Utilizing a precision potentiometer, the UniMeasure HX-PA Series position transducer provides basic absolute positioning with an analog output. With a steady state input voltage, and with the potentiometer connected as a voltage divider, the ratiometric output voltage is directly proportional to wire rope extension. The unit will function with any input voltage up to 30 volts maximum. To obtain best output linearity, the input voltage should be well regulated.

**SPECIFICATIONS**

**GENERAL**
- Measurement Ranges: See Supplemental Data, Table 12
- Sensing Device: Precision Potentiometer
- Connector: MS3102E-14S-6P
- Mating Connector (included): MS3106E-14S-6S

**PERFORMANCE**
- Linearity: 2", 3", 4", 5" & 6" Ranges: ±0.25% Full Scale
- 10", 15", 20", & 25" Ranges: ±0.15% Full Scale
- All other ranges: ±0.10% Full Scale
- Repeatability: ±0.015% Full Scale
- Resolution: Essential Infinity

**ENVIRONMENTAL**
- Operating temperature: -40°C to +95°C
- Storage Temperature: -55°C to +100°C
- Operating humidity: 100%
- Vibration: 15 G’s, 0.1 ms max.
- Shock: 50 G’s, 0.1 ms max.

**INGRESS PROTECTION** (Exclusive of Wire Rope Area)
- Standard: IP-65 (NEMA 4)
- Optional: IP-68 (NEMA 6)

**ELECTRICAL**
- Input Impedance: 1000 Ω ±10%
- Output Impedance: 0 to 1000 Ω
- Excitation Voltage: 30 Volts Max. AC or DC
- Output Voltage Change Over: Full Range of Transducer: 92% to 98% of Excitation Voltage

**CONNECTION DIAGRAM**

**FOOTNOTES TO SPECIFICATIONS**
1. Supplemental Data section located at end of HX Series pages.

**MODEL NUMBER CONFIGURATION**

**HX-PA-**

<table>
<thead>
<tr>
<th>RANGE</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>WIRE ROPE</td>
<td>...</td>
<td>Stainless Steel</td>
<td>...</td>
<td>0.018 (0.45 mm)</td>
<td>...</td>
<td>Nylon Jacketed Stainless Steel</td>
<td>...</td>
<td>0.037 (0.94 mm)</td>
<td>...</td>
<td>Nylon Jacketed Stainless Steel</td>
</tr>
<tr>
<td>WIRE ROPE TENSION</td>
<td>...</td>
<td>Standard</td>
<td>...</td>
<td>10&quot;, 15&quot;, 20&quot;, &amp; 25&quot; Ranges</td>
<td>...</td>
<td>Not Available Ranges</td>
<td>...</td>
<td>2&quot;, 3&quot;, 4&quot;, 5&quot;, &amp; 6&quot; Ranges</td>
<td>...</td>
<td>10&quot;, 15&quot;, 20&quot;, &amp; 25&quot; Ranges</td>
</tr>
<tr>
<td>WIRE ROPE EXIT DIRECTION</td>
<td>...</td>
<td>Standard</td>
<td>...</td>
<td>10&quot;, 15&quot;, 20&quot;, &amp; 25&quot; Ranges</td>
<td>...</td>
<td>Not Available Ranges</td>
<td>...</td>
<td>2&quot;, 3&quot;, 4&quot;, 5&quot;, &amp; 6&quot; Ranges</td>
<td>...</td>
<td>10&quot;, 15&quot;, 20&quot;, &amp; 25&quot; Ranges</td>
</tr>
</tbody>
</table>

**NOTES FOR OPTION BOXES 7, 8, AND 9**

**IP-65 (NEMA 4)**
- Transducer equipped with body mounted connector and with or without mating connector.
- Mating connector with electrical cable available separately as part number 10119-xM where x is the length of electrical cable in meters.

**IP-68 (NEMA 6)**
- Transducer equipped with bulkhead fitting and length of electrical cable. Remote end of electrical cable may be outfitted with water proof connector.
- Mating connector with electrical cable available separately as part number 10424-xM where x is the length of electrical cable in meters.

**IP-65–NEMA 4 CONNECTOR**
- B...6 Pin 3102E Body Mounted Connector

**IP-68–NEMA 6 CABLE MOUNTED CONNECTOR**
- N...No connector on end of electrical cable
- K...48 Cable to cable connector with NO mating connector
- **Electrical cable with mating connector may be ordered separately as part number 10424-xM where x is the length required in meters. Mating connector alone unavailable.**
The UniMeasure HX-PB Series transducer includes the sensing potentiometer in a bridge circuit with adjustable zero and span controls. The completely passive circuit gives a maximum output voltage at maximum span setting of approximately 18% of the input voltage. The span adjustment allows for easy interface to a bridge amplifier. With zero position adjustable to anywhere within the total range of the transducer, output voltage is positive when extending the wire rope from the selected zero position and is negative when retracting from zero.

