

User's Guide



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LVR300 Series Continuous Level Switch System



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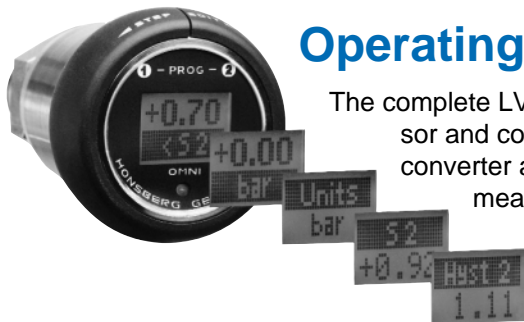
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The information contained in this document is believed to be correct, but OMEGA accepts no liability for any errors it contains, and reserves the right to alter specifications without notice.

WARNING: These products are not designed for use in, and should not be used for, human applications.

Operating Principle



The complete LVR300 Series Sensor is designed to be a self-contained continuous level sensor and control, requiring only a power source. A 16-bit microcontroller with a 14-bit A/D converter and a 12-bit D/A converter provides the necessary processing speed and measurement accuracy. The signal is displayed with units using a back-lit LCD graphical display and converted to a 4-20 mA signal. Two switch points with either a positive or negative output can be programmed over the complete range.

The switching point hysteresis can be set separately in value and direction (minimum/maximum switching value). Upward and downward crossings of switching points and error messages are shown in the display with a flashing red LED that is easily visible from a distance.

Other parameters can be changed using codes, including: signal filter; selectable unit (inch, cm) includes automatic conversion of the values; selectable 0-20 mA or 4-20 mA output; value assignment of 4-20 mA (setting of zero point and span). The complete housing can be rotated around the mechanical connection so that the correct reading position can be set after mounting (installation).

This LVR300 Series is very easy to use, as dialog messages are displayed for the user. It can even be set when wearing protective gloves, if necessary.

Programming Overview

The LVR300 Series' programming ring can be rotated from the Neutral center position to Position 1 and Position 2. The following actions are possible:

A – Display of parameters with Position 1 (simultaneous display of the set parameters) – Turn the programming ring left to Position 1 to begin cycling through these programming parameters: Switching points S1 and S2, Hysteresis direction of S1 and S2, Hysteresis Hyst 1 and Hyst 2, Code (allows editing of additional parameters), Filter, Units, Output, 4 mA Value and 20 mA value. See following pages for detailed programming instructions.

B – Editing with Position 2

Turn the programming ring to the right to Position 2 and a flashing cursor appears showing the position to be changed. With repeated turning to Position 2, the values are increased. By turning to Position 1, you obtain the next position. Each position can be edited in this way. **If there is no action within 5 seconds, the device returns to the normal display section without the change being accepted, and you will have to cycle through the program again.**

C – Saving the change with Position 1

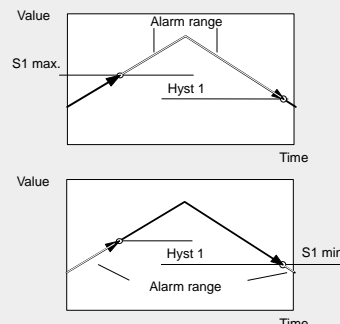
Turning one time toward Position 1 after quitting the last value signifies acceptance of the change.

Programming protection:

The programming ring can be pulled off, inverted and replaced. This will prevent further programming resulting from turning the ring in either direction.

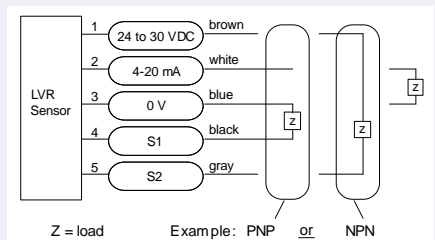
Example of hysteresis setting:

Examples with S1 as maximum switching point and as minimum switching point:



Programming Ring turns from Position 1 to Position 2

Terminal Assignment



The switch points are automatically changing to positive or negative, depending on your interface.

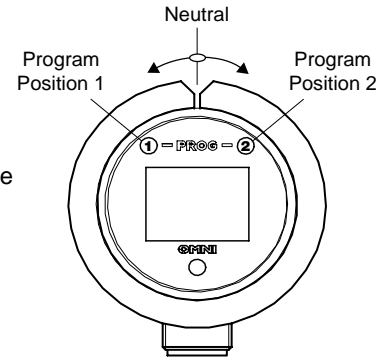
Mating Connector

M12 x 1, 5-position female, shielded, straight or M12 x 1, 5-position female, shielded, right angle

Sources: Hirschmann, Binder, rde Connectors & Cables or comparable connector

On power-up, the company logo is displayed, followed by the preset level/unit measurement. Changing the level (by float movement) will be reflected in the display. If the level is at either of the preset switch levels S1 or S2 (the upper and lower levels), the display will also be alternating between the **S1** (or **S2**) status indication with the level reading. The **Switch Active** status is also indicated by a flashing LED.

By rotating the program ring to Position 1 (P1, toward the left) and then back to Neutral, the program steps to the S1 setting. The level for activation of the S1 switch is indicated, and may be edited by turning the program ring to the P2 position (see below). This will highlight the tenths digit. The digit value is advancing by alternating the program ring from center to the right P2 position. Turning the ring to the P1 position accepts that value and moves to the next digit. Turning the ring to Neutral and then back to P1 will cycle through all of the digits and then accept the values.



