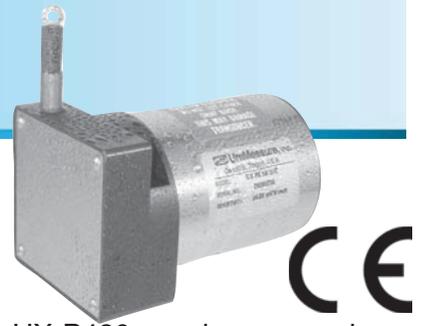


HX-P420 SERIES

4 to 20 mA OUTPUT

The HX-P420 position transducer provides a 4 to 20 mA output signal with a potentiometric sensor. The HX-P420 is particularly advantageous in electrically noisy environments. Since the transmitter is loop powered, an assembled system consists of a power supply, current monitor, and transmitter all connected in series. Zero and span adjustments allow setting the 4 mA position within the first 30% of total travel and setting the 20 mA position within 80% to 100% of total travel. The HX-P420 may be powered with a supply voltage in the range of 9 to 35 VDC subject to the total loop resistance.



SPECIFICATIONS

General

Available Measurement Ranges .. See Supplemental Data¹, Table 12
 Connector MS3102E-14S-6P
 Mating Connector (included)..... MS3106E-14S-6S

Performance

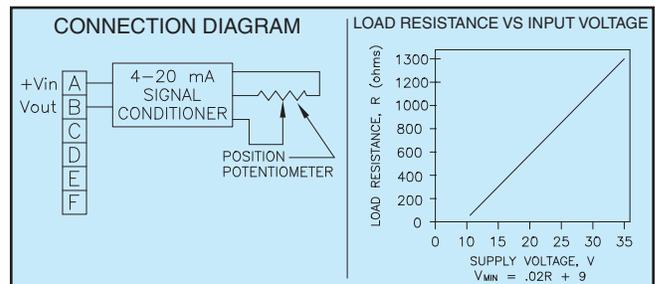
Linearity
 2", 3", 4", 5" & 6" Ranges ±0.30% Full Scale
 10", 15", 20" & 25" Ranges ±0.20% Full Scale
 All other ranges ±0.15% Full Scale
 Repeatability ±0.015% Full Scale
 Resolution Essentially Infinite

Electrical

Output User Adjustable 4 to 20 mA
 Excitation Voltage..... 9 to 35 VDC
 Min. Supply Voltage..... (.02 x Load Res.) + 9 VDC
 Insulation Resistance..... 100 Megohms min. at 100 VDC
 Adjustment Range
 4 mA..... 0 to 30% of Range
 20 mA..... 80% to 100% of Range
 Protection..... Reversed Polarity

Environmental

Thermal Coefficient of Sensing Element ±100 PPM/°C Max.
 Operating Temperature -40°C to +95°C
 Operating Humidity 100%
 Shock 50 G @ 0.1 ms Max.
 Vibration 10 Hz to 2000 Hz, 15 G peak
 Ingress Protection
 Exclusive of Wire Rope Area NEMA 4 (IP-65)
 Optional Ingress Protection..... NEMA 6 (IP-68)



FOOTNOTES TO SPECIFICATIONS

1. Supplemental Data section located at end of HX Series pages.

Model Number Configuration

Range
 Select measurement range from Supplemental Data, Table 12, Insert corresponding Measurement Range Designator

Wire Rope
 * Stainless Steel (See Supplemental Data, Table 12)
NJC Ø.018 (0,45 mm) Nylon Jacketed Stainless Steel
 Ranges to 80" (2m) only.
NJC037 Ø.037 (0,94 mm) Nylon Jacketed Stainless Steel
 Ranges 100" (2.5m) to 500" (12.7m) only.

