# Self Test Sensor ZERO SPEED

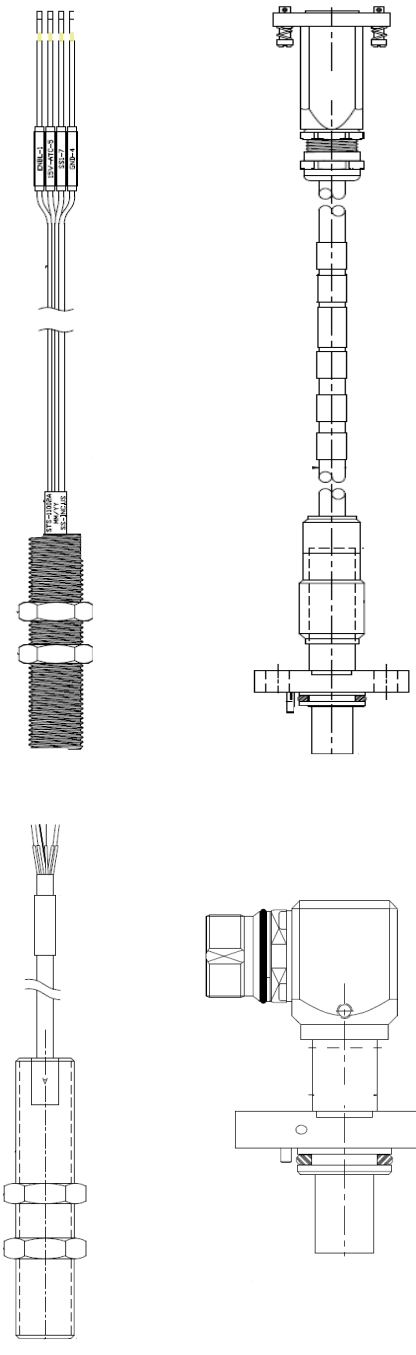

**Figure 1**
Example sensor outlines

## 1. Description

The Self Test Sensor (STS) at Smith Systems Inc. is a complete zero speed sensor with a configurable self-testing feature to indicate sensor functionality by a selectable frequency output.

For specific applications, self-test configurations and parameters may be modified according to this datasheet.

Contact Smith Systems Inc. (SSI) to discuss your application requirements.

Phone: (828) 884-3490

Website: www.smith-systems-inc.com

## 2. Features and Capabilities

- Transient voltage protection
- Harsh environment ready
- Reverse polarity protection
- Customizable self-test output frequency and timing

**Configurable Capabilities:**

- Enable input to trigger self-test
- Automatic self-test on power up
- Automatic self-test at stop

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# 3. Specifications

## 3.1 Simplified schematic

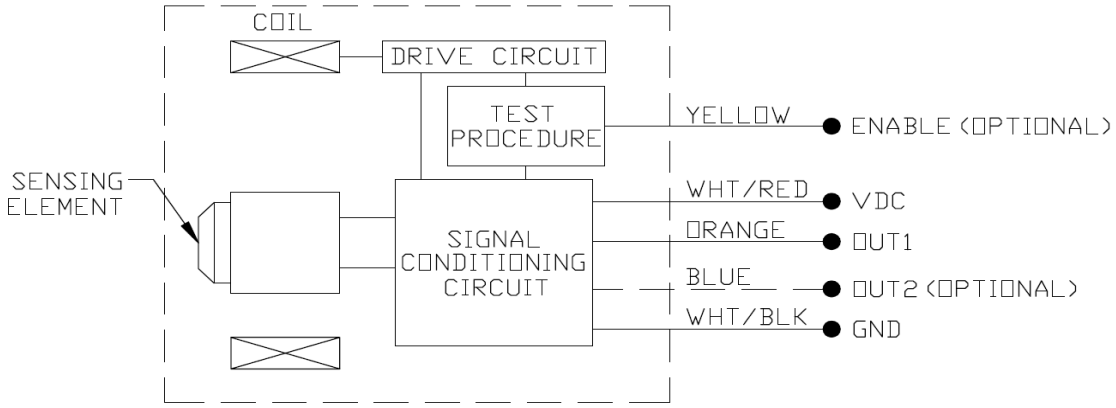


**Figure 2**
STS11001 Simplified Schematic

## 3.2 Mechanical configuration

The STS technology may be implemented in a variety of sensor sizes and mounting configurations. Contact SSI for a review of your application needs.

