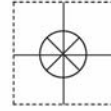


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LVV-110 Series Vertical Buoyancy Level Switch



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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.

About Vertical Buoyancy Level Switch Sensors: The Vertical Buoyancy Level Switch consists of a float, magnet reed switch and baffle body which dampens turbulence and eliminates the negative effects of switch chatter. When the probe is dry, the float rests on the bottom of the baffle body such that the magnet does not influence the reed switch. As the probe becomes immersed in liquid, the float becomes buoyant and the magnet elevates causing the reed switch to change to change.

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Accuracy: ±2mm in water
 Repeatability: ±1mm in water
 Orientation: ±20° from vertical
 Specific Gravity: 0.8 minimum
 Contact Type: (1) SPDT reed
 Contact Rating: 15VA, 0.25A max.
 Contact Voltage: 120 VAC, 120 VDC @ 15 VA
 Contact Output: Selectable NO/NC
 Temperature Range: F: -40° to 176°
 C: -40° to 80°
 Pressure Range: 25 psi (2 bar) @ 25° C., derated
 @ 1.667 psi (.113 bar) per °C.
 above 25° C.
 Sensor Rating: NEMA 6 / IP68
 Sensor Material: Polypropylene (PP)
 Polyvinylidene Fluoride (PVDF)
 Cable Type: 3-cond.r, 22-gauge, shielded
 Cable Length: 10' (3m)
 Cable Material: PP or PFA jacket
 Mounting Threads: 3/4" NPT

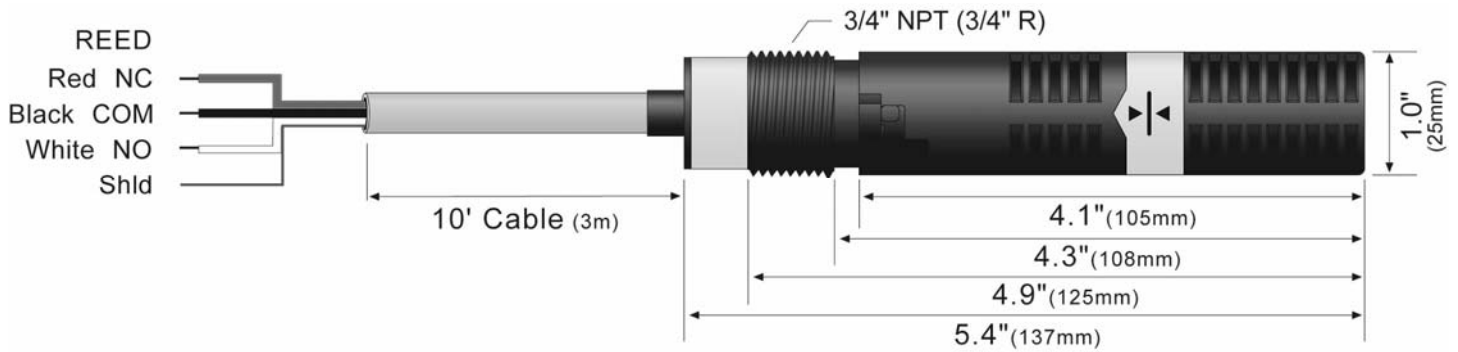
Switch Rating:

Reed Switch Rating		Maximum Resistive Load	
VA	Volts	Amps AC	Amps DC
15	0-50	0.3	0.21
15	120	0.13	0.09
15	240	0.06	0.04

Components:

Part Number	Body Material	Cable Material	Cable Length
LVV-110	PP	PP	10'
LVV-110-25	PP	PP	25'
LVV-110-50	PP	PP	50'
LVV-111	PVDF	PFA	10'
LVV-110-25	PVDF	PFA	25'
LVV-110-50	PVDF	PFA	50'

Dimensions:



⚠ About Manual: PLEASE READ THE ENTIRE MANUAL PRIOR TO INSTALLING OR USING THIS PRODUCT. This manual includes information on the vertical buoyancy, Model LVV-110 & LVV-111. Please refer to the part number located on the sensor label to verify the exact model which you have purchased.

