

The **UniMeasure HX-P510 Series** transducer offers a voltage output with wide adjustability to give a 0 to 5, 0 to 10,  $\pm 5$  or  $\pm 10$  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  $\pm 5$  or  $\pm 10$  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<sup>[1]</sup>, Table 12  
Sensing Device ..... Precision Potentiometer  
Connector ..... MS3102E-14S-6P  
Mating Connector (included) ..... MS3106E-14S-6S

**PERFORMANCE**

Linearity  
2", 3", 4", 5" & 6" Ranges .....  $\pm 0.30\%$  Full Scale  
10", 15", 20" & 25" Ranges .....  $\pm 0.20\%$  Full Scale  
All other ranges .....  $\pm 0.15\%$  Full Scale  
Repeatability .....  $\pm 0.015\%$  Full Scale  
Resolution ..... Essentially Infinite

**ENVIRONMENTAL**

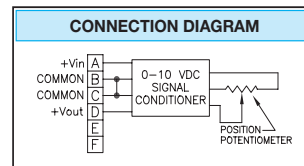
Operating temperature .....  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$   
Storage Temperature .....  $-55^{\circ}$  to  $+100^{\circ}\text{C}$   
Operating humidity ..... 100%  
Vibration ..... 15 G's 0.1 ms max.  
Shock ..... 50 G's 0.1 ms max.

**INGRESS PROTECTION (Exclusive of Wire Rope Area)**

Standard ..... IP-65 (NEMA 4)  
Optional ..... IP-68 (NEMA 6)

**ELECTRICAL**

Output ..... 0 to 5 or 10 VDC,  $\pm 5$  or  $\pm 10$  VDC  
Excitation Voltage ..... 4.9 to 30 VDC  
Excitation Current ..... 25 mA max.  
Output Impedance ..... 10 $\Omega$  max.  
Output Load ..... 5K $\Omega$  min.  
**ADJUSTMENT RANGE-0 to 5 or 0 to 10 VDC**  
Zero ..... 0 to 30% of Range  
Span ..... 80% to 100% of Range  
**ADJUSTMENT RANGE- $\pm 5$  or  $\pm 10$  VDC**  
Zero ..... 10% to 90% of Range  
Span ..... 50% to 100% of Longest Possible Travel from Zero Position  
Protection ..... Reversed Polarity  
Temperature Stability ..... 0.02%/ $^{\circ}\text{C}$  of Span



**FOOTNOTES TO SPECIFICATIONS**

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

**MODEL NUMBER CONFIGURATION**

**HX-P510-** 0 1 2 3 4 5 6 7 8 9

**BASIC CONFIGURATION (FOR ALL RANGES)**

**HX-P510-50-S10-N0S-1BC**

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

**1 WIRE ROPE**  
**S** ..... Stainless Steel (See Supplemental Data, Table 12)  
**N** .....  $\varnothing.018$  (0,45 mm) Nylon Jacketed Stainless Steel Ranges to 80" (2m) only. (formerly NJC)  
**J** .....  $\varnothing.037$  (0,94 mm) Nylon Jacketed Stainless Steel Ranges 100" (2.5m) to 500" (12.7m) only.

**2 WIRE ROPE TENSION**  
**1** ..... Standard  
**2** ..... Reduced (Ranges to 80" only)

**3 WIRE ROPE EXIT DIRECTION**  
Use Number designators shown RANGES TO 80" (2000 mm)

RANGES 100" TO 2000" (2,5 m TO 50 M)

**4 N** ..... Required Designator  
**5 O** ..... Required Designator  
**6 ELECTRICAL OUTPUT POLARITY**  
**S** ..... Standard (increasing output as wire rope is extended)  
**R** ..... Reversed (decreasing output as wire rope is extended)

**7 INGRESS PROTECTION**  
**1** ..... IP-65 (NEMA 4)  
**2** ..... IP-68 (NEMA 6)  
**3** ..... IP-68 (NEMA 6) Corrosion Resistant Construction

