GNSS Speed Sender

High quality Speed Sender for automotive applications

Hummingbird's Global Navigation Satellite System (GNSS) Speed Sender provides a reliable calibration free replacement for mechanical speed senders.

Using data received from satellites, the GPS Speed Sender calculates three-dimensional ground speed and provides a pulsed output compatible with existing mechanical speed senders. This high technology solution eradicates the dependency on vehicle specific parameters, thereby reducing installation time and eradicating the need for periodic calibration.

GNSS Speed Sender - providing accurate speed information independent of the vehicle

Powerful Performance

Designed for harsh automotive environments, the module features transient voltage protection on the supply and short circuit protected outputs.

The ability to track American GPS, Russian GLONASS and Chinese BeiDOU navigation satellites simultaneously, enhanced receiver sensitivity and active antenna result in fast time-to-first-velocity-calculation as well as the ability to operate in the harshest RF environments such as canyons and cities.

Last known position and satellite information critical to fast start-up are battery backed in case of power failure.

Three dimensional velocity calculations are accurate to 0.2km/h and pulse output rates are updated 10 times per second.

The device is fully configurable and offers the following features:

• 1000 to 10,000 pulses per kilometre (PPK) settable via adjustment screw.

• Fixed 2000, 4000, 8000 or 50,000 pulses per kilometre option.

• Option to add back distance lost in tunnels

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The speed sender can be supplied with an external antenna (active) for challenging installations, or with an integrated antenna (passive) for cost sensitive applications.

The speed sender works equally well with speedometers calibrated in kilometres per hour or miles per hour

Rugged Hardware

GNSS is supplied in a rugged ABS plastic enclosure with provision for screw mounting when required. Antenna connection for the active antenna is provided through a gold-plated threaded SMA connector. The active antenna is available in two options:

• magnetic mount, suitable for mounting in the interior of the vehicle, for example under the dashboard or rear window sill.

• bulkhead mount, suitable for exterior mount, for example on the roof of the cab.

Power to the unit and pulse outputs are provided through four colour coded wires.

For optimum performance, the antenna should be mounted horizontally and upright; and should have a clear view of the sky.

A red and green LED are provided to give the user status information.

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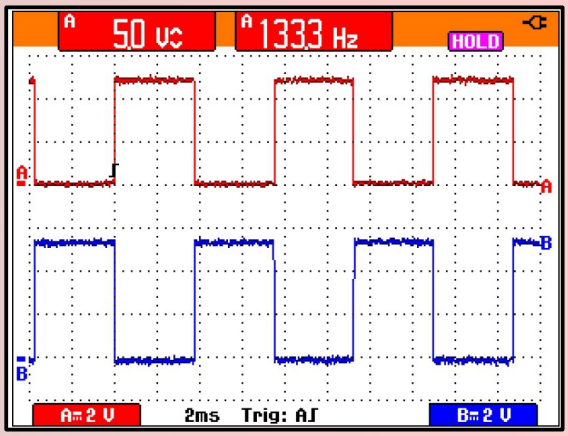
Technical Specifications and Ordering Information			
Part number	HMGS1A10CP	HMGS1A10CM	HMGS1A10CB
Antenna type	passive	magnetic mount	bulkhead mount
Pulse rate (pulse per km)	variable 1000 to 100,000 or fixed 2000, 4000, 8000, 50,000		
Power consumption	240mW	480mW (incl. antenna)	480mW (incl. Antenna)
Dimensions (mm)	50(l), 67(w), 21(h)	55(l), 67(w), 21(h)	55(l), 67(w), 21(h)
Input voltage	minimum for operation 6V; maximum 36V		
Differential output pulses	square wave, peak to peak 5V, DC 2.5V; maximum current drain 25mA		
Acquisition time, loss of lock	less than 2s (90% of the time)		
Acquisition time, temp loss of power	less than 10s (50% of the time), less than 13s (90% of the time)		
Acquisition time, power-up	less than 38s (50% of the time), less than 42s (90% of the time)		
Accuracy, horizontal	less than 5m (50% of the time), less than 8m (90% of the time)		
Accuracy, altitude	less than 10m (50% of the time), less than 16m (90% of the time)		
Precision, velocity	less than 0.06m/sec or 0.22km/h		
Update rate	10 times per second (10Hz)		
RF interface	SMA connector supplied on magnetic and bulkhead antenna versions		
Antenna dimensions (mm)	51(l), 42(w), 12(h); cable length minimum 3m		
Operating temperature	-40°C to 85°C; 5% to 95% relative humidity		
General	56 channel tracking receiver, battery backup 12 days		

