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FUNCTION ENGINEERING MANAGER FUNCTION ENGINEERING MANAGER

ANTENNA MATCHING UNIT

M7014

OPERATOR HANDBOOK



ISSUE CONTROL SHEET

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## 1. INTRODUCTION

### 1.1 General Arrangement

The Antenna matching Unit enables a short length of fine antenna wire to be correctly matched to a transmitter output so that maximum range may be obtained. It is principally intended for use on vehicles where its small size enables it to be fitted covertly underneath the vehicle, being connected by a length of detachable miniature coaxial cable to the transmitter which can be more conveniently installed elsewhere on the vehicle. Due to the small size of the antenna, however, correct adjustment of the wire length is necessary for maximum output.

### 1.2 Notes and Cautions

It is recommended that the Unit is clean and dry when installed and care should be taken to position the Unit so it does not experience excessive moisture during use.

The maximum power input of the Unit should not be exceeded as this may cause permanent damage.

### 1.3 Accessories and Related Equipment

#### Supplied Accessories

M7092 Antenna Matching Unit Cable  
- Antenna Wire

#### Related Equipment

M7013 Directional Power Meter  
- various Beacons/Transmitters

## 2. INSTALLATION

The procedure outlined below refers to installation of the Antenna Matching Unit and a transmitter on a vehicle or similar large metal structure.

The only adjustment required is to the length of the antenna wire. It is essential that this is correctly adjusted if maximum range performance is to be achieved, since the length is critical to a few mm. The procedure requires the use of a directional power meter (eg model M7013) and is more easily performed using a continuously operating transmitter than a pulsed transmitter.

For a rapid deployment, reasonable range performance can be obtained by adjusting the antenna wire length on a similar vehicle or large metal structure prior to final installation. The following procedure should be used and then step 3 may be omitted during final deployment.

- 1 Secure the Antenna Matching Unit to the vehicle so that the antenna wire is as far as possible from metal surfaces and in a position to maximise the transmitter power radiated from the vehicle. Ensure that the fixing clamp makes electrical contact with the vehicle.



- 2 Attach the transmitter in any convenient position, but preferably in contact with the vehicle bodywork to ensure the best pickup of vehicle movement and vibration.
- 3 Antenna wire length adjustment
  - a) Connect the power meter between the transmitter and the Antenna Matching Unit and set it to read reflected power at the appropriate power level.
  - b) Connect a 12V power source of adequate capacity to the transmitter DC power terminals.
  - c) Adjust the length of the antenna wire, preferably by folding the end into a tight spiral using small pliers or by hand, until minimum reflected power is indicated with the hand well removed from the wire. A reading of 10% or less of the forward power should be aimed at, but a value as high as 25% is acceptable.
  - d) Check that the forward power corresponds approximately to the power output of the transmitter, taking account of the voltage of the supply.
  - e) An indication of whether the wire is slightly too long or too short can be obtained by moving the hand steadily towards the antenna wire. If the reflected power increases steadily the wire is too long, but if the reflected power decreases to a minimum and then increases again the wire is too short.
  - f) Disconnect the 12v power source and remove the power meter.

Note: The number on the label of the Antenna Matching Unit indicates the approximate length of the antenna wire in cm. that is required for a good match.
- 4 Connect the Antenna Matching Unit to the RF connector on the Transmitter using the miniature coaxial cable (M7092) supplied with the Matching Unit.

### 3. OPERATION

During operation the Unit requires no attention except to ensure that the antenna wire does not become bent or broken.

4. FAULT FINDING

The following chart is provided to help correct problems that are not equipment malfunctions.

FAULT	POSSIBLE CAUSE	REMEDY
Antenna wire does not produce a reasonable match (Installation Step 3c)	Antenna length grossly incorrect	Use correct length of wire (see note in Step 3 of installation)
	Antenna wire too close to metal surfaces	Reposition antenna wire
	cables incorrectly connected or faulty	Reconnect or replace cables

5. SPECIFICATIONS

Dimensions	High/low band, excluding bracket and clamp
Length	4.5/4.5cm
Diameter	2.0/2.7cm
Weight	20/40g
VSWR	Typically better than 1.5 : 1 when wire length correctly adjusted.
Max Power Input	2 W
Impedance	50 ohms when wire length correctly adjusted.
Wire length	Approx. 160 mm
Wire type	24 swg phosphor-bronze