Warranty, Service & Repair

To register your product with the manufacturer, fill out the enclosed warranty card and return it immediately to:

Flowline Inc.
10500 Humbolt Street
Los Alamitos, CA 90720.

If for some reason your product must be returned for factory service, contact Flowline Inc. to receive a Material Return Authorization number (MRA) first, providing the following information:

1. Part Number, Serial Number
2. Name and telephone number of someone who can answer technical questions related to the product and its application.
3. Return Shipping Address
4. Brief Description of the Symptom
5. Brief Description of the Application

Once you have received a Material Return Authorization number, ship the product prepaid in its original packing to:

Flowline Factory Service
MRA
10500 Humbolt Street
Los Alamitos, CA 90720

To avoid delays in processing your repair, write the MRA on the shipping label. Please include the information about the malfunction with your product. This information enables our service technicians to process your repair order as quickly as possible.

WARRANTY

Flowline warrants to the original purchaser of its products that such products will be free from defects in material and workmanship under normal use and service for a period which is equal to the shorter of one year from the date of purchase of such products or two years from the date of manufacture of such products.

This warranty covers only those components of the products which are non-moving and not subject to normal wear. Moreover, products which are modified or altered, and electrical cables which are cut to length during installation are not covered by this warranty.

Flowline’s obligation under this warranty is solely and exclusively limited to the repair or replacement, at Flowline’s option, of the products (or components thereof) which Flowline’s examination proves to its satisfaction to be defective. FLOWLINE SHALL HAVE NO OBLIGATION FOR CONSEQUENTIAL DAMAGES TO PERSONAL OR REAL PROPERTY, OR FOR INJURY TO ANY PERSON.

This warranty does not apply to products which have been subject to electrical or chemical damage due to improper use, accident, negligence, abuse or misuse. Abuse shall be assumed when indicated by electrical damage to relays, reed switches or other components. The warranty does not apply to products which are damaged during shipment back to Flowline’s factory or designated service center or are returned without the original casing on the products. Moreover, this warranty becomes immediately null and void if anyone other than service personnel authorized by Flowline attempts to repair the defective products.

Products which are thought to be defective must be shipped prepaid and insured to Flowline’s factory or a designated service center (the identity and address of which will be provided upon request) within 30 days of the discovery of the defect. Such defective products must be accompanied by proof of the date of purchase.

Flowline further reserves the right to unilaterally waive this warranty and to dispose of any product returned to Flowline where:

a. There is evidence of a potentially hazardous material present with product.
b. The product has remained unclaimed at Flowline for longer than 30 days after dutifully requesting disposition of the product.

THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE OF THIS WARRANTY. This warranty and the obligations and liabilities of Flowline under it are exclusive and instead of, and the original purchaser hereby waives, all other remedies, warranties, guarantees or liabilities, express or implied. EXCLUDED FROM THIS WARRANTY IS THE IMPLIED WARRANTY OF FITNESS OF THE PRODUCTS FOR A PARTICULAR PURPOSE OR USE AND THE IMPLIED WARRANTY OF MERCHANTABILITY OF THE PRODUCTS.

This warranty may not be extended, altered or varied except by a written instrument signed by a duly-authorized officer of Flowline, Inc.
**Section One**

**SPECIFICATIONS**

- **Range:** 0.5 to 14’ (15.2 cm to 4.3 m)
- **Accuracy:** ± 0.25% of span in air
- **Beam width:** 8° Conical
- **Blocking distance:** 6” (15.2 cm) minimum
- **Radio:** Cellular digital packet
- **Calibration:** Remote via TankLink service
- **LED indication:** Power & signal transmission
- **Battery:** Lithium-Ion battery pack
- **Battery life:** 12-24 months typical
- **Temperature range:** -20° to 140° F (-28° to 60° C)
- **Temperature comp.:** Automatic over entire range
- **Pressure range:** 30 psi (2 bar) @25° C., derated @1.667 psi (.113 bar) per °C. above 25 °C.
- **Enclosure rating:** NEMA 4X
- **Transducer material:** PVDF Kynar®
- **Mounting threads:** 2” NPT (G)

**Part# Description Thread**

- LN20-5001 Compact Transducer 2” NPT
- LN20-5061 Compact Transducer 2” G
- LN22-5001 Extended Transducer 2” NPT
- LN22-5061 Extended Transducer 2” G
- LN20-BATT Replacement Battery N/A
- LN20-RANT Remote Antenna N/A

**EchoNet Description**

EchoNet is a battery operated ultrasonic level transmitter that monitors and wirelessly transmits inventory updates via the Internet to the TankLink data and alarm management service for customer analysis, processing and interface. Users calibrate their EchoNet transmitters and access data through the secure TankLink data management center.

