AVTRON™ ENCODERS

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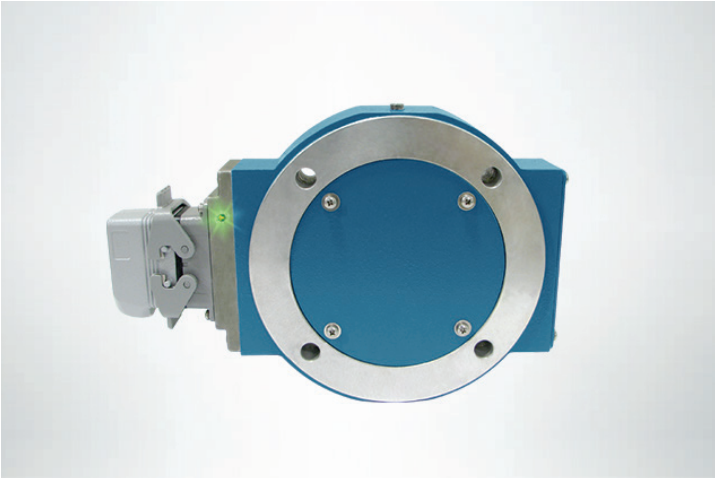


ENCODER INSTRUCTIONS

XR850 SMARTSafe™

8 1/2" FC FACE MOUNT MODULAR FOR HAZARDOUS APPLICATIONS

DESCRIPTION

The Avtron Model XR850 SMARTSafe™ encoder is a heavy duty encoder for hazardous locations (also known as tachometer or rotary pulse generator), allowing operation down to zero RPM. It provides a specific number of electrical Pulses Per Revolution (PPR) that are proportional to a shaft's revolution. The XR850 SMARTSafe encoder is a bearingless, couplingless, modular design, providing unequaled reliability and mechanical performance.

CAUTION
The XR850 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.

The XR850 fits AC and DC motors with an 8.5" C (FC / 180) Face. Both end-of-shaft and through shaft mountings are accommodated.

The XR850 Encoder consists of three or four parts: a rotor, a stator housing, and one or two removable sensor modules. These precision machined parts mount to the accessory end of a motor that conforms to NEMA MG1 for Type FC Face Mounting. See Mechanical Specifications. No gapping, adjustment, or shimming is required! (If the XR850 is installed as an open rotor and sensor only system without a C face, then manual gapping of the sensor is needed.)

The XR850 utilizes magnetoresistive sensors. This proven technology is ideal for rugged environments since it is immune to many contaminants that cause optical encoders to fail. All of the XR850 electronics are potted, providing full protection against liquids.

The outputs are protected against short circuits and wiring errors. An Avtron XR850 SMARTSafe encoder has a two-phase output (A,B) 90° out of phase, with complements ($\overline{A}$, $\overline{B}$), (A Quad B Output), and a marker pulse with complement (Z, $\overline{Z}$).

Because the XR850 is modular, there are no bearings or couplings required. This, combined with the latest magnetoresistive (MR) sensor technology, allows the XR850 to provide superior mechanical performance and increased reliability.

For applications which require more than 2 independent outputs, XR850 encoders may be stacked through the use of shaft adapters, see Table 2 for part numbers. Two separate encoders would be purchased. For example, part numbers XR850Q_X_ _ _ _ _000 and XR850CBF_ _ _ _ _000 for stacking on a GE CD frame motor.

Output resolution on the XR850 is determined by the sensor only. Unlike older models, any PPR's 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 XR850 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 XR850 is not considered as a safety device and is not suitable for connection into a safety system.

The XR850 construction materials contain less 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 XR850 may be subject. It is however the responsibility of the end user to ensure that the XR850 is selected correctly for the potentially explosive atmosphere in which the equipment is to be put into service.

The XR850 installation is similar to AV850. Installation and removal videos for the AV850/AV125 are available on Avtron's web site. Refer to the back page of these instructions for outline and mounting dimensions.

INSTALLATION
The motor must comply with NEMA MG1 for dimensions, face runout, and shaft runout. Axial float or endplay must be less than +/-0.100" inch.

CAUTION
Do not strike the encoder or rotor at any time. Damage will result and the warranty will be void. At installation, clean and remove paint and burrs from motor shaft and mounting face. Apply anti-seize compound (supplied) to each except cam screw rotors.

INSTALLATION HARDWARE
Supplied:
XR850 Encoder
1. Washer, Spring Lock 1/2 (4)
2. Hex Hd. Cap Screw 1/2-13 x 3.00 (4)

Rotor
1. Rotor Installation Hardware Kit
2. Anti-Seize Compound (copper)
3. Thread Locker (blue)

Not Supplied:
3/4" Wrench
Phillips Screwdriver
7/16" Nut Driver
Dial Indicator
Vernier Caliper
3/32" Hex Wrench (T-Handle Set Screw Style rotors only)
3/16" Hex Wrench (cam screw rotors only)
9/16" Wrench (end-of-shaft rotors only)
Model XRB3 Isolator for Division 1, Zone 0,1, 20 and 21 applications (Sold Seperatly)

Optional:
A35226 Gauge or A25355 M285/XR850 Rotor Gauge Block
Inboard Through-Shaft Seal Plate
Outboard Through-Shaft Seal Plate Kit
Silicone Lubricant or 20 Weight Machine Oil
Dead Blow Hammer
Large Frame Adapter Kit (Modification "700")
XR850 Shield Kit (A35355)

(OPTIONAL) LARGE MOTOR STATOR ADAPTER

INSTALLATION (Modification "700")
For large frame GE CD motors Avtron offers a frame adapter to add an 8.5" C-face to the motor. To install the flange adapter:
1. Remove all existing adapters on the non-drive end of the motor.
2. Clean the motor flange.
3. Using the supplied hardware, bolt the flange adapter in place (see Figure 1).
4. Apply anti-seize to the frame adapter C-face flange.

(OPTIONAL) INBOARD COVER PLATE INSTALLATION
(Cover Plate "B" & "N"):
For installations where the XR850 will be mounted to an open frame flange adapter, or other installation where the inner surface of the XR850 will not form a seal with the rear end bell of the motor, Avtron offers inboard, through-shaft cover plate kits. See Table 3 for part numbers. To install the inboard through-shaft cover plate kit:
1. Verify all components fit the motor shaft (rotor and cover plate).
2. Remove the double-stick tape protection. Align the bolt holes.
3. Stick the inner cover plate in place.
4. Mount rotor per instructions below, but increase axial position from motor to rotor to 0.620" [15.75mm] (from 0.584") to accommodate the inner seal plate thickness. See Figure 3.
5. Mount remainder of XR850 per instructions below.

SHIELD INSTALLATION
For top performance on older motors with magnetized shafts and frames install the XR850 shield. The XR850 also has built-in shields attached to the housing of every unit. For additional protection, consider the -004 option for extra sensor shielding.
1. Remove the double-stick tape protection.
2. Align the bolt holes and edges with the motor C-face.
3. Stick the shield in place on the motor C-face or on top of any inboard seal plate.
4. Install rotor as usual, but gage location from the shield. See Figure 3. The outer edge of the rotor may be damaged by scratches, severe blows, and strong magnetic fields.

ROTOR INSTALLATION
Use the dial indicator gauge to ensure motor shaft runout (TIR) does not exceed (0.004") [0.10mm]. Apply anti-seize compound to the shaft.

UNIVERSAL END-OF-SHAFT APPLICATIONS: (Rotors GF-G9, UF-U9, QF-Q9) See Table 2 for part numbers.
1. Verify the shaft projection from the C-face of the motor is 0.400".
2. GE CD180-320 style kits (-UF) require a roll pin (included) to be inserted into the shaft hole before installation of the stub shaft adapter.

2a. Install the shaft adapter on the motor using the bolts, threadlocker and washers provided.

3. Verify the stub shaft runout/wobble is less than 0.004" TIR. (0.001" is ideal). Use a dead blow hammer or shims (provided) to true the shaft as needed.
4. Slide the rotor onto the stub shaft. The space between the mounting face and the magnetic strip of the rotor must be set to 0.584", as shown in Figure 2. Use Avtron gauges (A25355 or A35226) or use housing alignment grooves as shown in Figure 5 to verify position.

Note
if optional inboard seal plate and/or shield is used, gage the rotor location from the shield/seal plate(s). Ensure the rotor label marked "this side out" is facing away from the motor.

4a. For rotors UN, UP, and UQ ensure the counter bored holes on the motor side of the rotor line up with the bolt heads used to mount the adapter. This will permit proper rotor axial positioning.

