

SLIM Tach ST56 Bearingless Encoder

Key Features

- Redesigned using our Revolutionary Sensor Technology to provide a Large Air Gap of 0.060"
- Bearingless Design Mounts to 56 and 140 C-Face Motors
- Thin 3/4" Profile Saves Space and Can be "Sandwiched" Between Motor & Reducer
- Compact Height of 9.8" Designed with Options to Extend
- Anodized Aluminum Housing with Field-Serviceable Connector
- Single or Dual Isolated Outputs Available



SPECIFICATIONS

STANDARD OPERATING CHARACTERISTICS

Code: Incremental
Pulses per Revolution: 64-2048
Phasing Sense: A leads B for Counter-Clockwise rotation (CCW) viewing encoder-mounted end
Quadrature Phasing: 90° ± 45°
Symmetry: 180° ± 54°
Index: Less than phase A/B pulse width
Number of Output Modules: Single or Dual Redundant

ELECTRICAL

Input Voltage Requirement: 5-26 Volts DC
Current Requirement: 95 mA typical per sensor module plus line driver load
Output Signals:
 With Elec Option V: 5-26 V Line Driver, 150mA
 With Elec Option 5: 5V Line Driver, 150mA
Frequency Response: 0 - 120kHz Data & Index
Electrical Immunity: 2kV ESD, Reverse Polarity, Short Circuit
Connector: 10 pin industrial duty latching, sealed NEMA 4 & 12, IP65; MS connector or pig-tail

MECHANICAL

Max. Shaft Speed: 7,000 RPM
Mounting Configuration: 4.5" 56C face mount for NEMA MG1 standards
Housing Material: Aluminum
Acceleration Rate: 3,600 rpm/sec max
Shaft Length Required: 0.7" min
Allowable Shaft End-Play: +0.050"/-0.125"
Allowable Shaft Runout: 0.005" TIR
Weight: 2.5 lbs.

ENVIRONMENTAL

Operating Temperature Range:
 Standard: -40°C to +100°C
 Optional: Extended, -40°C to +120°C
Storage Temperature Range: -40°C to +120°C
Humidity: to 100% RH
Shock: 300 G's Min.
Vibration: 20 G's @ 5-2000 Hz spectrum

ELECTRICAL CONNECTIONS

Signal	Connector Pin	Pigtail Cable	MS 3102E18-IT#	Conduit Box
Common	1	Black	F	1
B	2	Green	B	5
A	3	Blue	A	3
Z *	4	Violet	C	7
No Connection	5	—	E	—
Vcc (5-15 VDC)	6	Red	D	2
B	7	Yellow	I	6
A	8	Gray	H	4
Z *	9	Orange	J	8
Shield	10	Braid	G	—

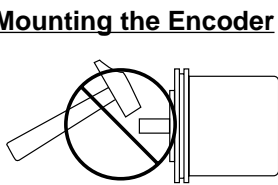
* Index (Z) optional. See Ordering Information

IMPORTANT INSTALLATION INFORMATION

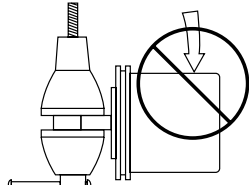
GENERAL GUIDELINES

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.

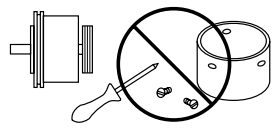
Mounting the Encoder



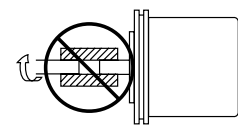
Do not shock the encoder.



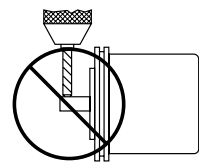
Do not subject the encoder to axial or radial shaft stresses.



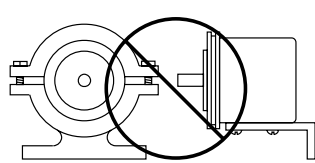
Do not disassemble the encoder.



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.

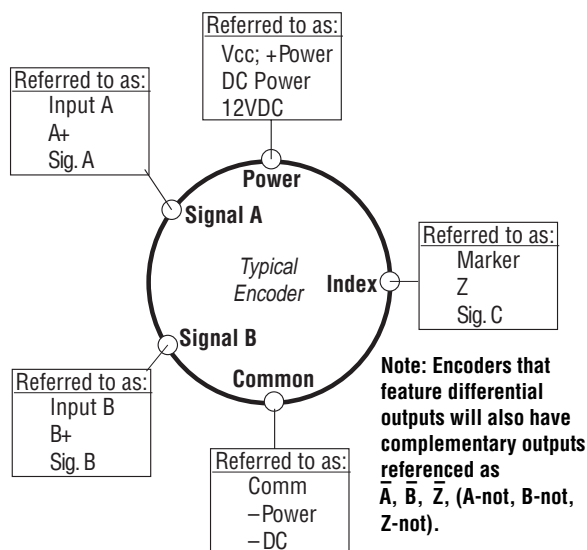
NOTE: Never connect these signals together or to the + or - side of DC power. Never connect differential signals to the same input.

