

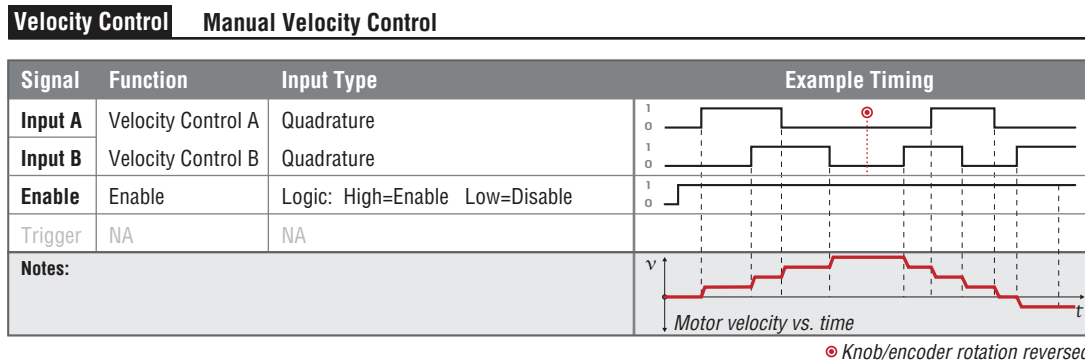
## MANUAL VELOCITY CONTROL

Available on  
**MVC + MCPV**

### MODE DESCRIPTION

This mode offers fine velocity control from zero to a user-defined maximum at the turn of a quadrature output device (such as a quadrature output encoder). Turn in one direction to increase CW motor velocity; turn in the other direction to increase CCW velocity. When enabled, ClearPath can either resume running at its last set speed *or* start at zero speed (and stay at zero speed until commanded to move).

Assert the Enable Input to energize the motor. Then, control motor velocity by sending quadrature signals to ClearPath Inputs A and B. Each quadrature signal transition (or “tick”) received by ClearPath causes an incremental increase or decrease in motor velocity, depending on which direction the encoder is turned (i.e. whether phase A leads B or B leads A).



## I/O FUNCTIONS

**Enable Input** - Asserting this input energizes the motor shaft.

**Input A** - This input is connected to one of the channels of the quadrature output device.

**Input B** - This input is connected to the other channel of the quadrature output device.

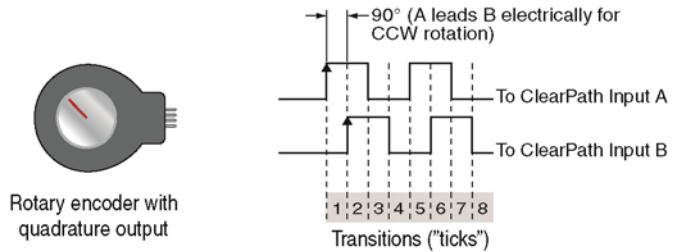
**Output (HLFB)** - See HLFB section for available modes.

### Notes:

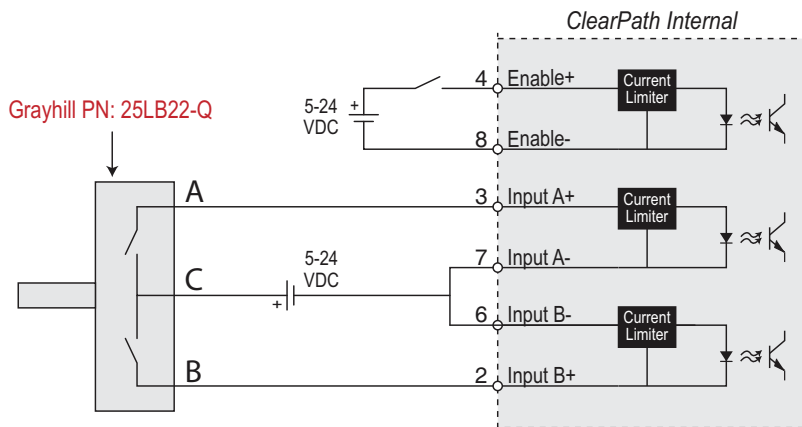
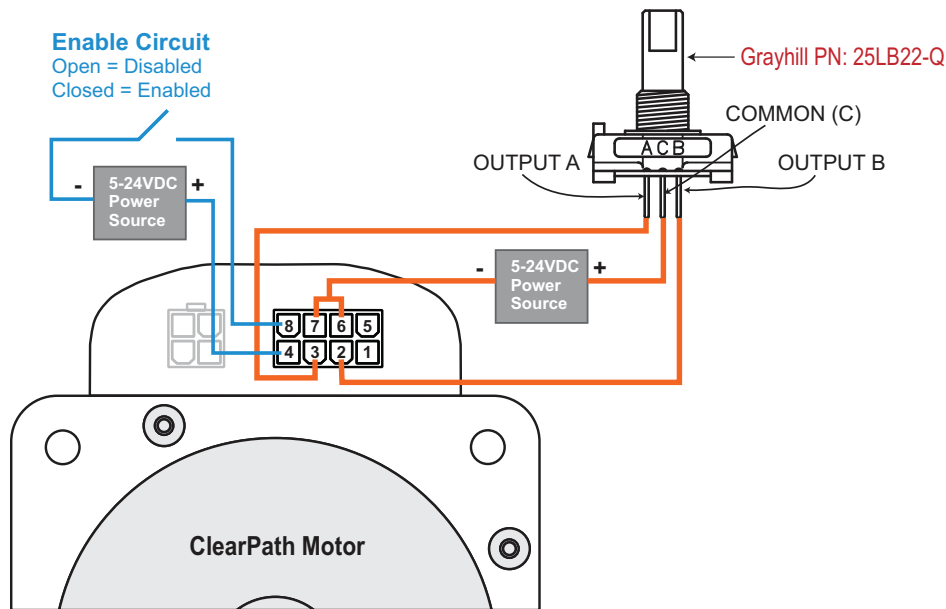
- Disable time = 10 mS
- Rotating the quadrature knob in one direction will cause an increase in speed; the other direction causes a decrease (which can be thought of as an increase in the opposite direction).
- If you want to only spin in only one direction, set one of the Max Velocity values in MSP (CW or CCW) to zero.

