



Matrix logger with Logger version 11

Quick Operating Instructions

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Introduction

This is a condensed description of the physical set-up of the logging equipment and brief overview of the logging software operation and a specific instance of instructions for two tools that can be followed generally for the majority of other similar types.

Detailed instructions are included as pdf files with the installation of Logger software, which can be found in the folder C:\Logger\Support\Manuals. The Logger Software Operator Manual.pdf is in the C:\Logger\Support folder. Or consult the Matrix Help in the Dashboard Right Click menu. Or the question mark icon on the title pane of the Dashboard.

Once Logger is installed on the computer it can be run in no-hardware mode without the logger attached. Start the software normally and when the dialog with the message, “No hardware detected. Run in no-hardware mode?” appears click Yes.

For more information on the MX Winch see: MX_Winch&ControllerOpMan.pdf

June 27, 2012

Installation check list

- Install Logger Software
 - Note that one printer must be installed on the PC whether it is used for logging or not.
- Identify the mounting style for the winch, it is either of the following:
 - Top or remote mount package.
 - Side mount “Mini” winch package.
- Identify winch type, measuring wheel diameter, encoder pulses per revolution, cable length and cable type.
 - Standard cable lengths for the “Mini” winch are 200M of 1/8” single conductor or 305M of 1/10” single conductor.
 - For the 4MXA-1000 winch the standard length is 500M 1/8” single conductor.
- Run LoggerSettings and set the following (if not set at the factory).
 - Wireline type
 - Wireline Length
 - Encoder wheel diameter
 - Encoder pulses per wheel diameter
 - Measuring System Units
- Identify your probes
 - Newer probes are stamped with an abbreviated model number and serial number. A 2PGA-1000 would be stamped with 2PGA. (Numbers may be covered by tape. Consult the electronic user documents provided by the Logger installation in C:\Logger\Support\Manuals\.
- Run LoggerSettings and install appropriate ".TOL", "SUB files from C:\Logger\Support\Tool Drivers or other source of TOL or SUB tool configuration files.
 - Add/Remove appropriate tool configuration, ".TOL", or ".Sub" and ".Stack" files.
 - Note: New Tool Stacks are created using Logger Tool Panel, ToolStack Factory; to start it, in Tool Selection dialog click New.
- Set the tripod over the hole and arrange and secure the logging winch for lowering the probe.
- Verify the following Winch control settings:
 - Power switch is OFF
 - UP/DOWN switch is in the center, OFF position
 - Speed Control Knob is in the fully Counter Clockwise Position

Note these are general guidelines for the Mini and MX series of winches from MSI. Consult operating instructions for your particular winch.

4MXA-1000 Set-up

- Connect power cables to the MATRIX and 4MXA-1000.
- Verify stable AC power source operation. **If using an inverter it needs to be minimum 600W True Sine Wave model. Do not use modified sine wave inverters!**
- Connect 18 -10 pin signal cable (500K-2279 or 500K-2316) between 5MXA and 4MXA
- Unlatch the measuring head by pressing down on the spring loaded latch pin located on the left (operating position left) side of the measuring head level wind plate. This allows the head to swivel freely.
- Rotate the measuring head down into logging position
 - If the logging angle is too high, the measuring head assembly can be flipped over. Consult the MX Winch electronic user documents provided on the Logger software installation in \Logger\Support\Manuals\.
- Lift the pinch wheel lever and guide logging cable over measuring wheel
- Rotate the Forward Guide Wheel, Cable Keeper away from the guide wheel with its knob and thread the wireline between them.
- Rotate the Cable Keeper back up to close the gap with the Guide Wheel

Warning: Before rotating the measuring head back into shipping position, remove the cable from between the Forward Guide Wheel and the Pinch Wheel. This prevents damaging the cable by bending it sharply over the first guide wheel when the head is rotated up. The wireline then can be left in a small, gentle loop and the cable head placed in the receiving tube in the interior of the winch frame.

