

AR200 Laser Measurement Sensors

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 CMOS 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 to mirror-like surfaces where nearly the entire light beam reflects back to the detector.



Definitions

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

Span: Working distance between measuring 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.

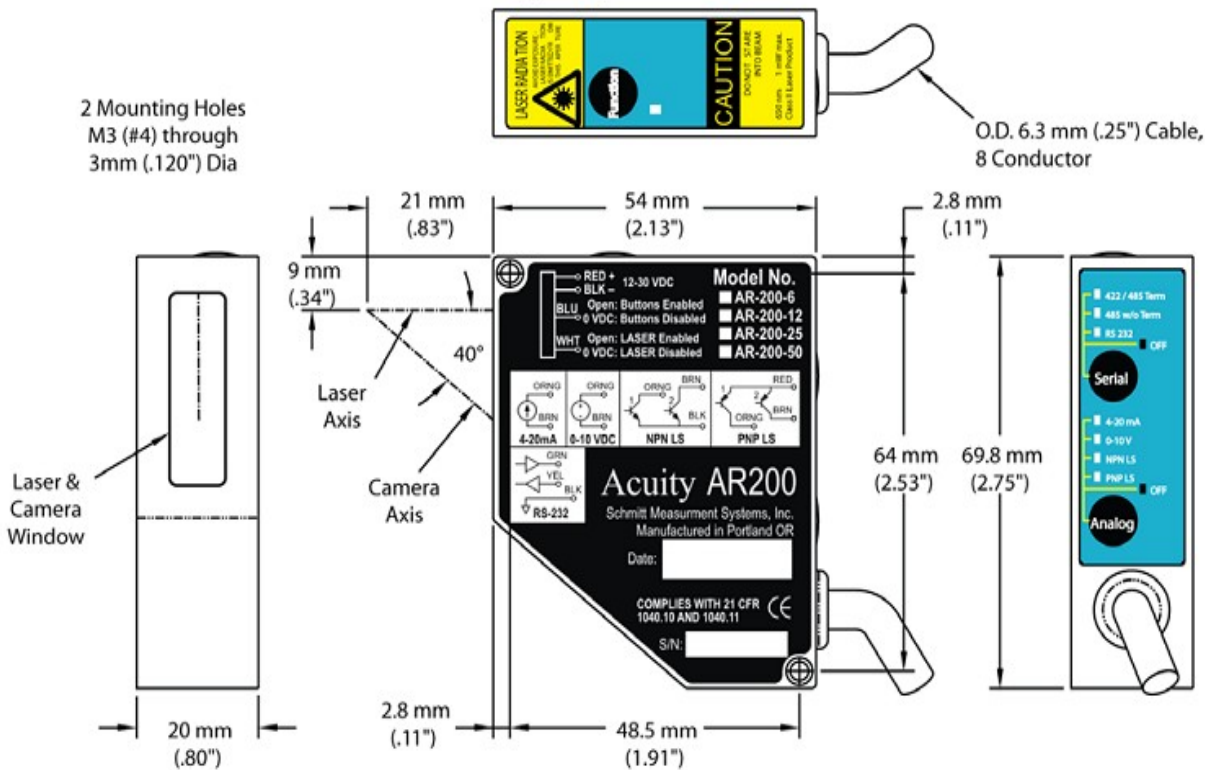
Background Light Elimination (BLE): A user-selected operating mode that improves measurement in bright surroundings by capturing an image with the laser off and subtracts it from the image taken with the laser on. Sample rates are lowered as a result.

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, black paint and shiny plastic.

AR200 Model Specifications units in inches [metric]

AR200 model	AR200-6	AR200-12	AR200-25	AR200-50
Span	0.250 [6.350 mm]	0.500 [12.70mm]	1.00 [25.40 mm]	2.00 [50.80]
Standoff to middle of span	0.83 [21 mm]	0.83 [21 mm]	1.35 [34 mm]	1.67 [42 mm]
Linearity +/- 0.2% of span	0.0005 [12.7 μm]	0.001 [25.4 μm]	0.002 [50.8 μm]	0.004 [101.6 μm]
Resolution 0.03% of span	0.00007 [1.9 μm]	0.00014 [3.8 μm]	0.0003 [7.6 μm]	0.0006 [15.2 μm]
Laser spot size at Standoff, at ends of span	35 μm , 100 μm	40 μm , 200 μm	45 μm , 130 μm	50 μm , 220 μm
Laser type	650 nm, 1 mW max. visible RED, Class 2. Complies with 21 CFR 1040 with Laser Notice #50 and IEC/EN 60825-1:2001			
Sample Rates	0.2 - 1250 Hz, or sample on command (serial command or hardware trigger)			
Power	12 - 30 VDC, <150 mA			
Weight (less cable)	3 oz. [85 g]			
Operating Temperature	-17 - 140°F [0 - 60°C]			
Environmental	NEMA -4, IP65. Keep optical windows clean for best performance. Aluminum case. Class window. Compliant with RoHS directive regarding the reduction of the use of lead and other hazardous substances.			
Output interfaces				
RS232	Full duplex serial, 300 - 115.2 Kbaud, ASCII or Binary formats			
4-20 mA or 0-10V	Analog outputs selectable through sensor push-buttons			
Limit switch signals	2 NPN limit Alarm switches, sink up to 150 mA 2 PNP limit Alarm switches, source up to 150 mA			
Cable ft. [m]	6 ft. [1.8 m] length, 8 conductor + shield, solder tail termination, PVC jacket			
	Red - Power +15 VDC (12-30 VDC)	White - Laser Disable (trigger)	Orange - Current Loop OUT, Voltage Output, NPN 1 sink, or PNP 1 source	Yellow - RxData
	Black - Ground	Blue - Button disable	Brown - Current Loop return, Voltage signal return, NPN 2 sink, or PNP 2 source	Green - TxData

Mechanical Dimensions units in mm [inches]



Laser Safety Label



AR200 Sensor Options

Connectivity kit: Includes terminal blocks, serial cable with molded DB9 connector, Universal AC power supply 110VAC or 24VAC

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

Software Library: Software developer's kit in C, C++, Visual Basic and Microsoft Excel® macros. Per-sensor-license

Touch Panel Display: Controller with alphanumeric display for Acuity laser sensors. Uses TFT touch display. Monitors up to two sensors for thickness measurements. Includes one RS485 output.



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