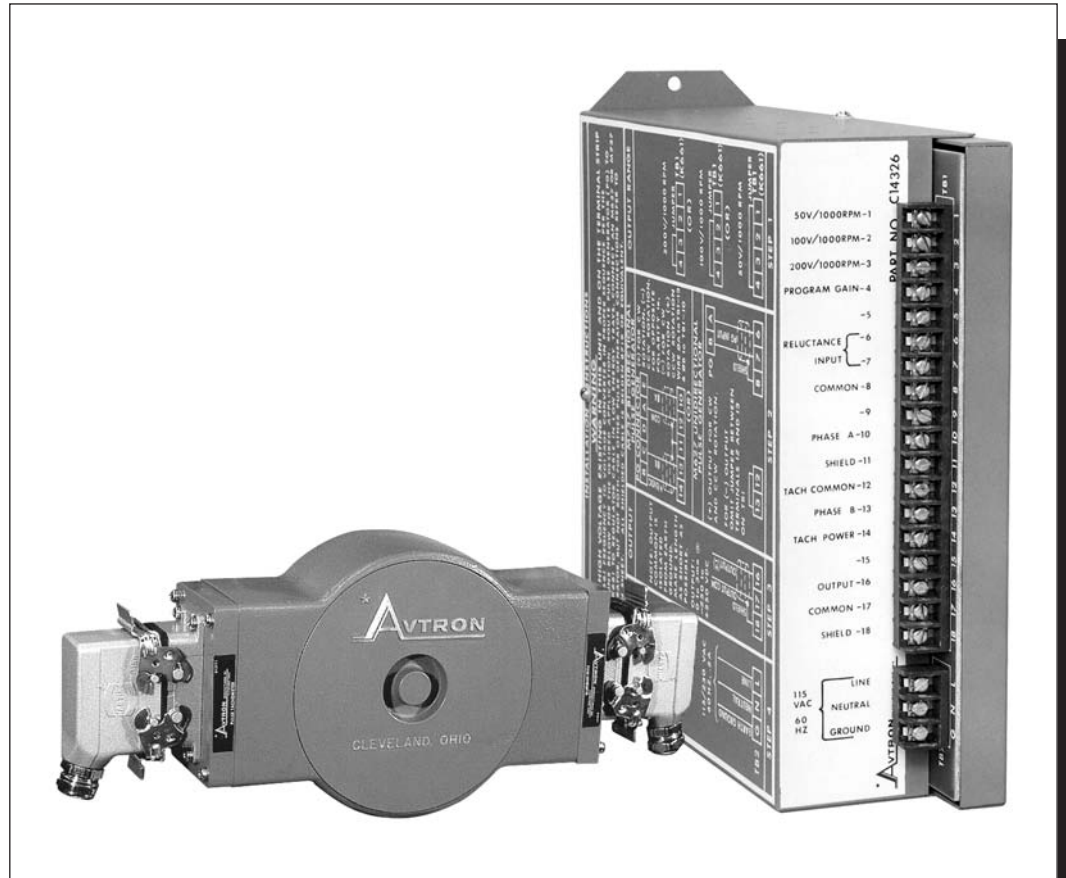


Model K661

Bulletin 301

Brushless Tachometer



- Improves Speed Regulation
- Eliminates Drift and Non-Linearities
- Eliminates Temperature Effects
- Easy to Install
- Economical

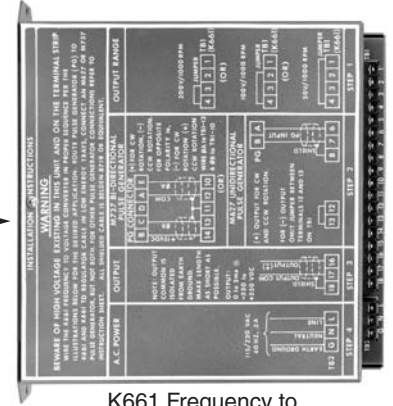
Avtron K661 Brushless Tachometer



Avtron Speed/Draw System



Avtron Dual Output Heavy Mill Duty Rotary Pulse Generator (Model M485)



K661 Frequency to Voltage Converter

Features

Avtron's Model K661 Brushless Tachometer improves drive regulation and reduces maintenance by directly replacing "precision" analog speed feedback tachometers. The K661 is considerably more accurate and is maintenance-free. Output is an analog signal of 50, 100 or 200

volts/1000 RPM, with polarity determined by direction of rotation. This allows use of the K661 with nearly any electric drive, static or rotating, irrespective of horsepower or manufacturer, without modifying the drive in any way.

