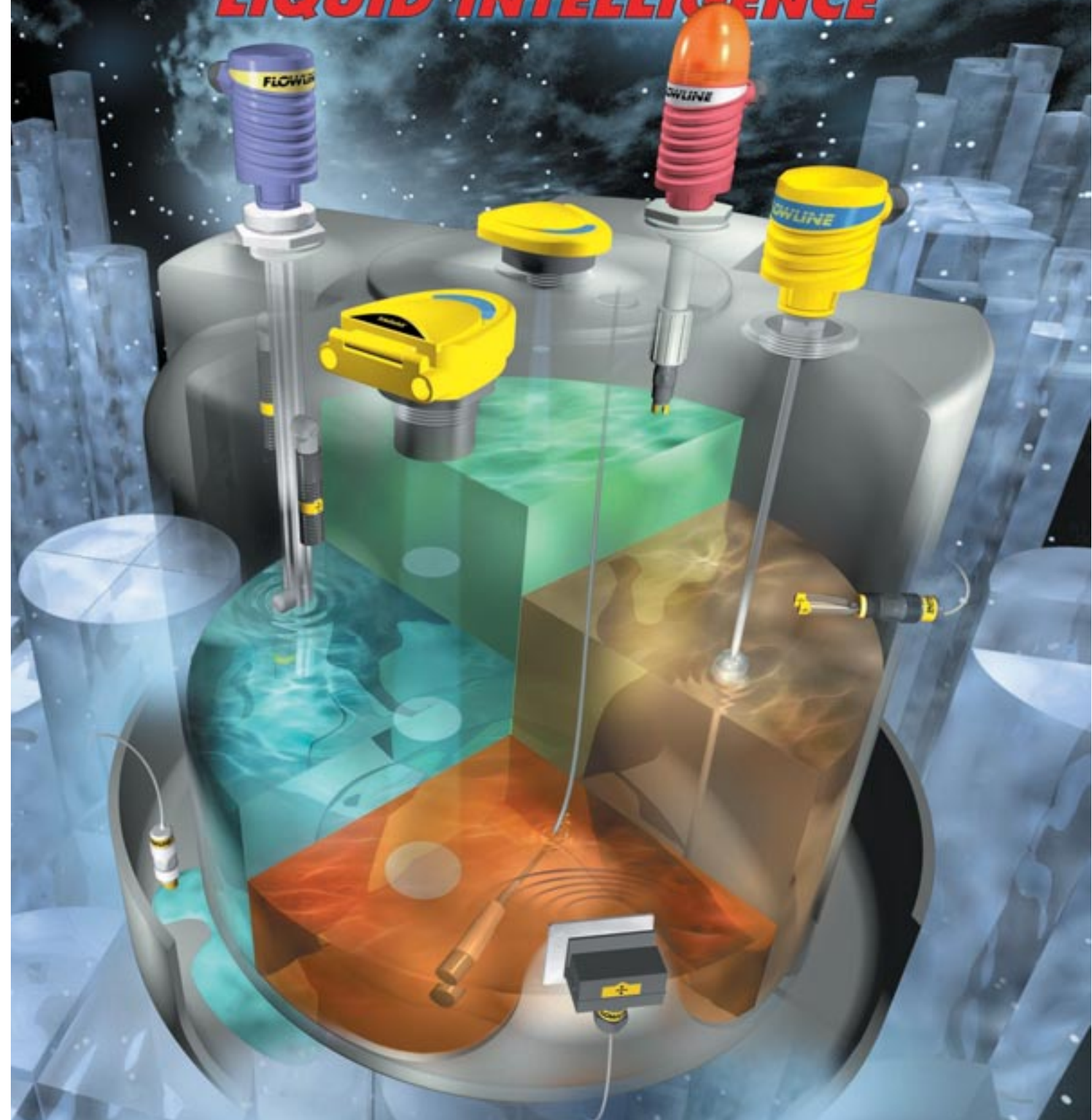


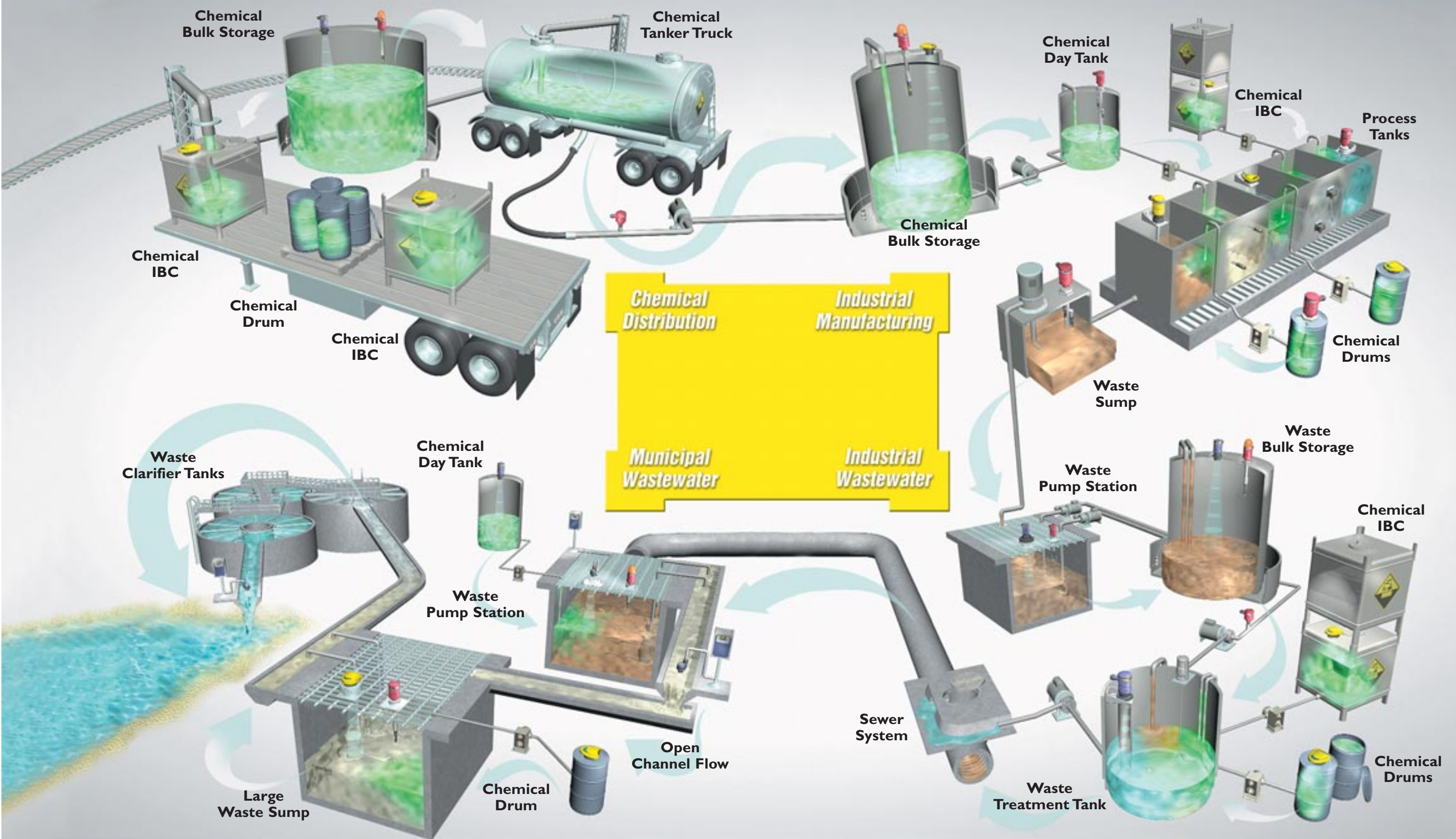
# **FLOWLINE**

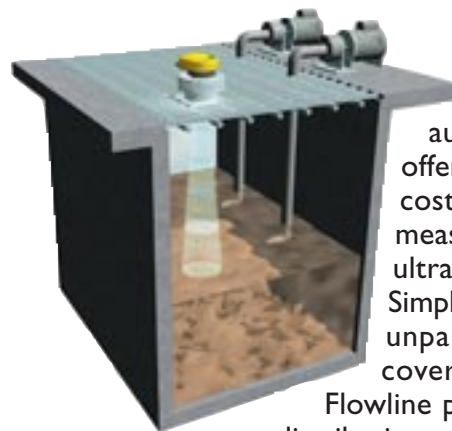
**LIQUID INTELLIGENCE**



*Tank Inventory Monitoring, Automation and Safety*

# Level Automation Map





## ABOUT FLOWLINE

Flowline is the leading source of ultrasonic tank inventory monitoring, automation and safety sensors. We offer the most technically advanced and cost effective solutions for the level measurement and control of challenging ultrapure, corrosive and waste media. Simple and easy to use, our sensors deliver unparalleled performance, application coverage and hands-free maintenance.

Flowline products are sold worldwide through our distribution network and are applied in most liquid industries. To contact your local distributor, please visit our web site or call Flowline directly. *It's level made simple!*



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 Mon-Fri, 7:30am-5:00pm PST

## WWW.DIGITALINFINITY.COM

Digitalinfinity.com is a comprehensive product and application reference database filled with streaming level solution animation and video content featuring the applied