5. Turn the cam screws of the rotor in the directions shown on the rotor to engage the cams. Tighten to 9-10 ft lbs (12.2-13.5 n-m). Total cam screw rotation will be less than one turn.

END-OF-SHAFT APPLICATIONS (Rotors EF-E9, HF-H9)
See Table 2 for part numbers:
1. Verify that the shaft projection from the C-face of the motor is 0.400" [10.2mm]. Apply antiseize to the shaft.

1a. GE CD180-320 style kits (-EF) require a roll pin (included) . Install the pin in the rotor first, then position the rotor on the shaft. Lightly tap into place.

2. Apply threadlocker to the bolt(s); use the supplied washer(s) and tighten.

THROUGH SHAFT APPLICATIONS (Rotors TA-T9, CA-C9, KA-K9, MF-MZ) See Table 3 for part numbers:

1. The through-shaft must project at least 1.5" [38.1mm] from the accessory mounting face. If it is greater than 2" [50.80mm] long, use the outboard through-shaft cover, detailed in Figure 4.
2. Slide the rotor on the shaft (option "B" or "T"), ensuring the rotor label "this side out" is away from the motor. The space between the mounting face and the rotor must be set to 0.584" [14.83mm], as shown in Figure 2. Use Avtron gauges (A35226 or A25355) or housing alignment grooves as shown in Figure 5 to verify position. (Note: if optional inboard seal or shield plate is used, gage the rotor location from the seal shield plates. See Figure 3.) If using a set screw rotor (TA-T6), apply threadlocker to the set screws (2) and tighten to 25 in-lbs. If using a cam screw rotor (CA-C3), threadlocker is pre applied.
3. Turn the cam screws of the rotor in the directions shown on the rotor to engage the cams. Tighten to 9-10 ft lbs (12.3-13.5 n-m). Total cam screw rotation will be less than one turn.

STATOR HOUSING INSTALLATION

NOTE
If additional magnetic shielding (option 004) has been added to the sensors, be sure to remove the sensors before installing the stator housing.

The stator housing is retained to the motor using four, 1/2-13 x 3" bolts and spring type lock washers (supplied). If the stator is to be sandwich mounted between an accessory such as a brake and the motor, select the bolt length accordingly. Apply antiseize compound to the perimeter of the XR850 where it will contact the motor C-face. Carefully move the stator housing into position, avoiding contact with the rotor. DO NOT FORCE the housing into place. Install the four mounting bolts (torque 30 to 35 foot pounds) [47.5-40.6 n-m].

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. Do apply antiseize compound (copper) to the encoder face to assist in easy removal. The XR850 electronics are fully sealed; water may enter and leave the rotor area as needed. Remove the bottom pipe plug in the housing if frequent moisture buildup is expected.

(OPTIONAL) OUTBOARD COVER KIT INSTALLATION.
For applications requiring shafts to pass completely through the XR850, Avtron offers an outboard through-shaft cover. See Table 4 for part numbers and Figure 4.

1. Install the encoder rotor as shown above.
2. Remove the existing cover of the encoder. Retain the screws and washers.
3. Mount the XR850 stator housing as shown above.
4. Install new through-shaft cover using the (4) #10-24 screws and washers from step 2.

(OPTIONAL) CHECK ROTOR POSITION

1. Remove a sensor or blank side cover plate.
2. Verify the rotor magnetic stripe is aligned with the grooves (see Figure 5).
3. Replace the sensor or side cover plate.

WIRING INSTRUCTIONS

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

The XR850 can be wired for single phase or two phase, either with or without complements, with or without markers. For bidirectional operation, in most cases Phase A channel typically leads phase B channel for clockwise shaft rotation as viewed from the anti-drive or accessory end of the motor. See 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 $\bar{A}$ in the phase A pair OR B with $\bar{B}$ in the phase B pair but **NOT** both.
3) Apply Power.
4) Verify encoder feedback is correct, using hand rotation of shaft, or jog mode of the speed controller.

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.

MAINTENANCE

GENERAL
This section describes routine maintenance for the Avtron XR850 Encoder. For support, contact Avtron's field service department at 216-642-1230. For emergency after hours service contact us at 216-641-8317.

The XR850 SMARTSafe encoder circuitry includes a diagnostic package that includes Adaptive Electronics and a Fault-Check output.

FAULT-CHECK

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

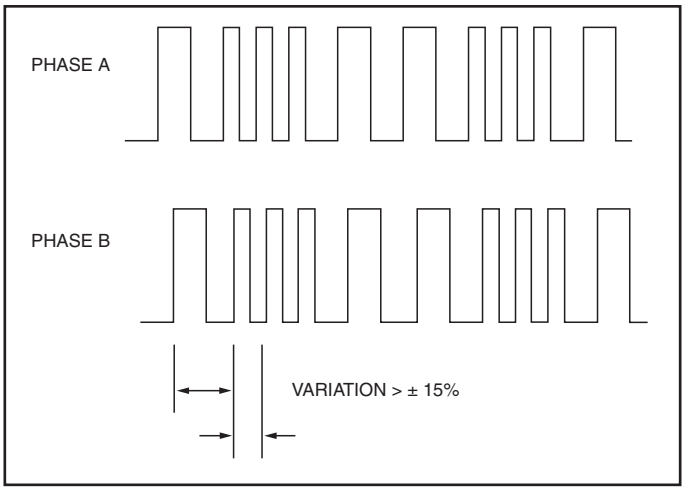
If the adaptive electronics reach their adjustment limit for any reason, the Fault-Check alarm and LED will notify the drive and operator of an impending failure. The LED will turn red if the Adaptive Electronics reach their adjustment limit. This output occurs before an actual failure, allowing steps 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 configurations only) and as an integral LED.

TROUBLESHOOTING:

If the drive indicates a loss of encoder/tach fault and the XR850 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 XR5 sensor module. If the new module 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 an end sensor plate or the second sensor, and use the built-in gauge to check the location of the rotor (see Figure 2.1). Ensure the label marked “This side out” is facing away from the motor.
2. Remove the XR5 sensor from the housing. Clean the housing mounting surface for the XR5 sensor and the XR850 housing. Ensure the XR5 sensor is directly mounted on the XR850 housing, 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 XR5 sensor and the rotor is properly located, replace the XR5 sensor.

An oscilloscope can also be used to verify proper output of the XR850 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 the adjacent figure, 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) (shafts, etc). For GE CD frame motors and similar styles, Avtron offers non-magnetic stub shafts (included with all “U” style rotor kits). If variations persist, consider replacing the sensors with super-shielded models, option -004.



STATOR HOUSING REMOVAL

To remove the stator housing remove the qty 4 1/2 13 x 3” bolts holding the housing to the motor. Take care that the housing does not fall from the pilot and cause the sensors to crash into the rotor. Damage to the sensor or rotor could result.

ROTOR REMOVAL

Remove shaft rust and burrs before removing the rotor.

END-OF-SHAFT style (EA-E9 & HA-H9): Remove hardware holding the rotor to the shaft.

THROUGH-SHAFT and UNIVERSAL (CA-C9, TA-T9, UA-U9) styles: Loosen the set or cam screws holding the rotor to the shaft. The cam screws rotate less than one turn to disengage the shaft. Do not remove the cam screws from the rotor. The stub shaft adapter from the universal (Ux) rotors can be left in place.
Remove the rotor by hand, taking care not to damage the outer magnetized ring.

If the rotor can not be removed by hand, use a gear puller taking care not to damage the outer magnetized ring. DO NOT APPLY HEAT TO ROTOR.

