FLOWLINE™ LEVEL BEST

EchoBeam® LR80 Series Radar Level Sensor

Part No. LR80-0000

Overview

The Flowline LR80 **EchoBeam®** general purpose 80GHz FMCW radar sensor provides continuous level measurement up to 32.8' (10m) for liquids or 16.4' (5m) for solids with a 4-20 mA signal output. The sensor is wirelessly configured over Bluetooth via the LevelTap™ App which enables you to see the level, verify the status, and manage the settings of connected sensors from the safety of the ground or nearby catwalk. The sensor measures liquid and solids media with a dielectric constant value ≥ 1.6, such as water, chemical or petroleum-based liquids, and pellet, grain, powder or aggregate solids. Select this sensor for tank, sump, lift station, weir, canal, reservoir, bin, conveyor or transfer station applications.

Features

- 80GHz technology provides reliable, maintenance-free operation
- Measures level height, air gap, tank volume or open channel flow
- Rugged PVDF antenna and enclosure for corrosive liquid or solids
- IP68 rated sensor for harsh outdoor or below grade installations
- Sealed 10m PVC jacketed cable for corrosive level environments
- Zero dead band maximizes the potential fill capacity of small tanks
- Optionally measures through top wall of plastic or fiberglass tanks
- Bluetooth wireless configuration via the LevelTap™ mobile App
- 2-year warranty

Agency Approvals

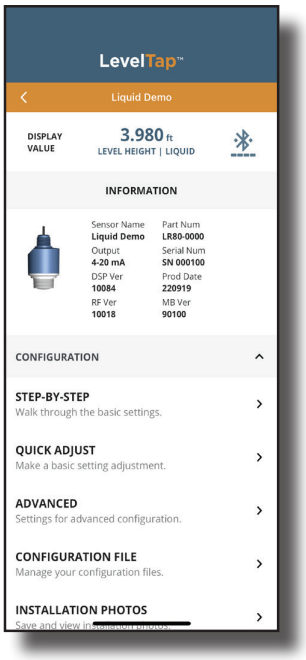
- CSA, FCC

Configuration

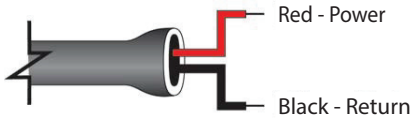
Download the free **LevelTap™** App at the Apple Store or Google Play Store, register and go to Demo Sensors. There you can view level status and step-by-step or advanced configuration examples prior to sensor purchase.

Download on the App Store

GET IT ON Google Play



Wiring



4-20 mA Wiring: The Red Wire or Positive (+) and Black Wire or Negative (-) terminals are for connection to a 12-30 VDC power supply or to a 4-20 mA loop power source. The wire to the terminals can be extended up to 1,000 feet using 16–22-gauge wire.

LR80-0000 Technical Specifications

Model	LR80-0000
Price	$;066v[:
Drawing Link	PDF
Weight (lb)	3.1
Maximum Range	Liquid: 32.8' (10m) with media dielectric ≥ 1.6 and no agitation Solids: 16.4' (5m) with media dielectric ≥ 6 and no dust
Frequency	80 GHz., W-band, FMCW
Accuracy	0.4m to 10m: ± 5mm 0.00m to 0.39m: ± 10mm
Sensing Dead Band*	0" (0mm)
Beam Angle	8°
Minimum Dielectric	≥ 1.6
Bluetooth Version	Bluetooth 5.0
Bluetooth Range	26.2' (8m)
Configuration	LevelTap™ App (IOS & Android)
Memory	Non-volatile
Signal Output	4-20 mA, two-wire
Maximum Signal Distance	1,000' (304m)
Signal Fail-Safe	Selectable high, low or hold last value
Supply Voltage	12-30 VDC
Maximum Consumption	22.5 mA
Process Temperature	-40° to 140°F (-40° to 60°C)
Temperature Compensation	Automatic
Storage Temperature	-40° to 176°F (-40° to 80°C)
Pressure	-14.5 to 43.5 psi (-1 to 3 bar)
Enclosure Rating	Type 6P (IP68)
Enclosure Material	PVDF (pigmented polyvinylidene fluoride)
Antenna Material	PVDF (natural polyvinylidene fluoride)
Cable Jacket Material	PVC (polyvinyl chloride)
Cable Seal Material	Viton GLT (fluoroelastomer)
Cable Orientation	Vertical
Shielded Cable	2-conductor
Cable Length	32.8' (10m)
Conduit Connection	1" NPT
Process Mount	1-1/2" NPT
Classification	General purpose (cCSAus)
Approvals	C22.2 No. 61010-1-12
Compliance	FCC: Part 15.256, 15.209, 15C ISED IC: RSS-102, RSS-211, RSS-247 CE/RED 2014/53/EU: EN 302 372, EN 302 729, EN 301 489-1, -33, EN 300 328 SRRC: (No. [2002] 353), CRN

** Dead band is the minimum distance the sensor must be mounted above the max liquid level.*

FLOWLINE™ LEVEL BEST

EchoBeam® LR80 Series Radar Level Sensor Accessories

EchoBeam Radar Level Sensor Accessories						
Part No.	*Item Photo*	*Description*	*Quantity*	*Weight (lb)*	*Drawing Link*	*Price*
LM50-3S21		Flowline short mounting bracket, 316 stainless steel. For use with Flowline EchoBeam frequency modulated continuous wave (FMCW) radar level sensors. 1in NPT lock nut included.	1	1.1	PDF	$066v_:
LM50-3S31		Flowline short mounting bracket, 316 stainless steel. For use with Flowline EchoBeam frequency modulated continuous wave (FMCW) radar level sensors. 1-1/2in NPT lock nut included.	1	1.1	PDF	$066v#:
LM50-3S22		Flowline long mounting bracket, 316 stainless steel. For use with Flowline EchoBeam frequency modulated continuous wave (FMCW) radar level sensors. 1in NPT lock nut included.	1	1.45	PDF	$;066v!:
LM50-3S32		Flowline long mounting bracket, 316 stainless steel. For use with Flowline EchoBeam frequency modulated continuous wave (FMCW) radar level sensors. 1-1/2in NPT lock nut included.	1	1.45	PDF	$066v?:
LM53-2440		Flowline capped reducer, PTFE, 1-1/2in female to 2in male NPT. For use with Flowline EchoBeam frequency modulated continuous wave (FMCW) radar level sensors.	1	0.25	PDF	$066vy:
LM53-4855		Flowline adhesive mounting fitting, PVC, 1-1/2in female NPT. For use with Flowline EchoBeam frequency modulated continuous wave (FMCW) radar level sensors.	1	0.60	PDF	$066vz:
LM53-3850		Flowline mounting flange, CPVC, 3in ANSI x 1-1/2in female NPT. For use with Flowline EchoBeam frequency modulated continuous wave (FMCW) radar level sensors.	1	1.65	PDF	$;066v]:

See our website www.AutomationDirect.com for complete Engineering drawings.

Mounting Examples

LR80-0000 shown mounted to LM50-3S21 short mounting bracket

LR80-0000 shown mounted to LM53-2440 capped reducer

LR80-0000 shown mounted to LM53-4855 mounting fitting

FLOWLINE™ LEVEL BEST

EchoPod/EchoTouch® Reflective Technology™ Ultrasonic Liquid Level Sensors

Overview

The innovative EchoPod/EchoTouch Reflective Technology ultrasonic liquid level sensors replace other ultrasonic level sensors in condensation applications, as well as float, conductance and pressure sensors that fail due to contact with dirty, sticky and scaling media in small, medium and large capacity tanks. Applied in chemical, water and wastewater applications, these general purpose or intrinsically safe non-contact sensors are available with single and multi-function capabilities, including continuous level measurement, switching and control. The standard 4-20 mA output is easily monitored by a PLC or other controller. Models with four relays can be configured for level alarms and/or stand-alone level control such as automatic fill or empty functions using the embedded level controller. PC configuration of all models is simple with WEBCAL™ software, while the UG06, UG12 and US06 models also offer limited configuration via their pushbuttons and integral display.

What is Reflective Technology™?

Condensation is the most commonly encountered variable in liquid level applications. Condensation attenuates the acoustic signal of ultrasonic sensors that have a flat horizontal transducer face, weakening their signal strength and signal-to-noise ratio by up to 50%, and substantially reducing their measurement reliability. At the core of Reflective Technology™ is a simple fact: unlike flat horizontal surfaces, significant water droplets cannot adhere to smooth vertical surfaces. By orienting the internal ultrasonic transducer vertically, condensation runs off the transducer face and does not affect sensor performance. The unimpeded transmit and receive signals are redirected to and from the liquid off a 45° reflector, delivering reliable level measurement. Thanks gravity!

CE cULus 2 YEAR WARRANTY

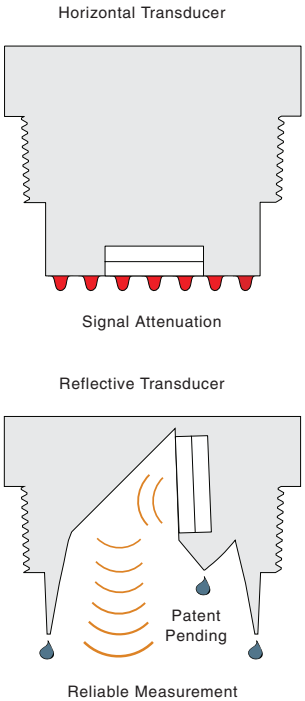
WEBCAL

LI99-2001

WebCal Software

WEBCAL PC software is a utility program that enables users to easily configure their EchoSonic II, EchoTouch and EchoPod level transmitters, switches, and controllers. Download your free copy of WebCal at www.AutomationDirect.com, and connect your sensor through our Fob USB adapter (LI99-2001). Develop your configuration using pre-programmed function menus as the tank graphic and set point fields automatically change to match your configuration. Then, input your level set point values and click the Write to Unit button. Your configuration will be downloaded into the sensor and verified in less than a second. Last, click the Wiring Diagram button to open a wiring schematic of your configuration in PDF format. Print the document, disconnect the sensor and wire it per the schematic. As new software or firmware becomes available, it can be downloaded and updated through WebCal.

Reflective Technology



FLOWLINE™ LEVEL BEST

REFLECTIVE TECHNOLOGY

EchoPod/EchoTouch® Reflective Technology™ Ultrasonic Liquid Level Sensors

EchoPod/EchoTouch Reflective Technology Ultrasonic Liquid Level Sensors General Specifications							
Model	***UG01-0001-40***	***UG03-0001-40***	***UG06-0001-00***	***UG12-0001-00***	***US01-0001-00***	***US03-0001-00***	***US06-0001-00***
Price	$-044hi:	$-044hj:	$044hk:	$;-0044hl:	$044hn:	$044ho:	$;004ze7:
Type	EchoPod/EchoTouch Reflective Technology (works in condensing environments)						
Classification	General purpose (non-hazardous)				Intrinsically safe		
Media	Liquids						
Range	1.5 in to 4.9 ft (3.8 cm to 1.5 m)	4in to 9.8 ft (10.1 cm to 3m)	8in to 19.6 ft (20cm to 6m)	18in to 39.3 ft (45.7 cm to 12m)	1.5 in to 4.9 ft (3.8 cm to 1.5 m)	4in to 9.8 ft (10.1 cm to 3m)	8in to 19.6 ft (20cm to 6m)
Output	4-20 mA and (4) SPST relays		4-20 mA (No Relays)				
Mounting	Vertical, top of tank, 2in NPT male			Vertical, top of tank, 3in NPT male	Vertical, top of tank, 2in NPT male		
Electrical Termination	Integral 48in, 9-conductor, shielded cable		Screwless terminals, 1/2in female NPT		Integral 48in, 4-conductor, shielded cable		Screwless terminals, 1/2in female NPT
Configuration	WEBCAL Software (free download) and LI99-2001 Fob USB Adapter (purchased separately)		WEBCAL Software (free download) and LI99-2001 Fob USB Adapter (purchased separately) or Pushbutton / LCD		WEBCAL Software (free download) and LI99-2001 Fob USB Adapter (purchased separately)		WEBCAL Software (free download) and LI99-2001 Fob USB Adapter (purchased separately) or Pushbutton / LCD
Ambient Temperature	-31° to 140°F (-35° to 60°C)						-40° to 176°F (-40° to 80°C)
Process Temperature	-40° to 176°F (-40° to 80°C)						
Pressure	30 PSI (2 bar) max.						

FLOWLINE™ LEVEL BEST

EchoPod® UG01 & UG03 Series Ultrasonic Liquid Level Sensors

Part No. UG01-0001-40 Shown

Overview

The EchoPod UG01 and UG03 general-purpose reflective ultrasonic multi-function level transmitters provide continuous level measurement up to 9.8' (3m) with a 4-20 mA analog signal output and four relays, and are configured via WEBCAL software. The non-contact liquid level sensor features Flowline's proprietary Reflective Technology™ that delivers reliable level measurement in condensing environments. Each output relay can be configured for alarm, automatic fill or empty functions. Select this sensor for small tanks with non-foaming and mildly vaporous media such as chemicals, water, wastewater and oil. Typical applications include day tank, IBC or drum, cooling tower, skid or machine, process tank and waste sumps.

Features

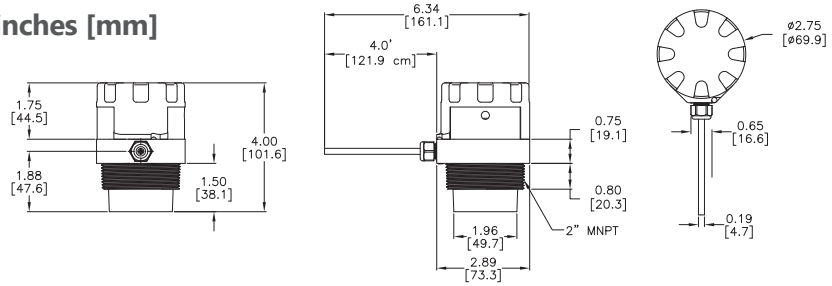
- 1.5m (4.9') and 3m (9.8') measurement ranges
- Fail-safe diagnostics with selectable relay and signal outputs
- Narrow 2" (5cm) beam width for applications with limited space
- Corrosion resistant PVDF transducer and compact PP enclosure
- Short 1.5" (3.8cm) dead band maximizes tank filling capacity
- Automatic temperature compensation from -40° to 176°F (-40° to 80°C)
- Configuration via WEBCAL software
- Four programmable relays with embedded level control logic
  - 1 pump or valve with 3 alarms
  - 2 pumps lead-lag with 2 alarms
  - 2 pumps duplexing with 2 alarms
  - 4 independent switch point alarms
- 2-year warranty

Agency Approvals

- CSA, CE

Dimensions

inches [mm]



See our website www.AutomationDirect.com for complete Engineering drawings.

Configuration

The settings for the the UG01 & UG03 are configured with free WEBCAL software (downloadable from AutomationDirect Web site), and an LI99-2001 Fob USB adapter (purchased separately).

Wiring

LI99-2001

See the end of the Ultrasonic Level Sensor Section for further details and Accessories

UG01 & UG03 Technical Specifications

Model	UG01-0001-40	UG03-0001-40
Price	$-044hi:	$-044hj:
Weight (lbs)	1.5	1.5
Range	1.5 in to 4.9 ft (3.8 cm to 1.5 m)	4in to 9.8 ft (10.1 cm to 3m)
Accuracy	0.125 in (3mm)	±0.2% of range
Resolution	0.019 in (0.5 mm)	0.039 in (1mm)
Sensing Dead Band*	1.5 in (3.8 cm)	4in (10.1 cm)
Beam Width	2in (5cm)	
Configuration	WEBCAL® PC Windows® USB® 2.0	
Memory	Non-volatile	
Supply Voltage	14-28 VDC	
Max. Consumption	0.5 W	
Loop Resistance	500Ω @ 24VDC	
Signal Output	4-20 mA, two-wire	
Signal Invert	4-20 mA or 20-4 mA	
Signal Fail-Safe	4mA, 20mA, 21mA, 22mA, hold last	
Contact Type	(4) SPST relays (N.O./N.C. selectable)	
Contact Rating	60VA, 1A maximum	
Contact fail-safe	Open, closed, hold last	
Contact Hysteresis	Selectable	
Process Temperature	-40° to 176°F (-40° to 80°C)	
Temp. Compensation	Automatic	
Ambient Temperature	-31° to 140°F (-35° to 60°C)	
Pressure	30 PSI (2 bar)	
Enclosure Rating	Type 6P (IP68)	
Enclosure Material	Polypropylene (PP)	
Transducer Type	Reflective	
Transducer Material	Polyvinylidene Fluoride (PVDF)	
Cable Jacket Material	Polyurethane (PUR)	
Cable Type	9-conductor, shielded	
Cable Length	48in (1.2 m)	
Process Mount	2in Male NPT	
Classification	General purpose	
Approval	CSA certified to UL 61010-1	
Compliance	CSA, CE	

** Dead band is the minimum distance the sensor must be mounted above the max liquid level.*

FLOWLINE™ LEVEL BEST

EchoPod® UG06 & UG12 Series Ultrasonic Liquid Level Sensors

REFLECTIVE TECHNOLOGY

Part No. UG06-0001-00 Shown

Part No. UG12-0001-00 Shown

Overview

The EchoPod UG06 and UG12 general-purpose reflective ultrasonic level transmitters provide continuous level measurement up to 39.3' (12m) with a 4-20 mA analog signal output, and is configured via WEBCAL software with limited configuration also available via the integral pushbutton display module. The non-contact liquid level sensor features Flowline's proprietary Reflective Technology™ that delivers reliable level measurement in condensing environments. Select this sensor for bulk tanks with non-foaming and mildly vaporous media such as chemicals, water, wastewater and oil. Typical applications include bulk storage, neutralization tank, clarifier and waste sumps.

Features

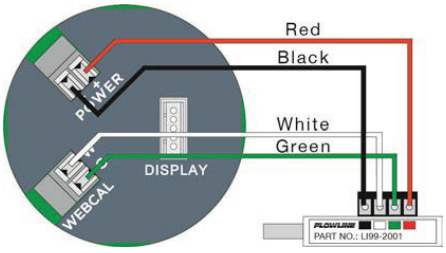
- 6m (19.6') and 12m (39.3')measurement ranges
- Reflective Technology™ measures reliably with condensation
- Corrosion resistant PVDF transducer with IP68 PP enclosure
- Fail-safe diagnostics with selectable signal fail-safe outputs
- LCD display indicates level in inches, feet, or meters
- Narrow 3" (7.6cm) (UG06) or 6" (15.2cm) (UG12) beam width for applications with limited space
- Windowed enclosure cap provides liquid tight level indication
- Configuration via WEBCAL software with limited configuration via the integral pushbutton and display
- Automatic temperature compensation from -40° to 176°F (-40° to 80°C)
- 2-year warranty

Agency Approvals

- CSA, CE

Configuration

The settings for the UG06 and UG12 are configured with free WEBCAL software (downloadable from AutomationDirect Web site), and an LI99-2001 Fob USB adapter (purchased separately).



LI99-2001

Note: Remove the display from the housing and disconnect the cable from the connector before wiring the Fob.

UG06 & UG12 Technical Specifications

Model	UG06-0001-00	UG12-0001-00
Price	$044hk:	$;-0044hl:
Weight (lbs)	1.9	2.5
Range	8in to 19.6 ft (20cm to 6m)	18in to 39.3 ft (45.7 cm to 12m)
Accuracy	±0.2% of range	
Resolution	0.079 in (2mm)	0.196 in (5mm)
Sensing Dead Band*	8in (20.3 cm)	18in (45.7 cm)
Beam Width	3in (7.6 cm)	6in (15.2 cm)
Configuration**	Pushbutton or WEBCAL® PC Windows® USB® 2.0	
Memory	Non-volatile	
Display Type	LCD, 6-digit	
Display Units	Inch, cm or percent	
Supply Voltage	14-28 VDC	
Max. Consumption	0.5 W	
Loop Resistance	500Ω @ 24VDC	
Signal Output	4-20 mA, two-wire	
Signal Invert	4-20 mA or 20-4 mA	
Signal Fail-Safe	4mA, 20mA, 21mA, 22mA, hold last	
Process Temperature	-40° to 176°F (-40° to 80°C)	
Temp. Compensation	Automatic	
Ambient Temperature	-31° to 140°F (-35° to 60°C)	
Pressure	30 PSI (2 bar)	
Enclosure Rating	Type 6P (IP68)	
Enclosure Material	Polypropylene (PP)	
Enclosure Cap Material	Clear Polycarbonate (PC)	
Enclosure Vent	Water tight membrane	
Conduit Entrance	1/2 in NPT	
Transducer Type	Reflective	
Transducer Material	Polyvinylidene Fluoride (PVDF)	
Process Mount	2in Male NPT	3in Male NPT
Classification	General purpose	
Compliance	CSA certified to UL 61010-1	
Agency Approvals	CSA, CE	

** Dead band is the minimum distance the sensor must be mounted above the max liquid level.*

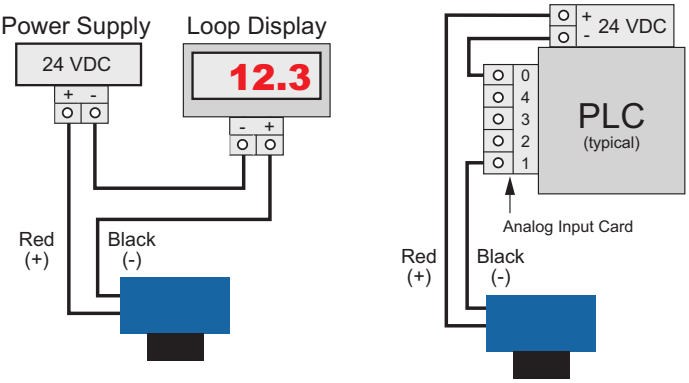
*** Some configuration options, such as volumetric mode, only available through Web-Cal. See manual for more configuration options.*

See the end of the Ultrasonic Level Sensor Section for further details and Accessories

FLOWLINE™ LEVEL BEST EchoPod® UG06 & UG12 Series Ultrasonic Liquid Level Sensors

Wiring

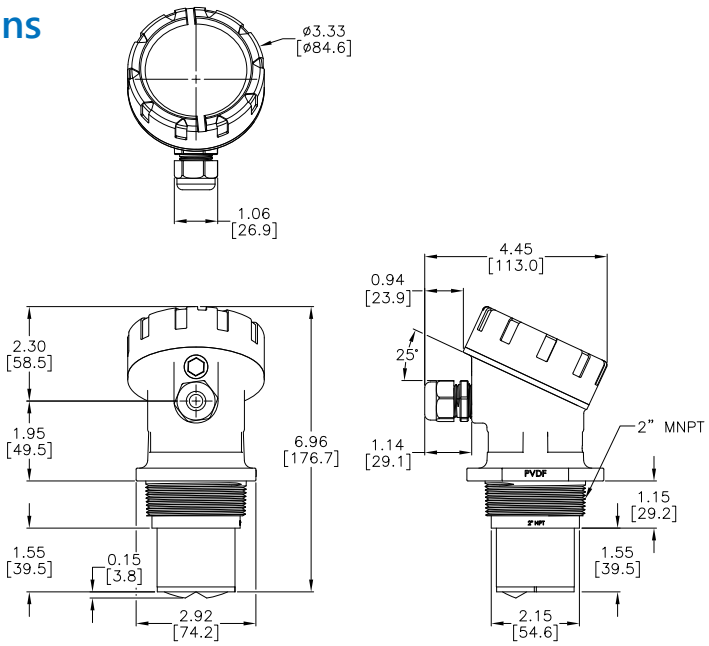
Common wiring to display, controllers and PLC examples



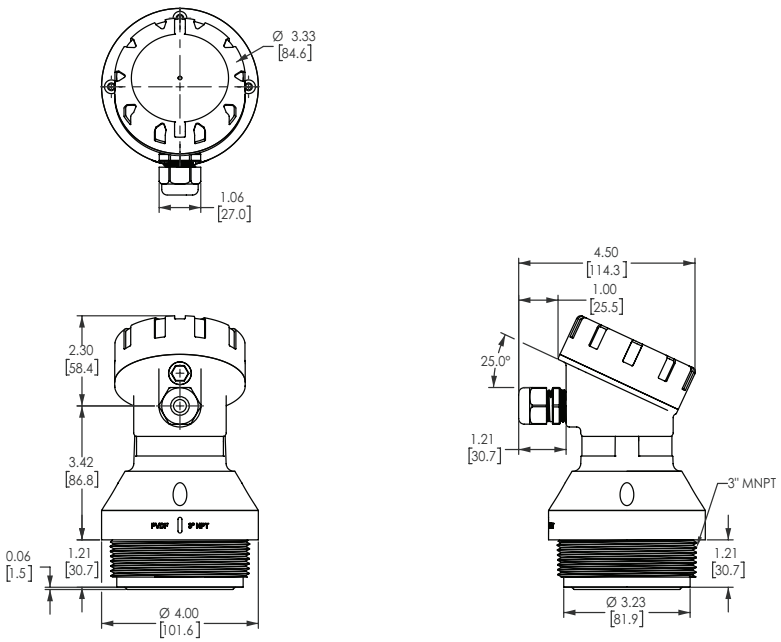
Dimensions

inches [mm]

Part No. UG06-0001-00



Part No. UG12-0001-00



See our website www.AutomationDirect.com for complete Engineering drawings.

FLOWLINE™ LEVEL BEST

EchoTouch® US01 & US03 Series Ultrasonic Liquid Level Sensors

Part No. US01-0001-00 Shown

Overview

The EchoTouch US01 and US03 intrinsically safe reflective ultrasonic level transmitters provide continuous level measurement up to 9.8' (3m) with a 4-20 mA analog signal output, and are configured via WEBCAL software. The non-contact liquid level sensor features Flowline's proprietary Reflective Technology™ that delivers reliable level measurement in condensing environments. Select this sensor for intrinsically safe environments and small tanks with non-foaming and mildly vaporous media such as chemicals, water, wastewater and oil. Typical applications include day tank, IBC or drum, cooling tower, skid or machine, process tank and waste sumps.

Features

- Intrinsically safe approvals for hazardous locations
- 1.5 m (4.9') and 3m (9.8') measurement ranges
- Reflective Technology™ measures reliably with condensation
- Narrow 2" (5cm) beam width for applications with limited space
- Configuration is easy with WEBCAL software
- Short 1.5" (3.8 cm) dead band maximizes tank filling capacity
- PVDF transducer and PP enclosure for corrosive environments
- Fail-safe diagnostics with selectable fail-safe signal outputs
- Type 6P (IP68) compact enclosure for small tank applications
- Automatic temperature compensation from -40° to 176°F (-40° to 80°C)
- 2-year warranty

Agency Approvals

- CSA, CE

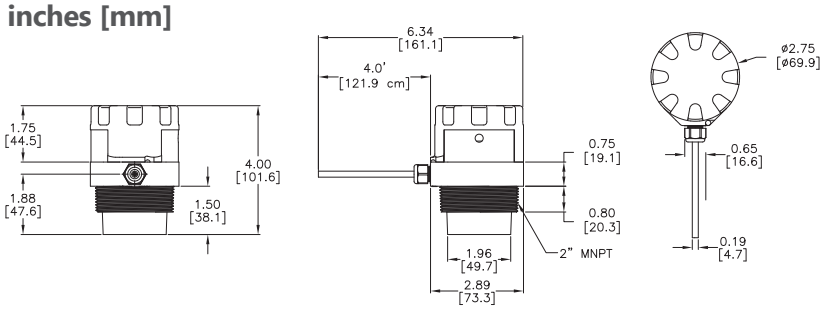
US01 & US03 Technical Specifications

Model	US01-0001-00	US03-0001-00
Price	$044hn:	$044ho:
Weight (lbs)	1.5	1.5
Range	1.5 in to 4.9 ft (3.8 cm to 1.5 m)	4in to 9.8 ft (10.1 cm to 3m)
Accuracy	0.125 in (3mm)	±0.2% of range
Resolution	0.019 in (0.5 mm)	0.039 in (1mm)
Sensing Dead Band*	1.5 in (3.8 cm)	4in (10.1 cm)
Beam Width	2in (5cm)	
Configuration	WEBCAL® PC Windows® USB® 2.0	
Memory	Non-volatile	
Supply Voltage	14-28 VDC	
Loop Resistance	500Ω @ 24VDC	
Signal Output	4-20 mA, two-wire	
Signal Invert	4-20 mA or 20-4 mA	
Signal Fail-Safe	4mA, 20mA, 21mA, 22mA, hold last	
Process Temperature	-40° to 176°F (-40° to 80°C)	
Temp. Compensation	Automatic	
Ambient Temperature	-31° to 140°F (-35° to 60°C)	
Pressure	30 PSI (2 bar)	
Enclosure Rating	Type 6P (IP68)	
Enclosure Material	Polypropylene (PP)	
Transducer Type	Reflective	
Transducer Material	Polyvinylidene Fluoride (PVDF)	
Cable Jacket Material	Polyurethane (PUR)	
Cable Type	4-conductor, shielded	
Cable Length	48in (1.2 m)	
Process Mount	2in Male NPT	
Classification	Intrinsically safe	
Approvals (for USA)	CSA: Class I, Div 1, Groups A,B, C & D T4; Class II, Div 1 Groups E, F & G T4; Class III T135C; Class I, Zone 0, IIC AEx ia T4 Ga; Class II, Zone 20, IIIC AEx ia, T135C, Da	
Approvals (for Canada)	CSA: Class I, Div 1, Groups A,B, C & D T4; Class II, Div 1 Groups E, F & G T4; Class III T135C	
Approvals (for IECEx)	Ex ia IIC T4 Ga; Ex ia IIIC, T135C Da; Tamb: -40 to 80C	
Compliance	CE	

** Dead band is the minimum distance the sensor must be mounted above the max liquid level.*

Dimensions

inches [mm]

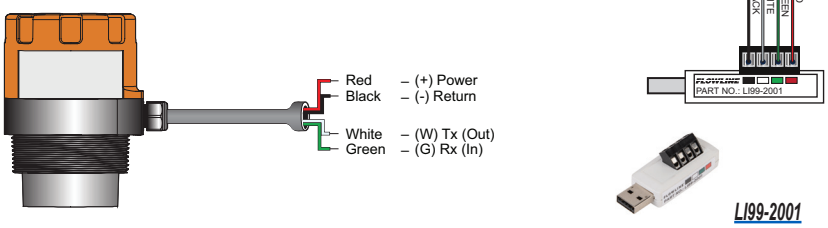


See our website www.AutomationDirect.com for complete Engineering drawings.

Configuration

The settings for the the US01 & US03 are configured with free WEBCAL software (downloadable from AutomationDirect Web site), and an LI99-2001 Fob USB adapter (purchased separately).

Wiring



LI99-2001

See the end of the Ultrasonic Level Sensor Section for further details and Accessories

FLOWLINE™ LEVEL BEST

EchoTouch® US06 Series Ultrasonic Liquid Level Sensors

REFLECTIVE TECHNOLOGY

Part No. US06-0001-00 Shown

US06 Technical Specifications

Model	US06-0001-00
Price	$;004ze7:
Weight (lbs)	1.9
Range	8in to 19.6 ft (20cm to 6m)
Accuracy	±0.2% of range
Resolution	0.079 in (2mm)
Sensing Dead Band*	8in (20.3 cm)
Beam Width	3in (7.6 cm)
Configuration	Pushbutton or WEBCAL® PC Windows® USB® 2.0
Memory	Non-volatile
Display Type	LCD, 6-digit
Display Units	Inch, cm or percent
Supply Voltage	14-28 VDC
Loop Resistance	500Ω @ 24VDC
Signal Output	4-20 mA, two-wire
Signal Invert	4-20 mA or 20-4 mA
Signal Fail-Safe	4mA, 20mA, 21mA, 22mA, hold last
Process Temperature	-40° to 176°F (-40° to 80°C)
Temp. Compensation	Automatic
Ambient Temperature	-40° to 176°F (-40° to 80°C)
Pressure	30 PSI (2 bar)
Enclosure Rating	Type 4X (IP66)
Enclosure Material	Aluminum
Enclosure Vent	Water tight membrane
Transducer Type	Reflective
Transducer Material	Polyvinylidene Fluoride (PVDF)
Conduit Entrance	1/2in NPT
Process Mount	2in Male NPT
Classification	Intrinsically safe
Approvals (for USA)	CSA: Class I, Div 1, Groups A,B, C & D T4; Class II, Div 1 Groups E, F & G T4; Class III T135C; Class I, Zone 0, IIC AEx ia T4 Ga; Class II, Zone 20, IIIC AEx ia, T135C, Da
Approvals (for Canada)	CSA: Class I, Div 1, Groups A,B, C & D T4; Class II, Div 1 Groups E, F & G T4; Class III T135C
Approvals (for IECEx)	Ex ia IIC T4 Ga; Ex ia IIIC, T135C Da; Tamb: -40 to 80C
Compliance	CE

** Dead band is the minimum distance the sensor must be mounted above the max liquid level.*

Overview

The EchoTouch US06 intrinsically safe reflective ultrasonic level transmitters provide continuous level measurement up to 19.6' (6m) with a 4-20 mA analog signal output, and are configured via WEBCAL software with limited configuration also available via the integral pushbutton display module. The non-contact liquid level sensor features Flowline's proprietary Reflective Technology™ that delivers reliable level measurement in condensing environments. Select this sensor for intrinsically safe environments and bulk tanks with non-foaming and mildly vaporous media such as chemicals, water, wastewater and oil. Typical applications include bulk storage, neutralization tank, clarifier and waste sumps.

