Acuity®

NON-CONTACT LASER SENSOR EXPERTS

LONG RANGE SENSORS

COMPARISON CHART

	DESCRIPTION	RANGE	ACCURACY	SAMPLING SPEED	HIGHLIGHTS
AR1000 Laser Distance Sensor 	Acuity's most cost effective, rugged long-distance sensor	Measurement range up to 30 m (150 m on reflective targets)	Accurate to within ± 3 mm	Sampling speed up to 50 Hz	Internal heater version available suitable for operation -40 °C
AS2100 Accurate Distance Sensor 	Acuity's most accurate long-distance sensor	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, industry leading accuracy
AR2700 High-Speed Long-Range Sensor 	Acuity's highest speed, long range sensor	Measurement range up to 70 m (270 m with reflective targets)	Accurate to within ± 60 mm	Sampling rates up to 40 kHz	Eye-safe, infrared laser (Class 1) - operating temperature between -20 °C and +60 °C
AR3000 Distance Measurement Sensor 	Acuity's longest range distance sensor	Measurements up to 300 m (3000 m on reflective targets)	Accurate to within ± 20 mm	Sampling speed options of 2 kHz or 10 kHz	Eye-safe, infrared laser (Class 1), precise measurements for low reflectance surfaces (asphalt, grass, aluminum)

Acuity
Laser Measurement

The AR1000 laser distance sensor is Acuity's most versatile model of time-of-flight sensors. The device uses LIDAR measuring principles to gage distances to opaque targets at long distances with sharp accuracy. Compact and versatile, the sensor is sure to meet your industrial applications needs.

AR1000 Laser Distance Sensor

Principles of Operation

The AR1000 is a time-of-flight sensor that measures distance by a rapidly-modulated and collimated laser beam that creates a spot on a target surface. Components of the reflected light signal are collected by a lens and focused onto a photodiode within the sensor unit. The reflected light returns with a shift in phase compared with the reference signal. From the amount of phase shift, a required distance is calculated with millimeter accuracy. The distance is transmitted through serial communications or analog outputs. Maximum ranges exceed 100 feet (30 m) with the optional usage of reflectors. The *AR1000H* model has an automatic internal heater for sensor operation to -40°C.

Definitions

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

Accuracy: The sum of all measurement errors when compared to a known standard

Resolution: Smallest increment of change in distance that a sensor can detect.

