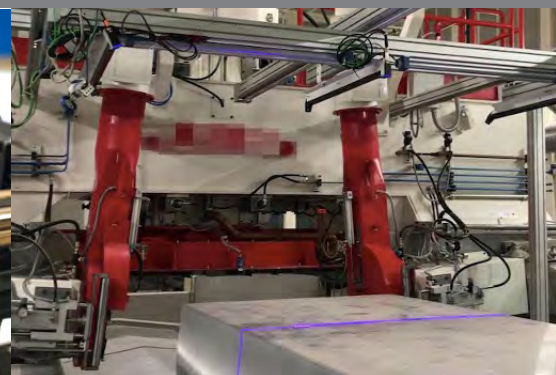
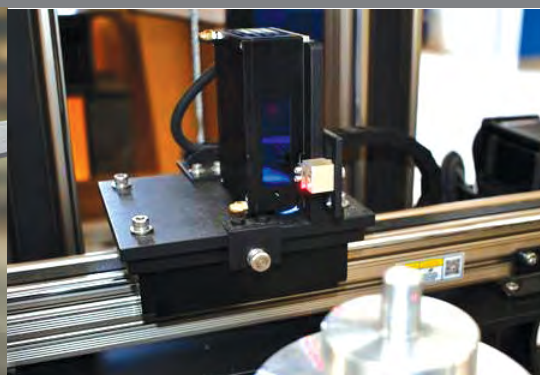




PRODUCT CATALOG 2023

NON-CONTACT LASER MEASUREMENT SENSORS





SOLUTION AREAS



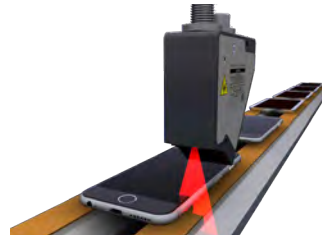
DISPLACEMENT
AND POSITION



LENGTH
MEASUREMENT



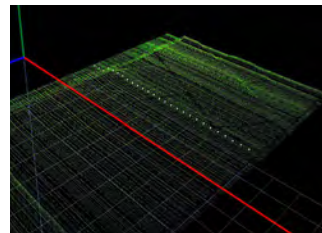
THICKNESS AND
WIDTH



PROFILE
MEASUREMENT



HEIGHT
MEASUREMENT



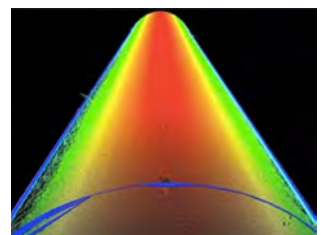
GAP
MEASUREMENT



VIBRATION AND
RUN-OUT



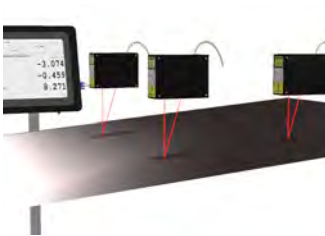
FILL LEVEL
MEASUREMENT



SEAM DETECTION



INNER DIAMETER



STRAIGHTNESS &
FLATNESS



2D MEASUREMENT

ABOUT ACUITY LASER



Acuity Laser is a US-based laser sensor company

Acuity Laser is product line of Schmitt Industries, Inc., a public company headquartered in Portland, Oregon. Acuity Laser was founded in 1992 to develop laser distance sensors and laser measurement systems for industrial and OEM use. Today our sensors are used in a wide range of industrial applications including manufacturing, lumber production, steel casting, glass and paper production, medical imaging, crane control and micron-level part and surface inspection. We serve a wide range of customers, including clients in production industries, system integrators, and OEM customers.

Acuity's product line includes:

- Single point laser triangulation sensors
- Long distance measurement sensors
- 2D and 3D laser line scanners
- Confocal chromatic sensors

Acuity products are sold worldwide. We have worldwide sales engineers located throughout the United States and are ready to help solve your most challenging measurement applications.

Schmitt Industries is certified according to **ISO 9001:2015** for Laser-Based Measurement and Alignment Tools.



LASER TRIANGULATION SENSORS

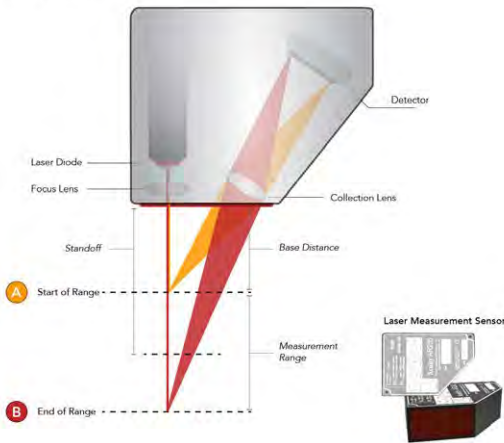
Use Cases

Contactless dimensions, surface profile, deformation, vibration measurement, sorting, sensing presence or absence, positional checking, bulk materials and liquids level measurement.

Operating Principle

Sensor operation is based on the principle of laser triangulation. The laser beam is projected from the instrument and is reflected from a target surface to a collection lens. This lens is typically located adjacent to the laser emitter. The lens focuses an image of the spot on a linear array camera (CMOS array). The camera views the measurement range from an angle that varies from 45 to 65 degrees at the center of the measurement range, depending on the particular model. The position of the spot image on the pixels of the camera is then processed to determine the distance to the target. The camera integrates the light falling on it, so longer exposure times allow greater sensitivity to weak reflections. The beam is viewed from one side so that the apparent location of the spot changes with the distance to the target.

