



## Avtron XR56A SMARTSafe™ Encoders



**Hazardous Duty Magnetic Encoder,  
Heavy Duty 4.5" Modular**

### Hazardous Duty Thinline Modular Encoder

Fits NEMA 4.5" Flanges for  
Marathon Blue & Black Max,  
Reliance & Reuland Motors

ATEX/IECEX Rated for Zone 1, 2,  
21 & 22 Applications

Ideal for Oil and Gas Drilling

No Bearings to Wear Out

Up to 5000 PPR

Wide Sensor-Rotor Gap: No  
Shimming or Scraping

Protected Against Wiring Errors

Self-Diagnostic LED and Alarm  
Output

3 Year No-Hassle Warranty

cULus Class I Division 1 Groups  
A,B,C,D Listed

cULus Class I Zone 0 Group IIC

cULus Class I Division 2 Groups  
A,B,C,D Listed

Fully Potted Electronics

### XR56A

XR56A SMARTSafe 4.5" modular incremental quadrature rotary encoders are a breakthrough in hazardous duty encoders. They are ATEX and UL approved and offer incredibly reliable no-bearing construction! SMARTSafe encoders can be used in gas and ATEX dust hazardous environments. Also available: hollow shaft models (XR45, XR685), shafted models (XR4F, XR485), and no-bearing modular encoders to fit other flange sizes (XR85A, XR115, XR125, XR850).

For applications requiring ATEX/IECEX Zone 2 or 22 or UL Class I, Division 2, (gas) Groups A,B,C,D use the XR56A directly in your application with no barrier, isolator or cable gland required.

For applications requiring UL Division 1, ATEX/IECEX Zone 1 or 21 protection use the XRB3 isolator in your control cabinet which permits the use of intrinsically safe wiring instead of explosion-proof conduit or glands. The XR56A can also be used in UL Class I Div 1 & Zone 0 applications using the XRB3 Isolator.

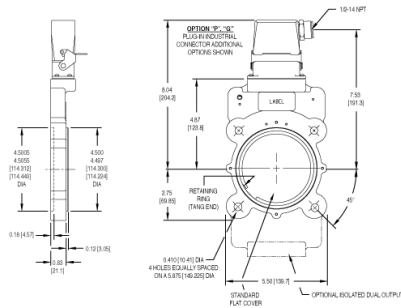
Unlike the competition, Avtron SMARTSafe encoder systems are protected against short circuits, power-to-output wiring, and output-to-ground faults.

Instead of relying on a tiny optical encoder with weak bearings, install the most rugged encoders available for your drilling or industrial applications. Vibration, shock, liquids, dust and dirt won't harm SMARTSafe encoders! Paint booths, draw works, coil tubing rigs...XR56A can keep them all working 24/7/365.

Eliminate the biggest cause of industrial encoder failure--eliminate the bearings with XR56A hazardous duty encoders!

10/12/25

## OUTLINE DRAWING



## MORE XR56A ADVANTAGES

- Replaces BEI H38 and Dynapar X25 explosion-proof encoders
- Thin profile reduces overall motor depth
- No air gap adjustment required
- Fits shafts 0.500" - 3.188" [10 - 85 mm]
- 4,500,000+ hour MTBF design
- Eliminates large & costly flange adapters & flowerpots
- Shrugs off dirt, oil, and water contamination
- No glass disks to break or optics to fail

## MORE XR56A SPECIFICATIONS

**Operating Power:** (add load and cable drive current as req'd)

Division 1, Zone 1 (XRB3): 12-24VDC In/Out, 150 mA

Division 2, Zone 2: 5-24VDC In/Out, 150mA

**Output Format:** A Quad B with marker (A, /A, B, /B, Z, /Z)

**Frequency Range:** 0 to 165 kHz

**Maximum Cable Length:**

Division 1, Zone 1: Encoder 500' Isolator 1000'

Division 2, Zone 2 (5 to 12 VDC in): 500'

Division 2, Zone 2 (15 to 24 VDC in): 250'

**Temperature:** -40°C to 80°C (storage -40°C to 100°C)

**Environmental:** IP54 (see manual for details)

**Vibration:** 5-2000Hz, 20G, 100G Shock

**Weight:** 2-3lbs [.9-1.4kg]

**Certifications:**

ATEX/IECEX Zone 1 & 21 Group IIC

cULus Class I Div 1 and Zone 0 Group A,B,C,D\*

ATEX/IECEX Zone 2 & 22 Group IIC

cULus Class I Div. 2 Groups A,B,C,D

**\*See installation drawings for Warnings and Limitations.**

Check out our website for more detailed specifications, drawings, and installation instructions. [www.avtronencoders.com](http://www.avtronencoders.com)



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Features and specifications are subject to change without notice. EU-SMART™, SMARTSafe™, SMARTTach™, THIN-LINE™, WIDE-GAP™, SAFETach™, and BULLSEYE32™ are trademarks of Nidec Industrial Solution. All other trademarks and registered trademarks are the property of their respective owners. Nidec Industrial Solutions' standard warranty applies. All dimensions approximate.

