Installation Instructions for the
Aerospace Linear Variable Differential Transducers,
1LVT Series

⚠️ WARNING
IMPROPER INSTALLATION
Consult with safety agencies and their requirements when designing a machine control, interface, and all elements that affect safety. Strictly adhere to all installation instructions.
Failure to comply with these instructions could result in death or serious injury.

⚠️ WARNING
PERSONAL INJURY
Use the correct personal protection. The chemical solution can cause skin, eye, and lung damage. Follow the manufacturer’s instructions.
Failure to comply with these instructions could result in death or serious injury.

INTRODUCTION
Honeywell 1LVT Series LVDTs (Linear Variable Differential Transformers) are high resolution, robust, ac-operated, and designed to operate under extreme environments. Qualified as per DO-160 procedures for aerospace applications, 1LVT Series products are intended to be used in various aerospace applications for position control and feedback.
Dual-channel LVDTs have two separate sensors in parallel or tandem that provide two independent outputs (channels A & B) for redundancy.

ELECTRICAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical stroke range</td>
<td>8.89 mm to 35.56 mm [0.35 in to 1.4 in]</td>
</tr>
<tr>
<td>Excitation voltage</td>
<td>7.07 V ±0.14 V RMS sinusoidal wave at 3000 Hz ±50 Hz</td>
</tr>
</tbody>
</table>

PRODUCT NOMENCLATURE
The product nomenclature system is based on these key parameters
- Total electrical stroke
- Mounting type
- Termination (electrical interface)
- LVDT probe mounting
The “reserved” column is for the custom LVDT designs.

Figure 1. Single-Channel Product Nomenclature

Figure 2. Dual-Tandem Product Nomenclature

Figure 3. Dual-Parallel Product Nomenclature

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LVDT HANDLING AND INSTALLATION GUIDELINES

The LVDT body and magnetic probe rods are matched sets with identification by unique serial number engraved on the LVDT body (not shown in Figures). The magnetic core is manufactured to have homogeneity and high permeability to achieve greater performance requirements. The magnetic core is sensitive to mechanical stresses and should be handled carefully.

⚠️ WARNING
PRODUCT DAMAGE

Do not operate the LVDT without the magnetic probe rod or core inside the LVDT bore (hole where the magnetic probe rod slides). Energizing the LVDT body alone may lead to damage of coils due to overheating.

1LVT (DUAL PARALLEL) SERIES
Installation of LVDT Body: 1LVT Series

Note: It is important to keep the LDVT sensor free of foreign material such as oil, grease, dust, etc. If cleaning is necessary due to handling or re-installation, care must be taken to avoid causing scratches or damage to the seal grooves and mounting surface.

The LVDT has two O-ring grooves: AS568-119 size. In the wider groove, the O-ring is supported by two backup rings to avoid any O-ring extrusion due to fluid pressure. A typical thread mount LVDT with flying leads is shown in Figures 3 and 4.

The 24AWG (MIL-W-22759/33-24) lead wires should be routed. The LVDT thread #10-32 should be torqued to 18 in-lb to 20 in-lb max. with a nut and spring washer.

For the flanged version, the socket head screws should be torqued to 7 ft-lb to 9 ft-lb max. using high strength stainless steel screws. Honeywell recommends using NAS 1351/NAS 1352-compliant steel screws. A typical thread mount LVDT with connector orientation is shown in Figures 5 and 6.

Figure 3. LVDT, Dual Parallel, Thread Mount

Figure 4. LVDT, Dual Parallel, Thread Mount

Figure 5. LVDT, Dual Parallel, Flange Mount with Connector

Figure 6. LVDT, Dual Parallel, Flange Mount with Connector
**Aerospace LVDT, 1LVT Series**

**Installation of Probe Fitting: 1LVT Series**

The dual parallel threaded probe fitting is bearing mounted, so the position of the two parallel channels is not affected during assembly. Assembly the fitting with #6-32 thread to the interface using a #6 (0.110 in) Allen key and torque to 6 in-lb to 8 in-lb max. 17-4PH stainless steel or equivalent material is recommended for the interface. Materials with a greater thermal expansion than 17-4PH stainless steel should be avoided to eliminate or reduce the electrical null offset at extreme operating temperatures. The channels are identified with A & B, and should slip in to the respective LVDT channels for the desired performance.