performance benefits of our ultrasonic level measurement and switch products. Using a broadband Internet connection, go to the *level solutions wheel*, find your application challenge and click on the associated animation clip. Each animation provides foundational application data in an easy problem and solution format. Then click on the associated video clip to view a Digital Infinity sensor working in each of the application challenges. The online catalog provides complete product selection and application reference data including downloadable data sheets and manuals in PDF file formats. To receive the full benefits of this information rich site, we recommend that you register and log-in when you visit Digitalinfinity.com.



Go to Level Solutions Wheel

Call to Receive Your Free  
 119 Page Full Product Catalog



## ABOUT DIGITAL INFINITY

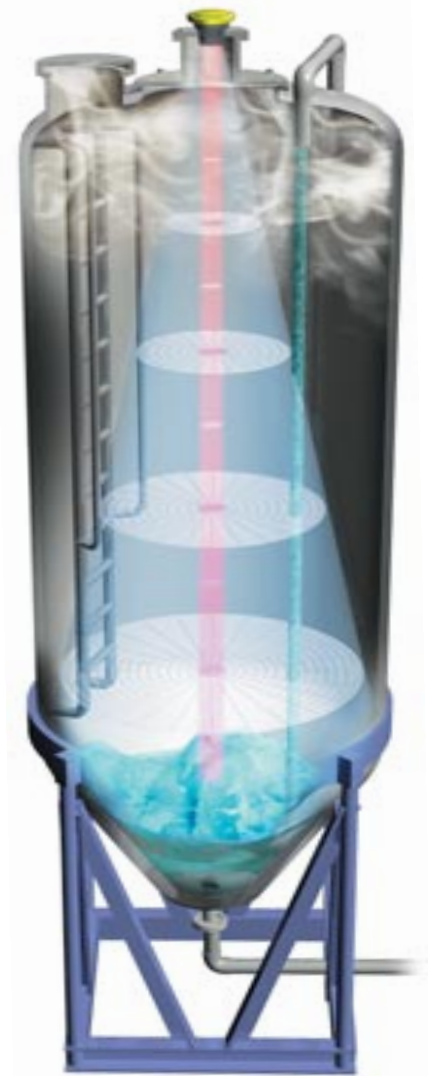
Digital Infinity provides unparalleled ultrasonic sensor performance and application benefits through advanced *digital surface imaging* technology. Try our new Digital Infinity level sensors in your application and experience the future of ultrasonic level today.

