**Description**

The Series LLS61X is a high performance long stroke DC powered LVDT displacement transducer with a spring return armature. The armature is restrained and guided by a very low friction bearing assembly. An internal spring automatically positions the armature to its full extension. This unique design is used for applications where it is not possible to connect the transducer armature to the moving part being measured. This position sensor operates from unregulated power supplies of +20Vdc to +40Vdc or dual ±10Vdc to ±20Vdc and generates either a ±5Vdc or 0-10Vdc. The compact size of the LLS61X series makes it ideal for applications requiring limited space. These displacement transducers are ruggedly constructed of all stainless steel. All Series LLS61X displacement transducers are shipped with traceable calibration certificates.

**Standard Features**

- Stroke ranges from ±0.1 inches to ±3.0 inches
- Spring Return Armature
- Low Friction Bearing Assembly
- DC/DC
- ±0.5% Linearity
- ±5Vdc or 0-10Vdc Output
- Encapsulated Integral Electronics
- All Stainless Steel Construction
- Traceable Calibration Certificate

**Optional Features**

- Improved Linearity
- Expanded Operating Temperature Range
- Sealing Against Moisture Ingress
- Mounting Blocks

**Performance**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stroke Ranges</td>
<td>± 0.1 inches to ± 3.0 inches</td>
</tr>
<tr>
<td>Linearity</td>
<td>± 0.5% of full stroke max</td>
</tr>
<tr>
<td>Output Voltage</td>
<td>± 25% or ± 0.1 options on some ranges</td>
</tr>
<tr>
<td></td>
<td>± 5Vdc or 0-10Vdc</td>
</tr>
</tbody>
</table>
Series LLS61X
Specifications

Dimensions (inches)

Baseline Configuration Specs Represented. Modifications Encouraged - See Below
Custom Designs Available

<table>
<thead>
<tr>
<th>Linearity error (%) F.S.</th>
<th>Range</th>
<th>L</th>
<th>X</th>
<th>Total Weight</th>
<th>Spring Force at X</th>
<th>Spring Rate</th>
<th>Inward over-travel</th>
<th>Outward over-travel</th>
</tr>
</thead>
<tbody>
<tr>
<td>±0.1&quot;</td>
<td>&lt;± 0.5</td>
<td>2.5&quot;</td>
<td>0.5&quot;</td>
<td>2.9oz</td>
<td>4oz</td>
<td>8.5oz/inch</td>
<td>0.09&quot;</td>
<td>0.05&quot;</td>
</tr>
<tr>
<td>±0.2&quot;</td>
<td>&lt;± 0.5</td>
<td>2.5&quot;</td>
<td>0.5&quot;</td>
<td>2.9oz</td>
<td>4oz</td>
<td>7.1oz/inch</td>
<td>0.01&quot;</td>
<td>0.05&quot;</td>
</tr>
<tr>
<td>±0.3&quot;</td>
<td>&lt;± 0.5</td>
<td>2.5&quot;</td>
<td>0.7&quot;</td>
<td>2.9oz</td>
<td>5oz</td>
<td>5.8oz/inch</td>
<td>0.06&quot;</td>
<td>0.05&quot;</td>
</tr>
<tr>
<td>±0.4&quot;</td>
<td>&lt;± 0.5</td>
<td>2.5&quot;</td>
<td>0.9&quot;</td>
<td>2.9oz</td>
<td>6oz</td>
<td>7.2oz/inch</td>
<td>0.05&quot;</td>
<td>0.05&quot;</td>
</tr>
<tr>
<td>±0.5&quot;</td>
<td>&lt;± 0.5</td>
<td>7.2&quot;</td>
<td>1.5&quot;</td>
<td>8oz</td>
<td>4.6oz</td>
<td>2.0oz/inch</td>
<td>0.04&quot;</td>
<td>0.51&quot;</td>
</tr>
<tr>
<td>±1&quot;</td>
<td>&lt;± 0.5</td>
<td>8.3&quot;</td>
<td>2.5&quot;</td>
<td>10oz</td>
<td>7.2oz</td>
<td>3.0oz/inch</td>
<td>0.12&quot;</td>
<td>0.39&quot;</td>
</tr>
<tr>
<td>±2&quot;</td>
<td>&lt;± 0.5</td>
<td>12.8&quot;</td>
<td>3.0&quot;</td>
<td>14oz</td>
<td>6oz</td>
<td>1.8oz/inch</td>
<td>0.31&quot;</td>
<td>0.55&quot;</td>
</tr>
<tr>
<td>±3&quot;</td>
<td>&lt;± 0.5</td>
<td>17.2&quot;</td>
<td>4.5&quot;</td>
<td>1.1lb</td>
<td>1lbs</td>
<td>3.2oz/inch</td>
<td>0.59&quot;</td>
<td>0.59&quot;</td>
</tr>
</tbody>
</table>

Mechanical Characteristics

Resolution
Infinite.