Bulkhead mount antenna

Magnetic mount antenna

Note: Passive units have a built in antenna and do not require either a magnetic mount or bulkhead mount antenna



Output pulses at 60km/h with 8000ppk setting

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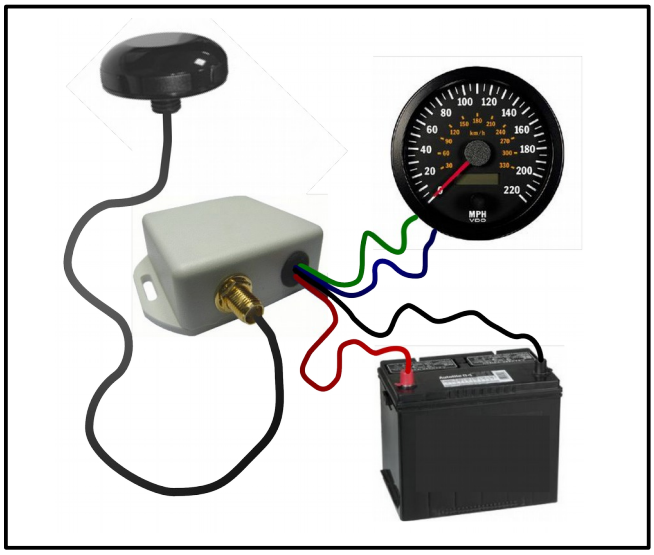
Installation and set-up instructions

Installation of a GNSS Speed Sender is straightforward as long as a few critical points are noted. Critical items will be highlighted in ***bold italics*** in this document for your quick reference.



Typical GNSS Speed Sender installation

The Speed Sender should ideally be provided with permanent power. Ideally the unit should be connected directly to the vehicle's battery (through a 1A fuse). If switched power is provided, the unit will re-start each time power is applied, and pulses, representing distance travelled, may be lost during satellite acquisition time.

Wiring Specification:

Red	input voltage (6V to 36V)
Black	ground (0V)
Green	pulse output (0 to 5V)
Blue	inverted pulse output

Some tachometers and speedometers require two pulses for correct operation. The GPS Speed Sender provides two pulses, which are the inverse of each other. When only one pulse is needed, the other can be left disconnected, but please ensure that it does not short to the chassis of the vehicle.

he amplitude of the output pulses provided by the Speed Sender is 5V. ***Please check that this voltage is suitable for use with your equipment.*** Other voltages are available if required. Please contact your distributor or Hummingbird Electronics for more information.

For optimum performance, ***the antenna or unit should be mounted horizontally and and should have a clear view of the sky.*** Typical positions for mounting the various units are:

• magnetic mount or passive: suitable for mounting in the interior of the vehicle, for example under the dashboard or rear window sill.

• bulkhead mount: suitable for exterior mount, for example on the roof of the cab.

For active units that require an external antenna, ***please ensure that the antenna cable is never tightly bent or twisted*** but is folded gently around corners. The antenna is attached to the Speed Sender using the gold plated SMA connector provided on the side of the enclosure.

A red and a green LED are provided to give the user status information. At power on, the red LED will light for approximately 2 seconds and will then begin to flash at 2Hz, indicating that the unit has power and is searching for satellites. ***When satellites have been acquired, the red LED will stop flashing*** and remain on. The green LED flashes in sympathy with the pulse output, and so will flash faster as the vehicle speed increases.

The Speed Sender has a built in test function that can be used to check that the pulse outputs are correctly driving the end equipment, and that the unit is powered correctly. In order to activate the test function, open the unit by removing the two screws securing the back-plate. Place the link provided across pins 1 and 2 of the connector (see page 2). The Speed Sender will now provide a pulse output simulating 60km/h. The end equipment should respond to the pulse output as expected. If the end equipment responds, but the speed shown is incorrect, then the wrong pulse-per-kilometer (ppk) value has been selected and the value should be set using the instructions on the next page.

