



The AR500 laser position sensors are compact devices for dimensional measurement. The unit uses laser triangulation principles to accurately measure at high speeds. The same compact enclosure houses models with ranges from 5 to 1000 mm. Sensor options include blue laser diodes, faster speeds and cooling jackets.

AR500 Laser Position Sensors

Principles of Operation

The AR500 is a triangulation sensor that measures distance by projecting a beam of laser light that creates a spot on a target surface. Reflected light from the surface is viewed from an angle by a CMOS detector array inside the AR500 sensor. The target's distance is calculated from the image pixel data using the sensor's microprocessor. The distance is transmitted through serial communications, analog outputs or optionally, via Ethernet. A variety of models are specified, each to allow a different measurement range and standoff.



Definitions

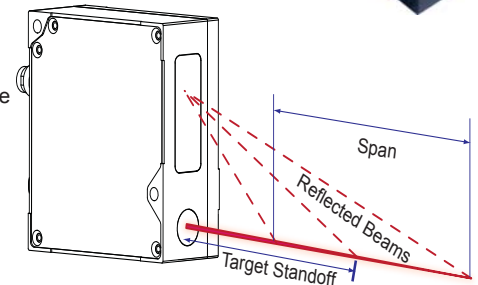
Span: Working distance between measurement endpoints over which the sensor will reliably measure displacement

Standoff: Offset distance from the face of the sensor to the middle of the span. Accuracy is greatest at the standoff distance and the laser spot size is smallest at this focal point. AR700 standoff location tolerance is +/-0.25mm.

Linearity: The largest deviation from a best-fit straight line over the measurement range, created by data from the sensor with reference taken from a true distance scale. Stated as +/-% of the Span.

Resolution: Smallest increment of change in distance that a sensor can detect. Stated as % of the Span.

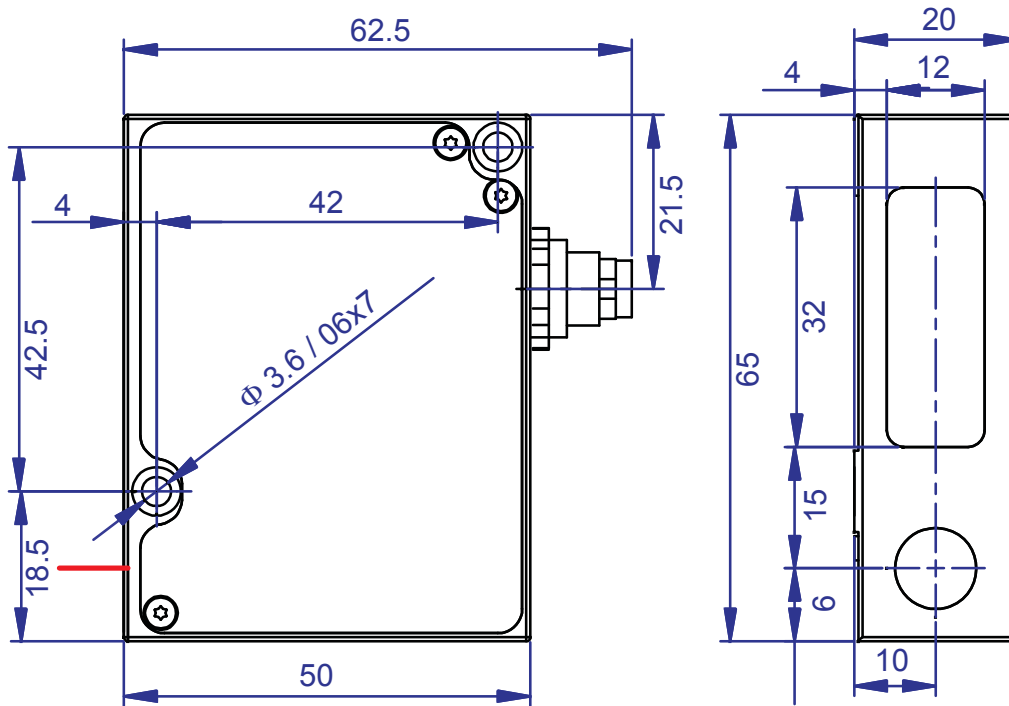
Sample Rate: Speed that data samples are obtained from the sensor.



