

100 Hz Speed Sensor with RTK (VBSS100-V5)



The VBOX Speed Sensor 100 Hz (v5) is a compact, non-contact measurement solution featuring a low-latency GNSS receiver with RTK capability.

Utilizing dual-band GNSS signal tracking, the VBSS100-V5 offers a resilient PNT solution where a high degree of accuracy is required. Ideal for:

- Brake testing
- Performance Testing
- Lap-timing



With the addition of an RTK input such as the VBOX NTRIP modem, centimetre-level positional accuracy can be achieved.

Data output is via CAN Bus and each unit also features RS232, Ethernet, and digital output for easy integration with a range of data loggers and test systems.

IP67 rating means that each unit is water and dustproof, offering a robust solution for a variety of conditions.



Features

- 100 Hz low latency dual-band GNSS receiver
- Centimetre-level position accuracy (RTK input required)
- User-friendly OLED display
- CAN Bus output
- RS232 for NMEA output or connection to VBOX Test Suite
- Ethernet output
- User configurable digital output (Virtual Lap Beacon or Speed)
- ± 1.8 cm trigger distance accuracy
- Rugged Deutsch ASDD Autosport connector
- High quality IP67 rated enclosure: water + dustproof.
- Wide 7 V – 30 V operating range and low current consumption
- ISO/IEC: 17025:2017 calibrated
- Free lifetime customer support

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Inputs

Unit Power	
Input Voltage Range	7.5 – 30 V DC
Power Consumption	7.5 W max
Digital Input	
Input Function	Brake event trigger/ track marker
RS232 Input	
Input Function	DGPS/RTK Corrections
	Configuration

Outputs

CAN Bus	
Output Data Rate	125 kbit/s, 250 kbit/s, 500 kbit/s & 1 Mbit/s selectable baud rate. Software controlled CAN termination.
Data available	<p>Outputs: Satellite count, time, position, speed, course over ground heading, vertical velocity, longitudinal acceleration, lateral acceleration, distance, DGPS status</p> <p>Results: Trigger event time, trigger speed, start speed, end speed, deceleration test time, lap time, split time, radius of turn.</p>
RS232	
Output Data Rate	Up to 100Hz
Data available	NMEA, Racelogic (compatible with VBOX Test Suite)
Ethernet	
Output Data Rate	100 Hz
Data available	As per CAN data
Digital	
Signal Levels	Low = 0 V, High = 5 V, Max. frequency 4.4 kHz
Output Type	Speed or Lap Beacon
GNSS Antenna Supply	
Supply Voltage	5 V DC

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GNSS Specifications

Velocity		Absolute Positioning (RMS)	
Accuracy	0.1 km/h (averaged over 4 samples)	Accuracy* with RTK	V: 10 mm; H: 5 mm
Update rate	100 Hz	Accuracy* with DGPS	V: 0.5 m; H: 0.3 m
Maximum velocity	1200 mph	Accuracy* with SBAS	V: 1.2 m; H: 0.8 m
Minimum velocity	0.1 km/h	Accuracy* (Standalone)	V: 1.8 m; H: 1.2 m
Resolution	0.01 km/h	Update rate	100 Hz
Latency	20 ms	Resolution	1.8 mm

Acceleration		Distance	
Accuracy	0.50 %	Accuracy	0.05 % (<50 cm per km)
Maximum	20 g	Units	m / ft
Resolution	0.01 g	Update rate	100 Hz
Update rate	100 Hz	Resolution	1 cm

Heading		Time	
Resolution	0.01°	Resolution	0.01 s
Accuracy	0.1°	Accuracy	0.01 s

Brake Distance Accuracy			
Accuracy**	±1.8 cm		

* Specifications will vary depending on the number of satellites used, obstructions, satellite geometry (PDOP), multipath effects, and atmospheric conditions. For maximum system accuracy, always follow best practices for GNSS data collection.

