LVCN6000/7000 SERIES
Capacitive Point Level Detection
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Introduction

The LVCN Series are capacitance switches ideal for High/Low level detection for liquid, solids, granular materials and pastes. These units can also detect level without being in contact with the product through a sight glass. Unlike other capacitance probes, the LVCN6000/7000 can detect conductive, non-conductive or low dielectric materials with extremely accurate performance without requiring an external reference or installation in a metal vessel.

Both models can be made with cable or rod rigid stainless steel giving more flexibility to complex applications.

Technology

The sensor operates in a manner that is similar to a simple capacitor. A high frequency oscillator is located within the tip of the probe. When the tip of the probe comes in contact with the medium, the frequency of the oscillation reaches a preset point and the detection circuit signals the switch to change state.

Features

- No Moving Parts – Rugged Construction
- Highly customizable:
  - POM (Polyoxymethylene), PTFE or PVC Sensing Tip
  - Extended Lengths with both Rigid 316 rod or Cable
  - Threaded, Flange or Sanitary Process Connections
- Available in DC or Universal Power Supply versions
- Almost completely immune from build-up, coating media aggressive products
- Easily applied in a wide range of applications/industries such as: water, oils, corrosives, solids, powders, grains, conductive as well as non-conductive medias.
Housing Options

Nylon

Aluminum

Mounting Options for LVCN6000/7000

POM Standard

PTFE or PVC Standard

Extended Length

Cable Extension

PTFE or PVC Tip Minimum Sizes

Process Connections

Threaded Connections

<table>
<thead>
<tr>
<th>Size</th>
<th>Connection</th>
<th>NPT</th>
<th>BSP</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 1/2&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Tri-Clamp Connection

<table>
<thead>
<tr>
<th>Size</th>
<th>Connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 1/2&quot;</td>
<td></td>
</tr>
<tr>
<td>2&quot;</td>
<td></td>
</tr>
<tr>
<td>2 1/2&quot;</td>
<td></td>
</tr>
</tbody>
</table>

Flange Connections

<table>
<thead>
<tr>
<th>Size</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&quot;</td>
<td>FF</td>
</tr>
<tr>
<td>1 1/2&quot;</td>
<td></td>
</tr>
<tr>
<td>2&quot;</td>
<td>RF</td>
</tr>
<tr>
<td>2 1/2&quot;</td>
<td></td>
</tr>
</tbody>
</table>
L1 - Power ON (Green)
L2 - Output Status (Red)
L3 - Sensor Status (Delay) Yellow
P1 - Sensitivity Adjustment
P2 - Time Delay Adjustment

### LVCN7000 Nylon Housing

1 - Positive DC
2 - Negative DC
3 - Ground
4 - NO Contact
5 - Common
6 - NC Contact

### LVCN6000 Aluminum Housing

1 - Power Supply
2 - Power Supply
3 - Ground
4 - Common
5 - NO Contact
6 - Common
7 - NC Contact
8 - Positive DC
9 - Negative DC

**Wiring Diagram**

- **Power Supply**: 24Vdc
- **Relay Contact**: 5A-250Vac
- **Input**: L1, L2, L3
- **Output**: P1, P2
### Relay Status Guide

#### LVCN6000

<table>
<thead>
<tr>
<th>Switch Position</th>
<th>Level</th>
<th>NO - NC</th>
<th>Green LED</th>
<th>Yellow LED</th>
<th>Red LED</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Probe covered" /></td>
<td><img src="image2" alt="Probe covered" /></td>
<td><img src="image3" alt="Probe covered" /></td>
<td><img src="image4" alt="Probe covered" /></td>
<td><img src="image5" alt="Probe covered" /></td>
<td><img src="image6" alt="Probe covered" /></td>
</tr>
<tr>
<td>H</td>
<td>Maximum fail-safe</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td></td>
</tr>
<tr>
<td><img src="image7" alt="Probe uncovered" /></td>
<td><img src="image8" alt="Probe uncovered" /></td>
<td><img src="image9" alt="Probe uncovered" /></td>
<td><img src="image10" alt="Probe uncovered" /></td>
<td><img src="image11" alt="Probe uncovered" /></td>
<td><img src="image12" alt="Probe uncovered" /></td>
</tr>
<tr>
<td>L</td>
<td>Minimum fail-safe</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
<td></td>
</tr>
</tbody>
</table>

