



How Can I Use IDA Polynomial Coefficients in MultiLogger? Frequently Asked Question #16

Overview

The IDA polynomial coefficients are typically used to convert Slope Indicator (or instruments from other manufacturers) raw instrument readings to engineering units using a 2nd order polynomial.

There are two issues to consider as it relates to utilizing these coefficients in the measurement and channel configuration of MultiLogger, first, the difference in units of the raw instrument readings and second, the scaling required of the coefficients prior to entering in the channel configuration.

Note: This FAQ assumes you are using MultiLogger version 2.1.4 or later, there were important changes to the polynomial coefficient support beginning with this version, these changes are detailed in FAQ #14. Contact Canary Systems or your software vendor to obtain updates to MultiLogger.

Instrument Reading Units

For most Vibrating Wire gages the default raw instrument reading unit is digits, or $f^2 \times 10^{-3}$, where f is the resonant frequency in Hertz. MultiLogger also incorporates a Zero Factor of 1000 for most vibrating wire instruments, this is used to internally adjust the magnitude of the instrument readings to digits, so the raw instrument readings (as returned by the instructions in the instruction file for each instrument) are actually $f^2 \times 10^{-6}$. The units utilized to derive the IDA polynomial coefficients are $f/1333.3$, where f is the resonant frequency in Hertz. For example, a gage with a resonant frequency of 3000Hz is equal to a digits result of 9000, or a value of 9.000 in terms of what is produced by the MultiLogger instruction files. This equates to an IDA value of 2.250 (3000/1333.3). However, keep in mind that the Zero Factor will change this to a value of 2250, more on the implications of this in the Coefficient Scaling section.

It is recommended to modify the default instruction files for the instrument you wish to use with the IDA factors (alternately a new instrument could be created for this measurement). Select the appropriate **Gage Type | Make | Model** on the channel configuration form. Press the gear button located to the left of the Model selection. The instruction file for the respective instrument will be loaded into the MultiLogger Editor. Note the P28 instruction for reading the vibrating wire gage, immediately following this instruction enter the following instructions and parameters:

```
P39      Z=SQRT(X)      ;  
1:[ReadingLoc      ]      X Loc  ;  
2:[ReadingLoc      ]      Z Loc  ;  
  
P37      Z=X*F      ;  
1:[ReadingLoc      ]      X Loc  ;  
2:[.75             ]      F      ;  
3:[ReadingLoc      ]      Z Loc  ;
```

Coefficient Scaling

The IDA coefficients are calculated from $f/1333.3$ values, this results in coefficients of a relatively large magnitude since the raw instrument values are relatively small, ranging in value between 0.375 and 3.75. By incorporating the above instructions into the instruction file of the instrument the raw instrument values will range between approximately 375 and 3750, this necessitates changing the magnitude of the IDA coefficients reported by the manufacturer, specifically the A coefficient must be divided by 1,000,000 and the B by 1,000 (C is unchanged). For example if the A coefficient is -916.6571 then enter -.0009166571 in the channel configuration, if the B is 276.6734 then enter .2766734 as the B.