

Nidec-Avtron Makes the Most Reliable Encoders in the World

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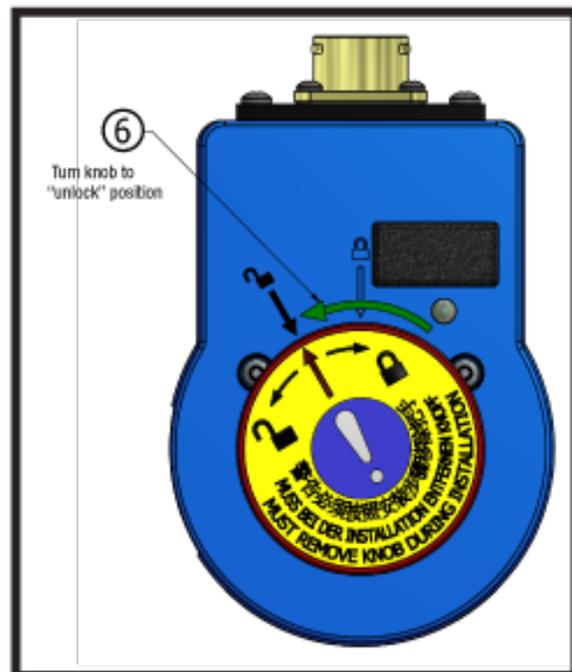
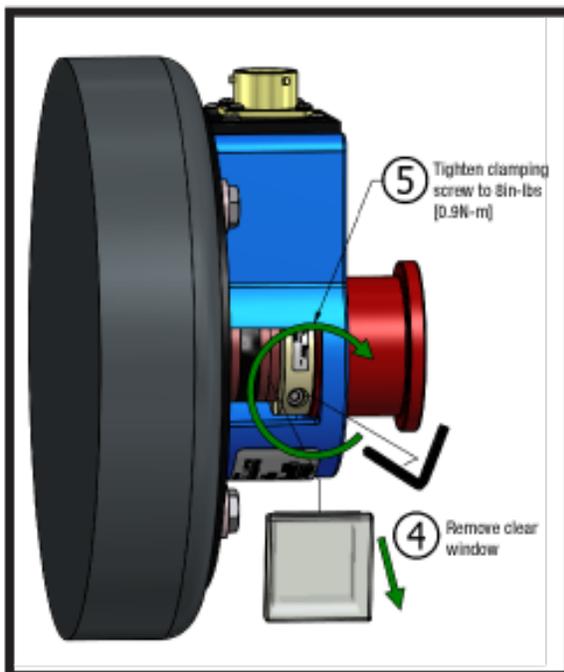
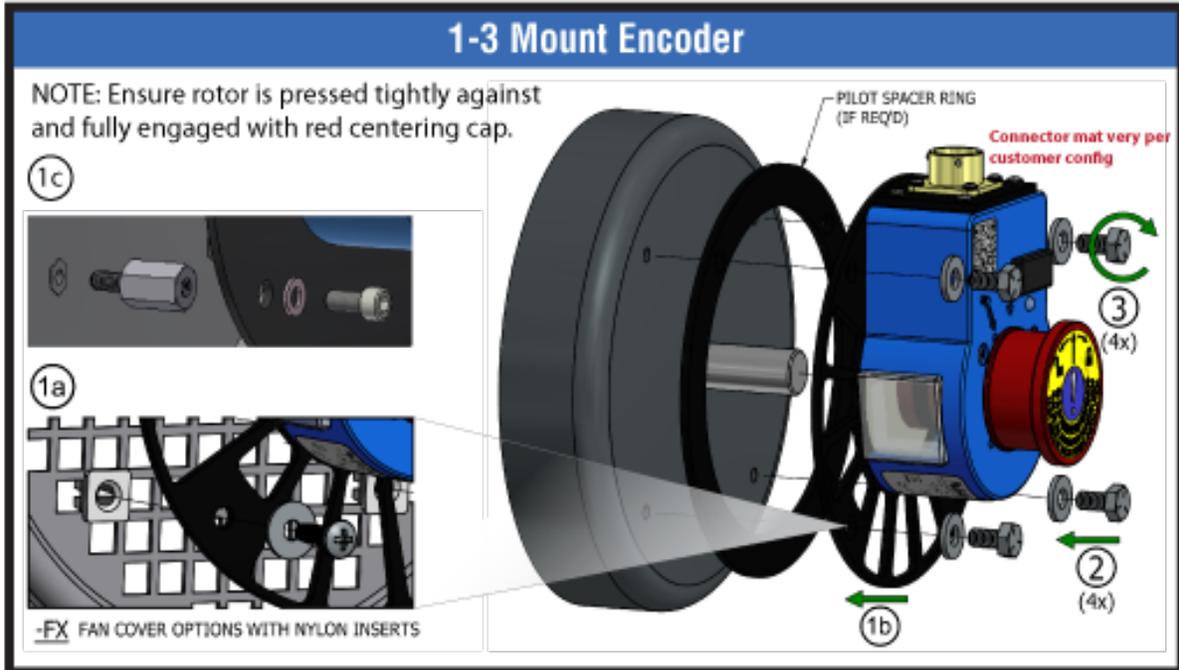
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## Encoder Instructions

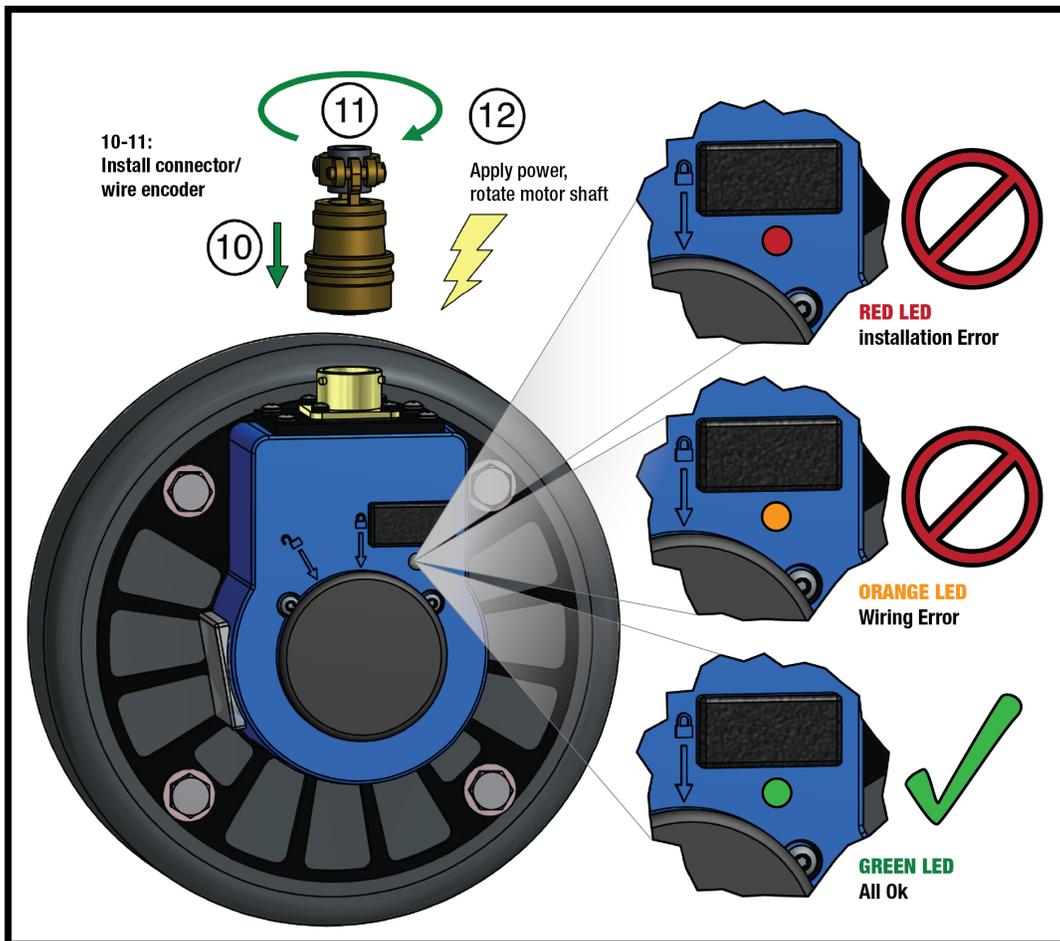
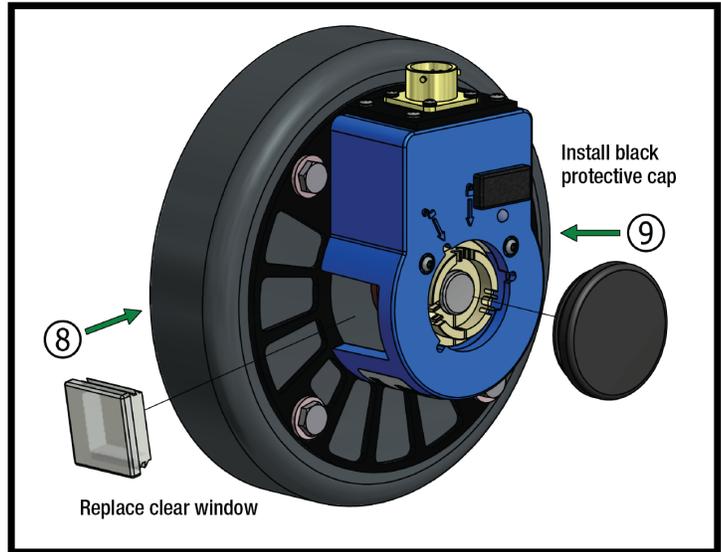
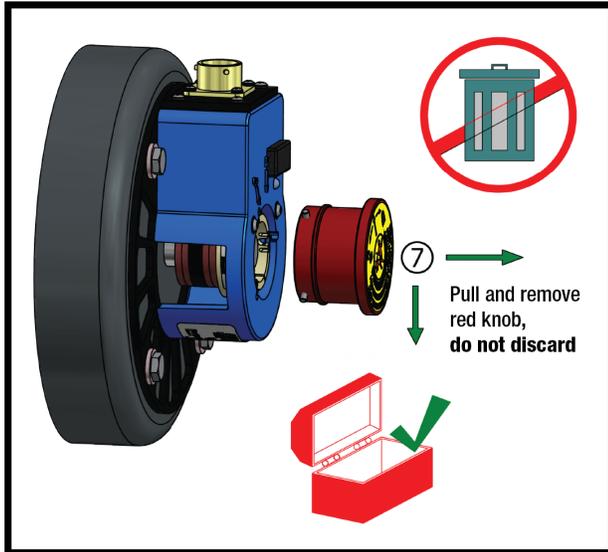
### MODEL AV32