Reproducibility: Similarity between duplicate measurements

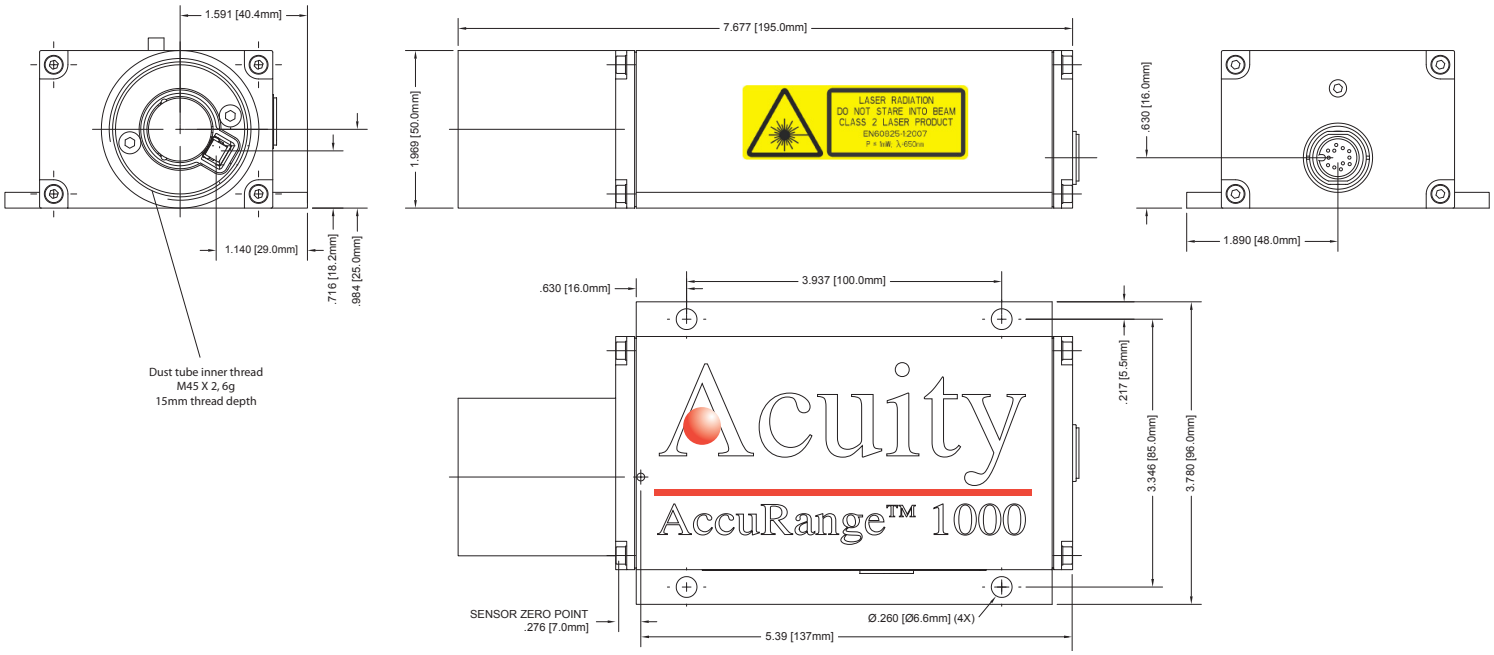
Sample Rate: Speed that data samples are obtained from the sensor

AR1000 Standard Model Specifications units in inches unless noted metric

	English units		Metric units
Span	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 (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)		
Cable	6.6 ft. (2 m) length, 12 conductor, Binder series 723 flange-mount connector, soldertail wire termination		
	Red – current loop out	**Pink** - unassigned	**Yellow** – RxD(RS232), RX- (RS422)
	Black – Tx - (RS422)	**Grey** – Ground	**Green** – TxD (RS232), RX+ (RS422)
	White – Alarm, digital switching output	**Orange** – supply voltage	**Blue** – Ground
	Clear – Shield	**Brown** – external trigger	**Violet** – Tx+ (RS422)

* Contact Acuity for these targets

Mechanical Dimensions units in inches [mm] (RS232/RS422 version shown)



AR1000 Sensor Options

RS422 Output: Differential serial output in both terminated and unterminated formats. RS422 replaces RS232.

Touch Panel Display: Smart controller displays distance readings and differential measurements with two sensors.

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

Internal Heater: *AR1000H* operates to -40°C using internal heating stabilization

Laser Safety Labels

CE

Contact Acuity

Schmitt Industries, Inc.
2765 NW Nicolai Street, Portland, Oregon, 97210, USA
Tel: 503-227-5178 Fax: 503-227-5040
www.acuitylaser.com

Acuity
Laser Measurement

AS2100 Accurange sensor is Acuity's most accurate long-distance sensor. The device is rugged, flexible, and fast. The sensor has a measurement range up to 500 meters, accuracy of ±1 mm, and sampling rate up to 250 Hz.

AS2100 Accurate Distance Sensor

The AS2100 is a Class 2 laser that is designed to work well outdoors, in bright lights, and even on difficult targets such as hot or dark surfaces. With the ability to take accurate measurements (± 1 mm) from distances up to 500 meters away, and a measurement frequency of up to 250 Hz, it is the perfect laser for a wide range of applications.

