

ENCODER INSTRUCTIONS

XR125 SMARTSafe™

12.5" FC FACE MOUNT
MODULAR FOR HAZARDOUS
APPLICATIONS

DESCRIPTION

The Avtron Model XR125 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 XR125 SMARTSafe encoder is a bearingless, couplingless, modular design, providing unequaled reliability and mechanical performance.

CAUTION

The XR125 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 XR125 fits AC and DC motors with an 12.5" C Face. Both end-of-shaft and through shaft mountings are accommodated. The XR125 Encoder consists of three or four parts: a rotor, a stator housing, and one or two removable sensor modules. No gapping, adjustment, or shimming is required!

The XR125 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 XR125 is installed as an open rotor and sensor only system without a C face, then manual gapping of the sensor is needed.)

The XR125 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 XR125 electronics are potted, providing full protection against liquids.

The outputs are protected against short circuits and wiring errors. An Avtron XR125 SMARTSafe encoder has a two-phase output (A,B) 90° out of phase, with complements (Ā, B̄), (A Quad B Output), and a marker pulse with complement (Z, Z̄).

Because the XR125 is modular, there are no bearings or couplings required. This, combined with the latest magnetoresistive (MR) sensor technology, allows the XR125 to provide superior mechanical performance and increased reliability.

Output resolution on the XR125 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 XR125 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 Encoder

NOTE:

The equipment is intended for a fixed installation and should be mounted so as to avoid electrostatic charging. The XR125 is not considered as a safety device and is not suitable for connection into a safety system.

The XR125 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 XR125 may be subject. It is however the responsibility of the end user to ensure that the XR125 is selected correctly for the potentially explosive atmosphere in which the equipment is to be put into service.

The XR125 installation is similar to AV125. 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.

The XR125 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 in accordance with the requirements for category 2 or 3 equipment.

These materials are not known to react with any explosive atmospheres to which the XR125 may be subject. It is however the responsibility of the end user to ensure that the XR125 is selected correctly for the potentially explosive atmosphere in which the equipment is to be put into service.

The XR125 installation is similar to AV125. 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. 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 must be less than ± 0.100 ".

In preparation for installing the Model XR125 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.

GENERAL

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

CAUTION

Do not strike the encoder or rotor at any time. Damage will result and the warranty will be void. The outer edge of the rotor may be damaged by scratches, severe blows, and strong magnetic fields. 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:

XR125 Encoder

1. Washer, Spring Lock 1/2 (4)
2. Hex Hd. Cap Screw 5/8-11 x 4.00 (4)

Rotor

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

Not Supplied:

15/16" Wrench
Dial Indicator
Vernier Caliper
1/8" Hex Wrench (cam screw rotors only)
3/16" Hex Wrench (cam screw rotors only)
Model XRB3 Isolator for Division 1, Zone 0,1, 20 and 21 applications (Sold Separately)

Optional:

A35679 Gauge or A25355 Gauge Block
Outboard Through-Shaft Cover Plate Kit
Silicone Lubricant or 20 Weight Machine Oil
Dead Blow Hammer

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.

SHIELD INSTALLATION

For top performance on older motors with magnetized shafts and frames install the XR125 inboard shield. The XR125 also comes with built-in outboard sensor shields attached to the housing on every unit. For additional magnetic protection consider the special option "004" which includes additional magnetic shielding on the XR12 sensor.

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.
4. Install the rotor as usual, but gauge the 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 for setscrew style rotors but not cam screw style.

The motor shaft must project at least 1.8" [45.7mm] from the accessory mounting face. If it is greater than 3" [76.2mm] long, use the outboard through-shaft cover detailed in figure 3.

Slide the rotor on the shaft, ensuring the rotor label "this side out" is away from the motor. The space between the mounting face and the magnetic strip of the rotor must be set to 1.097" [27.9mm]. The innermost surface of the rotor will be 0.584" [14.84mm] from the motor C-face as shown in figures 2 & 3. Use Avtron gauges A35679, A25355, or housing alignment grooves as shown in figure 1 to verify position.

SET SCREW STYLE ROTORS

Apply threadlocker to the set screws (2) and tighten to 75 in-lbs

CAM SCREW STYLE ROTORS

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. 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.

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, 5/8-11 x 4" 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 XR125 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 XR125 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 PLATE KIT INSTALLATION

For applications requiring shafts to pass completely through the XR125, Avtron offers an outboard through-shaft cover plate kit. See Table 3 for part numbers and Figure 3. For T9 through-shafts, no cover is needed.

1. Install the encoder rotor as shown in FIG 1, 2 and 3.
2. Remove the existing cover of the encoder. Retain the screws and washers.
3. Mount the XR125 stator housing as shown above.
4. Install new through-shaft cover using the (4) #10-24 screws and washers from step 2.

MOUNTING THE XR125/XR12 WITHOUT A STATOR HOUSING

The XR125 (XR12 sensor+ rotor) may be mounted without the use of a C-face or XR125 stator housing. See XR12 manual for details.

WIRING INSTRUCTIONS

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 XR125 can be wired for single phase or two phase, either with or without complements, with or without markers.

For bidirectional operation of the encoder, proper phasing of the two output channels is important. Phase A channel typically leads phase B channel for clockwise shaft rotation as viewed from the anti-drive or accessory end of the motor (encoder mounting end). See pinout and phasing tables for exceptions

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 and verify encoder feedback is correct.

