

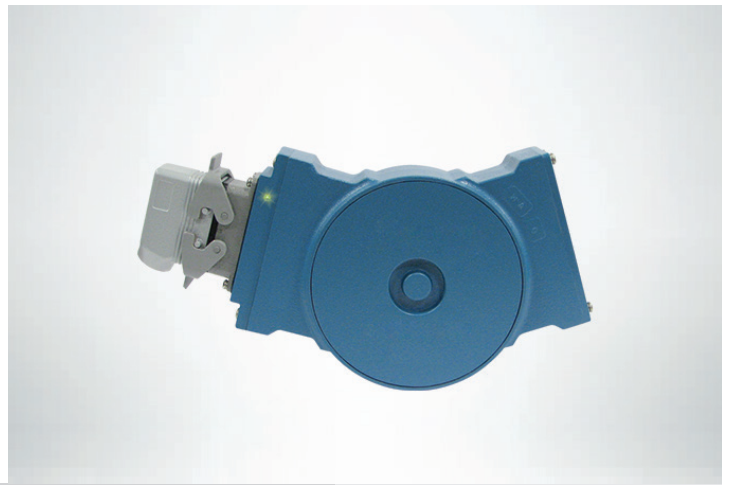
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ENCODER INSTRUCTIONS

XR485 SMARTSafe™

5/8" SOLID SHAFT
FOR HAZARDOUS APPLICATIONS

DESCRIPTION

The Avtron Model XR485 SMARTSafe™ encoder is a severe duty incremental encoder for use in hazardous locations (also known as tachometer or rotary pulse generator). When coupled to a motor or machine, its output is directly proportional to shaft position (pulse count) or speed (pulse rate). The XR485 operates down to zero speed and can be used for both control and instrumentation applications.

CAUTION

The XR485 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.

Mechanically, the XR485 mounts on a NEMA 56C adapter flange or it can be foot mounted by using an optional foot mounting bracket kit. The XR485 utilizes magnetoresistive sensors. This proven technology is ideal for rugged environments since it is immune to contaminants that cause optical encoders to fail. These factors, make the XR485 ideal for demanding industries like paper, metals, and chemical processing.

The outputs are protected against short circuits and wiring errors. An Avtron XR485 SMARTSafe encoder is equipped with one or two XR5 sensor modules. Each module has a two-phase output (A, B) 90° out of phase, with complements (\bar{A} , \bar{B}), (A Quad B Output). A marker pulse with complement (\bar{Z} , \bar{Z}) is also present.

Output resolution on the XR485 is determined by the sensor only. Unlike older models, any PPRs can be mixed and matched. Selection of the rotor is based only on the shaft mounting requirements (and not PPR).

The XR5 removable sensor assembly has a diagnostic package that includes Adaptive Electronics and a Fault-Check output.

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 XR485 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 XR485 may be subject. It is however the responsibility of the end user to ensure that the XR485 is selected correctly for the potentially explosive atmosphere in which the equipment is to be put into service.

Equipment needed for installation

Supplied:

XR485 Encoder
Thread Locker (blue)
Anti-seize (copper)

Not Supplied:

Socket Hd. Cap Screw 5/16" Hex Wrench (T-Handle style)
3/8-16 x 0.75 (4) Shaft Coupling
Washer, Flat 5/16 (4) Motor Adapter Flange
Washer, Lock 5/16 (4) Dial Indicator
Model XRB3 Isolator for Division 1, Zone 0, 1, 20 and 21 applications (Sold Separately)

DRIVE INSTALLATION INSTRUCTIONS

The encoder must be driven by a positive drive rather than a friction drive. The following means of coupling are acceptable when properly installed: Direct Coupling, Timing Belt/Pulleys, Chain/Sprockets. With a direct drive, use a flexible disc coupling and align the shafts as accurately as possible. EXAMPLE: For a size 62 Thomas Miniature Coupling angular misalignment must be less than 1.34°, parallel misalignment less than 0.028", and axial float less than ±0.031". The encoder should not be subjected to any axial thrust. Overhung loads should also be minimized. Installations using timing belts/pulleys should have just enough belt tension to eliminate belt sag. Excessive tension will shorten belt and bearing service life. If a rubber slinger disc is used, position it on the shaft so it will rotate freely.

CAUTION

Do not force or drive the coupling onto the shaft, or damage to the bearings may result. The coupling should slide easily on the shaft. Remove nicks and burrs if necessary. Consider driving shaft endplay when positioning coupling.

For more details on alignment specifications, measurement techniques, and special considerations in specifying and installing drive components, refer to separate installation instructions in the

Avtron PULSE GENERATOR HANDBOOK.

NEMA 56C FACE MOUNTING INSTRUCTIONS

- 1) Apply anti-seize compound [copper], included, to inner circumference of coupling (both motor and encoder side).
- 2) Loosen set screws in coupling and apply thread locker to set screws.
- 3) Place coupling on motor shaft, inserting to depth per manufacturer's instructions.
- 4) Attach coupling to motor shaft using set screws per manufacturer's instructions.
- 5) Bolt mounting flange (flowerpot) to motor C-Face, using thread locker with fasteners, included.
- 6) Slide encoder shaft into other side of coupling. DO NOT FORCE. Ensure 1/4" keyway aligns with coupling set screw location.
- 7) Ensure C-Face on mounting flange matches and aligns with encoder C-Face precisely.
- 8) Apply thread locker to hex cap screws.
- 9) Align bolt holes of encoder and flange, thread in (4) hex cap screws, using lock washers.
- 10) Tighten set screws on encoder side of coupling.

