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# Encoder Instructions

## M585 SHAFTach™

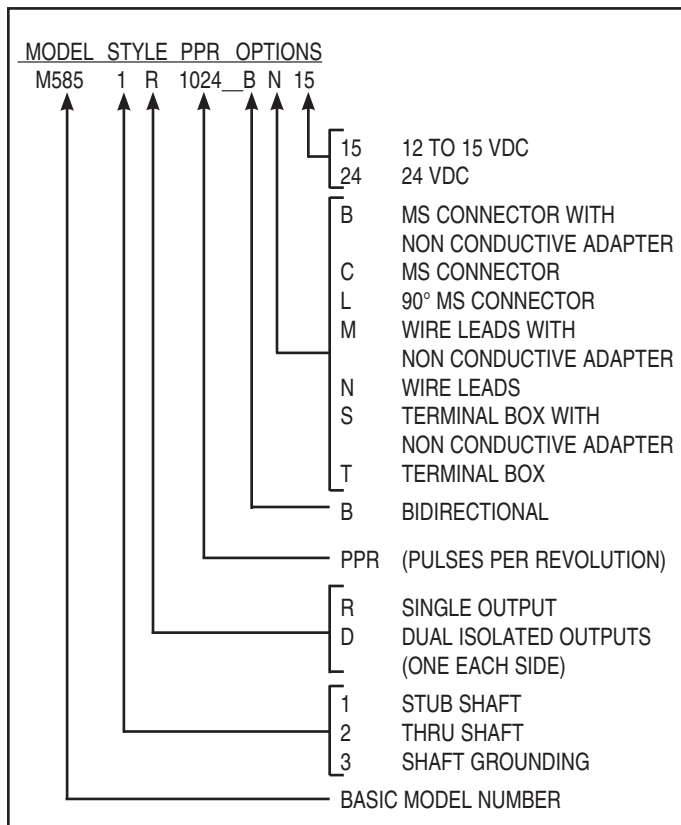
**INACTIVE DESIGN**  
 Replaced by Model AV685

## DESCRIPTION

The Avtron Model M585 SHAFTach™ Pulse Generator is a zero-speed incremental rotary transducer. When mounted to a machine shaft, it provides a specific number of electrical pulses per revolution that are proportional to the shaft's rotation. The photoelectric sensing system and electronics are protected by an O-ring sealed, cast aluminum housing.

The M585 design eliminates the need for shaft couplings, adapter flanges, or accessory mounting faces. The unit employs a keyless shaft mount to lock the M585's rotor to a 1.125" diameter shaft. The hub is designed to maintain concentricity of the rotor and shaft, providing an accurate output signal. An anti-rotation arm prevents rotation while allowing for shaft end float.

The available options for the M585, and how they are indicated in the M585 part number, are shown below:



## INSTALLATION CONSIDERATIONS

In a conventional pulse generator installation, a flexible coupling is used to compensate for small shaft misalignment and runout of the driving shaft. Often this misalignment and runout reduce the life of the mechanical parts and may cause unwanted modulation of the electrical output signal.

While misalignment is not a problem with the SHAFTach™, circular runout of the driving shaft may cause a once per revolution frequency modulation of the output signal. Depending upon the application, this may or may not be acceptable. Typically, a runout of 0.001 TIR or less will not have an adverse effect.

## ITEMS REQUIRED FOR INSTALLATION

The following special items are required for installation:

1¼" Spanner Wrench - Avtron P/N 484017 for the 1¼" diameter clamping nut  
 McMaster-Carr P/N 6975A17

2½" Spanner Wrench - Avtron P/N 484018 for the 2½" diameter bearing locknut  
 McMaster-Carr P/N 6975A19

Thread locking liquid - Loctite 242, supplied

Metal Putty (Required for machine shafts with a keyway.)

## UNPACKING INSTRUCTIONS

The M585 is supplied with four main items: the pulse generator with integral specific option package, the anti-rotation arm, the mounting board with attaching hardware, and the V-ring seal. Check and verify all components received as ordered. Check for external damage or missing items. This must be handled by the customer through the shipper.

Check nameplate against your requirement to make sure proper style, output, PPR, options, and voltage have been received.

