

Encoders and Tachometers

Maximum Reliability



AVTRON
INDUSTRIAL
AUTOMATION

Industrial Encoders and Tachometers for Drive System
Feedback, Instrumentation, and Control

General Information

Introduction

Avtron Industrial Automation, Inc. is a leader in the design and manufacture of industrial encoders (also known as rotary pulse generators or digital tachometers).

We have been proudly manufacturing rugged designs in the U.S.A. for over 40 years and provide full support and service for all our models, even older units.

Encoder Selection

Avtron offers ultra-reliable encoders for all applications. Select a mounting style (modular, hollow shaft, etc.), then pick the level of durability (light, heavy, severe duty).

Avtron's encoders are far more durable than competitive units. They feature cast aluminum housings, potted electronics, and huge bearings. For maximum reliability, select our modular models with no bearings at all, and Wide-Gap Technology to eliminate head crashes.

Avtron's magnetic sensors also increase reliability – they withstand dirt, dust, oil and liquids that disable optical sensors.

Look for our models with high-power, fully short-circuit protected outputs. These encoders can drive the longest cables, yet they are protected from wiring errors.

Many of our encoders come with onboard diagnostics. They digitally self-tune for best signal, and a remote alarm contact and LED notify you if there is a problem. Yet our encoders keep working as long as they can, giving you time to schedule maintenance.

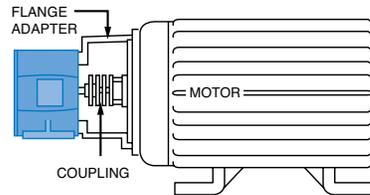
Some Avtron models have experienced over 4,500,000 hours Mean-Time-Between-Failure! Keep your machines running with Avtron encoders!

Pricing

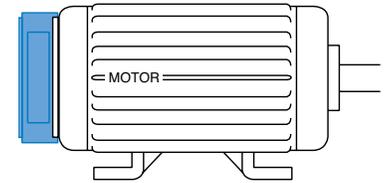
Pricing and ordering information can be obtained directly from our web site, or by calling, faxing, or e-mailing us (see page 28 for contact information).

Mechanical mounting

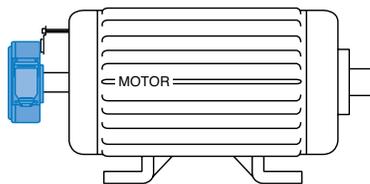
Avtron encoders can be mounted several different ways. The standard mounting methods include:



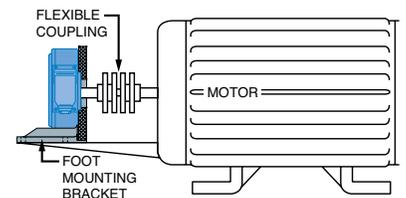
NEMA 56C & IEC B10 Flange Mounting: (Solid Shaft Coupled)
Requires 4.5" or 85mm flange adapter with coupling.



NEMA C/FC Face Mounting:
Requires motor stub shaft and one of the following: 115mm, 4.5", 6.75", 8.5", 12.5" C/FC-Face.



Hollow Shaft/Tether Mounting: Stub shaft required. Shaft requirements depend on the encoder selected.



Foot Mounting: This method is usually used when encoders are coupled directly to rolls, gear boxes, or motors without C-Faces.

Environmental Ratings

Avtron environmental ratings don't mean IP sealing. Seals may break down quickly in applications with temperature changes or small, sealed bearings can be destroyed by loads. Instead, Avtron rates encoders for overall durability:

OEM Components: Require additional physical protection.

Light, Mill Duty: For use in dry commercial and industrial environments with temperature controlled spaces.

Mill Duty: For use in typical industrial environments. More mechanically robust than light mill duty. Not recommended for environments with frequent temperature changes and chronically wet conditions.

Heavy, Mill Duty: For more rugged environments with frequent temperature fluctuations and increased levels of contamination and moisture.

Severe Duty: This rating is for very wet or dusty environments with large and frequent temperature extremes including outdoor applications.

Hazardous Duty: Avtron encoders are available for use in explosive atmospheres; these models are also extremely rugged. Avtron offers two levels of hazard protection: Level 2 for areas with moderate risk, and Level 1 for the higher risk environments.

Encoder Selection Guide

| TYPE | TYPICAL APPLICATIONS * | | | | | | | | |
|------------|------------------------|------------|-------|------|-------|-------|--------|--------|--------------|
| | Conveying | Converting | Films | Food | Paper | Steel | Mining | Marine | Oil Drilling |
| LIGHT MILL | 👍 | 👍 | | 👎 | 👎 | 👎 | 👎 | 👎 | 👎 |
| STD. MILL | 👍 | 👍 | 👍 | | 👎 | 👎 | 👎 | 👎 | 👎 |
| HEAVY MILL | 👍 | 👍 | 👍 | 👍 | 👍 | 👍 | 👍 | 👍 | 👍 |
| SEVERE | 👍 | 👍 | 👍 | 👍 | 👍 | 👍 | 👍 | 👍 | 👍 |

See Specification Chart on pages 26-27 for more details on the encoders below.

| Table of Contents | Page |
|-------------------------------------|--------|
| Hazardous Duty Encoders | 4-5 |
| Modular Encoders | 6-9 |
| Solid Shaft Encoders..... | 10-13 |
| Hollow Shaft Encoders | 14- 21 |
| Older Models..... | 22 |
| Upgrades and Retrofits..... | 23 |
| Encoder Options & Accessories | 24 |
| Output Specifications | 25 |
| Encoder Product Comparison..... | 26-27 |
| Free Site Assessments..... | 28 |

| TYPE of ENCODER | MOUNTING | MODEL | PAGE |
|----------------------------|---|---|----------------------|
| Optical Light Mill Duty | Face or Foot Solid Shaft (Coupled) | AV20, AV25 | 11 |
| | Hollow Shaft | HS25A, HS35A | 15 |
| Optical Mill Duty | Large Bore Hollow Shaft | M3 | 18 |
| Magnetic Mill Duty | Hollow Shaft | HS35M | 16 |
| Magnetic Heavy Mill Duty | Modular C-Face | AV5, AV12, AV56, AV56S, AV67, AV85, AV115, AV125, AV850 | 8 7 9 |
| | Hollow Shaft Large Bore Hollow Shaft | HS45, M4, M7 | 17 18 19 |
| | Face or Foot Solid Shaft (Coupled) | AV45 | 12 |
| Magnetic Severe Duty | Face or Foot Solid Shaft (Coupled) | AV485 | 13 |
| | Hollow Shaft | AV685, XT45 | 21, 20 |
| Level 1 & 2 Hazardous Duty | Hollow Shaft | M6, XR45, XR47, XR685 | 19 17 20 21 |
| | Modular C-Face | XR5, XR12, XR56, XR67, XR85, XR115, XR125, XR850 | 8 7 9 |
| | Face or Foot Solid Shaft (Coupled) | XR45, XR485 | 17 13 |

Features and specifications subject to change without notice.
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*Avtron Industrial Automation, Inc. makes no warranty as to suitability of purpose; recommendations are based on industry standard applications and are subject to warranty terms and conditions of sale.

Hazardous Duty

SMARTSafe™ Encoders | XRB1 Isolator

Durability

For applications in hazardous atmospheres, you need an encoder that is both ultra-reliable and certified for the environment.

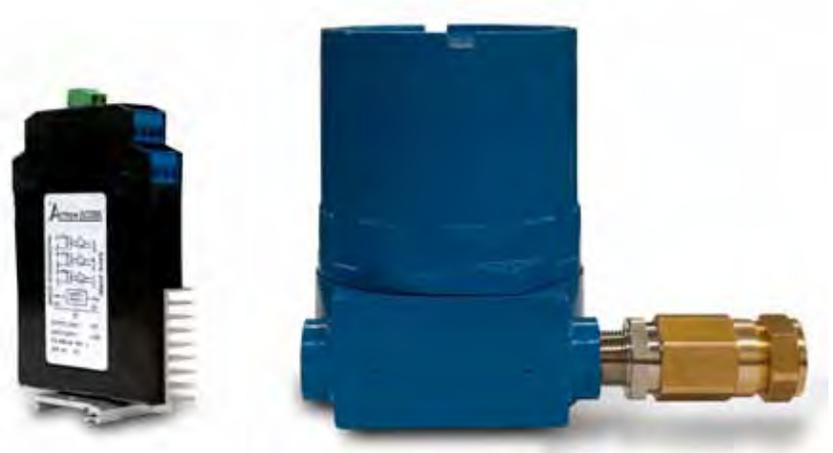
What use is a hazardous duty encoder if it fails to work? Many “hazardous duty” encoders from the competition are merely repackaged, weak optical encoders. Avtron’s hazardous duty SMARTSafe encoders are heavy and severe duty units, with potted electronics, magnetic sensors and huge bearings or no bearings at all!

Avtron offers a full range of SMARTSafe encoders including shafted, hollow shaft, and modular no-bearing styles.

Intrinsic Safety Encoder Isolator

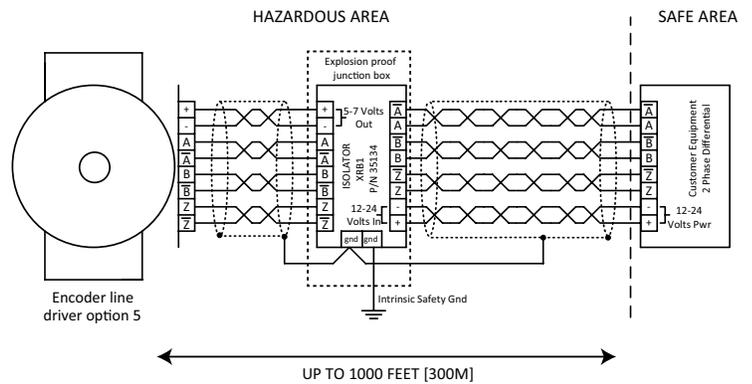
XRB1 Features

- Level 1 certifications*
 - ATEX Zone 1
 - UL Class I, Div 1
 - UL Class II, Div 1
 - UL Class I, Zone 1
 - UL Class II, Zone 1
- Ideal for oil and gas operations
- Works with a broad range of Avtron encoders
- Permits cable runs of 1000 ft [300m]
- Compatible with all major drive brands and controls
- Protected against wiring errors

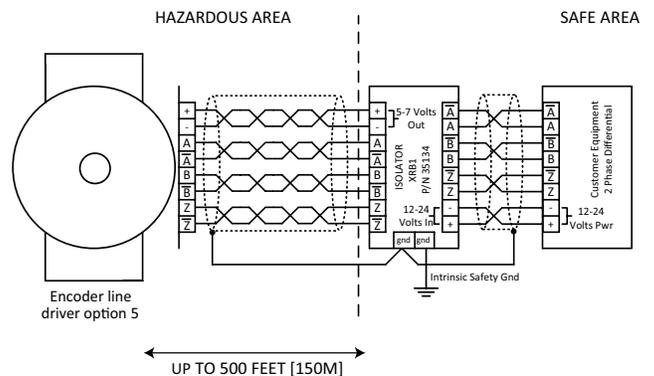


XRB1 isolator for remote installation (left) XRB1 in explosion proof box for Level 1 local protection with ATEX cable gland (right)

LEVEL 1 LOCAL PROTECTION



LEVEL 1 REMOTE PROTECTION



* (Certifications pending)

Hazardous Duty

SMARTSafe™ Encoders | XRB1 Isolator

Applications

- Oil and gas drilling
- Industrial metal painting lines
- Grain handling & storage equipment

Select Application Protection

LEVEL 2 LOCAL PROTECTION

Where hazardous/ignitable concentrations of materials are not likely to exist under normal operating conditions.