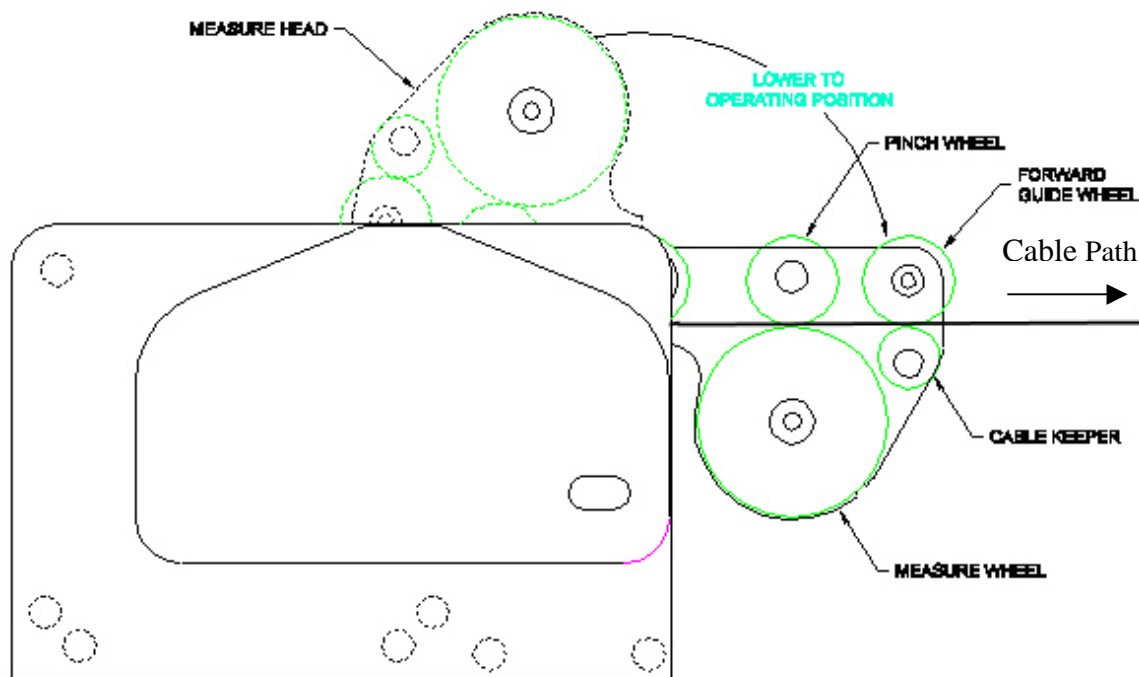


Figure 1 Measuring head operating position

In the view above, the Measuring Wheel will turn clockwise when the wireline is going down hole.

Warning: Be aware of loose clothing and keep hands and clothing away from moving parts of the winch assembly. Make sure all winch controls are off before turning on AC Power. Make sure the winch is secure before applying a load to it.

Note: There are three motor control versions used with the 4MXA, and two with the 4MXB and 4MXC winches. The original control for the 4MXA has no brake, these have no Hold switch position; the next version uses an electric brake system to hold the cable in place with a load when the logging system is connected and power applied.

Around January 2012 a mechanical brake was added to the winch and the electric brake was removed from the motor controller. Accordingly this configuration requires different operating controls and the procedures. Both electric and mechanical brake version operation procedures are detailed below.

The easiest way to tell the controllers apart is that the new winches have a manual brake lever in the rear left, motor control side of the winch frame. See below.

Electric Brake version

- Turn MATRIX AC Power On
- Turn Winch AC Power On
 - For 4MXA winch set the top, RUN/STOP Switch to RUN
- Set Winch UP/Down Switch to Down
- Turn Speed Control Pot Clockwise and spool out enough cable to work with.
- Turn Speed Control Pot Fully Counter Clockwise to stop the winch.
- Set Winch UP/Down Switch to Center, "HOLD", Position
- Remove protector caps from the cablehead and probe top and screw probe onto the cable head.

Matrix Quick Operating instructions

Mechanical Brake version

- Set UP / DOWN switch to Center position.
 - Set SPEED potentiometer fully counter clockwise (0). Here it is shown in the nine o'clock position.
 - Connect AC Power to the Winch controller.
 - Connect power cable 500K-2274 between the Winch and Matrix.
 - Turn Winch and Matrix AC Power On by pressing the silver button at center top.
 - Disengage manual brake by lifting the hand lever up.
-
- Set Winch UP/Down Switch to Down
 - Turn Speed Control Pot Clockwise and spool out enough cable to work with perhaps enough to place the tool at the well.
 - Turn Speed Control Pot Fully Counter Clockwise to stop the winch.
 - Set the manual brake by pushing the hand lever down until it locks.
 - Remove protector caps from the cablehead and probe top and screw probe onto the cable head.