## PERFORMANCE BENEFITS

- Accuracy** Digital Infinity sensors are accurate to  $\pm 0.2\%$  of measured span in air with insignificant accuracy degradation over span. Compact, yet powerful, the sensors are capable of ranges up to 10m with a small 2" transducer. The miniature dead band is as little as 5 cm to optimize small tank fill capacity. The minimum beam width is an amazing 7.6 cm which enables application in narrow space.
- Range**
- Dead band**
- Beam width**

## APPLICATION BENEFITS

- Fittings**
  - Dome tops**
  - Vapor**
  - Obstacles**
  - Cone bottoms**
  - Foam**
  - Agitation**
  - Diagnostics**
- Digital Infinity sensors are broadly installed in tank adapters, still wells or flanges and can even be located in the center of parabolic dome top tanks. The raw signal strength and processing capacity enable the sensor to measure through most aqueous vapor. The digital imaging creates a living process map that rejects obstacle reflections within the broader measurement beam. The same technology enables deep measurement into sloped or cone bottom tanks. Using various power modes, the sensor delivers increased measurement performance in foam. During agitation, the sensor maintains both level focus and accuracy. In the event of acoustic signal loss, the sensor inverts to the fail-safe state and indicates a diagnostic string for use in troubleshooting. *It's level made simple!*



Metal Finishing Plating Baths



Municipal Pump Lift Stations



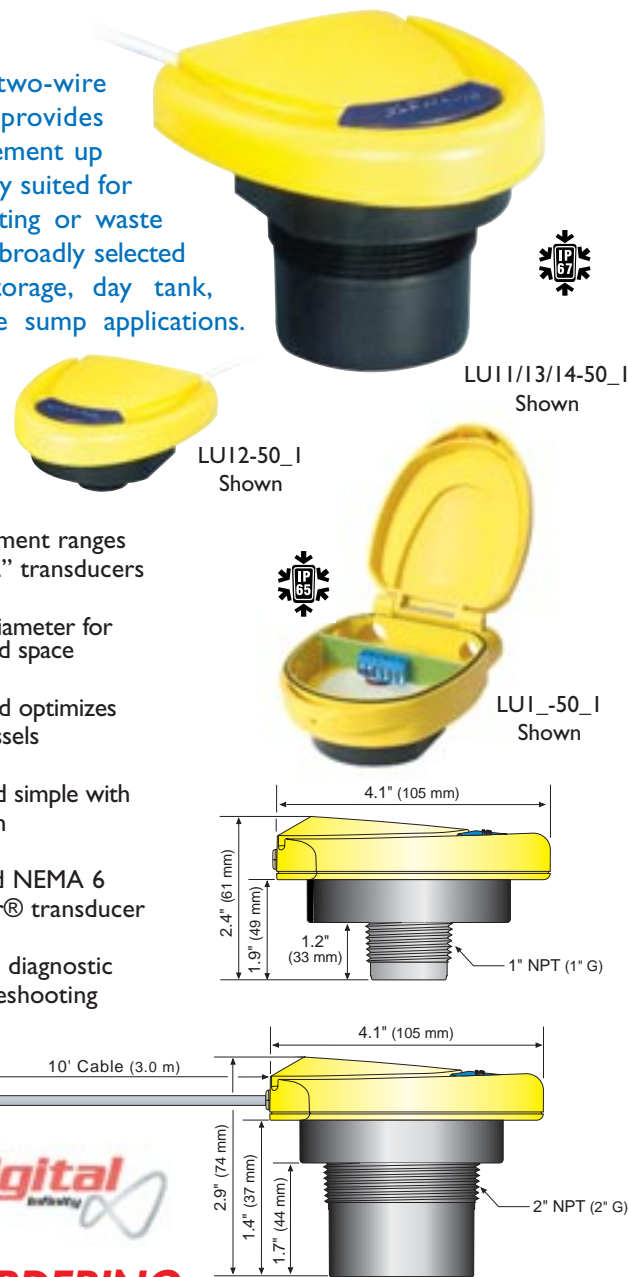
Chemical Bulk Storage Tanks

## APPLICATION

The general purpose two-wire ultrasonic transmitter provides non-contact level measurement up to 32' or 10m, and is ideally suited for challenging corrosive, coating or waste liquids. The transmitter is broadly selected for atmospheric bulk storage, day tank, process vessel and waste sump applications. Media examples include ink and wastewater.

## FEATURES

- ✓ Offered in four measurement ranges up to 10m with 1" and 2" transducers
- ✓ Incredible 7.6 cm beam diameter for applications with restricted space
- ✓ Amazing 10 cm dead band optimizes filling capacity of small vessels
- ✓ Installation is both fast and simple with two-step target calibration
- ✓ PC/ABS enclosures rated NEMA 6 or NEMA 4X with Kynar® transducer
- ✓ Fail-safe intelligence with diagnostic feedback for easy troubleshooting