FLANGELESS MOUNT  
MODULAR

## QUICKSTART INSTALLATION GUIDE

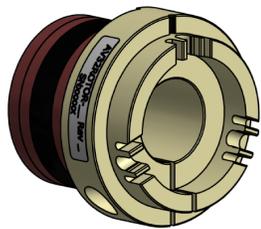
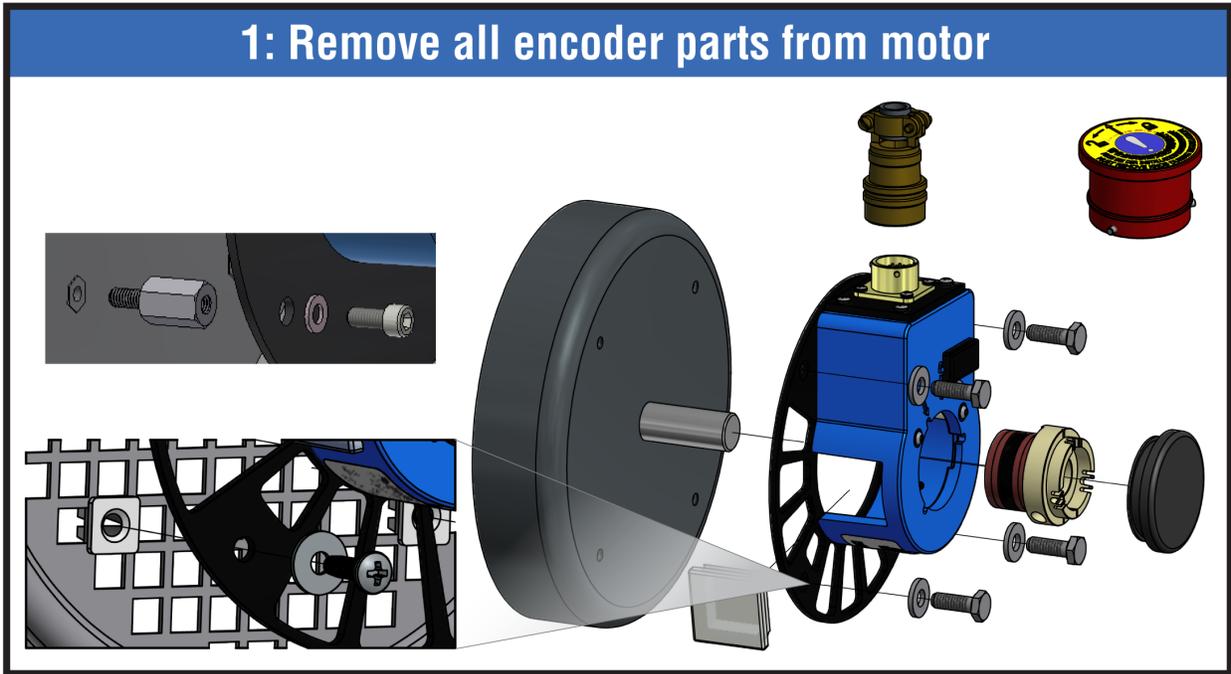


# Quickstart Installation Guide (Part 2)



# Removal Instructions

## 1: Remove all encoder parts from motor



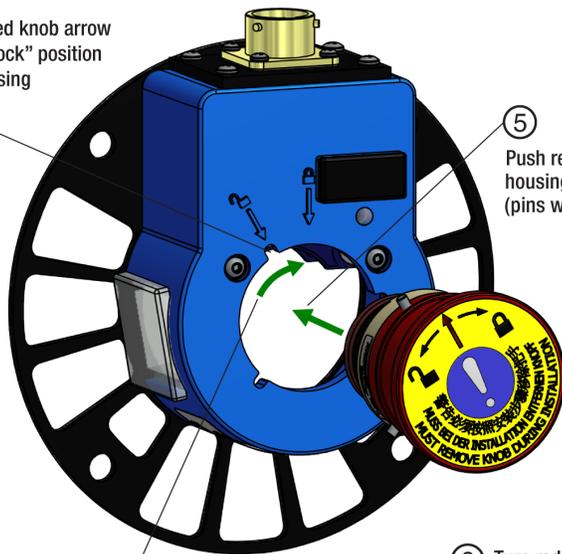
② Align rotor arrow to knob line & pin



③ Snap rotor onto red knob



④ Align red knob arrow to "unlock" position on housing



⑤ Push red knob into housing firmly (pins will go inside)

⑥ Turn red knob to "lock" position



⑦ Encoder is ready for reinstallation

# AVTRON™ ENCODERS

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**A Nidec BRAND**

## Encoder Instructions

### MODEL AV32

FLANGELESS MOUNT  
MODULAR

### DESCRIPTION

The Avtron AV32 Bullseye32™ is a modular, two piece incremental encoder (also known as a tachometer or rotary pulse generator). It provides a two phase, A Quad B frequency (pulse) output, with complements. The AV32 mounts on virtually any motor or machine surface using the patent-pending auto-centering system. No pilot is required.

The AV32 offers a wide range of mounting flanges: Bx styles for flat, featureless surfaces, Fx styles for mounting on motor fan covers, Px styles for mounting on motor surfaces with existing pilots.

Because the Bullseye32 is modular, there are no bearings or couplings required. This, combined with the latest magnetoresistive (MR) sensor technology, allows the AV32 to provide superior mechanical performance and increased reliability. An Avtron Bullseye32 output has six signals: (A, B) 90° out of phase, with complements (A, B). A marker pulse with complement (Z, Z̄) is also provided.

Output resolution on the Bullseye32 is factory and OEM-programmable. Selection of the rotor is based only on the shaft mounting requirements (and not PPR).

### CAUTION

**Bullseye32 rotors are matched to the stator and have mating serial numbers. Using mismatched rotors and stators can lead to Z pulse errors.**

### Equipment Needed for Installation

| Provided                            | Provided  | Not Provided   |
|-------------------------------------|---|--|
| AV32 Stator/Housing                 | Hardware per mounting flange option:                              | Nut driver/socket wrench:  |
| AV32 Rotor with M3 Socket Cap Screw | B5- (4) 1/4-20 x 1/2"<br>F3- (4) 8-32 x 1/2"<br>w/nylon insert    | B5- 7/16" SAE<br>F3- 1/4" SAE<br>F5-10-24 5/16" SAE<br>P4- 9/16" SAE |
| Rotor Hex Key 2.5mm (right angle)   | F5- (4) 10-24 x 5/8"<br>w/nylon insert                            | F1-Phillips/Pozi Drive   |
| Auto-Center (red) Knob              | P4- (4) 3/8-16 x 1/2<br>F1 & F2- (4) M6x1.0 x 20mm w/nylon insert |  |
| Rear Cover (black)                  | B3- (4) M6 stand-offs   |  |
| Side Cover (clear)                  |   |  |
| Mounting Flange                     |   |  |

### AV32 Bullseye32™ PART NUMBERS AND AVAILABLE OPTIONS

| Model                   | Rotor Bore Options   | PPR  | Mounting Style   | Connector Options  | Channels   | Special Features  |   |
|-------------------------|--|--|--|--|--|---|---|
| <b>AV32 Bullseye32™</b> | <b>SAE</b><br>AC- 1/4"<br>AE- 5/16"<br>AF- 3/8"<br>AH- 7/16"<br>AK- 1/2"<br>AL- 9/16"<br>AN- 5/8"<br>AP- 11/16"<br>AR- 3/4"<br>AT- 13/16"<br>AV- 7/8"<br>AY- 15/16"<br>AZ- 1"<br><br><b>Metric</b> | <b>MA-</b> 4mm<br><b>MB-</b> 5mm<br><b>MC-</b> 6mm<br><b>MD-</b> 7mm<br><b>ME-</b> 8mm<br><b>MF-</b> 9mm<br><b>MG-</b> 10mm<br><b>MH-</b> 11mm<br><b>MJ-</b> 12mm<br><b>MK-</b> 13mm<br><b>ML-</b> 14mm<br><b>MM-</b> 15mm<br><b>MN-</b> 16mm<br><b>MP-</b> 17mm<br><b>MQ-</b> 18mm<br><b>MR-</b> 19mm<br><b>MT-</b> 20mm<br><b>MU-</b> 21mm<br><b>MV-</b> 22mm<br><b>MW-</b> 23mm<br><b>MY-</b> 24mm<br><b>MZ-</b> 25mm | <b>AA-</b> 32 PPR<br><b>AK-</b> 80 PPR<br><b>AH-</b> 120 PPR<br><b>AC-</b> 128 PPR<br><b>AM-</b> 200 PPR<br><b>AL-</b> 240 PPR<br><b>AN-</b> 256 PPR<br><b>AE-</b> 360 PPR<br><b>AG-</b> 400 PPR<br><b>AB-</b> 480 PPR<br><b>AR-</b> 512 PPR<br><b>AS-</b> 600 PPR<br><b>AP-</b> 720 PPR<br><b>AJ-</b> 960 PPR<br><b>AW-</b> 1000 PPR<br><b>AY-</b> 1024 PPR<br><b>AZ-</b> 1200 PPR<br><b>AU-</b> 1440 PPR<br><b>AU-</b> 1800 PPR<br><b>A3-</b> 2000 PPR<br><b>A4-</b> 2048 PPR<br><b>AT-</b> 3072 PPR<br><b>A6-</b> 3600 PPR<br><b>AD-</b> 4096 PPR<br><b>A8-</b> 4800 PPR<br><b>A9-</b> 5000 PPR<br><b>A0-</b> Special | <b>B5-</b> 4x 1/4-20 on 5.00 B.C. straight slots<br><b>F1-</b> Fan Cover - 10mm straight slots<br><b>F2-</b> Fan Cover - 10mm square grid<br><b>F3-</b> Fan Cover - 1/4" arced slots<br><b>F5-</b> Fan Cover - 5/16" straight slots<br><b>P4-</b> 4.5" NEMA 56C flange<br><b>P6-</b> 6.75" Recessed flange<br><b>P8-</b> 8.50" NEMA 180 FC flange<br><b>B3-</b> 4xM6 on 140mm B.C. with stand-offs | <b>C-</b> 10 pin MS style w/Plug, Avtron pinout<br><b>D-</b> 10 pin MS style w/plug, Reverse Phasing (Dynapar HS35)<br><b>W-</b> Side Exit Cable (18" or special length)*<br><b>Y-</b> Top Exit Cable (18" or special length)<br><b>G-</b> 6 pin MS style w/plug, Avtron pinout (BEI)<br><b>H-</b> 6 pin MS style on cable w/plug, Reverse Phasing<br><b>M-</b> 7 pin MS style w/plug, Avtron pinout<br><b>N-</b> 7 pin MS style w/plug, Reverse Phasing<br><b>R-</b> 10 pin Mini-MS style (Bayonet) w/plug<br><b>S-</b> 10 pin Mini-MS style (Bayonet) on 18" cable w/plug<br><b>T-</b> M12 8 pin, Turck pinout w/o plug<br><b>2-</b> M23 12 pin w/o plug, L&L pinout<br><b>3-</b> M23 12 pin w/o plug, pinout (Hubner)<br><b>4-</b> M23 12 pin, 90° rt angle<br><b>5-</b> Terminal box<br><br>* "W" N/A w/mounting F1,F2,F3,F5 | <b>AA-</b> All Signals: A, $\bar{A}$ , B, $\bar{B}$ , Z, $\bar{Z}$ ; (Z - 1/2 pulse width)<br><b>AD-</b> All Signals: A, $\bar{A}$ , B, $\bar{B}$ , Z, $\bar{Z}$ ; (Z - 1/4 pulse width)<br><b>BX-</b> A, $\bar{A}$ ,B, $\bar{B}$ (complements, no marker)<br><b>EA-</b> A, B, Z (no complements, marker) | <b>000-</b> No Special Features<br><b>9xx-</b> Special cable length, xx- ft/0.3m<br><b>Wxx-</b> Connector on cable, length, xx- ft/0.3m<br><b>H00-</b> Hx Line Driver, no other special features<br><b>Hxx-</b> Hx Line Driver, special cable length, xx- ft/0.3m |

