**SR50A/SR50AH**

The SR50 is a sonic (acoustic) ranger. It is used on the ASFS to measure the height of the surface. It’s FOV is about 30º and thus at a height of 2 m, the diameter of the area of the surface it measures is approximately 1.2 m (~ 1 m2 area).

**Turning the system on/off:**

 Connect/disconnect power source.

 Fused 1A 12 VDC.

**Communications & Settings:**

 The SR50A is connected directly to 12 VDC power and to the data logger control channel C1. Refer to the wiring diagram for details.

 The SR50A measurements are collected using a polled digital protocol, SDI-12. The only setting that needs to be applied to the sensor configuration is its SDI-12 address, which is 1 (the default address is 0). The device can be contacted using the SDI-12 mode of the LoggerNet terminal emulator on channel C1. The same settings are used on each ASFS and the tower.

**Variables:**

 Two variables are reported in the “slow” data table file, the sonic distance (sr50\_dist) in meters (both average and standard deviation of 12 samples taken every minute) and the data quality (average only). The interpretation of the data quality flag is as follows:

|  |  |
| --- | --- |
| **Quality Val** | **Meaning** |
| **0** | Not able to read distance |
| **152-210** | Good! |
| **210-300** | Reduced signal strength |
| **300-600** | Poor quality data |

Snowfall and low-density surface could increase the quality values. Icing of the transducer head could plausibly also affect this metric.

**Heater:**

 The sensor mounted on the tower is an SR50AH. It is the same as systems on the ASFS, but has a heated transducer. It is ok to run the heater continuously at MOSAiC (air temperature must be < 25 C) and we have not built any automated power management into the tower program.

**Post Processing:**

 Note that the measured distance is sensitive to temperature and that the observed values are uncompensated for this effect. The native calculation assumes the speeds of sound at 0 C (331.4 m/s). In post-processing it will be necessary to correct the reported distances thusly,

$D\_{corr}=D\_{raw}\sqrt{\frac{T}{273.15}}$, (1)

where *Dcorr* is the corrected value, *Draw* is the value saved in the data files (sr50\_dist) and *T* is the air temperature, mostly likely that measured by the nearby Vaisala PTU300. The error is approximately linear between -40 and 0 C. At -40, the distance will be overestimated by about 7.5%.

**Daily Data Checks:**

* Monitor the reported height, which is a useful data point for the status of the ASFS; the installation height is about 2 m.
* Bad or unusually small values of distance could be a sign of icing.
* Check data quality

**ASFS Visit Checks:**

* Inspect wire mesh transducer face for snow/ice and clear as needed.
* The chassis is aluminum. Inspect wire mech transducer face for corrosion, which may occur over a period of months if exposed to salt and water.
* Inspect instrument level.

**Things to consider:**

* Note that the precise level of the instrument is less critical than the consistency of the level and recording of the level should it be changed. Consider measuring the distance to the surface with a tape if a major change is made.
* Avoid disturbing the surface in the FOV of the instrument!