Some rotors have 1/4-20 threaded holes for Jack Screws

OPTIONAL LARGE STATOR ADAPTER

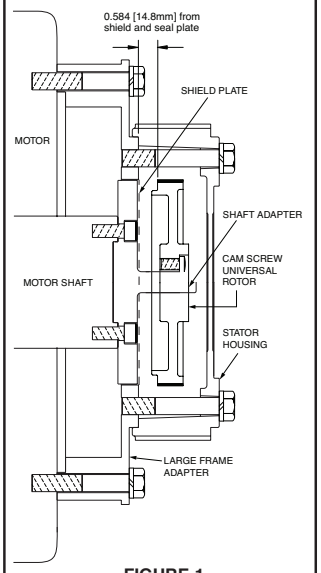


FIGURE 1

ROTOR MOUNTING
(Through Shaft Shown)

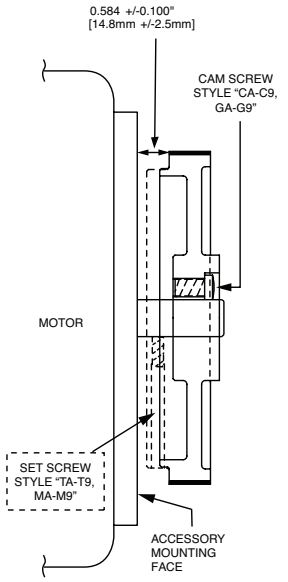


FIGURE 2

OPTIONAL INBOARD SHIELD AND/OR COVER PLATE

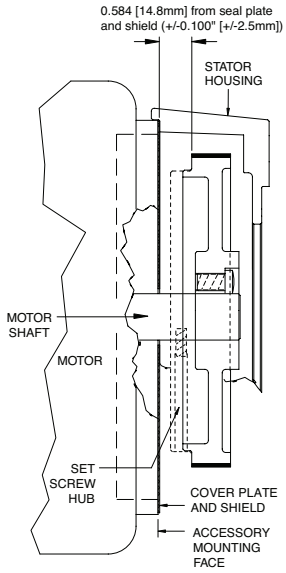


FIGURE 3

OPTIONAL OUTBOARD COVER PLATE

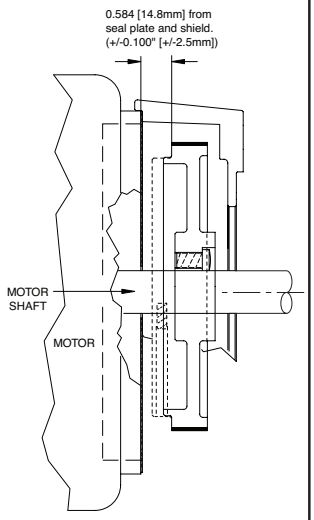
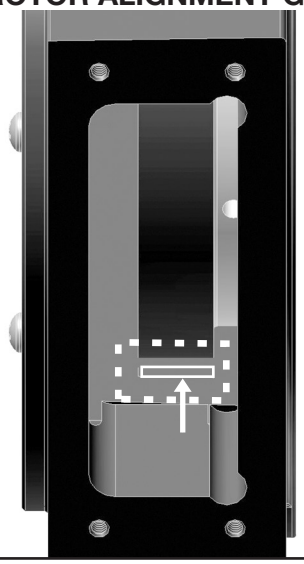


FIGURE 4

ROTOR ALIGNMENT GROOVE



Rotor magnetic strip aligns with groove.

Figure 5

XR850 PART NUMBERS AND AVAILABLE OPTIONS INCLUDING AV5 SENSORS

Model	Rotor Style	Shaft Size	Inboard & Outboard Cover Plates	Left Module		Right Module		Connector Options	XR850 Modification
				Line Driver	PPR	Line Driver	PPR		
XR850			X- none B- inboard, thru outboard>` F- no inboard, flat outboard N- inboard, flat outboard>` T- no inboard, thru outboard>`	See Line Driver Connection Option Chart	X- none P- 300 1270 C*- E- 360 3- 2000 50 B- 480 4- 2048 F- 60 Q- 500 5- 2500 G- 100 R- 512 D- 4096 H- 120 S- 600 8- 4800 A- 128 V- 900 9- 5000 B*- J- 960 0-special 150 Y- 1024 L- 240 Z- 1200 N- 256 A*-	See Line Driver Connection Option Chart	X- none B- 480 5- 2500 C*- 50 Q- 500 D- 4096 F- 60 R- 512 8- 4800 G- 100 S- 600 9- 5000 H- 120 V- 900 0-special A- 128 J- 960 B*- 150 Y- 1024 L- 240 Z- 1200 N- 256 A*- 1270 P- 300 3- 2000 E- 360 4- 2048	See Line Driver Connection Option Chart	

XR850 Modification

000- none
004- Super magnetic shielding
018- Add isolator
032- Conduit Box + Isolator
039- Special ATEX conduit box
400-
700- Large motor stator adapter
704- Stator adapter + super shield
900- Special cable length

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

Cam screw rotors patented.

+Large motor stator adapter required if not previously installed. > N/A for End of Shaft rotor styles. • Rotor Style "T" only.

Rotor Style	Shaft Size
T- Thru Shaft (Inch) C- Thru Shaft, Cam Screw (Inch) K- Keyed single Cam	A- 0.750 E- 1.000 J- 1.625 M- 2.000 Q- 2.250 W- 3.250 2- 2.875 G- 3.750• 6- 4.500• B- 0.625 F- 1.125 K- 1.750 N- 2.125 R- 2.500 Y- 3.375 3- 3.500 4- 3.875• C- 0.875 H- 1.375 L- 1.875 P- 2.375 T- 2.625 Z- 3.421 D- 3.625• 1- 4.000
M- Thru Shaft (mm)	F- 30mm P- 60mm Z- 80mm (2) 1) For Shaft DIA 80 -.030/-.047mm (f6) 2) For Shaft DIA 80 +.0/-.030mm (h7) J- 42mm Y- 80mm (1) 4- 95mm
E- End of Shaft H- End of Shaft for Grounding Kit	F- 1.125 GE CD180-320 P- 2.375 GE CD400 2- 2.875 GE CD500 9- GE CD6000, 6100, 6200, 6700, 6800, & 6900 N- 2.125 GE CD360 Q- 2.250 GE CD444/505E
U- Universal with End of Shaft G- Universal with Grounding Kit Q- EOS Adapter for Stacked Encoders	F- 1.125 GE CD180-320 9- GE CD6000, 6100, 6200, 6700, 6800, & 6900 Y- GE CD4600, 4700, 8500, & 8600+ U- Universal (Includes 1 Rotor and Shaft adapters for all motors except Q, R, Z & 4) N- 2.125 GE CD360 V- GE CD4300, 4400, 5400,6400 & 6500+ Z- GE CD680+ Q- GE CD444/505E+ P- 2.375 GE CD400 W- GE CD4500, 7500, 7600+ 4- ABB 95mm 2- 2.875 GE CD500 R- GE CD507, 509
X- no rotor	X- no rotor

XR5 Sensor Part Numbers

Model	Line Driver	PPR	Connector Options	Modifications
XR5-	See Line Driver Connection Option Chart	X- none S- 600 F- 60 V- 900 G- 100 J- 960 H- 120 Y- 1024 A- 128 Z- 1200 L- 240 3- 2000 N- 256 4- 2048 P- 300 5- 2500 E- 360 D- 4096 B- 480 8- 4800 Q- 500 9- 5000 R- 512 0-special	See Line Driver Connection Option Chart	000- none 004- Super Magnetic Shielding 4xx- Special PPR (see table) 9xx- Special Cable Length (xx=ff/0.3m)

			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	XRB3	None	XRB3	None	None
SMARTach Connector Options	A	10 Pin MS W/O Plug	✓	✓	✓		✓
	B	10 Pin MS With Plug	✓	✓	✓		✓
	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	Large Industrial Style Std. Pinout & Plug	✓	✓	✓		
	G	Large Industrial Style Northstar Pinout & Plug	✓	✓	✓		
	R	10 Pin mini Twist Lock with Plug	✓	✓	✓		
	W	Flexible Cable with Sealing Gland	✓	✓	✓		
	4	Conduit Box, Terminal Block & 1/2" NPT	✓	✓	✓	✓	
	5	Conduit Box, Terminal Block, 3/4" NPT+Cord	✓	✓	✓	✓	
	6	Conduit Box, Terminal Block & 1" NPT	✓	✓	✓	✓	
	7	Conduit Box, Terminal Block & 25mm	✓	✓	✓	✓	

SPECIFICATIONS

ELECTRICAL

A. Operating Power (Vin)
1. Volts ..... See Line Driver Option Chart
2. Current ..... Each output, 100mA Nom. 355mA Max.
B. Output Format
1. 2O/ & Comp ..... A, $\overline{A}$, B, $\overline{B}$ (differential line driver)
2. Marker ..... 1/Rev, Z, $\overline{Z}$
C. Signal Type ..... Incremental, Square Wave, 50 ±10% Duty Cycle.
D. Direction Sensing ..... O/ A leads O/ B for CW rotation as viewed from the back of the tach looking at the non-drive end of the motor.
E. Phase Sep ..... 15% minimum
F. Frequency Range ..... 0 to 165,000 Hz
G. PPR 8-5000
H. Line Driver Specs ..... See table
I. Connectors ..... See connector options on page 1
J. Integral LED Indicator ..... GREEN: power on, unit ok. RED: alarm on