# INSTALLATION

## MACHINE SHAFT PREPARATION

Preparing the machine shaft prior to Pulse Generator installation is essential in providing an adequate barrier against environmental contamination. In some cases, a separate stub shaft (1.125" D x 4.5" long) will be installed on the motor. To prepare the machine shaft that the M585 is to be installed on, conduct the following procedures (see figures):

1. Remove from the M585 the four 1/4-20 UNC machine screws which hold the end cap on the cover plate.
2. Remove the end cap, O-Ring, and wave spring, noting the location of each to assist in reassembly.

### CAUTION

SPANNER WRENCHES MUST BE USED DURING THE FOLLOWING PROCEDURES. Using a substitute can distort the 1 3/4" nut and damage the unit. Do not try to remove the 2 1/2" bearing locknut at any time. This locknut is factory adjusted for optimum M585 performance.

### NOTE

Two spanner wrenches, which are required for M585 installation, accommodate the 1 3/4" and 2 1/2" nuts found under the cap.

3. Holding the 2 1/2" bearing locknut, remove the 1 3/4" diameter clamping nut and slide out the internal compression sleeve.
4. Verify that the compression sleeve can be installed by hand on the shaft where the unit is to be installed. File any burrs that obstruct sleeve installation and lightly oil the shaft.
5. If a keyway or flat exists on the shaft, provide a sealing medium or true shaft back to round using metal putty or equal.
6. Return the compression sleeve to the M585 hub.
7. Thread the 1 3/4" clamping nut onto the M585 by hand until resistance is felt. **DO NOT TIGHTEN AT THIS TIME.**

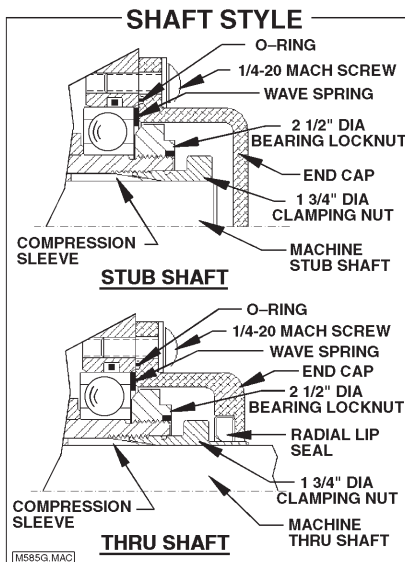
## PULSE GENERATOR INSTALLATION

Installing the M585 and Anti-Rotation Arm:

1. The free end of the Anti-Rotation Arm must be secured by the customer to a stationary member such as the floor or machine frame. Refer to "Anti-Rotation Arm Mounting Guidelines" on the last page for general requirements.

2. Based on the location of the stationary point and the guidelines on page 4, attach the 1/4" thick mounting board provided to one of five places on the M585. Use two 1/4-20 UNC by 3/4" long machine screws provided.

3. Ensure that the machine shaft is lightly oiled. A packet of silicone grease is provided to lubricate the following shaft seals: First, **ALL**



M585 types have an O-ring inside their hollow shafts at the motor end. In addition, in **THRU SHAFT** types, the clamping nut has an O-ring on the inside, plus the outside of the clamping nut requires lubrication for the radial lip seal per step 8b. Slide the M585 onto the machine shaft, mounting board first. Ideally, the M585 housing will be 1/2" to 1" from the motor or machine housing, but this may vary depending on the machine profile and the anti-rotation arm clearance requirements. Consider shaft end float when positioning the M585.

- 4a. FOR **STUB SHAFT** APPLICATIONS, place the M585 3 3/4" to 4" onto the shaft. The end of the machine shaft must extend completely through the M585 compression sleeve and be approximately flush with the end of the 1 3/4" clamping nut.

- 4b. FOR **THRU SHAFT** APPLICATIONS, position the M585 as required.

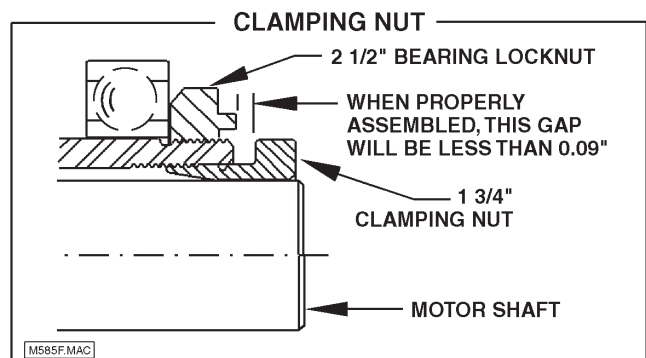
5. Attach free end of the Anti-Rotation Arm to the 1/4" mounting board using the shoulder bolt provided.