Certifications*

- ATEX Zone 2
- UL Classes I & II, Div II
- UL Class I, Zone 2

Key advantages

- No barrier/isolator required
- Smallest form factor

LEVEL 1 PROTECTION

Where hazardous/ignitable concentrations of materials can or are likely to exist under normal operating conditions:

Certifications*

- ATEX Zone 1
- UL Classes I & II, Div I
- UL Class I, Zone 1

For Level 1 applications, Avtron offers local and remote protection options:

LEVEL 1 LOCAL PROTECTION

Key advantages

- Directly connect to existing control system
- Maximum allowable cable length: 1000 ft [300m]
- Directly connect to rigid explosion-proof conduit wiring systems

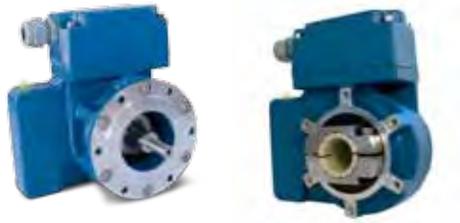
LEVEL 1 REMOTE PROTECTION

Key advantages

- Smallest form factor
- Eliminate costly wiring/conduit requirements

SMARTSafe Advantages

- Replace failure prone optical encoders
- Eliminate costly motor oversizing caused by flange designs
- Fits huge shafts up to 7 7/8" [200mm]
- Directly feed cooling water or air junctions through the encoder!
- Eliminate bearings with modular units
- Fully potted electronics
- Built-in diagnostics



(from left)

Avtron model XR4F, XR45, XR850 with Level 2 Local Protection



(from left)

Avtron model XR47, XR5 with Level 1 Local Protection



(from left)

Avtron model XR45, XR56 with Level 1 Remote Protection XRB1 Isolator

*(Certifications pending)

Modular Encoders

Modular no-bearing encoders, such as AV850 and AV125 SMARTach II™ and THIN-LINE II™ series offer extremely high durability. A machined face is required on the motor or machine. The rotor mounts on the motor shaft, and the stator with electronics bolts directly to the flange or face. This design has no couplings, bearings, or wearing parts.

Fast, Reliable Installation

The SMARTach II, THIN-LINE II and SMARTSafe modular style designs permit installation in under 5 minutes. These designs also eliminate common encoder failures such as:

Installation Damage

The sensor gap is 2-4X larger than older models, so sensor scraping, gapping, and shimming are eliminated.

Mechanical Misalignment

On power up, the green LED shows that the encoder and rotor are installed properly and are providing optimal output signals. Digital self-tuning ensures the optimal signal is maintained, even as physical conditions change.

Contamination

Oil, water, dirt, and debris are ignored by the Avtron magnetic sensor system.

Damaged Outputs

The electronics in the SMARTach II and THIN-LINE II are protected against wiring errors, short circuits, reverse voltage, overvoltage, and surges.

See our web site for an AV850 installation video. See it to believe it!

Modular encoder mounting options

Modular encoders can be easily installed on most AC and DC motors equipped with accessory mounting faces as shown below.

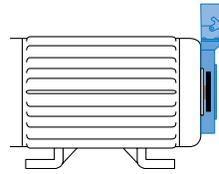


Figure A
Totally enclosed, non-ventilated with face mounted modular encoder.

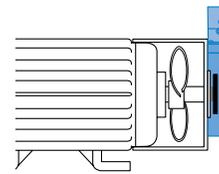


Figure B
Totally enclosed, fan cooled with C-Face and modular encoder (outboard).

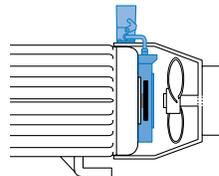


Figure C
Totally enclosed, blower cooled with face mounted modular encoder (inboard). ("Z" connector option shown.)

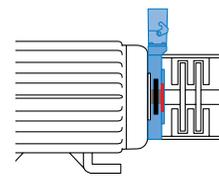


Figure D
Modular encoder mounted between brake and motor (shown with optional thru-shaft cover and seal.)

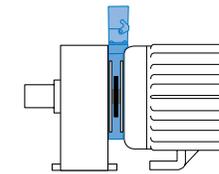


Figure E
Gearbox motor with modular encoder mounted on drive end with optional thru-shaft cover and seal.

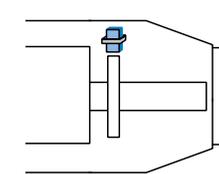


Figure F
Modular encoder components imbedded in OEM machinery.

NO FLANGE?

Wish you could use no-bearing encoders but don't have a C-face or flange? Avtron offers you two options:

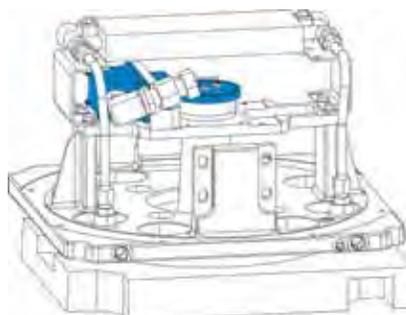
Adapters and mounting kits

Center the modular encoder on the application shaft.



Modular Components

Enable OEMs to imbed modular sensors and rotors within their designs. No Bearings + Potted Electronics = Ultra-Reliable Operation



Modular C-Face Mount

AV125 (SMARTach II™) | AV12 Sensors
XR125 (SMARTSafe™) | XR12 Sensors

Magnetic, Heavy Mill Duty

AV125 Features

- -40° to 100°C Operation, (Rotors -40°C to 150°C)
- High power outputs
- Full short circuit and wiring protection
- Wide rotor to sensor gap
- Replaceable sensors
- Diagnostic LED
- No bearings or couplings
- Large axial tolerance: ±0.100" [±2.5mm]
- Installs in minutes, lasts for decades
- Fits shafts up to 7 7/8" [200mm], metric or US
- Fits 12 1/2" C-Face
- 8 – 8192 PPR



Avtron Model AV125 and AV125 rotor

Hazardous Duty

XR125 Features

- Mechanically identical to AV125
- 8 – 8192 PPR
- -40° to 80°C Operation
- Level 1 & Level 2 Hazard Protection



XR125 (left) with Level 2 hazardous application protection; XR12 (right) with Level 1 remote protection; XRB1 (bottom) Level 1 isolator.

AV125 and XR125 direct replacement of Avtron M1250, Lakeshore/Northstar RIM 1250™, and SL1250™.

SELECTION GUIDE

| Model | Rotor Bore Size/Mounting (AV & XR Models) | | Inboard & Outboard Cover Plates | Left Module | | Right Module | | Connector Options | Modifications | | | |
|-------|---|---|--|---|---|--|---|---|---|--|---|--|
| | Thru Shaft (US) | Thru Shaft (Metric) | | Line Driver | PPR | Line Driver | PPR | | | | | |
| AV125 | XX - none TH - 1.375 TJ - 1.625 TK - 1.750 TL - 1.875 TM - 2.000 TN - 2.125 TQ - 2.250 TP - 2.375 TR - 2.500 TT - 2.625 T2 - 2.875 TW - 3.250 TY - 3.375 | CZ - 3.421 T3 - 3.500 T4 - 3.875 T5 - 4.250 T6 - 4.500 TG - 5.000 T7 - 5.375 T8 - 6.750 T9 - 7.875 | XX - none MG - 25mm MF - 30mm MJ - 42mm MZ - 80mm MY - 85mm M4 - 95mm MC - 110mm ME - 120mm MF - 160mm M8 - 170mm | X - none B - inboard, thru outboard* F - no inboard, flat outboard N - inboard, flat outboard* T - no inboard, thru outboard | X - none 8 - STD: 5-24V in/hi power H - 120 6 - Single Ended: 5-24V in/5-24V out hi power 9 - Remote TTL: 5-24V in, 5V fixed out | X - none F - 60 G - 100 A - 128 L - 240 N - 256 P - 300 E - 360 B - 480 Q - 500 R - 512 S - 600 V - 900 | J - 960 Y - 1024 Z - 1200 3 - 2000 4 - 2048 5 - 2500 D - 4096 8 - 4800 9 - 5000 | X - none 8 - STD: 5-24V in/hi power H - 120 6 - Single-Ended: 5-24V in/5-24V out hi power 9 - Remote TTL: 5-24V in, 5V fixed out | X - none F - 60 G - 100 A - 128 L - 240 N - 256 D - 4096 E - 360 B - 480 Q - 500 R - 512 S - 600 V - 900 | J - 960 Y - 1024 Z - 1200 3 - 2000 4 - 2048 5 - 2500 D - 4096 8 - 4800 9 - 5000 | P - Ind. w/ Plug G - Ind. w/ Plug (Northstar Pinout) B - 10 Pin MS w/ Plug W - 3' Leads only | 000 - none 003 - BC42/46 converter 004 - super magnetic shielding 4xx - special PPR 700 - large motor stator adapter* 9xx - spcl cable length (xx=feet) |
| XR125 | as above | as above | as above | X - none 5 - Level 1: 12-24V in, 10.6V out 7 - Level 2: 5-24V in, 5-24 out | as above | X - none 5 - Level 1: 12-24V in, 10.6V out 7 - Level 2: 5-24V in, 5-24 out | Level 2 and Level 1 Remote Protection Options P,G,B,W as above Level 1 Local Protection 5 - Explosion Proof Conduit Box, no gland 6 - XP box, w/ATEX gland 7 - XP box, w/UL gland | as above | | | | |

Modular C-Face Mount

AV850 (SMARTach II™) | AV5 Sensors
XR850 (SMARTSafe™) | XR5 Sensors

Magnetic, Heavy Mill Duty

AV850 Features

- -40° to 100°C operation, (rotors -40°C to 150°C)
- High power outputs
- Full short circuit and wiring protection
- Wide rotor to sensor gap
- Replaceable sensors
- Diagnostic LED
- No bearings or couplings
- Large axial tolerance: ±0.100" [±2.5mm]
- Installs in minutes, lasts for decades
- Fits shafts up to 4 1/2" [115mm], metric or US
- Fits 8 1/2" C-Face
- 8 – 5000 PPR



AV850 SMARTach II encoders (left) with diagnostic LED and connector option "P". AV850 Universal cam screw rotor (patented), AV850 front view (right).

Hazardous Duty

XR850 Features

- Mechanically identical to AV850
- 8 – 5000 PPR
- -40° to 80°C operation
- Level 1 & Level 2 hazard protection



XR850 (left) with Level 1 local protection; XR5 (center) with Level 1 remote protection; XRB1 (right) Level 1 isolator.

AV850 & XR850 direct replacement of Avtron M193B and M285, Lakeshore/Northstar RIM 8500™, and GE ANDG series.

SELECTION GUIDE

| Model | Rotor Bore Size/Mounting (AV & XR Models) | | | | Inboard & Outboard Cover Plates | Left Module | | Right Module | | Connector Options | Modifications | |
|-------|---|--|--|--|---|--|---|---|---|--|--|--|
| | Thru Shaft (US) | | End of Shaft (GE Motors) | | | Line Driver | PPR | Line Driver | PPR | | | |
| AV850 | XX- none CB- 0.625 CA- 0.750 CC- 0.875 CE- 1.000 CF- 1.125 CH- 1.375 CJ- 1.625 CK- 1.750 CL- 1.875 CM- 2.000 CN- 2.125 CQ- 2.250 CP- 2.375 | CR- 2.500 CT- 2.625 C2- 2.875 CW- 3.250 CY- 3.375 CZ- 3.421 C3- 3.500 T4- 3.875 T5- 4.250 T6- 4.500 | XX- no rotor UF- CD180-32x UN- CD36x UP- CD4xx UQ- CD444/ 505E U2- CD5xx UR- CD507/509 UV- CD43xx, 44xx, 54xx, 64xx, 65xx UW- CD45xx, 75xx, 76xx | UY- CD46xx, 47xx, 85xx, 86xx, 9xxx UZ- CD68x U9- CD6xx-62xx, v67xx-69xx UU- Universal: CD180- CD9xxx U4- ABB 95mm | X- none B- inboard, thru outboard F- no inboard, flat outboard N- inboard, flat outboard T- no inboard, thru outboard | X- none 8- STD: 5-24V in/ 5-15V out hi power 6 - Single Ended: 5-24V in/ 5-24V out 9- Remote TTL: 5-24V in, 5V fixed out | X- none F- 60 G- 100 H- 120 A- 128 L- 240 N- 256 D- 4096 B- 480 Q- 500 R- 512 S- 600 V- 900 | J- 960 Y- 1024 Z- 1200 3- 2000 4- 2048 5- 2500 8- 4800 9- 5000 | X- none F- 60 G- 100 H- 120 A- 128 L- 240 N- 256 D- 4096 B- 480 Q- 500 R- 512 S- 600 V- 900 | J- 960 Y- 1024 Z- 1200 3- 2000 4- 2048 5- 2500 8- 4800 9- 5000 | P- Ind. w/ Plug G- Ind. w/ Plug (Northstar Pinout) B- 10 Pin MS w/ Plug W- 3' Leads only | 000- none 003- BC42/46 converter 004- super magnetic shielding 4xx- special PPR 700- large motor stator adapter* 9xx- spcl cable length (xx=feet) |
| XR850 | Thru Shaft (Metric) | | | | as above | X- none 5- Level 1: 12-24V in, 10.6V out 7- Level 2: 5-24V in, 5-24 out | as above | X- none 5- Level 1: 12-24V in, 10.6V out 7- Level 2: 5-24V in, 5-24 out | as above | Level 2 and Level 1 Remote Protection Options P,G,B,W as above Level 1 Local Protection 5- Explosion Proof Conduit Box, no gland 6- XP box, w/ATEX gland 7- XP box, w/ UL gland | as above | |

Modular C-Face Mount

AV56 | AV67 | AV85 | AV115 (THIN-LINE II™)
 XR56 | XR67 | XR85 | XR115 (SMARTSafe™)

Magnetic, Heavy Mill Duty

AV56, AV67, AV85, and AV115 Features

- Fits shafts 1/2" to 3 3/16" metric bores [10mm to 85mm]
- Fits 4 1/2", 6 3/4", 8 1/2", or 115mm C-Face
- 8 – 5000 PPR
- -40° to 100°C Operation (rotors -40°C to 150°C)
- High power outputs with full short circuit and wiring protection
- Diagnostic LED + alarm
- Wide sensor-to-rotor gap



Avtron model AV85, AV56, and AV67 with "P" connector option and diagnostic LED.

