

1056 9944 Radar



# TGSS (MkIII) True Ground Speed Sensor

Measurement of true vehicle speed regardless  
of wheel size or slippage



## Application:

- Non-contacting signal input for true measurement of vehicle speed regardless of wheel size or wheel slippage.
- Used where accurate speed measurement is required.
- Essential for anti-slip systems, traction control etc.
- RDS Technology also supplies a wide range of instrumentation to be used with the TGSS.

## Principle of operation:

The TGSS uses the well known principle of Doppler shift. A low power K band microwave beam is transmitted at, and reflected from, the ground. The reflected signal differs from the transmitted one by the doppler shift. The difference in frequency is directly proportional to the forward speed.

The kit includes Sensor, Mounting Plate, Extension Cable, Fixings and fasteners.



## Technical Details:

**Velocity Range:** 0.3 - 62 km h<sup>-1</sup> (0.2 - 39mph)

**Accuracy:** <±3% 0-3.5 km h<sup>-1</sup> ( 0-2.2 mph)  
<±1% 3-62 km h<sup>-1</sup> (2-39 mph)

**Mounting Angle:** 45° depressed below horizontal, rearward-facing (preferred) or forward-facing

**Mounting Height:** 30 - 100cm (12 - 39") above the ground or above the top of the crop, typical mounting height 60cm (24")

**Mounting Fixings:** 3 x M8 Bolts

**Overall Dimensions:** 10cm(H) x 10 cm(W) x 10cm(D)  
(4" x 4" x 4")

**Weight:** 0.45 kg (1lb)

**Connections:** 3-way Female WeatherPak  
Pin A (Red Wire): +12V DC (nominal 12V battery voltage)  
Pin B (White Wire): Speed Signal Output  
Pin C (Black Wire): Ground  
Standard 32cm cable length  
Standard 100cm extension cable: (3-way male-3-way female WeatherPak)

**Electrical Supply:** 150 mA @ 12V DC

**Output Frequency:** 35.68 Hz / km h<sup>-1</sup> (128.4 pulse m<sup>-1</sup>)  
57.42 Hz / mph (3.26 pulse inch<sup>-1</sup>)

**Square Wave Output:** Z OH approx. 1000 ohms  
Z OL less than or equal to 100 ohms  
V OH approx. +V (battery) - 1.0V  
V OL less than or equal to 1.0V at 15 mA  
I out (max.) = 22 mA

**Electrical Protection:** Signal to ground and signal to power supply protection.  
Electrical transient protection per ASAE EP-455 Standard.

**Step Response:** < or equal to 200 ms delay.

**Start/Stop Delay:** < or equal to 25 cm

**Microwave Frequency:** 24.125 GHz (standard)  
24.300 GHz (UK)  
Tolerance ± 25 MHz

**Microwave Power:** 5 mW, nominal

### Regulatory Compliance:

**Environmental:** ASAE EP-455: includes standards for reverse polarity, electrical transients (such as load dump, inductive load switching), chemical corrosion, dust, salt spray, rain, wash, mechanical shock, and vibration.

### Electromagnetic

**Compatibility:** CE, CSA, FCC

**Storage Temperature:** -40°C to +85°C

**Operating Temperature:** -30°C to +70°C

### Available from:



Errors and omissions excepted. Technical details, specifications and design are subject to change without notice., ref:INFO/DS/rel/tgssmk3/rev.01

## Introduction

The RDS True Ground Speed Sensor provides a forward speed signal for use with any of the range of RDS instruments or to any other control or logging system. The sensor can be used on agricultural vehicles, on-road vehicles, rail vehicles, and can be used over almost any surface (except a perfectly smooth, reflecting surface). The sensor supplied into the UK is classed as a "Low Power Microwave Device" operating at 24.300 GHz producing 5mW of power. This meets performance specification MPT 1349 and complies with The Wireless Telegraphy (Exemption) Regulations 1991 (S1 1991/1523). No operators Licence is required.

