

# EP SERIES

## TWO CHANNEL DIGITAL OUTPUT



### Two channel digital output

Utilizing an incremental encoder as the sensor, the **UniMeasure EP Series** position transducer provides a quadrature square wave output. The resolution values shown in Table 4 indicate resolution for times 1 counting mode where a count is registered for one up transition on channel A. With interface electronics capable of times 2 or times 4 counting mode, a true resolution increase of 2 or 4 may be obtained. The actual resolution of an EP transducer differs slightly from unit to unit because of tolerances associated with the wire rope diameter and the capstan upon which the wire rope winds. In applications where the output count is interpreted as a percentage of total travel, resolution differences from unit to unit are not critical. 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 "Optional Electrical Outputs" Table 8 are available to facilitate interfacing to a variety of different types of equipment.

## SPECIFICATIONS

### GENERAL

Linearity.....	±0.03% Full Scale
Resolution <sup>[1]</sup> .....	See Table 4
Repeatability <sup>[2]</sup> .....	±0.015% Full Scale
Construction.....	Aluminum Cover & Baseplate
Sensing Device.....	Digital Encoder
Connector.....	MS3102A-14S-6P
Wire Rope.....	Ø.016 Stainless Steel
Wire Rope Tension.....	See Table 4
Wire Rope Inbound Acceleration.....	See Table 4
Reduced Wire Rope Tension.....	See Supplemental Data, Table 7
Weight	
Up to 50".....	1.0 lb. (0.45 Kg)
60" & 80".....	1.4 lb. (0.63 Kg)
Dimensional Information.....	See Supplemental Data <sup>[4]</sup> , Fig. 1 & 2
Options and Accessories.....	See Supplemental Data <sup>[4]</sup>

### ENVIRONMENTAL

Operating temperature.....	-20°C to +80°C
Storage temperature.....	-40°C to +100°C
Shock.....	50 G's for 11 ms duration
Vibration.....	20 Hz to 2000 Hz @ 5G's
Humidity.....	98% R.H. max.(non-condensing)
Ingress Protection.....	IP-40 (NEMA 1)

### ELECTRICAL

Input Voltage.....	+5 VDC ±5% or 5-28 VDC
Input Current.....	125 mA maximum
Output.....	Two channel TTL square wave

**TABLE 4**

MODEL	RANGE		RESOLUTION <sup>[1]</sup>			WIRE ROPE	
	(in)	(mm)	counts/inch	counts/mm	TOLERANCE	TENSION	ACCEL (G's) <sup>[3]</sup>
EP-10	10	250	500.0	19.69	±0.30%	34 oz	43
EP-25	25	640	250.0	9.84	±0.20%	34 oz	37
EP-50	50	1250	250.0	9.84	±0.20%	34 oz	37
EP-60	60	1.5 m	205.8	8.10	±0.20%	24 oz	18
EP-80	80	2.0 m	155.2	6.11	±0.20%	19 oz	7

NOTE: For reduced wire rope tension & acceleration see TABLE 7 on Page 29.

**OUTPUT STAGE**

**STANDARD OUTPUT WAVEFORM**

**CONNECTION DIAGRAM**

#### FOOTNOTES TO SPECIFICATIONS

- The resolution shown is a calculated number based upon the capstan diameter, cable 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 cable. In practice, the output count in a given unit of travel is an integer.
- Moving to the same position from the same direction.
- Maximum cable retraction acceleration.
- Supplemental Data section located at end of Standard Series pages.

## MODEL NUMBER CONFIGURATION



### BASIC CONFIGURATION (FOR ALL RANGES)

**EP-50-S10-N10-1P**

**0 RANGE**

10.....	10" (254 mm)
25.....	25" (635 mm)
50.....	50" (1270 mm)
60.....	60" (1524 mm)
80.....	80" (2032 mm)

**1 WIRE ROPE**

S.....	Ø.016 (0,4 mm) Stainless Steel
N.....	Ø.018 (0,45 mm) Nylon Jacketed Stainless Steel

**2 WIRE ROPE TENSION**

1.....	Standard (50 G Units to 50")
2.....	Reduced (See Table 7 for Value)