**SPECIFICATIONS**

**GENERAL**
- Measurement Ranges: See Supplemental Data, Table 12
- Sensing Device: Precision Potentiometer
- Connector: MS3102E-14S-6P
- Mating Connector (included): MS3106E-14S-6S

**PERFORMANCE**
- Linearity: 2", 3", 4", 5", & 6" Ranges: ±0.25% Full Scale
- 10", 15", 20", & 25" Ranges: ±0.15% Full Scale
- All other ranges: ±0.10% Full Scale
- Repeatability: ±0.015% Full Scale

**ENVIRONMENTAL**
- Thermal Coefficient of Sensing Element: ±100 PPM/°C Max.
- Operating Temperature: -40°C to +95°C
- Operating Humidity: 100%
- Vibration: 15 G’s for 0.1 ms max.
- Shock: 50 G’s for 0.1 ms max.

**INGRESS PROTECTION** (Exclusive of Wire Rope Area)
- Standard: IP-65 (NEMA 4)
- Optional: IP-68 (NEMA 6)

**FOOTNOTES TO SPECIFICATIONS**
1. Supplementary Data section located at end of HX Series pages.

**MODEL NUMBER CONFIGURATION**

**Electrical Output**

```plaintext
<table>
<thead>
<tr>
<th>HX-PB-</th>
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<th>-</th>
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<tr>
<td>RANGE</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>WIRE ROPE</td>
<td>S... Stainless Steel (See Supplemental Data, Table 12)</td>
<td>3... © 0.018 (0.45 mm)</td>
<td>N... © 0.018 (0.45 mm)</td>
<td>J... © 0.037 (0.94 mm)</td>
<td>R... © 0.018 (0.45 mm)</td>
<td>M... © 0.018 (0.45 mm)</td>
<td>X... Custom (See Supplemental Data, Table 12)</td>
<td>4... Electrical Output Polarity</td>
<td>5... Electrical Output Polarity</td>
</tr>
<tr>
<td>WIRE ROPE TENSION</td>
<td>1... Standard</td>
<td>2... Reduced (Ranges to 80&quot; only)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WIRE ROPE EXTENSION</td>
<td>Use number designators shown elsewhere (See Supplemental Data, Table 12)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NOTES FOR OPTION BOXES</td>
<td>7, 8, and 9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IP-65 (NEMA 4):</td>
<td>Transducer equipped with body mounted connector and with or without mating connector. Mating connector with electrical cable available separately as part number 10119-xM where ‘x’ is length of electrical cable in meters</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IP-68 (NEMA 6):</td>
<td>Transducer equipped with body mounted connector and with or without mating connector. Mating connector with electrical cable available separately as part number 10124-xM where ‘x’ is length of electrical cable in meters</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```

**CONNECTION DIAGRAM**

---

**PM Instrumentation**
59 rue Emile Deschanel | F-92400 Courbevoie | France
+33(0) 46 91 93 32 | contact@pm-instrumentation.com | www.pm-instrumentation.com
The HX-P420 position transducer provides a 4 to 20 mA output signal with a potentiometric sensor. The HX-P420 is particularly advantageous in electrically noisy environments. Since the transmitter is loop powered, an assembled system consists of a power supply, current monitor, and transmitter all connected in series. Zero and span adjustments allow setting the 4 mA position within the first 30% of total travel and setting the 20 mA position within 80% to 100% of total travel. The HX-P420 may be powered with a supply voltage in the range of 9 to 35 VDC subject to the total loop resistance.

### Model Number Configuration

**General**
- Measurement Ranges: See Supplemental Data, Table 12
- Sensing Device: Precision Potentiometer
- Mating Connector (included): MS3106E-14S-6P

**Performance**
- Linearity: ±0.30% Full Scale
- 2", 3", 4", 5" & 6" Ranges: ±0.30% Full Scale
- All other ranges: ±0.20% Full Scale
- Repeatability: ±0.015% Full Scale
- Resolution: Essentially Infinite

**Environmental**
- Thermal Coefficient of Sensing Element: ±100 PPM/°C Max.
- Operating Temperature: -40°C to +95°C
- Operating Humidity: 100%
- Vibration: 15 G’s 0.1 ms max.
- Shock: 50 G’s 0.1 ms max.

**Ingress Protection**
- Standard: IP-65 (NEMA 4)
- Optional: IP-68 (NEMA 6)

**Footnotes to Specifications**
1. Supplemental Data section located at end of HX Series pages.