Laser Triangulation
Measurement Method



Available Features

- Ranges from 3 mm (0.12 in) – 1270 mm (50 in)
- Linearity down to $\pm 1 \mu\text{m}$
- Sampling rate up to 70 kHz
- Communication inference options: RS232, RS485, Ethernet, CAN/ CANopen, +4-20mA/0-10V, ModbusRTU
- Sensors with blue lasers available for measurement of high temperature materials and elimination of crosstalk
- Binary and ASCII data formats
- Sensors with ability for mutual synchronization
- Robustness to ambient light
- Automatic gain control for target color changes
- Compact designs for ease of installation

MODELS

- AR100 Series – Compact triangulation Sensor
- AR200 Series – Laser Measurement Sensor
- AR500 Series – Laser Position Sensor
- AR550 Series – High Speed Sensor
- AR700 Series – Laser Displacement Sensor

Common Applications



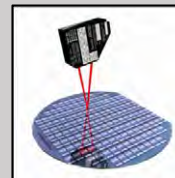
Thickness



Profiling



Displacement



Height

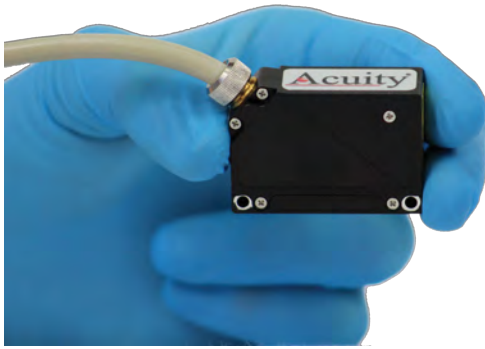


Industry Tests

LASER TRIANGULATION SENSORS

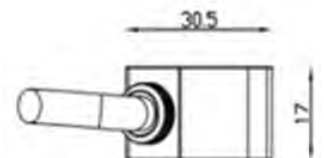
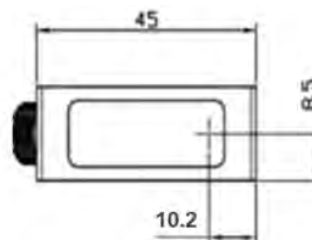
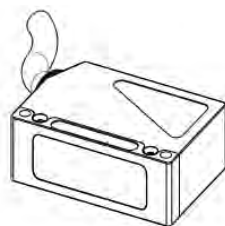
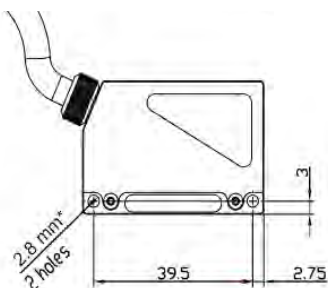
Super Compact Triangulation Sensor

AR100 Series



- Measurement range up to 500 mm (19.685 in)
- Linearity to within 0.05% of the range
- Resolution to within 0.01% of the range
- Sampling rate up to 9,400 Hz
- Red or blue laser diode options
- Serial Options: RS232, RS485 & Analog output: 4-20 mA, 0-10 V
- Compact designs for ease of installation

Model AR100	-10	-25	-50	-100	-250	500
Base distance X, mm [in]	20 [0.79]	20 [0.79]	30 [1.18]	55 [2.17]	65 [2.56]	105 [4.13]
Range, mm [in]	10 [0.39]	25 [0.98]	50 [1.97]	100 [3.94]	250 [9.84]	500 [19.69]
Linearity, %	±0.05% of the Full Scale range					±0.1 %
Resolution, %	0.01% of the Full Scale range (for digital output)					0.02%
Temperature drift	0.02% range/°C					
Maximal sampling rate, Hz	9,400 Hz					
Light source	Red semiconductor laser, 660 nm wavelength or UV semiconductor laser 405 nm wavelength (BLUE version)					
Output power, mW	≤1					
Laser safety Class	2 (IEC60825-1)					
Output Interface	Digital	RS232 (max. 460.8 kbit/s) or RS485 (max. 460.8 kbit/s)				
	Analog	4 ... 20 mA (load ≤ 500 Ohm) or 0 ... 10 Volts				
Trigger input	2.4 - 24 V (CMOS, TTL)					
Logical output	Programmed functions, NPN: 100 mA max; 40 V max for output					
Power supply, V	24 (9 ... 36) Volts					
Power consumption, W	1.5 ... 2.0 Watts					
Environmental Resistance	Enclosure rating	IP67				
	Vibration	20g/10 ... 1000Hz, 6 hours, for each of XYZ axes				
	Shock	30 g / 6 ms				
	Operation temperature, °C	-10 ... +60 °C				
	Permissible Ambient light, lx	10,000				
	Relative humidity	5-95% (no condensation)				
Storage temperature	-20 ... +70, °C					
Housing material	aluminum, glass windows					
Weight (without cable)	40 g					
Size, mm [in]	17x45x30.5 [0.67x1.77x1.2]					



LASER TRIANGULATION SENSORS

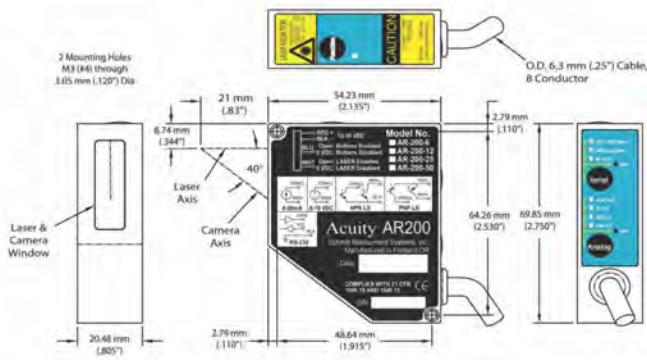
AR200 Series

Laser Measurement Sensor

NEW FOR 2023 – AR200 Now Nearly Twice as Accurate

The linearity has been improved for 2023 for all available unit types. Previously the linearity was +/- 0.2% of range, and for 2023, has been improved to ± 0.1% of range.

The AR200 laser measurement sensor is a compact, durable, and reliable sensor built for many industries including the lumber, medical and high-tech industries. The AR200 sensor consists of five different models with ranges up to 100 mm (4 in) and accuracies down to 6-microns to satisfy precise measuring requirements.



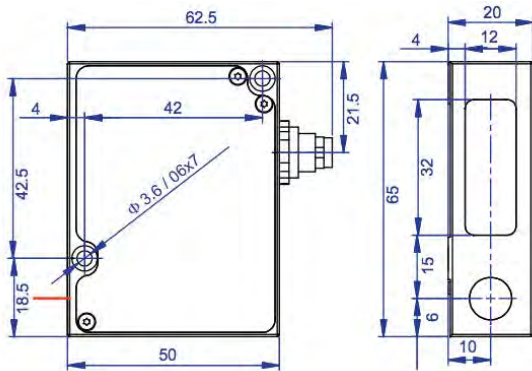
- Range from 6 mm (0.25 in) to 100 mm (4 in)
- Linearity to within +/- 0.1% of range
- Resolution to within 0.03% of range
- Speeds up to 1,250 Hz (samples per second)
- Analog, Limit Switch and Serial outputs
- Spot size down to 35 µm in middle of range
- No signal degradation for analog output