Features

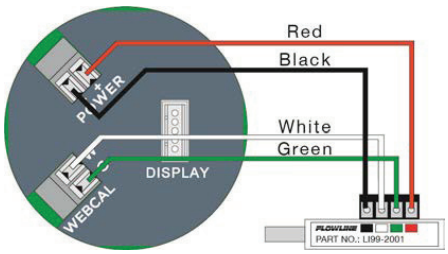
- Intrinsically safe approvals for hazardous locations
- 6m (19.6') measurement range
- Reflective Technology™ measures reliably with condensation
- Corrosion resistant PVDF transducer with aluminum IP66 enclosure
- Fail-safe diagnostics with selectable signal fail-safe outputs
- LCD display indicates level in inches, feet, or meters
- Narrow 3" (7.6cm) beam width for applications with limited space
- Configuration via WEBCAL software with limited configuration via the integral pushbutton and display
- Short 8" (20.3 cm) dead band maximizes tank filling capacity
- Type 4X (IP66) compact enclosure for small tank applications
- Automatic temperature compensation from -40° to 176°F (-40° to 80°C)
- 2-year warranty

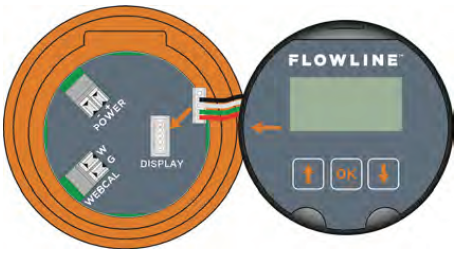
Agency Approvals

- CSA, CE

Configuration

The settings for the US06 are configured with free WEBCAL software (downloadable from AutomationDirect Web site), and an LI99-2001 Fob USB adapter (purchased separately).





Note: Remove the display from the housing and disconnect the cable from the connector before wiring the Fob.

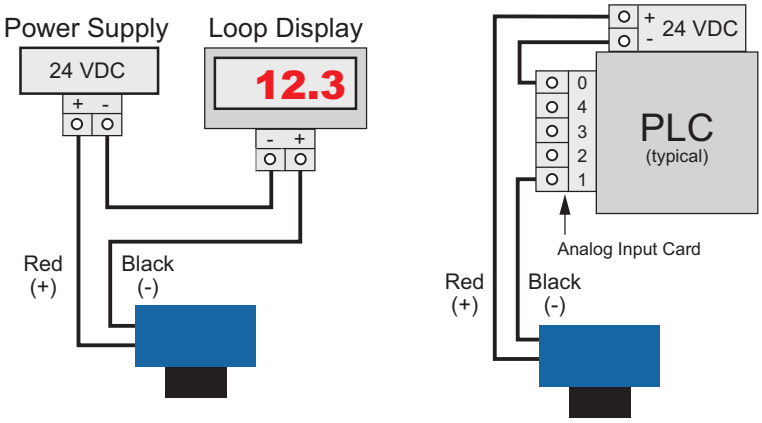
LI99-2001

See the end of the Ultrasonic Level Sensor Section for further details and Accessories

FLOWLINE™ LEVEL BEST EchoTouch® US06 Series Ultrasonic Liquid Level Sensors

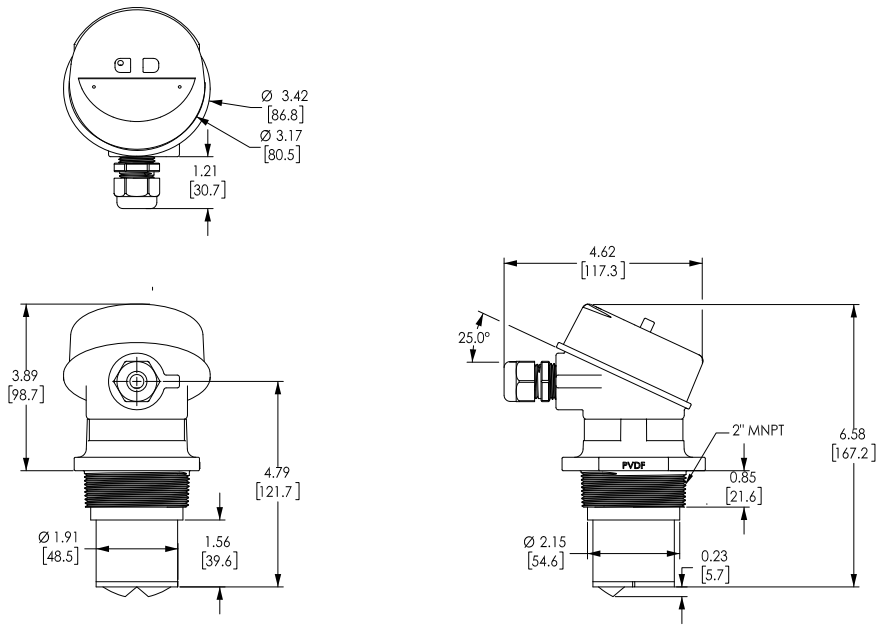
Wiring

Common wiring to display, controllers and PLC examples



Dimensions

inches [mm]



Part No. US06-0001-00

FLOWLINE™ LEVEL BEST

EchoPod® & EchoSonic® II Ultrasonic Liquid Level Sensors

SOFTWARE CONFIGURED

The EchoPod and EchoSonic II are innovative ultrasonic liquid level sensor families that replace float, conductance and pressure sensors that fail due to contact with dirty, sticky and scaling media in small, medium and large capacity tanks. Applied in chemical, water and wastewater applications, these general purpose non-contact sensors are available with single and multi-function capabilities including continuous level measurement, switching and control.

For input to a PLC or other controller, measurement outputs include current, voltage and frequency. Models with four relays can be configured for level alarms and/or stand-alone level control such as automatic fill or empty functions using the embedded level controller. PC configuration is simple with WEBCAL™ software.

2 YEAR WARRANTY

EchoPod & EchoSonic II Ultrasonic Liquid Level Sensors General Specifications

Model	DL34-00	DL24-00	DL14-00	DS14-00	DX10-00	DL10-00	LU27-00	LU23-00	LU28-00	LU29-00
Price	$00d_3:	$00d_2:	$00d_1:	$00d_4:	$00d_5:	$00d_0:	$00d_7:	$00d_6:	$;000d_8:	$;000d_9:
Type	EchoPod						EchoSonic II			
Class	General Purpose (non-hazardous)									
Media*	Liquids									
Range	8in to 18 ft (20cm to 5.5 m)	4in to 9.8 ft (10cm to 3m)	2in to 4.1 ft (5cm to 1.25 m)				4in to 9.8 ft (10cm to 3m)	8in to 18 ft (20cm to 5.5 m)	8in to 26.2 ft (20cm to 8m)	8in to 32.8 ft (20cm to 10m)
Output Types	4-20 mA and (4) SPST relays			(4) SPST relays	0-5V, 0-10V, 976-2000 Hz	4-20 mA				
Install	Vertical, top of tank									
Mounting	2in MNPT	1in MNPT						2in MNPT		
Relays	(4) SPST				No Relay					
Configuration	WEBCAL Software (free download) and LI99-2001 Fob USB Adapter (purchased separately)									
Ambient Temperature	-31° to 140°F (-35° to 60°C)									
Process Temperature	20° to 140°F (-7° to 60°C)						-4° to 140°F (-20° to 60°C)			
Pressure	30 PSI (2 bar) max.									

** Any factor that negatively affect sound's ability to travel such as, vapor, condensation, foam, turbulence, vacuum, etc., will have a negative effect on the ultrasonic sensor signal and should be avoided. For condensing environments the Flowline UG/US series of Reflective Ultrasonic Level Sensors are recommended.*

FLOWLINE LEVEL BEST WEBCAL

WEBCAL

LI99-2001

WEBCAL Software

WEBCAL PC software is a utility program that allows users to easily configure their EchoSonic II and EchoPod level transmitters, switches, and controllers. Download your free copy of WEBCAL at www.AutomationDirect.com, and connect your sensor through our Fob USB adapter (LI99-2001). Develop your configuration using pre-programmed function menus as the tank graphic and set point fields automatically change to match your configuration. Then, input your level set point values and click the Write to Unit button. Your configuration will be downloaded into the sensor and verified in less than a second. Last, click the Wiring Diagram button to open a wiring schematic of your configuration in PDF format. Print the document, disconnect the sensor and wire it per the schematic. As new software or firmware becomes available, they can be downloaded and updated through WEBCAL.

Click on the thumbnail or go to https://www.automationdirect.com/VID-LE-0003 for a short video introduction to Flowline Ultrasonic Level Switches.

LI40-1001

PodView®

The PodView digital level indicator is a low cost general purpose level indicator that displays engineering units for level or volume and shares power with an EchoPod ultrasonic sensor, including loop powered devices. The LI40 can be field mounted for local indication as well as be used to make simple setting changes to the sensor. The display can be easily attached to any EchoPod sensor that has been configured with WEBCAL 6.0 / firmware 50.0 or higher. PodView displays sensor output and can reconfigure sensor setpoints on the fly. PodView shares power with the sensor and does not require any additional outside power supply.

Click on the thumbnail or go to https://www.automationdirect.com/VID-LE-0002 for a short video introduction to Flowline EchoTouch, EchoSpan, EchoSwitch and PodView product lines.

FLOWLINE™ LEVEL BEST

SOFTWARE CONFIGURED

EchoPod DS14 Ultrasonic Liquid Level Switch & Controller

Overview

The EchoPod DS14 ultrasonic liquid level switch provides continuous level detection up to 4.1 ft (1.25m), with 4 programmable relays for level switch or level control functions, and is configured via WEBCAL software. The embedded level controller can lower cost by replacing external control hardware. This non-contact liquid level sensor is ideally suited for corrosive, sticky or dirty liquids, and is broadly selected for small day tank, skid, intermediate bulk tanks, sump and process tank level applications.

Features

- Continuous level detection up to 4.1 ft (1.25 m)
- Configuration is fast and easy via WEBCAL software and USB adapter
- Narrow 2 inch beam width and short 2 inch dead band optimized for small tanks
- Four programmable relays for switch, pump or valve control and fail-safety
  - 1 pump or valve with 3 alarms
  - 2 pumps (lead-lag) with 2 alarms
  - 2 pumps (duplexing) with 2 alarms
  - 4 independent outputs
- PVDF transducer and NEMA Type 6P polycarbonate enclosure for corrosive liquids, UV stable for outdoor use
- Automatic temperature compensation for accurate measurement
- 2-year warranty

Agency Approvals

- cFMus

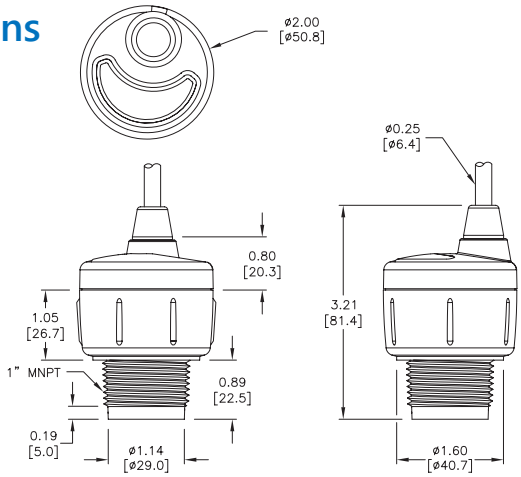
DS14-00 Technical Specifications

Price	$00d_4:
Range	2in to 4.1 ft (5cm to 1.25 m)
Accuracy	0.125 in (3mm)
Resolution	0.019 in (0.5 mm)
Sensing Dead Band*	2in (5cm)
Beam Width	2in (5cm)
Configuration	WEBCAL Free Software and LI99-2001 USB Fob Adapter
Memory	Non-volatile
Supply Voltage	12 to 24 VAC/VDC
Consumption	0.5W
Output Type	(4) SPST relays
Contact Voltage Ratings	120 VAC/DC @ 0.5A; 30 VAC/DC @ 1A
Contact Fail-Safe	Power loss: Hold last Echo loss: Open, close or hold last
Hysteresis	Selectable
Process Temperature	20° to 140°F (-7° to 60°C)
Temp. Compensation	Automatic
Ambient Temperature	-31° to 140°F (-35° to 60°C)
Pressure	30 PSI (2 bar) MAX
Enclosure Rating	NEMA Type 6P, IP67, encapsulated, corrosion resistant & submersible, UV stable
Enclosure Material	Polycarbonate
Strain Relief Material	Santoprene
Transducer Material	Polyvinylidene Fluoride
Cable Jacket Material	Polyurethane
Cable Type	9-conductor, shielded
Cable Length	48in (1.2 m)
Process Mount	1in MNPT (See accessories for installation fittings)
Mount Gasket	Viton® (included, replacement part number 204038)
Weight (lbs)	0.5
Classification	General purpose
Compliance	CE, RoHS
Agency Approvals	cFMus

** Dead band is the minimum distance the sensor must be mounted above the max liquid level.*

Dimensions

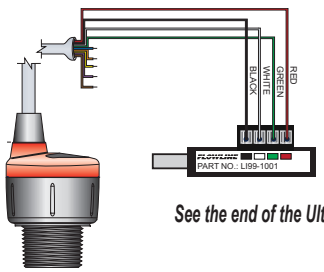
inches [mm]



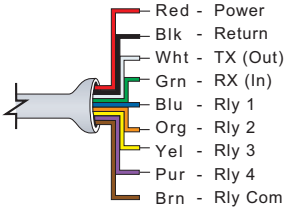
See our website www.AutomationDirect.com for complete Engineering drawings.

Configuration

The settings for the the DS14 are configured with free WEBCAL software (downloadable from AutomationDirect Web site), and an LI99-2001 Fob USB adapter (purchased separately).



Wiring



LI99-2001

See the end of the Ultrasonic Level Sensor Section for further details and Accessories

FLOWLINE™ LEVEL BEST

SOFTWARE CONFIGURED

EchoPod DX10 Ultrasonic Liquid Level Transmitter

Overview

The EchoPod DX10 ultrasonic liquid level transmitter provides continuous level measurement up to 4.1 ft (1.25m), with a selectable 0-5 VDC, 0-10 VDC or 976-2000 Hz frequency signal output, and is configured via WEBCAL software. Select the voltage output for interface with analog input cards. Select the frequency output for interface with discrete input cards. This non-contact liquid level sensor is ideally suited for corrosive, sticky or dirty liquids, and is broadly selected for small day tank, skid, intermediate bulk tanks, sump and process tank level applications.

Features

- Continuous non-contact level measurement output up to 4.1 ft (1.25 m)
- Selectable voltage (analog) or frequency (discrete) signal outputs
- Configuration is fast and easy via WEBCAL software and USB adapter
- Narrow 2 inch beam width and short 2 inch dead band optimized for small tanks
- PVDF transducer and NEMA Type 6P polycarbonate enclosure for corrosive liquids, UV stable for outdoor use
- Automatic temperature compensation for accurate measurement
- 2-year warranty

Agency Approvals

- cFMus

RoHS CE FM APPROVED 2 YEAR WARRANTY

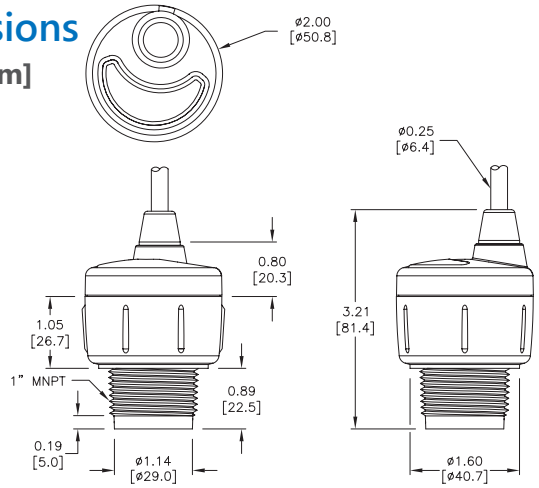
DX10-00 Technical Specifications

Price	$00d_5:
Range	2in to 4.1 ft (5cm to 1.25 m)
Accuracy	0.125 in (3mm)
Resolution	0.019 in (0.5 mm)
Sensing Dead Band*	2in (5cm)
Beam Width	2in (5cm)
Configuration	WEBCAL Free Software and LI99-2001 USB Fob Adapter
Memory	Non-volatile
Supply Voltage	12 to 24 VDC
Consumption	0.5 W
Signal Output	0-5V, 0-10V, 976-2000 Hz
Minimum Load	800Ω at 12 VDC; 1600Ω at 24 VDC
Output Current	Sink current, 15 mA nominal
Signal Invert	5-0V, 10-0 V, 2000-976 Hz
Signal Fail-Safe	Full, empty or hold last
Process Temperature	20° to 140°F (-7° to 60°C)
Temp. Compensation	Automatic
Ambient Temperature	-31° to 140°F (-35° to 60°C)
Pressure	30 PSI (2 bar) MAX
Enclosure Rating	NEMA Type 6P, IP67, encapsulated, corrosion resistant & submersible, UV stable
Enclosure Material	Polycarbonate
Strain Relief Material	Santoprene
Transducer Material	Polyvinylidene Fluoride
Cable Jacket Material	Polyurethane
Cable Type	6-conductor, shielded
Cable Length	48in (1.2 m)
Process Mount	1 in MNPT (See accessories for installation fittings)
Mount Gasket	Viton® (included, replacement part number 204038)
Weight (lbs)	0.5
Classification	General purpose
Compliance	CE, RoHS
Agency Approvals	cFMus

** Dead band is the minimum distance the sensor must be mounted above the max liquid level.*

Dimensions

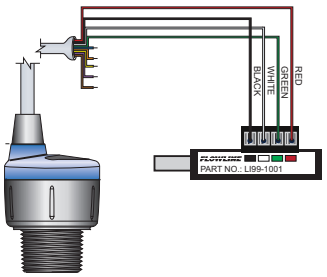
inches [mm]



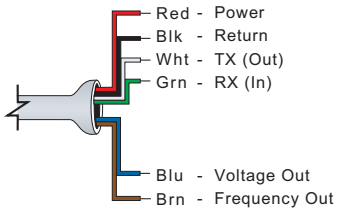
See our website www.AutomationDirect.com for complete Engineering drawings.

Configuration

The settings for the the DX10 are configured with free WEBCAL software (downloadable from AutomationDirect Web site) and an LI99-2001 Fob USB adapter (purchased separately).



Wiring



LI99-2001

When installing the 1 inch NPT level sensors care should be used to mechanically isolate the sensor housing from the tank. This can easily be done by using any of the Flowline mounting accessories which are designed to provide the isolation needed. See the end of the Ultrasonic Level Sensor Section for further details and Accessories

FLOWLINE™ LEVEL BEST

EchoPod DL10 Ultrasonic Liquid Level Transmitter

SOFTWARE CONFIGURED

Overview

The EchoPod DL10 ultrasonic liquid level transmitter provides continuous level measurement up to 4.1 ft (1.25m), with a 4-20mA signal output, and is configured via WEBCAL software. This non-contact liquid level sensor is ideally suited for corrosive, sticky or dirty liquids, and is broadly selected for small day tank, skid, intermediate bulk tanks, sump and process tank level applications.

Features

- Continuous non-contact level measurement output up to 4.1 ft (1.25 m)
- 4-20 mA output for longer signal distances, up to 1000 ft. (300m)
- Configuration is fast and easy via WEBCAL software and USB adapter
- Narrow 2 inch beam width and short 2 inch dead band optimized for small tanks
- PVDF transducer and NEMA Type 6P polycarbonate enclosure for corrosive liquids, UV stable for outdoor use
- Automatic temperature compensation for accurate measurement
- 2-year warranty

Agency Approvals

- cFMus

RoHS · CE · FM APPROVED · 2 YEAR WARRANTY

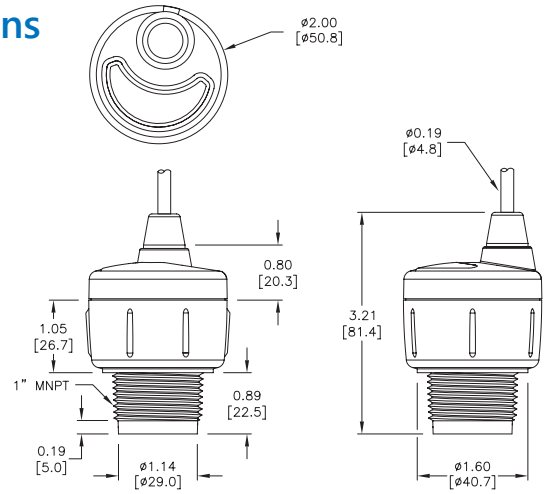
DL10-00 Technical Specifications	
Price	$00d_0:
Range	2in to 4.1 ft (5cm to 1.25 m)
Accuracy	0.125 in (3mm)
Resolution	0.019 in (0.5 mm)
Sensing Dead Band*	2in (5cm)
Beam Width	2in (5cm)
Configuration	WEBCAL Free Software and LI99-2001 Fob USB Adapter
Memory	Non-volatile
Loop Supply Voltage	14-28 VDC[1]
Consumption	0.5 W
Loop Resistance	500Ω max at 24 VDC
Signal Output	4-20 mA, two-wire
Signal Invert	4-20 mA or 20-4 mA
Signal Fail-Safe	4mA, 20mA, 21mA, 22mA or hold last
Process Temperature	20° to 140°F (-7° to 60°C)
Temp. Compensation	Automatic
Ambient Temperature	-31° to 140°F (-35° to 60°C)
Pressure	30 PSI (2 bar) MAX
Enclosure Rating	NEMA Type 6P, IP67, encapsulated, corrosion resistant & submersible, UV stable
Enclosure Material	Polycarbonate
Strain Relief Material	Santoprene
Transducer Material	Polyvinylidene Fluoride
Cable Jacket Material	Polyurethane
Cable Type	4-conductor, shielded
Cable Length	48in (1.2 m)
Process Mount	1in MNPT (See accessories for installation fittings)
Mount Gasket	Viton (included, replacement part number 204038)
Weight (lbs)	0.5
Classification	General purpose
Compliance	CE, RoHS
Agency Approvals	cFMus

** Dead band is the minimum distance the sensor must be mounted above the max liquid level.*

[1] If supply exceeds 28 VDC damage to the transmitter may occur.

Dimensions

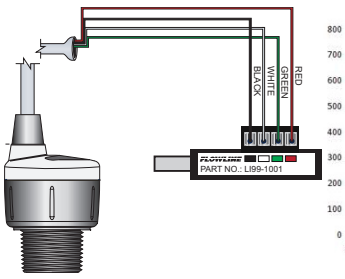
inches [mm]



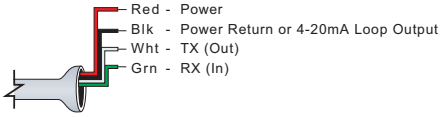
See our website www.AutomationDirect.com for complete Engineering drawings.

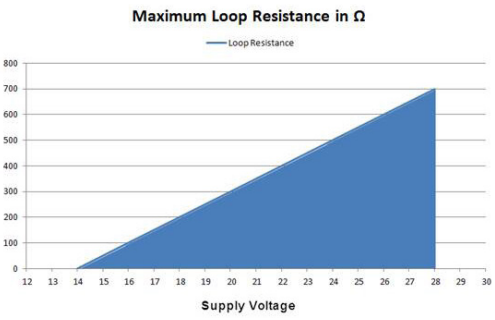
Configuration

The settings for the the DL10 are configured with free WEBCAL software (downloadable from AutomationDirect Web site) and an LI99-2001 Fob USB adapter (purchased separately).



Wiring





When installing the 1 inch NPT level sensors care should be used to mechanically isolate the sensor housing from the tank. This can easily be done by using any of the Flowline mounting accessories which are designed to provide the isolation needed. See the end of the Ultrasonic Level Sensor Section for further details and Accessories

FLOWLINE™ LEVEL BEST

EchoPod DL Series Multi-Function Ultrasonic Liquid Level Sensors

Overview

The EchoPod DL series multi-function ultrasonic liquid level sensors provide continuous level measurement up to 4.1 ft (1.25m), 9.8 ft (3m), or18 ft (5.5m), with a 4-20mA signal output and 4 programmable relays for level switch or level control functions, and are configured via WEBCAL software. The embedded level controller can lower cost by replacing external control hardware. This non-contact liquid level sensor is ideally suited for corrosive, sticky or dirty liquids, and is broadly selected for small day tank, skid, intermediate bulk tanks, sump and process tank level applications.

Part No. DL14-00

Part No. DL24-00

Part No. DL34-00

Features

- Switch and control functions with continuous level measurement analog output up to 4.1 ft (1.25m), 9.8 ft (3m) or 18 ft (5.5m)
- Configuration is fast and easy via WEBCAL software and USB adapter
- Narrow beam width and short dead band optimized for small tanks
- 4-20 mA signal output and four programmable relays rated at 1A / 60VA for switch, pump or valve control and fail-safety
  - 1 pump or valve with 3 alarms
  - 2 pumps (lead-lag) with 2 alarms
  - 2 pumps (duplexing) with 2 alarms
  - 4 independent outputs
- PVDF transducer and NEMA Type 6P polycarbonate enclosure for corrosive liquids, UV stable for outdoor use
- Automatic temperature compensation for accurate measurement
- 2-year warranty

SOFTWARE CONFIGURED

Agency Approvals

- cFMus

RoHS CE FM APPROVED 2 YEAR WARRANTY

DLx4 Series Technical Specifications			
Model	**DL14-00**	**DL24-00**	**DL34-00**
Price	$00d_1:	$00d_2:	$00d_3:
Range	2in to 4.1 ft (5cm to 1.25 m)	4in to 9.8 ft (10cm to 3m)	8in to 18.0 ft (20cm to 5.5 m)
Accuracy	0.125 in (3mm)	± 0.2% of range	
Resolution	0.019 in (0.5 mm)	0.039 in (1mm)	0.079 in (2mm)
Sensing Dead Band*	2in (5.1 cm)	4in (10.2 cm)	8in (20.3 cm)
Beam Width	2in (5.1 cm)	2in (5.1 cm)	3in (7.6 cm)
Configuration	WEBCAL Free Software and LI99-2001 Fob USB Adapter		
Memory	Non-volatile		
Loop Supply Voltage	14 - 28 VDC[1]		
Consumption	0.5 W		
Loop Resistance	500Ω max @ 24 VDC		
Signal Output	4-20 mA, two-wire		
Signal Invert	4-20 mA or 20-4 mA		
Loop Fail-Safe	4mA, 20mA, 21mA, 22mA or hold last		
Contact Type	(4) SPST relays		
Contact Ratings	0.5 A @ 120 VAC/DC; 1A @ 30 VAC/DC		
Contact Fail-Safe	Power loss: Hold last; Echo loss: Open, close or hold last		
Hysteresis	Selectable		
Process Temperature	20° to 140°F (-7° to 60°C)		
Temp. Compensation	Automatic		
Ambient Temperature	-31° to 140°F (-35° to 60°C)		
Pressure	30 PSI (2 bar) MAX		
Enclosure Rating	NEMA Type 6P, IP67, encapsulated, corrosion resistant & submersible, UV stable		
Enclosure Material	Polycarbonate		
Strain Relief Material	Santoprene		
Transducer Material	Polyvinylidene Fluoride		
Cable Jacket Material	Polyurethane		
Cable Type	9-conductor, shielded		
Cable Length	48in (1.2 m)		
Process Mount	1in MNPT (See accessories for installation fittings)		2in MNPT (See accessories for installation fittings)
Mount Gasket	Viton (included, replacement part number 204038)	Viton (included, replacement part number 200128)	Viton (included, replacement part number 200129)
Weight (lbs)	0.5	0.9	1.8
Classification	General purpose		
Compliance	CE, RoHS		
Agency Approvals	cFMus		

** Dead band is the minimum distance the sensor must be mounted above the max liquid level.*

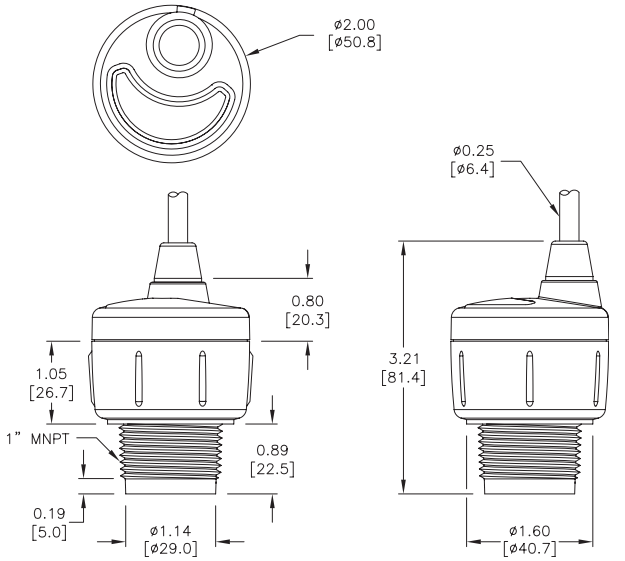
[1] If supply exceeds 28 VDC damage to the transmitter may occur.

EchoPod DL Series Multi-Function Ultrasonic Liquid Level Sensors

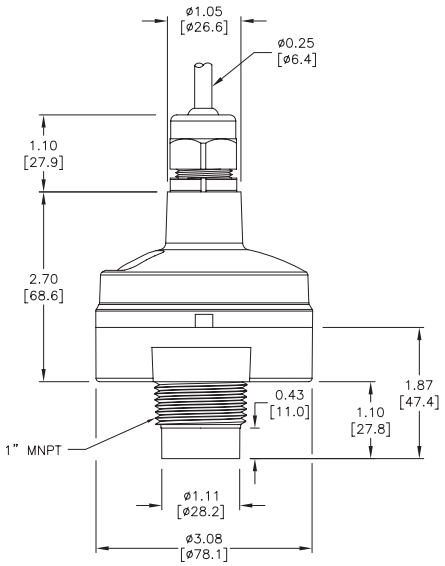
Dimensions

inches [mm]

DL14-00

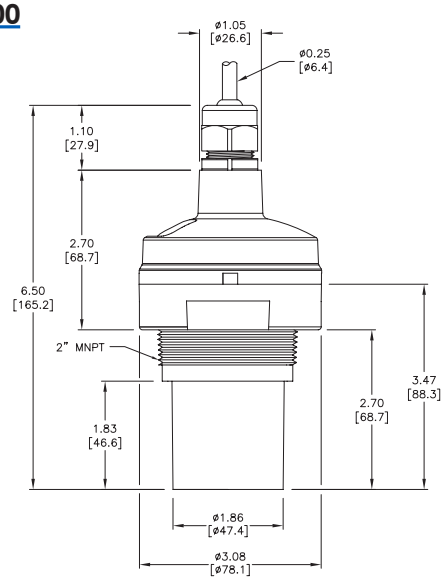


DL24-00

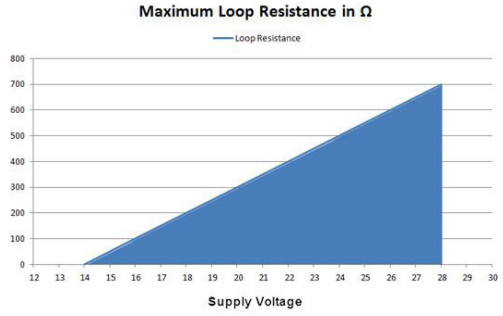


When installing the 1 inch NPT level sensors care should be used to mechanically isolate the sensor housing from the tank. This can easily be done by using any of the Flowline mounting accessories which are designed to provide the isolation needed.

