

AVTRON INCREMENTAL ENCODER

Model: SMARTSafe™ XPH1 With Rotor & Modular XP5 Sensor Encoder Instructions

DESCRIPTION

The Avtron Model XPH1 SMARTSafe™ Explosion Proof Modular Encoder is an incremental encoder for hazardous atmosphere applications (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 XPH1 SMARTSafe explosion proof encoder employs a bearingless, couplingless, modular design, providing unequaled reliability and mechanical performance.

The XPH1 encoder consists of multiple modular parts: a rotor with positioning riser shaft, a stator mounting plate, and a removable XP5 sensor module designed to be imbedded within or mounted on OEM machines.

The XPH1 utilizes a XP5 magnetoresistive sensor. This proven technology is ideal for rugged environments since it is immune to many contaminants that cause optical encoders to fail. All of the XP5 sensor electronics are potted, providing full protection against liquids.

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

The XP5 removable sensor assembly has a diagnostic package that includes Adaptive Electronics and a Fault-Check LED. With this package, the SMARTSafe encoder can maintain itself and let you know if there is a problem before the problem causes unscheduled downtime. The XP5 diagnostic LEDs are viewable through the viewing light pipes provided in the rear of the XPH8 housing.

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 XP5 sensor 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 drawing **XP5CRT05** for installation information appropriate for specific hazardous locations.

NOTE

The equipment is intended for a fixed installation and should be mounted so as to avoid electrostatic charging. The XPH1 is not considered as a safety device and is not suitable for connection into a safety system.

GENERAL

The sensor must be located accurately to properly center it on the rotor and provide the correct sensor-to-rotor air gap without permitting contact between the stationary sensor and spinning rotor. Axial shaft float or endplay must be less than ± 0.100 " inch. Use a dial indicator gauge to ensure motor shaft runout (TIR) does not exceed (0.004") [0.10mm]. Apply anti-seize compound to the shaft before mounting rotors.

CAUTION

Do not strike or pound the sensor or rotor.

Equipment needed for installation	
Supplied	Not Supplied
XPH1 Encoder <ul style="list-style-type: none">- XP5 Sensor (Assembled)- Sensor Mounting Bracket- B34972 Mounting Plate with B34975 Centering Jig- XPHSHM01 shims- XP5RTR01 Rotor + Installation Hardware- Shaft Riser	<ul style="list-style-type: none">- Wrench for mounting plate bolts (existing at Customer site)- M4 Allen Wrench- Dial Indicator- Vernier Caliper- 3/16" Allen Wrench- Anti-Seize Compound (copper)

ROTOR INSTALLATION: Style '1' - (XPH1) TDS9/10/11 Complete Mounting Assembly

CAUTION

Do not strike or pry the encoder or rotor at any time. Damage will result and the warranty will be void. At installation, clean and remove paint and burrs from motor shaft and mounting face.

LOCATING SENSOR RELATIVE TO ROTOR.

The sensor must be properly located to sense the rotor in both the axial and radial directions. The rotor-sensor orientation must be correct so that the incremental and marker tracks are correctly sensed.

MOUNTING THE ROTOR

1. Begin the installation process by mounting the B34975 centering jig onto top drive shaft using short screws supplied with rotor if needed.
2. Slide the B34972 mounting plate over centering jig.
3. Insert and begin threading the existing base plate fastening screws into the motor pylons. using existing brackets on both sides to secure mounting plate in place. Do not tighten at this time.
- 3A. Ensure that the sensor will be axially aligned with the rotor when mounted. The sensor-to-rotor axial position is adjusted by using shims (provided) below the mounting base plate.
- 3B. Check the base plate to centering jig height. Insert (2 x 0.060) shims on each side (4 total) between the mounting base plate and the motor mounting pylons. Be sure to shim evenly on both sides of the plate. Shim as needed so top of mounting plate and top of centering jig are flush within ± 0.030 [0.75mm].
- 3C. Once the base plate is at the proper height, tighten the base plate mounting screws.
4. Remove the centering jig. The base plate is now correctly positioned to ensure the sensor-to-rotor axial and radial position is correct.

MOUNTING THE SENSOR

WARNING

The mounting brackets for the XP5 are factory-aligned and should not be removed or reinstalled in the field. These screws are factory-secured with permanent threadlocker (red) and torque seal has been applied to the heads. Applying a field-mounted wire loop is permissible; the screw heads are pre-drilled.

5. Slide the sensor into place, fitting the axial position bar/bracket into the machined groove in the base plate. This properly locates the sensor axially to the rotor.
- 5A. Secure the sensor using the 1/4- 20 x 1" screws, threadlocker and provided lock washers. Use screw wire-loops as required.

