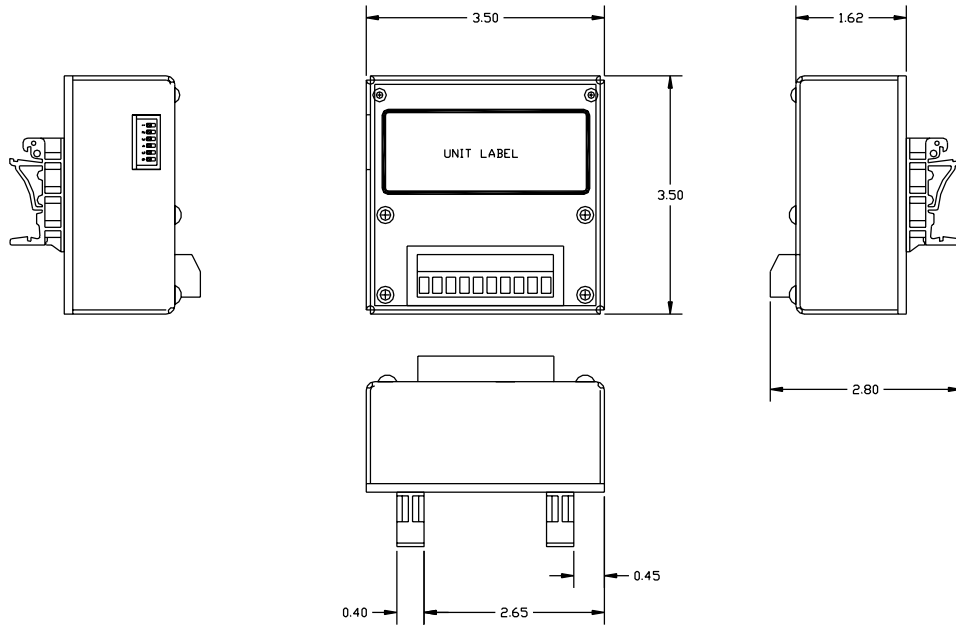
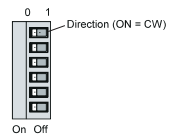


PS-2252-12-TP1 Net Forward Encoder Interface

The PS-2252-12-TP1 Net Forward Encoder Interface (NFEI) accepts inputs from the A and B channels of a standard quadrature encoder. The NFEI outputs a pulse for each forward direction transition of the encoder, but reverse direction transitions result in no pulses. Furthermore, following reverse movement, no output pulses result from forward movement until the encoder position exceeds the furthestmost forward position reached before the reverse movement. The NFEI rejects jitter resulting from mechanical oscillation at a transition point of the encoder with the system at a zero average velocity. Note: If more than 65,535 consecutive reverse encoder transitions are made, an Overflow output on the NFEI is activated indicating that the reverse counter has lost track of reverse transitions. A reset input allows clearing the reverse counter in order to restart.

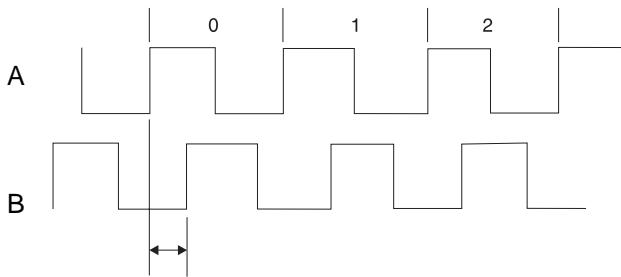


<p>Inputs Channel A, Channel B: Standard Quadrature encoder A and B channels. Reset: Resets internal reverse counter when high-level.</p>
<p>Outputs Out 0: High-going pulse indicates forward increment of encoder. Overflow: High level indicates overflow of internal 16-bit reverse counter.</p>
<p>Voltage Levels Channel A & B Inputs: 5-15 VDC. Reset Input On voltage: Optically isolated, 4.0 VDC min @ 10 mA. Out 0 & Overflow Outputs: 7406 open collector. VOL = 0.4V max @ IOL = 16 mA. VOH = 30V max.</p>
<p>Timing Time Between Encoder Channel Edges: 17 microseconds minimum. Reset Input Pulse Width: 50 microseconds minimum. Output Pulse Width: 20 microseconds minimum.</p>
<p>Configuration CW/CCW: Dip switch sets forward rotation direction. 1st switch ON = CW. 1st switch OFF = CCW. Switches 2-6 are not used.</p>
<p>Power Supply Supply Voltage: 11-15 VDC. Supply Current: 90 mA @ 12 VDC.</p>
<p>Environment Operating Temperature: 0° to 55°C (32° to 131°F) Storage Temperature: -40° to 70°C (-40° to 160°F) Humidity: 95% maximum relative non-condensing.</p>
<p>Mounting Brackets accept EN-50035 ("G" profile) or EN-50022 ("Top Hat" profile) DIN rail. EN-50035 ("G" profile) included.</p>



Internal Encoder Count

Mechanical oscillation of the encoder is properly tracked by the NFEI as long as the minimum time between encoder channel edges is within specification, as illustrated below.



