

## Warranty, Service & Repair

To register your product with the manufacturer, go to the Flowline website for on-line registration. The website address is as follows:

[www.flowline.com](http://www.flowline.com)

On-line Warranty Registration can be found under Contact Us in the Navigation Bar along the left side of the home page.

If for some reason your product must be returned for factory service, contact Flowline Inc. at (562)5998-3015 to receive a Material Return Authorization number (MRA), 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

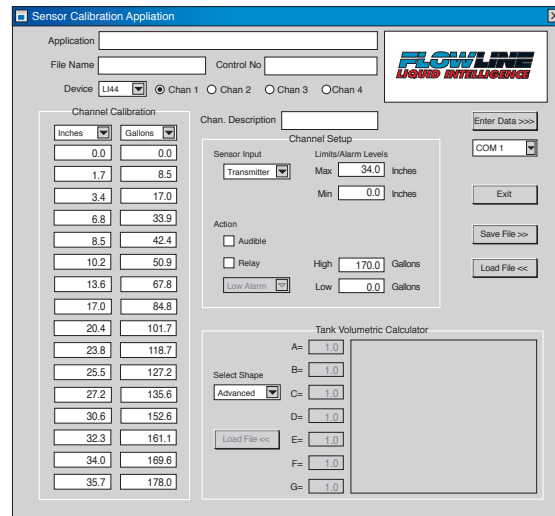
Once you have received a Material Return Authorization number, ship the product prepaid in its original packing to:

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.

# FLOWLINE®

## MicroCal Calibration Kit LI96 Series Owner's Manual



Version 2.0A  
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Manual # LI900005 07/04



## 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.

## SPECIFICATIONS

PC-cal software:	MicroCal (Windows®95 and higher)
PC-cal interface:	USB® to RS485 adapter with 1m cable
Description fields:	Application, file name, control no. and device
Compatibility:	Flowline LI42 & LI44 series multi-channel indicators
Configuration cloning:	*cfg files
Available channels:	LI42: Two LI44: Four
Engineering units:	Gallons, liters, mA, percent, inches, cm, feet, meters, GPH, GPM, GPD, LPM, LPH, LPD and pH
Sensor inputs:	Transmitter or switch
Alarm actions:	Audible and/or FET
Alarm set points:	Min and max values
Linearization:	2-16 point function
Tank shapes:	Rectangular, vertical cylinder, vertical cylinder w/cone bottom, horizontal cylinder, horizontal cylinder w/half sphere-ends and sphere

## SAFETY

### Introduction

**⚠ About this Manual:** PLEASE READ THE ENTIRE MANUAL PRIOR TO INSTALLING OR USING THIS PRODUCT. This manual includes information on the LI96-1001 MicroCal Calibration Kit from FLOWLINE. Please refer to the part and revision number located on the CD label to verify the exact software version that you have purchased.

**⚠ User's Responsibility for Safety:** FLOWLINE manufactures a broad range of level measurement, control and leak detection technologies. While our products are designed to operate in a wide variety of applications, it is the user's responsibility to select models that are appropriate for the application, install them 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 Calibration:** Only properly trained staff should install and/or calibrate hardware with the MicroCal Calibration Kit. Always test the hardware prior to system start-up.

**⚠ Make a Fail-Safe System:** Design a fail-safe system that accommodates for the possibility of hardware and/or power failure. FLOWLINE recommends the use of redundant backup systems and alarms in addition to the primary system.

**⚠ Flammable, Explosive or Hazardous Applications:** The MicroCal Calibration kit should not be used within classified hazardous environments.

