



## **Steel Stress Sensor Eval Kit**

***ADTEC-SS-0001-EVAL***

***ADTEC-SS-0002-EVAL***

*Datasheet-Rev01*



- Programmable sensing range
- Interface type: Passive PoE 100M 24VDC
- Connector: M12 X-Coded Female Connector
- Service Temperature: 0° to 70°
- Output Data rate: 40Ksps@16-bit, 2-channels
- Open-source Evaluation PC Software
- Selectable Excitation Frequency & Amplitude
- Programmable Hardware Zero-Output
- Upgradable Firmware Through Ethernet interface
- IP 66 Upgradable to IP67
- Perfect Choice for Technology Evaluation Sample






## **Product Description:**

ADTEC-SS-EVAL is a Complete Active Stress Sensing Solution with Integrated Excitation and Sensing Features. It Utilizes a High-Speed DSP Coupled with a 100M Ethernet Interface Capable of Providing a Stable Output Data Stream of 40KHz (over UDP). Depending on the Required Rensing Range, Material Type and Magnetic Properties, the Excitation Frequency, Amplitude and Direction can be Digitally Controlled to Tune the Sensor's Behavior. Using TI's Innovative Integrated Magnetic Field Sensors **DRV425** Combined with a Serial 16-bit SAR Analog to Digital Converter Chip **ADS8839** and a Voltage Reference **REF5050** to Achieve an Absolute Accuracy of **3000µV**.

This Sensor Comes with 2 different Shapes:

- ADTEC-SS-0001-EVAL: The Cube Sensor
- ADTEC-SS-0002-EVAL: The Flat Sensor

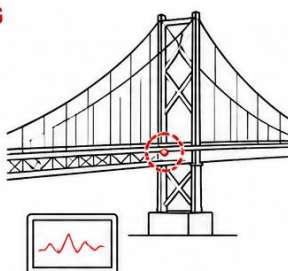
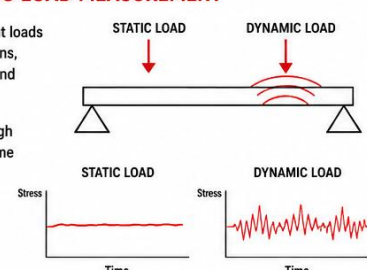
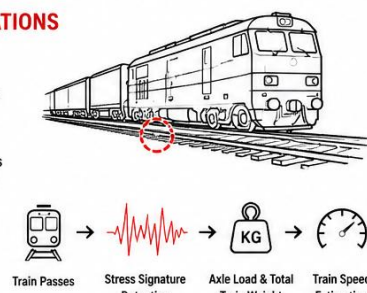
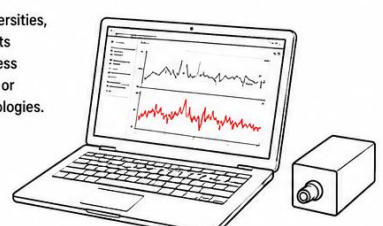
Stress Measurement is Completely Contactless, Based on a State of Art Technology Developed by ADTEC. This Unique Technology Gives the Opportunity to Build a Robust, Contactless, Calibration-Free Sensor that Measures Stress without any Metal intervention or Modification.

 <p><b>CONTACTLESS</b></p> <p>No physical contact ensures wear-free operation and long service life.</p>	 <p><b>ACCURATE</b></p> <p>High precision measurements with excellent repeatability.</p>	 <p><b>ROBUST</b></p> <p>Built to withstand harsh environments, shock, vibration and extreme conditions.</p>	 <p><b>CALIBRATION FREE</b></p> <p>Stable and reliable performance over years of use – no recalibration needed.</p>	 <p><b>STRAIN-GAUGE AND ADHESIVE FREE</b></p> <p>No strain gauges or adhesives required – simplifies installation and improves reliability.</p>
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## Typical Use Cases:

- Structure Monitoring
- Static and Dynamic Load Measurement
- Weighing Applications
- Research & Technology Evaluation

And Much More!!!

