

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 2 or times 4 counting mode, a true resolutional increase of 2 or 4 may be obtained. The actual resolution of an encoder differs slightly from unit to unit because of tolerances associated with the wire rope diameter and the capstan winds. In applications where the output count is interpreted as a percentage of total travel, resolutional 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
Repeatability ²	±0.015% Full Scale
Resolution	See Table 4
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
Weight	1.0 lb. (0.45 Kg) to 50" 1.4 lb. (0.63 Kg) 60" & 80"
Dimensional Information	See Supplemental Data ⁴ , Fig. 1 & 2
Options and Accessories	See Supplemental Data ⁴

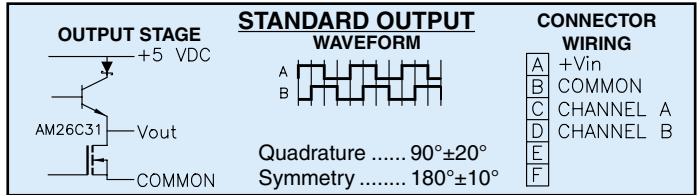
Environmental

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	NEMA 1, IP-40

Electrical

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

MODEL	RANGE (inches)	RESOLUTION (See note 1) (counts/in)	TOLERANCE on RESOLUTION (See note 1)	WIRE ROPE TENSION (Nominal)	WIRE ROPE ACCEL ³ (G's)	WEIGHT
EP-10	10"	500	±0.30%	34 oz	43	1.0 LB
EP-25	25"	250	±0.20%	34 oz	37	0.45 Kg
EP-50	50"	250	±0.20%	34 oz	37	
EP-60	60"	205.8	±0.20%	24 oz	18	1.4 LB
EP-80	80"	155.2	±0.20%	19 oz	7	0.63 Kg
(METRIC)						
	(mm)	(counts/mm)				
EPM-250	250	20	±0.30%	9.5 N	43	1.0 LB
EPM-625	625	10	±0.20%	9.5 N	37	0.45 Kg
EPM-1250	1250	10	±0.20%	9.5 N	37	



FOOTNOTES

- 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

EP- - - - - -

Range

10.....	10" (254 mm)
25.....	25" (635 mm)
50.....	50" (1270 mm)
60.....	60" (1524 mm)
80.....	80" (2032 mm)
M250..... 250 mm	
M625..... 625 mm	
M1250..... 1250 mm	

Wire Rope

*	Ø.016 (0,4 mm) Stainless Steel
NJC	Ø.018 (0,45 mm) Nylon Jacketed Stainless Steel

Wire Rope Tension

*	Standard (50 G units to 50")
004	Reduced (see Table 7 for value)

Wire Rope Exit Direction

*	Top Exit
CES	Side Exit
CEB	Bottom Exit

Dust Wiper Option

*	No dust wiper
DS	Dust Wiper Installed

Electrical Interface

- *.....Mating Connector Included
- TS**.....Terminal Strip
- L3M**.....Mating Conn with 3 m (10') electrical cable
- L4M**.....Mating Conn with 4 m (13.5') electrical cable
- L5M**.....Mating Conn with 5 m (16.5') electrical cable
- L6M**.....Mating Conn with 6 m (20') electrical cable
- L7M**.....Mating Conn with 7 m (23') electrical cable

Note: Options TS and L3M through L7M are not available with Electrical Output Options H11, H21, H31, H41 and H51

Connector Location

*	Standard Location
S2	End
S3	Rear Side
S5	Top

Note: S2 and S5 available with standard output and "I" option only.

Electrical Output (See Standard Series Supplemental Data, TABLE 8.)

- *.....Standard 2 channel 5 VDC, TTL
- I**.....2 channel 5 VDC, TTL with Index
- H1**.....8 to 28 VDC Current Sinking
- H11**.....8 to 28 VDC Current Sinking with Index
- H2**.....5 VDC Current Sinking Differential Line Drive
- H21**.....5 VDC Current Sinking Differential Line Drive with Index
- H3**.....8 to 28 VDC Current Sinking Differential Line Drive
- H31**.....8 to 28 VDC Current Sinking Differential Line Drive with Index
- H4**.....8 to 28 VDC Push-Pull Differential Line Drive
- H41**.....8 to 28 VDC Push-Pull Differential Line Drive with Index
- H5**.....5 VDC Push-Pull Differential Line Drive
- H51**.....5 VDC Push-Pull Differential Line Drive with Index

NOTE

- *—Asterisk items are standard configuration. No option designator is required.
- Shaded options available at additional cost.
- See Supplemental Data for options.