⚠ User's Responsibility for Safety: OMEGA ENGINEERING manufactures a wide range of liquid level switches and technologies. While each of these switches are designed to operate in a wide variety of applications, it is the user's responsibility to select a switch model that is appropriate for the application, install it properly, perform tests of the installed system, and maintain all components. The failure to do so could result in property damage or serious injury.

⚠ Proper Installation and Handling: Because this is an electrically operated device, only properly trained staff should install and/or repair this product. Use a proper sealant with all installations. Never over tighten the sensor within the fitting, beyond a maximum of 80 inch-pounds torque. Always check for leaks prior to system start-up.

⚠ Material Compatibility: The LVV-110 series level switch is available in two wetted material versions. The switch and the cable are made of Polypropylene (PP) for the LVV-110 models. The switch is made of Polyvinylidene Fluoride (PVDF) and cable is made of Perfluoroalkoxy (PFA) for the LVV-111 models. Make sure that the switch is compatible with the application liquids. To determine the chemical compatibility between the sensor and its application liquids, refer to the Compass Corrosion Guide.

⚠ Temperature and Pressure: The LVV-110 Series switch is designed for use in application temperatures up to 80°C, and for use at pressures up to 25 psi (2bar) @ 25 °C., derated @ 1.667 psi (.113 bar) per °C. above 25°C.

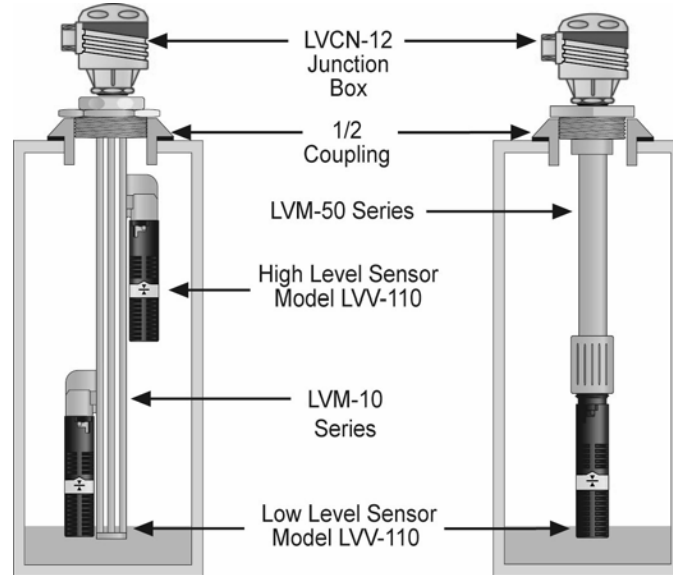
⚠ Wiring and Electrical: The supply voltage used for the LVV-110 series should never exceed 120 volts AC @ 15 VA. Electrical wiring of the switch should be performed in accordance with all applicable national, state, and local codes.

⚠ Flammable, Explosive and Hazardous Applications: The LVV-110 Series switch should not be used within flammable or explosive applications unless properly connected to an approved control device. In hazardous applications, use redundant measurement and control points, each having a different sensing technology. Refer to the National Electrical Code (NEC) for all applicable installation requirements in hazardous locations.