MOUNTING THE ROTOR

6. Mount the riser shaft on top of the machine shaft.
- 6A. For TDS 11SA, the riser shaft is mounted using separate (2) 1/4-20 x 1.5" screws (provided). Screws should be secured with blue/removable threadlocker (provided). Do not use permanent (red) threadlocker as heat to remove permanent threadlocker cannot be applied to the rotor or riser shaft without damaging the rotor.
7. Place the rotor on top of the riser shaft. Secure with (2) 1/4-20 x 2.75" screws (provided), use threadlocker. Add wire-loops as required to prevent vibration-related back-out.
8. Verify the sensor-to-rotor axial position is correct. The rotor top should be 0.46" \pm 0.060 [11.7 \pm 1.54] below the sensor extended "snout" that protrudes toward the rotor.
- 8A. If the sensor-to-rotor axial position is not in the correct position, the base plate shims can be adjusted to move the plate up or down. Loosen the plate mounting screws to permit shim changes. Be sure to evenly match shims on both sides. Be sure to retighten the base plate screws.
9. Using a PLASTIC shim (only): check the sensor-to-rotor radial air gap; should be nominally 0.040", \pm 0.005" [1.02mm, \pm 0.127mm]. For best performance and resistance to debris, the maximum deviation from nominal should be +0.015" / -0.030" [+0.38mm / - 0.76mm]. The sensor can function properly down to 0.005" gap, but this is not recommended as machine vibration could cause a sensor-rotor head crash. If the sensor gap is not correct, adjust the location of the base plate as required.

WIRING INSTRUCTIONS

CAUTION

Remove power before wiring.

The XP5 sensor terminal box is threaded for cable gland or hard conduit interface. See XP5CRT05 for detailed requirements including torque specification.

CAUTION

To wire the XP5 sensor, first ensure there is no hazard (gas or explosive dust) atmosphere present.

Remove the (4) M5 hex head screws from the terminal box.

CAUTION

When removing or replacing the XP5 terminal box cover, do not damage the flame path surfaces. These surfaces include the part of the box cover that extends into the housing and the mating surfaces on the box itself. Before replacing the cover, be sure to inspect for scratches or gouges: If the flame paths are scratched or gouged this can cause an unsafe condition. Return the XP5 for factory review.

The signal wiring pinout is shown on the mating terminal plug, and an additional copy is affixed inside the wiring terminal box cover.

CAUTION

Remove the mating terminal plug before wiring by loosening the 2 captive screws and pulling the plug completely out of the housing. Attempting to wire the terminal plug inside the XP5 can lead to accidental damage of the encoder cover flame paths.

SWITCHING LEFT-RIGHT ORIENTATION ON TERMINAL BOX

The user may exchange cable entry points by removing the blanking plug and installing it in the opposite terminal box hole. The blanking plug must be installed per XP5CRT05.

SIGNAL WIRING

Refer to the attached wiring diagrams. Be sure to comply with all installation requirements shown on XP5CRT05. Information on specific connector pin-outs and phasing can be found on labels on the encoder and in the tables included in these instructions.

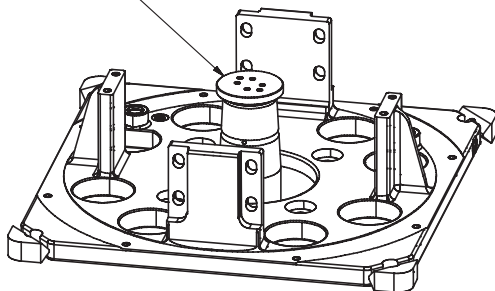
The XP5 sensor can be wired for single phase or two phase, either with or without complements, with or without markers. For bidirectional operation, in most cases Phase A channel typically leads phase B channel for clockwise shaft rotation as viewed from the anti-drive or accessory end of the motor. From this position, the sensor diagnostic LED can also be seen. 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 and B at the use end of the wires.
 - 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.

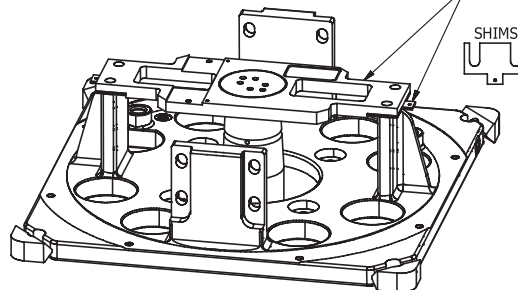
1

INSTALL CENTERING JIG
ONTO TOP DRIVE SHAFT.
USE SHORT SCREWS SUPPLIED
WITH ROTOR IF NEEDED.



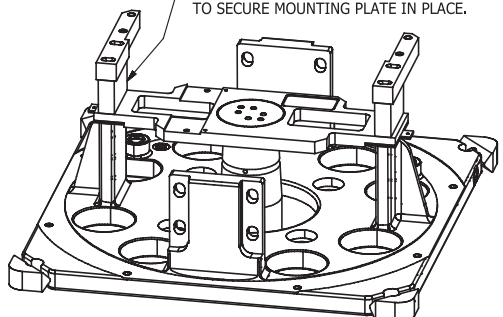
2

PLACE MOUNTING PLATE OVER CENTERING JIG.
SHIM AS NEEDED SO TOP OF MOUNTING PLATE AND TOP
OF CENTERING JIG ARE FLUSH WITHIN ± 0.030 [0.75].