### Specifications

**HX-P420**

<table>
<thead>
<tr>
<th>Range</th>
<th>2&quot;, 3&quot;, 4&quot;, 5&quot;, &amp; 6&quot; Ranges</th>
<th>±0.30% Full Scale</th>
</tr>
</thead>
</table>

**Electrical**
- Output: User Adjustable 4 to 20 mA
- Excitation Voltage: 9 to 35 VDC
- Min. Supply Voltage: (0.2 x Load Res.) + 9 VDC
- Protection: Reversed Polarity

**Intrinsically Safe (Optional):**
- Class 1, Div 1, Groups A, B, C, D
- Class 2, Groups E, F, G
- Class III hazardous locations

---

**Basic Configuration**

**HX-P420-50-S10-N0S-1BC**

<table>
<thead>
<tr>
<th>Range</th>
<th>2&quot;, 3&quot;, 4&quot;, 5&quot;, &amp; 6&quot; Ranges</th>
<th>±0.30% Full Scale</th>
</tr>
</thead>
</table>

**Wiring Options**

1. **Wire Rope**
   - Standard: Stainless Steel
   - Reduced (Ranges to 60") only

2. **Wire Rope Tension**
   - Standard
   - Reduced (Ranges to 60") only

3. **Wire Rope Exit Direction**
   - Use number designations shown (next page)
   - Standard

4. **Wiring Protection**
   - No connector on end of electrical cable
   - Mating connector with electrical cable available separately as part number 10119-xM where ‘x’ is length of electrical cable in meters

5. **Electrical Output Polarity**
   - Standard: (increasing output as wire rope is extended)
   - Reversed (decreasing output as wire rope is extended)

6. **Insulation Resistance**
   - 100 Megohms min. at 100 VDC

7. **Excitation Voltage**
   - 9 to 35 VDC

---

**Supplemental Data** section located at end of HX Series pages.
The UniMeasure HX-P510 Series transducer offers a voltage output with wide adjustability to give a 0 to 5, 0 to 10, ±5 or ±10 VDC output. The device may be powered with an unregulated voltage in the range of 4.9 to 30 VDC. Zero and span adjustment potentiometers are readily accessible. With the zero position set anywhere within the first 30% of total travel, the span may be adjusted to give a full 0 to 5 or 0 to 10 VDC output with the span set anywhere within the last 20% of travel. Alternatively, the zero position may be set anywhere between 10% and 90% of full travel to give an output of ±5 or ±10 VDC with the span set between 50% to 100% of the longest travel from the zero position.

**SPECIFICATIONS**

**GENERAL**
- Available Measurement Ranges: See Supplemental Data, Table 12
- Sensing Device: Precision Potentiometer
- Connector: MS3102E-14S-6P
- Mating Connector (included): MS3106E-14S-6S

**PERFORMANCE**
- Linearity: ±0.30% Full Scale
- 10°, 15°, 20° & 25° Ranges: ±0.20% Full Scale
- All other ranges: ±0.15% Full Scale
- Repeatability: ±0.015% Full Scale
- Resolution: Essentially Infinite
- Operating temperature: -40°C to +85°C
- Storage Temperature: -55°C to +100°C
- Operating humidity: 100%
- Vibration: 15 G’s 0.1 ms max.
- Shock: 50 G’s 0.1 ms max.

**INGRESS PROTECTION**
- IP-65 (NEMA 4): Mating Connector Included
- IP-65–NEMA 4 CONNECTOR: Standard
- IP-65–NEMA 4 MATING CONNECTOR: Optional
- IP-68 (NEMA 6):

**ENVIRONMENTAL**
- Storage Temperature: -55°C to +125°C
- Shock: 50 G’s 0.1 ms max.
- Temperature Stability: ±0.02%/oC of Span

**ELECTRICAL**
- Output: 0 to 5 or 10 VDC, ±5 or ±10 VDC
- Excitation Voltage: 4.9 to 30 VDC
- Excitation Current: 25 mA max.
- Output Impedance: 100Ω max.
- Output Load: 5KΩ min.

**ADJUSTMENT RANGE**
- Zero: 0 to 30% of Range
- Span: 80% to 100% of Range
- ADJUSTMENT RANGE: ±5 or ±10 VDC

**CONNECTION DIAGRAM**

**NOTES FOR OPTION BOXES 7, 8, and 9**

**IP-65 (NEMA 4):**
- Transducer equipped with body mounted connector and with or without mating connector.
- Mating connector with electrical cable available separately as part number 10119-xM where ‘x’ is length of electrical cable in meters.

**IP-68 (NEMA 6):**
- Transducer equipped with bulkhead fitting and length of electrical cable. Remote end of electrical cable may be outfitted with water proof connector. Mating connector with electrical cable available separately as part number 10424-xM where ‘x’ is length of electrical cable in meters.