⚠ Warning ⚠

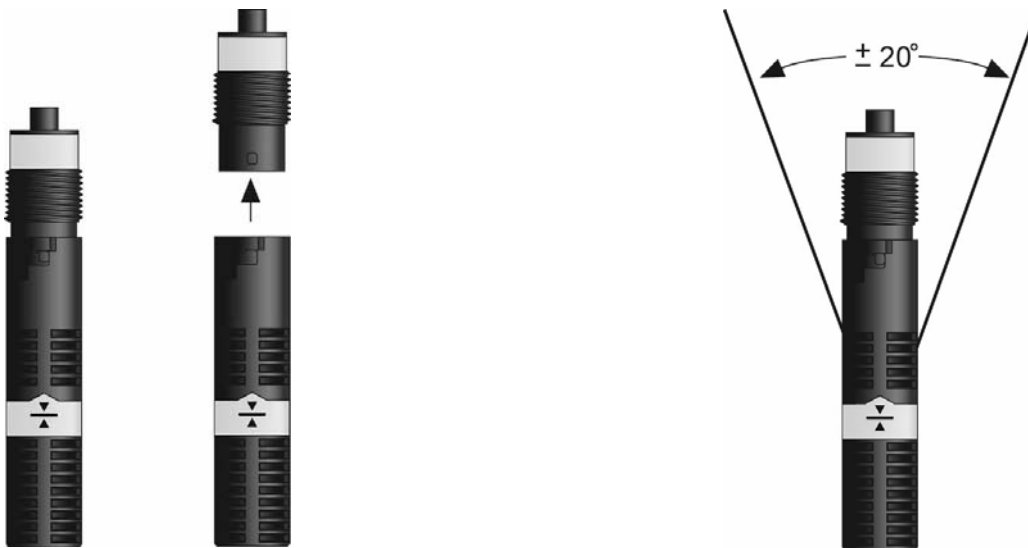
Avoid installing the LVV-110 series in tanks in magnetized metal tanks. Doing so will activate the internal reed switch.

Top Wall Installation: OMEGA ENGINEERING's LVV-110 series may be installed through the top wall of a tank. For Level Track Mounting System (LVM-10 series) installations, remove the sensors thread and use the bayonet adapter to interface to the LVM-20 series Switch Car. For the Single-Switch Fitting Assembly (LVM-50 series) installations use the 3/4" thread as the interface.



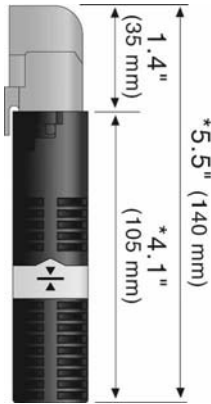
Bayonet Connection: The 3/4" thread can be removed to access the bayonet connection. Simple press down on the threads and twist to release.

Orientation: Mounting orientation must be kept vertical for proper orientation. The vertical buoyancy and float switches are orientated in vertical position $\pm 20^\circ$.



Connection to a Switch Car Kit (LM30 series): In order to attach the LVV-110 Series to a Level Track Mounting System (LVM-10 series) fitting, a Switch Car Kit (LVM-20 series) is required. The LVV-110 Series can be attached in two ways, without the bayonet adapter and with the bayonet adapter.