PROGRAMMING POSITIONS

The P1 to Neutral movement steps the program through positions in the following sequence:

LOGO	←	Logo display, only shown on initial power-up.
###.# Inches (cm)	OR	###.# < S1
↔ S1 ###.#	←	Switch point 1 value, sets level for activation.
↔ S1 Min. (Max.)	←	Switch point 1 is active if the level is below (or below) S1.
↔ Hyst 1 ##.#	←	Hysteresis threshold added to switch point 1 for switch = active.
↔ S2 ###.#	←	Switch point 2 value, sets level for activation.
↔ S2 Max. (Min.)	←	Switch point 2 is active if the level is above (or below) S2.
↔ Hyst 2 ##.#	←	Hysteresis threshold added to switch point 2 for switch = active.
↔ Code 000	←	To access other program parameters, rotate ring to P2 and change 000 to 111.
↔ ###.# Inches (cm)	←	Returns to regular display of current float level.

MODIFYING OPERATING PARAMETERS

From any of the Programming Position steps noted at left, follow these steps to modify the operating parameter:

- 1 Turn the programming ring to the right to Position 2, and then back to Neutral, to bring up the editing cursor in the first decimal place.
- 2 Turning the ring to the right and back to Neutral increases the current decimal place to the next highest value.
- 3 Turning the ring to the left and back to Neutral moves the cursor on to the next decimal position. Repeat step 2 to edit the current position.
- 4 To confirm the new value, continue to turn the ring to the left and back to neutral until you cycle through all of the decimal places and the next parameter shows on the display.

ENTERING ADDITIONAL PROGRAM PARAMETERS

After reaching the Code step, enter 111 by turning the ring P1 to Neutral, and you can access these additional parameters:

1 Filter ###.# Time for the measurement to respond (seconds)	2 Units Inch (cm) Switch between inches and cm; Switch points are converted automatically	3 Output 4-20 mA Switchable to 0-20 mA
4 4 mA ###.# Set the 4 mA level (may be higher than the min. level)	5 20 mA ###.# Set the 20 mA level	6 ###.# Inches (cm) Returns to regular display mode

PROTECTING YOUR PROGRAMMING PARAMETERS

1. Pull off the ring. Keep it as a personal key.
2. Use ring in reverse position on the sensor (PROG.LOCK position).



Enter Code 989 to return to Factory Default Settings.

Step-by-step program examples are illustrated on the following pages.

Note: During the programming process, if there is no new action taken within 30 seconds, the sensor will return to "measurement display" without saving your changes. You will have to go through the entire program a second time to re-program the unit.

HOW TO MODIFY THE SENSOR OPERATING PARAMETERS

HOW TO ENTER ADDITIONAL PARAMETERS & INFORMATION

Example: S1 = +18.6 Inches (or cm)

If the ring is turned right toward Position 2 (EDIT), a cursor appears while the parameter you want to modify is displayed.

Turning right effects a change to the next higher figure.

Turning left moves the cursor to the next decimal position.

Move ring 3 times to the right, alternating to Position 2 and center, and you will see a 3-digit increase to the figure marked by the cursor's location.

Turn the ring 2 times to the left, toward Position 1, and the cursor disappears. The modified S1 is now visible and the next parameter is shown automatically.

□ Cursor flashing

NOTE: If you remain idle in the programming stage for 30 seconds, the display indication will return to "measurement display" without saving your new settings. You will have to cycle through the program again to make your changes.

When the program ring is turned to the right toward Position 2 (EDIT), a cursor appears at the parameter to modify.

Turning right effects an increase of the figure.

Turning left moves the cursor to the next decimal position.

By turning the ring to the left toward Position 1, the cursor disappears and enters the code. The next parameter arrives automatically.

Filter for display and analog output. (It is a FIFO filter and the time to accomplish the actual measurement value corresponds to the seconds shown in the display.)

Selection of various units (inches, cm, PSI). Display and switch points are recalculated automatically.

Set analog output 4-20 mA or 0-20 mA.

Start of analog output range (in the selected unit).

End of analog output range (in the selected unit).

In regular display mode again.

To RETURN TO THE FACTORY DEFAULT SETTING:
Set the code to 989.

All individual parameters are now overwritten.

All specifications are subject to change without notice.



LVR300 Continuous Level Sensor Installation Guide

General Information

1. Continuous Level Sensors should be installed rigidly so the float is free to move as the liquid level changes.
2. Continuous Level Sensors should be mounted in a tank area free of severe turbulence or protected from such turbulence by appropriate and adequate slosh shields.
3. Continuous Level Sensors stems should be vertical for best results, but satisfactory operation is possible in most liquids with the stem at up to a 30° angle from vertical.
4. Care should be taken that Continuous Level Sensors are always operated within electrical ratings.

Cautions

1. The pressure, temperature and electrical limitations shown for the specified level sensor must not be exceeded.
2. The pressures and temperatures must take into consideration possible surges in the temperature and pressure of the system.
3. The liquids used must be compatible with the materials of construction. Specifications of materials will be given upon request.
4. Life expectancy of the sensor varies with applications.
5. Ambient temperature changes can affect sensor set points, since specific gravities of liquids vary with temperature. Consult factory for assistance.
6. Level sensors have been designed to be shock and vibration resistant. For maximum life, both should be minimized. Consult factory for assistance.
7. Excessive contaminants in fluid may inhibit float operation and occasional wipe down may be necessary.
8. Physical damage to product may render product unserviceable.
9. Installation in a vessel made from magnetic materials may affect operation.



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If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective, it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components in which wear is not warranted, include but are not limited to contact points, fuses, and triacs.

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