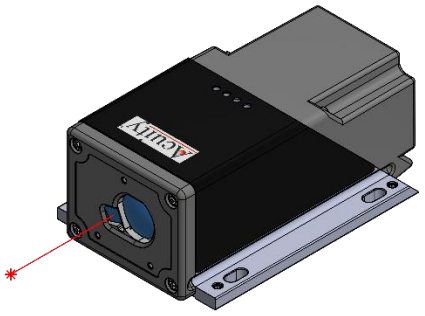
Due to its standard interfaces, the Acuity AS2100 is optimized for easy integration into industrial automation and process control applications. Contact Acuity Sales for specific application assistance.

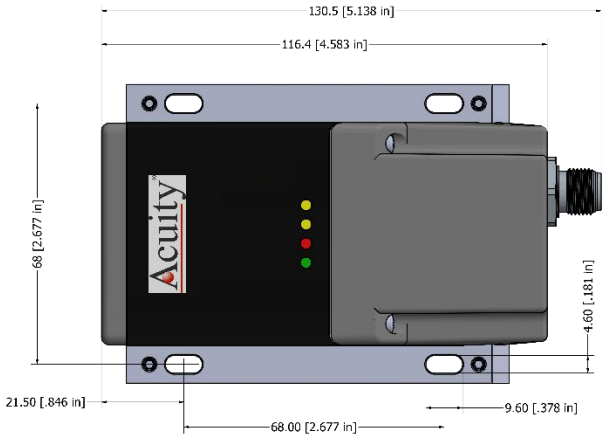
AS2100 Standard Model Specifications

	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
Laser spot diameter @ 10, 50, 100 m	0.28 x 0.12 in.; 1.10 x 0.51 in.; 2.16 x 1.81 in.	7 x 3 mm; 28 x 13 mm; 55 x 30 mm
Dimensions (l x w x h)	5.51 x 3.07 x 1.89 in.	140 x 78 x 48 mm
Weight (less cable)	0.77 lbs.	350 grams
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 20µm) 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)	
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)	

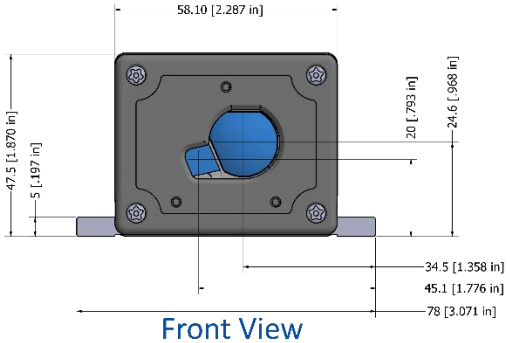
*Contact Acuity for these targets. Other reflectivity targets can damage the sensor. Contact a sales rep for pricing.

Mechanical Dimensions Units in mm [inches].

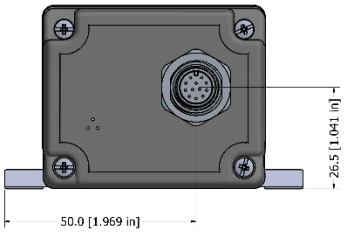




Top View



Front View



Rear View

AS2100 Sensor Options see ordering information for part number.

Cables - Cables sold separately from unit. Standard cable lengths include 2M, 5M, 10M, 15M, 30M. Contact Acuity for custom cable lengths.

Touch Panel Display - Smart controller displays distance readings and differential measurements with two sensors.

Connectivity Kit - Includes terminal blocks, serial cable with DB9 connector (optional serial to USB cable), AC power supply with 110 VAC or 240 VAC.

Reflective Plate - Reflective plate 210 x 297 mm (orange). The reflective aluminum target improves the reflected signal strength to measure long distance ranges.

Laser Safety Labels

Wavelength: 620-690nm, Max Power < 1mW
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice no. 50 dated June 24, 2007, with IEC 60825-1:2014

AR2700 is a high-speed rangefinder designed for measurements of moving targets. The ultra-compact unit measures distances to 270 meters at sampling rates up to 40 kHz. The distance sensor is used to detect objects in industrial automation or for monitoring defined areas in transport and logistics applications. Offered in IP67 housing or inside module for OEM partners.