**8 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  
**3** ..... Bulkhead Fitting w/ 3m (10') Electrical Cable  
**4** ..... Bulkhead Fitting w/ 4m (13.5') Electrical Cable  
**5** ..... Bulkhead Fitting w/ 5m (16.5') Electrical Cable  
**6** ..... Bulkhead Fitting w/ 6m (20') Electrical Cable  
**7** ..... Bulkhead Fitting w/ 7m (23') Electrical Cable

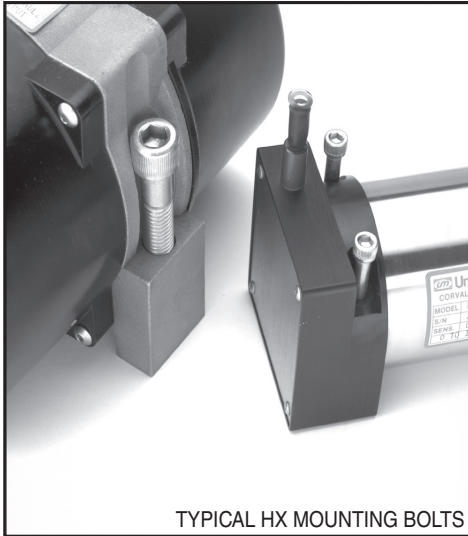
**9 IP-65-NEMA 4 MATING CONNECTOR**  
**C** ..... IP-65 Mating Connector Included  
**K** ..... IP-65 Mating Connector Omitted\*  
\*Electrical cable with mating connector may be ordered separately as part number 10119-xM where 'x' is the length required in meters.  
**IP-68-NEMA 6 CABLE MOUNTED CONNECTOR**  
**N** ..... No connector on end of electrical cable  
**K** ..... IP-68 Cable to cable connector with **NO** mating connector\*\*  
\*\*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.

**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.

**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<sup>(1)</sup>**

- 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<sup>6</sup> lineal inches

**NOTES:**

<sup>1</sup>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.

Use value from this column to indicate overall measurement range

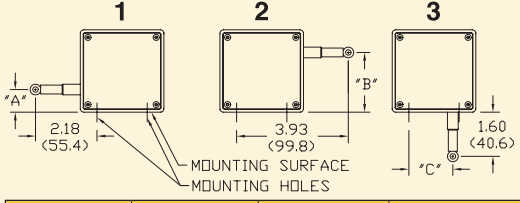
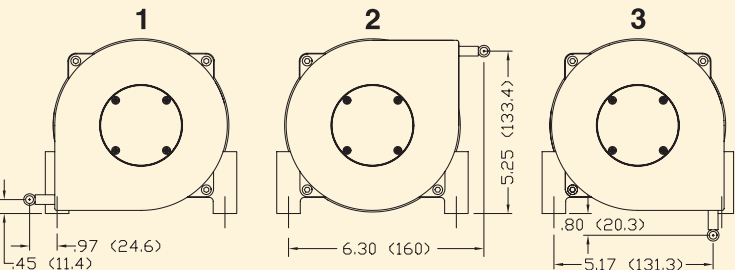