FOOT MOUNTING INSTRUCTIONS

Equipment needed for installation

Supplied:

- | | |
|--|--------------------------|
| 1. Foot Bracket (A36261/A25448) | 4. Nut, Hex 5/16-18 (4) |
| 2. Soc. Hd. Cap Screw
3/8-16 x .75 (4) | 5. Washer, Flat 5/16 (4) |
| 3. Hex Hd. Cap Screw
5/16-18 x 1.50 (4) | 6. Washer, Lock 5/16 (4) |
| | 7. Thread Locker (blue) |

Not Supplied:

- 1/2" Wrench
- 5/16" Hex Wrench (T-Handle style)
- Dial Indicator

The NEMA 56C face is the preferred mounting method for the XR485. In certain cases, however, it may be necessary to foot-mount this unit. The optional foot mounting bracket kit, Option 1, will be required for standard installations or replacement of Northstar RIM6200 units. To replace BC42 or BC46 units, use Option 2 foot mount kit. Read all of the following instructions and the Avtron PULSE GENERATOR HANDBOOK prior to beginning any work.

The XR485 performance and life will be directly affected by the installation. Following this sequence of steps is recommended.

- 1) Clean and inspect motor/driver shaft. Do not use force to assemble coupling onto motor/driver shaft. The foot mounting bracket must be secured to a flat, rigid, vibration free steel or aluminum base which can be machined to accept 5/16-18 mounting hardware.
- 2) Temporarily mount the XR485 to the foot bracket, install the coupling to the XR485 and driver, and verify that the location is suitable for installation.
- 3) If the XR485 encoder, bracket and coupling are suited to the area, check motor/encoder shaft alignment with a straight edge from multiple positions around the shaft circumference to verify that it meets specifications.
- 4) While maintaining alignment, precisely mark the position of the foot bracket on its mounting base.
- 5) Remove the XR485. Transfer punch or layout the mounting hole pattern as indicated on outline drawing.
- 6) Machine four, 3/8" dia through holes or tap four, 5/16-18 holes in center of base slots to give some degree of freedom in final alignment.
- 7) Reinstall the XR485 with the flexible coupling loosely in place, and tighten down all mounting hardware. Check motor/encoder shaft alignment with a straight edge from multiple positions around the shaft circumference to verify that it meets specifications. Use thread locker supplied on cap screws which mount XR485 to foot bracket.
- 8) Ensure any flat or keyway on the motor and encoder shaft are aligned with the set screw holes of the flexible coupling. Apply thread locker to coupling set screws and tighten per manufacturer's recommendations.
- 9) Recheck alignment and tighten all hardware after first several hours of operation.

MINIMIZE DOWN-TIME: Should XR485 replacement be required, leave the foot mounting bracket installed on its base and mount the new XR485 to the bracket. This maintains the original alignment.

WIRING INSTRUCTIONS

Refer to the installation 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.

CAUTION

SMARTSafe encoders include a local ground lug for customer convenience and encoder frame grounding if required to meet local electric code requirements or site operator protection standards. This is NOT the required intrinsic safety ground connection required for hazard protection against ignition of explosive atmospheres.

The XR485 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 and B at the use end of the wires.
 - b) Differential 2 Phase Wiring (see wiring diagram)

Exchange either A with A- in the phase A pair OR B with B- in the phase B pair but NOT both.

- 3) Apply Power.
- 4) Verify encoder feedback is correct, using hand rotation of shaft, or jog mode of the speed controller.

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

NOTE

When using the industrial connector (“G” and “P” options), the minimum wire size is 20 gauge, and 20 gauge (only) wire ends must be tinned with solder before connection at the screw terminals.

MAINTENANCE

GENERAL

This section describes routine maintenance for the Avtron XR485 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 XR485 SMARTSafe encoder circuitry includes a diagnostic package that includes Adaptive Electronics and a Fault-Check output.

FAULT-CHECK

After power-up and the internal 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:

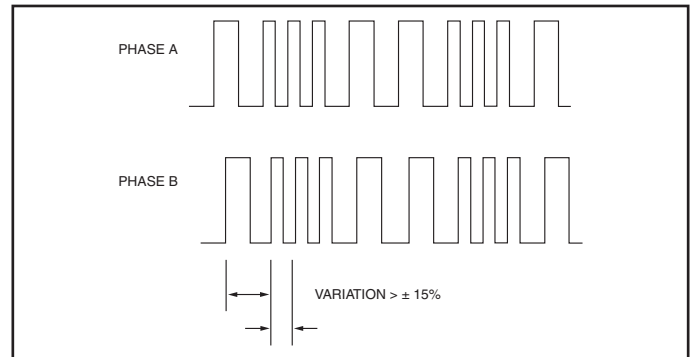
If the drive indicates a loss of encoder/tach fault and the XR485 fault-check LED is not illuminated, check the encoder power supply. If power is present, check polarity: one indicator of reversed power supply is that all outputs will be high at the same time. If the drive indicates encoder fault, but 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 1).
2. Remove the XR5 sensor from the housing. Clean the housing mounting surface for the XR5 sensor and the XR485 housing.

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 XR5 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 shafts with non-magnetic material (stainless/aluminum). Consider replacing the sensors with super-shielded models, option -004.