## OVERVIEW

### Introduction

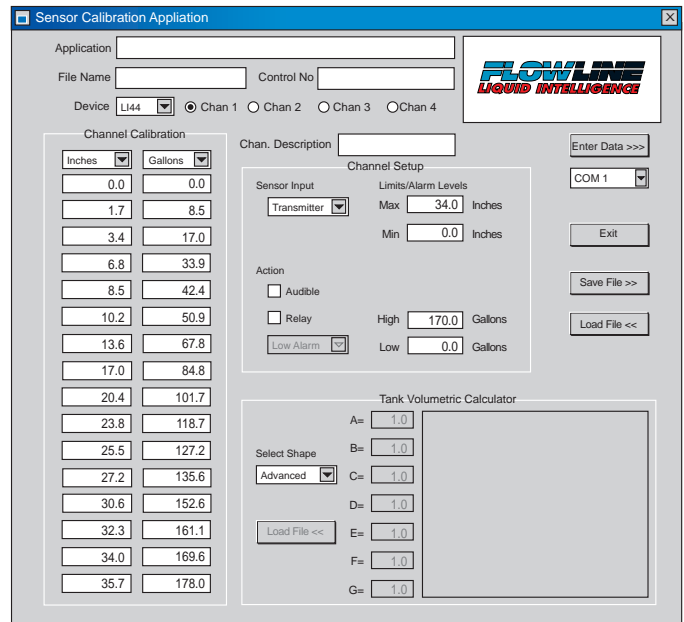
**A. Introduction:** The LI96-1001 MicroCal PC calibration kit enables users to greatly expand the functionality of Flowline LI42 and LI44 series multi-channel indicators. With the calibration kit, users can customize engineering units, configure FET alarm set points from level transmitter, level switch or leak detection switch inputs, linearize the volumetric measurement of odd shaped tanks, and clone program indicators via saved configuration files. Each kit includes (1) PC Windows® based MicroCal software CD, (1) USB driver CD, and (1) USB to RS485 adapter with 1m cable.



Software CD



USB / RS485 Adapter



**B. MicroCal Software:** The software CD includes a self contained copy of the MicroCal software (MicroCal.exe) and a sample configuration (\*.cfg) file.

**C. Indicator Part Number:** Determine the indicator model (LI42 = 2-channel or LI44 = 4-channel ) that you will program with MicroCal. The part number is located on the back of the indicator. To access the part number label, remove the locking nut and separate the mounting bracket from the indicator.

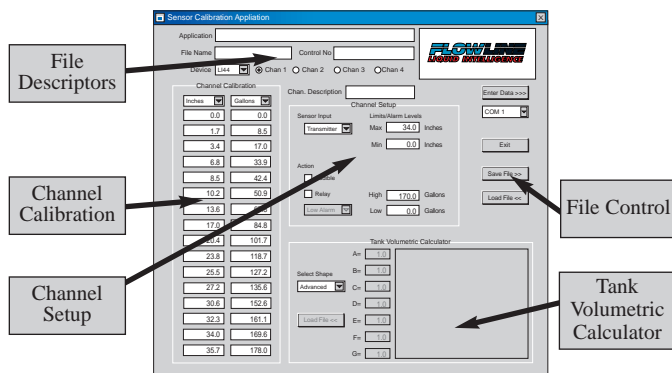
Part Number	Inputs	Output(s)	PLC Loop
LI42-1001	2	(2) FET	Yes
LI44-1001	4	(1) FET	No

## PREPARATION OVERVIEW

### Introduction

**A. Calibration Steps:** The following are the steps to install, configure and program a MicroPoint LI4\_-1001 multi-channel level indicator with the LI96-1001 MicroCal calibration kit.

1. Software Installation.
2. Enter file descriptors.
3. Select input types.
4. Select units of measure.
5. Enter tank characteristics.
6. Enter alarm setup.
7. Enter sensor settings.
8. Save file to PC.
9. Connect PC to indicator.
10. Send configuration data to indicator.
11. Exit program.



**B. MicroCal Functional Areas:** The MicroCal software is segmented into five functional areas including file descriptors, channel calibration, channel setup, tank volumetric calculator and file control as shown below.

### MicroCal Functional Areas

1. **File Descriptors:** Where the application, file and control number descriptors are entered.
2. **Channel Calibration:** Where the units of measurement for each channel are entered.
3. **Channel Setup:** Where the sensor, display range, alarm settings and actions are determined for each channel.
4. **Tank Volumetric Calculator:** Where the tank characteristics are determined for each channel.
5. **File Control:** Where the file is saved, loaded or entered into the indicator.

## SOFTWARE INSTALLATION

### Step One

**A. Introduction:** The following steps will guide you through installation of the MicroCal software on your PC.

**B. System Requirements:** The operating system requirements are Microsoft™ Windows® 95 or later.

**C. Hardware Requirements:** Personal computer with CD drive and USB port.

**D. Copy MicroCal Program:** The MicroCal software CD includes a self contained copy of MicroCal (MicroCal.exe) and a sample configuration (\*.cfg) file. Follow the below steps to copy the program to the appropriate drive.