## INSTALLATION

Refer to the back page of these instructions for outline and mounting dimensions. Simple step-by-step visual instructions are shown in the front of this manual.

Axial float or endplay must be less than +1/-2mm.

Axial shaft length must be a minimum of 1.4" [36mm].  
For the standard housing and standard rear shaft cover cap, axial shaft length must be less than 1.75" [44.5mm]. If longer or through-shaft mounting is required, contact factory.

In preparation for installing the Model AV32 Bullseye32 encoder, ensure the (motor or machine) shaft is clean and the mounting surface is flat. These surfaces must be inspected and any paint, burrs, or other surface imperfections removed.

### WARNING

**Installation procedures should be performed only by qualified personnel. Safety precautions must be taken to ensure machinery cannot rotate and all sources of power are removed during installation.**

### WARNING

**The red auto-centering knob is for installation only. The RED AUTO-CENTERING CAP MUST BE REMOVED as part of proper installation before the shaft is rotated and the machine is powered-up. Failure to follow these instructions can lead to encoder damage, operator injury, or even death.**

### NOTE

**Before installation:**  
Ensure the encoder is fully-preassembled-  
The red auto-centering knob must be mounted in the encoder housing in the locked position.  
The rotor must be snapped into the red centering knob (inside the encoder housing) If the encoder is not properly pre-assembled, follow the removal and reassembly instructions to prepare for installation.

### NOTE

**Do not attempt to install or reinstall the AV32 encoder without the red auto-centering knob. If the knob is missing, a replacement knob can be purchased separately.**

### Mounting preparation for fan cover/guard/grille/grid Install:

- Snap (4) square locking tabs in place in grille/grid
- Ensure locking tab locations match the mounting screw holes in the flange

### Installation Instructions for AV32 using B3 Flange and B37981 Leveling Gauge:

Use B37891 Leveling Gauge to determine "perpendicular plane" to motor shaft (**Note:** this may require some iteration of steps):

- 1) Install 4 M6 Stand-offs (from kit AV32HWKIT-B3) into studs on motor/generator end plate or cover. (**Note: DO NOT** use the M6 washers at this point).
- 2) Slide B37891 Leveling Gauge onto motor shaft until contact is made with at least one Stand-off.
- 3) Note (mentally or with marking) which stand-off(s) is(are) not in contact with Gauge.
- 4) Rotate Leveling Gauge on motor shaft to allow access to the Stand-offs.
- 5) Remove the Stand-off(s) that **DID NOT** make contact with the Leveling Gauge.
- 6) Insert washer(s) over the Stand-off(s) as needed to obtain contact with Leveling Gauge for each Stand-off. This step may have to be repeated as each Stand-off is raised to the proper level. This activity has now resulted in a "perpendicular plane" to the motor shaft, and the AV32 flange can be mounted.

## General Instructions

(Also refer to Quick Start Intallation Guide shown at the front of this manual)

1. Slide the fully preassembled encoder over the shaft.
2. Install using the (4) mounting screws and washers provided.
3. Tighten mounting screws.
4. Remove (clear) rotor viewing window.
5. Using 2.5mm hex wrench (provided), tighten rotor clamping screw to 8 in-lbs [0.9N-m].

### NOTE

**Finger tighten rotor screw only-do not use T-handle, extender bar or pliers to increase screw force-the screw will strip the rotor threads. If a sharp "crack" noise occurs, the rotor has been overtightened and the encoder must be replaced.**

6. Turn the auto-centering (red) knob to the unlock position.
7. Pull the auto-centering (red) knob out from the encoder body. The rotor should be visible inside the encoder housing, and should not extend outside the encoder housing.

### NOTE

**DO NOT DISCARD RED AUTO-CENTERING KNOB. This knob is required for proper reinstallation.**

8. Replace the (clear) rotor viewing window in the side of the encoder housing.
9. Install (black) rear cover cap.

### NOTE

**DO NOT REINSTALL RED AUTO-CENTERING KNOB unless removing/reinstalling the encoder.**

### WARNING

**The black rear cover cap and clear rotor viewing cap must be installed for finger-safe operation. Operating the encoder without the rear cover and/or the rotor viewing cover may lead to encoder damage and/or serious operator injury.**

## WIRING

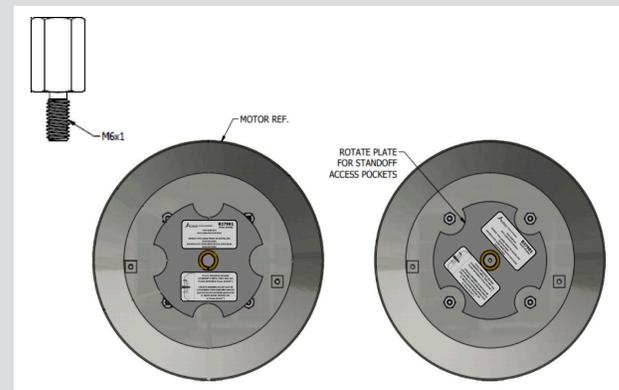
### CAUTION

**Be sure to remove power before wiring the encoder. Be sure to ground the cable shield: it should be grounded at the control/drive end, and should not be grounded on both ends.**  
Refer to the wiring diagrams for specific information on each option.

### NOTE

**B37891 Leveling Gauge MUST BE REMOVED prior to mounting AV32 encoder**

- 7) Install the AV32 encoder per General Instructions provided in this Manual



The Bullseye32 can be wired for single phase or two phase, either with or without complements, with or without markers. For bidirectional operation, Phase A channel leads Phase B channel for clockwise shaft rotation as viewed from the anti-drive or accessory end of the motor (AV32 mounting end).

**CORRECTIVE ACTION FOR PHASE REVERSAL**

- 1) Remove Power.
- 2) Exchange wires on cable, either at encoder cable end, or at speed controller end (but not both).
  - a) Single Ended 2 Phase Wiring (see wiring diagram)  
Exchange A and B at the use end of the wires.
  - b) Differential 2 Phase Wiring (see wiring diagram)  
Exchange either A with  $\bar{A}$  in the phase A pair OR B with  $\bar{B}$  in the phase B pair but NOT both.
- 3) Apply Power.
- 4) Verify encoder feedback is correct, using hand rotation of shaft, or jog mode of the speed controller.

Interconnecting cables specified in the wire selection chart are based on typical applications. 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 through 16 AWG, each wire pair individually shielded with braid or foil with drain wire, .05  $\mu$ f of maximum total mutual or direct capacitance, outer sheath insulator. See specifications for maximum cable length. Stranded 22 AWG wire should not be used for cable runs greater than 61 meters.

**FAULT-CHECK**

After power-up and the rotor position is checked by the sensor, the Fault-Check LED will turn GREEN.

If the adaptive electronics reach their adjustment limit for any reason, the Fault-Check alarm and LED will notify the drive and operator of an

impending failure. The LED will turn RED if the Adaptive Electronics reach their adjustment limit. This output occurs before an actual failure, allowing steps to be taken to replace the unit before it causes unscheduled downtime.

If there is a wiring error, such as an output being shorted to ground or +V or another output, the Fault-Check LED will turn ORANGE. The ORANGE LED may blink intermittently, depending on voltage and severity of short.

**If the alarm output and/or LED indicate a fault (RED):**

1. Remove the (clear) side cover, and use the circuit boards to check the location of the rotor (see Figure 1).
2. Remove the AV32 from the motor/machine. Clean the mounting surface for the AV32 housing. Reassemble to prepare for reinstallation, then reinstall the AV32. Ensure the AV32 is directly mounted on the motor/machine, with no sealant, gasketing, or other materials, and is firmly bolted in place.

If the alarm output and/or LED indicate a fault (RED)

On a properly mounted Bullseye32 and the rotor is properly located, replace the Bullseye32 encoder (both rotor and housing/electronics).

An oscilloscope can also be used to verify proper output of the Bullseye32 at the encoder connector itself and at the drive/controller cabinet. If the outputs show large variations in the signals at steady speed (jitter or "accordion effect" see Figure 2), check rotor position. If the rotor position is correct, the motor or shaft may be highly magnetized. Replace any magnetized material nearby with non-magnetic material (aluminum, stainless) (especially shafts). If the source of magnetic interference cannot be eliminated, another encoder model may be required that offers super-magnetic shielding such as Avtron HS45.

