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 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

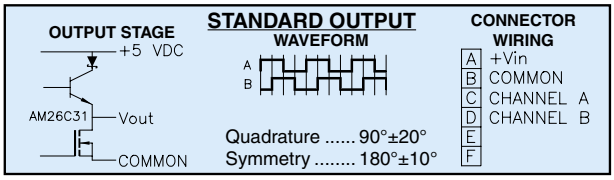
General
- Linearity ..... ±0.03% Full Scale
- Repeatability[2] ..... ±0.015% Full Scale
- Resolution ..... See Table 4
- Construction ..... Aluminum Cover & Baseplate
- Sensing Device..... Digital Encoder
- Connector..... MS3102A-14S-6P
- Wire Rope ..... Ø.016 Stainless Steel
- Wire Rope Tension ..... See Table 4
- Wire Rope Inbound Acceleration..... See Table 4
- Weight ..... 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

TABLE 4

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 0.45 Kg
EP-25	25"	250	±0.20%	34 oz	37	
EP-50	50"	250	±0.20%	34 oz	37	
EP-60	60"	205.8	±0.20%	24 oz	18	1.4 LB 0.63 Kg
EP-80	80"	155.2	±0.20%	19 oz	7	
(METRIC)	(mm)	(counts/mm)				
EPM-250	250	20	±0.30%	9.5 N	43	1.0 LB 0.45 Kg
EPM-625	625	10	±0.20%	9.5 N	37	
EPM-1250	1250	10	±0.20%	9.5 N	37	



FOOTNOTES
1. 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.
2. Moving to the same position from the same direction.
3. Maximum cable retraction acceleration.
4. Supplemental Data section located at end of Standard Series pages.

Model Number Configuration

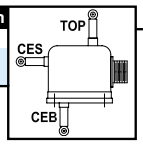
EP- - - - - - - - -

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



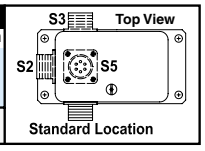
Dust Wiper Option
- ✻..... No dust wiper
- **DS**..... Dust Wiper Installed

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 H1I, H2I, H3I, H4I and H5I

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
- **H1I**.....8 to 28 VDC Current Sinking with Index
- **H2**.....5 VDC Current Sinking Differential Line Drive
- **H2I**.....5 VDC Current Sinking Differential Line Drive with Index
- **H3**.....8 to 28 VDC Current Sinking Differential Line Drive
- **H3I**.....8 to 28 VDC Current Sinking Differential Line Drive with Index
- **H4**.....8 to 28 VDC Push-Pull Differential Line Drive
- **H4I**.....8 to 28 VDC Push-Pull Differential Line Drive with Index
- **H5**.....5 VDC Push-Pull Differential Line Drive
- **H5I**.....5 VDC Push-Pull Differential Line Drive with Index

NOTE
1) ✻—Asterisk items are standard configuration. No option designator is required.
2) Shaded options available at additional cost.
3) See Supplemental Data for options.

Example
EP-50-004-H2-TS

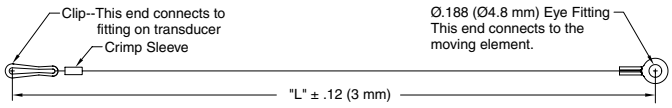
STANDARD SERIES
SUPPLEMENTAL DATA

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.

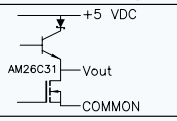
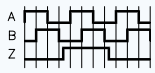
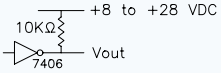
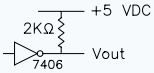
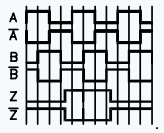
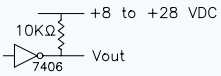
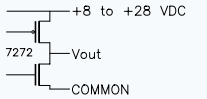
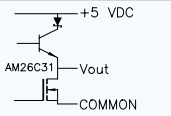
STANDARD SERIES
SUPPLEMENTAL DATA