#### LVCN7000

<table>
<thead>
<tr>
<th>Level</th>
<th>SPDT</th>
<th>Green LED</th>
<th>Yellow LED</th>
<th>Red LED</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image13" alt="Probe uncovered" /></td>
<td><img src="image14" alt="Probe uncovered" /></td>
<td><img src="image15" alt="Probe uncovered" /></td>
<td><img src="image16" alt="Probe uncovered" /></td>
<td><img src="image17" alt="Probe uncovered" /></td>
</tr>
<tr>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
<td></td>
<td></td>
</tr>
<tr>
<td><img src="image18" alt="Probe covered" /></td>
<td><img src="image19" alt="Probe covered" /></td>
<td><img src="image20" alt="Probe covered" /></td>
<td><img src="image21" alt="Probe covered" /></td>
<td><img src="image22" alt="Probe covered" /></td>
</tr>
<tr>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Installation

Verify that the location the probe is to be mounted is clear from the stream of product (Fig. 1).

When installing more than one probe in your process, verify that they are separated by a minimum distance of 500mm (Fig. 1).

Material falling onto the probe can cause damage or switching errors. If this is unavoidable, it is recommended that a protective shield be installed above the probe to protect it. The shield is also recommended when the probe is use for a low level switch or in the outflow of the product (Fig. 2).

The tip of the probe should slightly point downward (when possible) so that if there are any excess of product it will easily slide from the probe (Fig. 2).

When installing from the top of the tank confirm that the tip of the probe has cleared the side of the vessel at least 500mm (Fig. 3).

When installing the sensor directly to the tank make sure that the rod extends beyond the inner wall of the tank, by as much as possible, so that internal build up or other debris does not interfere with the sensor's performance (Fig. 2 correct Fig. 4 incorrect).
For probes with cable extensions, installation should be from the top of the tank. It is also recommended that for these probes the process shouldn't have any agitation as this can cause fluctuating readings or damage to the probe (Fig. 5).

The LVCN with rigid rod is recommended for applications that have turbulence or vortices throughout use (Fig. 6).

Ensure that the conduit is facing downward to avoid water from entering the housing (Fig. 7).

Before installing the probe, ensure that the available power supply is correct.

Verify that the probe has been wired as per the instructions on page 7.

Verify that the operating pressure and temperature of the process corresponds to the operating parameters of the probe.

The probe must be installed utilizing the type of connection provided.

**Caution:**

The Capacitance Probes Series will not work properly in viscous, coating mediums with high salt content (high di-electric), especially when mounting from the side of the vessel. Sitron does not recommend using this product in this type of application unless otherwise specified.
Calibration

1. Turn both potentiometers (P1 and P2) fully counterclockwise before you begin (Fig. 1).

2. Install the probe and power it on. The L1 green LED should be on.

3. With the vessel empty (or the medium not in contact with the sensor), turn the sensibility potentiometer (P1) clockwise until the yellow LED (L3) turns On. Mark that location on the electronics' label using a pencil. If this LED (L3) does not turn on, mark the maximum position on the label with a pencil (Fig. 2).

4. Fill the vessel until the medium is in contact with the sensor.

5. Turn the potentiometer (P1) counter-clockwise until the yellow LED (L1) turns Off. Mark the location where the yellow LED shuts off on the electronics' sticker using a pen or pencil. If the LED does not turn Off, leave the potentiometer completely turned counter-clockwise (Fig. 3).

6. Now that you have marked minimum and maximum settings for your particular application, turn the sensibility potentiometer (P1) clockwise halfway between the two pencil marks. This point should be the ideal setting where the probe is neither too sensitive or not sensitive enough. This method of calibration should also prevent false alarms.

Delay
Adjust the delay time from 0,1 to 20 seconds by setting potentiometer P2.
**Handling**

Probes:

Seal the thread with Teflon tape before installation (Fig. 1).

Do not turn or handle by the housing when tightening the process connection. However, the housing is suitable to be reoriented by once the process connection has been tighten (Fig. 2).