Below are examples of possible customizable sensor configurations:

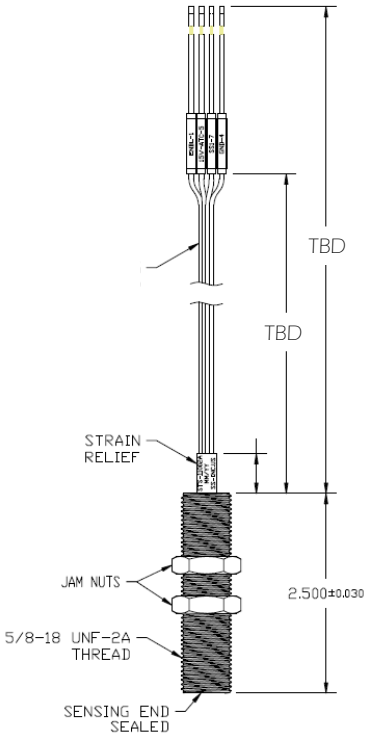


**Figure 3**
Example Configuration 1

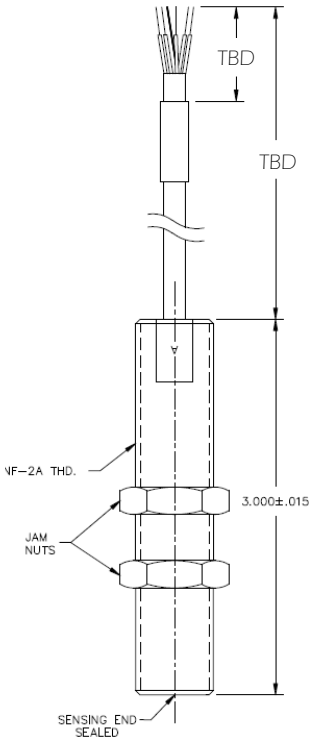


**Figure 4**
Example Configuration 2

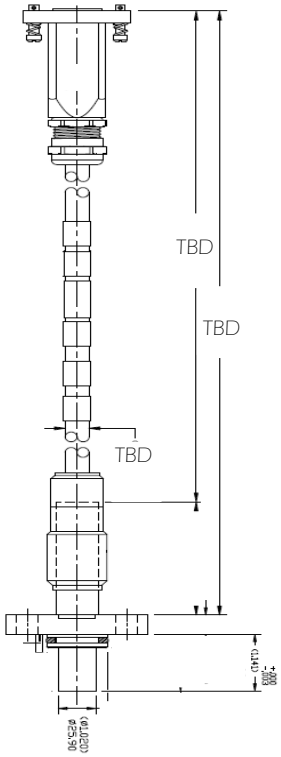


**Figure 5**
Example Configuration 3

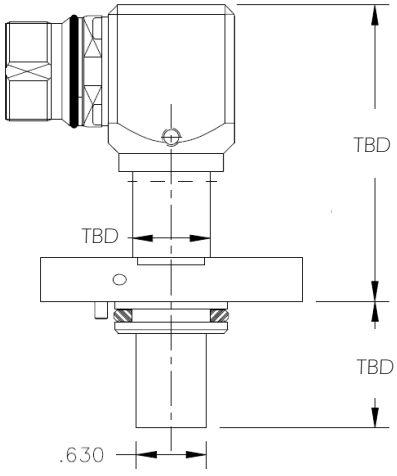


**Figure 6**
Example Configuration 4

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# 3. Specifications (Continued)

## 3.3 Electrical configuration

Below are recommended electrical specifications for STS zero speed sensors. Modifications may be made according to application requirements.

