Magnetic Susceptibility, Deviation

User Guide

Primary Calibration of The Tool

The magnetic susceptibility portion of the tool is calibrated with a "free air" reading and a standardized "calibrator" reading. The tool should be allowed to warm up for approximately 15 minutes prior to performing this calibration. Also ensure that the tool is at least one foot away from any ferrous material.

In the calibration routine, record the cps values of the free air value. Next slide the calibration cylinder over the detector section so that the calibrator is centered over the detector coils (see tool schematic). Move the calibration cylinder up and down the tool, watching the magnetic susceptibility sensor response until the maximum reading is obtained. The standard values and response limits are the following:

Primary Calibration	Standard	Response Range
SUSCEP	0 CGS E-5	439,000 +/-5%
SUSCEP	124.44 CGS E-5 (or as stamped on the block)	439,150 +/-5%

Other Calibration Points:

The natural gamma can alternately be calibrated with a small calibration source or run with the default calibrations from the Houston test pits.

Primary Calibration	Standard	Response Range
Natural Gamma	0 api units 200 api units	0 cps 190-210 cps
Deviation	All points will show 0 standard and response.	

In order to ACCURATELY record deviation, a special deviation calibration file called XXXX.DEV (XXXX being the tool serial number) must be copied into the \pcl\cal directory. The deviation calibration is performed by recording two CPS rotating logs, and then using the dipmeter calibration menu program to produce an XXXX.DEV file for each tool. Refer to the Deviometer Test Stand User Guide for procedures to calibrate the X-Y inclinometers and X-Y-Z magnetometers. Using this calibration procedure will insure an accurate hole deviation is computed using the Compu-Log program.

When a 962X (with deviation option) is shipped from Century's Tulsa manufacturing and repair group, a 3.25" floppy disk containing an XXXX.DEV file specifically for the 962X provided will be included. This file must be copied into the /PCL/CAL directory before attempting to log with the tool.

It is recommended that a Century Deviometer Test Stand be used to check the accuracy of slant angle, pad one azimuth and bearing measurements. This test should be done after the XXXX.DEV file is copied to the CAL directory and before beginning a critical logging operation.

Deviation Check Out - The tool is tested in the "Rocket Launcher Test Stand" with tolerances of 2 degrees direction and +/- .5 degree inclination. Lastly, the tool is logged in the test hole, with the deviation at 76.2 m (250 ft.) within an established target.

Default Calibrations
The following parameters are sensors and responses are set up to electronic bench testing specifications. Therefore, these "default" calibration numbers may be used to log the tool. The sensors are the following:

Natural Gamma
In the calibration file, if the default values of 0 cps equals 0 engineering units are not changed, the tool will then automatically use the default values in the tool module for that tool. **Other Sensors**
Default calibrations should not be used for the susceptibility or inclinometer or magnetometer sensors.

Notes On Logging The 962X Tool

The magnetic susceptibility of the this tool is designed around a dual-coiled focused array operating at 1.44 kHz. Magnetic susceptibility is the index to the bulk magnetization of matter in an external magnetic field.

It is defined as: M = X H, where

M = Magnetization
X = Susceptibility
H = Magnetic Intensity

The primary use of the tool is in hard rock and uranium mining, but also has applications for hydrological investigations. In uranium mining, the occurrence of iron compounds shows a large contrast between the oxidized and reduced states.

Borehole corrections are very necessary for correcting the susceptibility response due to hole size changes. The sensor itself is designed to work the best in 50 - 60 mm (2.0 to 2.4 in.) borehole sizes. Larger holes require more correction and are best run with the tool decentralized or sidewall. The following corrections would apply to a 25 mm (1 in.) bed normalized to a 50 mm (2 in.) hole size:

Borehole Diameter (mm/in.)	Response Centralized % Signal	Response Decentralized % Signal
70 (2.75)	0.75	0.725
80 (3.15)	0.275	0.5
100 (3.93)	0.09	0.45

The calibration file XXXX.dev is used to compute the hole inclination and direction.

An additional curve also has been added to the tool module called MAGVET. This is a calculated curve which is the field strength as the tool traverses the borehole. This curve is derived from the square root of the sum of the squares of the x, y and z magnetometers. The curve will normally read about ONE and deviate when casing of a magnetic anomaly is approached.

Phone: 918-838-9811
Fax: 918-838-1532

Century
Geophysical Corp.
1223 S. 71st E. Ave
Tulsa Oklahoma, 74112

sales@century-geo.com
www.century-geo.com