CLS0950 Ultra-slim range

These high performance ultra slim linear potentiometers are designed for the most demanding control and measurement applications. They are constructed from aluminum alloy and stainless steel for high strength and durability, yet are lightweight in design, making them ideal for industrial, automotive and motorsport applications.

- Measurement Range: 10mm to 150mm (6”)
- Ultra slim compact 9.54mm body Ø
- 3.0mm dia. operating shaft
- Sealed as standard
- Raychem cabling
- Choice of mounting
- Very long operational life
- Models available from stock

Model dimensions and mounting

CLS0951 - body clamp mounting

For electrical connection diagram, see page 3

For mounting accessories, see page 3

Doc. Ref: WS-CLS0950-1
Mounting accessories

Mounting accessories

Body mounting clamps. Part no: PT0950-0109

3mm rod-end. Part no: PT0952-0104-19

Electrical connections (all models)

<table>
<thead>
<tr>
<th>Material:</th>
<th>Aluminium Alloy, anodised black.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case - Aluminium 6063 - Sulphuric acid anodised</td>
<td></td>
</tr>
<tr>
<td>Shaft - Stainless steel - 303 series</td>
<td></td>
</tr>
<tr>
<td>Rod end bearing - Aluminium 6262 housing &amp; Stainless steel ball</td>
<td></td>
</tr>
</tbody>
</table>

Note 1
Incorrect wiring may cause internal damage to the sensor.

Note 2
Circuit recommendation: Due to the presence of a high contact resistance, these potentiometers should be used as voltage dividers only. Operation with wiper circuits of low impedance will degrade the output signal.
Other CLS linear position sensor models available

**CLS3200**
- Robust housing
- Up to 1100mm (44") stroke
- Choice of mounting
- 32mm body Ø

**CLS1300**
- Robust housing
- Up to 350mm (14") stroke
- Choice of mounting
- 13mm body Ø

**CLS1900**
- Robust housing
- Up to 500mm (20") stroke
- Choice of mounting
- 19mm body Ø

Contact details

**Europe**
Active Sensors Ltd
Unit 12, Wilverley Road
Christchurch, Dorset
BH23 3RU
UK

Tel +44 (0)1202 480620
Fax +44 (0)1202 480664

**North America**
Active Sensors Inc.
8520 Allison Point Blvd Suit 220
Indianapolis
IN 46250
USA

Tel + 317 713 2973
Fax + 317 713 2950

sales@activesensors.com

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Doc. Ref: WS-CLS0950-1
These high performance, high temperature linear potentiometers are designed for the most demanding control and measurement applications. They are constructed from aluminum alloy and stainless steel for high strength and durability, yet are lightweight in design, making them ideal for industrial, automotive and motor racing measurement applications. The sensors are sealed to IP66 as standard and feature fire and chemical resistant high temperature Raychem FDR-type 55-24 signal cabling ensuring total system reliability. The physical design of these slim body linear potentiometers enables their survival in the severest of environmental conditions.

- Measurement range: 10mm (0.4") to 350mm (14")
- Ultra compact 13mm (1/2") body Ø
- Low noise output signal
- Sealed as standard
- Raychem cabling
- Choice of mounting
- Very long operational life
- Models available from stock

### CLS1310 ultra compact series

<table>
<thead>
<tr>
<th>Model features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement range: 10mm (0.4&quot;) to 75mm (3&quot;)</td>
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<tr>
<td>Ultra compact 13mm (1/2&quot;) body Ø</td>
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<tr>
<td>Low noise output signal</td>
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<tr>
<td>Sealed as standard</td>
</tr>
<tr>
<td>Raychem cabling</td>
</tr>
<tr>
<td>Choice of mounting</td>
</tr>
</tbody>
</table>
Model dimensions and mounting

