

HX-PA

Long Range Ratiometric Voltage Output



Utilizing a precision potentiometer, the **UniMeasure 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 30 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 ±0.25% Full Scale
10", 15", 20" & 25" Ranges ±0.15% Full Scale
All other ranges ±0.10% Full Scale
Repeatability ±0.015% Full Scale
Resolution Essentially Infinite
ENVIRONMENTAL
Operating temperature40°C to +95°C
Storage Temperature55° 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)

ELECTRICAL



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

MODEL NUMBER CONFIGURATION

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

НХ-РА		BASIC CONFIGURATION (FOR ALL RANGES)
0 1		HX-PA-50-S10-N1S-1BC
RANGE Select Measurement Range From Supplemental Da Table 12 12 (next page), Insert Corresponding Measurement Range Designator WIRE ROPE S Stainless Steel (See Supplemental Data, Table 12) N	 NRequired Designator POTENTIOMETER VALUE I1K ohm I1K ohm I10K ohm* I10K ohm* Vot Available Ranges 2" to 6" See Supplemental Data for Linearity Option ELECTRICAL OUTPUT POLARITY Standard (increasing output as wire rope is extended) RReversed (decreasing output as wire rope is extended) 	 INGRESS PROTECTION IP-65 (NEMA 4) IP-68 (NEMA 6) IP-68 (NEMA 6) Corrosion Resistant Construction IP-65-NEMA 4 CONNECTOR 6 Pin 3102E Body Mounted Connector IP-68-NEMA 6 ELECTRICAL CABLE Builkhead Fitting w/ 0.3m (12") Electrical Cable Builkhead Fitting w/ 3m (10') Electrical Cable Builkhead Fitting w/ 5m (16.5') Electrical Cable Builkhead Fitting w/ 5m (16.5') Electrical Cable Builkhead Fitting w/ 5m (20') Electrical Cable
Wirke ROPE TENSION I Standard Z Standard Wirke ROPE EXIT DIRECTION Use Number designators shown RANGES TO 80° (2000 mm) D	NOTES FOR OPTION BOXES (),), and) IP-65 (NEMA 4): Transducer equipped with body mound Mating connector with electrical cable available separately as provide the electrical cable. Remote electrical cable in meters IP-68 (NEMA 6): Transducer equipped with bulkher of electrical cable may be outfitted with water proof connector Mating connector with electrical cable available separately as provide electrical cable in meters Mating connector with electrical cable available separately as provide electrical cable electrical cabl	Pe65-NEMA 4 MATING CONNECTOR CIP-65 Mating Connector Included KIP-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 NNo connector on end of electrical cable KIP-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.



HX-PB

ong Range Brindge Voltage Output



The UniMeasure HX-PB Series transducer includes the sensing potentiometer in a bridge circuit with adjustable zero and span controls. The completely passive circuit gives a maximum output voltage at maximum span setting of approximately 18% of the input voltage. The span adjustment allows for easy interface to a bridge amplifier. With zero position adjustable to anywhere within the total range of the transducer, voltage output is positive when extending the wire rope from the selected zero position and is negative when retracting from zero.



FOOTNOTES TO SPECIFICATIONS

Supplemental Data section located at end of HX Series pages

Measurement Ranges	
Sensing Device	Precision Potentiometer
Connector	MS3102E-14S-6P
Mating Connector (included) MS3106E-14S-6S
PERFORMANCE	, ,
Linearity	
2", 3", 4", 5" & 6"Ranges	±0.25% Full Scale
10", 15", 20" & 25" Ranges	s ±0.15% Full Scale
All other ranges	±0.10% Full Scale
Repeatability	±0.015% Full Scale
Resolution	Essentially Infinite
ENVIRONMENTAL	
Thermal Coefficient of Sensing Ele	ment ±100 PPM/°C Max.
Operating Temperature	40°C to +95°C
Operating Humidity	100%
Vibration	15 G's 0.1 ms max.
Shock	50 G's 0.1 ms max.
INGRESS PROTECTION (E>	clusive of Wire Rope Area)
Standard	IP-65 (NEMA 4)
Optional	IP-68 (NEMA 6)

ELECTRICAL

Input Impedance	.1.25ΚΩ
Output Impedance	.1.25KΩ at max span setting
	14.4KΩ @ 51% max. span setting
Excitation Voltage	.30 Volts Max. AC or DC
Output Voltage	User adjustable to a maximum of
	18% of Input Voltage



