

ENCODER INSTRUCTIONS

XR56 SMARTSafe™

4 1/2" C-FACE MOUNT MODULAR
FOR HAZARDOUS APPLICATIONS

DESCRIPTION

The Avtron XR56, SMARTSafe™ is a modular, two piece incremental encoder for hazardous atmosphere applications. It provides a two phase, A Quad B frequency (pulse) output, with complements. The XR56 mounts on a 4.5" (NEMA 56C) Face.

CAUTION

The XR56 is designed for use in hazardous applications which require protection from gas or dust ignition for safe operation. Proper selection, wiring and installation procedures are essential to ensuring safe conditions.

Because the XR56 is modular, there are no bearings or couplings required. This, combined with the latest magnetoresistive (MR) sensor technology, allows the XR56 to provide superior mechanical performance and increased reliability.

An Avtron XR56 can be configured with one or two independent outputs. Each output has six signals: (A, B) 90° out of phase, with complements (\bar{A} , \bar{B}). A marker pulse with complement (Z , \bar{Z}) is also provided.

Output resolution on the XR56 is determined by the sensor only. Unlike older models, any PPRs can be mixed and matched. Selection of the rotor is based only on the shaft mounting requirements (and not PPR).

ADAPTIVE ELECTRONICS

A perfect duty cycle consists of a waveform whose "high" and "low" conditions are of the same duration (50%/50%). It is possible over time for the duty cycle and edge separation to change due to component drift, temperature changes, or mechanical wear. The Adaptive Electronics extend the life of the XR56 by constantly monitoring and correcting duty cycle and edge separation over time.

INSTALLATION

WARNING

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

Refer to the following attached installation drawings for installation information appropriate for specific hazardous locations:

D53008: ATEX / IECEx Zone 1, 21

D52353: ATEX / IECEx Zone 2, 22

D52354: US and Canada Class I Division 1 Encoder

D52355: US and Canada Class I Division 2

NOTE

The equipment is intended for a fixed installation and should be mounted so as to avoid electrostatic charging. The XR56 is not considered as a safety device and is not suitable for connection into a safety system.

The XR56 construction materials contain no more than 7.5% in total by mass of magnesium, titanium and zirconium. These materials are not considered as able to trigger an explosion in normal operating modes. These materials are not known to react with any explosive atmospheres to which the XR56 may be subject. The construction materials do include aluminum. As such care should be taken to avoid the possibility of ignition from impact or friction. It is the responsibility of the end user to ensure that the XR56 is selected correctly for the potentially explosive atmosphere in which the equipment is to be put into service.

The XR56 installation is similar to AV56. Installation and removal videos for the AV56/67/85/115 are available on Avtron's web site. Refer to the back page of these instructions for outline and mounting dimensions. The motor must comply with 1998 NEMA MG 1, section 4, for tolerances on diameters and runout for shafts and accessory faces. Axial float or endplay plus rotor location tolerance must be less than $\pm 0.050"$.

EQUIPMENT NEEDED FOR INSTALLATION

| Provided | Optional | Not Provided |
|---|--|--|
| <ul style="list-style-type: none"> AV56 Stator/Housing Socket Hd Cap Screw 3/8"-16 x 1.25" (qty 4) AV56 Rotor Socket Set Screw #M4 x 8mm (qty 2) or Pre-Installed Cam Screw Thread locker (Blue) | <ul style="list-style-type: none"> Extended Shaft Cover w/ Screws 6-32 x 0.31" (qty 4) Lock Washers Thru Shaft Cover w/ V-Ring Seal and Silicone Lubricant XR3 Isolator Model XR3 for Division I, Zone 0, 1, 20 and 21 Applications (Sold Separately) | <ul style="list-style-type: none"> Phillips Screwdriver 2mm Hex Wrench (T-Handle Style for set screw Rotors) 3mm Hex Wrench 5/16" Hex Wrench |

In preparation for installing the Model XR56 encoder, it is first necessary to clean both the accessory motor shaft and the mounting face. These surfaces must be inspected and any paint, burrs, or other surface imperfections removed.

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

ROTOR INSTALLATION

The motor shaft must project at least 0.66" from the motor face. For set screw rotors only: Apply anti-seize compound to the motor shaft. For all rotors: Slide the rotor onto the shaft with the marking "Motor side" facing in, (toward the motor face). The rotor centerline must match the sensor centerline. To accomplish this, use the rotor locating gauge (A28503) and slide the rotor onto the shaft until it is in the proper position as shown in Figure 1. If a gauge is not available, use the stator housing alignment grooves as shown in Figure 3.

STANDARD CAM SCREW ROTOR INSTALLATION

Turn the cam screws of the rotor in the directions shown on the rotor to engage the cams. Tighten to 50-60 in-lb [5.6 - 6.8 N-m] (Fig 2) using the 3mm hex wrench. Total cam screw rotation will be less than one turn.

CAUTION

Do not adjust the cam screws before motor shaft mounting; bottoming out the screws, or backing them out excessively, can lead to insufficient shaft holding force. Thread locker is pre-applied on the cam screws.

LARGE BORE SET SCREW ROTOR INSTALLATION

Apply thread locker to the rotor set screw holes, preferably from the inside of the rotor bore before mounting. Tighten the rotor set screws to 15 in-lb [2 N-m] using the 2mm T-handle hex wrench.

CAUTION

Use only a T-handle or torque hex wrench to tighten set screws; using a right angle wrench will not provide enough holding force, and the rotor may slip.

STATOR HOUSING INSTALLATION

The stator housing is attached to the motor using four socket head cap screws (4) 3/8"-16 x 1.25", locating on a 5.88" bolt circle. Longer bolts (not included), are required for sandwich installation between a motor and a brake. Install the four mounting bolts using thread locker and torque to approximately 20-30 ft lbs [27 to 40 N-m] using the 5/16" T-handle hex wrench.

VERIFY ROTOR LOCATION

To ensure the rotor is properly located on the shaft: remove the back cover if factory-preinstalled, and verify that the outer face of the rotor is at the same depth as the alignment grooves, using a straight edge tool. (Fig 3)

CAUTION

Do not use silicone sealants or caulk of any kind on the motor or encoder face; these can cause misalignment or sensor scraping damage. The XR56 electronics are fully sealed; water may enter and leave the rotor area as needed. A drain hole option is available if frequent moisture buildup is expected.

COVER INSTALLATION

Covers must not interfere with the motor shaft or rotor. The longest shaft that can be used without interfering is 0.72" [18.3mm] with a standard flat cover (Cover Style option "F") and 2.55" [64.8mm] with an extended "pie pan" cover (Cover Style option "E"). Through shaft covers are available for other applications (Cover Style option "T").

EXTENDED COVER MOUNT

(Cover Style option "E")

The extended cover mounts to the encoder housing using quantity 4 #6-32 x 0.31" screws, lock washers, and thread locker.

THRU SHAFT AND FLAT COVER INSTALLATION

(Cover Style option "T" and "F")

The housing has a machined step in the outboard face to accept the cover and a recessed groove for the retaining ring. Insert the cover, line up ears on cover, smooth side facing out, fully into the machined step until it seats against shoulder. Using a spiral assembly method, install the retaining ring by first inserting the squared off end into the machined groove. Flex the ring and insert it into the groove walking it around the perimeter (A flat blade screwdriver can be used). Final position should have the ring fully seated into groove. Remove the cover by reversing above procedure, starting with the tang end.

WIRING

Refer to the attached installation drawings referenced above for wiring diagrams. Use the drawing appropriate for the encoder's installation location. Information on specific connector pin-outs and phasing can be found on labels on the encoders and in the tables included in these instructions.

The XR56 can be wired for single phase or two phase, either with or without complements, with or without markers. For bidirectional operation, Phase A channel typically leads phase B channel for clockwise shaft rotation as viewed from the anti-drive or accessory end of the motor (XR56 mounting end). Refer to the pinout and phasing tables for exceptions.

NOTE

Wiring option "G" provides a pinout compatible with Northstar™ encoders, with a cable shield connection on pin 10. Note that this option does not ground the shield.

CORRECTIVE ACTION FOR PHASE REVERSAL

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

Interconnection cables specified in the wire selection chart are based on typical applications. Cable must be selected and installed in accordance with regional standards. Typical interconnection cable is 4 twisted pair + overall shield. Recommended cable is Avtron B37178. Alternates are Belden P/N 1064A or Rockbestos 04P-18 I/S-OS. Actual cables should be picked based on specific application requirements such as abrasion, temperature, tensile strength, solvents, etc. General electrical requirements are: stranded copper, 20 through 16 AWG, twisted wire pairs, braid or foil individual shields or over-all shield with drain wire, .03uF of maximum total mutual or direct capacitance and outer sheath insulator. 20 AWG wire should not be used for DC power to the encoder for runs greater than 200 feet and 22AWG should not be used for runs greater than 100 ft. This is to minimize voltage drop between the encoder and the XRB3 isolator. The smaller conductors are acceptable for the signal lines.

FAULT-CHECK

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

If the adaptive electronics reach their adjustment limit for any reason, the Fault-Check alarm and LED will notify the drive and operator of an impending failure. The LED will turn red if the Adaptive Electronics reach their adjustment limit. This output occurs before an actual failure, allowing steps to be taken to replace the unit before it causes unscheduled downtime. Fault-Check annunciation is available as an “alarm” output through the connector (zone 2 and division 2 configurations only) and as an integral LED.

TROUBLESHOOTING

If the drive indicates a loss of encoder/tach fault and the XR56 fault-check LED is not illuminated, check the encoder power supply. If power is present, check polarity; one indicator of reversed power supply is that all outputs will be high at the same time. If the drive indicates encoder fault, but the LED shows GREEN, then check the wiring between the drive and the encoder. If the wiring appears correct and in good shape, test the wiring by replacing the XR56. If the new unit shows GREEN, and the drive still shows encoder loss/tach fault, then the wiring is faulty and should be repaired or replaced.

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

1. Remove the rear cover, and use the built-in gauge to check the location of the rotor (Fig 1). Ensure the label marked “This side out” and/or cam screws is/are facing away from the motor.
2. Remove the XR56 from the motor. Clean the housing mounting surface for the XR56 housing. Ensure the XR56 is directly mounted on the motor, with no sealant, gasketing, or other materials, and is firmly bolted in place.

If the alarm output and/or LED indicate a fault (RED) on a properly mounted XR56 and the rotor is properly located, replace the XR56. An oscilloscope can also be used to verify proper output of the SMARTSafe™ encoder at the encoder connector itself and at the drive/controller cabinet. If the outputs show large variations in the signals at steady speed (jitter or “accordion effect”, see below), check rotor position. If the rotor position is correct, the motor or shaft may be highly magnetized. Replace any magnetized material nearby with non-magnetic material (aluminum, stainless) (especially shafts). For GE CD frame motors and similar styles, Avtron offers non-magnetic stub shafts. If variations persist, consider replacing the encoder with super-shielded models, option -005, or use retrofit shielding kits AVSKxxx yy z, where xxx=model (ex: 56A), yy=rotor (ex: CB), and z=cover (ex: F).

NOTE

Do not use rotors from THIN-LINE I (M56, M56S, M67, M85, M115) with XR56. This will cause incorrect PPR output, but the XR56 LED will remain green.

ENCODER REMOVAL

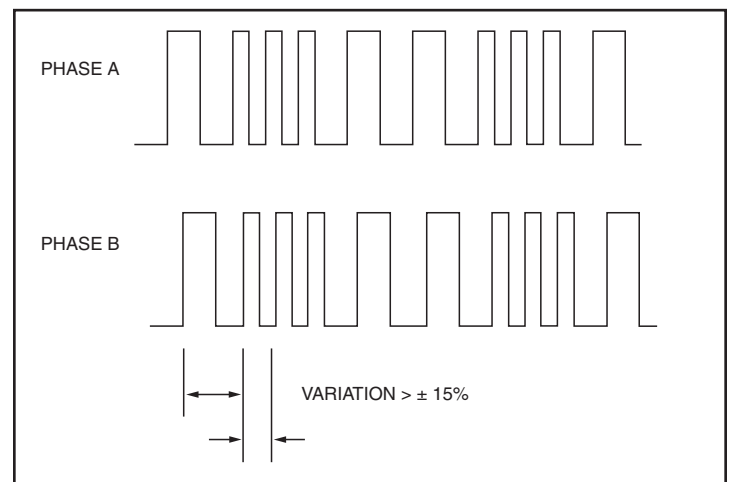
The XR56 stator housing can be removed by loosening and removing the socket head cap screws.

CAM SCREW ROTOR REMOVAL

Disengage the (2) cam screws by turning them counterclockwise less than 1 full turn. The cam heads will visibly move away from the shaft. Remove the rotor by hand by pulling it away from the motor. If the rotor will not move, do NOT use a gear puller, and do not use a heat gun. Instead, insert two M6 screws, >25mm length into the Jack Screw Holes shown in Fig 2. Alternately tighten the screws to push the rotor away from the motor and remove it.

LARGE BORE SET SCREW ROTOR REMOVAL

Disengage the (2) set screws by turning them counterclockwise until removed from the rotor. Retain the set screws. Remove the rotor by hand by pulling it away from the motor. If the rotor will not move, do NOT use a gear puller, and do not use a heat gun. Instead, pry the rotor away from the motor gently, being careful to only pry against the rotor metal hub and not the magnetic outer strip.