XR485 PART NUMBERS AND AVAILABLE OPTIONS INCLUDING AV5 SENSORS										
Model	Temp Rating	Foot Bracket	Style	Left Module		Right Module		Connector Options	Modifications	
				Line Driver	PPR	Line Driver	PPR			
XR485	N- -20°C to 80°C C- -40°C to 80°C	X- none 1- A36261 STD 2- BC42/46 style (A25448)	S- single shaft D- dual shaft	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	6- 1800 3- 2000 4- 2048 5- 2500 D- 4096 8- 4800 9- 5000 0-special	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	See Line Driver Connection Option Chart	000- none 400*- Select alternate PPR assignment code 005- Krytox bearings 018- ADD isolator 900- Special cable length 004- Super magnetic shielding

XR5 Sensor Part Numbers					
Model	Line Driver	PPR	Connector Options	Modifications	
XR5-	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 005- Special 97mm Rotor (see special manual) 4xx- Special PPR (see table) 9xx- Special Cable Length (xx=ff/0.3m)

Special PPR Option Code	PPR
401	1270
402	150
403	50
404	512
405	N/A
406	6000

		Line Driver Options					
		Description	ATEX / IECEx Zone 1 & 21	ATEX / IECEx Zone 2 & 22	Class I Div. 1 & Zone 0	Class I Div. 2 Listed	Class I Div. 2 Recognized
		Voltage In / Out	5-7 / 5	5-24 / 5-24	5-7 / 5	5-24 / 5-24	5-24 / 5-24
		Line Driver Code	H	7	F	G	R
Code	Required Isolator	XR3	None	XR3	None	None	None
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. 2Ø & Comp A, \bar{A} , B, \bar{B} (differential line driver)
 2. Marker 1/Rev, Z, \bar{Z}
- C. Signal Type Incremental, Square Wave, 50 ±10% Duty Cycle.
- D. Direction Sensing Ø A leads Ø B for CW rotation as viewed from the back of the tach looking at the non-drive end of the motor.
- E. Transition 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. Shaft Inertia 21 Oz. In. Sec.²
- B. Acceleration 5000 RPM/Sec. Max.
- C. Speed 5400 RPM Max.
- D. Weight 14-16 lbs. [6-7.5 kg.]
- E. Radial Load 350 Lbs [1500N] at 1E08 revolutions (900 hrs at 1800 RPM) 35 lbs [150N] at 5E09 resolutions (5000 hrs at 1800 RPM)
- F. Axial Load 115 lbs [510N] at 1E08 resolutions 12 lbs [51N] at 5E09 resolutions

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 temp see rating on P/N chart
 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
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		

Description	Code	Line Driver Specifications				Isolator Specifications		Units
		H	7	F	G	XR33		
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							

