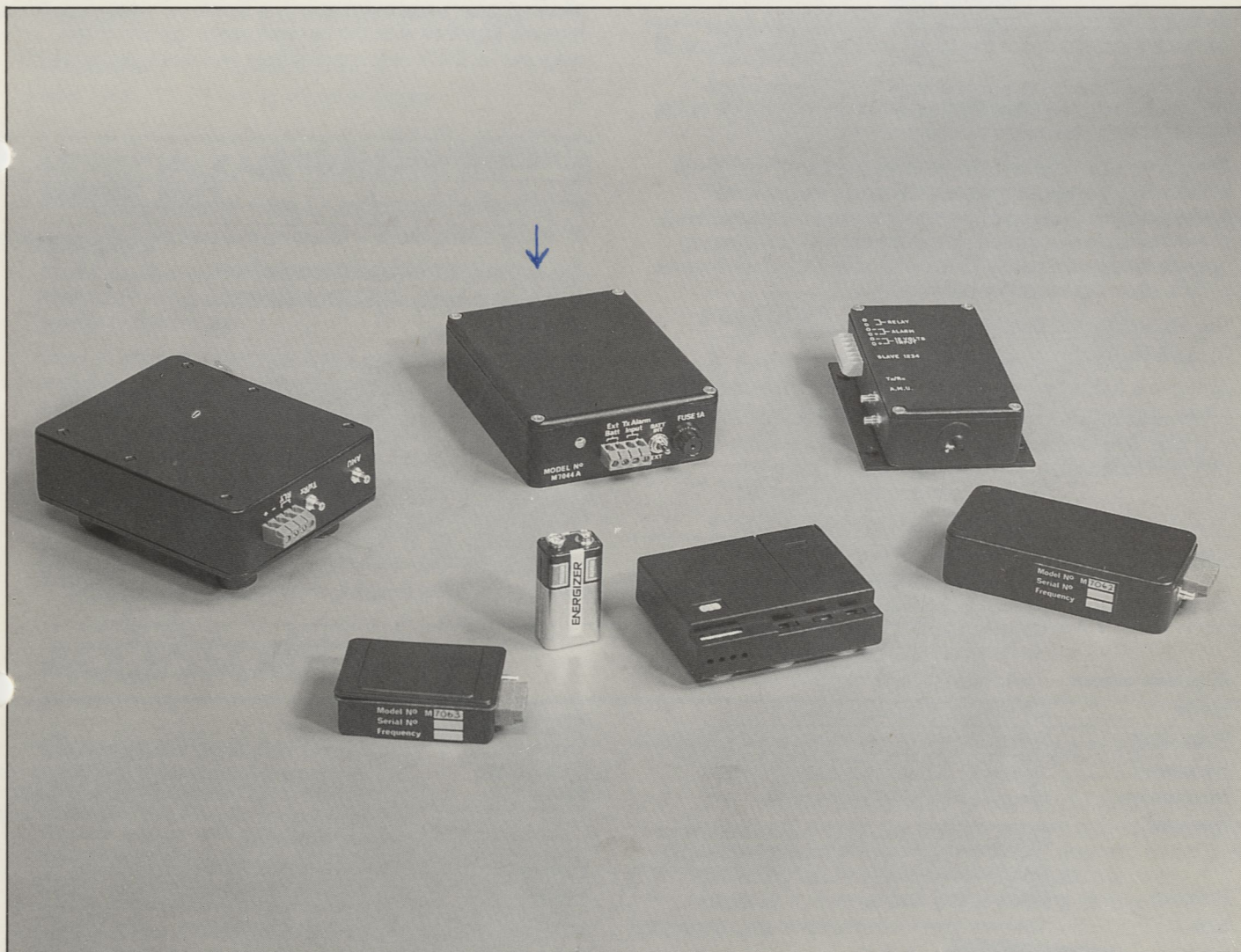


GRIFFTECH SYSTEMS

TARGET TRACKING TRANSMITTER AND ACCESSORIES



M7706

M7063

M7044

M7045

M7704

M7062

A wide range of crystal controlled transmitters are available for operation with the vehicle tracking system. The transmitters which operate on a narrow band FM can be supplied to specified frequency over the range 27 to 175MHz.