If the alarm output and/or LED indicate a wiring fault (ORANGE): Remove all output wires/connections (A,A,B,B,Z,Z). The LED should turn

**SPECIFICATIONS**

**ELECTRICAL**

- A. Operating Power (Vin)
  1. Volts.....5-24 VDC
  2. Current.....60mA, no load
- B. Output Format
  1. 2 $\phi$  & Comp
    - AA, AD, BX .....A, $\bar{A}$ , B, $\bar{B}$  (differential line driver)
    - EA .....A, B (single ended line driver)
  2. Marker .....1/Rev
    - AA, EA .....1/2 incremental pulse width, gated to  $\bar{B}$
    - AD .....1/4 incremental pulse width, gated to A & B
    - BX .....No marker
- C. Signal Type .....Incremental, Square Wave, 50  $\pm$ 10% Duty Cycle.
- D. Direction Sensing ..... $\emptyset$ A leads  $\emptyset$ B for CW rotation as viewed from the back of the tach looking at the non-drive end of the motor.
- E. Phase Sep.....15% minimum
- F. Frequency Range.....0 to 250,000 Hz
- G. PPR .....8-5000
- H. Line Driver Specs.....See table
- I. Connectors.....See connector options on page 1
- J. Integral LED Indicator....GREEN: power on, unit ok. RED: alarm on. ORANGE: Wiring error

**MECHANICAL**

- A. Rotor Inertia: .....0.0298 lb-in<sup>2</sup> [0.055 kg-cm<sup>2</sup>]
- B. Acceleration: .....5000 RPM/Sec. Max.
- C. Speed: .....5000 RPM Max.
- D. Weight: .....0.7lb [350g].
- E. Sensor to Rotor
  - Air Gap (nominal): .....0.030 [0.76mm]
  - Tolerance: ..... $\pm$ 0.010 [ $\pm$ 0.25mm]
- F. Rotor Axial Tolerance ..+0.040/-0.078 [+1.0/-2.0mm]

**ENVIRONMENTAL**

Engineered resin housing and rotor  
Fully coated electronics, protected against oil and water spray  
IP65 when mounted on flat solid surface  
Operating Temperature: .....-40 to 100°C, 0-100% condensing humidity  
**Vibration:** ..... 5-2000Hz  
**Shock:** ..... 50G, 11mSec

**LINE DRIVER SPECIFICATIONS**

| Electrical Specifications |                 | LINE DRIVER OPTIONS   |                    | Units    |
|---------------------------|-----------------|---|--------------------|----------|
|                           |                 | Standard  | "H00 mod"          |          |
| Input Voltage (nominal)   |                 | 5-24  | 5-24               | VDC      |
| Absolute minimum          |                 | 4.75  | 4.75               | VDC      |
| Absolute maximum          |                 | 28  | 28                 | VDC      |
| Output Voltage (nominal)  |                 | 5-24  | 5-24               | VDC      |
| Line Driver               |                 | 7272  | Hx                 |          |
| Output Resistance Typ     |                 | 13  | 75                 | ohms     |
| Maximum Peak Current      |                 | 1500  | 800                | mA       |
| Maximum Average Current   |                 | 120   | 200                | mA       |
| Voh Typ                   |                 | V <sub>IN</sub> -1  | V <sub>IN</sub> -1 | VDC      |
| Vol Typ                   |                 | 0.5   | 0.4                | VDC      |
| Cable Drive Capacity      |                 | 1000' [300m]@ 5V<br>500' [150m] @ 12V<br>200' [60m] @ 24V   | 1000'              | feet [m] |
| Protection                | Reverse Voltage | yes   | yes                |          |
|                           | Short Circuit   | yes   | yes                |          |
|                           | Transient       | yes   | yes                |          |
| Alarm                     | LED             | Green = Power on<br>Red = Alarm<br>Orange = Line Driver Shutdown<br>(Due to thermal overload or undervoltage) |                    |          |
| Marker                    |                 | One per revolution.<br>See table for details  |                    |          |

GREEN. If the LED does not turn GREEN, the encoder is not receiving enough voltage at +V to properly operate. Correct input voltage problem at power supply or cabling.

If the LED turns GREEN once all outputs are disconnected, reconnect each output, one at a time, monitoring for ORANGE LED. For partial/resistive short circuits, the LED may take a few minutes to turn ORANGE. To speed the troubleshooting process, if possible, spin the motor/machine to rotate the encoder rotor while replacing individual output connections. This will make the ORANGE LED condition occur faster. Once the shorted output(s) are located, correct the shorting condition, and the encoder LED should remain GREEN.

If the LED is OFF, but power is being applied to the encoder, check the output voltage level at A, A,B, B. If all outputs are ON ( $\approx +V$ ), the connections to +V and COM are reversed. Swap connections between +V and COM; the LED should turn GREEN.

## Encoder Removal

Step-by-step visual instructions are shown at the back of this manual.

### WARNING

**Remove all machine power and encoder connector/wiring before removing encoder.**

### Removal:

1. Remove clear window to allow rotor screw access.
2. Loosen clamping collar screw.
  - 2a. If the clamping screw is not visible, rotate the machine/motor shaft by hand until the screw can be accessed.
  - 2b. If the machine cannot be rotated, remove the mounting screws for the Bullseye32 housing and rotate the housing until the screw can be accessed.
3. Remove all encoder parts from the motor/machine.

### Reassemble the encoder:

4. Align the auto-centering "lock/unlock" arrow on the red knob with the black-marked rotor interlocking groove. The interlock pattern is not symmetric – it can only be mounted at one position.
5. Snap the rotor onto the bottom of the red auto-centering knob. If the rotor is not retained by the auto-centering knob pins, recheck the rotation position/pin alignment. If the rotor cannot be snapped together with the auto-centering knob, the rotor or knob has been damaged, and the encoder must be replaced.
6. Align the lock/unlock arrow on the auto-centering knob with the "Unlock" position on the housing.
7. Push the auto-centering red knob assembly (with rotor attached) into the Bullseye32 housing. The metal pins will fit inside. If the knob will not fit into the housing, recheck that the arrow on the red auto-centering knob is aligned with the unlock symbol.
8. Turn the auto-centering knob to the "Lock" position in the housing. This should be a snug, firm fit – the knob should not wobble or move easily. If the knob does not hold securely in the lock position, unlock, remove and reinstall the knob assembly. If mounting is correct but the knob assembly is not held in a snug, firm fit, the knob or housing has been worn or damaged and the Bullseye32 encoder must be replaced.
9. The encoder is now correctly reassembled and ready for reinstallation.

| CONNECTOR SPARE PARTS |             |              |      |                 |                |
|-----------------------|-------------|--------------|------|-----------------|----------------|
| STYLE                 | OPTION CODE | ENCODER SIDE |      | CABLE SIDE PLUG |                |
| Mini-MS<br>Twist Lock | R, S        | 315296       | Base | 316110          | Plug           |
| 10 pin MS             | C, D        | 3159331      | Base | 315932          | Plug           |
|                       |             |              |      | 411216          | Cable Bushings |
|                       |             |              |      | 411217          |                |
|                       |             |              |      | 411218          |                |
|                       |             | 411219       |      |                 |                |

Figure 1

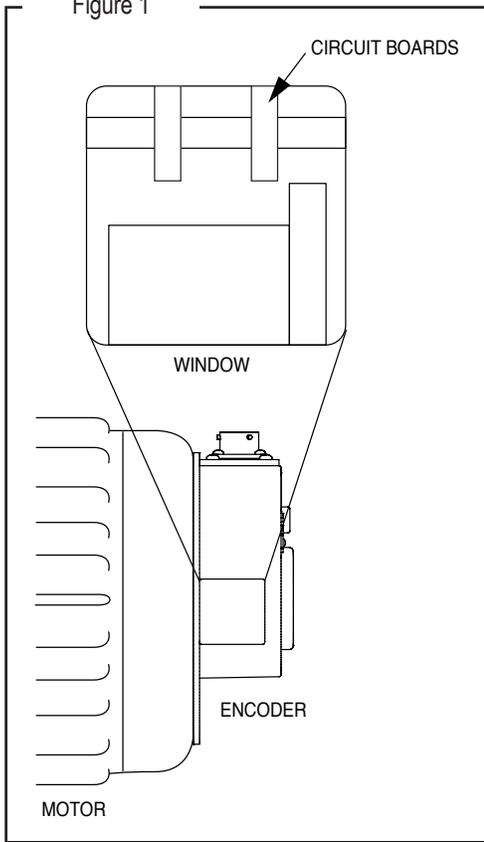
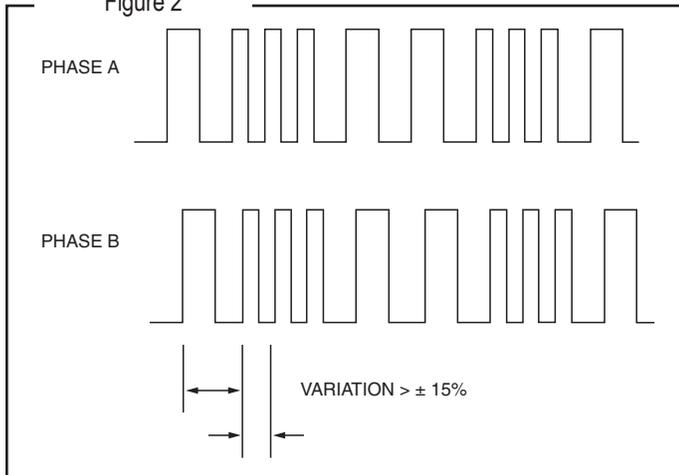