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 XR125 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 XR125 SMARTach II 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 configuration only) and as an integral LED.

TROUBLESHOOTING:

If the drive indicates a loss of encoder/tach fault and the XR125 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 XR125 sensor from the housing. Clean the housing mounting surface for the XR5 sensor and the XR125 housing. Ensure the XR5 sensor is directly mounted on the XR125 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 XR125 sensor and the rotor is properly located, replace the XR125 sensor.

An oscilloscope can also be used to verify proper output of the XR125 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 figure 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) (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

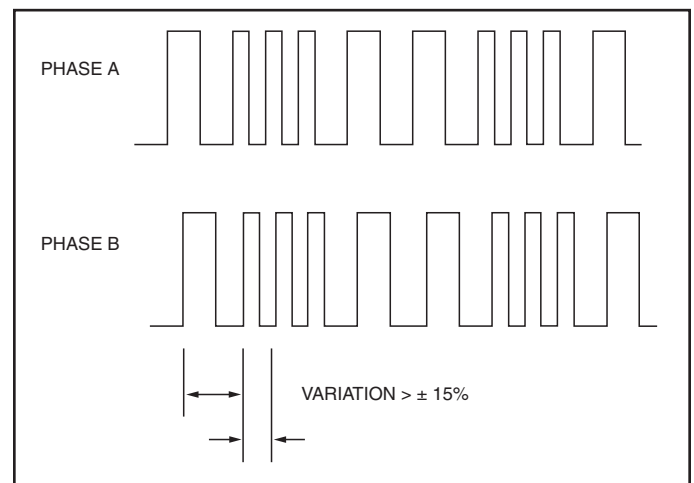
To remove the stator housing remove the qty 4 5/8-11x4" bolts holding the housing to the motor. Take care that the housing does not fall from the pilot and cause the sensors to crash into the rotor. Damage to the sensor or rotor could result.

ROTOR REMOVAL

Remove shaft rust and burrs before removing the rotor.

THROUGH-SHAFT TA-T9 MA-M9 styles: Loosen the set screws holding the rotor to the shaft. Remove the rotor by hand, taking care not to damage the outer magnetized ring.

If the rotor can not be removed by hand, use 1/4-20 Jack Screws in the holes provided in the rotor.



XR125 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				
XR125			X- none F- flat T- thru	See Line Driver Connection Option Chart	X- none F- 60 G- 100 H- 120 A- 128 L- 240 N- 256 P- 300 E- 360 B- 480 Q- 500	R- 512 S- 600 V- 900 J- 960 Y- 1024 Z- 1200 3- 2000 4- 2048 5- 2500 D- 4096 8- 4800	9- 5000 0-special	See Line Driver Connection Option Chart	X- none C* 50 F- 60 G- 100 H- 120 A- 128 B*-150 L- 240 N- 256 P- 300 E- 360	B- 480 Q- 500 R- 512 S- 600 V- 900 J- 960 Y- 1024 Z- 1200 A* 1270 3- 2000 4- 2048	5- 2500 D- 4096 8- 4800 9- 5000 0-special	See Line Driver Connection Option Chart	

XR125 Modification
000- none
004- Super magnetic shielding
018- Add isolator
400-
900- Special cable length

"0" OPTION SPECIAL PPR		
OPTION CODE	LEFT PPR	RIGHT PPR
404	None	16
405	16	None
406	6000	None
407	2800	None
408	1400	None

Rotor Style	Shaft Size										
	H=1.375	J=1.625	L=1.875	M=2.000	N=2.125	Q=2.250	P=2.375	R=2.500	T=2.625	2=2.875	
T-Thru Shaft Set Screw (Inch)	V=3.125	W=3.250	Y=3.375	4=3.875	1=4.000	B=4.125	5=4.250	C=4.375	6=4.500	D=4.625	
	E=4.690	A=4.875	G=5.000	Z=5.001	7=5.375	3=6.000	F=6.250	U=6.375	8=6.750	9=7.875	
C-Thru Shaft Cam Screw (Inch)	H=1.375	J=1.625	L=1.875	M=2.000	N=2.125	Q=2.250	P=2.375	R=2.500	T=2.625	2=2.875	
	V=3.125	W=3.250	Y=3.375	4=3.875	1=4.000	B=4.125	5=4.250	C=4.375	6=4.500	D=4.625	
	E=4.690	A=4.875	G=5.000	K=5.250	7=5.375	3=6.000	F=6.250	N/A	8=6.750	N/A	
M-Thru Shaft Set Screw (mm)			Y=85		1=100			C=110			
	E=120		G=25	K=120(E6)			F=160		8=170		
D-Thru Shaft Cam Screw (mm)			Y=85		1=100			C=110			
	E=120		G=25	K=120(E6)			F=160		8=170		

XR125 Sensor Part Numbers					
Model	Line Driver	PPR		Connector Options	Modifications
XR12-	See Line Driver Connection Option Chart	X- none F- 60 G- 100 H- 120 A- 128 L- 240 N- 256 P- 300 E- 360 B- 480 Q- 500 R- 512	S- 600 V- 900 J- 960 Y- 1024 Z- 1200 3- 2000 4- 2048 5- 2500 D- 4096 8- 4800 9- 5000 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) 018- Add Isolator

