10 $\frac{1}{4}$ in.	2 ft	203 lb
(52.6 cm)	(56.5 cm)	(61 cm)	(92 kg)
<i>Control unit</i>			
1 ft 0 $\frac{1}{2}$ in.	1 ft 9 $\frac{1}{2}$ in.	1 ft 9 $\frac{1}{2}$ in.	120 lb
(32.8 cm)	(54.5 cm)	(54.5 cm)	(54 kg)

* Including shock absorbers and aerial output insulator.

Marconi

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