AR200 Model	AR200-6	AR200-12	AR200-25	AR200-50	AR200-100
Range	0.250 [6.350 mm]	0.500 [12.70mm]	1.00 [25.40 mm]	2.00 [50.80]	4.00 [101.6 mm]
Base Distance	0.71 [18.03 mm]	0.664 [16.87 mm]	0.85 [21.59]	0.67 [17.018]	1.1 [27.94]
Linearity (± 0.1% of range)	0.00025 [6.35 µm]	0.0005 [12.7 µm]	0.001 [25.4 µm]	0.002 [50.8 µm]	0.004 [101.6 µm]
Resolution (0.03% of range)	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 middle of range, end of range)	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				
Operating Temperature	32 - 140°F [0 - 60°C]				
Environmental	NEMA -4, IP65.				
Weight (less cable)	3 oz. [85 g]				

LASER TRIANGULATION SENSORS

Laser Position Sensor **AR500 Series**

- Range from 5 mm (0.20 in) to 1000 mm (39.4 in)
- Linearity to within $\pm 0.10\%$ of range
- Resolution to within 0.01% of range
- Speeds up to 9,400 Hz (samples per second)
- Digital interface options: RS232, RS485, Ethernet
- Analog output: 4-20 mA; 0-10 V (optional)



Sensor Options

- Available with Red, Blue or IR laser diodes
- Internal heater: permits sensor use to $-30\text{ }^{\circ}\text{C}$
- Air-cooled jacket: enclosure with forced air to cool sensor for use up to $120\text{ }^{\circ}\text{C}$
- Spray guard: open-sided enclosure which helps to keep debris off optical windows

Units in Metric unless noted Imperial

AR500 Model	-5	-10	-25	-50	-100	-250	-500	-750	-1000
Range [in.]	5 [0.20]	10 [0.39]	25 [0.98]	50 [1.97]	100 [3.94]	250 [9.84]	500 [19.7]	750.0 [29.5]	1000 [39.4]
Base Distance [in.]	10 [0.39]	15 [0.595]	45 [1.77]	65 [2.555]	60 [2.36]	80 [3.15]	125 [4.95]	145 [5.75]	245 [9.6]
Linearity (+/-) μm [10^{-3} in.]	0.10% of range								0.15%
	5 [0.2]	10 [0.39]	25 [0.98]	50 [1.97]	100 [3.94]	250 [9.84]	500 [19.7]	750 [29.5]	1500 [59.1]
Resolution (+/-) μm [10^{-3} in.]	0.01% of range								0.02%
	0.5 [0.02]	1.0 [0.04]	2.5 [0.1]	5.0 [0.2]	10 [0.4]	25 [1.0]	50 [2.0]	75.0 [3.0]	200 [7.88]
Laser spot size μm	40	50	60	80	70	130	140	300	500
Weight no cable [oz.]	100 grams [3.5 oz.]								
Laser class	2	2	2	2	3R	3R	3R	3R	3R
	Complies with 21 CFR 1040 with Laser Notice #50 and IEC/EN 60825-1:2001								
Laser type STANDARD	660 nm, ≤ 0.95 mW, visible RED				660 nm, ≤ 3 mW RED		650 nm, ≤ 4.8 nm visible RED		
Laser type OPTIONAL	405 nm, ≤ 0.95 mW, visible BLUE				405 nm, ≤ 3 mW BLUE		660nm, 20mW visible RED (Class 3B) 405 nm, ≤ 3 mW BLUE 405 nm, 20mW BLUE (Class 3B)		
Power	9 - 36 Volts DC, 250 mA max. Voltage tolerance -5% to +10%								
Sample rates	STANDARD: to 9400 Hz, or sample trigger (serial command or Hardware)								

AR550 Series

High Speed Triangulation Sensor



- Range from 2 mm (0.08 in) to 750 mm (29.5 in)
- Sampling rate up to 70 kHz
- Available with red and blue laser diodes
- RS232 or RS485 serial communication options
- Ideal for fast event logging & road surfacing

LASER TRIANGULATION SENSORS

Laser Displacement Sensor **AR700 Series**

- Ranges from 3 mm (0.125 in) to 1270 mm (50.0 in)
- Linearity to within 0.03% of range
- Resolution to within 0.005% of range
- Easily interface through RS232, RS422, 0-10 V, and 4-20 mA outputs
- Sampling speeds up to 9,400 Hz to satisfy requirements for the road profiling industry
- No signal degradation for analog output



Highest Precision

Linearity specification is among the best in the industry, +/- 0.03% of the sensor's measuring range

Versatile Outputs

Serial and analog communication with ability to output error codes and contains 2 NPN limit switches

Customizable Options

Road profiling option, laser diode power, filter upgrades & specialty cable lengths available

AR 700 Model	0125	0250	0500	1	2	4	6	8	12c	12	16	24	32	50	
Range (in)	0.125	0.250	0.500	1.0	2.0	4.0	6.0	8.0	12.0	12.0	16.0	24.0	32.0	50.0	
Range (mm)	3.175	6.35	12.7	25.4	50.8	101.6	152.4	203.2	304.8	304.8	406.4	609.6	812.8	1270	
Base Distance (in)	0.4375	0.625	1	1.5	2.38	3.06	7	8	9	11	13	31	26	31	
Base Distance (mm)	11.11	15.88	25.40	38.10	60.45	77.72	177.8	203.2	228.6	279.4	330.2	787.4	660.4	787.4	
Linearity (+/-)	0.03% of Range, 500 Hz, to white target (85% diffuse reflectance)											0.03%*	0.05%*	0.1%*	
Linearity in $\times 10^{-3}$ (+/-)	0.04	0.08	0.15	0.3	0.6	1.2	1.8	2.4	4.8	3.6	4.8	7.2	16.0	50.0	
Linearity μm (+/-)	0.95	1.9	3.8	7.6	15	31	46	61	122	91	122	183	406	1270	
Resolution	0.005% of Range														
Resolution in $\times 10^{-3}$	0.006	0.013	0.025	0.05	0.1	0.2	0.3	0.4	0.6	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	15.2	20.5	30.5	41.0	63.5	
Laser Spot Size μm	30	35	40	60	65	70	95	120	130	135	150	200	250	300	
Weight w/cable	13.1 oz. / 370 g					15.0 oz. / 425 g				43.2 oz. / 1225 g			75.7 oz. / 2146 g		
Laser Class	2	2	2	2	2	2	3R	3R	3R	3R	3R	3R	3R	3R	
Complies with 21 CFR 1040 with Laser Notice #50 and IEC/EN 60825-1:2001															

Common Examples



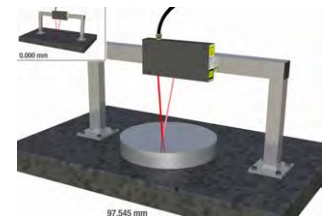
Calendared Rubber



Road Profiling



Thickness Measurement



Height Measurement

LONG DISTANCE SENSORS

Use Cases

Non-contact laser measurement sensors that are highly versatile, being able to measure distances both indoors and outdoors for geometric distances, heights, lengths, levels, and positions.