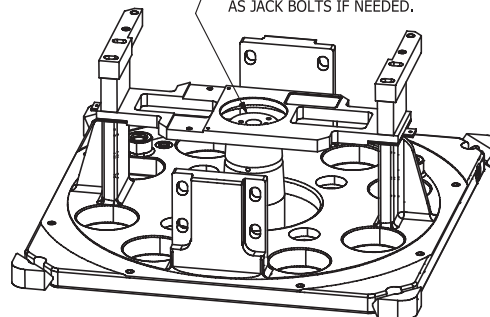
3

INSTALL EXISTING BRACKETS ON BOTH SIDES
TO SECURE MOUNTING PLATE IN PLACE.



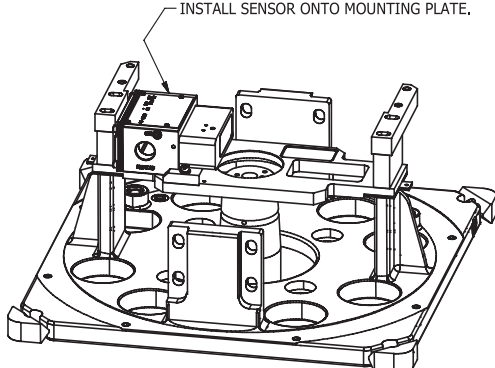
4

REMOVE CENTERING JIG.
USE SCREWS SUPPLIED WITH ROTOR
AS JACK BOLTS IF NEEDED.



5

INSTALL SENSOR ONTO MOUNTING PLATE.

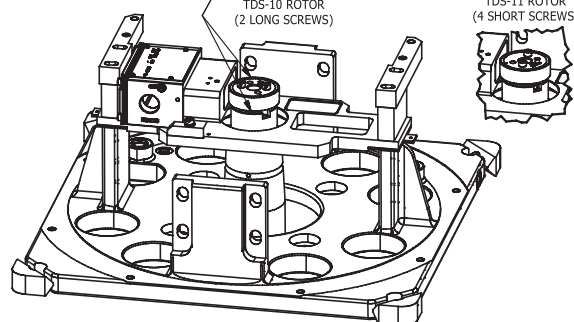


6

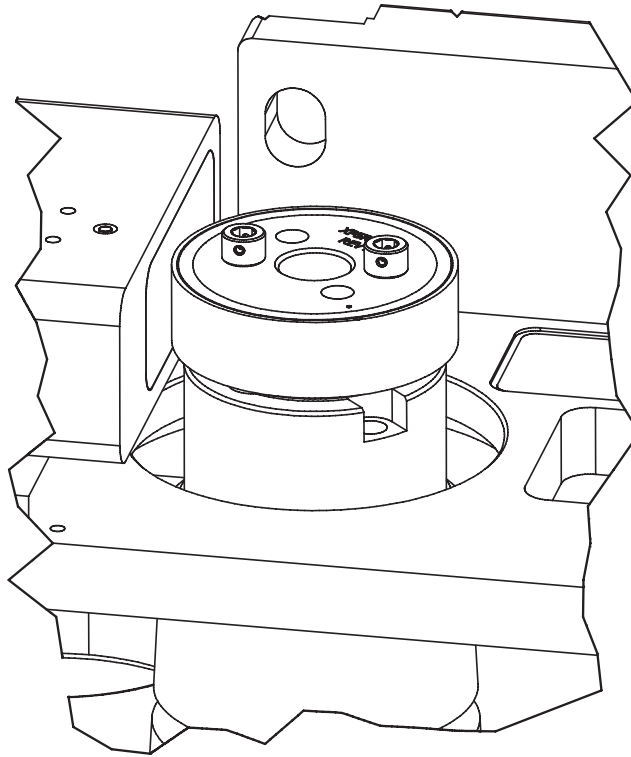
INSTALL RISER AND ROTOR
WITH ANTISEIZE ON PILOTS.

