

EP SERIES

TWO CHANNEL DIGITAL OUTPUT



Two channel digital output

Utilizing an incremental encoder as the sensor, the 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 resolutional 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, 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	
Up to 50"	1.0 lb. (0.45 Kg)
60" & 80"	1.4 lb. (0.63 Kg)
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

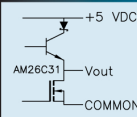
ELECTRICAL

Input Voltage	+5 VDC ±5% or 8-28 VDC
Input Current	125 mA maximum
Output	Two channel TTL square wave

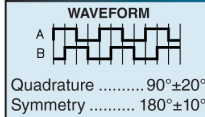
TABLE 4

MODEL	RANGE (inches)	RESOLUTION ^[1] (counts/in)	RESOLUTION TOLERANCE ^[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	

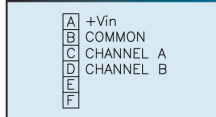
OUTPUT STAGE



STANDARD OUTPUT



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

EP - **0** **1** **2** **3** **4** **5** **7** **0** **9**

BASIC CONFIGURATION (FOR ALL RANGES)

EP-50-S10-N10-10C

0 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	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.....Increased (100G on Units With Ranges From 2" to 50")	4 DUST WIPER OPTION N.....No dust wiper D.....Dust Wiper Included	7 CONNECTOR LOCATION Use Number designators shown Note: Locations 2 and 5 are only available with ELECTRICAL OUTPUT options 10 or 11(option box 5)
3 WIRE ROPE EXIT DIRECTION Use Number designators shown		5 ELECTRICAL OUTPUT 10.....5 VDC Standard 2 Channel, TTL 11.....5 VDC Standard 2 Channel, TTL with Index 30.....5 VDC Push-Pull Differential Line Drive 31.....5 VDC Push-Pull Differential Line Drive with Index 50.....8 to 28 VDC Current Sinking 2 Channel 51.....8 to 28 VDC Current Sinking 2 Channel with Index 70.....8 to 28 VDC Push-Pull Differential Line Drive 71.....8 to 28 VDC Push-Pull Differential Line Drive with Index Note: Mating connector w/ electrical cable is not available with options 31 and 71 For Description See TABLE 8 on Next Page	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. Note: Mating connector with electrical cable is NOT available with ELECTRICAL OUTPUT options 31 and 71 (option box 5).

STANDARD SERIES

SUPPLEMENTAL DATA



ADDITIONAL OPTIONS

TABLE 7

PA, PB, P420 & P510 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)	(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																
10	5 VDC Current Sinking 5 VDC TTL compatible open collector current sinking output.			<table><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><tr><td>F</td><td></td></tr></table>	A	+Vin	B	COMMON	C	CHANNEL A	D	CHANNEL B	E	CHANNEL Z	F					
A	+Vin																			
B	COMMON																			
C	CHANNEL A																			
D	CHANNEL B																			
E	CHANNEL Z																			
F																				
11	Two channels with optional index channel available. 11 is same as Option 10 but adds the index (Z) channel.																			
50	8 to 28 VDC Current Sinking Current sinking output with 10KΩ internal pullup resistors 8 to 28 VDC input voltage. 51 is same as Option 50 but adds the index (Z) channel.			Z information applies to Options 11 and 51 only.																
51				Z information applies to 11 and 51 options only.																
30	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. 31 is same as Option 30 but adds the index (Z) channel			<table><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><tr><td>G</td><td>CHANNEL Z</td></tr><tr><td>H</td><td>CHANNEL Z</td></tr></table>	A	+Vin	B	COMMON	C	CHANNEL A	D	CHANNEL A	E	CHANNEL B	F	CHANNEL B	G	CHANNEL Z	H	CHANNEL Z
A	+Vin																			
B	COMMON																			
C	CHANNEL A																			
D	CHANNEL A																			
E	CHANNEL B																			
F	CHANNEL B																			
G	CHANNEL Z																			
H	CHANNEL Z																			
31																				
70	8 to 28 VDC Push-Pull Differential Line Drive Push-Pull, current sourcing and current sinking output. 8 to 28 VDC input voltage. 71 is same as Option 70 but adds the index (Z) channel.			Z & Z information applies to Options 31 and 71 only.																
71				Z & Z information applies to 31 and 71 options only.																

STANDARD SERIES

SUPPLEMENTAL DATA



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

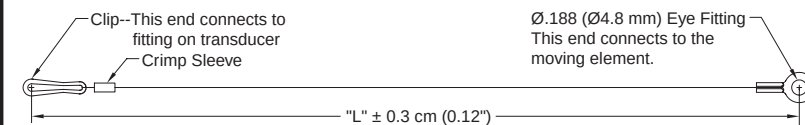
*With 1K ohm potentiometer, wire rope misalignment 2° maximum at full stroke, relatively dust free environment, and with nylon jacketed wire rope

OPTION DESCRIPTIONS

OPTION	OPTION DESIGNATOR	DESCRIPTION								
WIRE ROPE	N	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.								
Nylon jacketed wire rope										
WIRE ROPE TENSION	2	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.								
Reduced Wire Rope Tension										
Increased Wire Rope Tension	3	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	D	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.								
POTENTIOMETER VALUE	2,3,4	Non-standard potentiometer linearity is as follows:								
Non-standard potentiometer (applies to PA series only)		<table><tr><th>RANGE</th><th>LINEARITY</th></tr><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></table>	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
		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									
Note: This option is subject to potentiometer availability.										
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 or encoder signal.								
Reversed output										
ELECTRICAL INTERFACE	T	Replaces connector with a terminal strip.								
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.



STANDARD SERIES

SUPPLEMENTAL DATA

DIMENSIONAL INFORMATION

STANDARD SERIES | PA, PB, P420, P510, EP & V SERIES

RANGES TO 50" (1250 mm)

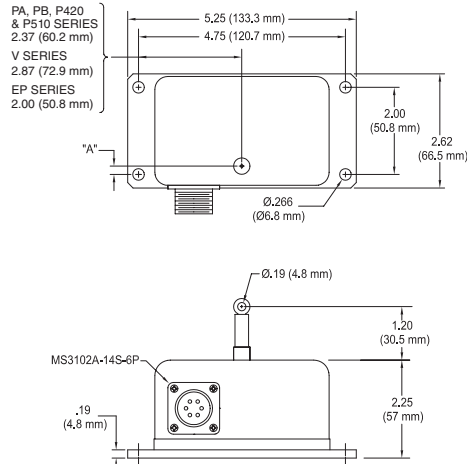


Fig. 1

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 Figure 2
80"	See Figure 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 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)

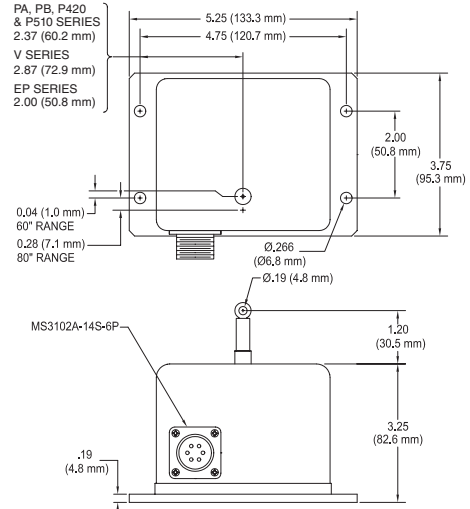


Fig. 2

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