Utilizing an incremental encoder as the sensor, the UniMeasure HX-EP Series position transducer provides a two channel square wave current sinking output signal in quadrature. The standard output is a single-ended TTL compatible square. The resolution values shown in the specifications table indicate resolution for times 1 counting mode where a count is registered for one up transition in 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. For example, the HX-EP-50 has a resolution of approximately .004" per count in times 1 counting mode whereas the resolution is approximately .001" per count in times 4 counting mode.

The actual resolution of a HX-EP transducer differs from unit to unit because of tolerances associated with the wire rope diameter and the capstan upon which the wire rope winds. The nylon jacketed wire rope option will have the effect of slightly reducing the resolution. Linearity and repeatability remain independent of resolution.

In applications where the output count is interpreted as a percentage of total travel, resolutional differences from unit to unit are not critical. However, 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 Electrical Outputs table below are available to facilitate interfacing to a variety of different types of equipment.

### SPECIFICATIONS

#### GENERAL
- Connector: MS3102E-14S-6P
- Mating Connector: MS3106E-14S-6S
- Available Measurement Ranges: See Supplemental Data (Table 12)

#### PERFORMANCE
- Linearity: ±0.03% Full Scale
- Repeatability: ±0.015% Full Scale
- Resolution: See Table 9

#### ENVIRONMENTAL
- Operating temperature: -20°C to +95°C
- Storage temperature: -40°C to +100°C
- Operating humidity: 100%
- Vibration: 15 G’s 0.1 ms max.
- Shock: 50 G’s 0.1 ms max.

#### INGRESS PROTECTION
- (Exclusive of Wire Rope Area)
  - Standard: IP-65 (NEMA 4)
  - Optional: IP-68 (NEMA 6)

#### ELECTRICAL
- Input Voltage: +5 VDC ±5% or 8-28 VDC
- Input Current: 125 mA Maximum
- Output: Two channel TTL square wave
- Phase Quadrature: 90° ±20°

### MODEL NUMBER CONFIGURATION

#### HX-EP-

<table>
<thead>
<tr>
<th>MODELS</th>
<th>0</th>
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<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>RANGE</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>SELECT MEASUREMENT RANGE FROM SUPPLEMENTAL DATA ON PAGE 12, INSERT CORRESPONDING MEASUREMENT RANGE DESIGNATOR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### WIRE ROPE

- **B** - Stainless Steel Wire Rope
  - **N** - Nylon Jacketed Stainless Steel Wire Rope
  - **J** - Jute Jacketed Stainless Steel Wire Rope

#### WIRE ROPE TENSION

- **1** - Standard
- **2** - Reduced (Ranges to 80’ only)

#### WIRE ROPE EXIT DIRECTION

- **0** - Standard
- **1** - Reduced

### TABLE 9 - RESOLUTION

<table>
<thead>
<tr>
<th>MODEL</th>
<th>RANGE</th>
<th>RESOLUTION</th>
<th>RESOLUTION TOLERANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>in</td>
<td>mm</td>
<td>counts/inch</td>
</tr>
<tr>
<td>HX-EP-10</td>
<td>10</td>
<td>250</td>
<td>0.00</td>
</tr>
<tr>
<td>HX-EP-25</td>
<td>25</td>
<td>640</td>
<td>0.00</td>
</tr>
<tr>
<td>HX-EP-50</td>
<td>50</td>
<td>1250</td>
<td>0.00</td>
</tr>
<tr>
<td>HX-EP-60</td>
<td>60</td>
<td>1.5m</td>
<td>0.00</td>
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<tr>
<td>HX-EP-80</td>
<td>80</td>
<td>2.0m</td>
<td>0.00</td>
</tr>
<tr>
<td>HX-EP-100</td>
<td>100</td>
<td>2.5m</td>
<td>0.00</td>
</tr>
</tbody>
</table>

### ELECTRICAL OUTPUT

For electrical output description, waveform and wiring. See Standard Series Supplemental Data, TABLE 8, Page 29.

**FOOTNOTES TO SPECIFICATIONS**

1. Supplemental Data section located at end of HX Series pages.
2. Transducer equipped with body mounted connector and with or without mating connector. Mating connector with electrical cable available as separate part number 10119-xM where ‘x’ is length of electrical cable in meters.

### IP-65 NEMA 4 CONNECTOR

- B - 6 Pin 3102E Body Mounted Connector
- IP-68 NEMA 6 ELECTRICAL CABLE