Operating Principle

Acuity's long distance rangefinders utilize laser light (pulsed or continuous) to accurately measure distances. This system is made up of a laser, the transmitter and receiver optics, the sensitive photo diodes and sophisticated electronics and algorithms for time or phase measurement. Our sensors use opt electric principles such as **time-of-flight, phase comparison** and the **pulse mixing method**. These methods allow measurements accurate to millimeter and ranges up to several hundred meters.

Available Features

- Long distance measurement from 0.10 m (4 in) up to 3,000 m (1.9 mi)
- Sampling rate up to 30 kHz
- Accuracy to within ± 1 mm
- Operating temperature down to -40 °C
- Time of flight, phase comparison & pulse back method principles
- Interface options: RS-232, RS-422, analog output
- Ideal for integration into your automation and process control systems
- Reliable and robust: dependable use in a wide range of harsh industrial environments
- Easily mounted and user friendly
- Usable on gluey or softish surfaces



MODELS

- AR1000 – Laser Distance Sensor
- AS2100 – Accurate Distance Sensor
- AR2700 – High-Speed Long Range Sensor
- AR3000 – Distance Measurement Sensor

Common Applications



Distance



Thickness



Positioning



Diameter

LONG DISTANCE SENSORS

Laser Distance Sensor

AR1000

- Measurement range up to 30 m (150 m on reflective targets)
- Accurate to within ± 3 mm
- Sampling speed up to 50 Hz
- Measure hot, glowing steel near 1000 °C
- Internal heater version available suitable for operation -40 °C
- Phase shift measurement principle – measurements less impacted by ambient light



Application Examples



Crane & Hoist Applications



Industrial Positioning



Automated and security

Sensor Details

- IP65 enclosure ratings
- Class 2 laser
- Available serial outputs: RS232, RS422
- 4-20 mA analog output
- Heater option available
- Reflective tape available for longer range

	English Units	Metric Units
Range	4 in. min to 100 ft. max (targets of 85% diffuse reflectance) 500 ft. max (retroreflective targets*)	0.1 to 30 m (targets of 85% diffuse reflectance) 150 m max (re0.1 to 30 m (targets of 85% diffuse reflectance) 150 m max (retroreflective targets*)
Accuracy	+/- 0.12 in.	+/- 3 mm
Resolution	0.04 in.	1 mm
Laser spot	0.2 in., 0.6 mrad divergence	5.1 mm, 0.6 mrad divergence
Reproducibility	≥ 0.02 in.	≥ 0.5 mm
Weight (less cable)	1.7 lbs.	760 grams
Laser class	Class 2, Complies with 21 CFR 1040.10 with Laser Notice 50, IEC/EN60825-1:2001	
Laser type	650 nm, 1 mW visible RED	
Power	10 - 30 Volts DC, 50 – 150 mA draw. (AR1000H 24W at 24VDC with heater)	
Sample rates	50 Hz maximum, or sample trigger (serial command and analog)	
Operating temp	14 to 122 °F	-10 to 50 °C
	-40 to 122°F (AR1000H with internal heater)	-40 to 50 °C (AR1000H with internal heater)
Environmental	NEMA – 4, IP65. Keep optical windows clean for best performance. Aluminum case.	
Shock & Vibration	Shock (single): 500g / 1ms, DIN ISO-9022-30-08-1 Shock (continuous): 10g / 6ms / 1000x in all 6 directions, DIN ISO-9022-31-01-1 Vibration: 10 Hz ... 2000 Hz ... 10 Hz / 0,075mm / 1g / 2 cycles in 3 directions, DIN ISO-9022-36-02-1	
Outputs serial	RS232 full duplex, RS422 (optional) unterminated and terminated	
Analog	4-20 mA, limit switch (NPN, 100 mA sinking)	

LONG DISTANCE SENSORS

Accurate Distance Sensor

AS2100

- Measuring range up to 100 m (500 m on Acuity reflective targets)
- Accurate to within ± 1 mm
- Sampling speed up to 250 Hz
- Measurement on difficult targets, including measurements on black surfaces with solar irradiation



Sensor Details

- IP65 enclosure ratings
- Class 2 laser
- Available serial outputs: RS232, RS422
- **Ethernet IP communication option**
- 4-20 mA analog output
- Reflective target available for maximum range

Application Examples



Crane & Hoist Applications



Industrial Positioning



Measurement of hot surfaces

	English Units	Metric Units
Range	~2 in. min. to 328 ft. max (natural targets) ~20 in. min. to 1640 ft. max (reflective foil*)	0.05...~100 m (natural targets) ~0.5...500 m max (reflective foil*)
Accuracy @ 2σ	± 0.039 in.	± 1 mm
Repeatability @ 2σ	0.012 in.	0.3 mm
Resolution	0.004 in.	0.1 mm
Dimensions (l x w x h)	5.51 x 3.07 x 1.89 in.	140 x 78 x 48 mm
Laser class	Class 2, Complies with 21 CFR 1040.10 and with Laser Notice 50, IEC/EN60825-1:2014	
Laser type	Typical 650 nm (620 – 690 nm), <1 mW visible RED	
Power	12 - 30 Volts DC; Max. Current: 0.2A	
Sample rates	250 Hz	
Operating temp	14 to 122 °F	-10 to 50 °C
Environmental	IP65	
Material	Sensor body: Aluminum Alloy EN-AW 6060 (Anodized 20 μ m) Front and back cover: Mineral reinforced nylon resin	
Shock & Vibration	IEC 60068-2-27 (Shock); IEC 60068-2-6 (Vibration)	
Outputs: Serial	RS232, RS422, RS485, (USB connection only for configuration), ethernet IP option available	
Analog output, programmable	4-20 mA/0-20mA software configurable	
Measuring accuracy of analog output	± 0.1 % of the programmed AO range or ± 1.0 mm (Whichever is greater)	

*Contact Acuity for these targets. Other reflectivity targets can damage the sensor. Contact a sales rep for pricing.