DL34-00

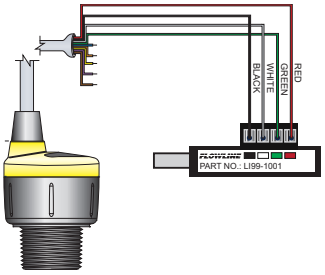


See our website www.AutomationDirect.com for complete Engineering drawings.



Configuration

The settings for the the DL series are configured with free WebCal software (downloadable from AutomationDirect Web site) and an LI99-2001 Fob USB adapter (purchased separately).



LI99-2001

See the end of the Ultrasonic Level Sensor Section for further details and Accessories

Wiring

FLOWLINE™ LEVEL BEST PodView® Digital Level Indicator

Overview

The PodView digital level indicator is a low cost general purpose indicator that displays engineering units for level or volume when combined with an EchoPod DL, DS and DX series ultrasonic sensor that has been configured with WEBCAL 6.0 / firmware 50.0 or higher. The LI40 can be field mounted for local indication as well as be used to make simple setting changes to the sensor. PodView displays sensor output and can reconfigure sensor set points on the fly without needing to connect to a PC. PodView shares power with the EchoPod DL, DS and DX series sensor and does not require any additional separate power supply.

Features

- Operates with all EchoPod DL, DS and DX series level sensors compatible with WEBCAL 6.0 software / firmware 50.0 or higher
- No separate power supply required
- Use PodView to make simple adjustments to EchoPods sensor settings
- Provides level indication up to 15 feet from sensor
- Corrosion resistant NEMA 4 / IP65 enclosure
- No configuration required for the display. Simply wire the display directly to a programmed compatible EchoPod sensor
- Display can be transferred from sensor to sensor without any configuration changes to the display
- Make quick setpoint changes without the need to connect sensor back to a PC
- 2-year warranty

Agency Approvals

- CE

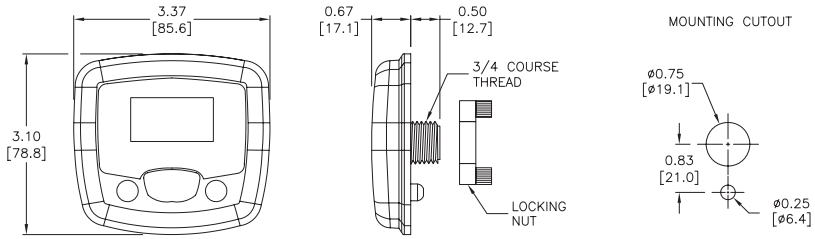
LI40-1001 Technical Specifications

Price	$0046d:
Display Type	LCD, 6-digit with 4 relay indicators
Display (Engineering Units)	Level or Volume
Character Height	0.374 in (9.5 mm)
Linearization	per sensor configuration
User Interface	Three button
Input	EchoPod DL, DS and DX sensor family
Memory	Non-volatile
Supply Voltage	12-28 VDC power shared with sensor (EchoPod not to exceed 28 VDC)
Operating Temperature	-4°F to 140°F (-20°C to 60°C)
Cable Type	4-conductor, 22 AWG (0.33 mm²)
Cable Length	4ft (1.2 m)*
Cable Jack Material	Polyurethane
Enclosure Rating	NEMA 4 (IP65) faceplate
Enclosure Material	Polycarbonate
Enclosure Mount	Panel
Button Material	Silicon rubber
Classification	General purpose
Weight (lbs)	0.6
Compliance	CE, RoHS

** Maximum distance between EchoPod sensor and PodView display is 15 ft (4.5m)*

Dimensions

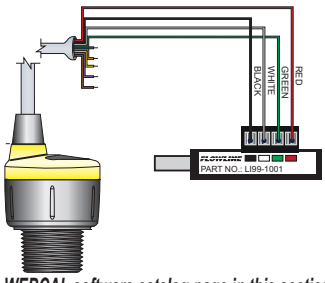
inches [mm]



See our website www.AutomationDirect.com for complete Engineering drawings.

Configuration

The settings for the the EchoPod DL, DS and DX series are configured with free WEBCAL software (downloadable from AutomationDirect Web site) and an LI99-2001 Fob USB adapter (purchased separately). To be compatible with PodView the EchoPod DL, DS and DX sensor must be configured with WebCal 6.0 / firmware 50.0 or higher.

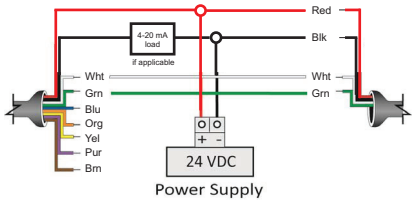


LI99-2001

See the WEBCAL software catalog page in this section for further details

Wiring

EchoPod® DL, DS and DX series



PodView®

Note: Maximum distance between EchoPod sensor and PodView display is 15 ft. (4.5m)

FLOWLINE™ LEVEL BEST

SOFTWARE CONFIGURED

EchoSonic II LU Series Ultrasonic Liquid Level Transmitters

Overview

The EchoSonic II LU Series ultrasonic liquid level transmitters provide continuous level measurement up to 9.8 ft (3m), 18ft (5.5 m), 26.2 ft (8m) or 32.8 ft (10m), with a 4-20mA signal output, and are configured via WebCal software. This non-contact liquid level sensor is ideally suited for corrosive, ultrapure, sticky or dirty liquids, and is broadly selected for bulk storage, dry tank, lift station and process tank level applications.

Part No. LU27

Part No. LU23/28/29

Features

- Continuous level measurement up to 9.8 ft (3m), 18 ft (5.5m), 26.2 ft (8m) or 32.8 ft (10m)
- DSP auto adaptive filters enable plug and play operation optimizing signal output filtering and obstacle recognition
- Configuration is fast and easy via WebCal software and USB adapter
- Narrow 2 inch or 3 inch beam width for applications with limited measurement space
- Short 4 inch or 8 inch dead band maximizes the measurable filling capacity of the tank
- PVDF transducer and NEMA Type 6P polycarbonate enclosure for corrosive liquids, UV stable for outdoor use
- Automatic temperature compensation for accurate measurement
- 2-year warranty
- **Agency Approvals**
- cFMus

RoHS CE FM APPROVED 2 YEAR WARRANTY

LU20 Series Technical Specifications

Model	LU27-00	LU23-00	LU28-00	LU29-00
Price	$00d_7:	$00d_6:	$;000d_8:	$;000d_9:
Range	4in to 9.8 ft (10cm to 3m)	8in to 18.0 ft (20cm to 5.5 m)	8in to 26.2 ft (20cm to 8m)	8in to 32.8 ft (20cm to 10m)
Accuracy	± 0.2% of range			
Resolution	0.019 in (0.5 mm)	0.039 in (1mm)	0.079 in (2mm)	
Sensing Dead Band*	4in (10.2 cm)	8in (20.3 cm)		
Beam Width	2in (5.1 cm)	3in (7.6 cm)		
Configuration	WebCal Free Software and LI99-2001 Fob USB Adapter			
Memory	Non-volatile			
Loop Supply Voltage	14 - 28 VDC[1]			
Consumption	0.5 W			
Loop Resist	500Ω @ 24 VDC			
Signal Output	4-20 mA, two-wire			
Signal Invert	4-20 mA or 20-4 mA			
Signal Fail-Safe	4mA, 20mA, 21mA, 22mA or hold last			
Process Temperature	-4° to 140°F (-20° to 60°C)			
Temp. Compensation	Automatic			
Ambient Temperature	-31° to 140°F (-35° to 60°C)			
Pressure	MWP = 30 PSI (2 bar)			
Enclosure Rating	NEMA Type 6P, IP67, encapsulated, corrosion resistant & submersible, UV stable			
Enclosure Material	Polycarbonate			
Transducer Material	Polyvinylidene Fluoride			
Cable Jacket Material	Polyurethane			
Cable Type	4-conductor, shielded			
Cable Length	10ft (3m)			
Process Mount	1in MNPT (See accessories for installation fittings)	2in MNPT (See accessories for installation fittings)		
Mount Gasket	Viton (included, replacement part number 200128)	Viton (included, replacement part number 200129)		
Weight (lbs)	1.4	1.8	1.8	1.8
Classification	General purpose			
Compliance	CE, RoHS			
Agency Approvals	cFMus			

** Dead band is the minimum distance the sensor must be mounted above the max liquid level.*

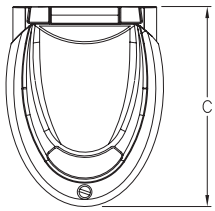
[1] If supply exceeds 28 VDC damage to the transmitter may occur.

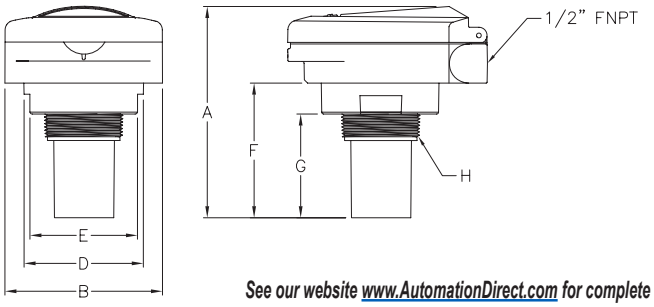
EchoSonic II LU Series Ultrasonic Liquid Level Transmitters

Dimensions

inches [mm]

LU20 Series





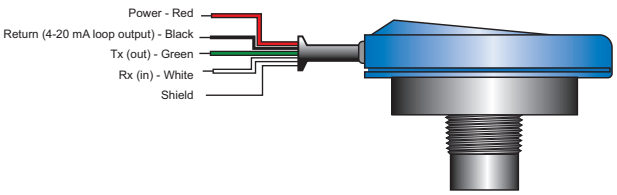
See our website www.AutomationDirect.com for complete Engineering drawings.

Dimensions	*A*	*B*	*C*	*D*	*E*	*F*	*G*	*H*
LU27	2.71 [68.9]	4.00 [101.7]	4.10 [104.1]	3.10 [78.8]	2.75 [69.7]	1.70 [43.1]	1.10 [28.0]	1" MNPT
LU23, 28, & 29	4.31 [109.6]	4.00 [101.7]	4.10 [104.1]	3.10 [78.8]	2.75 [69.7]	3.30 [83.8]	2.70 [68.7]	2" MNPT

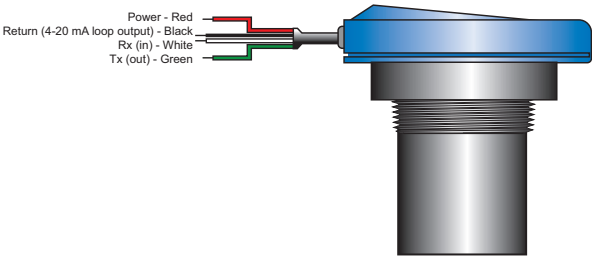
When installing the 1" NPT level sensors care should be used to mechanically isolate the sensor housing from the tank. This can easily be done by using any of the Flowline mounting accessories which are designed to provide the isolation needed.

Wiring

LU27

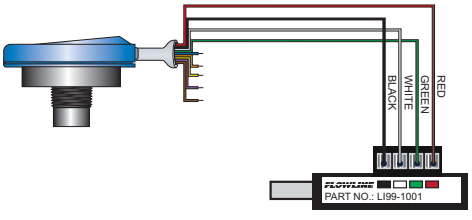


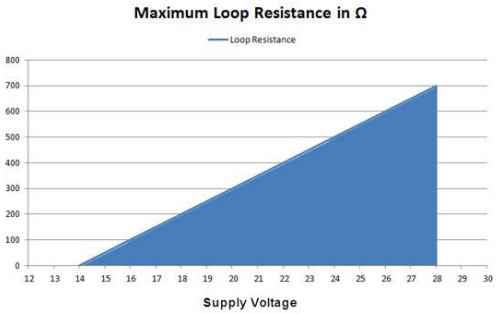
LU23, LU28, LU29



Configuration

The settings for the the LU series are configured with free WebCal software (downloadable from AutomationDirect Web site) and an LI99-2001 Fob USB adapter (purchased separately).





See the end of the Ultrasonic Level Sensor Section for further details and Accessories

WebCal Ultrasonic Level Sensor Software and USB Fob Adapter

Overview

WEBCAL PC software is a utility program that allows users to easily configure their EchoPod, EchoTouch and EchoSonic II level transmitters, switches, and controllers. Download your free copy of WEBCAL at www.AutomationDirect.com, and connect your sensor through the Fob USB adapter (LI99-2001). Develop your configuration using pre-programmed function menus as the tank graphic and set point fields automatically change to match your configuration. Then, input your level set point values and click the Write to Unit button. Your configuration will be downloaded into the sensor and verified in less than a second. Last, click the Wiring Diagram button to open a wiring schematic of your configuration in PDF format. Print the document, disconnect the sensor and wire it per the schematic. It's that simple.

Configuration files can be named, saved, emailed, printed, opened and used again under revision control. The advanced feature page enables you to change the measurement signal, output filtering and invert relay states from N.O. to N.C. As new software or firmware becomes available, they can be downloaded and updated through WEBCAL.

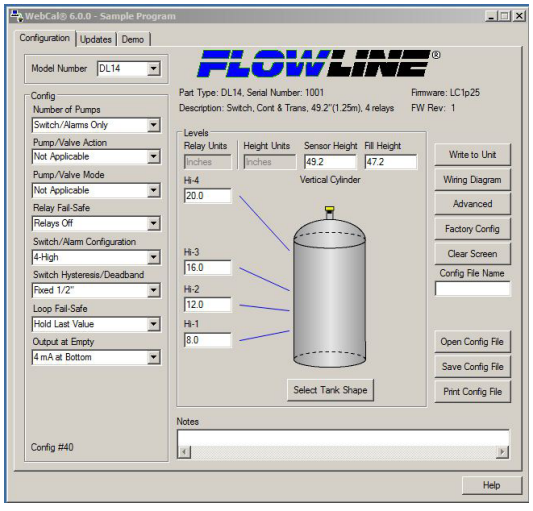
Features

- 169 configurations with pull-down menu selections
- Graphical interface lets you visualize your configuration
- Applicable level set point fields appear automatically
- Installs and tests configuration in less than a second
- Available PDF wiring diagram for each configuration
- Technical help menu with FAQs, tips and glossary
- Rapidly program sensors to the same configuration
- Save configuration files for future use or reference
- Print wiring diagrams and configuration text files
- Email configuration files to other remote users
- Please check www.automationdirect.com for the most recent system requirments.

WebCal Ultrasonic Level Sensor Software and USB Adapter

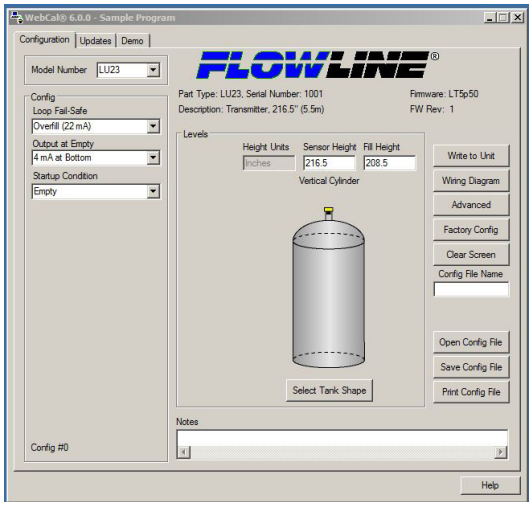
Part No.	Item Photo	Description	Quantity	Weight (lbs)	Price
LI99-2001		Flowline Fob USB adapter, required for use with WebCal software to configure Flowline EchoPod, EchoTouch and EchoSonic II ultrasonic level sensors.	1	0.1	$;44ht:
WEBCAL	FLOWLINE LEVEL BEST WEBCAL	Configuration software for Flowline EchoPod, EchoTouch and EchoSonic II ultrasonic level sensors. Requires an LI99-2001 Fob USB adapter (purchased separately).	1	0.1	Free Download

EchoPod Configuration



Click on the thumbnail or go to https://www.automationdirect.com/VID-LE-0004 for Part 1 of our How To video on the use of the Flowline Ultrasonic Level Sensors

EchoSonic II Configuration



Click on the thumbnail or go to https://www.automationdirect.com/VID-LE-0005 for Part 2 of our How To video on the use of the Flowline Ultrasonic Level Sensors

FLOWLINE™ LEVEL BEST

EchoSpan® & EchoSwitch® Ultrasonic Liquid Level Sensors

PUSHBUTTON CONFIGURED

Overview

The, EchoSpan and EchoSwitch are innovative ultrasonic liquid level sensor families that replace float, conductance and pressure sensors that fail due to contact with dirty, sticky and scaling media in small, medium and large capacity tanks. Applied in chemical, water and wastewater applications, these general purpose non-contact sensors are available with single and multi-function capabilities including continuous level measurement, switching and control.

For input to a PLC or other controller, measurement outputs include current, voltage and frequency. Models with three relays can be configured for level alarms and/or stand-alone level control such as automatic fill or empty functions using the embedded level controller. Units are easily configured using built-in pushbuttons.

EchoSpan & EchoSwitch Ultrasonic Liquid Level Sensors General Specifications

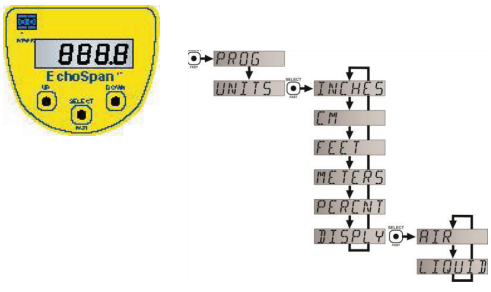
Model	LU80-5101	LU81-5101	LU83-5101	LU84-5101	LU77-5004	LU74-5004	LU78-5004
Price	$;00d[#:	$;;00d[!:	$;;000d[?:	$;;;000d[,:	$;;;000d[[:	$;;;000d[]:	$;;000d[_:
Type	EchoSpan				EchoSwitch		
Class	General Purpose (non-hazardous)						
Range	4in to 9.8 ft (10cm to 3m)	8in to 18ft (20cm to 5.5 m)	8in to 26.2 ft (20cm to 8m)	12in to 32.8 ft (30cm to 10m)	4in to 9.8 ft (10cm to 3m)	8in to 18 ft (20cm to 5.5 m)	8in to 26.2 ft (20cm to 8m)
Output Types	4-20 mA, two-wire				(1) SPDT relay, (2) SPST relays 4-20 mA, two-wire		
Install	Vertical, top of tank						
Mounting	1in MNPT	2in MNPT			1in MNPT	2in MNPT	
Relays	No relay				(1) SPDT relay, (2) SPST relays		
Configuration	Pushbutton / LCD						
Ambient Temperature	-40° to 160°F (-40° to 71°C)						
Process Temperature	-4° to 140°F (-20° to 60°C)						
Pressure	30 PSI (2 bar) MAX						

Pushbutton Configuration

With no software or PC required EchoSpan, and EchoSwitch ultrasonic level sensors are easily configured using integral pushbuttons and LCD digital display. Configuration parameters are organized in a simple menu structure so that parameter values are easily accessed and set or changed as needed. Parameters are stored in non-volatile memory so the setting values are not lost when the sensor is powered down, allowing configuration before installation in the field.

Click on the thumbnail or go to https://www.automationdirect.com/VID-LE-0002 for a short video introduction to Flowline EchoSpan, EchoSwitch and PodView product lines.

Example - EchoSpan Display and Menu



FLOWLINE™ LEVEL BEST

PUSHBUTTON CONFIGURED

EchoSpan® LU Series Ultrasonic Level Transmitters

Overview

The EchoSpan LU series ultrasonic level transmitters provide continuous level measurement up to 32.8 ft (10m) with a 4-20 mA signal output, and is configured via its integral pushbutton display module. This non-contact liquid level sensor is ideally suited for corrosive, ultrapure, sticky or dirty liquids, and is broadly selected for bulk storage, day tank, lift station and process tank level applications.

Part No. LU80-5101

Part No. LU81-/83/84-5101

Features

- 4 measurement ranges from 9.8 ft (3m) to 32.8 ft (10m)
- Configuration is simple via integral pushbutton display module
- LCD display indicates level in inches, centimeters and percentages
- Narrow 2 inch or 3 inch beam width for applications with limited measurement space
- Fail-safe intelligence and diagnostic feedback for simple troubleshooting
- PVDF transducer and NEMA 4X / IP65 polycarbonate enclosure for corrosive liquids
- Automatic temperature compensation for accurate measurement
- 2-year warranty

RoHS CE 2 YEAR WARRANTY

LU80 Series Technical Specifications

Model	LU80-5101	LU81-5101	LU83-5101	LU84-5101
Price	$;00d[#:	$;;00d[!:	$;;000d[?:	$;;;000d[,:
Range	4in to 9.8 ft (10cm to 3m)	8in to 18ft (20cm to 5.5 m)	8in to 26.2 ft (20cm to 8m)	12in to 32.8 ft (30cm to 10m)
Accuracy	± 0.2% of range			
Resolution	0.019 in (0.5 mm)	0.039 in (1mm)		0.078 in (2mm)
Sensing Dead Band*	4in (10cm)	8in (20cm)		12in (30cm)
Beam Width	2in (5.1 cm)	3in (7.6 cm)		
Configuration	Pushbutton / LCD			
Memory	Non-volatile			
Display Type	LCD, 6-digit			
Display Units	Inch, cm and percent			
Supply Voltage	12 - 28 VDC**			
Loop Resistance	500Ω @ 24VDC			
Signal Output	4-20 mA, two-wire			
Signal Invert	4-20 mA or 20-4 mA			
Signal Fail-Safe	4mA, 20mA, 21mA, 22mA or hold last			
Terminal Block	26-12 AWG (tighten torque, 0.5 Nm)			
Process Temperature	-4° to 140°F (-20° to 60°C)			
Temp. Compensation	Automatic			
Ambient Temperature	-40° to 160°F (-40° to 71°C)			
Pressure	30 PSI (2 bar) MAX			
Enclosure Rating	NEMA Type 4X (IP65)			
Enclosure Material	Polycarbonate			
Enclosure Hardware	Brass & stainless steel			
Enclosure Vent	Water tight membrane			
Conduit Entrance	Dual, 1/2 in FNPT			
Transducer Material	Polyvinylidene Fluoride			
Process Mount	1in MNPT (See accessories for installation fittings)	2in MNPT (See accessories for installation fittings)		
Mount Gasket	Viton (included, replacement part number 200128)	Viton (included, replacement part number 200129)		
Weight (lbs)	1.5	1.9		
Classification	General purpose			
Compliance	CE, RoHS			

** Dead band is the minimum distance the sensor must be mounted above the max liquid level.*

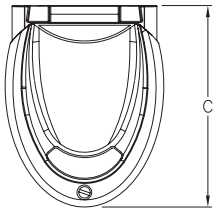
*** If supply exceeds 28 VDC damage to the transmitter may occur.*

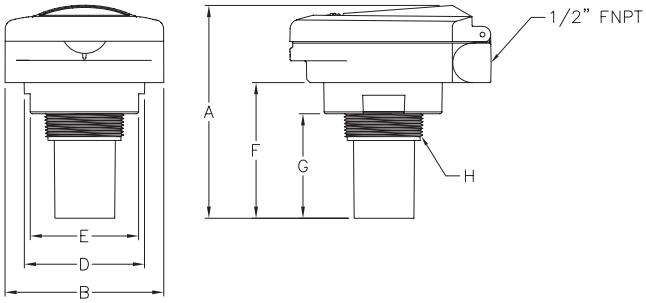
FLOWLINE™ LEVEL BEST EchoSpan® LU Series Ultrasonic Level Transmitters

Dimensions

inches [mm]

LU80 Series





See our website www.AutomationDirect.com for complete Engineering drawings.

Dimensions	*A*	*B*	*C*	*D*	*E*	*F*	*G*	*H*
LU80	3.90 [99.1]	4.10 [104.1]	5.20 [132.1]	3.10 [78.8]	2.80 [71.1]	1.90 [48.3]	1.25 [31.8]	1 in MNPT
LU81, 83 & 84	5.50 [139.6]	4.10 104.1]	5.20 [132.1]	3.10 [78.8]	2.80 [71.1]	3.40 [86.4]	2.70 [68.6]	2 in MNPT

When installing the 1 inch NPT level sensors care should be used to mechanically isolate the sensor housing from the tank. This can easily be done by using any of the Flowline mounting accessories which are designed to provide the isolation needed.

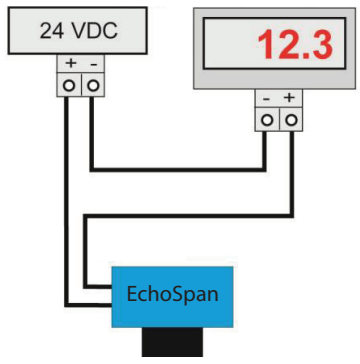
Configuration

The transmitter is configured using the three buttons (UP, DOWN and SELECT) and the transmitter's LCD on the transmitters face.

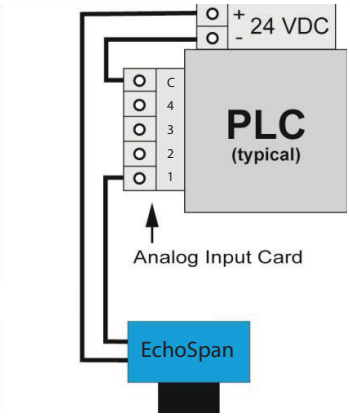
More information about configuring the LU series sensors can be found at www.AutomationDirect.com

Wiring

Typical Loop Powered Display



Typical Generic PLC



FLOWLINE™ LEVEL BEST

EchoSwitch® LU Series Ultrasonic Level Sensors

Overview

The EchoSwitch LU series of ultrasonic level sensors are configured via the integral pushbutton display module, provides continuous level detection up to 26.2 ft (8m) with 3 programmable relays for level switch or level control functions and a 4-20 mA output. Each relay can be configured on a single setpoint (high level alarm or low level alarm) or latched on two setpoints for automatic fill or empty in simplex (one pump or valve), duplex (two pumps) or triplex (three pumps) level control modes with selectable time delay and fail-safe logic. The embedded level controller can lower cost by replacing external control hardware. These non-contact level sensors are ideally suited for corrosive, sticky or dirty liquids, and are broadly selected for pump lift station, sump and day tank level applications.

Features

- 3 level detection ranges: 9.8 ft (3m), 18.0 ft (5.5 m) and 26.2 ft (8m)
- Configuration is simple via integral pushbutton display module
- Three programmable relays for switch, pump control and fail-safety
  - 1 pump or valve with 2 alarms
  - 2 pumps (lead-lag) with 1 alarm
  - 2 pumps (duplexing) with 1 alarm
  - 3 independent outputs
- 4-20 mA output can be used to provide local or remote level detection
- LCD display indicates level height in engineering units and relay status
- Narrow 2 inch or 3 inch beam width for applications with limited measurement space
- Short 4 inch or 8 inch dead band maximizes the measureable filling capacity of the tank
- PVDF transducer and NEMA 4X / IP65 polycarbonate enclosure for corrosive liquids
- Automatic temperature compensation
- 2-year warranty

Part No. LU77-5004

Part No. LU74-5004

Part No. LU78-5004

LU70 Series Technical Specifications			
Model	**LU77-5004**	**LU74-5004**	**LU78-5004**
Price	$;;;000d[[:	$;;;000d[]:	$;;000d[_:
Range	4in to 9.8 ft (10cm to 3m)	8in to 18ft (20cm to 5.5 m)	8in to 26.2 ft (20cm to 8m)
Repeatability	0.25 in (6.35 mm)		
Loop Output	4-20 mA isolated, sinking 12 to 28 VDC**		
Loop Resistance	500Ω max @ 24 VDC		
Sensing Dead Band*	4in (10cm)	8in (20cm)	
Beam Width	2in (5.1 cm)	3in (7.6 cm)	
Configuration	Pushbutton / LCD		
Memory	Non-volatile		
Display Type	Level and relay status, 6 character		
Display Units	Inch, cm, percent, feet or meter		
LCD Indication	Level and relay status		
Supply Voltage	95 to 250 VAC (separate 12-28 VDC power supply required for 4-20 mA loop output)		
Power	20W @ 120VAC		
Contact Type	Relay 1, SPDT relay; Relay 2 & 3, SPST, N.O., all commons connected together		
Contact Rating	2A @ 30VDC max / 2A @ VAC max		
Terminal Block	22-14 AWG (tighten torque, 0.5 Nm)		
Contact Fail-Safe	Programmable / selectable		
Process Temperature	-4° to 140°F (-20° to 60°C)		
Temp. Compensation	Automatic		
Ambient Temperature	-40° to 160°F (-40° to 71°C)		
Pressure	30 PSI (2 bar) MAX		
Enclosure Rating	NEMA Type 4X (IP65)		
Enclosure Material	Polycarbonate		
Transducer Material	Polyvinylidene Fluoride		
Enclosure Hardware	Brass & stainless steel		
Enclosure Vent	Water tight membrane		
Conduit Entrance	Dual, 1/2" FNPT		
Process Mount	1in MNPT (See accessories for installation fittings)	2in MNPT (See accessories for installation fittings)	
Mount Gasket	Viton (included, replacement part number 200128)	Viton (included, replacement part number 200129)	
Weight (lbs)	1.5	2.0	
Classification	General purpose		
Compliance	CE, RoHS		

** Dead band is the minimum distance the sensor must be mounted above the max liquid level.*

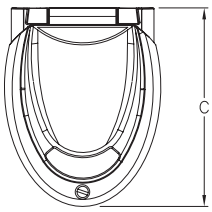
*** If supply exceeds 28 VDC damage to the transmitter may occur.*

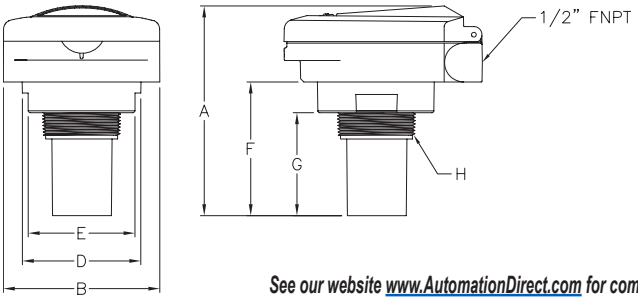
FLOWLINE™ LEVEL BEST EchoSwitch® LU Series Ultrasonic Level Sensors

Dimensions

inches [mm]

LU70 Series





See our website www.AutomationDirect.com for complete Engineering drawings.

Dimensions	*A*	*B*	*C*	*D*	*E*	*F*	*G*	*H*
LU74 & LU78	5.50 [139.6]	4.10 [104.1]	5.20 [132.1]	3.10 [78.8]	2.80 [71.1]	3.50 [89.0]	2.70 [89.0]	2" MNPT
LU77	3.90 [99.1]	4.10 [104.1]	5.20 [132.1]	3.10 [78.8]	2.80 [71.1]	1.90 [48.3]	1.25 [31.8]	1" MNPT

When installing the 1" NPT level sensors care should be used to mechanically isolate the sensor housing from the tank. This can easily be done by using any of the Flowline mounting accessories which are designed to provide the isolation needed.

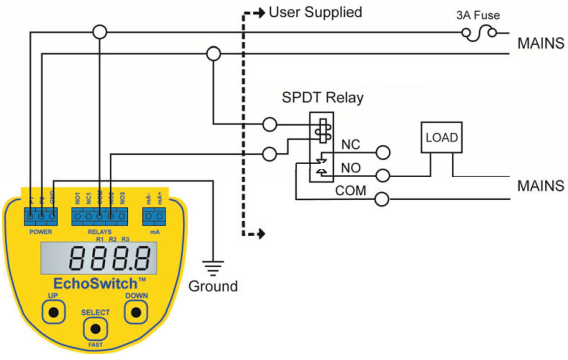
Configuration

The transmitter is configured using the three buttons (UP, DOWN and SELECT) and the transmitter's LCD on the transmitters face.