Wire Rope Tension
 * Standard
004 Reduced (Ranges to 80" only)

Wire Rope Exit Direction
 * Top Exit
E1 Side Exit (Left)
E2 Side Exit (Right)
E3 Bottom Exit

Housing
 * NEMA 4 (IP-65) Aluminum
N6 NEMA 6 (IP-68) Aluminum
SS NEMA 6 (IP-68) Corrosion Resistant Stainless Steel and Non-Metallic Construction

Hazardous Area Protection
 * None
XP UL, CSA Intrinsically Safe
 Class 1, Division 1, Groups A, B, C, & D
 Class 2, Groups E, F, G
 Class III hazardous locations.
 See control drawing 400254 below

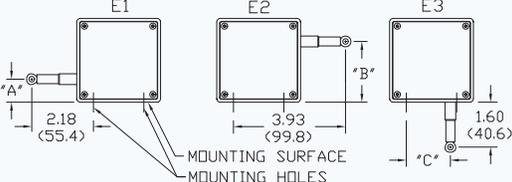
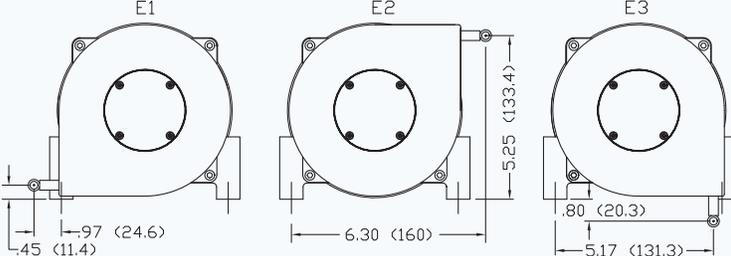
Electrical Interface
 * Mating Connector Included (See note 1 below)
L3M 3 m (10') electrical cable (See note 2 below)
L4M 4 m (13.5') electrical cable (See note 2 below)
L5M 5 m (16.5') electrical cable (See note 2 below)
L6M 6 m (20') electrical cable (See note 2 below)
L7M 7 m (23') electrical cable (See note 2 below)
 1. Applies to NEMA 4 Housing option only. Does not apply to N6 or SS Housing options.
 2. Select one of options L3M through L7M when electrical cable is required with mating connector when Housing option NEMA 4 is also selected. Select one of options L3M through L7M when Housing option N6 or SS is selected. Connector is **not** available with Housing option N6 or SS.

Electrical Output Polarity
 * Standard (increasing output as wire rope is extended)
R Reversed (decreasing output as wire rope is extended)

NOTE
 1) *—Asterisk items are standard configuration. No option designator is required.
 2) Shaded options available at additional cost.
 3) See Supplemental Data for options.