MECHANICAL

A. Rotor Inertia ..... 0.12-0.41 Oz. In. Sec.^{2}
B. Acceleration ..... 5000 RPM/Sec. Max.
C. Speed ..... 5400 RPM Max.
D. Weight ..... 9 lbs. [4 kg.]
E. Sensor to Rotor
Air Gap (nominal) ..... 0.045" [1.14mm]
Tolerance ..... ±0.015" [0.38mm]- 0.30 [7.62mm]
F. Rotor Axial Tolerance ..... ±0.10" [±2.54mm]

ENVIRONMENTAL

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

XR485 Connector Spare Parts					
Style	Code	Encoder Side		Customer Side	
Large Industrial "Epic"	P, G	314879	Base	314880	Hood
		314878	Terminals	314877	Terminals
10 pin MS	A, B	Box Recepticle		Plug	
		315933	Standard	315932	Standard
		431079	Line Driver "R"	316445	Line Driver "R"
				411216	Bushing
				411217	Bushing
				411218	Bushing
				411219	Bushing
7 Pin MS	E, F, J, K, S, T, U, V	Box Recepticle		Plug	
		316297	Standard	315932	Standard
		431080	Line Driver "R"	316446	Line Driver "R"
				411218	Bushing
				411219	Bushing
Conduit Box	4,5,6,7			364987	Terminal Plug
10 pin mini MS Twist Lock	R	431081	Base	316447	Plug
		471748	Gasket		

			Line Driver Specifications				Isolator Specifications	
		Code	H	7	F	G	XRB3	
Description		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	Units
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 Voltabe 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					

Table 3

SPARE END OF SHAFT ROTORS						
	Motor Specific Style		Universal Style			
Motor Frame	Code	Rotor	Code	Rotor	Shaft Adapter**	Magnetic Shield
Universal rotor only* (no stub shaft)	-NA-	-NA-	CB*	B31515	none	-NA-
CD 180-32x	EF/HF	B30916-EF	QF/UF/GF	B31515	B31516	A35355
CD36x	EN/HN	B30916-EN	QN/UN/GN	B31515	B31517	A35355
CD4xx	EP/HP	B30916-EP	QP/UP/GP	B31515	B31518	A35355
CD444/CD505E	EQ/HQ	B30916-EQ	QQ/UQ/GQ	B31515	B31631	A35355
CD43xx, 44xx, 54xx, 64xx, 65xx		-NA-	QV/UV/GV	B31515	B31676	A35355
CD45xx, 75xx, 76xx		-NA-	QW/UW/GW	B31515	B31676	A35355
CD46xx, 47xx, 85xx, 86xx		-NA-	QY/UY/GY	B31515	B31677	A35355
CD68x		-NA-	QZ/UZ/GZ	B31515	B31678	A35355
CD5xx (excluding CD505)	E2/H2	B30916-E2	Q2/U2/G2	B31515	B31519	A35355
E9- CD60xx, 61xx, 62xx, 67xx, 68xx, 69xx	E9/H9	B31092	Q9/U9/G9	B31515	B31520	-NA-
All except CD505 and CD680	-NA-	-NA-	UU	B31515	B31516, B31517, B31518, B31637, B31676, B31677	-NA-

** Shaft adapter part numbers for rotor style “Q” (stacked encoders) is the same as above but with a “-1” suffix.

Table 4

SPARE THROUGH SHAFT ROTORS AND COVERS										
Through Shaft Rotors							Outboard Covers		Inboard Covers	
Shaft Bore	Set Screw		Cam Screw		Keyed Single Cam		Flat	Thru-Shaft Cover		Magnetic Shield
Imperial (US) Sizes	Rotor Code	Rotor Part	Rotor Code	Rotor Part	Code	Part #				
0.750"	TA	B30915-TA	CA	B31514-CA		B36832-KE	B30934	A34203-2	-NA-	A35355
0.625"	TB	B30915-TB	CB*	B31515				A34203-1	A26211-1	A35355
0.875"	TC	B30915-TC	CC	B31514-CC				A34203-3	-NA-	A35355
3.625"	TD	B30915-TD	-NA-	-NA-				-NA-	-NA-	-NA-
1.000"	TE	B30915-TE	CE	B31514-CE	KE	B36832-KE		A34203-4	A26211-2	A35355
1.125"	TF	B30915-TF	CF	B31514-CF				A34203-5	A26211-3	A35355
3.750"	TG	B30915-TG	-NA-	-NA-				-NA-	-NA-	-NA-
1.375"	TH	B30915-TH	CH	B31514-CH				A34203-7	A26211-4	A35355
1.625"	TJ	B30915-TJ	CJ	B31514-CJ				A34203-8	A26211-5	A35355
1.750"	TK	B30915-TK	CK	B31514-CK				A34203-10	-NA-	A35355
1.875"	TL	B30915-TL	CL	B31514-CL				A34203-11	A26211-6	A35355
2.000"	TM	B30915-TM	CM	B31514 CM				A34203-12	A26211-7	A35355
2.125"	TN	B30915-TN	CN	B31514-CN				A34203-13	A26211-8	A35355
2.375"	TP	B30915-TP	CP	B31514-CP				A34203-15	A26211-12	A35355
2.250"	TQ	B30915-TQ	CQ	B31514-CQ				A34203-14	A26211-8	A35355
2.500"	TR	B30915-TR	CR	B31514-CR				A34203-16	A26211-9	A35355
2.625"	TT	B30915-TT	CT	B31514-CT				A34203-25	-NA-	A35355
3.250"	TW	B30915-TW	CW	B31514-CW				A34203-19	-NA-	-NA-
3.375"	TY	B30915-TY	CY	B31514-CY				A34203-20	-NA-	-NA-
3.421"	TZ	B30915-TZ	CZ	B31514-CZ				A34203-21	-NA-	-NA-
4.000"	T1	B30915-T1	-NA-	-NA-				-NA-	-NA-	-NA-
2.875"	T2	B30915-T2	C2	B31514-C2				A34203-17	A26211-10	A35355
3.500"	T3	B30915-T3	C3	B31514-C3				A34203-22	A26211-11	-NA-
3.875"	T4	B30915-T4	-NA-	-NA-				A34203-23	-NA-	-NA-
4.500"	T6	B30915-T6	-NA-	-NA-				A34203-24	-NA-	-NA-

Table continued on page 10

* Note Universal rotor (CB) is a 5/8" thru-shaft cam screw style rotor. Universal style kits (GF-G9, QF-Q9, UF-U9) add the required stub shaft to fit the rotor to GE CD frame motors.

SPARE THROUGH SHAFT ROTORS AND COVERS										
Through Shaft Rotors							Outboard Covers		Inboard Covers	
Shaft Bore	Set Screw		Cam Screw		Keyed Single Cam		Flat	Thru-Shaft Cover		Magnetic Shield
Metric Sizes	Rotor Code	Rotor Part	Rotor Code	Rotor Part	Code	Part #				
30mm	MF	B31502-MF	-NA-	-NA-			B30934	A34203-6	-NA-	A35355
42mm	MJ	B31502-MJ	-NA-	-NA-			↓	A34203-9	-NA-	A35355
60mm	MP	B31502-MP	-NA-	-NA-				A34203-15	-NA-	A35355
80mm	MY	B31502-MY	-NA-	-NA-				A34203-18	-NA-	-NA-
80mm	MZ	B31502-MZ	-NA-	-NA-				A34203-18	-NA-	-NA-
90mm	M3	B31502-M3	-NA-	-NA-				-NA-	-NA-	-NA-
95mm	M4	B31502-M4	-NA-	-NA-				A34203-26	-NA-	-NA-
70mm	M5	B31502-M5	-NA-	-NA-				-NA-	-NA-	-NA-

See the following Installation Drawings for Wiring Information

D53008: ATEX / IECEx Zone 1 & 21

D52353: ATEX / IECEx Zone 2 & 22

D52354: Division 1

D52355: Division 2

NOTE: Remote alarm is not functional for Division 1, Zone 0 or Zone 1

PINOUTS AND PHASING

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

	Option Code	Phasing	Signal	0V Gnd	A+	B+	Z+	* Alm+	+Vin	$\overline{\text{A-}}$	$\overline{\text{B-}}$	$\overline{\text{Z-}}$	* Alm
10 Pin MS AvtronPinout	A,B	CW	Pin #	A	D	E	C	F	B	G	H	I	J
10 Pin, Industrial, Avtron Pinout	P	CW	Pin #	1	2	3	4	5	6	7	8	9	10
10 Pin, Industrial, Northstar Pinout	G	CW	Pin #	1	2	3	4	NC	6	7	8	9	NC
10 Pin MS Mini Twist Lock	R	CW	Pin #	F	A	B	C	NC	D	H	J	K	NC
Conduit Box W/10 Pin Terminal Block	4,5,6,7	CW	Pin #	1	2	3	4	5	6	7	8	9	10
10 Wire Cable	W	CW	Color	BLK	GRN	BLU	ORG	BRN	RED	YEL	GRA	WHT	VIO

