## Counter Modules

The POINT I/O counter modules serve as signal conditioners and function blocks (that is, counters) between the customer process signals on the mounting base, and the POINTBus backplane containing the command information. The three main functional blocks are the customer digital I/O interface, the counter ASIC, and the microprocessor.

The counter modules accept feedback from:

- Encoders (either single-ended or differential)
- Pulse generators
- Mechanical limit switches
- Frequencies up to 1 MHz

A filter is available with four settings: 50 Hz, 500 Hz, 5 kHz, 50 kHz. The filter can be turned off to achieve the fastest counting rate.

The modules return the count or frequency in the form of a 24-bit binary number (0…16,777,215) expressed in a 32-bit word. Each counter has a user-selectable preset and rollover value associated with it.

The counter modules operate in the following modes.

- Counter mode — read incoming single-phase pulses, return a binary count.
- Encoder mode — read incoming two-phase quadrature pulses, return a binary count.
- Period/rate mode — count internal clocks during the on period, return a frequency (1734-VHSC24 and 1734-VHSC5 outputs are updated only at the end of the period).
- Continuous/rate mode — count internal clocks during the on period, return a frequency (1734-VHSC24 and 1734-VHSC5 outputs are updated continuously during this period).
- Rate measurement mode — read pulses during the sample period, return a frequency.
- Pulse width modulation (PWM) mode — generate a pulse width modulated signal (1734-VHSC24 and 1734-VHSC5 only).
- Pulse generator mode — generates a pulse of defined width, returns width and quantity of trigger (1734-VHSC24 and 1734-VHSC5 only).

The operation of the counter and encoder modes is nearly identical. The difference between the two modes is in the type of feedback (one-phase versus two-phase) for the count direction (up or down). In encoder mode, a transition is expected on B for counting to proceed in a direction. In counter mode, the

B input may be left at a static level. All operating modes are selected by writing appropriate configuration data to the module.

**1734 Incremental Encoder Modules Technical Specifications**

| | 1734-IJ | 1734-IK |
|---|---|---|
| Number of counters | 1 | |
| Input frequency, max | 1.0 MHz counter and encoder X1 configurations (no filter)<br>500 kHz encoder X2 configuration (no filter)<br>250 kHz encoder X4 configuration (no filter) | |
| Voltage category/type, input | 5V DC<br>A/Areturn, B/Breturn, Z/Zreturn | 24V DC<br>A/Areturn, B/Breturn, Z/Zreturn |
| Current, off-state input, max | ≤0.250 mA | ≤0.250 mA |
| Voltage, off-state input, max | ≤1.25V DC | ≤1.8V DC |
| Current, on-state input, min | ≥5 mA | |
| Current, on-state input, max | 25.7 mA @ 6V DC 19.1 mA @ 5V DC | 6.1 mA @ 15V DC or 10.2 mA @ 24V DC |
| Voltage, on-state input, min | ≥2.6V DC | ≥12.5V DC |
| Voltage, on-state input, max | ≤6V DC | Refer to input derating curve |
| Input filter selections, per A/B/Z group | Off<br>10 μs (50 kHz)<br>100 μs (5 kHz)<br>1.0 ms (500 Hz)<br>10.0 ms (50 Hz) | |
| Power dissipation, max | 1.1 W @ rated load | 1.5 W @ rated load |
| Thermal dissipation, max | 3.75 BTU/hr @ rated load | 5.1 BTU/hr @ rated load |
| Terminal base unit | 1734-TB, 1734-TBS, 1734-TOP, or 1734-TOPS | |
| Keyswitch position | 2 | |
| Isolation voltage | 50V (continuous), Basic Insulation Type<br>Type tested at 1100V DC for 60 s, field-side to system | |
| External DC supply voltage, nom | No additional external power required to power module | |