Example
HX-P420-50-NJC-004-L7M

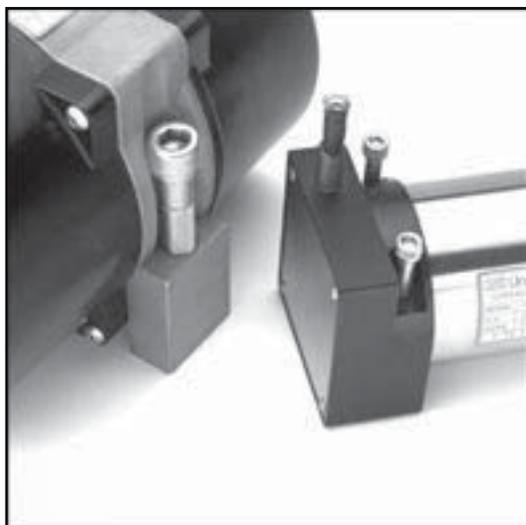
ADDITIONAL OPTIONS

OPTION	OPTION DESIGNATOR	DESCRIPTION																												
Nylon jacketed wire rope (Ranges to 80" only)	NJC	Replaces standard stainless steel wire rope with Ø.018 nylon jacketed wire rope. This option increases wire rope life dramatically but may increase non-linearity by as much as ±.05% of full scale.																												
Nylon jacketed wire rope (Ranges 100" to 500" only)	NJC037	Replaces standard stainless steel wire rope with Ø.037 nylon jacketed wire rope.																												
Reversed output	R	Output is at a maximum when wire rope is fully retracted. Output decreases as wire rope is extended. Does not apply to velocity signal.																												
NEMA 6, IP-68 capability	N6	 Connector is replaced with a bulkhead fitting and a designated length of urethane jacketed, shielded, twisted pair cable. Retraction mechanism and electrical components are sealed to NEMA 6, IP-68 capability. No connector.																												
Corrosion Resistant Construction	SS	All external anodized aluminum parts of transducer are replaced with stainless steel and corrosion resistant plastic. Transducer is sealed to NEMA 6, IP-68 capability. Urethane jacketed, shielded, twisted pair cable exits unit. No connector. 																												
Non-standard potentiometer (Applies to HX-PA only)	PXK	Replace "X" in option designator with required potentiometer value in K ohms. Non-standard potentiometer linearity is as follows: Ranges 0 to 2" to 0 to 5" ±1.00% of full scale Ranges 0 to 10" to 0 to 25" ±0.50% of full scale Ranges 30" and above ±0.25% of full scale Note: This option is subject to potentiometer availability.																												
Alternate wire rope exit Measurement ranges to 80" (2.0 m)	E1, E2, E3	 <table border="1"> <thead> <tr> <th>RANGE</th> <th>"A"</th> <th>"B"</th> <th>"C"</th> </tr> </thead> <tbody> <tr> <td>2", 10"</td> <td>1.12 (28.4)</td> <td>1.79 (45.5)</td> <td>1.21 (30.7)</td> </tr> <tr> <td>3", 15", 30"</td> <td>.96(24.4)</td> <td>1.95 (49.5)</td> <td>1.37 (34.8)</td> </tr> <tr> <td>4", 20", 40"</td> <td>.80 (20.3)</td> <td>2.11 (53.6)</td> <td>1.53 (38.9)</td> </tr> <tr> <td>5", 25", 50"</td> <td>.64 (16.3)</td> <td>2.27 (57.7)</td> <td>1.69 (42.9)</td> </tr> <tr> <td>6", 60"</td> <td>.49 (12.4)</td> <td>2.42 (61.5)</td> <td>1.84 (46.7)</td> </tr> <tr> <td>80"</td> <td>.25 (6.4)</td> <td>2.66 (67.6)</td> <td>2.08 (52.8)</td> </tr> </tbody> </table> <p>Dimensions in brackets are millimeters.</p>	RANGE	"A"	"B"	"C"	2", 10"	1.12 (28.4)	1.79 (45.5)	1.21 (30.7)	3", 15", 30"	.96(24.4)	1.95 (49.5)	1.37 (34.8)	4", 20", 40"	.80 (20.3)	2.11 (53.6)	1.53 (38.9)	5", 25", 50"	.64 (16.3)	2.27 (57.7)	1.69 (42.9)	6", 60"	.49 (12.4)	2.42 (61.5)	1.84 (46.7)	80"	.25 (6.4)	2.66 (67.6)	2.08 (52.8)
RANGE	"A"	"B"	"C"																											
2", 10"	1.12 (28.4)	1.79 (45.5)	1.21 (30.7)																											
3", 15", 30"	.96(24.4)	1.95 (49.5)	1.37 (34.8)																											
4", 20", 40"	.80 (20.3)	2.11 (53.6)	1.53 (38.9)																											
5", 25", 50"	.64 (16.3)	2.27 (57.7)	1.69 (42.9)																											
6", 60"	.49 (12.4)	2.42 (61.5)	1.84 (46.7)																											
80"	.25 (6.4)	2.66 (67.6)	2.08 (52.8)																											
Alternate wire rope exit Measurement ranges 100" (2.5 m) and greater.	E1, E2, E3	 <p>Dimensions in brackets are millimeters.</p>																												

Specifications subject to change without notice.

HX SERIES

SUPPLEMENTAL DATA



Typical HX mounting bolts.

MECHANICAL SPECIFICATIONS

Mechanical Specifications

Available Measurement Ranges.....	See Table 12
Construction	
Ranges 80" (2 m) and under.....	Anodized Aluminum Mounting Base, Stainless Steel & Anodized Aluminum Housing
Ranges 100" (2.5 m) and greater	Stainless Steel Mounting Base High Impact, Corrosion Resistant Thermoplastic Housings
Wire Rope Tension	See Table 12
Wire Rope Diameter.....	See Table 12
Weight	See Table 12
Connector.....	MS3102A-14S-6P
Mating Connector (included)	MS3106E-14S-6S
Optional NEMA 6 Capability.....	Bulkhead fitting with shielded, twisted pair cable
Life*	
Ranges 2" to 6"	5,000,000 full stroke cycles
Ranges 10" to 25"	500,000 full stroke cycles
Ranges 30" to 400"	250,000 full stroke cycles
Ranges 500" to 2000"	200x10 ⁶ lineal inches

* with 1K ohm potentiometer, wire rope misalignment 2° maximum at full stroke, relatively dust free environment, nylon jacketed wire rope on units with ranges 80" and less.