Hazardous Duty

XR56, XR67, XR85 and XR115 Features

- Mechanically identical to AV models
- 8 – 5000 PPR
- -40° to 80°C operation
- Level 1 & Level 2 hazard protection

AV and XR models direct replacement of Avtron M56, M67, M85, M115 and LakeShore/Northstar SL56, RL67, SL85, and MSL115

OPTIONS

- Stainless steel model, (AV56S only)
- Shaft grounding kits (AV only)
- Remote wiring base "Q" for mounting under fan/blower covers (AV only)
- Super magnetic shielding
- Mating cables

SELECTION GUIDE

| Model | Housing Type | Rotor Bore Size | | | Cover Style | Line Driver | Single/Left Output PPR | | Right Output PPR | | Connector Options | Special Features |
|---|--|--|---|--|--|---|---|---|---|--|--|------------------|
| | | Thru Shaft (US) | End of Shaft | | | | | | | | | |
| AV56A AV56S AV67A AV85A AV115 | 1- Single Output: 4 1/2", 6 3/4", 8 1/2", 115mm Pilot 2- Dual Output: 4 1/2" Pilot*, 8 1/2" Pilot * Dual Output NA on AV56S, AV67A, XR67A | CA- 1/2" CB- 5/8" CC- 7/8" CD- 15/16" CE- 1" CF- 1 1/8" CG- 1 1/4" CH- 1 3/8" CT- 1 1/2" CJ- 1 5/8" CK- 1 3/4" | CL- 1 7/8" CM- 2" CN- 2 1/8" CQ- 2 1/4" CP- 2 3/8" CR- 2 1/2" CS- 2 5/8" CT- 3" CV- 3 1/8" CW- 3 3/16" | EF- CD180-32x EN- CD36x EP- CD4xx E2- CD5xx | X- none E- Extended Shaft Cover F- Flat Cover T- Flat Thru-Hole Cover w/ Shaft Seal | X- none 8- STD: 5-24V in/5-15V out hi power 6- Single Ended: 5-24V in/5-24V out hi power 9- Remote TTL: 5-24V in, 5V fixed out | F- 60 G- 100 H- 120 A- 128 L- 240 N- 256 P- 300 E- 360 B- 480 R- 512 S- 600 V- 900 | J- 960 Y- 1024 Z- 1200 4- 2048 5- 2500 D- 4096 8- 4800 9- 5000 | X- none F- 60 G- 100 H- 120 A- 128 L- 240 N- 256 P- 300 E- 360 B- 480 R- 512 S- 600 V- 900 | G- Plug-in Ind. w/ Northstar pinout P- Plug-in Ind. Q- Plug-in Ind., 18" cable, remote mounting base W- 3' Flex. Cable Z- Plug-in Ind., 3' Flex. Cable | 000- none 004- Add Housing Drain 005- Super Magnetic Shielding 4xx- Special PPR 9xx- Special Cable Length, xx=feet | |
| XR56A XR67A XR85A XR115 | as above | D2- 10mm DA- 11mm D3- 12mm DB- 14mm DC- 15mm DD- 16mm D4- 18mm DE- 19mm DF- 24mm DG- 28mm DH- 30mm DT- 32mm DJ- 36mm DK- 38mm DL- 42mm | DM- 45mm DN- 48mm DP- 52mm DR- 55mm MS- 60mm MU- 65mm MV- 70mm MW- 75mm MY- 80mm MZ- 85mm | as above | as above | X- none 5- Level 1: 12-24V in, 10.6V out 7- Level 2: 5-24V in, 5-24 out | as above | as above | Level 2 and Level 1 Remote Protection Options G,P,W as above Level 1 Local Protection 5- Explosion Proof Conduit Box, no gland 6- XP box, w/ATEX gland 7- XP box, w/UL gland | as above | | |

Solid Shaft Encoders

NEMA 56C Face

Historically, this is the most common encoder mounting system for US DC motors. NEMA 56C Face provides a 4 1/2" flange (with 5.88" bolt circle) for flange adapter mounting. Solid shaft encoders are bolted to a flange adapter and coupled to the motor.

IEC B10 Flange

This is a common encoder mounting system for European motors. IEC B10 Flange provides a 85mm flange (with 100mm bolt circle) for encoder mounting. Solid shaft encoders are bolted to a flange adapter and coupled to the motor.

Foot Mounting Bracket Option

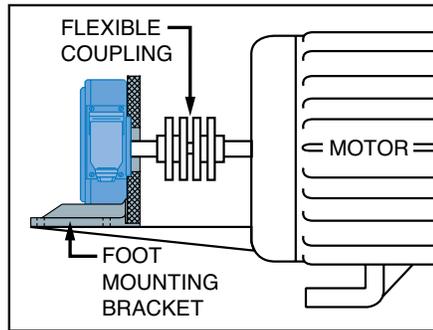
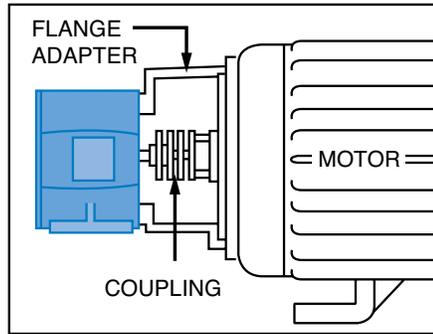
The AV485, XR485, AV45 and XR4F offer optional foot mount brackets. The encoder only needs to be aligned once, rather than each time the encoder is serviced.

Couplings

If they cannot be eliminated from the system, Avtron can provide couplings for many foot and flange mounting applications on motors. Consult the factory for specifications and details.

Eliminate Couplings & Bearings

Avtron offers modular encoders such as AV850 and AV115 that can directly mount on the back of the motor, eliminating the flange adapter, coupling, and the encoder bearings. This offers yet another huge increase in reliability.



Direct coupled encoder. Bracket Part Numbers: BC46 Style: A25448, Standard:A36261
AV45 (bottom right) with optional foot mount bracket (option 2, Hubner POG Style)



Flexible disk couplings.

Solid Shaft Coupled Face

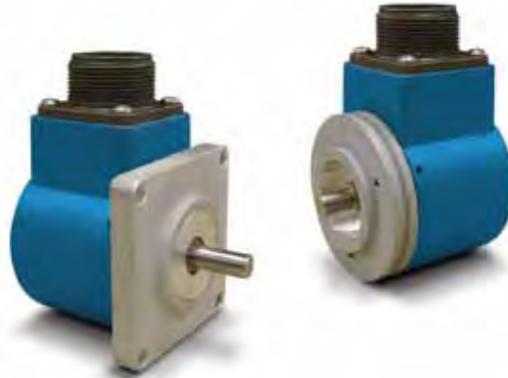
AV20 | AV25

Optical, Light Mill Duty

AV20 and AV25 Features

- 1/4", 3/8", and 10mm shaft options
- 1 – 3600 PPR AV20
- 1 – 5000 PPR AV25
- -40° to 100°C operation
- Industry standard mounting and form factor
- Optical sensor-rotor gap up to 8X larger than the competition
- Shatterproof optical disk
- 100lb shaft loads permitted (2-4X the competition)

Direct replacement for BEI H20 and H25, Dynapar Hx25, Hx525, Hx625 and many other common 2" and 2.5" encoders



Avtron model AV20 shown with square flange mounting style "1" (left) and servo mounting style "4" (right).



Avtron model AV25 shown with servo mounting style "2" (left) and square flange mounting style "1" (right).

SELECTION GUIDE

| Model | PPR | Line Driver | Shaft Size | Connector Options | Wiring | Mounting Style | Face/Bolt Pattern | Seals | Channels | Special Features | |
|-------------------------------|--|---|--|---|---|-------------------------------|--|---|---|--|---|
| AV20 AV25 | A- 1 C- 25 F- 60 G- 100 H- 120 K- 200 L- 240 M- 250 N- 256 P- 300 E- 360 Q- 500 R- 512 S- 600 T- 625 | U- 720 V- 900* W- 1000 Y- 1024 Z- 1200 1- 1250 2- 1440 3- 2000 4- 2048 5- 2500 6- 2540 7- 3600 D- 4096* 9- 5000* 0- Special | 1- 5-28V (7272) 2- 5-28V, open collector (7273) 3- 5-15V* (4469) 4- 5-28V in, 5V out (7272) | 0- Non-std. With Flat A- 0.25" B- 0.375" C- 10mm Without Flat N- 0.25" P- 0.375" R- 10mm | W- 18" cable (pigtail) See manual for all options. | A- Side E- End* | AV20 1- Sq. Flange 2.06", 1.25" mp 2- Rnd. Flange 2.0", 1.25" mp 3- Sq. Flange 2.06", 1.181" fp 4- Rnd. Flange 2.0", 1.181" fp AV25 1- Sq. Flange 2.650", 1.250" mp 2- Rnd. Servo Mount 2.500", 1.250" mp 3- Rnd. Servo Mount 2.625", 2.500" mp mp = male pilot fp = female pilot | X- none AV25 1- 3x 10-32 @ 1.875" 2- 4x 4-40 @ 1.272" [^] 3- 4x 4-40 @ 2" 4- 3x 6-32 @ 2" AV20 5- 4x 6-32 @ 2" 6- 4x 10-32 @ 1.625" 7- 3x 4-40 @ 1.5" | X- none A- Shaft Sealed** B- Bearing Sealed | With Comp. A- A, A-bar, B, B-bar Z, Z-bar*** B- A, A-bar, B, B-bar D- A, A-bar Without Comp. E- A, B, Z F- A, B | 000- none 00W- Connector on 18" cable: Use w/ Option "T"- "U" 9xx- Specify cable length xx=feet (use w/ Option "W") |
| Connector Options | | | | | | | | | | | |
| Mounted on Encoder | | | | | | | | | | | |
| 10 Pin MS | | | 6 Pin MS | | | 7 Pin MS | | 8 Pin M12 | | | |
| A- w/o plug (std. phasing) | | | E- w/o plug (std. phasing) | | | J- w/o plug (std. phasing) | | T- w/o plug (Turck Pinout) | | | |
| B- w/o plug (reverse phasing) | | | F- w/o plug (reverse phasing) | | | K- w/o plug (reverse phasing) | | U- w/o plug (US Pinout) | | | |
| C- w/ plug (std. phasing) | | | G- w/ plug (std. phasing) | | | M- w/ plug (std. phasing) | | | | | |
| D- w/ plug (reverse phasing) | | | H- w/ plug (reverse phasing) | | | N- w/ plug (reverse phasing) | | | | | |