ADDITIONAL SPECIFICATIONS

TABLE 7

PA, PB, P420, P510, P1010 SERIES										EP Series		V & VP Series		
Range Designator	Range (in)	Range (mm)	Wire Rope Standard Tension (Nominal) (oz)	Wire Rope Standard Tension (Nominal) (N)	Wire Rope Standard Acceleration (G's)	Wire Rope Reduced Tension (004 option) (oz)	Wire Rope Reduced Tension (004 option) (N)	Wire Rope Reduced Acceleration (004 option) (G's)	Wire Rope Reduced Tension (004 option) (oz)	Wire Rope Reduced Tension (004 option) (N)	Wire Rope Reduced Acceleration (004 option) (G's)	Wire Rope Reduced Tension (004 option) (oz)	Wire Rope Reduced Tension (004 option) (N)	Wire Rope Reduced Acceleration (004 option) (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

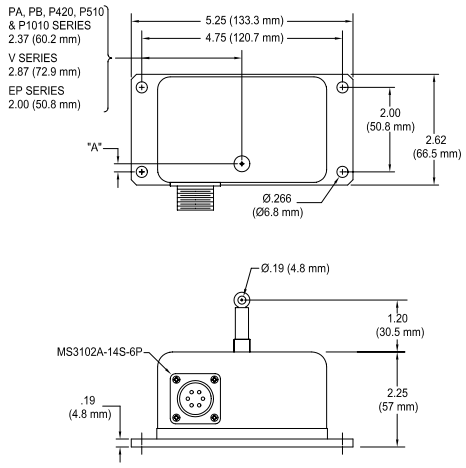
EP, HX-EP Series Optional Electrical Ouputs				
Option	Output Description	Output Stage	Waveform	Connector Wiring
I	**Index Channel** Adds index (Z) channel. Index is triggered within the first 0.25" (6 mm) of extension of the wire rope. Triggers repeatedly for each complete rotation of the internal capstan.		 Z information applies to "I" & "H1I" options only.	A +Vin B COMMON C CHANNEL A D CHANNEL B E CHANNEL Z F Z information applies to "I" & "H1I" options only.
H1 H1I	**8 to 28 VDC Current Sinking** Current sinking output with 10KΩ internal pullup resistors 8 to 28 VDC input voltage. "H1I" is same as "H1" option but adds the index (Z) channel.			
H2 H2I	**5 VDC TTL Current Sinking Differential Line Drive** Current sinking line drive output with 2KΩ internal pullup resistors. 5 VDC input voltage. "H2I" is same as "H2" option but adds the index (Z) channel.		 Z & Z̄ information applies to H2I, H3I, H4I, & H5I options only.	A +Vin B COMMON C CHANNEL A D CHANNEL Ā E CHANNEL B F CHANNEL B̄ G CHANNEL Z H CHANNEL Z̄ Z & Z̄ information applies to H2I, H3I, H4I, & H5I options only.
H3 H3I	**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. "H3I" is same as "H3" option but adds the index (Z) channel.			
H4 H4I	**8 to 28 VDC Push-Pull Differential Line Drive** Push-Pull, current sourcing and current sinking output. 8 to 28 VDC input voltage. "H4I" is same as "H4" option but adds the index (Z) channel.			
H5 H5I	**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. H5I is same as H5 option but adds the index (Z) channel.			

STANDARD SERIES
SUPPLEMENTAL DATA

DIMENSIONAL INFORMATION

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

RANGES TO 50" (1250 mm)



PA, PB, P420, P510, P1010, V Series		
RANGE	"A" (in)	"A" (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)	"A" (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

Figure 1

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

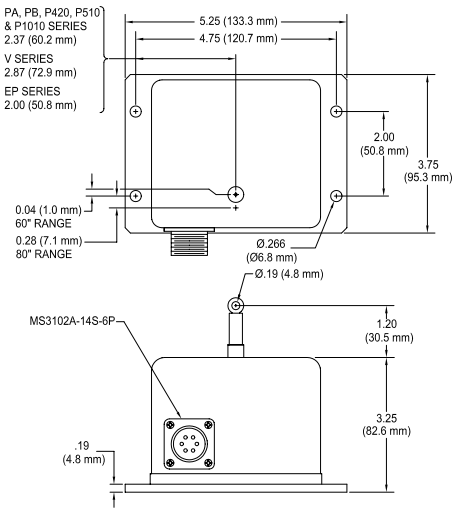


Figure 2

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