	Description	ATE / IECEx Zone 1 & 21	ATEX / IECEx Zone 2 & 22	Class I & II Div. 1 & Zone 0	Class I & II Div. 2 Listed	Class I & II 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
A	10 Pin MS W/O Plug - Std Phasing	✓	✓	✓		✓
B	10 Pin MS W/O 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 - Dynapar Phasing	✓	✓	✓		✓
T	7 Pin MS W/Plug A, A\ - Dynapar Phasing	✓	✓	✓		✓
U	7 Pin MS W/Plug A, B, Z - Dynapar Phasing	✓	✓	✓		✓
V	7 Pin MS W/Plug A, A\, B, B\ - Dynapar 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	✓	✓	✓		
2	Conduit Box (Tall), Terminal Block & 3/4" NPT	✓	✓	✓	✓	
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, \bar{A} , B, \bar{B} (differential line driver)
 2. Marker 1/Rev, Z, \bar{Z}
- C. Signal Type Incremental, Square Wave, 50 \pm 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 1.38-3.38 Oz. In. Sec.²
- B. Acceleration 5000 RPM/Sec. Max.
- C. Speed 5400 RPM Max.
- D. Weight 15-18 lbs. [7-8 kg.]
- E. Sensor to Rotor
 Air Gap (nominal) 0.040" [1.02mm]
 Tolerance + 0.015" [0.33mm] - 0.30 [7.62mm]
- F. Rotor Axial Tolerance \pm 0.10" [\pm 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.

Operating Temperature:
 -40 to 80°C, 0-100% condensing humidity
 See "Description" section for information on hazardous location environments

XR125 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
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	2,4,5,6,7			364987	Terminal Plug
10 pin mini MS Twist Lock	R	431081	Base	316447	Plug
		471748	Gasket		

Description	Code	Line Driver Specifications				Isolator Specifications		Units
		H	7	F	G	XR3		
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							

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+	*	+Vin	A-	B-	Z-	*
10 Pin MS Avtron Pinout	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	2,4,5,6,7	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	A-	B-	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™

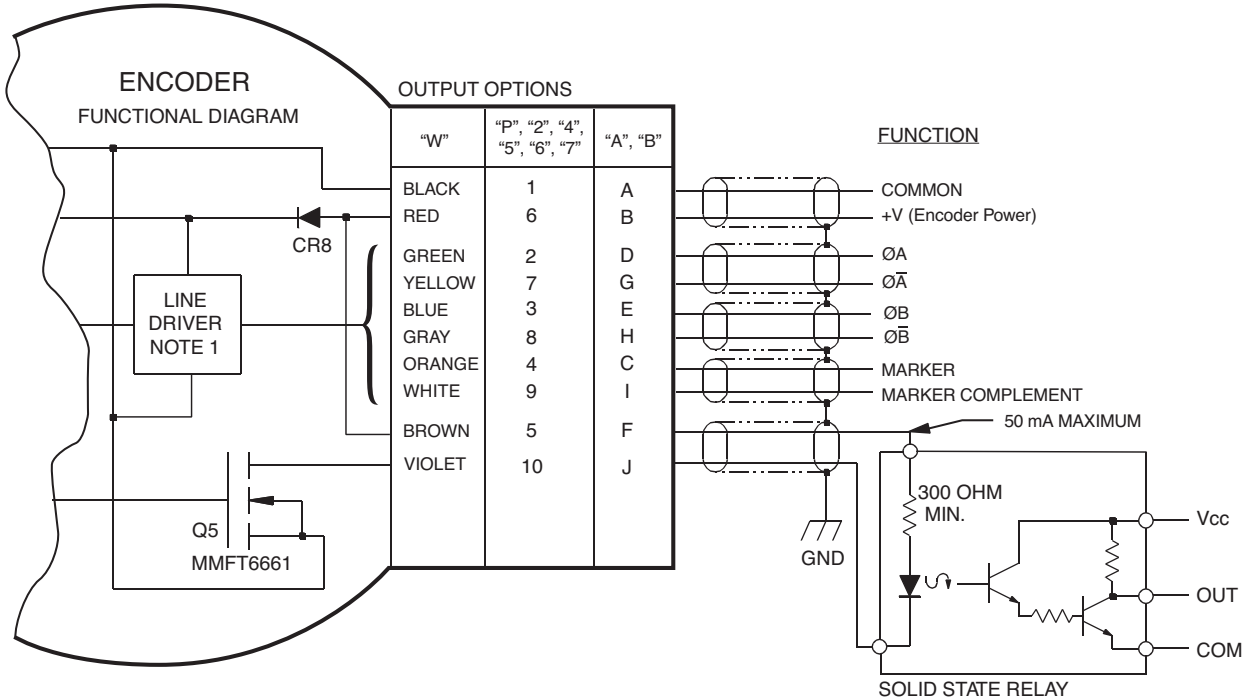
Application Examples

Applies to all XR125 Zone 2 & Division 2 models with wiring options "W", "P", "2", "4", "5", "6", "7", "A" and "B".
Remote alarm not available for Zone 0, Zone 1 or Division 1.