XR56 PART NUMBERS AND AVAILABLE OPTIONS

| Model | Housing Type | Rotor Code (See Chart) | Cover Style | Line Driver | Single/Left Output (PPR) | Right Output (PPR) | Connector | Modifications |
|-------|--------------------------------------|--|---|---|---|---|---|---|
| XR56A | 1- Single Output 2- Double Output | C0- None-std. Shaft Size XX- None US Metric CA- 0.500 D2- 10mm CB- 0.625 D3- 12mm CC- 0.875 DB- 14mm CD- 0.938 DC- 15mm CE- 1.000 DD- 16mm CF- 1.125 D4- 18mm CG- 1.250 DE- 19mm CH- 1.375 DF- 24mm CT- 1.500 DG- 28mm CJ- 1.625 DH- 30mm CK- 1.750 DT- 32mm CL- 1.875 DJ- 36mm CM- 2.000 DK- 38mm CN- 2.125 DL- 42mm CQ- 2.250 DM- 45mm CP- 2.375 DN- 48mm CR- 2.500 DP- 52mm TS- 2.625* DR- 55mm TU- 2.875* DS- 60mm TV- 3.000* MU- 65mm* T4- 3.125* MV- 70mm* T7- 3.188* MW- 75mm* MY- 80mm* MZ- 85mm* | E- Extended Shaft Cover F- Flat Cover T- Flat Thru-Hole Cover with Shaft Seal | See Line Driver / Connector Options Chart PAGE 5 | 0- Non-std. 60 V- 900 J- 960 Y- 1024 F- 60 Z- 1200 G- 100 H- 120 A- 128 L- 240 N- 256 P- 300 E- 360 B- 480 Q- 500 R- 512 S- 600 | 0- Non-std. 60 J- 960 Y- 1024 F- 60 Z- 1200 G- 100 H- 120 A- 128 L- 240 N- 256 P- 300 E- 360 B- 480 Q- 500 R- 512 S- 600 V- 900 | See Line Driver / Connector Options Chart | 000- No Modification 005- Super Magnetic Shielding 4xx- Special PPR Code, consult factory 9xx- Special Cable Length, xx=length in feet 018- Includes Isolator |

* Set Screw Rotor Only

| SPECIAL PPR OPTION CODES | | |
|--------------------------|----------|-----------|
| OPTION CODE | LEFT PPR | RIGHT PPR |
| 401 | 1270 | None |
| 402 | 150 | None |
| 403 | 50 | None |
| 404 | 512 | 16 |
| 405 | 16 | None |
| 406 | 6000 | None |

| Size Inches | Rotor Codes for English Shaft Sizes | | | | | | Size mm | Rotor Codes for Metric Shaft Sizes | | | | | |
|-------------|-------------------------------------|------|-----------------|------|------------------|------|---------|------------------------------------|------|-----------------|------|------------------|------|
| | Cam Screw Style | | Set Screw Style | | Single Cam Keyed | | | Cam Screw Style | | Set Screw Style | | Single Cam Keyed | |
| | Style | Size | Style | Size | Style | Size | | Style | Size | Style | Size | Style | Size |
| NONE | X | X | X | X | X | X | NONE | Y | X | Y | X | Y | X |
| 0.500 | C | A | T | A | K | N/A | 10.0 | D | 2 | M | 2 | J | N/A |
| 0.625 | C | B | T | B | K | N/A | 11.0 | D | A | M | A | J | N/A |
| 0.875 | C | C | T | C | K | N/A | 12.0 | D | 3 | M | 3 | J | N/A |
| 0.938 | C | D | T | D | K | D | 14.0 | D | B | M | B | J | N/A |
| 1.000 | C | E | T | E | K | N/A | 15.0 | D | C | M | C | J | N/A |
| 1.112 | C | 3 | T | 3 | K | N/A | 16.0 | D | D | M | D | J | N/A |
| 1.125 | C | F | T | F | K | F | 18.0 | D | 4 | M | 4 | J | N/A |
| 1.188 | C | 2 | T | 2 | K | N/A | 19.0 | D | E | M | E | J | N/A |
| 1.250 | C | G | T | G | K | N/A | 24.0 | D | F | M | F | J | N/A |
| 1.375 | C | H | T | H | K | N/A | 25.0 | D | 5 | M | 5 | J | N/A |
| 1.500 | C | T | T | T | K | N/A | 28.0 | D | G | M | G | J | N/A |
| 1.625 | C | J | T | J | K | N/A | 30.0 | D | H | M | H | J | N/A |
| 1.750 | C | K | T | K | K | N/A | 32.0 | D | T | M | T | J | N/A |
| 1.875 | C | L | T | L | K | N/A | 36.0 | D | J | M | J | J | N/A |
| 2.000 | C | M | T | M | K | N/A | 38.0 | D | K | M | K | J | N/A |
| 2.125 | C | N | T | N | K | N/A | 42.0 | D | L | M | L | J | N/A |
| 2.250 | C | Q | T | Q | K | N/A | 45.0 | D | M | M | M | J | N/A |
| 2.375 | C | P | T | P | K | N/A | 48.0 | D | N | M | N | J | N/A |
| 2.500 | C | R | T | R | K | N/A | 52.0 | D | P | M | P | J | N/A |
| 2.625 | C | N/A | T | S | K | N/A | 55.0 | D | R | M | R | J | N/A |
| 2.750 | C | N/A | T | W | K | N/A | 60.0 | D | S | M | S | J | N/A |
| 2.875 | C | N/A | T | U | K | N/A | 65.0 | D | N/A | M | U | J | N/A |
| 3.000 | C | N/A | T | V | K | N/A | 70.0 | D | N/A | M | V | J | N/A |
| 3.125 | C | N/A | T | 4 | K | N/A | 75.0 | D | N/A | M | W | J | N/A |
| 3.188 | C | N/A | T | 7 | K | N/A | 80.0 | D | N/A | M | Y | J | N/A |
| 3.250 | C | N/A | T | Z | K | N/A | 85.0 | D | N/A | M | Z | J | N/A |

| | | Line Driver Options | | | | | |
|-----------------------------------|--|---|-----------------------------|-----------------------------|----------------------------|--------------------------|------------------------------|
| | | Description | ATEX / IECEx Zone 1 & 21 | ATEX / IECEx Zone 2 & 22 | Class I Div. 1 & Zone 0 | Class I Div. 2 Listed | Class I Div. 2 Recognized |
| | | Voltage In / Out | 5-7 / 5 | 5-24 / 5-24 | 5-7 / 5 | 5-24 / 5-24 | 5-24 / 5-24 |
| | | Line Driver Code | H | 7 | F | G | R |
| Code | Required Isolator | XR3 | None | XR3 | None | None | None |
| Thinline Connector Options | A | 10 Pin MS W/O Plug Std Phasing | ✓ | ✓ | ✓ | | ✓ |
| | B | 10 Pin MS W/O Plug Dynapar Phasing | ✓ | ✓ | ✓ | | ✓ |
| | C | 10 Pin MS W/Plug Std Phasing | ✓ | ✓ | ✓ | | ✓ |
| | D | 10 Pin MS W/Plug Dynapar Phasing | ✓ | ✓ | ✓ | | ✓ |
| | E | 7 Pin MS W/Plug A-quad-B Std. Phasing | ✓ | ✓ | ✓ | | ✓ |
| | F | 7 Pin MS W/Plug A, A\ Std. Phasing | ✓ | ✓ | ✓ | | ✓ |
| | J | 7 Pin MS W/Plug A, B, Z Std. Phasing | ✓ | ✓ | ✓ | | ✓ |
| | K | 7 Pin MS W/Plug A, A\, B, B\ Std. Phasing | ✓ | ✓ | ✓ | | ✓ |
| | S | 7 Pin MS W/Plug A-quad-B Dyn. Phasing | ✓ | ✓ | ✓ | | ✓ |
| | T | 7 Pin MS W/Plug A, A\ Dyn. Phasing | ✓ | ✓ | ✓ | | ✓ |
| | U | 7 Pin MS W/Plug A, B, Z Dyn. Phasing | ✓ | ✓ | ✓ | | ✓ |
| | V | 7 Pin MS W/Plug A, A\, B, B\ Dyn. Phasing | ✓ | ✓ | ✓ | | ✓ |
| | P | Small Industrial Style Std. Pinout & Plug | ✓ | ✓ | ✓ | | |
| | G | Small Industrial Style Northstar Pinout & Plug | ✓ | ✓ | ✓ | | |
| | R | 10 Pin mini Twist Lock with Plug | ✓ | ✓ | ✓ | | |
| | W | Flexible Cable with Sealing Gland | ✓ | ✓ | ✓ | | |
| | Y | 10 Pin MS with Plug on 12" cable | ✓ | ✓ | ✓ | | |
| | H | Conduit Box, Terminal Block & 1/2" NPT | ✓ | ✓ | ✓ | ✓ | |
| M | Conduit Box, Terminal Block, 3/4" NPT | ✓ | ✓ | ✓ | ✓ | | |
| N | Conduit Box, Terminal Block & 1" NPT | ✓ | ✓ | ✓ | ✓ | | |
| 8 | Conduit Box, Terminal Block & 25mm | ✓ | ✓ | ✓ | ✓ | | |

SPECIFICATIONS

ELECTRICAL

- A. Operating Power (Vin)
 1. VoltsSee Line Driver Option Chart
 2. Current100mA, each output, no load
- B. Output Format
 1. 2/ & Comp.....A, \bar{A} , B, \bar{B} (differential line driver)
 2. Marker.....1/Rev, Z, \bar{Z}
- C. Signal TypeIncremental, Square Wave, 50 ±10% Duty Cycle.
- D. Direction Sensing.....Typically A leads.
 Refer to the connector pinout and phasing table for exceptions B for CW rotation as viewed from the back of the tach looking at the non-drive end of the motor.
- E. Phase Sep15% minimum
- F. Frequency Range0 to 165,000 Hz
- G. PPR8-5000
- H. Line Driver SpecsSee table
- I. Connectors.....See connector options on page 1
- J. Integral LED Indicator.....GREEN: power on, unit ok. RED: alarm on

MECHANICAL

- A. Rotor Inertia0.17-0.36 Oz. In. Sec.2
- B. Acceleration5000 RPM/Sec. Max.
- C. Speed5400 RPM Max.
- D. Weight.....2-3 lbs [0.9kg to 1.36kg].
- E. Sensor to Rotor
 Air Gap (nominal).....0.023" [0.58mm]
 Tolerance±0.015" [0.38mm]
- F. Rotor Axial Tolerance.....±0.050" [±1.27mm]

ENVIRONMENTAL

Solid cast aluminum stator and rotor. Less than 7.5% in total magnesium, titanium and zirconium. Fully potted electronics, protected against oil and water spray.
 Operating Temperature: -40 to 80°C, 0-100% condensing humidity. See "Description" section for information on hazardous location environments.

| XR56 Connector Spare Parts | | | | | |
|----------------------------|------------------------|--------------|------------|---------------|---------------|
| Style | Code | Encoder Side | | Customer Side | |
| Small | | 315934 | Base | 315937 | Hood |
| Industrial "Epic" | P, G | 315935 | Terminals | 315936 | Terminals |
| | | | | 401122 | 1/2 NPT |
| 10 pin MS | A, B, C, D | 431079 | Receptacle | 316445 | Plug |
| | | | | 411216 | Bushing |
| | | | | 411217 | Bushing |
| | | | | 411218 | Bushing |
| | | | | 411219 | Bushing |
| 7 Pin MS | E, F, J, K, S, T, U, V | 431080 | Receptacle | 316446 | Plug |
| | | | | 411218 | Bushing |
| | | | | 411219 | Bushing |
| Conduit Box | H,M,N,8 | | | 364987 | Terminal Plug |
| 10 pin mini MS Twist Lock | R | 431081 | Base | 316447 | Plug |
| | | 471748 | Gasket | | |
| 10 pin MS on cable | Y | 314383 | In-Line | 316445 | Plug |
| | | | | 411216 | Bushing |
| | | | | 411217 | Bushing |
| | | | | 411218 | Bushing |
| | | | | 411219 | Bushing |

| Description | Code | Line Driver Specifications | | | | Isolator Specifications | | Units | |
|--------------------------------|-----------------------------------|---|----------------------------|-------------------------|----------------------------|---|--|-----------------|--|
| | | H | 7 | F | G | XRB3 | | | |
| | Symbol | ATEX / IECEx Zone 1 & 21(ia) | ATEX / IECEx Zone 2 & 22 | Class I Div. 1 & Zone 0 | Class I Div. 2 Listed | ATEX/IECEx Zone 1&21(ia) + Class I Div 1&Zone 0 | | | |
| Line Driver | | 7272 | 7272 | 7272 | 7272 | IXDF604 | | | |
| Input Voltage (Nominal) | V _{IN} / V _S | 5-7 | 5-24 | 5-7 | 5-24 | 12-24 | | V _{DC} | |
| Input Voltage (Max Safe) | U _M | N/A | N/A | N/A | N/A | 30 | | V | |
| Input Current (no load) | I _{IN} / I _S | 80 | 80 | 80 | 80 | 150 | | mA | |
| Input Current (Typical) | I _{IN} / I _S | 100 | 200 | 100 | 200 | 450 | | mA | |
| Input Current (Max.) | I _{IN} / I _S | 140 | 300 | 140 | 300 | 900 | | mA | |
| Output Voltage (nominal) | V _H | N/A | N/A | N/A | N/A | 6.8 | | V _{DC} | |
| Output Voltage Min.(@140mA) | V _H | N/A | N/A | N/A | N/A | 5 | | V _{DC} | |
| Output Voltage Max(No Load) | V _H | N/A | N/A | N/A | N/A | 7.14 | | V _{DC} | |
| Output Current (@6.8V) | I _H | N/A | N/A | N/A | N/A | 115 | | mA | |
| Output Current (@5V) | I _H | N/A | N/A | N/A | N/A | 140 | | mA | |
| Output Current (short circuit) | I _H | N/A | N/A | N/A | N/A | 420 | | mA | |
| Voltage Output High (Nominal) | V _{OH} | 5 | V _{IN} -1 | 5 | V _{IN} -1 | V _S -1 | | V _{DC} | |
| Voltage Output Low (Nominal) | V _{OL} | .5 | .5 | .5 | .5 | .4 | | V _{DC} | |
| Signal Current (Continuous) | I _{OH} / I _{OL} | 100 | 100 | 100 | 100 | 2580 | | mA | |
| Signal Current (Peak) | I _{OH} / I _{OL} | 1500 | 1500 | 1500 | 1500 | 3000 | | mA | |
| Output Resistance Ω | R _{OH} / R _{OL} | 15 | 15 | 15 | 15 | 7 | | Ω | |
| Cable Drive | | 500 | 5-15Vin=500 24Vin = 250 | 500 | 5-15Vin=500 24Vin = 250 | 1000 | | ft. | |
| Protection | Reverse Voltage | Yes | Yes | Yes | Yes | Yes | | | |
| | Short Circuit | Best | Good | Best | Good | Best | | | |
| | Transient | Good | Good | Good | Good | Best | | | |
| Alarm | +Vout | no | Yes | no | Yes | no | | | |
| | Alarm | no | Yes | no | Yes | no | | | |
| | LED | Yes | Yes | Yes | Yes | Yes | | | |
| | +Vout | Reverence Signal for Alarm Circuit, Output Voltage = Input Voltage | | | | | | | |
| | Alarm | Open Collector, normally off, goes low on alarm, sink 100mA max, See Connector Pinouts for Availability | | | | | | | |
| | LED | Green = Power On, Red = Alarm | | | | | | | |