## SPECIFICATIONS

<b>Range:</b>	LU12: 4" to 9.8' (10 cm to 3m) LU11: 4" to 16.4' (10 cm to 5m) LU13: 8" to 26.2' (20 cm to 8m) LU14: 12" to 32.8' (30 cm to 10m)
<b>Accuracy:</b>	± 0.2% of span in air
<b>Resolution:</b>	LU11/2/3: 0.039" (1 mm) LU14: 0.078" (2 mm)
<b>Beam width:</b>	LU12: 2" (5 cm) dia. LU11/3/4: 3" (7.6 cm) dia.
<b>Dead band:</b>	LU11/12: 4" (10 cm) LU13: 8" (20 cm) LU14: 12" (30 cm)
<b>LED indication:</b>	Power, calibration and diagnostics
<b>Memory:</b>	Non-volatile
<b>Supply voltage:</b>	14-28 VDC
<b>Loop resist.:</b>	500 Ohms @ 24 VDC
<b>Signal output:</b>	4-20 mA, two-wire
<b>Calibration:</b>	Target, calibration wire
<b>Fail-safety:</b>	Reverts to 22 mA
<b>Process temp.:</b>	F: -4° to 140° C: -20° to 60°
<b>Temp. comp.:</b>	Automatic
<b>Electronics temp.:</b>	F: -40° to 160° C: -40° to 71°
<b>Pressure:</b>	30 psi (2 bar) @ 25° C., derated @ 1.667 psi (.113 bar) per °C. above 25° C.
<b>Enclosure rating:</b>	50_1: NEMA 6 (IP67) 51_1: NEMA 4X (IP65)
<b>Encl. material:</b>	PC/ABS FR
<b>Trans. material:</b>	PVDF Kynar®
<b>Cable jacket mat.:</b>	50_1: PP
<b>Cable type:</b>	50_1: 3-cond., shielded
<b>Cable length:</b>	50_1: 10' (3m)
<b>Conduit entrance:</b>	51_1: Dual, 1/2" NPT
<b>Process mount:</b>	LU12: 1" NPT (1" G) LU11/3/4: NPT (2" G)
<b>Mount. gasket:</b>	Viton®
<b>Classification:</b>	General purpose
<b>CE compliance:</b>	EN 61326 EMC

## MiniMe ORDERING

LU1  -5   1

### Sensor range / size

2	3m (9.8') / 1"
1	5m (16.4') / 2"
3	8m (26.2') / 2"
4	10m (32.8') / 2"

### Enclosure / termination (1) (2)

0	NEMA 6 / cable
1	NEMA 4X / conduit

### Process mount (3)

0	NPT (US)
6	G (Metric)

### Ordering Notes

- 1) The NEMA 6 includes a standard 10' (3m) cable. To special order a 25' (7.6m) or 50' (15.2m) cable, place the cable length at the end of the part number (ie: LU12-5001-25).
- 2) The NEMA 4X enclosure has a flip-lid with dual conduit ports and a terminal strip.
- 3) For installation on open tanks, order the LM50-1001-1 (1" NPT), LM50-1061-1 (1" G) LM50-1001 (2" NPT) or LM50-1061 (2" G) side mount bracket.

## SPECIFICATIONS

<b>Range:</b>	2" to 4' (5 cm to 1.2m)
<b>Accuracy:</b>	0.125" (3 mm)
<b>Resolution:</b>	0.019" (0.5 mm)
<b>Beam width:</b>	2" (5 cm) dia.
<b>Dead band:</b>	2" (5 cm)
<b>LED indication:</b>	Power, calibration and diagnostics
<b>Memory:</b>	Non-volatile
<b>Supply voltage:</b>	12-28 VDC
<b>Loop resist.:</b>	500 ohms @ 24 VDC
<b>Signal output:</b>	4-20 mA, two-wire
<b>Calibration:</b>	Target, calibration wire
<b>Fail-safety:</b>	Reverts to 22 mA
<b>Process temp.:</b>	F: -4° to 140° C: -20° to 60°
<b>Temp. comp.:</b>	Automatic
<b>Electronics temp.:</b>	F: -40° to 160° C: -40° to 71°
<b>Pressure:</b>	30 psi (2 bar) @ 25° C., derated @ 1.667 psi (.113 bar) per °C. above 25° C.
<b>Enclosure rating:</b>	50_1: NEMA 6 (IP67) 51_1: NEMA 4X (IP65)
<b>Encl. material:</b>	PC/ABS FR
<b>Trans. material:</b>	PVDF Kynar®
<b>Cable jacket mat.:</b>	50_1: PP
<b>Cable type:</b>	50_1: 3-cond., shielded
<b>Cable length:</b>	50_1: 10' (3m)
<b>Conduit entrance:</b>	51_1: Dual, 1/2" NPT
<b>Process mount:</b>	1" NPT (1" G)
<b>Mount. gasket:</b>	Viton®
<b>Classification:</b>	General purpose
<b>CE compliance:</b>	EN 61326 EMC

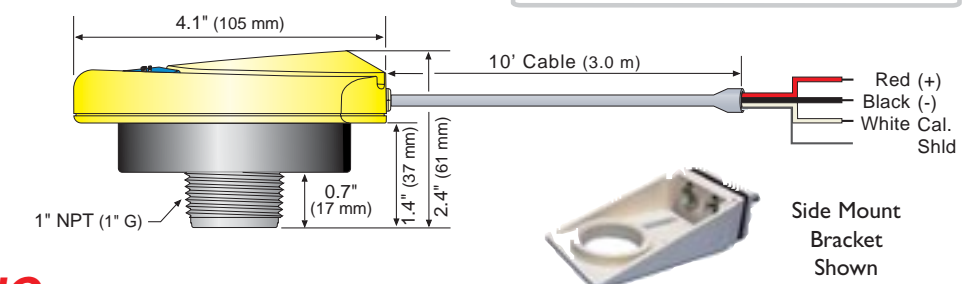


## APPLICATION

The general purpose two-wire ultrasonic transmitter provides non-contact level measurement up to 4' or 1.2m, and is ideally suited for challenging ultrapure, corrosive, slurry or waste liquids. The transmitter is typically selected for small atmospheric process vessel, IBC tote, 55-gallon drum and waste sump applications. Media examples include sulfuric acid and copper sulfate.

