Customer Support Engineering Tech Note #10

Analog Voltage Proportional to Pacer Velocity

Abstract

This Tech Note shows a way to generate an analog voltage proportional to the velocity of a pacer encoder.

Description

Applications that use a pacer encoder to track material passing through a machine often need to generate an analog voltage proportional to the pacer encoder’s speed. This signal could be used for display purposes or to control other parts of the machine that need to match the pacer encoder speed. This “Tech Note” shows a way to generate such an output with minimal programming.

Solution

Configure the pacer encoder axis as though it is connected to a velocity mode servo drive, and enable the axis in mode 14.

The DSP Velocity Observer converts changes in encoder position to a speed value. Since the “axis” is not being commanded to move, the DSP processor interprets this speed value as a velocity error. The DSP servo algorithms multiply this velocity error by a proportional gain and convert it into an analog voltage.

Implementation

Use MotionPRO’s GEN-III Configuration utility to select the proper encoder and set up the axis for velocity mode. Using the “Motor/Load Parameters” form, position the cursor on the “Motor Model Number” field, then press the enter key. Select the appropriate encoder from the list. Set Drive type to “Velocity” and set “Maximum Motor Speed” to the maximum speed that the encoder will turn. For an EDR-25S/A1500 encoder, the form should look like Figure 1.

![Motor/Load Parameters Form](image)

Figure 1
Using the "Range Variables" form, set the "Position Error" to zero to disable position error limit checking.

In your application program, set the KVH@ value to 100, this should result in a voltage of 10V when the encoder is running at its maximum speed. For a different voltage, adjust KVH@.

To enable the output, set MODE@ to 14. This enables the axis in velocity mode without checking for the actual presence of a servo drive. The output voltage is accessible on pin 3 (DRV-CMD) of the DSP axis interface connector (J11 or J12).

The output is a ±10 VDC 12-bit digital to analog converter, the actual voltage you get will depend on the "Maximum motor speed", the "Drive input at maximum speed” and the KVH@ values.

The DSP will update the analog output once per servo loop update (typically 3000Hz, as defined by LOOP.RATE@) independent of what your application program is doing.

**DSP Axis Module Selection**

ORMEC offers two primary models of DSP Axis Module. The GN3-DSP-AQ model does not have analog output circuitry on axis channel A. If you use a GN3-DSP-AQ module, you can only use this technique on axis channel B. The GN3-DSP-A2 module has analog output circuitry on both channels allowing you to use this technique on either or both.