**Thinline II Spare Parts
(XR56/XR56S/XR67/XR85/XR115 Only)
SAE/USA Sizes**

| Shaft Size | Rotors XR56, XR56S, XR67 & XR115 | | Rotor AV56S & XR56S | Thru-Shaft Covers | |
|---------------|--|-----------|---------------------------------|---|-------------------------|
| | Option Code | Cam Screw | Set Screw Stainless Rotor | AV56, AV56S, AV67, AV115, XR56, XR56S, XR67 & XR115 Cover Kit | AV85/XR85 Cover /kit |
| .500/.4995 | CA | AVTR1-CA | AVTR2-TA | A36521-TA | A36523-TA |
| .625/.6245 | CB | AVTR1-CB | AVTR2-TB | A36521-TB | A36523-TB |
| .875/.8745 | CC | AVTR1-CC | AVTR2-TC | A36521-TC | A36523-TC |
| .9375/.9370 | CD | AVTR1-CD | AVTR2-TD | A36521-TD | A36523-TD |
| 1.000/.9995 | CE | AVTR1-CE | AVTR2-TE | A36521-TE | A36523-TE |
| 1.125/1.1245 | CF | AVTR1-CF | AVTR2-TF | A36521-TF | A36523-TF |
| 1.250/1.2495 | CG | AVTR1-CG | AVTR2-TG | A36521-TG | A36523-TG |
| 1.375/1.3745 | CH | AVTR1-CH | AVTR2-TH | A36521-TH | A36523-TH |
| 1.500/1.4995 | CT | AVTR1-CT | AVTR2-TT | A36521-TT | A36523-TT |
| 1.625/1.6245 | CJ | AVTR1-CJ | AVTR2-TJ | A36521-TJ | A36523-TJ |
| 1.750/1.7495 | CK | AVTR1-CK | AVTR2-TK | A36521-TK | A36523-TK |
| 1.875/1.8745 | CL | AVTR1-CL | AVTR2-TL | A36521-TL | A36523-TL |
| 2.000/1.9995 | CM | AVTR1-CM | AVTR2-TM | A36521-TM | A36523-TM |
| 2.125/2.1245 | CN | AVTR1-CN | AVTR2-TN | A36521-TN | A36523-TN |
| 2.250/2.2495 | CQ | AVTR1-CQ | AVTR2-TQ | A36521-TQ | A36523-TQ |
| 2.375/2.3745 | CP | AVTR1-CP | AVTR2-TP | A36521-TP | A36523-TP |
| 2.500/2.4995 | CR | AVTR1-CR | AVTR2-TR | A36521-TR | A36523-TR |
| 2.625/2.6245 | TS | N/A | AVTR2-TS | A36521-TS | A36523-TS |
| 2.875/2.8745 | TU | N/A | AVTR2-TU | A36521-TU | A36523-TU |
| 3.000/2.9995 | TV | N/A | AVTR2-TV | A36521-TV | A36523-TV |
| 3.1250/3.1245 | T4 | N/A | AVTR2-T4 | A36737-T4 | A36523-T4 |
| 3.1875/3.1870 | T7 | N/A | AVTR2-T7 | A36737-T7 | A36523-T7 |

| | |
|----------------------|---------|
| 1.125" w/.25" Keyway | AVTR-KD |
| 15/16" w/.25" Keyway | AVTR-KF |

Extended and Flat Cover Plates

| Shaft Size | Model | Extended Shaft Cover Kit | Flat Cover Kit |
|------------|---|--------------------------|----------------|
| Any | AV56A, AV67, AV115, XR56A, XR67, XR115 | A35841 | A37298 |
| Any | AV56S, XR56S | A36526 | A37298 |
| Any | AV85, XR85 | A35841 | A36525 |

**Thinline II Spare Parts
(XR56/XR56S/XR67/XR85/XR115 Only)**

Metric Sizes

| Shaft Size | Rotors XR56A, XR67, XR85, XR115 | | | Thru-Shaft Covers | |
|------------|------------------------------------|-----------|-----------|---|-------------------------|
| | Option Code | Cam Screw | Set Screw | AV56, AV56S, AV67, AV115, XR56, XR56S, XR67, XR115, Cover Kit | AV85/XR85 Cover /kit |
| 10mm | D2 | AVTR1-D2 | N/A | A36522-M2 | A36524-M2 |
| 11mm | DA | AVTR1-DA | N/A | A36522-MA | A36524-MA |
| 12mm | D3 | AVTR1-D3 | N/A | A36522-M3 | A36524-M3 |
| 14mm | DB | AVTR1-DB | N/A | A36522-MB | A36524-MB |
| 15mm | DC | AVTR1-DC | N/A | A36522-MC | A36524-MC |
| 16mm | DD | AVTR1-DD | N/A | A36522-MD | A36524-MD |
| 18mm | D4 | AVTR1-D4 | N/A | A36522-M4 | A36524-M4 |
| 19mm | DE | AVTR1-DE | N/A | A36522-ME | A36524-ME |
| 24mm | DF | AVTR1-DF | N/A | A36522-MF | A36524-MF |
| 28mm | DG | AVTR1-DG | N/A | A36522-MG | A36524-MG |
| 30mm | DH | AVTR1-DH | N/A | A36522-MH | A36524-MH |
| 32mm | DT | AVTR1-DT | N/A | A36522-MT | A36524-MT |
| 36mm | DJ | AVTR1-DJ | N/A | A36522-MJ | A36524-MJ |
| 38mm | DK | AVTR1-DK | N/A | A36522-MK | A36524-MK |
| 42mm | DL | AVTR1-DL | N/A | A36522-ML | A36524-ML |
| 45mm | DM | AVTR1-DM | N/A | A36522-MM | A36524-MM |
| 48mm | DN | AVTR1-DN | N/A | A36522-MN | A36524-MN |
| 52mm | DP | AVTR1-DP | N/A | A36522-MP | A36524-MP |
| 55mm | DR | AVTR1-DR | N/A | A36522-MR | A36524-MR |
| 60mm | DS | AVTR1-DS | N/A | A36522-MS | A36524-MS |
| 65mm | MU | N/A | AVTR1-MU | A36522-MU | A36524-MU |
| 70mm | MV | N/A | AVTR1-MV | A36522-MV | A36524-MV |
| 75mm | MW | N/A | AVTR1-MW | A36522-MW | A36524-MW |
| 80mm | MY | N/A | AVTR1-MY | A36737-MY | A36524-MY |
| 85mm | MZ | N/A | AVTR1-MZ | A36737-MZ | A36524-MZ |

FIG 1

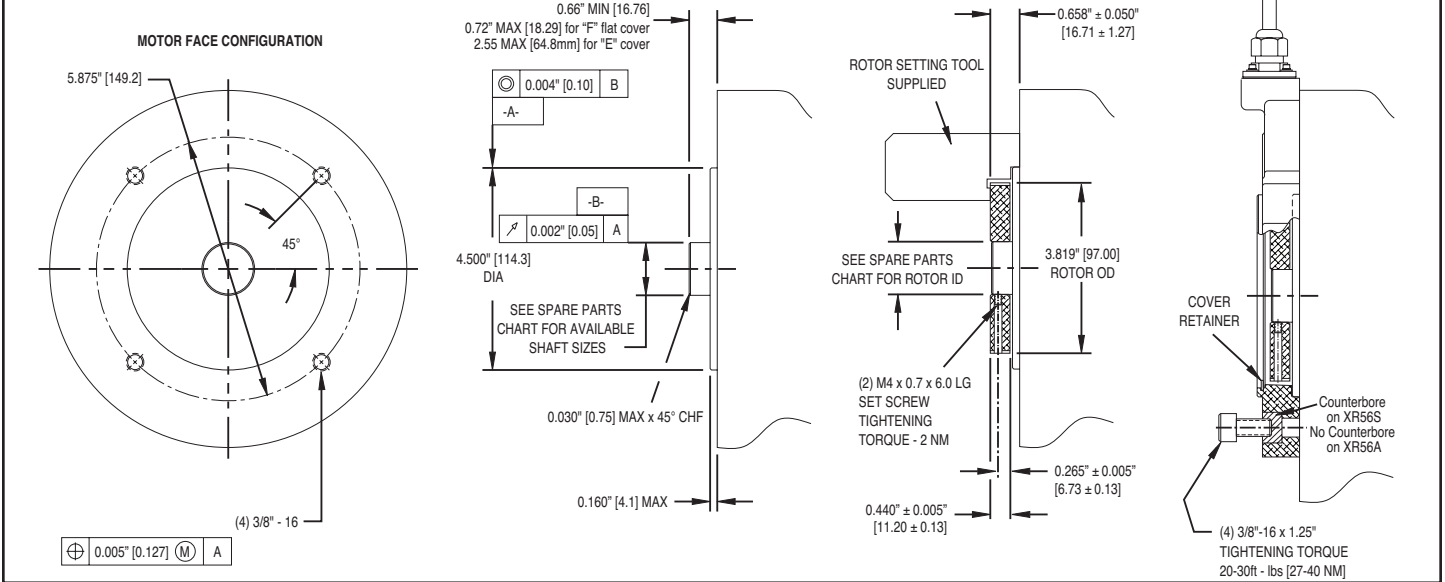


FIG 2

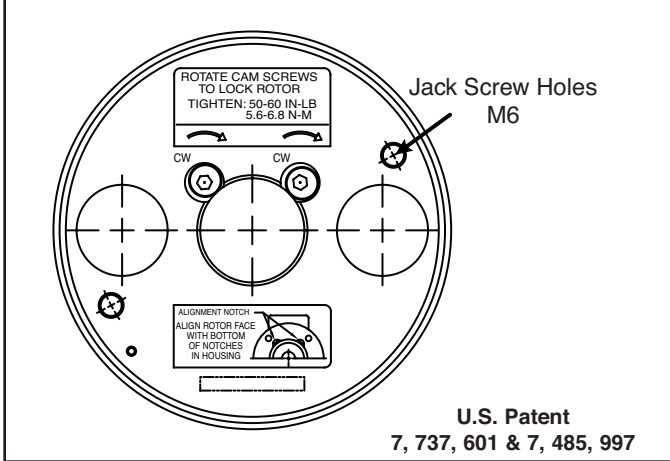
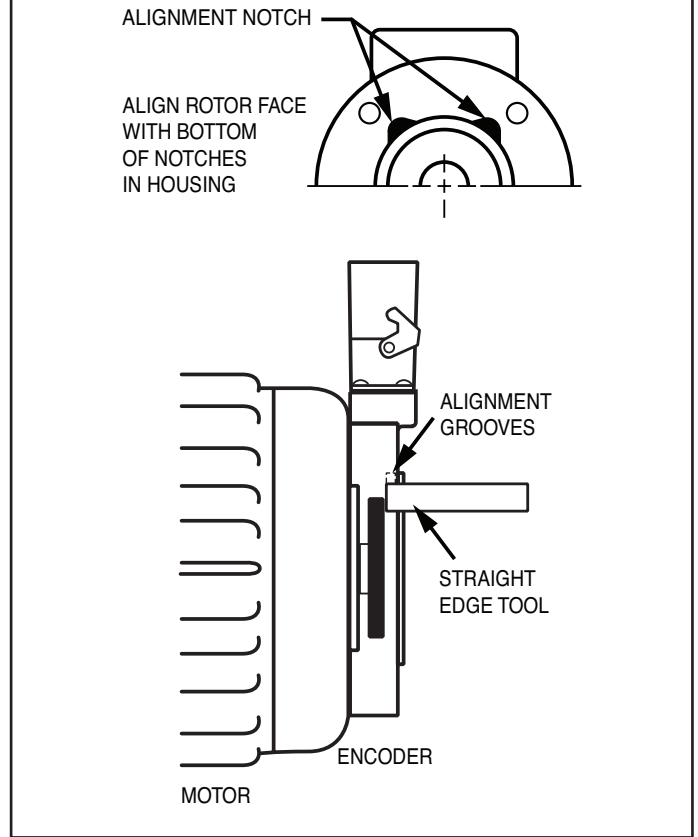


