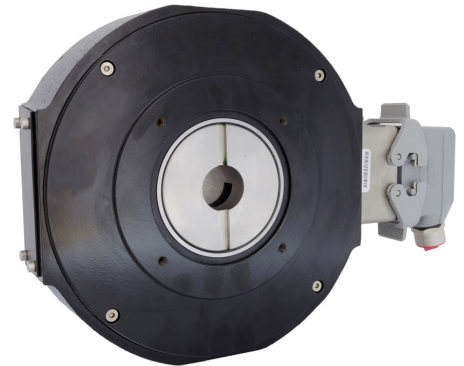


## NexGen RIM Tach HT85 Encoder

### Key Features

- Hollowshaft Design Mounts Easily to Large Motor Shafts, up to 4.50” in Diameter
- New Sensor Provides up to 0.075” of Air Gap, Over 50% More Than Competitive Models
- Expanded Resolution up to 2400PPR
- Redesigned Circuitry for On-Board Diagnostics with LED and Alarm Output
- Multiple Bore Sizes Available, Including Tapered Shafts
- Stainless Steel and Ductile Cast Iron Construction



### SPECIFICATIONS

#### STANDARD OPERATING CHARACTERISTICS

**Code:** Incremental, Magnetic  
**Pulses per Revolution:** 60-2400 PPR  
**Phasing Sense:** A leads B for Counter-Clockwise rotation (CCW) viewing encoder-mounted end  
**Quadrature Phasing:** 90° ± 45°  
**Symmetry:** 50% ± 15%  
**Number of Output Modules:** Single or Dual

#### ELECTRICAL

**Input Power Requirements:** 5-26VDC, 95mA typical per sensor module, plus line driver load  
**Output Signals:** IC-WE Differential Line Driver: 150mA, sink or source  
**Frequency Response:** 0 - 180kHz Data & Index  
**Noise Immunity:** Tested to EN61326-1  
**Electrical Immunity:** Reverse polarity and short circuit protected

#### ELECTRICAL (Cont.)

**Connector:** 10 pin industrial duty latching, sealed NEMA 4 & 12, IP65. Optional MS3102 10 pin, Pigtail Cable, or Latching connector on cable extension

#### MECHANICAL

**Bore Diameter:** 1” to 4-1/2”, straight or tapered  
**Mounting Configuration:** Hollow Shaft mount with Anti-Rotation Tether  
**Shaft Speed:** 3,600 RPM  
**Shaft Length Required:** 2.5” min  
**Acceleration Rate:** 3,600 rpm/sec max  
**Allowable Shaft End-Play:** 0.25” (Subject to RPM Limitation)  
**Allowable Shaft Runout:** 0.010” TIR (Subject to RPM Limitation)  
**Housing Material:** Cast Iron/Stainless Steel  
**Weight:** 30 lbs

#### ENVIRONMENTAL

**Operating Temperature Range:** -40°C to +85°C  
**Storage Temperature Range:** -40°C to +120°C  
**Shock (Sensor Module):** 30 G’s Min  
**Vibration:** 18 G’s @ 5-2000 Hz spectrum  
**Humidity:** Up to 98% (non-condensing)

### ELECTRICAL CONNECTIONS

Signal	Connector Pin	Pigtail Cable	MS 3102E18-IT#
Common	1	Black	A
B	2	Green	E
A	3	Blue	D
Z*	4	Violet	C
Alarm †	5	N/A	F
Vcc (5-26 VDC)	6	Red	B
B̄	7	Yellow	H
Ā	8	Gray	G
Z̄*	9	Orange	I
Shield	10	Braid	J

\* Index (Z) optional. See Ordering Information

† Alarm not available with Pigtail cable. See Ordering Information

### CONTENTS

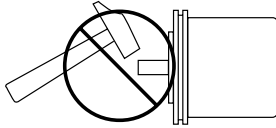
Specifications .....Pg 1  
 Important .....Pg 2  
 Mechanical Installation .....Pg 4  
 Sensor Module Installation...Pg 5  
 Electrical Installation.....Pg 6  
 Dimensions .....Pg 7  
 Ordering Information.....Pg 7

# IMPORTANT INSTALLATION INFORMATION

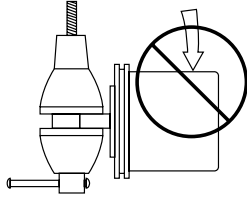
## GENERAL GUIDELINES

Encoders provide quality measurements and long life when common sense, care, and accurate alignments are provided during installation. The following general guide-lines will help to ensure a trouble-free installation.