## FEATURES

- ✓ Extremely compact sensor for use in small machines, tools and skids
- ✓ Miniature 5 cm dead band optimizes filling capacity of small vessels
- ✓ Incredible 5 cm beam diameter for applications with restricted space
- ✓ PC/ABS enclosure rated NEMA 6 or NEMA 4X with Kynar® transducer
- ✓ Fail-safe intelligence with diagnostic feedback for easy troubleshooting
- ✓ Digital Infinity surface imaging for reliable level measurement



## MicroSpan ORDERING

LU05-5   1

### Enclosure / termination (1) (2)

0	NEMA 6 / cable
1	NEMA 4X / conduit

### Process mount (3)

0	1" NPT (US)
6	1" G (Metric)

### Ordering Notes

- 1) The NEMA 6 includes a standard 10' (3m) cable. To special order a 25' (7.6m) or 50' (15.2m) cable, place the cable length at the end of the part number (ie: LU05-5001-25).
- 2) The NEMA 4X enclosure has a flip-lid with dual conduit ports and a terminal strip.
- 3) For installation on open tanks, order the LM50-1001-1 (1" NPT) or LM50-1061-1 (1" G) side mount bracket.



## SPECIFICATIONS

<b>Range:</b>	LU75: 2" to 4" (5 cm to 1.2m) LU72: 4" to 9.8" (10 cm to 3m) LU71: 4" to 16.4" (10 cm to 5m) LU73: 8" to 26.2" (20 cm to 8m)
<b>Repeatability:</b>	0.25" (6 mm)
<b>Adjustability:</b>	Over entire range
<b>Hysteresis:</b>	LU72/5: 0.5" (1.2 cm) (single set point) LU71/3: 1" (2.5 cm) (single set point)
<b>Beam width:</b>	LU72/5: 2" (5 cm) dia. LU71/3: 3" (7.6 cm) dia.
<b>Dead band:</b>	LU75: 2" (5 cm) LU71/2: 4" (10 cm) LU73: 8" (20 cm)
<b>LED indication:</b>	Power, relay and echo status
<b>Calibration:</b>	Target, push button
<b>Memory:</b>	Non-volatile
<b>Supply voltage:</b>	50_5: 95-250 VAC 58_5: 12-28 VDC
<b>Consumption:</b>	50_5: 20 watts max. 58_5: 100 mA @ 24 VDC

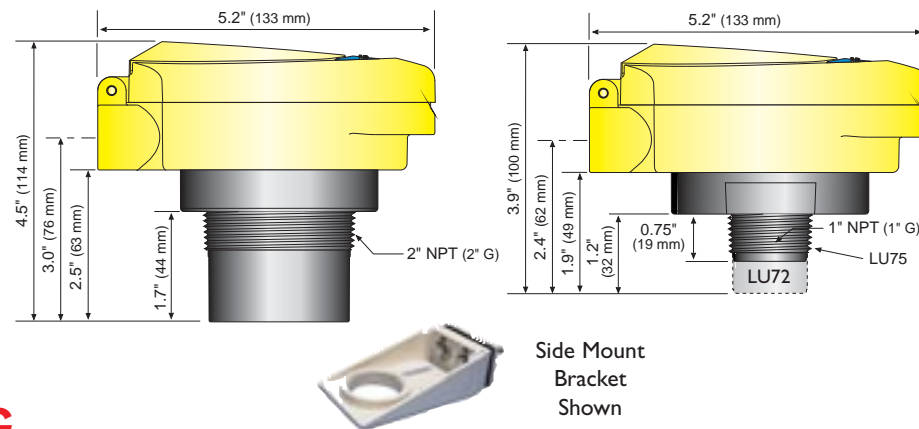
<b>Contact type:</b>	(3) SPDT relays
<b>Contact rating:</b>	60 VA
<b>Contact logic:</b>	Single point: alarm Two point: latching or out of bounds alarms
<b>Contact fail-safety:</b>	De-energizes during echo signal loss
<b>Process temp.:</b>	F: -4° to 140° C: -20° to 60°
<b>Temp. comp.:</b>	Automatic
<b>Electronics temp.:</b>	F: -40° to 160° C: -40° to 71°
<b>Pressure:</b>	30 psi (2 bar) @ 25° C., derated @ 1.667 psi (.113 bar) per °C. above 25° C.
<b>Enclosure rating:</b>	NEMA 4X (IP65)
<b>Enclosure vent:</b>	Water tight membrane
<b>Encl. material:</b>	PC/ABS FR
<b>Trans. material:</b>	PVDF Kynar®
<b>Process mount:</b>	LU72/5: 1" NPT (1" G) LU71/3: 2" NPT (2" G)
<b>Mount gasket:</b>	Viton®
<b>Conduit entrance:</b>	Dual, 1/2" NPT
<b>Classification:</b>	General purpose
<b>CE compliance:</b>	EN 61326 EMC (pending) EN 61010 safety

## APPLICATION

The general purpose ultrasonic switch provides non-contact level detection up to 10m with 3 relays. Each relay can be configured on a single set point alarm, two latched set points for automatic fill or empty including lead-lag, or two set points for out of bounds alarms. The switch is well suited for a broad range of corrosive, waste and slurry type media, and is broadly selected for atmospheric day tank, pump lift station and waste sump applications.

## FEATURES

- ✓ EasyCal target push button calibration with non-volatile memory
- ✓ Incredible 7.6 cm beam diameter for applications with restricted space
- ✓ Amazing 5 cm dead band optimizes filling capacity of small vessels
- ✓ Fail-safe intelligence with diagnostic feedback for easy troubleshooting



## EchoSwitch ORDERING

LU7  -5   5

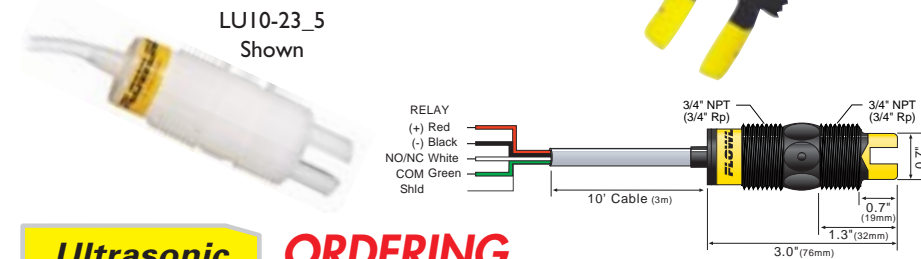
**Ordering Notes**  
1) For installation on open tanks, order the LM50-1001-1 (1" NPT), LM50-1061-1 (1" G) LM50-1001 (2" NPT) or LM50-1061 (2" G) side mount bracket.