Reliability

The K661 is the latest version of a product line which has operated successfully in the most strenuous continuous processing environments since 1974. The K661 is even more reliable than its predecessors because it has fewer components.

The K661 contains no switches, no potentiometers, and no hand wiring. This ensures an extra long operating life, as mill conditions frequently attack such items before active components.

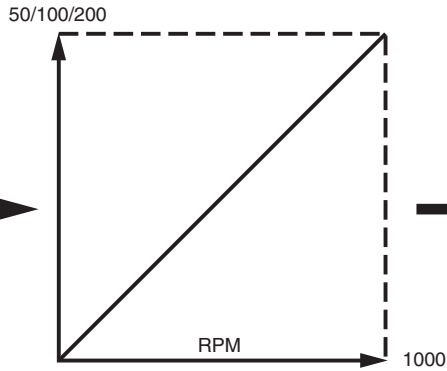
Pulse Generator Selection and Drive Interface

Recommended pulse generators for use as input devices to the K661 include any Avtron pulse generator having 240 pulses/revolution. Other pulse generators may be used but the analog output voltage will be proportional to PPR. A 300 PPR pulse generator for example, would yield 62.5, 125, and 250 volts/1000 RPM instead of 50, 100, and 200. For motors from 600 to 3000 RPM base speed, there is no point in selecting any PPR other than 240 unless pulse generators already exist.

Drive interface is exactly like any analog tach. The only possible limitations are (a) a maximum output voltage of ± 300 VDC, irrespective of range, and (b) maximum

current of 3mA. The latter has been found to cause no problems with drives manufactured by major suppliers since 1940, or with most other drives as well. If in doubt, use Ohm's law with the drive's input impedance to calculate current or consult Avtron.

Unlike earlier units, calibration is not required. Each K661 is set to a volts/RPM relationship of $\pm 1\%$ of its nominal value. Unlike analog tachs, this output will remain linear and repeatable to within 0.002% of this factory value. Machine operators, after setting machine speeds, can forget about tach drift.



Feedback Conversion



Avtron Digital DC Drive

Operation

The analog tachometer is replaced by an Avtron heavy mill duty (HMD) rotary pulse generator, which may be foot mounted or NEMA 56C face mounted. The frequency produced is exactly proportional to RPM, irrespective of temperature, etc. K661 electronics convert this to an analog signal. Combined repeatability and linearity is 0.002% and temperature effect is insignif-

icant. There are no brushes to contaminate and specifications remain stable under demanding mill conditions.

In addition to the HMD style pulse generators, the K661 is also compatible with the Avtron SMARTach™, THIN-LINE™, and Universal Encoders™ set for 240 PPR output resolution.

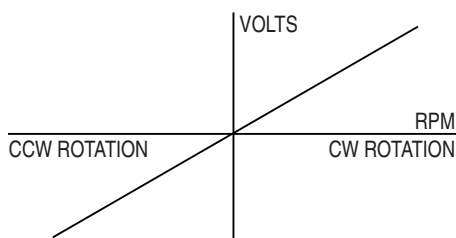
K661 Output with Avtron Pulse Generators

Several styles of Avtron pulse generators can be used with the K661. The HMD styles are mechanically identical when face mounted, and can be foot mounted with only slight modification to the base plate. Use of other pulse

generators like the SLAPtach™ depend upon the motor. Consult with Avtron for recommendations and information.

Two Phase Bidirectional Pulse Generator

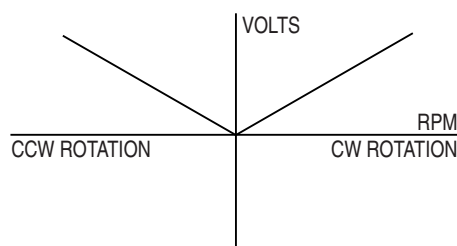
The K661 output voltage reverses when the drive runs backwards. Requires 4 wires between the pulse generator and K661. Can be used on nearly any drive.



Single Phase Unidirectional Pulse Generator

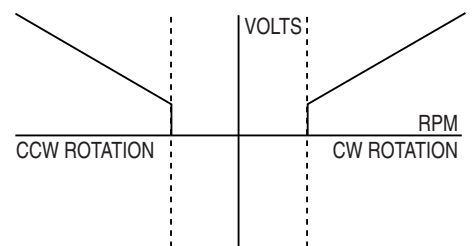
The K661 output is the same except voltage does not reverse when drive runs backwards. Requires 3 wires between the pulse generator and K661. Use on nonregenerative drives or drives where tach voltage does not determine rotation direction.