More information about configuring the LU series sensors can be found at www.AutomationDirect.com

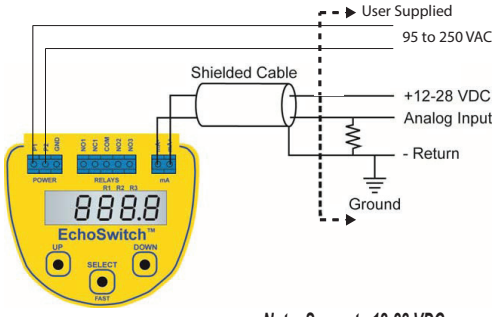
Wiring

Relay Application



Note: Isolate power to instrument from power to load (pumps, etc.) as much as possible by running power to the sensor directly from main power source. All relay commons are internally connected.

Loop Application



Note: Separate 12-28 VDC power supply is required for loop output.

FLOWLINE™ LEVEL BEST

Ultrasonic Liquid Level Sensor Accessories

Ultrasonic Liquid Level Sensor Accessories					
Part No.	***Item Photo***	***Description***	***Quantity***	***Weight***	***Price***
LI40-1001		Flowline PodView general purpose digital indicator, displays tank level or volume and sensor relay status, 6-digit LCD display with four relay status indicators, 3-button user interface, polycarbonate panel mount enclosure with NEMA 4 (IP65) faceplate, 6-foot (1.8-meter) 22AWG 4-conductor cable, for use with Flowline EchoPod DL, DS and DX series ultrasonic level sensor with firmware V50.0 or later	1	0.6	$0046d:
LM50-1001		Flowline side mount bracket, 2 inch NPT female threads, polypropylene (PP), for use with Flowline DL34, LU23, LU28, LU29, LU74, LU78, LU81, LU83, LU84, UG01, UG03, UG06, US01, US03 and US06 series ultrasonic level sensors	1	0.4	$05he:
LM50-1001-1		Flowline side mount bracket, 2 inch NPT female threads, polypropylene (PP), and 2 inch NPT male x 1 inch NPT female reducer bushing (PVC), for use with Flowline DL14, DL24, DS14, DL10, DX10, LU27, LU77 and LU80 series ultrasonic level sensors	1	0.6	$;05hf:
LM52-1400		Flowline reducer bushing, 2 inch NPT male x 1 inch NPT female threads, PVC, for use with Flowline DL14, DL24, DS14, DL10, DX10, LU27, LU77 and LU80 series ultrasonic level sensors	1	0.2	$;0ek,:
LM52-2400		Flowline reducer bushing, 3 inch NPT male x 2 inch NPT female threads, PVC, for use with Flowline DL34, LU23, LU28, LU29, LU74, LU78, LU81, LU83, LU84, UG01, UG03, UG06, US01, US03 and US06 series ultrasonic level sensors	1	0.6	$-0el1:
LM52-3800		Flowline reducer bushing, PVC, 4in male NPT to 2in female NPT. For use with Flowline DL34, LU23, LU28, LU29, LU74, LU78, LU81, LU83, LU84, UG01, UG03, UG06, US01, US03 and US06 series ultrasonic level sensors	1	2.0	$044hp:
LM52-1890		Flowline low-profile bulkhead fitting, 1 inch NPT female x slip socket, with mounting nut, PVC, for use with Flowline DL14, DL24, DS14, DL10, DX10, LU27, LU77 and LU80 series ultrasonic level sensors	1	0.5	$-0el0:
LM52-2890		Flowline low-profile bulkhead fitting, 2 inch NPT female x slip socket, with mounting nut, PVC, for use with Flowline DL34, LU23, LU28, LU29, LU74, LU78, LU81, LU83, LU84, UG01, UG03, UG06, US01, US03 and US06 series ultrasonic level sensors	1	1.2	$-00el2:
LM52-3890		Flowline low-profile bulkhead fitting, PVC, 3in female NPT to slip socket. For use with Flowline UG12 series ultrasonic level sensors. Mounting hardware included.	1	2.1	$044hs:
LM52-1850		Flowline mounting flange, 1 inch NPT female threads, CPVC, for use with Flowline DL14, DL24, DS14, DL10, DX10, LU27, LU77 and LU80 series ultrasonic level sensors	1	0.5	$;06h,:
LM52-2850		Flowline mounting flange, 2 inch NPT female threads, CPVC, for use with Flowline DL34, LU23, LU28, LU29, LU74, LU78, LU81, LU83, LU84, UG01, UG03, UG06, US01, US03 and US06 series ultrasonic level sensors	1	1.0	$-006i0:
LM52-3850		Flowline mounting flange, CPVC, 3in female NPT. For use with Flowline UG12 series ultrasonic level sensors.	1	1.9	$044hq:
204038		Replacement mounting gasket, for use with Flowline DL14, DL10, DX10 and DS14 series ultrasonic level sensors	1	0.1	$;d[a:
200128		Replacement mounting gasket, for use with Flowline DL24, LU27, LU77 and LU80 series ultrasonic level sensors	1	0.1	$;06h!:
200129		Replacement mounting gasket, for use with Flowline DL34, LU23, LU28, LU29, LU74, LU78, LU81, LU83 and LU84 series ultrasonic level sensors	1	0.1	$06h?:

When installing the 1" NPT level sensors care should be used to mechanically isolate the sensor housing from the tank. This can easily be done by using any of the Flowline mounting accessories which are designed to provide the isolation needed.

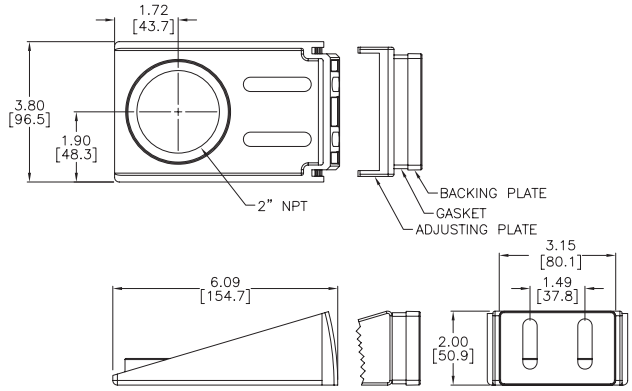
FLOWLINE™ LEVEL BEST

Ultrasonic Liquid Level Sensor Accessories

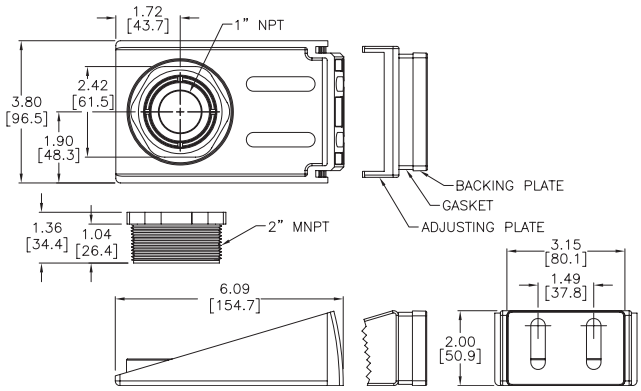
Dimensions

inches [mm]

LM50-1001



LM50-1001-1



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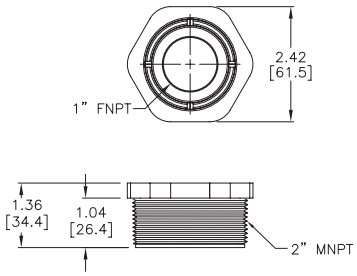
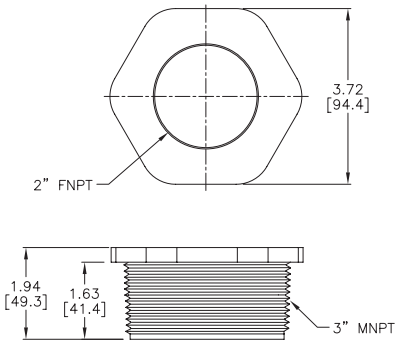
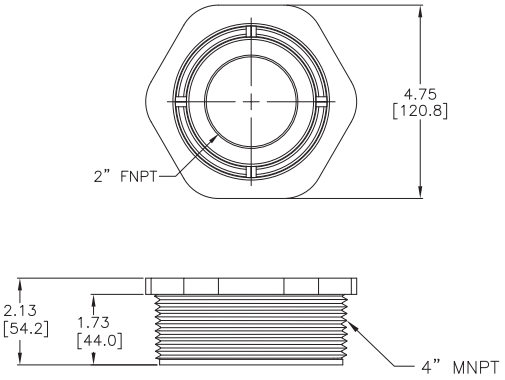


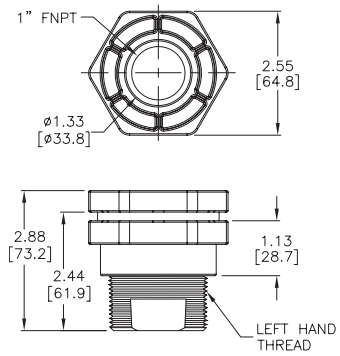
LM52-2400



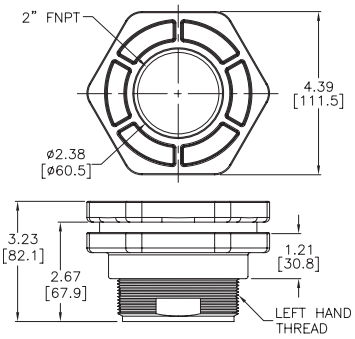
LM52-3800



LM52-1890



LM52-2890



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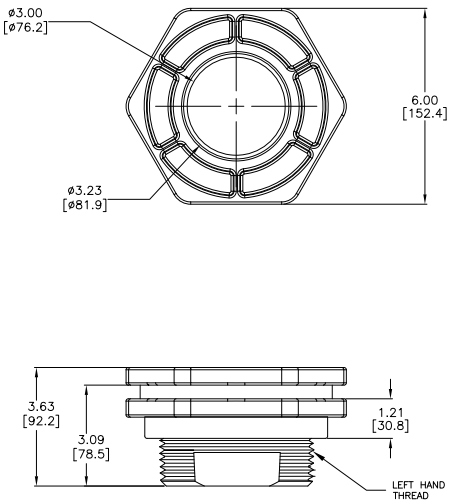


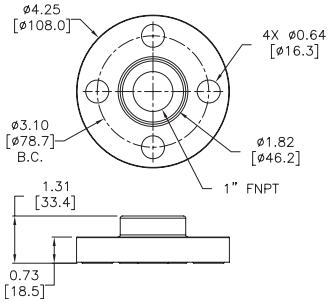
See our website www.AutomationDirect.com for complete Engineering drawings.

Ultrasonic Liquid Level Sensor Accessories

Dimensions

inches [mm]

LM52-1850



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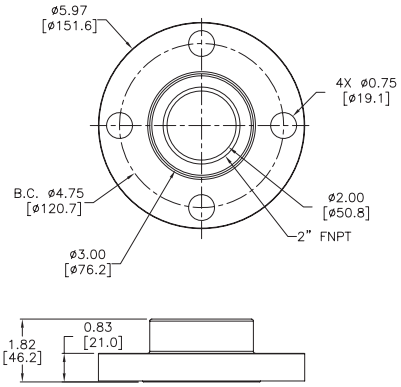

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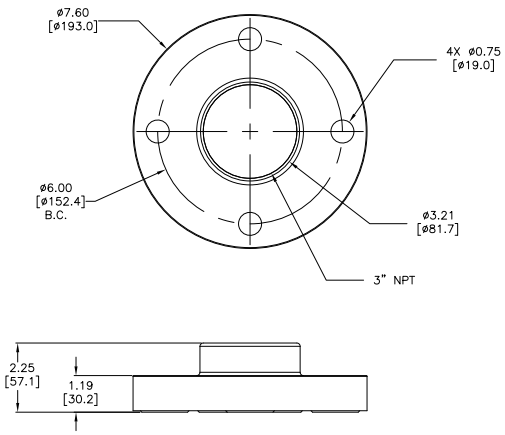


See our website www.AutomationDirect.com for complete Engineering drawings.

FLOWLINE™ LEVEL BEST Switch-Tek™ LU10 Ultrasonic Level Switches

Part No. LU10-1305

Part No. LU10-1405

Overview

CSA approved for hazardous environments, the intrinsically safe ultrasonic point level switch provides reliable liquid level detection of chemical, solvent, hydrocarbon and petroleum based liquids with a 1A relay output. The submersible polypropylene (PP) liquid level sensor is universally mounted through the tank wall or inside the tank as a high level alarm or low level alarm.

Features

- CSA approved intrinsically safe for use in hazardous environments
- Submersible polypropylene (PP) sensor and cable
- 60VA relay selectable NO or NC via power supply wiring polarity
- Compatible with Switch-Pak installation fittings
- Able to mount through the side wall or top wall of tank
- 2-year warranty

NRTL/C

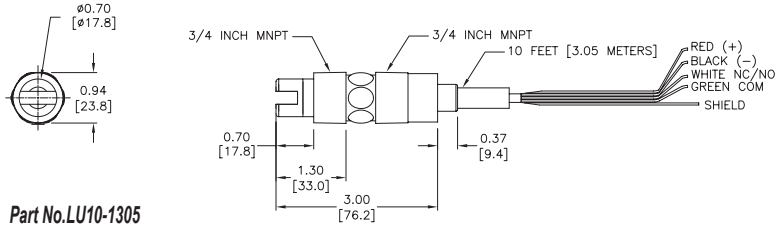
Switch-Tek™ LU10 Technical Specifications

Model	LU10-1305	LU10-1405
Price	$00?9y:	$00?9z:
Weight (lb)	0.7	0.7
Insertion Length	0.7 in [17.8 mm]	2.1 in [53.3 mm]
Orientation	Universal	
Accuracy	±1mm [0.04 in] in water	
Repeatability	±0.5 mm [0.02 in] in water	
Supply Voltage	12-36 VDC	
Consumption	25mA maximum	
Contact Type	(1) SPST relay	
Contact Rating	General purpose: 60VA @ 1A (125VAC max) Intrinsically safe: 32VDC @ 0.5 A	
Contact Output	Selectable NO / NC	
Process Temp.	-40°F to 176°F [-40°C to 80°C]	
Pressure	150psi [10bar] @ 25°C, derated @ 1.667 psi [0.113 bar] per °C above 25°C	
Sensor Rating	NEMA 6 (IP68)	
Sensor Material	PP (polypropylene)	
Cable Jacket Material	PP (polypropylene)	
Cable Type	4-conductor, #22AWG, shielded	
Cable Length	10ft (3m)	
Process Mount	3/4" NPT	
Classification	Intrinsically safe (Haz-Loc)	
Agency Approvals*	CSA: Class 1, Groups A, B, C, & D; Class II Groups E, F & G; Class III EEx: Class 1, Division 1, Groups A, B, C, & D; EEx ib IIC T6	
Intrinsically Safe (I.S.) Parameters	CSA: Vmax = 32V, Imax = 300mA, Pmax = 1.3 W; Ci = 0µF, Li = 0µH EEx: Ui = 32V; Ii = 300mA; Pi = 1.3 W; Ci = 0µF; Li = 0µH	
Certificates*	CSA: LR 79326; EEx: LCIE 01.E6048 X	
Compliance*	CE (EN61326, EN61010-1)	

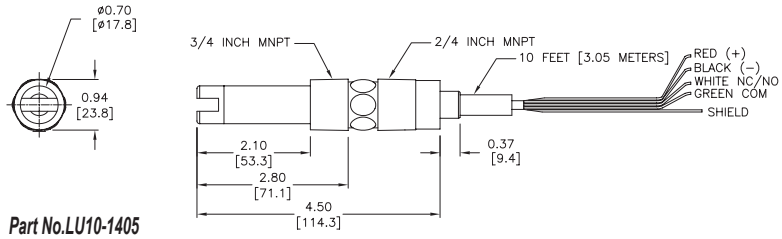
** To obtain the most current agency approval information, see the Agency Approval Check-list section on the specific part number's web page at www.AutomationDirect.com*

Dimensions

inches [mm]



Part No.LU10-1305



Part No.LU10-1405

See our website www.AutomationDirect.com for complete Engineering drawings.

Compatible Products

Switch-Pro™
Remote Level Controllers

LCXX

Switch-Pro™
Junction Box and Strobe

LC06-1001

LC06-1001 with LC09-1004 and LM90-1001

Switch-Pak™
Installation Fittings

LM45-1001-12

LM45-7001-0000

See the Switch-Pro® LCXX and Accessories pages at the end of the section for further details and pricing.

Switch-Tek™ LU10 Ultrasonic Level Switches

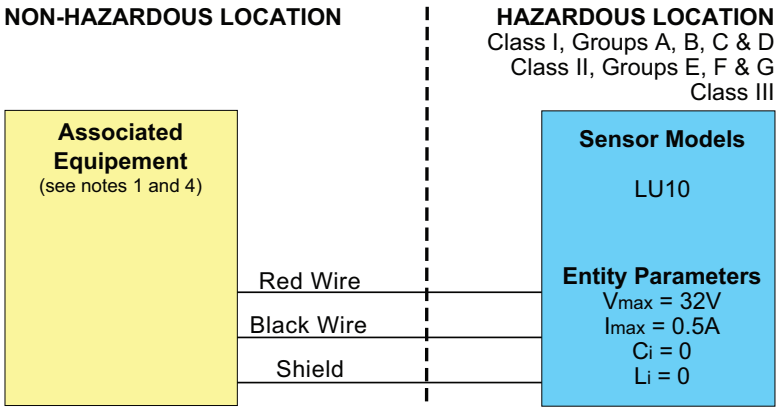
Intrinsically Safe (Haz-Loc) Wiring Information

Models LU10:

The LU10 level switch has been approved for use in Class I, Groups A, B, C & D; UNDER CERTIFICATE NUMBER LR 79326-4. The Entity parameter for the LU10 are:

Vmax = 32 VDC
Imax = 0.5 A
Ci = 0 μF
Li = 0 mH

Intrinsically Safe Control Drawing:



Notes:
1. CSA certified associated equipment with entity parameters.
2. $V_{max} \geq V_{oc}$, $I_{max} \geq I_{sc}$, $C_i + C_{cable} \leq C_a$., $L_i + L_{cable} \leq L_a$.
3. Installation should be in accordance with CEC Part I, or NFPA 70.
4. Associated equipment must be installed per manufacturers instructions

Sensor Drawing: LSD1
Rev. B 10-01-02

Switch-Tek™ LU10 Ultrasonic Level Switches

Intrinsically Safe (Haz-Loc) Wiring Information

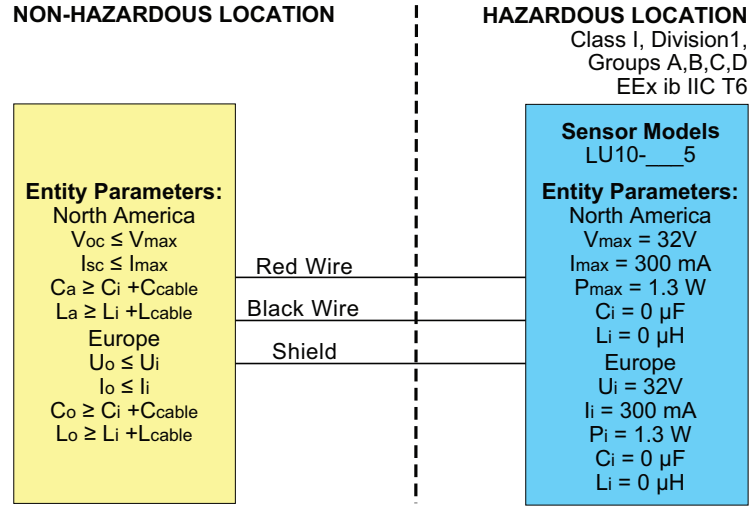
Models LU10:

The LU10 level switch has been approved for use in Class I, Division 1, Groups A, B, C & D; EEx ib IIC T6; UNDER CERTIFICATE NUMBER LCIE 01.E6048X.

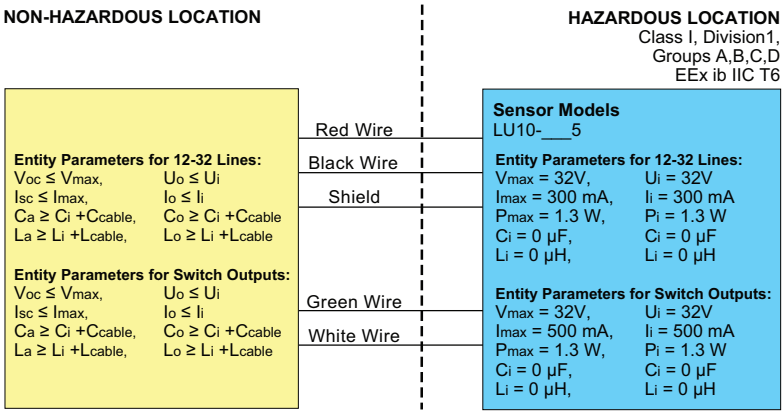
The Entity parameter for the LU10 are:

North America	Europe
Vmax = 32 VDC	Ui = 32 VDC
Imax = 0.5 A	Ii = 0.5 A
Pmax = 1.3 W	Pi = 1.3 W
Ci = 0 μF	Ci = 0 μF
Li = 0 μH	Li = 0 μH

Intrinsically Safe Control Drawing:



Sensor Drawing: U10900
Sheet 1 of 2
Rev. B 4-02-01



Notes: PARAMETERS DEPEND ON OUTPUT TYPE
1. Installation should be in accordance with CEC Part 1, or NFPA 70.
2. Associated Equipment shall be CSA certified with entity parameters connected in accordance with manufacturers instructions.

Sensor Drawing: U10900
Sheet 2 of 2
Rev. B 4-02-01

FLOWLINE™ LEVEL BEST

Switch-Tek™ LZ12 Vibration Fork Level Switch

Part No. LZ12-1405

Overview

The general purpose vibration point level switch provides reliable liquid level detection of dirty liquids such as those with light to medium coating, scaling or foaming characteristics with a 1A relay output. Media examples include wastewater, diluted caustic soda and light weight oil. For optimum performance, the liquid level switch automatically adjusts for coating build up and, if necessary, outputs a proactive maintenance alarm to request cleaning. The submersible Ryton® liquid level sensor is universally mounted through the tank wall or inside the tank as a high level or low level alarm.

Features

- Automatic coating adjustment optimizes sensor performance
- Submersible Ryton® sensor with polypropylene (PP) cable for corrosive liquids
- Coating alarm proactively alerts user when cleaning is required
- 60VA relay selectable NO or NC via power supply wiring polarity
- Compatible with Switch-Pak installation fittings
- Ideal for coating/scaling liquids
- Mounts through side wall or top wall of tank
- 2-year warranty

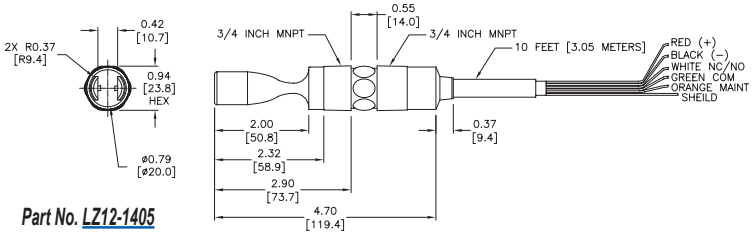
Switch-Tek LZ12 Technical Specifications

Model	LZ12-1405
Price	$00?d9:
Weight (lb)	0.7
Insertion Length	2.3 in [57mm]
Orientation	Universal
Accuracy	±1mm [0.04 in] in water
Repeatability	±0.5 mm [0.02 in] in water
Supply Voltage	12-30 VDC
Consumption	25mA maximum
Contact Type	(1) SPST relay
Contact Rating	60VA, 1A maximum (125VAC max)
Contact Output	Selectable NO / NC
Maint. Alarm	NPN transistor, 10mA maximum
Process Temp.	-40°F to 176°F [-40°C to 80°C]
Pressure	150psi [10bar] @ 25°C, derated @ 1.667 psi [0.113 bar] per °C above 25°C
Sensor Rating	NEMA 6 (IP68)
Sensor Material	Ryton® (glass filled)
Cable Grommet Material	Viton®
Cable Jacket Material	PP (polypropylene)
Cable Type	5-conductor, #24AWG, shielded
Cable Length	10ft (3m)
Process Mount	3/4" NPT
Classification	General purpose
Compliance*	CE (EN61326, EN61010-1)

To obtain the most current agency approval information, see the Agency Approval Checklist section on the specific part number's web page at www.AutomationDirect.com

Dimensions

inches [mm]



Part No. LZ12-1405

See our website www.AutomationDirect.com for complete Engineering drawings.

Compatible Products

Switch-Pro™
Remote Level Controllers

LCXX

Switch-Pro™
Junction Box and Strobe

LC06-1001

LC06-1001 with LC09-1004 and LM90-1001

Switch-Pak™
Installation Fittings

LM45-1001-12

LM45-7001-0000

See the Switch-Pro® LCXX and Accessories pages at the end of the section for further details and pricing.

FLOWLINE™ LEVEL BEST Switch-Tek™ LP15 Capacitance Level Switch

Part No. LP15-1405

Overview

The general purpose guard capacitance point level switch provides reliable high or low liquid level detection of water based conductive liquids with light coating, crystalizing or scaling characteristics with a 1A relay output. Media examples include copper sulfate and brine. The RF guard circuit eliminates the coating signal path between the active and reference electrodes. The submersible polypropylene (PP) liquid level sensor is universally mounted through non-metallic tank walls or inside the tank as a high level or low level alarm.

Features

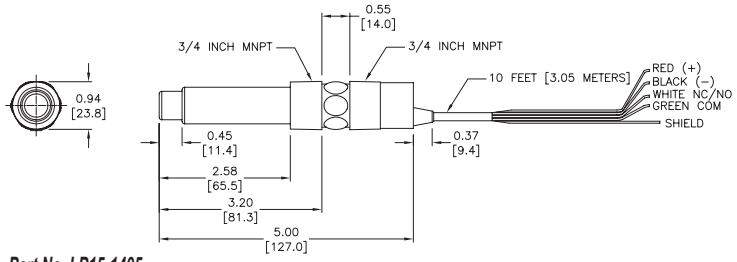
- Guard circuit optimized performance in coating type media
- Submersible polypropylene (PP) sensor body and cable for corrosive liquids
- 60VA relay selectable NO or NC via power supply wiring polarity
- Compatible with Switch-Pak installation fittings
- Ideal for side wall or top mount
- Ideal for coating liquids
- Great for waste water applications
- 2-year warranty

Switch-Tek LP15 Technical Specifications	
Model	*LP15-1405*
Price	$00?d4:
Weight (lb)	0.7
Insertion Length	2.6 in [67mm]
Orientation	Universal
Accuracy	±1mm [0.04 in] in water
Repeatability	±0.5 mm [0.02 in] in water
Dielectric Range	>20 constants
Conductive range	>100µΩ
Supply Voltage	12-36 VDC
Consumption	25mA maximum
Contact Type	(1) SPST relay
Contact Rating	60VA, 1A maximum (125VAC max)
Contact Output	Selectable NO / NC
Maint. Alarm	NPN transistor, 10mA maximum
Process Temp.	-40°F to 176°F [-40°C to 80°C]
Pressure	150psi [10bar] @ 25°C, derated @ 1.667 psi [0.113 bar] per °C above 25°C
Sensor Rating	NEMA 6 (IP68)
Sensor Material	PP (polypropylene)
Cable Jacket Material	PP (polypropylene)
Cable Type	4-conductor, #22AWG, shielded
Cable Length	10ft (3m)
Process Mount	3/4" NPT
Classification	General purpose
*Compliance**	CE (EN61326, EN61010-1)

** To obtain the most current agency approval information, see the Agency Approval Checklist section on the specific part number's web page at www.AutomationDirect.com*

Dimensions

inches [mm]



Part No. LP15-1405

See our website www.AutomationDirect.com for complete Engineering drawings.

Compatible Products

Switch-Pro™
Remote Level Controllers

LCXX

Switch-Pro™
Junction Box and Strobe

LC06-1001

LC06-1001 with LC09-1004 and LM90-1001

Switch-Pak™
Installation Fittings

LM45-1001-12

LM45-7001-0000

See the Switch-Pro® LCXX and Accessories pages at the end of the section for further details and pricing.

FLOWLINE™ LEVEL BEST

Switch-Tek™ LV10 Buoyancy Level Switch

Part No. LV10-1301

Overview

The general purpose buoyancy point level switch provides reliable liquid level detection of relatively clean water and chemical solutions. Media examples include boric acid and ultrapure water. The baffle body eliminates level switch chatter caused by turbulence. The submersible polypropylene (PP) liquid level sensor is mounted vertically inside the tank as a high level or low level alarm.

Features

- Baffle body and stabilized float dampen out switch chatter
- Submersible polypropylene (PP) sensor and cable for corrosive liquids
- 15VA dry contact (reed switch) selectable NO or NC state
- Compatible with Switch-Pak installation fittings
- Ideal for water and waste applications
- Float can wire directly to PLC/SCADA or controller
- Cage helps protect from debris
- 2-year warranty

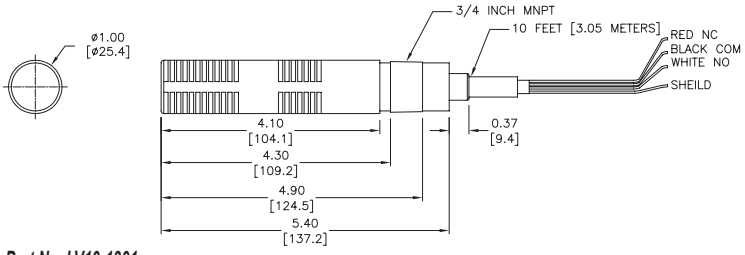
Switch-Tek LV10 Technical Specifications

Model	LV10-1301
Price	$00?d8:
Weight (lb)	0.7
Insertion Length	4.3 in [108mm]
Orientation	±20° vertical
Accuracy	±2mm [0.08 in] in water
Repeatability	±1mm [0.04 in] in water
Specific Gravity	0.8 minimum
Contact Type	(1) SPDT reed
Contact Rating	15VA, 0.25 A maximum (125VAC max)
Contact Output	Selectable NO / NC
Process Temp.	-40°F to 194°F [-40°C to 90°C]
Pressure	25psi [2bar] @ 25°C, derated @ 1.667 psi [0.113 bar] per °C above 25°C
Sensor Rating	NEMA 6 (IP68)
Sensor Material	PP (polypropylene)
Cable Jacket Material	PP (polypropylene)
Cable Type	3-conductor, #22AWG, shielded
Cable Length	10ft (3m)
Process Mount	3/4" NPT
Classification	General purpose
Compliance*	CE (EN61326)

** To obtain the most current agency approval information, see the Agency Approval Checklist section on the specific part number's web page at www.AutomationDirect.com*

Dimensions

inches [mm]



Part No. LV10-1301

See our website www.AutomationDirect.com for complete Engineering drawings.

Compatible Products

Switch-Pro™
Remote Level Controllers

LCXX

Switch-Pro™
Junction Box and Strobe

LC06-1001 when used with LM45-1001-12 or LM45-7001-0000

LC06-1001 with LC09-1004 and LM90-1001

Switch-Pak™
Installation Fittings

LM45-1001-12

LM45-7001-0000

See the Switch-Pro® LCXX and Accessories pages at the end of the section for further details and pricing.

FLOWLINE™ LEVEL BEST

Switch-Pro™ Remote Level Controllers

Part No. LC40-1001

Part No. LC41-1001

Part No. LC42-1001

Overview

CSA approved, the Switch-Pro general purpose level controllers are offered in three configurations for alarms, pump and valve control. The LC40 accepts one level sensor input and provides one 10A relay for high level or low level alarm. The LC41 accepts two level sensor inputs and provides one latching 10A relay for automatic fill or empty control. The LC42 accepts three level sensor inputs with one latching 10A relay output for automatic fill or empty control, and a second non-latching 10A relay for high level or low level alarm.