**1734 VHSC Modules Technical Specifications**

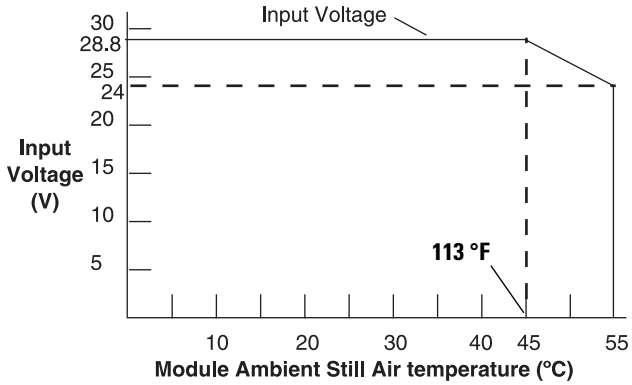
| | 1734-VHSC24 | 1734-VHSC5 |
|---|---|---|
| Number of counters | 1 | |
| Number of compare windows | 4 | |
| Output groups | 1 group of 2 | |
| Voltage category/type, input | 24V DC | 5V DC |
| Current, off-state input, max | ≤0.250 mA | ≤0.250 mA |
| Voltage, off-state input, max | ≤1.8V DC | ≤1.25V DC |
| Current, on-state input, min | ≥5 mA | |

### 1734 VHSC Modules Technical Specifications

| | | |
|---|---|---|
| Current, on-state input, max | 10.2 mA @ 24V DC or 6.1 mA @ 15V DC | 25.7 mA @ 6V DC<br>19.1 mA @ 5V DC |
| Voltage, on-state input, min | ≥12.5V DC | ≥2.6V DC |
| Voltage, on-state Input, max | Refer to input derating curve | ≥2.6V DC |
| Input filter selections | Off<br>10 μs (50 kHz)<br>100 μs (5 kHz)<br>1.0 ms (500 Hz)<br>10.0 ms (50 Hz) | |
| Input frequency, max | 1.0 MHz counter and encoder X1 configurations (no filter)<br>500 kHz encoder X2 configuration (no filter)<br>250 kHz encoder X4 configuration (no filter) | |
| Output delay time off to on | 25 μs (load dependent) | |
| Power dissipation, max | 1.9 W @ rated load | 1.5 W @ rated load |
| Thermal dissipation, max | 6.5 BTU/hr @ rated load | 5.1 BTU/hr @ rated load |
| Terminal base unit | 1734-TB, 1734-TBS, 1734-TOP, or 1734-TOPS | |
| Keyswitch position | 2 | |
| Isolation voltage | 50V (continuous), Basic Insulation Type<br>Type tested at 1100V DC for 60 s, field-side to system | |
| External DC supply voltage, nom | No additional external power required to power module(1) | |

(1) Does not represent power required to supply outputs.

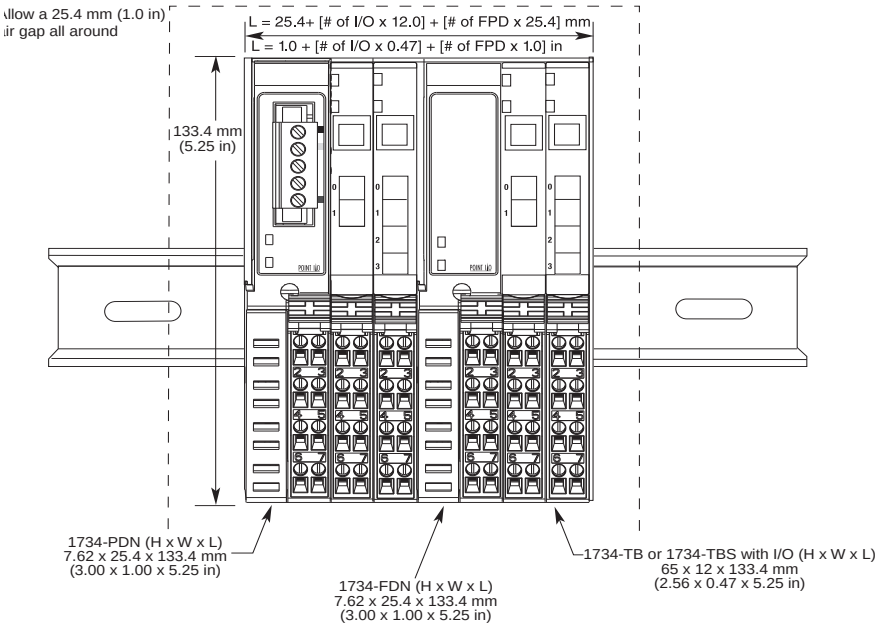
**1734-VHSC24 Input Derating Curve**




**Note:** Exceeding the maximum input voltage can cause permanent damage to the input.

# Approximate Mounting Dimensions

### POINT I/O with 1734-PDN Mounting Dimensions




**IMPORTANT** When mounting the 1734-IB8S, 1734-OB8S, and 1734-IE4S modules, ensure that there is 2 in. of clearance space above the POINT rail.