THE FEATURES OF THE RANGE INCLUDE:

- ★ Pulse or continuous operation
- ★ Power saving features
- ★ Movement sensors
- ★ Identity signals
- ★ Simple wire antenna
- ★ High reliability
- ★ Rugged construction
- ★ Available with internal or external power supplies
- ★ Magnetic bases

TRANSMITTER M7044A (1 watt)

This unit consists of a 1 watt transmitter, antenna matching unit, internal battery pack, and power saving unit. The complete package forms an integral beacon transmitting system which can be quickly attached to the target.

By fitting the optional magnetic base type M7080 the unit can be quickly located under the target vehicle without the use of fixing clamps.

An on/off switch is conveniently located on the outside of the diecast case.

The power saving system ensures that the transmitter is not active when the target vehicle is stationary except for a 1 second confidence pulse which is radiated once per minute. The transmitter is activated by movement and continues to operate for approximately 15 minutes after movement ceases, before returning to confidence mode.

The transmitter will operate in a "continuous" mode or "pulse" mode.

Antenna is a short wire approximately 18cm. The directional power meter type M7013 is used to adjust length of antenna for maximum RF output. This unit is available as an optional extra.

SPECIFICATIONS

| | |
|------------------------|--|
| DC power input | Selectable: external +10V to +15V DC at 250mA or 4 off "C" size lithium batteries (eg National BRC) fitted internally. |
| RF power output | 1 watt into 50 ohms load. |
| Mode | Continuous or pulse. |
| Pulse data | One pulse of ¼ second duration every 2 seconds. |
| Frequency | 27MHz to 175MHz (to customer's order). |
| Modulation | Narrow band FM 500Hz nominal. |
| Features | Alarm signal Vibration and motion signal Identification signal. |
| Housing | Diecast metal case. |
| Size | 120mm x 95mm x 34mm (excluding connectors). |
| Weight | 560g including batteries. |

BEACON (TRANSMITTER) M7045 (¼ watt)

The Beacon is a very small, triggerable pulsed transmitter of great versatility and easy deployment. The Beacon comprises a ¼W transmitter, with power saving, internal movement sensor, antenna matching, integral battery and magnetic base.

The power saving facility ensures that the Beacon is energised only when triggered by movement or activation of a pair of make/break contacts. When triggering ceases, the Beacon continues to be energised for an over-run period of approximately 15 minutes after which it is maintained in a low duty ratio mode to conserve power. In this mode, short "confidence" pulses are radiated periodically to confirm that the unit is still functional. Alternatively, the unit may be set during deployment to be energised in a continuously pulsing mode independent of trigger activations.

When energised, the Beacon transmits short pulses at either of two repetition rates selectable by the operator.

The transmissions include digitally encoded data which can be decoded and displayed at the Tracking Receiver by the Beacon Status Display (M7114) which indicates the identity, operating mode, movement status and battery state of the Beacon. This is particularly useful to show whether the Beacon is moving or stationary for pulsed transmissions which do not convey this information by any other means.

The Beacon is powered from an internal, readily obtainable alkaline battery and requires only a simple wire antenna. These features together with the Beacon's small size and fitted magnets facilitate easy concealment and rapid deployment.

SUMMARY OF FEATURES

- ★ ¼W pulsed transmitter – 2 pulse rates selectable.
- ★ Power saving mode – movement or make/break triggerable.
- ★ Continuous pulsing mode selectable.
- ★ Internal, readily obtainable battery.
- ★ Fitted magnets.
- ★ Simple wire antenna.
- ★ Operating mode, movement status and battery state included in transmission.

NOTE

The Beacon is controlled by a microprocessor which permits factory modification of the operation of the unit to customer requirements. All of the parameters (eg pulse length, pulse repetition rate, over-run period etc) can be modified to any value within limits to satisfy most tracking requirements.