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

	Option Code	Phasing	Signal	0V Gnd	A+	B+	Z+	+Vin	$\overline{\text{A-}}$	$\overline{\text{B-}}$	$\overline{\text{Z-}}$
7 Pin MS, Avtron / BEI Pinout (A,A\,B,B\)	K	CW	Pin #	F	A	B	NC	D	C	E	NC
7 Pin MS, Avtron / BEI Pinout (A,A\)	F	CW	Pin #	F	A	NC	NC	D	C	NC	NC
7 Pin MS, Avtron / BEI Pinout (A,B,Z)	J	CW	Pin #	F	A	B	C	D	NC	NC	NC
7 Pin MS, Avtron / BEI Pinout (A,B)	E	CW	Pin #	F	A	B	NC	D	NC	NC	NC
7 Pin MS, Dynapar Pinout (A,A\,B,B\)	V	CCW	Pin #	F	A	B	NC	D	C	E	NC
7 Pin MS, Dynapar HS35 Pinout (A,A\)	T	CCW	Pin #	F	A	NC	NC	D	C	NC	NC
7 Pin MS, Dynapar HS35 Pinout (A,B,Z)	U	CCW	Pin #	F	A	B	C	D	NC	NC	NC
7 Pin MS, Dynapar HS35 Pinout (A,B)	S	CCW	Pin #	F	A	B	NC	D	NC	NC	NC

***** Remote alarm function not available with line driver options “H”, “7” or “F” (Zone 0, Zone 1 or Class I Div I)

THIN-LINE II™

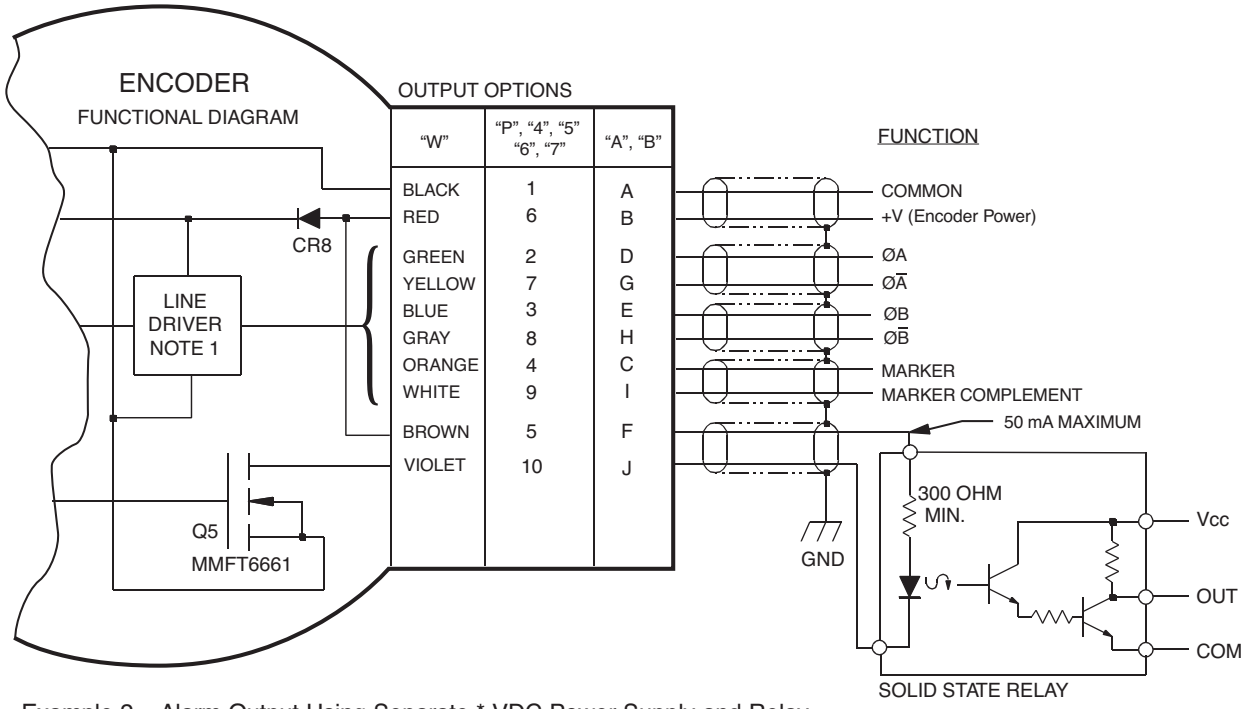
Application Examples

Applies to all XR685 Zone 2 & Division 2models with wiring optons “W”, “P”, “4”, “5”, “6”, “7”, “A” and “B”. Remote alarm not available for Zone 0, Zone 1 or Division 1.

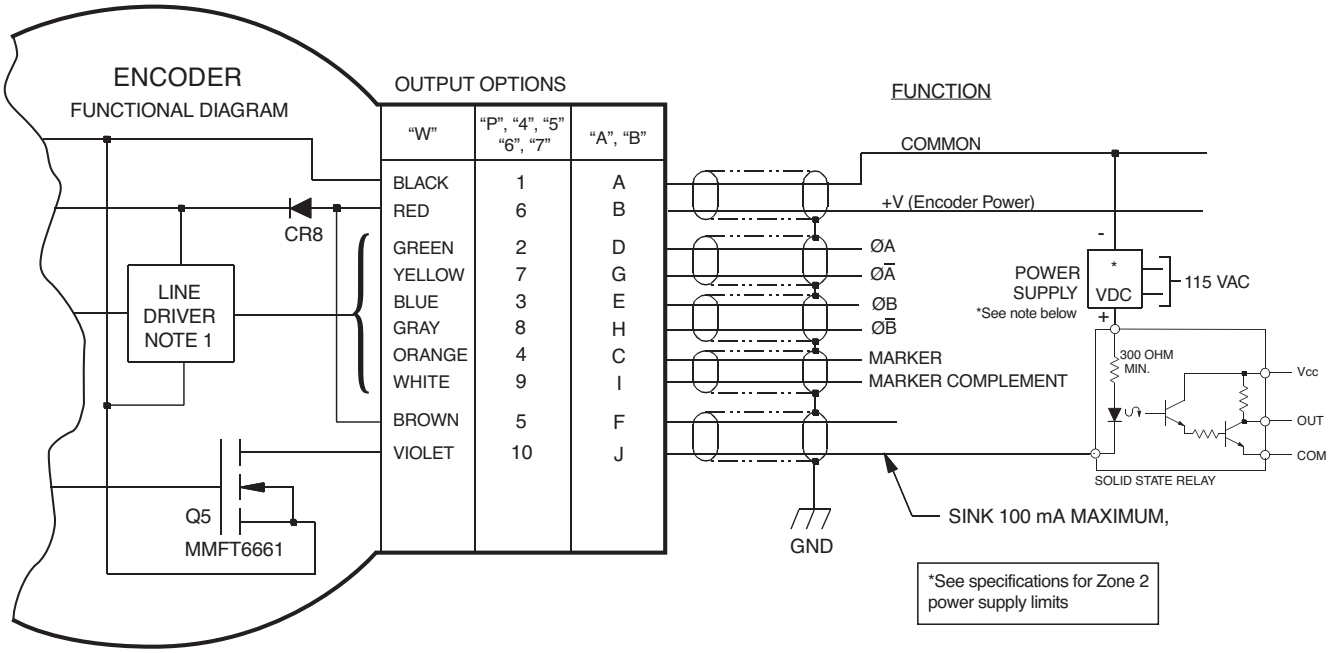
ALARM OUTPUT CONNECTION

Avtron 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.

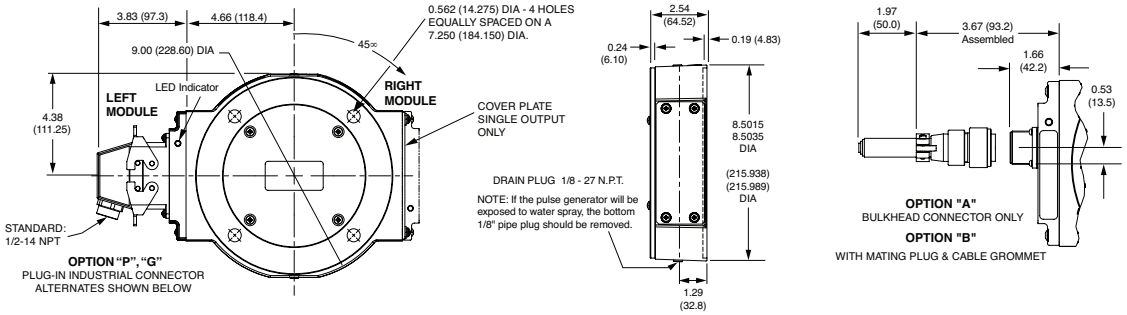
Example 1. Alarm output using +V(OUT). +V(OUT) is equal to +V, the encoder power supply.

