

Acuity

Laser Measurement

AccuRange AR1000™ Laser Distance Sensor
AccuRange AR1000H™ Laser Distance Sensor w/ Heater

User's Manual



Rev. 1.7
For use with AR1000™ and AR1000H™
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Acuity
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2. General Description

The AR1000H is a laser diode based distance measurement sensor for ranges up to 118 feet (30m) on regular surfaces and up to 500 feet (150 m) using a reflective target. The accuracy is generally specified with a linearity of +/- 0.08 inches (2mm). Linearity will vary depending on temperature and surface reflectivity of the target surface. The AR1000H unit version has an on-board heater for cold use in cold environments.

- ± 2 mm for white surfaces, (+15 °C ... +30 °C)
- ± 3 mm for natural surfaces, (+15 °C ... +30 °C)
- ± 4 mm at 0.1 ... 0.5 m range in DS mode, (+15 °C ... +30 °C)
- ± 5 mm over full temperature range (-40 °C ... +50 °C)

2.1. Principles of Operation

The AR1000H uses the time of flight of light to measure distance. The laser beam is projected from the housing's aperture and shines on a target surface, where it creates a small spot. From there the laser light is scattered in all directions. A collection lens is located in the sensor to the side of the laser aperture. It collects a portion of the reflected light, which is focused on a photodetector and converted to an electrical signal. The signal is amplified and symbolizes a shift in phase. This phase is compared to a reference signal to determine the amount of shift and hence a change in distance..

2.2. Mechanical Dimensions

The following diagram shows the mechanical dimensions for the small AR1000. The sensor has four 6.6 mm holes on the side flanges for mounting to a fixture. The cable is for power and all communication (serial, analog, trigger, power, etc.). It is a 12-pin M18 flange-mount connector (Binder series 723). The outer case of the sensor is extruded aluminum with powder-coated paint for corrosion resistance.