<b>Sensor range / size</b>	
5	1.2m (4') / 1"
2	3m (9.8') / 1"
1	5m (16.4') / 2"
3	8m (26.2') / 2"
<b>Supply voltage</b>	
0	95-250 VAC
8	12-28 VDC
<b>Process mount (1) (2)</b>	
0	NPT (US)
6	G (Metric)

## APPLICATION

CSA and Cenelec approved intrinsically safe use in general purpose or hazardous applications, the ultrasonic level switch is broadly applied in chemical, waste, hydrocarbon and petroleum based liquids. Media examples include sulfuric acid, diesel fuel and wastewater. The submersible sensor is universally mounted through the wall or inside the tank, and it compatible with the MicroPoint indicator.



## Ultrasonic ORDERING

LU10-  3  5

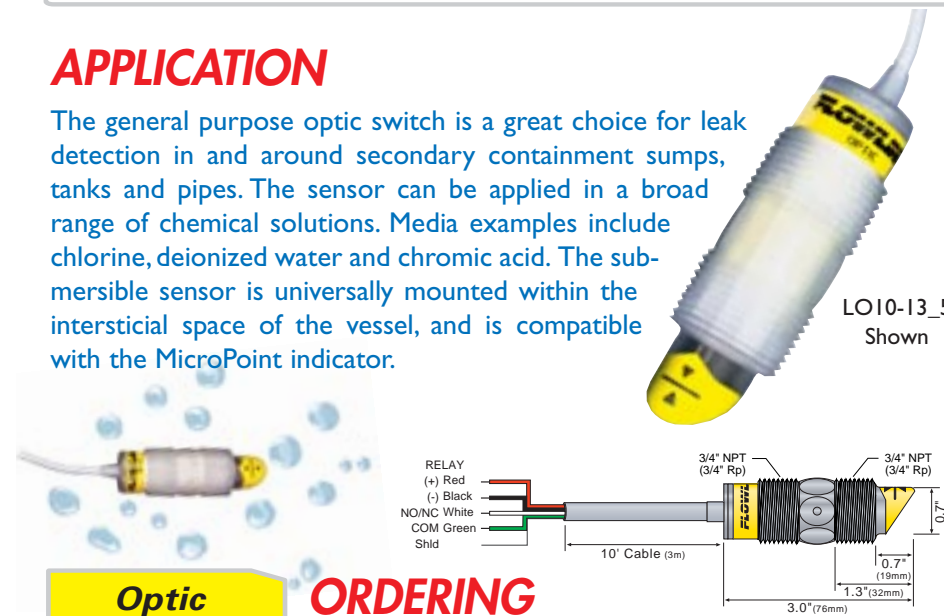
<b>Sensor material (1)</b>	
1	PP
2	PFA
<b>Process mount</b>	
0	3/4" NPT (US)
2	3/4" Rp (Metric)

**Ordering Notes**  
1) To special order a 25' (7.6m) or 50' (15.2 m) sensor cable, place the cable length at the end of the part number (ie: LU10-1305-25).



## APPLICATION

The general purpose optic switch is a great choice for leak detection in and around secondary containment sumps, tanks and pipes. The sensor can be applied in a broad range of chemical solutions. Media examples include chlorine, deionized water and chromic acid. The submersible sensor is universally mounted within the interstitial space of the vessel, and is compatible with the MicroPoint indicator.



## Optic ORDERING

LO10-  3  5

<b>Sensor material (1)</b>	
1	PP
2	PFA
<b>Process mount</b>	
0	3/4" NPT (US)
2	3/4" Rp (Metric)

**Ordering Notes**  
1) To special order a 25' (7.6m) or 50' (15.2 m) sensor cable, place the cable length at the end of the part number (ie: LO10-1305-25).



## SPECIFICATIONS

<b>Repeatability:</b>	± 0.5 mm in water
<b>Supply voltage:</b>	12-36 VDC
<b>Consumption:</b>	25 mA maximum
<b>Contact type:</b>	(1) SPST relay (NO/NC)
<b>Contact rating:</b>	60 VA, 1A max.
<b>Process temp.:</b>	C: -40° to 90°
<b>Pressure:</b>	150 psi (10 bar) max.
<b>Sensor rating:</b>	NEMA 6 (IP68)
<b>Sensor material:</b>	13_5: PP / 23_5: Teflon®
<b>Cable material:</b>	13_5: PP / 23_5: Teflon®
<b>Cable length:</b>	10' (3m)
<b>Cable type:</b>	4-conductor, shielded
<b>Process mount:</b>	3/4" NPT (3/4" Rp)
<b>Classification:</b>	Intrinsically safe
<b>CE compliance:</b>	EN 50082-2 immunity EN 55011 emission EN 61010-1 safety

## SPECIFICATIONS

<b>Repeatability:</b>	± 0.5 mm in water
<b>Supply voltage:</b>	12-36 VDC
<b>Consumption:</b>	25 mA maximum
<b>Contact type:</b>	(1) SPST relay (NO/NC)
<b>Contact rating:</b>	60 VA, 1A max.
<b>Process temp.:</b>	C: -40° to 90°
<b>Pressure:</b>	150 psi (10 bar) max.
<b>Sensor rating:</b>	NEMA 6 (IP68)
<b>Sensor material:</b>	13_5: PP / 23_5: Teflon®
<b>Cable material:</b>	13_5: PP / 23_5: Teflon®
<b>Cable length:</b>	10' (3m)
<b>Cable type:</b>	4-conductor, shielded
<b>Process mount:</b>	3/4" NPT (3/4" Rp)
<b>Classification:</b>	General purpose
<b>CE compliance:</b>	EN 50082-2 immunity EN 55011 emission EN 61010-1 safety

## APPLICATION

Factory calibrated, the general purpose indicator reads 0-100% of span with two or four level transmitter input channels. A single push button allows users to scroll through active channels. With the optional MicroCal PC calibration kit, users can customize engineering units, configure FET alarm set points from level transmitter and switch inputs, and/or linearize the volumetric measurement of odd shaped tanks. The compact NEMA 4X enclosure supports panel and wall mount installations. Select the 2 channel version for loop insertion with PLC's and the 4 channel for stand alone indication.