Figure 2

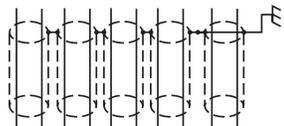


EXCESSIVE SIGNAL JITTER-ERROR CONDITION

DIFFERENTIAL TWO PHASE WIRING APPLICATIONS

| CONNECTOR                              |  | PINOUT                            |                                   |  |   |  |  |                                 |  |  |  |
|--|--|-----------------------------------|-----------------------------------|--|---|--|--|---------------------------------|--|--|--|
| OPTION<br>"W", "Y"<br>(CABLE)          | OPTIONS<br>"C", "D"<br>(10 PIN MS)     | OPTIONS<br>"M", "N"<br>(7 PIN MS) | OPTIONS<br>"G", "H"<br>(6 PIN MS) | OPTIONS<br>"T"<br>(8 PIN M12)          | OPTIONS<br>"R", "S"<br>(10 PIN<br>TWIST-LOCK) | OPTIONS<br>"2", "4"<br>(12 PIN M23)    | OPTIONS<br>"3"<br>(12 PIN M23)         | OPTION<br>"5"<br>(Terminal Box) |  |  |  |
| AA, AD<br>ØA, ØĀ<br>ØB, ØB̄<br>ØZ, ØZ̄ | AA, AD<br>ØA, ØĀ<br>ØB, ØB̄<br>ØZ, ØZ̄ | BX<br>ØA, ØĀ, ØB, ØB̄             | BX<br>ØA, ØĀ<br>ØB, ØB̄           | AA, AD<br>ØA, ØĀ<br>ØB, ØB̄<br>ØZ, ØZ̄ | AA, AD<br>ØA, ØĀ<br>ØB, ØB̄<br>ØZ, ØZ̄        | AA, AD<br>ØA, ØĀ<br>ØB, ØB̄<br>ØZ, ØZ̄ | AA, AD<br>ØA, ØĀ<br>ØB, ØB̄<br>ØZ, ØZ̄ | ØA, ØĀ<br>ØB, ØB̄<br>ØZ, ØZ̄    |  |  |  |
| BLACK                                  | F                                      | F                                 | A                                 | 1                                      | F   | 10                                     | 10                                     | 1                               |  |  |  |
| RED                                    | D                                      | D                                 | B                                 | 2                                      | D   | 12                                     | 12                                     | 6                               |  |  |  |
| GREEN                                  | A                                      | A                                 | E                                 | 3                                      | A   | 8                                      | 5                                      | 2                               |  |  |  |
| YELLOW                                 | H                                      | C                                 | C                                 | 4                                      | H   | 1                                      | 6                                      | 7                               |  |  |  |
| BLUE                                   | B                                      | B                                 | D                                 | 5                                      | B   | 5                                      | 8                                      | 3                               |  |  |  |
| GRAY                                   | I                                      | E                                 | F                                 | 6                                      | J   | 6                                      | 1                                      | 8                               |  |  |  |
| ORANGE                                 | C                                      | NC                                | NC                                | 7                                      | C   | 3                                      | 3                                      | 4                               |  |  |  |
| WHITE                                  | J                                      | NC                                | NC                                | 8                                      | K   | 4                                      | 4                                      | 9                               |  |  |  |
| BROWN                                  | NC                                     | NC                                | NC                                | NC                                     | NC  | NC                                     | NC                                     | NC                              |  |  |  |
| VIOLET                                 | NC                                     | NC                                | NC                                | NC                                     | NC  | NC                                     | NC                                     | NC                              |  |  |  |

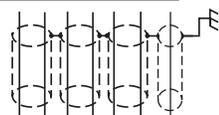
| REF SIGNAL |      |      |
|------------|------|------|
| COM        | GND  | 0V   |
| +V         | +Ub  | +E   |
| ØA         | K1+  | 1+   |
| ØĀ         | K1-  | 1-   |
| ØB         | K2+  | 2+   |
| ØB̄        | K2-  | 2-   |
| Z          | K0+  | 0+   |
| Z̄         | K0-  | 0-   |
| ALM+       | ALM+ | ALM+ |
| ALM        | ALM  | ALM  |



SINGLE ENDED TWO PHASE WIRING APPLICATIONS

| CONNECTORS       |                                   | PINOUT           |                                   |
|------------------|-----------------------------------|------------------|-----------------------------------|
| EA<br>ØA, ØB, ØZ | OPTIONS<br>"M", "N"<br>(7 PIN MS) | EA<br>ØA, ØB, ØZ | OPTIONS<br>"G", "H"<br>(6 PIN MS) |
| D                | B                                 | B                | B                                 |
| B                | D                                 | D                | D                                 |
| A                | E                                 | E                | E                                 |
| F                | A                                 | A                | A                                 |
| C                | C                                 | C                | C                                 |
| NC               | NC                                | NC               | NC                                |
| NC               | NC                                | NC               | NC                                |

| REF SIGNAL |
|------------|
| +V         |
| ØB         |
| ØA         |
| COM        |
| OZ         |
| NC         |
| NC         |



### AV32 Bullseye32™ Sizes

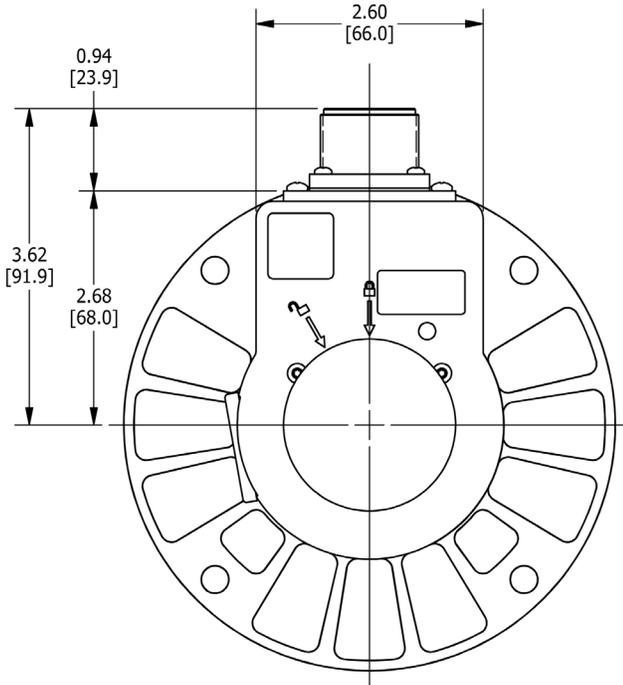
| SAE/USA Sizes |             | Metric Sizes |  |  |               |             |       |
|---------------|-------------|--------------|--|--|---------------|-------------|-------|
| Shaft Size    | Option Code | Rotor        |  |  | Shaft Size    | Option Code | Rotor |
| 0.250/0.2495  | AC          | **           |  |  | 4.000/3.987   | MA          | **    |
| 0.3125/0.3120 | AE          | **           |  |  | 5.000/4.987   | MB          | **    |
| 0.375/0.3745  | AF          | **           |  |  | 6.000/5.987   | MC          | **    |
| 0.4375/0.4370 | AH          | **           |  |  | 7.000/6.987   | MD          | **    |
| 0.500/0.4995  | AK          | **           |  |  | 8.000/7.987   | ME          | **    |
| 0.5625/0.5620 | AL          | **           |  |  | 9.000/8.987   | MF          | **    |
| 0.625/0.6245  | AN          | **           |  |  | 10.000/9.987  | MG          | **    |
| 0.6875/0.6870 | AP          | **           |  |  | 11.000/10.987 | MH          | **    |
| 0.750/0.7495  | AR          | **           |  |  | 12.000/11.987 | MJ          | **    |
| 0.8125/0.8120 | AT          | **           |  |  | 13.000/12.987 | MK          | **    |
| 0.875/0.8745  | AV          | **           |  |  | 14.000/13.987 | ML          | **    |
| 0.9375/0.9370 | AY          | **           |  |  | 15.000/14.987 | MM          | **    |
| 1.000/0.9995  | AZ          | **           |  |  | 16.000/15.987 | MN          | **    |
|               |             |              |  |  | 17.000/16.987 | MP          | **    |
|               |             |              |  |  | 18.000/17.987 | MQ          | **    |
|               |             |              |  |  | 19.000/18.987 | MR          | **    |
|               |             |              |  |  | 20.000/19.987 | MT          | **    |
|               |             |              |  |  | 21.000/20.987 | MU          | **    |
|               |             |              |  |  | 22.000/21.987 | MV          | **    |
|               |             |              |  |  | 23.000/22.987 | MW          | **    |
|               |             |              |  |  | 24.000/23.987 | MY          | **    |
|               |             |              |  |  | 25.000/24.987 | MZ          | **    |

\*\* Rotors are not sold separately

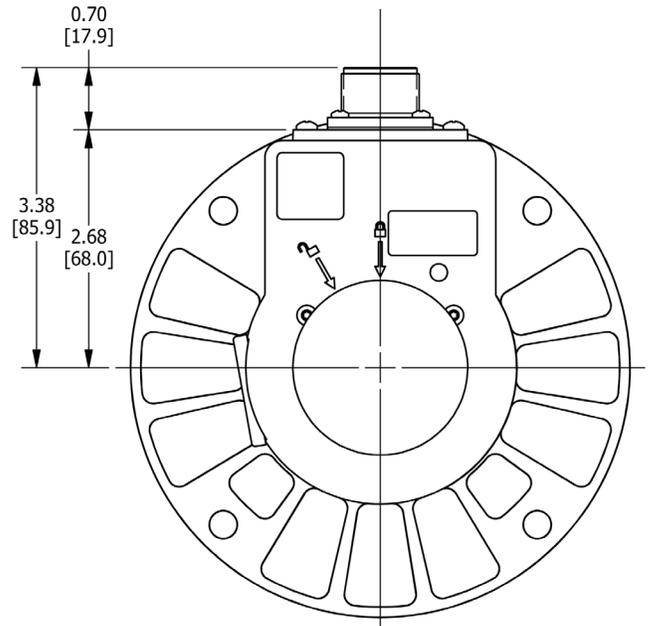
| Parts (all shaft sizes)                   |              |
|---|--------------|
| Auto-Centering Knob (red)                 | AV32KNOB-ASY |
| Rear Cover/Shaft Cap (black)              | AV32CAP      |
| Side Cover/Rotor (clear)                  | AV32WINDOW   |
| Programming Port Cap (black, rectangular) | 416583       |
| 2.5mm hex key (all shaft sizes)           | 484160       |

# CONNECTOR OPTIONS

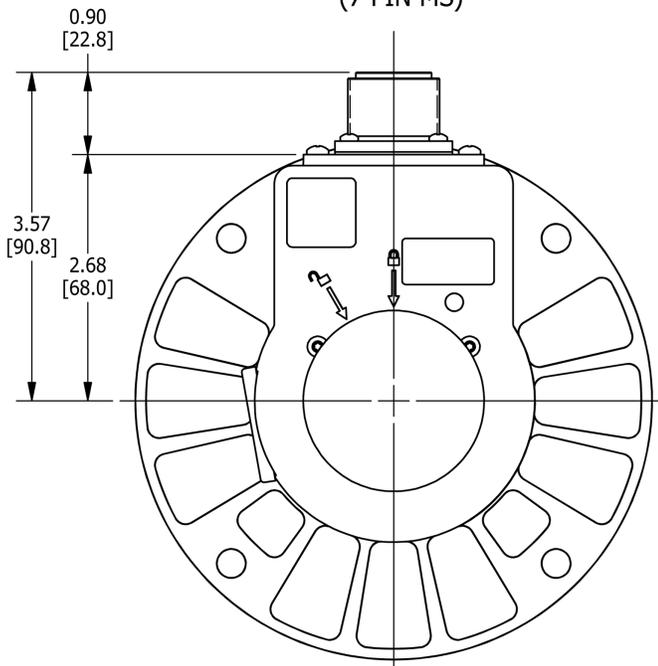
-C & D CONNECTOR  
(10 PIN MS)