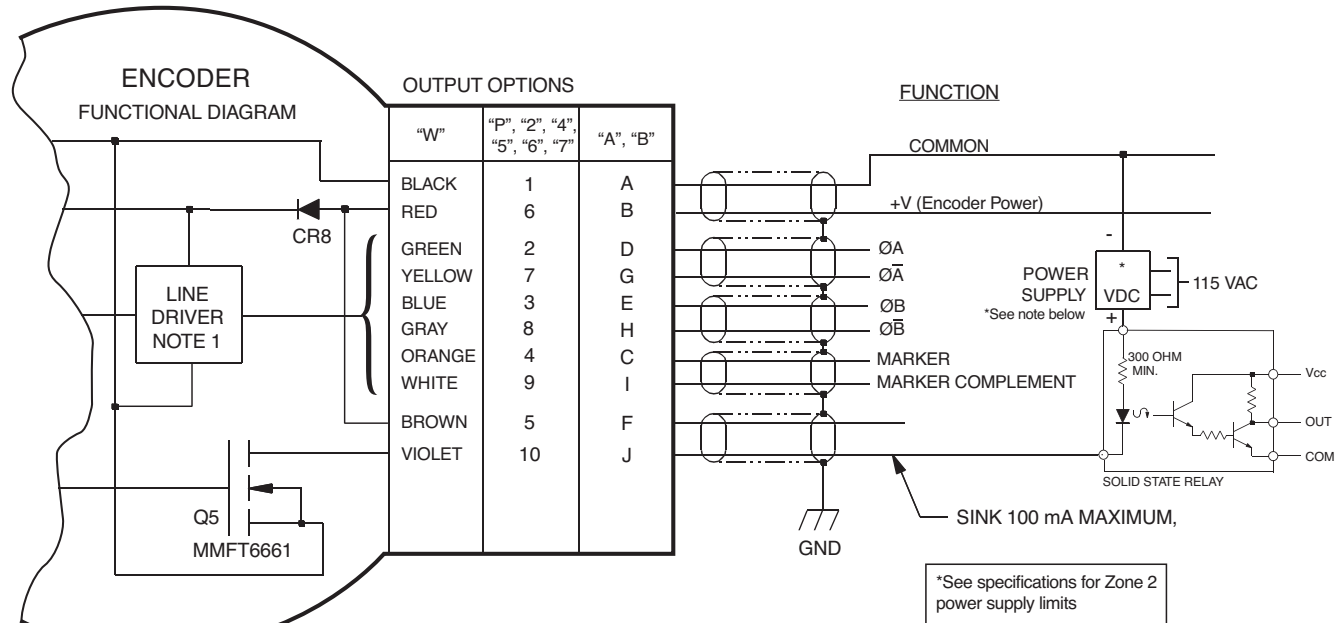
ALARM OUTPUT CONNECTION

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.



ROTOR MOUNTING
(Through Shaft Shown)

