1 YEAR
WARRANTY

User's Guide

Shop online at

omega.com®

OMEGA®

omega.com
e-mail: info@omega.com
For latest product manuals:
omegamanual.info

ISO 9001 CERTIFIED CORPORATE QUALITY
STAMFORD, CT

ISO 9001 CERTIFIED CORPORATE QUALITY
MANCHESTER, UK

LVM-11/-12/-13/-14/-15 Series
Level Track Kit

omega.com®
OMEGA®

OMEGAnet® Online Service omega.com	Internet e-mail info@omega.com

Servicing North America:

U.S.A.: ISO 9001 Certified
Omega Engineering, Inc., One Omega Drive, P.O. Box 4047
Stamford, CT 06907-0047 USA
Toll Free: 1-800-826-6342 TEL: (203) 359-1660
FAX: (203) 359-7700 e-mail: info@omega.com

Canada:
976 Bergar
Laval (Quebec), Canada H7L 5A1
Toll-Free: 1-800-826-6342 TEL: (514) 856-6928
FAX: (514) 856-6886 e-mail: info@omega.ca

For immediate technical or application assistance:

U.S.A. and Canada: Sales Service: 1-800-826-6342/1-800-TC-OMEGA®
Customer Service: 1-800-622-2378/1-800-622-BEST®
Engineering Service: 1-800-872-9436/1-800-USA-WHEN®

Mexico:
En Espaol: 001 (203) 359-7803 FAX: (001) 203-359-7807
info@omega.com.mx e-mail: espanol@omega.com

Servicing Europe:

Benelux:
Managed by the United Kingdom Office
Toll-Free: 0800 099 3344 TEL: +31 20 347 21 21
FAX: +31 20 643 46 43 e-mail: sales@omega.nl

Czech Republic:
Frystatska 184
733 01 Karviná, Czech Republic
Toll-Free: 0800-1-66342 TEL: +420-59-6311899
FAX: +420-59-6311114 e-mail: info@omegashop.cz

France:
Managed by the United Kingdom Office
Toll-Free: 0800 466 342 TEL: +33 (0) 161 37 29 00
FAX: +33 (0) 130 57 54 27 e-mail: sales@omega.fr

Germany/Austria:
Daimlerstrasse 26
D-75392 Deckenpfronn, Germany
Toll-Free: 0 800 6397678 TEL: +49 (0) 7059 9398-0
FAX: +49 (0) 7056 9398-29 e-mail: info@omega.de

United Kingdom: ISO 9001 Certified
OMEGA Engineering Ltd.
One Omega Drive, River Bend Technology Centre, Northbank
Irlam, Manchester M44 5BD England
Toll-Free: 0800-488-488 TEL: +44 (0)161 777-6611
FAX: +44 (0)161 777-6622 e-mail: sales@omega.co.uk

About Level Track Mounting Kit: Omega Engineering's Level Track Kit is an adjustable mounting system for installing multiple level sensors vertically within a tank. Mounted through a single point at the top of the tank, up to 4 different sensors can be located at any depth on the Level Track Kit. Omega Engineering's LVCN-11 or LVCN-12 electrical housing, and LVCN-100, LVCN-110 or LVCN-20 compact relay controllers are designed to be mounted directly to the 3/4" NPT fitting at the top of the assembly. Level Track Kit mounts vertically through a standard 2" NPT tank adapter or on a side mount bracket (such as the LVM-30). Unlike prefabricated "trees" or pipes, the Level Track Kit allows you to experiment with sensor position to account for variations in the point of actuation of each sensor during process testing.

Level Track Mounting Kit: The Level Track kit consists of the following:

Track: The track itself is approximately 1" square, and is from 2' to 10' long depending on model. The track may be cut to length if desired. Four separate grooves run the length of the track, one on each side of the square. These grooves hold the sensor cars that attach to Omega Engineering sensors, and also serve to contain the sensor wire. The bottom of the track is capped with an end cap. About 3/8" from the top of the track is a hole for a locking pin that holds the track in position in the top fitting.

Sensor Car and Bayonet Adapter: The sensor car assembly is the heart of the Level Track Kit. It slides in the grooves of the track, and is locked into position by a plastic bolt and screw. The bayonet to ¾" NPT adapter has a female ¾" NPT fitting on one end where the sensor (not included) will screw in, and a bayonet fitting on the other end that attaches it onto the sensor car with a slight turn, with an o-ring in between to provide tension for the push-and-turn connection.