Features

- Fail-safe relay control of pumps or valves with 0-60 second delay
- Easy setup with LED indicators for sensor, power and relay status
- 35mm DIN rail mount or panel mount polypropylene (PP) enclosure with removable terminal strips
- Invert switch changes relay state from NO to NC without rewiring
- Mounts easily in control panel
- Connects to any Flowline level switch
- Interfaces directly with any horn, buzzer, valve, etc...
- Use LC41, LC42 version for automatic fill/empty operations
- 2-year warranty

Switch-Pro LC Series Technical Specifications			
Model	**LC40-1001**	**LC41-1001**	**LC42-1001**
Price	$;00?9]:	$;00?9[:	$00?9_:
Weight (lb)	1.9	1.9	1.9
Supply Voltage	120VAC @ 50-60 Hz (can be field configured for 240VAC)		
Consumption	5W maximum		
Sensor Inputs	(1) two wire level switch	(2) two wire level switches	(3) two wire level switches
Sensor Supply	13.5 VDC @ 27mA		
LED Indication	Sensor (green), power (green) & relay (red)		
Contact Type	(1) SPDT relay (non-latching)	(1) SPDT relay (latching)	(2) SPDT relays, (one non-latching, one latching)
Contact Rating	250VAC @ 10A		
Contact Output	Selectable NO / NC		
Contact Latch	N/A	Selectable ON / OFF	Selectable ON / OFF
Contact Delay	0-60 seconds		
Ambient Temperature	-40°F to 158°F [-40°C to 70°C]		
Enclosure Mounting	35mm DIN rail or thru-hole panel mount		
Enclosure Material	PP (polypropylene), UL94VO		
Classificaton	General purpose		
Compliance*	CSA LR 79326		

** To obtain the most current agency approval information, see the Agency Approval Checklist section on the specific part number's web page at www.AutomationDirect.com*

Switch-Pro™ Remote Level Controllers

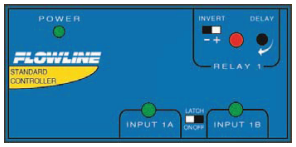
Wiring

LC40 series: 1 sensor input, 1 relay output.

Typical Application:
High level or low level alarm

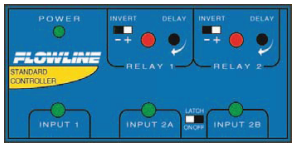
LC41 series: 2 sensor inputs, 1 relay output. The relay included is a latching relay.

Typical Application:
Automatic fill or empty

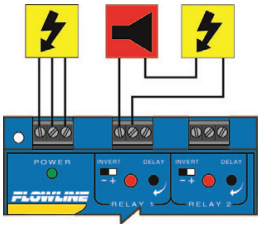


LC42 series: 3 sensor input, 2 relay outputs. One relay is latching and the other is a single input relay.

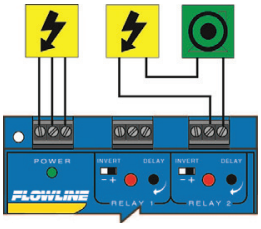
Typical Application:
Automatic fill or empty with high level or low level alarm



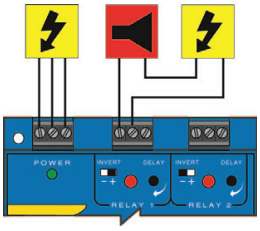
Low Level Alarm Output Wiring Example (One level sensor input required):



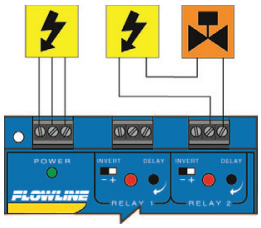
Automatic Fill Output Wiring Example (Two level sensor inputs required):



High Level Alarm Output Wiring Example (One level sensor input required):



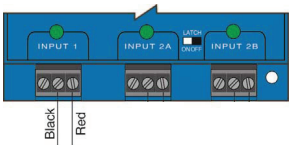
Automatic Empty Output Wiring Example (Two level sensor inputs required):



Symbol Key:

Power: 
Pump: 
Horn: 
Valve: 

Level Sensor Input Wiring Example:

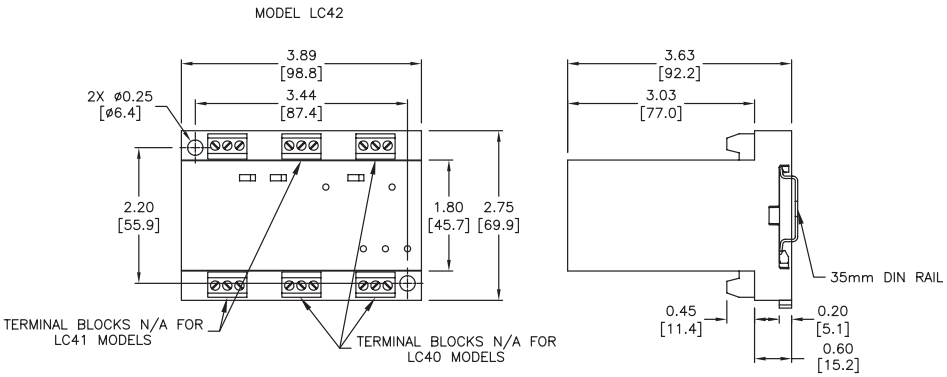


LZ12
LU10
LP15
LV10*

LV10 series can be wired using the White and Black wires for NO operations or the Red and Black wires for NC operations.

Dimensions

inches [mm]



See our website www.AutomationDirect.com for complete Engineering drawings.

Compatible Products

ProSense Float Level Switches

Switch-Tek™ Level Switch Sensors

FLOWLINE™ LEVEL BEST

DataPoint™ Remote Level Controller

Part No. LC52-1001

Overview

The LC52 general purpose controller provides single tank level indication with 2 relays, up to three setpoints and an isolated analog repeater. Relay 1 is configurable on a single setpoint. Relay 2 can be configured on a single setpoint or latched on two setpoints for automatic fill or empty control. The controller accepts a 4-20 mA input from any type of level transmitter. The LC52 has a polycarbonate enclosure with integral 35mm DIN rail mounting.

Features

- 3.5 digit LED display indicates level in custom engineering units
- Fail-safe relay control of pumps or valves with 0-60 second delay
- Easy set up with pushbutton calibration for span, display and relay set points
- 35mm DIN rail or panel mount polypropylene (PP) enclosure with removable terminal strips
- Invert switch changes relay state from NO to NC without rewiring
- Simple controller for operating 2 alarms or 1 auto fill/empty with alarm
- Bar graph provides instant confirmation of transmitter's operational performance
- Lock-out feature prevents inadvertent setting changes
- 2-year warranty

DataPoint LC52 Series Technical Specifications	
Model	***LC52-1001***
Price	$00?d0:
Weight (lb)	1.9
Supply Voltage	120VAC @ 50-60 Hz (can be configured for 240VAC) 50-60 Hz
Display Type	LED, 3.5 digit
Display Units	Engineering
Display Output	0 to 999
LED Indication	Power & relay
LED Bar Graph	Span and setpoints
Memory	Non-volatile
Security	Setpoint lock out
Configuration	Pushbutton
Alarm Indication	Amber: < 4mA; Red: > 20mA
Sensor Input	(1) 4-20 mA
Sensor Supply	24VDC @ 1.5 W
Loop Power	4-20 mA, 18VDC
Consumption	5W maximum
Contact Type	(2) SPDT relays (one non-latching, one latching)
Contact Rating	250VAC @ 10A
Contact Output	Selectable NO / NC
Contact Latch	ON / OFF
Contact Delay	0-60 seconds
Repeater Output	4-20 mA, 12-36 VDC, 1200Ω max
Ambient Temperature	-40°F to 158°F [-40°C to 70°C]
Enclosure Mounting	35mm DIN rail or direct panel mount
Enclosure Material	Polypropylene (PP), UL94VO
Classificaton	General purpose
Compliance*	N/A

** To obtain the most current agency approval information, see the Agency Approval Checklist section on the specific part number's web page at www.AutomationDirect.com*

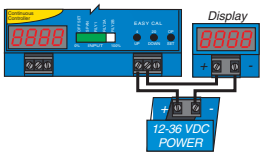
FLOWLINE™ LEVEL BEST

DataPoint™ Remote Level Controller

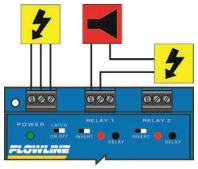
Wiring

LC52 series: One 4-20mA sensor input, 2 relay outputs, 4-20mA repeater output

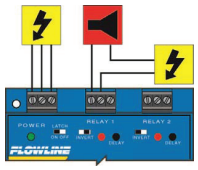
Repeater Ouput (4-20mA) Wiring Example:



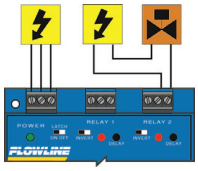
Low Level Alarm Output Wiring Example:



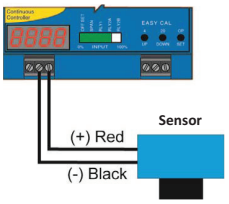
High Level Alarm Output Wiring Example:



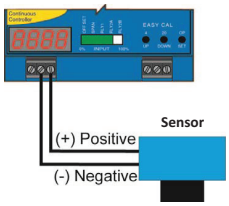
Automatic Fill Output Wiring Example:



EchoSonic II (LU23, LU27, LU28 & LU29 Sensors & EchoPod (DL10, DL14, DL24 & DL34) Sourcing Mode (Factory Setting) Wiring Example:



EchoSpan (LU80, LU81, LU83 & LU84 Sensors) Sourcing Mode (Factory Setting) Wiring Example:



Symbol Key:

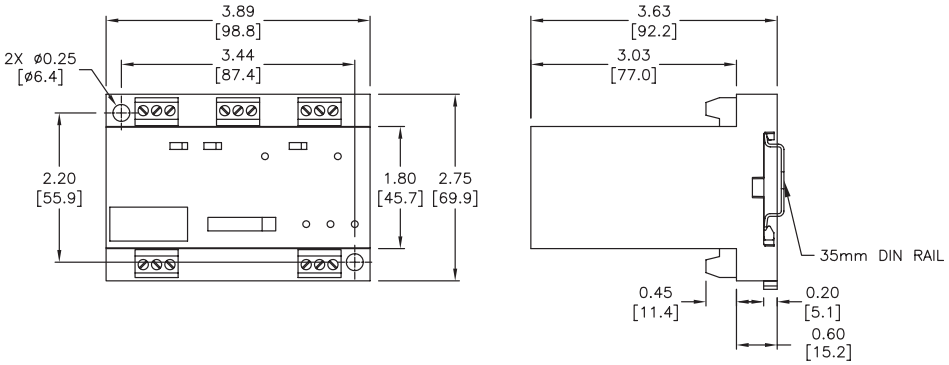
Power:

Horn:

Valve:

Dimensions

inches [mm]



See our website www.AutomationDirect.com for complete Engineering drawings.

Compatible Products

EchoSonic® II Ultrasonic Level Transmiters

EchoPod® Ultrasonic Level Transmitters

EchoSpan® Ultrasonic Level Transmitter

EchoTouch® Ultrasonic Level Transmitters

Endress+Hauser Submersible Level Transmitters

FLOWLINE™ LEVEL BEST Level Switch Accessories

Level Sensor Accessories					
Part No.	*Item Photo*	*Description*	*Quantity*	*Weight (lb)*	*Price*
LM45-1001-12		Flowline Switch-Pak level sensor extension installation fitting, polypropylene (PP) construction, 12 inch insertion length, 2 inch NPT male process connection, 3/4 inch NPT female sensor threads, 3/4 inch NPT male electrical junction box threads	1	1.1	$0?d1:
LM45-7001-0000		Flowline Switch-Pak level sensor extension installation fitting kit, polyvinyl chloride (PVC) construction, includes (1) fitting with 2 inch NPT male process connection, 3/4 inch NPT male electrical junction box threads and 3/4 inch PVC pipe socket; (1) fitting with 3/4 inch NPT female sensor threads and 3/4 inch female PVC pipe socket. Purchase 3/4 inch schedule 40 PVC pipe separately, cut to desired length and solvent weld to fittings in this kit.	1	0.7	$0?d2:
LC06-1001		Flowline Switch-Pro compact electrical junction box, polypropylene (PP) construction, screw cover with O-ring gasket, NEMA 4X rated, 3/4 inch NPT female mounting threads with 300 degree swivel base, 1/2 inch NPT female conduit entrance, removable 6-pole terminal strip	1	0.7	$0?c?:
LM90-1001		Cable gland, 1/2 inch NPT male thread, Buna N sealing gland accommodates a cable diameter range of 0.180 to 0.400 inches (4.6 to 10.2 mm), nylon housing, IP68 protection level	1	0.4	$0?d3:

Accessory Field Assembly Example

Order the following parts for field assembly: (1)
LC06-1001 - Junction box
(1) LM90-1001 - Cable gland
(1) LU10 Series ultrasonic level switch

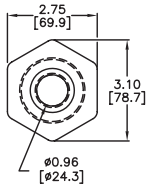
FLOWLINE™ LEVEL BEST

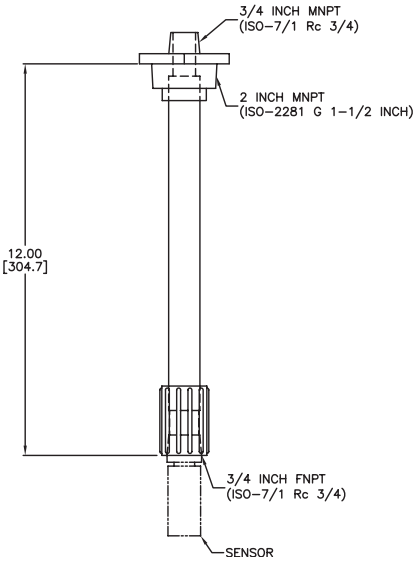
Level Switch Accessory Drawings

Dimensions

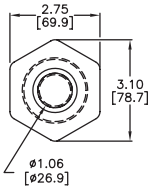
inches [mm]

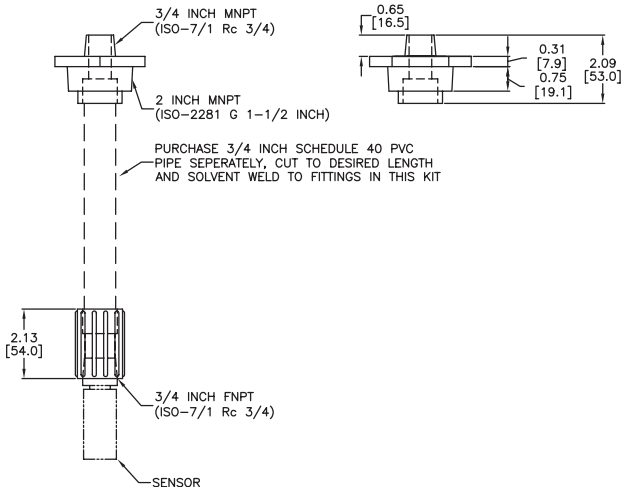
LM45-1001-12



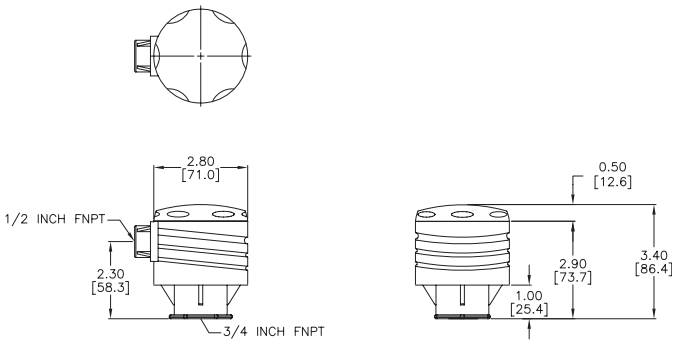


LM45-7001-0000





LC06-1001



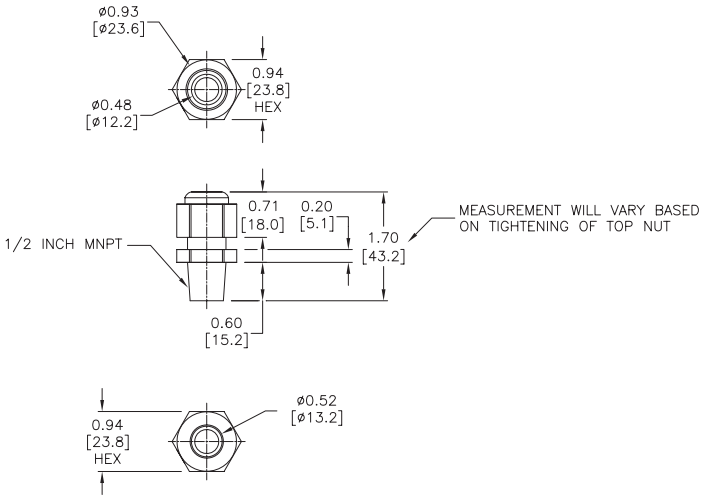
See our website www.AutomationDirect.com for complete Engineering drawings.

Level Switch Accessory Drawings

Dimensions

inches [mm]

LM90-1001



See our website www.AutomationDirect.com for complete Engineering drawings.

ProSense® CLC Series Liquid Level Controllers

Part No. CLC1-F-24

Overview

The ProSense CLC Series Liquid Level Controllers detect and control levels of conductive liquids (tap water, seawater, sewage, chemical solutions, coffee, ice cream, etc.) in dual probe pump up or pump down applications. The conductive properties of the liquid complete a circuit between a probe and common when the liquid comes in contact with both. These relays compare the value of the measured resistance between the probe and common with the setpoint of the adjustable sensitivity potentiometer provided on the product. The output of the relay is used to control pumps, solenoids or valves to automatically lower, raise or maintain the level of the liquid in the tank. The CLC Series controller pulses the probes with a DC voltage to prevent potential electroplating issues.

Operation - Dual Probe

Pump Up (Fill) Models: When the liquid level falls below the low level probe, a 1 second time delay begins & the LED flashes Red. At the end of the time delay, the output relay energizes & the LED is Red ON. The pump is ON to fill the tank. The relay remains energized (latched) until the liquid level rises & touches the high level probe. The output relay de-energizes, turning OFF the pump, and remains de-energized & the LED is Green ON until the liquid level again falls below the low level probe.

Pump Down (Drain) Models: When the liquid level rises & touches the high level probe, a 1 second time delay begins & the LED flashes Red. At the end of the delay, the output relay energizes & the LED is Red ON. The pump is ON to drain the tank. The relay remains energized (latched) until the liquid level falls below the low level probe. The output relay de-energizes, turning OFF the pump, and remains de-energized & the LED is Green ON until the liquid level rises & touches the high level probe.

Features

- Controls level of conductive liquids in pump up (Fill) or pump down (Drain) applications
- Dual probe operation
- Probes are pulsed with a DC Voltage to prevent electroplating
- Adjustable sensitivity range to meet a large variety of liquid types
- LED status indication
- Uses industry-standard 8-pin octal socket
- Pilot duty contact rating

Approvals

- cURus, File number E191059
- UL Listed when used with socket 70169-D, File number E191059
- CE

(with socket 70169-D)

CLC Liquid Level Controllers							
Model	***Function***	***Operating Voltage***	***Sensitivity***	***Price***	***Weight (lbs)***	***Use With***	***Drawing Link***
CLC1-F-24	Pump Up (Tank Fill)	24VAC	1K-250KΩ	$;57ts:	0.3	70169-D socket required for cULus	PDF
CLC1-F-120		120VAC		$;;57tt:	0.3		PDF
CLC1-F-240		240VAC		$;57tu:	0.3		PDF
CLC1-D-24	Pump Down (Tank Drain)	24VAC		$;57tv:	0.3		PDF
CLC1-D-120		120VAC		$;57tx:	0.3		PDF
CLC1-D-240		240VAC		$;57tz:	0.3		PDF

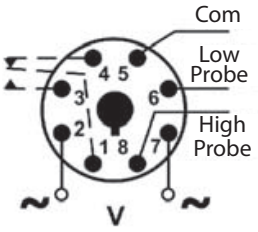
Order socket and sensing probes separately

ProSense® CLC Series Liquid Level Controllers

CLC Liquid Level Controller Specifications	
Voltage Tolerance	+10/-15% of nominal at 50/60 Hz.
Load (Burden)	2VA
Probe Voltage	5V DC Pulsed
Resistance Sensitivity Range	1K - 250KΩ
Response Time	Pick-up: One second Drop-out: One second
LED Indicator	Green ON with Input Voltage applied; Red Flashing during timing; Red ON when relay energized
Temperature	Operating: -28 to 65°C (-18 to 149°F) Storage: -40 to 85°C (-40 to 185°F)
Output Contacts	SPDT: 10A @ 240V AC / 7A @ 28V DC, 1/4HP @ 120V AC (N.O.), Minimum contact rating: 12V @ 100mA
Contact Life	Mechanical: 10,000,000 operations Electrical at Full Load: 100,000 operations
Mounting	Requires Industry-Standard 8 Pin Octal Socket (70169-D to maintain UL Listing or equivalent)
Approvals	cURus, cULus (File Number E191059), CE

Wiring

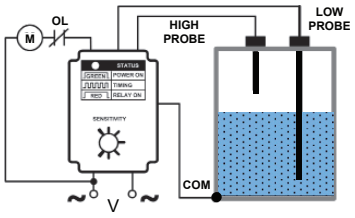
8 Pin Octal
70169-D



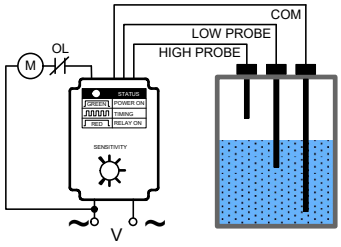
Suggested Probe Assembly

8mm diameter GWR-P240 through GWR-P1600 probes can be used with BSPBX-12-W cable gland and CLC-ACC1 wiring kit. Can be mounted through tank hole with included nut or without the included nut when installed in a 1/2" NPT tank flange.

Installation and Usage

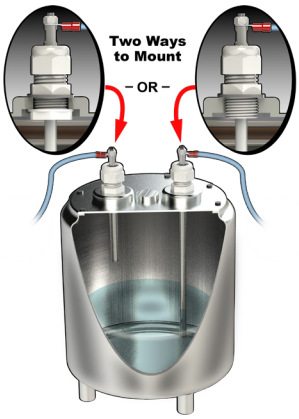


When using a metal or conductive tank the HIGH and LOW PROBE should be isolated from the tank and the COM should be tied to the tank wall that will be in contact with the process fluid.

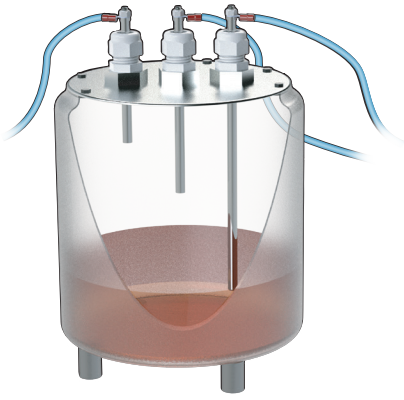


When using a plastic or non-conductive tank a third COM PROBE should be used that will always be lower in the process liquid than the LOW PROBE.

Dual Probe Installation



Dual Probe with Common Probe Installation



Note: The suggested probe configurations and suggested parts above are one application solution. Any conductive material can be used as a probe and installations do not have to be vertically installed in the tank. For applications in deep tanks threaded rod, available at most hardware stores, or an equivalent can be used.

ProSense® CLC Series Liquid Level Controller Accessories

Part No. 70169-D

Part No. GWR-P700

Part No. CLC-ACC1

Part No. BSPBX-12-W

CLC Liquid Level Controller Accessories

Model	Description	Pcs/ Pkg	Weight (lbs)	Price	Drawing Link
70169-D	Macromatic relay socket, 8-pin, 35mm DIN rail or panel mount. For use with ProSense octal relays.	1	3.8	$;5t6:	PDF
GWR-P240	ProSense level sensing probe, 240mm length, stainless steel. For use with GWR-1600-C and GWR-1600-P guided wave radar level sensors and CLC Series Liquid Level Controllers	1	0.7	$4ovo:	PDF
GWR-P450	ProSense level sensing probe, 450mm length, stainless steel. For use with GWR-1600-C and GWR-1600-P guided wave radar level sensors and CLC Series Liquid Level Controllers	1	0.9	$4ovp:	PDF
GWR-P700	ProSense level sensing probe, 700mm length, stainless steel. For use with GWR-1600-C and GWR-1600-P guided wave radar level sensors and CLC Series Liquid Level Controllers	1	1.3	$4ovq:	PDF
GWR-P1000	ProSense level sensing probe, 1000mm length, stainless steel. For use with GWR-1600-C and GWR-1600-P guided wave radar level sensors and CLC Series Liquid Level Controllers	1	1.5	$4ovg:	PDF
GWR-P1200	ProSense level sensing probe, 1200mm length, stainless steel. For use with GWR-1600-C and GWR-1600-P guided wave radar level sensors and CLC Series Liquid Level Controllers	1	1.9	$4ovh:	PDF
GWR-P1600	ProSense level sensing probe, 1600mm length, stainless steel. For use with GWR-1600-C and GWR-1600-P guided wave radar level sensors and CLC Series Liquid Level Controllers	1	2.3	$-4ovi:	PDF
CLC-ACC1	ProSense electrical connector, for use with ProSense GWR level sensing probes.	5	0.1	$;57ty:	N/A
BSPBX-12-W	Bimed cable gland, 1/2in NPT thread type, polyamide, light gray, accepts 6 to 12mm diameter cable, IP68. Package of 5. Mounting hardware included.	5	0.2	$114z:	PDF

ProSense® GWR Series Guided Wave Radar Level Sensors

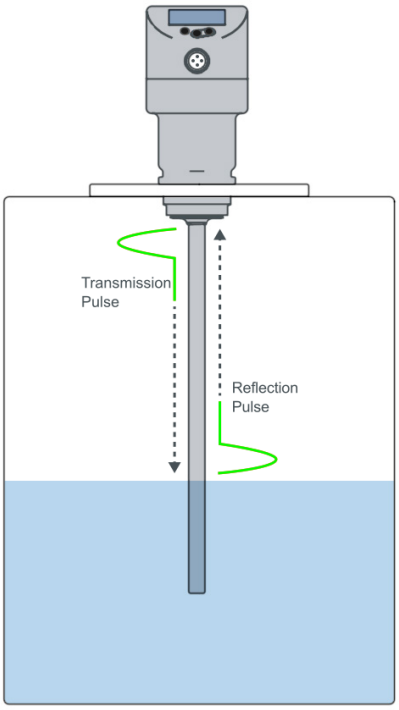
Guided Wave Radar Level Measuring Principle

The GWR uses electromagnetic pulses in the nanosecond (microwave) range. The sensor head transmits the pulses and the pulses travel down the metal probe (guide). When the wave hits the medium, it is reflected back, collected by the metal probe, and guided to the sensor head. The time difference between the transmitting and receiving pulse (time-of-flight) is directly proportional to the distance measurement. To prevent signal attenuation, a coaxial tube configuration can be used for low dielectric process fluids. For applications with build up, the probe only configuration should be used to prevent false signals from bridging between the tube and probe. Probes and coaxial tubes can be cut in the field to adapt to different level applications.

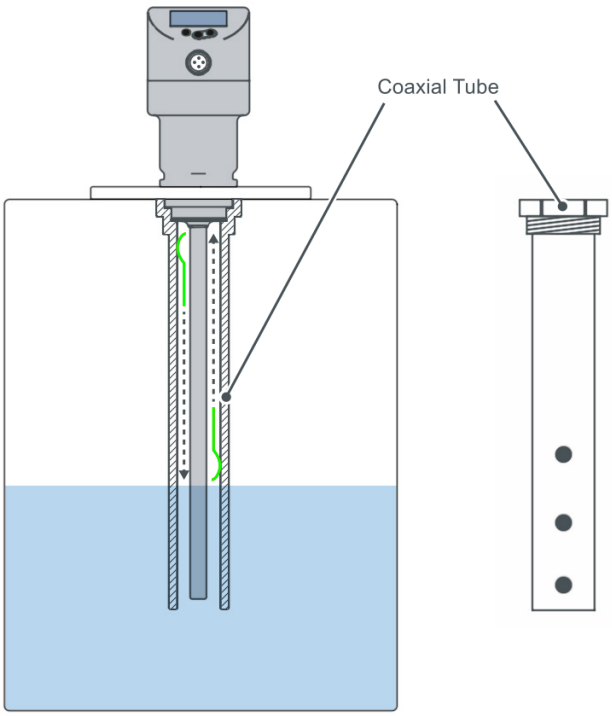
Application Examples

- Detection of cleaning liquid in a parts cleaning system
- Monitoring of hydraulic oil in a hydraulic power unit (with coaxial assembly)
- Detection of cooling water in an industrial cooling system
- Detection of hot glue in corrugated cardboard manufacture

Probe Only Configuration



Probe and Coaxial Tube Configuration



ProSense Guided Wave Radar Level Sensors Selection Guide

Model	Price	Weight (lb)	Drawing Link	Process Connection	Radar Guide	Probe Length	Media	Medium Temperature	Display	Output 1	Output 2
GWR-1600-P	$-04ovl:	0.99	PDF	3/4" male NPT thread	Probe	150 to 1600 mm	Water / Water Based Media	-4°F to 212°F (-20°C to 100°C)	Unit of Measure: 3 x LED, green Switching status: 2 x LED, yellow Measured values and parameter setting: alphanumeric display, 4-digit	Switch	Switch or Analog Selectable
GWR-1600-C	$04ovn:	0.99	PDF	G 3/4 BSPP male thread	Coaxial Tube and/ or Probe		Oil / Oil Based Media; Water / Water Based Media				

Purchase probes, coaxial tubes, and mounting accessories separately.

ProSense® GWR Series Guided Wave Radar Level Sensors

Part No. GWR-1600-P

Part No. GWR-1600-C

Overview

AutomationDirect's ProSense GWR series guided wave radar level sensors provide reliable, low cost liquid level measurement for industrial applications. With one switch output and a second output that can be configured as a switch or analog output signal, the GWR series can provide both continuous as well as point level measurements. The GWR-1600-P probe model is best suited for use with water or water-based media and is ideal for challenging applications with liquid that is soiled, viscous, or prone to formation of deposits. The unit has 3/4" NPT male process connection threads. The GWR-1600-C coaxial tube and probe model is optimized for use with oil or oil-based media or clean water or water-based media without particulates or deposits that might bridge the gap between the probe and coaxial tube. The unit is mounted to the process using 3/4" NPT male threads on the coaxial tube. The GWR-1600-C can also be used as a probe only unit without the coaxial tube for water or water-based applications that may be soiled, viscous, or prone to formation of deposits. When used as a probe only unit without the coaxial tube, the GWR-1600-C has G3/4 male process connection threads. A variety of probe and coaxial tube accessories are available in lengths from 240mm to 1600mm and can be cut in the field to adapt to different level applications. Using the pushbuttons and display, the GWR series can be easily set up to measure and display liquid level in millimeters, inches, or percent. The 4-digit alphanumeric display and LEDs are used during configuration and provide clear indication of the measured variable and output status during operation. The rugged 316 stainless steel housing is IP68/IP69K rated providing uncompromising protection and long life in difficult industrial environments. The GWR series is backed by a five-year warranty.

Output Function Selections

Output 1:

- Switching signal for level limit values

Output 2:

- Switching signal for level limit values
- Analog signal for continuous level measurement

Features

- Switch and analog outputs for both continuous and point level measurement
- Probe unit is best suited for use with water or water-based media and is ideal for challenging applications with liquid that is soiled, viscous, or prone to formation of deposits
- Coaxial tube and probe model is optimized for use with oil or oil-based media or clean water or water-based media without particulates or deposits that might bridge the gap between the probe and coaxial tube
- Variety of probe and coaxial tube accessories are available in lengths from 240mm to 1600mm and can be cut in the field to adapt to different level applications
- Measure and display liquid level in millimeters, inches, or percent
- 4-digit alphanumeric display and LEDs with easy pushbutton setup
- Rugged 316 stainless steel IP68/IP69K rated housing
- 4-pin M12 quick disconnect electrical connection
- 5-year warranty

ProSense GWR Series Sensors Specifications		
Model	***GWR-1600-P***	***GWR-1600-C***
	Application	
Media	Water / Water Based Media	Oil / Oil Based Media or Water / Water Based Media
Radar Guide	Probe	Coaxial tube* and/or probe
Medium Dielectric Constant	> 5	≥ 1.8 (Coaxial tube required from 1.8 to 5)
Medium Temperature	-4°F to 212°F (-20°C to 100°C)	
Pressure Rating	-1 to 16 bar (-14.5 to 232 psi)	
	Electrical Data	
Operating Voltage	18 to 30 VDC	
Current Consumption	< 50mA	
Protection Class	III	
Reverse Polarity Protection	Yes	
Power-on Delay Time	3s	
	Electrical Connection	
Connector	1 x M12	
Contacts	Gold plated	
	Outputs	
Outputs	OUT1: Switch OUT2: Switch or Analog Selectable	
Switch Outputs	PNP / NPN Selectable N.O. / N.C. Selectable Hysteresis or Window Functions Selectable Max. voltage drop: 2.5 VDC Current rating: 150mA	

For media with a viscosity greater than 500 cSt the probe only configuration should be used.

