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How To Use a Single Barometer for Barometric Correction MultiLogger Application Note #2

Overview

It is common when using unvented pressure transducers to monitor water levels in open wells that correction for changes in barometric pressure are applied. Barometric pressure can change by over 100 mbar over the course of a test, without correction this change will result in a corresponding error in the water level measurements.

This MultiLogger Application Note will outline how to use a single barometer to apply correction to one or more pressure transducers. This is accomplished in MultiLogger using the Processing File/Extended Properties capability.

A Processing File is simply a list of additional instructions that execute after the instruments on a mux (or instruments that are directly connected) are all read, including any math or conversion units that have been applied. Press the  button located on the channel configuration form to access the Processing File/Extended Properties form. The MultiLogger help file contains much more information on the Processing File/Extended Properties form, but in short this form allows the selection of a Processing File (the instructions that will execute) and the entering of any Extended Properties that are associated with the requested file. Extended Properties refer specifically to values that MultiLogger must look up or are entered by the user so that the Processing File can function properly.

In the case described above we will use this feature to select a Processing File that will use a single barometer measurement to apply barometric correction to any number of channels. Following are the steps that must be followed:

- 1) The Processing File must be built. The file must be stored in the MultiLogger program directory, usually Program Files\MultiLogger.
- 2) The file name must be added to the [Processing File] section of the multilogger setup file.
- 3) The file must be selected in the Processing File/Extended Properties form.
- 4) The Extended Properties must be configured for the channel.

Detailed instructions for each of these steps follows in this MultiLogger Application Note.

1) Build the Processing File called barocorrection.ins using the MultiLogger Editor (press the setup button in MultiLogger, press New, select Instruction File). The file is listed at the end of this MAN (MultiLogger Application Note). Alternately the file may be copied as received via e-mail or other means to the MultiLogger directory.

2) This file must added to the multilogger.ini setup file. Close the editor after completing the above modifications and saving. Press the Setup button in MultiLogger. Scroll down to the **[Processing Files]** section. Note the last entry, add an entry with the following format:


File#n=Single Barometric Correction,barocorrection.ins

For **n** simply increment that last number shown by one. Press Save, close the Editor.

Note: When future updates are applied to the installed version of MultiLogger these settings should remain after the update completes.

3) Locate a channel which requires the barometric correction. Press the Processing File/Extended Properties button. Click the “down arrow” of the combo box to display the list of available Processing Files. Note the “Single Barometric Correction” option just added in step 2. If it does not appear check for completion of step #2, ie make sure the sequence number follows properly for the “File#” listing, make sure the setup file was saved. Select “Single Barometric Correction”.

4) Note that “BaroInit” and “WhichChannel” all show in blue in the File Properties list. This means that MultiLogger was not able to figure out what these values in the processing file represent, they must be entered in the column labeled “Value”. For “BaroInit” enter the initial barometric pressure to be used as a reference for the barometric correction. Note: If a zero reading was obtained for the barometric sensor at the start of the test (the readings are relative, ie they start with 0, as opposed to absolute) then it will not be necessary to enter the pressure here, simply enter 0. For “WhichChannel” scroll down the “Available Properties” until the “MuxReadingLocn” locations display. Locate which channel the barometer is connected. For example, if the barometer is connected to channel #3, double-click the item in “Available Properties” listed as “MuxReadingLoc3”. Press “Accept”. You will notice that the button above the

Processing Files/Extended Properties button now displays enabled . Note: Be sure the engineering units match between the barometer output and pressure transducers! If the pressure transducers output water level then the barometer must also represent the barometric pressure in the same units. If the units differ, ie the barometer outputs mbar and the pressure transducers output meters of water, then a conversion must be done in the processing file. Note the location where this conversion factor may be entered in the instruction file.

Instruction File barocorrection.ins

```

;-----
;Barometric compensation
;-----
;load the initial baro
P30  Z=F          ;load value
1:[BaroInit      ]  F          ;initial baro
2:[0             ]  Exponent of 10      ;no exponent
3:[ScratchLoc1   ]  Z Loc          ;scratch location

;calculate barometric change
P35  Z=X-Y        ;deduct
1:[WhichChannel  ]  X Loc ;barometer
2:[ScratchLoc1   ]  Y Loc          ;subtract initial barometer
3:[ScratchLoc1   ]  Z Loc          ;scratch location

;convert engineering units
P37  Z=X*F ;
1:[ScratchLoc1   ]  X Loc ;
2:[1             ]  F          ; Enter conversion factor here if
required
3:[ScratchLoc1   ]  Z Loc ;

;deduct atmospheric change from waterlevel (pressure)
P35  Z=X-Y        ;deduct
1:[MuxReadingLoc++ ]  X Loc ;actual water level
2:[ScratchLoc1     ]  Y Loc          ;adjust
3:[MuxReadingLoc++ ]  Z Loc ;compensated water level

```