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# Encoder Instructions

**M560**  
 INACTIVE DESIGN  
 Replaced by Model AV56

## DESCRIPTION

The Model M560 Pulse Generator is a zero-speed rotary transducer; that is, it can operate effectively down to zero RPM. The M560 generates a specific number of pulses for each rotation of its shaft. When the M560 is coupled to a machine, its output is directly proportional to process travel (pulse count) or speed (pulse rate). The output signal is generated by a metal gear rotating in proximity to an encapsulated magnetic transducer, providing long life and high reliability. A cast aluminum housing, 5/8 steel shaft, and heavy-duty double row bearings provide mechanical ruggedness required for industrial applications.

Various M560 options and how they are indicated in the M560 part number are shown below:

| MODEL | STYLE | PPR | OPTION |                                      |
|-------|-------|-----|--------|--------------------------------------|
| M560  | 1 R   | 240 | B 05   |                                      |
|       |       |     | 05     | OUTPUT VOLTAGE                       |
|       |       |     | 12     | OUTPUT VOLTAGE                       |
|       |       |     | B      | BIDIRECTIONAL                        |
|       |       |     | PPR    | (PULSES PER REVOLUTION)              |
|       |       |     | R      | CONDUIT BOX ON RIGHT SIDE (STANDARD) |
|       |       |     | D      | CONDUIT BOX ON BOTH SIDES (STANDARD) |
|       |       |     | 1      | SINGLE SHAFT                         |
|       |       |     |        | BASIC MODEL NUMBER                   |

### CAUTION

The M560 is often used for speed feedback in drive systems, where any failure can cause a machine shutdown. While the M560 is designed for continuous mill operation, it is vitally important to follow proper procedures with this unit.

**DO NOT** remove the sensor as it can cause the pickup to be misaligned. It is recommended that defective units be returned to the factory.

**DO NOT** remove the connector from an unused output on a dual output M560. Otherwise, when it comes time to use the second output, the pins may be corroded.

**DO NOT** connect oscilloscope or any instrument "common" to any pulse generator connection other than "common" (Pin A).

**DO NOT** force or drive coupling onto the shaft, or damage to the internal run-out absorbing spring may result. Provide clearance between shaft ends to allow for thermal expansion and end play.

## SPECIFICATIONS

|                                    |  |                |                |                  |                 |                 |             |  |                  |
|------------------------------------|--|----------------|----------------|------------------|-----------------|-----------------|-------------|--|------------------|
| OPERATING POWER (EACH OUTPUT)..... | 12 +/-10% VDC AT APPROX. 100 mA  |                |                |                  |                 |                 |             |  |                  |
| OUTPUT SIGNAL.....                 | TWO CHANNELS (A,B), IN QUADRATURE  |                |                |                  |                 |                 |             |  |                  |
| PULSES PER REVOLUTION.....         | 60, 240 PPR  |                |                |                  |                 |                 |             |  |                  |
| WAVE SHAPE.....                    | SQUARE WAVE  |                |                |                  |                 |                 |             |  |                  |
| FREQUENCY.....                     | 15 kHz MAXIMUM   |                |                |                  |                 |                 |             |  |                  |
| OUTPUT PROTECTION.....             | SHORT CIRCUIT PROTECTED TO COMMON  |                |                |                  |                 |                 |             |  |                  |
| OUTPUT VOLTAGE.....                | <table border="0"> <tr> <td>05 VOLT OPTION</td> <td>12 VOLT OPTION</td> </tr> <tr> <td>HIGH: 5.6V, N.L.</td> <td>HIGH: 12V MINUS</td> </tr> <tr> <td>180 OHM PULL UP</td> <td>1 VOLT N.L.</td> </tr> <tr> <td></td> <td>1000 OHM PULL UP</td> </tr> </table> | 05 VOLT OPTION | 12 VOLT OPTION | HIGH: 5.6V, N.L. | HIGH: 12V MINUS | 180 OHM PULL UP | 1 VOLT N.L. |  | 1000 OHM PULL UP |
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| HIGH: 5.6V, N.L.                   | HIGH: 12V MINUS  |                |                |                  |                 |                 |             |  |                  |
| 180 OHM PULL UP                    | 1 VOLT N.L.  |                |                |                  |                 |                 |             |  |                  |
|                                    | 1000 OHM PULL UP   |                |                |                  |                 |                 |             |  |                  |
|                                    | LOW: 0.5V MAX. 25 mA SINK  |                |                |                  |                 |                 |             |  |                  |
|                                    | LOW: 0.5V MAX. 40 mA SINK  |                |                |                  |                 |                 |             |  |                  |
| MECHANICAL SPEED RANGE.....        | 0 TO 3000 RPM  |                |                |                  |                 |                 |             |  |                  |
| OPERATING TEMPERATURE.....         | -20° TO 80° C AMBIENT  |                |                |                  |                 |                 |             |  |                  |
| WEIGHT.....                        | 17 LBS. (STYLE 2D)   |                |                |                  |                 |                 |             |  |                  |