MODEL NUMBER CONFIGURATION BASIC CONFIGURATION (FOR ALL RANGES) HX-PB- $\overline{1}\overline{2}\overline{3}$ 4 5 6 $\overline{(7)}$ $\overline{(8)}$ $\overline{(9)}$ 0 HX-PB-50-S10-N0S-1BC 0 RANGE 4 N......Required Designator **(7)** INGRESS PROTECTION Select Measurement Range From . IP-65 (NEMA 4) 5 0.....Required Designator Supplemental Da Table 12 12 (next page), Insert Corresponding IP-68 (NEMA 6) 3 . IP-68 (NEMA 6) Corrosion Resistant Construction 6 ELECTRICAL OUTPUT POLARITY Measurement Range Designator ..Standard (increasing output (8) IP-65–NEMA 4 CONNECTOR S. WIRE ROPE as wire rope is extended) T B..... 6 Pin 3102E Body Mounted Connector Reversed (decreasing output S Stainless Steel (See Supplemental Data, Table 12) **IP-68-NEMA 6 ELECTRICAL CABLE** as wire rope is extended) Р ... Bulkhead Fitting w/ 0.3m (12") Electrical Cable N.....Ø.018 (0,45 mm) Nylon Jacketed Stainless Steel Ranges to 80" (2m) only. (formerly NJC) .. Bulkhead Fitting w/ 3m (10') Electrical Cable Bulkhead Fitting w/ 4m (13.5') Electrical Cable .. Bulkhead Fitting w/ 5m (16.5') Electrical Cable .Ø.037 (0.94 mm) Nylon Jacketed Stainless Steel Ranges 100" (2.5m) to 500" (12.7m) only. . Bulkhead Fitting w/ 6m (20') Electrical Cable . Bulkhead Fitting w/ 7m (23') Electrical Cable 2 WIRE ROPE TENSION (9) IP-65–NEMA 4 MATING CONNECTOR Standard NOTES FOR OPTION BOXES (7), (8), and (9) IP-65 Mating Connector Included C. . Reduced (Ranges to 80" only) IP-65(NEMA 4): Transducer equipped with body mounted mounted with or without mating connector. Mating connector with electrical cable available separately as part .. IP-65 Mating Connector Omitted* к WIRE ROPE EXIT DIRECTION *Electrical cable with mating connector may be ordered separately as part number **10119-xM** where 'x' is the length required in meters. (3) Use Number designators shown RANGES TO 80° (2000 mm) number 10119-xM where 'x' is length of electrical cable in meters. IP-68-NEMA 6 CABLE MOUNTED CONNECTOR IP-68^{(NEMA 6):} Transducer equipped with bulkhead of electrical cable. Remote end of electrical cable may be outfitted with water proof connector. Mating connector with electrical cable available separately as part N.....No connector on end of electrical cable 2 2 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 (e number 10424-xM where 'x' is length of electrical cable in meters. required in meters. Mating connector alone unavailable



HX-P420

Long Range 4-20 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.



