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# Encoder Instructions

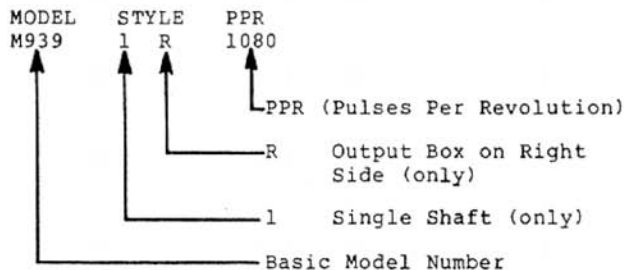
## M939

INACTIVE DESIGN  
 Replaced by Model AV485

### Description

The Model M939 Pulse Generator is a zero-speed rotary transducer; that is, it can operate effectively down to zero RPM. The M939 generates a specific number of pulses for each rotation of its shaft. When the M939 is coupled to a machine, its output is directly proportional to process travel (pulse count) or speed (pulse rate). A rugged cast aluminum housing, 5/8-inch steel shaft, and heavy-duty sealed bearings provide mechanical ruggedness required for industrial applications.

The M939 options and how they are incorporated in the M939 part number are shown below:



### CAUTION

The M939 is often used for speed feedback in drive systems, where any failure can cause a machine shutdown. While the M939 is designed for continuous mill operation, it is important to follow proper procedures with this unit.

DO NOT force or drive a coupling onto the shaft. This can damage bearings so that a failure will happen at a later time.

DO NOT install M939 (or any other rotating equipment) where liquids will be sprayed or hosed onto them. If necessary, provide a shield.

DO NOT connect grounded oscilloscope, K761, or any grounded instrument to M939 output.

DO NOT connect oscilloscope or any instrument common to any pulse generator connection other than common (Blk wire or pin A).

REPAIR of defective units requires returning the unit to the factory, where there is special test equipment. Turn-around time is minimal, and charges are nominal for out-of-warranty units.

### Specifications

Operating Power.....	12-15 VDC @ 150 ma (TYP)
Output Signal.....	Two channels in quadrature (two-phase, bidirectional, A, B) with complements ( $\bar{A}$ , $\bar{B}$ ). Marker pulse (M) with complement ( $\bar{M}$ ).
Pulses per revolution.....	1,080 - Others available upon request.
Wave Shape.....	Square Wave, 50 ± 15% duty cycle.
ØA To ØB Transition Separation.....	15% Minimum
Voltage Swing (No load).....	0.7 to supply voltage - 1 Volt
Output Drive.....	1000 Ohms Internal pull up, 20 mA sink
Connection.....	MS3106E18-1S Plug
Marker Pulse.....	One pulse per revolution, (M) is coincident with the $\bar{B}$ positive going alternation.
Frequency Range (No Load).....	0 to 54 kHz max.
Output Protection.....	Output is short circuit protected to common.
Speed Range.....	0 to 3000 RPM
Operating Temperature.....	32° to 140°F ambient
Weight.....	15 lbs.
Mechanical	
Starting Torque.....	2.2 oz. - in. (typ.)
Shaft Inertia.....	0.1 oz. - in. - sec <sup>2</sup>
Acceleration (Max.).....	5,000 rpm/sec.
Coupling Recommended.....	Zero Backlash, Thomas DBZ or equivalent

Specifications are subject to change without notice

The pulse generator must be driven by a positive drive rather than a friction drive. The following means of coupling are acceptable when properly installed: Direct Coupling, Timing Belt/Pulleys, Chain/Sprockets.

If a direct drive is used, use a flexible coupling and align the shafts as accurately as possible. The pulse generator should not be subjected to any axial thrust. Overhung loads should also be minimized. Installations using timing belts/pulleys should have just enough belt tension to eliminate belt sag. Excessive tension will shorten belt and bearing service life. If a rubber slinger disc is used, position it on the shaft so it will rotate freely.

### CAUTION

Do not force or drive coupling member onto the shaft, or damage to the bearings, pickup, or the rotor disc will result. Provide clearance between shaft end of M939 and the coupled driving shaft to allow for thermal expansion and end play.