1. Remove the MicroCal software CD from the jewel case and insert it into the CD drive.
2. Right click on "Start", select "Explore" and then select the appropriate CD drive.
3. Copy the "Flowline MicroCal" folder from the CD to the appropriate location (hard drive) on your PC. **Do not attempt to run the program from the CD.**

**E. Open MicroCal Program:** Follow the below steps to open the program.

1. On the Windows task bar, left click on "Start", select "Run" and then select "Browse".
2. From the "Browse" window, locate the "Flowline MicroCal" folder. Highlight the folder and click "Open".
3. Select the "MicroCal" program and click "Open".
4. From the "Run" window, click "OK" to open the program. Once open, the program is ready for use.

## ENTER FILE DESCRIPTORS

### Step Two

**A. Enter File Descriptors:**

1. Application: (optional) This field is used to distinguish between application configurations (ie: Inventory Monitoring).
2. File Name: (required) This field is used to identify the file name.
3. Control No: (optional) This field is used to cross reference against a document control number.

### File Descriptors

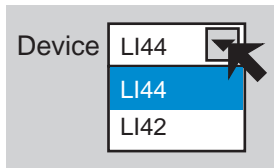
Application	<input type="text"/>		
File Name	<input type="text"/>	Control No	<input type="text"/>

## SELECT INPUT TYPES

### Step Three

**B. Select Indicator Type:** Follow the below steps to select the indicator type:

1. Determine the indicator model that you will program with MicroCal.
2. Under the “Device” pull down menu, select the appropriate “LI42” or “LI44” series part number.



**C. Select Indicator Channel:** Select the channel that you wish to program. The LI42 has two input channels and the LI44 has four input channels.

Device   Chan 1  Chan 2  Chan 3  Chan 4

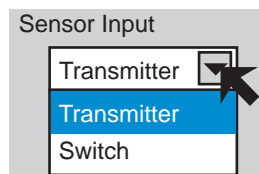
Device   Chan 1  Chan 2  Chan 3  Chan 4

**D. Enter Channel Descriptor:** Enter descriptors in the application, file name, control number and channel description fields. This field is used to identify the name of each channel (ie: Sodium Hypochlorite). This field is used to identify the name of each channel (ie: Sodium Hypochlorite).

Chan. Description

**E. Select Sensor Input:** Each channel can be configured to accept a transmitter (measurement) or switch (level or leak detection) sensor input. Follow the below steps to select the sensor input:

1. Determine the sensor type (transmitter or switch) that will be connected to the channel.
2. Under the “Sensor Input” pull down menu, select the appropriate “Transmitter” or “Switch” sensor input.



## SELECT UNITS OF MEASURE

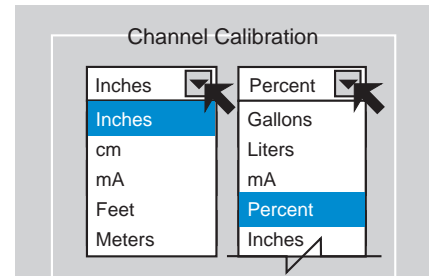
### Step Four

The units of measure are entered at the top of the two columns of data in the Channel Calibration field. The units of measure will be used in volumetric calculations and determining alarm set points.

Please note: changing the units of measure after entering other data will NOT cause the values to be converted automatically to the new unit of measure.

**A. Units of Measurement:** The first column under Channel Calibration establishes the unit choice for measuring the tank. This is the input for the units of measure. The choices available are as follows: Inches, cm, mA, Feet or Meters.

**B. Units of Display:** The second column under Channel Calibration establishes the unit choice for display on the indicator. The choices available are as follows: Gallons, Liters, mA, Percent, Inches, cm, Feet, Meters, GPM, GPH, GPD, LPM, LPH, LPD, pH.

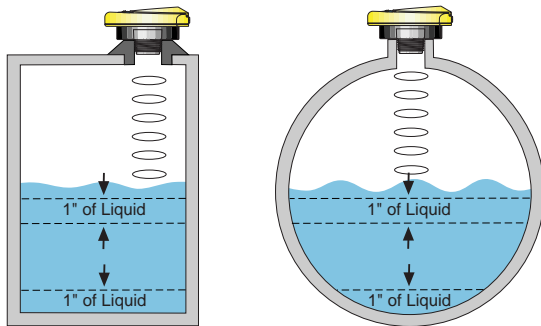


# ENTER TANK CHARACTERISTICS

## Step Five

The indicator can linearize the output for tanks having non-linear shapes. Determine whether your tank requires linearization. If your tank is linear, proceed to step B below. If your tank requires linearization, proceed to step C below.