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. **Note: If power is applied to the encoder prior to wheel installation random blinking of the LED may occur, which is NOT a fault condition.**
- 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?

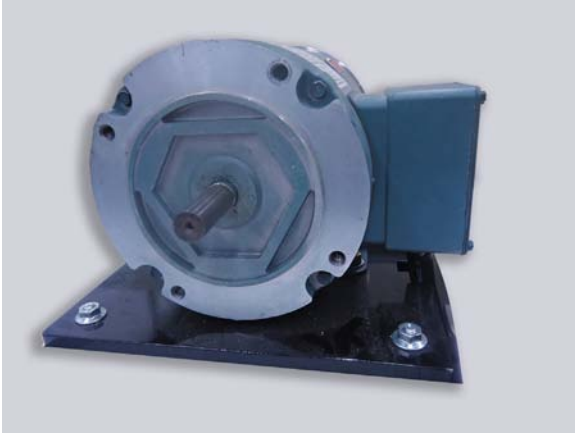
Many encoders have internal protection circuits which shut down the encoder to prevent damage if the input power is not correct or the outputs are overloaded. Check the following: Input Voltage (is it too high?); Input Polarity (is it reversed?); and Output Wiring (are they wired properly?).

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.

MECHANICAL INSTALLATION

1.0 Clean outer rim and surface of motor facing and shaft of paint, grease, dirt and other debris.



2.0 Remove housing from packaging



3.0 Slide housing on to motor facing.



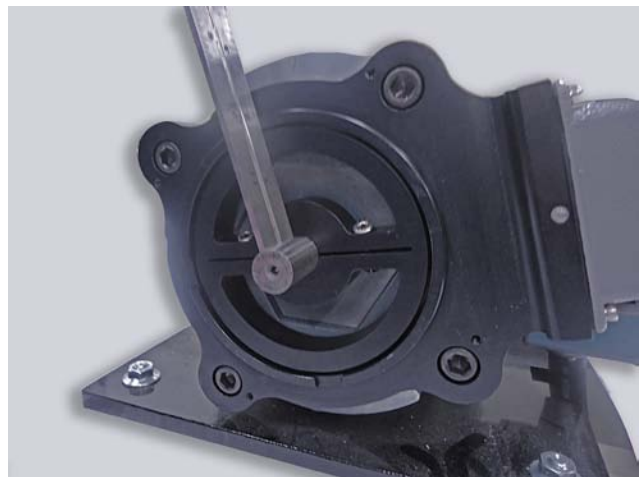
4.0 Tighten (4) 3/8"-16 UNC to a nominal 27 ft-lbs



5.0 Slide Clamp wheel on to the shaft

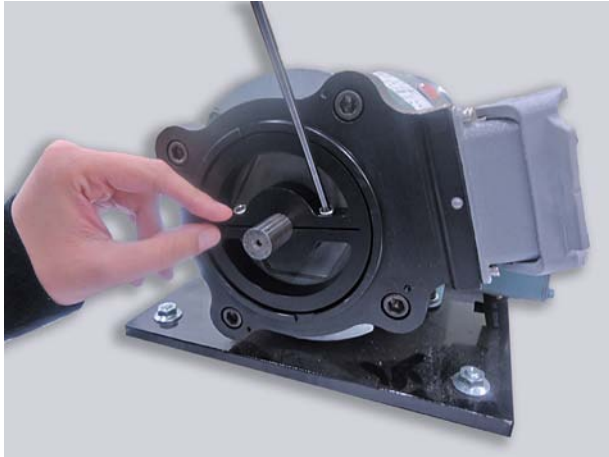


6.0 Position the wheel such that its front surface is flush with housing groove surface.



MECHANICAL INSTALLATION

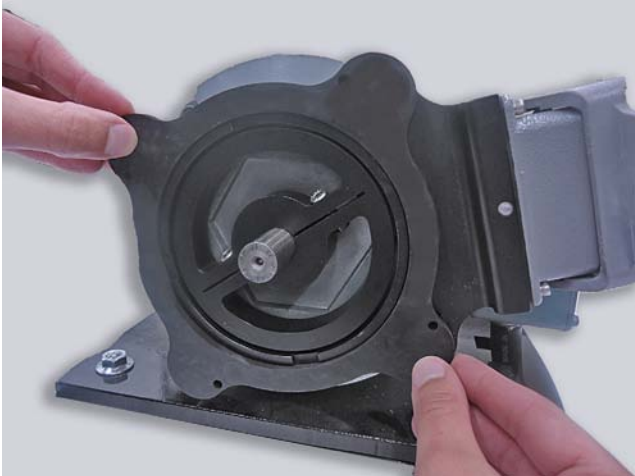
7.0 Tighten (2) M5x0.8 screws to a nominal 2.6 N-m.