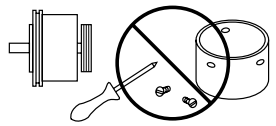
### Mounting the Encoder



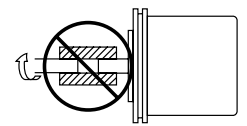
Do not shock the encoder.



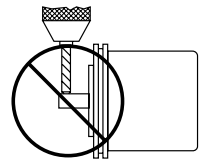
Do not subject the encoder to axial or radial shaft stresses.



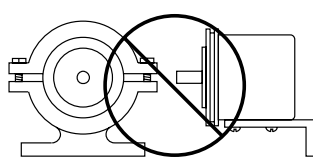
Do not disassemble the encoder.



Do not use a rigid coupling.



Do not tool the encoder or its shaft.



Do not use makeshift techniques to mount the encoder.

### Wiring the Encoder

- Never connect or disconnect the encoder connector or wiring while power is ON. Doing so may damage the encoder.
- Power should always be connected to the + side of DC power.
- Common should always be connected to the - side of DC power.
- Never connect A, B, or Z to the + or - side of DC power.

## ELECTRICAL CONNECTIONS

**Cable** - The use of shielded cable is recommended for all encoder installations. When a Dynapar brand encoder is ordered, the type of termination is generally defined (usually the last selectable code in Ordering Information). If a code for a cable was indicated, the encoder was manufactured to include a shielded cable. If any other type of termination was selected or if selection of termination type was not requested, a cable assembly must be ordered. (The cable assembly easily hooks onto the encoder's connector making it ready for wiring).

To determine which cable assembly to order, refer to the Electrical Connections table (in the encoder's manual).

## ELECTRICAL CONNECTIONS (cont.)

In some cases, there may be more than one table or the table may be broken into sections due to different output types. If so, refer to the information listed for the output type selected for the encoder (in Ordering Information).

Wiring should be run through dedicated conduits or harnesses (not shared with any other wiring) which are spaced at least 12 inches apart. This protects the cable from physical damage while providing a degree of electrical isolation. Also, do not run cable in close proximity to other conductors which carry current to heavy loads such as motors, motor starters, contactors, or solenoids. Doing so could result in electrical transients in the encoder cable which cause undesired signal pulses.

**NOTE: Never connect or disconnect the encoder connector or wiring while power is ON. Doing so may damage the encoder.**

**Grounding** - DO NOT ground the encoder through both the machine and the cable wiring. Connect the shield at the input device only. **NOTE: If the shield is connected at both ends, grounding problems that degrade system performance may result.**

For European-based applications requiring CE compliance, cable length must not exceed 30m. Connect the shield to building ground on either the Encoder or Controls end. CE compliant products are tested to EN61326 EMC.

## FEATURES

All encoders have the following electrical features:

- Power (+DC)
- Common
- Output Signal(s)

Power (also referred to as supply, power source, and power +V/VCC) is always +DC for encoders. **Therefore, power should always be connected to the positive (+) side of DC power.** In addition, encoder power should be regulated to within  $\pm 5\%$  at the encoder and should be free of induced transients. Common (also referred to as Com, supply common, and ground) is generally a black wire (verify via Electrical Connections table). Common should always be connected to the negative (-) side of DC power.

All encoders have at least one output signal (A); however, it is common for encoders to have three signals A, B, Z (may also be referred to as C, X, or index). The outputs should each be connected to the receiving device at the appropriate terminal. **NOTE: Never connect A, B, or Z to the + or - side of DC power.**

# IMPORTANT INSTALLATION INFORMATION

## FEATURES (cont.)

When encoders have a differential line driver, there are two signals for each of the outputs. Each signal (A, B and Z) has a compliment or inverse ( $\bar{A}$ ,  $\bar{B}$  and  $\bar{Z}$  referred to as A not, B not, and Z not). The signal and its compliment (i.e. A and  $\bar{A}$ ) are separate outputs. Connect each output to a separate input.