### THE QUADRATURE SIGNAL SOURCE

To use this mode you'll need a quadrature output device (usually an encoder) that can generate two channel (quadrature A/B) signals in the 5-24VDC range. Many users choose an optical or mechanical incremental encoder for this task, but a microcontroller or digital signal generator will work as well.



Example: Wiring a Mechanical Quadrature Output Device to ClearPath



## MODE CONTROLS

**Encoder Knob Configuration**

Enter max. desired motor velocity for CW and CCW shaft rotation. **Max CW Velocity (RPM)**: 700.

Enter desired incremental increase / decrease in motor velocity per quadrature tick. **Max CCW Velocity (RPM)**: 1,400.

**Velocity Resolution (RPM per knob count)**: 100.0

**Knob Direction**: As-Wired (dropdown menu). **Has Detents** checkbox is checked.

**Reverse sense of motor direction with respect to quadrature phasing, or leave As-Wired.** Eliminate need to rewire inputs if motor rotates the "wrong" way initially.

**Torque Limit**: OVR indicator and Setup... button. Click to open Torque Limit Setup dialog.

**Max Accel (RPM/s)**: 1,000. **Decel = Accel** checkbox is unchecked.

**Max Decel (RPM/s)**: 100.

**Profile Conversion**: RAS™ 25 ms. Setup... button.

**On Enable...** dropdown menu: Zero Velocity (selected), Zero Velocity, Last Command.

Set motor to initialize to either **Zero Velocity** or **Last Commanded** velocity each time ClearPath is enabled.

**Torque Override Indicator**: When lit, the main torque limit is being overridden by a secondary, user-set torque limit (e.g., when an axis is homing, the main torque limit may be overridden by the separate homing torque limit setting).

**Hardware Input Status LEDs**: Light = Input asserted (on), Dark = Input de-asserted (off).

**Inputs and Commands**: Enable On/Off (checked), Input A Enc A, Input B Enc B.

**Commanded Speed (krnts/sec)**: 0.00. Displays commanded speed (when using hardware inputs).

**AllSystemsGo**: At Target Speed (blue button). Displays HLFB output status.

**Override Inputs** checkbox is unchecked. Check to turn on Soft Controls. Override cannot be activated when ClearPath is hardware enabled.

**Soft Knob**: Click arrows to increase or decrease motor velocity by increment defined in "Velocity Resolution" field above. Each "arrow click" is equivalent to a hardware quadrature "tick".

## DESCRIPTION OF ENCODER/KNOB SETTINGS

### MAX CW VELOCITY

This setting defines the maximum motor shaft velocity that can be reached when the quadrature knob is turned in the direction that causes CW shaft rotation.

### MAX CCW VELOCITY

This setting defines the maximum shaft velocity that can be reached when the quadrature knob is turned in the direction that causes CCW shaft rotation.

### **VELOCITY RESOLUTION**

This setting defines exactly how much (i.e., by what increment) motor velocity will increase or decrease per quadrature “tick”.

### **KNOB DIRECTION**

This setting allows the user to reverse the motor’s sense of direction with respect to the quadrature device phasing.

### **“HAS DETENTS” CHECKBOX**

**When unchecked**, ClearPath treats each quadrature transition it sees as a single “tick”. (Remember, each tick causes an incremental change in motor speed.)

**When checked**, ClearPath treats every 4<sup>th</sup> quadrature transition it sees as one “tick”. (Remember, each “tick” causes an incremental change in motor speed.) Check this box when using an encoder that has one detent point per full quadrature cycle or if you want to divide your quadrature resolution by four.