

AR700 Laser Distance Gage

Principles of Operation

The AR700 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 AR700 sensor. The target's distance is calculated from the image pixel data using the sensor's microprocessor. The distance is transmitted through serial communications or analog outputs. A variety of models are specified, each to allow a different measurement range.



Definitions

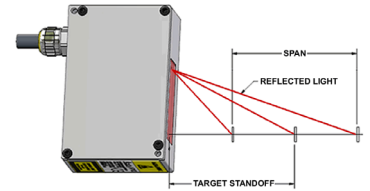
Span: Working distance between measurement endpoints over which the sensor will reliably measure displacement

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.

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.

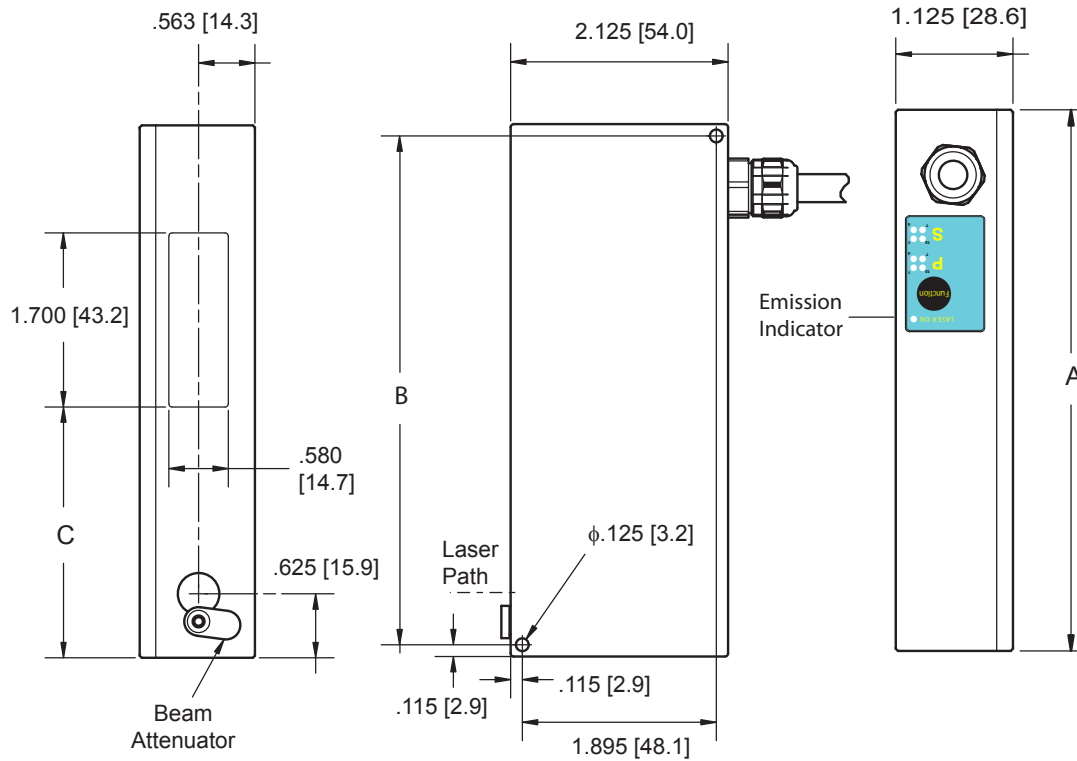
Sample Rate: Speed that data samples are obtained from the sensor.