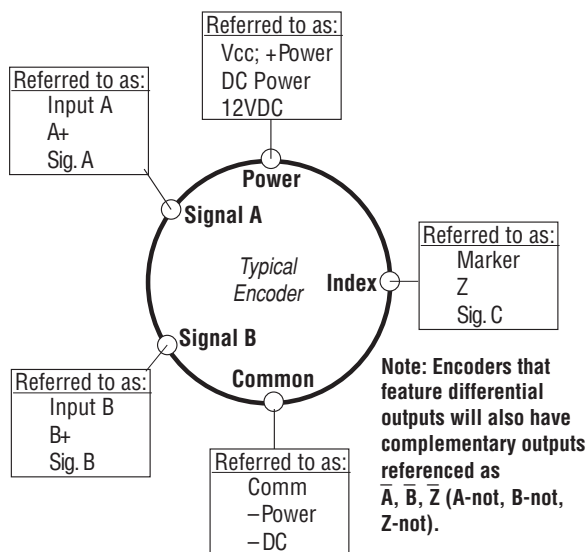
**NOTE: Never connect these signals together or to the + or - side of DC power. Never connect differential signals to the same input.**

## CONNECTIONS

Obviously not all receiving devices are the same. However, connecting your encoder to one, no matter what type or brand it may be, is not difficult. As discussed in the previous section, all encoders have certain electrical features. Each of these features/functions are identified in the encoder's Electrical Connections table along with its corresponding pin and wire color. Each wire specified in the table must be connected to the receiving device.

Determining where to connect each wire is as easy as following the Electrical Connections table and matching each wire to the proper terminal on the receiving device. In general, no matter what type of receiving device you are using, the terminal strip is marked, indicating the proper location for each function/wire. These markings may either be numbers or text labels identifying functions. If they are numbers, the receiving device's manual should define what function corresponds to each number.

Since receiving devices are made by various manufacturers, not all text labels/references are the same. There are various ways to identify each function. Following are a few examples:



## LED STATUS LIGHT:

A multicolor LED Status light will indicate to the user the overall condition of the encoder. The LED is built into the encoder and does not require any additional wiring or power to activate it. There are 4 basic status conditions for the light:

- 1) **LED off:** No power to Encoder, Low supply voltage (<3.0VDC), Total Failure of Encoder
- 2) **LED Green:** Correct Power to Encoder, Ready to operate, No wheel movement Detected
- 3) **LED Flashing:** Unit operating, Unit sending pulses out
- 4) **LED Flashing Red:** Low power to encoder (<4.5VDC), Line Driver Failure, Line Driver Over-Temperature (generally caused by external short circuit), Line Driver Logic Failure

## FREQUENTLY ASKED QUESTIONS

**There are additional colored wires which are not referred to in the Electrical Specifications table. What do I do with them?**

Do not connect them to the receiving device. Any unused encoder signal wires must be individually insulated and tied back. They should NEVER be in contact with common, power sources, or other output signal lines.

**The encoder is correctly connected to the receiving device per the Electrical Specifications table and the receiving device's terminal strip label; however, it's counting in the wrong direction. What's wrong?**

In order to reverse the counting direction, the output signal connections must be switched. If the encoder has a single ended output, swap A and B. If the encoder has a differential line driver, swap A and  $\bar{A}$ .

**I've connected the encoder and it doesn't work (No Outputs). What can I do?**

Many encoders have internal protection circuits which shut down the encoder to prevent damage if the input power is not correct or the outputs are overloaded. Check the following: Input Voltage (is it too high?); Input Polarity (is it reversed?); and Output Wiring (are they wired properly?).

**I've read and followed the technical manual and these guidelines and the encoder still doesn't work properly. Help!?**

Calm down - help is at your fingertips! Simply pick up the phone and dial our Applications Engineering Department at 1-800-234-8731 (US & Canada) or 847-662-2666 from 8:00 AM to 4:45 PM (Central time) Monday - Friday. One of our engineers will gladly help you solve the problem.