* AV25 Only.
** N/A with AV20 Mounting Styles "3" & "4"
*** N/A with AV25 Mounting Style "3"
**** N/A with MS 6 or 7 Pin Connector
^ Only available with AV25 Mounting Style "3"

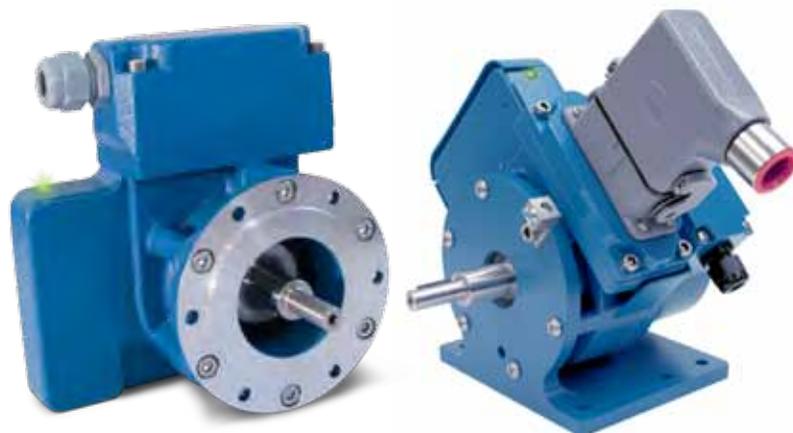
Solid Shaft B10 Flange

AV45 (EU-SMART) | XR4F (SMARTSafe™)

Magnetic, Heavy Duty

AV45 Features

- Fits IEC B10 flange
- 8 – 5000 PPR
- -40° to 100°C operation
- Diagnostic LED, remote alarm
- High power outputs with full short circuit and wiring protection
- Universal TTL & HTL power design
- Direct replacement for Hubner POG 8, POG 9, other models
- The most rugged B10 flange encoder ever made!



(from left) AV45 (XR4F with Level 2 protection) connector option “L”, AV45 with optional overspeed switch connector option “P”

Hazardous Duty

XR4F Features

- Physically identical to AV45
- Fits IEC B10 flange
- 8 – 5000 PPR
- -40° to 80°C operation
- Level 1 & Level 2 hazard protection

OPTIONS

- Second isolated output
- Overspeed switch (AV45 only)
- Foot mounting bracket
- Mating cables

SELECTION GUIDE

| Model | Shaft Size | Left PPR | | Right PPR | | Line Driver | Connector Options | Foot Mount | Output Channels | Modifications |
|-------|--------------------|---|--|---|--|--|--|---|---|---|
| AV45 | H- 11mm N- 10mm | AF- 60 AG- 100 AH- 120 AL- 240 AN- 256 AP- 300 AE- 360 AB- 480 AQ- 500 AR- 512 AS- 600 AV- 900 | AJ- 960 AW- 1000 AY- 1024 AZ- 1200 A3- 2000 A4- 2048 A5- 2500 AD- 4096 A8- 4800 A9- 5000 A0- Special | XX- none AG- 100 AH- 120 AL- 240 AN- 256 AP- 300 AE- 360 AB- 480 AQ- 500 AR- 512 AS- 600 AV- 900 | AJ- 960 AW- 1000 AY- 1024 AZ- 1200 A3- 2000 A4- 2048 A5- 2500 AD- 4096 A8- 4800 A9- 5000 A0- Special | X- none 8- Standard: 5-24V in, 5-15V out hi power 6- Single-Ended: 5-24V in, 5-24V out 9- Remote TTL: 5-24V in, 5V fixed out | T- M12 Global pinout w/o plug U- M12 USA pinout w/o plug 2- M23 Leine & Linde pinout w/o plug 3- M23 Hubner pinout w/o plug L- Terminal Box (Europe) H- Terminal Box USA P- Ind. w/ Plug W- 0.45m Cable | X- none 1- Toshiba TS2113N 2- Hubner POG/OG 3- J. Hubner - FG4 Foot mount not available with dual outputs | A- A, \bar{A} , B, \bar{B} , Z, \bar{Z} | 000- none 6xx- mechanical overspeed switch 9xx- Special cable length xx=length x 0.3m (use w/ Connector Option “W”) |
| XR4F | as above | as above | as above | as above | as above | 5- Level 1 (7v in, 5v out) 7- Level 2 (5-24V in/out) | Level 2 and Level 1 Remote Protection as above Level 1 Local Protection 5- Explosion Proof Conduit Box, no gland 6- XP box, w/ATEX gland 7- XP box, w/ UL gland | | as above **Only available with Level 2 Output and connectors | as above |

Solid Shaft Coupled NEMA

AV485 (SMARTach II™) | XR485 (SMARTSafe™)

Magnetic, Severe Duty

AV485 Features

- 5/8" Stainless steel shaft
- 8 – 5000 PPR
- -40° to 120°C operation
- Replaceable sensors to maximize uptime
- Diagnostic LED, remote alarm
- High power outputs with full short circuit and wiring protection
- Direct replacement for Avtron M485, Lakeshore/Northstar RIM 6200™, Dynapar H56 Rotopulser™
- Replaces analog tachometers GE BC42, BC46
- The most rugged solid shaft encoder available!



High resolution performance in a tough package. (Model AV485 SMARTach II encoder shown (upper left) with foot mount (upper right) face mount with connector option "P" with diagnostic LED, remote alarm.)

Hazardous Duty

XR485 Features

- Physically identical to AV485
- 8 – 5000 PPR
- Replaces GE explosion-proof tach BC66
- -40° to 80°C Operation
- Level 1 & Level 2 hazard protection

OPTIONS

- Dual shaft
- Second isolated output
- Overspeed switch (AV485 only)
- Shaft grounding brush (AV485 only)
- Foot mounting bracket
- Mating cables

SELECTION GUIDE

| Model | Temperature Rating | Foot Bracket | Style | Left Module | | | Right Module | | | Connector Options | Modifications |
|--------------|--|---|---|--|---|--|--|--|---|--|---------------|
| | | | | Line Driver | PPR | | Line Driver | PPR | | | |
| AV485 | N- -20°C to 80°C C- -40°C to 80°C H- -20°C to 120°C | X- none 1- Standard 2- BC42/46 Style | S- Single Shaft D- Dual Shaft G- Grounding | X- none 8- Standard: 5-24V in, 5-15V out hi power 6- Single-Ended: 5-24V in, 5-24V out 9- Remote TTL: 5-24V in, 5V fixed out | X- none F- 60 G- 100 H- 120 A- 128 L- 240 N- 256 P- 300 E- 360 S- 600 V- 900 | J- 960 Y- 1024 Z- 1200 3- 2000 4- 2048 5- 2500 D- 4096 8- 4800 9- 5000 0- special | X- none 8- Standard: 5-24V in, 5-15V out hi power 6- Single-Ended: 5-24V in, 5-24V out 9- Remote TTL: 5-24V in, 5V fixed out | X- none F- 60 G- 100 H- 120 A- 128 L- 240 N- 256 P- 300 E- 360 B- 480 Q- 500 R- 512 S- 600 V- 900 | P- Ind. w/ Plug G- Ind. w/ Plug (Northstar Pinout) B- 10 Pin MS w/ Plug W- 3' Leads only | 000- none 003- BC42/46 converter 004- super magnetic shielding 4xx- special PPR 9xx- special cable length (xx=feet) | |
| XR485 | N- -20°C to 80°C C- -40°C to 80°C | as above | S- Single Shaft D- Dual Shaft | X- none 5- Level 1: 12-24V in, 10.6V out 7- Level 2: 5-24V in, 5-24 out | as above | | X- none 5- Level 1: 12-24V in, 10.6V out 7- Level 2: 5-24V in, 5-24 out | as above | Level 2 and Level 1 Remote Protection Options P,G,B,W as above Level 1 Local Protection 5- Explosion Proof Conduit Box, no gland 6- XP box, w/ATEX gland 7- XP box, w/ UL gland | as above | |

Hollow Shaft Encoders

HOLLOW SHAFT/TETHER MOUNTED

Hollow shaft encoders fit over the shaft and clamp onto it. As the shaft rotates, so does the disk or rotor of the encoder. An anti-rotation or torque arm prevents the housing from also rotating. Avtron hollow-shaft encoders feature our Wide-Gap technology for shock and vibration resistance, enhanced with shatter-proof optical disks or chip-resistant magnetic rotors.

Hollow Shaft Advantages

- No C-Face required
- No couplings to maintain
- High tolerance of axial shaft movement
- No misalignment issues
- Reduced installation costs

STUB SHAFTS

For hollow shaft mounted encoders, Avtron has a complete selection of stub shafts to fit over 50 different motor configurations.

PROTECTIVE GUARDS

Avtron offers optional guards to protect the encoder from damage, or to provide finger safety when the encoder is not directly adjacent to the motor.

SELECTING HOLLOW SHAFT ENCODERS

How do you select the best encoder for your application? Encoders on these pages range from Light, Mill Duty weighing less than 1 pound, to Explosion Protected, weighing over 17 pounds!

To choose, consider the environment and application:

- Do you have water or oil sprays?
- Do you have large temperature changes?
- Is the application outdoors?
- Is the mounting shaft large?
- Do you need Level 1 or Level 2 hazardous environment certification?

The rougher the service environment, the more you need a durable, larger encoder to survive in these conditions.

HELP ME CHOOSE

Our web site has an expert system to select encoders based on motor type and brand, application needs and much more.

Hollow Shaft Application Figures

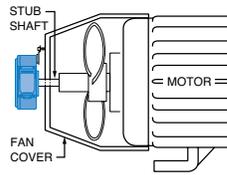


Figure 1
Shaft mounted on totally enclosed fan cooled motor.

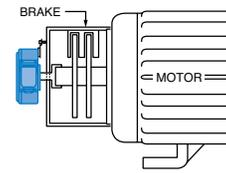


Figure 2
Shaft mounted outboard of disk brake.

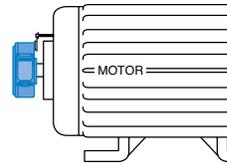


Figure 3
Shaft mounted on totally enclosed non-ventilated motor.

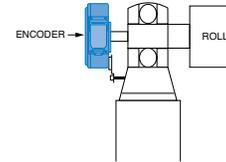


Figure 4
Shaft mounted encoder on process roll.



Stub shaft kits.



Basket guard.

Hollow Shaft Mount

HS25A | HS35A

Optical, Light Mill Duty

HS25A, HS35A Features

- HS25A: fits shafts from 3/8" to 3/4" [6mm to 16mm]
- HS35A: Fits shafts from 1/2" to 1" [12mm to 20mm]
- 1 – 5000 PPR
- -20° to 100°C operation
- Field resizeable by swapping inserts
- Wide-Gap sensor
- Shatterproof optical disk
- Fully isolated from motor shaft currents



Direct Replacement for BEI HS35 and Dynapar HS35, Northstar HS35R, HSD38

Avtron model HS35A (left) with connector option A (B), HS35A with connector option "T" (U) and model HS25A (right) shown with connector option "A" (B).