| PARAMETER | SPECIFICATION | REF | TEST PROC. | % TEST |
|---|---|---|---|---|
| TEMP. SPEC. | -40° TO +85°C | | | |
| SUPPLY VOLTAGE | 8 TO 24 VOLTS | | | |
| OUTPUT TYPE | PUSH/PULL | | | |
| OUTPUT CURRENT | 15mA MAX. | | | |
| OUTPUT IMPED. | 200 OHMS | | | |
| LOGIC 0 | 300 mV MAX. | | VDC=15V, RL=100K | 100% |
| LOGIC 1 | SUP. VOLT-2.5V MIN. | | VDC=15V, RL=100K | 100% |
| SUPPLY CURRENT | 9mA TYP. | | VDC=15V, RL=100K | |
| | 100 mA TYP. | | VDC=15V, RL=100K,ENABLE ACTIVE | |
| ENABLE VOLTAGE | 1V MIN. | | | |
| * TEST FREQ. | 500Hz, 250 CYCLES | | VDC=15V, RL=100K,ENABLE ACTIVE | |
| SENSING FREQ. RANGE | 0 TO 15KHz | | | |
| SENSING DISTANCE | 0.005" TO 0.080" | | 8DP. GEAR | |
| | 0.005" TO 0.030" | | 20DP. GEAR | |

**Frequency limited to 500Hz-10kHz @ 15V. Number of cycles not limited.*

**Table 1:** Electrical Specifications

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# 4. Self-test Parameters

## 4.1 Self-test description

STS technology enables a sensor to internally test the functionality of the complete sensor according to application requirements providing an extra layer of application safety and preventative maintenance. Parameters described in this data sheet may be configured, allowing the STS technology to be used in diverse applications. If a sensor has more than 1 output, all outputs will identically indicate sensor functionality when the self-test is enabled. The capabilities of STS sensor outputs are outlined throughout section **4. Self-Test Parameters.** Contact SSI for recommended STS configuration.

## 4.2 Enable

The STS may be triggered with an enable input. When the enable line is pulled high and the application is stopped, the self-test procedure is intiated and a specified frequency output will indicate sensor functionality. The test frequency may be steadily output as long as the enable is high and the application is stopped, or the test frequency may be burst once per rising edge of the enable line as long as the application is stopped. The self-test procedure will not activate if the application is moving. The STS enable parameters may be modified as described below:

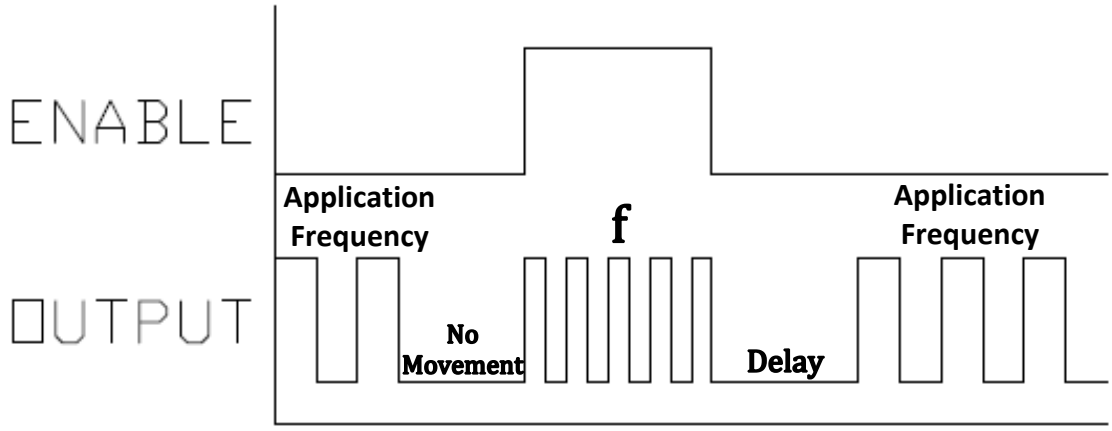


**Figure 7**
STS Output with Enable Input

- **No Movement:** Duration of no movement before test procedure can be enabled (seconds)
- **ENABLE:** Must be pulled high AND no movement detected to start self-test procedure
- **f :** Output test frequency (steady or burst Hz)
- **Delay:** Minimum time before sensor can resume normal operation
- **Application Frequency :** Normal operation speed output (Hz)

# 4. Self-test Parameters (Continued)

## 4.3 Test when powered on

The self-test procedure may be configured to start on power up. If the self-test is completed on each power cycle the sensor may no longer need an enable line. Power-on parameters are described below and may be configured for specific applications.