**Ultrasonic Technology**

An ultrasonic sound wave is pulsed two times per second from the base of the transducer. The sound wave reflects against the process medium below and returns to the transducer. The microprocessor based electronics measure the time of flight between the sound generation and receipt, and translates this figure into the distance between the transmitter and process medium below.

**Safety Precautions**

The EchoNet uses Radio Frequency (RF) for communication with the nearest cellular tower and may transmit at several times the power of a typical handheld cellular phone. As a general statement, if you can place a cellular telephone call in the location where you wish to install the unit, then the EchoNet should be able to communicate properly. However, because of the inherent characteristics of RF communications, there are certain guidelines that should be followed when applying the product:

- Do not use the EchoNet inside hospitals or near critical medical equipment.
- Do not install the EchoNet where explosive vapors may be present.
- Do not use the EchoNet where blasting or explosions are in progress.
- Electrostatic discharge can damage sensitive electronic components. Be sure to touch a grounded object before working with the internal circuit board.
- The EchoNet should be located in an area that is free from overhanging metal structures, large obstructions, or equipment which could generate RF or electrical interference.
- Do not install the unit below ground level unless provisions are made for use with an external antenna.
- Service may be limited in areas that do not have cellular coverage or where wireless service is unavailable.
- If the unit is installed in an area with poor signal strength, an external antenna may be required for reliable performance.
SAFETY PRECAUTIONS

Section Two

⚠️ About this Manual:
PLEASE READ THE ENTIRE MANUAL PRIOR TO INSTALLING OR USING THIS PRODUCT. This manual includes information on two versions of the EchoNet Wireless Level Transmitter from Flowline: models LN20-50_1 and LN22-50_1. 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:
Flowline manufactures a wide range of liquid level sensors and technologies. While each of these technologies is designed to operate in a wide variety of applications, it is the user’s responsibility to select a technology 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:
Only properly-trained staff should install and/or repair this product. Use a proper sealant with all installations. Note: Always install the 2” Viton gasket with the LN20-5061 and the LN22-5061. The G threaded version of the EchoNet will not seal unless the gasket is installed properly. Never overtighten the transmitter within the fitting. Always check for leaks prior to system start-up.

Battery Power:
The LN20 series wireless level transmitter operates from an internal Lithium Battery Pack. No additional power or wiring is required for the transmitter.

Temperature and Pressure:
The LN20 is designed for use in application temperatures from -28° to 60° C (-20° to 140° F), and for use at pressures up to 30 psi @ 25 °C, derated @ 1.667 psi per °C above 25 °C.

Material Compatibility:
The wireless level transmitter, LN20, is made of two materials. The enclosure is of Polypropylene (PP) and the transducer is made of Polyvinylidene Fluoride (PVDF). Make sure that the model which you have selected is chemically compatible with the application liquids. While the transmitter housing is liquid-resistant when mounted in such a way that it does not normally come into contact with fluids. The failure to do so could result in property damage or serious injury.

Flammable, Explosive and Hazardous Applications:
DO NOT USE THE LN20-50_1 OR LN22-50_1 WIRELESS TRANSMITTER IN HAZARDOUS LOCATIONS.

Make a Fail-Safe System:
Design a fail-safe system that accommodates the possibility of transmitter failure or battery power loss. In critical applications, Flowline recommends the use of redundant backup systems and alarms in addition to the primary system.

⚠️ Warning
When installing the LN20, never tighten the transmitter from the body. Always use the wrench flat located above the threads. Always install the 2” Viton gasket with the LN20-5061 and the LN22-5061. The G threaded version of the EchoNet will not seal unless the gasket is installed properly.

CONFIGURATION

Section Three

A. Getting Started
Congratulations on your purchase of an EchoNet wireless transmitter. Before you can install, activate and start receiving your inventory data on the TankLink web service, you must complete the following steps:

1. Check for wireless service coverage.
2. Set up your TankLink billing account.
3. Submit your EchoNet configuration.

B. Check for Wireless Service Coverage
Go to www.echonetsetup.com, click on the "Wireless" button, select the "Search by Zip Code" link and input the zip code location where the EchoNet wireless transmitter will be installed. The site will perform a search and provide one of the following two wireless service coverage responses: 1) Wireless Service Confirmation; and 2) Wireless Service Not Available.