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MODEL NUMBER CONFIGURATION

GE	INERAL		ELECTRICAL	
N	leasurement Ranges		Output	User Adjustable 4 to 20 mA
S	ensing Device	Precision Potentiometer	Excitation Volta	age9 to 35 VDC
С	onnector	MS3102E-14S-6P	Min. Supply Vol	Itage(.02 x Load Res.) + 9 VDC
N	lating Connector (included)	MS3106E-14S-6S	Insulation Resis	stance100 Megohms min. at 100 VDC
PE	RFORMANCE		Adjustment Rar	nge
L	inearity		4 mA	0 to 30% of Range
	2". 3". 4". 5" & 6"Ranges	±0.30% Full Scale	20 mA	
	10", 15", 20" & 25" Ranges	±0.20% Full Scale	Protection	Reversed Polarity
	All other ranges			, , , , , , , , , , , , , , , , , , ,
B	epeatability	+0.015% Full Scale	Intrinsic Safety (Optional):
B	esolution	Essentially Infinite	Class 1, Div 1, G	Groups A,B,C,D C(VL)us
EN	IVIRONMENTAL		Class 2, Groups	E, F, G
TI	hermal Coefficient of Sensing Elemen	t±100 PPM/°C Max.	Class III hazardo	ous locations
C	perating Temperature	-40°C to +95°C		
Õ	perating Humidity	100%	LOAD RESISTANCE VS IN	PUT VOLTAGE CONNECTION DIAGRAM
v	ibration	15 G's 0.1 ms max		
s	hock	50 G's 0 1 ms max	를 1300- 5 1200-	+Vin A 4-20 mA
IN	GRESS PROTECTION (Exclu	sive of Wire Bone Area)	≪ 1000- ⊎ 800 -	
S	tandard	IP-65 (NEMA 4)	AT LSS	
0	notional	IP-68 (NEMA 6)	9 200 -	
C			9 0 10 15 20 2	25 30 35 E POIENIIOMEIER
FO	OTNOTES TO SPECIFICATIONS		SUPPLY VOLTAN VMN = .02R	AGE, V
1.	Supplemental Data section located at	end of HX Series pages.		
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	IX-P420-		7 8 9	BASIC CONFIGURATION (FOR ALL RANGES) HX-P420-50-S10-N0S-1BC
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0	RANGE Supplemental Da[Table 12] 12 (next page), Insert Corresponding	1 2 3 4 5 6 HAZARDOUS AREA PROTECTION NNone XUL, CSA Intrinsically Safe Function antichle for presentation		BASIC CONFIGURATION (FOR ALL RANGES) HX-P420-50-S10-N0S-1BC INGRESS PROTECTION 1IP-65 (NEMA 4) 2IP-65 (NEMA 6) 3IP-68 (NEMA 6) Corrosion Besistant Construction
	IX-P420-	1 2 3 4 5 6 HAZARDOUS AREA PROTECTION NNone XUL, CSA Intrinsically Safe "X" Option available for measuremen ranges to 800" maximum.	T 8 9	BASIC CONFIGURATION (FOR ALL RANGES) HX-P420-50-S10-N0S-1BC 7 INGRESS PROTECTION 1
	RANGE Select Measurement Range From Supplemental Da Table 12 12 (next page), Insert Corresponding Measurement Range Designator	1 2 3 4 5 6 HAZARDOUS AREA PROTECTION NNone XUL, CSA Intrinsically Safe "X" Option available for measuremen ranges to 800" maximum.	7 8 9 CULUSTED LUSTED 44TU Eria	BASIC CONFIGURATION (FOR ALL RANGES) HX-P420-50-S10-N0S-1BC 7 INGRESS PROTECTION 1
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	IX-P420- EXANGE Select Measurement Range From Supplemental Dd[Table 12] 12 (next page), Insert Corresponding Measurement Range Designator WIRE ROPE SStainless Steel (See Supplemental Data, Table 12) NQ.018 (0,45 mm) Model Control Reference Text	1 2 3 4 5 6 HAZARDOUS AREA PROTECTION NNone XUL, CSA Intrinsically Safe "X" Option available for measuremen ranges to 800" maximum. 5 0Required Designator 6 ELECTRICAL OUTPUT POLA SStandard (increasing output as win	T 8 9	BASIC CONFIGURATION (FOR ALL RANGES) HX-P420-50-S10-N0S-1BC INGRESS PROTECTION 1
	IX-P420- Select Measurement Range From Supplemental Databel 12 12 (next page), Insert Corresponding Measurement Range Designator WIRE ROPE SStainless Steel (See Supplemental Data, Table 12) N	1 2 3 4 5 6 (4) HAZARDOUS AREA PROTECTION NNone NUL, CSA Intrinsically Safe "X" Option available for measuremen ranges to 800" maximum. 5 0Required Designator 6 ELECTRICAL OUTPUT POLA SStandard (increasing output as wir R	T B S t C U US LISTED 4 C U US LISTED 4 4 4 4 4 4 4 4 4 4 4 4 4	ASIC CONFIGURATION (FOR ALL RANGES) HX-P420-50-S10-NOS-1BC Imgress PROTECTION 1
	RANGE Select Measurement Range From Supplemental Dd[Table 12] + 12 (next page), Insert Corresponding Measurement Range Designator WIRE ROPE SStainless Steel (See Supplemental Data, Table 12) Nylon Jacketed Stainless Steel Ranges te 80° (20) only, (formerly NJC) Panges te 80° (20) only, (formerly NJC) J 0.037 (0,94 mm)	1 2 3 4 5 6 (4) HAZARDOUS AREA PROTECTION NNone NUL, CSA Intrinsically Safe "X" Option available for measurement ranges to 800" maximum. 5 0Required Designator (6) ELECTRICAL OUTPUT POLA SStandard (increasing output as with RReversed (decreasing outputs with R	T B S S t USTED t USTE	ASIC CONFIGURATION (FOR ALL RANGES) HX-P420-50-S10-NOS-1BC Imgress Protection 1
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	RANGE Select Measurement Range From Supplemental Databe 12 12 (next page), Insert Corresponding Measurement Range Designator WIRE ROPE S Stainless Steel (See Supplemental Data, Table 12) N Q0.18 (0.45 mm) Nylon Jacketed Stainless Steel Ranges 100 (29m) only. (formerly NJC) J Q0.37 (0.94 mm) Nylon Jacketed Stainless Steel Ranges 100 (2.9m) to 500" (12.7m) only.	A constraint of the second secon	TO B S TO S TO B S TO	ASIC CONFIGURATION (FOR ALL RANGES) HX-P420-50-S10-NOS-1BC INGRESS PROTECTION 1IP-65 (NEMA 4) 2P-68 (NEMA 6) 3IP-68 (NEMA 6) 3IP-68 (NEMA 6) IP-65-NEMA 4 CONNECTOR B
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0 1 2 3	RANGE Select Measurement Range From Supplemental Datable 12 12 (next page), Insert Corresponding Measurement Range Designator VIRE ROPE S Stainless Steel (See Supplemental Data, Table 12) N Q.018 (0.45 mm) Nylon Jacketed Stainless Steel Ranges to 80° (200) only. (formerly NJC) J Q.037 (0,94 mm) Nylon Jacketed Stainless Steel Ranges 100° (25m) to 500° (12.7m) only. VIRE ROPE TENSION 1 Standard 2 Reduced (Ranges to 80° only) VIRE ROPE EXIT DIRECTION Use Number designators shown RANGES TO 80° (2000 mm)	A constraints of the electrical cable may be outfling and length of electrical cable may be outfling and length of electrical cable may be outfling and length of electrical cable may be outfling of electri	() () () () () () () () () () () ()	ASIC CONFIGURATION (FOR ALL RANGES) HX-P420-50-S10-NOS-1BC INGRESS PROTECTION 1IP-65 (NEMA 4) 2IP-68 (NEMA 6) 3IP-68 (NEMA 6) 3IP-68 (NEMA 6) 3IP-68 (NEMA 6) 3IP-68 (NEMA 6) Corrosion Resistant Construction IP-65-NEMA 4 CONNECTOR B6 Pin 3102E Body Mounted Connector IP-68-NEMA 6 ELECTRICAL CABLE PBulkhead Fitting w/ 0.3m (12') Electrical Cable 3Bulkhead Fitting w/ 0.3m (12') Electrical Cable 5Bulkhead Fitting w/ 6m (20') Electrical Cable 5Bulkhead Fitting w/ 6m (20') Electrical Cable 7Bulkhead Fitting w/ 6m (20') Electrical Cable 7Bulkhead Fitting w/ 7m (23') Electrical Cable 7Bulkhead Fitting w/ 10') Silectrical Cable 7Bulkhead Fitting w/ 10') Silectrical Cable 7Bulkhead Fitting w/ 7m (23') Electrical Cable 7Bulkhead Fitting w/ 7m (23') Electrical Cable 7Bulkhead Fitting w/ 10') Silectrical Cable 7Bulkhead Fitting w/ 7m (23') Electrical Cable
0 1 3	RANGE Select Measurement Range From Supplemental Databel 12 12 (next page), Insert Corresponding Measurement Range Designator VIRE ROPE S Stainless Steel (See Supplemental Data, Table 12) N Stainless Steel Ranges to 80° (2m) only (formerly NJC) J	 Image: A state of the state of	() () () () () () () () () () () ()	BASIC CONFIGURATION (FOR ALL RANGES) HX-P420-50-S10-NOS-1BC INGRESS PROTECTION 1