FIG 3



See the following Control Drawings for Wiring Information

D53008: ATEX / IECEx Zone 1 & 21

D52353: ATEX / IECEx Zone 2 & 22

D52354: Division 1

D52355: Division 2

Pinouts for Connector Options

| Connection | Description | Phasing | Signal | 0V Gnd | A+ | B+ | Z+ | * Alm+ | +Vin | A- | B- | Z- | * Alm |
|----------------|---|---------|--------|-----------|-----|-----|-----|-----------|------|-----|-----|-----|----------|
| Option Code | | | | | | | | | | | | | |
| Y | 10 Pin MS Avtron / Northstar Pinout | CW | Pin # | A | D | E | C | NC | B | G | H | I | NC |
| A,C | 10 Pin MS Small Encoder Std Pinout | CW | Pin # | F | A | B | C | NC | D | H | I | J | NC |
| B,D | 10 Pin MS Small Encoder Dynapar Pinout | CCW | Pin # | F | A | B | C | NC | D | H | I | J | NC |
| R | 10 Pin MS Mini Twist Lock | CW | Pin # | F | A | B | C | NC | D | H | J | K | NC |
| P | 10 Pin, Mini Industrial, Avtron Pinout | CW | Pin # | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| G | 10 Pin, Mini Industrial, Northstar Pinout | CW | Pin # | 1 | 2 | 3 | 4 | NC | 6 | 7 | 8 | 9 | NC |
| H,M,N,8 | Conduit Box W/10 Pin Terminal Block | CW | Pin # | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| W | 10 Conductor Wire Cable | CW | Color | BLK | GRN | BLU | ORG | BRN | RED | YEL | GRA | WHT | VIO |

* Remote alarm function only connected for Zone 2, Zone 22 and Division 2

| Connection | Description | Phasing | Signal | 0V Gnd | A+ | B+ | Z+ | +Vin | A- | B- | Z- |
|----------------|---|---------|--------|-----------|----|----|----|------|----|----|----|
| Option Code | | | | | | | | | | | |
| K | 7 Pin MS, Avtron / BEI Pinout (A,A',B,B') | CW | Pin # | F | A | B | NC | D | C | E | NC |
| F | 7 Pin MS, Avtron / BEI Pinout (A,A') | CW | Pin # | F | A | NC | NC | D | C | NC | NC |
| J | 7 Pin MS, Avtron / BEI Pinout (A,B,Z) | CW | Pin # | F | A | B | C | D | NC | NC | NC |
| E | 7 Pin MS, Avtron / BEI Pinout (A,B) | CW | Pin # | F | A | B | NC | D | NC | NC | NC |
| V | 7 Pin MS, Dynapar Pinout (A,A',B,B') | CCW | Pin # | F | A | B | NC | D | C | E | NC |
| T | 7 Pin MS, Dynapar HS35 Pinout (A,A') | CCW | Pin # | F | A | NC | NC | D | C | NC | NC |
| U | 7 Pin MS, Dynapar HS35 Pinout (A,B,Z) | CCW | Pin # | F | A | B | C | D | NC | NC | NC |
| S | 7 Pin MS, Dynapar HS35 Pinout (A,B) | CCW | Pin # | F | A | B | NC | D | NC | NC | NC |

Phasing is defined as the direction of rotation for which phase A leads B as viewed from the back of the Encoder

THIN-LINE II™

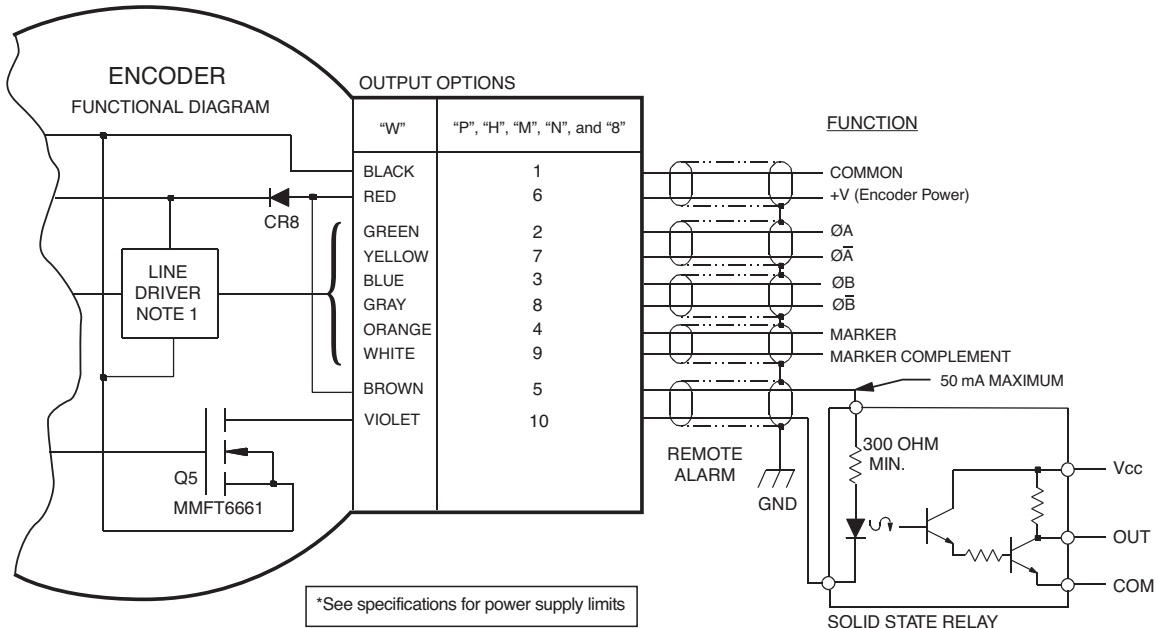
Application Examples

Applies to XR56 Zone 2 & Division 2 models, with wiring options "W", "P", "H", "M", "N", and "8".
Remote alarm not available for Zone I & Div I

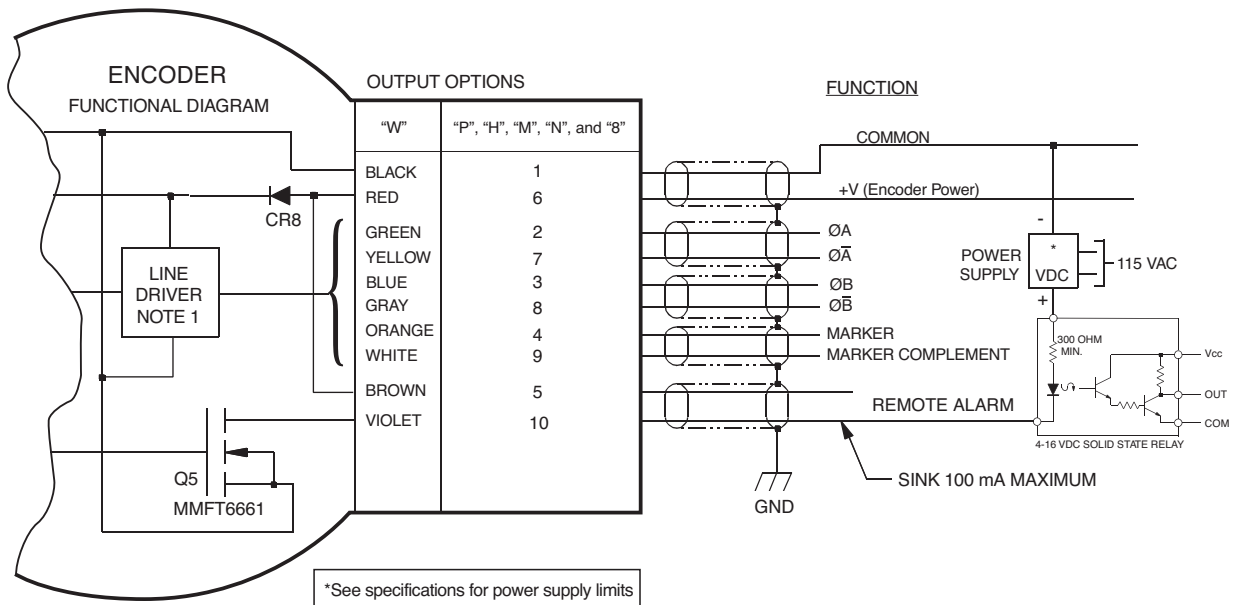
ALARM OUTPUT CONNECTION

Avtron THIN-LINE II encoders provide an alarm signal if maintenance is required under specific circumstances. An alarm LED indicator is also available. Green indicates power on, red indicates alarm on. Following are application examples provided to help install the alarm output.

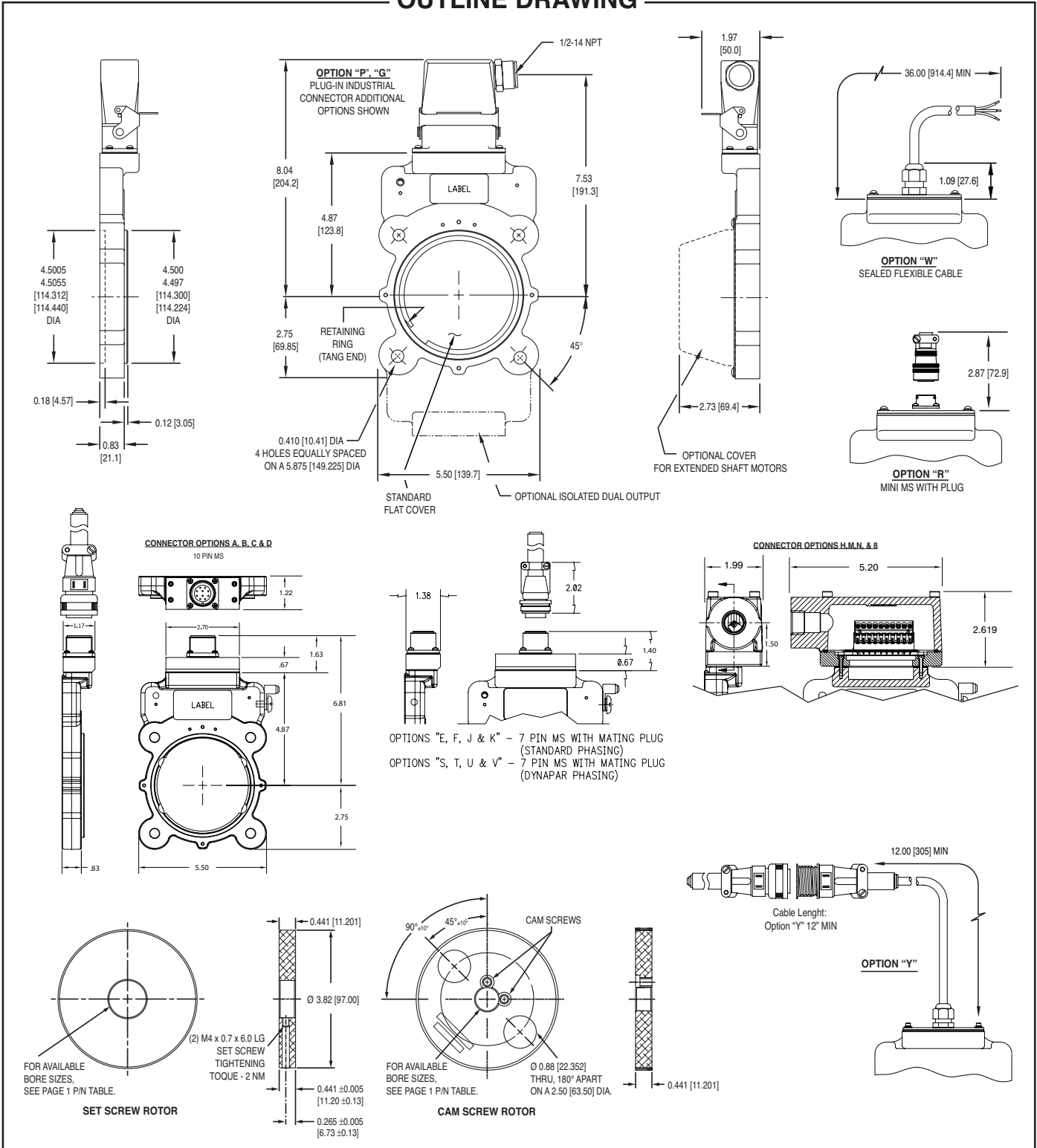
Example 1. Alarm output using +V(OUT). +V(OUT) is equal to +V, the encoder power supply.



Example 2. Alarm output using separate *VDC power supply and relay.



OUTLINE DRAWING




3 - DIMENSIONS IN INCHES [MILLIMETERS]
2 - ALL DIMENSIONS ARE APPROXIMATE
1 - WEIGHT: 2.5 - 4LBS [1.13 TO 1.81 KG].

These instructions have been reviewed and the product evaluated as suitable for our application.

Company Name _____

Authorized Company Representative _____

Title _____ Date _____

Features and specifications subject to change without notice.
Avtron standard warranty applies. All dimensions are in Inches [mm] approx. 