SPECIFICATIONS

| | |
|------------------------------|---|
| Transmitter Power | ¼W nominal. At a frequency of 80MHz and with a fresh battery this equates to approx. 100mW into load representing thin wire antenna (2.2p in series with 50ohm). |
| Frequency | Crystal controlled in range 27-175MHz. |
| Modulation | Narrow band FM (deviation approx. 1kHz). |
| Antenna | Thin wire approx. 250mm. |
| Pulse duration | ¼ second. |
| Pulse rate | 1 pulse every 1 or 8 seconds (selectable). |
| Over-run period | 15 minutes. |
| Confidence pulse rate | 1 pulse every 1 or 8 minutes (linked to pulse rate selection). |
| Triggers | (a) Internal movement sensor (selectable). (b) External make/break contacts (between the M and E terminals). |
| Controls | Switches: (a) ON/OFF (b) Pulse rate (½ seconds) (c) Movement trigger enabled. Others: Continuous pulsing mode (External wire link between B and E terminals). |

| Transmitted Data | Digitally encoded data included in the transmission to convey: (a) Beacon Identity (b) Operating Mode (1) Continuous pulsing selected (2) Pulse rate selected (3) Movement trigger selected (c) Status – moving or stationary (d) Battery state | | | | | | | | | | | | | | |
|-------------------------|---|------|----------|--------------|--|----------------------|---------|------------------------|---------|---------------------|--|-------------|----------|---------------|--------|
| Power Source | Internal 9V alkaline manganese (eg Duracell MN1604). Circuits are protected against reverse polarity connection. | | | | | | | | | | | | | | |
| Endurance | With fresh battery: <table> <tr> <th>Mode</th><th>Lifetime</th></tr> <tr> <td>"Confidence"</td><td></td></tr> <tr> <td>1 pulse/sec selected</td><td>25 days</td></tr> <tr> <td>1 pulse/8 sec selected</td><td>50 days</td></tr> <tr> <td>Transmitter pulsing</td><td></td></tr> <tr> <td>1 pulse/sec</td><td>20 hours</td></tr> <tr> <td>1 pulse/8 sec</td><td>7 days</td></tr> </table> | Mode | Lifetime | "Confidence" | | 1 pulse/sec selected | 25 days | 1 pulse/8 sec selected | 50 days | Transmitter pulsing | | 1 pulse/sec | 20 hours | 1 pulse/8 sec | 7 days |
| Mode | Lifetime | | | | | | | | | | | | | | |
| "Confidence" | | | | | | | | | | | | | | | |
| 1 pulse/sec selected | 25 days | | | | | | | | | | | | | | |
| 1 pulse/8 sec selected | 50 days | | | | | | | | | | | | | | |
| Transmitter pulsing | | | | | | | | | | | | | | | |
| 1 pulse/sec | 20 hours | | | | | | | | | | | | | | |
| 1 pulse/8 sec | 7 days | | | | | | | | | | | | | | |
| Magnetic base | Qty 6 Rare Earth magnets. | | | | | | | | | | | | | | |
| Size | Approx. 84 x 64 x 30mm including magnets. | | | | | | | | | | | | | | |
| Weight | Approx. 200g with battery. | | | | | | | | | | | | | | |

TRANSMITTER M7062 (2 watt)

This is the most powerful transmitter in the range and requires an antenna, antenna matching unit Type M7014, and DC power source of between 9 and 15 volts to become operative. This unit would normally be located in a concealed place such as a motor car trunk and be connected to the vehicle 12 volt DC supply or to a separate power supply source ie M7041 Battery & Power Saving unit. The transmitter would be connected to the M7014 Antenna Matching unit via the small diameter co-axial cable supplied. This permits the antenna to be placed in the most convenient or inconspicuous position.

The transmitter can be made to operate in its "Continuous" or "Pulse" mode by moving a wire link located conveniently on the outside of the case.