## SELECTION GUIDE

|  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                           |                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
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| MODEL                                                                             | HOUSING TYPE                                                                      | ROTOR BORE SIZE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | COVER STYLE                                                                                                                                | LINE DRIVER                                                                                                                                                                                                                                                                                                                                                                                                                           | LEFT OUTPUT PPR                                                                                                                                                                                                                                                                                                                                  | RIGHT OUTPUT PPR                                                                                                                                                                                                                                                                                                                                                                            | CONNECTOR OPTIONS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | MODIFICATIONS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| XR56A                                                                             | 1 - Single Output<br>2 - Dual, Isolated Outputs                                   | CA - 1/2" Thru-Shaft Rotor<br>CB - 5/8" Thru-Shaft Rotor (Universal)<br>CC - 7/8" Thru-Shaft Rotor<br>CD - 15/16" Thru-Shaft Rotor<br>CE - 1" Thru-Shaft Rotor<br>CF - 1 1/8" Thru-Shaft Rotor<br>CG - 1 1/4" Thru-Shaft Rotor<br>CH - 1 3/8" Thru-Shaft Rotor<br>CT - 1 1/2" Thru-Shaft Rotor<br>CJ - 1 5/8" Thru-Shaft Rotor<br>CK - 1 3/4" Thru-Shaft Rotor<br>CL - 1 7/8" Thru-Shaft Rotor<br>CM - 2" Thru-Shaft Rotor<br>CN - 2 1/8" Thru-Shaft Rotor<br>CQ - 2 1/4" Thru-Shaft Rotor<br>CP - 2 3/8" Thru-Shaft Rotor<br>CR - 2 1/2" Thru-Shaft Rotor<br>TS - 2 5/8" Thru-Shaft Rotor<br>TW - 2 3/4" Thru-Shaft Rotor<br>TU - 2 7/8" Thru-Shaft Rotor<br>TV - 3" Thru-Shaft Rotor<br>T4 - 3 1/8" Thru-Shaft Rotor<br>TZ - 3 1/4" Thru-Shaft Rotor<br>T7 - 3 3/16" Thru-Shaft Rotor<br>D2 - 10mm Thru-Shaft Rotor<br>DA - 11mm Thru-Shaft Rotor<br>D3 - 12mm Thru-Shaft Rotor<br>DB - 14mm Thru-Shaft Rotor<br>DC - 15mm Thru-Shaft Rotor<br>DD - 16mm Thru-Shaft Rotor<br>D4 - 18mm Thru-Shaft Rotor<br>DE - 19mm Thru-Shaft Rotor<br>DF - 24mm Thru-Shaft Rotor<br>D5 - 25mm Thru-Shaft Rotor<br>DG - 28mm Thru-Shaft Rotor<br>DH - 30mm Thru-Shaft Rotor<br>DT - 32mm Thru-Shaft Rotor<br>DJ - 36mm Thru-Shaft Rotor<br>DK - 38mm Thru-Shaft Rotor<br>DL - 42mm Thru-Shaft Rotor<br>DM - 45mm Thru-Shaft Rotor<br>DN - 48mm Thru-Shaft Rotor<br>DP - 52mm Thru-Shaft Rotor<br>DR - 55mm Thru-Shaft Rotor<br>DS - 60mm Thru-Shaft Rotor<br>MS - Obsolete, use DS for 60 mm Thru-Shaft Mount, Cam Screw<br>MU - 65mm Thru-Shaft Rotor<br>MV - 70mm Thru-Shaft Rotor<br>MW - 75mm Thru-Shaft Rotor<br>MY - 80mm Thru-Shaft