TABLE 12

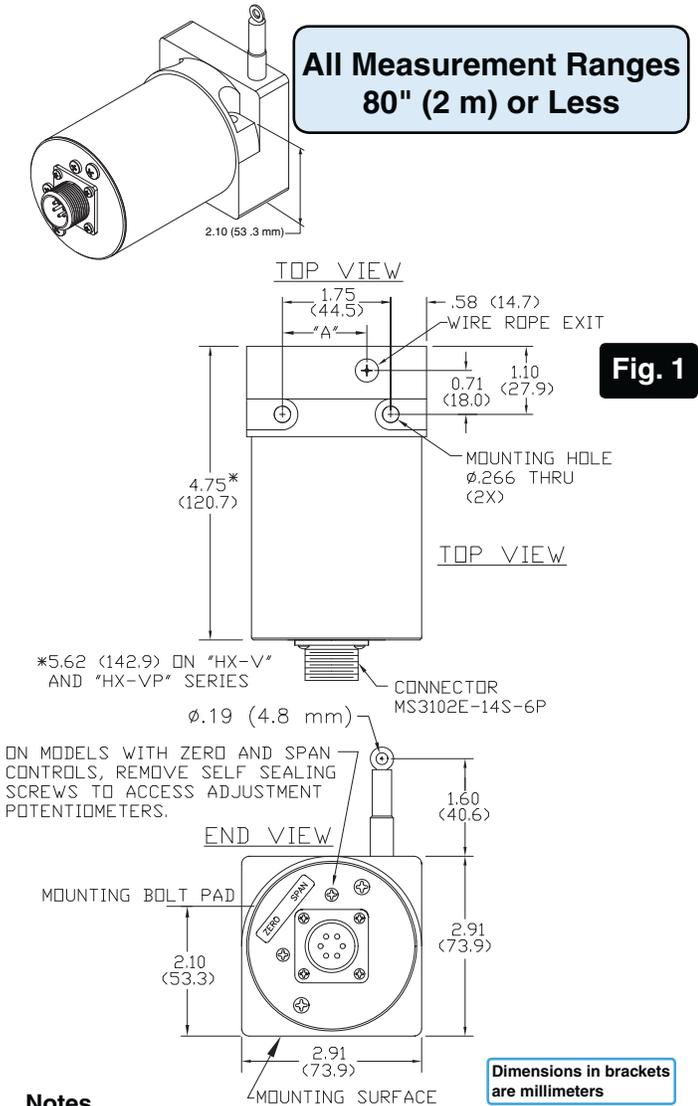
Use value from this column to indicate overall measurement range