TDS-10 ROTOR
(2 LONG SCREWS)

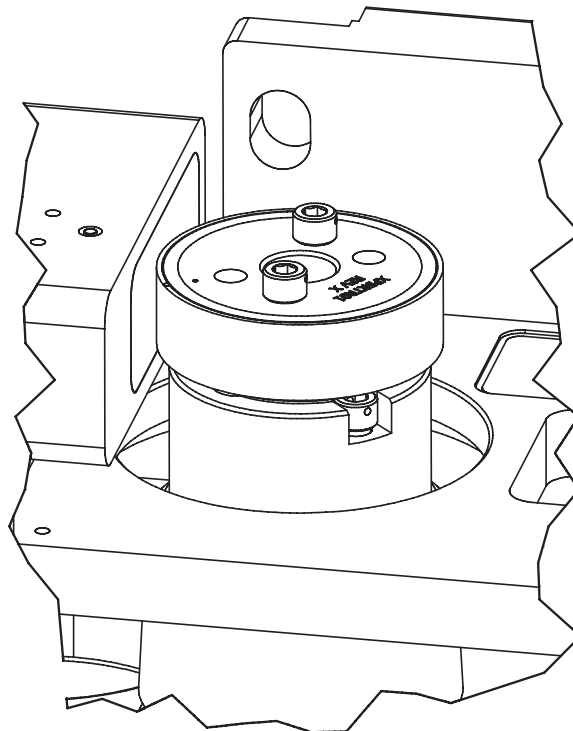
TDS-11 ROTOR
(4 SHORT SCREWS)



TDS-10
2x 1/4-20 x 2.75" LONG



TDS-11
4x 1/4-20 x 1.50" LONG



Interconnection cable must be selected in compliance with XP5CRT05.

Typical interconnection cable is 18-22AWG, 4 twisted pair + overall shield. Example: Avtron B37150. 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. 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 controller. The smaller conductors are acceptable for the signal lines.

WARNING

After completing the wiring procedures, reinstall the terminal block. Proper torque is 0.5 to 0.6 Nm (4.4 to 5.3 in-lb). Do not overtighten the mating terminal block retentions screws.

CAUTION

Before replacing terminal box cover, wipe the flame patch surfaces clean (the part of the cover that extends into the terminal box). Also wipe clean the mating surface inside the terminal box. DO NOT use emery paper or other abrasives to clean the flame path surfaces. Any scratching or gouging of the surfaces can cause an unsafe condition.

Be sure to replace the terminal box cover properly. Fully secure the terminal box cover per XP5CRT05. 3.4Nm (30in-lb)

CAUTION

Terminal box cover should slide in place without pounding or requiring heavy pull-in by the terminal box screws. If the terminal box cover will not fit smoothly in place, the flame paths around the cover may have been damaged. Return the XP5 sensor unit for factory review.

GROUNDING

The XPH1 encoder (and XP5 sensor) do not require an intrinsic safety ground (IS Ground). However, XP5 should be grounded in compliance with XP5CRT05. (2) holes and (1) #10 SAE screw are provided for convenient ground lug mounting on each side of the sensor.

MAINTENANCE

GENERAL

This section describes routine maintenance for the Avtron XP5 sensor. For support, contact Avtron Encoder's field service department at 216-642-1230. For emergency after hours service contact us at 216-641-8317. For any maintenance operation be sure to comply with XP5CRT05.

This product has no user serviceable parts. Care must be taken during use to ensure that flameproof joints on the cover and housing are not damaged. **Repair of flameproof joints is not permissible.** Contact Nidec Industrial Solutions for dimensions of flameproof joints.

The XP5 sensor SMARTSafe 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 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.

TROUBLESHOOTING:

If the drive indicates a loss of encoder/tach fault and the XP5 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 XP5 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 LED indicates a fault (RED):

1. Remove the XP5 sensor from the base plate. Clean surfaces for the XP5 sensor and the base plate to ensure it is seating fully and not mis-aligned with the rotor. Inspect the XP5 sensor face (the potted plastic area). There should be no scraping or rubbing marks on this surface. Minor potting defects such as pits or waves are acceptable.

2. Using a PLASTIC shim (only): check the sensor-to-rotor radial air gap; should be nominally 0.040" [1.02mm]. For best performance and resistance to debris, variation from the nominal gap should be within +0.015" / -0.030" [+0.38mm / - 0.76mm]. If the sensor gap is not correct, recheck the sensor mounting in the base plate. If the sensor is mounted correctly, it may indicate that the base plate has shifted and needs to be re-centered using the centering jig from initial installation.

2.A. Remove rotor and shaft riser taking care not to damage the magnetic ring. Remove shaft rust and burrs before removing the rotor.

CAUTION

Do not strike or pry the encoder or rotor at any time. Damage will result and the warranty will be void. At installation, clean and remove paint and burrs from motor shaft and mounting face.

CAUTION

DO NOT APPLY HEAT TO THE ROTOR. DO NOT USE A GEAR PULLER ON THE ROTOR.

2.B. Loosen brackets on both sides of the base plate, but do not fully remove the screws.

2.C. Insert centering jig and follow initial installation instructions regarding shimming and rotor installation.

If the LED indicates a fault (RED) on a properly mounted XP5 sensor and the rotor is properly located, replace the XP5 sensor.

An oscilloscope can also be used to verify proper output of the XP5 sensor 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”, figure 8), 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).