## SPECIFICATIONS

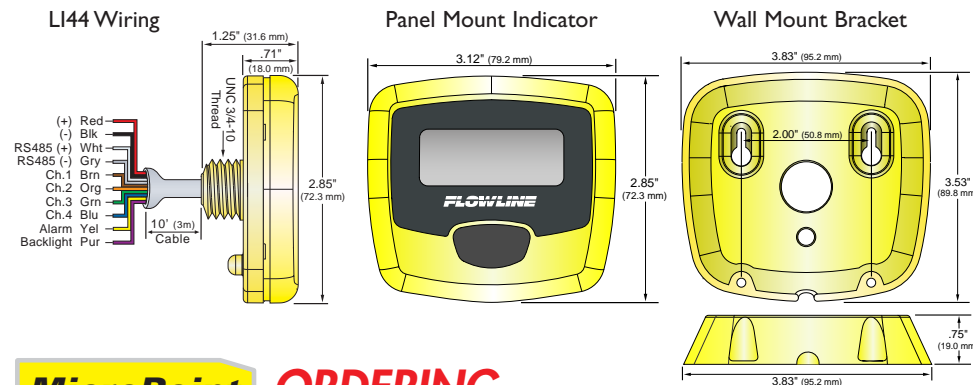
Display type:	LCD, 5-digit
Display units:	Factory cal: % of span PC cal: engineering*
Decimal point:	Floating
Display output:	Transmitter: 0-99999 Switch: Good / alarm*
Display height:	0.4" (1 cm)
Display backlight:	LED bar (adjustable)
Linearization:*	2-16-point function
User interface:	Single push button
Input channels:	LI42: (2) 4-20 mA LI44: (4) 4-20 mA
Loop insertion:	LI42: In-series, 10 Ohms LI44: N/a (stand-alone)
Supply voltage:	12-24 VDC
PC-cal. interface:*	USB® adapter w/cable
PC-cal. software:*	MicroCal (Windows®)
Memory:	Non-volatile
Alarm type:*	LI42: (2) FET switches with opt. audible chirp LI44: (1) FET switch with opt. audible chirp
Alarm cancel:*	Single push button
Alarm set points:*	1 point: alarm 2 points: out of bounds
Switch rating:*	1A @ 24 VDC
Switch output:*	Normally open
Operating temp.:	F: -4° to 140° C: -20° to 60°
Cable type:	10-conductor, #22 AWG
Cable length:	10' (3m)
Enclosure rating:	NEMA 4X (IP65)
Enclosure mat'l:	PC/ABS FR
Enclosure mount:	Panel or field
Button mat'l:	Silicon rubber
Classification:	General purpose
CE compliance:	EN 61326 EMC (pending)

\* Requires LI96-1001 MicroCal calibration kit



## FEATURES

- ✓ Compatible with Flowline level transmitter, switch and leak detection sensors
- ✓ Alarms can be configured for high level, low level, out of bounds or leak detection
- ✓ Adjustable LED backlight for night use outdoors and/or in dimly lit locations



## MicroPoint ORDERING

LI4□-1001

- Sensor input channels (1) (2) (3)**
- 2 2 channels (transmitter or switch)
  - 4 4 channels (transmitter or switch)



### Ordering Notes

- 1) For indicator and loop power, order the LC95-1001 (120 VAC) or LC96-1001 (240 VAC) power supply (24 VDC @ 0.6A).
- 2) Factory calibrated, the indicator displays % of span with transmitter inputs only and no alarm set points.
- 3) Order the LI96-1001 MicroCal PC calibration kit to display engineering units, configure alarm set points from transmitter and switch inputs, and/or linearize the volumetric measurement of odd shaped tanks. Each kit includes (1) PC Windows® based MicroCal software CD and (1) USB to RS485 adapter with 1m cable.

## APPLICATION

The general purpose meter reads engineering units with one level transmitter input channel and is offered in three configurations. Select the meter only for indication, the meter with 2 relays for indication and automation, and the meter with 4-20 mA repeater for signal isolation. Each relay can be configured on a single set point, two latched set points for tank automatic fill or empty with pump alternation and lead-lag functions. With the optional MeterView® PC calibration kit, users can conveniently program or clone meters, save meter profiles, datalog and export data to HTML or TXT file formats. The NEMA 4X faceplate and 1/8 DIN enclosure supports panel mount installations.



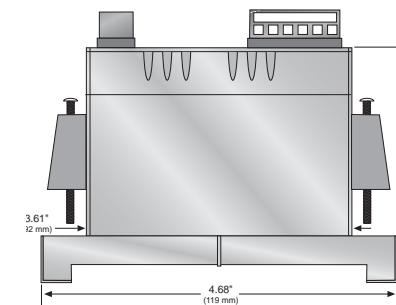
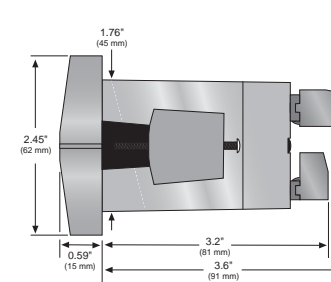
LM92 Shown