Check mark indicates available measurement range

MEASUREMENT RANGE DESIGNATOR	STANDARD MEASUREMENT RANGES		APPLICABLE SERIES			WIRE ROPE TENSION (NOMINAL)		WIRE ROPE DIAMETER		TRANSDUCER WEIGHT		Product Photo	
	(in)	(mm)	HX-PA HX-PB HX-P420 HX-P510 HX-P1010	HX-EP	HX-V HX-VP	(oz)	(N)	(in)	(mm)	(lb)	(Kg)		
	2	2	50	✓	-	✓	34	9.4	.016	0.4	2		0.9
3	3	75	✓	-	✓	24	6.7	.016	0.4	2	0.9		
4	4	100	✓	-	✓	24	6.7	.016	0.4	2	0.9		
5	5	125	✓	-	✓	19	5.3	.016	0.4	2	0.9		
6	6	150	✓	-	✓	24	6.7	.016	0.4	2	0.9		
10	10	250	✓	✓	✓	34	9.4	.016	0.4	2	0.9		
15	15	390	✓	-	✓	24	6.7	.016	0.4	2	0.9		
20	20	500	✓	-	✓	24	6.7	.016	0.4	2	0.9		
25	25	640	✓	✓	✓	19	5.3	.016	0.4	2	0.9		
30	30	750	✓	-	✓	24	6.7	.016	0.4	2	0.9		
40	40	1000	✓	-	✓	24	6.7	.016	0.4	2	0.9		
50	50	1250	✓	✓	✓	19	5.3	.016	0.4	2	0.9		
60	60	1500	✓	✓	✓	24	6.7	.016	0.4	2	0.9		
80	80	2.0m	✓	✓	✓	21	5.8	.016	0.4	2	0.9		
100	100	2.5m	✓	✓	✓	36	10.0	.024	0.6	6.8	3.1		
120	120	3.0m	✓	✓	✓	36	10.0	.024	0.6	6.8	3.1		
150	150	3.8m	✓	✓	✓	36	10.0	.024	0.6	6.8	3.1		
200	200	5.0m	✓	✓	✓	36	10.0	.024	0.6	6.8	3.1		
250	250	6.3m	✓	✓	✓	36	10.0	.024	0.6	6.8	3.1		
300	300	7.5m	✓	✓	✓	36	10.0	.024	0.6	6.8	3.1		
350	350	8.8m	✓	✓	✓	36	10.0	.024	0.6	6.8	3.1		
400	400	10.0m	✓	✓	✓	36	10.0	.024	0.6	6.8	3.1		
500	500	12.5m	✓	✓	✓	36	10.0	.024	0.6	8.6	3.9		
600	600	15.2m	✓	✓	✓	36	10.0	.024	0.6	8.6	3.9		
800	800	20.3m	✓	✓	✓	36	10.0	.024	0.6	8.6	3.9		
1000	1000	25.4m	✓	✓	-	36	10.0	.024	0.6	12.0	5.4		
1200	1200	30.4m	✓	✓	-	36	10.0	.024	0.6	12.3	5.6		
1600	1600	40.6m	✓	✓	-	36	10.0	.024	0.6	14.1	6.4		
1800	1800	45.7m	✓	✓	-	36	10.0	.021	0.6	15.9	7.2		
2000	2000	50.8m	✓	✓	-	36	10.0	.021	0.5	16.3	7.4		

Specifications subject to change without notice.

DIMENSIONAL INFORMATION



Notes

1. Transducer mounts with ϕ .25 or M6 socket head cap bolts.

Table 13

RANGE	"A"
2", 10"	1.21 (30.7)
3", 15", 30"	1.37 (34.8)
4", 20", 40"	1.53 (38.9)
5", 25", 50"	1.69 (42.9)
60"	1.84 (46.7)
80"	2.08 (52.8)

Table 14

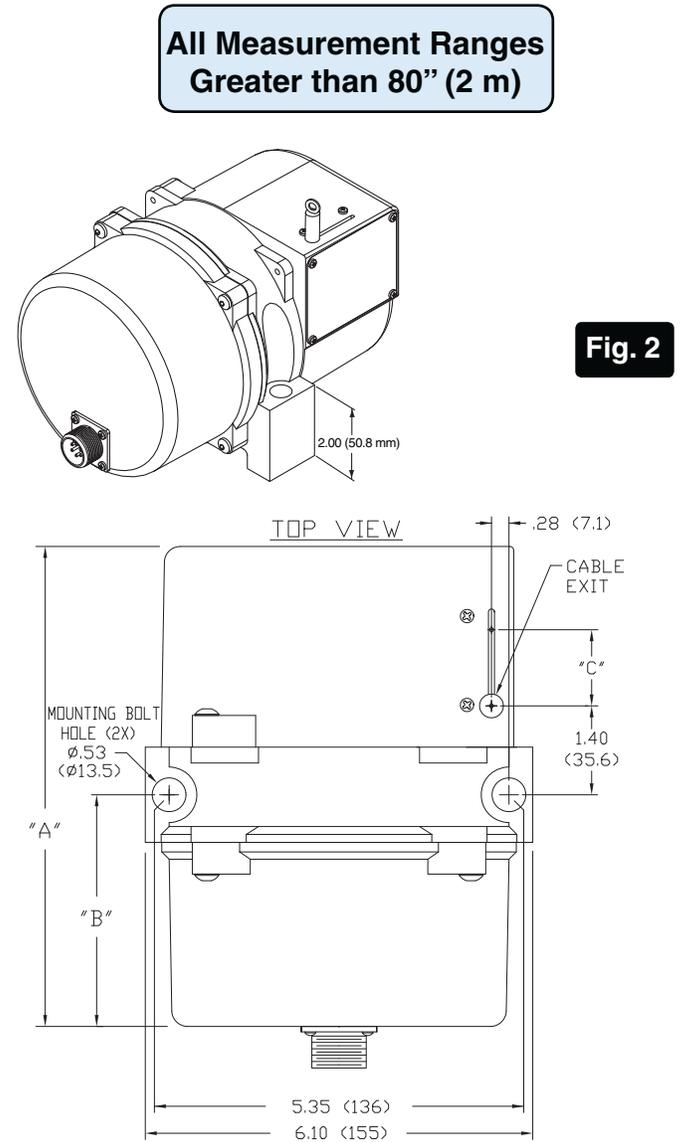
RANGE	DIM "A"	DIM "B"
Ranges to 800"	7.70 (196)	3.80 (97)
1000" to 2000"	11.0 (280)	5.60 (142)