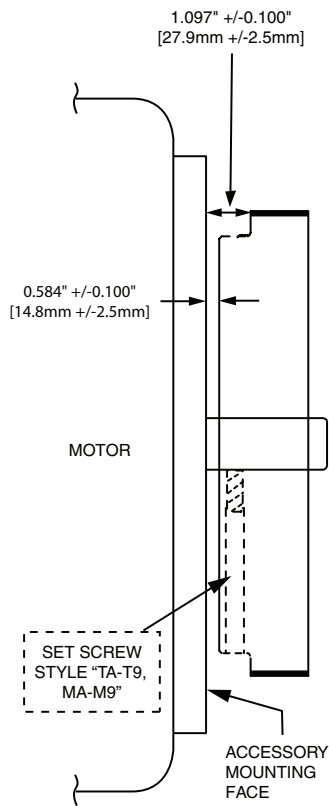


FIG. 2

**OPTIONAL OUTBOARD
SEAL PLATE**

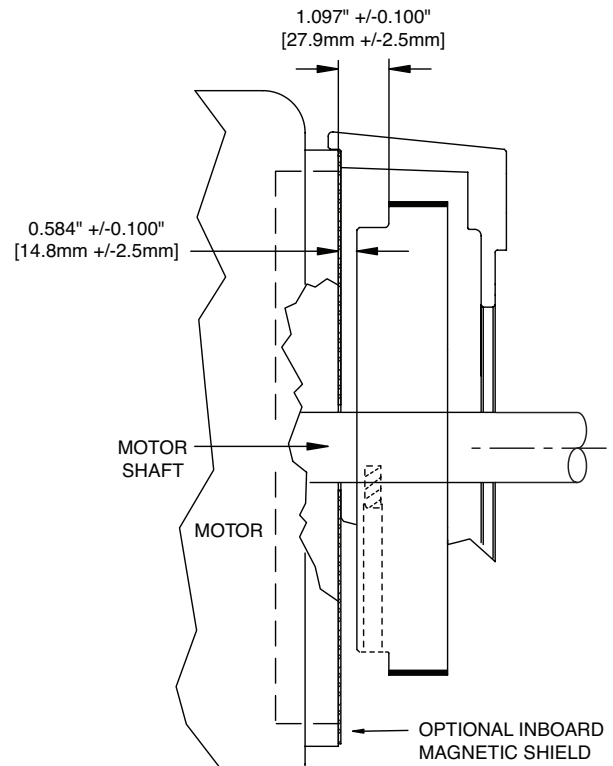


FIG. 3

ROTOR ALIGNMENT GROOVE

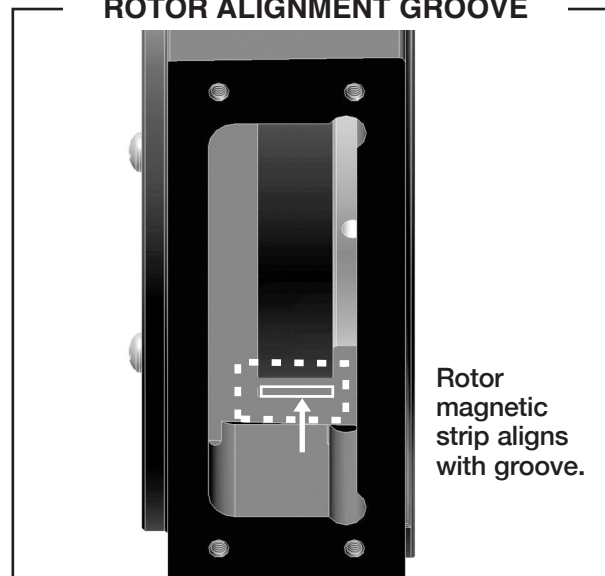
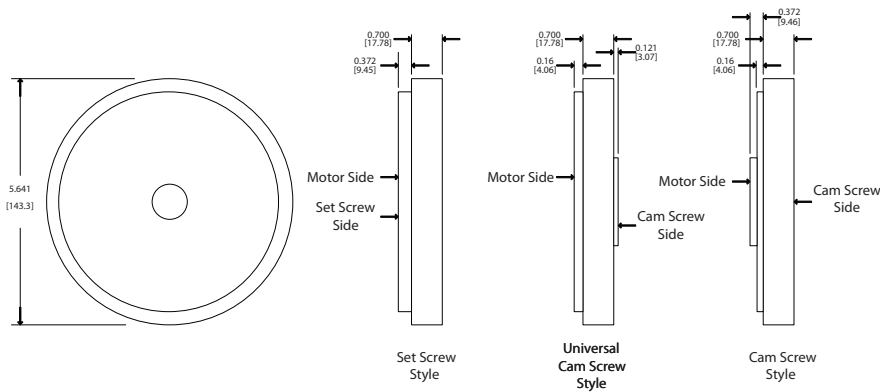
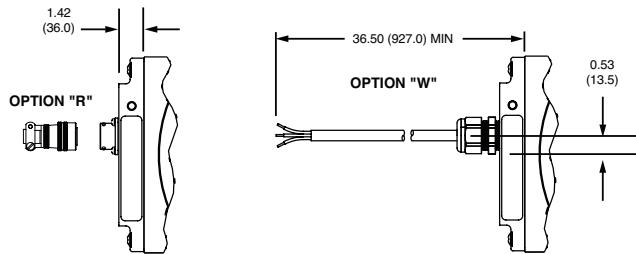
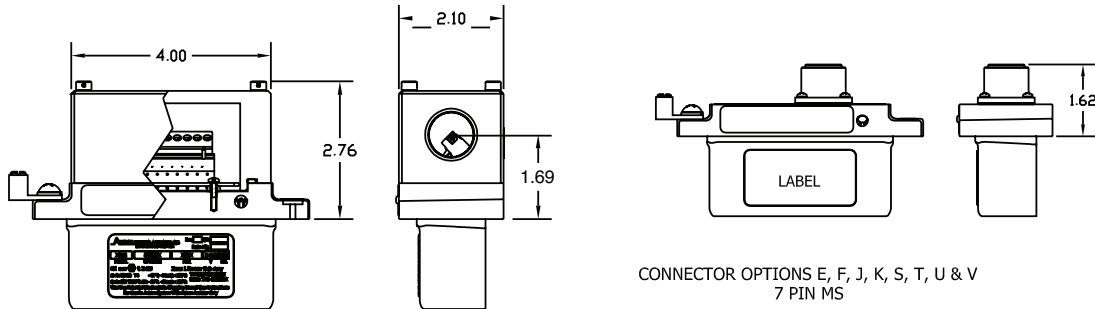
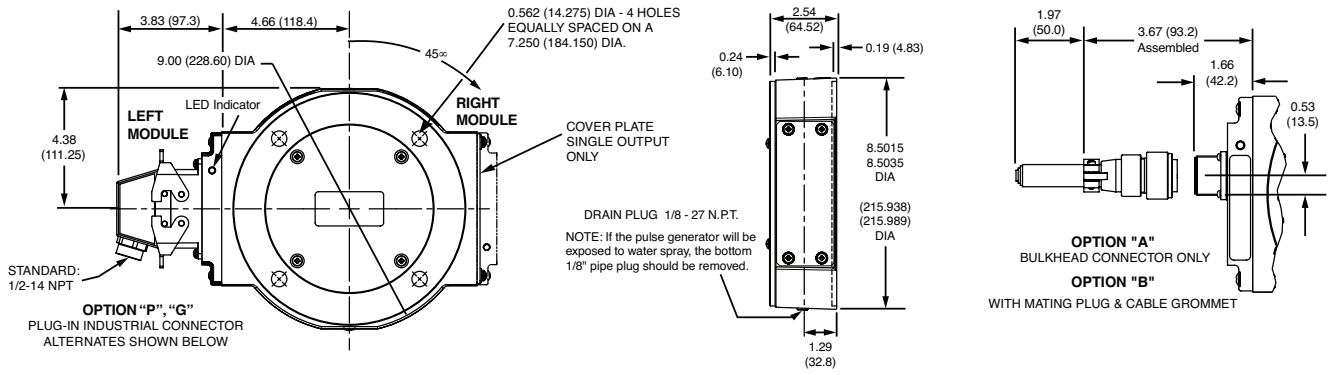


FIG. 1

OUTLINE DRAWING



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

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 ib 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 ib 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.