Power switch shown in the **Off** position.

Controller show configured for optional 230 Volt AC input.

Brake shown in the **On** position.

Not shown, at the top front of the motor controller is an AC output connector used with cable 500K-2274 to route AC power to the Matrix logger.

See MX Winch Manual for additional information.



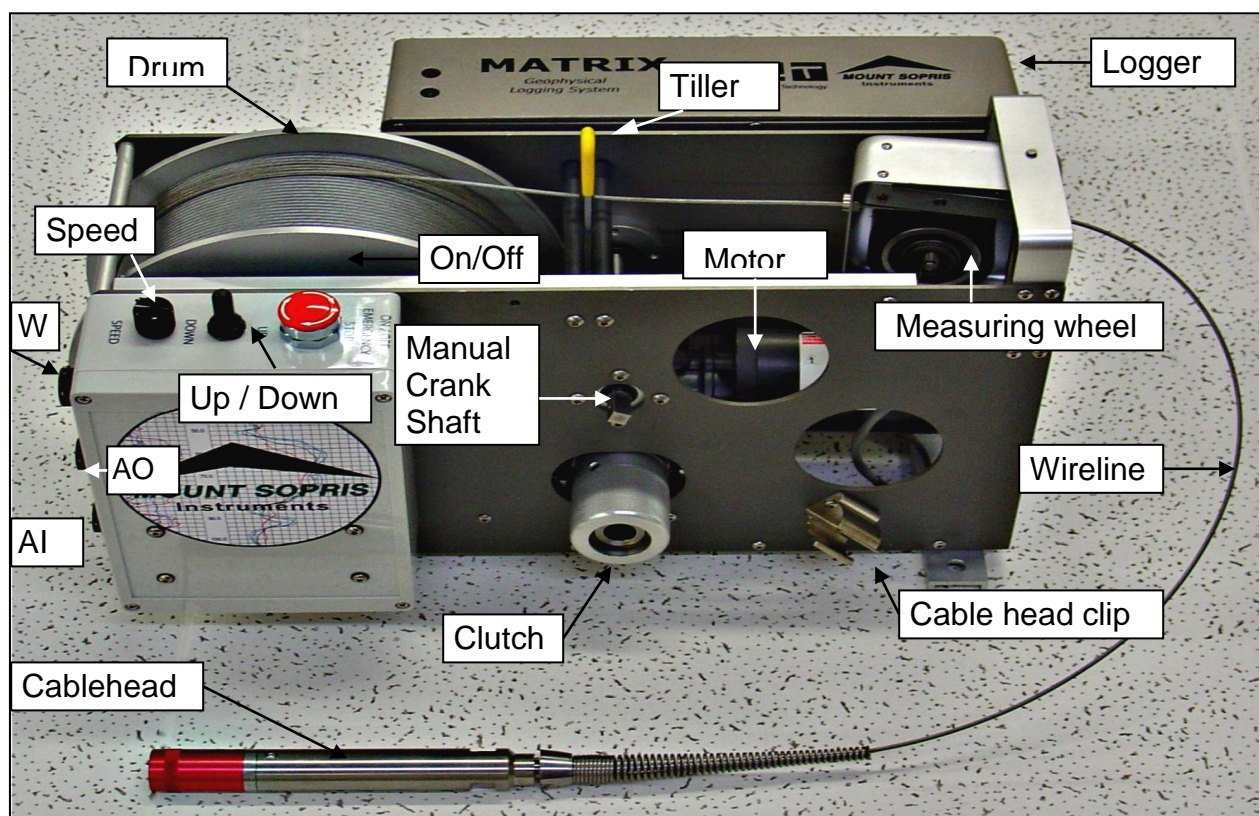
Warning-wireline

At all times prevent kinking the logging cable to prevent damage to the insulated center conductor. The wireline cablehead should be inspected periodically for electrical and mechanical integrity. To prevent loss of tools we recommend re-heading every three months or more often as conditions indicate. For detailed information see Single Conductor Rehead Instructions in MatrixHelp or:

C:\Matrix\Docs\Pdf\SingleConductorReheadInstructions.pdf

When operating the wireline in corrosive or saline environments clean and wipe the wireline before spooling it onto the winch.