During the installation, ensure the defined rig position or electrical null is achieved.

Figure 7. LVDT, Dual Parallel, Probe

**Electrical connections: 1LVT Series**

The typical electrical schematic is shown in Figure 10. These LVDTs use 7.07 V RMS with 3000 Hz excitation frequency. The recommended electrical loads (resistance and capacitance) should be used.

The flying lead variants will come with approximately 10-inch lead wires for easy installation.

Three types of hermetically sealed connectors are offered in flanged variant LVDTs. Connectors offered by Honeywell, include:

EN2997YE01005MN  
M83723/88P1005N  
D38999/27YB5XN

The detailed mounting dimensions, electrical schematic, and stroke information is provided in Figures 8 to 12.

**Table 1. Hardware Requirements Per LVDT**

<table>
<thead>
<tr>
<th>SI No.</th>
<th>Description</th>
<th>Quantity</th>
<th>Applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>O-ring per AS568-119</td>
<td>2</td>
<td>All configurations</td>
</tr>
<tr>
<td>2</td>
<td>Backup ring (Size -119)</td>
<td>2</td>
<td>All configurations</td>
</tr>
<tr>
<td>3</td>
<td>Spring washer (10-32 Thread)</td>
<td>1</td>
<td>Threaded configurations</td>
</tr>
<tr>
<td>4</td>
<td>Lock nut #10-32 UNF-2B</td>
<td>1</td>
<td>Threaded configurations</td>
</tr>
<tr>
<td>5</td>
<td>0.250 in socket head screw (Screw pitch per mating part)</td>
<td>5</td>
<td>Flanged configurations</td>
</tr>
</tbody>
</table>
Aerospace LVDT, 1LVT Series

Figure 8. Dual-Parallel (Wired) Dimensions

Figure 9. Dual-Parallel (Flanged) Dimensions

Table 2. Dual-Parallel Dimensions

Wire Color

<table>
<thead>
<tr>
<th>Pin Number</th>
<th>Channel A</th>
<th>Channel B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Red</td>
<td>Red</td>
</tr>
<tr>
<td>2</td>
<td>Black</td>
<td>Black</td>
</tr>
<tr>
<td>3</td>
<td>Blue</td>
<td>Blue</td>
</tr>
<tr>
<td>4</td>
<td>Orange</td>
<td>Orange</td>
</tr>
<tr>
<td>5</td>
<td>Yellow</td>
<td>Yellow</td>
</tr>
</tbody>
</table>
Aerospace LVDT, 1LVT Series

**1LVT (SINGLE CHANNEL) SERIES**

**Installation of LVDT Body: 1LVT Series**

**Note:** It is important to keep the LVDT sensor free of foreign material such as oil, grease, dust, etc. If cleaning is necessary due to handling or re-installation, care must be taken to avoid causing scratches or damage to the seal grooves and mounting surface.

The AS568-113 sized O-ring grooves provide environmental sealing. A typical thread mount LVDT with flying leads is shown in Figure 13.

The flange mount variant has an anti-rotation hole for locking the LVDT’s body to the housing. The AS568-114 size O-ring with one backup ring must be installed on the LVDT housing. A typical flange mount LVDT with flying leads is shown in Figure 14.

**Figure 13. LVDT, Single-Channel, Thread Mount**

**Figure 14. LVDT, Single-Channel, Flange Mount**

The 24AWG (MIL-W-22759/33-24) type lead wires should be routed. The LVDT body with 0.625-18 thread should be torqued to 10 ft-lb to 12 ft-lb max.

**Installation of Probe fitting: 1LVT Series**

The threaded probe fitting should be assembled to the interface using a 5/16 A/F spanner and torqued to 9 in-lb to 10 in-lb max. 17-4PH stainless steel or equivalent material is recommended for the interface. Materials with a greater thermal expansion than 17-4PH stainless steel should be avoided to eliminate or to reduce the electrical null offset at extreme operating temperatures.

During the installation, ensure the defined rig position or electrical null is achieved.