**3 WIRE ROPE EXIT DIRECTION**  
USE NUMBER DESIGNATORS SHOWN

0=STANDARD EXIT

**4 DUST WIPER OPTION**

N.....	No dust wiper
D.....	Dust Wiper Included

**5 ELECTRICAL OUTPUT**

10.....	5 VDC TTL Compatible, Two Channel
30.....	5 VDC Push-Pull Differential Line Drive
50.....	8 to 28 VDC Current Sinking Two Channel
70.....	8 to 28 VDC Push-Pull Differential Line Drive

*For Description See TABLE 8 on next page*

**7 CONNECTOR LOCATION**  
USE NUMBER DESIGNATORS SHOWN

1=STANDARD LOCATION  
NOTE: Locations 2 and 5 are only available with ELECTRICAL OUTPUT option "10".

**8 0.....** Required Designator

**9 ELECTRICAL INTERFACE**

C.....	Mating Connector Included
K.....	Mating Connector Omitted*
T.....	Terminal Strip

\*Electrical cable with mating connector may be ordered separately as part number **10028-xM** where 'x' is the length required in meters.

**Herbertek** www.herbertek.se  
info@herbertek.se  
+46-18 590510

### ADDITIONAL OPTIONS

#### TABLE 7

### STANDARD SERIES — WIRE ROPE TENSION AND ACCELERATION

RANGE	PA, PB, P420, P510 SERIES					EP SERIES				V & VP SERIES			
	STANDARD WIRE ROPE TENSION	STANDARD WIRE ROPE ACCEL	REDUCED WIRE ROPE TENSION	REDUCED WIRE ROPE ACCEL		STANDARD WIRE ROPE TENSION	STANDARD WIRE ROPE ACCEL	REDUCED WIRE ROPE TENSION	REDUCED WIRE ROPE ACCEL	STANDARD WIRE ROPE TENSION	STANDARD WIRE ROPE ACCEL	REDUCED WIRE ROPE TENSION	REDUCED WIRE ROPE ACCEL
(in) (mm)	(oz) (N)	(G's)	(oz) (N)	(G's)		(oz) (N)	(G's)	(oz) (N)	(G's)	(oz) (N)	(G's)	(oz) (N)	(G's)
2 50	34 9.5	>50	16 4.4	28	–	–	–	–	–	34 9.5	33	16 4.4	14
3 75	24 6.7	>50	14 3.9	16	–	–	–	–	–	24 6.7	30	14 3.9	15
4 100	24 6.7	>50	11 3.1	12	–	–	–	–	–	24 6.7	36	11 3.1	15
5 125	34 9.5	>50	8 2.2	7	–	–	–	–	–	34 9.5	33	8 2.2	6
10 250	34 9.5	>50	16 4.4	28	34 9.5	43	16 4.4	19	19	34 9.5	33	16 4.4	14
15 390	24 6.7	>50	14 3.9	16	–	–	–	–	–	24 6.7	30	14 3.9	15
20 500	24 6.7	>50	11 3.1	12	–	–	–	–	–	24 6.7	36	11 3.1	14
25 640	34 9.5	>50	8 2.2	7	34 9.5	37	8 2.2	7	7	34 9.5	33	8 2.2	6
30 750	24 6.7	>50	14 3.9	16	–	–	–	–	–	24 6.7	30	14 3.9	15
40 1000	24 6.7	>50	11 3.1	12	–	–	–	–	–	24 6.7	36	11 3.1	12
50 1250	34 9.5	>50	8 2.2	7	34 9.5	37	8 2.2	7	7	34 9.5	33	8 2.2	5
60 1500	24 6.7	27	7 1.8	2	24 6.7	18	7 1.8	5	5	24 6.7	27	7 1.8	6
80 2000	19 5.3	16	5 1.4	2	19 5.3	7	5 1.4	2	2	19 5.3	16	5 1.4	3