Principles of Operation

The Acuity 2700 high speed sensor is a time-of-flight rangefinder that measures distance by a rapidly-pulsing a collimated laser beam that creates an infrared spot on a target surface. Components of the reflected light signal are collected by a lens and focused onto a photodiode within the sensor unit. The roundtrip travel time is measured and a resulting distance is calculated internally. That distance is transmitted through serial or analog interfaces. Typical ranges on natural surfaces with 10% reflectivity are up to 70 m. The total range with special targets is up to 270 m. With an ultracompact design, the AR2700 is used by equipment manufacturers for applications that demand very high sampling rates.

Definitions

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

Accuracy: The sum of all measurement errors when compared to a known standard.

Resolution: Smallest increment of change in distance that a sensor can detect.

Repeatability: Similarity between duplicate measurements.

Sample Rate: Speed that data samples are obtained from the sensor.

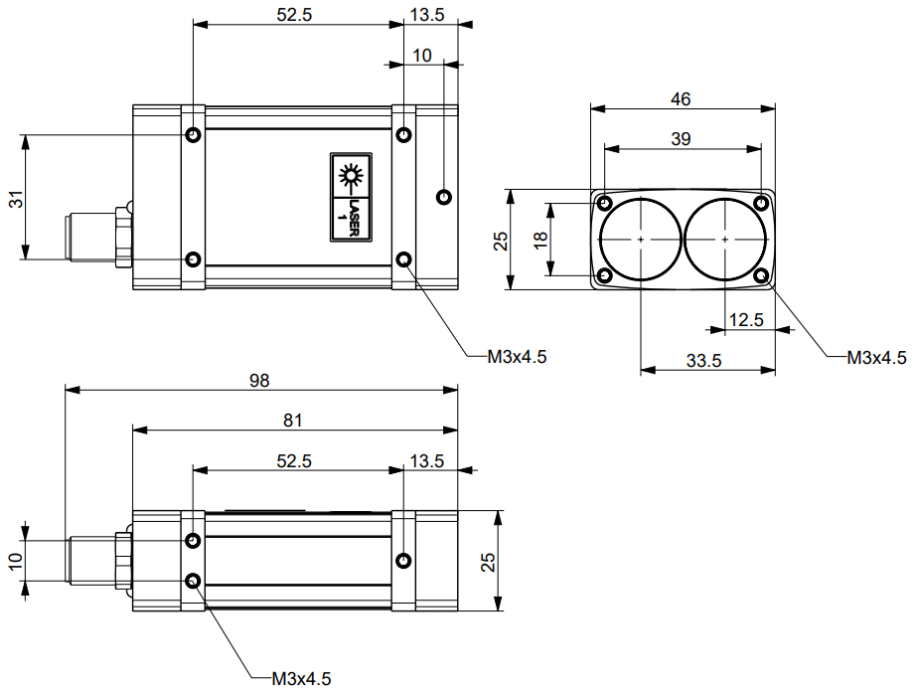
AR2700 Standard Model Specifications

	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 Serial	RS232 full duplex, RS422 (option)	
Analog	4-20 mA, 2 limit switches (up to 200 mA sourcing)	