CLS1311 - body clamp mounting

CLS1312 - rod-end mounting

CLS1313 - sprung loaded shaft

Electrical & mechanical information for CLS1310 range

<table>
<thead>
<tr>
<th>Measurement range (±0.5mm)</th>
<th>10</th>
<th>25</th>
<th>50</th>
<th>75</th>
<th>mm</th>
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<tbody>
<tr>
<td>Retracted mounting distance (D)</td>
<td>-</td>
<td>95</td>
<td>100</td>
<td>120</td>
<td>145</td>
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<tr>
<td>Retracted shaft length (R)</td>
<td>16.4</td>
<td>21.5</td>
<td>22.5</td>
<td>38.5</td>
<td>-</td>
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<tr>
<td>Body length (C)</td>
<td>53</td>
<td>68</td>
<td>73</td>
<td>93</td>
<td>118</td>
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<tr>
<td>Resistance (Typical)</td>
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<td>1</td>
<td>1.2</td>
<td>2</td>
<td>3</td>
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<tr>
<td>Non-linearity</td>
<td>&lt;±0.25%</td>
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<tr>
<td>Applied voltage</td>
<td>&lt;12</td>
<td>&lt;22</td>
<td>&lt;27</td>
<td>&lt;45</td>
<td>&lt;67</td>
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<tr>
<td>Wiper load</td>
<td>&gt;500</td>
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<tr>
<td>Mechanical range</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>±1</td>
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<tr>
<td>Shaft velocity</td>
<td>&lt;10</td>
<td>m/sec</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulation resistance (at 500V dc.)</td>
<td>&gt;100</td>
<td>Mohms</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Operating temp. range</td>
<td>-30° to +125°</td>
<td>°C</td>
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<tr>
<td>Sealing</td>
<td>CLS1311, 12 - IP66</td>
<td>CLS1313 - IP50</td>
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<tr>
<td>Shaft operating force</td>
<td>200 (typical)</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Shaft operating force (CLS1313)</td>
<td>150 - 350 (typical)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight (approx.)</td>
<td>52</td>
<td>60</td>
<td>61</td>
<td>66</td>
<td>72</td>
</tr>
</tbody>
</table>

Materials
- Case - Aluminium 6063 - Sulphuric acid anodised
- Shaft - Stainless steel - 303 series
- Rod end bearing - Aluminium 6262 housing & Stainless steel ball

Note: 10mm measurement range only available with CLS1313
CLS1320 compact series

Model features
- Measurement range: 25mm (1") to 350mm (14")
- Slim 13mm (1/2") body Ø
- Compact design
- Sealed as standard
- Raychem cabling
- Choice of mounting

Model dimensions and mounting

CLS1321 - body clamp mounting

Not to Scale, Dim: mm

CLS1322 - rod-end mounting

Not to Scale, Dim: mm

Extended retracted mounting distance compatibility option: Models CLS1324 (±25mm) & CLS1325 (±50mm). See table for mounting distance and ordering information for code.

CLS1323 - sprung loaded shaft

Available in measurement ranges 50, 75, 100 & 150mm only

Doc. Ref: WS-CLS1300-1
CLS1326 - threaded mounting

Electrical & mechanical information for CLS1320 range

<table>
<thead>
<tr>
<th>Feature</th>
<th>CLS1320 Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement range (±0.5mm)</td>
<td>25 50 75 100 125 150 175 200 225 250 280 300 350 mm</td>
</tr>
<tr>
<td>Retracted mounting distance (D)</td>
<td>123 148 173 198 223 248 273 298 323 348 373 398 - - mm</td>
</tr>
<tr>
<td>Retracted mounting distance (E)</td>
<td>148 173 198 223 248 273 298 323 348 373 398 - - mm</td>
</tr>
<tr>
<td>Retracted mounting distance (F)</td>
<td>173 198 223 248 273 298 323 348 373 398 - - mm</td>
</tr>
<tr>
<td>Retracted shaft length (R)</td>
<td>- 38.5 53.5 58.5 - 88.5 - - - - - - mm</td>
</tr>
<tr>
<td>Body length (C)</td>
<td>81 106 131 156 181 206 231 256 281 306 356 406 mm</td>
</tr>
<tr>
<td>Body length (G)</td>
<td>85 110 135 160 185 210 235 260 285 310 360 410 mm</td>
</tr>
<tr>
<td>Resistance (Typical)</td>
<td>1 2 3 4 5 6 7 8 9 10 12 14 kohms</td>
</tr>
<tr>
<td>Non-linearity</td>
<td>&lt;±0.25 &lt;±0.15 %</td>
</tr>
<tr>
<td>Applied voltage</td>
<td>&lt;22 &lt;45 &lt;65 &lt;90 &lt;110 &lt;130 &lt;130 &lt;130 &lt;130 &lt;130 &lt;130 &lt;130 Volts</td>
</tr>
<tr>
<td>Wiper load</td>
<td>&gt;500 &gt;500 &gt;500 &gt;500 &gt;500 &gt;500 &gt;500 &gt;800 &gt;900 &gt;1000 &gt;1100 &gt;1200 kohms</td>
</tr>
<tr>
<td>Mechanical range (mm)</td>
<td>Measurement range +1</td>
</tr>
<tr>
<td>Shaft velocity</td>
<td>&lt;10 m/sec</td>
</tr>
<tr>
<td>Insulation resistance (at 500V dc.)</td>
<td>&gt;100 Mohms</td>
</tr>
<tr>
<td>Operating temp. range</td>
<td>-30° to +125° °C</td>
</tr>
<tr>
<td>Sealing</td>
<td>CLS1321, 22, 24, 25, 26 - IP66. CLS1323 - IP50</td>
</tr>
<tr>
<td>Shaft operating force (typical)</td>
<td>200 grams</td>
</tr>
<tr>
<td>Shaft operating force (CLS1323)</td>
<td>150 - 350 grams</td>
</tr>
<tr>
<td>Weight (approx.)</td>
<td>60 66 73 78 85 90 96 102 108 114 120 126 grams</td>
</tr>
<tr>
<td>Materials</td>
<td>Case - Aluminium 6063 - Sulphuric acid anodised</td>
</tr>
<tr>
<td></td>
<td>Shaft - Stainless steel - 303 series</td>
</tr>
<tr>
<td></td>
<td>Rod end bearing - Aluminium 6262 housing &amp; Stainless steel ball</td>
</tr>
</tbody>
</table>