THIN-LINE II™

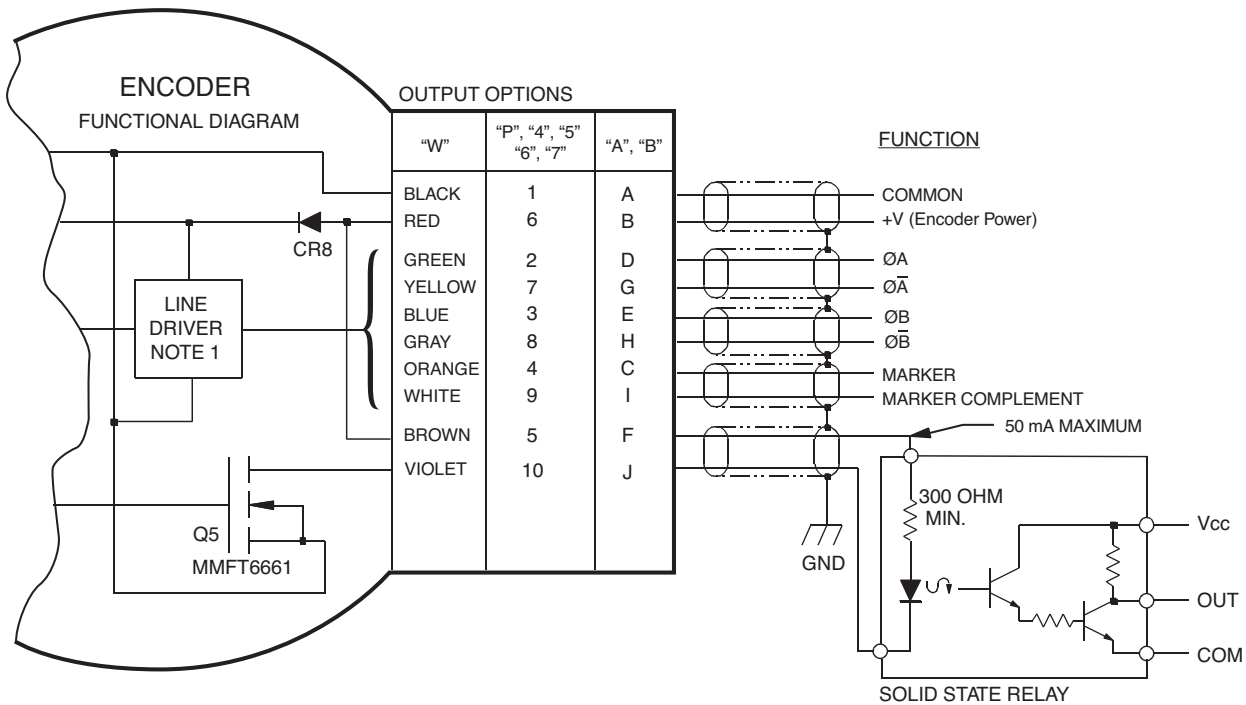
Application Examples

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

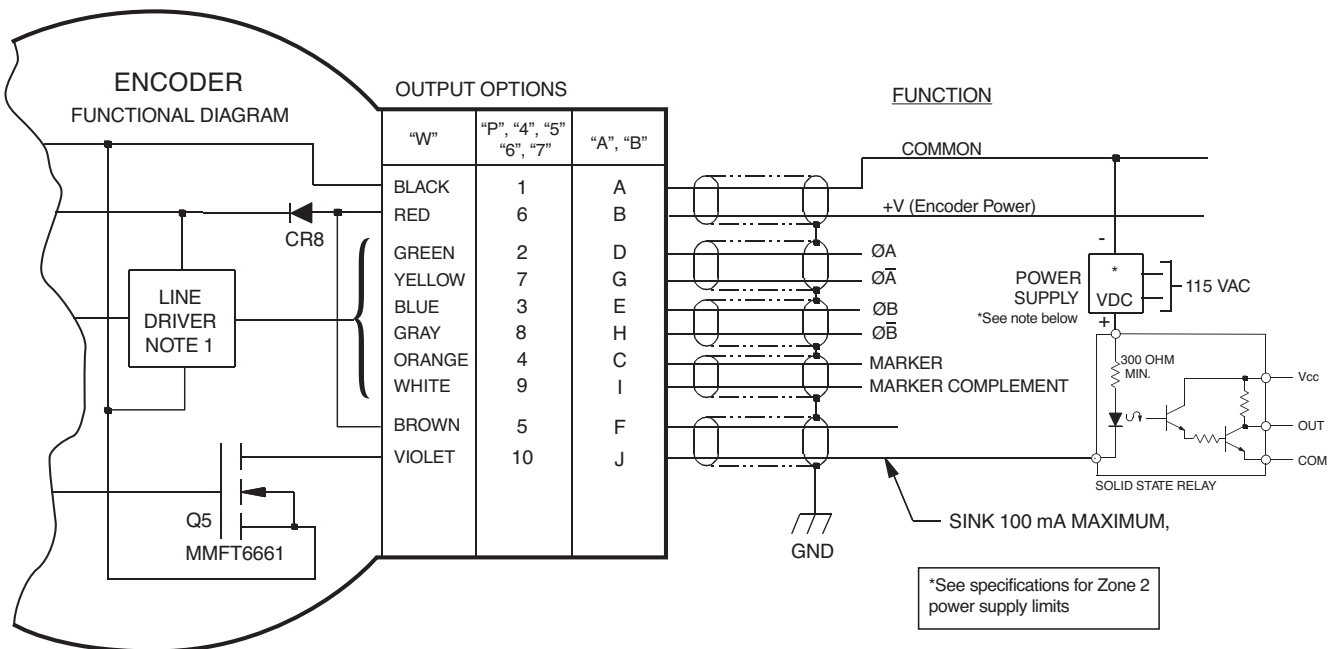
ALARM OUTPUT CONNECTION

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.



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

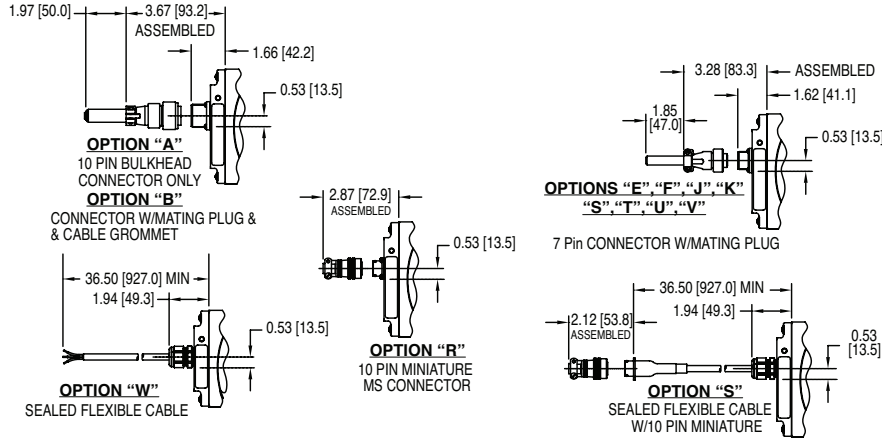
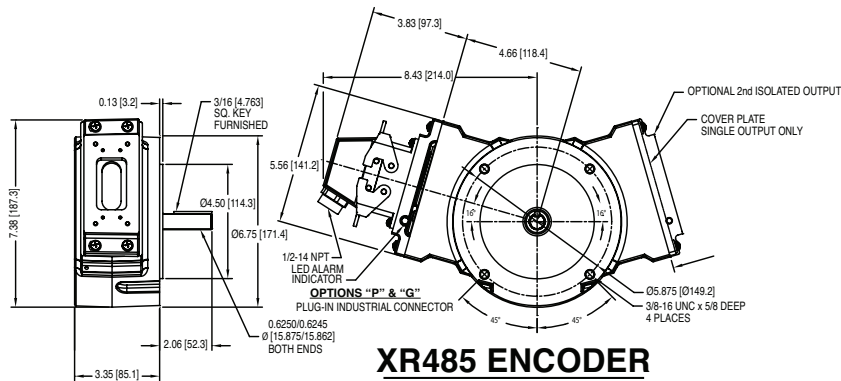
	Option Code	Phasing	Signal	0V Gnd	A+	B+	Z+	* Alm+	+Vin	A-	B-	Z-	* Alm
10 Pin MS Avtron Pinout	A,B	CW	Pin #	A	D	E	C	F	B	G	H	I	J
10 Pin, Industrial, Avtron Pinout	P	CW	Pin #	1	2	3	4	5	6	7	8	9	10
10 Pin, Industrial, Northstar Pinout	G	CW	Pin #	1	2	3	4	NC	6	7	8	9	NC
10 Pin MS Mini Twist Lock	R	CW	Pin #	F	A	B	C	NC	D	H	J	K	NC
Conduit Box W/10 Pin Terminal Block	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