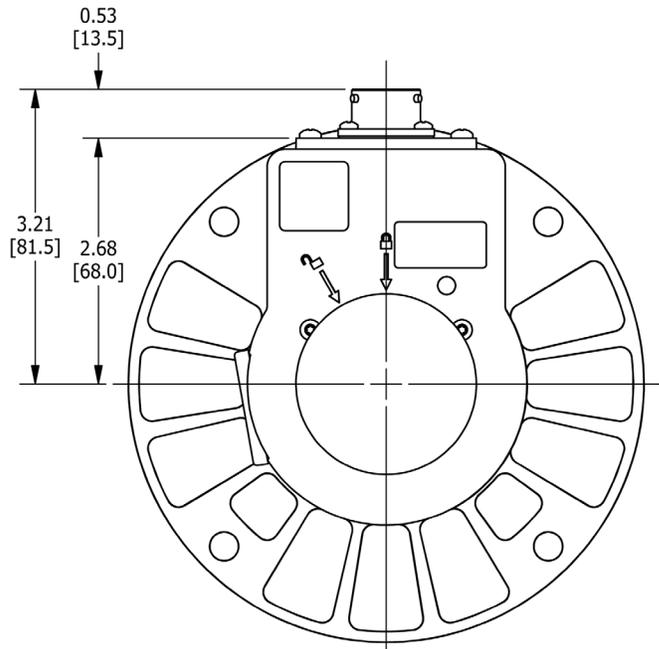
-G & H CONNECTOR  
(6 PIN MS)



-M & N CONNECTOR  
(7 PIN MS)

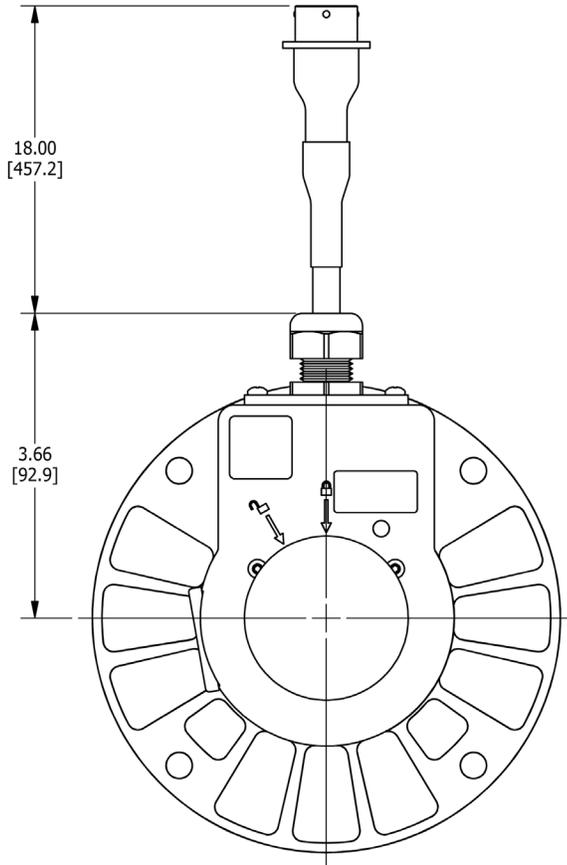


-R CONNECTOR  
(10 PIN MINI TWISTLOCK)

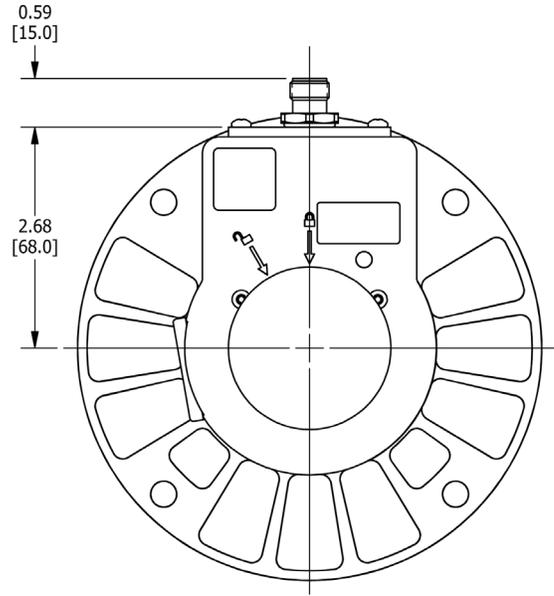


# CONNECTOR OPTIONS

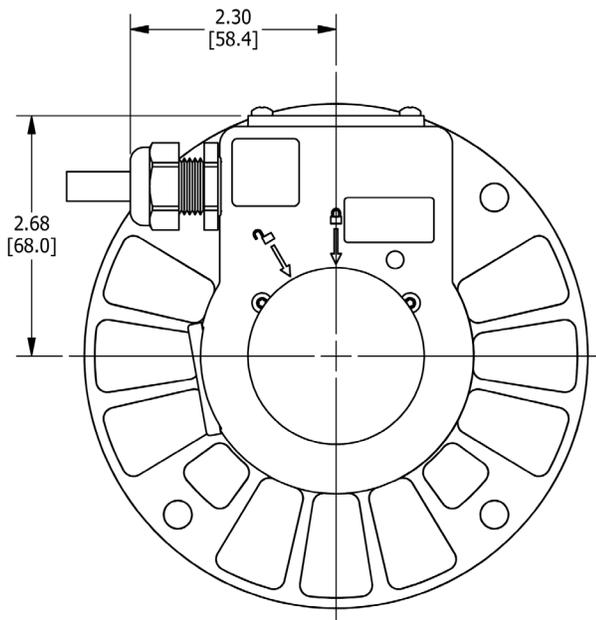
-S CONNECTOR  
(10 PIN MINI TWISTLOCK ON FLEX CABLE)



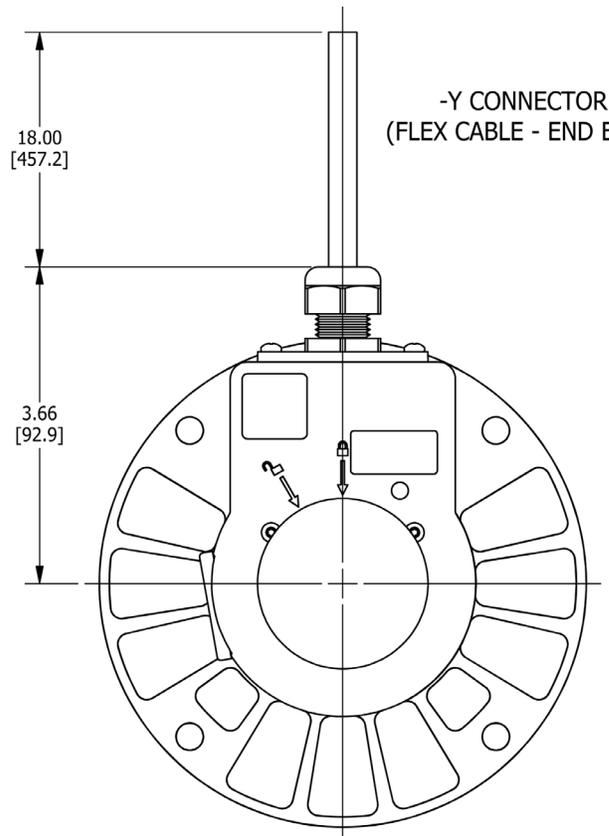
-T CONNECTOR  
(M12-8 PIN)



-W CONNECTOR  
(FLEX CABLE - SIDE EXIT)

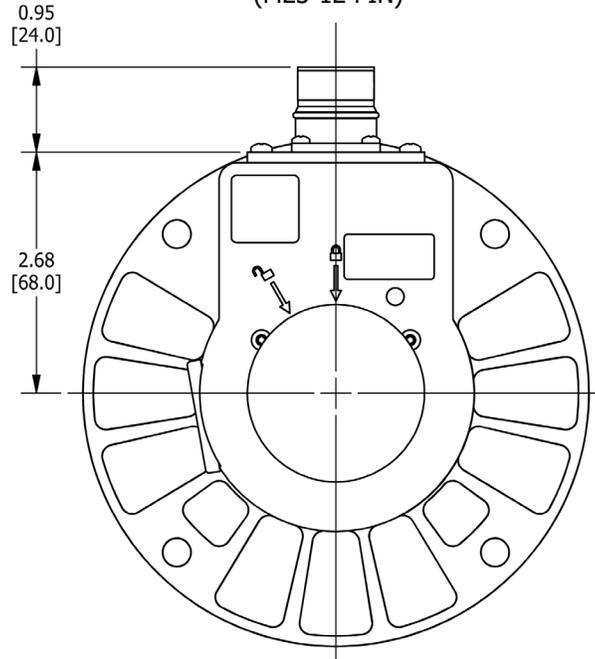


-Y CONNECTOR  
(FLEX CABLE - END EXIT)