Nidec Industrial Solutions | 243 Tuxedo Avenue | Cleveland, Ohio 44131 | encoderhelpdesk@nidec-industrial.com
+1 216-642-1230 | www.avtronencoders.com

XRYYY XXXX5XXX XXX

LINE DRIVER OPTION CODE FOR: XR850, XR125, XR485, XR685 (5 = ib, H = ia)

CONNECTOR OPTION CODE LOCATION FOR: XR56A, XR56S
XR67A, XR85A, XR115, XR850, XR125, XR485, XR685

CONNECTOR OPTION CODE LOCATION FOR: XR45, XR47, XR4F

LINE DRIVER OPTION CODE LOCATION FOR: XR56A, XR56S
XR67A, XR85A, XR115, XR45, XR47, XR4F, (5 = ib, H = ia)

MODEL # CODES: 56A, 56S, 67A, 85A, 115, 45, 47, 4F, 850, 125, 485, 685

HAZARDOUS LOCATION CODE

CONNECTOR OPTION CODES = A, B, C, D, E, F, G, H, J, K, L, M, N, P, R, S, T, U, V, W, Y, Z, 2, 3, 4, 5, 6, 7, 8

LINE DRIVER OPTION CODE = H FOR ZONE I & 21 (ia) 5 FOR ZONE 1 & 21 (ib)

XRYY 5 X X XXX

CONNECTOR OPTION CODE LOCATION FOR: XR5, XR12, XR97

LINE DRIVER OPTION CODE LOCATION FOR: XR5, XR12, XR97

MODEL # CODES: 5, 12, 97

HAZARDOUS LOCATION CODE

CONNECTOR OPTION CODES = A, B, C, D, E, F, G, H, J, K, L, M, N, P, R, S, T, U, V, W, Y, Z, 2, 3, 4, 5, 6, 7, 8

LINE DRIVER OPTION CODE = H FOR ZONE I & 21 (ia) 5 FOR ZONE 1 & 21 (ib)

ALL OTHER CODE LOCATIONS ARE NOT RELEVANT TO INTRINSIC SAFETY. SEE INSTRUCTION SHEETS FOR DEFINITIONS

THE XR___ FAMILY OF ENCODERS HAS BEEN EVALUATED TO BE COMPLIANT WITH:

IEC60079-0:2011
EN60079-0:2012/A11:2013
IEC60079-11:2011
EN60079-11:2012
BSEN61000-6-4:2007 AND BSEN61000-6-2:2005
CERTIFICATES OF CONFORMITY ExVeritas 20ATEX0676X, IECEx EXV 20.0029X

THE XR___ FAMILY OF ENCODERS IS CERTIFIED FOR USE IN:

GROUP II, CATEGORY 2 (ZONE 1) GAS GROUP IIC WHEN MARKED CE 0539 (Ex) II 2 GD Ex ia IIC T4 Gb AND USED WITH AN ISOLATOR XRB3 MARKED CE 0539 (Ex) II (2) GD [Ex ia IIC Gb]

GROUP II, CATEGORY 2 (ZONE 21) DUST GROUP IIIC WHEN MARKED CE 0539 (Ex) II 2 GD Ex ia IIIC T200°C Db AND USED WITH AN ISOLATOR XRB3 MARKED CE 0539 (Ex) II (2) GD [Ex ia IIIC Db]

GROUP II, CATEGORY 2 (ZONE 1) GAS GROUP IIC WHEN MARKED CE 0539 (Ex) II 2 GD Ex ib IIC T4 Gb AND USED WITH AN ISOLATOR XRB3 MARKED CE 0539 (Ex) II (2) GD [Ex ia IIC Gb]

GROUP II, CATEGORY 2 (ZONE 21) DUST GROUP IIIC WHEN MARKED CE 0539 (Ex) II 2 GD Ex ib IIIC T200°C Db AND USED WITH AN ISOLATOR XRB3 MARKED CE 0539 (Ex) II (2) GD [Ex ia IIIC Db]

MAXIMUM SAFE AREA VOLTAGE = 30V, -40°C ≤ Tamb ≤ +80°C

WARNING: INSTALLATION SHOULD BE PERFORMED ONLY BY QUALIFIED PERSONNEL. SAFETY PRECAUTIONS MUST BE TAKEN TO ENSURE MACHINERY CANNOT ROTATE AND ALL SOURCES OF POWER ARE REMOVED DURING INSTALLATION. EQUIPMENT AVAILABLE AS A SYSTEM ONLY INCLUDING: XR___ ENCODER WITH LINE DRIVER OPTION "H" OR "5" AND AN AVTRON ISOLATOR MODULE AS LISTED ABOVE. THE ISOLATOR IS SUPPLIED AS A SEPARATE MODULE FOR LOCATION IN A SAFE AREA AND MUST BE INSTALLED IN AN ENCLOSURE.

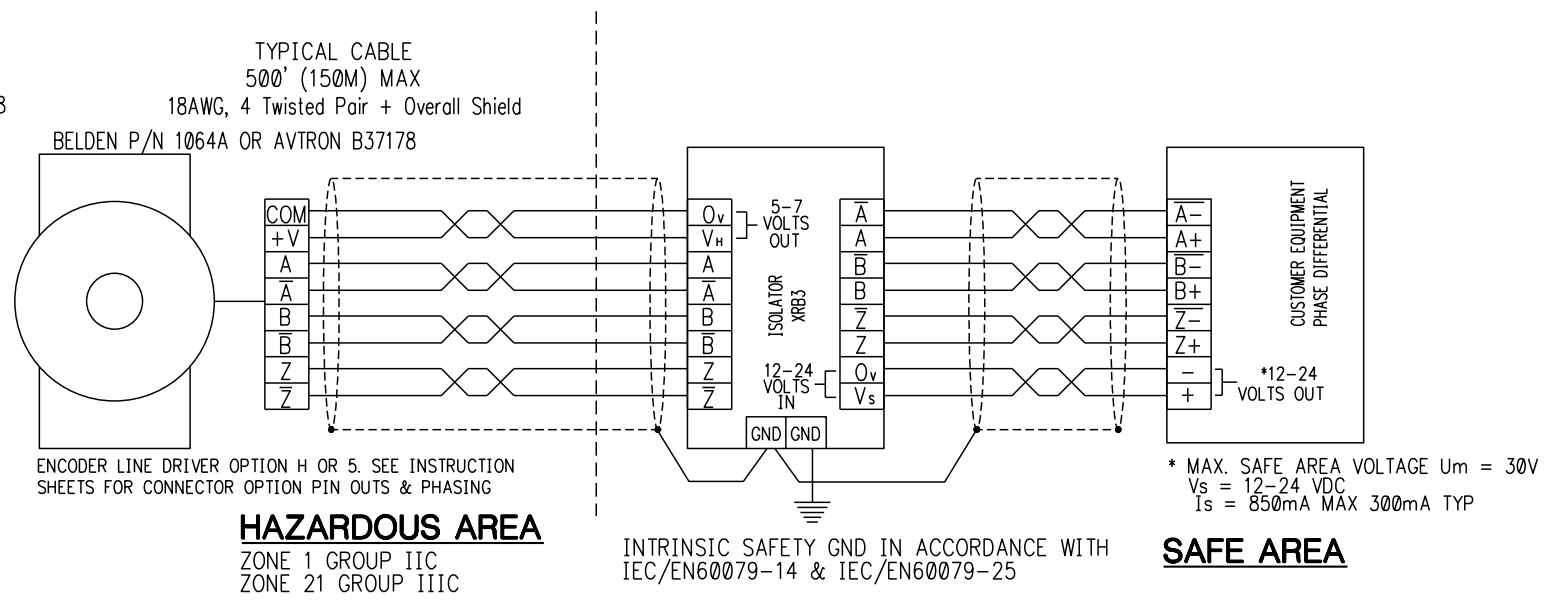
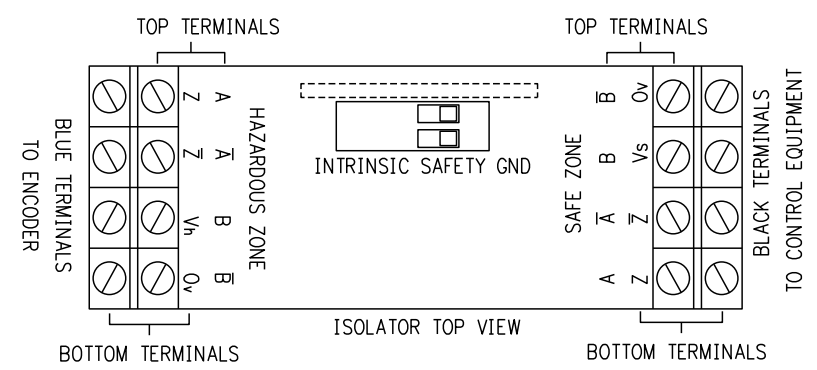
SYSTEM PARAMETERS ARE:

Um (MAXIMUM SAFE AREA VOLTAGE) = 30V
Uo (OPEN CIRCUIT VOLTAGE) = 7.14 VDC
Io (SHORT CIRCUIT CURRENT) = 420 mA
Co (SYSTEM CAPACITANCE) = 13.5 uF MAX.
Lo (SYSTEM INDUCTANCE) = .15 mH MAX.

THIS DRAWING IDENTIFIES CHARACTERISTICS REQUIRED FOR EQUIPMENT USED IN HAZARDOUS LOCATIONS AND MAY NOT BE CHANGED WITHOUT THIRD PARTY APPROVAL. THIRD PARTIES MUST BE IDENTIFIED FROM EQUIPMENT ID LABELS

| PARAMETER | ISOLATOR | ENCODER |
|-----------|----------|---------|
| Um | 30V | - |
| Ui | - | 7.14V |
| Ii | - | 420mA |
| Pi | - | 1.4W |
| Ci | - | 11.9uF |
| Li | - | 0mH |
| Uo | 7.14V | - |
| Io | 420mA | - |
| Po | 1.4W | - |
| Lo | .15mH | - |
| Co | 13.5uF | - |
| Lo/Ro | - | - |

ZONE 1 TABLE OF ENTITY PARAMETERS



CABLE CHARACTERISTICS AND INSTALLATION IN ACCORDANCE WITH THE LATEST EDITION OF IEC/EN60079-14/IEC/EC60079-25.

THE XR___ ENCODERS ARE NOT CONSIDERED AS SAFETY DEVICES AND ARE NOT SUITABLE FOR CONNECTION INTO A SAFETY SYSTEM. THE XR___ ENCODER CONSTRUCTION MATERIALS CONTAIN NO MORE THAN 7.5% IN TOTAL BY MASS OF MAGNESIUM, TITANIUM AND ZIRCONIUM. THE CONSTRUCTION MATERIALS ARE NOT CONSIDERED AS ABLE TO TRIGGER AN EXPLOSION IN NORMAL OPERATING MODES. THESE MATERIALS ARE KNOWN TO REACT WITH EXPLOSIVE ATMOSPHERES TO WHICH THE ENCODERS MAY BE SUBJECT. THE CONSTRUCTION MATERIALS DO INCLUDE ALUMINUM. AS SUCH, CARE SHOULD BE TAKEN TO AVOID THE POSSIBILITY OF IGNITION FROM IMPACT OR FRICTION. IT IS THE RESPONSIBILITY OF THE END USER TO ENSURE THAT THE ENCODER IS SELECTED CORRECTLY FOR THE POTENTIALLY EXPLOSIVE ATMOSPHERE IN WHICH THE EQUIPMENT IS TO BE PUT IN SERVICE.

SPECIAL CONDITIONS FOR SAFE USE:

- ENCODER:**
- WHEN ENCODER IS MARKED AS "ia Gb" OR "ib Gb" IT MUST ONLY BE USED WITH THE CORRESPONDING ISOLATORS LISTED IN THIS CERTIFICATE. THE ISOLATORS, ENCODERS AND CABLE MUST BE SELECTED AND INSTALLED IN ACCORDANCE WITH IEC/EN 60079-14 AND IEC/EN 60079-25.
 - WHEN THE ENCODER IS MARKED AS "ic" THE POWER SUPPLY SITUATED IN THE SAFE AREA MUST BE LIMITED TO THE LEVELS LISTED ON THIS CERTIFICATE AND CABLE MUST BE SELECTED AND INSTALLED IN ACCORDANCE WITH IEC/EN 60079-14 AND IEC/EN 60079-25
 - THE EQUIPMENT SHOULD BE MOUNTED SO AS TO AVOID ELECTROSTATIC CHARGING.
- ISOLATORS:** MUST BE INSTALLED INSIDE OF AN ENCLOSURE WITH AN APPROPRIATE MECHANICAL STRENGTH AND MINIMUM DEGREE OF PROTECTION, IP20 FOR INDOOR LOCATIONS AND IP54 FOR OUTDOOR LOCATIONS OR INDOOR WET LOCATIONS.
- MAINTENANCE:** CONTACT NIDEC INDUSTRIAL SOLUTIONS, CLEVELAND, OH, USA.

CAUTION: BE SURE TO REMOVE POWER BEFORE WIRING THE ENCODER. GROUND THE CABLE SHIELD AT THE ISOLATOR. THE CABLE SHOULD NOT BE GROUNDED MULTIPLE PLACES. AN INTRINSIC SAFETY GROUND IS REQUIRED AT THE XRB1 OR XRB2 ISOLATOR MODULE. ENCODERS INCLUDE A LOCAL GROUND LUG FOR CUSTOMER CONVENIENCE AND ENCODER FRAME GROUNDING IF REQUIRED TO MEET LOCAL ELECTRIC CODE FOR SITE OPERATOR PROTECTION STANDARDS. THIS IS NOT THE REQUIRED FOR INTRINSIC SAFETY GROUND CONNECTION REQUIRED FOR HAZARD PROTECTION AGAINST IGNITION OF EXPLOSIVE ATMOSPHERES.

INTERCONNECTION CABLES SPECIFIED ABOVE ARE BASED ON TYPICAL APPLICATIONS. PHYSICAL PROPERTIES OF CABLE SUCH AS ABRASION, TEMPERATURE, TENSILE STRENGTH, SOLVENTS, ETC., ARE DICTATED BY THE SPECIFIC APPLICATION. GENERAL ELECTRICAL REQUIREMENTS ARE: STRANDED COPPER, 20 THROUGH 16 AWG (INDUSTRIAL EPIC CONNECTOR TYPE OPTIONS CAN USE 14 AWG), TWISTED WIRE PAIRS, BRAID OR FOIL INDIVIDUAL SHIELDS OR OVER ALL SHIELD WITH DRAIN WIRE, 0.03uF OF MAXIMUM TOTAL MUTUAL OR DIRECT CAPACITANCE, OUTER SHEATH INSULATOR, MAXIMUM CABLE LENGTH = 500 FT.. 20 AWG WIRE SHOULD NOT BE USED FOR CABLE RUNS GREATER THAN 61 METERS. IF 20 AWG IS USED WITH EPIC TYPE CONNECTORS THEN THE WIRE ENDS SHOULD BE TINNED.

REFER TO THE WIRING DIAGRAMS ON THE ENCODER AND IN THE SPECIFIC MODEL INSTRUCTION SHEETS FOR SPECIFIC CONNECTOR PIN OUTS AND PHASING TABLES FOR EACH CONNECTOR STYLE OPTION.