#### TABLE 8

### EP, HX-EP SERIES OPTIONAL ELECTRICAL OUTPUTS

OPTION	OUTPUT DESCRIPTION	OUTPUT STAGE	WAVEFORM	CONNECTOR WIRING												
10	<b>5 VDC Current Sinking</b> 5 VDC TTL compatible output. Input Voltage: 5 VDC.			<table border="1"> <tr><td>A</td><td>+Vin</td></tr> <tr><td>B</td><td>COMMON</td></tr> <tr><td>C</td><td>CHANNEL A</td></tr> <tr><td>D</td><td>CHANNEL B</td></tr> <tr><td>E</td><td></td></tr> <tr><td>F</td><td></td></tr> </table>	A	+Vin	B	COMMON	C	CHANNEL A	D	CHANNEL B	E		F	
A	+Vin															
B	COMMON															
C	CHANNEL A															
D	CHANNEL B															
E																
F																
50	<b>8 to 28 VDC Current Sinking</b> Current sinking output with 10KΩ internal pullup resistors. Input Voltage: 8 to 28 VDC.															
30	<b>5 VDC Push-Pull Differential Line Drive</b> Push-Pull, current sourcing and current sinking output. Output is compliant with requirements of TIA/EIA-422-B. Input Voltage: 5 VDC input.			<table border="1"> <tr><td>A</td><td>+Vin</td></tr> <tr><td>B</td><td>COMMON</td></tr> <tr><td>C</td><td>CHANNEL A</td></tr> <tr><td>D</td><td>CHANNEL A</td></tr> <tr><td>E</td><td>CHANNEL B</td></tr> <tr><td>F</td><td>CHANNEL B</td></tr> </table>	A	+Vin	B	COMMON	C	CHANNEL A	D	CHANNEL A	E	CHANNEL B	F	CHANNEL B
A	+Vin															
B	COMMON															
C	CHANNEL A															
D	CHANNEL A															
E	CHANNEL B															
F	CHANNEL B															
70	<b>8 to 28 VDC Push-Pull Differential Line Drive</b> Push-Pull, current sourcing and current sinking output. Input Voltage: 8 to 28 VDC.															

### LIFE

Ranges 2" to 5" ..... 5,000,000 full stroke cycles  
 Ranges 10" to 25" ..... 500,000 full stroke cycles  
 Ranges 30" to 80" ..... 250,000 full stroke cycles

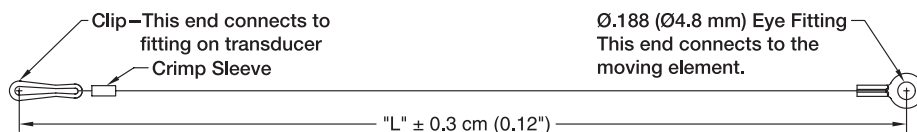
\*With 1K ohm potentiometer, wire rope misalignment 2° maximum at full stroke, relatively dust free environment, and with nylon jacketed wire rope

### OPTION DESCRIPTIONS

OPTION	OPTION DESIGNATOR	DESCRIPTION						
Nylon jacketed wire rope	<b>N</b>	Replaces standard stainless steel wire rope with Ø.018 nylon jacketed wire rope. Increases wire rope life dramatically but may increase non-linearity by as much as ±0.05% of full scale.						
Reduced Wire Rope Tension	<b>2</b>	Reduces the overall tension in the wire rope and increases wire rope life. Dynamic response of the transducer is reduced due to the reduced inbound acceleration capability.						
Increased Wire Rope Tension	<b>3</b>	Increases tension in the wire rope which increases the dynamic response of the transducer. On selected units with range of 50" (1250 mm) or less, inbound acceleration capability is 100G's. Wire rope life may be adversely affected by the high tension option.						
Dust wiper	<b>D</b>	Lubricated wiper strips dust and debris from wire rope as it retracts into case. Adds 0.36" (9 mm) height to wire rope exit location.						
Non-standard potentiometer (applies to PA series only)	<b>3,4</b>	Non-standard potentiometer linearity is as follows: <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>RANGE</th> <th>LINEARITY</th> </tr> </thead> <tbody> <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	10" to 25"	±0.50% of full scale	30" and above	±0.25% of full scale
RANGE	LINEARITY							
10" to 25"	±0.50% of full scale							
30" and above	±0.25% of full scale							
Reversed output	<b>R</b>	Output is at a maximum when wire rope is fully retracted. Output decreases as wire rope is extended. Does not apply to velocity or encoder signal.						
Terminal strip	<b>T</b>	Replaces connector with a terminal strip.						

### 10067 – AUXILIARY WIRE ROPE EXTENSION KIT

The auxiliary wire rope extension may be used to facilitate mounting the transducer remotely from the measurement point. The clip on the extension attaches to the eye fitting on the transducer. The eye fitting on the opposite end, which is identical to the fitting on the transducer, mounts to the moving element. The extension kit is also available with the clip end unterminated for situations where it is more convenient to size the wire rope length during installation. Clip and crimp fitting are included with the unterminated version.