For a variety of cable options see our website www.AutomationDirect.com

ProSense® GWR Series Guided Wave Radar Level Sensors

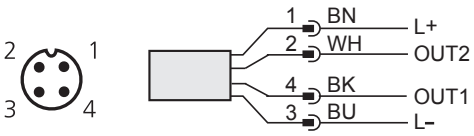
Specifications Continued		
Model	***GWR-1600-P***	***GWR-1600-C***
	Outputs Continued	
Analog Output	4 to 20 mA (scalable/invertable) Max. load: 500Ω	
Short-Circuit Protection	Yes	
Overload Protection	Yes	
	Measuring Range	
Probe Length L* (mm)	150 to 1600 mm	
Active Range A* (mm)	L-40 (L-60 when GWR-1600-C set to oil and oil based media)	
Inactive Range I1 / I2* (mm)	30 / 10 (30 when GWR-1600-C set to oil and oil based media)	
Sampling Rate	4Hz	
	Setting Range	
Set Point SP (mm)	≥ 15 (35 when GWR-1600-C set to oil and oil based media) to ≤ L-30	
Reset Point RP (mm)	≥ 10 (30 when GWR-1600-C set to oil and oil based media) to ≤ L-35	
In Steps of (mm)	1	
Hysteresis (mm)	> 5	
	Accuracy / Deviations	
Measuring Error*	± 7mm	
Offset Error	5mm	
Resolution	1mm	
Temperature Drift [per 10 K]	± 0.2%	
	Operating Conditions	
Ambient temperature	-40 to 176°F (-40 to 80°C)	
Process temperature	-4 to 212°F (-20 to 100°C)	
Storage temperature	-40 to 212°F (-40 to 100°C)	
Protection	IP 68; IP 69K	
	Mechanical Data	
Weight	0.99 lb (447.5 g)	
Material	Stainless steel (1.4404 / 316L); PEI; PFA; PBT; FKM	
Materials (wetted parts)	Sensing Head: Stainless steel (1.4404 / 316L); Stainless steel (1.4435 / 316L); PTFE; FKM Probes: Stainless steel (1.4404 / 316L) Coaxial Tubes: Stainless steel (1.4301 / 304); centering piece: PPS fibre-reinforced; fixing clip: stainless steel (1.4310 / 301)	
Process Connection	3/4" NPT male	G 3/4 BSPP male or 3/4" NPT male with coaxial tube installed
	Displays / Operating Elements	
Display	Unit of Measure: 3 x LED, green	
	Switching status: 2 x LED, yellow	
	Measured values and parameter setting: alphanumeric display, 4-digit	
	Tests / Approvals	
EMC	DIN EN 61000-6-2 DIN EN 61000-6-3 : in a metal tank DIN EN 61000-6-4 : in a plastic tank	
Shock resistance	DIN EN 60068-2-27 50g (11ms) / 20g (6ms) with reference rod 0.5 m	
Vibration resistance	DIN EN 60068-2-6 20g (10...2000 Hz) / 1g (5...200 Hz) with reference rod 0.5 m	
UL approval	E328811	
CE	EMC; RoHS II	

**Reference Measurement Deviation Graph for L,A, I1, and I2 positions*

Note: Check the chemical compatibility of the sensor's wetted parts with the medium to be measured.

GWR Series Guided Wave Radar Level Sensors

Wiring Diagram



Cable Assembly Wiring Colors:
Pin 1 - Brown
Pin 2 - White
Pin 3 - Blue
Pin 4 - Black

Colors to DIN EN 60947-5-2

For additional wiring details see individual product manuals.

Note: Wiring colors are based on AutomationDirect CD12L and CD12M 4-pole cable assemblies.

Output Function Selections

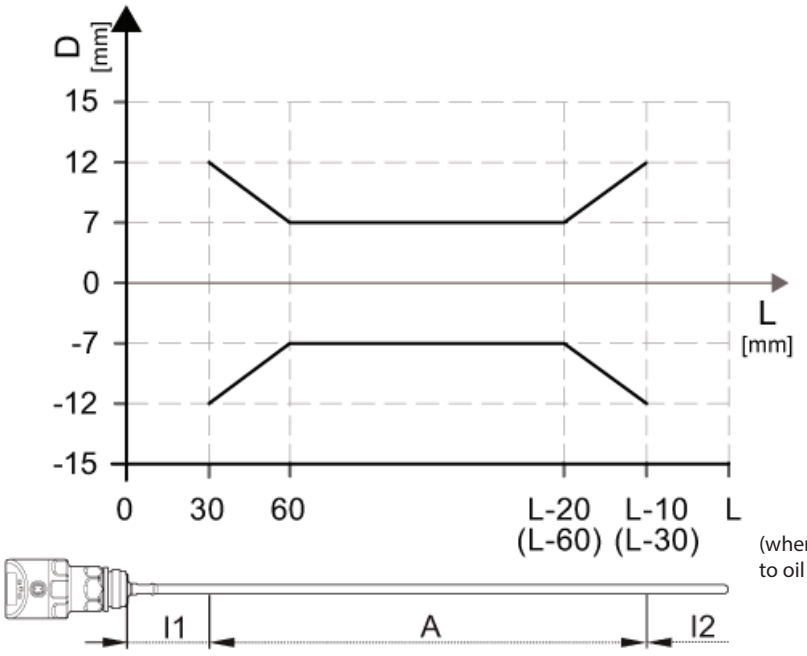
Output 1:
Switching output for level limit values
Output 2:
Switching output for level limit values or
Analog output for continuous level measurement

Click or scan the above QR code to be taken to the operating instructions for the GWR-1600-P unit.

Click or scan the above QR code to be taken to the operating instructions for the GWR-1600-C unit.

Click or scan the above QR code to be taken to the installation instructions for the GWR-CC

Measurement Deviation D at the Limits of the Active Probe Range



(when GWR-1600-C set to oil and oil-based media)

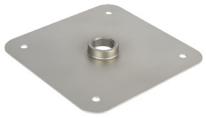
ProSense® GWR Series Guided Wave Radar Level Sensor Accessories

Part No. GWR-P700

Part No. GWR-C700

Part No. GWR-CC

Part No. GWR-FPLT



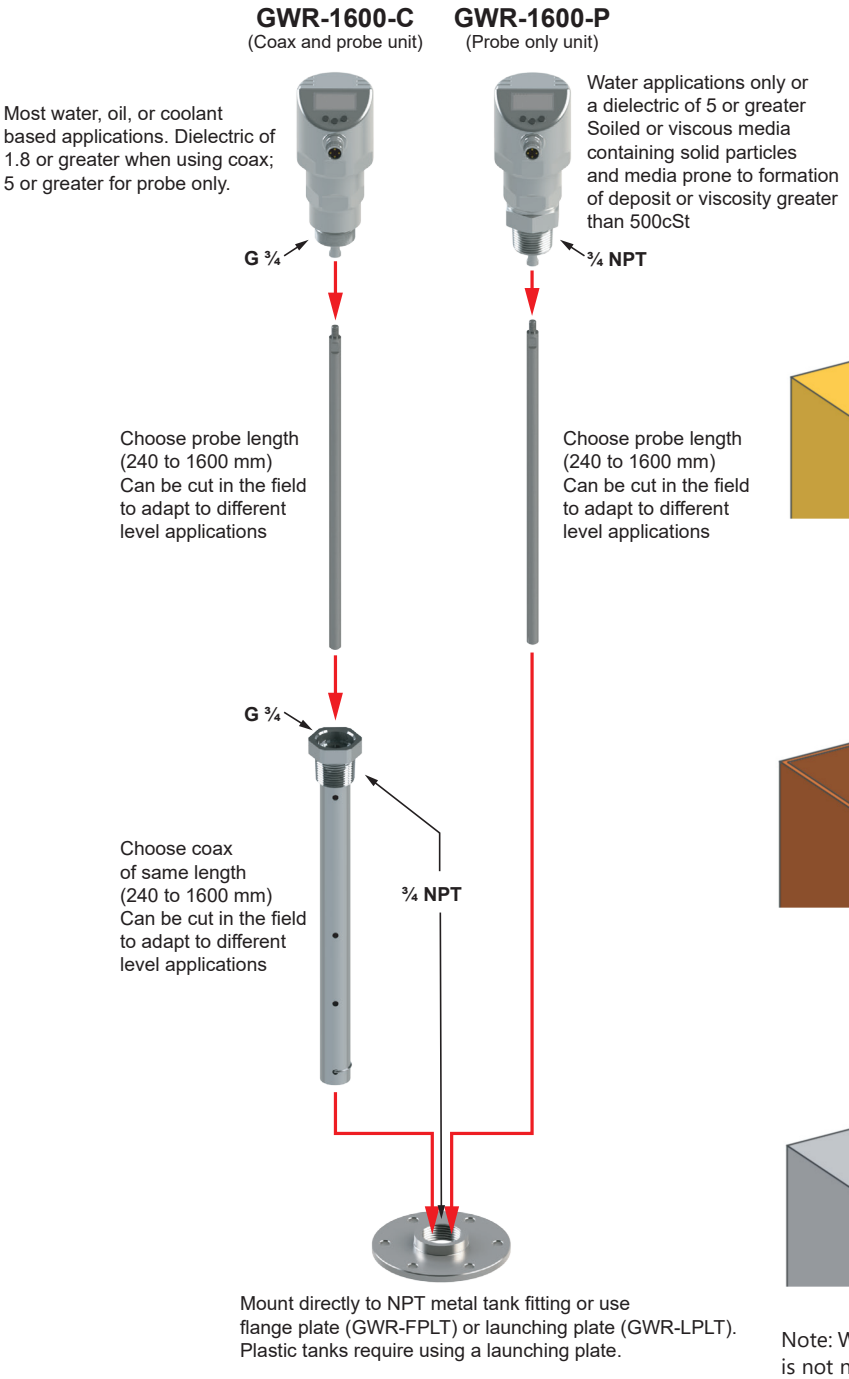
Part No. GWR-LPLT

GWR Series Guided Wave Radar Level Sensor Accessories

Part No.	Description	Pcs/Pkg	Weight (lbs)	Price	Drawing Links
GWR-P240	ProSense level sensing probe, 240mm length, stainless steel. For use with GWR-1600-C and GWR-1600-P guided wave radar level sensors and CLC series conductive level controllers.	1	0.7	$4ovo:	PDF
GWR-P450	ProSense level sensing probe, 450mm length, stainless steel. For use with GWR-1600-C and GWR-1600-P guided wave radar level sensors and CLC series conductive level controllers.	1	0.9	$4ovp:	PDF
GWR-P700	ProSense level sensing probe, 700mm length, stainless steel. For use with GWR-1600-C and GWR-1600-P guided wave radar level sensors and CLC series conductive level controllers.	1	1.3	$4ovq:	PDF
GWR-P1000	ProSense level sensing probe, 1000mm length, stainless steel. For use with GWR-1600-C and GWR-1600-P guided wave radar level sensors and CLC series conductive level controllers.	1	1.5	$4ovg:	PDF
GWR-P1200	ProSense level sensing probe, 1200mm length, stainless steel. For use with GWR-1600-C and GWR-1600-P guided wave radar level sensors and CLC series conductive level controllers.	1	1.9	$4ovh:	PDF
GWR-P1600	ProSense level sensing probe, 1600mm length, stainless steel. For use with GWR-1600-C and GWR-1600-P guided wave radar level sensors and CLC series conductive level controllers.	1	2.3	$-4ovi:	PDF
GWR-C240	ProSense coaxial tube, 240mm length, 3/4in male NPT process connection, stainless steel. For use with GWR-1600-C guided wave radar level sensors. (1) centering piece included.	1	0.5	$-4ovj:	PDF
GWR-C450	ProSense coaxial tube, 450mm length, 3/4in male NPT process connection, stainless steel. For use with GWR-1600-C guided wave radar level sensors. (1) centering piece included.	1	0.7	$4ovk:	PDF
GWR-C700	ProSense coaxial tube, 700mm length, 3/4in male NPT process connection, stainless steel. For use with GWR-1600-C guided wave radar level sensors. (1) centering piece included.	1	1.5	$4ovs:	PDF
GWR-C1000	ProSense coaxial tube, 1000mm length, 3/4in male NPT process connection, stainless steel. For use with GWR-1600-C guided wave radar level sensors. (1) centering piece included.	1	1.8	$;4ovt:	PDF
GWR-C1200	ProSense coaxial tube, 1200mm length, 3/4in male NPT process connection, stainless steel. For use with GWR-1600-C guided wave radar level sensors. (1) centering piece included.	1	2.3	$4ovu:	PDF
GWR-C1600	ProSense coaxial tube, 1600mm length, 3/4in male NPT process connection, stainless steel. For use with GWR-1600-C guided wave radar level sensors. (2) centering pieces included.	1	2.7	$04ovv:	PDF
GWR-CC	ProSense centering pieces, replacement. For use with GWR-C series coaxial tubes. Hardware and seals included.	1	0.02	$4ovx:	N/A
GWR-FPLT	ProSense flange plate, stainless steel, 3/4in female NPT. For use with GWR-1600-C with GWR-C series coaxial tubes or GWR-1600-P guided wave radar level sensor.	1	0.6	$4ovy:	PDF
GWR-LPLT	ProSense launching plate, stainless steel, 3/4in female NPT. For use with GWR-1600-C with GWR-C series coaxial tubes or GWR-1600-P guided wave radar level sensor.	1	1.4	$4ovz:	PDF

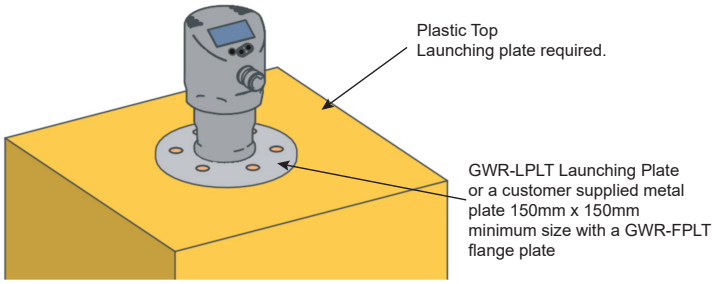
ProSense® GWR Series Guided Wave Radar Level Sensors

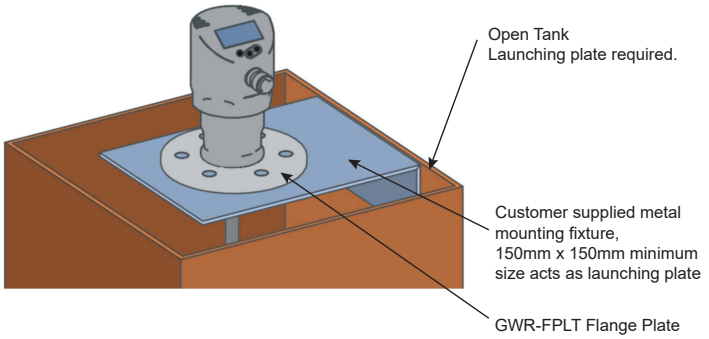
Using GWR Series Guided Wave Radar Level Sensor Accessories

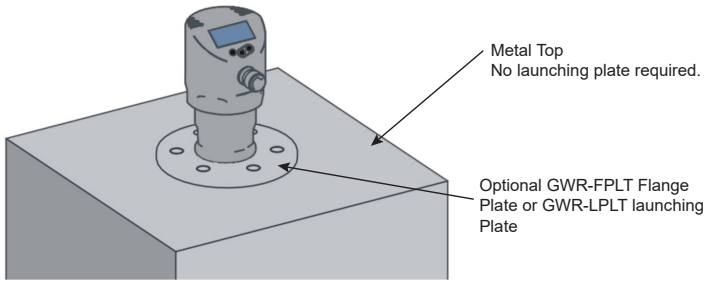


Launching Plate Requirements

For proper decoupling of the radar pulse, a metal launching plate at least 150mm square or 150mm diameter is required.







Note: When using the coaxial tube, the launching plate as described above is not necessary. This makes mounting easier. However, bridging between the probe and coaxial tube due to solids, emulsions, etc. can cause false level indication. Incorrect measurements may be caused by highly absorbing surfaces such as foam, intensely bubbling surfaces, or inhomogeneous materials such as oil and water layers. See product Operating Instructions for settings and methods to mitigate signal loss or degradation.

ProSense® VFL Series Vibration Fork Liquid Level Switches

Part No. VFL75-100L-3H

Part No. VFL50-100S-3D

ProSense Vibration Fork Liquid Level Switches

The ProSense VFL Series of Vibration Fork Level Switches is designed using tuning fork technology for reliable liquid point level detection for monitoring, alarming, and control applications. The device's electronics cause its tuning forks to vibrate at their natural frequency. When the forks come in contact with the medium, the fork vibration frequency will change and trigger the switch output to change state. Suitable for use in tanks, vessels, and pipes, the VFL series is an ideal alternative for applications where other liquid point level technologies such as float switches or conductive, optical and capacitance sensors are not suitable due to conductivity, turbulence, buildup, air bubbles, foam, pressure, temperature, and viscosity changes. The ProSense VFL Series is offered in two process connection sizes with short and extended insertion lengths, standard and high temperature constructions, and a 3-wire DC switch output for connection to controller inputs or a 2-wire AC/DC switch suitable for control of valves and pumps, making the VFL Series perfect for high and low point level alarms, overfill protection, and pump protection in a wide variety of liquid level applications.

Features

- 1/2" or 3/4" male NPT process connection
- Short or extended insertion lengths
- Standard or high temperature constructions
- 3-wire DC output for PLC inputs or 2-wire AC/DC output for control of valves and pumps
- M12 quick disconnect or DIN style electrical connectors
- Robust stainless steel construction
- LED indication provides visual function check
- External function test with test magnet

Applications

- Ideal for applications not suitable for other liquid point level technologies due to conductivity, turbulence, buildup, air bubbles, foam, pressure, temperature, and viscosity changes
- Use in tanks, vessels, and pipes for:
  - Overfill protection
  - High and low point level alarms
  - Pump control or limit detection
  - Valve control
  - Run dry or pump protection
  - High-temperature applications

CE cULus

VFL Series Vibration Fork Liquid Level Switch Selection

Model	Insertion Length	Process Connection	Output Type	Operating Voltage	Electrical Connection	Process Temperature	Price	Weight (lbs)
VFL50-100S-3H	1.89 in (48mm) (Short Length)	1/2 in Male NPT	Switch PNP, 3-wire, N.O./N.C. complementary	10-30 VDC	4-pin M12 quick-disconnect	-40°F to 212°F (-40°C to 100°C)	$045h0:	0.64
VFL75-100S-3H		3/4 in Male NPT					$045h1:	0.71
VFL50-100S-3D		1/2 in Male NPT	Switch PNP, 3-wire, N.O. or N.C.		EN 175301-803-A connector		$045h2:	0.75
VFL75-100S-3D		3/4 in Male NPT					$045h3:	0.82
VFL50-150S-3H		1/2 in Male NPT	Switch PNP, 3-wire, N.O./N.C. complementary		4-pin M12 quick-disconnect	-40°F to 302°F (-40°C to 150°C)	$045h4:	0.68
VFL75-150S-3H		3/4 in Male NPT					$045h5:	0.75
VFL50-150S-3D		1/2 in Male NPT	Switch PNP, 3-wire, N.O. or N.C.		EN 175301-803-A connector		$045h6:	0.77
VFL75-150S-3D		3/4 in Male NPT					$045h7:	0.84
VFL50-100L-3H	3.44 in (87.4 mm) (Extended Length)	1/2 in Male NPT	Switch PNP, 3-wire, N.O./N.C. complementary		4-pin M12 quick-disconnect	-40°F to 212°F (-40°C to 100°C)	$045h8:	0.69
VFL75-100L-3H		3/4 in Male NPT					$045h9:	0.76
VFL50-100L-3D		1/2 in Male NPT	Switch PNP, 3-wire, N.O. or N.C.		EN 175301-803-A connector		$045ha:	0.80
VFL75-100L-3D		3/4 in Male NPT					$045hb:	0.87
VFL75-100S-2D	1.89 in (48mm) (Short Length)	3/4 in Male NPT	AC/DC, 2-wire, N.O. or N.C.	20-253 VAC/DC			$045hc:	0.85
VFL75-150S-2D		3/4 in Male NPT				-40°F to 302°F (-40°C to 150°C)	$045hd:	0.85

ProSense® VFL Series Vibration Fork Liquid Level Switches

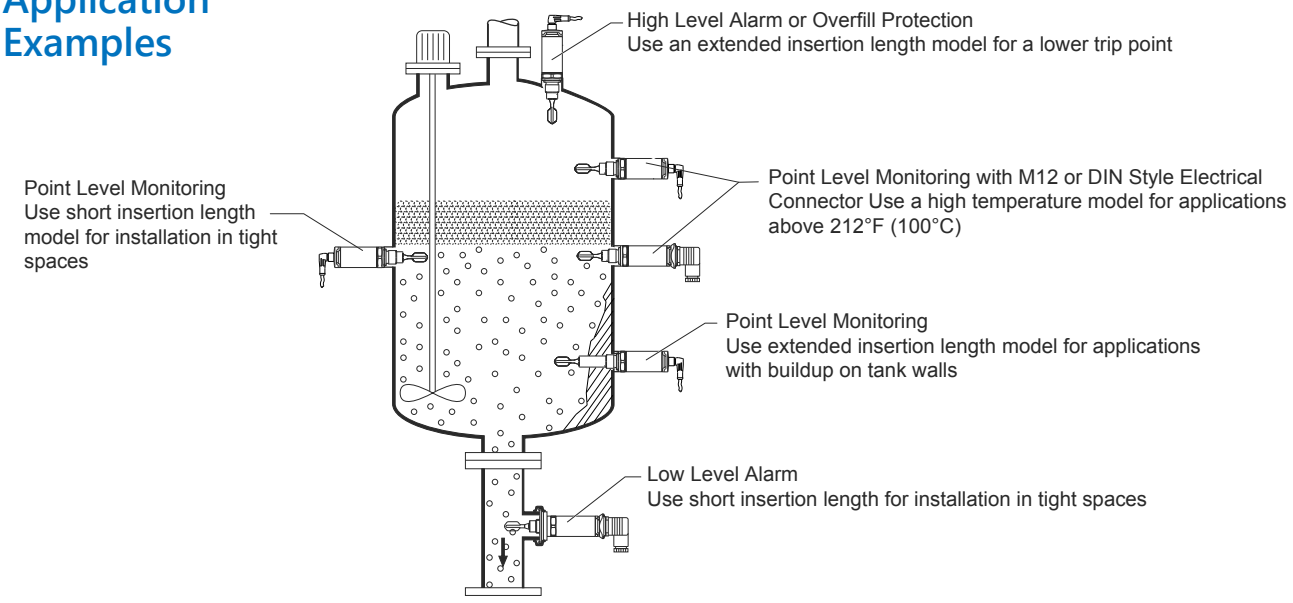
VFL Series Vibration Fork Liquid Level Switch Specifications	
Output	
Switch Output	Switching behavior: On/Off 3-wire DC-PNP: Positive voltage signal at the switch output of the electronics (PNP), switching capacity 200mA* 2-wire AC/DC: Load switching in the power supply line (see Wiring section for Load Requirements), switching capacity 250mA*
Operating Modes	The device has two operating modes: maximum safety (MAX) and minimum safety (MIN). By choosing the corresponding operating mode, the user ensures that the device also switches in a safety-oriented manner even in an alarm condition, e.g. if the power supply line is disconnected. Maximum safety (MAX) The device keeps the electronic switch closed as long as the liquid level is below the fork. Sample application: overfill prevention Minimum safety (MIN) The device keeps the electronic switch closed as long as the fork is immersed in liquid. Sample application: Dry running protection for pumps The electronic switch opens if the limit is reached, if a fault occurs or the power fails (quiescent current principle).
Electrical	
Supply Voltage	DC-PNP: 10 to 30 V DC, 3-wire AC/DC: 20 to 253 V AC/DC, 2-wire
Power Consumption	DC-PNP: < 975mW AC/DC: < 850mW
Current Consumption	DC-PNP: < 15mA AC/DC: < 3.8 mA
Residual Ripple	DC-PNP: 5Vss 0 to 400Hz AC/DC: N/A
Electrical Connection	Electronic version 3-wire DC-PNP with M12 plug or valve plug connection Electronic version 2-wire AC/DC with valve plug connection A fine-wire fuse is necessary for operation: 500mA slow-blow. Electronic version 3-wire DC-PNP 3-wire DC-PNP is preferably used in conjunction with programmable logic controllers (PLC) Voltage source: non-hazardous contact voltage or Class 2 circuit (North America).
Cable Specification	Valve plug: – Cable cross-section: max. 1.5 mm2 (16AWG) – Ø 3.5 to 8mm (0.14 to 0.26 in) M12 connector: IEC 60947-5-2
Overvoltage Protection	Overvoltage category II
Reverse Polarity Protection	2-wire AC/DC: AC mode: the device reverse polarity protection does not apply. DC mode: in the event of reverse polarity the maximum safety mode is always detected. Check the wiring and perform a function check before commissioning. The device is not damaged in the event of reverse polarity. 3-wire DC-PNP: Integrated. In the event of reverse polarity, the device is deactivated automatically.
Short-Circuit Protection	2-wire AC/DC: During switching the sensor checks whether a load, e.g. relay or contactor, is present (load check). If an error occurs, the sensor is not damaged. Smart monitoring: normal operation is resumed once the error is fixed. 3-wire DC-PNP: Overload protection/short-circuit protection at I > 250 mA; the sensor is not destroyed. Intelligent monitoring: Testing for overload at intervals of approx. 1.5 s; normal operation resumes once the overload/short-circuit has been rectified.
Performance	
Reference Operating Conditions	Ambient temperature: +25°C (+77°F) Process pressure: 1 bar (14.5 psi) Fluid: Water (density: approx. 1 g/cm³, viscosity 1 mm2/s) Medium temperature: 25°C (77°F) Density setting: > 0.7 g/cm³ Switching time delay: Standard (0.5 s, 1s)
Switch Point	13mm (0.51 in) ±1mm
Hysteresis	max. 3mm (0.12 in)
Non-Repeatability	±1 mm (0.04 in) in accordance with DIN 61298-2
Influence of Ambient Temperature	Negligible
Influence of Medium Temperature	–25 µm (984 µin) / °C
Influence of Medium pressure	–20 µm (787 µin) / bar
Switching Delay	0.5 s when tuning fork is covered 1.0 s when tuning fork is uncovered
Switch-On Delay	max. 3s
Measuring Frequency	approx. 1,100 Hz in air
Measured Error	In event of device change: ± 2mm (0.08 in) as per DIN 61298-2

**50°C (122°F) ambient maximum. See Operating Instructions for Derating Curve for ambient temperatures to 70°C (158°F).*

ProSense® VFL Series Vibration Fork Liquid Level Switches

VFL Series Vibration Fork Liquid Level Switch Specifications Continued	
Process	
Process Temperature Range	-40 to +100°C (–40 to +212°F) -40 to +150°C (–40 to +302°F)
Process Pressure Range	Max. –1 to +40 bar (–14.5 to +580psi)
Density	> 0.7 g/cm³
State of Aggregation	Liquid
Viscosity	1 to 10,000 mPa·s, dynamic viscosity
Solids Contents	ø < 5mm (0.2 in)
Lateral Loading Capacity	Lateral loading capacity of the tuning fork: maximum 200 N
Environment	
Ambient Temperature Range	–40 to +70°C (–40 to +158°F)
Storage Temperature	–40 to +85°C (–40 to +185°F)
Climate Class	DIN EN 60068-2-38/IEC 68-2-38: test Z/AD
Altitude	Up to 2,000 m (6,600 ft) above sea level
Degree of Protection	IP65/67 NEMA Type 4X Enclosure (M12 connector) IP65 NEMA Type 4X Enclosure (valve plug)
Shock Resistance	a = 300 m/s² = 30 g, 3 planes x 2 directions x 3 shocks x 18 ms, as per test Ea, prEN 60068-2-27:2007
Vibration Resistance	a(RMS) = 50 m/s², ASD = 1.25 (m/s²)²/Hz, f = 5 to 2,000 Hz, t = 3 x 2 h, as per test Fh, EN 60068-2-64:2008
Electromagnetic Compatibility	Electromagnetic compatibility in accordance with all relevant requirements of the EN 61326 series and NAMUR recommendation EMC (NE21).
Approvals	
CSA	File# 600062
CE	EMC; LVD; RoHS II

Application Examples



ProSense® VFL Series Vibration Fork Liquid Level Switches

Wiring

The device has two operating modes: maximum safety (MAX) and minimum safety (MIN). By choosing the corresponding operating mode, the user ensures that the device also switches in a safety-oriented manner even in an alarm condition, e.g. if the power supply line is disconnected.

- Maximum safety (MAX)

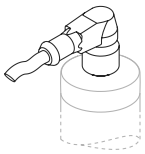
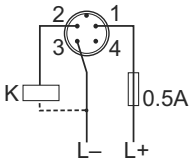
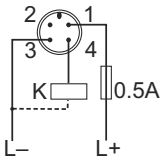
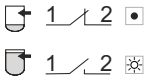
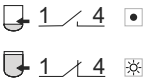
The device keeps the electronic switch closed as long as the liquid level is below the fork. Sample application: overfill prevention

- Minimum safety (MIN)

The device keeps the electronic switch closed as long as the fork is immersed in liquid. Sample application: Dry running protection for pumps

The electronic switch opens if the limit is reached, if a fault occurs or the power fails (quiescent current principle).

3-Wire DC-PNP Output - M12 Connector

Electrical connection	Operating mode	
M12 connector	MAX	MIN
		
		

▣ Yellow LED not lit
☼ Yellow LED lit
K external load

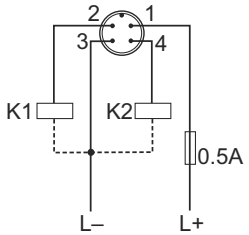
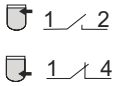
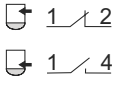
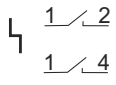
IEC 60947-5-2

Function Monitoring

Function monitoring with M12 connector

Using a two-channel analysis, function monitoring of the sensor can be implemented in addition to level monitoring, e.g. per relay switch, PLC, I/O module, ….

When both outputs are connected, the MIN and MAX outputs assume opposite states when the device is operating fault-free (XOR). In the event of an alarm condition or a line break, both outputs are deenergized.