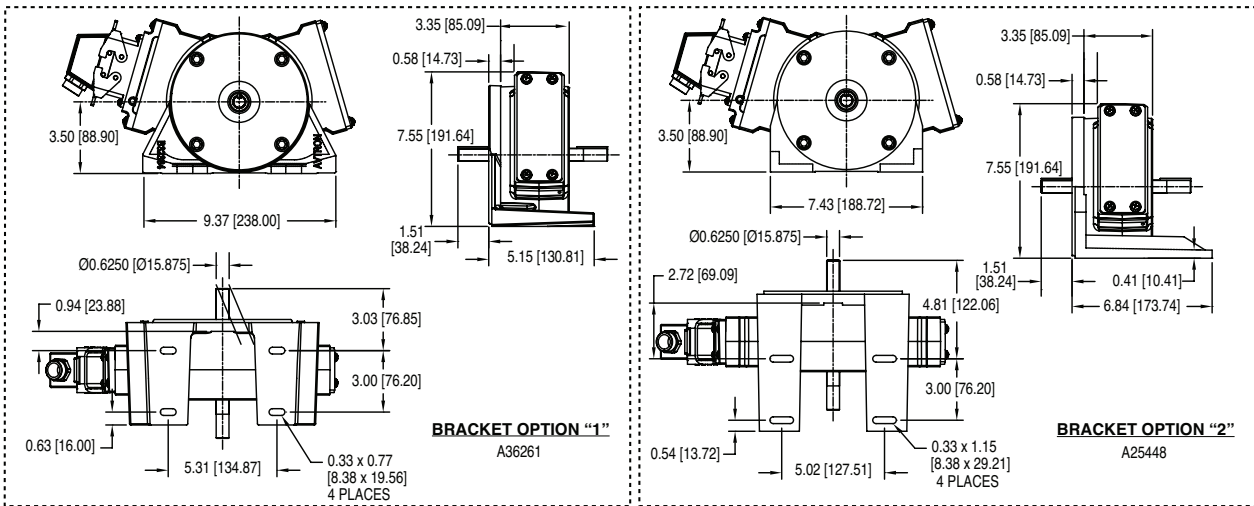
* Remote alarm function not available with line driver options "H", "7" or "F" (Zone 0, Zone 1 or Class I Div I)

OUTLINE DRAWING



OPTIONAL FOOT BRACKETS

INCLUDE ALL HARDWARE NECESSARY FOR MOUNTING ENCODER AND FOOT BRACKET TO MACHINE BASE.



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 _____

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.

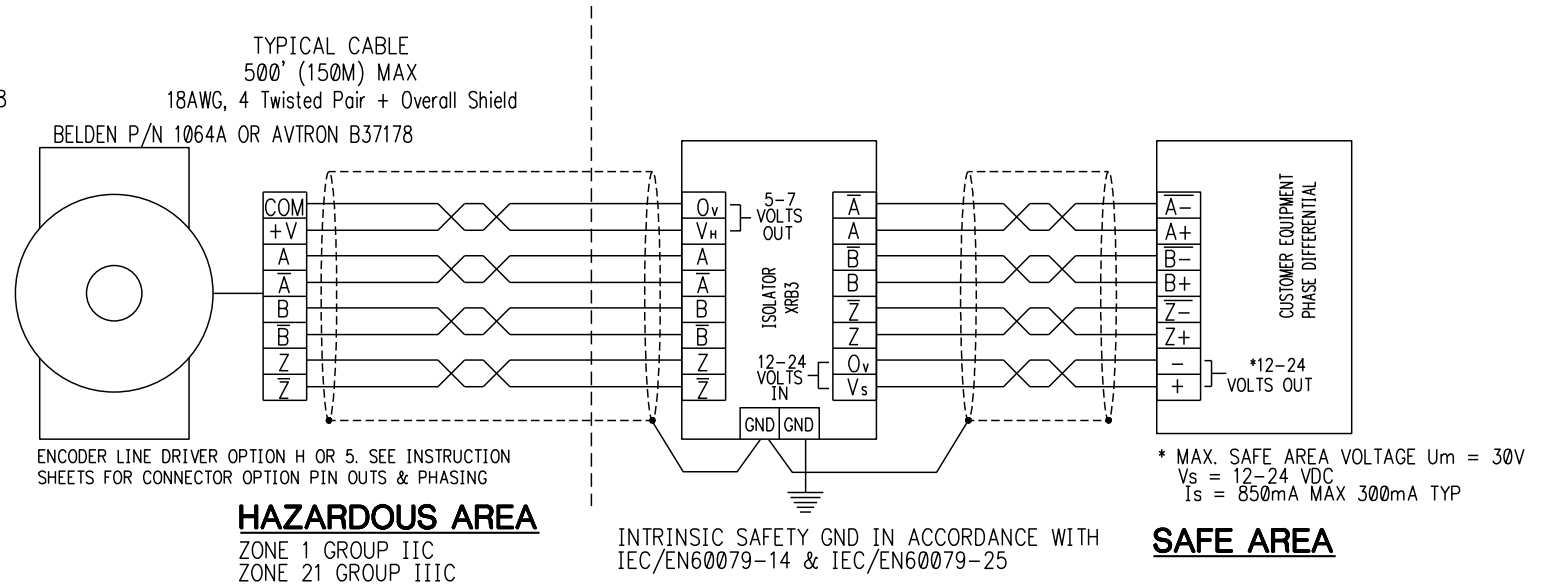
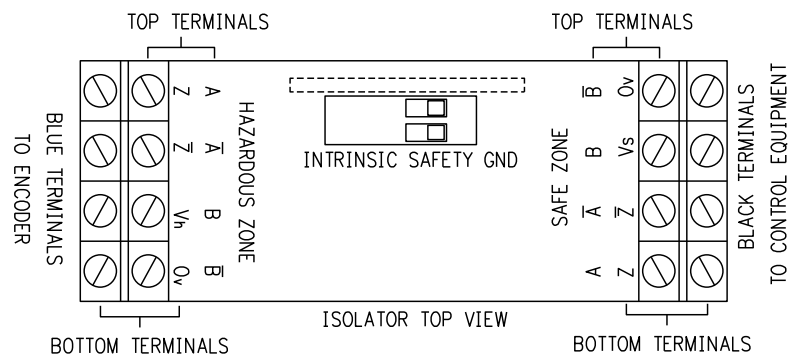
SYSTEM PARAMETERS ARE:

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

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

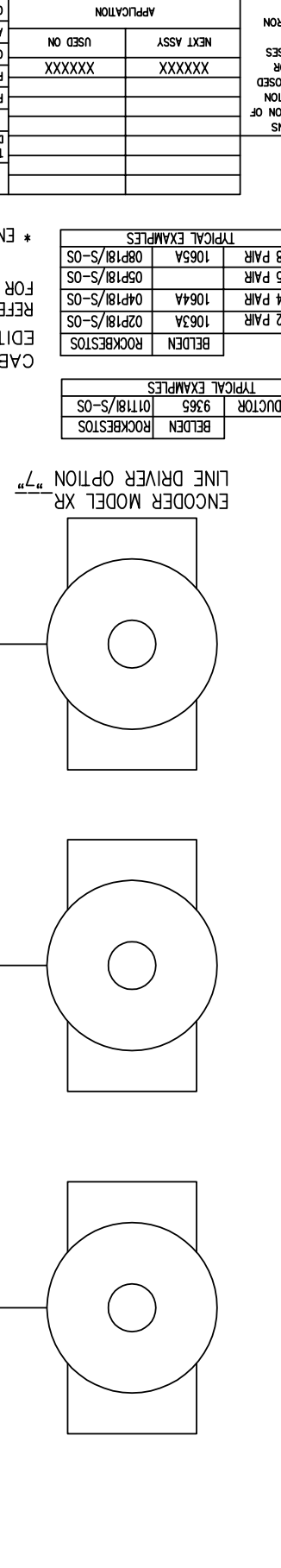
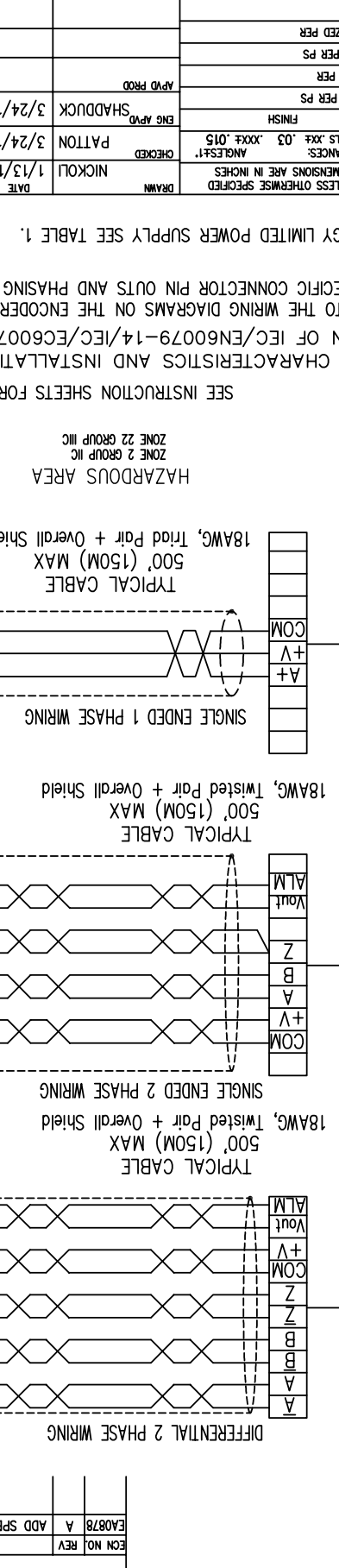
INTERCONNECTION CABLES SPECIFIED ABOVE ARE BASED ON TYPICAL APPLICATIONS. PHYSICAL PROPERTIES OF CABLE SUCH AS ABRASION, TEMPERATURE, TENSILE STRENGTH, SOLVENTS, ETC., ARE DICTATED BY THE SPECIFIC APPLICATION. GENERAL ELECTRICAL REQUIREMENTS ARE: STRANDED COPPER, 20 THROUGH 16 AWG (INDUSTRIAL EPIC CONNECTOR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

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

THIS DOCUMENT CONTAINS PROPRIETARY INFORMATION OF NIDEC INDUSTRIAL SOLUTIONS AND MAY NOT BE DISCLOSED TO OTHERS OR USED FOR MANUFACTURING PURPOSES WITHOUT THE WRITTEN CONSENT OF NIDEC INDUSTRIAL SOLUTIONS.	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	DRAWN	ZIVKOVIC	DATE	7/21/20	<p>243 TUXEDO AVENUE BROOKLYN HEIGHTS, OH 44131</p>	
	TOLERANCES: ANGLES±1° DECIMALS .xxx±.015	CHECKED	SIRACKI	7/21/20			
	FINISH	ENG APVD	WOLFF	7/21/20			
	PAINT PER PS PLATE PER COAT PER PS ANODIZED PER OTHER	APVD PROD					
APPLICATION	OTHER					ATEX / IECEx, ZONE 1 & 21 INSTALLATION DRAWING	IMF PSF
SIZE D	CAGE NO. 0FMV7	DWG. NO. D53008	SCALE 1/1	MODEL N/A	SHEET 1 OF 1		

UNLESS OTHERWISE SPECIFIED THE ABOVE NOTES APPLY

REVISIONS		DESCRIPTION		DATE		APPROVED	
EA0878	A	ADD SPECIAL CONDITIONS FOR SAFE USE	PATTON	6/24/15	SHADDUCK		



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 ZINC OXIDE. 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.