If the LED indicates (ORANGE):

The ORANGE LED indicates a shutdown due to under-voltage or thermal overload. Typical causes are (usually a combination of):

- High ambient temperature
- Higher than target load (including short circuits and mis-wiring)
- High output frequency
- Higher/Lower than target input voltage

Power does not have to be cycled for the GREEN LED to reset once conditions are brought back into target range.

If the output frequency and ambient temperate are not excessive, the first things to check for are proper wiring / connections and input voltage. Remove all output wires/connections (A, \bar{A} , B, \bar{B} , Z, \bar{Z}). The LED should turn GREEN. If the LED does not turn GREEN, the encoder is not receiving enough voltage at +V to properly operate. Correct input voltage problem at power supply or cabling.

Check for mis-wiring &/or short. If the LED turns GREEN once all outputs are disconnected, reconnect each output, one at a time, monitoring for ORANGE LED. For partial/resistive short circuits, the LED may take a few minutes to turn ORANGE. Once the shorted output(s) are located, correct the shorting condition, and the encoder LED should remain GREEN.

If the LED is OFF, but power is being applied to the encoder, check the output voltage level at A, \bar{A} , B, \bar{B} . If all outputs are ON ($\approx +V$), the connections to +V and COM are reversed. Swap connections between +V and COM; the LED should turn GREEN. If the problem persists contact the factory.

SENSOR REMOVAL

To remove the sensor remove the screws holding the sensor mounting bracket to the base plate. Take care that the sensor does not fall from the frame or flange and crash into the rotor. Damage to the sensor or rotor could result.

ROTOR REMOVAL

Remove shaft rust and burrs before removing the rotor.

CAUTION

DO NOT APPLY HEAT TO THE ROTOR. DO NOT USE A GEAR PULLER ON THE ROTOR.

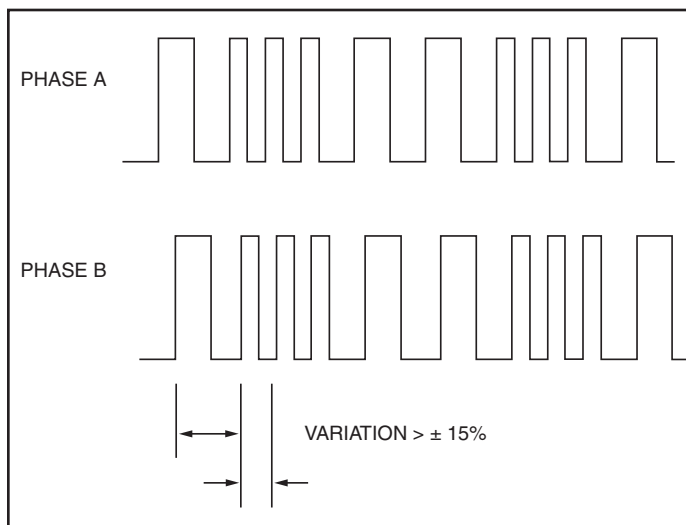
ROTOR INSPECTION

The rotor should be clean and free of magnetic debris. Ensure the magnetic ring is intact and is not chipped at the side, or cracked. This damage can affect encoder performance and/or result in rotor contact with the sensor surface. Chipped or cracked rotors should be replaced immediately.

CAUTION

Keep strong magnets away from rotor surfaces (such as the base magnet of a dial indicator gage). Strong magnets that contact the rotor can damage the signal quality permanently.

Excessive Signal Jitter



XP5 Sensor Part Numbers									
<div><div></div><div></div><div></div><div>-</div></div>		<div><div></div></div>	<div><div></div></div>	<div><div></div><div></div></div>		<div><div></div></div>		<div><div></div><div></div><div></div></div>	
Model	Compatible w/	Line Driver	PPR		Connection Options Terminal Box			Modifications	
XP5-	1- 64mm rotor (XPH1)	8- 5-24V in/ 5-24V out (Hx)	BC-50	AS-600	A- B-	Left Exit M25 thread	Right Exit Blanking Plug	Phasing A->B CCW A->B CCW	000- none
	8- 143mm rotor (XPH8)		AF-60 AK-80 AG-100 AH-120 AA-128 AM-200 AL-240 AN-256 AP-300 AE-360 AC-400 AB-480 AQ-500 AR-512	AV-900 AJ-960 AW-1000 AY-1024 AZ-1200 CX-1500 A3-2000 A4-2048 A5-2500 AD-4096 A8-4800 A9-5000 00-Special		<div>Left-Right orientation is viewed with terminal box facing up</div>			