**A. Linear vs. Non-Linear Tanks:** A linear tank is defined as a tank where a specified height change of liquid has the same volume change throughout the entire tank. A non-linear tank will have different volume changes for the same change in height of the liquid. For example, in a vertical cylindrical tank, 1" change of liquid height will always have the same volume change of liquid as you fill the tank. In a horizontal cylindrical tank, 1" of liquid will have a different volume as the tank is filled due to its expanding sides.

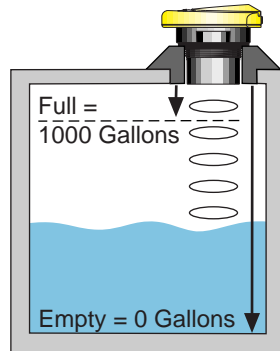


**B. 2-Point Calibration:** Typical linear tanks such as rectangular or vertical cylindrical tanks can use either a simple 2-point calibration or the Tank Volumetric Calculator in MicroCal. To use the Tank Volumetric Calculator, follow the instructions in Step C.

The key in establishing a 2-point calibration is to determine the actual display units associated with the Full (20 mA) and Empty (4 mA) parameters. For the Full setting, determine the equivalent value in engineering units for a full tank.

For the Empty setting, determine the equivalent value in engineering units for an empty tank.

**Example:** A 1000 gallon tank, the full setting (20 mA) should be set to the 1000 gallon mark on the tank. Therefore, your full value for the tank is 1000 gallons. In the same tank, the empty setting (4 mA) should be set to the 0 gallon (no liquid) mark on the tank. Therefore, your empty value for the tank is 0 gallons. *The rest of the table is left with values of zero.*

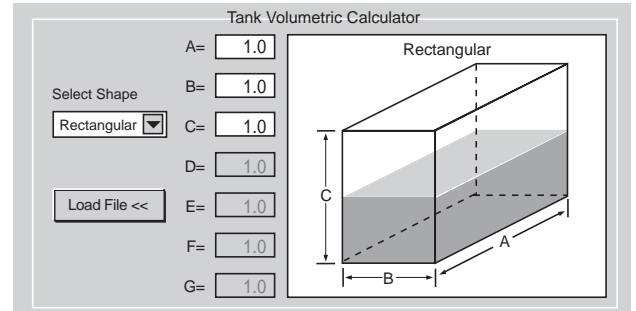


Channel Calibration	
mA	Gallons
4.0	0.0
20.0	1000.0
0.0	0.0

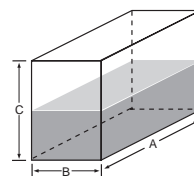
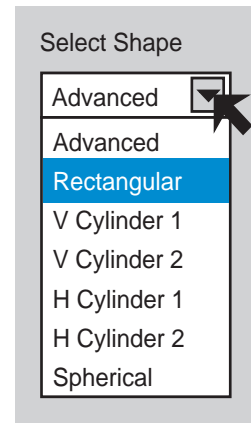
# ENTER TANK CHARACTERISTICS

## Step Five (cont.)

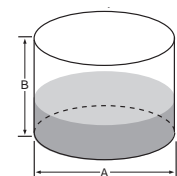
**C. Tank Volumetric Calculator:** Typical non-linear tanks such as vertical cylindrical with cone bottom, horizontal cylindrical, horizontal cylindrical with round ends or spherical tanks can use the simple Tank Volumetric Calculator in MicroCal. If the shape you need is not listed, proceed to D. below to manually enter the data.



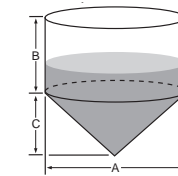
**1. Select Tank Shape:** Using the pull down menu, choose from the basic 6 tank shapes; rectangular, vertical cylindrical with flat bottom, vertical cylindrical with cone bottom, horizontal cylindrical with flat sides, horizontal cylindrical with round ends or spherical.