LONG DISTANCE SENSORS

High-Speed Long Range Sensor

AR2700



- Measurement range up to 70 m (270 m with reflective targets)
- Sampling rates up to 40 kHz
- Accurate to within ± 60 mm
- Acuity's highest speed, long range sensor
- Operating temperature between -40 °C and $+60$ °C
- Eye-safe, infrared laser (Class 1) that is designed for industrial environments with NEMA-4, IP67 enclosure ratings

Application Examples



Crane/Trolley Positioning



Automation



Positioning and distance measurement

Sensor Details

- Interface: RS232/RS422
- Inside modules available for high volume OEM and system integrators
- Measurements can be triggered using an input signal wire or a serial command at rates up to 30Khz.

	English Units	Metric Units
Range	8 in. min. to 230 ft. max (targets of 10% diffuse reflectance) 885 ft. max (retroreflective targets*)	0.2 to 70 m (targets of 10% diffuse reflectance) 270 m max (retroreflective targets*)
Accuracy **	± 2.4 in.	± 60 mm
Repeatability ***	± 0.98 in.	± 25 mm
Resolution	0.04 in.	1 mm
Laser spot	2 mrad x 0.4 mrad divergence	2 mrad x 0.4 mrad divergence
Weight (less cable)	0.3 lbs.	140 grams
Laser class	Class 1 eye-safe, Complies with 21 CFR 1040.10 with Laser Notice 50, IEC/EN60825-1:2014	
Laser type	905 nm, infrared	
Power	10 - 30 Volts DC, 3W max	
Sample rates	40 kHz maximum	
Dimensions (L x W x H, incl. connectors)	98 mm x 46 mm x 25 mm	
Operating Temp	-4 to 140 °F (10-90% non-condensing Humidity)	-20 to 60 °C (10-90% non-condensing Humidity)
Environmental	NEMA – 4x, IP67. Keep optical windows clean for best performance. Aluminum case.	
Shock & Vibration	Shock (single): 500g / 1ms, DIN ISO-9022-3 Shock (continuous): 10g / 6ms / 1000x in all 6 directions, DIN ISO-9022-31-01-1 Vibration: 10 Hz ... 2000 Hz ... 10 Hz / 0,075mm / 1g / 2 cycles in 3 directions, DIN ISO-9022-36-02-1	
Outputs	RS232 full duplex, RS422 (option)	
Serial		
Analog	4-20 mA, 2 limit switches (up to 200 mA sourcing)	

*Contact Acuity for these targets, **Accuracy in range ≤ 1 m and range ≥ 70 is ± 100 mm, ***Repeatability in range ≤ 1 m and range ≥ 70 is ± 50 mm

LONG DISTANCE SENSORS

Distance Measurement Sensor

AR3000

- Measurement range up to 300 m (3000 m on reflective targets)
- Sampling speed up to 10 kHz
- Accurate to within ± 20 mm
- High precision measurements for surfaces of low reflectance (asphalt, grass, aluminum)
- Highly versatile - water and abrasion resistant for use in harsh environments



Application Examples



Ship Docking
Procedures



Altitude
Measurements



Crane/Trolley
Positioning

Sensor Options

- IP67 enclosure ratings
- Eye-safe (Class I) infrared laser device
- Interface options: RS-232, RS-422, analog
- Time of flight principles

	Standard AR3000 (2mrad divergence)	AR3000 (10 mrad divergence)
Range		
to 90% reflectance targets (white)	0.5 - 300 m [20 in.- 980 ft.]	0.5 - 50 m [20 in.- 165 ft.]
to 10% reflectance targets (dark)	8 - 200 m [26 - 650 ft.]	0.5 - 50 m [20 in.- 165 ft.]
to high-gain reflectors *	3 km [1.9 mi.] max	NA
Accuracy	+/- 20 mm [0.79 in.] at 100 Hz +/- 60 mm [2.36 in.] at 2000 Hz	
Resolution	1 mm [0.04 in.]	
Sample rates	2000 Hz, or sample trigger (serial command and analog), 10kHz option available	
Weight (less cable)	850 grams [1.9 lbs.]	650 grams [1.4 lbs.]
Laser (measuring)	905 nm, Infrared, Class 1, IEC/EN60825-1:2001	
Laser (aiming)	635 nm, Visible Red, Class 2, Complies with 21 CFR 1040.10 with Laser Notice 50, IEC/EN60825-1:2001 Aiming laser can be disabled	
Laser divergence	1.7 mrad	10 mrad
Power	10 - 30 Volts DC, 170 - 500 mA draw Heater operation: 24 Volts DC, 11.5 W	
Operating temp	-40 to 60 °C [-40 to 140 °F]	
Environmental	NEMA - 4, IP67. Keep lenses clean for best performance. Aluminum case.	
Shock & Vibration	Shock (single): 500g / 1ms, DIN ISO-9022-30-08-1 Shock (continuous): 10g / 6ms / 1000x in all 6 directions, DIN ISO-9022-31-01-1 Vibration: 10 Hz ... 2000 Hz ... 10 Hz / 0.075 mm / 1g / 2 cycles in 3 axes, DIN ISO-9022-36-02-1	
Serial outputs	RS232 full duplex, RS422 (optional output) unterminated and terminated	
Analog outputs	4-20 mA, limit switch	

2D/3D LASER SCANNERS

Use Cases

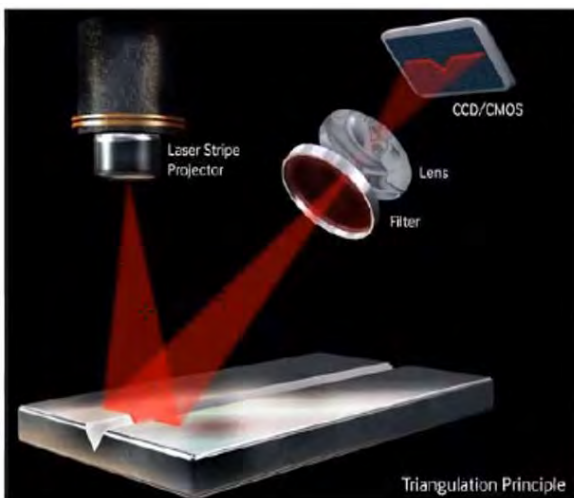
Non-contact measuring and checking of surface profiling, dimensions, deformations, flatness, gaps, volume, height, and thickness.