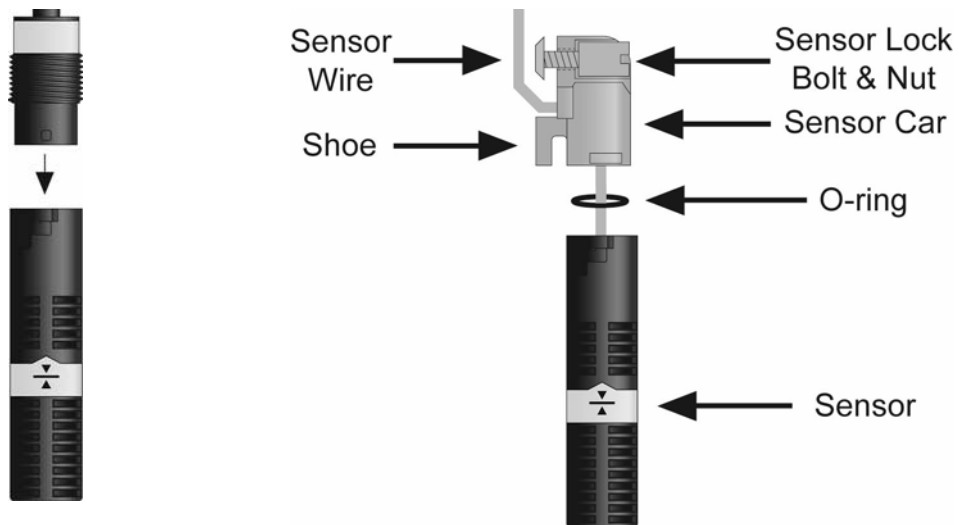
Without Bayonet Adapter



With Bayonet Adapter



The use of the bayonet adapter will increase the overall length of the LVV-110/LVM-20 series assembly. This will result in a lower activation point within the tank due to the added length. It is recommended to remove the bayonet adapter when interfacing with Level Track Mounting System.



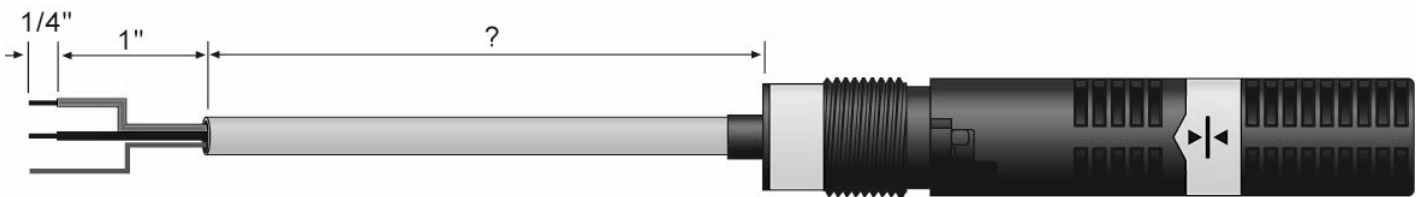
First, remove the bayonet adapter by pressing down twisting the adapter.

Next, thread the sensor wire through the O-ring and the sensor car and out through the hole between the sensor car shoe and the locking bolt. Set the O-ring into the LVV-110. Push the sensor into the bayonet side of sensor car. Screw the bayonet adapter onto the sensor until the sensor seats against the pit inside the adapter.

Voltage: The input voltage to the LVV-110 series should never exceed the maximum voltage rating. OMEGA ENGINEERING controllers have a built-in 13.5 VDC power supply which provides power to all of OMEGA ENGINEERING's level switches. Alternate controllers and power supplies may also be used with the LVV-110 series.

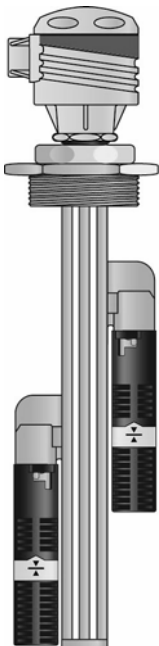
Cable Length: Determine the length of cable required between the LVV-110 Series sensor and its point of termination. Allow enough slack to ensure the easy installation, removal and/or maintenance of the sensor. The cable length may be extended up to a maximum of 1000 feet, using a well insulated, shielded wire.

Wire Stripping: Using a 10 gauge wire stripper, carefully remove the outer layer of insulation from the last 1-1/4" of the sensor's cable. Unwrap and discard the exposed foil shield from around the signal wires, leaving the drain wire attached if desired. With a 20 gauge wire stripper, remove the last 1/4" of the colored insulation from the signal wires.

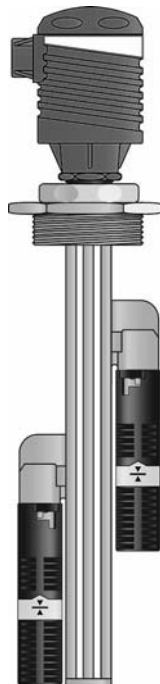


Level Track Mounting System and Single-Switch Fitting Assembly: The LVV-110 series can be packaged with Omega Engineering Level Track Mounting System and Single-Switch Fitting Assembly.