The transmitter is crystal controlled and frequency modulated by integral sensors. These sensors are activated by vibration and movement and indicate the status of the target ie engine running, vehicle moving etc. An identification signal is also radiated so that the Tracking Operator can be confident that the signal is authentic. The transmitter will also, if required, radiate an ALARM signal. This is a useful feature in the protection of VIPs or special loads. These Audio signals are detected by the Target Receiver M7101 and can be reproduced in a loudspeaker fitted into the display unit or by headphones. These audio signals will not be radiated when the transmitter is in the "Pulse" mode.

SPECIFICATIONS

| | |
|------------------------|--|
| DC power input | +9 to +15 volts. Current 350mA. "Continuous" rating at 12 volts. |
| RF power output | 2 watts into 50 ohm load with 12 volt supply. |
| Modulation | Narrow band FM. Deviation 500Hz nominal. |
| Frequency | Crystal controlled, single frequency, 27-175MHz (to customers' requirement). |
| Pulse data | One pulse every two seconds. Pulse length 250 milliseconds. When ALARM is activated in "Pulse" mode, pulse rate is two per second. |
| Audio data | Identification signal Motion and vibration signal Alarm signal. |
| Dimensions | 110 x 50 x 25mm approx. |
| Weight | 150gms. |
| Housing | Diecast metal case. |

TRANSMITTER M7063 (300mW)

This is the smallest transmitter in the range, having a RF power output of 300mW, and measuring only 75 x 45 x 20mm and weighing 50gms. To become operational it requires an external power supply of between 9 and 15 volts. This can be obtained from the target vehicle or from the Battery and Power saving unit type M7041. An Antenna Matching unit type M7014 is also required. This unit is connected to the transmitter via a small diameter co-axial cable and can be fitted easily by means of a clamp to the underside of the target or some other convenient position. Due to its small size it can be concealed in a parcel or suitcase.

The transmitter will operate in a "Continuous" or "Pulse" mode. The mode can be changed easily by moving a link situated on the outside of the metal case.

The transmitter is crystal controlled and frequency modulated by integral sensors. These sensors are activated by vibration or movement and indicate the status of the target ie engine running or vehicle moving. An identification signal is also radiated at intervals so that the operator can be confident that the signal is authentic. The transmitter will also if required radiate an ALARM signal. This feature is useful in the protection of VIPs. The audio signals are received by the Tracking Receiver type M7101 and will be reproduced in the loudspeaker which is fitted into the Visual Indicator. Provision is also made for headphone monitoring.

These Audio signals cannot be received when the transmitter is in the "Pulse" mode.

SPECIFICATIONS

| | |
|------------------------|--|
| DC power input | +9 to +15 volts. Current at 12 volts. 70mA in "Continuous" mode. |
| RF power output | 300mW into 50 ohm load with 12V supply. |
| Modulation | Narrow band Frequency Modulation. 500Hz deviation. |
| Frequency | Crystal controlled, single frequency, 27 to 175MHz (to customers' requirement). |
| Pulse data | One pulse every two seconds. Pulse length 250 milliseconds. When ALARM is activated in "Pulse" mode, pulse rate is two per second. |
| Audio data | Identification signal. Target status signal. Alarm signal. |
| Dimensions | 75 x 45 x 20mm approx. |
| Weight | 50gms. |
| Housing | Sealed metal case. |

COMMANDABLE BEACON – MODEL M7704A

The 7704A Commandable Beacon is a small unit which can be controlled by Command Unit (M7601) into the following modes:

- Transmitter on/off.
- Pulsing/non-pulsing transmitter operation.
- Movement trigger on/off.
- Independent relay contacts closed/open.

The unit requires an external 12 volt power source. An internal Antenna Matching Unit is used for both the Control Receiver and the Beacon Transmitter, and connections are supplied to allow fine adjustment of the antenna wire for maximum range.