Check mark indicates available measurement range

**TABLE 12**

| MEASUREMENT RANGE DESIGNATOR | STANDARD MEASUREMENT RANGES |       | APPLICABLE SERIES                    |       |               | WIRE ROPE TENSION (NOMINAL) |      | WIRE ROPE DIAMETER |      | TRANSDUCER WEIGHT |      | Product Photo |
|------------------------------|-----------------------------|-------|--------------------------------------|-------|---------------|-----------------------------|------|--------------------|------|-------------------|------|---------------|
|                              | (in)                        | (mm)  | HX-PA<br>HX-PB<br>HX-P420<br>HX-P510 | HX-EP | HX-V<br>HX-VP | (oz)                        | (N)  | (in)               | (mm) | (lb)              | (Kg) |               |
| 2                            | 2                           | 50    | ✓                                    | -     | ✓             | 34                          | 9.4  | .016               | 0.4  | 2                 | 0.9  |               |
| 3                            | 3                           | 75    | ✓                                    | -     | ✓             | 24                          | 6.7  | .016               | 0.4  | 2                 | 0.9  |               |
| 4                            | 4                           | 100   | ✓                                    | -     | ✓             | 24                          | 6.7  | .016               | 0.4  | 2                 | 0.9  |               |
| 5                            | 5                           | 125   | ✓                                    | -     | ✓             | 19                          | 5.3  | .016               | 0.4  | 2                 | 0.9  |               |
| 6                            | 6                           | 150   | ✓                                    | -     | ✓             | 24                          | 6.7  | .016               | 0.4  | 2                 | 0.9  |               |
| 10                           | 10                          | 250   | ✓                                    | ✓     | ✓             | 34                          | 9.4  | .016               | 0.4  | 2                 | 0.9  |               |
| 15                           | 15                          | 390   | ✓                                    | -     | ✓             | 24                          | 6.7  | .016               | 0.4  | 2                 | 0.9  |               |
| 20                           | 20                          | 500   | ✓                                    | -     | ✓             | 24                          | 6.7  | .016               | 0.4  | 2                 | 0.9  |               |
| 25                           | 25                          | 640   | ✓                                    | ✓     | ✓             | 19                          | 5.3  | .016               | 0.4  | 2                 | 0.9  |               |
| 30                           | 30                          | 750   | ✓                                    | -     | ✓             | 24                          | 6.7  | .016               | 0.4  | 2                 | 0.9  |               |
| 40                           | 40                          | 1000  | ✓                                    | -     | ✓             | 24                          | 6.7  | .016               | 0.4  | 2                 | 0.9  |               |
| 50                           | 50                          | 1250  | ✓                                    | ✓     | ✓             | 19                          | 5.3  | .016               | 0.4  | 2                 | 0.9  |               |
| 60                           | 60                          | 1500  | ✓                                    | ✓     | ✓             | 24                          | 6.7  | .016               | 0.4  | 2                 | 0.9  |               |