### 10067- 1 -CM- 2

- 1 DIMENSION "L"**  
Specify Dimension "L" in centimeters to the nearest whole centimeter  
NOTES: 1. 1 cm = 0.394", 1 inch = 2.54 cm  
 2. Shortest length "L" is 5 cm (approximately 2")
- 2 UNTERMINATED CLIP END**  
 Leave Blank.... Completed kit (No designator required)  
 U ..... Unterminated Clip End  
 (clip and crimp sleeve included in kit)

### REPLACEMENT WIRE ROPE KITS

The replacement Wire Rope Kit includes a new wire rope with all end terminations, wire rope guide, felt dust wiper where applicable and installation instructions. To order, replace 'xx' in the part number with the applicable measurement range in inches.

- 10107-xx Replacement Wire Rope Kit**—Standard Ø.016" Stainless Steel Wire Rope.
- 10108-xx Replacement Wire Rope Kit**—Ø.018" Nylon Jacketed Stainless Steel Wire Rope.
- 10127-xx Replacement Wire Rope Kit**—Standard Ø.016" Stainless Steel Wire Rope with Dust Wiper.
- 10128-xx Replacement Wire Rope Kit**—Ø.018" Nylon Jacketed Stainless Steel Wire Rope with Dust Wiper.

### DIMENSIONAL INFORMATION

#### RANGES TO 50" (1250 MM)

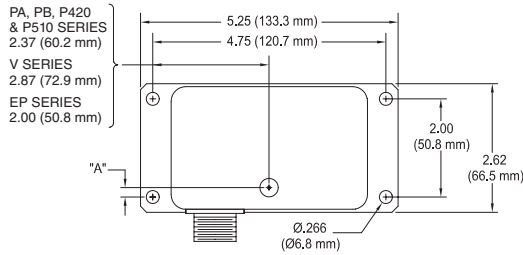
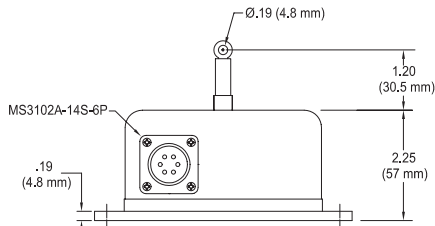


FIG. 1



PA, PB, P420, P510, V Series

RANGE	DIM "A"
	(inch) (mm)
2", 10"	0.66 (16.8)
3", 15", 30"	0.51 (12.9)
4", 20", 40"	0.35 (8.8)
5", 25", 50"	0.19 (4.8)
60"	See Fig. 2
80"	See Fig. 2

EP Series

RANGE	DIM "A"
	(inch) (mm)
EP-10	0.68 (17.4)
EP-25, EP-50	0.21 (5.3)
EP-60	See Fig. 2
EP-80	See Fig. 2
EPM-250	0.68 (17.4)
EPM-1250	0.21 (5.3)

Dimensions in brackets are millimeters

#### RANGES 60" (1.5 M) AND 80" (2 M)

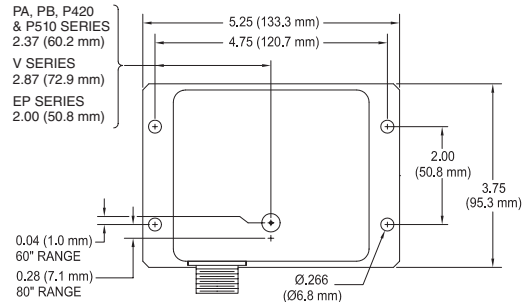
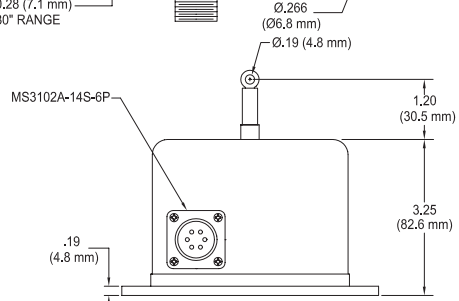


FIG. 2



Dimensions in brackets are millimeters