

## AccuRange 200™ laser displacement sensors with resolutions from 2 to 15 microns



The **AR200** family of triangulating laser displacement sensors has four models to satisfy your range requirements with excellent resolution and sensitivity. The most accurate model measures distances over 6 mm with a resolution of 2  $\mu\text{m}$ . The longest range AR200 sensor measures to 50mm with a resolution of 15  $\mu\text{m}$ .

### AR200 Specifications

Laser	650 nm, Class II red visible diode
Power	12 VDC (105 mA) to 30 VDC (60 mA) plus function output current
Resolution	+/- 0.03% of full scale Span
Operating Temperature	0 to 60°C
Weight (less cable)	85 g (3 oz.)
Enclosure	dust and moisture resistant
Sample Rates, configurable maximum	1250 samples / sec
BLE off	600 samples / sec
BLE on	0.2 samples / sec or sample on request
minimum	
Cable Length	2 m
Cable Configuration	8 conductor, Power and serial Data cable

### AR200 Model Specifications in mm unless stated otherwise

Model	200-6M	200-12M	200-25M	200-50M
Span	6.35	12.7	25.4	50.8
inches	0.25	0.50	1.00	2.00
Standoff (approximate)	21	24	34	42
inches	0.83	0.94	1.35	1.67
Linearity/Accuracy	+/- 0.2%			
Resolution	0.0019	0.0038	0.0076	0.015
inches	0.000071	0.00014	0.0003	0.0006
Laser Spot Size ( $\mu\text{m}$ )				
@ span center	35	40	45	50
@ span endpoints	100	200	130	220

### AR200 Outputs

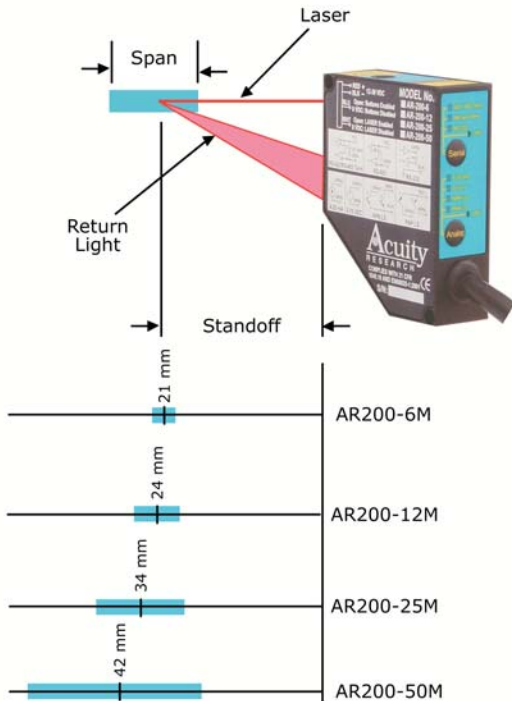
Output formats may be selected using device pushbuttons or through serial commands

Analogue signals	4 - 20 mA	Configurable zero and span points
	0 - 10 V	Configurable zero and span points
Limit Switch signals	100 mA with short-circuit protection	
	Two NPN (sinking)	
	Two PNP (sourcing)	
Serial Output	RS-232 Full Duplex	300 - 115.2 K baud
Serial Output Format	Binary	3 bytes / sample, 0 - 50K over full scale span
	ASCII	Hex FF terminated
		Up to 11 bytes / sample, terminal readable



## Principles of Operation

The AR200 sensors project a beam of visible laser light that creates a spot on a target surface. Reflected light from the surface is viewed from an angle by a line scan camera inside the AR200 sensor. The target's distance is computed from the image pixel data. The AR200 can not be overloaded and measures accurately even when a mirror reflects the entire light beam back to the detector. Likewise, on surfaces of polished glass, almost the entire beam passes through or is reflected away. The AR200 sensors can measure distance from the small remaining scattered light.



### Definitions

**Target Standoff:** Distance from the face of the sensor to the middle of the span.

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

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

**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 full scale span.

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

**Background Light Elimination (BLE):** A user-selected operating mode that improves measurement in bright surroundings by capturing an image with the laser off and subtracts it from the image taken with the laser on. Sample rates are lowered as a result.

