



The **AR550** high-speed laser sensors are Acuity's fastest triangulation devices for dimensional and distance measurement. These sensors are used for scanning of roads or capturing high-speed events such as a vehicle crash tests or ballistic measurements. The data interface is Ethernet.

## AR550 High Speed Laser Sensor

### Principles of Operation

The **AR550** 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 AR550 sensor. The target's distance is calculated from the image pixel data using the sensor's microprocessor. The distance measurement is transmitted through Ethernet output. The sensor is setup using a serial port. A variety of models are specified, each to allow a different measurement range and base distance.



### Definitions

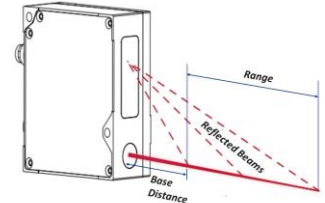
**Range:** Working distance between measurement endpoints over which the sensor will reliably measure displacement.

**Base Distance:** Offset distance from the face of the sensor to the beginning of the measurement range. Accuracy is greatest at the middle of the range, and the laser spot size is the smallest at the middle of the measurement range.

**Resolution:** Smallest change in distance that a sensor can detect. Stated as % of the full-scale range.

**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 a +/- % of the range.

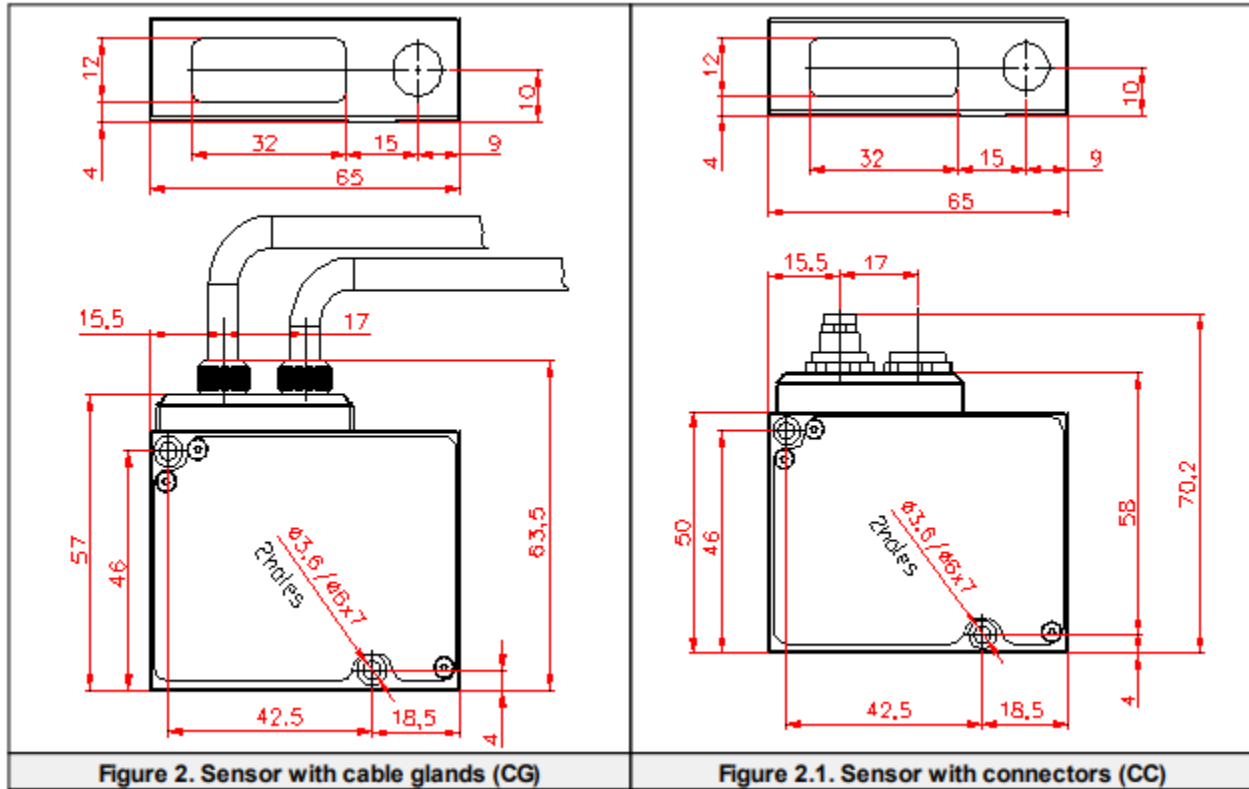
**Sample Rate:** Speed that data samples are obtained from the sensor. The maximum attainable sample rate is determined by the selected operating mode and target reflectance.



### AR550 Standard Model Specifications units in Metric unless noted Imperial

AR550 Model	-2	-5	-10	-25	-50	-100	-250	--500	-750
Range [in.]	2 [0.08]	5 [0.20]	10 [0.39]	25 [0.98]	50 [1.97]	100 [3.94]	250 [9.84]	500 [19.7]	750 [29.5]
Base Distance [in.]	15 [0.59]	15 [0.59]	25 [0.98]	45 [1.77]	65 [2.56]	90 [3.54]	80 [3.15]	125 [4.92]	145 [5.71]
Linearity (+/-) $\mu\text{m}$ [ $10^{-3}$ in.]	0.15% of range, 500 Hz, to white target (85% diffuse reflectance)								
Resolution (+/-) $\mu\text{m}$ [ $10^{-3}$ in.]	0.01% of range								
Weight no cable [oz.]	110 grams [3.9 oz.]								
Laser class	3R	3R	3R	3R	3B	3B	3B	3B	3B
	Complies with 21 CFR 1040 with Laser Notice #50 and IEC/EN 60825-1:2001								
Light source	Red semiconductor laser, 660 nm wavelength or UV semiconductor laser 405/450 nm wavelength (BLUE version)								
Output power	$\leq 4.8$ mW			$\leq 20$ mW			$\leq 80$ mW		
Power	9 - 36 Volts DC, 250 mA max								
Sample rates	Max 70 kHz								
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 range / °C								
Interfaces Serial	STANDARD: RS232 full duplex, for configuration; OPTION: RS485								
Analog	0-10V								
Data Transfer	Ethernet								
Sync Trigger	Optocoupled								

## Mechanical Dimensions units in mm.



## AR550 Sensor Options

**Blue diode lasers:** Diode upgrades to visible blue for high sample rates on dark surfaces, shiny 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



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