# INSTALLATION

## 1.0 MECHANICAL INSTALLATION

The RIM Tach® HT85 is shipped partially assembled. There are no field gap checks, axial alignment, or run out checks required. Sensor Module shimming may be required. The interchangeable stainless steel sensor modules are available in a wide variety of pulse counts. After unpacking the unit and verifying receipt of the items listed on the packing list, proceed with mechanical installation.

1. Place an anti-seizing agent such as a light moly-grease or other high temperature, stable corrosion inhibitor on motor shaft. This will aid not only installation but future removal of the encoder for maintenance, repairs, etc., and lessens chances for corrosion.
2. Slide encoder housing onto motor shaft with flange surface (back side-see Figure 2) facing the motor, and tilted so the sensor head is facing downward. In this orientation, the B channel will lead the A channel when shaft rotation is CCW.

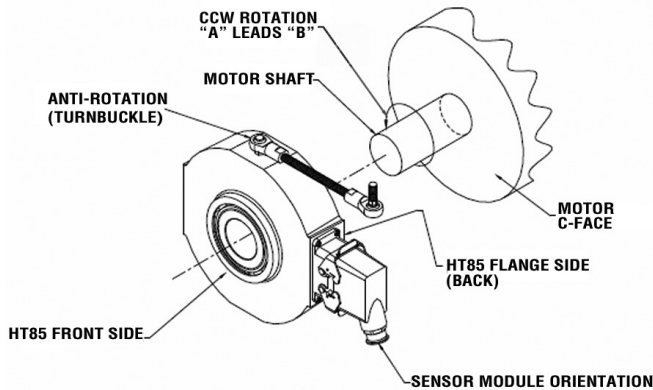


Figure 1: Encoder Housing Orientation

3. Remove black, trapezoidal access plate from the encoder housing using an M4 (DIN 912) metric hex wrench. Once removed, the clamping ring segment is now available for tightening.

**NOTE:** Dual units require a hex wrench to remove a module.

4. Tighten the clamping ring segment as follows (see Figure 2):

- 1) Look inside the access plate hole and rotate the hollow shaft until the two M5-0.8x12 mounting screw heads on clamping ring are visible.
- 2) Being very careful not to damage the magnetic pulse wheel (see Figure 2 below), tighten down both mounting screws using the M4 T-Handle hex wrench (included). Torque each mounting screw to 55 in-lbs (6.3 N-M regular) nominal, while ensuring gaps on both radial ends of clamping ring segment are approximately equal.

**IMPORTANT:** Be very careful not to touch the pulse ring when tightening the cap screws. The pulse ring is near the screws and can be damaged easily. The magnetic properties of the pulse wheel material can also be distorted or erased by exposure to strong magnetic fields.

**IMPORTANT:** Do not unscrew the (2) cap screws on the clamp ring completely, either when un-installing or servicing the encoder. The screws may fall inside the unit and would be difficult to retrieve.

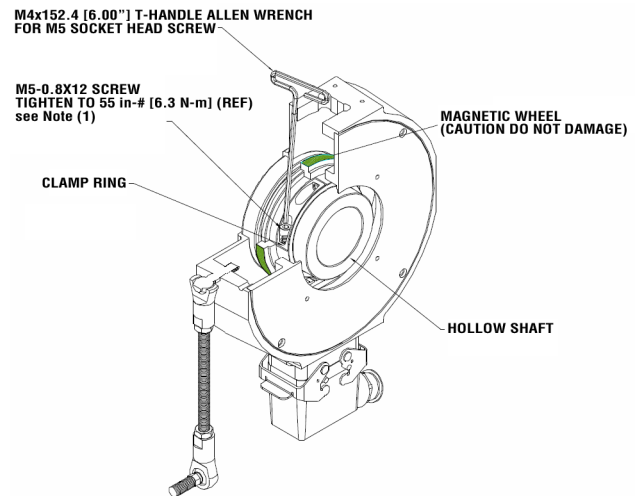
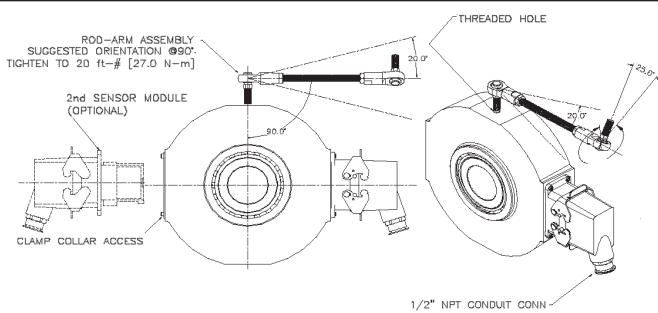