200-300Meter, Mini Winch



AO – Power Out, connects to the Logger AC cord input

AI – Power In, AC power cord, 110vac unless otherwise specified. *A true sine-wave Inverter or AC Generator is necessary for smooth operation.*

W – Winch signal cable to the Logger

Speed – Motor speed control adjustment, speed increases in clockwise direction

Up / Down – Motor Direction switch with center, hesitation action

On /Off – Motor power switch Push down for OFF, turn Clockwise for ON

Winch mechanical

Drum – Holds either 200M of 1/8" wireline or 305 M of 1/10" wireline

Tiller – Used to guide the cable onto the drum when logging up. Keeping the wireline neatly spooled will prolong its life.

Motor – 90 Volt DC motor. Three mounting bolts on the chassis bottom tension the drive chain.

Clutch - To Disengage Pull the knob out and twist CCW and release the knob. The drum will move freely. **To Engage** the clutch, pull knob out and twist CW, and rotate the drum slightly to return the knob to the original position. In the disengaged position, the manual crank can be used to hand operate the drum or wireline cable can be pulled freely from the drum.

Manual Crank Shaft – attachment point for the Hand Crank

Cablehead – Red protector cap is removed before attaching to logging probe. Keep the threads and O-ring free of dirt. Check electrical and mechanical integrity every few weeks.

Cable head Clip – Spool cable in to make a lazy loop and attach cablehead to clip with protector down.








Measuring Wheel – This wheel must turn freely as the wireline contacts it to properly measure the wireline travel.

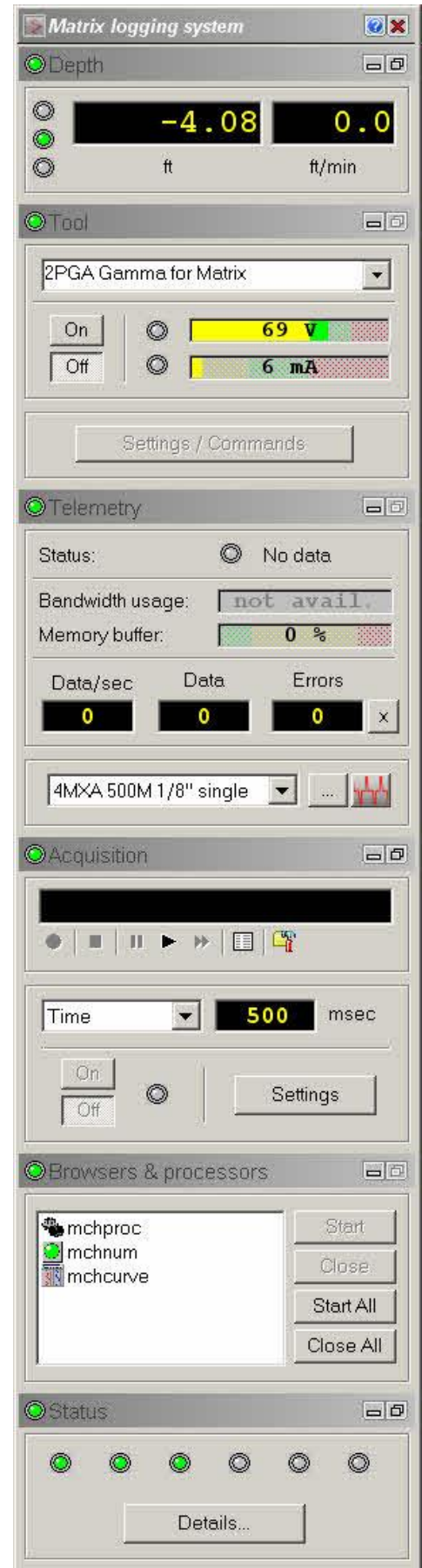
Wireline – Either 1/10" or 1/8" diameter, steel armoured, single conductor insulated logging cable to pass power and signals between the Logger and Logging Probe.

Logger – Matrix Logger mounts on two pins the latch for which is released by a clevis pin.