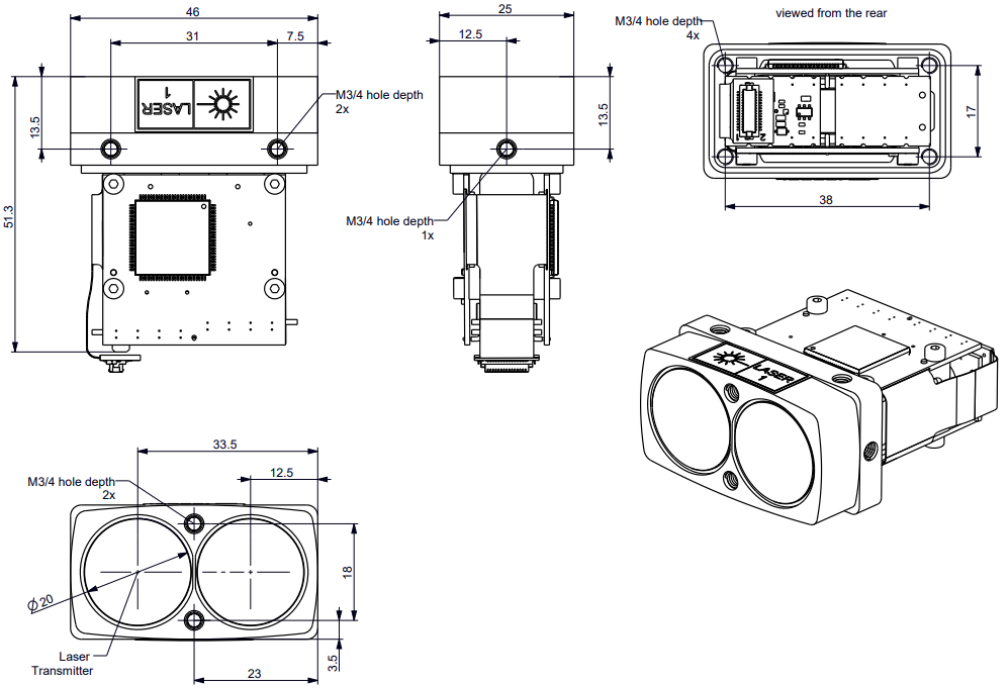
*Contact Acuity for these targets, **Accuracy in range ≤1 m and range ≥70 is ±100 mm, ***Repeatability in range ≤1 m and range ≥70 is ± 50 mm

AR2700 Mechanical Dimensions units in mm

Standard Unit IP67 Housing



Inside Module – OEM



Acuity®

Updated 10/7/2021

A Product Line of Schmitt Industries, Inc.
2765 NW Nicolai St., Portland, OR, USA
Tel: 503-227-5178 | www.acuitylaser.com

AR3000 distance measurement sensor is Acuity's longest-range model for cranes, process monitoring and fill levels in containers and silos. Its eye-safe laser and robust enclosure design make it a versatile choice for industrial measuring applications. A special version of the AR3000 can be used as a laser altimeter.

AR3000 Distance Measurement Sensor

Principles of Operation

The AR3000 sensor is a time-of-flight sensor that measures distance by a rapidly-modulated and collimated laser beam that creates a spot on a target surface. Components of the reflected light signal are collected by a lens and focused onto a photodiode within the sensor unit. The reflected light returns with a shift in phase compared with the reference signal. From the amount of phase shift, a required distance is calculated with good accuracy. The distance is transmitted through serial communications or analog outputs. The device monitors the distance to (and speed of) objects in motion. The standard model has a range of 300 m to natural surfaces with 90% reflectance and to 3 km to special reflectors. A visible sighting laser beam is used to aim the sensor. An AR3000 version with a wider laser divergence measures to 0-50m for closer-range measurements to targets of lower reflectivity.

AR3000 Standard Model Specifications

	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 maximum, 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	
Outputs serial	RS232 full duplex, RS422 (optional output) unterminated and terminated	
analog	4-20 mA, limit switch	
Cable	2 m (6.6 ft.) length, 12 conductor, Binder series 723 flange-mount connector, soldertail wire termination	
	Red – no connection	Pink - unassigned (RS232), Tx+ (RS422) / Yellow – 4-20 mA Out
	Black – Ground	Grey – unassigned (RS232), Tx- (RS422) / Green – trigger input
	White – TxD (RS232), RX+ (RS422)	Red/Blue – supply voltage / Blue – 10-30 Volt DC IN
	Grey/Pink – Ground	Brown – RxD(RS232), RX- (RS422) / Violet – switching output Q2
* Contact Acuity for these target		

QUESTIONS? READY TO ORDER?

Contact Acuity Laser:

Sales@AcuityLaser.com
+1-(503) 227-7908

2765 NW Nicolai Street
Portland, Oregon, 97210
USA

AcuityLaser.com