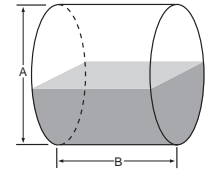
Rectangular



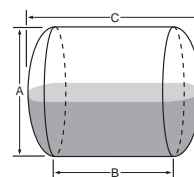
V Cylinder1



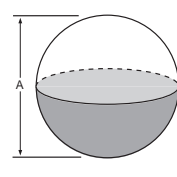
V Cylinder2



H Cylinder 1



H Cylinder2



Spherical

## ENTER TANK CHARACTERISTICS

### Step Five (cont.)

**2. Enter Tank Dimensions:** Enter the required dimension(s) for the tank shape selected.

**Rectangular:** Requires 3 dimensions, length (A), width (B) and depth (C).

**V Cylinder 1:** Requires 2 dimensions, diameter (A) and height (B).

**V Cylinder 2:** Requires 3 dimensions, diameter (A), straight side height (B) and cone height (C).

**H Cylinder 1:** Requires 2 dimensions, diameter (A) and length (B).

**H Cylinder 2:** Requires 3 dimensions, diameter (A), straight side length (B) and overall length (C).

**Spherical:** Requires 1 dimension, tank diameter (A).

**3. Load Tank Calculator Results into Table:** Depress the Load key to transfer the results of the tank calculator to the linearization table.

Channel Calibration	
Inches	Gallons
0.0	0.0
10.0	16.0
46.0	302.0

### D. Manual Non-linear Table Entry:

Enter the tank dimension versus volume data supplied by the tank manufacturer in the Channel Calibration table as shown at right. A maximum of 16 points may be entered and a minimum of two is required. **For switch input channels, skip to paragraph D. Continue below for transmitter inputs.**

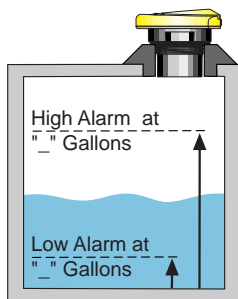
## ENTER ALARM SETUP

### Step Six

**A. Determine Alarm Setting:** Before beginning, determine if each channel will have a High Alarm, a Low Alarm, a High and Low Alarm or a No-Alarm requirement.

**B. Measure Alarm Settings:** If an alarm is being used on any channel, measure the location for each of the alarms. Measurements must be in the same units used on the display. For example, if the display is showing Gallons of Liquid, the any alarm will be measured in Gallons of liquid.

*Note: Each channel is independent from the others. A low alarm can be determined for one channel while a high alarm can be determined for another channel.*



## ENTER ALARM SETUP

### Step six (cont.)

**C. Alarm Settings:** Based upon requirements established in Step B, enter the High Alarm and Low Alarm values as required. All Alarm values will correspond to the units of displayed measurement on the indicator. For example, in a 1000 gallons tank, a high level alarm would be entered as a 900 gallons level. **Note:** For each channel, both the Low and High Alarm fields must have values entered. See table below to identify values for each field.

#### Action

Audible

Relay

High  Gallons

Low Alarm

Low  Gallons

Function	High Setting	Low Setting
High	Enter High Value	Enter lowest value in second column
Low	Enter highest value in second column	Enter Low Value
High & Low	Enter High Value	Enter Low Value

#### Action

Audible

Relay

#### Action

Audible

Relay

#### Action

Audible

Relay

#### Action

Audible

Relay

Audible chirp activates when the alarm level is reached.

No action when the alarm level is reached.

FET activates when the alarm level reached.

Audible chirp and FET activates when the alarm level is reached.

**D. Alarm Settings for Switches:** If the input is a discrete switch with a 4 or 20 mA output, the alarm functions are setup as shown below. The alarm will function when the input current on a switch Input exceeds 12 mA.

If a switch is being used as an alarm, then Select Switch under Sensor Input. Next, select the type of alarm under Action. The three choices are Low alarm, High Alarm and Leak Alarm.

Sensor Input

Action

Audible

Relay

Low Alarm

Action

Audible

Relay

Low Alarm

Low Alarm

High Alarm

Leak Alarm

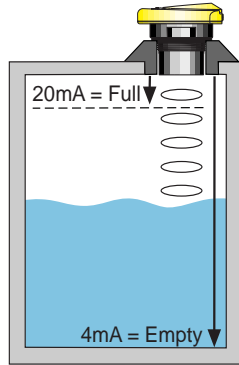
## ENTER SENSOR SETTINGS

### Step Seven

**A. Sensor Input:** Be sure to select Transmitter in the Sensor Input pull-down window. You cannot enter the Limits values when Switch is selected. *Values must be entered in these fields. Failure to do so will result in either a false reading or the display freezing.*

**B. Limits:** The Max and Min fields contain the maximum and minimum range of the sensor in the units of measure selected earlier. Please note, the sensor must be calibrated to have the maximum range and minimum range equal to the maximum and minimum values in the Channel Calibration table for proper operation. Please refer to the Owner's Manual for the sensor.