Connection for function monitoring			Yellow LED	Red LED
	Sensor covered		☼	•
	Sensor exposed		•	•
	Fault		•	☼

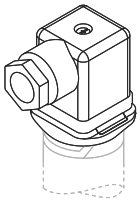
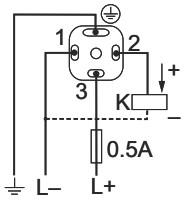
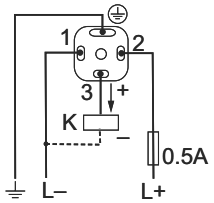
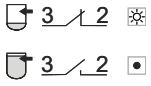
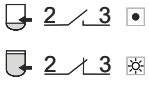
☼ LED lit
• LED not lit
ϟ Fault or warning
K1 / K2 external load

IEC 60947-5-2

ProSense® VFL Series Vibration Fork Liquid Level Switches

Wiring Continued

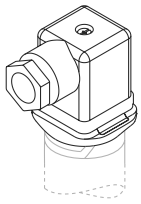
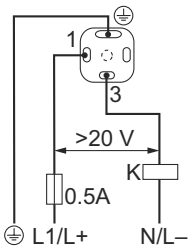
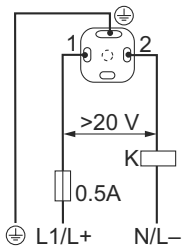
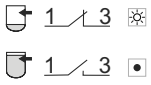
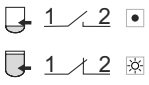
3-Wire DC-PNP Output - Valve Plug

Electrical connection	Operating mode	
Valve plug	MAX	MIN
		
		

Yellow LED not lit
Yellow LED lit
K external load

Valve plug cable Ø 3.5 to 8 mm (0.14 to 0.26 in)

2-Wire AC/DC Output

Electrical connection	Operating mode	
Valve plug	MAX	MIN
		
		

Yellow LED not lit
Yellow LED lit
K external load

Valve plug cable Ø 3.5 to 8 mm (0.14 to 0.26 in)

Load Requirements

Mode	Supply voltage	Rated power	
		min	max
AC mode	24 V 110 V 230 V	> 1.3 VA > 1.5 VA > 2.5 VA	< 6 VA < 27.5 VA < 57.5 VA
DC mode	24 V 48 V 60 V	> 0.7 W > 0.9 W > 1.5 W	< 6 W < 12 W < 15 W

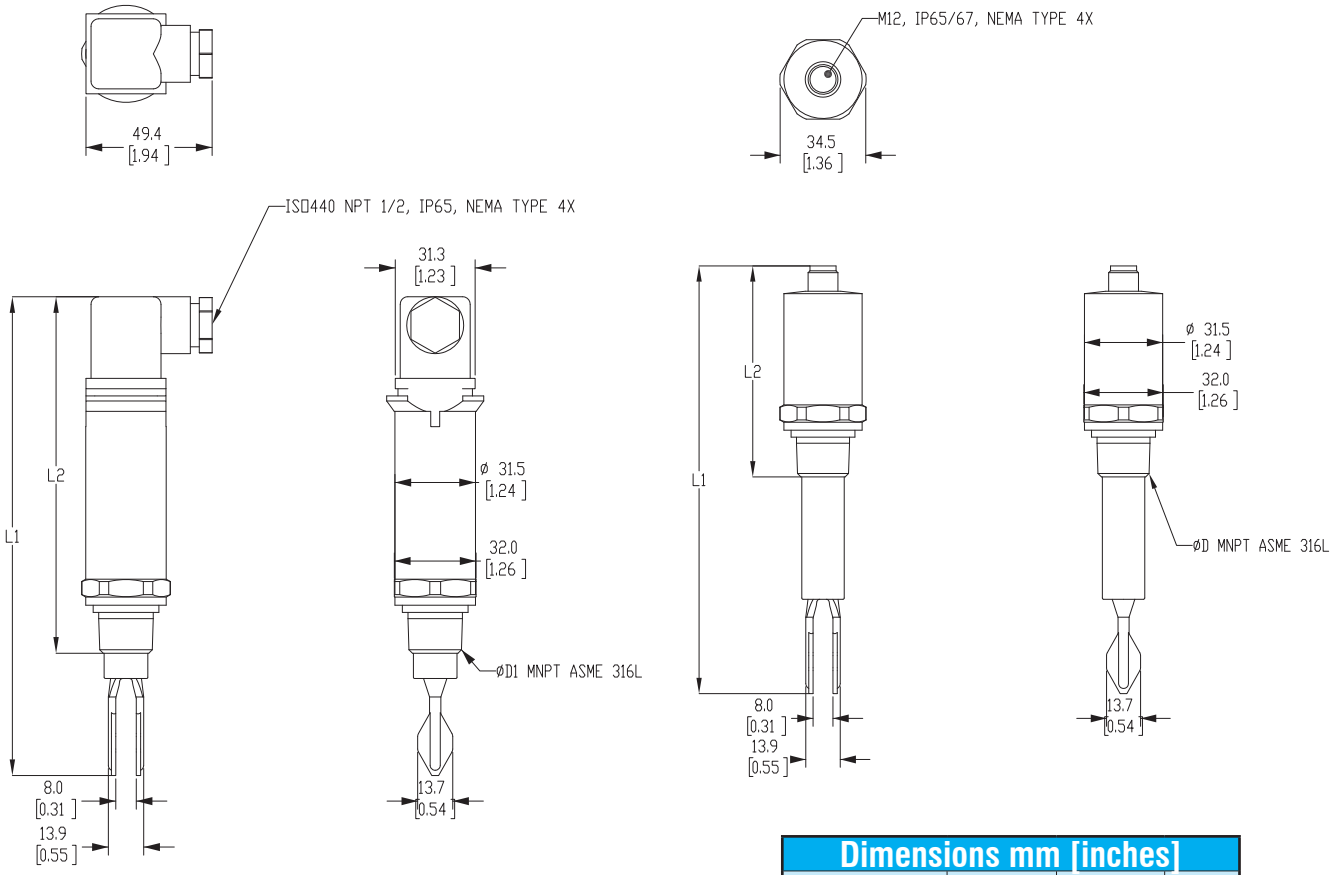
Not suitable for connection to PLC inputs!

Refer to Operating Instructions document for additional information.

ProSense® VFL Series Vibration Fork Liquid Level Switches

Dimensions

mm [inches]



Dimensions mm [inches]			
Part No.	*L1*	*L2*	*ØD*
VFL75-150S-2D	187.5 [7.38]	139.6 [5.50]	3/4
VFL75-100S-2D	162.9 [6.41]	115.0 [4.53]	3/4
VFL50-100L-3D	202.3 [7.96]	115.0 [4.53]	1/2
VFL75-100L-3D	202.3 [7.96]	115.0 [4.53]	3/4
VFL50-150S-3D	187.5 [7.38]	139.6 [5.50]	1/2
VFL75-150S-3D	187.5 [7.38]	139.6 [5.50]	3/4
VFL50-100S-3D	162.9 [6.41]	115.0 [4.53]	1/2
VFL75-100S-3D	162.9 [6.41]	115.0 [4.53]	3/4

Dimensions mm [inches]			
Part No.	*L1*	*L2*	*ØD*
VFL50-100L-3H	172.3 [6.78]	85.0 [3.35]	1/2
VFL75-100L-3H	172.3 [6.78]	85.0 [3.35]	3/4
VFL50-150S-3H	157.5 [6.20]	109.6 [4.31]	1/2
VFL75-150S-3H	157.5 [6.20]	109.6 [4.31]	3/4
VFL50-100S-3H	132.9 [5.23]	85.0 [3.35]	1/2
VFL75-100S-3H	132.9 [5.23]	85.0 [3.35]	3/4

See our website www.AutomationDirect.com for complete Engineering drawings.

AchieVe™ ELT Series Submersible Level Transmitters

Part No. ELT-005-L30

AchieVe Submersible Level Transmitters

The AchieVe ELT series hydrostatic submersible level transmitters provide continuous liquid level measurement by sensing the hydrostatic pressure produced by the height of liquid above the sensor and providing a 4-20 mA output signal compatible with PLCs, panel meters, data loggers, and other electronic equipment.

The AchieVe ELT series is a very economical continuous level sensing solution for water applications where overall small size, weight, and very low cost are required.

Features

- Very economical solution for water applications
- Three full scale ranges from 11.5 to 115.5 feet of water
- 4-20 mA output signal
- 1% Total Error Band accuracy
- Rugged 316L stainless steel construction
- Slim 0.825 inch diameter housing
- Polyethylene jacketed shielded cable with atmospheric vent tube

GREAT DEAL GREAT DEAL GREAT DEAL

2 YEAR WARRANTY

CE

AchieVe Economical Submersible Level Transmitters						
Model	***Range***	***Cable Length****	***Diaphragm***	***Price***	***Weight (lbs)***	***Drawing Link***
ELT-005-L30	0–5 psig (11.5 ftWC)	30ft (9.1 m)	Stainless steel diaphragm with polyamide protective cap	$062#0:	1.05	PDF
ELT-015-L60	0–15 psig (34.6 ftWC)	60ft (18.3 m)		$062#1:	1.85	PDF
ELT-050-L140	0–50 psig (115.5 ftWC)	140ft (42.7 m)		$062#2:	4.05	PDF

** It is required that any excess cable length be accommodated in a service loop and that the cable NOT be shortened as this will void the warranty. If longer transmitter cable is needed, terminate the sensor in an LTACC-5 junction box and run standard non-vented instrumentation cable between the junction box and the measuring electronics.*

See our website www.AutomationDirect.com for complete Engineering drawings.

AchieVe™ ELT Series Submersible Level Transmitters

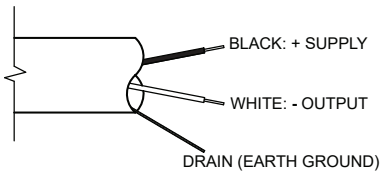
AchieVe Economical Submersible Level Transmitter Technical Specifications	
Total Error Band Accuracy[1]	±1% FS (full scale)
Wetted Materials	316L SS; EPDM (ethylene propylene diene terpolymer); Polyamide, Polyethylene
Compensated Temp. Range	0 to 50°C [32 to 122°F]
Operating Temp. Range	-20 to 60°C [-4 to 140°F]
Protection Rating	IP 68
Supply[2]	8–32 VDC
Load Resistance (Ω)	<(Supply-8V)/0.022A
Output	4–20 mA
Mounting	Vertical
Cable Jacket Material	Polyethylene
Number of Conductors	2 + Drain
Conductor Size	26 AWG
Certifications / Agency Approvals	CE

[1] TEB: Total Error Band; Includes the combined effects of non-linearity, hysteresis and non-repeatability as well as thermal dependencies, over the compensated temperature range.

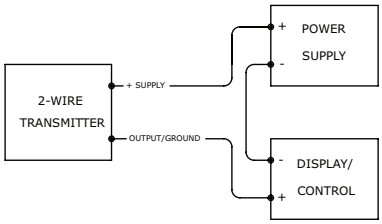
[2] Nominal values may be higher depending upon cable length. Cable loop resistance (~76Ω / 1000ft) adds to the supply requirement. In order to ensure proper system operation, calculate the minimum required supply voltage (at the source) as follows:
MINIMUM SUPPLY VOLTAGE = 8 + 0.022 (CABLE LENGTH x 0.076) VDC

Wiring

Standard 4-20mA



2-Wire Current Loop



For additional information see the AchieVe Economy Submersible Level Transmitter Quick Start Guide by scanning or clicking on the QR code.

ProSense® GPLT/NFLT Series Submersible Level Transmitters

Submersible Level Transmitters

Part No. GPLT-005-L30

The ProSense GPLT and NFLT series hydrostatic submersible level transmitters provide continuous liquid level measurement by sensing the hydrostatic pressure produced by the height of liquid above the sensor and providing a 4-20 mA output signal compatible with PLCs, panel meters, data loggers, and other electronic equipment.

The ProSense GPLT series is a general-purpose continuous level sensing solution for water applications offering a slim housing diameter, several sensing ranges and cable lengths, integral lightning protection, and ratings for hazardous locations.

The ProSense NFLT is a non-fouling design continuous level sensing solution for waste-water applications featuring an extremely rugged Kynar sensing membrane with superior abrasion and puncture resistance that eliminates the need for large bulky shields for protection against floating particles and small objects. For added membrane protection in extreme applications or when extra stabilizing weight is needed, a user installed shield is available as an accessory. Several sensing ranges and cable lengths, integral lightning protection, ratings for hazardous locations, and a 0.5% Total Error Band accuracy are standard.

Available ProSense submersible level transmitter accessories include a desiccant drying tube, bellows, stabilizing weight, terminating enclosure, and protective spacer/shield for the NFLT series.

Part No. NFLT-005-L30

GPLT Series Features

- Ideal for general purpose water applications
- Six full scale ranges from 11.5 to 115.5 feet of water
- 4-20 mA output signal
- 1% Total Error Band accuracy
- Rugged 316L stainless steel construction
- Slim 0.825 inch diameter housing
- Polyethylene jacketed shielded cable with atmospheric vent tube
- Integral lightning protection
- Hazardous location ratings

NFLT Series Features

- Non-fouling design for waste-water applications
- Five full scale ranges from 11.5 to 69.2 feet of water
- 4-20 mA output signal
- 0.5% Total Error Band accuracy
- Rugged abrasion and puncture resistant Kynar sensing membrane with 316L stainless steel construction
- Slim 1.26 inch diameter housing without protective shield
- Polyethylene jacketed shielded cable with atmospheric vent tube
- Integral lightning protection
- Hazardous location ratings

2 YEAR WARRANTY

CE c UL us

GPLT/NFLT Series Submersible Level Transmitters						
Model	*Range*	*Cable Length**	*Diaphragm*	*Price*	*Weight (lbs)*	*Drawing Link*
GPLT-005-L30	0–5 psig (11.5 ftWC)	30ft (9.1 m)	316 Stainless steel diaphragm with polyamide protective cap	$062#3:	1.10	PDF
GPLT-010-L40	0–10 psig (23.1 ftWC)	40ft (12.2 m)		$062#4:	1.35	PDF
GPLT-015-L60	0–15 psig (34.6 ftWC)	60ft (18.3 m)		$062#5:	1.90	PDF
GPLT-020-L60	0–20 psig (46.1 ftWC)			$062#6:	1.90	PDF
GPLT-030-L100	0–30 psig (69.2 ftWC)	100ft (30.5 m)		$062#7:	2.95	PDF
GPLT-050-L140	0–50 psig (115.5 ftWC)	140ft (42.7 m)		$062#8:	4.00	PDF
NFLT-005-L30	0–5 psig (11.5 ftWC)	30ft (9.1 m)	Non-fouling Kynar® membrane	$062#9:	1.25	PDF
NFLT-010-L40	0–10 psig (23.1 ftWC)	40ft (12.2 m)		$062#b:	1.55	PDF
NFLT-015-L60	0–15 psig (34.6 ftWC)	60ft (18.3 m)		$062#c:	2.05	PDF
NFLT-020-L60	0–20 psig (46.1 ftWC)			$062#d:	2.05	PDF
NFLT-030-L100	0–30 psig (69.2 ftWC)	100ft (30.5 m)		$062#e:	3.15	PDF

** It is required that any excess cable length be accommodated in a service loop and that the cable NOT be shortened as this will void the warranty. If longer transmitter cable is needed, terminate the sensor in an LTACC-5 junction box and run standard non-vented instrumentation cable between the junction box and the measuring electronics.*

See our website www.AutomationDirect.com for complete Engineering drawings.

ProSense® GPLT/NFLT Series Submersible Level Transmitters

GPLT/NFLT Series Submersible Level Transmitter Technical Specifications	
Total Error Band Accuracy[1]	GPLT: ±1% FS (full scale) NFLT: ±0.5% FS (full scale)
Wetted Materials	GPLT: 316L SS; Polyamide, PE (Polyethylene), EPDM (ethylene propylene diene terpolymer) NFLT: 316L SS; PVDF (polyvinylidene fluoride), PE (Polyethylene), EPDM (ethylene propylene diene terpolymer)
Compensated Temp. Range	-10 to 80°C [14 to 176°F]
Operating Temp. Range	-10 to 60°C [14 to 140°F]
Protection Rating	IP 68
Supply[2]	11–30 VDC
Input Current	3.2–22 mA
Output	4–20 mA
Load Resistance (Ω)	< (Supply-11V) / 0.022A
Mounting	Vertical
Circuit Protection	Polarity, surge/shorted output
Cable Jacket Material	PE (Polyethylene) & EPDM (ethylene propylene diene terpolymer)
Number of Conductors	2 + Drain
Conductor Size	26AWG
Certifications / Agency Approvals	cULus for Use in Hazardous Locations (E537209), CE

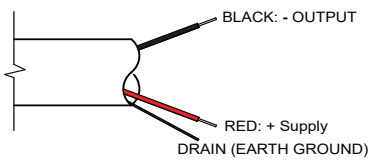
[1] TEB: Total Error Band; Includes the combined effects of non-linearity, hysteresis and non-repeatability as well as thermal dependencies, over the compensated temperature range.

[2] Nominal values may be higher depending upon cable length. Cable loop resistance (~76Ω / 1000ft) adds to the supply requirement. In order to ensure proper system operation, calculate the minimum required supply voltage (at the source) as follows:
MINIMUM SUPPLY VOLTAGE = 11 + 0.022 (CABLE LENGTH x 0.076) VDC

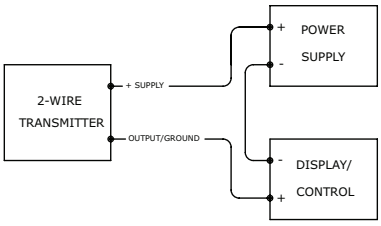
Wiring

4-20mA - IS Approved

Transmitters approved for use in hazardous areas



2-Wire Current Loop



For additional information see the ProSense Submersible Level Transmitter Quick Start Guide by scanning or clicking on the QR code.

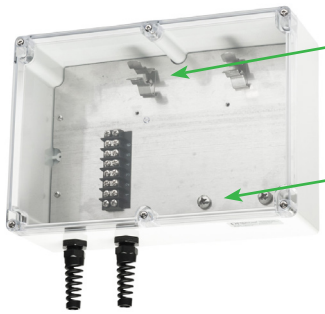
ProSense® Submersible Level Transmitter Accessories

Part No. LTACC-1

Part No. LTACC-2

Part No. LTACC-3

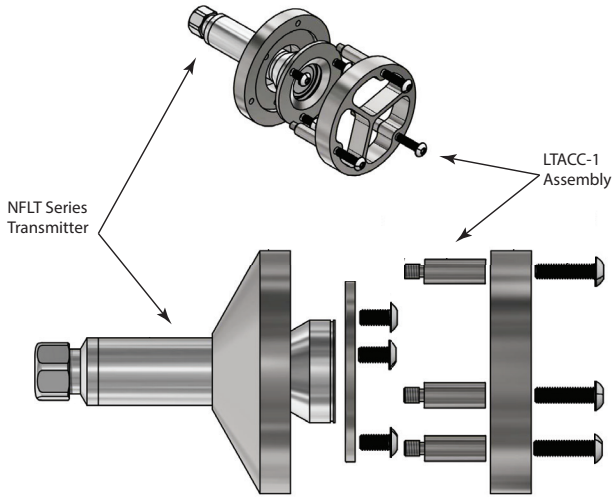
Part No. LTACC-4



Part No. LTACC-5

Submersible Level Transmitter Accessories				
Model	**Description**	**Price**	**Weight (lbs)**	**Drawing Link**
LTACC-1	ProSense protective spacer, for use with ProSense NFLT submersible level transmitters.	$062#a:	1.50	PDF
LTACC-2	ProSense drying tube, for use with submersible level transmitters.	$;62#f:	0.15	PDF
LTACC-3	ProSense bellows, for use with submersible level transmitters.	$62#g:	0.20	PDF
LTACC-4	ProSense stabilizing weight, for use with AchieVe and ProSense submersible level transmitters.	$62#h:	0.85	PDF
LTACC-5	ProSense termination enclosure, for use with submersible level transmitters.	$-062#i:	2.90	PDF

Note: Stabilizing weight LTACC-4 also aids in corrosion resistance by acting as a sacrificial anode.
See our website www.AutomationDirect.com for complete Engineering drawings.



Endress+Hauser
People for Process Automation

Waterpilot® FMX11 Hydrostatic Submersible Level Transmitters

Part No. FMX11-CA11DS06

Endress+Hauser Waterpilot FMX11 hydrostatic submersible level transmitters provide continuous liquid level measurement by sensing the hydrostatic pressure produced by the height of liquid above the sensor and providing a 4-20 mA output signal compatible with PLCs, panel meters, data loggers, and other electronic equipment. The Waterpilot FMX11 has a slim 22mm diameter stainless steel housing and a cap for protection of the sensor diaphragm making it ideally suited for freshwater applications. The shielded extension cable includes an atmospheric pressure compensation tube with Teflon filter and a tough abrasion-resistant TPE jacket that is UV-resistant. Accessories include a terminal box, additional weight and suspension clamp.

Features

- Ideally suited to freshwater applications
- Durable 316 SS construction for reliability and long life
- Shielded cable with atmospheric pressure compensation tube and Teflon filter
- Pre-calibrated ranges up to 2 bar (66.9 ftWC) to meet the most common submersible level applications in vented tanks, reservoirs and ground water systems
- ±0.35% accuracy for ranges ≥0.4 bar; ±0.5% accuracy for 0.2 bar range
- Environmental protection rating of IP68
- The Waterpilot FMX11 is cULus Listed and NSF Certified for drinking water applications

Applications

- Drinking water level in water towers
- Liquid level in vented tanks
- Groundwater wells
- Pump control
- River and lake water surface monitoring

Click on the thumbnail or go to https://www.automationdirect.com/VID-LE-0017 for a short video on Endress+Hauser Waterpilot Hydrostatic Submersible Level Transmitters

Waterpilot FMX11 Hydrostatic Submersible Level Transmitter Selection

Model	Description	Sensing Range	Wetted Parts	Output	Connection	Shielded/ Vented	Price	Weight (lbs)	Drawing Link	Vendor Operating Instructions
FMX11-CA11DS06	Hydrostatic submersible level transmitter	0 to 0.2 bar (6.7 ft of water column)	316L	4-20 mA	6m (19.7 ft) cable	Yes	$05x_b:	1.3	PDF	PDF
FMX11-CA11FS10		0 to 0.4 bar (13.4 ft of water column)			10m (32.8 ft) cable		$05x_c:	1.6	PDF	PDF
FMX11-CA11GS10		0 to 0.6 bar (20.1 ft of water column)					$05x_d:	1.5	PDF	PDF
FMX11-CA11HS20		0 to 1 bar (33.5 ft of water column)			20m (65.6 ft) cable		$05x_e:	2.3	PDF	PDF
FMX11-CA11KS30		0 to 2 bar (66.9 ft of water column)			30m (98.4 ft) cable		$;05x_f:	3.0	PDF	PDF

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Waterpilot® FMX11 Hydrostatic Submersible Level Transmitters

FMX11 Submersible Level Transmitter Specifications	
Accuracy	Sensor measuring range ≥ 400mbar: ≤ ± 0.35 % Sensor measuring range < 400mbar: ≤ ± 0.50 %
Long-Term Stability	≤ 0.1 % of URL/year
Wetted Materials	316L, POM, EPDM, TPE
Process Temp. Range	0 to +70°C (+32 to +158°F)
Thermal Error	Thermal change in the zero output and the output span: –10 to +70°C (+14 to 158°F): < (0.4 + 0.4 x TD)% of set span Temperature coefficient (TK) of the zero output and the output span: 0 to +70°C (32 to 158°F): 0.15 %/10 K of URL
Protection Rating	IP68
Input Voltage	8 to 28 VDC
Input Current	≤ 22mA
Output	4 to 20 mA
Output Resolution	4.88 µA
Output Impedance	727Ω at 24VDC
Mounting	Vertical
Circuit Protection	Overvoltage protection to EN 61000-4-5 (2kV asymmetrical)
Cable Jacket Material	TPE (Thermoplastic Elastomer)
Cable Pull Strength	500N (112.4 lbf) Max Cable extraction force (tensile force required to extract the cable from the probe): ≥ 400 N (89.92 lbf)
Number of Conductors	2 + 1 drain (shielded cable)
Conductor Size	0.22 mm²
Vent Tube	Teflon filter: External diameter of 2.5 mm (0.1 in), Internal diameter of 1.5 mm (0.06 in)
Agency Approvals	cULus, NSF, CE

Note: For Wiring and Installation information refer to the additional Vendor Operating Instruction PDF.

Endress+Hauser
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Waterpilot® FMX21 Hydrostatic Submersible Level Transmitters

Part No. FMX21-FE121DGB10A

Endress+Hauser Waterpilot FMX21 hydrostatic submersible level transmitters provide continuous liquid level measurement by sensing the hydrostatic pressure produced by the height of liquid above the sensor and providing a 4-20 mA output signal compatible with PLCs, panel meters, data loggers, and other electronic equipment. The heavy-duty Waterpilot FMX21 is ideally suited for wastewater applications, offering an easy-to-clean, flush-mounted, process-isolating sensor diaphragm; a rugged 42mm diameter stainless steel housing; and a diaphragm protection cap. The shielded extension cable includes an atmospheric pressure compensation tube with Teflon filter and a tough abrasion-resistant, low-density polyethylene jacket that is UV-resistant. Accessories include a terminal box, suspension clamp, and cable shortener.

Features

- Ideally suited for wastewater applications
- Durable 316 SS construction for reliable, long life in harsh environments
- Easy-to-clean, flush-mounted, process-isolating sensor diaphragm with protection cap
- Shielded cable with atmospheric pressure compensation tube and Teflon filter
- Pre-calibrated ranges up to 2 bar (66.9 ftWC) to meet the most common waste water submersible level applications
- ±0.2% accuracy
- Environmental protection rating of IP68
- The Waterpilot FMX21 includes FM hazardous location approvals for intrinsically safe applications

Applications

- Wastewater
- Lift station monitoring
- Liquid level in vented tank
- Landfill leachate monitoring
- Construction by-pass pumping
- Dewatering
- Pump control
- Slurry tank liquid level

FM APPROVED CE

Click on the thumbnail or go to https://www.automationdirect.com/VID-LE-0017 for a short video on Endress+Hauser Waterpilot Hydrostatic Submersible Level Transmitters

Waterpilot FMX21 Hydrostatic Submersible Level Transmitter Selection

Model	Description	Sensing Range	Wetted Parts	Output	Connection	Shielded/ Vented	Price	Weight (lbs)	Drawing Link	Vendor Operating Instructions
FMX21-FE121DGB10A	Hydrostatic submersible level transmitter	0 to 0.2 bar (6.7 ft of water column)	316L	4-20 mA	10m (32.8 ft) cable	Yes	$;005x_g:	7.3	PDF	PDF
FMX21-FE121FGB10A		0 to 0.4 bar (13.4 ft of water column)					$;005x_h:	7.3	PDF	PDF
FMX21-FE121GGB10A		0 to 0.6 bar (20.1 ft of water column)					$;-005x_i:	7.5	PDF	PDF
FMX21-FE121HGB11A		0 to 1 bar (33.5 ft of water column)			20m (65.6 ft) cable		$;-005x_j:	8.4	PDF	PDF
FMX21-FE121KGB15A		0 to 2 bar (66.9 ft of water column)			30m (98.4 ft) cable		$;005x_k:	9.6	PDF	PDF

Endress+Hauser
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Waterpilot® FMX21 Hydrostatic Submersible Level Transmitters

FMX21 Submersible Level Transmitter Specifications	
Accuracy	± 0.2 % (In accordance with IEC 60770)
Long-Term Stability	≤ 0.1 % of URL/year ≤ 0.25 % of URL/5 years
Wetted Materials	316L, PFA, FKM, Al2O3 (Aluminum oxide ceramic), PE
Process Temp. Range	–10 to +70°C (+14 to +158°F)
Thermal Error	Thermal change in the zero output and the output span: 0 to 30°C (+32 to 86°F): < (0.15 + 0.15 x TD)% of set span –10 to +70°C (+14 to 158°F): < (0.4 + 0.4 x TD)% of set span Temperature coefficient (TK) of the zero output and the output span –10 to +70°C (+14 to 158°F): 0.1 % / 10 K of URL
Protection Rating	IP68
Input Voltage	10.5 to 35VDC / 10.5 to 30VDC (hazardous area)
Input Current	≤ 23mA
Output	4 to 20 mA
Output Resolution	1µA
Output Impedance	587Ω at 24 VDC
Mounting	Vertical
Circuit Protection	Overvoltage protection as per EN 61000-4-5 (500V symmetrical/1000V asymmetrical)
Cable Jacket Material	PE (Polyethylene)
Cable Pull Strength	950N (213.56 lbf) Max Cable extraction force (tensile force required to extract the cable from the probe): ≥ 400 N (89.92 lbf)
Number of Conductors	2 + 1 drain (shielded cable)
Conductor Size	0.14 mm²
Vent Tube	Teflon filter: External diameter of 2.5 mm (0.1 in), Internal diameter of 1.5 mm (0.06 in)
Agency Approvals	FM, CE

Note: For Wiring and Installation information refer to the additional Vendor Operating Instruction PDF.

Endress+Hauser
People for Process Automation

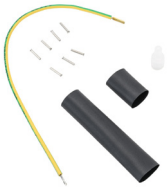
Waterpilot® Hydrostatic Submersible Level Transmitter Accessories

Accessories

Part No. 52006152

Part No. 52006153

Part No. 52006151



Part No. 71222671

Waterpilot Level Transmitter Accessories					
Model	**Description**	**Price**	**Weight (lbs)**	**Drawing Link**	**Vendor Instructions**
52006152	Endress+Hauser terminal box, for use with Endress+Hauser Waterpilot FMX11 and FMX21 hydrostatic submersible level transmitters.	$-05x_l:	0.6	PDF	N/A
52006153	Endress+Hauser weight, for use with Endress+Hauser Waterpilot FMX11 hydrostatic submersible level transmitters.	$5x_n:	0.7	PDF	N/A
52006151	Endress+Hauser suspension clamp, for use with Endress+Hauser Waterpilot FMX11 and FMX21 hydrostatic submersible level transmitters.	$5x_o:	0.5	PDF	N/A
71222671*	Endress+Hauser cable shortener, for use with Endress+Hauser Waterpilot FMX21 hydrostatic submersible level transmitters.	$5x_p:	0.1	N/A	PDF

** If the cable is shortened or modified the FMX21 is no longer FM approved. The shortening kit should only be used when FM approval is not required for the device. To maintain FM the additional cable length should be coiled and secured.*

- To avoid moisture migration in the pressure compensation tube of the FMX11 and FMX21, the cable must be terminated in a dry room or terminal box. The terminal box accessory is IP66/67 rated and includes a GORE-TEX filter element providing both humidity and climatic protection even if installed outdoors.
- The additional weight accessory for the FMX11 helps prevent sideways movement of the sensor that can result in measuring error, or can make it easier to lower the sensor in a guide tube. The additional weight accessory does not fit the FMX21.
- The suspension clamp accessory provides for easy mounting of the FMX11 or FMX21. Simply secure the sensor cable between the clamping jaws and attach the suspension clamp to an appropriate fastening point.
- The cable shortening kit is used to easily and professionally shorten the FMX21 cable including the conductors and the pressure compensation tube. If the cable is shortened or modified the FMX21 is no longer FM approved. The shortening kit should only be used when FM approval is not required. The cable shortening kit is not suitable for the FMX11. Alternatively any extra cable length can simply be coiled and secured.

Endress+Hauser
People for Process Automation

Micropilot® FMR10 Free Space Radar Liquid Level Sensor

Part No. FMR10-CAQBMVCEVEE2

Overview

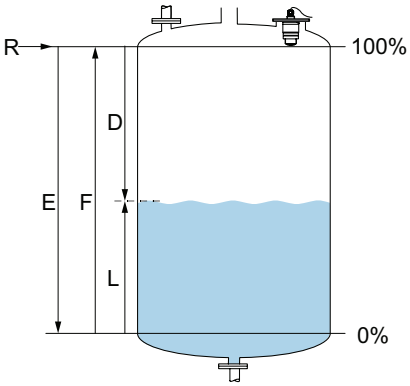
The Endress+Hauser Micropilot FMR10 pulsed radar liquid level sensor provides reliable, continuous, non-contact level measurement for liquids in storage tanks, open basins, pump lift stations, cooling towers, and canal systems. The Micropilot FMR10 can be configured to provide a 4-20mA analog output for liquid levels up to 8 meters (26.25 ft) or 12 meters (39.37 ft) when the flooding protection tube accessory is installed. Configuration and operation of the Micropilot FMR10 is accomplished using its Bluetooth wireless technology interface and the Endress+Hauser SmartBlue mobile app which, includes a linearization function that allows the conversion of the measured value into any unit of length, weight, flow, or volume. Envelope curves of the process can also be displayed and recorded using SmartBlue. The Micropilot FMR10 PVDF sensor body has 1-1/2" male NPT process connection threads and is IP66/68 and NEMA 4X/6P rated with hermetically sealed wiring and fully potted electronics to eliminate water ingress and allow operation under harsh environmental conditions. The Micropilot is powered from nominal 24VDC power and electrical connections are made via the 2-wire, unshielded, 10m (32 ft) cable. Available accessories include an adjustable mounting bracket for easy wall or ceiling installation, a protective sensor cover to protect from direct sunlight in outdoor applications, and a flooding protection tube that is required when the Micropilot FMR10 is installed in free space (not in an enclosed tank), a greater measuring range is required, or to ensure the sensor measures the maximum level even if it is completely flooded.