| 80                           | 80                          | 2.0m  | ✓                                    | ✓     | ✓             | 21                          | 5.8  | .016               | 0.4  | 2                 | 0.9  |               |
| 100                          | 100                         | 2.5m  | ✓                                    | ✓     | ✓             | 36                          | 10.0 | .024               | 0.6  | 6.8               | 3.1  |               |
| 120                          | 120                         | 3.0m  | ✓                                    | ✓     | ✓             | 36                          | 10.0 | .024               | 0.6  | 6.8               | 3.1  |               |
| 150                          | 150                         | 3.8m  | ✓                                    | ✓     | ✓             | 36                          | 10.0 | .024               | 0.6  | 6.8               | 3.1  |               |
| 200                          | 200                         | 5.0m  | ✓                                    | ✓     | ✓             | 36                          | 10.0 | .024               | 0.6  | 6.8               | 3.1  |               |
| 250                          | 250                         | 6.3m  | ✓                                    | ✓     | ✓             | 36                          | 10.0 | .024               | 0.6  | 6.8               | 3.1  |               |
| 300                          | 300                         | 7.5m  | ✓                                    | ✓     | ✓             | 36                          | 10.0 | .024               | 0.6  | 6.8               | 3.1  |               |
| 350                          | 350                         | 8.8m  | ✓                                    | ✓     | ✓             | 36                          | 10.0 | .024               | 0.6  | 6.8               | 3.1  |               |
| 400                          | 400                         | 10.0m | ✓                                    | ✓     | ✓             | 36                          | 10.0 | .024               | 0.6  | 6.8               | 3.1  |               |
| 500                          | 500                         | 12.5m | ✓                                    | ✓     | ✓             | 36                          | 10.0 | .024               | 0.6  | 8.6               | 3.9  |               |
| 600                          | 600                         | 15.2m | ✓                                    | ✓     | ✓             | 36                          | 10.0 | .024               | 0.6  | 8.6               | 3.9  |               |
| 800                          | 800                         | 20.3m | ✓                                    | ✓     | ✓             | 36                          | 10.0 | .024               | 0.6  | 8.6               | 3.9  |               |
| 1000                         | 1000                        | 25.4m | ✓                                    | ✓     | -             | 36                          | 10.0 | .024               | 0.6  | 12.0              | 5.4  |               |
| 1200                         | 1200                        | 30.4m | ✓                                    | ✓     | -             | 36                          | 10.0 | .024               | 0.6  | 12.3              | 5.6  |               |
| 1600                         | 1600                        | 40.6m | ✓                                    | ✓     | -             | 36                          | 10.0 | .024               | 0.6  | 14.1              | 6.4  |               |
| 1800                         | 1800                        | 45.7m | ✓                                    | ✓     | -             | 36                          | 10.0 | .021               | 0.6  | 15.9              | 7.2  |               |
| 2000                         | 2000                        | 50.8m | ✓                                    | ✓     | -             | 36                          | 10.0 | .021               | 0.5  | 16.3              | 7.4  |               |