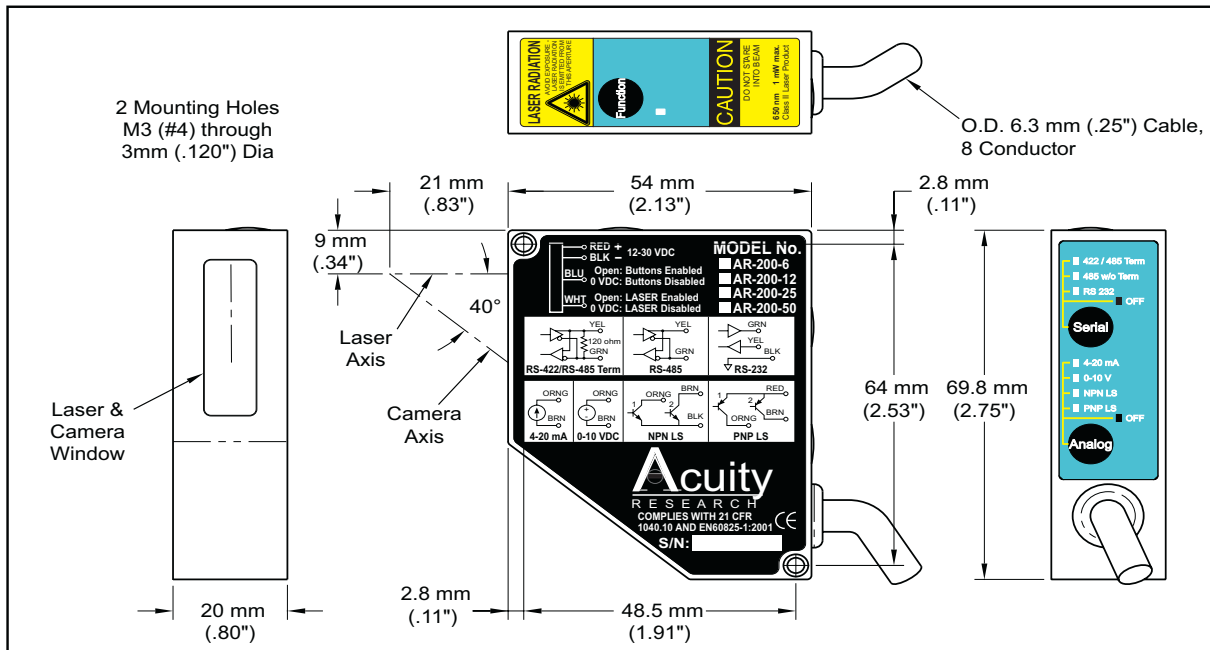
**Sensitivity:** A measure of the relative ability to detect small amounts of reflected light. The better the sensitivity, the higher the attainable sample rate on surfaces such as glass, gloss black paint or shiny plastic.

## AR200 Sensitivity for typical surfaces and relative amounts of diffuse light

Most surfaces reflect light in two ways. Some light is diffusely scattered over wide angles and some is reflected specularly, as from a mirror. Diffuse reflections are typically used for measurement, since they scatter widely and can be detected without precise alignment. The AR200 boasts great sensitivity to small amounts of the diffuse component from shiny surfaces. Versions of the AR200 sensor can measure many materials using either specular or diffuse reflections.

	Sensitivity (normalized) for minimum target reflectance	
	at 20 Hz	at 1.25 KHz
AR200-6	.00003	.003
AR200-12	.00003	.003
AR200-25	.00006	.006
AR200-50	.0008	.008

## Mechanical Dimensions



## AR200 Inputs

AR200 sensor command set:

- Set Zero Point (Configurable anywhere in measurement range.)
- Set Sample Interval between 0.2 to 1250 samples / sec
- Continuous sampling or Sample on command
- Set Span Point: either side of zero point
- Background Light Elimination ON / OFF
- Send Zero / Send NO update if NO measurement
- Serial and Current Loop output Enable / Disable
- Save / Retrieve Configuration settings
- Select: Serial, Analog or Limit Switch configurations
- Take Single Sample

## AR200 Signal and Power Interface

The table below shows the wiring of AR200 sensors ordered without power supplies.

Red	Power, +15V (12-30 VDC)
Black	Ground
Blue	Switches Disable
White	Laser Disable*
Shield	Ground at supply end

Function:	4-20 mA	0-10V	NPN LS	PNP LS
Orange	CL Out	Voltage Output	NPN 1 sink	PNP 1 source
Brown	CL RTN	Voltage RTN	NPN 2 sink	PNP 2 source
Function:	RS232			
Yellow	RxData			
Green	TxData			

\*An emission indicator near the operator control may be necessary to comply with laser safety regulations

## AR200 Sensor Options

**Power Supply:** Universal AC power supply. 100-240 V, 50 - 60 Hz

**Software Library:** Single sensor license for AR200 using serial interface. Includes tested functions for C, C++, VBA and Microsoft® Excel.

**Display:** Encased display with bright green characters, 9 mm high for output from AR200 in mm or in. Dimensions: 246.4 x 71.1 x 116.8 mm (L x H x D) with a 78.7 mm flange.



**Acuity** is the leader in laser sensor development. If our standard products do not exactly meet your needs, please call us with your requirements. We are happy to design a sensor to your range, accuracy and size constraints. For example, our products can be configured to detect multiple surfaces of transparent materials. Our custom configurations provide the greatest flexibility for your specialized applications.



AccuRange™ 4000 sensor series with 0 - 54 foot range and 0.1 inch accuracy



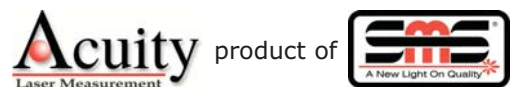
AccuRange™ 600 long-range models with spans of 20, 32 and 50 inches



AccuRange™ 600 short and medium range models with spans of 1/8, 1/4, 1/2, 1, 2 or 4 inches



This label appears on all AR200 models. This product complies with 21CFR 1040.10 and 1040.11. Specifications subject to change without notice.



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