HX-P510

Long Range Analog Output

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The UniMeasure HX-P510 Series transducer offers a voltage output with wide adjustability to give a 0 to 5, 0 to 10, ±5 or ±10 VDC output. The device may be powered with an unregulated voltage in the range of 4.9 to 30 VDC. Zero and span adjustment potentiometers are readily accessible. With the zero position set anywhere within the first 30% of total travel, the span may be adjusted to give a full 0 to 5 or 0 to 10 VDC output with the span set anywhere within the last 20% of travel. Alternatively, the zero position may be set anywhere between 10% and 90% of full travel to give an output of ±5 or ±10 VDC with the span set between 50% to 100% of the longest travel from the zero position.



IP-68–NEMA 6 ELECTRICAL CABLE

(9) IP-65–NEMA 4 MATING CONNECTOR

..... IP-65 Mating Connector Included

... IP-65 Mating Connector Omitted*

N.....No connector on end of electrical cable

6. 7

C.

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P Bulkhead Fitting w/ 0.3m (12") Electrical Cable

... Bulkhead Fitting w/ 3m (10') Electrical Cable 4..... Bulkhead Fitting w/ 4m (13.5') Electrical Cable

....... Bulkhead Fitting w/ 5m (16.5') Electrical Cable

. Bulkhead Fitting w/ 7m (23') Electrical Cable

...... Bulkhead Fitting w/ 6m (20') Electrical Cable

*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

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

SPECIFICATIONS

S Stainless Steel (See Supplemental Data, Table 12)

Nylon Jacketed Stainless Steel Ranges to 80" (2m) only. (formerly NJC)

Nylon Jacketed Stainless Steel Ranges 100" (2.5m) to 500" (12.7m) only.

... Reduced (Ranges to 80" only)

WIRE ROPE EXIT DIRECTION

Use Number designators shown RANGES TO 80° (2000 mm)

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3

N.....Ø.018 (0,45 mm)

2 WIRE ROPE TENSION

...... Standard

(3)

..Ø.037 (0.94 mm)

G	ENERAL	ELECTRICAL	
ŀ	Available Measurement RangesSee Supplemental Data ^[1] , Table	12 Output0 to 5 or 10 VDC, ±5 or ±10) VDC
5	Sensing DevicePrecision Potentiometer	Excitation Voltage4.9 to 30 VDC	
(ConnectorMS3102E-14S-6P	Excitation Current	
Ν	Mating Connector (included)MS3106E-14S-6S	Output Impedance10Ω max.	
PI	ERFORMANCE	Output Load5KΩ min.	
L	Linearity	ADJUSTMENT RANGE-0 to 5 or 0 to 10 VDC	
	2", 3", 4", 5" & 6"Ranges±0.30% Full Scale	Zero0 to 30% of Range	
	10", 15", 20" & 25" Ranges±0.20% Full Scale	Span	
	All other ranges±0.15% Full Scale	ADJUSTMENT RANGE-±5 or ±10 VDC	
F	Repeatability±0.015% Full Scale	Zero10% to 90% of Range	
F	ResolutionEssentially Infinite	Span	ossible
El	NVIRONMENTAL	Travel from Zero Position	
(Operating temperature40°C to +85°C	ProtectionReversed Polarity	
5	Storage Temperature55° to +100°C	Temperature Stability0.02%/°C of Span	
(Operating humidity100%		
\	/ibration15 G's 0.1 ms max.		
5	Shock50 G's 0.1 ms max.	CONNECTION DIAGRAM	
IN	IGRESS PROTECTION (Exclusive of Wire Rope Area)		
5	StandardIP-65 (NEMA 4)		
(OptionalIP-68 (NEMA 6)		
FO	DOTNOTES TO SPECIFICATIONS	F POTENTIOMETER	
_1.	Supplemental Data section located at end of HX Series pages.		
	NODEL NUMBER CONFIGURATION		
н	IX-P510		RANGES)
		HX-P510-50-S10-N0S-1B	J
0	RANGE	ed Designator 7 INGRESS PROTECTION	
	Select Measurement Range From	1 IP-65 (NEMA 4)	
	Supplemental Datable 12 12 5 0	20 Designator 2 IP-68 (NEMA 6)	
	(next page), insert Corresponding Measurement Bange Designator	OUTPUT POLARITY	onstruction
	SStanda	ard (increasing output 8 IP-65–NEMA 4 CONNECTOR	
	WIRE ROPE as wire	B 6 Pin 3102E Body Mounted Connecto	r

