



Stalker Hump Yard Sensor II User's Manual 011-0223-00 Rev. A

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STALKER[®] Intelligent Technologies

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1. Overview

The Stalker Analog Speed sensor is Doppler radar in a small, rugged housing. The sensor outputs an analog signal (sinusoid) with its frequency proportional to the speed of the target. The amplitude of the output signal is proportional to the size and/or the distance of the target to the sensor. The Stalker Analog Speed sensor can be set up through its RS232 port.

2. Specifications

GENERAL SPECIFICATIONS

| | |
|------------------------|--|
| Product Type | Analog Speed Sensor |
| Operating temperatures | -30°C to +70°C (-22°F to +158°F) 90% relative humidity |
| Storage Temperatures | -40°C to +85°C (-40°F to +185°F) |

MICROWAVE SPECIFICATIONS

| | |
|---------------------|---------------------|
| Operating Frequency | 24.125 GHz (K-band) |
| Frequency Stability | ±50 MHz |
| Antenna Type | Planar array |
| 3 dB Beam Width | 30 by 32° |
| Power Output | 18 dBm EIRP |

ELECTRICAL SPECIFICATIONS

| | |
|-----------------------------|---|
| Supply Voltage | 10 - 22 VDC |
| Current (at 12 VDC Nominal) | Transmitter On: 210mA, Transmitter Off: 130mA |

PHYSICAL SPECIFICATIONS

| | |
|---------------|--|
| Weight | 13 oz (0.35 kg) |
| Size (LxWxH) | 4.4 x 3.9 x 1.6 inches 11.2 x 9.9 x 4 cm |
| Case Material | Aluminum die cast |

PERFORMANCE SPECIFICATIONS

| | |
|--------------------------------------|---|
| Speed Range | Max target speed: 200 MPH (89 meters/sec) |
| Target speed versus output frequency | 1.39×10^{-2} Hz per mph (6.217×10^{-3} Hz per m/s) |



3. Electrical connections

Refer to table 1 for the connections to the sensor.

Table 1: I/O Cable pinout

| Pin number | Wire Color | Primary function |
|------------|-------------|-------------------------|
| 1 | Brown | Squelch Input |
| 2 | Red | RS232-RX(To computer) |
| 3 | Orange | RS232-TX(From computer) |
| 4 | Yellow | DC IN |
| 5 | Dark Green | DC IN |
| 6 | Blue | GND |
| 7 | Violet | Analog VOUT- |
| 8 | Gray | Analog VOUT+ |
| 9 | Black | GND |
| 10 | White | Do not connect |
| 11 | Pink | Test Input |
| 12 | Light Green | GND |

The diagrams in Figure 1 show the pinouts of the cable and sensor connector as mated

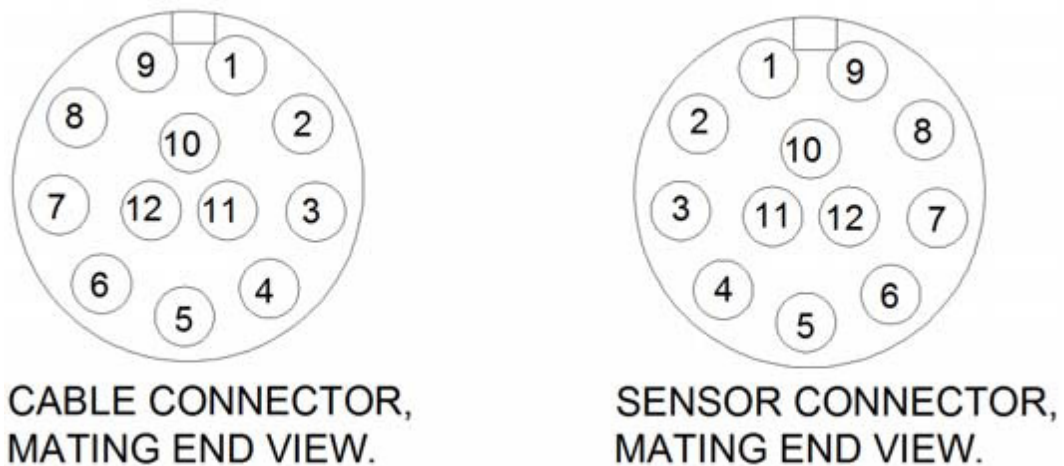


Figure 1



3.1 Pin Descriptions

- 1: Squelch input:** Short this wire to ground (or connect it to pin 6, blue wire) to disable the transmitter. When the squelch is activated, the sensor will not see any target.
- 2:RS232-RX:** RS232 signal from the sensor to a computer running the set up software
- 3:RS232-TX:** RS232 signal from a computer running the set up software to the sensor
- 4:DC IN:** DC power input to the sensor. Connect to a DC source with a voltage between 10V and 22V. **Any voltage above 24V will permanently damage the sensor**
- 5:DC IN:** DC power input
- 6: GND**
- 7: Analog VOUT-:** Negative leg of the differential analog signal out.
- 8: Analog VOUT+:** Positive leg of the differential analog signal out. The sensor is set to drive a differential load.
- 9: GND**
- 10:** Do not connected: currently not used
- 11: Test input:** Short this wire to ground to activate the test mode. With the test mode activated, the sensor will output an 1150 Hz sinusoid, which corresponds to a 16mph target. This test signal can be used to set up the gain of the sensor.
- 12:GND:**

4. Analog sensor's operation

The sensor has two modes of operation: The fixed gain mode and AGC (Automatic Gain Control) mode. These modes can be selected by the operator using the sensor's set up software (through the RS232 port). The operation of the configuration software is described in a separate document.