Please take care when opening the speed sender not to short any of the internal pins to either chassis, ground or positive voltage.

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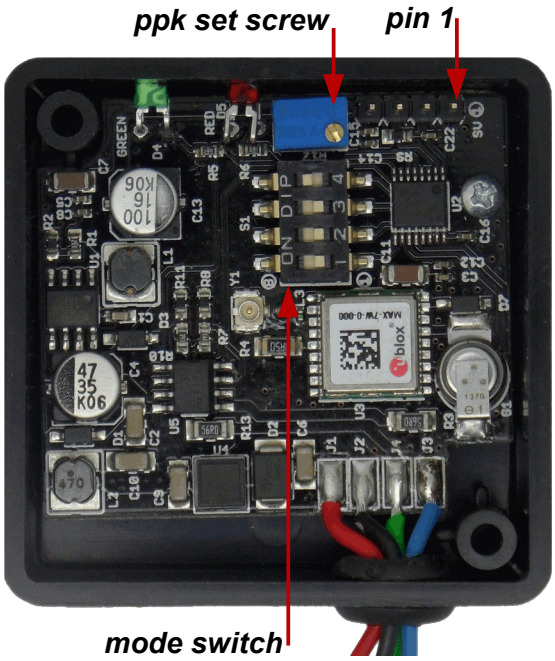
Setting the Pulse-Per-Kilometer Value

To set the ppk value, open the Speed Sender by removing the two screws securing the back-plate and gently remove. Once power has been applied, the unit will enter set- up mode if a link is present on pins 1&2 of the connector. In set-up mode, pulses will be provided to simulate a speed of 60km/h (37.3mi/h or 32.4knots).

The speedometer, tacho or other equipment that is connected will show that the vehicle is moving, but the speed will probably be incorrect. The pulse-per-kilometre (ppk) value must now be set.



If you require a fixed PPK value of 2000, 4000, 8000 OR 50,000, switch 2 should be in the OFF position. Now select between the values as follows:

SW3 OFF, SW4 OFF: 2000PPK
SW3 OFF, SW4 ON: 4000PPK
SW3 ON, SW4 OFF: 8000PPK
SW3 ON, SW4 ON, 50,000PPK

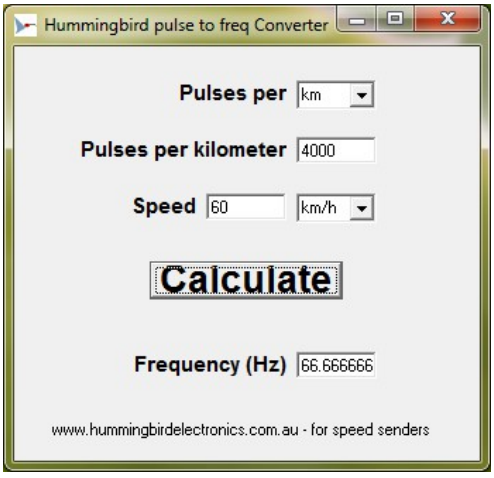
If you need a pulse per kilometer (or mile) value other than the available fixed values, switch 2 should be in the ON position. You will now be able to vary the PPK value as below using the ppk set screw. Turn the ppk set screw clockwise to increase the ppk or anti-clockwise to decrease the ppk.

SW3 OFF, SW4 OFF: 1000 to 4000PPK
SW3 OFF, SW4 ON: 2000 to 8000PPK
SW3 ON, SW4 OFF:4000 to 16,000PPK
SW3 ON, SW4 ON, 25,000 to 100,000PPK

Once the desired ppk has been set, remove the link on pins 1 and 2 of the connector to exit setup mode. Setup mode can be re-entered by replacing the link on pins 1 and 2 as before.

Insert a link on pins 1 and 2 for test mode

A handy tool that calculates the frequency produced by the speed sender at any given pulse per kilometre and speed is available for download from our website at www.hmbe.com.au.



Recovering lost distance

If the Speed Sender is being used to calculate distance, there is an option to recover distance lost whilst the unit has no view of the sky such as in tunnels. The GNSS Speed Sender approximates the distance lost as a straight line and adds pulses to the outputs until the lost distance has been recovered. Note that the vehicle speed will increase artificially whilst the speed sender is adding back the pulses.

To add back lost distance, turn switch 1 ON.

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