Logger Dashboard Operation

Having configured the software environment with LoggerSettings and the mechanical set-up of the winch and logger you are ready to start logging. Basic steps are:

- Start Logger software
 - The operating dashboard is shown at right. For more information see the electronic documents in \Logger\Support\Documents or Help
 - To close logger click the  icon on the top, title bar.
 - Help is available by clicking the  icon
 - Select tool configuration file from the Tool Panel list box
- Place Tool Top - Cablehead joint at ground zero level
 - Winch Controls, UP/Down Switch and Speed Control Knob
- Set tool Zero
 - Click Depth Panel upper right corner extend  icon
 - Click Zero Depth or Change Depth buttons as needed
 - Turn tool power on with Tool Panel Power, On button
- Select sampling interval
 - Acquisition Panel, Settings button
- Set logging scales in MChCurve
 - MChCurve Edit, Log Settings
- Set Depth scales in MChCurve
 - MChCurve Edit, Depth Settings
- WellCAD Browser
 - If the WellCAD Browser Key is connected when you start Logger, WellCAD will start. If you connect the key after starting Logger WellCAD will start after a tool is selected.
 - WellCAD Browser will close MChCurve
 - Enter Header information using Acquisition Panel Header  icon
- Calibration, when required
 - Set Acquisition Panel, Sampling Mode to Time, On
 - MChNum on the top pane, click the green LED or right click and click Calibration Settings.
- Select **Depth Down** or **Up** (Acquisition mode and turn **On** sampling mode. Use **Time** mode for testing.
- **Turn on Data Recording**
 - Acquisition Panel, click the  (record control) icon to start data recording file selection dialog
 - Enter file name, click OK
- Raise or lower tool using winch UP/Down, Speed Pot controls, data will begin scrolling and recording as the tool moves at the selected depth intervals.
 - When finished use  **Stop** button to turn off data recording
 - Use  **Replay** button to replay recorded data
 - Wait until it finishes or use **Stop** button



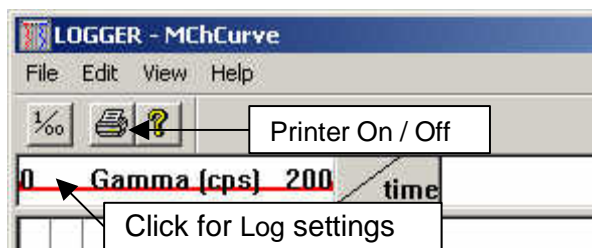
Matrix Quick Operating instructions

To modify MchCurve Log Settings, click Edit, **Logs Settings** or double click the log title

- For Real time or playback printing turn **Printing On**, MchCurve printer icon button or **File** menu



Edit menu options



Problems

LASWriter is no longer used and you will see an error if the tol file is set to run it. Installing files with LoggerSettings will prevent this. Inserting a WellCAD Key allows the use of TFD2LAS to create a LAS v2 or v3 format file from the TFD data file. Standalone Keys for this purpose are available for purchase.

Matrix

Operating the Matrix logging system is usually reliable but there are some known operational issues.

Symptom: No counts in the MChNum channels (panes remain black) with time digitizing turned on. The tool powers on, current is normal and there are telemetry signals on the Scope dialog.

Solution: Turn tool power off, close Logger and turn Matrix box power off, wait 30 seconds or longer, reapply power to the Matrix. If condition persists turn Matrix power off again and wait a little longer. Be sure you are using the proper version of Logger software.

Symptom: Logger software crashes (disappears, windows may pop up a dialog asking to close the application. The tool was selected and powered on but at some point Logger software application crashes; closing and restarting Logger results in the same problem.

Solution: Allow windows to close the Logger application, turn Matrix AC power off; reboot the computer. After the computer reboots, turn Matrix AC power on. If problem persists, contact Mount Sopris Instruments.

Warning: If tool power was turned on, rebooting the computer will not turn power to the tool off. Turn the Matrix AC power off to shut off the downhole tool power supply.

Symptom: After installing Logger on Vista machine no tools are available in the Tool Selection dialog.

Solution: Set Logger to run as Administrator. Refer to Vista installation notes.

Communications

Symptom: Digital or pulse tool provide no counts or reduced counts from a pulse style tool and a lot or all errors from a digital tool.

Solution: As above try turning the system off for 30 seconds then back on. If that doesn't help use an ohm-meter to test for shorts on the wireline. If the tool does not show current draw check for continuity between the 15 pin, Matrix signal connector and the end of the wireline cablehead or bridle. See wireline troubleshooting instructions in Matrix help for more details.