ENCODER: 1. WHEN THE ENCODER IS MARKED AS "i.c." 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 ELECTRICAL 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 FOL INDIVIDUAL SHIELDS OR OVER ALL SHIELD WITH DRAIN WIRE, 0.05% 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

CONDUCTOR	ROCKBESTOS	BELEN
3 CONDUCTOR	9365	011181/S-05
TYPICAL EXAMPLES		
2 PAIR	1063A	02P181/S-05
4 PAIR	1064A	04P181/S-05
5 PAIR	1064A	05P181/S-05
8 PAIR	1065A	08P181/S-05
TYPICAL EXAMPLES		

TABLE 1: ZONE 2 POWER SUPPLY LIMITS	
II	U
III	IIIB
250mA	15V 25V
1A	12V
5A	12V

$-40^{\circ}\text{C} < \text{Temp} < +80^{\circ}\text{C}$

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.

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.

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

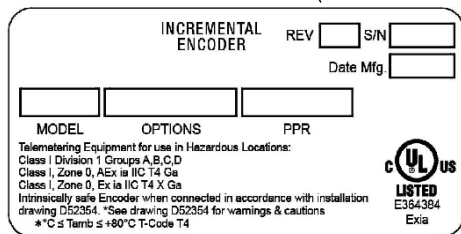
UL 60079-0 6TH EDITION

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	U _i (V)	I _i (mA)	P _i (W)	GAS GROUP	C _i (uF)	L _i (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	U _o (V)	I _o (mA)	P _o (W)	GAS GROUP	C _o (uF)	L _o (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 C_i AND L_i 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: C_{cable} = 60 pF/Ft., L_{cable} = 0.2 uH/Ft.

WHEN MAKING CONNECTIONS TO A SUITABLE ASSOCIATED APPARATUS, THE FOLLOWING GUIDELINES MUST BE FOLLOWED:

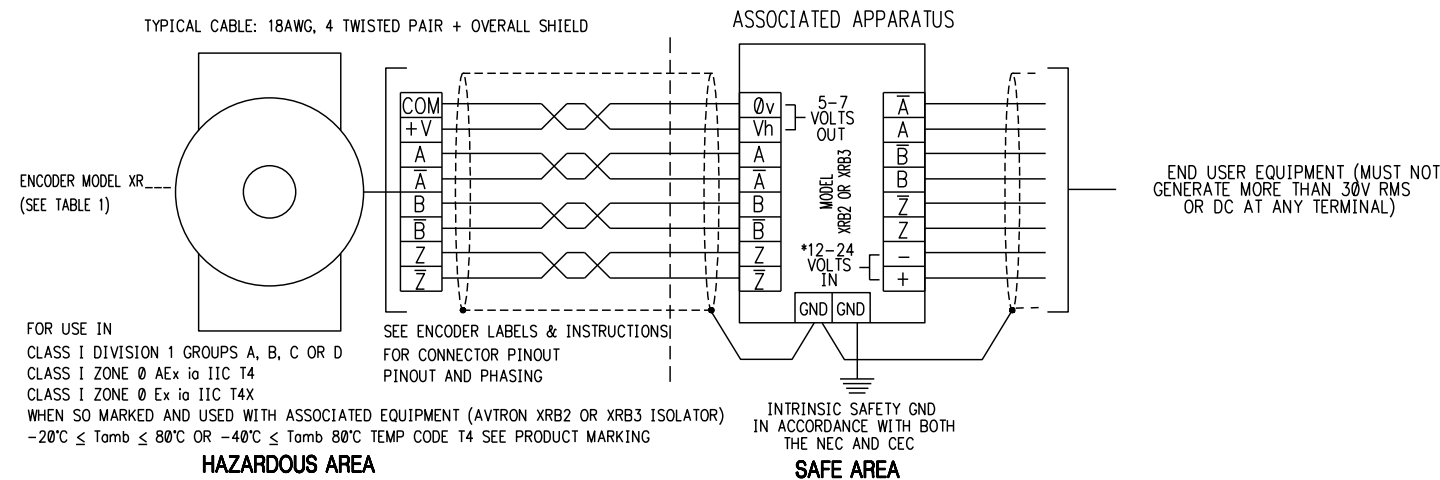
I.S. EQUIPMENT	ASSOCIATED APPARATUS
U _i	≥ Voc OR Vt (OR U _o)
I _i	≥ Isc OR It (OR I _o)
P _i	≥ Po
C _i + C _{cable}	≤ Ca (OR Co)
L _i + L _{cable}	≤ La (OR LO)

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

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

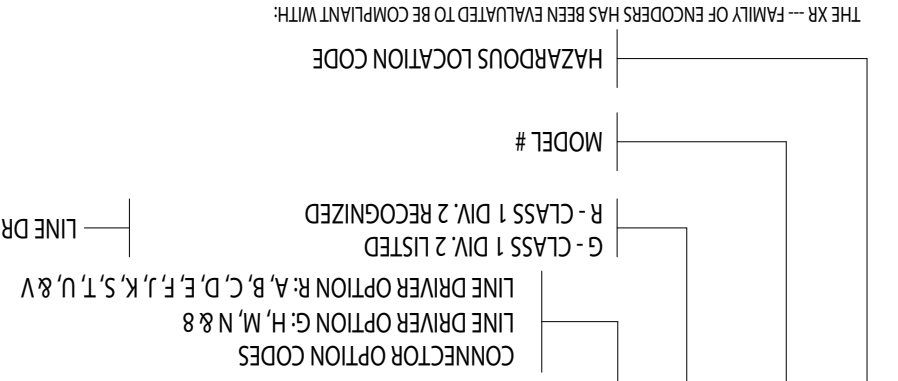
UNLESS OTHERWISE SPECIFIED THE ABOVE NOTES APPLY

REVISIONS				
ECN NO.	REV	DESCRIPTION	DATE	APPROVED
EA0759	A	IS "xxx" 2X. WAS "000" 2X. REMOVED 5, 12, 97 FROM MODEL CODES. IS XR5, XR12 & XR97, WAS XR45 FOR CONNECTOR OPTION CODE LOCATION	8/27/14 NICKOLI	SHADDUCK
EA1779	B	DEL NAME AND ADDRESS FROM LABEL	ZIVKOVIC 5/6/20	WOLFF
EA1658	C	UPDATED FOR XRB3	ZIVKOVIC 9/2/20	WOLFF