Non-pulsing transmissions are modulated with an identification and a movement signal which can be monitored on the audio output of the Tracking Receiver. Both pulsing and non-pulsing transmissions include digitally encoded data which can be used at the Tracking Receiver to indicate the operating mode and movement status of the Beacon. This is particularly useful to show whether the Beacon is moving or stationary during pulsed transmissions which would not otherwise convey this information. The digital data is encoded and displayed by the Beacon Status Display (M7114) which plugs into the "Auxiliary" socket of the Tracking Receiver Unit (M7111).

The "movement trigger" mode provides a power-saving facility in which the transmitter is energised only when the movement takes place. When movement ceases, the transmitter continues to be energised for an over-run period of approximately 15 minutes, after which it is energised in a low duty ratio mode to conserve power. In this mode, short "confidence" pulses are transmitted periodically to confirm that the transmitter is still functional.

The relay provides a pair of independent voltage-free contacts.

SPECIFICATIONS

| | |
|------------------------------|--|
| Power Source | External +10 to +15V Supply current (approx.) at 12V 4mA transmitter off 200mA transmitter on |
| Size | 120mm x 70mm x 30mm approx. |
| Weight | 250g approx. |
| Control Slave Section | |
| Frequency | Crystal controlled single frequency in 30-175MHz band. |
| Receiver Sensitivity | -106dBm (approx. 5km command range in open terrain with helical whip on the command unit). |
| Antenna | Shares Antenna Matching Unit with transmitter. |
| Relay | Max. switching power 35W. Max. switching voltage 150V d.c. Max. switching current 2A. |

Transmitter Section

| | |
|---------------------|---|
| Power Output | 1W nom. into 50 ohms with 12V supply. |
| Frequency | Crystal controlled single frequency in 30-175MHz band. |
| Features | Identification signal (non-pulsing transmission). Audio tone on M7101 receiver changes for: 1/4 second every 2 seconds (Alarm contacts closed) 1/4 second every 1/2 second (Alarm contacts open) Movement monitor signal (non-pulsing transmission). Binary encoded data included in transmission to convey: (a) Slave Number (identity). (b) Mode of operation. (c) Status - moving or stationary. |

Antenna Matching Unit

| | |
|--------------------|--|
| Impedance | 50 ohms when wire length correctly adjusted. |
| Wire length | Typically 160mm. |
| Wire type | 24swg phosphor-bronze. |

BEACON (TRANSMITTER) 7706 (1/4 watt)

The Commandable Beacon is a small self-contained dual-function unit which may be used as a stand alone beacon or as a slave under the control of the Command Unit (M7601). A magnetic base (M7080) can be fitted if required.

(1) STAND ALONE MODE

When initially powered-up, the unit is automatically set into the movement trigger mode permitting it to be operated as an independent movement triggerable beacon, without the need of a command unit. The transmitting mode (pulsing or non-pulsing) is operator selectable by use of a wire link connected to the unit's external terminals.

(2) SLAVE MODE

When used as a Slave the following modes are controlled by the Remote Control Command Unit:

- (a) Transmitter on/off
- (b) Pulsing/non-pulsing transmitter operation
- (c) Movement trigger on/off
- (d) Independent relay contacts closed/open

(3) COMMON FEATURES

The unit can be powered externally, or internally from three readily obtainable alkaline manganese batteries. An internal Antenna Matching Unit is used for both the Control Receiver and the Beacon Transmitter, and connections are supplied to allow fine adjustment of the antenna wire for maximum range.

Non-pulsing transmissions are modulated with an identification pulse and a movement signal which can be monitored on the audio output of the Tracking Receiver. Both pulsing and non-pulsing transmissions include digitally encoded data which can be used at the Tracking Receiver to indicate the operating mode, movement status and battery state of the Beacon. This is particularly useful to show whether the Beacon is moving or stationary during pulsed transmissions which would not otherwise convey this information. The digital data is decoded and displayed by the Beacon Status Display (M7114) which plugs into the "Auxiliary" socket of the Tracking Receiver Unit (M7111).