  - P - Bulkhead Fitting w/ 0.3m (12") Electrical Cable
  - B - Bulkhead Fitting w/ 3m (10') Electrical Cable
  - B - Bulkhead Fitting w/ 4m (13.7') Electrical Cable
  - B - Bulkhead Fitting w/ 5m (16.5') Electrical Cable
  - B - Bulkhead Fitting w/ 6m (20') Electrical Cable
  - B - Bulkhead Fitting w/ 7m (23') Electrical Cable

### IP-65 NEMA 4 MATING CONNECTOR

- C - IP-65 Mating Connector Included
- K - IP-65 Mating Connector Omit

**NOTE:** Electrical cable with mating connector may be ordered separately as part number 10119-xM where ‘x’ is the length required in meters.

### IP-68 NEMA 6 CABLE MOUNTED CONNECTOR

- N - No connector on end of electrical cable
- K - IP-68 Cable to cable connector with NO mating connector

**NOTE:** Electrical cable with mating connector may be ordered separately as part number 10424-xM where ‘x’ is the length required in meters. Mating connector alone unavailable.
# TABLE 8

## EP, HX-EP SERIES   OPTIONAL ELECTRICAL OUTPUTS

<table>
<thead>
<tr>
<th>OPTION</th>
<th>OUTPUT DESCRIPTION</th>
<th>OUTPUT STAGE</th>
<th>WAVEFORM</th>
<th>CONNECTOR WIRING</th>
</tr>
</thead>
</table>
| 10     | 5 VDC Current Sinking  
5 VDC TTL compatible output.  
Input Voltage: 5 VDC. | ![Output Stage Diagram](image1) | ![Waveform Diagram](image2) | ![Connector Wiring Diagram](image3) |
| 50     | 8 to 28 VDC Current Sinking  
Current sinking output with 10K internal pullup resistors.  
Input Voltage: 8 to 28 VDC. | ![Output Stage Diagram](image4) | ![Waveform Diagram](image5) | ![Connector Wiring Diagram](image6) |
| 30     | 5 VDC Push-Pull Differential Line Drive  
Push-Pull, current sourcing and current sinking output.  
Output is compliant with requirements of TIA/EIA-422-B.  
Input Voltage: 5 VDC input. | ![Output Stage Diagram](image7) | ![Waveform Diagram](image8) | ![Connector Wiring Diagram](image9) |
| 70     | 8 to 28 VDC Push-Pull Differential Line Drive  
Push-Pull, current sourcing and current sinking output.  
Input Voltage: 8 to 28 VDC. | ![Output Stage Diagram](image10) | ![Waveform Diagram](image11) | ![Connector Wiring Diagram](image12) |

## MECHANICAL SPECIFICATIONS

**AVAILABLE MEASUREMENT RANGES** .... See Table 12

**CONSTRUCTION**
- Ranges 80" (2 m) and under ............... Anodized Aluminum Mounting Base  
  Stainless Steel & Anodized Aluminum Housing  
- Ranges 100" (2.5 m) and greater ........... Stainless Steel Mounting Base  
  High Impact, Corrosion Resistant  
  Thermoplastic Housings

**Wire Rope Tension** ..................................... See Table 12

**Wire Rope Diameter** .................................. See Table 12

**Weight** ...................................................... See Table 12

**Connector** ................................................ MS3102A-14S-6P

**Mating Connector** ....................................... MS3106E-14S-6S

**Optional NEMA 6 Capability**  ....................... Bulkhead fitting with shielded twisted pair cable

**Life**
- Ranges 2" to 6" ........................................ 5,000,000 full stroke cycles
- Ranges 10" to 25" ..................................... 500,000 full stroke cycles
- Ranges 30" to 400" .................................. 250,000 full stroke cycles
- Ranges 500" to 2000" ................................ 200x10^6 lineal inches

**NOTES:**
1. With 1K ohm potentiometer, wire rope misalignment 2" maximum at full stroke, relatively dust free environment, nylon jacketed wire rope on units with ranges 80" and less.
The UniMeasure HX-V Series linear velocity transducer incorporates a self-generating tachometer which eliminates the need for any external power supply. Extra long brush life, excellent stability and a wide operating temperature range make the V series transducer highly reliable for long term service.

**SPECIFICATIONS**

**GENERAL**
Available Measurement Ranges .......... See Supplemental Data, Table 12
Connector .................................... MS3102E-14S-6P
Mating Connector ......................... MS3106E-14S-6S