Operating Principle

Acuity 2D laser scanners use triangulation measurement principles to measure displacements and surface heights by emitting a beam of visible laser light that creates a line on a target surface. Reflected light from the surface is viewed from an angle by a two-dimensional receiver chip inside the sensor. The two-dimensional contour profile is calculated by the scanner's microprocessor from the pixel data from the diffusely reflected laser line. The height distance profile is transmitted through Ethernet communications to a computer. Real-time 3D profiling is created by synchronizing the position of the scanner with encoder inputs from conveyors, linear stages or robotic movements. A variety of models are specified, each to allow a different measurement range and field of view.

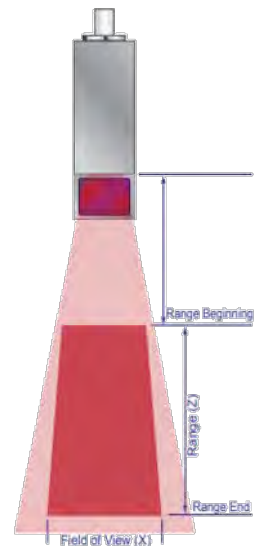
Available Features

- Measuring range in Z (height): 5 mm – 1000 mm
- Large selection of cases and measuring ranges
- Robust against ambient light
- Real-time 3D profiling can be created
- Master-slave configuration for multi-scanner-applications
- Blue laser option available for glowing targets and reduced noise



MODELS

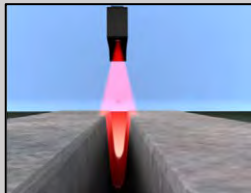
- AP820 Laser Scanner



Common Applications



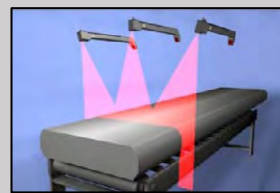
Dimension measurement



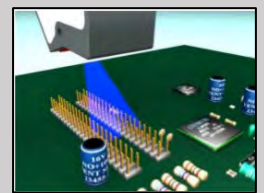
Gap Measurement



Inspection/Flaw Detection



Profile Measurement



Height Measurement

2D/3D LASER SCANNERS

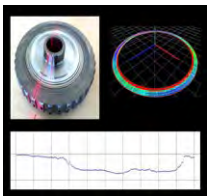
2D Laser Scanner

AP820

- Measuring range in Z (height) from 5 mm to 1000 mm
- Measuring range in X (width) up to 800 mm
- Resolution in X: 580 pixels
- Resolution of Z down to 0.8 μm
- Laser wavelength blue 405/450 nm, red 658 nm
- High stability against secondary light
- Data transmission via Ethernet



Application Examples



Weld Seam Inspection



Weld Seam Tracking

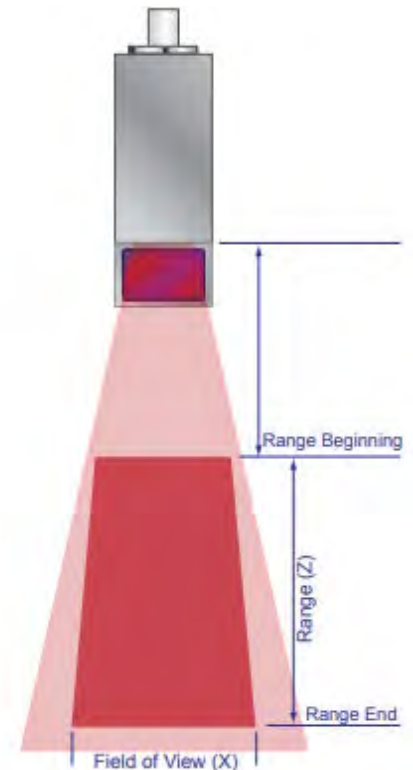


Measurement of Gap and Flushness

Sensor Options

- External Cooling Jacket
- Protective Shield
- Replace red laser diodes with blue, or purple for use on shiny targets
- Demo Software for quick feasibility test

Model	-5	- 20	- 40	- 60	- 80	- 120	- 240	- 400	-1000
Range in Z-axis	5.9 [0.23]	20 [0.79]	40 [1.6]	60 [2.4]	80 [3.2]	120 [4.7]	240 [9.5]	400 [15.7]	1000 [39.4]
Range Beginning	38 [1.5]	53 [2.1]	50 [2.0]	53 [2.1]	60 [2.4]	84 [3.3]	220 [8.7]	330 [13.0]	550 [21.7]
Range End	43.9 [1.7]	73 [2.9]	90 [3.5]	113 [4.5]	140 [5.5]	204 [8.0]	460 [15.7]	730 [28.7]	1550 [61.0]
Linearity, Z-axis	+/- 0.06% of the Z range								
μm [10^{-3} in.]	3.5 [0.14]	12 [0.47]	24 [0.95]	36 [1.4]	48 [1.9]	72 [2.8]	144 [5.7]	240 [9.4]	630 [25]
Resolution Z-axis	3.0 [0.12]	11 [0.43]	19 [0.75]	31 [1.2]	42 [1.7]	63 [2.5]	112 [4.4]	213 [8.4]	600 [24]
μm [10^{-3} in.]									
Field of View X-axis									
@ Range Beginning	3.9[0.15]	10 [0.39]	20 [0.79]	30 [1.2]	40 [1.6]	60 [2.4]	120 [4.7]	200 [7.9]	500 [19.7]
@ Range End	5.0 [0.20]	13 [0.51]	27 [1.1]	40 [1.5]	55 [2.2]	80 [3.2]	160 [6.3]	280 [11.0]	800 [31.5]
Scan frequency	up to 200 Hz (profiles / s) for the full Range								
Weight (less cables) g [oz.]	295 [10.3]	273 [9.6]	290 [10.2]	290 [10.2]	290 [10.2]	430 [15.2]	710 [25.0]	1100 [38.8]	2000 [70.5]
Laser	658 nm, visible RED, Class 2M			658 nm, visible RED, Class 3R			NA		NA
	405 nm, visible BLUE, Class 3R			NA			NA	NA	NA
	NA			435 nm, Blue, 3R			Blue, 3B		
Power	10 - 30 VDC, 4-8 W max consumption (Suggest 12 - 24 V)								
Environmental	0° to 40°C [32° to 104°F], With cooling option to 400°C [752°F]; Humidity: < 90% RH								
Vibration	5.5 g @ 1 kHz								
Enclosure Protection	IP64, Keep optical windows clean for best performance. Aluminum case.								
Data Interface	Ethernet								
	Reports: 2D Profile Data, Encoder position, Status, Temperature, Clock counter, Version #, Switch-on counter								
Signal Inputs	Digital, Incremental Encoder Position Synchronization IN/OUT for Multiple Sensors								
Connector 1	Ethernet: M12 round, 4 pin, D-coded, female								
Connector 2	Power & Synchronization: M12 round, 8 pin, A-coded, male								
Cables	Ethernet: 2m cable, CAT 5, RJ45 termination Power / Serial: 2m cable, Polyurethane jacket, 9 conductor								