10.0 Tighten (4) #6-32 UNC screws to a nominal 7 in-lbs.



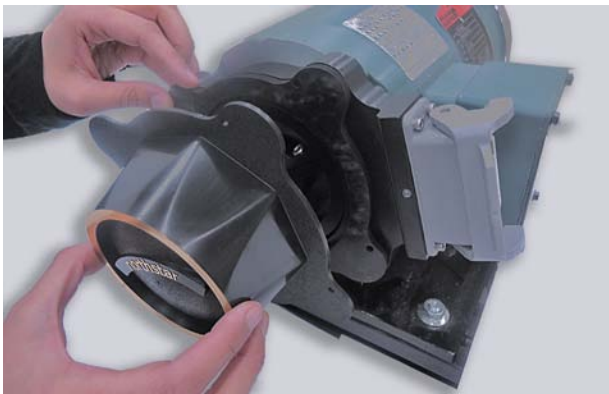
8.0 Place the rubber spacer.



11.0 Grab mating connector, unscrew (4) mating connector screws.



9.0 Holding the rubber spacer in place, align cover and spacer clearance holes with threaded holes on housing.

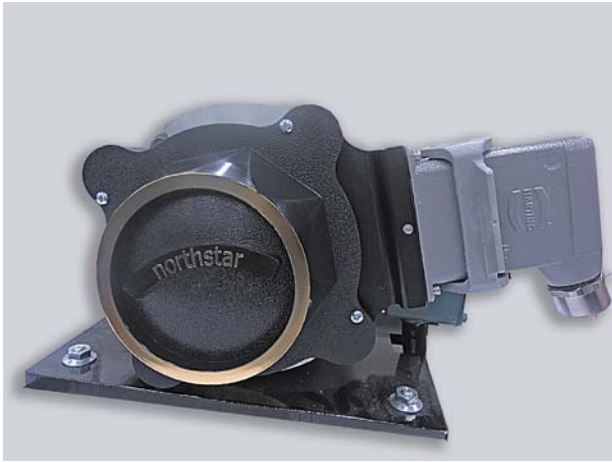


12.0 Pull the mating connector out and complete wiring per electrical connections table.



MECHANICAL INSTALLATION

13.0 Latch mating connector to the housing. Installation is complete.



Collet wheel option:



- Insert wheel adapter into the collet wheel, install (4) M4x0.7 screws (do not tighten completely).
- Slide the wheel onto the shaft; align the adapter front surface with housing groove surface.
- Tighten the screws to a nominal of 2.24 N-m.

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: Shaft Size	Code 5: Termination	Code 6: Electrical	Code 7: Cover/Adapter
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Ordering Information						
ST5 Direct Motor Mounting on NEMA 56 flange (4.5"), Single Output DT5 Direct Motor Mounting on NEMA 56 flange (4.5"), Dual Output	0064 0128 0256 0512 1024 2048	L No Index Z Index	C04 0.625" C05 0.875" C06 1.000" C07 1.125" C08 1.250" C09 1.375" C10 1.500" C11 1.625" C12 1.750" C13 1.875" C14 2.000" C15 2.125" C16 2.250" C17 2.375" C18 2.500" C19 2.875" C20 2.625" Additional Shaft Sizes Available Including Metric	B Conduit Box C Latching Industrial Connector with 1/2" NPT D 1" Extended Height Latching Industrial Connector with 1/2" NPT E 3" Extended Height Latching Industrial Connector with 1/2" NPT M 10 pin MS Connector N 10 pin MS 3112 Connector P 18" Pigtail Cable (25" when Code 6 = H) Q Latching Industrial Connector on 18" Pigtail Cable	V 5-26V in, 5-26V Line Driver (IC-WE) out 5 5-26V in, 5V out Line Driver (IC-WE) H Same as V but with High Temperature, Extended Operating Range to 120°C	CC Standard Cover EE Extra Heavy Duty Steel Cover FF Flat Thru-Hole Cover TT Flat No Hole Cover

DIMENSIONS inches