2" NPT to Level Track Fitting: The track slides into the square center of a large fitting which has coarse threads on the top, and 2" NPT-standard threads on the bottom. A slot inside the fitting mates with the locking pin to hold the track in position.

Top compression fitting and wire gasket: Once the track is in the 2" fitting, the wires pass through a thrust plate and a thick rubber gasket, and the assembly is held firmly in place by a top compression fitting which screws onto the coarse threads. The top fitting has a 3/4" NPT threaded outlet for connecting to conduit or for direct mounting of a Omega Engineering LVCN-11/-12 electrical housing, LVCN-100, LVCN-110 or LVCN-20 series controller. Make sure the seal plug has been installed for added protection.

⚠ **Note:** The wire gasket is not a vapor or water seal.

Table of Contents

Level Track Mounting Kit:

Track lengths:	2’, 4’, 6’, 8’, 10’ or 12’ (1m, 2m or 3m)
Adjustability:	Entire track length
Mixer velocity:	Up to 1.5 fps (0.45mps)
Max. no. of sensors:	Up to four (one per side of track)
Temperature range.:	F: -40 to 176°
	C: -40 to 80°
Pressure range:	Atmospheric
Track material:	Polypropylene, 20% glass filled
Mounting thread:	2” NPT

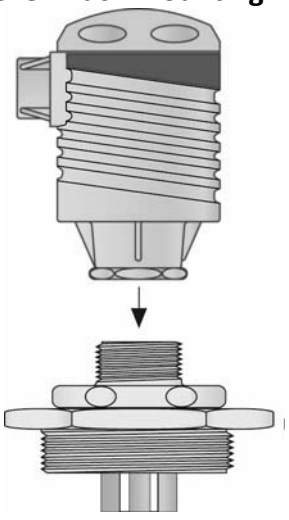
Electrical Housing (not included):

Enclosure rating:	NEMA 4X (IP65)
Enclosure material:	Polypropylene (U.L. 94 VO)
Enclosure rotation:	300 ° swivel base
Conduit connection:	½” NPT
Termination:	12 pole socket terminal strip
Temperature range.:	F: -40 to 158°
	C: -40 to 70°

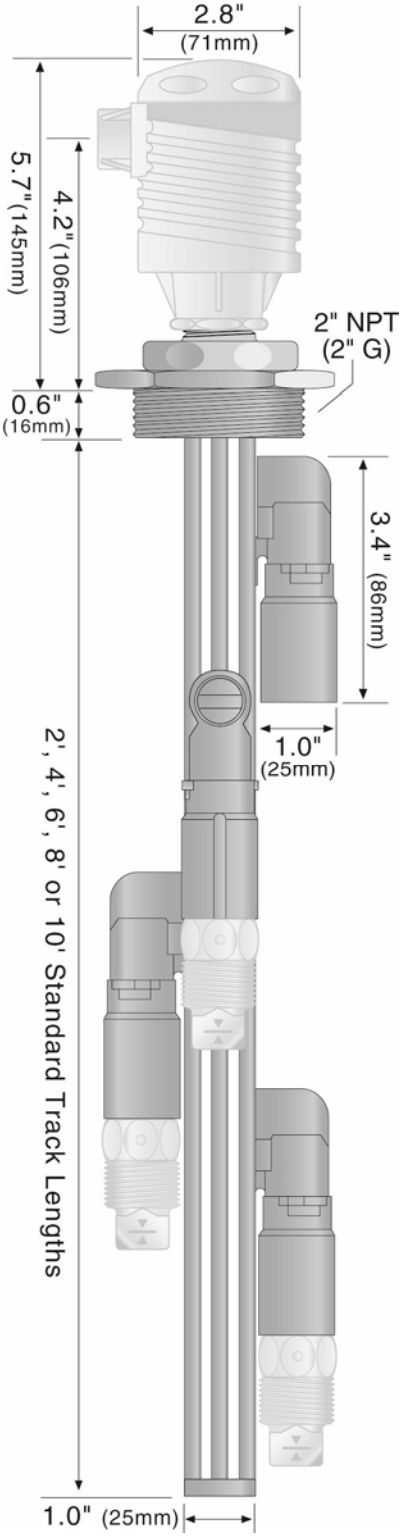
Side Mount Bracket (not included):

Bracket Material:	Polypropylene
Mounting thread:	2” NPT
Tank installation:	Bolt or plastic weld

Omega Engineering Electrical Housing Mounted on Level Track Mounting Kit



Level Track Mounting Kit Side View



⚠ **About This Manual:** PLEASE READ THE ENTIRE MANUAL PRIOR TO INSTALLING OR USING THIS PRODUCT. This manual includes information on the Level Track Kit installation fitting from Omega Engineering: LVM-11, LVM-12, LVM-13, LVM-14 & LVM-15 Series. Please refer to the part number located on the label to verify the exact model which you have purchased. Many aspects of installation and use are similar between models.