XPH1 Encoder Part Numbers										
<div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div><div></div></div> <div><div></div><div></div></div>	<div><div></div></div>				<div><div></div><div></div><div></div></div>	
Model	Rotor Style/Bore	Cover	Output	PPR		Connection Options Terminal Box			Modifications	
XPH1-TDS10/11 with 64mm rotor	XX- No Rotor A1- TDS10/11 w/shaft adapter	X- No Cover	8- 5-24V in/ 5-24V out (Hx)	Left PPR	Right PPR	A- B-	Left Exit	Right Exit	Phasing A->B CW A->B CW	000- none
				XX-None	XX-None		M25 thread	Blanking Plug		
				BC-50	BC-50		Blanking Plug	M25 thread		
				AF-60	AF-60		<div>Left-Right orientation is viewed with terminal box facing up</div>			
				AK-80	AK-80					
				AG-100	AG-100					
				AH-120	AH-120					
				AA-128	AA-128					
				AM-200	AM-200					
				AL-240	AL-240					
				AN-256	AN-256					
				AP-300	AP-300					
				AE-360	AE-360					
				AC-400	AC-400					
				AB-480	AB-480					
				AQ-500	AQ-500					
				AR-512	AR-512					
				AS-600	AS-600					
				AV-900	AV-900					
				AJ-960	AJ-960					
				AW-1000	AW-1000					
				AY-1024	AY-1024					
				AZ-1200	AZ-1200					
				CX-1500	CX-1500					
				A3-2000	A3-2000					
				A4-2048	A4-2048					
				A5-2500	A5-2500					
				AD-4096	AD-4096					
				A8-4800	A8-4800					
				A9-5000	A9-5000					
				00-Special	00-Special					

SPECIFICATIONS

ELECTRICAL

- A. Operating Power (Vin)
 1. Volts 5-24V Vin
 2. Current 500mA Max for sensor plus cable load
 400mA Max @ 5V (plus cable load)
 200mA Max @ 12V (plus cable load)
 100mA Max @ 24V (plus cable load)
- B. Output Format (5-24V Vout)
 1. 2 Phase & 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 See output types for phasing selection
- E. Phase Sep 15% minimum
- F. Frequency Range 0 to 250,000 Hz
- G. PPR 8-50000 (consult factory for PPR > 5000)
- H. Line Driver Specs See table
- I. Connectors Terminal box, explosion proof
- J. LED Indicator GREEN: power on, unit ok.
 RED: alarm on
 ORANGE: wiring fault (Thermal Overload;
 Under-voltage)

MECHANICAL

- A. Rotor Inertia 143mm rotor 0.12-0.46 Oz. In. Sec²
- B. Acceleration 5000 RPM/Sec. Max.
- C. Speed 6000 RPM Max.
- D. Weight
 XP5 Sensor only 4.6 lbs [2.1kg]
 Style '1' with baseplate 15lbs [7kg]
 XPH8 10-14 lbs [4.5 to 6.4kg]
- E. Sensor to Rotor
 Air Gap (nominal) 0.040" [1.02mm]
 Tolerance +0.015"/-0.030 [+0.38/-0.76mm]
- F. Rotor Axial Tolerance \pm 0.100" [\pm 2.54mm]

ENVIRONMENTAL

Solid aluminum stator and rotor
 Fully potted electronics, protected against
 oil and water spray
 Operating Temperature:
 -50 to 85°C, 0-100% condensing humidity
 See XP5CRT05 for installation notes

Certifications:

Class I Div 1, Groups C and D
 Class I Zone 1, Ex db ia IIB T4 Gb
 Class I Zone 1, AEx db ia IIB T4 Gb
 Ex db ia IIB T4 Gb (ATEX/IECEx)

Electrical Specifications		8	Units
Input Voltage		5-24	VDC
Nom Output Voltage		5-24	VDC
Line Driver		Hx	
Output Resistance Typ		75	ohms
Maximum Instantaneous Current		800	mA
Maximum Average Current		200	mA
Voh Typ		V _{IN} -1	VDC
Vol Typ		0.2 @10mA load	VDC
Cable Drive Capacity		1000' [305m]	Feet [m]
Protection	Reverse Voltage	Yes	
	Short Circuit	Yes	
	Transient	Yes	
	Power to A, Gnd to A/	Yes	
Alarm	LED	Green = Power On, High Signal Quality Output	
	LED	Red = Alarm	
	LED	Orange = Wiring Error	
Marker		1 Per Revolution	
		Mounting Style	Width
		Style 1, 64mm rotor	~4 degrees