Mounting accessories

Quick release ball joints. Part no: JN029-003

3mm rod-end. Part no: PT1312-0104-19

5mm rod-end. Part no: PT1322-0104-19

Body mounting clamps. Part no: PT1300-0109

Mounting flange. Part no: PT1300-0110
Electrical connections (all models)

Note 1
Incorrect wiring may cause internal damage to the sensor.

Note 2
Circuit recommendation: Due to the presence of a high contact resistance, these potentiometers should be used as voltage dividers only. Operation with wiper circuits of low impedance will degrade the output signal.

Other CLS linear position sensor models available

CLS0950  • Ultra-slim housing
          • Up to 150mm (6") stroke
          • Choice of mounting
          • 9.54mm body Ø

CLS1900  • Robust housing
          • Up to 500mm (20") stroke
          • Choice of mounting
          • 19mm body Ø

CLS3200  • Robust housing
          • Up to 1100mm (44") stroke
          • Choice of mounting
          • 32mm body Ø

Contact details

Europe
Active Sensors Ltd
Unit 12, Wilverley Road
Christchurch, Dorset
BH23 3RU
UK
Tel +44 (0)1202 480620
Fax +44 (0)1202 480664

North America
Active Sensors Inc.
8520 Allison Point Blvd Suite 220
Indianapolis
IN 46250
USA
Tel + 317 713 2973
Fax + 317 713 2950
sales@activesensors.com

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Doc. Ref: WS-CLS1300-1
The robust, general-purpose medium stroke CLS1920 sensor is used extensively in industrial monitoring and process control applications. They are also used in racing car and off road vehicles for monitoring suspension movement and steering angles. The housing is manufactured from aluminium alloy and the operating shaft is stainless steel. The spherical mounting bearings and body clamps are machined from aluminium alloy for strength and durability.
Model dimensions and mounting

