

SG- DVRT®

Subminiature Gauging Displacement Sensor

Designed specifically for tight spaces, the Subminiature Gauging DVRT® delivers high performance in a small package. A ruby bearing and hardened stainless steel ball guide the spring-loaded tip, providing an exceptionally smooth static and dynamic response and resistance to side load. The Subminiature Gauging DVRT® feature sub-micron resolution, linear analog output, flat dynamic response to kHz levels, and very low temperature coefficients. Extremely lightweight, captive cores are small and rugged. Manufactured using corrosion-resistant alloys, Subminiature Gauging DVRT® are suitable for short term submersion in harsh media such as brake fluid and hot saline.



Features & Benefits

High Performance

- micron resolution with large stroke/size ratio
- gauging pin enables measurement on moving parts
- frictionless design for robust use over millions of cycles
- suitable for use in harsh fluids and environments

Ease of Use

- plug and play usability
- easily customized to suit specific requirements
- signal conditioning options for any application

Applications

- Process Control for Production-Line Monitoring
- Miniature Position Control Elements
- Linear & Angular Motion Control
- Measuring Strain and Deflection in Materials and Structures
- Dimensional Gauging for Quality Control

System Overview

Sensor Design

Core position is detected by measuring the coils' differential reluctance using a sine wave excitation and synchronous demodulator. This differential detection method provides a very sensitive measure of core position while cancelling out temperature effects.

The transducers' coils and Teflon® cables are sealed in vacuum-pumped epoxy, within the stainless-steel case. This provides outstanding environmental resistance. The DVRT® has been successfully employed in harsh applications, including short term immersion in saline and pressurized oil.

Units available for long term immersion, corrosive and high pressure environments can be custom built to meet such requirements. LORD MicroStrain®'s desktop consoles and in-line signal conditioners provide the Subminiature Gauging DVRT® with plug and play housing, power, analog output, LCD display, RS-232 output and software. A range of modular positioning attachments and custom strokes are also available.

Specifications

Electrical Specifications

Obtained using DEMOD-DVRT® and DVRT® with 800 Hz lowpass filter at constant temperature

Linear Stroke Length	4, 8, 24, 38 mm (standard resolution) 6 mm (high resolution) 500 µm or less (nano resolution)
Accuracy	± 1.0 % using straight line ± 0.1 % using polynomial
Sensitivity	DEMOM output/sensor range
Signal to noise	4200 to 1 (with filter 3 dB down at 800 Hz, standard resolution), 466 to 1 (unfiltered)
Resolution	1.0 µm for 4 mm stroke 2.0 µm for 8 mm stroke 6.0 µm for 24 mm stroke 9.5 µm for 38 mm stroke 0.6 µm for high resolution version 125 nm for nano resolution version (up to 10 nm resolution is possible with customized sensor range and electronics)
Frequency response	800 Hz standard, 20 KHz optional
Temperature coefficient	offset 0.002% / °C (typical span 0.030% / °C (typical)
Hysteresis	± 1 micron
Repeatability	± 1 micron

Mechanical Specifications

Overall body length	30.5 mm for 4 mm stroke 50.5 mm for 8 mm stroke 127 mm for 24 mm stroke 183 mm for 38 mm stroke 50.5 mm for high res version 50.5 mm for nano version
Outside diameter	6.0 mm (smooth body) 8.0 mm for 38 mm stroke
Spring stiffness	0.2 N/mm (1 lb/in)
Bearing material	sapphire and stainless steel
Standard core tip	4.76 mm stainless steel ball
Housing material	400 stainless steel smooth body; 400 stainless steel 3/8-24 UNF thread (38 mm stroke has 7/16-20 UNF thread); 400 stainless steel M10x1.5-6g metric thread (38mm stroke has M11x1.5-6g metric thread)
Attachment method	threaded body
Leadouts	45 cm multistrand, shielded, stainless steel reinforced teflon insulated cable
Connector	keyed 4 pin Lemo, polyolefin relief
Operating temperature	-55 to 175 °C
Core material	stainless steel
Cable diameter	0.070 "

Contact us for information on custom designs suitable for immersion, corrosive and high pressure environments.