Figure 2: Clamping Ring Segment

5. Reinstall the access plate back onto encoder housing, or place second sensor module assembly.
6. Attach/insert anti-rotation arm into the threaded hole (3/8"-24 UNF) in the encoder housing (see Figure 3). Complete approximately 10 turns of the anti-rotation arm into stud. Tighten locking nut (using a 9/16" open wrench) against the encoder housing.



**Figure 3: Anti-Rotation Arm Orientation**

7. Position anti-rotation arm at a 90° angle to the motor shaft (perpendicular to motor axis and motor C-face is recommended). This orientation ensures three things:

- It provides enough clearance between the HT85 encoder and point of attachment (weldment angle or channel bracket, motor face or foot, or other stable mounting)
- It gives long moment arm from encoder centerline, thus minimizing housing rotation and encoder error caused by relative rotation
- It reduces misalignment of bearing rod ends which prevents binding and premature wear due to high degrees of angular misalignment

8. Loosely adjust anti-rotation arm to desired length. Apply thread locker on threaded rod where bearing rods will rest. The free end of the anti-rotation arm should then be mounted to a stationary surface such as a welded channel, angle, motor flange, or foot. Tighten locking nuts (using a 9/16" open wrench) against bearing rod ends and mounting stud.

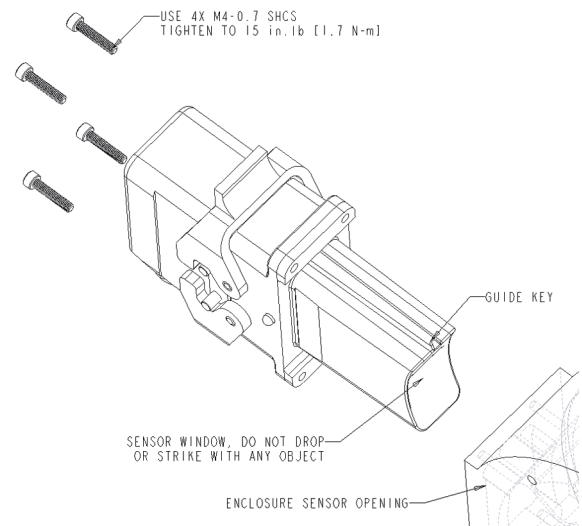
**IMPORTANT: Do not disrupt the anti-rotation arm's 90° alignment with the motor shaft during mounting. A parallel orientation between the anti-rotation arm and motor shaft is not recommended because it will significantly reduce the anti-rotation arm's performance and operational lifetime. Each rod end can withstand only 50° of deviation. Ideally, the anti-rotation arm should be mounted with rod-end ball centered in its socket. Recommended torque: 20 ft-lbs. [27 N-m].**

## 1.1 SENSOR MODULE INSTALLATION

To install the Sensor Module, perform the following steps. See Figure 4.

1. Remove sensor module and mating connector from packaging.
2. Separate mating connector from sensor module by releasing the two latches.
3. Insert sensor module into opening in enclosure. The sensor assembly is keyed to ensure proper orientation.
4. Locate four M4-0.7 socket head screws. Insert the screws through clearance holes in sensor module and into tapped holes in enclosure. Tighten to a nominal 15 in-lbs [1.7 N-m regular].