CLS1921 - body clamp mounting

CLS1922 - rod-end mounting

CLS1923 - sprung loaded shaft

For mounting accessories, see page 3

Doc. Ref: WS-CLS1900-1
Electrical & mechanical information for CLS1900 range

<table>
<thead>
<tr>
<th>Measurement range (±0.5mm)</th>
<th>25</th>
<th>50</th>
<th>75</th>
<th>100</th>
<th>125</th>
<th>150</th>
<th>175</th>
<th>200</th>
<th>225</th>
<th>250</th>
<th>275</th>
<th>300</th>
<th>325</th>
<th>350</th>
<th>400</th>
<th>500</th>
<th>mm</th>
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<tbody>
<tr>
<td>Retracted mounting distance (D)</td>
<td>-</td>
<td>-</td>
<td>199</td>
<td>224</td>
<td>249</td>
<td>274</td>
<td>299</td>
<td>324</td>
<td>349</td>
<td>374</td>
<td>399</td>
<td>424</td>
<td>449</td>
<td>474</td>
<td>-</td>
<td>-</td>
<td>mm</td>
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<tr>
<td>Retracted mounting distance (E)</td>
<td>149</td>
<td>174</td>
<td>199</td>
<td>249</td>
<td>274</td>
<td>299</td>
<td>324</td>
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<td>499</td>
<td>-</td>
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<td>mm</td>
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<td>Retracted mounting distance (F)</td>
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<td>274</td>
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<td>324</td>
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<td>499</td>
<td>524</td>
<td>-</td>
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<td>Retracted shaft length (R)</td>
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<td>44</td>
<td>54</td>
<td>223</td>
<td>-</td>
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<td>Body length (C)</td>
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<td>3</td>
<td>4</td>
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<td>%</td>
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<tr>
<td>Applied voltage</td>
<td>&lt;22</td>
<td>&lt;45</td>
<td>&lt;65</td>
<td>&lt;90</td>
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<td>Shaft velocity</td>
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<td>Insulation resistance (at 500V dc.)</td>
<td>&gt;100</td>
<td>Mohms</td>
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<td>°C</td>
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<td>CLS1923 - IP50</td>
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</tr>
<tr>
<td>Shaft operating force</td>
<td>200 (typical)</td>
<td>grams</td>
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<td>Weight (approx.)</td>
<td>79</td>
<td>91</td>
<td>109</td>
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<td>154</td>
<td>170</td>
<td>184</td>
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<td>233</td>
<td>254</td>
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<td>301</td>
<td>322</td>
<td>369</td>
<td>463</td>
<td>grams</td>
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<td>Materials</td>
<td>Case - Aluminium 6063 - Sulphuric acid anodised</td>
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</tr>
<tr>
<td>Shaft - Stainless steel - 303 series</td>
<td></td>
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<tr>
<td>Rod end bearing - Aluminium 6262 housing &amp; Stainless steel ball</td>
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<td></td>
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</tr>
</tbody>
</table>

Mounting accessories

**Mounting flange. Part no: PT1900-0110**

Material: Aluminium Alloy, anodised black.

**Body mounting clamps. Part no: PT1900-0109**

Material: Aluminium Alloy, anodised black.

**5mm rod-end. Part no: PT1922-0104-19**

Material: Housing - Aluminium Alloy, anodised black.

Ball - Steel BS970 230M07, electroless nickel plated

Race - Gr nylon

Electrical connections (all models)

![Electrical connections diagram](image)

**Note 1**

Incorrect wiring may cause internal damage to the sensor.

**Note 2**

Circuit recommendation: Due to the presence of a high contact resistance, these potentiometers should be used as voltage dividers only. Operation with wiper circuits of low impedance will degrade the output signal.
Other CLS linear position sensor models available

**CLS0950**  
- Ultra-slim housing  
- Up to 150mm (6") stroke  
- Choice of mounting  
- 9.54mm body Ø

**CLS1300**  
- Robust housing  
- Up to 350mm (14") stroke  
- Choice of mounting  
- 13mm body Ø

**CLS3200**  
- Robust housing  
- Up to 1100mm (44") stroke  
- Choice of mounting  
- 32mm body Ø

Contact details

**Europe**  
Active Sensors Ltd  
Unit 12, Wilverley Road  
Christchurch, Dorset  
BH23 3RU  
UK  
Tel +44 (0)1202 480620  
Fax +44 (0)1202 480664

**North America**  
Active Sensors Inc.  
8520 Allison Point Blvd Suite 220  
Indianapolis  
IN 46250  
USA  
Tel + 317 713 2973  
Fax + 317 713 2950

sales@activesensors.com

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CLS3200 medium stroke range

- Measurement Range: 250mm (10") to 1100mm (44")
- Robust design
- Long stroke model
- Sealed as standard
- Raychem cabling
- Choice of mounting
- Very long operational life
- Models available from stock

The robust, long stroke CLS3220 sensor is used extensively in industrial monitoring and process control applications. It is also used in flight simulator control systems and similar motion control platforms. The housing is manufactured from aluminium alloy and the operating shaft is stainless steel. The spherical mounting bearings and body clamps are machined from aluminium alloy for strength and durability.
Electrical & mechanical information for CLS3200 range