Reversed (decreasing output

IP-65(NEMA 4): Transducer equipped with body mounted Mating 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.

as wire rope is extended)

NOTES FOR OPTION BOXES (7), (8), and (9)

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



HX-EP Position Transducer

Utilizing an incremental encoder as the sensor, the **UniMeasure HX-EP Series** position transducer provides a two channel square wave current sinking output signal in quadrature. The standard output is a single-ended TTL compatible square. The resolution values shown in the specifications table indicate resolution for times 1 counting mode where a count is registered for one up transition in channel A. With interface electronics capable of times 2 or times 4 counting mode, a true resolutional increase of 2 or 4 may be obtained. For example, the HX-EP-50 has a resolution of approximately .004" per count in times 1 counting mode whereas the resolution is approximately .001" per count in times 4 counting mode.

The actual resolution of a HX-EP transducer differs from unit to unit because of tolerances associated with the wire rope diameter and the capstan upon which the wire rope winds. The nylon jacketed wire rope option will have the effect of slightly reducing the resolution. Linearity and repeatability remain independent of resolution. In applications where the output count is interpreted as a percentage of total travel, resolutional differences from



um

UniMeasure

unit to unit are not critical. However, in applications where the digital output is to be interfaced to a digital display to give an output in engineering units, the calibration constant supplied with the transducer may be used to calculate a suitable scale multiplier to produce the correct engineering units. Alternative outputs shown in the Electrical Outputs table below are available to facilitate interfacing to a variety of different types of equipment.

SPECIFICATIONS

GENERAL

GENERAL	
Connector	. MS3102E-14S-6P
Mating Connector	. MS3106E-14S-6S
Available Measurement Ranges	. See Supplemental Data ^[1] , Table 12
PERFORMANCE	
Linearity	. ±0.03% Full Scale
Repeatability	. ±0.015% Full Scale
Resolution	. See Table 9
ENVIRONMENTAL	
Operating temperature	20°C to +95°C
Storage temperature	40°C 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 Wir	re Rope Area)
Standard	. IP-65 (NEMA 4)
Optional	. IP-68 (NEMA 6)
ELECTRICAL	
Input Voltage	. +5 VDC ±5% or 8-28 VDC
Input Current	. 125 mA Maximum
Output	. Two channel TTL square wave
Phase Quadrature	. 90°±20°

TABLE 9-RESOLUTION					
MODEL	RA	NGE	RESOLU	JTION ^[2]	RESOLUTION
MODEL	inch	metric	counts/inch	counts/	TOLERANCE ^[2]
HX-EP-10	10	250 mm	500.0	19.69	±0.30%
HX-EP-25	25	640 mm	250.0	9.84	±0.20%
HX-EP-50	50	1250 mm	250.0	9.84	±0.20%
HX-EP-60	60	1.5 m	205.8	8.10	±0.20%
HX-EP-80	80	2.0 m	155.2	6.11	±0.20%
HX-EP-100	100	2.5 m	82.9	3.26	±0.20%
ALL RANGES GREATER THAN 100"	100	2.5 m	82.9	3.26	±0.20%

ELECTRICAL OUTPUT

For electrical output description, waveform and wiring, See Standard Series Supplemental Data, TABLE 8, Page 29.

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

 Supplemental Data section located at end of HX Series pages.
 The resolution shown is a calculated number based upon the capstan diameter, wire rope diameter and line count of the encoding device. The tolerance on the resolution accounts for resolutional differences from unit to unit due to manufacturing tolerances on the capstan and wire rope. In practice, the output count in a given unit of travel is an integer.

MODEL NUMBER CONFIGURATION

BASIC CONFIGURATION HX-EP-(FOR ALL RANGES) \bigcirc HX-EP-50-S10-N10-1BC () RANGE 4 N.....Required Designator $(\mathbf{7})$ INGRESS PROTECTION Select Measurement Range From IP-65 (NEMA 4) 5 ELECTRICAL OUTPUT Supplemental Da Table 12 e 12 IP-68 (NEMA 6) 10......5 VDC TTL Compatible, Two Channel (next page), Insert Corresponding IP-68 (NEMA 6) Corrosion Resistant Construction 30......5 VDC Push-Pull Differential Line Drive Measurement Range Designator **IP-65–NEMA 4 CONNECTOR** (8)8 to 28 VDC Current Sinking Two Channel WIRE ROPE 70... ...8 to 28 VDC Push-Pull Differential Line Drive в..... ... 6 Pin 3102E Body Mounted Connector S Stainless Steel (See Supplemental Data, Table 12) IP-68-NEMA 6 ELECTRICAL CABLE For Description See TABLE 8 on next page .. Bulkhead Fitting w/ 0.3m (12") Electrical Cable N.....Ø.018 (0,45 mm) Bulkhead Fitting w/ 3m (10') Electrical Cable Nylon Jacketed Stainless Steel Ranges to 80" (2m) only. (formerly NJC) Bulkhead Fitting w/ 4m (13.5') Electrical Cable **J**......Ø.037 (0,94 mm) Bulkhead Fitting w/ 5m (16.5') Electrical Cable Nylon Jacketed Stainless Str . Bulkhead Fitting w/ 6m (20') Electrical Cable Ranges 100" (2.5m) to 500" (12.7m) only. . Bulkhead Fitting w/ 7m (23') Electrical Cable 2 WIRE ROPE TENSION (9) IP-65-NEMA 4 MATING CONNECTOR 1..... Standard NOTES FOR OPTION BOXES (7, 8, and 9) C..... IP-65 Mating Connector Included 2...... Reduced (Ranges to 80" only) 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 .. IP-65 Mating Connector Omitted* 3 WIRE ROPE EXIT DIRECTION *Electrical cable with mating connector may be ordered separately as part number 10119-xM where 'x' is the length Use Number designators shown number 10119-xM where 'x' is length of electrical cable in meters required in meters RANGES TO 80* 00 mm) **IP-68–NEMA 6 CABLE MOUNTED CONNECTOR** .. No connector on end of electrical cable **IP-68**(NEMA 6): Transducer equipped with bulkhead fitting and length of electrical cable. Remote end Ν. .IP-68 Cable to cable connector with **NO** mating connector** κ. of electrical cable may be outfitted with water proof connector. Mating connector with electrical cable available separately as part **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. number 10424-xM where 'x' is length of electrical cable in meters.