**ENVIRONMENTAL**
Operating temperature ................. -40°C to +95°C
Storage Temperature ...................... -55°C to +125°C
Operating humidity ....................... 100%
Vibration .................................. 15 G’s 0.1 ms max.
Shock ....................................... 50 G’s 0.1 ms max.

**INGRESS PROTECTION**
Excluding (Exclusive of Wire Rope Area)
Standard ................................... IP-65 (NEMA 4)
Optional ................................. IP-68 (NEMA 6)

**ELECTRICAL**
Output .................................... See Table 10
Linearity ................................... ±0.10% F.S. with 10 VDC Max Output
Ripple ...................................... 0.01% Max.
Input ....................................... None Required; Self Generating
Output Impedance ........................ 3500
Thermal Effects ......................... ±0.10% F.S. with 10 VDC Max Output

**FOOTNOTES TO SPECIFICATIONS**
1. Supplemental Data section located at end of HX Series pages.

**MODEL NUMBER CONFIGURATION**

**HX-V-**

**RANGE**
Select Measurement Range From Supplemental Data (Table 12) next page. Insert Corresponding Measurement Range Designator

**WIRE ROPE**
5 Stainless Steel
(See Supplemental Data, Table 12)
N 0.016 (0.41 mm)
Stainless Wire Rope
Nylon Jacketed Stainless Steel Ranges 2" (50 mm) to 60" (150 mm)

**WIRE ROPE LENGTH**
1 Standard
2 Reduced (Ranges to 60"") only

**WIRE ROPE EXIT DIRECTION**
Use Number designators shown

**RANGE**
WIRE ROPE EXIT DIRECTION

**WIRE ROPE**
5 Stainless Steel
(See Supplemental Data, Table 12)
N 0.016 (0.41 mm)
Stainless Wire Rope
Nylon Jacketed Stainless Steel Ranges 2" (50 mm) to 60" (150 mm)

**WIRE ROPE LENGTH**
1 Standard
2 Reduced (Ranges to 60"") only

**WIRE ROPE EXIT DIRECTION**
Use Number designators shown

**RANGE**

**NOTES FOR OPTION BOXES**

**IP-65 (NEMA 4)**
Transducer equipped with body mounted connector and with or without mating connector. Mating connector with electrical cable available separately as part number 10191-xM where ‘x’ is length of electrical cable in meters.

**IP-68 (NEMA 6)**
Transducer equipped with bulkhead fitting and length of electrical cable. Remote end of electrical cable may be outfitted with water proof connector. Mating connector with electrical cable available separately as part number 10424-xM where ‘x’ is length of electrical cable in meters.

**INGRESS PROTECTION**

**IP-65 (NEMA 4)**
1 IP-65 (NEMA 4) Connection Required
2 IP-65 (NEMA 4) Connection Optional
3 IP-65 (NEMA 4) Corrosion Resistant Construction

**IP-68 (NEMA 6)**
4 IP-68 (NEMA 6) Electrical Cable
5 IP-68 (NEMA 6) Electrical Cable
6 IP-68 (NEMA 6) Electrical Cable

**IP-65 (NEMA 4) MATING CONNECTOR**
C........ IP-65 Mating Connector Included
K........ IP-65 Mating Connector Optional

**IP-68 (NEMA 6) CABLE MOUNTED CONNECTOR**
N........ No connector on end of electrical cable
K........ IP-68 Cable to cable connector with no mating connector

**CONNECTION DIAGRAM**

**DATA SECTION**

... Data section located at end of HX Series pages.

**CONNECTION DIAGRAM**
POSITIVE OUTPUT OCCURS WITH CABLE EXTENDING

PM Instrumentation | 59 rue Emile Deschanel | F-92400 Courbevoie | France
+33(0) 46 91 93 30 | contact@pm-instrumentation.com | www.pm-instrumentation.com
The UniMeasure HX-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 ratiometric voltage. Optionally available position outputs include ratiometric voltage from a bridge circuit, 4 to 20 mA, 0 to 10 VDC, and ±10 VDC. See HX-PB, HX-P420 and HX-P510 data sheets for electrical specifications.

**SPECIFICATIONS**

**FOR HX-VPB, HX-VP420 AND HX-VP510 SERIES SPECIFICATIONS, SEE HX-PB, HX-P420, AND HX-P510 SERIES PAGES.**

**GENERAL**
- **Available Measurement Ranges**: See Supplemental Data,[2] Table 12
- **Connector**: MS102A-14S-6P
- **Mating Connector**: MS106E-14S-6S

**PERFORMANCE**
- **Positional Linearity (HX-VP Only)**
  - 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**: ±0.015% Full Scale
- **Positional Resolution**: Essentially Infinite