Reluctance Pulse Generator



ator

Most economical. The K661 output is the same as output with single phase except that it drops to zero at low RPMs. Depending on cable length, this occurs at 30 to 50 RPM. Requires 2 wires between the pulse generator and K661.



K661 Specifications

Drift: 0.002% / °C Max. Zero

Output Ripple: Volts RMS is generally less than brush generators and is predictable depending on input frequency from rotary pulse generator. For 240 PPR, open loop ripple is 0.9V at 25 RPM, 0.15V at 250 RPM, and 0.1V at 2500 RPM.

The K661 ripple effect on speed is normally nil due to (a) high ripple frequency compared with electronic and mechanical time constants of DC drives and (b) absence of DC generator poles and brushes which generate unpredictable and non-zero average ripple that affects speed both short and long term.

Construction: Barrier terminal strips with 3/8" centers for ease of installation. Circuit board coated for corrosion protection. Steel enclosure removable for easy access.

Power: 115 VAC ± 15%, approx. 0.25 AMP

Signal Inputs: Most Avtron rotary pulse generators with at least 60 PPR. Maximum frequency 24 KHz.

Output Signal: 50, 100, or 200 Volts/1000 RPM, selectable. ± 1%, ± 300 volts max. 3mA max. Polarity selectable with jumper.

Linearity: ± 0.002% of volts/RPM from zero to max. RPM.

Stability: ± 0.02% of full scale over 30 days.

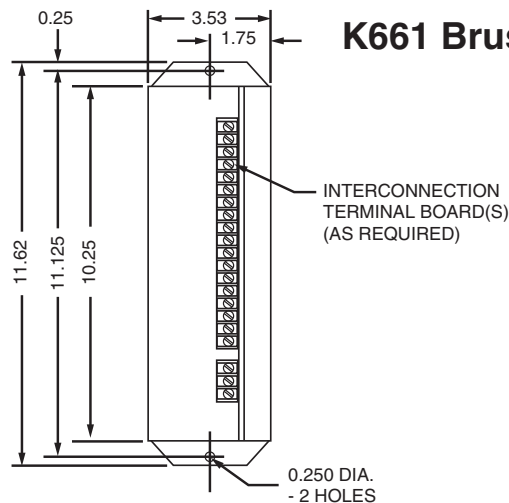
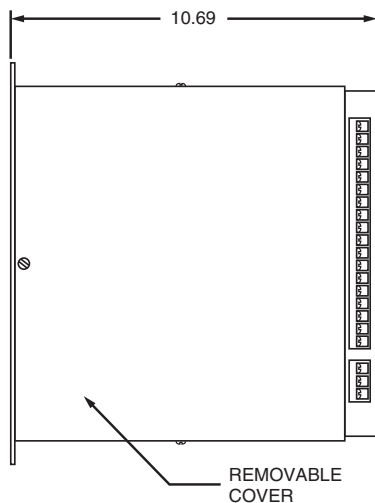
Response: 0.01 sec. to reach 90% of final value of a step change.

Offset: None, due to elimination of brush drops.

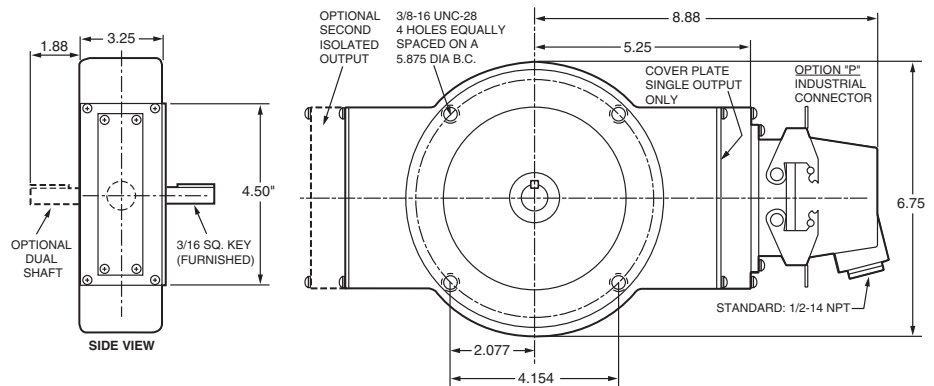
Reversing Error: Zero

Operating Temperature: K661: 0 - 60°C
pulse generator: 0° - 70°C

K661 Outline Drawings



K661 Brushless Tachometer



M485 Pulse Generator



SMARTach™, THIN-LINE™, SLAPtach™, and Universal Encoders™ are trademarks of Avtron Mfg., Inc. Specifications and features subject to change without notice. All dimensions are in inches. Printed in U.S.A. Rev. E