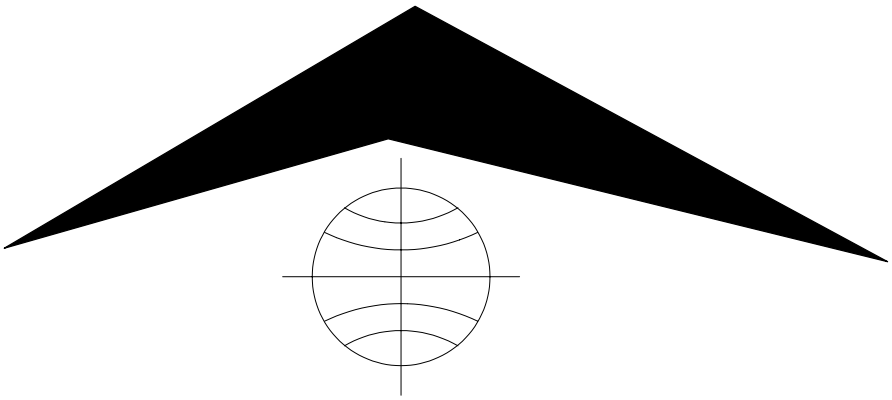
CLP-2492 Caliper Probe



Mount Sopris Instrument Co., Inc.
Golden CO U.S.A.
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General Information

Overview

The CLP-2492 measures hole diameter with three linked arms operating a single resistive sensor. The 3 Arm Caliper can be scaled and calibrated in inches or in centimeters. Caliper logs must be made while logging up, as moving the probe in the down direction with the arms open can damage the caliper mechanism. The output from the probe is a pulse-type output, which has been a Mount Sopris single conductor standard for many years. Power requirements for the probe are a minimum of 20 volts D.C. to operate the measurement circuits and a minimum of 50 volts D.C. positive and negative to operate the caliper motor.

Note: The CLP-2492 has the same electronics as the CTP-2492 combination temperature caliper and can be upgraded to the combination probe by adding a temperature sub. Contact factory for details.

Theory of Operation

The caliper measurement is made with arms attached to a mechanical assembly that drives a linear potentiometer. A constant reference voltage is applied across the potentiometer and ground. The output from the wiper of the potentiometer, which is a D.C. voltage, is then fed to a voltage to frequency convertor. This frequency is fed to a pulse shaping circuit that outputs a 1ms wide pulse for every input cycle. These 1ms pulses are fed to a driver circuit which helps drive the signals up the cable line. After the driver circuit the signal is coupled on to the cable line through a capacitor.

Switching for the circuit mentioned above and the caliper motor are done through two relays. When the proper voltages and polarities are applied to these relays they in turn switch the outputs and inputs to the correct assignments.

Specifications

Length:	58"	147 cms
Diameter:	1.25"	31.75mm
Weight:	11.0 lbs.	5.0 Kgm

Caliper measurement: 1.25" to 18.0"
31.75mm to 457.2mm

Operating Procedures

Operation

Caution! Never lower the probe with the caliper arms opened. The caliper measurement must be operated while logging up only. Damage can occur if the probe becomes stuck or stopped with the arms open, cable loops around the arms and an attempt is made to raise the probe.

Read through all the procedures as they should be similar in process for most logging systems. The probe is designed for operation with an MGX series logger. If the probe is to be operated with a system other than an MGX series logger consult the factory for proper operating procedures.

MSLog

1. Select the correct tool driver from the Tool panel selection box. If the correct one is not available run MSLConfig to install it.
2. In the Tool panel, click the Power On button.
3. Click Tool Settings / Commands button.
4. Click Open Button. Wait for the progress indicator to finish, click Done.
5. If you wish to fill out the header, in the Acquisition panel click Header button.
6. In the Acquisition panel, click Record and select a file name.
7. Select Depth Sampling Up mode and click the On button.
8. If you are printing, turn on the printer in MCHCurve.
9. Log up to the desired interval as normal. Refer to the MSLog manual for additional information on logging.
10. When done, in the Acquisition panel, click Stop.
11. Click Tool Settings / Commands button.
12. Click Close Button. Wait for the progress indicator to finish, click Done.
13. Tool Power will now be Off. You can remove the tool from the hole. Be sure to clean any remaining mud from the arm and piston area of the lower tool body. Grease the fittings to drive out any remaining mud and water.

Logshell

Caution! Never lower the probe in the hole with the arms open.

Select the proper probe file (**CTP-2492 Combination Temperature Caliper**), **which is also used for the CLP-2492** without temperature. Follow the LOGSHELL instructions to execute the ACQSBC logging program, and either calibrate the probe (see below) or proceed to the bottom of the hole. The system must be in the log acquisition mode to be able to measure depth while descending.