LM93 Shown

## FEATURES

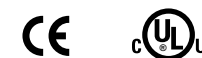
- ✓ Compatible with Flowline level transmitters, and voltage, thermocouple or RTD inputs
- ✓ Relay alternation and lead-lag control functions optimize pump performance / maintenance
- ✓ High intensity LED display is readable in direct sunlight for use in outdoor applications
- ✓ Rugged 1/8 DIN polycarbonate enclosure with splash-proof NEMA 4X faceplate



## DataPoint ORDERING

LI5□-1001

- Configuration (1) (2)**
- 0 Meter only
  - 1 Meter with 2 relays
  - 2 Meter with 4-20 mA repeater



LI97 Shown



### Ordering Notes

- 1) For panel mount installation in a NEMA 4X polycarbonate windowed enclosure, order the LM92-1001 (single meter box) or LM93-1001 (two meter box).
- 2) Order the LI97-1001 MeterView PC calibration kit to conveniently program or clone meters, save meter profiles, datalog and export data to HTML or TXT file formats. Each kit includes (1) PC Windows® based MeterView software CD and (1) RS232-RJ11 adapter with 2m cable.

## SPECIFICATIONS

Display type:	LED, 4-digit
Display units:	Engineering
Decimal point:	Floating
Display output:	0-9999
Display height:	0.56" (1.4 cm)
User interface:	Four push buttons
Input channels:	(1) 4-20 mA / 0-10 VDC
Supply voltage:	90-250 VAC, 50-60 Hz
PC-cal interface:*	RS232 (9-pin db to RJ11) adapter w/cable
PC-cal software:*	MeterView (Windows®)
Memory:	Non-volatile
Sensor supply:	24 VDC @ 200 mA
Repeater output:	LI52: Isolated (requires ext. 12-35 VDC supply)
Contact type:	LI51: (2) SPDT relays
Contact rating:	LI51: 750 VA
Contact output:	LI51: Selectable NO/NC
Contact mode:	LI51: Alarm, latched, pump altern., lead-lag
Contact delay:	0-199 seconds
Contact fail-safe:	Programmable
Contact status:	LED indication
Operating temp.:	F: -4° to 140° C: -20° to 60°
Enclosure type:	1/8 DIN
Enclosure rating:	NEMA 4X (IP65) faceplate
Enclosure mat'l:	Polycarbonate
Enclosure mount:	Panel mount
Classification:	General purpose
UL certificate:	E160849: 508
CE compliance:	EN 55011:1998 emissions EN 61000-6-2:2001 immunity EN 61010-1:2001 safety

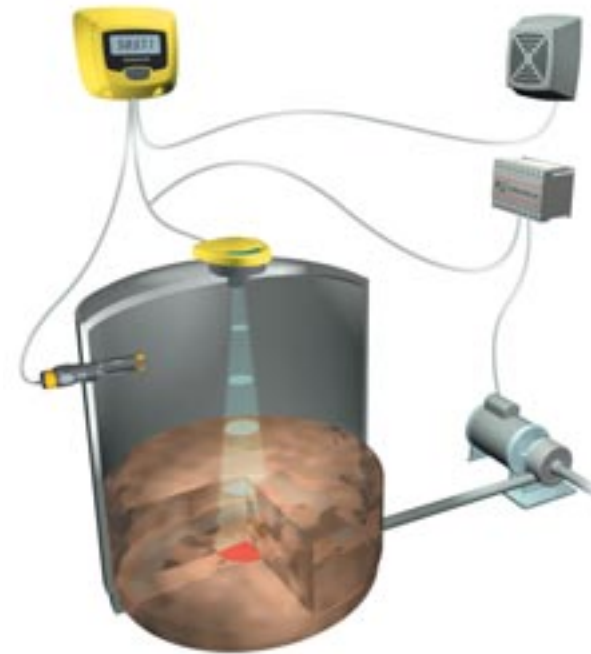
\* Requires LI97-1001 MeterView calibration kit



MeterView provides a convenient interface for meter calibration and datalog functions.

# Tank Inventory Monitoring, Automation and Safety

*Single Tank Level Measurement and Indication with Independent Alarms and PLC Automation*



Select: (1) LU\_\_ transmitter, (1) LU10 switch, (1) LI42 indicator

*Two Tank Level Measurement and Indication with Out of Bounds Alarms and PLC Automation*



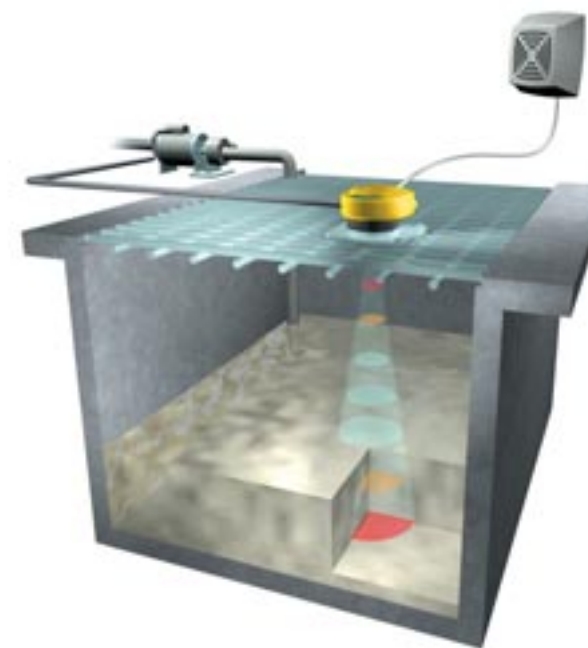
Select: (2) LU\_\_ transmitters, (1) LI42 indicator

*Three Tank Level Measurement and Indication with Low Level and Sump Leak Detection Alarm*



Select: (3) LU\_\_ transmitters, (1) LU10 switch, (1) LI44 indicator

*Integral Level Detection with Single or Dual Pump Automation and Independent Alarms*



Select: (1) LU7\_\_ switch      Volume 2: \$3.00 USD