17 microseconds minimum

For Example:

A quadrature encoder with 1000 pulses/revolution has $4000 \frac{\text{edges}}{\text{revolution}}$

If this encoder revolves at 800 rev/min:

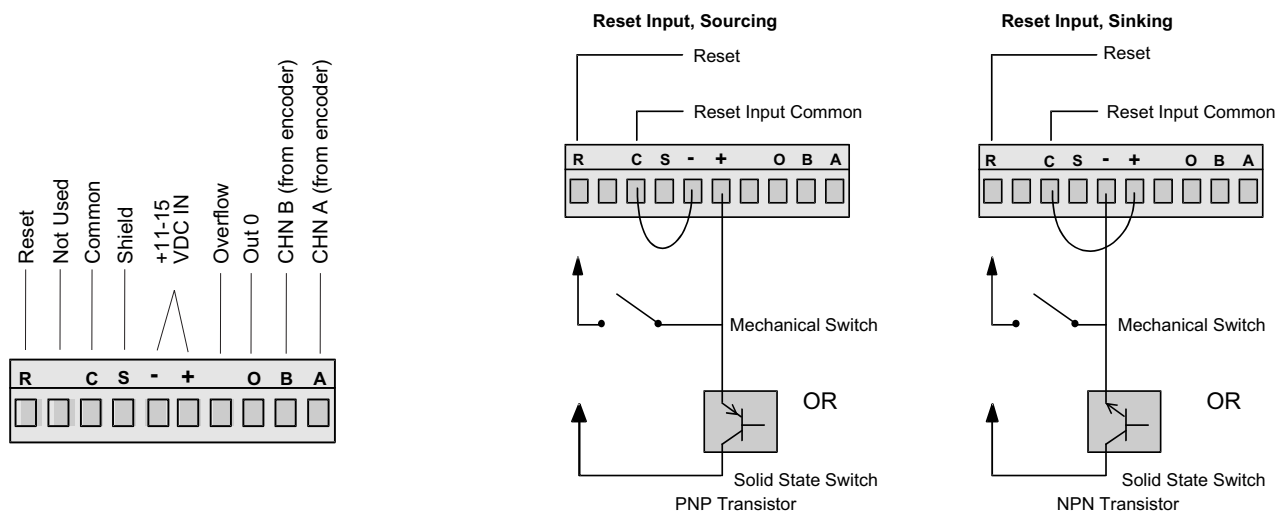
$$800 \frac{\text{rev}}{\text{min}} \cdot \frac{1 \text{ min}}{60 \text{ sec}} \cdot \frac{4000 \text{ edges}}{1 \text{ rev}} = 53,333 \frac{\text{edges}}{\text{sec}}$$

This implies $18.75 \frac{\text{microseconds}}{\text{edge}}$

Thus, the upper speed limit for a 1000 rpm quadrature encoder is 800 rpm.

Installation

Connect the NFEI using the Terminal Block Wiring illustration below.



Troubleshooting

Symptom: Output does not turn on with encoder movement.

- Verify that the voltage on the + and - terminals of the NFEI terminal block is between 11 and 15 VDC.
- Verify with oscilloscope that proper encoder signals (per Internal Encoder Count illustration) are present at the Chn A and Chn B terminals of the NFEI terminal block, and that the voltage levels are TTL compatible (logic 0 less than 0.8 v and logic 1 greater than 2.0 v). If not, there is a problem with the encoder or encoder cable. If the encoder signals are proper, the problem is internal to the NFEI, and the NFEI should be exchanged.
- Verify that the configuration DIP switch setting agrees with the actual direction of encoder movement. If the Overflow output is at a TTL high level, then the encoder has moved more than 65,535 counts in the reverse direction, and the internal reverse count logic of the NFEI will not be accurate. Move encoder to "0" position and reset NFEI.
- Verify with oscilloscope the status of the Out 0 terminal on the NFEI terminal block. If, after the reverse counts have been counted out, there are pulses when the encoder moves in the configured direction, then the problem is not in the NFEI.