In the fixed mode, there are 256 levels for the gain.

The AGC mode is actually a combination of an AGC portion and the fixed gain, which means that if a sensor is set to AGC mode and the output signal saturates, the user can reduce the fix gain. The output signal saturates at $\pm 12\text{VDC}$. Note that in the AGC mode, the output signal looks like "noise" when there is no target.

The sensor is configured to drive a differential load. The matching impedance is 600ohms. Any load impedance lower than this value will result in lower amplitude of the output signal. A load impedance of 600ohms or greater is recommended. Figure 2 and Figure 3 show a typical output signal at different load impedance.

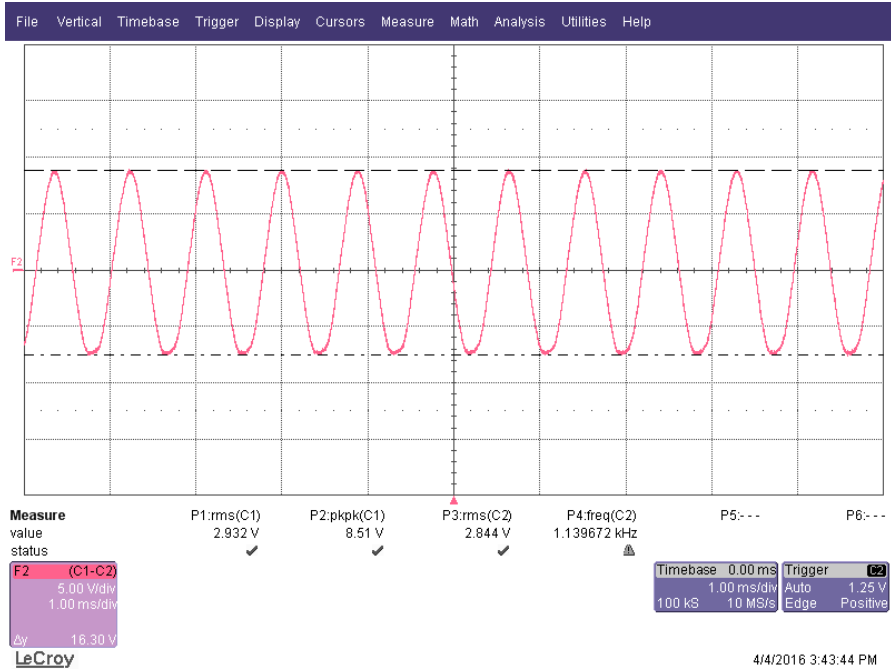


Figure 2: Differential output signal from the sensor. The differential load was 1kohm. The frequency was 1.135kHz which corresponds to a 16mph target. The amplitude of the differential signal is 16.3V in this case.

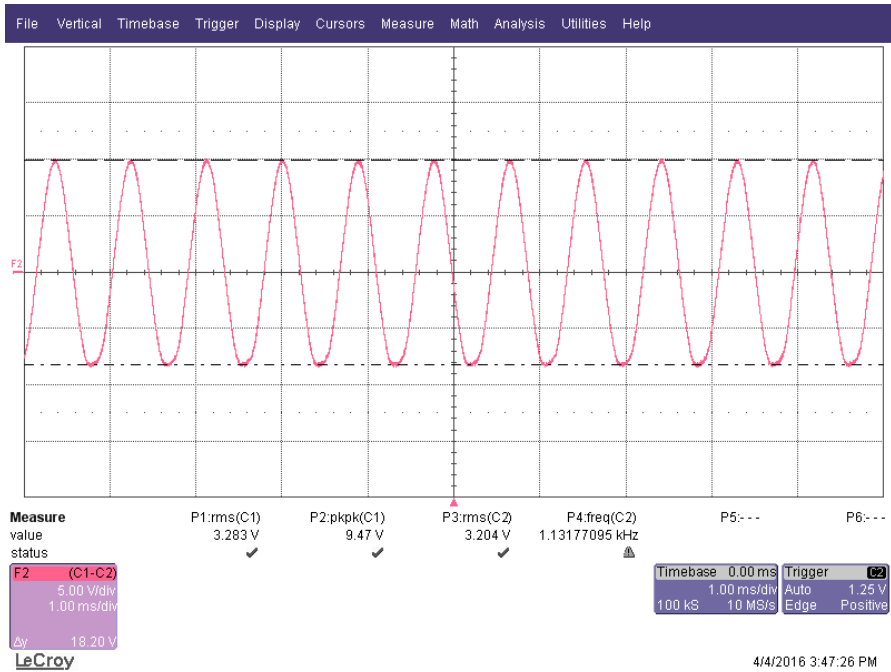


Figure 3: Differential output from sensor. The load was 10kohms. The output frequency was 1.135 kHz which corresponds to a 16mph target. The amplitude of the differential signal is 18.2V in this case.