ADDITIONAL OPTIONS

TABLE 8

EP, HX-EP SERIES OPTIONAL ELECTRICAL OUTPUTS

OPTION	OUTPUT DESCRIPTION	OUTPUT STAGE	WAVEFORM	CONNECTOR WIRING
10	5 VDC Current Sinking 5 VDC TTL compatible output. Input Voltage: 5 VDC.	AM28C3 - Vout	<u>^┢╪╋<u>┙</u>┛╤╋</u>	A +Vin B COMMON C CHANNEL A
50	8 to 28 VDC Current Sinking Current sinking output with $10K\Omega$ internal pullup resistors. Input Voltage: 8 to 28 VDC.	+8 to +28 VDC 10ΚΩ 	[₿] ┝╃ <u>╵</u> ┡┿┩╵┡┿┩╵┐	D CHANNEL B E F
30	5 VDC Push-Pull Differential Line Drive Push-Pull, current sourcing and current sinking output. Output is compliant with requirements of TIA/EIA-422-B. Input Voltage: 5 VDC input.	AM26C31-Vout		A +Vin B COMMON C CHANNEL A
70	8 to 28 VDC Push-Pull Differential Line Drive Push-Pull, current sourcing and current sinking output. Input Voltage: 8 to 28 VDC.		┋╞┨┚╪┫┚╪┫┚	D CHANNEL A E CHANNEL B F CHANNEL B

MECHANICAL SPECIFICATIONS



AVAILABLE MEASUREMENT RANGES CONSTRUCTION	See Table 12
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.



HX-V Linear Velocity Transducer

The **UniMeasure HX-V Series** linear velocity transducer incorporates a self-generating tachometer which eliminates the need for any external power supply. Extra long brush life, excellent stability and a wide operating temperature range make the V series transducer highly reliable for long term service.



SPECIFICATIONS

GENERAL	
Available Measurement Ranges	See Supplemental Data ^[1] , Table 12
Connector	MS3102E-14S-6P
Mating Connector	MS3106E-14S-6S
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 \	Nire Rope Area)
Standard	IP-65 (NEMA 4)
Optional	IP-68 (NEMA 6)
ELECTRICAL	
Output	See Table 10
Linearity	±0.10% F.S. with 10 VDC Max Output
Ripple	3% Max.
Input	None Required; Self Generating
Output Impedance	350Ω
Thermal Effects	0.01% Max. per Degree C
	through Range -20°C to 75°C

TABLE 10-VELOCITY OUTPUT				
MEASUREMENT	VELOCITY OUTPUT			
DESIGNATOR	mV/in/sec	mV/cm/sec		
2, 10	200	78		
3, 15, 30	136	53		
4, 20, 40	103	40		
5, 25, 50	82	32		
6, 60	69	27		
80	52	20		
100	180	71		
ALL RANGES GREATER THAN 100"	180	71		



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

MODEL NUMBER CONFIGURATION							
HX-V 3		BASIC CONFIGURATION (FOR ALL RANGES) HX-V-50-S10-N0S-1BC					
RANGE Select Measurement Range From Supplemental DdTable 12b 12 (next page), Insert Corresponding Measurement Range Designator WIRE ROPE SStainless Steel (See Supplemental Data, Table 12) NO118 (0,45 mm) Nylon Jacketed Stainless Steel Ranges to 80° (2m) only, (formerly NJC) JO137 (0,94 mm) Nylon Jacketed Stainless Steel Ranges 100° (2.5m) to 500° (12.7m) only.	 NRequired Designator 0Required Designator SRequired Designator 	 INGRESS PROTECTION IIP-65 (NEMA 4) IP-65 (NEMA 6) IP-68 (NEMA 6) Corrosion Resistant Construction IP-65–NEMA 4 CONNECTOR 6 Pin 3102E Body Mounted Connector IP-68–NEMA 6 ELECTRICAL CABLE Bulkhead Fitting w/ 0.3m (12") Electrical Cable Bulkhead Fitting w/ 3m (10") Electrical Cable Bulkhead Fitting w/ 4m (13.5") Electrical Cable Bulkhead Fitting w/ 5m (16.5") Electrical Cable Bulkhead Fitting w/ 5m (16.5") Electrical Cable Bulkhead Fitting w/ 5m (20") Electrical Cable 					
WIRE ROPE LENSION Standard Standard	NOTES FOR OPTION BOXES (), (), (), and () IP-65 ^(NEMA 4) : Transducer equipped with body m Mating connector with electrical cable available separately number 10119-xM where 'x' is length of electrical cable in IP-68 ^(NEMA 6) : Transducer equipped with bu of electrical cable may be outfitted with water proof cor Mating connector with electrical cable available separately number 10424-xM where 'x' is length of electrical cable in	P - 65 - NEMA 4 MATING CONNECTOR CIP-65 Mating Connector Included KIP-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 NNo connector on end of electrical cable KIP-68 Cable to cable connector with NO mating connector* **Electrical cable with mating connector may be ordered separately as part number 1042-XM where 'x' is the length required in meters.					