OPTIONS

- Full range of tether arms
- Mating cables

HOW TO BUILD AN ENCODER PART NUMBER

Begin with a model, then select an Encoder Part Number (Example HS35A)

| | | | | | | | | | |
|-------|----------|-------|-----------|------------------|------------|-------------|-------------|-------------|-------------|
| Model | 1024 PPR | 5-24V | 5/8" Bore | 10 Pin MS w/mate | thru shaft | with basket | 4.5" tether | all signals | no specials |
| ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ |
| HS35A | Y | 1 | C | C | U | 1 | E | A | 000 |

Final part number: HS35AY1CCU1EA000

SELECTION GUIDE

| Model | PPR | Line Driver | Bore Size | Connector Options | Mounting Style | Protection | Anti-Rotation Tether Options | Channels | Special Features |
|--|---|--|--|---|---|---|---|---|---|
| HS25A HS35A | A- 1* C- 25* F- 60* G- 100 H- 120* K- 200 L- 240 M- 250 N- 256* P- 300* E- 360* Q- 500 R- 512 S- 600 T- 625* U- 720* | V- 900* W- 1000 Y- 1024 Z- 1200 1- 1250* 2- 1440* 3- 2000 4- 2048 5- 2500* 6- 2540* 7- 3600* 8- 4000 [^] D- 4096 [^] 9- 5000 [^] 0- Special | 1- 5-28V (7272) 2- 5-28V, Open Collector (7273) 4- 5-28V in, 5V out (7272) | 0- Non-Std. Shaft A- 3/8"* B- 1/2" C- 5/8" D- 3/4"* E- 7/8" F- 1" L- 6mm* X- No inserts U- all U.S. inserts Z- all metric inserts | W- 18" flex. cable E- End-of-Shaft* (HS25A) J- Universal End-of-Shaft & Thru Shaft [^] (HS35A) | 0- None 1- Basket | X- None A- Fan cover, 1/4-20 B- Fan cover, 5/16-18 C- Fan cover, 3/8-16 D- Fan cover, all E- 4.5" C-Face F- 8.5" C-Face M- 4.5" C-Face or Fan Cover U- Universal (all tether options) | A- A, \bar{A} , B, \bar{B} , Z, \bar{Z} B- A, \bar{A} , B, \bar{B} D- A, \bar{A} E- A, B, Z F- A, B | 000- None 00W- Connector on 18" cable: Use w/ Option "E"-N", "T"-U" 9xx- Specify cable length xx=feet (use w/ Option "W") |
| Connector Options | | | | | | | | | |
| Mounted on Encoder | | | | | | | | | |
| 10 Pin MS | | 6 Pin MS | | 7 Pin MS | | 8 Pin M12 | | | |
| A- w/o plug (std. phasing) B- w/o plug (Dynapar HS35 phasing) C- "A" w/ plug D- "B" w/ plug | | E- w/o plug (std. phasing) F- w/o plug (Dynapar HS35 phasing) G- "E" w/ plug H- "F" w/ plug | | J- w/o plug (std. phasing) K- w/o plug (Dynapar HS35 phasing) M- "J" w/ plug N- "K" w/ plug | | T- w/o plug (Turck Pinout) U- w/o plug (US Pinout) | | | |

* HS25A only. [^] HS35A only.
 ** No insert for HS25A.
 < Only available with 6 & 7 pin MS connectors.
 < Only available with cable, 10 pin MS, 8 pin M12 connectors.

Hollow Shaft Mount

HS35M

Magnetic, Mill Duty

HS35M Features

- Fits shafts from 1/2" to 1 1/8" [12mm to 30mm]
- 1 – 3072 PPR
- -20° to 85°C operation
- Field resizeable by swapping inserts
- Fully isolated from motor shaft currents
- Magnetic technology shrugs off dirt, dust, and moisture
- Optional high power outputs with full short circuit and wiring protection

Direct replacement upgrade for BEI HS35, Dynapar HS35, Northstar HS35R, HSD35, HSD37, HSD38



Avtron model HS35M shown with industrial connector option "P" (left) and MS connector option "A" (middle), dual output HS35M with connector option "P" (lower right).

OPTIONS

- Second isolated output
- No-solder industrial connector
- High power outputs
- Mating cables

SELECTION GUIDE

| Model | Left & Right Output Range | | Line Driver | Bore Size | | Connector Options | Mounting Style | Protection | Anti-Rotation Tether Options | Channels | Special Features | | | | | | |
|---|---|--|--|--|--|---|---|--|--|---|---|-----------------------------------|--|---------------------------------|--|----------------------------------|--|
| HS35M | F- 60 G- 100 H- 120 K- 200 L- 240 M- 250 N- 256 P- 300 E- 360 Q- 500 R- 512 S- 600 U- 720 V- 900 | W- 1000 Z- 1200 1- 1250 2- 1440 B- 1500 3- 2000 4- 2048 5- 2500 C- 3072 X- None | 6- 5-24V (7272) 8- 5-15V (4125) hi-power 9- 5-24V in, 5V out (7272) | 0- Non-Std. B- 1/2" C- 5/8" D- 3/4" E- 7/8" F- 1"[▲] G- 1 1/8"[▲] U- U.S. Universal (all inserts, 1/2"-1") Z- Metric (all inserts, 12mm-20mm) | P- 12mm Q- 14mm R- 15mm S- 16mm W- 20mm Y- 25mm[▲] 3- 30mm[▲] | W- 18" flex. cable <i>See manual for all options.</i> | U- Universal End-of-Shaft & Thru Shaft | 0- None 1- Basket[*] | X- None A- Fan cover, 1/4-20 B- Fan cover, 5/16-18 C- Fan cover, 3/8-16 D- Fan cover, all E- 4.5" or 6.75" C-Face F- 8.5" C-Face G- Torque Arm M- 4.5" C-Face or Fan Cover U- Universal (all tether options, excluding "G") | A- A, \bar{A}, B, \bar{B}, Z, \bar{Z} B- A, \bar{A}, B, \bar{B}[◀] D- A, \bar{A}[◀] E- A, B, Z[◀] F- A, B[◀] 9- All. Enter specific cable length xx=feet under Special Features (Use w/ Connector Option "W"). | 00- None 0W- Connector on 18" cable: Use w/ Options "E", "N", "S", "U", "Z") | | | | | | |
| Connector Options | | | | | | | | | | | | | | | | | |
| Mounted on Encoder | | | | | | Mounted on 18" cable (0W) | | | | | | | | | | | |
| 10 Pin MS | | 10 Pin EPIC | | 10 Pin Mini MS/ TwistLock | | 12 Pin M23 | | 6 Pin MS[◀] | | 7 Pin MS[◀] | | 8 Pin M12[◀] | | 10 Pin EPIC[◀] | | 10 Pin Mini MS/ TwistLock | |
| A- w/o plug (std. phasing) | | P- w/ plug | | R- w/ plug | | 2- w/o plug | | E- w/o plug (std. phasing) | | J- w/o plug (std. phasing) | | T- w/o plug (Turck Pinout) | | Q- w/ remote base + plug | | S- w/ plug | |
| B- w/o plug (Dynapar HS35 phasing) | | V- w/o plug | | | | | | F- w/o plug (Dynapar HS35 phasing) | | K- w/o plug (Dynapar HS35 phasing) | | U- w/o plug (US Pinout) | | Z- w/ plug | | | |
| C- "A" w/ plug | | | | | | | | G- "E" w/ plug | | M- "J" w/ plug | | | | | | | |
| D- "B" w/ plug | | | | | | | | H- "F" w/ plug | | N- "K" w/ plug | | | | | | | |

^{*} Not applicable on dual output.
[▲] No insert used for Options "F", "G", "Y", "3".
[◀] Only available with 0W special feature.

Hollow Shaft Mount

HS45 | XR45 (SMARTSafe™)

Magnetic, Heavy Mill Duty

HS45 Features

- Fits shafts from 5/8" to 1 1/8" [16mm to 30mm]
- 8 – 5000 PPR
- -40° to 100°C operation
- Field resizeable by swapping inserts
- Swap connector styles in the field
- Magnetic technology shrugs off dirt, dust, and moisture
- LED & remote alarm diagnostics
- >2500V isolation from shaft currents
- Clamp and center-bolt mounting styles
- Our best model to directly replace: HS35 styles; Avtron M3 & M4; Leine and Linde 861, 862, 865; Hubner HOG 8, HOG 9, HOG 10



Avtron HS45 clamp style with connector option "L" (left), HS45 center bolt style with overspeed switch option and connector option "P". Removable connector options "P", "H" and "A".

XR45 Features

- Physically identical to HS45
- 8 – 5000 PPR
- -40° to 80°C operation
- Level 1 & Level 2 hazard protection

OPTIONS

- Second isolated output
- Overspeed switch (HS45 only)



Sizing inserts

SELECTION GUIDE

| Model | Bore Size | Left PPR | Right PPR | Line Driver | Connector Options | Tether | Channels | Modifications |
|-------------|--|--|--|--|--|--|---|--|
| HS45 | Clamp Style (End-of-shaft & thru shaft) Metric USA S- 16mm C- 5/8" V- 19mm D- 3/4" W- 20mm E- 7/8" Y- 25mm F- 1" 3- 30mm G- 1 1/8" Z- All metric U- All US sizes sizes Center-Bolt Style L- 16mm M- 17mm | AF- 60 AV- 900 AG- 100 AJ- 960 AH- 120 AW-1000 AA- 128 AY- 1024 AL- 240 AZ- 1200 AN- 256 A3- 2000 AP- 300 A4- 2048 AE- 360 A5- 2500 AB- 480 AD- 4096 AQ- 500 A8- 4800 AR- 512 A9- 5000 AS- 600 A0- spcl | XX- none AV- 900 AF- 60 AJ- 960 AH- 120 AY- 1024 AA- 128 AZ- 1200 AN- 256 A4- 2048 AE- 360 A5- 2500 AB- 480 AD- 4096 AQ- 500 A8- 4800 AR- 512 A9- 5000 AS- 600 A0- spcl | X- none 8- Standard: 5-24V in, 5-15V out hi power 6- Single-Ended: 5-24V in, 5-24V out 9- Remote TTL: 5-24V in, 5V fixed out | see below chart | D- Fan Cover E- 4.5" NEMA C-face F- 8.5" NEMA FC-face P- 70mm arm G- Torque Arm, 70-500mm Combinations: H- Fan Cover & 8.5" C-face M- Fan Cover & 4.5" C-Face U- Universal (includes all styles) X- none | A- A,Ā,B,Ā Z, Z̄ B- A,Ā,B,Ā D- A,Ā E- A,B,Z F- A,B | 000- none 001- Omit rear shaft cover 6xx- mechanical overspeed switch 9xx- specify cable length xx=feet (use w/ option "W") |
| XR45 | as above | as above | as above | X- none 5- Level 1: 12-24V in, 10.6V out 7- Level 2: 5-24V in, 5-24V out | Level 2 and Level 1 Remote Protection Options see below chart (except "Q") Level 1 Local Protection 5- Explosion Proof Conduit Box, no gland 6- XP box, w/ATEX gland 7- XP box, w/ UL gland | as above | as above | as above |

| Connector Options | | | | | | | | |
|--|---|--|---|--|---|---|-------------------|---|
| Mounted on Encoder Body | | | | | | | | Cable |
| Global Styles | | | North American Styles | | | | | |
| M12 8 pin | M23 12 pin | Terminal Box | Industrial Connector | MS 10 pin | MS 6 pin | MS 7 pin | Mini MS TwistLock | |
| T- Global pin out without plug U- USA pinout without plug | 2- Leine & Linde pinout without plug 3- Hubner pinout without plug | L- box with term'l's & cord grip H- box with term'l's & US 1/2" conduit | P- with Plug G- Northstar™ pinout w/o alarm w/plug | A- HS35 pinout without plug B- Dynapar™ HS35 pinout without plug C- HS35 pinout with plug D- Dynapar™ HS35 pinout with plug 4- Large encoder pinout (M3/4) | E- w/plug F- Dynapar™ HS35 pinout w/plug | J- w/plug K- Dynapar™ HS35 pinout w/plug | R- w/plug | W- 0.45m Cable Q- 0.45m cable w/ remote base w/ind'l conn w/plug S- 0.45m cable w/ twistlock conn |

Hollow Shaft Mount

M3 | M4

Optical, Mill Duty, Large Bore
Magnetic, Heavy Mill Duty, Large Bore

M3 Features

- Fit shafts from 1 1/2" to 2 3/8"
[48mm to 60mm]
- 240 – 2500 PPR
- -40°* to 85°C operation
- Our most durable optical encoder

M4 Features

- Fit shafts from 1 1/2" to 2 3/8"
[48mm to 60mm]
- 240 – 1200 PPR
- -40°* to 85°C operation
- M4 more resistant to water, oil, and grease than optical encoders



Avtron model M3-7 (M4-7) hollow shaft encoder shown with connector option "P", optional dual output, and standard tether.