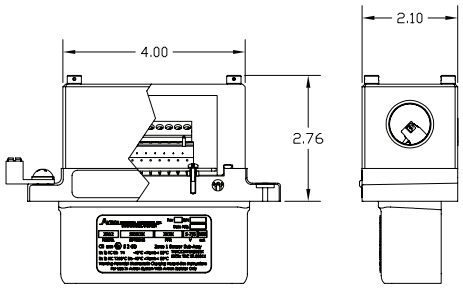


Example 2. Alarm Output Using Separate * VDC Power Supply and Relay.

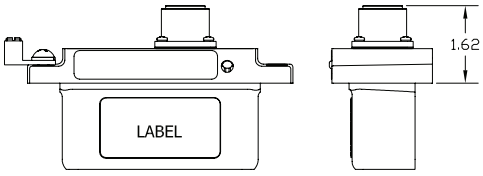


OUTLINE DRAWING

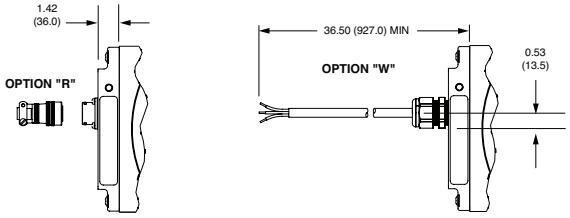


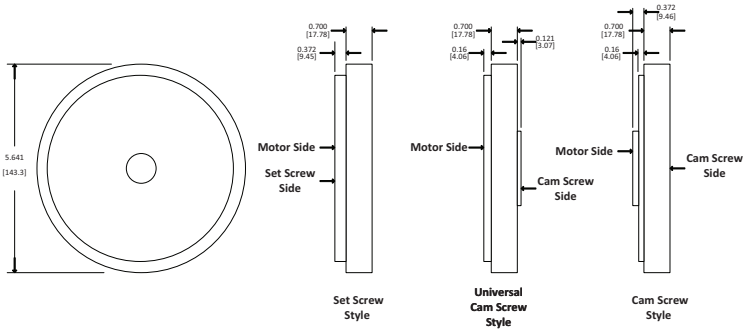


CONDUIT BOX OPTIONS 4, 5, 6, & 7



CONNECTOR OPTIONS E, F, J, K, S, T, U & V
7 PIN MS





CE

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

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

Company Name _____

Authorized Company Representative _____

Title _____ Date _____

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

REVISIONS				
ECN NO.	REV	DESCRIPTION	DATE	APPROVED

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

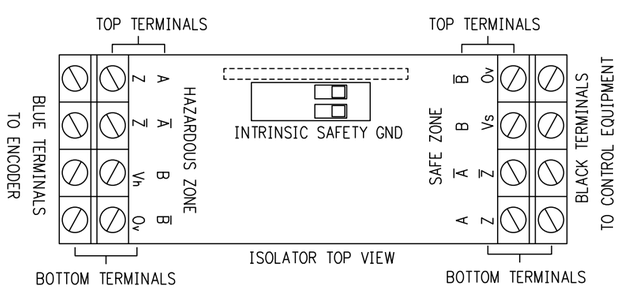
WARNING: INSTALLATION SHOULD BE PERFORMED ONLY BY QUALIFIED PERSONNEL. SAFETY PRECAUTIONS MUST BE TAKEN TO ENSURE MACHINERY CANNOT ROTATE AND ALL SOURCES OF POWER ARE REMOVED DURING INSTALLATION. EQUIPMENT AVAILABLE AS A SYSTEM ONLY INCLUDING: XR___ ENCODER WITH LINE DRIVER OPTION "H" OR "5" AND AN AVTRON 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:

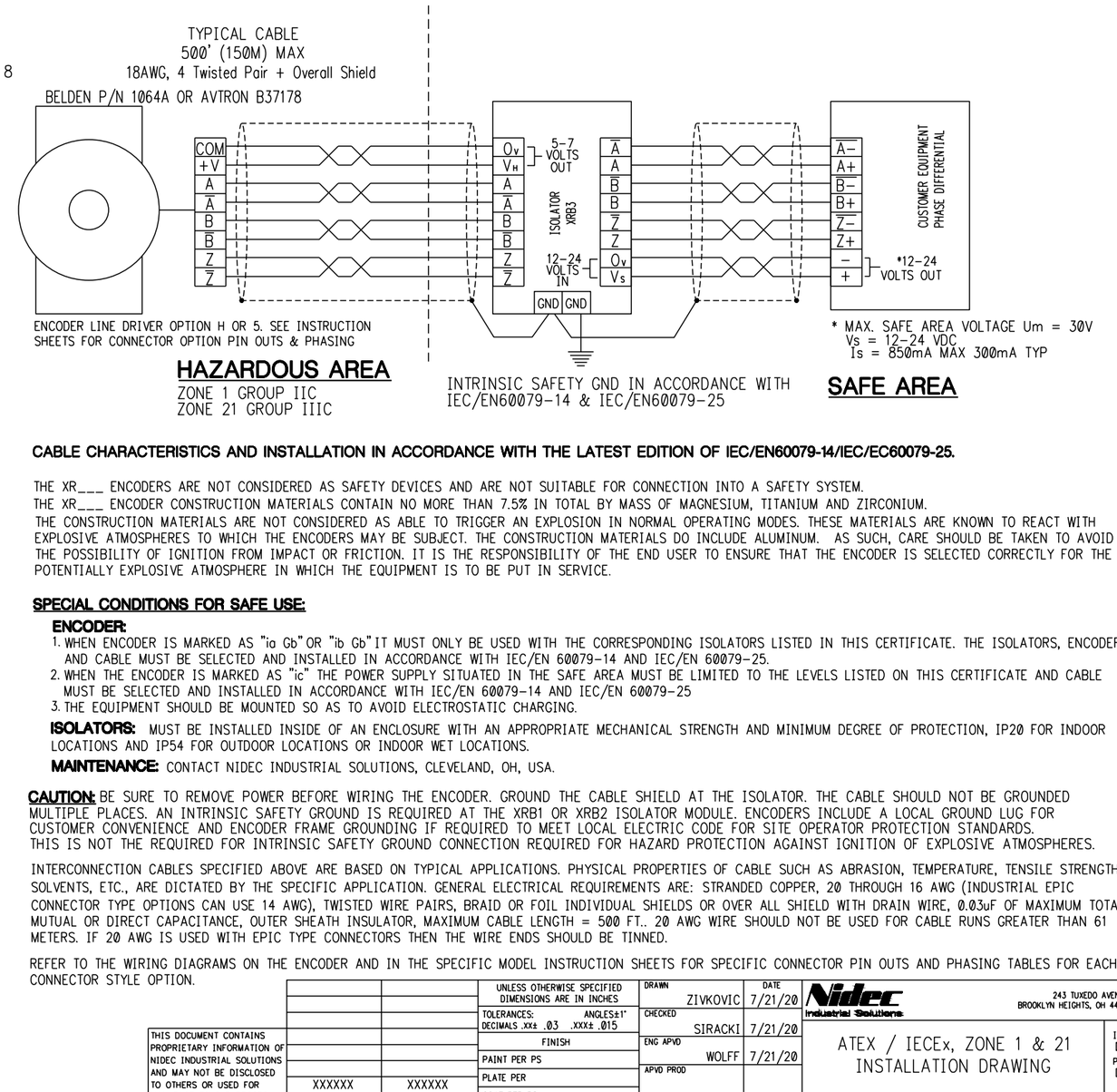
Um (MAXIMUM SAFE AREA VOLTAGE) = 30V
Uo (OPEN CIRCUIT VOLTAGE) = 7.14 VDC
Io (SHORT CIRCUIT CURRENT) = 420 mA
Co (SYSTEM CAPACITANCE) = 13.5 uF MAX.
Lo (SYSTEM INDUCTANCE) = .15 mH MAX.

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		



UNLESS OTHERWISE SPECIFIED THE ABOVE NOTES APPLY



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:

1. 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.
2. 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
3. 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.

