

AR1000 Laser Distance Gauge

Principles of Operation

The AR1000 is a time-of-flight sensor that measures distance by a rapidly-modulated and collimated laser beam that creates a spot on a target surface. Components of the reflected light signal are collected by a lens and focused onto a photodiode within the sensor unit. The reflected light returns with a shift in phase compared with the reference signal. From the amount of phase shift, a required distance is calculated with millimeter accuracy. The distance is transmitted through serial communications or analog outputs. Maximum ranges exceed 100 feet (30 m) with the optional usage of reflectors.



Definitions

Span: Working distance between measurement endpoints over which the sensor will reliably measure displacement

Accuracy: The sum of all measurement errors when compared to a known standard

Resolution: Smallest increment of change in distance that a sensor can detect.

Reproducibility: Similarity between duplicate measurements

Sample Rate: Speed that data samples are obtained from the sensor

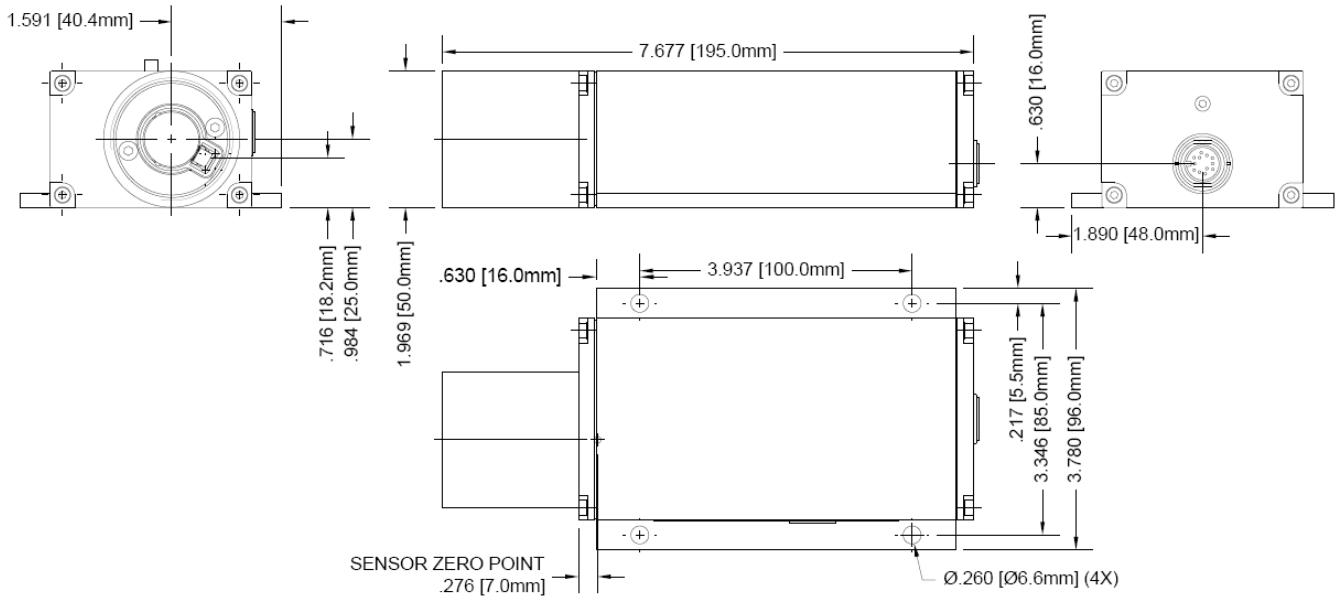
AR1000 Standard Model Specifications

	English units	Metric units
Span	4 in. min. to 100 ft. max (targets of 85% diffuse reflectance) 500 ft. max (retroreflective targets*)	0.1 to 30 m (targets of 85% diffuse reflectance) 150 m max (retroreflective targets*)
Accuracy	+/- 0.12 in.	+/- 3 mm
Resolution	0.004 in.	0.1 mm
Laser spot	0.2 in., 0.6 mrad divergence	5.1 mm, 0.6 mrad divergence
Reproducibility	≥ 0.2 in.	≥ 0.5 mm
Weight (less cable)	1.9 lbs.	850 grams
Laser class	Class 2, Complies with FDA 21 CFR, notice 50, EN60821-1-2001	
Laser type	650 nm, 1 mW visible RED	
Power	10- 30 Volts DC, 50 – 150 mA draw	
Sample rates	50 Hz maximum, or sample trigger (serial command and analog)	
Operating Temp	14 to 122 °F	-10 to 50 °C
Environmental	NEMA – 4, IP67. Keep optical windows clean for best performance. Aluminum case.	
Outputs	serial	RS232 full duplex, RS422 (optional) unterminated and terminated
	analog	4-20 mA, 0–10 V, limit switch (NPN, 100 mA sinking)
	Profibus®	Optional output: Profibus® RS485, Profibus-DP-V0
	SSI Option	Optional output: Simple Sensor Interface protocol
Cable	6.6 ft. (2 m) length, 12 conductor, Binder series 723 flange-mount connector, soldertail wire termination	
	Red – current loop out Black – Tx - (RS422) White – Alarm, digital switching output Clear – Shield	Pink - unassigned Grey – Ground Orange – supply voltage Brown – external trigger
		Yellow – RxD(RS232), RX- (RS422) Green – TxD (RS232), RX+ (RS422) Blue – Ground Violet – Tx+ (RS422)

*contact Acuity for these targets

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Mechanical Dimensions units in inches (mm)



AR1000 Sensor Options

RS422 Output: Differential serial output in both terminated and unterminated formats. RS422 replaces RS232.

Display: Encased display with bright alphanumeric characters, serial input.

Cables: Optional cable lengths. Contact us for custom cabling needs.

Safety labeling



The AR1000 laser distance sensor has a 1 mW, Class 2 visible red laser beam that meet FDA 21 CFR and EN60825-1

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