The **UniMeasure HX-VP Series** combines a self-generating tachometer and a precision potentiometer to give an output of both velocity and analog position. Standard position output is ratiometric voltage. Optionally available position outputs include ratiometric voltage from a bridge circuit, 4 to 20 mA, 0 to 10 VDC, and ± 10 VDC. See HX-PB, HX-P420 and HX-P510 data sheets for electrical specifications.



SPECIFICATIONS

FOR HX-VPB, HX-VP420 AND HX-VP510 SERIES SPECIFICA	ATIONS, SEE HX-PB, HX-P420, AND HX-P510	SERIES PAGES.			
GENERAL Available Measurement Ranges Mating Connector MS3102A-14S-6P Mating Connector MS3106E-14S-6S PERFORMANCE Positional Linearity (HX-VPA Only) 2", 3", 4" & 5" Ranges ±0.25% Full Scale 10", 15", 20" & 25" Ranges ±0.15% Full Scale All other ranges ±0.015% Full Scale Repeatability ±0.015% Full Scale Partilical Dack tion	ELECTRICAL (Position) iable 12 Input Impedance ("A" Circuit) Output Impedance ("A" Circuit) Excitation Voltage Output Voltage Change Over Full Range of Transducer ELECTRICAL (Velocity) Output Linearity Ripple Output Impedance.	AC or DC f Excitation th 10 VDC	: n Voltage Max Output		
ENVIRONMENTAL					
Thermal Coeff of potentiometer ±100 PPM/°C max. Operating temperature		IABLE 11-VEL MEASUREMENT RANGE	VELOCIT mV/in/sec	Y OUTPUT mV/cm/sec	
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 IP-65 (NEMA 4) Optional IP-68 (NEMA 6) FOOTNOTES TO SPECIFICATIONS 1. Supplemental Data section located at end of HX Series pages.		2, 10 3, 15, 30 4, 20, 40 5, 25, 50 6, 60 80 100 ALL RANGES GREATER THAN 100"	200 136 103 82 69 52 180 180	78 53 40 32 27 20 71 71	
MODEL NUMBER CONFIGURATION IX-VP	BASIC Co 5 6 7 8 9 HX-VP 4 NRequired Designator 7 INGRE	NFIGURATION A-50-S10-N ESS PROTECTION IP-65 (NEMA 4)	(for all 1S-1B	. RANGES C	
AVoltage Divider Circuit BBridge Circuit 4204 to 20 mA 5100 to 10 VDC	VPB 2	IP-68 (NEMA 6) IP-68 (NEMA 6) Corro •NEMA 4 CONNECT	sion Resistan OR	t Constructio	

HX-VP -		-	BASIC CONFIGURATION (FOR ALL RANGES)
Ē		5 6 7 8 9	HX-VPA-50-S10-N1S-1BC
E ELECTRICAL OUTPUT	0 RANGE	4 NRequired Designator	(7) INGRESS PROTECTION
ABridge Divider Circuit BBridge Circuit	Select Measurement Range From Supplemental Da Table 12: 12 (next page), Insert Corresponding	5 POTENTIOMETER VALUE	1
4204 to 20 mA 5100 to 10 VDC	Measurement Range Designator	VP510	8 IP-65-NEMA 4 CONNECTOR
	 S Stainless Steel (See Supplemental Data, Table 12) N Q.018 (0,45 mm) Nylon Jacketed Stainless Steel Ranges to 80° (2m) only, (formerly NJC) J Q.037 (0,94 mm) Nylon Jacketed Stainless Steel Ranges 100° (2.5m) to 500° (12.7m) only. 	VPA 35KΩ* 410KΩ* *Not Available Ranges 2" to 6" SEE SUPPLEMENTAL DATA FOR LINEARITY OPTI 6 ELECTRICAL OUTPUT POLARITY SStandard (increasing output as wire rope is extended) B Beversed (decreasing output	PIII STOZE BODY MUDITIES CONTRECTOR IP-68-NEMA 6 ELECTRICAL CABLE PBulkhead Fitting w/ 3m (10') Electrical Cable 3Bulkhead Fitting w/ 3m (10') Electrical Cable 4Bulkhead Fitting w/ 4m (13.5') Electrical Cable 5Bulkhead Fitting w/ 5m (16.5') Electrical Cable 6Bulkhead Fitting w/ 6m (20') Electrical Cable 7Bulkhead Fitting w/ 7m (23') Electrical Cable
	2 WIRE ROPE TENSION 1 Standard	as wire rope is extended)	9 IP-65-NEMA 4 MATING CONNECTOR
	 Reduced (Ranges to 80" only) WIRE ROPE EXIT DIRECTION Use Number designators shown EAMAGES TO 80" comm 	NOTES FOR OPTION BOXES (), (9), and IP-65 (NEMA 4): Transducer equip body mounted connector: or without mating connector. Mating connect electrical cable available separately as part 1019-xM where x is length of electrical cable in	d With ped with and with stor with number number 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
		IP-68(NEMA 6): Transducer eq of electrical cable. Remote end of electrical may be outlitted with water proof connector, connector with electrical cable available separ part number 10424-xM where 'x' is length of e cable in meters.	uipped NNo connector on end of electrical cable i length I cable al cable MO mating connector** * Mating **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.