AR500 Standard Model Specifications units in Metric unless noted Imperial

AR500 model	-5	-10	-25	-50	-100	-250	-500	-750	-1000
Span [in.]	5 [0.20]	10 [0.39]	25 [0.98]	50 [1.97]	100 [3.94]	250 [9.84]	500 [19.7]	750.0 [29.5]	1000 [39.4]
Standoff [in.]	12.5 [0.49]	20 [0.79]	57.5 [2.26]	90 [3.54]	110 [4.33]	205 [8.07]	375 [14.8]	520 [20.5]	745 [29.3]
Linearity (+/-) μm [10^{-3} in.]	0.15% of Span, 500 Hz, to white target (85% diffuse reflectance)								
	7.5 [0.3]	15 [0.59]	37.5 [1.48]	75 [2.95]	150 [5.91]	375 [14.8]	750 [29.5]	1125 [44.3]	1500 [59.1]
Resolution μm [10^{-3} in.]	0.01% of Span								
	0.5 [0.02]	1.0 [0.04]	2.5 [0.1]	5.0 [0.2]	10 [0.4]	25 [1.0]	50 [2.0]	75.0 [3.0]	100 [4.0]
Laser spot size μm	40	50	60	80	70	130	140	300	500
Weight no cable [oz.]	100 grams [3.5 oz.]								
Laser class	2	2	2	2	3R	3R	3R	3R	3R
	Complies with 21 CFR 1040 with Laser Notice #50 and IEC/EN 60825-1:2001								
Laser type STANDARD	660 nm, ≤ 0.95 mw, visible RED				660 nm, ≤ 3 mW RED		650 nm, ≤ 4.8 nm visible RED		
Laser type OPTIONAL	405 nm, ≤ 0.95 mw, visible BLUE				405 nm, ≤ 3 mW BLUE		660nm, 20mW visible RED (Class 3B) 405 nm, ≤ 3 mW BLUE 405 nm, 20mW BLUE (Class 3B)		
Power	9 - 36 Volts DC, 250 mA max. Voltage tolerance -5% to +10%								
Sample rates	STANDARD: to 9400 Hz, or sample trigger (serial command or Hardware)								
Operating Temp	-10 - 60°C [14 - 140°F]; to -30°C with optional heater; to 120°C with optional air-cooling; 95% Humidity (non-condensing)								
Environmental	NEMA - 4X, IP67. Keep optical windows clean for best performance. Aluminum case. Compliant with the RoHS directive regarding the reduction of the use of lead and other hazardous substances.								
Shock / Vibration	Shock: 30 grams / 6 ms; Vibration: 20 g / 10...1000Hz, 6 hours, for each of XYZ axes								
Temperature Drift	0.02% of span / °C								
Interfaces	Serial	STANDARD: RS232 full duplex (460.8 Kbits/sec); OPTION: RS485							
	Analog	STANDARD: 4-20 mA; OPTION: 0-10V							
	Ethernet	OPTION: Ethernet (minimum quantity required)							
	Logic	STANDARD: Programmable (see manual), NPN: 100 mA max; 40 V max for output							
	Sync Trigger	STANDARD: 2.4 - 5 V (CMOS, TTL)							
Cable	length: 6 ft. (1.8 m), weight: 5.8 oz. (165 g), 12 conductor, Polyurethane sheathing. Binder 712 connector.								

Mechanical Dimensions units in mm.



AR500 Sensor Options

Connectivity kit: Includes terminal blocks, serial cable with molded DB9 connector, AC power supply with 110 VAC or 240 VAC

High power lasers: Diode upgrades to visible red or blue for high sample rates on dark surfaces or in high ambient light.

Cables: Optional, longer cables. Contact us for custom cabling needs.

Serial interface: Optional RS485 interface for long-distance connections. Replaces RS232.

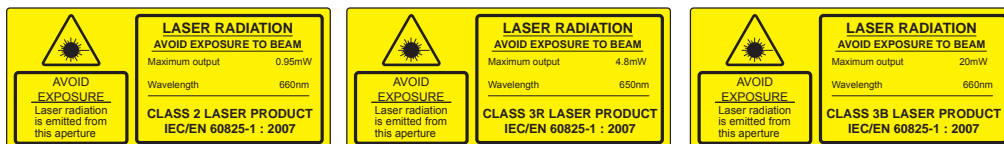
Analog interface: Optional 0-10 V analog interface signal. Replaces 4-20mA signal

Internal heater: Permits sensor use to -30°C

Air-cooled jacket: Enclosure with forced air to cool sensor for use up to 120°C. Sensor must be calibrated inside jacket at factory.

Spray guard: Open-sided enclosure which helps to keep debris off optical windows.

Laser Safety Labels



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Rev 6/12
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