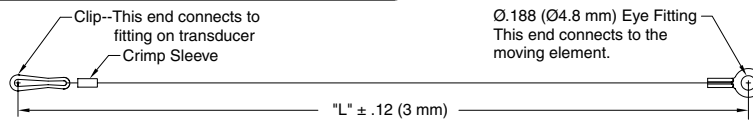
Example
EP-50-004-H2-TS

ADDITIONAL OPTIONS

OPTION	OPTION DESIGNATOR	DESCRIPTION
Nylon jacketed wire rope	NJC	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	004	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	HG	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 HG option.
Dust wiper	DS	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.
Terminal strip	TS	Replaces connector with a terminal strip.
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.
Non-standard potentiometer (applies to PA series 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.

ACCESSORIES

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. The clip and crimp sleeve are included as loose parts for user termination.

Dimension "L"

Specify dimension "L" in centimeters to the **nearest whole centimeter**.

Note 1. 1 cm = 0.394", 1 inch = 2.54 cm

Note 2. Shortest length "L" is 5 cm (approximately 2").

10067- CM-

*..... Completed kit (no designator required)

U..... Unterminated clip end

(clip and crimp sleeve included in kit)

* Leave blank. No designator required.

Replacement Wire Rope Kit

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—NJC option, Ø.018" nylon jacketed stainless steel wire rope.

10127-xx Replacement Wire Rope Kit—DS option, Standard Ø.016" stainless steel wire rope with dust wiper.

10128-xx Replacement Wire Rope Kit—NJC and DS options, Ø.018" nylon jacketed stainless steel wire rope with dust wiper.

ADDITIONAL SPECIFICATIONS

TABLE 7

PA, PB, P420, P510, P1010 SERIES						EP Series			V & VP Series					
Range Designator	Range		Wire Rope Standard Tension		Wire Rope Standard Acceleration		Wire Rope Reduced Tension		Wire Rope Reduced Acceleration		Wire Rope Reduced Tension		Wire Rope Reduced Acceleration	
	(in)	(mm)	(oz)	(N)	(G's)	(oz)	(N)	(oz)	(N)	(G's)	(oz)	(N)	(G's)	
2	2	50	34	9.5	>50	16	4.4	28	—	—	16	4.4	14	
3	3	75	24	6.7	>50	14	3.9	16	—	—	14	3.9	15	
4	4	100	24	6.7	>50	11	3.1	12	—	—	11	3.1	15	
5	5	125	34	9.5	>50	8	2.2	7	—	—	8	2.2	6	
10	10	250	34	9.5	>50	16	4.4	28	16	4.4	19	16	4.4	14
15	15	390	24	6.7	>50	14	3.9	16	—	—	14	3.9	15	
20	20	500	24	6.7	>50	11	3.1	12	—	—	11	3.1	14	
25	25	640	34	9.5	>50	8	2.2	7	8	2.2	7	8	2.2	6
30	30	750	24	6.7	>50	14	3.9	16	—	—	14	3.9	15	
40	40	1000	24	6.7	>50	11	3.1	12	—	—	11	3.1	12	
50	50	1250	34	9.5	>50	8	2.2	7	8	2.2	7	8	2.2	5
60	60	1500	24	6.7	27	7	1.8	2	7	1.8	5	7	1.8	6
80	80	2000	19	5.3	16	5	1.4	2	5	1.4	2	5	1.4	3