The "movement trigger" mode provides a power-saving facility in which the transmitter is energised only when movement takes place. When movement ceases, the transmitter continues to be energised only when movement takes place. When movement ceases, the transmitter continues to be energised for an over-run period of approximately 15 minutes after which it is energised in a low duty ratio mode to conserve power. In this mode, short "confidence" pulses are transmitted periodically to confirm that the transmitter is still functional.

SPECIFICATIONS

| | | |
|---------------------|--|-----------------|
| General | Internal - 3 off 9V alkaline manganese (eg Mallory MN1604) | |
| Power Source | or External +9 to +15V Supply current (approx.) at 9V 1mA transmitter off 80mA transmitter on | |
| Endurance | With fresh batteries: | |
| | Mode | Lifetime |
| | Transmitter off (receiver operating) | 60 days |
| | Transmitter on - pulsing | 5 days |
| Size | Transmitter on - non-pulsing | 8 hours |
| | 118mm x 93mm x 32mm approx. | |
| Weight | 500g approx. (including batteries). | |

Control Slave Section

| | |
|-----------------------------|--|
| Frequency | Crystal controlled single frequency in 30-175MHz band. |
| Receiver Sensitivity | -160dBm (approx. 5km command range in open terrain with helical whip on the command unit). |

| | |
|----------------------------|---|
| Antenna | Shares Antenna Matching Unit with transmitter. |
| Relay | Max. switching power 35W. Max. switching voltage 150V d.c. Max. switching current 2A. |
| Transmitter Section | |
| Power Output | ¼W nom. into 50 ohms with 9V supply. |
| Frequency | Crystal controlled single frequency in 30-175MHz band. |
| Features | Identification signal (non-pulsing transmission). Movement monitor signal (non-pulsing transmission). Binary encoded data included in transmission to convey: (a) Slave Number (identity). (b) Mode of operation. (c) Status – moving or stationary. (d) Battery state. |

Antenna Matching Unit

| | |
|--------------------|--|
| Impedance | 50 ohms when wire length correctly adjusted. |
| Wire length | Approx. 160mm. |
| Wire type | 24swg phosphor-bronze. |

MONEY PACKAGE TRANSMITTER MODEL 7002

Description

The Money-package transmitter Model M7002 is a target transmitter designed to be packed in a cavity within a bundle of banknotes.

It has an integral battery pack and integral antenna and is armed by removing an external magnet. When armed the transmitter is held off by the presence of an external RF field at the transmitter's operating frequency and is energised when this field is removed. The external field is normally provided by a primary transmitter fitted to the case containing the money package; in this way the M7002 only operates when it is removed from the case. Note that the primary target transmitter may be continuous or pulsed.

The M7002 operates in pulse mode, one pulse occurring every four seconds when the unit is stationary. When the unit is moved, an integral movement sensor causes additional pulses to occur up to a rate of one pulse every second. In this way an indication of whether the unit is moving or stationary can be obtained via the audio output of the tracking receiver model M7101.

An integral LED illuminates every time a pulse occurs, which gives confirmation of the unit's correct operation during deployment.

The M7002 uses standard AA size batteries.

SPECIFICATIONS

| | |
|---------------------|---|
| Power source | Internal 7.5V battery pack using 5 off AA alkaline-manganese batteries eg Duracell MN1500. |
| Frequency | Crystal controlled on single frequency in the range 70-90MHz. |
| Power output | 1W with fresh batteries. |
| Pulse length | ¼ sec. |
| Endurance | Approx. 4 days at 1 pulse/4 sec (no movement) and 1 day at 1 pulse/sec (continuous movement). |
| Antenna | Integral tuned dipole. |
| Size | 125mm x 60mm x 16mm. |
| Weight | 170gm (same as standard banknote pack). |