OPTIONS

- Second isolated output
- -40° C rating
- Full range of tether arms
- Mating cables

SELECTION GUIDE

| Model | Bore Size | Mounting Style | Line Driver | Output | Base PPR | Connector Options | | Special Features |
|-----------|-----------|---|-------------|---|----------|--|--|--|
| M3 | 8- 1 1/2" | S- End-of-Shaft G- End-of-Shaft with Grounding T- Thru-Shaft | 1- 5-24V | R- Right L- Left D- Dual | 240 600 | N- Wire Leads only C- MS Bulkhead A- "C" w/o plug L- MS Elbow T- Terminal Box K- Condulet P- Plug-in Industrial | Q- Plug-in Industrial, w/ remote + base Z- Plug-in Industrial, 3' Flexible Cable W- 3' Flexible Cable M6 Cable Gland only | 000- none 003- Torque arm (B27239) 005- -40° C rated 038- Fan cover tether (see instruction manual for full list.) |
| | 9- 1 5/8" | | 2- 5-18V | | 256 1024 | | | |
| | 6- 2" | | hi power | | 360 1200 | | | |
| | J- 2 1/8" | | 3- 18-24V | | 480 2048 | | | |
| | 7- 2 3/8" | | hi power | | 512 2500 | | | |
| | G- 48mm | | 4- 5-24V | | | | | |
| | D- 52mm | | in, 5V out | | | | | |
| | E- 58mm | | | | | | | |
| H- 60mm | | | | | | | | |

| Model | Bore Size | Mounting Style | Line Driver | Left & Right Output Range | Base PPR | Marker | Connector Options | | Special Features |
|-----------|-----------|---|-------------|--|----------|----------------------------|--|--|--|
| M4 | 8- 1 1/2" | S- End-of-Shaft G- End-of-Shaft with Grounding T- Thru-Shaft | 1- 5-24V | X- none L- Low Range (Base PPR x 1/2) M- Medium Range (Base PPR x 1) H- High Range (Base PPR x 2) | 48- 480 | Z- Marker - none | N- Wire Leads Only C- MS Bulkhead A- "C" w/o plug L- MS Elbow T- Terminal Box K- Condulet P- Plug-in Industrial | Q- Plug-in Industrial, w/ remote + base Z- Plug-in Industrial, 3' Flexible Cable W- 3' Flexible Cable | 000- none 003- Torque arm (B27239) 005- -40° C rated 038- Fan cover tether (see instruction manual for full list.) |
| | 9- 1 5/8" | | 2- 5-18V | | 51- 512 | | | | |
| | 6- 2" | | hi power | | 60- 600 | | | | |
| | J- 2 1/8" | | 3- 12-24V | | | | | | |
| | 7- 2 3/8" | | hi power | | | | | | |
| | G- 48mm | | 4- 5-24V | | | | | | |
| | D- 52mm | | in, 5V out | | | | | | |
| | E- 58mm | | | | | | | | |
| H- 60mm | | | | | | | | | |

Hollow Shaft Mount

M6 | M7

Heavy Duty Magnetic

M7 Features

- Fits shafts from 1" to 1 1/8" [25-30mm]
- 240 – 1200 PPR
- -45° to 80°C ultra-low-temperature operation

Hazardous Duty

M6 Features

- Fits shafts from 1" to 2 3/8" [25-60mm]
- 240 – 1200 PPR
- -40° to 80°C operation
- Exterior identical to M7
- Level 1 & Level 2 hazard protection
- ATEX certified: EEx de IICT4/ II 2G
- No isolation barrier required
- The industry standard for oil and gas drilling machinery



Avtron model M7 hollow shaft encoder shown with connector option "T" (lower left), model M6 with connector option "W" (upper right)

OPTIONS

- Second isolated output
- -40°C rating (M6 only), M7 std -45°C
- ATEX cable gland (M6 only)

SELECTION GUIDE

| Model | Bore Size* | Mounting Style | Line Driver | Left & Right Output Range | Base PPR | Marker | Connector Options | Modifications |
|-------|--|-----------------|--|--|-------------------------------|----------------------|--|--|
| M7 | 4- 1" 5- 1 1/8" | S- End of Shaft | 1- 5-24 VDC 2- 5-18 VDC hi power 3- 12-24 VDC hi power | X- none L- Low Range (Base PPR x 1/2) M- Medium Range (Base PPR x 1) H- High Range (Base PPR x 2) | 48- 480 51- 512 60- 600 | Z- Marker -- none | T- Terminal Box See manual for all options. | 000- none 003- include tether arm (B28390) |
| M6 | 4- 1" 5- 1 1/8" 6- 2" 7- 2 3/8" | as above | as above | as above | as above | as above | T- Terminal Box W- Terminal Box w/ATEX Gland | 000- none 003- include tether arm 005- w/tether arm & -40°C rating |

*Contact factory for metric sizes.

Hollow Shaft Mount

XT45 | XR47 (SMARTSafe™)

Magnetic, Severe Duty, Survives Extreme Vibration & Shock

XT45 Features

- Fits shafts from 3/4" to 1 1/8" [20-30mm]
- 8 – 5000 PPR
- -40° to 100°C operation
- Huge ultra heavy duty bearings
- Tested to 300G shock
- Onboard diagnostic LED & remote contact
- High-power outputs with full short circuit and wiring protection
- Clamp and center-bolt mounting styles



Avtron XT45 severe duty encoder, clamp style

Hazardous Duty

XR47 Features

- Physically identical to XT45
- 8 – 5000 PPR
- -40° to 80°C operation
- Tested to 300G shock
- Level 1 & Level 2 hazard protection
- Ideal for top drive/drilling machinery



Avtron XR47 encoder with local Level 1 Explosion Proof Junction Box

SELECTION GUIDE

| Model | Bore Size | Left PPR | Right PPR | Line Driver | Connector Options | Tether | Channels | Modifications | |
|-------------|--|--|---|---|---|--|--------------------------|--|--|
| XT45 | D- 3/4" E- 7/8" F- 1" G- 1 1/8" L- 20mm M- 25mm N- 30mm J- 30mm* (no stub) K- fits GE B20* | AG- 100 AH- 120 AA- 128 AL- 240 AN- 256 AP- 300 AE- 360 AB- 480 AQ- 500 AR- 512 AS- 600 AV- 900 | AJ- 960 AW- 1000 AY- 1024 AZ- 1200 A3- 2000 A4- 2048 A5- 2500 A8- 4800 A9- 5000 | XX- none | X- none 8- Standard: 5-24V in, 5-15V out hi power 6- Single-Ended: 5-24V in, 5-24V out 9- Remote TTL: 5-24V in, 5V fixed out | W- 18" Flex. Cable Y- 10 Pin MS on 18" Cable See manual for all options. | X- none G- Torque Arm | A- A, \bar{A} , B, \bar{B} Z, \bar{Z} | 000- none 001- Omit rear shaft cover 9xx- specify cable length xx=feet (use w/ option "W") |
| XR47 | as above | as above | XX- none | X- none 5- Level 1: 12-24V in, 10.6V out 7- Level 2: 5-24V in, 5-24 out | Level 2 and Level 1 Remote Protection as above Level 1 Local Protection 5- Explosion Proof Conduit Box, no gland 6- XP box, w/ATEX gland 7- XP box, w/ UL gland | as above | as above | as above | |

Hollow Shaft Mount

AV685 (SMARTach II™) | XR685 (SMARTSafe™)

Magnetic, Severe Duty

AV685 Features

- Fits shafts with diameter of 1 1/8"
- 8 – 5000 PPR
- -40° to 120°C operation
- Replaceable sensors to maximize uptime
- Diagnostic LED, alarm contact
- High power outputs with full short circuit and wiring protection
- The most durable hollow shaft encoder available!
- Auto-centering spline shaft system for perfect fit every time.
- Option: overspeed switch



Avtron model AV685 SMARTach II encoder with connector option “P” and diagnostic LED.

Hazardous Duty

XR685 Features

- Physically identical to AV685
- 8 – 5000 PPR
- -40° to 80°C Operation
- Level 1 & Level 2 hazard protection

OPTIONS

- Second isolated output
- Thru shaft
- Overspeed switch (AV685 only)
- Shaft grounding brush (AV685 only)
- Mating cables

SELECTION GUIDE

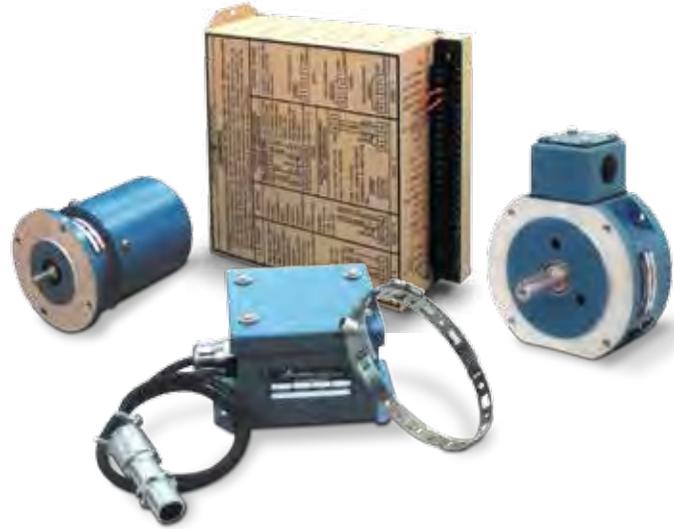
| Model | Temperature Rating | Tether | Style | Left Module | | Right Module | | Connector Options | Modifications |
|--------------|--|---|---|--|---|--|---|---|---|
| | | | | Line Driver | PPR | Line Driver | PPR | | |
| AV685 | N- -20°C to 80°C C- -40°C to 80°C H- -20°C to 120°C | X- none 1- B32809 threaded rod | E- Standard (EOS) T- Thru Shaft G- Grounding O- Overspeed Switch | X- none 8- Standard: 5-24V in, 5-15V out hi power 6- Single-Ended: 5-24V in, 5-24V out 9- Remote TTL: 5-24V in, 5V fixed out | X- none V- 900 F- 60 J- 960 G- 100 Y- 1024 H- 120 Z- 1200 A- 128 3- 2000 L- 240 4- 2048 N- 256 5- 2500 P- 300 D- 4096 E- 360 8- 4800 B- 480 9- 5000 Q- 500 R- 512 S- 600 | X- none 8- Standard: 5-24V in, 5-15V out hi power 6- Single-Ended: 5-24V in, 5-24V out 9- Remote TTL: 5-24V in, 5V fixed out | X- none V- 900 F- 60 J- 960 G- 100 Y- 1024 H- 120 Z- 1200 A- 128 3- 2000 L- 240 4- 2048 N- 256 5- 2500 P- 300 D- 4096 E- 360 8- 4800 B- 480 9- 5000 Q- 500 R- 512 S- 600 | P- Ind. w/ Plug G- Ind. w/ Plug (Northstar Pinout) B- 10 Pin MS w/ Plug W- 3' Leads only | 000- none 004- super magnetic shielding 4xx- special PPR 9xx- special cable length (xx=feet) |
| XR685 | N- -20°C to 80°C C- -40°C to 80°C | as above | E- Standard (EOS) T- Thru Shaft | X- none 5- Level 1: 12-24V in, 10.6V out 7- Level 2: 5-24V in, 5-24 out | as above | X- none 5- Level 1: 12-24V in, 10.6V out 7- Level 2: 5-24V in, 5-24 out | as above | Level 2 and Level 1 Remote Protection Options P,G,B,W as above Level 1 Local Protection 5- Explosion Proof Conduit Box, no gland 6- XP box, w/ATEX gland 7- XP box, w/ UL gland | as above |

Older Models

Industrial factories need equipment to last for decades, not years. Avtron proudly manufactures these high-quality, durable models to keep your mill running without costly physical revamps, wiring changes, or drive replacements: M460 Sandwich Encoders, M185 Unipulser™, M925 “PY” Style, and K661 and K662 Frequency to Voltage Converters.

(K66x models enable analog tach replacement.)

Avtron still services and supports older designs like the units listed in the table below. Please consult our web site to update older models or call us for upgrade/replacement options.



Avtron models (from left) M925, K661, M460, and M185 (front).

| Model | Replacement Model |
|------------|-------------------|
| M190, M285 | AV850 |
| M585, M685 | AV685 |
| M485, M785 | AV485 |
| M727A | AV485 |
| M737A | AV485 |
| M738, M938 | AV485 |
| M940, M945 | AV485 |
| M1250 | AV125 |

REPAIRS

Many Avtron encoders can be repaired or refurbished at our factory. Obtain a return material advice (RMA) number prior to returning units. Please call us for details or receive your RMA online instantly through our web site.