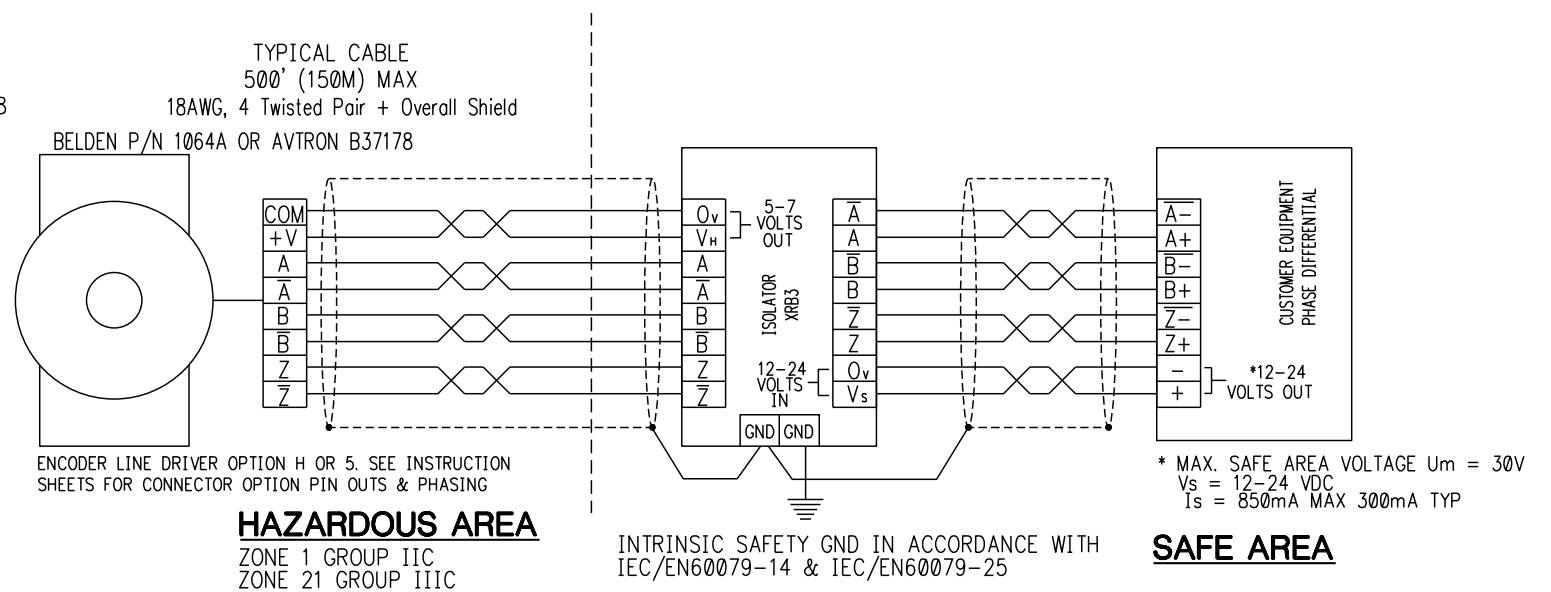
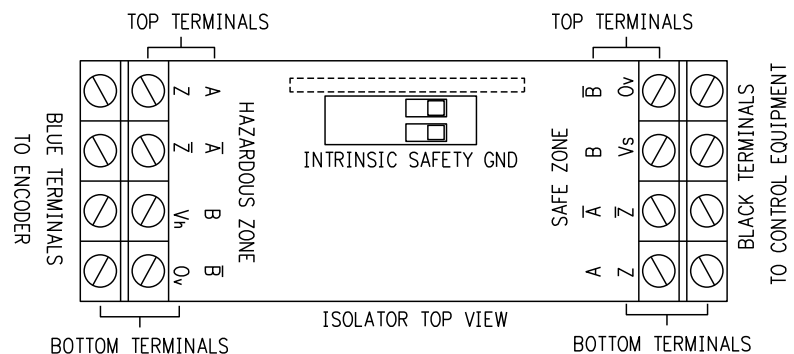
SYSTEM PARAMETERS ARE:

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/EN60079-25.

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.