Tool operating instructions

2PGA-1000 PolyGamma, Gamma

Logger tool menu descriptions: 2PGA Gamma for Matrix

2PGA-1000 Gamma





- 1) Make sure that Matrix logger is powered up and a USB and signal cable is connected between the PC and the logger.
- 2) For the Windows Operating System, make sure that you quit all other applications before running Logger. Other programs may interfere with the acquisition program.
- 3) After the Tool selection is made, press the Tool Power **On** button.
- 4) Be sure that the processors and browsers such as MChProc are started as listed in Browsers and Processors panel. They may be minimized on the tool bar at the bottom of the screen. Don't start them twice.
- 5) Select the desired Acquisition **Depth Sampling mode, Down, or Up** and press the On button to activate. *Before moving the winch press the Acquisition **record**  button and enter a file name to turn the recording function or no data will be recorded to disk.* You may wish to observe the log on screen while going down hole to decide on the best scale for real time plotting. Use the Log Settings and Depth Settings selection of the Curve Browser to make changes to plot parameters.
- 6) If you desire to print in real time turn **Printer On** before proceeding.
- 7) When the system is initialized, you may begin logging. Gamma can be logged up or down. Normal logging speed is 3 meters/min (15 ft/min).
- 8) When you reach the top or bottom of the logging interval, press the Acquisition  **stop** button to turn off data recording. Turn Tool Power **Off** before removing the probe from the bridle/cablehead.

2PGA-1000 PolyGamma Probe in R and SP mode with or without 2PEA-1000

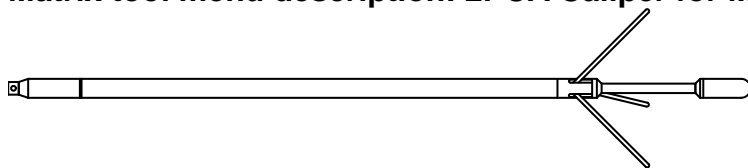
Logger tool menu descriptions: 2PGA SPR, SP for Matrix



2PGA-1000 SPR, SP

- 1) Make sure that the Matrix logger is powered up and that a USB and signal cable is connected between the PC and the logger.
- 2) Be sure that the mud plug is well grounded in a mud pit or in a hole dug in the soil and filled with water or firmly connected to a conductive rod driven into the soil. A good ground is essential for recording SP and Single Point Resistance logs.
- 3) Be sure that the 1 inch wide electrode, which is six inches from the top of the tool, is not covered with tape. You should tape over metal above and below the insulators, which are on either side of the electrode.
- 4) After the Tool selection is made, press the Tool Power **On** button
- 5) Be sure that the processors and browsers such as MChProc are started as listed in Browsers and Processors panel. They may be minimized on the tool bar at the bottom of the screen. Don't start them twice.
- 9) Select the desired Acquisition **Depth Sampling mode, Down or Up**, and press the On button to activate. *Before moving the winch, press the Acquisition **record**  button and enter a file name to turn the recording function on or no data will be recorded to disk.* You may wish to observe the log on screen while going down hole to decide on the best scale for real time plotting. Use the Log Settings and Depth Settings selection of the Curve Browser to make changes to plot parameters.
- 10) If you desire to print in real time turn **Printer On** before proceeding.
- 11) When the system is initialized, you may begin logging. Resistance and Spontaneous Potential can be logged up or down. Normal logging speed is 3 meters/min (15 ft/min).
- 12) When you reach the top or bottom of the logging interval, press the Acquisition  **stop** button to turn off data recording. Turn Tool Power **Off** before removing the probe from the bridle/cablehead.

2PCA-1000 PolyCaliper

Matrix tool menu description: 2PCA Caliper for Matrix. Use Power On to Open Arms!



- 1) Make sure that the Matrix logger is powered up and that a USB and signal cable is connected between the PC and the logger.
- 2) After the Tool selection is made, **UNLESS you are at the bottom of the desired logging interval DO NOT press** the Tool Power On button or the Arms will begin to open. If you travel down the hole with the arms open the caliper mechanism may be damaged or the probe become stuck. Travel to the bottom of the desired interval and then press the Tool Power **On** button. Do not press the **Tool Settings/Commands** button.
 - a. In the **Acquisition Panel**, set **Time** Sampling mode and Turn **On**.
 - b. Observe the LED indicator light in the MCHNum panel. It will turn Green when the tool arms are open and the data from the tool is in the valid range.
- 3) Be sure that the processors and browsers such as MChProc are started as listed in Browsers and Processors panel. They may be minimized on the tool bar at the bottom of the screen. Don't start them twice.
- 4) Select Acquisition **Depth Sampling mode Up** , and press the **On** button to activate. *Before moving the winch, press the Acquisition **record**  button and enter a file name to turn the recording function on or no data will be recorded to disk.*
- 5) Use the Log Settings and Depth Settings selection of the Curve Browser to make changes to plot parameters.
- 6) If you desire to print in real time turn **Printer On** before proceeding.
- 7) When you reach the top of the logging interval, press the Acquisition  **stop** button to turn off data recording. Press the **Tool Settings/Commands** button and press the **Close** button. A progress bar will display until a preset time interval elapses at which time the arms should be closed. Press the **Done** button. Power should be **Off**. Otherwise turn Tool Power **Off** before removing the probe from the cablehead.
- 8) **IF YOU MUST GO BACK TO BOTTOM, CLOSE THE CALIPER ARMS BEFORE GOING DOWN.**
Leave the Tool Power Off.