In the example below, the units of measure for the input are in mA. The minimum volume in the tank occurs with a sensor output of 4 mA (maximum range). The tank is full when the sensor is reading 20 mA.



Channel Setup	
Sensor Input	Limits/Alarm Levels
Transmitter	Max 20.0 mA
	Min 4.0 mA

In the example below, the units of measure are in inches. The maximum value is typically the larger of the values in the first column of the Channel Calibration table. The minimum value is typically the smaller of the values in the first column of the Channel Calibration table. The units to the right of the input fields (Channel Setup) should match the units of the limit values in the first column of the Channel Calibration.

Channel Calibration		Channel Setup	
Inches	Gallons	Sensor Input	Limits/Alarm Levels
0.0	0.0	Transmitter	Max 35.7 Inches
1.7	8.5		Min 0.0 Inches
34.0	169.6		
35.7	178.0		

## SAVE FILE TO PC

### Step Eight

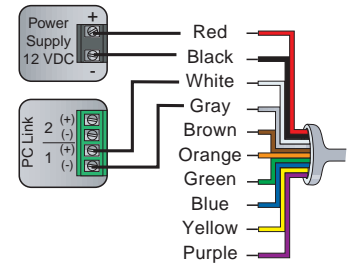
**A. Save File:** Once the data has been entered to MicroPoint, it is recommended to save the configuration to the PC. Before saving, make sure the Application, File Name and Control No. fields have been filled. Press the "Save File >>" button to save the configuration. A new window will open to confirm the location of the configuration file (\*.cfg). Press SAVE on the new window.

Save File >>

## CONNECT PC TO INDICATOR

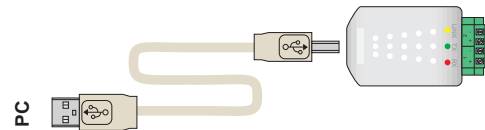
### Step Nine

**A. Connect MicroPoint to PC Link:** Connect Red to (+), Black to (-) of the power supply. Connect White to 1 (+) and Gray to 1(-) on the PC Link USB adapter.

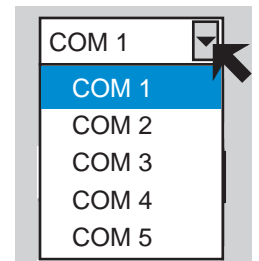


**B. Connect PC Link to PC:** Using the 3' USB cable

connect the USB connector into any USB port on the PC and the other end of the cable to the PC Link. The USB driver must be installed prior to uploading the configuration file. See the driver manual located on the driver CD provided in the kit.



**C. Choose COM port:** Choose the correct COM port that the computer will use (COM1 through COM5). Typically, COM1 is suitable for use when entering the data. *If there is a known device or software, which controls COM ports, (ie: WIN FAX, Palm Operating Software), you must choose an open COM port via the port properties in the system device manager.*



## SEND CONFIG DATA TO INDICATOR

### Step Ten

**Enter Data:** Once all of the input information has been filled, the data may now be sent to MicroPoint. Press the "Enter >>>" button located in the upper right corner of the window. The configuration will be transferred to the display. The display will beep once for each channel programmed to confirm the data has been entered correctly.

Enter Data >>>

## SAVE FILE TO PC

### Step Eleven

**A. Save File:** Once the data has been entered to MicroPoint, it is recommended to save the configuration to the PC. Before saving, make sure the Application, File Name and Control No. fields have been filled. Press the "Save File >>" button to save the configuration. A new window will open to confirm the location of the configuration file (\*.cfg). Press SAVE on the new window.

Save File >>

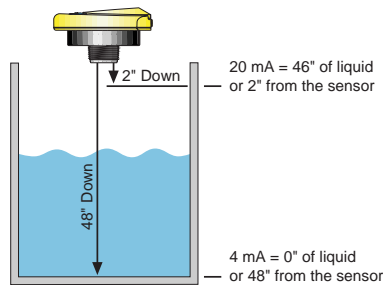
## EXAMPLES

### Introduction:

Below is a series of exercises in helping to identify what values to set for accurate level indication.

#### 1. Standard Tank Exercise:

The tank is 48" tall and contains 250 gallons of liquid at the full value. 4 mA is set to the bottom of the tank and 20 mA is the factory default for the transmitter. The usable range is 46 inches of liquid.