**The UK specification sensor is marked 'UK' on the sensor face. The sensor supplied to all other countries operates at 24.125 GHz. Please ensure that you have been supplied with the correct sensor**

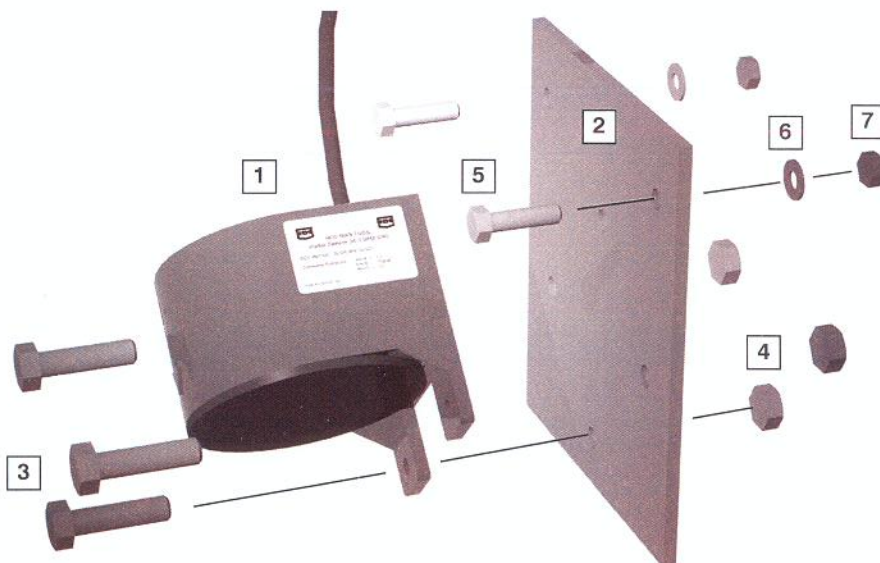


## Kit Contents

The kit contains the following components ("#" - part not illustrated).

Item	Part Number	Description	Qty
1(a)	S/SR/168-12-001	Mk3 Radar Sensor 24.300 GHz (UK)	1
or			
1(b)	S/SR/168-12-002	Mk3 Radar Sensor 24.125 GHz (Standard)	1
2	S/BK/168-12-010	Mk3 Radar Sensor Bracket	1
3	S/FR/500-6-055	M10 x 35 Hex. Set Screw	3
4	S/FNDR/227	M10 Nyloc Nut	3
5	S/FNDR/940122	M8 x 45 Hex. Set Screw	2
6	S/FR/500-5-006	M8 Plain Washer	2
7	S/FNDR/407	M8 Nyloc Nut	2
#	S/CB/220-1-002	Extension lead	1
#	S/DC/500-10-511	Instruction leaflet	1
#	S/DC/500-10-512	Self-adhesive Mounting Template	1

Figure 1



## Installation

The sensor can be mounted directly to the vehicle chassis, or on its mounting bracket, so that it is pointing at a depression angle of 45 degrees ( $\pm 2$  degrees) from the horizontal. This angle is critical to the accuracy of the instrument.

The sensor should ideally point **backwards** but will work equally effectively if pointing forwards. The mounting position must be chosen to provide a rigid fixing with a clear view of the ground. Anything that moves or vibrates in the radar beam can generate a false speed signal. **Please note the beam spread shown in figure 3.**

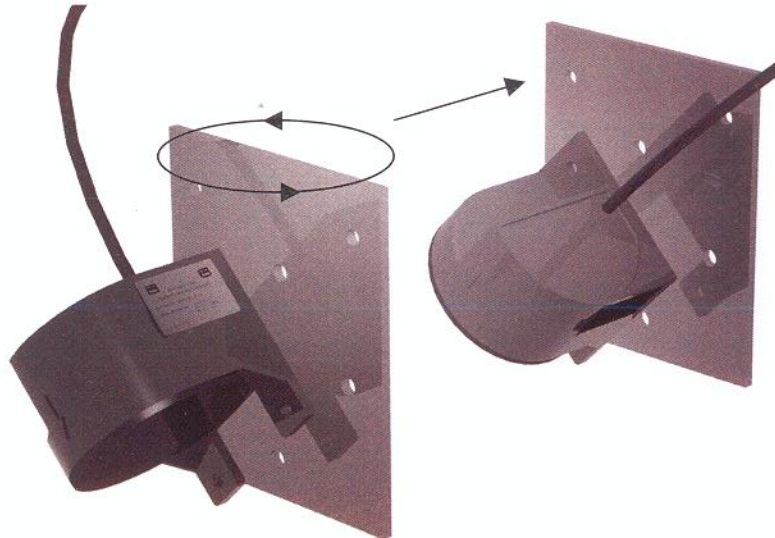
The sensor should ideally be mounted such that the lens is between 30 cm (12") and 100 cm (39") above the ground and is near to the vehicle's centre of gravity. This will minimise the effect of the vehicle roll and pitch.

