

HX-PA SERIES

RATIOMETRIC VOLTAGE OUTPUT

Utilizing a precision potentiometer, the HX-PA series position transducer provides basic absolute positioning with an analog output. With a steady state input voltage, and with the potentiometer connected as a voltage divider, the ratiometric output voltage is directly proportional to wire rope extension. The unit will function with any input voltage up to 25 volts maximum. To obtain best output linearity, the input voltage should be well regulated.



SPECIFICATIONS

GENERAL

Measurement Ranges.....	See Supplemental Data ^[1] , Table 12
Sensing Device.....	Precision Potentiometer
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

ENVIRONMENTAL

Operating temperature.....	-40°C to +95°C
Storage Temperature.....	-55° to +100°C
Operating humidity.....	100%
Vibration.....	15 G's 0.1 ms max.
Shock.....	50 G's 0.1 ms max.

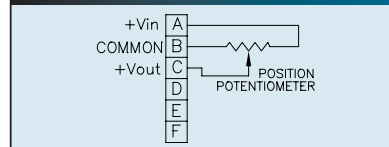
INGRESS PROTECTION (Exclusive of Wire Rope Area)

Standard.....	NEMA 4 (IP-65)
Optional.....	NEMA 6 (IP-68)

ELECTRICAL

Input Impedance.....	1000Ω ±10%
Output Impedance.....	0 to 1000 Ω
Excitation Voltage.....	30 Volts Max. AC or DC
Output Voltage Change Over	
Full Range of Transducer.....	92% to 98% of Excitation Voltage

CONNECTION DIAGRAM



FOOTNOTES TO SPECIFICATIONS

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

MODEL NUMBER CONFIGURATION

HX-PA- 0 1 2 3 **-N** 5 6 7 8 9

0 RANGE
Select Measurement Range From Supplemental Data, **Table 12** on Page 38, Insert Corresponding Measurement Range Designator

1 WIRE ROPE
S..... Stainless Steel
(See Supplemental Data, Table 12)
N..... Ø.018 (0.45 mm)
Nylon Jacketed Stainless Steel
Ranges to 80" (2m) only. (formerly NJC)
J..... Ø.037 (0.94 mm)
Nylon Jacketed Stainless Steel
Ranges 100" (2.5m) to 500" (12.7m) only.

2 WIRE ROPE TENSION
1..... Standard
2..... Reduced (Ranges to 80" only)

3 WIRE ROPE EXIT DIRECTION
Use Number designators shown
(RANGES TO 80" (2000 mm))

RANGES 100" TO 2000" (2.5 m TO 50 M)

5 POTENTIOMETER VALUE
1..... 1K ohm
2..... 2K ohm
3..... 5K ohm
4..... 10K ohm
See Supplemental Data for Linearity Option

6 ELECTRICAL OUTPUT POLARITY
S..... Standard (increasing output as wire rope is extended)
R..... Reversed (decreasing output as wire rope is extended)

NOTES FOR OPTION BOXES 7, 8, and 9

IP-65 (NEMA 4): Transducer equipped with body mounted connector and with or without mating connector. Mating connector with electrical cable available separately as part number **10119-xM** where 'x' is length of electrical cable in meters.

IP-68 (NEMA 6): Transducer equipped with bulkhead fitting and length of electrical cable. Remote end of electrical cable may be outfitted with water proof connector. Mating connector with electrical cable available separately as part number **10424-xM** where 'x' is length of electrical cable in meters.

BASIC CONFIGURATION (FOR ALL RANGES)

HX-PA-50-S10-N0S-1BC

7 INGRESS PROTECTION
1..... IP-65 (NEMA 4)
2..... IP-68 (NEMA 6)
3..... IP-68 (NEMA 6) Corrosion Resistant Construction

8 IP-65-NEMA 4 CONNECTOR
B..... 6 Pin 3102E Body Mounted Connector
IP-68-NEMA 6 ELECTRICAL CABLE
P..... Bulkhead Fitting w/ 0.3m (12") Electrical Cable
3..... Bulkhead Fitting w/ 3m (10') Electrical Cable
4..... Bulkhead Fitting w/ 4m (13.5') Electrical Cable
5..... Bulkhead Fitting w/ 5m (16.5') Electrical Cable
6..... Bulkhead Fitting w/ 6m (20') Electrical Cable
7..... Bulkhead Fitting w/ 7m (23') Electrical Cable

9 IP-65-NEMA 4 MATING CONNECTOR
C..... IP-65 Mating Connector Included
K..... IP-65 Mating Connector Omitted*
*Electrical cable with mating connector may be ordered separately as part number **10119-xM** where 'x' is the length required in meters.