**ENVIRONMENTAL**
- **Thermal Coef. of Potentiometer**: ±100 PPM/°C max.
- **Operating temperature**: -40°C to +95°C
- **Operating humidity**: 100%
- **Vibration**: 15 g's @ 0.1 ms max.
- **Shock**: 50 g's @ 0.1 ms max.

**INGRESS PROTECTION** (Exclusive of Wire Rope Area)
- **Standard**: IP-65 (NEMA 4)
- **Optional**: IP-68 (NEMA 6)

**FOOTNOTES TO SPECIFICATIONS**
1. Supplemental Data section located at end of HX-Series pages.

---

**MODEL NUMBER CONFIGURATION**

**HX-VP**

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<tr>
<th>E</th>
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<td><strong>ELECTRICAL OUTPUT</strong></td>
<td><strong>RANGE</strong></td>
<td><strong>POSITION ELECTRICAL OUTPUT</strong></td>
<td><strong>Wire Rope</strong></td>
<td><strong>Wire Rope Tension</strong></td>
<td><strong>Wire Rope Exit Direction</strong></td>
<td><strong>Potentiometer Value</strong></td>
<td><strong>Electrical Output Polarity</strong></td>
<td><strong>Electrical Output Impedance</strong></td>
<td><strong>Electrical Output Polarity</strong></td>
<td><strong>Electrical Output Impedance</strong></td>
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<td>Voltage Divider Circuit</td>
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<td>Standard to 60' (20m) only (formerly N2C)</td>
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</table>

**BASE CONFIGURATION**

**FOR ALL RANGES**

**HX-VP50-S10-N1S-1BC**

**INGRESS PROTECTION**
1. IP-55 (NEMA 4)
2. IP-66 (NEMA 6)
3. IP-68 (NEMA 6) Conduit Resistant Construction

**IP-65/NEMA 4 CONNECTOR**

- [6 Pin] 312*2 Body Mounted Connector

**IP-68/NEMA 6 ELECTRICAL CABLE**

- 1000 Volts Max AC or DC
- 5000 Volts Max AC or DC

**IP-65/NEMA 4 MATING CONNECTOR**

**NOTES FOR OPTION BOXES**

- **Select Measurement Range**
- **Required Designator**
- **Required Designator**
- **Required Designator**
- **Required Designator**
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- **Required Designator**
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- **Required Designator**
### MECHANICAL SPECIFICATIONS

**AVAILABLE MEASUREMENT RANGES**... See Table 12

**CONSTRUCTION**
- **Ranges 80” (2 m) and under**
  - Stainless Steel & Anodized Aluminum Housing
- **Ranges 100” (2.5 m) and greater**
  - Stainless Steel Mounting Base

**Wire Rope Tension**... See Table 12
- **Wire Rope Diameter**... See Table 12
- **Weight**... See Table 12

**Connector**... MS3102A-14S-6P
- **Mating Connector**... MS3106E-14S-6S

**Optional NEMA 6 Capability**...
- Bulkhead fitting with shielded twisted pair cable

**Life**
- **RANGES 2” TO 6”**
  - 5,000,000 full stroke cycles
- **RANGES 10” TO 25”**
  - 500,000 full stroke cycles
- **RANGES 30” TO 400”**
  - 250,000 full stroke cycles
- **RANGES 500” TO 2000”**
  - 200x10\(^6\) lineal inches

**TYPICAL HX MOUNTING BOLTS**

**NOTES:**
- With 1K ohm potentiometer, wire rope misalignment 2° maximum at full stroke, relatively dust-free environment, nylon jacketed wire rope on units with ranges 80” and less.

### TABLE 12

<table>
<thead>
<tr>
<th>MEASUREMENT RANGE DESIGNATOR</th>
<th>STANDARD MEASUREMENT RANGES</th>
<th>APPLICABLE SERIES</th>
<th>WIRE ROPE TENSION (NOMINAL)</th>
<th>WIRE ROPE DIAMETER</th>
<th>TRANSDUCER WEIGHT</th>
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Specifications subject to change without notice
### OPTION DESCRIPTIONS

<table>
<thead>
<tr>
<th>OPTION</th>
<th>OPTION DESIGNATOR</th>
<th>DESCRIPTION</th>
</tr>
</thead>
</table>
| NYLON JACKETED WIRE ROPE  
**RANGES TO 80” ONLY** | N | Replaces standard stainless steel wire rope with Ø.018 nylon jacketed wire rope. This option increases wire rope life dramatically but may increase non-linearity by as much as ±.05% of full scale. |
| NYLON JACKETED WIRE ROPE  
**RANGES 100” TO 500” ONLY** | J | Replaces standard stainless steel wire rope with Ø.037 nylon jacketed wire rope. |
| ALTERNATE WIRE ROPE EXIT  
**RANGES TO 80” (2.0 m)** | 1, 2, 3 | ![Diagram](image)  
2", 10" | 1.12 (28.4) | 1.79 (45.5) | 1.21 (30.7)  