When the bottom of the logging interval is reached, place the MGX Probe Select to the Pulse 2 (MOTOR) position and put the Probe Power switch in the OPEN position. This will open the caliper arms, which will take approximately a minute and a half. Notice the Probe Current light is on while the arms are opening or closing and the light goes out when the arms are fully opened or closed.

When the Probe Current light goes out turn the Probe Power switch to the Off position, place the Probe select switch to the Pulse position and turn the Probe power switch to the ON position.

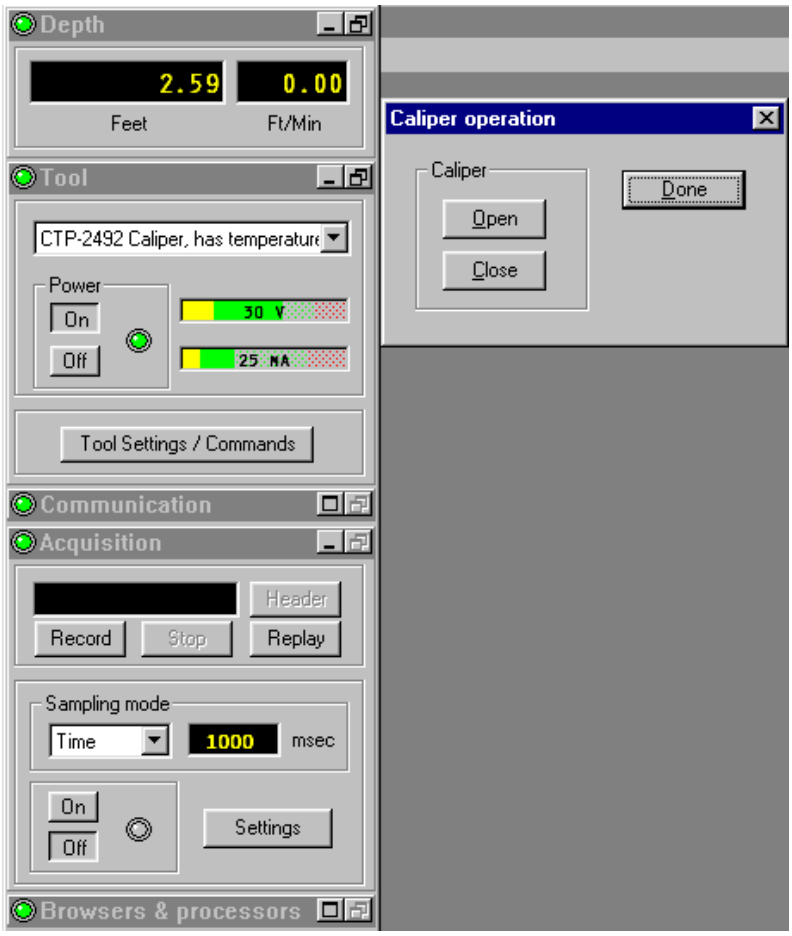
Once logging has been completed turn off the data acquisition recording capabilities and exit the file.

Place the Probe Power switch to the OFF position, place the Probe Select switch to the PULSE 2 (MOTOR) position and turn the Probe power switch to the CLOSE position. This will close the caliper arms in about a minute and a half, indicated by the Probe Current light going out.

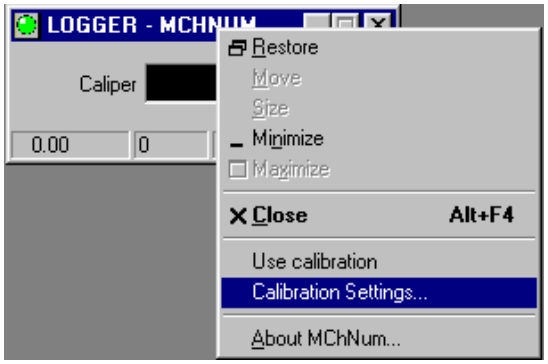
Calibration

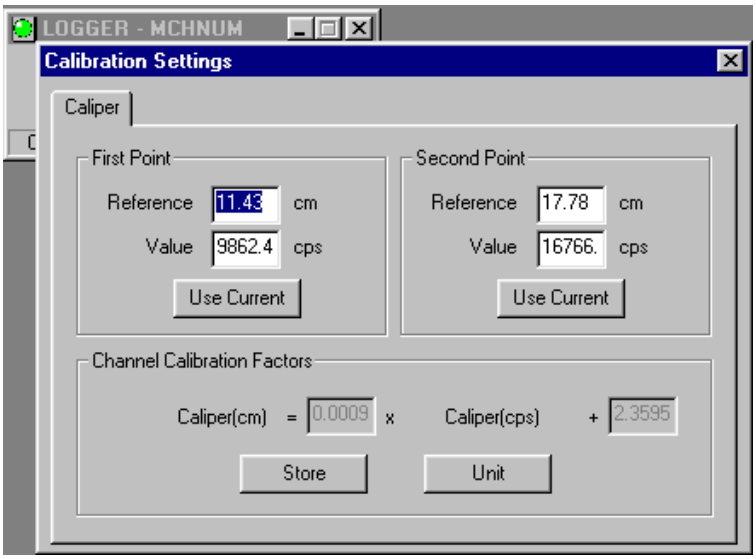
MSLog

1. Select the proper Tool driver. Turn Probe power On.
2. Click Tool Settings/Commands button.
3. Click Open and wait until the progress bar finishes and click Done.
4. On the Acquisition Panel, Sampling mode, select Time and click On.