⚠ **User's Responsibility for Safety:** OMEGA ENGINEERING manufactures several models of liquid level sensors, controller and mounting systems. It is the user's responsibility to select components that are 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:** Use a proper sealant with all installations. Never over tighten the components. Always check for leaks prior to system start-up.

⚠ **Material Compatibility:** The track, end cap, wire retainer clips, bayonet adapter and sensor car for all the LVM-11/-12/-13/-14/-15 models are made of glass filled PP (Polypropylene, a polyolefin). The sensor car locking bolt and screw are made of PCTFE (polychlorotrifluoroethylene, a fluoroplastic), the top compression fitting, thrust plate, locking pin and 2" NPT fitting are made of PP and the O-ring is made of Viton (a fluorocarbon). The wire gasket is made of Neoprene, the seal plug is made of Santoprene and both have a silicon gel for lubrication. Make sure that the application liquids are compatible with the materials that will be wetted. To determine the chemical compatibility between the components and its application liquids, refer to the Compass Corrosion Guide, available from Compass Publications.

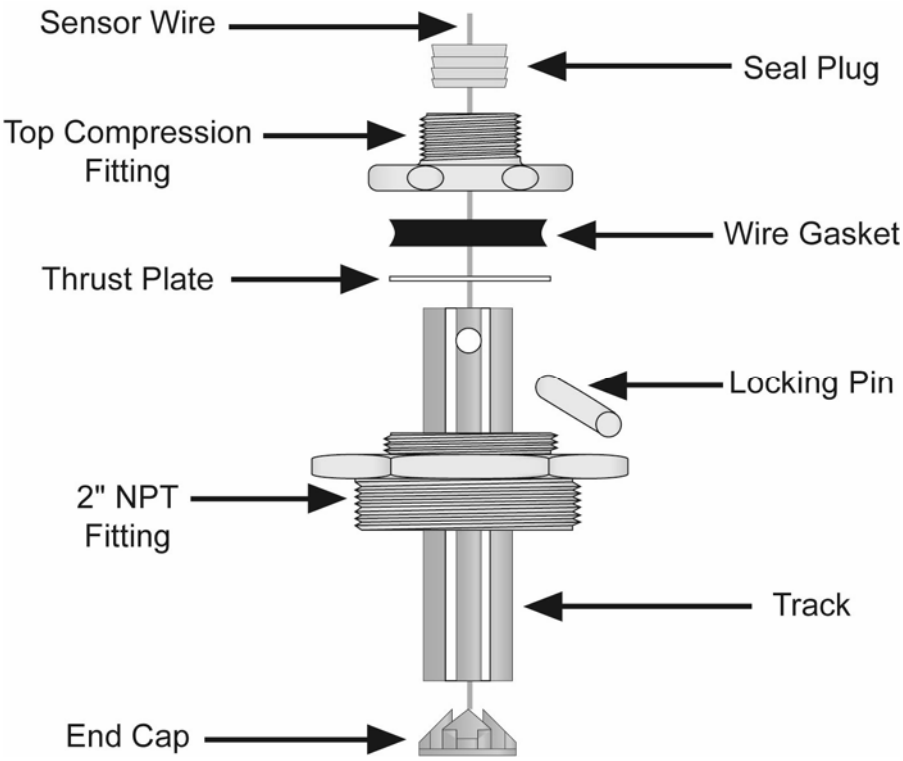
⚠ **Temperature and Pressure:** Level Track Kit is designed for use in application temperatures up to 80° C (176° F). It is not designed for pressurized applications due to the wiring that must travel through a gasket at the head.

⚠ **Wiring and Electrical:** Electrical wiring of any liquid level control system should be performed in accordance with all applicable national, state, and local codes. Take care not to cut or break the outer insulation jacket of wiring that may be immersed while routing cables in the Level Track Kit system. Such breaks of the liquid seal of the sensor system may lead to component failure.