6. Remove 1 3/4" clamping nut and apply liquid thread locker to the threads. (Loctite grade 242, supplied, should be used in most applications.)

### NOTE

Where thread locker has been used, additional force is required for M585 removal.

7. Replace 1 3/4" clamping nut and tighten so the gap is less than or equal to 0.09", as shown in **CLAMPING NUT** sketch (approx. 15-20 ft-lbs), holding the 2 1/2" bearing locknut in place. Spanner wrenches are required for this operation.



- 8a. FOR **STUB SHAFT** INSTALLATIONS, replace the end cap with the wave spring (loading spring) against the bearing and the O-ring located in the cap groove. Secure the end cap with the four 1/4-20 UNC machine screws previously removed. Apply the supplied grade 242 Loctite to the screws when assembling.

- 8b. FOR **THRU SHAFT** APPLICATIONS, prior to replacing the end cap per step 8a, apply a small amount of silicone grease (provided) to the seal surface on the 1 3/4" clamping nut. The radial lip seal in the end cap will seal on this surface.

# WIRING CONSIDERATIONS

For bidirectional operation of the SHAFTach™, proper phasing of the two output channels is important. Phase A channel leads phase B channel for clockwise rotation as viewed from the end-cap (anti-drive) end of the generator.

Interconnecting cables specified in the wiring diagrams are based on typical applications. Refer to the system drawing for specific cable requirements where applicable.

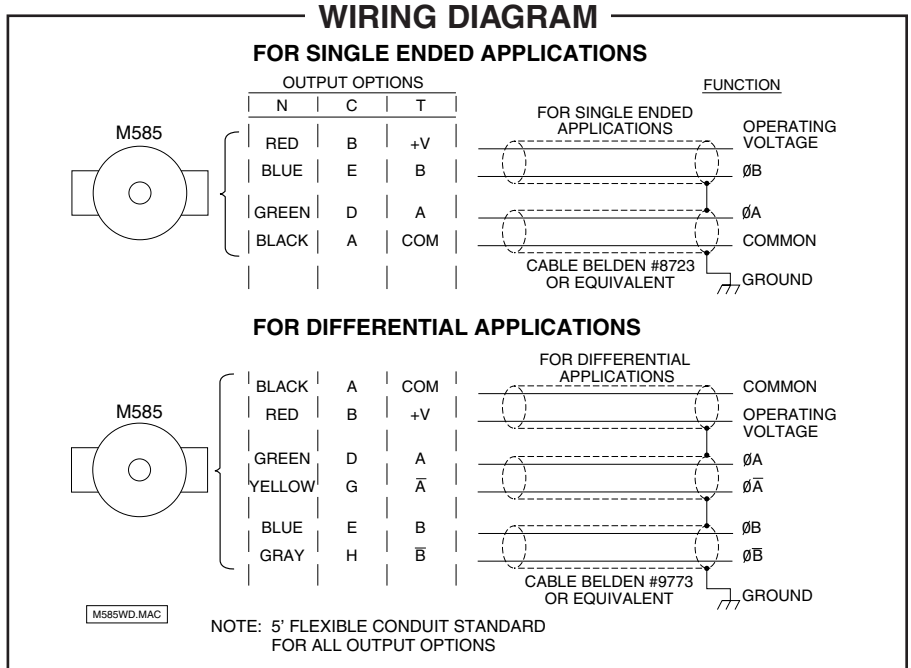
Physical properties of cable such as abrasion, temperature, tensile strength, solvents, etc., are dictated by the specific application. General electrical requirements are: stranded copper, 22 thru 16 gauge, braid or foil with drain wire, 0.05 MF maximum total mutual or direct capacitance, outer sheath insulator, 1,000 ft. max.

# ENVIRONMENTAL CONSIDERATIONS

Special attention is to be given to conduit runs, interconnection wiring and NEMA type enclosure mounting. In those applications where ambient temperatures are controlled within 40°F and high humidity/washdown are not present, position the flexible conduit with a slight sag to prevent any condensation from entering the SHAFTach via conduit.

