



Eight Steps to a More Stable Weighing System

The performance of any weighing system is largely dependent on its environment. Although the best practice is to install equipment in areas with as little vibration and electrical noise as possible, these elements are often unavoidable. Reaching optimum accuracy and response time requires choosing instrumentation that allows you to adjust noise and vibration filters to meet individual application needs.

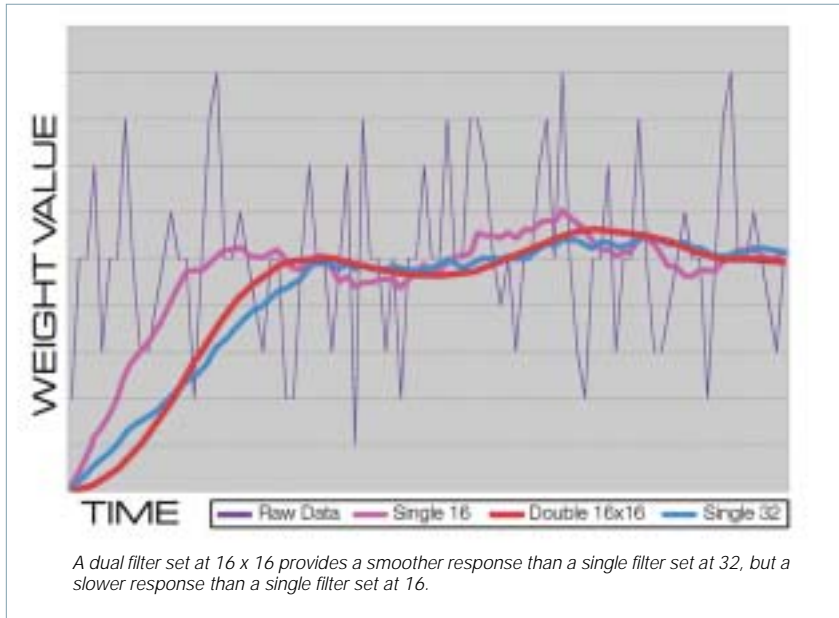
Rice Lake indicators are available with a variety of parameters that work together to reach a balance of stability and speed. They are completely configurable to meet individual application requirements. To help you understand how the filtering parameters of Rice Lake indicators function, I've put together some guidelines for determining the proper settings for your applications.

1 Begin by evaluating the scale to determine how it is affected by the environment. Place the indicator in setup mode and, if available, set an appropriate SMPRAT (sample rate) of the analog-to-digital (A/D) converter. Choosing a lower setting will create more inherent stability within the scale.

2 Next, if available, determine if the ALGFLTR (analog filter) is necessary. This function selects the range used for filtering mechanical and electrical noise. It is effective when interference is present at a constant level, such as in a mixing tank. However, it will not effectively compensate for wind or animal movement. As with the sample rate setting, a lower number will increase stability but also slow response time.

3 Turn digital filtering off by setting all of the available digital filter parameters (DIGFLT1, DIGFLT2, and DIGFLT3 if all are present) to 1, and set DFTHR (digital filter threshold) to NONE. Return indicator to operation mode.

4 Remove all weight from the scale, then observe the indicator display to determine the



magnitude of vibration effects on the scale. Record the weight below which all but a few readings fall (this value will be used to calculate the DFTHR parameter value in Step 6). For example, if a heavy-capacity scale produces vibration-related readings of up to 50 lb with occasional spikes to 75 lb, record 50 lb as the threshold weight value.

5 Now, set the DIGFLT_x parameters to eliminate vibration effects on the scale (leave DFTHR set to NONE). These parameters are configurable filter stages that control the effect of a single A/D reading on the displayed weight. The value assigned to each parameter determines the number of readings received from the preceding filter stage before averaging. The overall filtering effect can be expressed by adding the values assigned to each filter stage:

$$DIGFLT1 + DIGFLT2 + DIGFLT3$$

For example, if the filters are configured as DIGFLT1=8, DIGFLT2=8, and DIGFLT3=8, the overall filtering effect is 24.

Higher values will provide more stability, but increase settling time. For best results, choose the lowest effective value for the DIGFLT_x parameters.

6 The parameters DFTHR (digital filter threshold) and DFSENS (digital filter sensitivity) can be used to temporarily override filter averaging and improve settling time. DFTHR specifies the filter threshold in display

divisions. When a specified number of consecutive scale readings (DFSENS parameter) fall outside of this threshold, digital filtering is suspended.

Calculate the DFTHR parameter value by converting the weight value recorded in Step 4 to display divisions:

$$\frac{\text{threshold weight value}}{DSPDIV}$$

Using the example in Step 4, the threshold weight value of 50 lb and a display division value of 5D equals 10DD:

$$\frac{50}{5D} = 10DD$$

DFTHR should be set to a minimum of 10DD for this example.

7 Next, set the DFSENS parameter high enough to ignore transient peaks. Longer transients (typically caused by lower vibration frequencies) will cause more consecutive out-of-band readings, so DFSENS should be set higher to counter low frequency transients. Reconfigure as necessary to find the lowest effective value for the DFSENS.

8 The final consideration is RATTLETRAP (RATTRAP), Rice Lake's own technology. When set to ON, it amplifies the effects of DFTHR to filter out repeating vibrations caused by mechanical noise from nearby machines.

I hope these tips have helped you to better understand how to use digital filtering in your applications. But remember, our technical support is just a phone call away to provide assistance. My columns are also available online at our rlws.com dealer site.

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