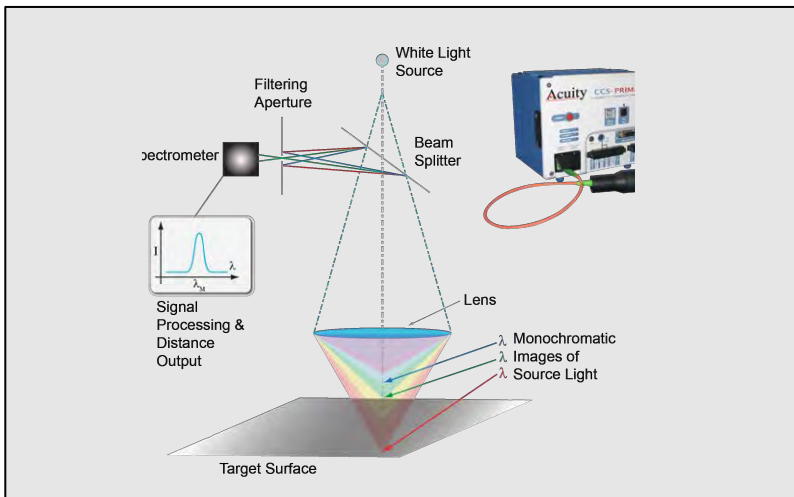
CONFOCAL DISPLACEMENT SENSORS

Use Cases

Sensors to meet the requirements of the most demanding applications for dimension, thickness or even roughness measurement. Measurement of any type of sample (transparent or opaque, polished or rough) and any type of material (metal, glass, ceramic, semiconductor, plastic).

Operating Principle

The essence of our confocal chromatic imaging principle is the accurate detection of colors from light that is reflected back from target surfaces. The white light is focused onto the target surface by a multi-lens optical system. These lenses disperse the light into monochromatic stages (colors) along the measurement axis. A specific distance to the target is assigned to each color's wavelength in a factory calibration. Only the wavelength which is exactly focused on the target is used for the measurement. This light reflected from the target surface is transmitted from the probe, through a confocal aperture and onto a spectrometer which detects and processes the spectral changes and calculates distances.



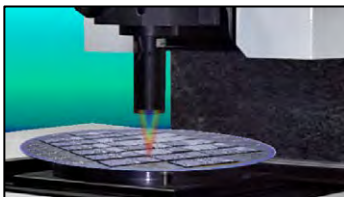
Available Features

- Single point or multi point controllers available
- Different measurement pens: modular, endoscopic, interferometric, 90° pens available
- Modular pen measurement ranges up to 24 mm
- Linearity to within ± 35 nm
- Axial resolution down to 5 nm
- Sampling rate up to 10 kHz
- Spot size down to 2.7 μ m
- Customizable cable lengths
- Demo software available

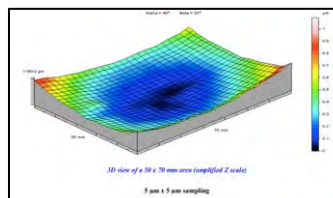
Popular Industries

- Semiconductor
- Glass Manufacturing
- Medical Engineering
- Watchmaking
- Plastics Production
- Aerospace
- Robotics
- Research

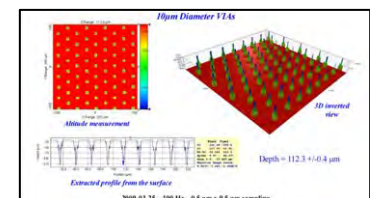
Common Applications



Thickness Measurement



Flatness Measurement



Depth Measurement

CONFOCAL DISPLACEMENT SENSORS

Confocal Controllers



Available Controller Features

- Single point or multi point controllers available
- Controllers that fit multiple pens
- Sampling rate up to 10 kHz
- Input/output options – USB, RS232, RS422, analog output

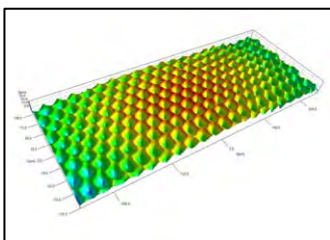
Confocal Pens



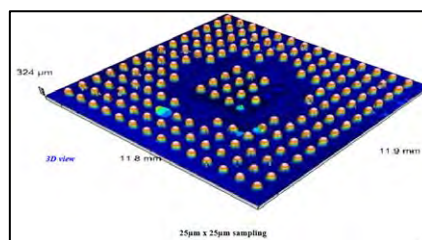
Available Pen Features

- Different measurement pens: modular, endoscopic, interferometric, 90° pens available
- Modular pen measurement ranges up to 24 mm
- Linearity to within ± 35 nm
- Axial resolution down to 5 nm
- Spot size down to 2.7 μm

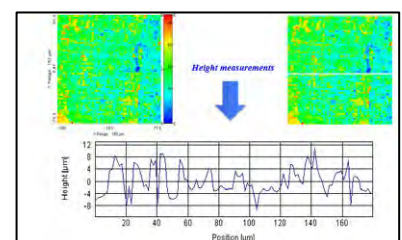
Other Applications



Wasp Eye Topography



Ball Grid Array



Varnish Thickness

PRODUCT ACCESSORIES

Accessories for Accurate, Non-Contact Laser Measurement

Acuity continuously develops new accessories to provide optimized sensors and solutions for our customers.

AS2100 Cooling Enclosure with Built-in Bandpass Filter



To deal with heat related challenges, Acuity engineers have designed an AS2100 cooling enclosure with a built-in bandpass filter option. The cooled housing enables the sensor to be protected from the hot ambient temperature and the bandpass filter options allows the sensor to perform reliable, accurate measurements on molten metal.

AR700 Precisely Manufactured C-Frame Mount



The AR700 C-Frame is a precisely manufactured frame designed to mount two Acuity AR700 laser displacement sensors in opposition to measure thickness of material easily and precisely. The C-Frame comes with M3 and M6 threaded mounted holes to both mount the sensors and mount to another piece of hardware.