**Figure 15. LVDT, Single Channel, Probe Tip**

**Electrical connections: 1LVT Series**

The typical electrical schematic is shown in Figure 18. These LVDTs use 7.07 V RMS with 3000 Hz excitation frequency. The recommended electrical loads (resistance and capacitance) should be used.

The flying lead variants will come with approximately 10-inch lead wires for easy installation.

Three types of hermetically sealed connectors are offered in flanged variant LVDTs. Connectors offered by Honeywell include:

- EN2997YE0100SMN
- M83723/88P100SMN
- D38999/27YB5XN

The detailed mounting dimensions, electrical schematic, and stroke information is provided in Figures 16 to 20.

**Table 3. Hardware Requirements Per LVDT**

<table>
<thead>
<tr>
<th>SI No.</th>
<th>Description</th>
<th>Quantity</th>
<th>Applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>O-ring per AS568-113</td>
<td>1</td>
<td>Threaded configurations</td>
</tr>
<tr>
<td>2</td>
<td>O-ring per AS568-114</td>
<td>1</td>
<td>Flanged configurations</td>
</tr>
<tr>
<td>3</td>
<td>Back-up ring (Size -114)</td>
<td>2</td>
<td>Flanged configurations</td>
</tr>
<tr>
<td>4</td>
<td>Dowel pin</td>
<td>1</td>
<td>Flanged configurations</td>
</tr>
</tbody>
</table>
Figure 16. Single-Channel (Wired) Dimensions

![Diagram showing single-channel wired dimensions with annotations for Null Position, Rig Position “C”, Housing Length “D”, Housing Length “E”, and Weight.]

Figure 17. Single-Channel (Flanged) Dimensions

![Diagram showing single-channel flanged dimensions with annotations for Null Position, Master keyway to align with axis of orientation hole within ±10°, and Connector: EN29997YE01005MN or D38999/27YB5XN or M83723/88P1005N.]

Table 4. Single Channel Dimensions

<table>
<thead>
<tr>
<th>Mounting Type</th>
<th>Catalog Listing</th>
<th>Total Electrical Stroke “A”</th>
<th>Total Mechanical Stroke “B”</th>
<th>Rig Position “C”</th>
<th>Housing Length “D”</th>
<th>Housing Length “E”</th>
<th>Housing Length “F”</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Threaded</td>
<td>1LVTS035ADB</td>
<td>8.89 mm (0.35 in)</td>
<td>9.4 mm (0.37 in)</td>
<td>64 mm (2.52 in)</td>
<td>50.3 mm (1.98 in)</td>
<td>67.06 mm (2.64 in)</td>
<td>22.23 mm (0.875 in)</td>
<td>0.22 lb max.</td>
</tr>
<tr>
<td>Threaded</td>
<td>1LVTS050ADB</td>
<td>12.7 mm (0.50 in)</td>
<td>13.2 mm (0.52 in)</td>
<td>66.04 mm (2.60 in)</td>
<td>50.3 mm (1.98 in)</td>
<td>67.06 mm (2.64 in)</td>
<td>22.23 mm (0.875 in)</td>
<td>0.22 lb max.</td>
</tr>
<tr>
<td>Flanged</td>
<td>1LVTS100BABB</td>
<td>25.4 mm (1.0 in)</td>
<td>25.91 mm (1.02 in)</td>
<td>111.76 mm (4.40 in)</td>
<td>89.9 mm (3.54 in)</td>
<td>119.89 mm (4.72 in)</td>
<td>–</td>
<td>0.30 lb max.</td>
</tr>
</tbody>
</table>

Figure 18. Single-Channel Wiring

![Diagram showing single-channel wiring with annotations for Red, Black, Blue, Orange, and Yellow wires.]

- Indicates wind start
- Indicates solder connection

Figure 19. Single-Channel Stroke Definition

![Diagram showing single-channel stroke definition with annotations for Null position, B/2 min extend mechanical stroke, B/2 min retract mechanical stroke, A/2 extend electrical stroke, and A/2 retract electrical stroke.]

Figure 20. Single-Channel Gain vs. Stroke

![Graph showing single-channel gain vs. stroke with annotations for Armature stroke.]