## INSTALLATION

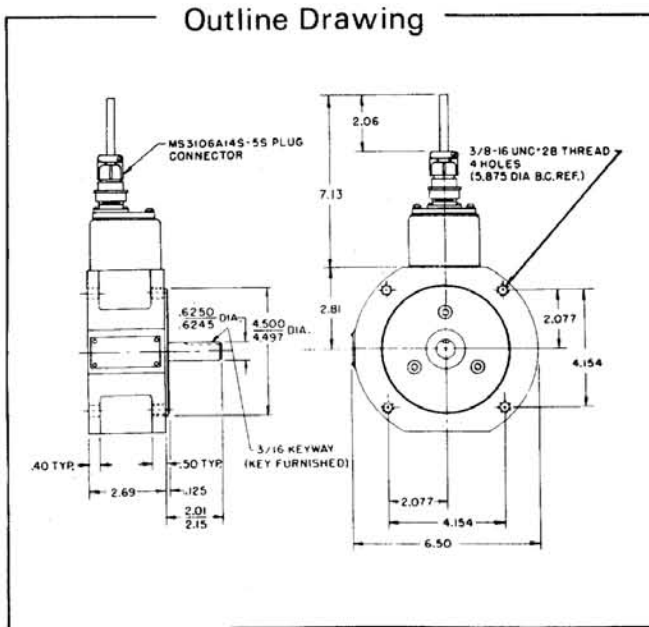
The M560 is designed for face mounting between two drive system elements, typically a motor and DC Tachometer generator, having NEMA 56 mounting and drive dimensions. The hollow input shaft of the M560 aligns to and is supported by the shaft and bearing of the mating unit. The 3/16 inch square key and the 3/8-16 x 1 bolts required for mounting are provided. Direct drive of the combination assembly through a flexible drive coupling is recommended, and attachment should follow the coupling manufacturer's installation procedure. Prior to coupling and assembly, the misalignment shall not exceed .010 inch T.I.R. The pulse generator shall not be exposed to any axial thrust or to side loads from drives such as belt, chain, and gear.

## INSPECTION AND REPLACEMENT OF ROTOR ASSEMBLY

1. The pulse generator bearing is shielded and permanently lubricated. Inspection and replacement schedule should be the same as for other shielded bearing equipment in use at the same location.
2. The bearing should be replaced when worn or rough, or upon excessive loss of grease.
3. The rotor wheel should be replaced if the teeth are severely nicked or gouged.
4. Avtron recommends that the entire internal assembly (Rotor Assembly) be returned to the factory for service if repairs are necessary.

Repair of defective units requires returning the unit to the factory. Turnaround time is minimal, and charges are nominal for out-of-warranty units.

5. The Rotor Assembly may be removed from the housing by removal of the three #10-24 socket head cap screws from the frame outboard of the output shaft. Assembly removal is through the large opening at the female pilot diameter end of the housing. Care must be taken not to force the assembly, which might hang up on the transducer.



## CAUTION

It is not recommended that the rotor assembly be repaired in the field because special tooling is required to maintain concentricity of adjacent parts.

6. Internal assembly reinstallation is accomplished as follows:
  - a. If the internal assembly is new or replaced, the transducer assembly must be first removed to assure clearance of the rotor O.D.
  - b. Install the internal assembly by placing the bearing support centrally so that the tapped holes align with the housing clearance holes. Tighten the three #10-24 screws after coating with Loctite Grade A thread sealant.

## TRANSDUCER REMOVAL, REPLACEMENT & ADJUSTMENT

To remove the transducer assembly, remove the two screws securing the conduit box to the housing. Remove the set screws holding the transducer in the housing adapter. Remove the transducer and its jam nut from the housing. Loosen the set screws and remove the jam nut. Remove the two screws holding the PC board assembly to the conduit box. Unsolder the leads from the transducer assembly being removed at the connector.

To replace the transducer assembly (including the transducer and PC board), connect the leads from the M560 connector to the new transducer assembly (in accordance with the wiring diagram) using rosin core solder and a soldering iron rated 50 watts or less. Assemble the PC board to the conduit box. Install the jam nut onto the transducer and install the transducer into the housing adapter, inserting a .005" feeler gauge between the rotor and the tip of the transducer. Tighten the housing adapter set screws. Slide the jam nut against the housing adapter AND tighten its set screws.

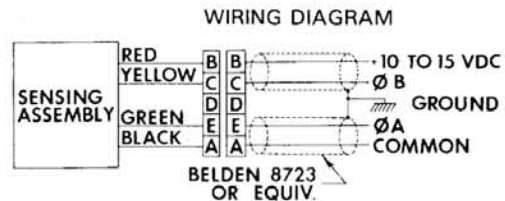
Loosen the housing adapter set screws and adjust the rotational angle of the transducer with the transducer powered and the gear rotating for proper phasing and optimum duty cycle of both channels. Proper phasing of the two output channels is important. Phase A channel leads phase B by 90 degrees for clockwise rotation of the shaft as viewed from the end of the housing with the hollow input shaft.

## CAUTION

Do not rotate the gear if both sets of screws are loose or the gap between the gear and the transducer is less than .005" or damage to the transducer will result.

Reinstall the conduit box using Loctite on the mounting screws.

Interconnection cables specified in the wiring diagram below are based on typical applications with cable lengths limited to about 500 feet. Cable length, operating frequency, and receiving equipment affect choice of cable. Consult factory for recommendations for other conditions.



Features and specifications subject to change without notice. Avtron standard warranty applies. All dimensions are in inches. REV. -