MECHANICAL SPECIFICATIONS



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" 200x106 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.

Use colu meas	Use value from this column to indicate overall measurement range			ſ	Check mark indicates available measurement range							TABLE 12
MEASUREMENT RANGE DESIGNATOR	STAN MEASU RAI	NDARD IREMENT NGES (mm)	APPLIC HX-PA HX-PB HX-P420 HX-P510	HX-EP	HX-V HX-VP	WIRE TEN (NOM (oz)	ROPE SION (INAL) (N)	WIRE DIAM (in)	ROPE IETER (mm)	TRANS WE	GDUCER IGHT (Kg)	Product Photo
2	2	50	V	-	V	34	9.4	.016	0.4	2	0.9	
3	3	75	V	-	V	24	6.7	.016	0.4	2	0.9	
4	4	100	V	-	~	24	6.7	.016	0.4	2	0.9	9
5	5	125	V	-	V	19	5.3	.016	0.4	2	0.9	
6	6	150	V	-	~	24	6.7	.016	0.4	2	0.9	
10	10	250	~	~	~	34	9.4	.016	0.4	2	0.9	
15	15	390	V	-	~	24	6.7	.016	0.4	2	0.9	
20	20	500	V	-	~	24	6.7	.016	0.4	2	0.9	Beerly Beerly
25	25	640	~	V	V	19	5.3	.016	0.4	2	0.9	
30	30	/50	V	-	V	24	6.7	.016	0.4	2	0.9	
40	40	1000	V	-	V	24	6.7	.016	0.4	2	0.9	1
50	50	1200	V	V	V	19	5.3 6.7	.016	0.4	2	0.9	
80	80	2 0m	V	V	V	24	5.8	.010	0.4	2	0.9	
00	00	2.011	V	V	•	21	5.0	.010	0.4	2	0.3	
100	100	2.5m	~	~	~	36	10.0	024	0.6	6.8	31	
120	120	3.0m	V	V	V	36	10.0	.024	0.6	6.8	3.1	
150	150	3.8m	V	V	V	36	10.0	.024	0.6	6.8	3.1	
200	200	5.0m	V	V	V	36	10.0	.024	0.6	6.8	3.1	X
250	250	6.3m	~	V	V	36	10.0	.024	0.6	6.8	3.1	
300	300	7.5m	V	V	V	36	10.0	.024	0.6	6.8	3.1	And
350	350	8.8m	v	V	v	36	10.0	.024	0.6	6.8	3.1	The second se
400	400	10.0m	~	~	V	36	10.0	.024	0.6	6.8	3.1	
												the second s
500	500	12.5m	V	V	~	36	10.0	.024	0.6	8.6	3.9	Statement in the second
600	600	15.2m	V	V	~	36	10.0	.024	0.6	8.6	3.9	Contraction of the local division of the loc
800	800	20.3m	~	~	~	36	10.0	.024	0.6	8.6	3.9	
1000	1000	25.4m	V	V	-	36	10.0	.024	0.6	12.0	5.4	E 122
1200	1200	30.4m	~	~	-	36	10.0	.024	0.6	12.3	5.6	and the second s
1600	1600	40.6m	V	V	-	36	10.0	.024	0.6	14.1	6.4	
1800	1800	45.7m	V	V	-	36	10.0	.021	0.6	15.9	7.2	
2000	2000	50.8m	V	V	-	36	10.0	.021	0.5	16.3	7.4	

Specifications subject to change without notice



OPTION DESCRIPTIONS

	OPTION	
OPTION	DESIGNATOR	DESCRIPTION
NYLON JACKETED WIRE ROPE RANGES TO 80" ONLY	N	Replaces standard stainless steel wire rope with \emptyset .018 nylon jacketed wire rope. This option increases wire rope life dramatically but may increase non-linearity by as much as \pm .05% of full scale.
NYLON JACKETED WIRE ROPE RANGES 100" TO 500" ONLY	J	Replaces standard stainless steel wire rope with Ø.037 nylon jacketed wire rope.
ALTERNATE WIRE ROPE EXIT	1, 2, 3	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$
ALTERNATE WIRE ROPE EXIT RANGES 100" (2.5 m) and GREATER	1, 2, 3	1 2 3 3 5 5 5 5 5 5 5 5 5 5 5 5 5
NON-STANDARD POTENTIOMETER	3, 4	Non-standard potentiometer linearity is as follows:RANGELINEARITY5" and Below±1.00% of full scale10" to 25"±0.50% of full scale30" and above±0.25% of full scaleNote: This option is subject to potentiometer availability.
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.
IP-68, (NEMA 6) CAPABILITY	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 IP-68, (NEMA 6) 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 IP-68 (NEMA 6) capability. Urethane jacketed, shielded, twisted pair cable exits unit. No connector on unit.

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