Notes

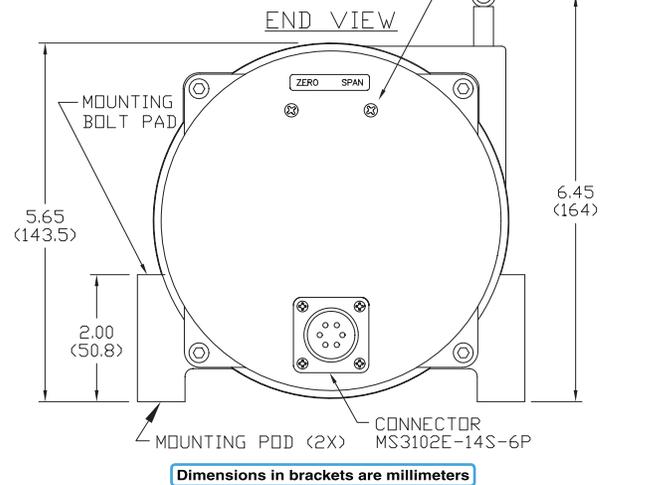
1. Transducer mounts with ϕ .50 or M12 socket head cap bolts.
2. Dimension "C" is the cable offset that occurs as the cable is extended from the transducer.

For "C" in inches, $C = .0016 \times E$ where E = extension in inches.

For "C" in millimeters, $C = .0016 \times E$ where E = extension in mm.



ON MODELS WITH ZERO AND SPAN CONTROLS, REMOVE SELF SEALING SCREWS TO ACCESS ADJUSTMENT POTENTIOMETERS.



Specifications subject to change without notice.

REV.	ECN NO.	ZONE	REVISION	APPROVED/DATE
A			AS ISSUED	TWP 11-13-2008

NON-HAZARDOUS LOCATION

NOTES:

- Associated apparatus output current must be limited by a resistor such that the output voltage plot is a straight line drawn between open-circuit voltage and short-circuit voltage.
- The intrinsically safe device does not provide 500V isolation with respect to earth. Associated apparatus used must be galvanically isolated or dual channel shunt zener diode barriers with linear outputs used channel to channel.
- Associated apparatus may be in a Division 2 or Zone 2 location if so approved.
- Selected associated apparatus must be third party listed as providing intrinsically safe circuits for the application, and have V_{oc} or V_t not exceeding V_{max} (or U_o not exceeding U_i), I_{sc} or I_t not exceeding I_{max} (or I_o not exceeding I_i) and the P_o of the associated apparatus must be less than or equal to the P_{max} or P_i of the intrinsically safe equipment, as shown in Table 1.

5. Capacitance and inductance of the field wiring from the intrinsically safe equipment to the associated apparatus shall be calculated and must be included in the system calculations as shown in Table 1. Cable capacitance, C_{cable} , plus intrinsically safe equipment capacitance, C_i , must be less than the marked capacitance, C_a (or C_o), shown on any associated apparatus used. The same applies for inductance (L_{cable} , L_i and L_a or L_o , respectively). Where the cable capacitance and inductance per foot are not known, the following values shall be used: $C_{cable} = 60$ pF/ft., $L_{cable} = 0.2$ μ H/ft.