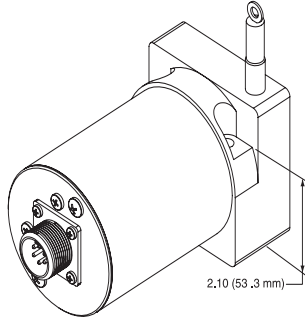
Specifications subject to change without notice

**OPTION DESCRIPTIONS**

| OPTION   | OPTION DESIGNATOR    | DESCRIPTION  |             |           |              |                      |            |                      |               |                      |              |           |             |             |              |            |             |             |              |            |             |             |         |            |             |             |     |           |             |             |
|--|----------------------|--|-------------|-----------|--------------|----------------------|------------|----------------------|---------------|----------------------|--------------|-----------|-------------|-------------|--------------|------------|-------------|-------------|--------------|------------|-------------|-------------|---------|------------|-------------|-------------|-----|-----------|-------------|-------------|
| <b>NYLON JACKETED WIRE ROPE</b><br><u>RANGES TO 80" ONLY</u>                   | <b>N</b>             | 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.   |             |           |              |                      |            |                      |               |                      |              |           |             |             |              |            |             |             |              |            |             |             |         |            |             |             |     |           |             |             |
| <b>NYLON JACKETED WIRE ROPE</b><br><u>RANGES 100" TO 500" ONLY</u>             | <b>J</b>             | Replaces standard stainless steel wire rope with Ø.037 nylon jacketed wire rope.   |             |           |              |                      |            |                      |               |                      |              |           |             |             |              |            |             |             |              |            |             |             |         |            |             |             |     |           |             |             |
| <b>ALTERNATE WIRE ROPE EXIT</b><br><u>RANGES TO 80" (2.0 m)</u>                | <b>1, 2, 3</b>       |  <table border="1"> <thead> <tr> <th>RANGE</th> <th>"A"</th> <th>"B"</th> <th>"C"</th> </tr> </thead> <tbody> <tr> <td>2", 10"</td> <td>1.12 (28.4)</td> <td>1.79 (45.5)</td> <td>1.21 (30.7)</td> </tr> <tr> <td>3", 15", 30"</td> <td>.96(24.4)</td> <td>1.95 (49.5)</td> <td>1.37 (34.8)</td> </tr> <tr> <td>4", 20", 40"</td> <td>.80 (20.3)</td> <td>2.11 (53.6)</td> <td>1.53 (38.9)</td> </tr> <tr> <td>5", 25", 50"</td> <td>.64 (16.3)</td> <td>2.27 (57.7)</td> <td>1.69 (42.9)</td> </tr> <tr> <td>6", 60"</td> <td>.49 (12.4)</td> <td>2.42 (61.5)</td> <td>1.84 (46.7)</td> </tr> <tr> <td>80"</td> <td>.25 (6.4)</td> <td>2.66 (67.6)</td> <td>2.08 (52.8)</td> </tr> </tbody> </table> <p><i>Dimensions in brackets are millimeters</i></p> | RANGE       | "A"       | "B"          | "C"                  | 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) |
| RANGE  | "A"                  | "B"  | "C"         |           |              |                      |            |                      |               |                      |              |           |             |             |              |            |             |             |              |            |             |             |         |            |             |             |     |           |             |             |
| 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) |           |              |                      |            |                      |               |                      |              |           |             |             |              |            |             |             |              |            |             |             |         |            |             |             |     |           |             |             |
| <b>ALTERNATE WIRE ROPE EXIT</b><br><u>RANGES 100" (2.5 m) and GREATER</u>      | <b>1, 2, 3</b>       |  <p><i>Dimensions in brackets are millimeters</i></p>  |             |           |              |                      |            |                      |               |                      |              |           |             |             |              |            |             |             |              |            |             |             |         |            |             |             |     |           |             |             |
| <b>NON-STANDARD POTENTIOMETER</b><br><u>APPLIES TO HX-PA &amp; HX-VPA ONLY</u> | <b>3, 4</b>          | <p>Non-standard potentiometer linearity is as follows:</p> <table border="1"> <thead> <tr> <th>RANGE</th> <th>LINEARITY</th> </tr> </thead> <tbody> <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> </tbody> </table> <p><b>Note:</b> This option is subject to potentiometer availability.</p>  | 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 |  |             |           |              |                      |            |                      |               |                      |              |           |             |             |              |            |             |             |              |            |             |             |         |            |             |             |     |           |             |             |
| <b>REVERSED OUTPUT</b>   | <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.  |             |           |              |                      |            |                      |               |                      |              |           |             |             |              |            |             |             |              |            |             |             |         |            |             |             |     |           |             |             |
| <b>IP-68, (NEMA 6) CAPABILITY</b>  | <b>2</b>             |  <p>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.</p>  |             |           |              |                      |            |                      |               |                      |              |           |             |             |              |            |             |             |              |            |             |             |         |            |             |             |     |           |             |             |
| <b>CORROSION RESISTANT CONSTRUCTION</b>  | <b>3</b>             | <p>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.</p>   |             |           |              |                      |            |                      |               |                      |              |           |             |             |              |            |             |             |              |            |             |             |         |            |             |             |     |           |             |             |