XXXXXX	XXXXXX
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES: ANGLES±1° DECIMALS .XX± .03 .XXX± .015
FINISH
PAINT PER PS
PLATE PER
COAT PER PS
ANODIZED PER
OTHER

DRAWN	ZIVKOVIC	7/21/20
CHECKED	SIRACKI	7/21/20
ENG APVD	WOLFF	7/21/20
APVD PROD		

Nidec Industrial Solutions
243 TUXEDO AVENUE
BROOKLYN HEIGHTS, OH 44131

ATEX / IECEx, ZONE 1 & 21 INSTALLATION DRAWING

IMF ☒ PSF ☐

SIZE	CAGE NO.	DWG. NO.	REV
D	0FMV7	D53008	–

SCALE 1/1 | MODEL N/A | SHEET 1 OF 1

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

XRYYY XXXX7XXX XXX

- LINE DRIVER OPTION CODE FOR XR850, XR125, XR485, XR685
- 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
- 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 = 7 FOR ZONE 2 & 22

XRYY 7 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 = 7 FOR ZONE 2 & 22
  ALL OTHER CODE LOCATIONS ARE NOT RELEVANT TO INTRINSIC SAFETY
  SEE INSTRUCTION SHEETS FOR DEFINITIONS

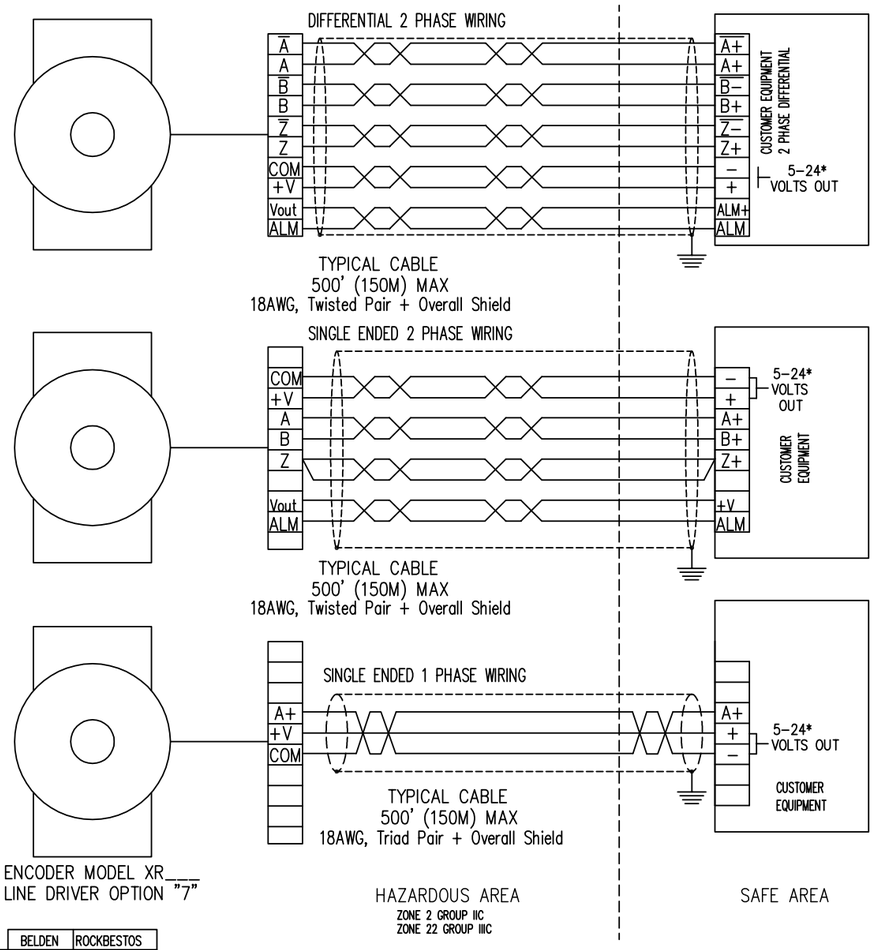
THE XR --- FAMILY OF ENCODERS HAS BEEN EVALUATED TO BE COMPLIANT WITH:
IEC60079-0:2011, EN60079-0:2012/A11:2013
IEC60079-11:2011, EN60079-11:2012
BSEN61000-6-4:2007 AND BSEN61000-6-2:2005
CERTIFICATES OF CONFORMITY TRAC12ATEX0003X, IECEx TRC12.0009X

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 EQUIVILENT POWER SUPPLY THAT LIMITS VOLTAGE AND CURRENT PER THE FOLLOWING CHART.
GROUP II, CATEGORY 3 (ZONE 22) DUST GROUP IIIC WHEN MARKED CE Ex II 3 GD Ex ic IIIC T200°C Dc

$-40°C \leq Tamb \leq +80°C$

TABLE 1: ZONE 2 POWER SUPPLY LIMITS			
Ii	Ui		Ci
	IIC	IIB	
250mA	15V	25V	1.8uF
1A		15V	
5A		12V	

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



	BELDEN	ROCKBESTOS
3 CONDUCTOR	9365	01T18I/S-OS
TYPICAL EXAMPLES		

	BELDEN	ROCKBESTOS
2 PAIR	1063A	02P18I/S-OS
4 PAIR	1064A	04P18I/S-OS
5 PAIR		05P18I/S-OS
8 PAIR	1065A	08P18I/S-OS
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 ON THE ENCODER 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.

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.
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:

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

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 ELECTRIC CODE FOR SITE OPERATOR PROTECTION STANDARDS.

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 FOIL INDIVIDUAL SHIELDS OR OVER ALL SHIELD WITH DRAIN WIRE, 0.05uF 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.

UNLESS OTHERWISE SPECIFIED THE ABOVE NOTES APPLY

XXXXXX	XXXXXX
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES: ANGLES±1° DECIMALS .XX± .03 .XXX± .015
FINISH
PAINT PER PS
PLATE PER
COAT PER PS
ANODIZED PER
OTHER

		DATE
DRAWN	NICKOLI	1/13/14
CHECKED	PATTON	3/24/15
ENG APVD	SHADDUCK	3/24/15
APVD PROD		

Nidec Avtron Automation
8901 E.PLEASANT VALLEY ROAD
INDEPENDENCE, OH 44131-5529

ATEX / IECEx ZONE 2, 22 INSTALLATION DRAWING

IMF ☒ PSF ☐

SIZE	CAGE NO.	DWG. NO.	REV
D	0FMV7	D52353	A
SCALE 1/1	MODEL N/A	SHEET 1 OF 1	

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

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

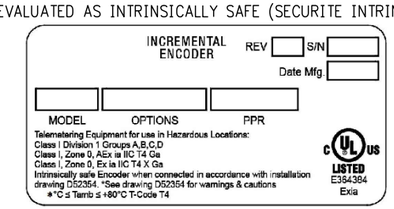
XRYY F X X XXX

- 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)	11.89	2
				C & D (IIB)	11.91	100

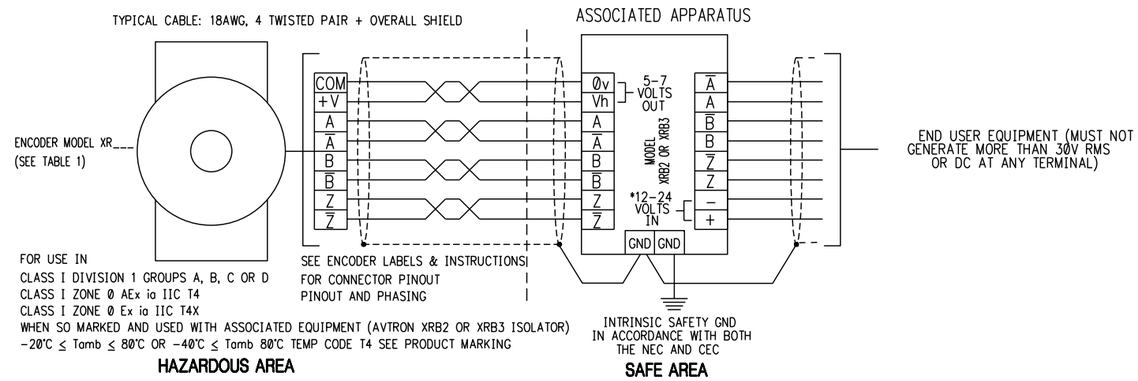
2. CAPACITANCE AND INDUCTANCE CONNECTED TO THE OUTPUT TERMINALS MUST BE ADDED TO Ci AND Li OF THE INPUT TERMINALS OF THE ENCODER WHEN DETERMINING THE MAXIMUM CAPACITANCE AND INDUCTANCE APPARENT AT THE INPUT TERMINALS. WHERE THE CABLE CAPACITANCE AND INDUCTANCE PER FOOT ARE NOT KNOWN, THE FOLLOWING VALUES 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 LO)

IF Po OF THE ASSOCIATED APPARATUS IS NOT KNOWN, IT MAY BE CALCULATED USING THE FORMULA Po = (Voc * Isc)/4 = (Uo * Io)/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



3.) 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 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.