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**1LVT (DUAL TANDEM) SERIES**

**Installation of LVDT Body - 1LVT Series**

*Note:* It is important to keep the LVDT sensor free of foreign material such as oil, grease, dust, etc. If cleaning is necessary due to handling or re-installation, care must be taken to avoid causing scratches or damage to the seal grooves and mounting surface.

The AS568-113 sized O-ring grooves provide environmental sealing. A typical thread mount LVDT with flying leads is shown in Figure 21.

The AS568-114 O-ring with one backup ring must be installed on the flanged LVDT housing grooves. A typical flange mount LVDT with flying leads is shown in Figure 22.

**Figure 21. LVDT, Dual Tandem, Thread Mount**

**Figure 22. LVDT, Dual Tandem, Flange Mount**

Since the tandem LVDT is long, it’s recommended to have a front support made with PEEK (Polyetheretherketone) for better vibration withstanding capacity, as shown in Figure 23.

**Installation of Probe Fitting: 1LVT Series**

The threaded probe fitting should be assembled to the interface using a 5/16 A/F spanner and torqued to 9 in-lb to 10 in-lb max. 17-4PH stainless steel or equivalent material is recommended for the interface. Materials with a greater thermal expansion than 17-4PH stainless steel should be avoided to eliminate or to reduce the electrical null offset at extreme operating temperatures.

During installation, ensure the defined rig position or electrical null is achieved.

**Figure 24. LVDT, Single Channel, Probe Tip**

**Electrical connections: 1LVT Series**

The typical electrical schematic is shown in Figure 26. These LVDTs use 7.07 V RMS with 3000 Hz excitation frequency. The recommended electrical loads (resistance and capacitance) should be used.

The flying lead variants will come with approximately 10-inch lead wires for easy installation. The detailed mounting dimensions, electrical schematic and stroke information is provided in Figures 25 to 28.
## Table 5. Hardware Requirements Per LVDT

<table>
<thead>
<tr>
<th>SI No.</th>
<th>Description</th>
<th>Quantity</th>
<th>Applicable</th>
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<td>1</td>
<td>O-ring per AS568-113</td>
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<td>Threaded configurations</td>
</tr>
<tr>
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<td>O-ring per AS568-114</td>
<td>1</td>
<td>Flanged configurations</td>
</tr>
<tr>
<td>3</td>
<td>Back-up ring (Size -114)</td>
<td>2</td>
<td>Flanged configurations</td>
</tr>
<tr>
<td>4</td>
<td>Dowel pin</td>
<td>1</td>
<td>Flanged configurations</td>
</tr>
<tr>
<td>5</td>
<td>Front support. Recommended material: PEEK</td>
<td>1</td>
<td>All configurations</td>
</tr>
</tbody>
</table>

Aerospace LVDT, 1LVT Series

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Figure 25. Dual-Tandem Dimensions mm [in]

Figure 26. Dual-Tandem Wiring

Figure 27. Dual-Tandem Stroke Definition

Figure 28. Dual-Tandem Gain vs. Stroke

Table 6. Dual-Tandem Dimensions

<table>
<thead>
<tr>
<th>Mounting Type</th>
<th>Catalog Listing</th>
<th>Total Electrical Stroke “A”</th>
<th>Total Mechanical Stroke “B”</th>
<th>Rig Position “C”</th>
<th>Front Housing Length for Threaded Config “D”</th>
<th>Front Housing Length for Flanged Config “E”</th>
<th>Rear Housing Length for Flanged Config “F”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Threaded</td>
<td>1LVTT140ADB</td>
<td>35.56 mm [1.40 in]</td>
<td>36.07 mm [1.42 in]</td>
<td>168.96 mm [6.652 in]</td>
<td>142.24 mm [5.60 in]</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>1LVTT140BDB</td>
<td>35.56 mm [1.40 in]</td>
<td>36.07 mm [1.42 in]</td>
<td>121.97 mm [4.802 in]</td>
<td>95.25 mm [3.75 in]</td>
<td>93.22 mm [3.67 in] max</td>
<td>-</td>
</tr>
<tr>
<td>Threaded</td>
<td>1LVTT070ADB</td>
<td>17.78 mm [0.7 in]</td>
<td>18.29 mm [0.72 in]</td>
<td>138.73 mm [5.462 in]</td>
<td>122.43 mm [4.82 in]</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
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