Use the correct tool during installation (Fig. 3).

The probe should not be dropped or suffer any impact or fall that could damage the electronics or the plastic tip of the probe (Fig. 4 and 5).

Periodic visual inspection of the probe is required to check for corrosion or deposit build-up. If deposits are found, clean the sensor to ensure optimum performance.

When cleaning the rod use a soft brush or any other similar object.

---

**Fig. 1**

**Fig. 2**

**Fig. 3**

**Fig. 4**

**Fig. 5**
**Technical Specifications**

| LVCN7000 |

<table>
<thead>
<tr>
<th>Application</th>
<th>Level switch for liquids solids and granular</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Voltage</td>
<td>24 Vdc +/- 10%</td>
</tr>
<tr>
<td>Current Consumption</td>
<td>2VA</td>
</tr>
<tr>
<td>Output</td>
<td>Relay (SPDT) 5A max (250Vac)</td>
</tr>
<tr>
<td>Adjustment</td>
<td>Potentiometer - Switch Point</td>
</tr>
<tr>
<td>Time Delay</td>
<td>Potentiometer 1 to 20 seconds</td>
</tr>
<tr>
<td>Frequency oscillation</td>
<td>5MHz</td>
</tr>
<tr>
<td>Level indication</td>
<td>Led status on/off</td>
</tr>
<tr>
<td>Electrical Connection</td>
<td>Cable gland - ½”NPT cond. entry or M12 connector</td>
</tr>
<tr>
<td>Process Connection</td>
<td>3/4” to 1 1/2” BSP or NPT flange or sanitary connections</td>
</tr>
<tr>
<td>Wetted Material</td>
<td>POM (Polyoxymethylene), PTFE or PVC</td>
</tr>
<tr>
<td>Enclosure Material</td>
<td>Glass filled nylon</td>
</tr>
<tr>
<td>Max pressure</td>
<td>145 PSI (10 Bar)</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>14 to 176° F (-10 to 80°C)</td>
</tr>
<tr>
<td>Class Protection</td>
<td>IP 65</td>
</tr>
</tbody>
</table>
## Technical Specifications

**LVCN6000**

![Image of LVCN6000 device](image)

<table>
<thead>
<tr>
<th>Application</th>
<th>Level switch for liquids, solids, and granular</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Voltage</td>
<td>85...230 Vac, 24 Vdc</td>
</tr>
<tr>
<td>Current Consumption</td>
<td>4VA</td>
</tr>
<tr>
<td>Output</td>
<td>Relay (NO + NC) 5A max (250Vac)</td>
</tr>
<tr>
<td>Adjustment</td>
<td>Potentiometer - Switch Point</td>
</tr>
<tr>
<td>Time Delay</td>
<td>Potentiometer 1 to 20 seconds</td>
</tr>
<tr>
<td>Frequency Oscillation</td>
<td>5MHz</td>
</tr>
<tr>
<td>Level Indication</td>
<td>Led status on/off</td>
</tr>
<tr>
<td>Electrical Connection</td>
<td>Cable gland - (\frac{1}{2})”NPT cond. entry or M12 connector</td>
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<tr>
<td>Process Connection</td>
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<td>Enclosure Material</td>
<td>Glass filled nylon, Aluminium</td>
</tr>
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<td>Max Pressure</td>
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<tr>
<td>Class Protection</td>
<td>IP 65</td>
</tr>
</tbody>
</table>
### Trouble Shooting

<table>
<thead>
<tr>
<th>Fault</th>
<th>Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doesn’t Power Up</td>
<td>Green LED Off No power</td>
<td>Verify current supply</td>
</tr>
<tr>
<td></td>
<td>Bad contact</td>
<td>Verify cable connection</td>
</tr>
<tr>
<td>Doesn’t Detect Medium</td>
<td>Low sensibility</td>
<td>Adjust sensibility trimpot</td>
</tr>
<tr>
<td>Always On</td>
<td>Build up on the sensor</td>
<td>Clean sensor then adjust sensibility</td>
</tr>
</tbody>
</table>
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2. Model and serial number of the product, and
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OMEGA’s policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

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