CAMPBELL SCIENTIFIC
WHEN MEASUREMENTS MATTER

SR50AT, SR50AT-316SS and SR50ATH

Sonic Ranging Sensors with External Air Temperature Probes

Rugged, acoustic distance sensors with temperature probes

For determining snow or water depth

Overview

The SR50AT[a], SR50AT-316SS[a] and SR50ATH[a] are sonic ranging sensors with external temperature probes. The SR50AT-316SS has a stainless-steel chassis and parylene-coated transducer head that allows the sensor to be used in marine or other corrosive environments. The SR50ATH includes a heater that prevents ice from coating the transducer.

Sonic ranging sensors determine distance by emitting an ultrasonic pulse and then measuring the elapsed time between the emission and return of the pulse. The temperature probe allows the SR50AT series to output temperature-corrected values (speed of sound varies with temperature).

Benefits and Features

- Temperature probe for providing temperature correction of measurements.
- Non-contact method for determining snow or water depth
- Wide operating temperature range
- Rugged enough for harsh environments
- User-selectable options for output
- Uses a multiple echo processing algorithm to help ensure measurement reliability
- Compatible with most of our current dataloggers.

Mounting

To achieve an unobstructed view, the sensor is typically mounted to a tripod mast, tower leg, or user-supplied pole via the CM206 1.8 m (6 ft) crossarm. The 008168 mounting kit attaches directly to the crossarm. The 008164 mounting stem attaches to the crossarm using the NU-Rail fitting, CM220 right-angle mount, CM230 adjustable-angle mount, or CM230XL adjustable-angle mount. Use the CM230 or CM230XL when the surface is at an angle.

The air temperature probe is housed in a RAD06 6-plate radiation shield. The louvred construction of these radiation shields allows air to pass freely through the shield thereby keeping the sensor at or near ambient temperature. The shield's white colour reflects solar radiation.

The RAD06 uses a double-louvred design that offers improved sensor protection from driving rain, snow, insect intrusion and has lower self-heating in bright sunlight combined with higher temperatures (>24ºC (~75ºF)) and low wind speeds (< 2 m s^{-1} (~4.5 mph)) giving a better measurement.

Output

SDI-12, RS-232 and RS-485 output options are available for measuring these sensors. Campbell Scientific's MD485 interface can be used to connect one or more SR50A-series sensors in RS-485 mode to an RS-232 device. This can be useful for sensors that require lead lengths that exceed the limits of either RS-232 or SDI-12 communications.

[a]The SR50AT-series sonic ranging sensors are manufactured by Campbell Scientific Canada.

Specifications

- Measurement Time: < 1.0 s
- Output Options: SDI-12 version 1.3, RS-232, RS-485 (output options selected by configuring internal jumpers)
- Baud Rates (RS-232, RS-485 modes): 1200 to 38400 bps
- Power Requirements: 9 to 18 Vdc (typically powered by datalogger's 12 Vdc power supply)
- Measurement Range: 0.5 to 10 m (1.6 to 32.8 ft)
- Beam Acceptance: ~30°
- Resolution: 0.25 mm (0.01 in)
- Accuracy: ±1 cm (0.4 in.) or 0.4% of distance to target (whichever is greatest); requires external temperature compensation
- Operating Temperature Range: -45° to +50°C
- Length: 10.1 cm (4.0 in)
- Diameter: 7.5 cm (3 in)

Weight

- SR50AT, SR50ATH (no cable): 375 g (13.2 oz)
- SR50AT-316SS (no cable): 795 g (28 oz)
- Cable: 4.5 m (15 ft): 250 g (8.2 oz)

Temperature Measurement

- 0° to +50°C: ±0.2°C; -45° to 0°C: ±0.75°C

Maximum Cable Length

- SDI-12: 60 m (200 ft)
- RS-232: 60 m (200 ft); baud rates ≤9600 bps
- RS-485: 300 m (984 ft); cable lengths greater than 60 m require a heavier gauge wire if the power supply drops below 11 Vdc

Power Consumption (no heater)

- Active (typical): 250 mA
- Quiescent SDI-12 Mode: < 1.0 mA
- Quiescent RS-232/RS-485 Modes: < 1.25 mA (≤9600 bps), < 2.0 mA (>9600 bps)

Heater (SR50ATH only)

- Heater Resistance: 75 Ohms
- Nominal Operating Voltage: 12 V (ac or dc)[b]
- Maximum Rated Wattage: 3 W
- Maximum Rated Voltage: 15 V (ac or dc)
- Maximum Operating Temperature: 25°C[c]

Ordering Information

Sonic Ranging Sensor

SR50AT	CSC sonic ranging sensor
SR50AT-316SS	CSC stainless-steel sonic ranging sensor for Marine Environments. Includes temperature sensor
SR50ATH	CSC sonic ranging sensor with heater. Includes temperature sensor

NB: Standard cable lengths 3, 5 & 10 m. Other lengths available to special order.

RS-485 Interface

MD485 RS-485 Multidrop Interface for applications with long cable lengths.

Mounting Hardware

008168 Mounting Kit that attaches directly to the crossarm. Either this mounting kit or the 008164 mounting stem (see below) is required to mount the sensor to a crossarm

008164 Mounting Stem that uses a 008285 NU-RAIL fitting, CM220 mount, CM230 mount, or CM230XL mount (see below) to attach the sensor to a crossarm. Either this stem or the 008168 mounting kit (see above) is required to mount the sensor to a crossarm.

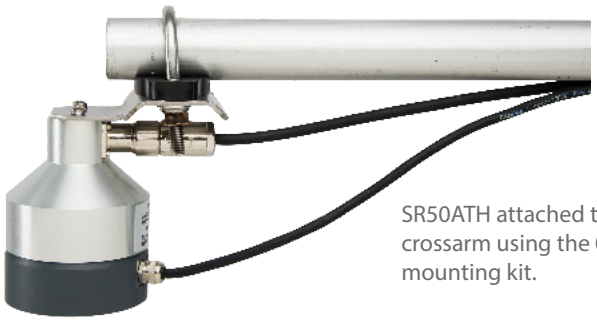
008285 1-inch x 1-inch NU-RAIL Crossover Fitting that attaches the 008164 mounting stem to a crossarm.

CM220 Right Angle Mounting Kit that attaches the 008164 mounting stem to a crossarm.

CM230 Adjustable Inclination Mount Kit for applications where the measurement surface is at an angle.

CM230XL Adjustable Angle Mounting Kit with Extended Length. Provides same functionality as the CM230 but places the SR50A further from the crossarm.

RAD06 **6-Plate MetSpec Radiation Shield with U bolts for attachment to a Campbell Scientific crossarm or mast.**



SR50ATH attached to a crossarm using the 008168 mounting kit.

This shows the 008164 to SR50AT connection.

[b]*Use a properly conditioned low noise power source. A noisy power source will affect operation of the sensor.*
[c]*Turn the heater power off at temperatures above 25°C. This prevents damage to the sensor and reduces power consumption.*