** Based on trigger stop distance of <50m.

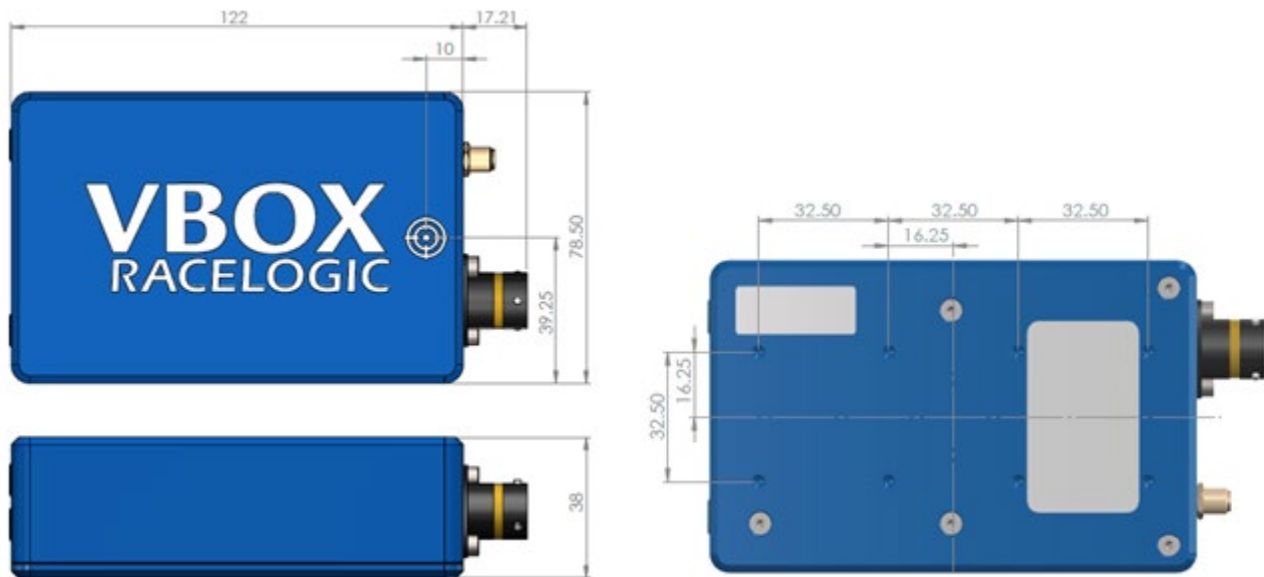
Supported GNSS Signals			
GPS	L1, L2		
GLONASS	G1, G2		

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Environmental and Physical

Environmental and physical			
Weight	Approx. 480g	Operating temperature	-20°C to +70°C
Size	139.21 x 78.5 x 38 mm	Storage temperature	-40°C to +85°C
IP rating	IP67		



Package Contents

Description	Product code
VBOX 100 Hz V5 Speed Sensor Unit only	VBSS100-V5
Dual Band GNSS Antenna (includes 4 m removable cable)	RLACS283
Deutsch 23W ASDD - Multiple Connectors	RLCAB163
Lemo 5W Plug - 9W D Socket – 2 m cable (Serial Configuration)	RLCAB001
Lemo 2W Plug - Cigar Plug – 2 m cable (Power) Screened	RLCAB010LE
VBOX Plastic Carry Case	RLACS106
Certificate of Calibration - UKAS Accredited Calibration Lab	RLCALUKAS

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Connector Pinout

Function		23-Way Deutsch Pin
Aux Tx	1	
Aux Rx	2	
Ethernet Tx+	3	
Ethernet Tx-	4	
Ethernet Rx-	5	
Ethernet Rx+	6	
CAN L Input	7	
CAN H Input	8	
CAN H Output	9	
CAN L Output	10	
Digital Input	11	
Power Input -	12	
Power Input +	13	
Digital Output	14	
Ground 1 (Digital Output)	15	
DGPS Rx	16	
DGPS Tx	17	
RS232 Rx	18	
RS232 Tx	19	
Ground 2 (Digital Input)	20	
Power Output 1	21	
Power Output 2	22	
PPS	23	