TABLE 8

EP, HX-EP Series Optional Electrical Outputs

Option	Output Description	Output Stage	Waveform	Connector Wiring																
I	Index Channel Adds index (Z) channel. Index is triggered within the first 0.25" (6 mm) of extension of the wire rope. Triggers repeatedly for each complete rotation of the internal capstan.			<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>CHANNEL Z</td></tr> </table> <p>Z information applies to "I" & "H11" options only.</p>	A	+Vin	B	COMMON	C	CHANNEL A	D	CHANNEL B	E	CHANNEL Z						
A	+Vin																			
B	COMMON																			
C	CHANNEL A																			
D	CHANNEL B																			
E	CHANNEL Z																			
H1	8 to 28 VDC Current Sinking Current sinking output with 10KΩ internal pullup resistors 8 to 28 VDC input voltage. "H11" is same as "H1" option but adds the index (Z) channel.		 Z information applies to "I" & "H11" options only.																	
H11																				
H2	5 VDC TTL Current Sinking Differential Line Drive Current sinking line drive output with 2KΩ internal pullup resistors. 5 VDC input voltage. "H21" is same as "H2" option but adds the index (Z) channel.		 Z & Z̄ information applies to H21, H31, H41, & H51 options only.	<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 Ā</td></tr> <tr><td>E</td><td>CHANNEL B</td></tr> <tr><td>F</td><td>CHANNEL B̄</td></tr> <tr><td>G</td><td>CHANNEL Z</td></tr> <tr><td>H</td><td>CHANNEL Z̄</td></tr> </table> <p>Z & Z̄ information applies to H21, H31, H41, & H51 options only.</p>	A	+Vin	B	COMMON	C	CHANNEL A	D	CHANNEL Ā	E	CHANNEL B	F	CHANNEL B̄	G	CHANNEL Z	H	CHANNEL Z̄
A	+Vin																			
B	COMMON																			
C	CHANNEL A																			
D	CHANNEL Ā																			
E	CHANNEL B																			
F	CHANNEL B̄																			
G	CHANNEL Z																			
H	CHANNEL Z̄																			
H21																				
H3	8 to 28 VDC Current Sinking Differential Line Drive Current sinking line drive output with 10KΩ internal pullup resistors. 8 to 28 VDC input voltage. "H31" is same as "H3" option but adds the index (Z) channel.		 Z & Z̄ information applies to H21, H31, H41, & H51 options only.																	
H31																				
H4	8 to 28 VDC Push-Pull Differential Line Drive Push-Pull, current sourcing and current sinking output. 8 to 28 VDC input voltage. "H41" is same as "H4" option but adds the index (Z) channel.		 Z & Z̄ information applies to H21, H31, H41, & H51 options only.																	
H41																				
H5	5 VDC Push-Pull Differential Line Drive Push-Pull, current sourcing and current sinking output. 5 VDC input voltage. Output is compliant with requirements of TIA/EIA-422-B. H51 is same as H5 option but adds the index (Z) channel.		 Z & Z̄ information applies to H21, H31, H41, & H51 options only.																	
H51																				

DIMENSIONAL INFORMATION

PA, PB, P420, P510, P1010, EP & V Series

RANGES TO 50" (1250 mm)

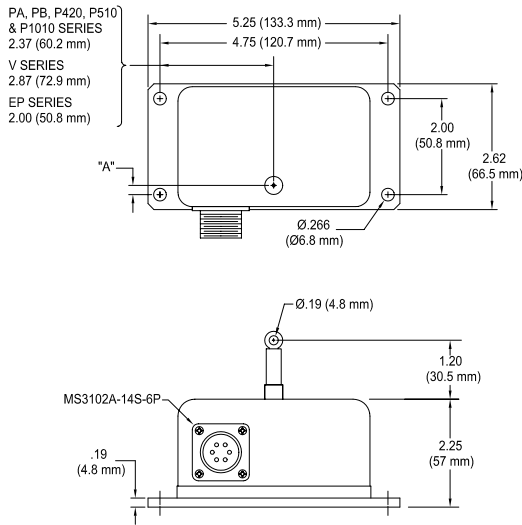


Figure 1

PA, PB, P420, P510, P1010, V Series	
RANGE	"A" (in) (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 Figure 2
80"	See Figure 2

EP Series	
MODEL	"A" (in) (mm)
EP-10	0.68 17.4
EP-25, EP-50	0.21 5.3
EP-60	See Figure 2
EP-80	See Figure 2
EPM-250	0.68 17.4
EPM-1250	0.21 5.3

RANGES TO 60" (1500 mm) and 80" (2000 mm)

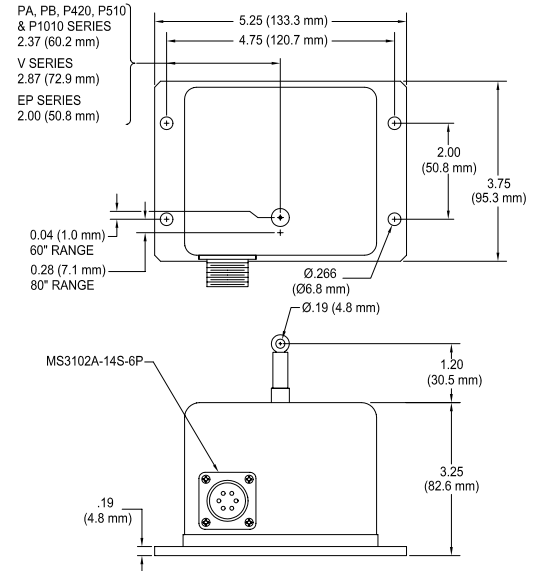


Figure 2