<p><b>1 STRUCTURE MONITORING</b></p> <p>The Sensor can be used to monitor stress variations in steel structures such as bridges, towers, industrial frames, and support beams.</p> <p>Its contactless sensing principle enables long-term monitoring without modifying the structure or interrupting operation.</p> <p>Continuous monitoring helps detect abnormal loading conditions before mechanical failure occurs.</p> 	<p><b>2 STATIC &amp; DYNAMIC LOAD MEASUREMENT</b></p> <p>Suitable for monitoring both constant loads and rapidly changing stress conditions, including vibration, cyclic loading, and transient mechanical events.</p> <p>This is supported by the sensor's high sampling rate of 40kSps and real-time Ethernet streaming capability.</p> 
<p><b>3 WEIGHING APPLICATIONS</b></p> <p>The sensor can be used in weighing applications by monitoring stress variations generated in steel structures under load.</p> <p>This Sensor Suits heavy vehicles in motion applications like railway systems where the sensor can detect the stress signatures produced by passing train axles to estimate axle load, total train weight and Train Speed in real time.</p> 	<p><b>4 RESEARCH &amp; TECHNOLOGY EVALUATION</b></p> <p>The evaluation kit is ideal for universities, laboratories, and R&amp;D departments working on magnetic sensing, stress analysis, predictive maintenance, or non-contact measurement technologies.</p> <p>Open-source PC software allows rapid experimentation and system customization.</p> 

## **Technical Specifications:**

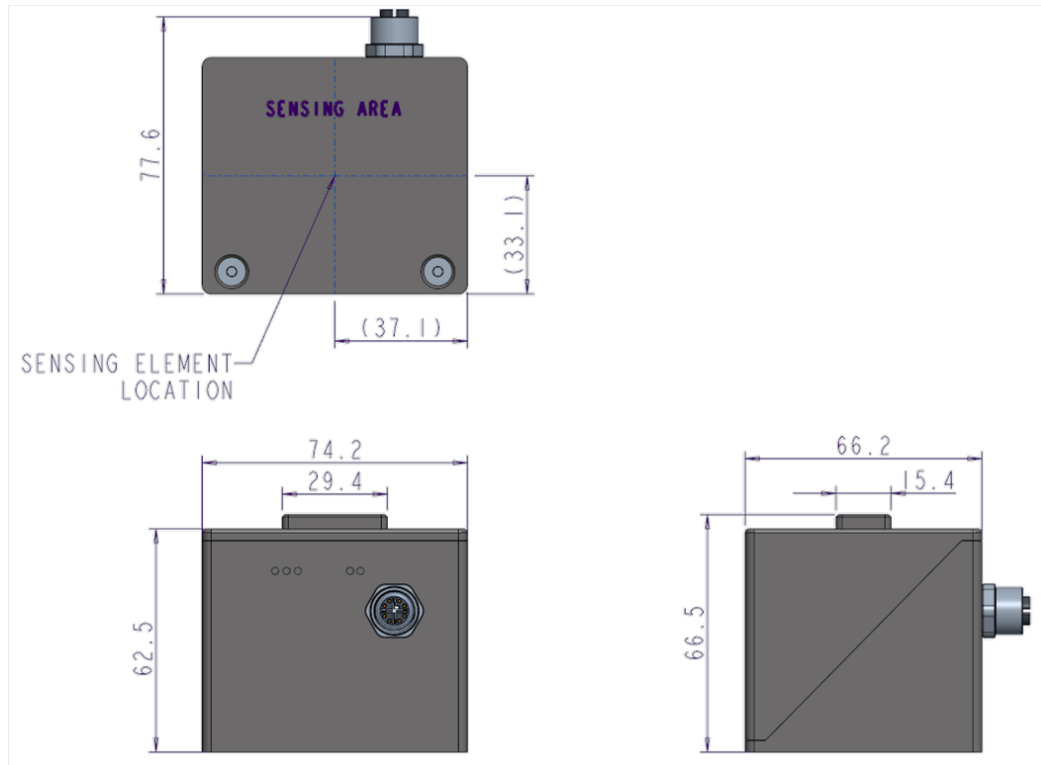
### **• Sensor Specifications:**

<b>Parameter</b>	<b>Value</b>	<b>Unit</b>
<b>Supply Requirement</b>		
Supply voltage	24 ±5%	V
Supply Current	400-1500	mA
<b>Excitation System</b>		
Frequency range	0.6-2.5	KHz
Current range	200-1000	mA
Control mode	Constant Current	
Number of output channels	3	Channels
Diagnostic feedback	Yes, through ADC readback	
<b>Sensing System</b>		
Number of channels	2	Channels
Sampling rate	40	kSps
Resolution	16	bits
Auxiliary sensors	Temperature sensor	
<b>Interface Specs</b>		
Interface Connector	M12 X-coded 8-pin connector	
Interface Type	Passive PoE 100M	
Supported protocols	UDP (Data streaming), TCP (Control)	
Network detection method	Identifier packet broadcast (UDP)	