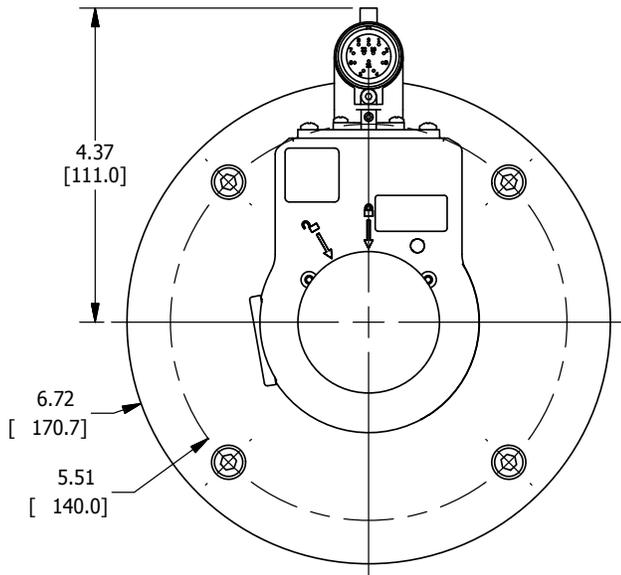


# CONNECTOR OPTIONS

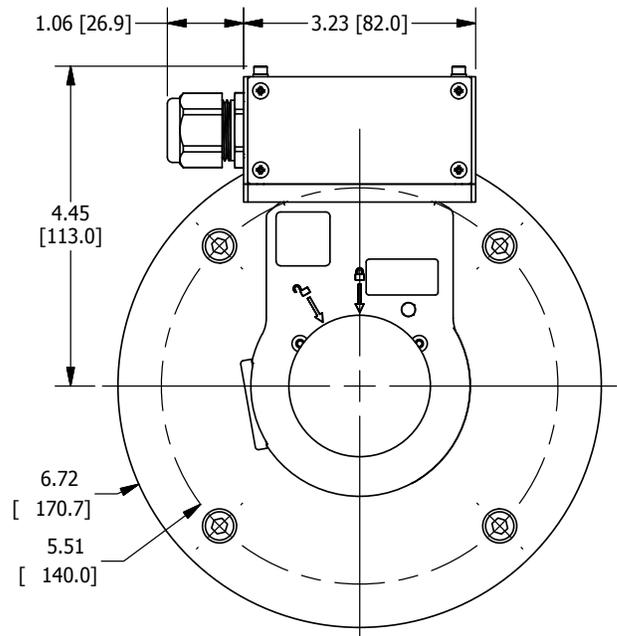
-2 & 3 CONNECTOR  
(M23-12 PIN)