5. Right click on the top panel of MCHNum.
6. Click Use calibration to unselect it.
7. Right click on the top panel of MCHNum.
8. Click Calibration Settings…





9. Place a small set of calibration rings over the extended arms. Type the diameter in the First Point Reference field.
10. Press the Use Current button in the First Point box.
11. Place a large set of calibration rings over the extended arms. Type the diameter in the Second Point Reference field.
12. Press the Use Current button in the Second Point box.
13. Press Store button.
14. Click the top right corner X button to leave this dialog.
15. In the Browsers & Processors. Click Close All.
16. Individually select each Browser and click Start.

    This is important so that the Browsers read the newly saved calibration settings that were written to the tool driver in step 12. Browsers and processors read these settings only once when they start and, other than MCHNum itself, do not know when they are changed.
17. The tool driver now contains the calibration settings and they will be available the next time the tool driver is started as long as it is not removed from the installed tool drivers list.
18. Click Close and wait until the progress bar finishes and click Done.
19. You are now ready to lower the probe to bottom of the logging interval.

LOGSHELL with the MGX

The CLP-2492 will need to be calibrated through the LOGSHELL software before logging. Follow the procedure above for opening the caliper, and see the section in the LOGSHELL manual for calibrations.

The normal operating mode of the MGX system updates data each time the probe moves past a given depth interval. When calibrating a caliper on the surface, it is not necessary to operate the winch to update the data, as this is automatically done every 5 seconds whether the probe is moving or not.

Normally, the user will have a small and a large diameter calibration ring available for calibrating the caliper. In LOG mode (as if you were getting ready to log the hole), place the small ring on the caliper and allow the arms to centrally locate within the ring.

Move the cursor in the ACQSBC status screen to LftOut and type in the value (in inches or mm) that corresponds to the small ring diameter. Press F3 to copy the current value from the A/D into the LftInp column. This sets the low-end calibration value in real units to the low-end frequency generated by the probe.

Next place the large ring on the probe, center the arms, and move the cursor to RgtOut. Type in the value for the large ring, and press F4 to copy the current A/D value into the RgtInp column. You may wish to repeat this a few times to check the calibration. It will take 5 seconds for the data to update in this mode, so be sure to wait long enough for the value to stabilize. When you are satisfied that the calibrations are accurate and repeatable, Press F2 to save the cal values in the probe file. This file will be saved in the current directory, and after logging you will need to copy it to the ACQ directory to update the original probe file values that came with the LOGSHELL program.

Preventive Maintenance

The CLP-2492 should provide long life with only minor maintenance required to the mechanical end of the probe. When possible, clean and flush mud and or contaminants out of the caliper arm assembly after each log. When the caliper arms are open inspect the teeth on the arms to see if there is adequate grease for lubrication. If this area appears to be dry pump some grease via the fitting provided on the tool located above the arms on the probe body.

Electronic troubleshooting should only be performed by qualified persons.

To access the inside of the probe the probe top can be unscrewed from the main housing. Next the housing can be unscrewed from the lower section of the probe. The PCB is located at the top end of the inner housing with the motor just below the PCB. In the middle of the probe are the limit switches that switch voltage to or from the motor. Just above where the housing threads are located is the linear potentiometer. Feed thru wiring is then carried to the bottom of the probe for the temperature sensor.

Common electronic problems are a broken or shorted wire. A visual inspection of the wiring should be performed before further testing is done.

If electronic testing is to be done a copy of the schematics is highly recommended before proceeding further. Depending on the nature of the problem checking things like regulator voltages and pulse outputs is recommended to locate the problem.

Schematics

Drawing Number	Title
0500S-1996	Caliper/Temperature Combo
None	Assembly drawing
None	Component layout

Note: The CLP-2492 has the same electronics as the CTP-2492 combination temperature caliper and can be upgraded to the combination probe by adding a temperature sub. Contact Mount Sopris Instruments for details.

Appendix

Suggested QA Procedure

Regular calibration of the caliper response will provide accurate, high quality hole diameter information. Be sure to use calibration standards which are rigid and whose dimensions can be traced to a high degree of precision. The caliper mechanism will normally have some “play” due to mechanical wear and tolerances, but the spring tension will provide for accurate measurements with a minimum of maintenance. Cleaning and greasing the mechanical section on a routine basis will insure repeatable results.