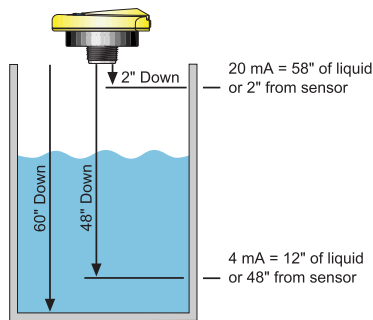


Channel Calibration	
Inches	Gallons
0.0	0.0
46.0	250.0

Enter the values shown to enable the display to indicate the gallons in the tank. Please note that under Limits, Max. = 46.0 inches and Min = 0.0 inches. The display will indicate level between 0 and 250 gallons.

#### 2. Never Empty Tank Exercise:

The tank is 60" tall and contains 300 gallons of liquid at the full value. 4 mA is set to 12" from the bottom of the tank (62 gallons of liquid) and 20 mA is the factory default for the transmitter. The usable range is still 46 inches of liquid, however it is offset 12" from the bottom.

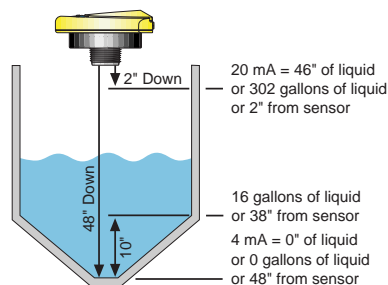


Channel Calibration	
Inches	Gallons
12.0	62.0
58.0	300.0

Enter the values shown to enable the display to indicate the gallons in the tank. Please note that under Limits, Max. = 58.0 inches and Min = 12.0 inches. The display will indicate the level between 62 and 300 gallons.

#### 3. Cone Bottom Tank Using Advanced (3-Point):

The tank is 48" tall and contains 302 gallons of liquid at the full value. 4 mA is set to the bottom of the tank and 20 mA is the factory default for the transmitter. The cone bottom contains 16 gallons of liquid and is 10" tall. The usable range is still 46 inches of liquid.



Channel Calibration	
Inches	Gallons
0.0	0.0
10.0	16.0
46.0	302.0

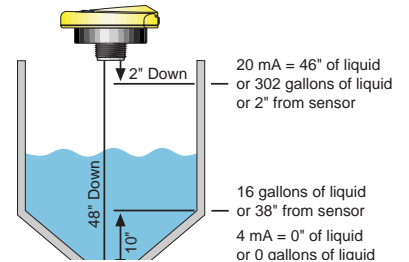
Please note that three sets of values will be entered to track the liquid, due to the cone bottom. Enter the values shown to enable the display to indicate the gallons in the tank. Please note that under Limits, Max. = 46.0 inches and Min = 0.0 inches. The display will indicate the level between 0 and 302 gallons.

## EXAMPLES

#### 4. Cone Bottom Tank Using Volumetric Calculator:

The tank is the same as in example 3.

*Note: Make sure that Inches and Gallons are the selected units for the Channel Calibration table.*



Channel Calibration	
Inches	Gallons

Under Select Shape in the Tank Volumetric Calculator, choose V Cylinder 2. Enter the following dimensions into the calculator; A = 47.5" (diameter), B = 36.0" (straight side height), C = 10.0" (cone height). When completed, press "<< Load" to enter values into the Channel Calibration table.

*Note: Limits, Max. = 36.0 inches and Min = 0.0 inches.*

Tank Volumetric Calculator	
Select Shape	V Cylinder 2
A =	47.5
B =	36.0
C =	10.0
D =	1.0
E =	1.0
F =	1.0
G =	1.0
Load File <<	

#### 5. Horizontal Tank:

The tank is 36" round and contains 320 gallons of liquid at the full value. The transmitter is placed 2" above the full level. 4 mA is set to the bottom of the tank (38" down) and 20 mA is the factory default for the transmitter. The usable range is 36 inches of liquid.

*Note: Make sure that Inches and Gallons are the selected units for the Channel Calibration table.*

Channel Calibration	
Inches	Gallons

Under Select Shape in the Tank Volumetric Calculator, choose H Cylinder 1. Enter the following dimensions into the calculator; A = 36.0" (diameter), B = 72.5" (length of tank). When completed, press "<< Load" to enter values into the Channel Calibration table.