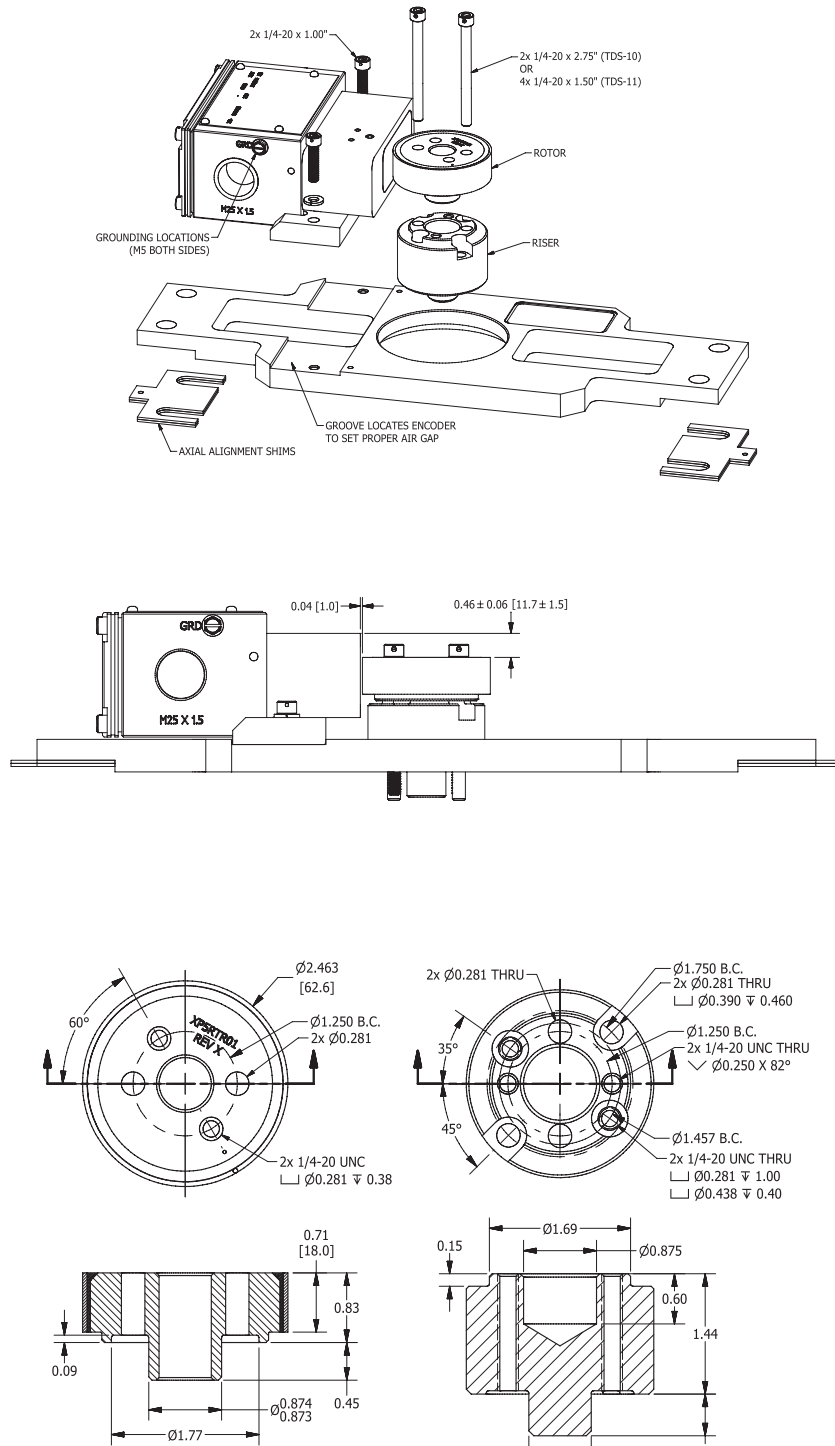


PINOUTS AND PHASING

Table 5

Connector Option	Phasing	+V	0V	A	A-	B	B-	Z	Z-	NC**	CG*
A, B - Terminal Box	CW	1	2	3	4	5	6	7	8	9	10
*Case Ground--not recommended for cable shield termination											
**Future use											

OUTLINE DIMENSIONS AND OPTION DETAILS



All Dimensions showing mm [in]

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

Company Name _____

Authorized Company Representative _____

Title _____ Date _____

Nidec

Avtron Encoders are the Most Reliable Encoders in the World

Nidec Industrial Solutions
8901 E. Pleasant Valley Road • Independence, Ohio 44131-5508
E-mail: helpdesk@nidec-industrial.com • Web: www.avtronencoders.com
Phone: (216) 642-1230 • Fax: (216) 642-6037

SMARTSafe is a trademark of Nidec.
Features and specifications subject to change without notice.
Nidec standard warranty applies. All dimensions are in inches [mm].

REV DATE: 03/09/18

REV: 003

XPH1

9

THIS DOCUMENT MUST BE PROVIDED TO THE CUSTOMER AS PART OF THE INSTRUCTION MANUAL OR AS A SEPARATE DOCUMENT.