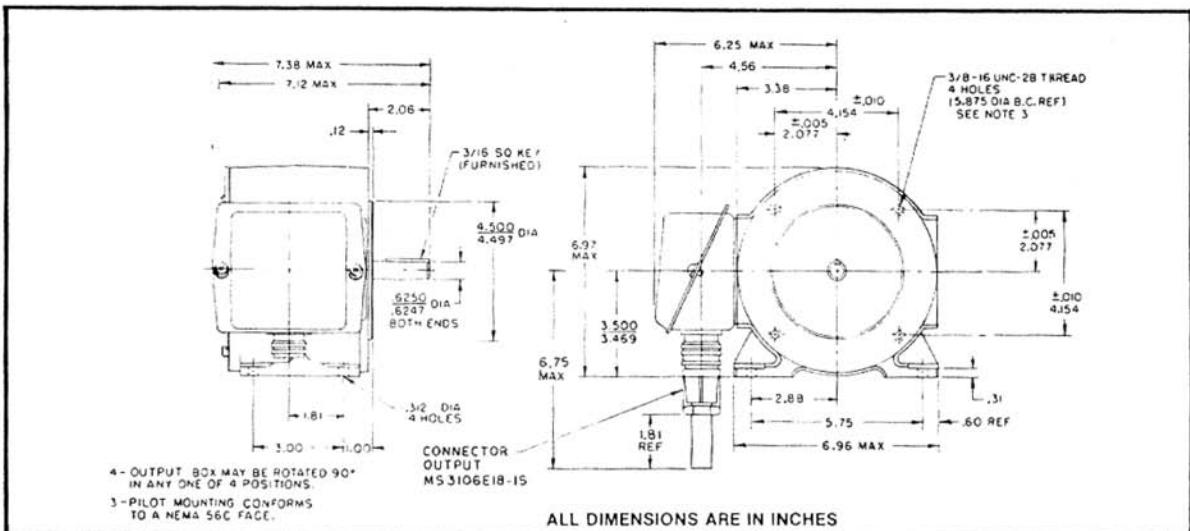
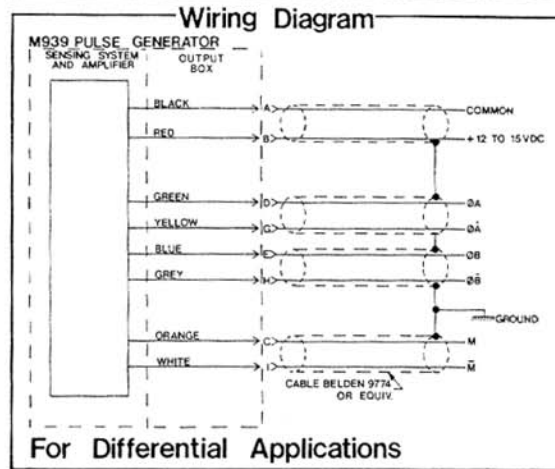
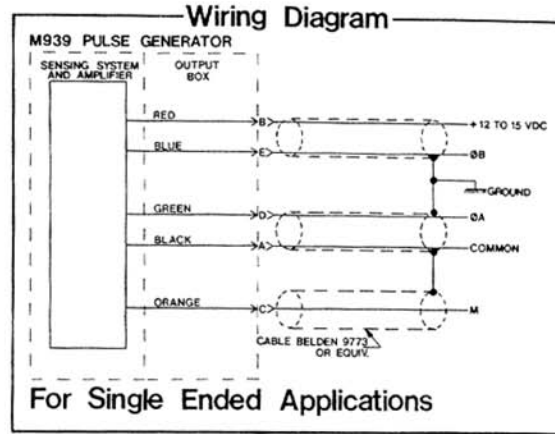
For more details and special considerations in specifying and installing drive components, refer to separate installation instructions, Avtron Rotary Pulse Generators.

### Special Application Notes

For bidirectional operation of the two-phase M939, proper phasing of the two output channels is important. Phase A channel leads phase B for clockwise rotation of the shaft as viewed from the anti-drive end of the housing.

The interconnection cables specified in the wiring diagrams below are based on typical applications. Reference system drawing for specific cable requirements where applicable.

Physical properties of cable such as abrasion, temperature, tensile strength, solvents, etc., are dictated by the specific application. General electrical requirements are: stranded copper, 22 thru 16 gauge, braid or foil with drain wire, 0.05 MF maximum total mutual or direct capacitance, outer sheath insulator, 1,000 ft. max. A typical installation might use Belden 9773 for single ended applications or Belden 9774 for differential applications. If used with K661, consult K661 manual.



Rev. C