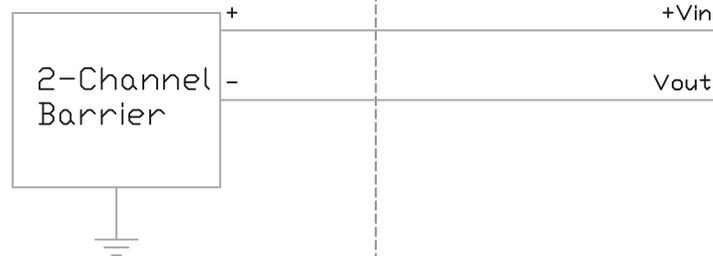
TABLE 1:

IS Equipment		Assc Equipment
V_{max} (or U_i)	\geq	V_{oc} or V_t (or U_o)
I_{max} (or I_i)	\geq	I_{sc} or I_t (or I_o)
P_{max} (or P_i)	\geq	P_o
$C_i + C_{cable}$	\leq	C_a (or C_o)
$L_i + L_{cable}$	\leq	L_a (or L_o)

If P_o of the associated apparatus is not known, it may be calculated using the formula: $P_o = (V_{oc} * I_{sc}) / 4 = (U_o * I_o) / 4$

6. Associated apparatus must be installed in accordance with its manufacturer's control drawing and Article 504 of the NEC (ANSI/NFPA 70) for installation in the United States, or Section 18 of the Canadian Electrical Code for installations in Canada.

②



GENERAL NOTES:

- Substitution of components may disqualify intrinsic safety.

7. When required by the manufacturer's control drawing, the associated apparatus must be connected to a suitable ground electrode per the National Electrical Code (ANSI/NFPA 70), the Canadian Electrical Code, or other local installation codes, as applicable. The resistance of the ground path must be less than 1 ohm.

8. Associated apparatus must not be used in combination unless permitted by the associated apparatus certification.

9. Control equipment must not use or generate more than 250 V rms or dc with respect to earth.

10. Suitability for installation in particular applications is at the discretion of the Authority Having Jurisdiction (AHJ).

HAZARDOUS LOCATION

Class I, Div 1, Groups A, B, C, and D
Class II, Div 1, Groups E, F, and G
and Class III Hazardous Locations

4 TO 20 mA
Position Transmitter
Model: HX-P420
800" range and less
EX:
HX-P420-200-NJC-L7M

V_{max} (or U_i) = 12.6 VDC
 I_{max} (or I_i) = 24 mA
 C_i = 1.1 μ F
 L_i = 0 μ H
 P_{max} (or P_i) = 76 mW

CABLE NOTES:

The HX-P420's N6 and SS versions are provided with a connected cable. Other versions may or may not include electrical cable. Even when supplied, this cable may or may not be used.

The supplied cable has the following characteristics:

Type	= 3 twisted pairs, foil shield, drain wire
Rated Voltage	= 290 V
Max Rated Temp	= 105°C
Conductor Size	= 22 gauge, tinned copper wire
Conductor Insulation	= PVC, 0.010" thick
Shielding	= Alum foil with 22 gauge, 7/30 drain wire
Jacket	= Black polyurethane, 0.032" thick (0.29" overall OD)
Cable	= 39 pF/ft
L_{cable}	= 0.9 μ H/ft

UNLESS OTHERWISE SPECIFIED: 1) ALL DIMENSIONS ARE IN INCHES. 2) TOLERANCES ARE AS FOLLOWS:		N/A	
DO NOT SCALE THIS DRAWING	.XXX	± 0.05	
	.XX	± 0.02	
	.X	± 1	
	ANGLES	$\pm 0^{\circ}30'$	
	SURFACE FINISH	125	
DRAWN	JME	DATE	11-13-08
ENGINEER	JASON ENRIGHT	DATE	11-13-08
REL. TO PROD.		DATE	
		MATERIAL	
		TITLE	
		HX-P420 CONTROL DWG	
		PART, ASM or FAMILY DWG NO.	
		B 400254	
		FILE NAME & DOCUMENT NO.	
		400254B1.DWG	
		SCALE: 1:1	SHEET 1 OF 2

①