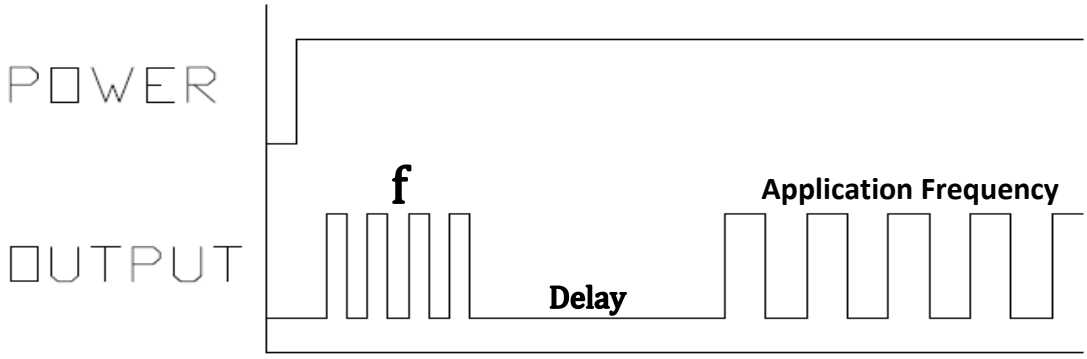


**Figure 8**
Power on test output

- **f :** Output test frequency (Hz)
- **Delay :** Minimum time before sensor can resume normal operation
- **Application Frequency :** Normal operation speed output (Hz)

## 4.4 Test when application stops

The self-test may automatically be triggered when the application comes to a stop. The test frequency output may be steady/burst for a set period of time, or until it detects the application moving again. The parameters described below may be configured for specific applications.

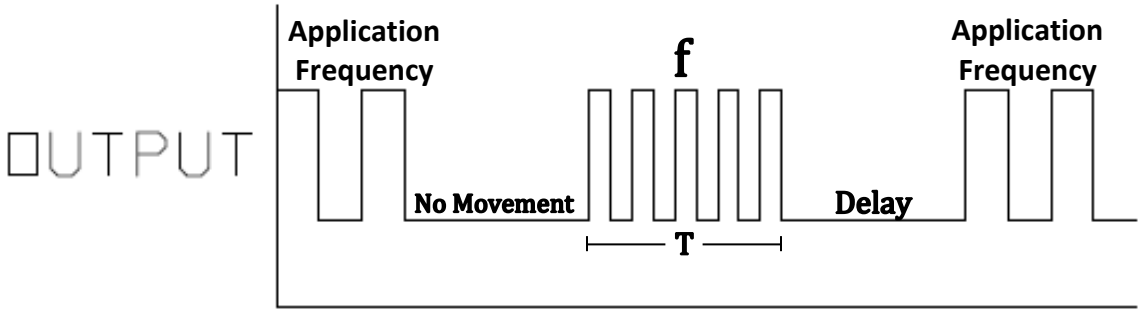


**Figure 9**
Test output on stop

- **No Movement:** Duration of no movement before test procedure will start (seconds)
- **f :** Output test frequency (steady or burst Hz)
- **T:** Period of time the test frequency will output
- **Delay :** Minimum time before sensor can resume normal operation
- **Application Frequency :** Normal operation speed output (Hz)

# 5. MetaSense™

## 5.1 MetaSense™

The Self Test Sensor defined in this document is part of the MetaSense™ line of speed, motion, and temperature sensor development program. Smith Systems Inc. is striving to offer sensors with enhanced capabilities that provide longer service life and an extra layer of safety and protection within your existing systems.

The self-test procedure and any other monitoring functions are programmed to suit your application requirement(s). These features can be designed as an automatic conditional-response or enabled by your control system.

Smith System Inc. would be pleased to work with you to develop enhanced sensors that can function with your current systems and move forward together to create sensors and systems that add additional safety and assurance to your application.

We are interested in providing intelligent sensors that improve efficiency- making systems safer and enhancing preventative maintenance.

Contact Smith Systems Inc. to discuss your application needs.

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