

# VP SERIES

## LINEAR VELOCITY AND POSITION



### Simultaneous velocity and position measurement

The 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 voltage divider circuit. Outputs optionally available are the bridge circuit, 4-20 mA, 0-10 VDC, and ±10 VDC. See PB, P420, P510 and P1010 series data sheets for specifications.

### SPECIFICATIONS

#### General

- Positional Linearity
  - 2", 3", 4" & 5" Ranges..... ±0.25% Full Scale
  - 10", 15", 20" & 25" Ranges..... ±0.15% Full Scale
  - All other ranges ..... ±0.10% Full Scale
- Repeatability<sup>1</sup> ..... ±0.015% Full Scale
- Positional Resolution ..... Essentially Infinite
- Construction ..... Aluminum Cover & Baseplate
- Sensing Device..... Tacho-Generator—Velocity
- Precision Potentiometer—Position
  - Connector ..... MS3102A-14S-6P
  - Wire Rope ..... Ø.016 Stainless Steel
  - Wire Rope Tension ..... See Table 6
  - Wire Rope Inbound Acceleration..... See Table 6
  - Weight ..... 1.96 lb. (0.89 Kg) to 50"
  - ..... 2.20 lb. (1.00 Kg) 60" & 80"
- Dimensional Information..... See Supplemental Data<sup>1</sup>, Fig. 3
- Options and Accessories..... See Supplemental Data<sup>1</sup>

#### Environmental

- Thermal Coefficient of potentiometer ..... ±100 PPM/°C max.
- Operating temperature ..... -40°C to +95°C
- Operating humidity ..... 95% R.H. max. non-condensing
- Vibration ..... 15 G's 0.1 ms max.
- Shock..... 50 G's 0.1 ms max.
- Ingress Protection..... NEMA 1, IP-40

#### FOOTNOTES TO SPECIFICATIONS

1. Supplemental Data section located at end of Standard Series pages.

#### Electrical (Position)

- Input Impedance ("A" Circuit) ..... 1000Ω ±10%
- Excitation Voltage ..... 25 Volts Max. AC or DC
- Output Voltage .....  $\frac{990}{\text{Range in Inches}}$  mV/V/inch
- (Use total measurement range in calculation)  $\frac{990}{\text{Range in mm.}}$  mV/V/mm

#### Electrical (Velocity)

- Output..... See Table 6
- Linearity..... Within 0.10% of Output Voltage
- Ripple ..... 3% Max.
- Output Impedance ..... 350Ω

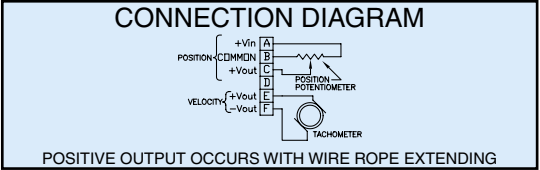


TABLE 6

MEASUREMENT RANGE (inch)	VELOCITY OUTPUT		WIRE ROPE TENSION		WIRE ROPE ACCEL	WEIGHT	
	(mV per in/sec)	(mV per cm/sec)	(oz)	(N)	(G's)	(lb)	(Kg)
2, 10	200	78	34	9.5	33	1.20	0.54
3, 15, 30	136	53	24	6.7	30	1.20	0.54
4, 20, 40	102	40	24	6.7	36	1.20	0.54
5, 25, 50	82	32	34	9.5	33	1.20	0.54
60	69	27	24	6.7	27	1.54	0.70
80	52	20	19	5.3	16	1.54	0.70

## Model Number Configuration

**Electrical Output (Position)**

- A ..... Voltage Divider Circuit
- B ..... Bridge Circuit
- 420 ..... 4 to 20 mA
- 510 ..... 0 to 10 VDC
- 1010 ..... ±10VDC

**Range**

- 2 ..... 2" (50 mm)
- 3 ..... 3" (75 mm)
- 4 ..... 4" (100 mm)
- 5 ..... 5" (125 mm)
- 10 ..... 10" (250 mm)
- 15 ..... 15" (390 mm)
- 20 ..... 20" (500 mm)
- 25 ..... 25" (640 mm)
- 30 ..... 30" (750 mm)
- 40 ..... 40" (1000 mm)
- 50 ..... 50" (1250 mm)
- 60 ..... 60" (1500 mm)
- 80 ..... 80" (2000 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)
- HG ..... Increased (Doubles Wire Rope Accel)

**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

**Connector Location**

- \* ..... Standard Location
- S2 ..... End\*\*
- S3 ..... Rear Side
- S5 ..... Top\*\*
- \*\* Available with "VPA" only

**Electrical Output Polarity**

- \* ..... Standard (increasing output as wire rope is extended)
- R ..... Reversed (decreasing output as wire rope is extended)

**Potentiometer Value**  
(Applies to VPA model only)

- \* ..... 1K ohm
- P2K ..... 2K ohm
- P5K ..... 5K ohm
- P10K ..... 10K ohm
- (VP1010 optional inputs only)
- SI ..... 4.9 to 30 VDC Single Input

**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.

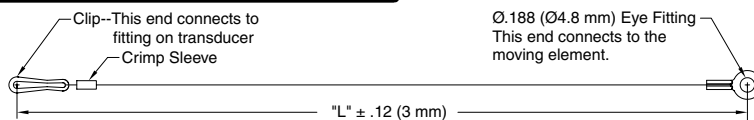
**Example**  
**VP510-50-NJC-DS-L3M**

### ADDITIONAL OPTIONS

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

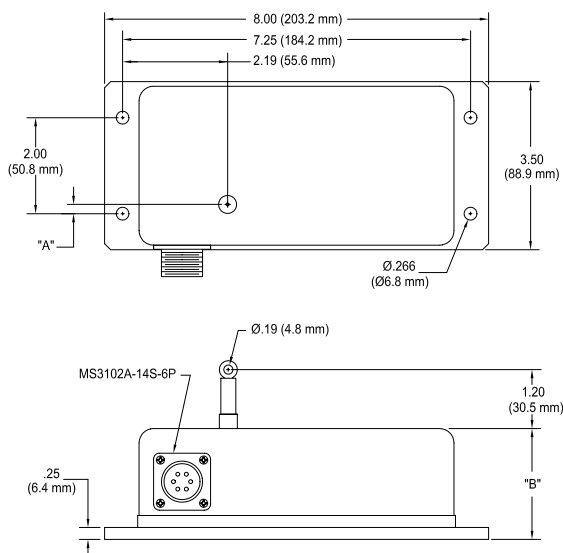
### ADDITIONAL SPECIFICATIONS

#### TABLE 7

PA, PB, P420, P510, P1010 SERIES						EP Series		V & VP Series						
Range Designator	Range		Wire Rope Standard Tension (Nominal)		Wire Rope Standard Acceleration		Wire Rope Reduced Tension (004 option)		Wire Rope Reduced Acceleration (004 option)					
	(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

### VP (VELOCITY-POSITION) Series

#### ALL MEASUREMENT RANGES



RANGE	"A"		"B"	
	(in)	(mm)	(in)	(mm)
2", 10"	0.66	16.8	2.25	57.0
3", 15", 30"	0.51	12.9	2.25	57.0
4", 20", 40"	0.35	8.8	2.25	57.0
5", 25", 50"	0.19	4.8	2.25	57.0
60"	0.04	1.0	3.25	82.6
80"	-0.28	-7.1	3.25	82.6

Figure 3