4.) 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.

5.) 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.

6.) 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.

7.) 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.

8.) 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.

9.) WHEN AN ENCODER CONTAINS MULTIPLE ELECTRICALLY ISOLATED SENSOR MODULES, THE WIRING MUST BE IN SEPARATE CABLES TO SEPARATE ISOLATOR MODULES.

10.) INTERCONNECTION CABLES MUST BE SELECTED AND INSTALLED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AND CANADIAN ELECTRICAL CODE.

11.) 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.

NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES: ANGLES±1° DECIMALS .XX± .03 .XXX± .015
FINISH
PAINT PER PS
PLATE PER
COAT PER PS
ANODIZED PER
OTHER

		DATE
DRAWN	NICKOLI	7/28/14
CHECKED	SHADDUCK	7/28/14
ENG APVD	SHADDUCK	7/28/14
APVD PROD		

Nidec Industrial Solutions
243 TUXEDO AVENUE
BROOKLYN HEIGHTS, OH 44131

DIVISION 1 ZONE Ø ENCODER INSTALLATION DRAWING

IMF ☒ PSF ☐

SIZE	CAGE NO.	DWG. NO.	REV
D	ØFMV7	D52354	C

SCALE 1/1 | MODEL N/A | SHEET 1 OF 1

XRYYY-X-X---

- CONNECTOR OPTION CODES
  LINE DRIVER OPTION G: H, M, N & 8
  LINE DRIVER OPTION R: A, B, C, D, E, F, J, K, S, T, U, & V
- G - CLASS 1 DIV. 2 LISTED
  R - CLASS 1 DIV. 2 RECOGNIZED — LINE DRIVER CODE
- MODEL #
- HAZARDOUS LOCATION CODE

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

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

CSA 22.2 NO. 14-13
CSA C22.2 NO. 213-M1987
ISA 12.12.01 NONINCENDIVE ELECTRICAL EQUIPMENT FOR USE IN CLASS 1 DIVISION 2 HazLoc
UL508 STANDARD FOR INDUSTRIAL CONTROL EQUIPMENT

THE XR --- FAMILY OF ENCODERS IS SUITABLE FOR USE IN HAZARDOUS LOCATIONS:
CLASS I DIV 2 GROUPS A, B, C OR D, OR NON - HAZARDOUS LOCATIONS ONLY.

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

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

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.

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

ENCODERS PARAMETERS ARE:

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

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 ELECTRICAL CODE (600V INSTRUMENT TRAY CABLE). INTERCONNECTION CABLES SPECIFIED 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, .05uF 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.

RECOGNIZED MODELS ARE INTENDED TO BE FACTORY WIRED IN ACCORDANCE WITH ISA 12.12.01 CLAUSE 8.8.1.

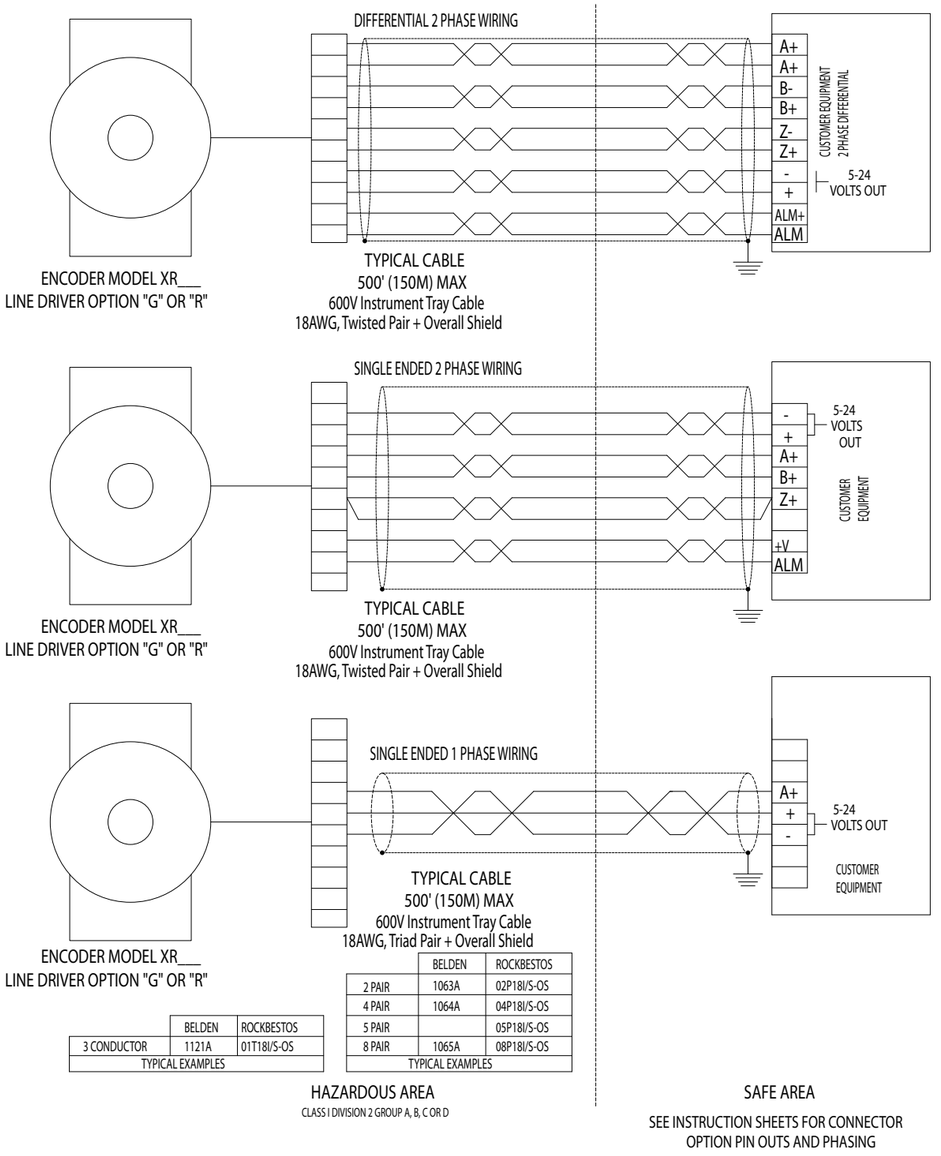
THIS EQUIPMENT HAS BEEN EVALUATED FOR USE IN A MAXIMUM AMBIENT TEMPERATURE OF 80°C.
CONSIDERATION MUST BE GIVEN TO ENSURE FIELD WIRING IS SUITABLY RATED.

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

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.

UNLESS OTHERWISE SPECIFIED THE ABOVE NOTES APPLY

REVISIONS				
ECN NO.	REV	DESCRIPTION	DATE	APPROVED
EA0698	A	UPDATED ENCODER PARAMETERS NICKOLI	5/8/14	SHADDUCK



	BELDEN	ROCKBESTOS
3 CONDUCTOR	1121A	01T18I/S-OS
TYPICAL EXAMPLES		

	BELDEN	ROCKBESTOS
2 PAIR	1063A	02P18I/S-OS
4 PAIR	1064A	04P18I/S-OS
5 PAIR		05P18I/S-OS
8 PAIR	1065A	08P18I/S-OS
TYPICAL EXAMPLES		

INSTALLATION IN ACCORDANCE WITH THE NEC AND IN ACCORDANCE WITH THE CEC

XXXXXX	XXXXXX
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES: ANGLES±1°
DECIMALS .XX± .03 .XXX± .015
FINISH
PAINT PER PS
PLATE PER
COAT PER PS
ANODIZED PER
OTHER

		DATE
DRAWN	NICKOLI	1/8/14
CHECKED	SHADDUCK	1/9/14
ENG APVD	SHADDUCK	1/9/14
APVD PROD		

Nidec Avtron Automation
8901 E.PLEASANT VALLEY ROAD
INDEPENDENCE, OH 44131-5529

DIVISION 2
INSTALLATION DRAWING

IMF ☒ PSF ☐

SIZE	CAGE NO.	DWG. NO.	REV
D	0FMV7	D52355	A

SCALE 1/1 | MODEL N/A | SHEET 1 OF 1