THIS DOCUMENT CONTAINS PROPRIETARY INFORMATION OF NIDEC INDUSTRIAL SOLUTIONS AND MAY NOT BE DISCLOSED TO OTHERS OR USED FOR MANUFACTURING PURPOSES WITHOUT THE WRITTEN CONSENT OF NIDEC INDUSTRIAL SOLUTIONS.

| | | | |
|--|-----------------|--------------|---|
| UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES | DRAWN ZIVKOVIC | DATE 7/21/20 | Nidec Industrial Solutions 243 TUXEDO AVENUE BROOKLYN HEIGHTS, OH 44131 |
| TOLERANCES: DECIMALS .xx± .03 .xxx± .015 ANGLES ±1° FINISH | CHECKED SIRACKI | 7/21/20 | |
| PAINT PER PS | ENG APVD WOLFF | 7/21/20 | ATEX / IECEx, ZONE 1 & 21 INSTALLATION DRAWING |
| PLATE PER | APVD PROD | | |
| COAT PER PS | | | SIZE D |
| ANODIZED PER | | | CAGE NO. 0FMV7 |
| OTHER | | | DWG. NO. D53008 |
| APPLICATION | | | SCALE 1/1 |
| | | | MODEL N/A |
| | | | SHEET 1 OF 1 |

| | | | | |
|--|-----------------|----------------|---------------------|--------------|
| REV A | DWG. NO. D52353 | SCALE 1/1 | MODEL N/A | SHEET 1 OF 1 |
| DATE 1/13/14 | DRAWN NICKOLI | CHECKED PATTON | ENG. APP'D SHADDUCK | DATE 3/24/15 |
| DIMENSIONS ARE IN INCHES TOLERANCES: ANGLES ± .015 DECIMALS XXX .03 XXXX .015 UNLESS OTHERWISE SPECIFIED | | | | |
| APPLICATION: USED ON XXXXXX NEXT ASSY: XXXXXX PAINT PER PS: PAINT PER PS COAT PER PS: COAT PER PS ANODIZED PER: ANODIZED PER OTHER: OTHER | | | | |

CAUTION: BE SURE TO REMOVE POWER BEFORE WIRING THE ENCODER. GROUND THE CABLE SHIELD. THE CABLE SHIELD SHOULD NOT BE GROUNDED MULTIPLE PLACES. ENCODERS INCLUDE A LOCAL GROUND LUG FOR CUSTOMER CONVENIENCE AND ENCODER FRAME GROUNDING WITH 14 AWG WIRE IF REQUIRED TO MEET LOCAL ELECTRICAL CODE FOR SITE OPERATOR PROTECTION STANDARDS. UNLESS OTHERWISE SPECIFIED THE ABOVE NOTES APPLY

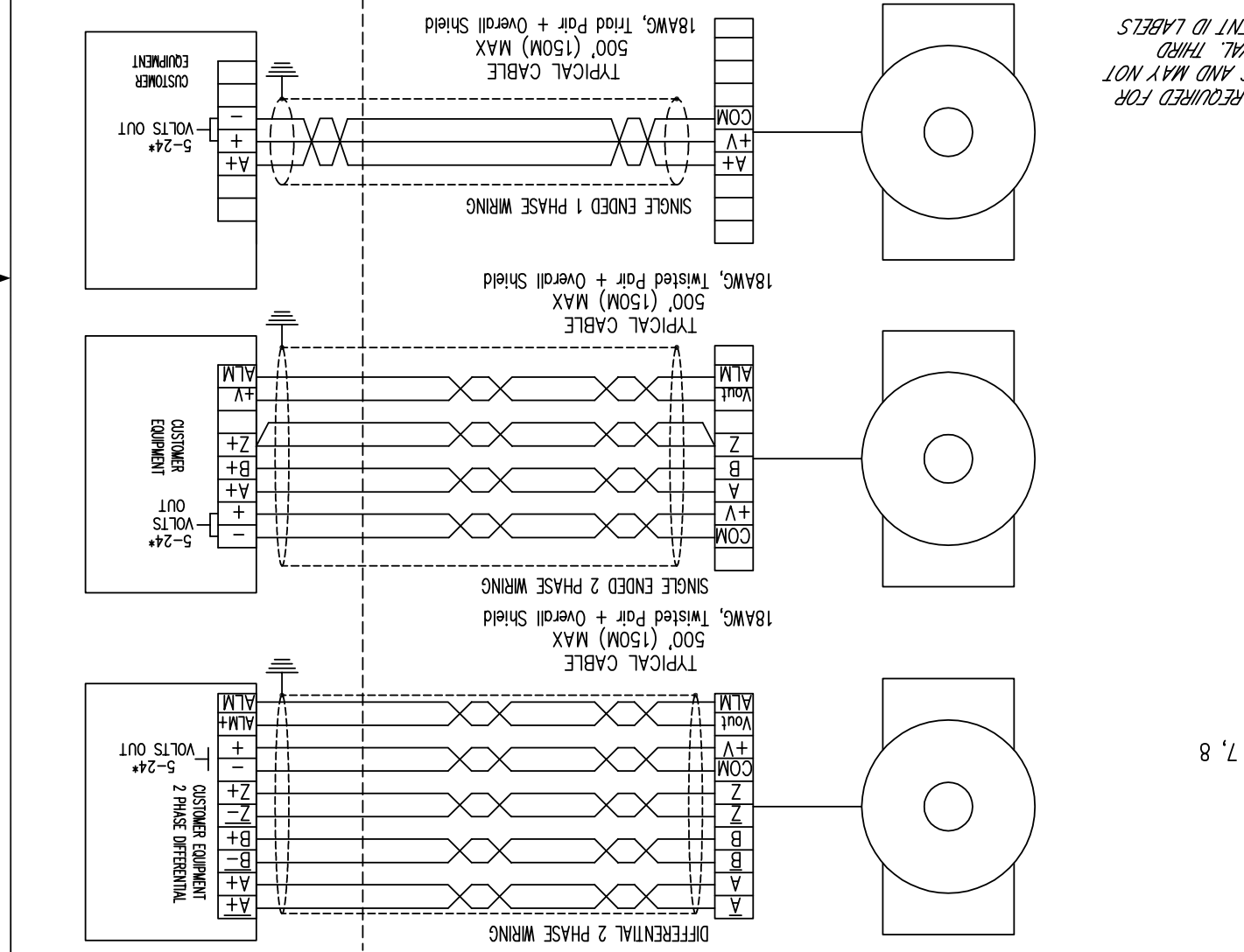
INTERCONNECTION CABLES SPECIFIED ARE BASED ON TYPICAL APPLICATIONS. CABLE MUST BE SELECTED AND INSTALLED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AND CANADIAN ELECTRICAL CODE. PHYSICAL PROPERTIES OF CABLE SUCH AS ABRASION, TEMPERATURE, TENSILE STRENGTH, SOLVENTS, ETC., ARE DICTATED BY THE SPECIFIC APPLICATION. GENERAL ELECTRICAL REQUIREMENTS ARE: STRANDED COPPER, 20 THROUGH 16 AWG (INDUSTRIAL EPIC CONNECTOR TYPE OPTIONS CAN USE 14 AWG), TWISTED WIRE PAIRS, BRAID OR FOLI INDIVIDUAL SHIELDS OR OVER ALL SHIELD WITH DRAIN WIRE, 0.05µF OF MAXIMUM TOTAL MUTUAL OR DIRECT CAPACITANCE, OUTER SHEATH INSULATOR, MAXIMUM CABLE LENGTH = 500 FT., 20 AWG WIRE SHOULD NOT BE USED FOR CABLE RUNS GREATER THAN 61 METERS. IF 20 AWG IS USED WITH EPIC TYPE CONNECTORS THEN THE WIRE ENDS SHOULD BE TINNED.

WARNING: INSTALLATION SHOULD BE PERFORMED ONLY BY QUALIFIED PERSONNEL. SAFETY PRECAUTIONS MUST BE TAKEN TO ENSURE MACHINERY CANNOT ROTATE AND ALL SOURCES OF POWER ARE REMOVED DURING INSTALLATION. THE XR ENCODERS ARE NOT CONSIDERED AS SAFETY DEVICES AND ARE NOT SUITABLE FOR CONNECTION INTO A SAFETY SYSTEM. THE XR ENCODER CONSTRUCTION MATERIALS CONTAIN NO MORE THAN 7.5% IN TOTAL BY MASS OF MAGNESIUM, TITANIUM AND ZIRCONIUM. THESE MATERIALS ARE KNOWN TO REACT WITH EXPLOSIVE ATMOSPHERES TO WHICH THE ENCODERS MAY BE SUBJECT. THE CONSTRUCTION MATERIALS DO INCLUDE ALUMINUM. AS SUCH CARE SHOULD BE TAKEN TO AVOID THE POSSIBILITY OF IGNITION FROM IMPACT OR FRICTION. IT IS THE RESPONSIBILITY OF THE END USER TO ENSURE THAT THE ENCODER IS SELECTED CORRECTLY FOR THE POTENTIALLY EXPLOSIVE ATMOSPHERE IN WHICH THE EQUIPMENT IS TO BE PUT IN SERVICE.

ENCODER: 1. WHEN THE ENCODER IS MARKED AS "ic" THE POWER SUPPLY SITUATED IN THE SAFE AREA MUST BE LIMITED TO THE LEVELS LISTED ON THIS CERTIFICATE AND CABLE MUST BE SELECTED AND INSTALLED IN ACCORDANCE WITH IEC/EN 60079-14 AND IEC/EN 60079-25
 2. THE EQUIPMENT SHOULD BE MOUNTED SO AS TO AVOID ELECTROSTATIC CHARGING.
 MAINTENANCE: CONTACT NIDEC AVTRON AUTOMATION CORPORATION, 8901 EAST PLEASANT VALLEY ROAD, INDEPENDENCE, OHIO 44131

| | | | | |
|------------------|------------|------------|--------|------------|
| 3 CONDUCTOR | 9365 | 0118/5-05 | BELDEN | ROCKBESTOS |
| TYPICAL EXAMPLES | | | | |
| 2 PAIR | 1063A | 0218/5-05 | BELDEN | ROCKBESTOS |
| 4 PAIR | 1064A | 0418/5-05 | BELDEN | ROCKBESTOS |
| 5 PAIR | 05P18/5-05 | 05P18/5-05 | BELDEN | ROCKBESTOS |
| 8 PAIR | 1065A | 08P18/5-05 | BELDEN | ROCKBESTOS |
| TYPICAL EXAMPLES | | | | |

SEE INSTRUCTION SHEETS FOR CONNECTOR OPTION PIN OUTS AND PHASING
 CABLE CHARACTERISTICS AND INSTALLATION IN ACCORDANCE WITH THE LATEST EDITION OF IEC/EN60079-14/IEC/EC60079-25.
 REFER TO THE WIRING DIAGRAMS AND IN THE SPECIFIC MODEL INSTRUCTION SHEETS FOR SPECIFIC CONNECTOR PIN OUTS AND PHASING TABLES FOR EACH CONNECTOR STYLE OPTION.
 * ENERGY LIMITED POWER SUPPLY SEE TABLE 1.



| | | | | |
|----------------|-------|---|--------------|-------------------|
| CON NO. EA0878 | REV A | DESCRIPTION ADD SPECIAL CONDITIONS FOR SAFE USE | DATE 6/24/15 | APPROVED SHADDUCK |
| REVISIONS | | | | |

THIS DRAWING IDENTIFIES CHARACTERISTICS REQUIRED FOR EQUIPMENT USED IN HAZARDOUS LOCATIONS AND MAY NOT BE CHANGED WITHOUT THIRD PARTY APPROVAL. THIRD PARTIES MUST BE IDENTIFIED FROM EQUIPMENT ID LABELS

TABLE 1: ZONE 2 POWER SUPPLY LIMITS

| | | | | |
|----|-----|-------|-------|-------|
| II | U | III C | III B | I |
| | 15V | 15V | 25V | |
| 1A | 12V | | | 1.8uf |

THE XR --- FAMILY OF ENCODERS HAS BEEN EVALUATED TO BE COMPLIANT WITH: IEC60079-0:2011, EN60079-0:2012/A11:2013
 IEC60079-11:2011, EN60079-11:2012
 BSEN61000-6-4:2007 AND BSEN61000-6-2:2005
 CERTIFICATES OF CONFORMITY TRAC12AT2EX0003X, IECX TRC12.0009X
 THE XR --- FAMILY OF ENCODERS IS CERTIFIED FOR USE IN:
 GROUP II, CATEGORY 3 (ZONE 2) GAS GROUP IIC WHEN MARKED CE (Ex) II 3 GD Ex ic IIC * T4 Gc AND USED WITH A SELV OR EQUIVALENT POWER SUPPLY THAT LIMITS VOLTAGE AND CURRENT PER THE FOLLOWING CHART.
 GROUP II, CATEGORY 3 (ZONE 22) DUST GROUP IIC WHEN MARKED CE (Ex) II 3 GD Ex ic IIC T200°C Dc
 -40°C ≤ Tamb ≤ +80°C

HAZARDOUS LOCATION CODE
 CONNECTOR OPTION CODES = A, B, C, D, E, F, G, H, J, K, L, M, N, P, R, S, T, U, V, W, Y, Z, 2, 3, 4, 5, 6, 7, 8
 LINE DRIVER OPTION CODE = 7 FOR ZONE 2 & 22
 ALL OTHER CODE LOCATIONS ARE NOT RELEVANT TO INTRINSIC SAFETY
 SEE INSTRUCTION SHEETS FOR DEFINITIONS
 THE XR --- FAMILY OF ENCODERS HAS BEEN EVALUATED TO BE COMPLIANT WITH:
 IEC60079-0:2011, EN60079-0:2012/A11:2013
 IEC60079-11:2011, EN60079-11:2012
 BSEN61000-6-4:2007 AND BSEN61000-6-2:2005
 CERTIFICATES OF CONFORMITY TRAC12AT2EX0003X, IECX TRC12.0009X
 THE XR --- FAMILY OF ENCODERS IS CERTIFIED FOR USE IN:
 GROUP II, CATEGORY 3 (ZONE 2) GAS GROUP IIC WHEN MARKED CE (Ex) II 3 GD Ex ic IIC * T4 Gc AND USED WITH A SELV OR EQUIVALENT POWER SUPPLY THAT LIMITS VOLTAGE AND CURRENT PER THE FOLLOWING CHART.
 GROUP II, CATEGORY 3 (ZONE 22) DUST GROUP IIC WHEN MARKED CE (Ex) II 3 GD Ex ic IIC T200°C Dc
 -40°C ≤ Tamb ≤ +80°C