**NOTE: There should not be a gap between the lip on the housing and the enclosure. The stainless steel sensor module is designed to seat in metal to metal contact with the enclosure. Ensure that no gaskets, paint, dirt, etc., interferes with the complete seating of the module in the enclosure.**



**Figure 4: Sensor Module Installation**



## 1.2 ELECTRICAL INSTALLATION

**IT IS VERY IMPORTANT** that the mating connector and the encoder body be isolated from electrical ground in the wiring and conduit to prevent motor or machine shaft eddy currents from going to ground through the encoder bearings, as this will damage the bearings over time. To insure that this is being done, it is suggested that a plastic wiring/conduit adaptor or non-conductive conduit is used to isolate the connector from any metallic surface or conductive conduit. Please see special note under table 1, for proper encoder connector shielding. Also, to allow for proper encoder grounding, the motor must be wired and grounded per your local NEC Requirements.

Electrical connections are made to the sensor module through a standard 1/2 inch NPT liquid tight flexible conduit. The nipple length may be changed to extend the outlet box if desired. Interconnection cable recommendations are as follows: stranded copper, 22 through 16 gage, braided or foil with drain wire shielding 0.05 F maximum total mutual or direct capacitance, outer sheath insulated. Shrink tubing may be placed over any wires without insulation. For lengths over 100 feet, use 18 gage or larger, to a maximum of 1000 feet. If shielded twisted pair wire is used, do not cross channels. Keep each pair of complementary channel outputs together in a single twisted pair (e.g., A and A).

**IMPORTANT: Reversing power and common will not damage the unit. However, applying power to any of the sensor outputs may cause damage.**

### 1.3 QUICK RELEASE CONNECTOR HOOD WIRING

To install the Quick Release Connector, perform the following steps.

1. Remove the four screws from the mating connector housing that hold the terminal block in place. Remove terminal block from housing.
2. Insert wiring through liquid tight flexible seal and mating connector housing. Leave enough wire exposed to comfortably reach the terminal block. Wire to terminal block according to wire code in Table 1. A similar wiring list is attached to enclosure.
3. Tighten Liquid Tight fitting on housing. **OPTIONAL:** In some hostile environments, seal between connector body and Sensor Module can be improved by smearing a sealant (silicone grease, etc.) on the neoprene seal of the connector.

4. Mate connector into place on sensor mount and snap the two latches into place. If only one sensor is being installed, ensure cover plate is installed over other sensor hole.

**Grounding:** For applications with high ground potential differences, DO NOT ground the encoder through both machine and controls end. Connect the shield at the controls end only. **NOTE: If the shield is connected at both ends, grounding problems that degrade system performance can result.**

**CE Grounding Measures** – For best EMC immunity the cable screen must be grounded on both encoder and controls end. For cable lengths longer than 30m or outdoor applications, additional measures must be implemented to comply with CE requirements. Connection of the encoder to DC power supply network is prohibited if CE compliance is required. CE-compliant products are tested to EN61326-1 EMC.

In all cases, system CE compliance is ultimately the responsibility of the manufacturer integrating the encoder.

**Table 1. Signal Coding Table**

Signal	Connector Pin	Pigtail Cable	MS 3102E18-IT#
Common	1	Black	A
B	2	Green	E
A	3	Blue	D
Z*	4	Violet	C
Alarm †	5	N/A	F
Vcc (5-26 VDC)	6	Red	B
$\bar{B}$	7	Yellow	H
$\bar{A}$	8	Gray	G
$\bar{Z}$ *	9	Orange	I
Shield	10	Braid	J

\* Index (Z) optional. See Ordering Information

† Alarm not available with Pigtail cable. See Ordering Information

**NOTE: The shield in the sensor module is isolated from the frame of the encoder for maximum noise immunity. The shield wire or pin should be connected to the shield of the cable and that of the drive or other receiving device.**