**DIMENSIONAL INFORMATION**

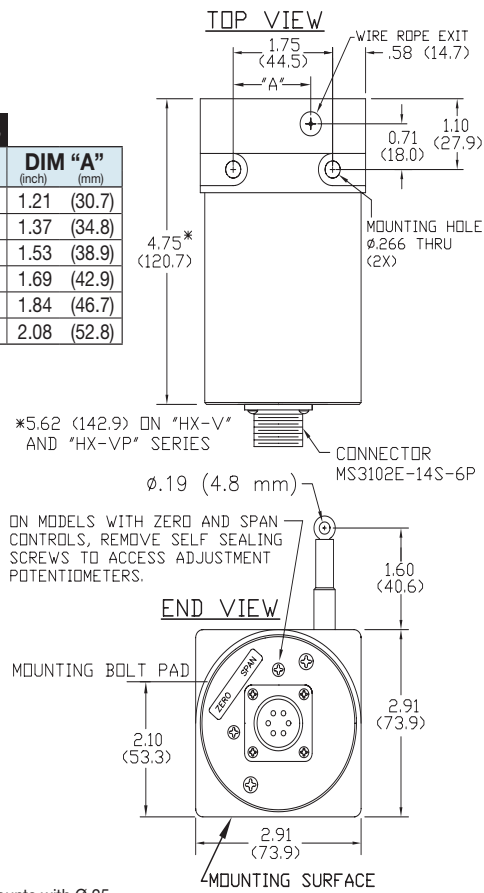
**HX SERIES – RANGES TO 80" (2 m)**



**Fig. 1**

**TABLE 13**

| RANGE        | DIM "A"     |
|--------------|-------------|
|              | (inch) (mm) |
| 2", 10"      | 1.21 (30.7) |
| 3", 15", 30" | 1.37 (34.8) |
| 4", 20", 40" | 1.53 (38.9) |
| 5", 25", 50" | 1.69 (42.9) |
| 6", 60"      | 1.84 (46.7) |
| 80"          | 2.08 (52.8) |



**NOTES:**

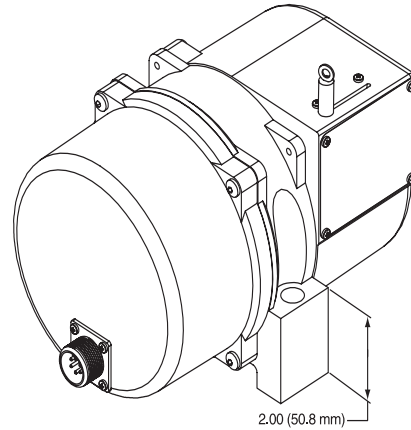
1. Transducer mounts with Ø.25 or M6 Socket head cap bolts.

Dimensions in brackets are millimeters

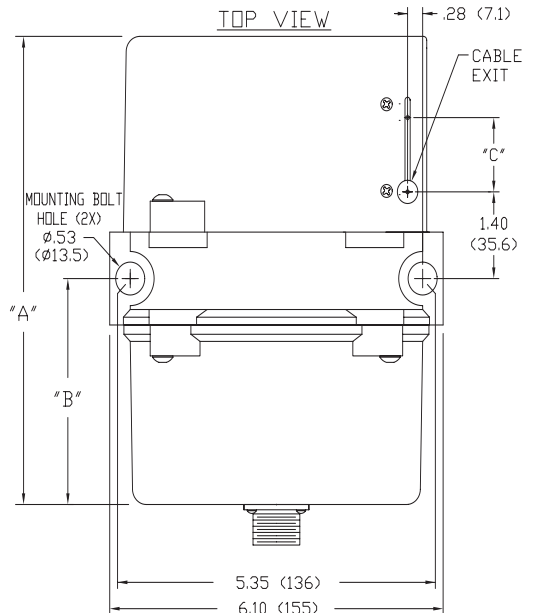
**TABLE 14**

| RANGE          | DIM "A"     | DIM "B"     |
|----------------|-------------|-------------|
|                | (inch) (mm) | (inch) (mm) |
| Ranges to 800" | 7.70 (196)  | 3.80 (97)   |
| 1000" to 2000" | 11.0 (280)  | 5.60 (142)  |

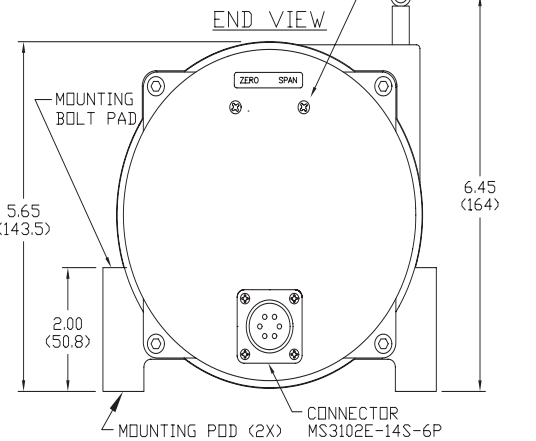
**HX SERIES – RANGES GREATER THAN 80" (2 m)**



**Fig. 2**



ON MODELS WITH ZERO AND SPAN CONTROLS, REMOVE SELF SEALING SCREWS TO ACCESS ADJUSTMENT POTENTIOMETERS.



Dimensions in brackets are millimeters