⚠ **Flammable or Explosive Applications:** *Level Track Kit may be used within flammable or explosive applications* ***only if the associated components are rated intrinsically safe for such use.*** *In hazardous applications, use redundant measurement and control points, each having a different sensing technology.*

⚠ **Make a Fail-Safe System:** Design a fail-safe system that accommodates the possibility of sensor or power failure. In critical applications, Omega Engineering recommends the use of redundant backup systems and alarms in addition to the primary system.

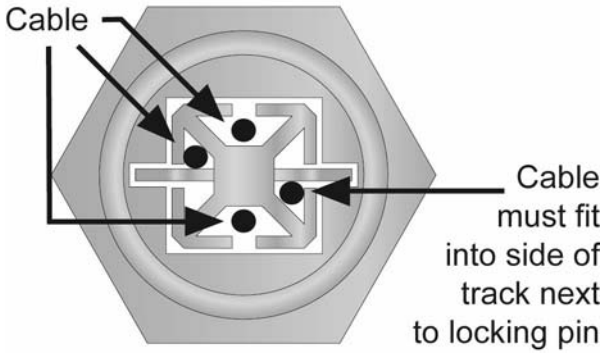
Level Track Kit Assembly Drawing (side view)



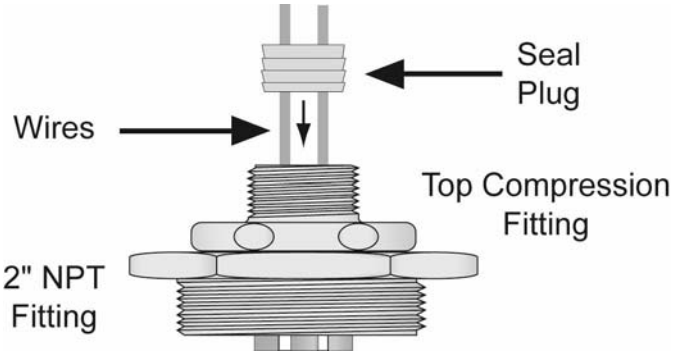
Components: One Level Track Kit (LVM-11/-12/-13/-14/-15) includes the following parts:

1 Seal Plug
1 Wire Gasket
1 Locking Pin
1 Track
2 Wire Retainer Clips (not shown)
Owner's Manual
1 Top Compression Fitting
1 Thrust Plate
1 2" NPT Fitting
1 End Cap

Level Track Kit Assembly Drawing (Top View)



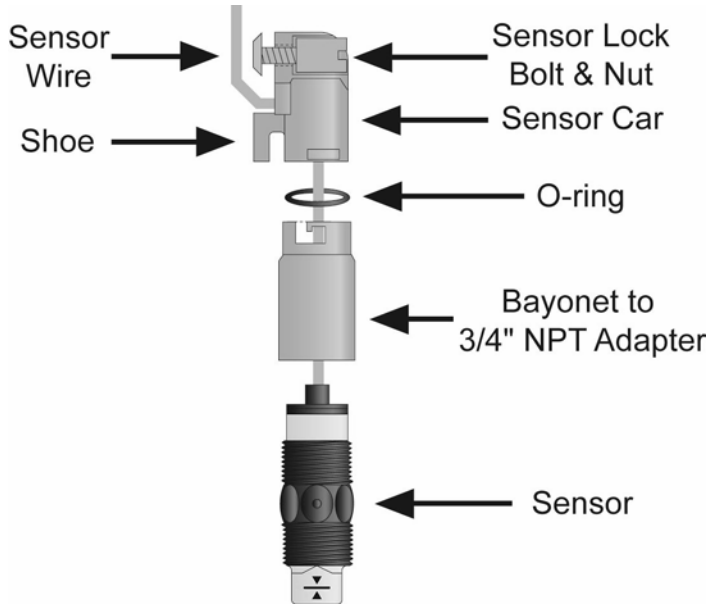
Seal Plug Assembly Drawing (Side View)



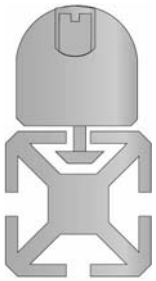
ASSEMBLY OF SWITCH CAR **Step Five**

Sensor car and bayonet adapter: The sensor car kit is the heart of the Level Track Mounting Kit system. It slides in the grooves of the track, and is locked into position by a plastic bolt and screw. The bayonet to 3/4" NPT adapter has a female 3/4" NPT fitting on one end where the sensor (not included) will screw in, and a bayonet fitting on the other end that attaches it onto the sensor car with a slight turn, with an O-ring in-between to provide tension for the push-and-turn connection.