Calibrating Tools

As an example of a two-point calibration the 2PCA-1000 requires the use of two different diameter calibration fixtures, these can be measured casing or manufactured calibration rings.

Attach the tool as described in the tool operating procedures

Caliper Calibration with rings:

- Open the arms
- Set Time digitization On
- Right Click MChNum and click Calibration Settings
- In the First Point Reference enter the diameter in Inches or Centimeters of the small calibration standard
 - Use the **Unit** button to change unit labels as necessary
- Place the ring over the caliper arms
- Press **Sample** in that section
- In the Second Point Reference enter the diameter in Inches or Centimeters of the large calibration standard
- Place the ring over the caliper arms
- Press **Sample** in that section
- Press **Compute**
- Press **Store**
- Press **Close**

Pressing Store writes the new calibrations into the tol file. Now the other browsers and processors need to read them.

- In the Browsers and Processors Panel
 - Press **Close All**
 - Press **Start All**

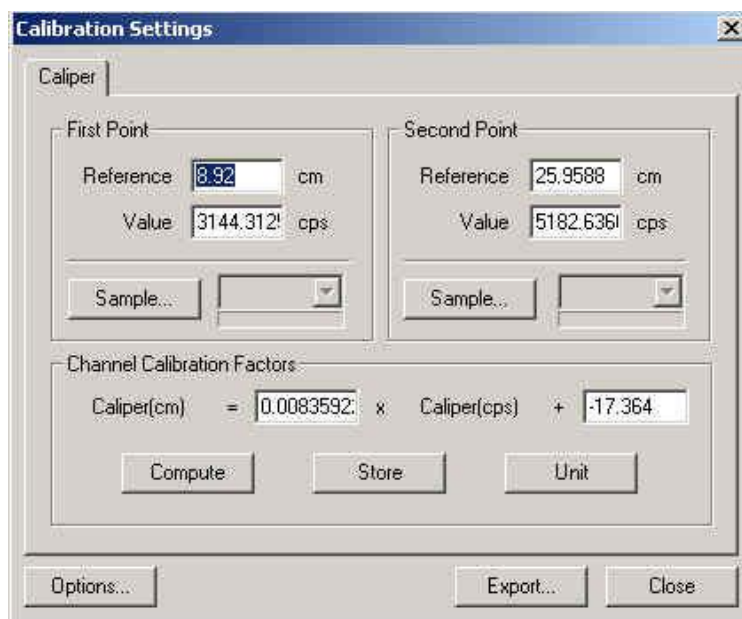
Entering Reference and Value from previous calibrations:

If you have written calibration values from a previous calibration of the tool then to calibrate the tool in the above dialog:

- Fill in the First and Second Point Reference and Values in the text entry boxes but do not check Sample.
- Press Compute.
- Change Units if necessary.
- Press Store.

You may also have to convert the Reference numbers to the desired units, for instance in the above example if you want to convert the value of cm to inches then you would divide the cm reference by 2.54 to get inches: $8.94\text{cm} / 2.54 = 3.52\text{ in}$. Similarly, for the Second Point, use the original frequency Values.

This method can be used for similar tools requiring two point calibrations such as the 2PFA-1000, Fluid resistivity, Temperature tool or the 2PIA-1000 Induction conductivity tool.



MX Winch operating position



MX Winch storage/shipping position



Do not store in this position without removing the wireline from between the measuring wheel and front guide wheel. Wireline remains under the first guide wheel. Kinking or bending the cable in a short radius can damage it.

Storage Warning:

To help prevent or lessen corrosion of the wireline and unsealed components in the system, before storing the winch for extended period of time allow it to dry out before shutting it in the case.