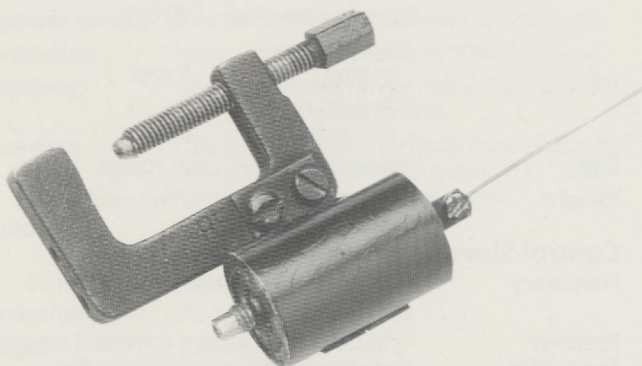
FEATURES

- ★ Armed by removing small magnet (position of reed switch indicated on unit).
- ★ Held off by RF field (eg 1W at 300mm) at operating frequency and operates approx. 6 sec. after field is removed. If field is pulsed, max. permissible interval between pulses = 6 sec.
- ★ LED indicator to confirm operation (does not glow if batteries exhausted or incorrectly inserted).
- ★ Movement indicated by changes in pulse rate.

ACCESSORIES

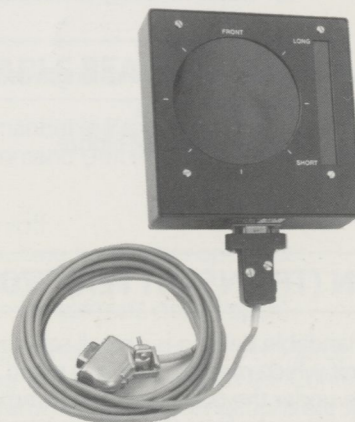
TRANSMITTER ANTENNA MATCHING UNIT M7014

This unit is essential when transmitters type M7062 and M7063 are used. It is provided with an adjustable clamp so that it can be fixed securely to the underside of the target vehicle, preferably to an earthed point. The antenna wire, approx. 20cm is fixed to the unit by a screw. The unit is connected to the transmitter by a thin co-axial cable.



RECEIVER DISPLAY UNIT M7113

This unit is an accessory which can be plugged into a socket situated on the tracking receiver type M7101. It gives an indication of "bearing and range" only and is useful in providing information to a remote position ie to an observer in the rear seat of the tracking vehicle.

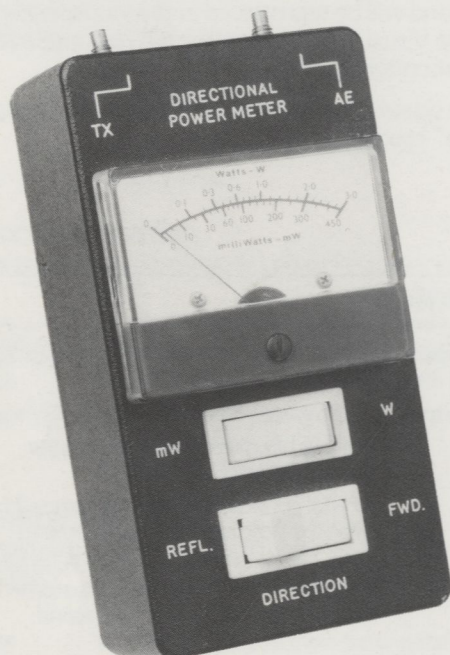


GRIFFTECH SYSTEMS

DIRECTIONAL POWER METER M7013

This test unit is used to accurately adjust the length of the transmitter antenna during installation. This ensures maximum radio frequency power output, hence the range of the transmitter.

The meter measures actual power output and reflected power. Antenna is adjusted for minimum reflected power. Unit is removed from circuit on completion of adjustment.



BATTERY AND POWER-SAVING UNIT MODEL M7041

This unit can be used to supply power to the target transmitters either from the internal batteries (5 AH Lithium) or from an external 12V battery. In both cases it provides a power-saving facility in which the transmitter is energised only when the movement takes place. When movement ceases, the transmitter continues to be energised for an over-run period of approximately 15 minutes, after which it is energised in a low duty ratio mode to conserve power. In this mode, short "confidence" pulses are radiated to confirm that the transmitter is still functional.

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