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		243 TUXEDO AVENUE BROOKLYN HEIGHTS, OH 44131
TOLERANCES:	ANGLES ±1°	CHECKED	SIRACKI	7/21/20			ATEX / IECEx, ZONE 1 & 21 INSTALLATION DRAWING
DECIMALS .xxx ± .03	.xxx ± .015	ENG APVD	WOLFF	7/21/20		SIZE	
FINISH		APVD PROD				CAGE NO.	0FMV7
PAINT PER PS						DWG. NO.	D53008
PLATE PER						SCALE	1/1
COAT PER PS						MODEL	N/A
ANODIZED PER						SHEET	1 OF 1
OTHER							

UNLESS OTHERWISE SPECIFIED THE ABOVE NOTES APPLY

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

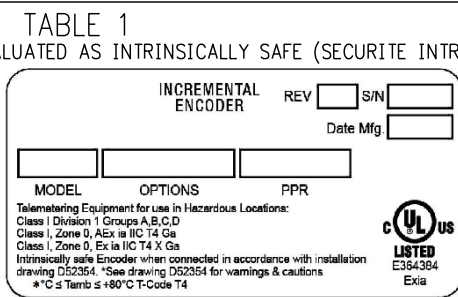
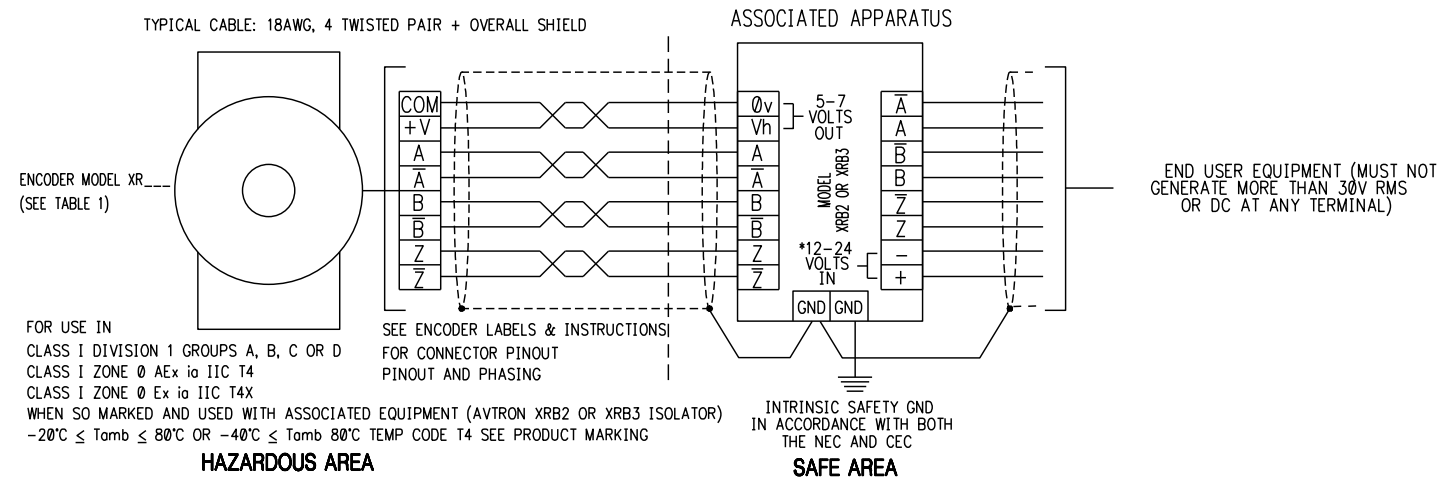
CONNECTOR OPTION CODES = A, B, C, D, E, F, G, H, J, K, L, M, N, P, R, S, T, U, V, W, Y, Z, 2, 3, 4, 5, 6, 7, 8

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

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
EA1779	B	DEL NAME AND ADDRESS FROM LABEL	ZIVKOVIC	5/6/20
EA1658	C	UPDATED FOR XRB3	ZIVKOVIC	9/2/20



* -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 LO)

IF Po OF THE ASSOCIATED APPARATUS IS NOT KNOWN, IT MAY BE CALCULATED USING THE FORMULA $P_o = (V_o * I_s) / 4 = (U_o * I_o) / 4$

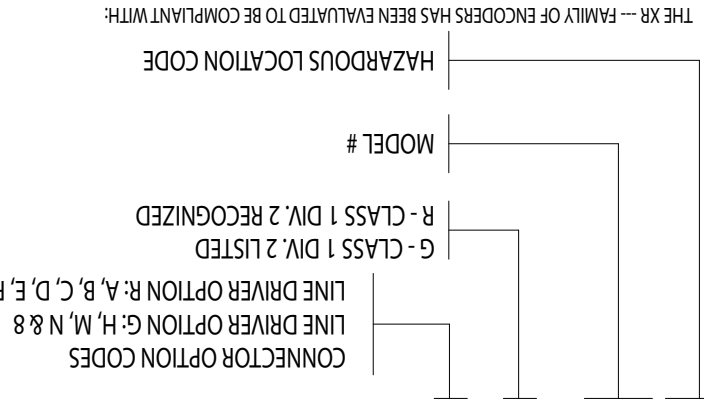
THIS DRAWING IDENTIFIES CHARACTERISTICS REQUIRED FOR EQUIPMENT USED IN HAZARDOUS LOCATIONS AND MAY NOT BE CHANGED WITHOUT THIRD PARTY APPROVAL. THIRD PARTIES MUST BE IDENTIFIED FROM ID LABELS.

- 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.
- 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.

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

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 THE ABOVE NOTES APPLY



LINE DRIVER OPTION G: H, M, N & 8
 LINE DRIVER OPTION R: A, B, C, D, E, F, J, K, S, T, U, & V

LINE DRIVER 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 222 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 1 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 dangereuses.

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 déconnecter l'équipement à moins que l'alimentation est coupée

ou que la zone est connue pour être non dangereux.