HAZARDOUS LOCATION CODE
 CONNECTOR OPTION CODES = A, B, C, D, E, F, G, H, J, K, L, M, N, P, R, S, T, U, V, W, Y, Z, 2, 3, 4, 5, 6, 7, 8
 LINE DRIVER OPTION CODE = 7 FOR ZONE 2 & 22
 ALL OTHER CODE LOCATIONS ARE NOT RELEVANT TO INTRINSIC SAFETY
 SEE INSTRUCTION SHEETS FOR DEFINITIONS
 THE XR --- FAMILY OF ENCODERS HAS BEEN EVALUATED TO BE COMPLIANT WITH:
 IEC60079-0:2011, EN60079-0:2012/A11:2013
 IEC60079-11:2011, EN60079-11:2012
 BSEN61000-6-4:2007 AND BSEN61000-6-2:2005
 CERTIFICATES OF CONFORMITY TRAC12AT2EX0003X, IECX TRC12.0009X
 THE XR --- FAMILY OF ENCODERS IS CERTIFIED FOR USE IN:
 GROUP II, CATEGORY 3 (ZONE 2) GAS GROUP IIC WHEN MARKED CE (Ex) II 3 GD Ex ic IIC * T4 Gc AND USED WITH A SELV OR EQUIVALENT POWER SUPPLY THAT LIMITS VOLTAGE AND CURRENT PER THE FOLLOWING CHART.
 GROUP II, CATEGORY 3 (ZONE 22) DUST GROUP IIC WHEN MARKED CE (Ex) II 3 GD Ex ic IIC T200°C Dc
 -40°C ≤ Tamb ≤ +80°C

XRYYY XXXXFXXX XXX

CONNECTOR OPTION CODE LOCATION FOR: XR56A, XR56S, XR67A, XR85A, XR115, XR850, XR125, XR485, XR685

CONNECTOR OPTION CODE LOCATION FOR: XR45, XR47, XR4F

LINE DRIVER OPTION CODE LOCATION FOR: XR56A, XR56S, XR67A, XR85A, XR115, XR45, XR47, XR4F, XR850, XR125, XR485, XR685

MODEL # CODES: 56A, 56S, 67A, 85A, 115, 45, 47, 4F, 850, 125, 485, 685

HAZARDOUS LOCATION CODE

CONNECTOR OPTION CODES = A, B, C, D, E, F, G, H, J, K, L, M, N, P, R, S, T, U, V, W, Y, Z, 2, 3, 4, 5, 6, 7, 8

LINE DRIVER OPTION CODE = F FOR CLASS I DIVISION 1 AND ZONE 0

XRYY F X X XXX

CONNECTOR OPTION CODE LOCATION FOR: XR5, XR12, XR97

LINE DRIVER OPTION CODE LOCATION FOR: XR5, XR12, XR97

MODEL # CODES: 5, 12, 97

HAZARDOUS LOCATION CODE

CONNECTOR OPTION CODES = A, B, C, D, E, F, G, H, J, K, L, M, N, P, R, S, T, U, V, W, Y, Z, 2, 3, 4, 5, 6, 7, 8

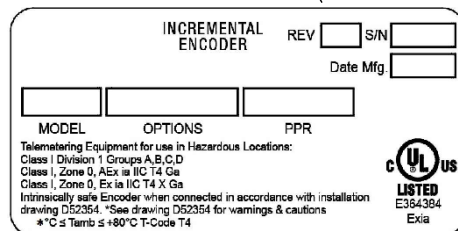
LINE DRIVER OPTION CODE = F FOR CLASS I DIVISION 1 AND ZONE 0

ALL OTHER CODE LOCATIONS ARE NOT RELEVANT TO INTRINSIC SAFETY

SEE INSTRUCTION SHEETS FOR DEFINITIONS

TABLE 1

THE XR --- FAMILY OF ENCODERS HAS BEEN EVALUATED AS INTRINSICALLY SAFE (SECURITE INTRINSEQUE) AND COMPLIANT WITH: UL913 8TH EDITION, UL 60079-0 6TH EDITION, UL 60079-11 6TH EDITION, CSA/CAN C22.2 No. 157 REAFFIRMED 2012, CSA/CAN C22.2 No. 60079-0:11, CSA/CAN C22.2 No. 60079-11:14



* -20°C OR -40°C SEE PRODUCT MARKING

1. INTRINSICALLY SAFE DEVICE INPUT ENTITY PARAMETERS (TERMINALS V(in) & COM):

| TERMINAL NUMBERS | Ui (V) | Ii (mA) | Pi (W) | GAS GROUP | Ci (uF) | Li (mH) |
|------------------|--------|---------|--------|------------------|---------|---------|
| V(in) & COM | 7.14 | 416 | 1.41 | A, B, C, D (IIC) | 11.88 | 0 |

THESE DEVICES HAVE THE FOLLOWING OUTPUT ENTITY PARAMETERS:

| TERMINAL NUMBERS | Uo (V) | Io (mA) | Po (W) | GAS GROUP | Co (uF) | Lo (uH) |
|----------------------------|--------|---------|--------|----------------------------|----------------|----------|
| A & A/ B & B/ Z & Z/ | 7.14 | 416 | 1.41 | A & B (IIC) C & D (IIB) | 11.89 11.91 | 2 100 |

2. CAPACITANCE AND INDUCTANCE CONNECTED TO THE OUTPUT TERMINALS MUST BE ADDED TO Ci AND Li OF THE INPUT TERMINALS OF THE ENCODER WHEN DETERMINING THE MAXIMUM CAPACITANCE AND INDUCTANCE APPARENT AT THE INPUT TERMINALS. WHERE THE CABLE CAPACITANCE AND INDUCTANCE PER FOOT ARE NOT KNOWN, THE FOLLOWING VALUES SHALL BE USED: Ccable = 60 pF/Ft., Lcable = 0.2 uH/Ft. WHEN MAKING CONNECTIONS TO A SUITABLE ASSOCIATED APPARATUS, THE FOLLOWING GUIDELINES MUST BE FOLLOWED:

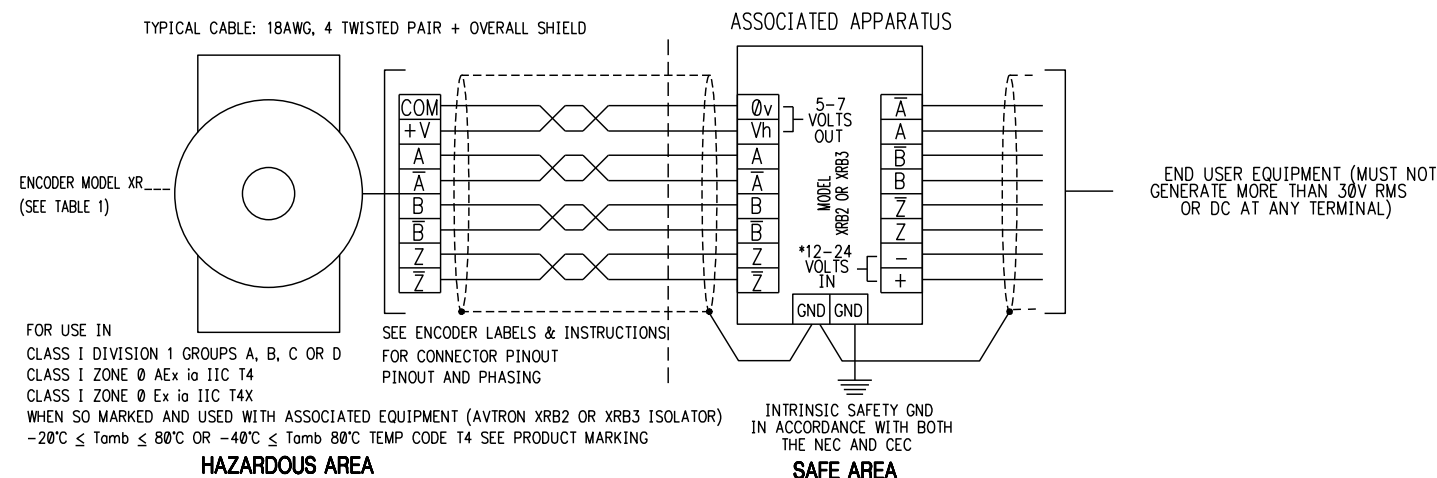
| I.S. EQUIPMENT | ASSOCIATED APPARATUS |
|----------------|----------------------|
| Ui | ≥ Voc OR Vt (OR Uo) |
| Ii | ≥ Isc OR It (OR Io) |
| Pi | ≥ Po |
| Ci + Ccable | ≤ Ca (OR Co) |
| Li + Lcable | ≤ La (OR L0) |

IF Po OF THE ASSOCIATED APPARATUS IS NOT KNOWN, IT MAY BE CALCULATED USING THE FORMULA $P_o = (V_{oc} * I_{sc})/4 = (U_o * I_o)/4$

THIS DRAWING IDENTIFIES CHARACTERISTICS REQUIRED FOR EQUIPMENT USED IN HAZARDOUS LOCATIONS AND MAY NOT BE CHANGED WITHOUT THIRD PARTY APPROVAL. THIRD PARTIES MUST BE IDENTIFIED FROM ID LABELS.

UNLESS OTHERWISE SPECIFIED THE ABOVE NOTES APPLY

| REVISIONS | | | | |
|-----------|-----|--|--------------------|----------|
| ECN NO. | REV | DESCRIPTION | DATE | APPROVED |
| EA0759 | A | IS "XXX" 2X WAS "000" 2X REMOVED 5.12.97 FROM MODEL CODES, IS XR5, XR12 & XR97 WAS XR45 FOR CONNECTOR OPTION CODE LOCATION | 8/27/14 NICKOLI | SHADDUCK |
| EA1779 | B | DEL NAME AND ADDRESS FROM LABEL | ZIVKOVIC 5/6/20 | WOLFF |
| EA1658 | C | UPDATED FOR XRB3 | ZIVKOVIC 9/2/20 | WOLFF |



- SPECIAL CONDITIONS FOR SAFE USE (X MARKING FOR CuL): THIS EQUIPMENT IS INTENDED FOR A FIXED INSTALLATION AND SHOULD BE MOUNTED SO AS TO AVOID ELECTROSTATIC CHARGING. CLEAN ONLY WITH A DAMP CLOTH. THE CONSTRUCTION MATERIALS DO NOT INCLUDE ALUMINUM. AS SUCH, CARE SHOULD BE TAKEN TO AVOID THE POSSIBILITY OF IGNITION FROM IMPACT OR FRICTION. FOR EXAMPLE, WHEN IN CONTACT WITH SHAFTS MADE FROM IRON OR STEEL IT IS THE RESPONSIBILITY OF THE END USER TO ENSURE THAT THE ENCODER IS SELECTED CORRECTLY FOR THE POTENTIALLY EXPLOSIVE ATMOSPHERE IN WHICH THE EQUIPMENT IS TO BE PUT IN SERVICE.
- WARNING INSTALLATION SHOULD BE PERFORMED ONLY BY QUALIFIED PERSONNEL. SAFETY PRECAUTIONS MUST BE TAKEN TO ENSURE MACHINERY CANNOT ROTATE AND ALL SOURCES OF POWER ARE REMOVED DURING INSTALLATION.
- THIS EQUIPMENT IS AVAILABLE AS A SYSTEM CONSISTING OF 1 MODEL XR--- ENCODER AND ONE ISOLATOR MODULE MODEL XRB2 OR XRB3 PER OUTPUT. THAT IS 2 ISOLATOR MODULES REQUIRED FOR A DUAL OUTPUT ENCODER. MULTIPLE ISOLATORS (ASSOCIATED APPARATUS) SHALL NOT BE CONNECTED TO A SINGLE ENCODER OUTPUT.
- WARNING-EXPLOSION HAZARD: SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY. AVERTISSEMENT - RISQUE D'EXPLOSION Le substitution de composants peut altérer l'aptitude de Securite Intrinseque.
- THIS EQUIPMENT HAS BEEN EVALUATED FOR USE IN A MAXIMUM AMBIENT TEMPERATURE OF 80°C. CONSIDERATION MUST BE GIVEN TO ENSURE FIELD WIRING IS SUITABLY RATED. Cet équipement a été évalué pour une utilisation dans une température ambiante maximale de 80° C. Il faut tenir compte pour assurer le câblage est convenablement évalué.
- ISOLATORS, ENCODERS AND CABLE MUST BE SELECTED AND INSTALLED IN ACCORDANCE WITH THE LATEST EDITION OF ARTICLE 504 OF THE NATIONAL ELECTRICAL CODE AS WELL AS THE CANADIAN ELECTRICAL CODE. CABLE CHARACTERISTICS MUST COMPLY WITH THE NATIONAL ELECTRICAL CODE. THE ISOLATOR MUST BE INSTALLED IN ACCORDANCE WITH DRAWING D52463 OR D53007.
- WHEN AN ENCODER CONTAINS MULTIPLE ELECTRICALLY ISOLATED SENSOR MODULES, THE WIRING MUST BE IN SEPARATE CABLES TO SEPARATE ISOLATOR MODULES.
- INTERCONNECTION CABLES MUST BE SELECTED AND INSTALLED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AND CANADIAN ELECTRICAL CODE.
- PERMANENTLY INSTALLED EXTERNAL CABLE, WHEN FACTORY SUPPLIED, HAS THE FOLLOWING CHARACTERISTICS: UL AWM STYLE 2464, 80°C MAXIMUM RATED TEMP., 300V, 2.1A @ 25°C, INDIVIDUAL 22 AWG CONDUCTORS WITH PVC INSULATION THICKNESS = .011", COVERED BY AN OVERALL FOIL SHIELD AND AN OUTER PVC JACKET WHICH IS 0.035" THICK. SUITABILITY FOR INSTALLATION IN PARTICULAR APPLICATIONS IS AT THE DISCRETION OF THE AUTHORITY HAVING JURISDICTION.