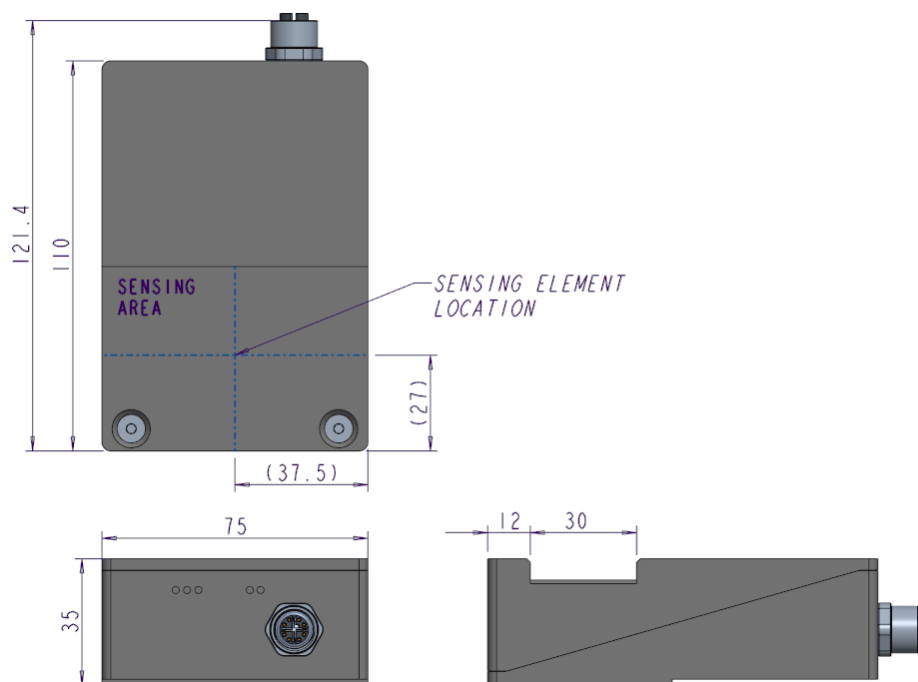
The Specs above are Applicable for both “ADTEC-SS-0001-EVAL” and “ADTEC-SS-0002-EVAL” Variants.

Since This Sensor Uses Magnetic Field for Stress Measurement, It Should be only Attached to Ferromagnetic Steel Piece, Otherwise Readings will be Inaccurate.