### Installation with the bracket

The correct mounting angle is provided using the bracket provided (#2 -fig.1). By reversing the mounting plate as appropriate (fig. 2), you can mount the sensor facing forwards or rearwards, either to the left hand side or right hand side of the vehicle.


*Ensure that the bracket is attached to the vehicle with the top edge parallel to the ground.*

Figure 2



### Installation without the bracket

If you are mounting the sensor directly to the vehicle, a self-adhesive mounting template is provided in the kit, for drilling the mounting holes at the correct spacing and position.

*Ensure that the template is placed with the line marked  parallel to the ground.*

## Wiring Connections

The sensor is fitted with an integral cable and three-pin connector. A mating cable is supplied to join the sensor to the instrument.

Connector Pin	Sensor Lead	Extension Lead	Function
A	Red	Brown	+V
B	White	Yellow/Green	Signal
C	Black	Blue	0V

### Calibration

The sensor output is calibrated at 128.4 pulses per metre travelled, when the sensor is mounted at the correct angle of 45° from the horizontal.

The normal RDS convention is that the "speed sensor factor" is either;

- (i) the distance travelled over **one** interval between sensor pulses (all Pro-Series instruments and Wizard instruments with software versions prefixed WZxxx.).

*In this instance set a factor of 0.008 metres (or programme 0.307" if the instrument display is set for Imperial units).*

- (ii) the distance travelled over **two** intervals between sensor pulses -(UDM and Wizard instruments instruments with software versions prefixed UDMxxx or UDJxxx).

*In this instance set a factor of 0.016 metres (or programme 0.613" if the instrument display is set for Imperial units).*

The calibration manual supplied with the instrument will confirm the necessary factor.

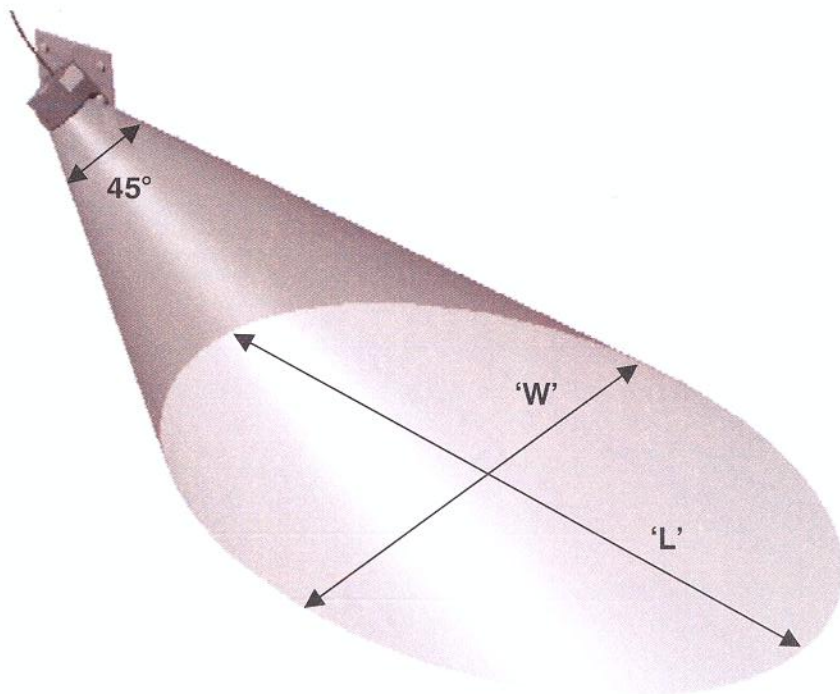
Many instruments have an "Auto Cal" facility for determining the correct Speed Sensor Factor. This is primarily used where a conventional magnetic sensor is installed, however, note that with the radar sensor, the instrument should accumulate 12,840 pulses over a 100 metre test run (11740 pulses over 100 yards).

### Replacing a Mk 2 TGSS with a Mk 3 TGSS

If you are replacing a Mk 2 TGSS with a Mk 3 TGSS mounted in the same position on the vehicle,

- (i) Use Extension Lead Pt No. S/CB/500-1-073 (available on request), to re-connect to the existing sensor lead.
- (ii) the calibration factor programmed in the instrument does not need to be changed.

Figure 3: Beam Spread



Height from ground	'L'	'W'
MIN 0.3 m (12")	0.8 m	0.5 m
0.45 m (18")	1.1 m	0.7 m
0.6 m (24")	1.4 m	0.9 m
0.75 m (30")	1.7 m	1.1 m
MAX 0.9 m (36")	2.0 m	1.3 m