AVTRON SUPPORT

Unlike most competitors, Avtron offers 24x7x365 engineering support for our encoder products at no charge!

Technical support is provided by application engineers familiar not only with our products, but also with industrial applications, motors, etc., to provide complete product support.

Avtron’s Quality System is Certified to ISO 9001:2000. We are a vertically integrated manufacturing company whose facilities include:

- Machine shop with the latest in high performance machine tools
- Circuit board assembly
- Test department that performs incoming inspections, environmental testing, final testing, and quality control

Upgrades and Retrofits

Competitive Models

Avtron offers 100% compatible versions to replace competitors' models. Enjoy the superior durability of Avtron encoders with no wiring changes!

To assist you, Avtron has a conversion assistant on our web site. Some common models are shown below.

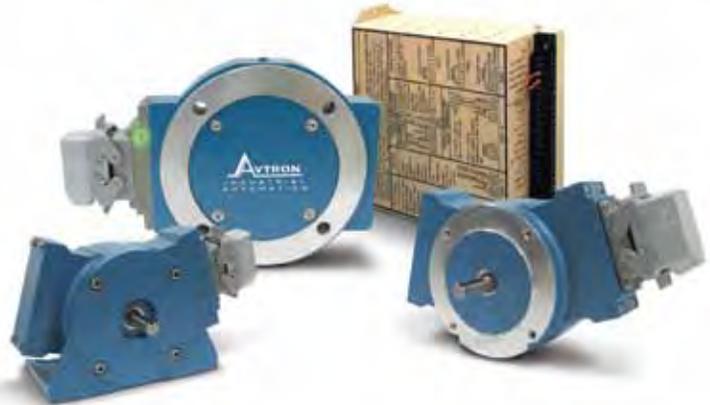
Note that for some models such as HS35, Avtron offers "good" (HS35A), "better" (HS35M), and "best" (HS45) drop-in replacements!

| Model ‹‹ | Brand ‹‹ | Avtron Model | Avtron Connector |
|-----------|----------|--------------|------------------|
| 62P | DYN | AV485 | T |
| 861, 862 | L&L | HS45 | 2 |
| 865 | L&L | HS45 | 2 |
| H20 ® | BEI, DYN | AV20 | A, E, J |
| H25 ® | BEI, DYN | AV25 | A, E, J |
| H56 | DYN | AV485 | G |
| HOG8,9,10 | HUB | HS45 | 3 |
| HS20 | DYN | HS25A | A |
| HS22 | BEI | HS25A | A |
| HS25 | BEI | HS25A | A |
| HS35 | BEI | HS35A | A |
| HS35 | DYN | HS35A | B |
| HS35M | NOR | HS35M | P |
| HSD35 | NOR | HS35M | P |
| HS45 | BEI | M3 | A030 |
| HS56 | NOR | M4 | P |
| HS85 | NOR | AV685 | G |
| POG8,9 | HUB | AV45 | 3, L |
| RIM 1250™ | NOR | AV125 | G |
| RIM 6200™ | NOR | AV485 | G |
| RIM 8500™ | NOR | AV850 | G |
| RL67™ | NOR | AV67 | P |
| SL56™ | NOR | AV56 | P |
| SL85™ | NOR | AV85 | P |
| SL1250™ | NOR | AV125 | G |

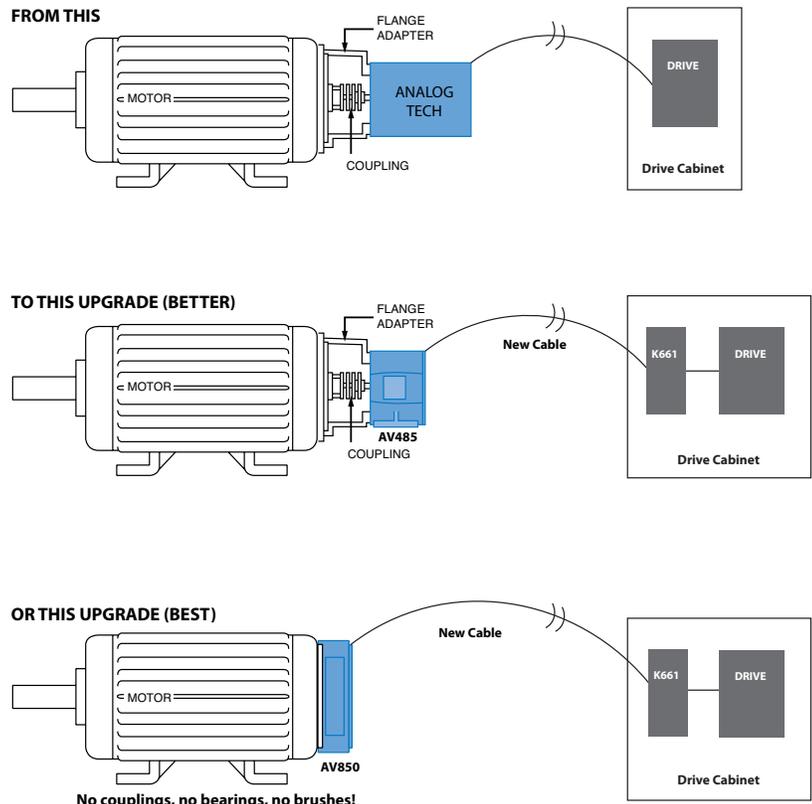
DYN = Dynapar
 NOR = Northstar/Lakeshore
 L&L = Leine and Linde
 HUB = Baumer/Hubner

Analog Retrofits

Avtron's retrofit solutions directly replace obsolete tachogenerators such as GE 5PY, 5BC42, 5BC46, & 5BC66 with durable magnetic encoders and signal converters, without any drive changes. Enjoy the benefits of more-linear and more-reliable operation, combined with widely interchangeable spare parts. See our web site for more details.



Model AV485 with footmount, AV850, K661, AV485.



‹‹ All brand and product names are trademarks of their respective holders. H20 ® and H25 ® are registered trademarks of BEI.

Encoder Options & Accessories

SHAFT GROUNDING BRUSHES

Motor shaft currents can cause damage to both the motor and the encoder bearings. Select Avtron encoders have an integral shaft grounding brush option.



Model M3 encoder with shaft grounding brush.

MOTOR SHAFT ISOLATION

The HS25A, HS35A & HS45 hollow shaft encoders are available with a shaft isolating insert to insulate the encoder from the motor shaft. This eliminates induced shaft currents common to AC motor applications. The HS35M features a fully insulated housing for shaft isolation.



Avtron model HS25A with isolating insert

OVERSPEED SWITCHES

The AV45, AV85, AV485, AV685, AV850 and HS45 encoders can be mounted with a mechanical overspeed switch on the same shaft assembly. This single assembly eliminates the need for couplings or foot mounting pedestals.



Avtron models (from left) AV685 with 3rd party overspeed switch, HS45 with integral overspeed switch.

MODULAR ENCODER COMPONENTS

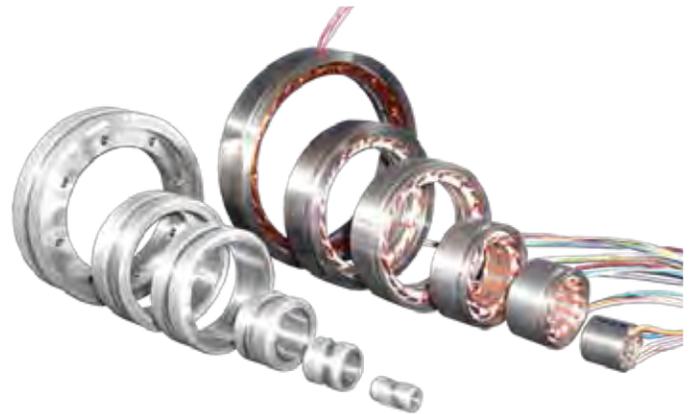
Admotec brand modular encoders provide OEM's with compact, durable solutions where a full-size encoder is not practical. KA offers sine-cosine output; KXL and KXS offer standard quadrature.



Avtron model KXS

MODULAR RESOLVER COMPONENTS

Admotec Rotasyn resolver components offer rotary absolute position feedback with OEM hollow shaft mount. Rotasyn also has ultra-high temperature performance and the ability to run immersed.



Admotec brand Rotasyn resolvers from Avtron

DON'T FORGET THE CABLE!

Avtron offers a full range of prefabricated mating cable assemblies up to 100ft (30m) in length to save site assembly time and eliminate errors. Shown here (from left), mating cables for 10 pin industrial (EPIC) style (large), 10 pin industrial (EPIC) (small), 10 pin MS, 8 pin M12, 7 pin MS & 5 pin MS.



Output Specifications

| OUTPUT CHART 0 | Voltage Input (V _{in}) | Protection | Maximum Cable Drive (feet) | |
|--|----------------------------------|-------------------|---|-----------------------------------|
| AV20, AV25, HS25A, HS35A Line Driver Options | 1 | 5-28 VDC | Reverse Voltage, Transient, Short Circuit | |
| | 2 | 5-28 VDC | | 500 ft@5V, 250 ft@12V, 125 ft@24V |
| | 3* | 5-15 VDC | | 500 ft. |
| | 4 | 5-28 VDC (5V out) | | 1000 ft. |

* Available only on AV25, no short circuit protection for this option.

| OUTPUT CHART 1 | Voltage Input (V _{in}) | Protection | Maximum Cable Drive (feet) | |
|------------------------------------|----------------------------------|--------------------|---|---|
| M3, M4, M6, M7 Line Driver Options | 1 | 5-24 VDC | Reverse Voltage, Transient, Short Circuit | |
| | 2 | 5-18 VDC | | 1000 ft@5V, 500 ft@12V, 200 ft@24V |
| | 3 | 12-24 VDC | | Reverse Voltage, Transient |
| | 4 | 5-24 VDC (5V out)* | | Reverse Voltage, Transient, Short Circuit (low) |

* N/A on M6 and M7.

| OUTPUT CHART 2 | Voltage Input (+V) | Protection | Maximum Cable Drive (feet) | |
|---|--------------------|-------------------|---|------------------------------------|
| AV45, AV56, AV56S, AV67, AV85, AV115, AV125, AV485, AV685, AV850, HS35M, HS45, XT45 Line Driver Options | 6 | 5-24 VDC | Reverse Voltage, Enhanced Transient, Enhanced Short Circuit | |
| | 8 | 5-24 V (5-15 V*) | | 1000 ft@5V, 500 ft@12V, 250 ft@24V |
| | 9 | 5-24 VDC (5V out) | | 2000 ft |

* HS35M only.

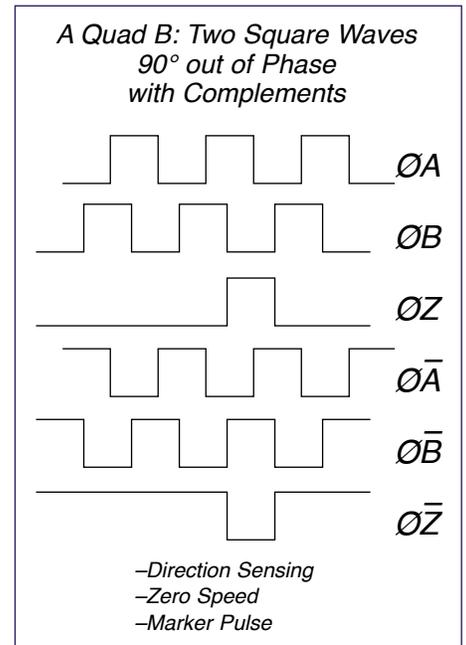
| OUTPUT CHART 3 | Voltage Input (+V) | Protection | Maximum Cable Drive (feet) |
|---|--------------------|---------------------------------------|---|
| XR4F, XR45, XR47, XR56, XR67, XR85, XR115, XR125, XR485, XR685, XR850 Line Driver Options | 5 | (Level 1) 12-24 VDC (10.6V out) | Reverse Voltage, Transient, Short Circuit |
| | 7 | (Level 2) 5-24 VDC | |

| OUTPUT CHART 4 | Voltage Input (+V) | Protection | Maximum Cable Drive (feet) |
|----------------|-----------------------|---|----------------------------|
| XR81 | 12-24 VDC (10.6V out) | Reverse Voltage, Enhanced Transient, Enhanced Short Circuit | 1000 ft |

OUTPUT DESCRIPTION

Most Avtron encoders have a two square wave output: A Quad B (A, B) 90° out of phase, with complements (A-, B-). Marker pulses (Z) are available on most units. Resolver and sine-cosine outputs also available on Admotec components.