3", 15", 30" | .96 (24.4) | 1.95 (49.5) | 1.37 (34.8)  
4", 20", 40" | .80 (20.3) | 2.11 (53.6) | 1.53 (38.9)  
5", 25", 50" | .64 (16.3) | 2.27 (57.7) | 1.69 (42.9)  
6", 60" | .49 (12.4) | 2.42 (61.5) | 1.84 (46.7)  
80" | .25 (6.4) | 2.66 (67.6) | 2.08 (52.8)  
Dimensions in brackets are millimeters. |
| ALTERNATE WIRE ROPE EXIT  
**RANGES 100” (2.5 m) and GREATER** | 1, 2, 3 | ![Diagram](image)  
2", 10" | 1.12 (28.4) | 1.79 (45.5) | 1.21 (30.7)  
3", 15", 30" | .96 (24.4) | 1.95 (49.5) | 1.37 (34.8)  
4", 20", 40" | .80 (20.3) | 2.11 (53.6) | 1.53 (38.9)  
5", 25", 50" | .64 (16.3) | 2.27 (57.7) | 1.69 (42.9)  
6", 60" | .49 (12.4) | 2.42 (61.5) | 1.84 (46.7)  
80" | .25 (6.4) | 2.66 (67.6) | 2.08 (52.8)  
Dimensions in brackets are millimeters. |
| NON-STANDARD POTENTIOMETER  
**APPLIES TO HX-PA & HX-VPA ONLY** | 3, 4 | Non-standard potentiometer linearity is as follows:  
<table>
<thead>
<tr>
<th>RANGE</th>
<th>LINEARITY</th>
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</thead>
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<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>
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</table>
*Note: This option is subject to potentiometer availability.* |
| 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. |
| IP-68, (NEMA 6) CAPABILITY | 2 | Connector is replaced with a bulkhead fitting and a designated length of urethane jacketed, shielded, twisted pair cable. Retraction mechanism and electrical components are sealed to IP-68, (NEMA 6) capability. |
| CORROSION RESISTANT CONSTRUCTION | 3 | All external anodized aluminum parts of transducer are replaced with stainless steel and corrosion resistant plastic. Transducer is sealed to IP-68 (NEMA 6) capability. Urethane jacketed, shielded, twisted pair cable exits unit. No connector on unit. |
DIMENSIONAL INFORMATION

**HX SERIES – RANGES TO 80” (2 m)**

<table>
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<th>RANGE</th>
<th>DIM “A” (inch)</th>
<th>DIM “A” (mm)</th>
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<td>3”, 15”, 30”</td>
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<td>4”, 20”, 40”</td>
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<td>5”, 25”, 50”</td>
<td>1.69</td>
<td>42.9</td>
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<td>6”, 60”</td>
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<td>80”</td>
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**TABLE 14**

<table>
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<th>RANGE</th>
<th>DIM “A” (inch)</th>
<th>DIM “B” (inch)</th>
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<td>Ranges to 800”</td>
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<tr>
<td>1000” to 2000”</td>
<td>11.0</td>
<td>5.60</td>
</tr>
</tbody>
</table>

**HX SERIES – RANGES GREATER THAN 80” (2 m)**

**NOTES:**
1. Transducer mounts with Ø.25 or M6 Socket head cap bolts.

**TABLE 13**

<table>
<thead>
<tr>
<th>RANGE</th>
<th>DIM “A” (inch)</th>
<th>DIM “B” (inch)</th>
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<td>Ranges to 800”</td>
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<tr>
<td>1000” to 2000”</td>
<td>11.0</td>
<td>5.60</td>
</tr>
</tbody>
</table>

**NOTES:**
1. Dimensions in brackets are millimeters.

Dimensions in brackets are millimeters.

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**HX SERIES – RANGES TO 80” (2 m)**

**NOTES:**
1. Transducer mounts with Ø.50 or M12 socket head cap bolts.

**TABLE 14**

<table>
<thead>
<tr>
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<th>DIM “A” (inch)</th>
<th>DIM “B” (inch)</th>
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</thead>
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<td>3.80</td>
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<tr>
<td>1000” to 2000”</td>
<td>11.0</td>
<td>5.60</td>
</tr>
</tbody>
</table>

**NOTES:**
1. Dimensions in brackets are millimeters.

Dimensions in brackets are millimeters.