*Note: Limits, Max. = 36.0 inches and Min = 0.0 inches.*

Tank Volumetric Calculator	
Select Shape	H Cylinder 1
A =	36.0
B =	72.5
C =	1.0
D =	1.0
E =	1.0
F =	1.0
G =	1.0
Load File <<	

## DIAGNOSTICS

### A. Display Descriptors:

CH=\_ - Currently displayed channel, shown for a short period of time following a pushed button.

CH\_=L - If a 4-20 mA input falls below the Low Alarm level programmed for a channel, the display redirects to that channel and alternatively blinks the "CH\_=L" message and the level for the channel. This condition is cleared if the input rises above the Low Alarm level +10%.

CH\_=H - If a 4-20 mA input rises above the High Alarm level programmed for a channel, the display redirects to that channel and alternatively blinks the "CH\_=H" message and the level for the channel. This condition is cleared if the input falls below the Low Alarm level -10%.

ALLUC - If the 4-20 mA input falls below 1 mA on both channels, the display assumes the display to be unconnected. Re-connecting the input to a valid 4-20 mA signal restores the display.

CH\_OL - If a 4-20 mA input rises above 25 mA for even a very short duration, the channel will be disabled and the overload message will be displayed for this channel. Correcting the overload condition and then cycling power to the unit restores an overloaded channel. Severe or repeated overloading may cause permanent damage to the MicroPoint.

### B. Error Messages:

Err-0	Received packet exceeds 115 bytes
Err-1	Time-out error occurs before full packet is delivered
Err-2	Checksum error
Err-3	Unrecognized packet command
Err-4	Unrecognized tank number
Err-5	Tank level overrun
Err-6	Unrecognized units
Err-7	Tank element overrun
Err-8	Volume element overrun
Err-9	Alarm setting overrun
Err10	Unrecognized alarm action
Err11	Unrecognized calibration action
Err12	Out-of-range applied low current level for calibration
Err13	Out-of-range applied high current level for calibration

**C. Additional Information:** Go to [www.digitalinfinity.com](http://www.digitalinfinity.com) and click on the nav-bar "Application Info" button for FAQ's, tech-tips, case studies, white papers, glossary and success stories.

**D. Tank volumetric Calculator:** Do not have access to the Tank Volumetric Calculator. Make sure that the first column under Channel Calibration has a length unit of measurement (ex: inches, centimeters, etc.) and the second column has a volume unit of measurement (ex. gallons, liters).

**E. Display Does Not Change:** Make sure the MAX and MIN values are loaded in their respective fields.

## DEFINITIONS

**A. Introduction: vb** Below is a list of terms and definitions for the MicroCal software.

**Application:** Descriptors used to identify the calibration file. Use this field to help distinguish between different files and their functions.

**File Name:** Descriptors for the actual file. Use this field to identify the file name for the configuration.

**Control No.:** Descriptors used to identify a control number for the calibration file. Use this field as a cross reference a document control number.

**Chan #:** Used to identify individual channels whose values are shown below. To change to an alternate channel, simply click on the radio button for the corresponding channel.

**Channel Description:** A description for each individual channel. Use this field to differentiate between each channel.

**Enter Data >>:** A command button used to send the calibration data to the MicroPoint display.

**COM #:** A pull down menu used to identify the COM port used by the serial PC link. Options include COM1, COM2, COM3, COM4 and COM5. Select an alternate COM port if the computer is having difficulty communicating with the MicroPoint. COM ports can be manually configured via the port properties accessed through the system device manager.

**Exit:** Ends program.

**Save File >>:** Saves changes to the configuration to the computers hard drive. Save File >> will prompt user to specify name and location of the file.

**Load File >>:** Retrieves previous configurations for the software. Ideal for use in calibrating similar applications or re-configuring an existing display.

**Max.:** Maximum value for the operational range of each tank. For example, Max. limit is typically the highest level of liquid in the tank. Max is the equivalent value for a 20 mA signal.

**Min.:** Minimum value for the operational range of each tank. For example, Min. limit is typically the lowest level of liquid in the tank. Min is the equivalent value for a 4 mA signal.

**High:** Value for the high alarm set point.

**Low:** Value for the low alarm set point.

**Action:** Use to identify action of the display when a high or low alarm is achieved.

**Relay:** Closes the NO FET switch when an alarm condition occurs on the appropriate channel.

**Audible:** Activates the audible alarm when an alarm condition occurs on the appropriate channel.

**Sensor Input:** Identifies if the channel input will be from either a transmitter or switch.