Rotor<br>MZ - 85mm Thru-Shaft Rotor | E - Extended (Pie-Pan Style) Cover<br>F - Flat Outboard Cover, Low-Profile<br>T - Outboard Seal Plate for Thru-Shaft<br>X - No Cover Plate | 7 - Level 2 Protection, (ATEX/IECEx Zone 2 & 22) 5-24v, 5-24V out<br>F - Level 1 Protection, (UL Class I, Div 1, UL/cUL Class I, Zone 0 Listed) 5-7v, 5V out (NOTE Requires XRB3 Isolator)<br>G - Level 2 Protection, (UL Class I, Div 2 Listed) 5-24v, 5-24V out<br>H - Level 1 Protection (ATEX/IECEx Zone 1 & 21), 5-7v in, 5v out (NOTE Requires XRB3 Isolator)<br>R - US CLASS I, DIV 2, ZONE 2, RECOGNIZED, 5-24v in, 5-24v out | F - 60 PPR<br>G - 100 PPR<br>H - 120 PPR<br>A - 128 PPR<br>L - 240 PPR<br>N - 256 PPR<br>P - 300 PPR<br>E - 360 PPR<br>B - 480 PPR<br>Q - 500 PPR<br>R - 512 PPR<br>S - 600 PPR<br>V - 900 PPR<br>J - 960 PPR<br>Y - 1024 PPR<br>Z - 1200 PPR<br>4 - 2048 PPR<br>5 - 2500 PPR<br>D - 4096 PPR<br>8 - 4800 PPR<br>9 - 5000 PPR<br>0 - Special PPR | X - No Right Output, Single Output Only<br>F - 60 PPR<br>G - 100 PPR<br>H - 120 PPR<br>A - 128 PPR<br>L - 240 PPR<br>N - 256 PPR<br>P - 300 PPR<br>E - 360 PPR<br>B - 480 PPR<br>Q - 500 PPR<br>R - 512 PPR<br>S - 600 PPR<br>V - 900 PPR<br>J - 960 PPR<br>Y - 1024 PPR<br>Z - 1200 PPR<br>4 - 2048 PPR<br>5 - 2500 PPR<br>D - 4096 PPR<br>8 - 4800 PPR<br>9 - 5000 PPR<br>0 - Special PPR | A - 10 pin MS style w/o Plug, Avtron/BEI HS35 Pinout<br>B - 10 pin MS style w/o Plug, Dynapar HS35 Pinout<br>C - 10 pin MS style w/ Plug, Avtron/BEI HS35 Pinout<br>D - 10 pin MS style w/ Plug, Danaher HS35 Pinout<br>P - Industrial (EPIC Style) w/mating plug & remote alarm contact<br>G - Ind'l w/Northstar Pinout (EPIC Style connector), w/mating plug, LED diagnostics<br>W - 36 inch Cable w/LED diagnostics + alarm output contact<br>J - 7 pin MS style w/o Plug, Avtron/BEI HS35 Pinout, A,B,Z channels, LED Diagnostics<br>K - 7 pin MS style w/o Plug, Avtron/BEI HS35 Pinout, A,A/B, B/ channels, LED Diagnostics<br>U - 7 pin MS style w/o Plug, (reverse phasing Dynapar Pinout), A,B,Z channels, LED Diagnostics<br>V - 7 pin MS style w/o Plug, (reverse phasing Dynapar Pinout), A,A/B, B/ channels, LED Diagnostics<br>R - 10 pin Mini-MS style (Bayonet) w/LED diagnostics<br>H - Terminal box w/ USA 1/2" conduit entry (UL/ATEX/IECEx)<br>M - Terminal box w/ USA 3/4" conduit entry (cUL/UL/ATEX/IECEx)<br>N - Terminal box w/ USA 1" conduit entry (cUL/UL/ATEX/IECEx)<br>8 - Terminal box w/ 25mm conduit entry (cUL/UL/ATEX/IECEx) | 000 - None<br>005 - Super Magnetic Shielding Added<br>017 - Add counterbores to mounting holes for thinnest profile<br>018 - Include XRB3 Remote Level 1 Isolator for Remote Cabinet Mount<br>401 - 1270 (Special) Left Output PPR, No Right Output (Set PPR Codes = 0)<br>402 - 150 (Special) Left Output PPR, No Right Output (Set PPR Codes = 0)<br>403 - 50 (Special) Left Output PPR, No Right Output (Set PPR Codes = 0)<br>405 - 16 (Special) Left PPR, No Right Output (Set PPR Codes = 0)<br>406 - 6000 (Special) Left PPR, No Right Output (Set PPR Codes = 0)<br>407 - 2800 (Special) Left PPR, No Right Output (Set PPR Codes = 0)<br>408 - 1400 (Special) Left PPR, No Right Output (Set PPR Codes = 0)<br>409 - 30 (Special) Left PPR, No Right Output (Set PPR Codes = 0)<br>415 - 3000 (Special) Left PPR, No Right Output (Set PPR Codes = 0)<br>901 - 0.3m/1' Special Cable Length<br>902 - 0.6m/2' Special Cable Length<br>903 - 0.9m/3' Special Cable Length<br>905 - 1.5m/5' Special Cable Length<br>910 - 3m/10' Special Cable Length<br>915 - 4.5m/15' Special Cable Length<br>920 - 6m/20' Special Cable Length<br>930 - 9m/30' Special Cable Length<br>933 - 10m/33' Special Cable Length |