CONNECTOR OPTION 4  
90° M23-12 PIN

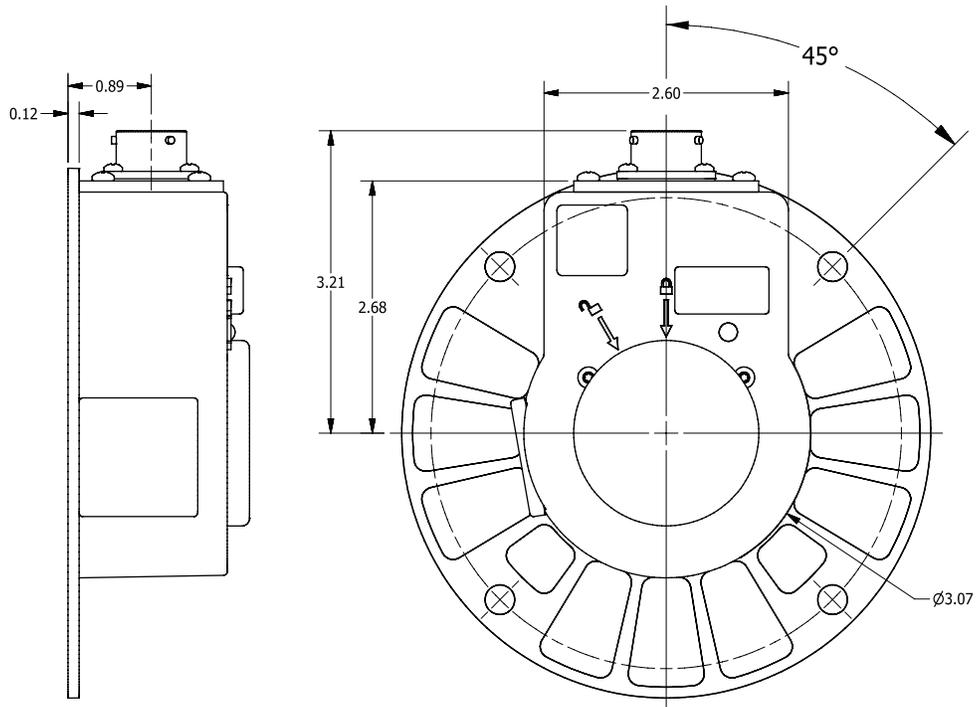


CONNECTOR OPTION 5  
TERMINAL BOX

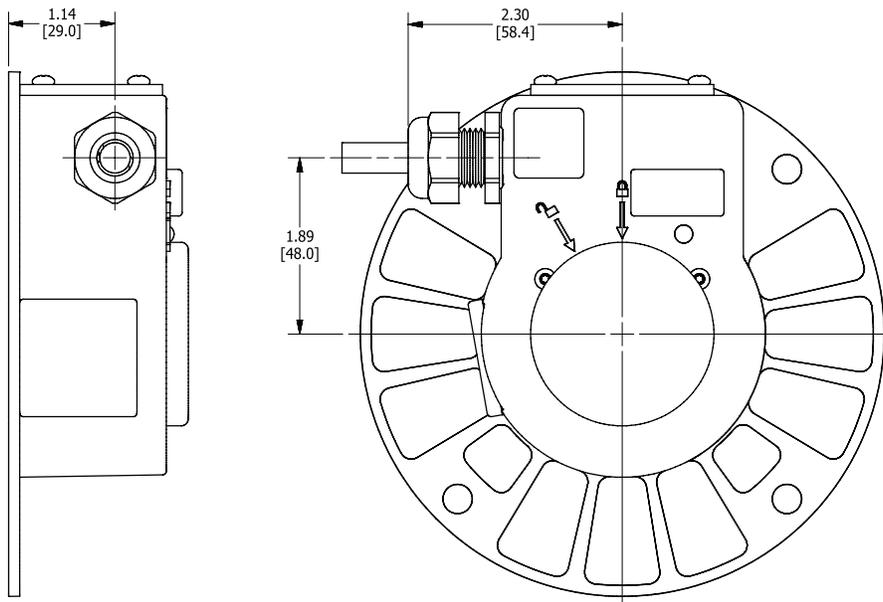


# CONNECTOR OPTIONS

## -R CONNECTOR (SIDE VIEW TYPICAL OF ALL CONNECTIONS EXCEPT FOR -W)

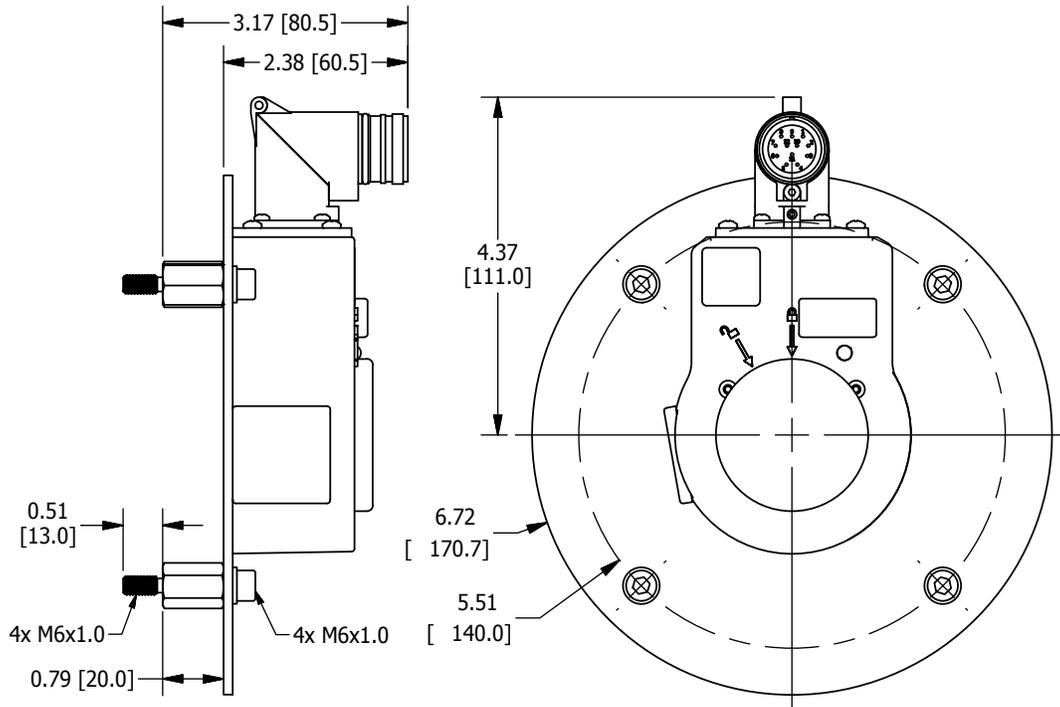


## -W CONNECTOR (CORDGRIP W/ FLEX CABLE)

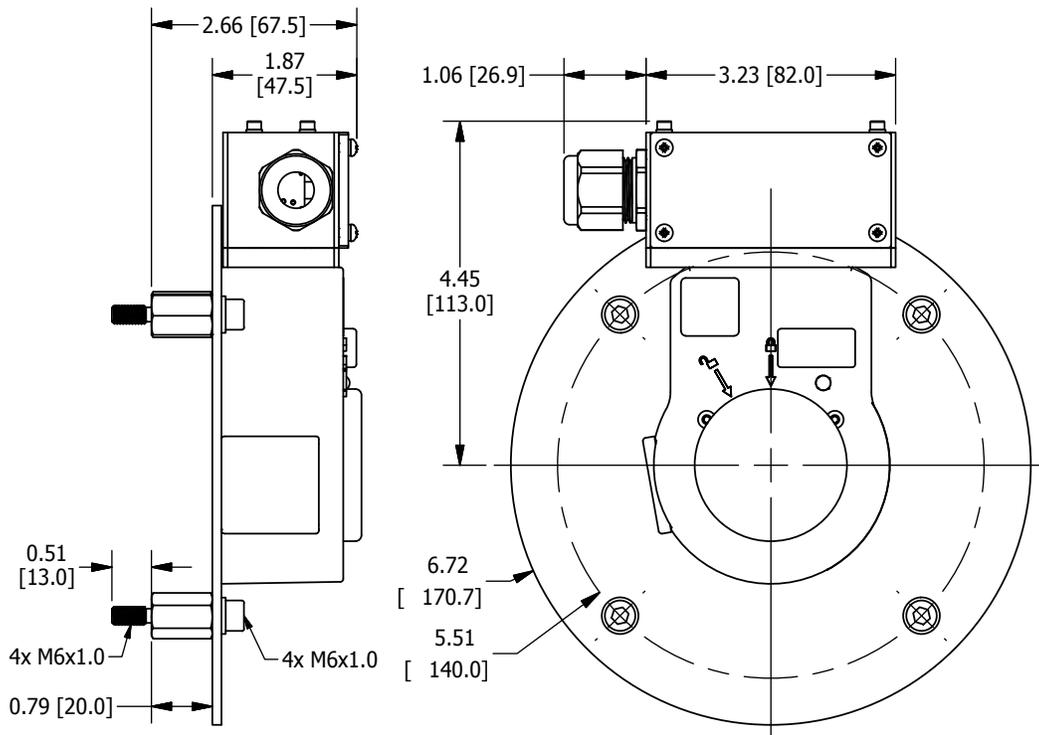


# CONNECTOR OPTIONS

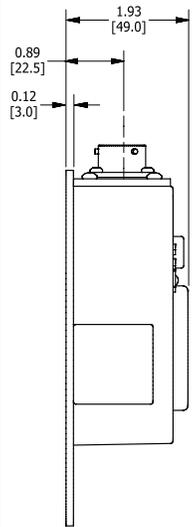
## CONNECTOR OPTION 4 90° M23-12 PIN



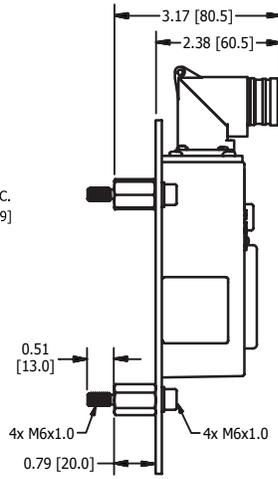
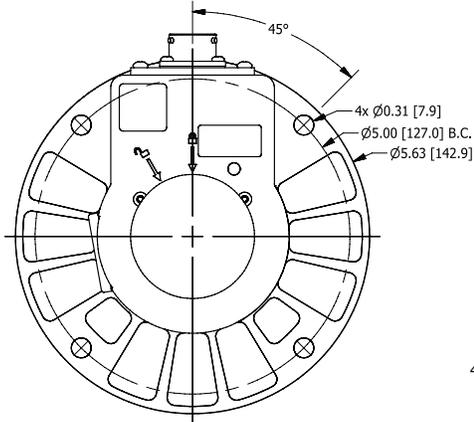
## CONNECTOR OPTION 5 TERMINAL BOX



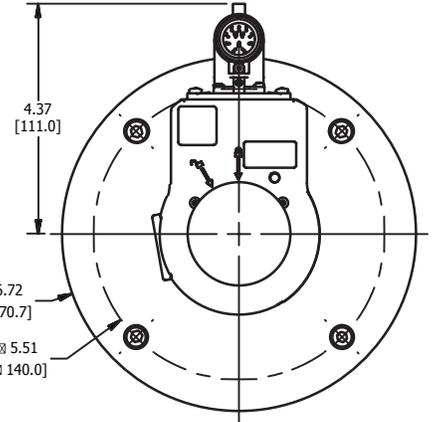
# OUTLINE DRAWING



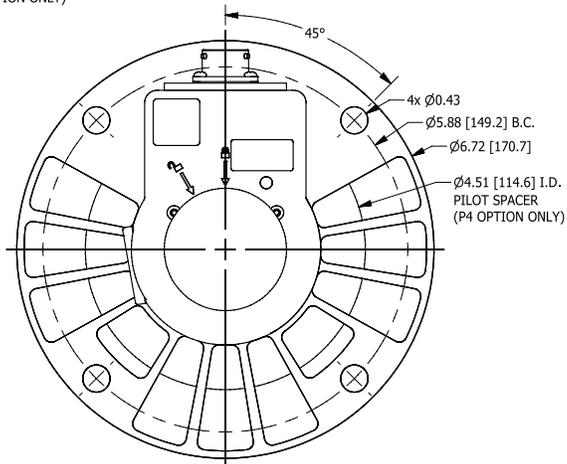
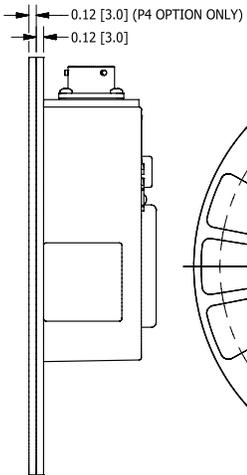
**-B5 MOUNTING STYLE**



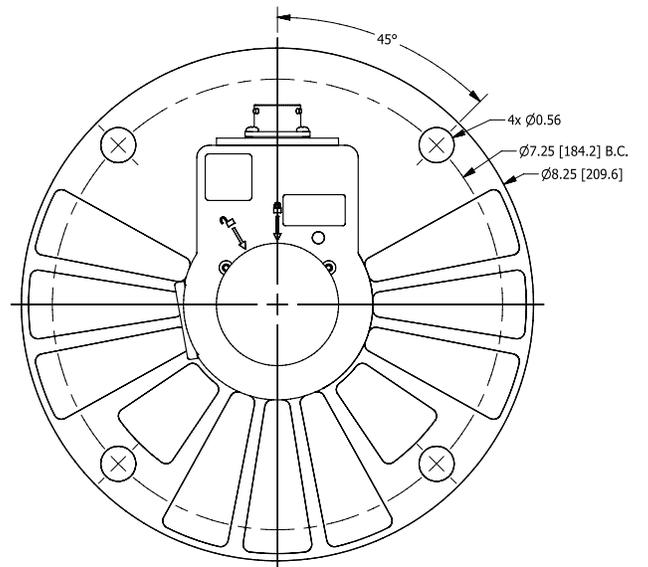
**B3 MOUNTING STYLE**



**-P4 (& -P6) MOUNTING STYLE**

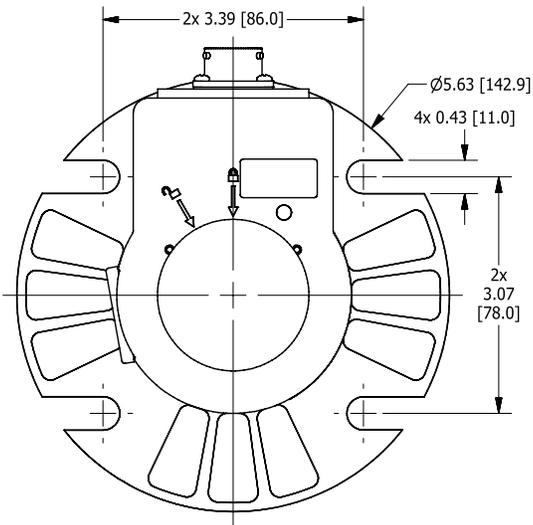


**-P8 MOUNTING STYLE**

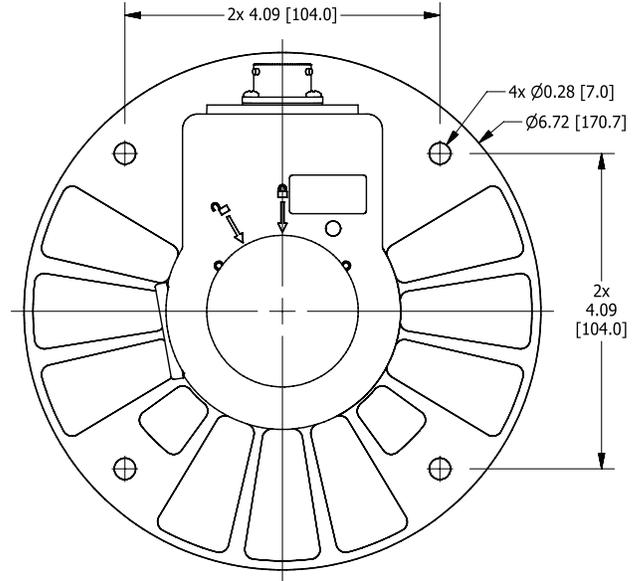


OUTLINE DRAWING

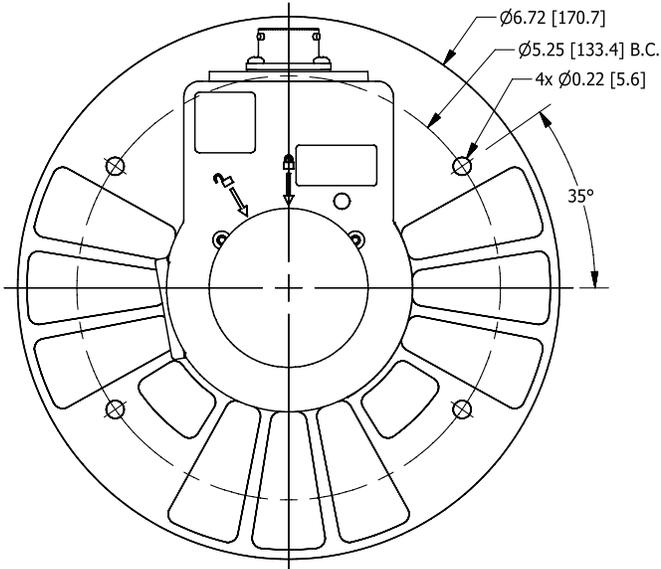
**-F1 MOUNTING STYLE**



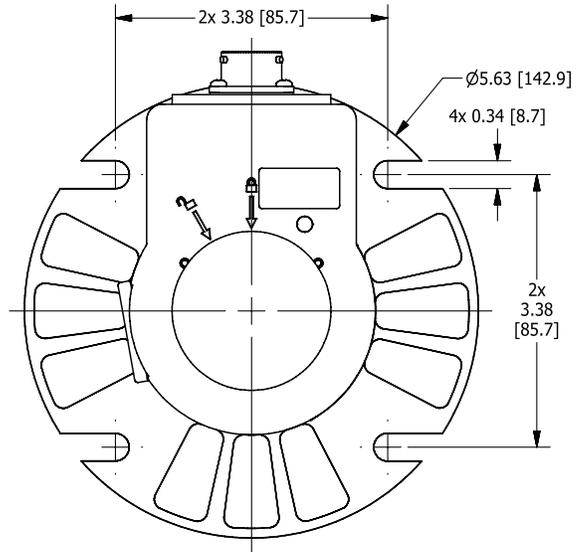
**-F2 MOUNTING STYLE**



**-F3 MOUNTING STYLE**



**-F5 MOUNTING STYLE**



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 WEB: [www.avtronencoders.com](http://www.avtronencoders.com)

A Nidec BRAND



Features and specifications subject to change without notice.  
 Nidec-Avtron standard warranty applies.  
 All dimensions are in millimeters approx.

REV: 04-12-2022