Sensors for Year Round Polar Programs

Cold Rated Guralp CMG-3T

The Guralp CMG-3T seismometer is a 3-axis broadband instrument that has a flat response to ground velocity between 120s and 100Hz. It has been tested to operate down to -55C and only draws 0.3W of power.

PASSCAL's Polar program has purchased the cold-rated 3Ts (with active logic high) for broadband experiments in Antarctica. When powered and locked, the reported mass positions will be '0'. This does not mean that the instrument is dead or unpowered. Once the 'unlock' command is initiated, first the lock/unlock and then the centering motors should run and finally result in meaningful mass position readouts.

The CMG-3T has a low tilt tolerance and is sensitive to temperature changes, it therefore requires a well established and well thermally isolated vault.

Although Guralp will only guarantee that the CMG-3T will work to -55C, it has been successfully tested down to -60C. A few instruments deployed on the high Antarctic Plateau have actually continued to operate reliably below -60C.

Nanometrics Trillium 240
The Nanometrics Trillium 240 is a symmetric triaxial broadband instrument that has a flat response to ground velocity between 240s and 200Hz, and has a low self-noise, below the New Low Noise Model between 100s and 10Hz. The manufacturer specifications of operating temperatures are between -20C and +50C, but the Trillium 240 has operated reliably for us to temperatures below -60C. The power consumption at low seismic noise conditions and with the instrument well leveled is about 650mW. The Trillium has a +/-1deg tilt tolerance, is fairly sensitive to varying temperature but was designed to be insensitive to atmospheric variations.

The Trillium 240 is well suited for medium to long term experiments in the Arctic and Antarctic supported by the IRIS PASSCAL Polar Program.

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