THIS DOCUMENT CONTAINS PROPRIETARY INFORMATION OF NIDEC INDUSTRIAL SOLUTIONS AND MAY NOT BE DISCLOSED TO OTHERS OR USED FOR MANUFACTURING PURPOSES WITHOUT THE WRITTEN CONSENT OF NIDEC INDUSTRIAL SOLUTIONS.

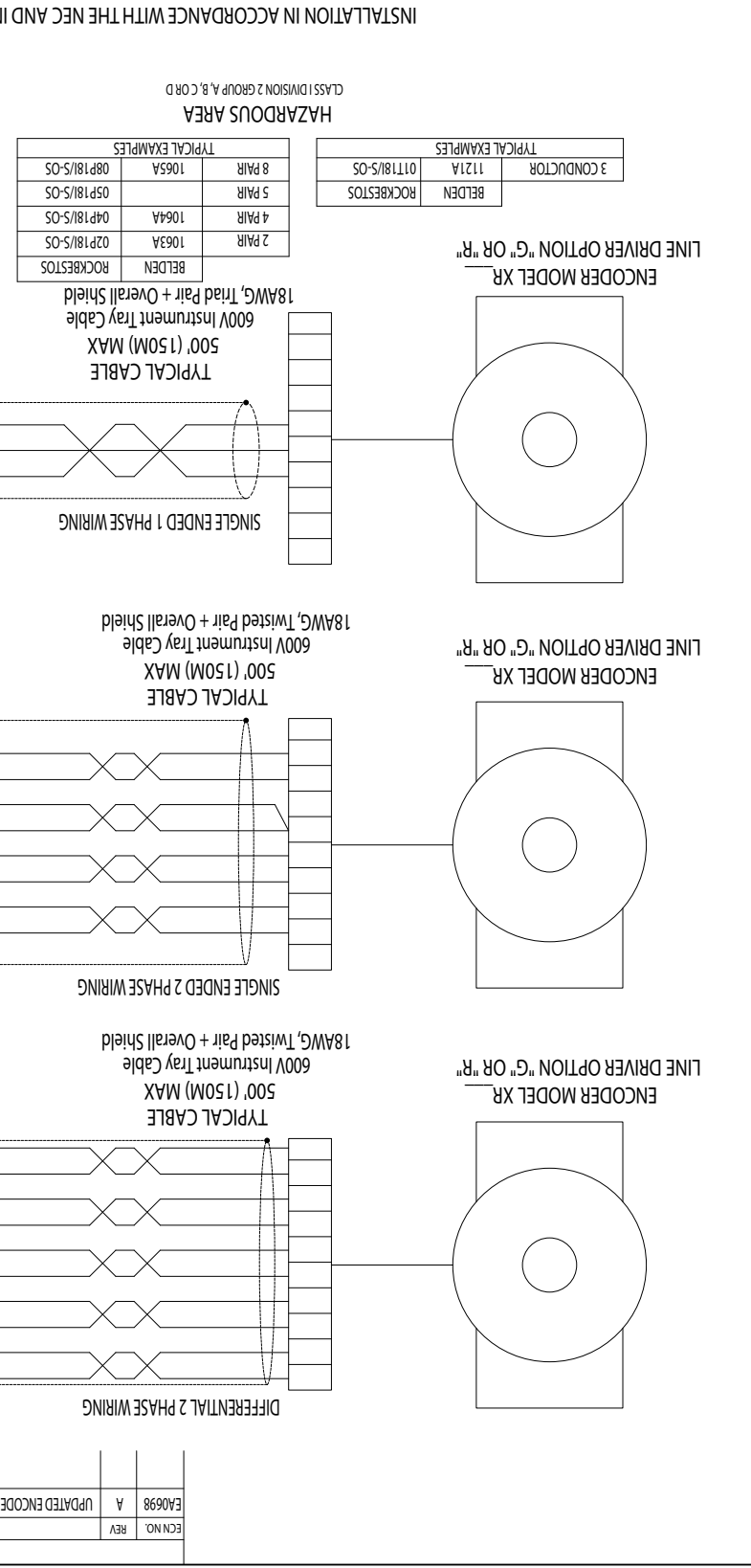
| UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES | | DRAWN | DATE | Nidec Industrial Solutions | |
|---|--------------|-----------|---------|---|---|
| TOLERANCES: .xx± .03 .xxx± .015 | ANGLES±1° | NICKOLI | 7/28/14 | 243 TUXEDO AVENUE BROOKLYN HEIGHTS, OH 44131 | |
| FINISH | PAINT PER PS | CHECKED | 7/28/14 | DIVISION 1 ZONE 0 ENCODER INSTALLATION DRAWING | |
| PLATE PER | COAT PER PS | ENG APVD | 7/28/14 | | |
| ANODIZED PER | OTHER | APVD PROD | | | |
| APVD PROD | | | | | |
| NEXT ASSY | USED ON | | | SIZE | IMF <input checked="" type="checkbox"/> |
| APPLICATION | | | | D | PSF <input type="checkbox"/> |
| | | | | CAGE NO. | REV |
| | | | | 0FMV7 | C |
| | | | | DWG. NO. | |
| | | | | D52354 | |
| | | | | SCALE | SHEET |
| | | | | 1/1 | 1 OF 1 |

UNLESS OTHERWISE SPECIFIED THE ABOVE NOTES APPLY

THIS DOCUMENT CONTAINS PROPRIETARY INFORMATION OF NIDEC AVTRON AUTOMATION AND MAY NOT BE DISCLOSED TO OTHERS OR USED FOR MANUFACTURING PURPOSES WITHOUT THE WRITTEN CONSENT OF NIDEC AVTRON AUTOMATION.

| | | | | | | | |
|--------------|--------|----------|----------|---------|-----------|---------------------------------|---|
| DATE | 1/8/14 | DRAWN | NICKOLI | CHECKED | ANGLES41* | TOLERANCES: DECIMALS XXXX, .015 | UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES |
| DATE | 1/9/14 | ENG APVD | SHADDUCK | CHECKED | ANGLES41* | TOLERANCES: DECIMALS XXXX, .015 | UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES |
| DATE | 1/9/14 | APVD PRD | SHADDUCK | CHECKED | ANGLES41* | TOLERANCES: DECIMALS XXXX, .015 | UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES |
| OTHER | | | | | | | |
| APPLICATION | | | | | | | |
| NEXT ASSY | | | | | | | |
| USED ON | | | | | | | |
| ANODIZED PER | | | | | | | |
| COAT PER PS | | | | | | | |
| PLATE PER | | | | | | | |
| PLATE PER PS | | | | | | | |
| FINISH | | | | | | | |
| APVD PRD | | | | | | | |
| SIZE | | | | | | | |
| CAGE NO. | | | | | | | |
| MODEL | | | | | | | |
| SCALE | 1/1 | | | | | | |
| MODEL | N/A | | | | | | |
| SHEET | 1 OF 1 | | | | | | |
| REV | A | | | | | | |
| REV | D52355 | | | | | | |

| | | | |
|-----------|----------------------------|--------|----------|
| REV | DESCRIPTION | DATE | APPROVED |
| A | UPDATED ENCODER PARAMETERS | 5/8/14 | SHADDUCK |
| REVISIONS | | | |



INSTALLATION IN ACCORDANCE WITH THE NEC AND IN ACCORDANCE WITH THE CEC
SEE INSTRUCTION SHEETS FOR CONNECTOR OPTION PIN OUTS AND PHASING
SAFE AREA

REFER TO THE WIRING DIAGRAMS ON THE ENCODER AND IN SPECIFIC MODEL INSTRUCTION SHEETS FOR SPECIFIC CONNECTOR PIN OUTS AND PHASING TABLES FOR EACH CONNECTOR STYLE OPTION.

Cet équipement a été évalué pour une utilisation dans une température ambiante maximum de 80 ° C. Il faut tenir compte pour assurer le câblage est convenablement classé.

THIS EQUIPMENT HAS BEEN EVALUATED FOR USE IN A MAXIMUM AMBIENT TEMPERATURE OF 80°C. CONSIDERATION MUST BE GIVEN TO ENSURE FIELD WIRING IS SUITABLY RATED.

RECOGNIZED MODELS ARE INTENDED TO BE FACTORY WIRED IN ACCORDANCE WITH ISA 1.2.1.2.01 CLAUSE 8.8.1.

FOR LISTED ENCODERS AND CABLE MUST BE SELECTED AND INSTALLED IN ACCORDANCE WITH THE LATEST EDITION OF ARTICLE 504 OF THE NATIONAL ELECTRICAL CODE AS WELL AS THE CANADIAN ELECTRICAL CODE. CABLE CHARACTERISTICS MUST COMPLY WITH THE NATIONAL INSTRUMENT TRAY CABLE. INTERCONNECTION ABOVE ARE BASED ON TYPICAL APPLICATIONS. CABLE MUST BE SELECTED AND INSTALLED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AND CANADIAN ELECTRICAL CODE. PHYSICAL PROPERTIES OF CABLE SUCH AS ABRASION, TEMPERATURE, TENSILE STRENGTH SOLVENTS, ECT., ARE DICTATED BY SPECIFIC APPLICATION. GENERAL ELECTRICAL REQUIREMENTS ARE: STRANDED COPPER, 18 THROUGH 14 AWG TWISTED WIRE PAIRS, BRAID OR FOIL SHIELDS WITH DRAIN WIRE, 0.5UF OF MAXIMUM TOTAL MUTUAL OR DIRECT CAPACITANCE, OUTER SHEATH INSULATOR, MAXIMUM CABLE LENGTH = 500 FT. 20 AWG WIRE SHOULD NOT BE USED FOR CABLE RUNS GREATER THAN 61 METERS. IF 20 AWG IS USED WITH THE EPIC TYPE CONNECTOR THE WIRE ENDS SHOULD BE TINNED.

| | |
|----------------------|-----------------------|
| OUTPUT | INPUT |
| 5-24VDC | 5-24VDC |
| 100mA Max. ea Output | 100mA Nom. 355mA Max. |
| CURRENT | |

ENCODERS PARAMETERS ARE:

AVERTISSEMENT-RISQUE D'EXPLOSION Le remplacement de composants peut altérer l'aptitude de Classe 1, Division 2. AVERTISSEMENT-RISQUE D'EXPLOSION Ne pas déconnecter l'équipement à moins que l'alimentation est coupée ou que la zone est connue pour être non dangereux.

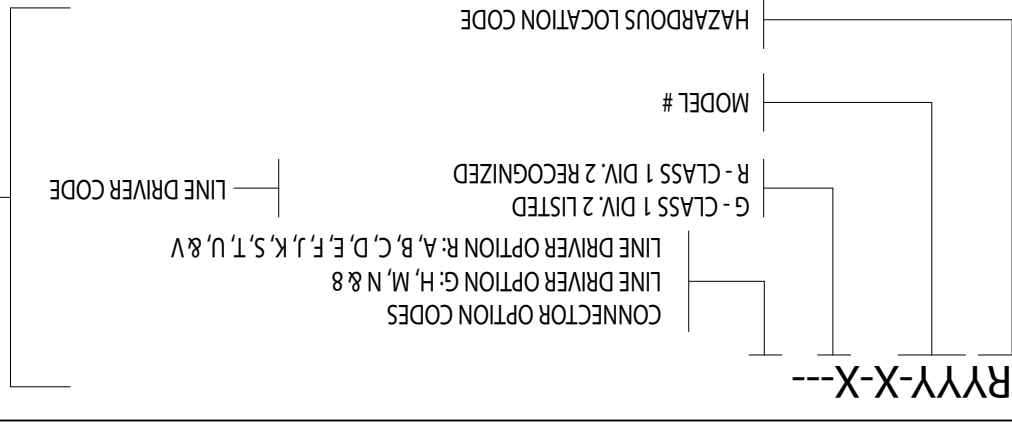
WARNING: EXPLOSION HAZARD INSTALLATION SHOULD BE PERFORMED ONLY BY QUALIFIED PERSONNEL. SAFETY PRECAUTIONS MUST BE TAKEN TO ENSURE MACHINERY CANNOT ROTATE AND ALL SOURCES OF POWER ARE REMOVED DURING INSTALLATION. SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS 1 DIVISION 2. DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN REMOVED OR THE AREA IS KNOWN TO BE NON-HAZARDOUS.

WHEN SO MARKED AS ABOVE -40°C<Tamb<+80°C TEMP CODE T4

Cet équipement est adapté à une utilisation en Classe 1, Division 2, Groupes A, B, C et D ou des locations non dangereux.

THE XR --- FAMILY OF ENCODERS IS SUITABLE FOR USE IN HAZARDOUS LOCATIONS: ISA 1.2.1.2.01 NONINCENDIVE ELECTRICAL EQUIPMENT FOR USE IN CLASS 1 DIVISION 2 HAZLOC CSA C22.2 NO. 213-M1987 CSA 22.2 NO. 14-13

THE XR --- FAMILY OF ENCODERS HAS BEEN EVALUATED TO BE COMPLIANT WITH:



SEE INSTRUCTION SHEET FOR EACH MODEL FOR EXACT P/N BREAKDOWN