Acuity®

The AR200 family of triangulation laser measurement sensors has four models to satisfy you range requirements with excellent resolution and sensitivity. The most accurate model measures distances over 6 mm with a resolution of 2 μm. The AR200-50 sensor measures 50 mm to within 15 μm.

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.
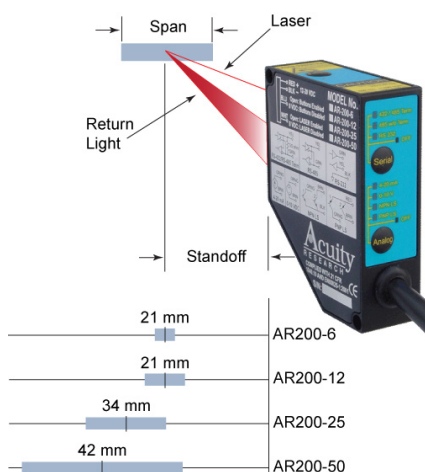
Definitions

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.
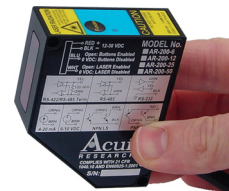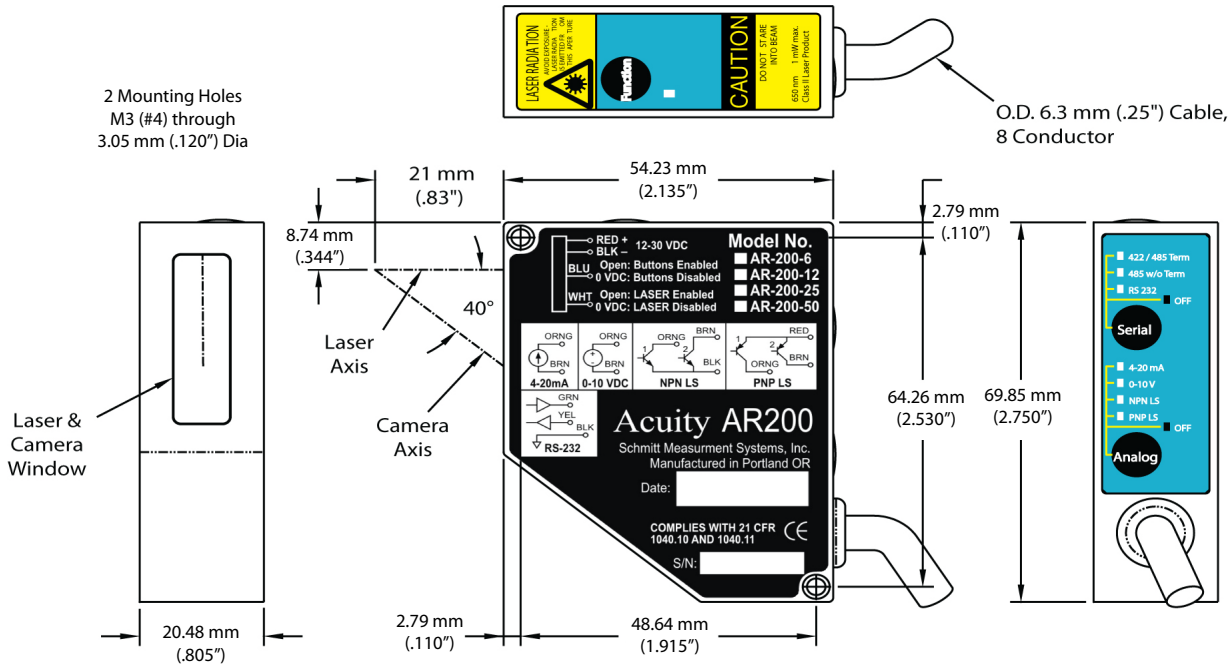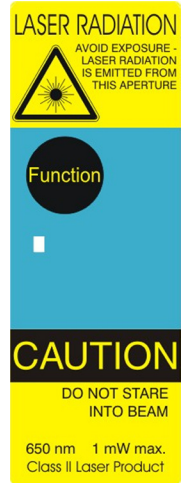
AR200 Model Specifications units in inches [metric]

AR200 model	AR200-6	AR200-12	AR200-25	AR200-50	AR200-100
Span	0.250 [6.350 mm]	0.500 [12.70mm]	1.00 [25.40 mm]	2.00 [50.80]	4.00 [101.6]
Standoff to middle of span	0.83 [21 mm]	0.83 [21 mm]	1.35 [34 mm]	1.67 [42 mm]	3.10 [79 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]	0.008 [203.2 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]	0.0012 [30.5 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	55 μm, 250 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 m 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]. Approximat

2 Mounting Holes
M3 (#4) through
3.05 mm (.120") Dia

O.D. 6.3 mm (.25") Cable,
8 Conductor

21 mm (.83")

54.23 mm (2.135")

2.79 mm (.110")

8.74 mm (.344")

40°

Laser Axis

Camera Axis

Laser & Camera Window

RED + 12-30 VDC
BLK –
BLU Open: Buttons Enabled
     0 VDC: Buttons Disabled
WHT Open: LASER Enabled
     0 VDC: LASER Disabled

Model No.
☐ AR-200-6
☐ AR-200-12
☐ AR-200-25
☐ AR-200-50

4-20mA   0-10 VDC   NPN LS   PNP LS

RS-232

Acuity AR200
Schmitt Measurement Systems, Inc.
Manufactured in Portland OR

Date:

COMPLIES WITH 21 CFR CE
1040.10 AND 1040.11

S/N:

422 / 485 Term
485 w/o Term
RS 232   OFF

Serial

4-20 mA
0-10 V
NPN LS
PNP LS   OFF

Analog

64.26 mm (2.530")

69.85 mm (2.750")

20.48 mm (.805")

2.79 mm (.110")

48.64 mm (1.915")

Laser Safety Label

LASER RADIATION
AVOID EXPOSURE - LASER RADIATION IS EMITTED FROM THIS APERTURE

Function

CAUTION
DO NOT STARE INTO BEAM

650 nm   1 mW max.
Class II Laser Product

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. Optional polyurethane jacket. 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.

Contact Acuity

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Acuity®