<table>
<thead>
<tr>
<th>Measurement range (±0.5mm)</th>
<th>250</th>
<th>300</th>
<th>350</th>
<th>400</th>
<th>450</th>
<th>500</th>
<th>550</th>
<th>600</th>
<th>650</th>
<th>700</th>
<th>750</th>
<th>800</th>
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<th>1050</th>
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<tbody>
<tr>
<td>Retracted mounting distance (D)</td>
<td>430</td>
<td>480</td>
<td>530</td>
<td>580</td>
<td>630</td>
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<td>930</td>
<td>980</td>
<td>1030</td>
<td>1080</td>
<td>1130</td>
<td>1180</td>
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<tr>
<td>Retracted mounting distance (F)</td>
<td>480</td>
<td>530</td>
<td>580</td>
<td>630</td>
<td>680</td>
<td>730</td>
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<td>930</td>
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<td>1080</td>
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<td>Body length (C)</td>
<td>351</td>
<td>401</td>
<td>451</td>
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<td>551</td>
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<td>951</td>
<td>1001</td>
<td>1051</td>
<td>1101</td>
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<td>Resistance (Typical)</td>
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<td>12</td>
<td>14</td>
<td>16</td>
<td>18</td>
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<td>44</td>
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<td>Non-linearity</td>
<td>&lt;±0.15</td>
<td>%</td>
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<tr>
<td>Applied voltage</td>
<td>&lt;150</td>
<td>Volts</td>
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<td>Wiper load</td>
<td>&gt;1.0</td>
<td>&gt;1.2</td>
<td>&gt;1.4</td>
<td>&gt;1.6</td>
<td>&gt;1.8</td>
<td>&gt;2.0</td>
<td>&gt;2.2</td>
<td>&gt;2.4</td>
<td>&gt;2.6</td>
<td>&gt;2.8</td>
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<td>Mechanical range</td>
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<tr>
<td>Shaft velocity</td>
<td>&lt;10 m/sec</td>
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<td>Insulation resistance (at 500V dc.)</td>
<td>&gt;50 Mohms</td>
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<td>Operating temp. range</td>
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<td>Sealing</td>
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<tr>
<td>Shaft operating force</td>
<td>&lt;100 (typical) grams</td>
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<tr>
<td>Weight (approx.)</td>
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<td>1180</td>
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<td>2265</td>
<td>2355</td>
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<td>Materials</td>
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<tr>
<td>Shaft - Stainless steel - 303 series</td>
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<tr>
<td>Rod end bearing - Aluminium 6262 housing &amp; Stainless steel ball</td>
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</tr>
</tbody>
</table>

Model dimensions and mounting

**CLS3221 - body clamp mounting**

Not to scale. Dims: mm

Raychem, 3 core type 55 - 24 AWG with FDR sleeve Ø3.2mm, 1000mm long

For electrical connection diagram, see page 2

**CLS3222 - rod-end mounting**

Not to scale. Dims: mm

Raychem, 3 core type 55 - 24 AWG with FDR sleeve Ø3.2mm, 1000mm long

Spherical bearing mounting hole Ø10 (+0.05/-0.00) fitted both ends

For electrical connection diagram, see below

Extended retracted mounting distance compatibility option: Model CLS3225 (+50mm). See table for mounting distance and ordering information for code.

**Electrical & mechanical information for CLS3200 range**

Doc. Ref: WS-CLS3200-1
Other CLS linear position sensor models available

**CLS0950**
- Ultra-slim housing
- Up to 150mm (6") stroke
- Choice of mounting
- 9.54mm body Ø

**CLS1300**
- Robust housing
- Up to 350mm (14") stroke
- Choice of mounting
- 13mm body Ø

**CLS1900**
- Robust housing
- Up to 500mm (20") stroke
- Choice of mounting
- 19mm body Ø

Electrical connections (all models)

<table>
<thead>
<tr>
<th>Status</th>
<th>White</th>
<th>Red</th>
<th>Black</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shaft Retracted</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Shaft Extended</td>
<td>White</td>
<td>Red</td>
<td>Black</td>
</tr>
</tbody>
</table>

**Note 1**
Incorrect wiring may cause internal damage to the sensor.

**Note 2**
Circuit recommendation: Due to the presence of a high contact resistance, these potentiometers should be used as voltage dividers only. Operation with wiper circuits of low impedance will degrade the output signal.

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**Europe**
Active Sensors Ltd
Unit 12, Wilverley Road
Christchurch, Dorset
BH23 3RU
UK

Tel +44 (0)1202 480620
Fax +44 (0)1202 480664

**North America**
Active Sensors Inc.
8520 Allison Point Blvd Suit 220
Indianapolis
IN 46250
USA

Tel + 317 713 2973
Fax + 317 713 2950

sales@activesensors.com

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