C. Wireless Service Confirmation
If service exists for the zip code, or if service is scheduled to be brought online, then a Wireless Service Confirmation table will appear that provides the following information:

Zip Code: Confirmation of the zip code that was entered into the search.
Carrier: Name of the local wireless carrier providing wireless service.
Market: Name of the Metropolitan region where the zip code is located.
Side: Identifies the A or B frequency side used by the wireless service.
SID: ID number of the local cell tower providing wireless coverage.
Status: Indicates status of wireless coverage per the zip code location.

The key wireless service coverage and EchoNet configuration data are provided in the "Status" and "Side" fields of the table.

Status: There are four codes which define the current status of the wireless service coverage per the input zip code including:

- COMM (Service Available): Indicates that wireless service is installed, tested and available now.
- VRFY (Service Pending): Indicates that wireless service is installed but pending final testing. Wireless service is often available in 60-120 days of the VRFY step.
- INST (Installation Begun): Indicates that wireless installation has started on the tower. Wireless service is often available in 120-180 days of the INST step.
- ACQU (Site Selected): Indicates a tower has been selected for wireless installation. Wireless service is often available in 180-360 days of the ACQU step.

Side: There are two frequencies, denoted as the A or B frequency side that may be used by the local service carrier for wireless transmitting and receiving. In order for EchoNet to communicate, the internal jumpers must be configured to match the related A or B frequency side used by the carrier. Please write down the identified frequency side for use in the following Calibration Section.

Wireless Service Not Available: If service does not exist for the zip code, then a rejection message will appear that says, “Wireless service coverage is not currently available for this zip code. Please enter a new zip code to verify service for another location.”
Section Four

D. Set Up Your TankLink Billing Account
If you already have a confirmed TankLink billing account, please go to the next step. To set up your billing account on the TankLink service, go to www.echonetsetup.com and follow the steps below:

1. Then click on the “Account” button and select the “Create New Account” link.
2. For access to account registration, input your Logon and Password in the appropriate fields and click Submit.
3. First, we suggest that you open, download and/or print a PDF copy of the TankLink registration form to ensure that you have all the necessary information prior to registration.
4. When you have the information, go to www.echonetsetup.com, click on the “Account” button and select “Create New Account”. Then click “Continue” to begin account registration. After submitting the form, a TankLink account representative will contact you via email, Monday through Friday, within 24 hours (credit card) or 72 hours (open account) to confirm the new account.
5. Once you have a confirmed account, you can view and/or submit account changes by clicking on the “Account” button and selecting the “View Current Account” link.

E. Submit Your EchoNet Configuration
To configure your EchoNet transmitter on the TankLink service, go to www.echonetsetup.com, click on the “EchoNet” button and select the “Configure New EchoNet” link.

1. First, we suggest that you open, download and/or print a PDF copy of the EchoNet configuration form to ensure that you have all the necessary information prior to configuration. The following identification data will be required from the EchoNet transmitter. The 9-digit part number and 13-digit serial number are located on the exterior enclosure label. The MIN0 number (Primary MIN) is located under the cap enclosure on the radio PCB label.

2. When you have the information, go to www.echonetsetup.com, click on the “EchoNet” button and select the “Configure New EchoNet” link. Then click “Continue” to fill out and submit your EchoNet configuration form. After submitting the form, please wait for up to 24 hours, Monday through Friday, for your configuration to be programmed on the TankLink service prior to EchoNet calibration, installation and/or activation. After your configuration has been successfully programmed, you will receive an email confirmation via the site contact email address. At this point, you may proceed to the Calibration steps.
3. Following EchoNet installation and start up, you can view and/or submit configuration changes by clicking on the “EchoNet” button and selecting the “View Current EchoNets” link.

Section Five

A. Getting Started
After submitting your EchoNet configuration form(s), and having received your confirmation email, you are ready to calibrate, install and activate your transmitter. We recommend that you access and print a copy of EchoNet configuration form(s) for reference in the following sections. EchoNet calibration includes three steps:
1. Setting the monitoring service jumper configuration.
2. Setting the A or B side radio jumper configuration.
3. Connecting the battery pack.

B. Setting The Monitoring Service Plan Jumper
In the previously submitted EchoNet configuration form, you selected either the Silver, Gold or Platinum TankLink monitoring service plan for your EchoNet. In the next steps, you will set the internal monitoring service jumper to match the service that you selected in the configuration form.