• **Mechanical Dimensions (ADTEC-SS-0001-EVAL)**

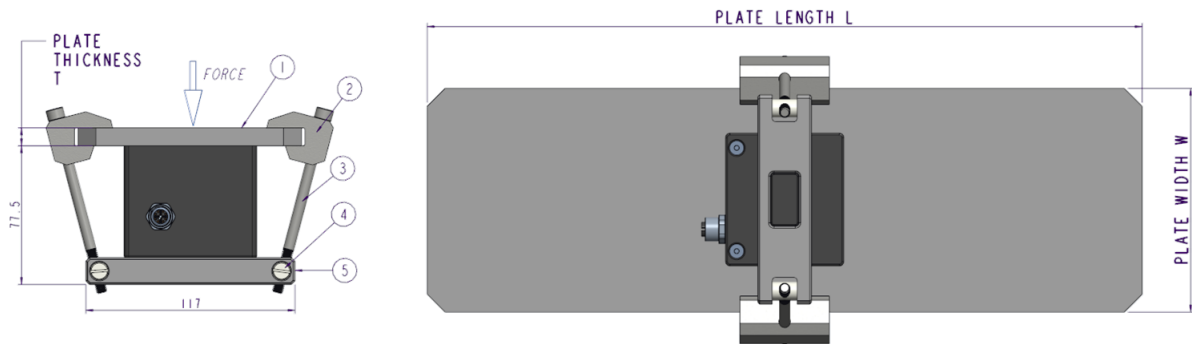


• **Mechanical Dimensions (ADTEC-SS-0002-EVAL):**

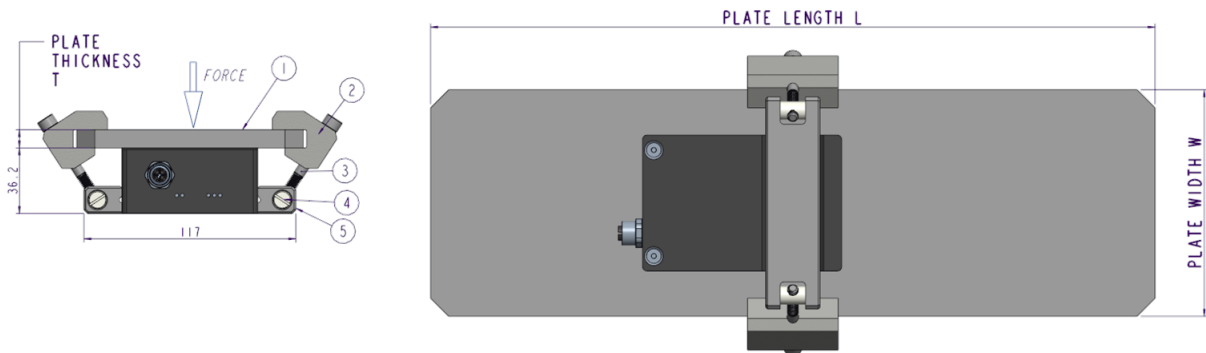


• **Mechanical Interface:**

○ **ADTEC-SS-0001-EVAL**



○ **ADTEC-SS-0002-EVAL**

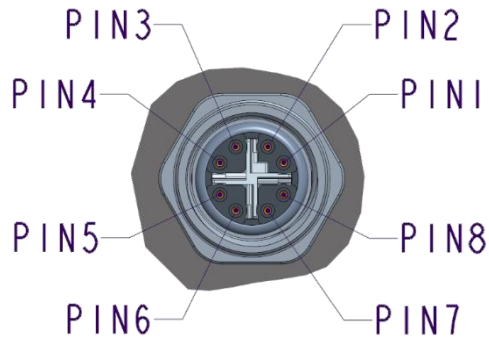


Sensor Unit Comes with the Following Accessories to Ease Sensor Use:

1. Steel Metal Plate
  - ✓ Thickness  $T = 4\text{mm}$
  - ✓ Width  $W = 125\text{mm}$
  - ✓ Length  $L = 400\text{mm}$  (Can be Customized)
2. Pair of Clamps (Designed to suit the Plate Size)
3. Pair of Screws
4. Pair of Cross Dowels
5. Aluminum Holder

Ensure that the Sensor is securely mounted before operation to prevent unintended movement of the sensor which might affect the accuracy of the readings

## • **Cable Connection:**



Pin Number	Description
1	TX-
2	TX+
3	POE-
4	POE-
5	POE+
6	POE+
7	RX-
8	RX+

## **Handling and Transportation:**

During Handling and Transportation, Make Sure the Sensor is not Exposed to Magnetic Field (Like Permanent Magnets).

Magnetic Tools when Assembling the Sensor can affect its Performance as well.

## **Important Technical Safety Instructions:**

Sensor is Built from 3D Printed Material for Evaluation Purposes Only; it is not Built to Withstand:

- High Temperature (Higher than 70° Can Affect Reading).
- Mechanical Loads: Drops, Vibration, etc...
- Reverse Polarity or Overvoltage on the Connector can Damage the Sensor.
- Aggressive Chemicals or Solvents for Cleaning

Sensor Disassembly will Permanently Damage the Product.

The evaluation kit is not designed for safety-critical or life-support applications (For Evaluation Purposes Only).

## **Package Contents:**

<b>Parameter</b>	<b>Qty</b>
Stress Sensor Unit	1
RJ45 to M12 -Xcoded Ethernet Cable	1
Passive PoE Injector Adapter	1

## **Manufacturer:**

The Manufacturer of ADTEC-TS-0EB1-EVAL is:

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