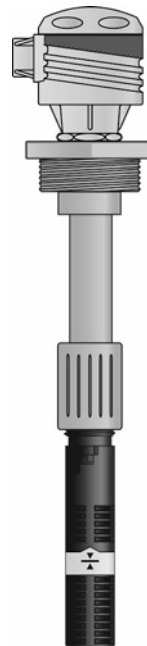
Level Track Mounting System with Junction Box and (2) Switches



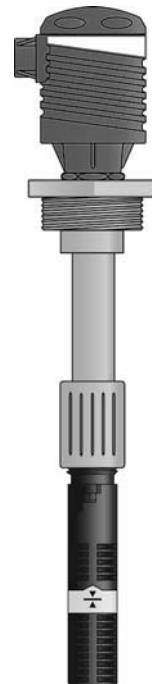
Level Track Mounting System with Relay Controller and (2) Switches



Single-Switch Fitting Assembly with Junction Box and (1) Switch

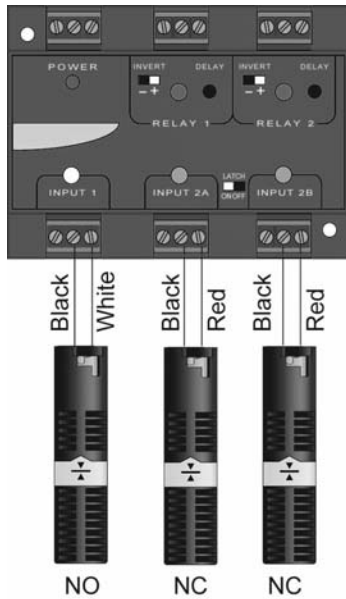


Single-Switch Fitting Assembly with Relay Controller and (1) Switch

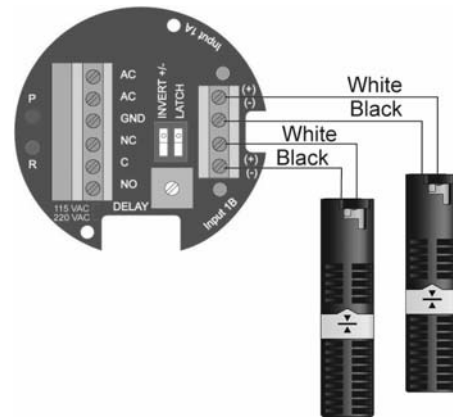


Wiring to a OMEGA ENGINEERING Controller

LVCN-120 Series Controller (LVCN-120 Shown):



LVCN-100 Series Controller (LVCN-20 shown):

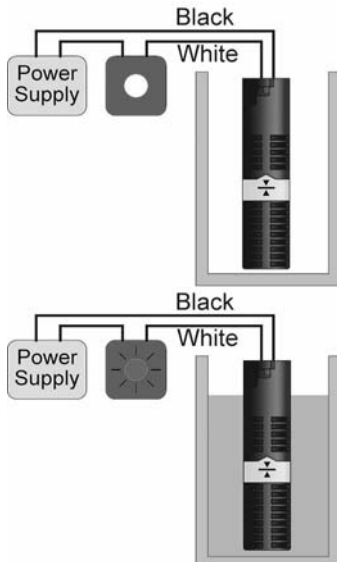


NOTE: When using a latching relay, the polarity of both switches must be the same. Either both switches are wired Normally Closed (Red & Black – See Relay #2 with LVCN-120) or both Normally Open (White & Black – See Relay #1 with LVCN-20).