1. Remove the EchoNet cap enclosure.
2. Locate the JW1 and JW3 pins on the PCB. Then set the jumper configurations to match the service you selected. The jumpers are factory configured for the Silver service.
   - Silver Monitoring Service: Remove both jumpers across pin JW1 and pin JW3. Place the unused jumpers across a single pin for later use.
   - Gold Monitoring Service: Place one jumper across pin JW3 and remove the jumper from pin JW1. Place the unused jumper across a single pin for later use.
   - Platinum Monitoring Service: Place one jumper across pin JW1 and remove the jumper across pin JW3. Place the unused jumper across a single pin for later use.
Section Six

C. Setting the A or B Side Radio Jumper
In the previously viewed Wireless Service Confirmation table, you were provided with the A or B side frequency that is used by your local wireless service carrier for wireless transmitting and receiving. In the next steps, you will set the internal A or B side radio jumper to match the local carrier frequency.

Locate the JW4 pins on the PCB. Then set the jumper configurations to match the A or B carrier frequency. The jumpers are factory configured for the B-side.

- **A-Side Radio Jumper:** Remove the jumper across pin JW4. Place the unused jumper across a single pin for later use.
- **B-Side Radio Jumper:** Place the jumper across pin JW4.

D. Connecting the Battery Pack
Connect the battery pack connector to the mating female socket located on the PCB. Double check the connector to make sure that it is firmly seated within the socket. Then replace the cap enclosure and hand-tighten. Be careful not to over-tighten the cap on the enclosure and ensure that the cap seats properly with the enclosure gasket.

Section Seven

A. Getting Started
EchoNet calculates level by reflecting ultrasonic sound waves between the transducer and process medium below, and measuring the time of flight between the sound generation and receipt. For proper functioning, the transmitter must be located and installed in such a way that it is perpendicular to the liquid and free from any physical obstructions that would effect the acoustic beam cone such as a tall installation fitting, tank side-wall, filling apparatus or mixer.

B. Beam Cone
To determine the free space area needed below the transducer, refer to the Beam Cone depth vs. radius chart.

<table>
<thead>
<tr>
<th>Depth (Feet)</th>
<th>Radius (Inches)</th>
<th>Radius (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.2</td>
<td>3.1</td>
</tr>
<tr>
<td>2</td>
<td>2.1</td>
<td>5.2</td>
</tr>
<tr>
<td>3</td>
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</tr>
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<td>5</td>
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</tr>
<tr>
<td>12</td>
<td>10.4</td>
<td>26.5</td>
</tr>
</tbody>
</table>

C. Problem Installations
Finally, please review the illustrations below and avoid these types of installation problems.

Avoid installations where there is very significant surrounding metal and/or concrete structure which may disrupt radio signals. Do not install the EchoNet below ground where there may be little or no radio coverage. A remote antenna may be required in these types of installations.
**INSTALLATION**

**Section Eight**

**D. Transducer Configuration**

EchoNet is offered in compact (LN20-50_1) and extended (LN22-50_1) transducer configurations for use with various installation fittings. The compact version is best applied in short tank adapter style tank adapter fittings where the transducer either: a) Extends through the fitting and into the tank; or b) Is flush with or slightly recessed with the base of the installation fitting and/or opening into the tank. The extended version may be specified to various lengths and is best applied in flange style fittings where the transducer must protrude through a taller fitting riser for penetration into the tank.

**E. Fitting ID vs. Height Chart**

EchoNet should never be installed such that the transducer is significantly recessed within the installation fitting. To determine, the recommended fitting installation geometry, refer to the Fitting ID vs. Height chart. For example, with a fitting ID of 3”, the fitting height should not exceed a maximum of 3”.

<table>
<thead>
<tr>
<th>Fitting I.D. (Inches)</th>
<th>Fitting Height (Inches)</th>
<th>Fitting Height (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>3</td>
<td>7.6</td>
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<td>4</td>
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<td>19</td>
<td>48.3</td>
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<tr>
<td>8</td>
<td>26</td>
<td>66.0</td>
</tr>
</tbody>
</table>

**F. Installation Fittings**

EchoNet is commonly installed in the following fitting types:

1. **Tank Adapter**
   - NPT (LN20-5001 or LN22-5001): Thread the transducer into the 2” NPT tank fitting and hand-tighten within the fitting by using the wrench flat located above the threads.
   - G (LN20-5061 or LN22-5061): Place the Viton gasket over the transducer. Thread the transducer into the 2” G tank fitting and hand-tighten within the fitting by using the wrench flat located above the threads.

2. **Flange**
   - Tap out the center of a blind flange with a 2” NPT (LN20-5001 or LN22-5001) or 2” G (LN20-5061 or LN22-5061) thread. Follow the previous installation instructions for threading the transducer into the blind flange.