## Ordering Information

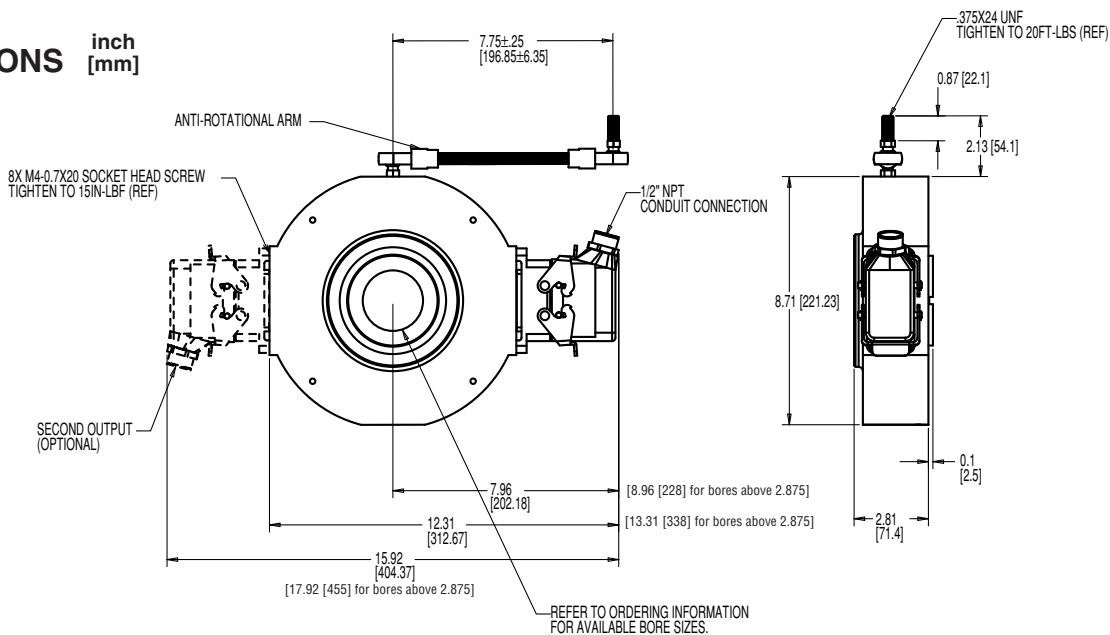
To order, complete the model number with code numbers from the table below:

Code 1: Model	Code 2: PPR	Code 3: Index	Code 4: Wheel Bore	Code 5: Electrical	Code 6: Termination
HT8	□□□□	□	□□□□	□	□
Ordering Information					
<b>HT8</b> Hollow Shaft	<b>0060 0480</b> <b>0120 0960</b> <b>0240 1920</b> Available with bore sizes up to 2.875" <hr/> <b>0075 0600</b> <b>0150 1200</b> <b>0300 2400</b> Available with bore sizes up to 3.875" <hr/> <b>0064 0512</b> <b>0128 1024</b> <b>0256 2048</b> Available with bore sizes up to 4.500"	<b>L</b> No Index <b>Z</b> With Index Signal Output	<b>Thru-bores</b> <b>T01</b> 1-1/8" <b>M25</b> 25 mm <b>T02</b> 1-3/8" <b>M40</b> 40 mm <b>T03</b> 1-5/8" <b>M48</b> 48 mm <b>T04</b> 1-7/8" <b>M55</b> 55 mm <b>T05</b> 2.00" <b>M65</b> 65 mm <b>T06</b> 2-1/8" <b>M70</b> 70 mm <b>T07</b> 2-1/4" <b>T08</b> 2-3/8" <b>T09</b> 2-1/2" <b>T10</b> 2-7/8" <hr/> <b>Bores with 1.25" per foot taper</b> <b>P01</b> 1-1/8" <b>P02</b> 1-3/8" <b>P03</b> 1-5/8" <b>P04</b> 1-7/8" <b>P05</b> 2.00" <b>P06</b> 2-1/8" <b>P07</b> 2-1/4" <b>P08</b> 2-3/8" <b>P09</b> 2-1/2" <b>P10</b> 2-7/8"	<b>1</b> 5-26VDC in, 5-26VDC Line Driver out (IC-WE), Single output  <b>2</b> 5-26VDC in, 5-26VDC Line Driver out (IC-WE), Dual output	<b>C</b> Latching Industrial Connector with 1/2" NPT <b>M</b> 10 pin MS Connector <b>P</b> 18" Pigtail <b>Q</b> Latching Industrial Connector on 18" Cable

**Note:** See ACCESSORIES Section for Connectors and Spare Parts

**For additional bore sizes up to 4.500" maximum, please consult the factory.**

### DIMENSIONS inch [mm]



Worldwide Brands: **NorthStar™** • **Acuro™** • **Dynapar™** • **Hengstler™** • **Harowe™**

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