AR700 Standard Model Specifications units in inches unless noted metric

AR700 model	-0125	-0250	-0500	-1	-2	-4	-6	-8	-12	-16	-24	-32	-50
Span	0.125	0.250	0.500	1.0	2.0	4.0	6.0	8.0	12.0	16.0	24.0	32.0	50.0
Span (mm)	3.175	6.35	12.7	25.4	50.8	101.6	152.4	203.2	304.8	406.4	609.6	812.8	1270
Standoff	0.50	0.75	1.25	1.90	3.36	5.06	10.0	12.0	15.0	18.0	43.0	42.0	56.0
Standoff (mm)	12.7	19.1	31.8	48.3	85.3	129	254	305	381.0	457.2	1092	1067	1422
Linearity	+/- 0.03% of Span, 500 Hz, to white target (85% diffuse reflectance)												
Linearity x10 ⁻³ (+/-)	0.04	0.08	0.15	0.3	0.6	1.2	1.8	2.4	3.6	4.8	7.2	9.6	15.0
Linearity μm (+/-)	0.95	1.9	3.8	7.6	15	31	46	61	91	122	183	244	381
Resolution	0.005% of Span												
Resolution x10 ⁻³ (+/-)	0.006	0.013	0.025	0.05	0.1	0.2	0.3	0.4	0.6	0.8	1.2	1.6	2.5
Resolution μm	0.16	0.32	0.64	1.3	2.6	5.1	7.6	10.2	15.2	20.5	30.5	41.0	63.5
Laser spot size μm	30	35	40	60	65	70	95	120	135	150	200	250	300
Weight, ounces	7.2 oz.; 13.1 oz. with cable												
Weight, grams	205 g; 370 g with cable												
Laser class	2	2	2	2	2	2	3R	3R	3R	3R	3R	3R	3R
	Complies with 21 CFR 1040 with Laser Notice #50 and IEC/EN 60825-1:2001												
Laser type	650 nm, 1 mW visible RED						670 nm, 5 mW visible RED						
	OPTIONAL 660 nm, 20 mW visible RED (Class 3B)												
Power	15 – 24 Volts DC, 120 – 200 mA draw with 350 mA surge at power-up												
Sample rates	0.2 – 9400 Hz, or sample trigger (serial command or analog)												
Operating Temp	0 – 50 °C (32 – 122 °F)						0 – 40 °C (32 – 104 °F)						
Environmental	NEMA – 4, 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.												
Outputs serial	RS232 full duplex, RS422 unterminated and terminated												
analog	4-20 mA or 0–10 V; two limit switches (NPN, 100 mA sinking)												
Cable	6 ft. (1.8 m) length, 12 conductor, Polyurethane sheathing												
	Red – power 15-24 VDC				Pink - Limit 1, NPN				Yellow – RxD(RS232), TX- (RS422)				
	Black – Ground				Grey – Limit 2, NPN				Green – TxD (RS232), RX- (RS422)				
	White – laser disable				Orange – current loop / voltage out				Blue – RTS (RS232), TX+ (RS422)				
	Clear – Shield				Brown – current loop / voltage return				Violet – CTX (RS232), RX+ (RS422)				

Mechanical Dimensions units in inches [mm]



Model	A	B	C
AR700-0125, 0250, 0500, 1, 2, 4	3.250 [82.6]	3.020 [76.7]	.500 [12.7]
AR700-6, 8, 12, 16	5.200 [132.1]	4.97 [126.2]	2.45 [62.2]
AR700-24, 32, 50			

AR700 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 20 mW (660 nm, Class 3B) for high sample rates on dark surfaces or in high ambient light.

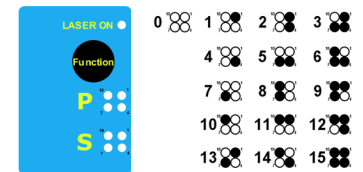
Road profiling option: Package for AR700-6 or -8. Includes specialized optics, upgraded diode and signal processing firmware optimized for use in high-speed longitudinal road surface profiling.

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

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

Interface Selection

The AR700 has many configurations that can be set directly using the sensor's built-in Function button and corresponding LED's. External controllers are not required to change settings! Manipulation of the PARAMETER and SETTING functions allow users to configure sampling rates, output formats, zero and span points, baud rates, optional exposure limits and limit switches. See the User's Manual for more information.



Specifications subject to change without notice

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Laser Safety Labels



Acuity AR700
Schmitt Measurement Systems
2765 NW Nicolai St
Portland OR, 97210
COMPLIES WITH 21 CFR
1040.10 WITH LASER
NOTICE 50 AND
IEC/EN60825-1:2001



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