In harsh environments, which include temperature extremes, high humidity, equipment washdown or atmosphere contamination, extra care is required for interconnection. Follow these steps to reduce potential problems:

1. Always mount connection points, conduit couplings, junction boxes, etc., lower than actual generator.
2. Venting of generator is beneficial. One method is to take conduit run outside of hostile area where practical. (Applies to conduit installations only.)
3. For washdown areas, shroud or otherwise cover the SHAFTach to prevent direct water spray. Do not attach the shroud directly to the generator.
4. Keep conduit outputs and axis of rotation horizontal.
5. Purging of SHAFTach should be reviewed with Avtron.



# M585 SPECIFICATIONS

	15 V OPERATING VOLTAGE	24 V OPERATING VOLTAGE
OPERATING POWER (EACH OUTPUT).....	12 TO 15 VDC AT APPROX. 70 mA (NO LOAD)	24 VDC AT APPROX. 70 mA (NO LOAD)
OUTPUT SIGNAL .....	TWO CHANNELS IN QUADRATURE (2-PHASE, BIDIRECTIONAL)	TWO CHANNELS IN QUADRATURE (2-PHASE, BIDIRECTIONAL)
PULSES PER REVOLUTION.....	240, 360, 600, 1024, 1200, 2048 PPR STD. — OTHERS AVAILABLE UPON REQUEST	240, 360, 600, 1024, 1200, 2048 PPR STD. — OTHERS AVAILABLE UPON REQUEST
WAVE SHAPE.....	SQUARE WAVE	SQUARE WAVE
VOLTAGE OUTPUT.....	HIGH: SUPPLY VOLTAGE MINUS 1 VOLT (NO LOAD) 120 OHMS PULL-UP LOW: 1.0 VOLT MAX. 50mA SINK	HIGH: SUPPLY VOLTAGE MINUS 1 VOLT (NO LOAD) 330 OHMS PULL-UP LOW: 1.0 VOLT MAX. 50mA SINK
OUTPUT PROTECTION .....	SHORT CIRCUIT PROTECTION TO COMMON	SHORT CIRCUIT PROTECTION TO COMMON
FREQUENCY .....	50 KHz MAX.	50 KHz MAX.
<b>MECHANICAL</b>		
SHAFT DIAMETER REQUIREMENTS.....	1.125 +.000/-.003 INCHES	1.125 +.000/-.003 INCHES
SPEED RANGE .....	0 TO 3600 RPM	0 TO 3600 RPM
STARTING TORQUE.....	3.9 OZ.-IN. (TYP.)	3.9 OZ.-IN. (TYP.)
HUB INERTIA.....	0.5 OZ.-IN.-SEC <sup>2</sup>	0.5 OZ.-IN.-SEC <sup>2</sup>
ACCELERATION (MAX.).....	3000 RPM/SEC	3000 RPM/SEC
OPERATING TEMPERATURE .....	0° TO 160°F AMBIENT	0° TO 160°F AMBIENT
WEIGHT .....	15 LBS.	15 LBS.

# ANTI-ROTATION ARM MOUNTING GUIDELINES

The Anti-Rotation Arm stabilizes the SHAFTach and keeps it from rotating as the motor shaft rotates. To mount the Anti-Rotation Arm, use these guidelines:

1. Mount SHAFTach with conduit entry ports positioned horizontally.

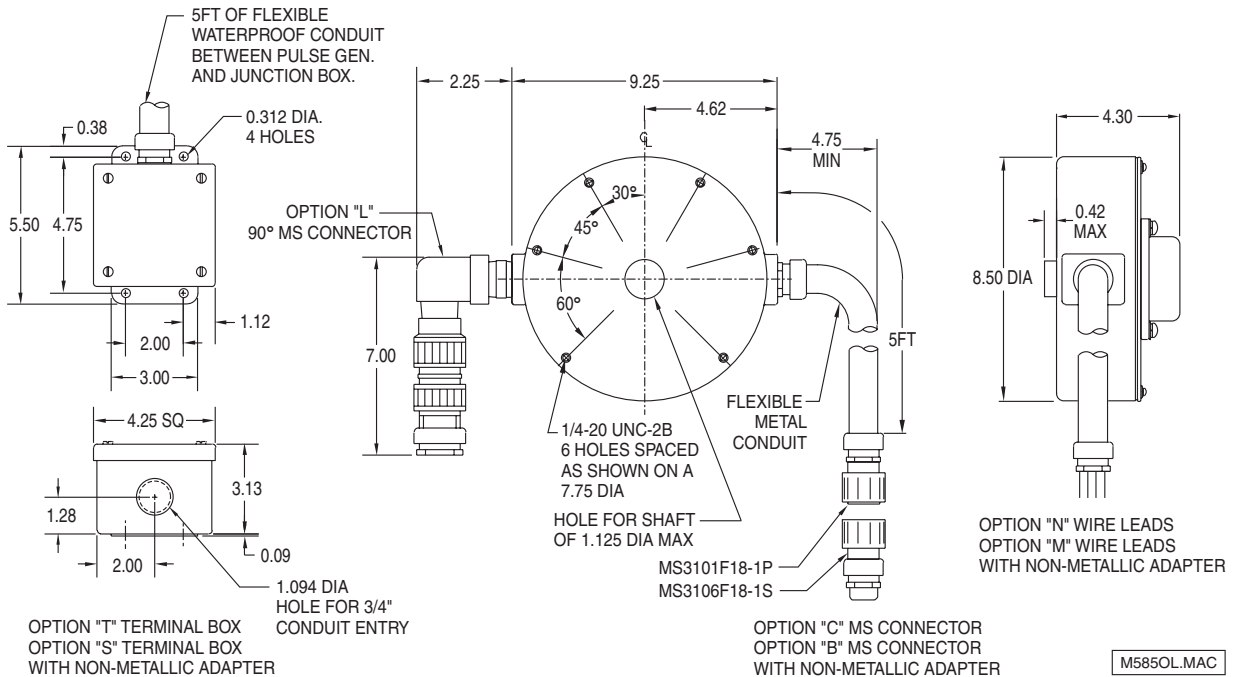
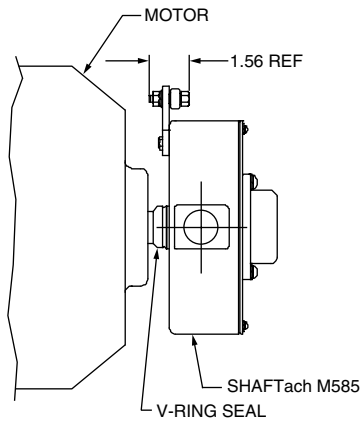
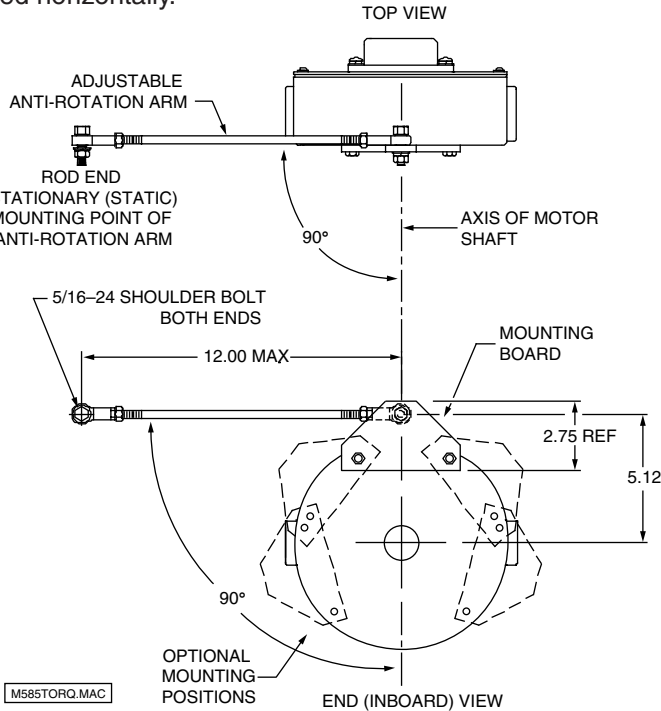
2. Mount Anti-Rotation Arm perpendicular to motor shaft axis of rotation. Arm mounting bolts and associated rod bearings should be parallel to motor shaft also. (Viewed from above.)

3. Mount Anti-Rotation Arm 90° to a line established between mounting board, mounting hole, and shaft center-line. (Viewed from end.)

4. Mount SHAFTach as close as possible to the motor with the mounting board closest to the motor.

5. Establish a stationary (static) mounting point for the free end of the Anti-Rotation Arm, using the guidelines above. Use the shoulder bolt provided to fasten arm to stationary point.

6. The Anti-Rotation Arm can be adjusted in length. The recommended length is 8 to 12 inches.



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