**INSTALLATION**

**Section Nine**

**3. Stand-Pipe**

In applications with surface foam, significant agitation, or limited beam cone space, your EchoNet may be installed in an alternative stand-pipe installation with the following guidelines:

- For optimal performance, EchoNet may be installed in 2”, 3” or 4” stand pipes of any standard schedule and/or material.
- The pipe ID must be smooth and extend uninterrupted the entire length of the measurement span. If the pipe touches the bottom of the tank, cut a 45° notch into one half of the pipe base to allow for filling and emptying.
- Drill one or two ¼” hole(s) into the top of the pipe for pressure equalization. The hole(s) should be placed as high within the 6” dead band as possible so as not to disrupt the acoustic measurement. Afterward, remove any burrs that may be left over from the drilling process with sand paper.

The pipe may be transitioned into a threaded adapter or flange fitting per the above illustrations. Follow the previous installation instructions for threading the transducer into the selected threaded adapter or flange type fitting.
A. Activating Your EchoNet Transmitter

With the transmitter installed, you're ready to activate the EchoNet and view your data on the TankLink web service with the following steps:

1. Remove the EchoNet cap enclosure.
2. Locate the Activation Switch (S1), Green LED (D2) and Red LED (D1) on the PCB.
3. To begin the 60-90 second 4-STEP activation process, press and hold the Activation Switch (S1) until the Green LED (D2) turns ON, and then release the Activation Switch (S1).
4. Carefully watch the Green LED (D2) and Red LED (D1). During normal activation, the Green LED (D2) will FLASH QUICKLY indicating that the transmitter is measuring level. Then the Green LED (D2) will FLASH SLOWLY indicating that the transmitter is receiving the EchoNet configuration data from the cell tower. Then the Green LED (D2) will STAY ON continuously indicating that the transmitter is sending level measurement data to the cell tower. Finally, the Green LED (D2) will FLASH SLOWLY and then extinguish indicating that the transmitter has successfully communicated with the cell tower and is now configured for operation.

B. Activation Time

When you activate EchoNet for the first time, you will set the clock time sequence for future updates. For example, when you activate EchoNet at 8:00 AM under the Silver Monitoring Plan (1 inventory update per day), all inventory updates will occur at 8:00 AM.

C. View TankLink Web Data

With the transmitter installed and activated, go to www.echonetsetup.com, click on the “Data” button and select the “View My Data” link. Then input the appropriate “Logon” and “Password” for access to viewing your EchoNet data on the TankLink web service. We recommend that you also open the EchoNet configuration form(s) in a separate window for reference at this time. Then contact a TankLink IT engineer via telephone to: 1) Verify successful activation of your EchoNet; 2) Ensure the correctness of your inventory data; and 3) Answer any questions about the TankLink service.

Technical Support

(847) 392-0060
Extension #517
Extension #713
Extension #217

Optional Remote Antenna (P/N: LN20-RANT)

The 17’ remote antenna kit may be used in applications which have low radio signal strength with the local cell tower. The adjustable antenna may be moved around the installation, giving maximum flexibility for optimal line of site connectivity with the tower. Simply remove the existing EchoNet antenna, attach the remote antenna kit and locate the remote antenna for best signal strength. Then follow the Activation instructions in Section Ten.
**Wireless Monitoring, Communication and Data Management System**

**2-Way Wireless Digital Data Network**
The nationwide wireless network features 2-way digital communication for maximum reliability and security. Wireless coverage maps are available at [echonetsetup.com](http://echonetsetup.com) for your review prior to field deployment.

**EchoNet Wireless Level Transmitter**
With your TankLink account opened, go to [echonetsetup.com](http://echonetsetup.com), submit an EchoNet configuration form and your transmitter will be remotely calibrated in 24 hours via the Internet, Monday through Friday.

**TankLink Data Management Center**
EchoNet Internet calibration, data acquisition, analysis, reporting, transmission and alarm functions are provided by the secure TankLink data management center located in Rolling Meadows, Illinois.

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**Event Based Alarm Notifications**
Event or time based alarm notifications can be automatically sent via email or electronic file transfer. Alarm process data can be reviewed in detail at [echonetsetup.com](http://echonetsetup.com).

**Electronic Data File Transfer Via Internet**
Electronic file transfers are available via the Internet for raw data integration with your corporate information system and SAP, ERP or Intranet specific application.

**24/7 Data Access Via Internet**
Your data is available at [echonetsetup.com](http://echonetsetup.com) in customized application view reports supported by advanced analysis, trend forecasting and alarm algorithms.