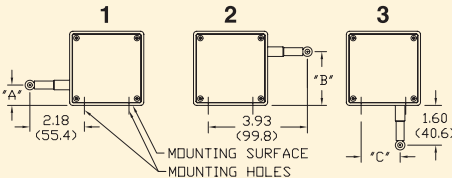
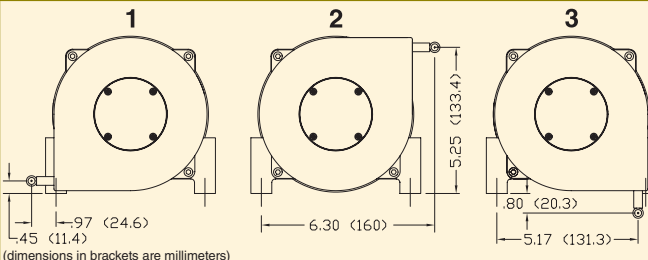
IP-68-NEMA 6 CABLE MOUNTED CONNECTOR
N..... No connector on end of electrical cable
K..... IP-68 Cable to cable connector with no mating connector**
Electrical cable with mating connector may be ordered separately as part number **10424-xM where 'x' is the length required in meters. Mating connector alone unavailable.

HX SERIES

SUPPLEMENTAL DATA



OPTION DESCRIPTIONS

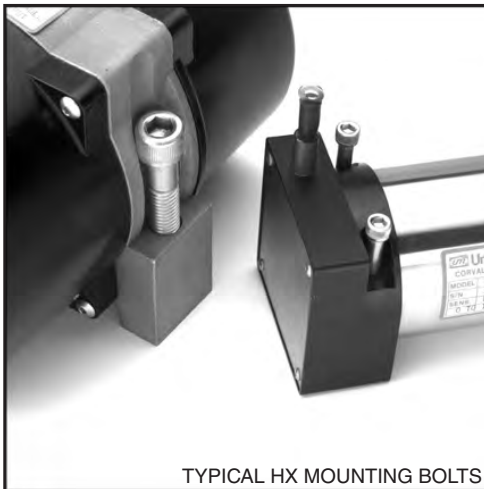
OPTION	OPTION DESIGNATOR	DESCRIPTION																												
WIRE ROPE	N	Replaces standard stainless steel wire rope with Ø.018 nylon jacketed wire rope. This option increases wire rope life dramatically but may increase non-linearity by as much as ±.05% of full scale.																												
NYLON JACKETED WIRE ROPE RANGES TO 80" ONLY																														
NYLON JACKETED WIRE ROPE RANGES 100" TO 500" ONLY	J	Replaces standard stainless steel wire rope with Ø.037 nylon jacketed wire rope.																												
WIRE ROPE EXIT DIRECTION	1, 2, 3	 <table><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> (dimensions in brackets are millimeters)	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"																										
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ALTERNATE WIRE ROPE EXIT RANGES TO 80" (2.0 m)																														
ALTERNATE WIRE ROPE EXIT RANGES 100" (2.5 m) and GREATER	1, 2, 3	 (dimensions in brackets are millimeters)																												
POTENTIOMETER VALUE	2, 3, 4	Non-standard potentiometer linearity is as follows: <table><thead><tr><th>RANGE</th><th>LINEARITY</th></tr></thead><tbody><tr><td>5" and Below</td><td>±1.00% of full scale</td></tr><tr><td>10" to 25"</td><td>±0.50% of full scale</td></tr><tr><td>30" and above</td><td>±0.25% of full scale</td></tr></tbody></table> Note: This option is subject to potentiometer availability.	RANGE	LINEARITY	5" and Below	±1.00% of full scale	10" to 25"	±0.50% of full scale	30" and above	±0.25% of full scale																				
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NON-STANDARD POTENTIOMETER APPLIES TO HX-PA & HX-VPA ONLY																														
ELECTRICAL OUTPUT POLARITY	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.																												
REVERSED OUTPUT																														
INGRESS PROTECTION	2	 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.																												
NEMA 6, IP-68 CAPABILITY																														
CORROSION RESISTANT CONSTRUCTION	3	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 on unit. 																												