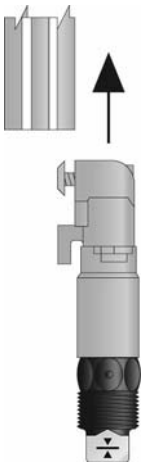
Sensor Car Kit Assembly Drawing (Side View):



Sensor Car Kit to Level Track Kit (Top View)



Sensor Car Kit to Level Track Kit (Side View)



Components: One Sensor Car kit (LVM-20) includes the following parts:

1 Locking Bolt
1 Sensor Car
1 Bayonet to ¾" NPT Adapter
Owner's Manual
1 Locking Nut
1 O-ring

1. **Attach the sensor(s) to the sensor car(s):**
    a. Thread the sensor wire through the bayonet to the ¾" NPT adapter, making the approach from the threaded side.
    b. Screw the bayonet adapter onto the sensor until the cap of the sensor seats against the pit inside the adapter.
    c. Thread the black O-ring onto the sensor wire and push it into the bayonet side of the bayonet adapter, seating it firmly into the adapter.
    d. Thread the sensor wire into the sensor car and out through the hole between the sensor car shoe and the locking bolt.

⚠ **Note:** The sensor wire insulation is made from polypropylene or perfluoroalkoxy to ensure chemical compatibility. This makes it stiffer than conventional wire. Take care not to bend the wire too sharply to the point where the insulation is broken. Such a break could cause liquid to enter the wiring, damaging the sensor.

    e. Pull the sensor wire through the hole while pushing the sensor and bayonet towards the sensor car until the bayonet is in position. Align the slots on the bayonet with the pine on the sensor car, and firmly push together. When the pin is in the correct position, turn the bayonet until it is in the locked position.

2. **Slide the first sensor car into the track:**
    a. Place the sensor car locking bolt (with the square tapered head) through the hole on the flat side of the sensor car, and place the slot-head nut through the other side. Screw them together several turns, but do not tighten them all the way yet.
    b. One end of the track has a hole drilled horizontally through it. This is the top of the track. You will want to insert the sensor car on the bottom end of the track (opposite the hole). Slide the bolt of the sensor car into the track (make sure the bolt head is turned so that the beveled edges are aligned with the beveled edges of the track, see illustration on previous page). Then slide the shoe (the lower end closest to the sensor) of the sensor car into the track.
    c. Slide the sensor to the desired position/depth. Tighten the sensor car lock screw with a screwdriver. To not over tighten. Route the wire inside the track. Slide the wire clips into the track to hold the wire in the track. Do not cut the wire to length yet.

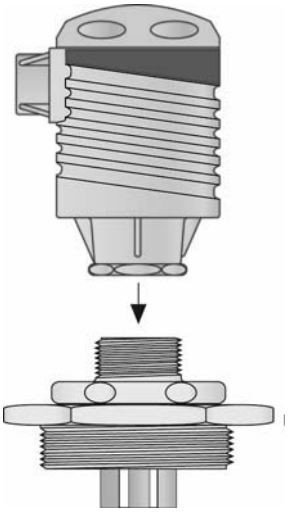
⚠ **Procedure for two or more sensors:** If more than one sensor will be installed on the track, repeat the procedures above for each sensor. However, do not mount the sensors too closely together because two sensors on different side of the track cannot fit through a 2" NPT fitting at the top of the tank. If adjacent mounting is necessary you may need to install the other sensor in temporary staggered positions, sliding them into the correct position after the Level Track Kit system has been mounted in the tank.

3. **Connect the track to the top fitting:**
    a. Thread the sensor wire(s) through the bottom of the 2" NPT to the Level Track Kit system fitting. The bottom of the fitting is the side with the smaller threads (2" NPT); it should be nearest the sensors.
    b. Before actually sliding the fitting onto the track, note the position of the horizontal hole through the track, orient the fitting so that the slot in the top of the fitting will be aligned with the hole. Slide the fitting onto the track, a few inches down from the top.
    c. Insert the locking pin into the hole in the track.
        i. If there are wires in either or both of the two tracks the locking pin passes through, make sure the wires are pinned into the inside slot by the locking pin (see illustration).