APPROVALS:

ATEX per Certificate No. DEMKO 17 ATEX 1880X
IECEX per Certificate No. IECEX UL 17.0049X
UL/CSA 1203 per File E364384

MARKINGS:

Ex db ia IIB T4 Gb DEMKO 17 ATEX 1880X $-50^{\circ}\text{C} \leq T_{\text{amb}} \leq 85^{\circ}\text{C}$
IECEx UL 17.0049X $-50^{\circ}\text{C} \leq T_{\text{amb}} \leq 85^{\circ}\text{C}$

Telemetry Equipment for use in Hazardous Locations:

Class I, Division 1, Groups C and D

Ex db ia IIB T4 Gb

Class I Zone 1, AEx db ia IIB T4 Gb

-50°C ≤ Tamb ≤ 85°C T-Code T4

RATINGS:

MAX. VOLTAGE = 24V

MAX. CURRENT = 500 mA

MAX. SAFE AREA VOLTAGE $U_m = 250V$

AMBIENT TEMPERATURE T_{amb} : $-50^{\circ}\text{C} \leq T_{amb} \leq 85^{\circ}\text{C}$

CONDITIONS FOR SAFE USE ("X" MARK):

This product has no user serviceable parts. Care must be taken during use to ensure that flameproof joints on the Cover and Housing are not damaged. Repair of flameproof joints is not permissible. Contact Nidec Industrial Solutions for dimensions of flameproof joints.

The circuits shall be limited to overvoltage category I/II/III as defined in IEC 60664-1.

The (4) screws that secure the XP5 cover onto the XP5 enclosure require the minimum tensile strength shown below:

<u>MATERIAL</u>	<u>GRADE</u>	<u>MINIMUM TENSILE STRENGTH</u>
A2 Stainless Steel	A-70	700 Mpa (101.5 KSI)
A4 Stainless Steel	A-80	800 Mpa (116.0 KSI)
Carbon Steel	8.8	800 Mpa (116.0 KSI)
Alloy Steel	12.9	1220 Mpa (176.9 KSI)

Protect the cover seal from sunlight during storage and installation.

INSTALLATION NOTES:

Installation should only be performed by qualified personnel. Refer to WIRING INSTRUCTIONS in XP5-MAN for detailed wiring and installation instructions. The installer should refer to the latest edition of the following standards before installing or operating in a Hazardous Location:

EN 1127-1 Explosive Atmospheres - Explosion prevention and protection, basic concepts and methodology

EN 60079-14 Electrical apparatus for explosive gas atmospheres - Part 14: Electrical installations in hazard

Local electric code (i.e. Article 501 of the National Electric Code (NEC) for installations in the United States)

All bolted connections must be secure. Tighten Cover Screws to 3.4 N-m (30 in-lb) max. Installer must ensure that the Rotor does not contact the Sensor or any other stationary parts.

Encoder Housing must be grounded at one of two specified locations either on the outside or inside of housing. Use a lock washer or similar means on the external ground location to prevent the screw from loosening. Use anti-corrosion compound on the outside ground location to prevent corrosion of the ground connection. Ground screws must be colored green. The ground conductor size should be equal to, or larger than the power/signal conductors to the encoder.

The M25 Blanking/Close-up Plug must be assembled per manufacturer (CMP Products) installation instructions. Max. installation torque of plug is 30 N-m (22.1 ft.-lb.) For 1/2 and 3/4 NPT Blanking Plugs the customer must provide a certified plug suitable for the application.

Cable glands and conductors specified by the end user must be suitable for a service temperature of at least 94°C.

WARNINGS/CAUTIONS:


DO NOT OPEN IN A HAZARDOUS ENVIRONMENT WHILE ENERGIZED.

AVERTISSEMENT : Ne pas ouvrir dans un environnement dangereux, alors qu'il est sous tension.

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.

NEXT ASSY	USED ON

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	DRAWN PATTON	DATE 3/23/2017
TOLERANCES ANGLES $\pm 1^\circ$	CHECKED WOLFF	9/29/2017
DECIMALS .XX ± 0.03 .XXX ± 0.015	APP'D ENG PATTON	9/29/2017
FINISH	APP'D	
PAINT PER PS	PROD	
PLATE PER PS		
COAT PER PS		
ANODIZE PER		
OTHER		

		8901 E. PLEASANT VALLEY ROAD INDEPENDENCE, OH 44131-5529	
Nidec Industrial Solutions			
CERTIFICATION DRAWING USER INSTRUCTIONS			IMF <input type="checkbox"/> PSF <input type="checkbox"/>
SIZE	CAGE NO.	DWG NO.	3D DWG
B	0FMV7	XP5CRT05	REV
			A
SCALE	MODEL	SHEET	
NONE	XP5	1 OF 1	

UNLESS OTHERWISE SPECIFIED ABOVE NOTES APPLY.

REVISION				
ECN NO.	REV	DESCRIPTION	DATE	APPROVED
EA1328	A	ADD NOTE: "FOR 1/2 AND 3/4 NPT BLANKING PLUGS..."	10/10/17 PATTON	WOLFF

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 IDENTIFICATION LABELS.