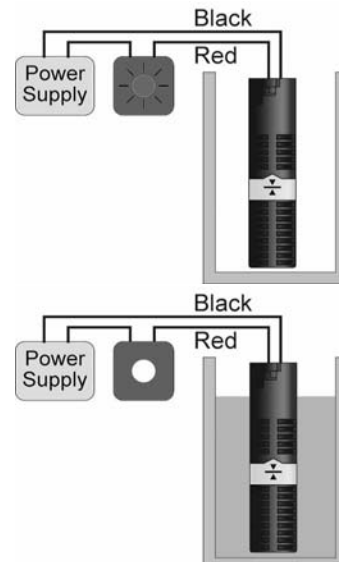
Vertical Buoyancy Level Switch:

The LVV-110 series can be wired normally open or normally closed for your application requires.

Normally Open: Use the Black and White wire for operation the LVV-110 series in a normally open state. Normally open is defined as the switch being open when the float is dry and closed when the float becomes submersed. This operation is typical for indicating a high level.



Normally Closed: Use the Black and Red wires for operating the V-110 series in a normally closed state. Normally closed is defined as the switch being closed when the float is dry and open when the float becomes submersed. This operation is typical for indicating a low level.



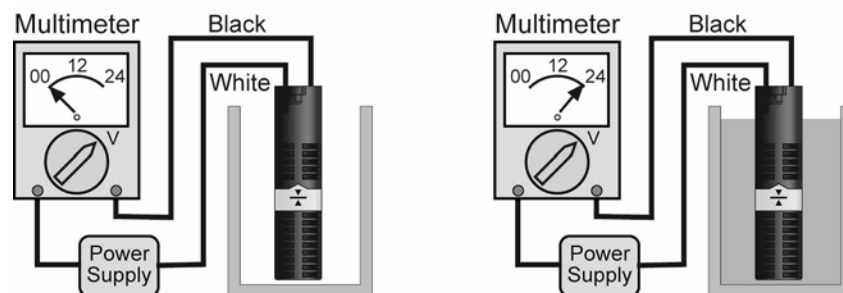
General: While a filter shroud protects the float from particulate contamination, the switch may need to be cleaned periodically to prevent jamming or sticking. The vertical buoyancy and vertical float has no scheduled maintenance requirement, except to clean off any deposits or scaling from the switch as necessary. It is the responsibility of the user to determine the appropriate maintenance schedule, based on the specific characteristics of the application liquid.

Cleaning procedure:

- 1. Power:** Make sure that all power to the switch, controller and/or power supply is completely disconnected.
- 2. Switch removal:** If necessary, make sure that the tank is drained well below the switch prior to removal. Carefully, remove the sensor from the installation. Remove the outer screen by pushing on the screen and turning it slightly to disconnect it from the buoyancy net connector so that the float is exposed.
- 3. Cleaning the switch:** using a soft bristle brush and mild detergent, carefully wash the switch. Do not use harsh abrasives such as steel wool or sandpaper, which might damage the surface of the sensor. Do not use incompatible solvents which may damage the sensor's PP or PVDF plastic body. Take particular care to remove any scaling from the float body and make sure that it moves freely.
- 4. Sensor installation:** Follow the appropriate steps of installation as outlined in the Installation section of this manual.

Testing the installation:

- 1. Power:** Turn on power to the controller and/or power supply.
- 2. Immersing the switch:** Immerse the sensing tip in its application liquid, by filling the tank up to the switch during preliminary testing is to hold a cup filled application liquid up to the switch's tip.
- 3. Test:** With the switch being fluctuated between wet and dry states, the switch indicator light in the controller should turn on and off. If the controller doesn't have an input indicator,
 - Use a voltmeter with a power supply in series to measure an open or closed circuit.
 - Use an ohmmeter in series to measure an open or closed circuit.
- 4. Point of actuation:** Observe the point at which the rising or falling fluid level causes the switch to change state, and adjust the installation of the switch if necessary.



Example: Testing the LVV-110 Series with a Multimeter set to read Volts. When wired NO (Black and White), the meter will read 0 volts when dry and full voltage when wet.



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2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

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