ENCODERS PARAMETERS ARE:

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

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 classé.

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

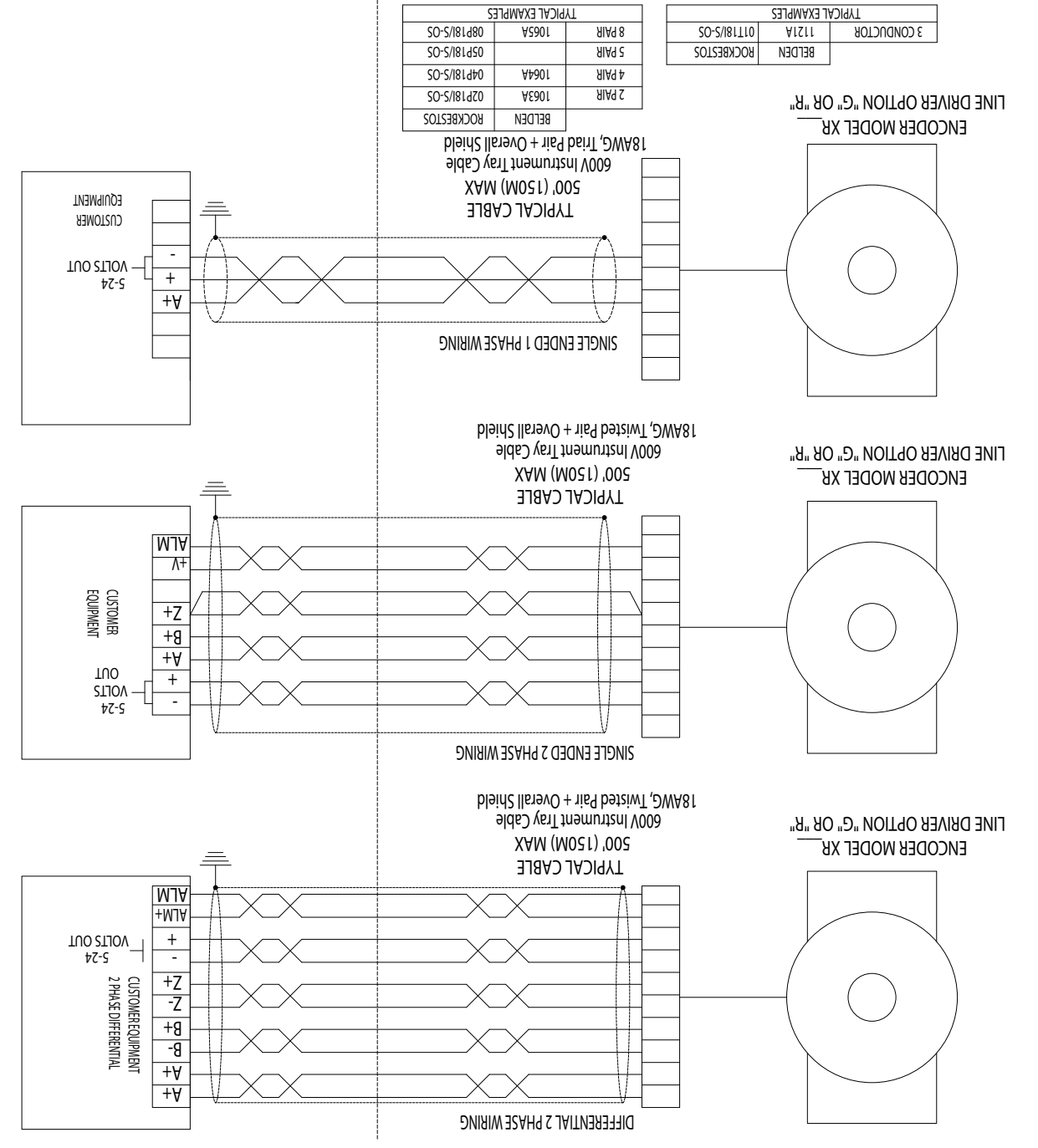
THIS DOCUMENT CONTAINS PROPRIETARY INFORMATION OF NIDEC AVTRON AUTOMATION AND MAY NOT BE DISCLOSED TO OTHERS OR USED FOR MANUFACTURING PURPOSES WITHOUT THE WRITTEN CONSENT OF NIDEC AVTRON AUTOMATION.

OTHER					
APPLICATION	USED ON	XXXXXX	XXXXXX		
	PAINT PER PS				
	PLATE PER				
	COAT PER PS				
	ANODIZED PER				
	FINISH				
	ENG APVD	SHADDUCK	1/9/14		
	APVD PRD	SHADDUCK	1/9/14		
	CHECKED	NICKOLI	1/8/14		
	DATE				
	DRAWN				
	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES				
	TOLERANCES: ANGLES ± .1°				
	DECIMALS XXX .03				
	OTHER				
	SCALE	1/1			
	MODEL	N/A			
	DWG. NO.	D52355			
	REV	A			
	SHEET	1 OF 1			

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

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

SEE INSTRUCTION SHEETS FOR CONNECTOR OPTION PIN OUTS AND PHASING SAFE AREA



REV	DESCRIPTION	DATE	APPROVED
EA0698 A	UPDATED ENCODER PARAMETERS	5/8/14	SHADDUCK