Case Material
Stainless steel.

Armature Type
Spring Return.

Probe
Ball end (standard). Optional probes available.

Electrical Characteristics

Input Supply
± 10Vdc to ± 20Vdc unregulated
(H ±12 Vdc to ± 20 Vdc).
- or-
+ 20Vdc to + 40Vdc unregulated at 30 mA
(H + 24 Vdc to + 40Vdc).

Input Voltage (Factory Calibrated)
±15Vdc (with 6 ft. of cable).

Output Load (Minimum)
2K Ohms.

Output Ripple
30mV peak to peak.

Output Bandwidth
200 Hz (flat).

Output Impedance
2 Ohms.

Electrical Termination
High Quality Polyurethene Shield Cable (6 ft.).

Environmental Characteristics

Operating Temperature Range
-60°F to +180°F

Temperature Effect on Zero
±0.006%/°F.

Temperature Effect on Span
±0.017%/°F.

MODEL IDENTIFICATION

<table>
<thead>
<tr>
<th>L</th>
<th>L</th>
<th>S</th>
<th>6</th>
<th>1</th>
<th>X</th>
</tr>
</thead>
</table>

SERIES

ELECTRICAL TERMINATIONS

Please specify termination required:
X = 1 Axial Cable Exit (Standard - ±0.1 tp ±0.4)
2 Radial Cable Exit (Standard - ±0.5 to ±3.0)
3 Axial Connector (Optional)
4 Radial Connector (Optional)

ISO 9001/AS9100
Due to the nature of technology, changes are inevitable. For latest technical specifications, see our website.

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Modifications and Warranty

MODIFICATIONS: We realize transducer applications vary greatly and as such our designs are flexible. Choice of pressure port, electrical termination, material compatibility and performance characteristics are a few of the many options available. Specifications on this datasheet represent the standard configuration only. Product and company names listed are trademarks of their respective companies. Specifications subject to change without notice.

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Connection Details

Standard

<table>
<thead>
<tr>
<th>INPUT CONNECTIONS</th>
<th>OUTPUT CONNECTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dual Supply</strong></td>
<td><strong>Single Supply</strong>*</td>
</tr>
<tr>
<td><em>+12 to +20V Input</em></td>
<td><em>+12 to +20V Input</em></td>
</tr>
<tr>
<td><em>-12 to 0V Input</em></td>
<td><em>Supply Negative</em></td>
</tr>
<tr>
<td>0V Common</td>
<td>Instrument Ground</td>
</tr>
<tr>
<td><strong>SHIELD</strong></td>
<td><strong>SHIELD</strong></td>
</tr>
</tbody>
</table>

**NOTE:** If only Output 1 (0-10V) is required, then the supply minimum can be a 10V dual or 36V single.

Optional

<table>
<thead>
<tr>
<th>INPUT CONNECTIONS</th>
<th>OUTPUT CONNECTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dual Supply</strong></td>
<td><strong>Single Supply</strong>*</td>
</tr>
<tr>
<td><em>+12 to +30V Input</em></td>
<td><em>+12 to +30V Input</em></td>
</tr>
<tr>
<td><em>-10 to 0V Input</em></td>
<td><em>Supply Common</em></td>
</tr>
<tr>
<td>0V Common</td>
<td>Output Common**</td>
</tr>
<tr>
<td>Output 1 10-0V</td>
<td>Output 1 10-0V</td>
</tr>
<tr>
<td>Output 2 (+) 15V</td>
<td>Output 2 (+) 15V</td>
</tr>
<tr>
<td>Instrument/Ground</td>
<td>Instrument Ground</td>
</tr>
<tr>
<td><strong>SHIELD</strong></td>
<td><strong>SHIELD</strong></td>
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</tbody>
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