AS2100 Air Cooling Jacket



Designed to protect the sensor in higher temperature environments. The housing is a hard anodized aluminum material and has the necessary connections to connect to an air mounting line. The air jacket can also be used for alignment purposes and supports both the standard and ethernet/IP AS2100 sensors.

PRODUCT ACCESSORIES

Accessories for Accurate, Non-Contact Laser Measurement

Acuity continuously develops new accessories to provide optimized sensors and solutions for our customers.

AS2100 Bracket Alignment Unit



Bracket alignment unit that makes it easy to adjust the laser beam to the requested measuring target. The alignment unit allows $\pm 4^\circ$ adjustment in two axis and is ideal for distances up to about 300m. The bracket is made of steel, zinc-plated and weighs about 850g.

Connectivity Kit



Aids in connecting your laser to a power supply and serial port. This product includes a 120V, 15 VDC, AC power supply; a serial cable with DB9 connector; and a solid-state, NEMA-4X interface box.

AS2100 Reflective Plate



Reflective aluminum target that improves the reflected signal strength to measure long distance ranges. We recommend only using Acuity reflective targets to avoid damage to the laser. Reflective plate size is 210 x 297 mm (orange).

AS2100 Reflective Foil



The reflective foil provides a defined highly reflecting measuring target. It improves the reflected signal strength. This improved signal strength and is used to measure long distance ranges.



The **8-inch Touch Panel Display** can control up to six Acuity laser sensors and display their distance readings. Using serial communications, this smart terminal includes software applications for calculating thickness and other dimensions without the need for a computer or software programming.

8" Touch Panel Display

Product Description

The Acuity™ 8" Touch Panel Display is a stand-alone industrial PC interface for use with Acuity laser distance sensors. These fully enclosed units replace panel meters, alphanumeric displays and analog controllers by providing a modern interface through a full-color LCD and touch screen.

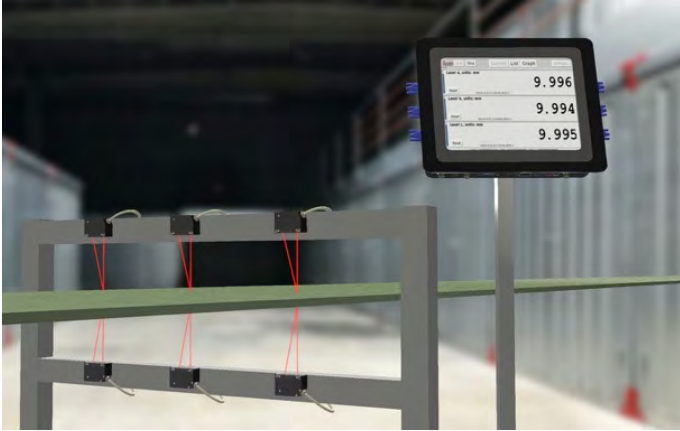
The Touch Panel Display communicates with up to six Acuity sensors using RS-232 serial interfaces. The touch panel can be easily configured using on-screen buttons to display, scale, and even graph the sensors' distance outputs. Relative dimensions can be measured using a tare function. With two Acuity sensors paired together, the touch panel can serve as a thickness gauge. Limits can be programmed into the touch panel to give a visual warning to operators that the target is too close or too far or too thick or too thin. With a USB flash drive, measurements can be logged and saved for further analysis.

Features/Benefits

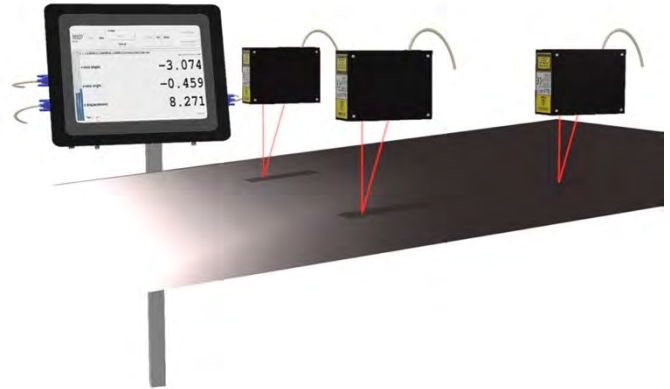
- Support for up to six sensors shown on the screen at the same time
- Dual-sensor thickness measurement mode (up to 3 different dual thickness measurement locations)
- Three sensor plane measurement mode
- Visual alerts when measurements are approaching or exceeding desired limits
- Measurement logging and output to a USB drive
- Real-time stream of outputs via RS232 serial connection
- Easy calibration of measurements to match known distances and standards
- Accepts user-defined distance offsets and offers a TARE function through the touch screen interface
- Bright and easy-to-read display can be mounted in industrial panels or in your work area
- Secured Linux OS for security and reliability
- Remote update for latest installation software using an Ethernet connection or a USB drive



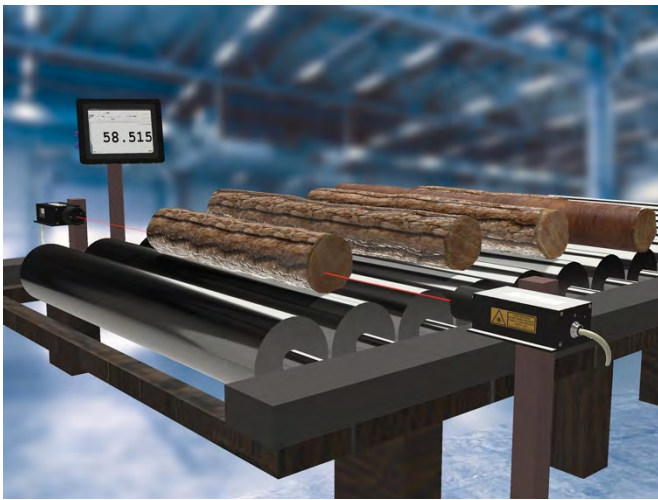
Touch Panel Display – Common Uses and Applications



Thickness Measurement



Plane Analysis



Length Measurement



Cut-to-Length



Acuity[®]

NON-CONTACT LASER SENSOR EXPERTS



A PRODUCT LINE OF

SCHMITT[®]

INDUSTRIES

2765 NW Nicolai Street
Portland, Oregon, 97210
USA

Contact Acuity:
sales@acuitylaser.com
+1-(503) 227-7908