- SPECIAL CONDITIONS FOR SAFE USE (X MARKING FOR CuL): THIS EQUIPMENT IS INTENDED FOR A FIXED INSTALLATION AND SHOULD BE MOUNTED SO AS TO AVOID ELECTROSTATIC CHARGING. CLEAN ONLY WITH A DAMP CLOTH. THE CONSTRUCTION MATERIALS DO NOT INCLUDE ALUMINUM. AS SUCH, CARE SHOULD BE TAKEN TO AVOID THE POSSIBILITY OF IGNITION FROM IMPACT OR FRICTION. FOR EXAMPLE, WHEN IN CONTACT WITH SHAFTS MADE FROM IRON OR STEEL. IT IS THE RESPONSIBILITY OF THE END USER TO ENSURE THAT THE ENCODER IS SELECTED CORRECTLY FOR THE POTENTIALLY EXPLOSIVE ATMOSPHERE IN WHICH THE EQUIPMENT IS TO BE PUT IN SERVICE.
- WARNING INSTALLATION SHOULD BE PERFORMED ONLY BY QUALIFIED PERSONNEL. SAFETY PRECAUTIONS MUST BE TAKEN TO ENSURE MACHINERY CANNOT ROTATE AND ALL SOURCES OF POWER ARE REMOVED DURING INSTALLATION.
- THIS EQUIPMENT IS AVAILABLE AS A SYSTEM CONSISTING OF 1 MODEL XR___ ENCODER AND ONE ISOLATOR MODULE MODEL XRB2 OR XRB3 PER OUTPUT. THAT IS 2 ISOLATOR MODULES REQUIRED FOR A DUAL OUTPUT ENCODER. MULTIPLE ISOLATORS (ASSOCIATED APPARATUS) SHALL NOT BE CONNECTED TO A SINGLE ENCODER OUTPUT.
- WARNING-EXPLOSION HAZARD: SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY. AVERTISSEMENT - RISQUE D'EXPLOSION Le substitution de composants peut altérer l'aptitude de Sécurité Intrinsèque.
- 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°		NICKOLI	7/28/14	243 TUXEDO AVENUE BROOKLYN HEIGHTS, OH 44131	
DECIMALS .xx ± .03 .xxx ± .015		CHECKED	7/28/14	DIVISION 1 ZONE 0 ENCODER INSTALLATION DRAWING	
FINISH		SHADDUCK	7/28/14		
PAINT PER PS		ENG APVD	7/28/14		
PLATE PER		SHADDUCK	7/28/14		
COAT PER PS		APVD PROD		SIZE	CAGE NO.
ANODIZED PER				D	0FMV7
OTHER				DWG. NO.	D52354
APPLICATION				SCALE	1/1
				MODEL	N/A
				SHEET	1 OF 1



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 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 dangereuse.

ENCODERS PARAMETERS ARE:

INPUT	5-24VDC	100mA Nom. 355mA Max.
OUTPUT	5-24VDC	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 INSTRUMENT TRAY CABLE.

INTERCONNECTION CABLES 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, 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 INDEC AUTRON AUTOMATION AND MAY NOT BE DISCLOSED TO OTHERS OR USED FOR MANUFACTURING PURPOSES WITHOUT THE WRITTEN CONSENT OF INDEC AUTRON AUTOMATION.

APPLICATION

USED ON

NEXT ASSY

XXXXXX

XXXXXX

PLATE PER

PAINT PER PS

FINISH

ENG APVD

SHADDUCK

1/9/14

DATE

1/8/14

DRAWN

NICKOLI

1/8/14

CHECKED

ANGLES 1

03

XXXX

0015

TOLERANCES

UNLESS OTHERWISE SPECIFIED

DIMENSIONS ARE IN INCHES

OTHER

ANODIZED PER

SCALE

1/1

MODEL

N/A

SHEET

1 OF 1

REV

A

D52355

INSTALLATION DRAWING

DIVISION 2

OFMV7

CAGE NO.

DWG. NO.

D52355

ECN NO.	REV	DESCRIPTION	DATE	APPROVED
EAO698	A	UPDATED ENCODER PARAMETERS	5/8/14	SHADDUCK

REVISIONS



8901 PLEASANT VALLEY ROAD
INDEPENDENCE, OH 44131-5529

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

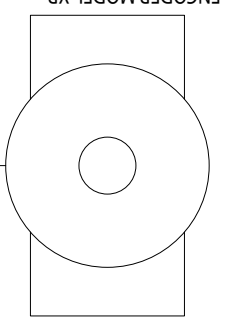
CLASS 1 DIVISION 2 GROUP A, B, C OR D

HAZARDOUS AREA

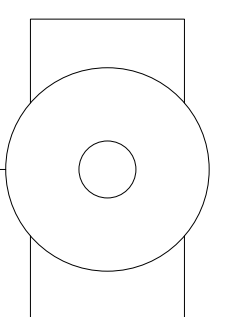
TYPICAL EXAMPLES	
3 CONDUCTOR	1121A 01T18U/S-05
BELDEN	ROCKBESTOS

TYPICAL EXAMPLES	
2 PAIR	1063A 02P18U/S-05
4 PAIR	1064A 04P18U/S-05
5 PAIR	1065A 05P18U/S-05
8 PAIR	1065A 08P18U/S-05

ENCODER MODEL XR



ENCODER MODEL XR



ENCODER MODEL XR