HX SERIES

SUPPLEMENTAL DATA



MECHANICAL SPECIFICATIONS



TYPICAL HX MOUNTING BOLTS

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	MS3106E-14S-6S
Optional NEMA 6 Capability	Bulkhead fitting with shielded twisted pair cable

Life⁽¹⁾

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

NOTES:

1. 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

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-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

HX SERIES

SUPPLEMENTAL DATA



DIMENSIONAL INFORMATION

HX SERIES | RANGES 80" (2 m) OR LESS

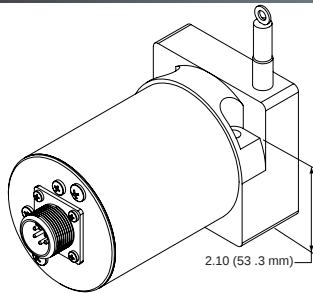


FIG. 1

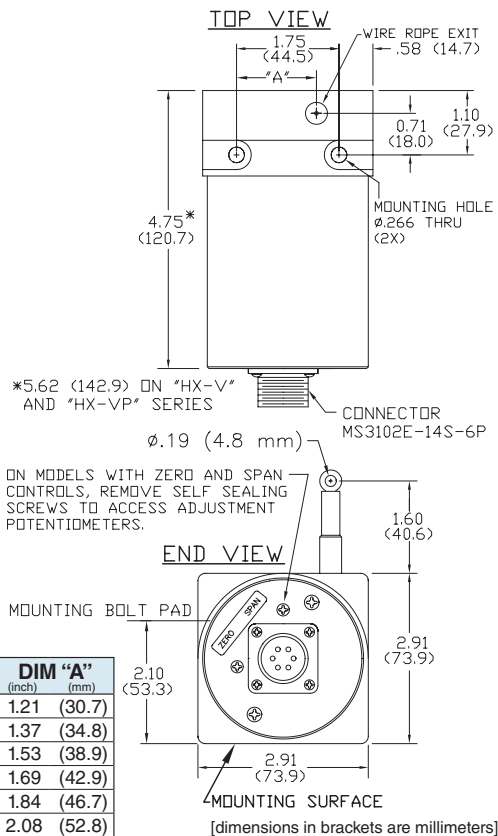


TABLE 13

RANGE	DIM "A"
(inch)	(mm)
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)

NOTES:

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

TABLE 14

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

NOTES:

- Transducer mounts with Ø.50 or M12 socket head cap bolts.
- 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.

HX SERIES | RANGES GREATER THAN 80" (2 m)

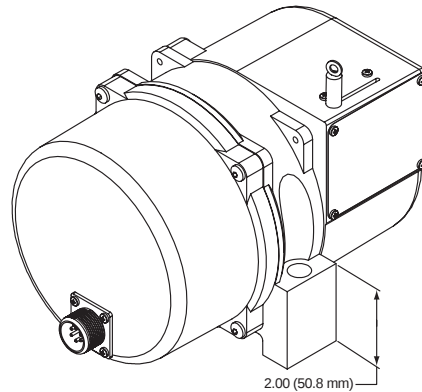
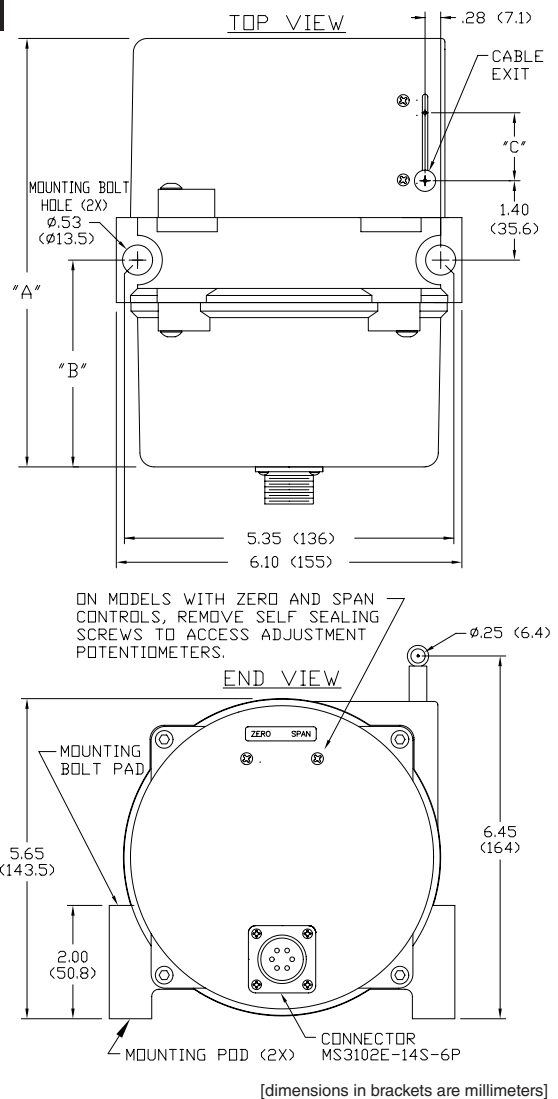


FIG. 2



We are here for you. Addresses and Contacts.

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