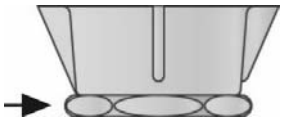
ii. **Hint:** Start by inserting the locking pin into the top of the track vertically, parallel with the wire, then when its end nears the alignment hole, push the pin in, prying the wire into the edge of the slot as you do.

d. Pull the fitting up to the top of the track until the locking pin is seated firmly in the slot and the top of the track is flush with the fitting.
e. Thread the wires through the holes in the thrust plate. Push the thrust plate down until it seats into the top of the 2" NPT fitting.
f. Thread the wires through the slots in the wire gasket. Push the gasket down until it seats into the top of the thrust plate.
g. Thread the wires through the ¾" NPT opening of the top compression fitting, with the approach made from the large threaded side.
h. Screw the top compression fitting onto the 2" Level Track Kit system fitting until hand-tight.
i. Thread the wires through the slots in the seal plug. Push the seal plug down into the top of the ¾" NPT opening on the top compression fitting until it seats with the top of the opening.

4. **Attach the termination hardware:** At this point, an enclosure housing (LVCN-11 or LVCN-12 series) or Compact Relay Controller (LVCN-20, LVCN-100 or LVCN-110 series) may be screwed onto the top of the assembly, and wiring attachments made following the instructions in its manual. Assuming that each sensor is already mounted in position, cut the sensor wires to the length approximately 1-1/2" above the top of the housing. However, be sure to make allowances when cutting the sensor leads for future adjustments to the sensor position.



Note: Always tighten the controller from the wrench flat located on the swivel base. Never tighten from the body of the controller.

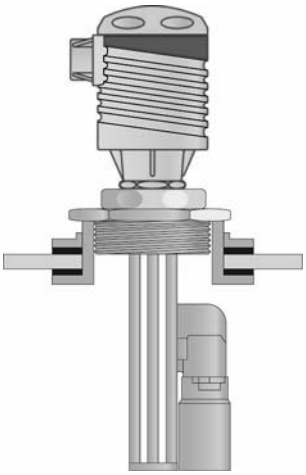


Determine the Proper Wire Length: Don't make the mistake of trimming the sensor wires too short before the process is tested. If the sensors might need to be lowered in the future, leave sufficient slack in the wires to allow for future adjustment. This extra wire may be stored in the bottom of the terminal strip housing, or elsewhere above the compression fitting.

Selecting a Location: The Level Track Kit should be mounted vertically at a point in the tank where it will not be exposed to excessive stress (such as radial mixing velocities in excess of 1.5 feet per second). When mounting in a tank with a mixer, mount the LVM-11/-12/-13/-14/-15 series close to the tank wall were velocities are lowest. Choose a mounting location where the sensors will function correctly (away from inlet pipes that may spray on the sensors causing false readings) and where the sensor technologies function best.

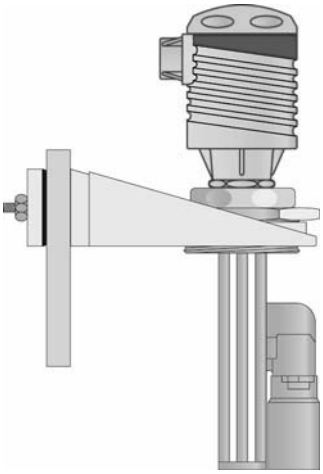
It is the user's responsibility to identify the proper placement and method of installation for the specific application.

Tank Top Mounting:



1. Install a standard 2" NPT tank adapter through the top of the tank at the desired location. If the tank top is not flat, use a 2" NPT self-aligning tank adapter. Make sure the threads of the adapter are not damaged or worn. If damaged, use a new adapter.
2. Insert the assembled Level Track Kit system through the tank adapter. If several sensors are too close together to fit through the tank adapter, slide them to a different locations so that only one sensor is going through the adapter at a time.
3. To ensure a proper seal, apply an appropriate sealant to the threads of the Level Track Kit system. Screw the LVM-11/-12/-13/-14/-15 series assembly into the tank adapter.
4. Make adjustments as required to the sensor position.
5. Connect the external wiring and conduit to the terminal strip or controller, following the instructions in that manual.