OUTPUT WAVEFORMS



ADVANCED DIAGNOSTICS

Many Avtron encoders feature our self-diagnostic system. The microprocessor-based system continuously monitors the output of the encoder for signal quality. A red/green LED and an alarm contact indicate if the signal is nearing specification limits. Operators can replace the removable sensor module or correct mechanical issues before an actual failure occurs.



SMARTach II Diagnostic LED (AV850 shown).

Encoder Product Comparison

| Enclosure | Mounting Style | Non-Hazardous Application Models and Options | | | | | All Application Options (Hazardous and Non-Hazardous) | | | |
|------------------|------------------|--|-------------------|------------|-----------------|-------------------|---|--------------------|------------|--|
| | | Model | Temperature Range | Std Output | Grounding Brush | Over-speed switch | Sensing | Shaft or Bore Size | | |
| | | | | | | | | US | Metric | |
| Components | Modular | KA | -40C to +115C | 1V p-p | N | N | Magnetic | 5/16" - 10" | 8-250mm | |
| | Modular | KX | -40C to +115C | 3.3-5V | N | N | Magnetic | 5/16" - 10" | 8-250mm | |
| | Modular | Rotasyn | -60C to +260C | 1-15VAC | N | N | Magnetic | 5/32" - 9" | 4-230mm | |
| Light Mill Duty | Face or Foot | AV20 | -40C to +100C | Chart 0 | N | N | Optical | 1/4", 3/8" | 10mm | |
| | Face or Foot | AV25 | -40C to +100C | Chart 0 | N | N | Optical | 1/4", 3/8" | 10mm | |
| | Hollow Shaft | HS25A | -20C to +100C | Chart 0 | N | N | Optical | 3/8" - 3/4" | 6-16mm | |
| | Hollow Shaft | HS35A | -20C to +100C | Chart 0 | N | N | Optical | 1/2" - 1" | 12-20mm | |
| Mill Duty | Hollow Shaft | HS35M | -20C to +85C | Chart 2 | N | N | Magnetic | 1/2" - 1 1/8" | 12-20mm | |
| | Hollow Shaft | M3 | -40C to +85C | Chart 1 | Y | N | Optical | 1 1/2" - 2 3/8" | 48-60mm | |
| Heavy Mill Duty | B10 Face or Foot | AV45 | -40C to +100C | Chart 1 | N | Y | Magnetic | 5/16" - 11/16" | 9-18mm | |
| | Modular 4.5" | AV56 | -40C to +100C | Chart 2 | N | Y | Magnetic | 1/2" - 3 3/16" | 10-85mm | |
| | Modular 4.5" | AV56S | -40C to +100C | Chart 2 | N | Y | Magnetic | 1/2" - 3 3/16" | 10-85mm | |
| | Modular 6.75" | AV67 | -40C to +100C | Chart 2 | N | Y | Magnetic | 1/2" - 3 3/16" | 10-85mm | |
| | Modular 8.5" | AV85 | -40C to +100C | Chart 2 | N | Y | Magnetic | 1/2" - 3 3/16" | 10-85mm | |
| | Modular 115mm | AV115 | -40C to +100C | Chart 2 | N | Y | Magnetic | 1/2" - 3 3/16" | 10-85mm | |
| | Modular 12.5" | AV125 | -40C to +100C | Chart 2 | N | Y | Magnetic | 1 3/8" - 7 7/8" | 25-200mm | |
| | Modular 8.5" | AV850 | -40C to +100C | Chart 2 | N | Y | Magnetic | 5/8" - 4 1/2" | 16mm-115mm | |
| | Hollow Shaft | HS45 | -40C to +100C | Chart 2 | N | Y | Magnetic | 5/8" - 1 1/8" | 16-30mm | |
| | Hollow Shaft | M4 | -40C to +85C | Chart 1 | Y | N | Magnetic | 1 1/2" - 2 3/8" | 48-60mm | |
| | Hollow Shaft | M7 | -45C to +80C | Chart 1 | N | N | Magnetic | 1" - 2 3/8" | 25-60mm | |
| Severe Mill Duty | Modular Sensor | AV5 | -40C to +100C | Chart 2 | N | Y | Magnetic | 5/8" - 4 1/2" | 16mm-115mm | |
| | Modular Sensor | AV12 | -40C to +100C | Chart 2 | N | Y | Magnetic | 1 3/8" - 7 7/8" | 25-200mm | |
| | 56C Face or Foot | AV485 | -40C to +120C | Chart 2 | Y | Y | Magnetic | 5/8" | 15.88mm | |
| | Hollow Shaft | AV685 | -40C to +120C | Chart 2 | Y | Y | Magnetic | 1 1/8" | 28.58mm | |
| | Hollow Shaft | XT45 | -40C to +100C | Chart 2 | N | N | Magnetic | 3/4" - 1 1/8" | 20-30mm | |

Ultra-Durable Sensor Technology

Avtron uses two different sensor technologies to generate the signals in our encoders: optical and magnetic. Both technologies are field proven with thousands of successful installations with all brands of variable speed drives and controls. The choice is based on durability needs.

Optical sensors are offered in Light Mill and Mill Duty encoders. Optical sensing technology performs best when used in environments without frequent temperature changes and/or chronically wet conditions.

The optical sensing circuit uses an LED light source that shines through a rotating disk. Unlike the competition, which sometimes uses fragile glass disks, Avtron uses only shatterproof disks. As the disk rotates, the sensor sees an interruption in the light beam, and generates pulses as a result. Avtron encoders feature Wide-Gap technology, with up to 8X the distance between disk and sensor. This eliminates sensor damage from vibration or shock.

Magnetic sensors are offered in Mill Duty, Heavy Mill Duty, and Severe Duty encoders. Because they are not affected by dust or moisture, they are suited to rough service in modular style encoders like the SMARTach II™ and the THIN-LINE II™ series.

A magnetic sensor detects a rotating wheel (rotor) that is encoded with a series of magnetic poles on its surface. As the poles pass the sensor, a small change in resistance of the sensor is detected and pulses are generated as a result. Avtron Wide-Gap Technology allows the wheel to be 2-4X farther from the sensor, eliminating sensor damage from misalignment, shaft runout, and bearing movement.

| All Application Options (Hazardous and Non-Hazardous) | | | | | | | | | Hazardous Duty Applications | | | | | |
|--|-----------------------------|---------------|--------------|--------------|------------|----------------------|--------------|-------|-----------------------------|---------|----------------|-------------|------|--|
| Model | Pulses per Revolution (PPR) | Max Speed RPM | Max Freq kHz | Max Out-puts | Thru Shaft | Replace-able Sensors | Diag-nostics | Model | Temperature Range | Output | Certifications | | | |
| | | | | | | | | | | | UL CI/Div | UL CI /Zone | ATEX | |
| KA | 1-720 | 100k | 500k | 1 | Y | N | N | | | | | | | |
| KX | 1-45000 | 100k | 500k | 1 | Y | N | N | | | | | | | |
| Rotasyn | NA | 20k | NA | 2 | Y | N | N | | | | | | | |
| AV20 | 1-3600 | 6000 | 125k | 1 | N | N | N | | | | | | | |
| AV25 | 1- 5000 | 6000 | 125k | 1 | N | N | N | | | | | | | |
| HS25A | 1-3600 | 6000 | 125k | 1 | N | N | N | | | | | | | |
| HS35A | 1-5000 | 6000 | 125k | 1 | Y | N | N | | | | | | | |
| HS35M | 8-3600 | 4700 | 125k | 2 | Y | N | N | | | | | | | |
| M3 | 240-2500 | 5000 | 150k | 2 | Y | N | N | | | | | | | |
| AV45 | 8-5000 | 5000 | 165k | 2 | N | N | Y | XR4F | -40C to +80C | Chart 3 | Y | Y | Y | |
| AV56 | 8-5000 | 5000 | 165k | 2 | Y | N | Y | XR56 | -40C to +80C | Chart 3 | Y | Y | Y | |
| AV56S | 8-5000 | 5000 | 165k | 1 | Y | N | Y | | | | | | | |
| AV67 | 8-5000 | 5000 | 165k | 1 | Y | N | Y | XR67 | -40C to +80C | Chart 3 | Y | Y | Y | |
| AV85 | 8-5000 | 5000 | 165k | 2 | Y | N | Y | XR85 | -40C to +80C | Chart 3 | Y | Y | Y | |
| AV115 | 8-5000 | 5000 | 165k | 2 | Y | N | Y | XR115 | -40C to +80C | Chart 3 | Y | Y | Y | |
| AV125 | 8-8192 | 5000 | 165k | 2 | Y | Y | Y | XR125 | -40C to +80C | Chart 3 | Y | Y | Y | |
| AV850 | 8-5000 | 5000 | 165k | 2 | Y | Y | Y | XR850 | -40C to +80C | Chart 3 | Y | Y | Y | |
| HS45 | 8-5000 | 5000 | 165k | 2 | Y | N | Y | XR45 | -40C to +80C | Chart 3 | Y | Y | Y | |
| M4 | 240-1200 | 5000 | 150k | 2 | Y | N | N | | | | | | | |
| M7 | 240-1200 | 5000 | 150k | 2 | N | N | N | M6 | -40C to +80C | Chart 1 | N | N | Y | |
| AV5 | 8-5000 | NA | 165k | 1 | Y | Y | Y | XR5 | -40C to +80C | Chart 3 | Y | Y | Y | |
| AV12 | 8-8192 | NA | 165k | 1 | Y | Y | Y | XR12 | -40C to +80C | Chart 3 | Y | Y | Y | |
| AV485 | 8-5000 | 5000 | 165k | 2 | Y | Y | Y | XR485 | -40C to +80C | Chart 3 | Y | Y | Y | |
| AV685 | 8-5000 | 4000 | 165k | 2 | Y | Y | Y | XR685 | -40C to +80C | Chart 3 | Y | Y | Y | |
| XT45 | XT45 | 5000 | 165k | 1 | Y | N | Y | XR47 | -40C to +80C | Chart 3 | Y | Y | Y | |

* -40°C rating is optional.

** 3600 RPM max. for bore > 2" [52mm].

^ Optional, standard temperature range is -40° to 130°C.

^^ Analog position signals of resolver are converted to digital signals by external analog-to-digital board not provided by Avtron.

 All Avtron and Admotec products shown in the specifications table above are CE Rated.

Index

| | |
|---|-----------|
| Adapters | 6 |
| Admotec, Inc. Products | 24 |
| BC Tach Replacement | 8, 13, 23 |
| Building a Part Number | 15 |
| Components | 24 |
| Couplings | 10 |
| CE Labeling | 27 |
| Diagnostics | 25 |
| Environmental Ratings | 2 |
| Face Mount | 7-13 |
| Foot Mount | 13 |
| Frequency to Voltage Converters/ Analog Tach Replacement | 24 |
| Grounding Brushes | 24 |
| Mechanical Mounting | 2 |

| | |
|-----------------------------|----|
| Motor Adapters | 6 |
| OEM Components | 24 |
| Output Specifications | 25 |
| Overspeed Switchers | 24 |
| Pricing | 2 |
| PY Tach Replacement | 22 |
| Repairs | 22 |
| Replace Other Models | 22 |
| Resolvers | 24 |
| Rotors | 6 |
| Sine-Cosine Encoders | 24 |
| Site Surveys | 28 |
| Stub Shafts | 14 |
| Waveforms | 25 |



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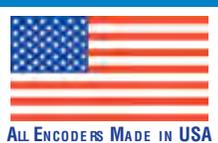
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QUALITY SYSTEM CERTIFIED TO ISO 9001

Avtron's Encoder Designs are Designed and Built for Maximum Reliability