Side Mount Bracket Mounting:



1. Install the side mount bracket (LVM-30 series) at the desired location. Make sure the threads of the bracket are not damaged or worn. If damaged, use a new bracket.
2. Insert the assembled Level Track Kit system into the bracket. If several sensors are too close together to fit through the bracket, slide them to a different locations so that only one sensor is going through the bracket at a time.
3. Screw the LVM-11/-12/-13/-14/-15 series assembly into the bracket.
4. Make adjustments as required to the sensor position, and to the bracket tilting arm.
5. Connect the external wiring and conduit to the terminal strip or controller, following the instructions in that manual.

MADE IN USA

WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **13 months** from date of purchase. OMEGA's WARRANTY adds an additional one (1) month grace period to the normal **one (1) year product warranty** to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

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.

OMEGA is pleased to offer suggestions on the use of its various products. However, OMEGA neither assumes responsibility for any omissions or errors nor assumes liability for any damages that result from the use of its products in accordance with information provided by OMEGA, either verbal or written. OMEGA warrants only that the parts manufactured by the company will be as specified and free of defects. OMEGA MAKES NO OTHER WARRANTIES OR REPRESENTATIONS OF ANY KIND WHATSOEVER, EXPRESSED OR IMPLIED, EXCEPT THAT OF TITLE, AND ALL IMPLIED WARRANTIES INCLUDING ANY WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED. LIMITATION OF LIABILITY: The remedies of purchaser set forth herein are exclusive, and the total liability of OMEGA with respect to this order, whether based on contract, warranty, negligence, indemnification, strict liability or otherwise, shall not exceed the purchase price of the component upon which liability is based. In no event shall OMEGA be liable for consequential, incidental or special damages.

CONDITIONS: Equipment sold by OMEGA is not intended to be used, nor shall it be used: (1) as a "Basic Component" under 10 CFR 21 (NRC), used in or with any nuclear installation or activity; or (2) in medical applications or used on humans. Should any Product(s) be used in or with any nuclear installation or activity, medical application, used on humans, or misused in any way, OMEGA assumes no responsibility as set forth in our basic WARRANTY/DISCLAIMER language, and, additionally, purchaser will indemnify OMEGA and hold OMEGA harmless from any liability or damage whatsoever arising out of the use of the Product(s) in such a manner.

RETURN REQUESTS/INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting OMEGA:

1. Purchase Order number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR **NON-WARRANTY** REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

1. Purchase Order number to cover the COST of the repair,
2. Model and serial number of the product, and
3. Repair instructions and/or specific problems relative to the product.

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.

OMEGA is a registered trademark of OMEGA ENGINEERING, INC.

Where Do I Find Everything I Need for Process Measurement and Control? OMEGA...Of Course!

Shop online at omega.com℠

TEMPERATURE

- Thermocouple, RTD & Thermistor Probes, Connectors, Panels & Assemblies
- Wire: Thermocouple, RTD & Thermistor
- Calibrators & Ice Point References
- Recorders, Controllers & Process Monitors
- Infrared Pyrometers

PRESSURE, STRAIN AND FORCE

- Transducers & Strain Gages
- Load Cells & Pressure Gages
- Displacement Transducers
- Instrumentation & Accessories

FLOW/LEVEL

- Rotameters, Gas Mass Flowmeters & Flow Computers
- Air Velocity Indicators
- Turbine/Paddlewheel Systems
- Totalizers & Batch Controllers

pH/CONDUCTIVITY

- pH Electrodes, Testers & Accessories
- Benchtop/Laboratory Meters
- Controllers, Calibrators, Simulators & Pumps
- Industrial pH & Conductivity Equipment

DATA ACQUISITION

- Data Acquisition & Engineering Software
- Communications-Based Acquisition Systems
- Plug-in Cards for Apple, IBM & Compatibles
- Datalogging Systems
- Recorders, Printers & Plotters

HEATERS

- Heating Cable
- Cartridge & Strip Heaters
- Immersion & Band Heaters
- Flexible Heaters
- Laboratory Heaters

ENVIRONMENTAL MONITORING AND CONTROL

- Metering & Control Instrumentation
- Refractometers
- Pumps & Tubing
- Air, Soil & Water Monitors
- Industrial Water & Wastewater Treatment
- pH, Conductivity & Dissolved Oxygen Instruments

M-1970/1212