Features

- Pulsed radar level sensor for continuous, non-contact liquid level measurement
- 4-20mA analog output
- Liquid levels up to 8 meters (26.25 ft) or 12 meters (39.37 ft) with the flooding protection tube accessory installed
- Configuration and operation with Bluetooth wireless technology and the Endress+Hauser SmartBlue mobile app
- SmartBlue linearization function to convert the measured value into any unit of length, weight, flow, or volume
- Display and recording of process envelope curves with SmartBlue
- PVDF sensor body with 1-1/2" male NPT process connection threads
- IP66/68 and NEMA 4X/6P rated
- Electrical connections via the 2-wire, unshielded, 10m (32 ft) cable
- Nominal 24VDC powered

Operation

The Micropilot FMR10 is a downward-looking sensor that emits 26 GHz radar pulses towards the surface of the liquid and measures the length of time (time of flight) for the pulse to reflect off the liquid surface and return to the Micropilot sensor. Because the distance to the liquid surface is proportional to the time of flight, the liquid level above a known empty distance can be determined. Configuration of the empty distance and full distance, as well as other parameters, is accomplished via Bluetooth wireless technology and the Endress+Hauser SmartBlue mobile app.



Level calibration parameter

E	Empty calibration (= zero)
F	Full calibration (= span)
D	Measured distance
L	Level (L = E - D)
R	Reference point

With maximum radiated pulse power of 5.7 mW and an average power output of 0.015 mW, the Micropilot FMR10 is ideal for use in metallic and non-metallic tanks. Free space operation (not in an enclosed tank) is also possible when the flooding protection tube accessory is installed. When used in outdoor applications, the radar signal from the Micropilot is immune to cross-wind effects that can cause loss of signal for ultrasonic level sensors.

Optimal performance will be reduced by certain application characteristics that interfere with or prevent the Micropilot from receiving the pulses reflected from the liquid surface. In general, the following application characteristics should be avoided. Refer to the Micropilot FMR10 Operating Instructions for specific details regarding application, installation, and operation.

Application characteristics to avoid:

- Tank height < 1.5 m (5 ft)
- Open channel width < 0.5 m (1.6 ft)
- Media with bad reflective properties (Relative dielectric constant εr < 4)
- Agitated surfaces
- Foam layer
- Formation of buildup, particularly of moist products
- Heavy condensation
- Freezing of the sensor
- Obstructions such as limit switches, temperatures sensors, baffles, heating coils, liquid filling curtain, etc.

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Micropilot® FMR10 Free Space Radar

Approvals

Download the free Endress+Hauser SmartBlue Mobile App for phone or tablet:

Download on the App Store | GET IT ON Google Play

Micropilot FMR10 Free Space Radar						
Model	***Description***	***Weight (lbs)***	***Price***	***Drawing Link***	***Vendor Specs***	***Vendor Operating Manual***
FMR10-CAQBMVCEVEE2	Endress+Hauser Micropilot pulsed radar liquid level sensor, 26.2ft/8m or 39.3ft/12m with flooding protection tube sensing range, 4-20 mA, 10.5-30 VDC operating voltage, 1-1/2in male NPT process connection.	4.01	$05x_x:	PDF	PDF	PDF

Note: For Wiring and Installation information refer to the additional Vendor Specs and Operating Information PDFs.

Accessories

Part No. 52025686

Part No. 71325090

Part No. 71325079

Micropilot FMR10 Free Space Radar Accessories				
Model	***Description***	***Price***	***Weight (lbs)***	***Drawing Link***
52025686	Endress+Hauser protective cover, for use with Endress+Hauser Micropilot FMR10 pulsed radar liquid level sensor.	$5x_y:	0.28	PDF
71325090	Endress+Hauser flooding protection tube, for use with Endress+Hauser Micropilot FMR10 pulsed radar liquid level sensor.	$05x_z:	0.46	PDF
71325079	Endress+Hauser adjustable mounting bracket, for use with Endress+Hauser Micropilot FMR10 pulsed radar liquid level sensor.	$;05x_]:	0.73	PDF

- The protective sensor cover protects the FMR10 from direct sunlight in outdoor applications
- The flooding protection tube is required when the Micropilot FMR10 is installed in free space (not in an enclosed tank), when a greater measuring range is required, or to ensure the sensor measures the maximum level even if it is completely flooded
- The adjustable mounting bracket allows easy wall or ceiling installation

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Nivector® FTI26 Capacitance Level Sensors

Part No. FTI26-CA7MWDG

Part No. FTI26-CA7MWDJ

Part No. FTI26-CA4VWDG

Overview

The Endress+Hauser Nivector FTI26 is a capacitance point level switch for detection of powders or fine-grained bulk solids. The versatile design of the Nivector makes it an ideal level switch for detecting the full, empty, refill, or point level status in silos, hoppers, and bins containing plastic granules, detergent, grain, sugar, spices, milk powder, animal feed, and other similar materials. The compact polycarbonate or stainless-steel housing with integral G 1" male thread process connection allows for easy installation in a variety of threaded adapters or through a bore hole using the optional lock nut accessory. The optional sensor protective cover accessory protects the sensor from abrasive or coarse product and can also be used to convert the G 1" sensor threads to 1-1/2" male NPT. Depending on the model, outputs include DC-PNP switches and IO-Link communication via an M12 quick disconnect or DIN style valve plug electrical connector. Factory configured to meet most applications; user specific adjustments are possible using the provided test magnet or IO-Link on equipped models. Color signal LEDs are provided for user specific adjustments and function verification (not on hazardous location rated versions), and hazardous location versions require M12 cable with LEDs for this function. Stainless-steel housing versions are FDA compliant and marked with the 3-A symbol for use in food industry hygienic applications when installed using appropriate hygienic fittings. Models are also available for use in Hazardous Locations with certifications to both US and Canadian standards.

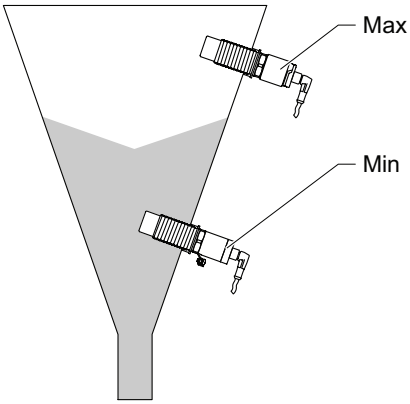
Features

- Capacitance point level switch for detection of powders or fine-grained bulk solids such as plastic granules, detergent, grain, sugar, spices, milk powder, animal feed, and other similar materials
- Full, empty, refill, or point level status in silos, hoppers, and bins
- Factory configured to meet most applications with user specific adjustments possible
- Compact polycarbonate or stainless-steel housing with integral G 1" male thread process connection allows for easy installation
- Available outputs include DC-PNP switches and IO-Link communication
- M12 quick disconnect or DIN style valve plug electrical connector
- Color signal LEDs are provided for user specific adjustments and function verification (not on hazardous location rated versions), and hazardous location versions require M12 cable with LEDs for this function
- Stainless-steel housing versions are FDA compliant and marked with the 3-A symbol for food industry hygienic applications
- Models available for use in Hazardous Locations
- Ability to set each output to detect different media (IO-Link models only)

Operation

The Endress+Hauser Nivector FTI26 capacitance point level switch is commonly used to detect the full or empty status in silos, hoppers, and bins containing powders or fine-grained bulk solids. When used as an empty status switch, it is typically mounted at an angled position near the bottom of the storage vessel to initiate refilling or turn off equipment for dry-running protection. When used as a full status switch, it is mounted near the top of the storage vessel to limit refilling or for overfill protection.

The sensor surface of the Nivector evaluates the different dielectric values of air and bulk solids. When the bulk solids come into contact with the sensor surface, the electronics change the switch status. An internal guard electrode eliminates interference factors due to the vessel wall or possible buildup of the medium.



There are two modes of operation:

- Maximum point level detection (MAX): e.g. Overfill protection. The Nivector keeps the electrical switch closed as long as the sensor is not yet covered by medium.
- Minimum point level detection (MIN): e.g. Dry running protection. The Nivector keeps the electrical switch closed as long as the sensor is covered by medium.

Choosing the MAX or MIN mode of operation ensures that the Nivector switches in a safety-oriented manner even in an alarm condition. The electronic switch opens if the point level is reached, if a fault occurs, or if the power fails.

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Nivector® FTI26 Capacitance Level Sensors

Configuration

The Nivector FTI26 is preconfigured at the factory to work with most applications without the need for an adjustment. The electrical switch point of the device is factory-set for medium with a particle size < 10mm and a relative dielectric constant ≥ 1.6 when installed in a metal tank using lock nuts, with or without the optional sensor protective cover accessory. For other types of installations, such as in plastic tanks, weld-in or tri-clamp adapters, medium with a dielectric constant <1.6, or processes with large temperature variations, measurement performance can be improved with user-specific empty and full adjustments using IO-Link on equipped models or the provided test magnet and signal LEDs, and hazardous location versions require M12 cable with LED's for this function. The test magnet can also be used to reset the Nivector to factory settings or carry out a functional test while in operation.

Click on the thumbnail or go to https://www.automationdirect.com/VID-LE-0018 for a short video on Endress+Hauser Nivector Capacitance Level Sensors

Approvals

- 3-A (Certain Models)
- CSA (General Purpose or Hazardous Location depending on model)
- CE

Nivector FTI26 Capacitance Level Sensor Selection

Model	Description	Housing/ Protection	Wetted Parts	Process Connection	Operating Voltage	Output	Connection	IO-Link	Approval	Price	Weight (lbs)
FTI26-CA7MWDG	Nivector capacitance bulk solids level switch	Polycarbonate IP65 IP67 (NEMA 4X)	Polycarbonate	G1 male thread	18 to 30 VDC	switch PNP, 3 or 4 wire, 2 PNP freely configurable outputs with IO-Link	4-pin M12 quick-disconnect	Yes	CSA	$;05x_[:	1.24
FTI26-CA7MWDJ		316L stainless steel IP65 IP67 (NEMA 4X)	316L stainless steel and ECTFE (ethylene chlorotrifluoroethylene)						CSA 3-A	$05x_q:	1.11
FTI26-CA4MWDG		Polycarbonate IP65 IP67 (NEMA 4X)	Polycarbonate		12 to 30 VDC	switch PNP, 3-wire, N.O./N.C. complementary		N/A	CSA	$05x_s:	0.78
FTI26-CA4MWDJ		316L stainless steel IP65 IP67 (NEMA 4X)	316L stainless steel and ECTFE (ethylene chlorotrifluoroethylene)						CSA 3-A	$;05x_t:	1.28
FTI26-CA4VWDG		Polycarbonate IP65 (NEMA 4x)	Polycarbonate			switch PNP, N.O. or N.C.	EN 175301-803-A connector		CSA	$05x_u:	0.88
FTI26-CA4VWDJ		316L stainless steel IP65 (NEMA 4x)	316L stainless steel and ECTFE (ethylene chlorotrifluoroethylene)						CSA 3-A	$05x_v:	1.25
FTI26-CO7NWDJ		316L stainless steel IP66 IP68 IP69 (NEMA 4X/6P)			18 to 30 VDC	switch PNP, 3 or 4 wire, 2 PNP freely configurable outputs with IO-Link	4-pin M12 quick-disconnect	Yes	CSA Hazardous Location 3-A	$05x_?:	1.61
FTI26-CO4NWDJ		316L stainless steel IP66 IP68 IP69 (NEMA 4X/6P)			12 to 30 VDC	switch PNP, 3-wire, N.O./N.C. complementary		N/A	CSA Hazardous Location 3-A	$;05x_:	1.43

Note: For Wiring and Installation information refer to the additional Vendor Specs and Operating Information PDFs.

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Nivector® FTI26 Capacitance Level Sensor Accessories

Nivector FTI26 Capacitance Level Sensor Resources				
Model	*Drawing Link*	*Vendor Technical Specifications*	*Vendor Operating Manual*	*IO-Link Quick Start Guide*
FTI26-CA7MWDG	PDF	PDF	PDF	PDF
FTI26-CA7MWDJ	PDF	PDF	PDF	PDF
FTI26-CA4MWDG	PDF	PDF	PDF	N/A
FTI26-CA4MWDJ	PDF	PDF	PDF	N/A
FTI26-CA4VWDG	PDF	PDF	PDF	N/A
FTI26-CA4VWDJ	PDF	PDF	PDF	N/A
FTI26-CO7NWDJ	PDF	PDF	PDF	PDF
FTI26-CO4NWDJ	PDF	PDF	PDF	N/A

Note: For Wiring and Installation information refer to the additional Vendor Specs and Operating Information PDFs.

Part No. 71416936

Part No. 71395801

Part No. 71395803

Nivector FTI26 Capacitance Level Sensor Accessories				
Model	*Description*	*Price*	*Weight (lbs)*	*Drawing Link*
71416936	Endress+Hauser sensor protective cover, 1-1/2in male NPT. For use with Endress+Hauser Nivector FTI26 capacitance bulk solids level switch.	$5x__:	1.98	PDF
71395801	Endress+Hauser lock nut, for use with Endress+Hauser Nivector FTI26 capacitance bulk solids level switch.	$5x_#:	0.05	PDF
71395803	Endress+Hauser plug protective cover, for use with Endress+Hauser Nivector FTI26 capacitance bulk solids level switch.	$;5x_!:	0.08	PDF

Endress+Hauser
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Liquipoint® FTW23 Capacitance Level Sensors

Part No. FTW23-CA4MWVJ

Overview

The Endress+Hauser Liquipoint FTW23 is a capacitance point level switch for detection of water-based liquids. The versatile design of the Liquipoint makes it an ideal level switch for detecting the full, empty, refill, or point level status in vessels, tanks, or pipes containing mineral water, milk, and various milk products, soft drinks, beer, and other similar water-based liquids. The compact stainless-steel and plastic housing with integral G ½", ¾", or 1" male thread process connection allows for easy installation and has an IP 65/67 protection rating. A more robust all stainless-steel housing version provides an IP 66/68/69 protection rating. Depending on the model, outputs include DC-PNP switches and IO-Link communication via an M12 quick disconnect electrical connector. Factory configured to meet most applications, individual adjustments for different liquids are not needed. Versions with IO-Link communication capability can be configured with two separate switching thresholds for medium detection and differentiation; and can also be adjusted to work with alcohol- and oil-based liquids, or even powders. Color signal LEDs are provided for function verification (not on IP69 rated versions). Liquipoint FTW23 level switches are FDA compliant and marked with the 3-A symbol (except versions with G ½" threads) for use in food and beverage industry hygienic applications and can be cleaned and sterilized in place (CIP/SIP) when installed in appropriate hygienic fittings.

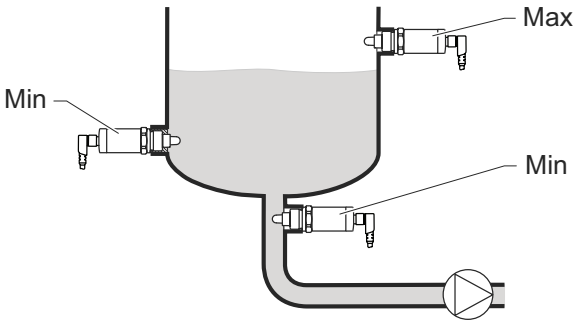
Features

- Capacitance point level switch for detection of water-based liquids such as mineral water, milk, various milk products, soft drinks, beer, and other similar water-based liquids
- Full, empty, refill, or point level status in vessels, tanks, and pipes
- Factory configured to meet most applications without requiring individual adjustments for different liquids
- Compact plastic/stainless-steel or all stainless-steel housing with integral G ½", ¾", or 1" male thread process connection allows for easy installation
- IO-Link communication versions can be adjusted to work with alcohol- and oil-based liquids, or even powders
- Available outputs include DC-PNP switches and IO-Link communication
- M12 quick disconnect electrical connector
- Color signal LEDs are provided for function verification
- FDA compliant and marked with the 3-A symbol for food and beverage industry hygienic applications (except versions with G ½" threads)
- Ability to set each output to detect different media (IO-Link models only)

Operation

The Endress+Hauser Liquipoint FTW23 capacitance point level switch is commonly used to detect the full or empty status in vessels, tanks, or pipes containing water-based liquids. When used as an empty status switch, it is typically mounted in or near the bottom of the storage vessel to initiate refilling or turn off equipment for dry-running protection. When used as a full status switch, it is mounted near the top of the storage vessel to limit refilling or for overfill protection.

The tip of the Liquipoint sensor evaluates the different dielectric values of air and water-based liquids. When the liquid comes into contact with the sensor tip, the electronics change the switch status.



There are two modes of operation:

- Maximum point level detection (MAX): e.g. Overfill protection. The Liquipoint keeps the electrical switch closed as long as the sensor is not yet covered by liquid.
- Minimum point level detection (MIN): e.g. Dry running protection. The Liquipoint keeps the electrical switch closed as long as the sensor is covered by liquid.

Choosing the MAX or MIN mode of operation ensures that the Liquipoint switches in a safety-oriented manner even in an alarm condition. The electronic switch opens if the point level is reached, if a fault occurs, or if the power fails.

Endress+Hauser
People for Process Automation

Liquipoint® FTW23 Capacitance Level Sensors

Configuration

The Liquipoint FTW23 is preconfigured at the factory to work with most applications without the need for an adjustment for different liquids. The electrical switch point of the device is factory-set for water-based liquids with a dielectric constant >20. Versions with IO-Link communication capability can be configured with two separate switching thresholds for medium detection and differentiation; and can also be adjusted to work with alcohol- and oil-based liquids, or even powders with a dielectric constant >1.5. A test magnet (not provided) can be used to carry out a functional test while in operation.

Click on the thumbnail or go to https://www.automationdirect.com/VID-LE-0018 for a short video on Endress+Hauser Liquipoint Capacitance Level Sensors

Approvals

- 3-A (Certain Models)
- CSA
- CE

Liquipoint FTW23 Capacitance Level Sensor Selection

Model	Description	Housing/ Protection	Wetted Parts	Process Connection	Operating Voltage	Output	Connection	IO-Link	Approval	Price	Weight (lbs)
FTW23-CA4MWVJ	Liquipoint capacitance liquid level switch	316L stainless steel IP65 IP67 (NEMA 4X)	316L stainless steel and PEEK (polyether ether ketone)	G1/2 male thread	10 to 30 VDC	Switch PNP, 3-wire, N.O./N.C. complementary	4-pin M12 quick-disconnect	N/A	CSA	$05x#0:	1.03
FTW23-CA4MW5J				G3/4 male thread					CSA 3-A	$05x#1:	1.00
FTW23-CA4MWSJ				G1 male thread					CSA 3-A	$05x#2:	1.68
FTW23-CA4NWVJ		316L stainless steel IP66 IP68 IP69 (NEMA 4X/6P)		G1/2 male thread					CSA	$05x#3:	0.89
FTW23-CA4NW5J				G3/4 male thread					CSA 3-A	$05x#4:	1.01
FTW23-CA4NWSJ				G1 male thread					CSA 3-A	$05x#5:	1.14
FTW23-CA7MWVJ		316L stainless steel IP65 IP67 (NEMA 4X)		G1/2 male thread	18 to 30 VDC	Switch PNP, 3 or 4 wire, 2 PNP freely configurable outputs with IO-Link		Yes	CSA	$05x#6:	1.14
FTW23-CA7MW5J				G3/4 male thread					CSA 3-A	$05x#7:	0.94
FTW23-CA7MWSJ				G1 male thread					CSA 3-A	$05x#8:	1.14
FTW23-CA7NWVJ		316L stainless steel IP66 IP68 IP69 (NEMA 4X/6P)		G1/2 male thread					CSA	$05x#9:	0.85
FTW23-CA7NW5J				G3/4 male thread					CSA 3-A	$05x#a:	1.00
FTW23-CA7NWSJ				G1 male thread					CSA 3-A	$05x#b:	1.14

Note: For Wiring and Installation information refer to the additional Vendor Specs and Operating Information PDFs.

Endress+Hauser
People for Process Automation

Liquipoint® FTW23 Capacitance Level Sensors

Liquipoint FTW23 Capacitance Level Sensor Resources				
Model	*Drawing Link*	*Vendor Technical Specifications*	*Vendor Operating Manual*	*IO-Link Quick Start Guide*
FTW23-CA4MWVJ	PDF	PDF	PDF	N/A
FTW23-CA4MW5J	PDF	PDF	PDF	N/A
FTW23-CA4MWSJ	PDF	PDF	PDF	N/A
FTW23-CA4NWVJ	PDF	PDF	PDF	N/A
FTW23-CA4NW5J	PDF	PDF	PDF	N/A
FTW23-CA4NWSJ	PDF	PDF	PDF	N/A
FTW23-CA7MWVJ	PDF	PDF	PDF	PDF
FTW23-CA7MW5J	PDF	PDF	PDF	PDF
FTW23-CA7MWSJ	PDF	PDF	PDF	PDF
FTW23-CA7NWVJ	PDF	PDF	PDF	PDF
FTW23-CA7NW5J	PDF	PDF	PDF	PDF
FTW23-CA7NWSJ	PDF	PDF	PDF	PDF

Note: For Wiring and Installation information refer to the additional Vendor Specs and Operating Information PDFs.

ProSense Float Level Switches

ProSense float level switches provide a low-cost general purpose solution for single point monitoring of liquid level in a variety of applications. Powerful permanent magnets within the float actuate a highly reliable and repeatable hermetically sealed reed switch as the float rises and lowers with liquid level. These switches are available in several different material constructions for compatibility with many types of liquids, a wide temperature range, and system pressure requirements. Vertical and horizontal mounting styles with several mounting thread variations are offered for ease of installation. Reed switches carry electrical ratings for both AC and DC voltage for adaptability to many control interface applications. These float switches are available with either normally open or normally closed operation, and most can be converted to the opposite operation in the field. Designed to be shock and vibration resistant, ProSense float level switches ensure long and trouble-free service.

Features

- Low-cost solution for general purpose single point liquid level monitoring
- Magnetically operated, highly reliable and repeatable hermetically sealed reed switch
- Vertical and horizontal mounting styles with a variety of mounting threads
- Several material constructions for compatibility with different liquids
- Electrical ratings for AC and DC voltage
- Most switches easily converted in the field from normally closed to normally open operation

Click on the thumbnail or go to https://www.automationdirect.com/VID-LE-0001 for a short video on ProSense Level Switches.

Operation

ProSense float level switches are shipped configured for normally closed switch operation. Except where noted, most models can be easily converted to normally open operation in the field.

Vertical Mount Switches

For Vertical Mount switches, normally closed is defined as the switch mounted in a vertical position with the mounting threads above the float (top mount) and the float in the "dry" position at the bottom of the stem (Figure 1). When the liquid raises the float, the switch will open.

To change the operation of the switch to normally open (depending on model), remove the C-clip, remove the float from the stem, flip the float 180 degrees, re-install the float on the stem and replace the C-clip. Now the switch will be normally open in the "dry" position and will close when the liquid raises the float.

Vertical Mount switches can also be mounted with the mounting threads below the float (bottom mount) as in the bottom of a tank. If bottom mounted, switch operation will be the opposite of top mounted installation described above.

Horizontal Mount Switches

For Horizontal Mount switches installed in the side of a tank (side-mounted), normally closed is defined as when the float arm is below and parallel with the stem in the "dry" position (Figure 2). When the liquid raises the float, the switch will open.

To change the operation of the switch, rotate the installed position of the switch 180 degrees so the float arm is above and hanging at an angle with the stem. Now the switch will be normally open in the "dry" position and will close when the liquid raises the float.

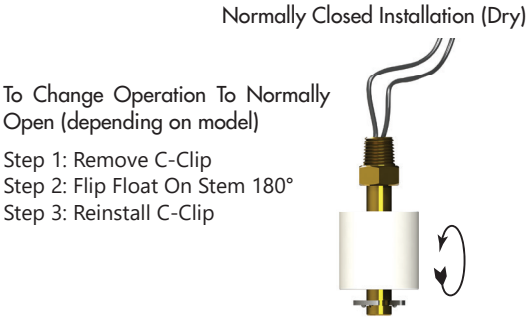


Figure 1: Vertical (Top) Mount Switch Operation

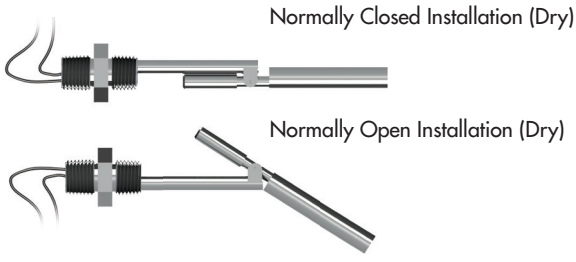


Figure 2: Horizontal Mount Switch Operation

ProSense® Float Level Switches, Vertical Top-Mount

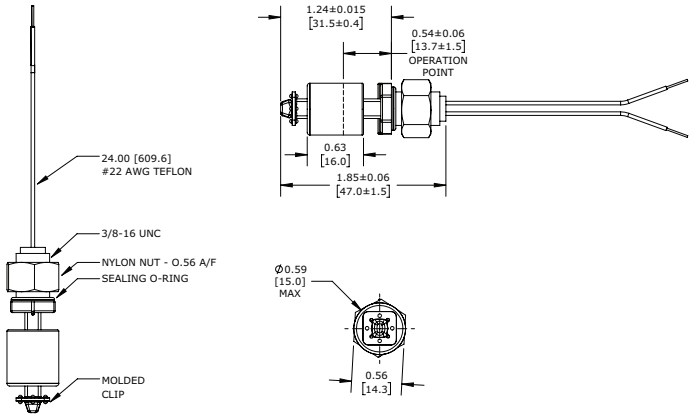
Float Level Switch Specifications											
Part No.	*Price*	*Float Material*	*Stem Material*	*Temperature Range*	*Pressure*	*Float Specific Gravity*	*Electrical Rating**	*Lead Wires*	*Mounting Hole*	*Approvals*	*Weight (lbs)*
FLS-VS-100	$;0d[6:	Polypropylene (PP)	Polypropylene (PP)	-40°F to 221°F [-40°C to 105°C]	50 psig [3.4 bar]	0.7	SPST-NC, 15W max 120VAC, 0.12 A 100VDC, 0.1 A 24VDC, 0.3 A 12VDC, 0.3 A	22AWG, Teflon 24in	Ø 0.375 in [9.53 mm] (Install w 30° max from vertical)	cURus, CE (See Approvals table for details)	0.02

** Normally closed switch only. Cannot be converted to function as normally open. Electrical ratings are for resistive loads ONLY. For inductive loads, maximum life will be obtained with the use of appropriate transient suppression such as an MOV or TVS.*

Caution: Not recommended for use with PLC AC inputs or other digital AC input devices due to damage that may occur to the switch or input device.

Dimensions

inches [mm]



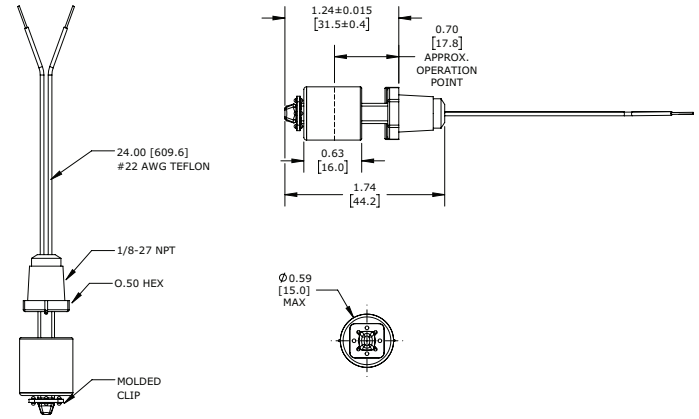
Float Level Switch Specifications											
Part No.	*Price*	*Float Material*	*Stem Material*	*Temperature Range*	*Pressure*	*Float Specific Gravity*	*Electrical Rating**	*Lead Wires*	*Mounting Thread*	*Approvals*	*Weight (lbs)*
FLS-VS-200	$;0d[7:	Polypropylene (PP)	Polypropylene (PP)	-40°F to 221°F [-40°C to 105°C]	50 psig [3.4 bar]	0.7	SPST-NC, 15W max 120VAC, 0.12 A 100VDC, 0.1 A 24VDC, 0.3 A 12VDC, 0.3 A	22AWG, Teflon 24in	1/8 in MNPT (Install w 30° max from vertical)	CE (See approvals table for details)	0.02

** Normally closed switch only. Cannot be converted to function as normally open. Electrical ratings are for resistive loads ONLY. For inductive loads, maximum life will be obtained with the use of appropriate transient suppression such as an MOV or TVS.*

Caution: Not recommended for use with PLC AC inputs or other digital AC input devices due to damage that may occur to the switch or input device.

Dimensions

inches [mm]



ProSense® Float Level Switches, Vertical Top-Mount

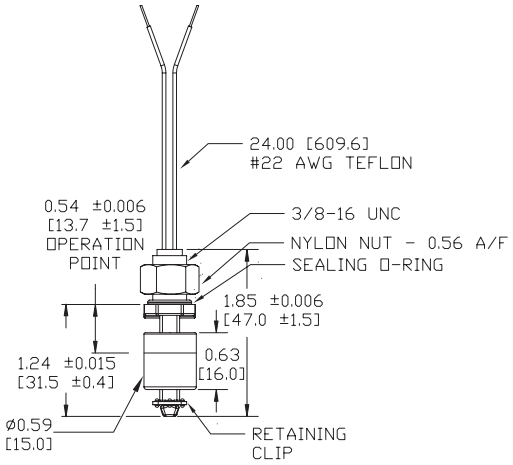
Float Level Switch Specifications											
Part No.	*Price*	*Float Material*	*Stem Material*	*Temperature Range*	*Pressure*	*Float Specific Gravity*	*Electrical Rating**	*Lead Wires*	*Mounting Hole*	*Approvals*	*Weight (lbs)*
FLS-VS-300	$-5jbb:	Polypropylene (PP)	Polypropylene (PP)	-40°F to 221°F [-40°C to 105°C]	50 psig [3.4 bar]	0.6	SPST-NO, 15W max 120VAC, 0.12 A 100VDC, 0.1 A 24VDC, 0.3 A 12VDC, 0.3 A	22AWG, Teflon 24in	Ø 0.375 in [9.53 mm] (Install w 30° max from vertical)	cURus, CE (See approvals table for details)	0.02

** Normally open switch only. Cannot be converted to function as normally closed. Electrical ratings are for resistive loads ONLY. For inductive loads, maximum life will be obtained with the use of appropriate transient suppression such as an MOV or TVS.*

Caution: Not recommended for use with PLC AC inputs or other digital AC input devices due to damage that may occur to the switch or input device.

Dimensions

inches [mm]



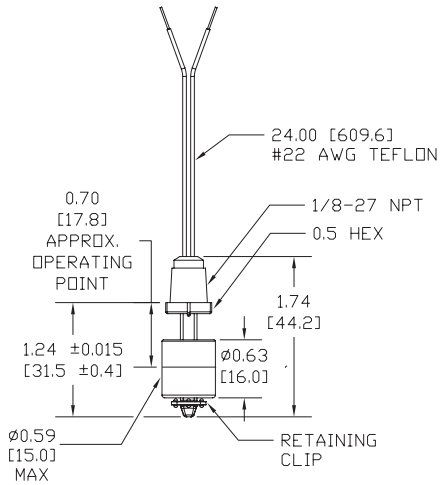
Float Level Switch Specifications											
Part No.	*Price*	*Float Material*	*Stem Material*	*Temperature Range*	*Pressure*	*Float Specific Gravity*	*Electrical Rating**	*Lead Wires*	*Mounting Thread*	*Approvals*	*Weight (lbs)*
FLS-VS-400	$-5jbc:	Polypropylene (PP)	Polypropylene (PP)	-40°F to 221°F [-40°C to 105°C]	50 psig [3.4 bar]	0.6	SPST-NO, 15W max 120VAC, 0.12 A 100VDC, 0.1 A 24VDC, 0.3 A 12VDC, 0.3 A	22AWG, Teflon 24in	1/8 in MNPT (Install w 30° max from vertical)	cURus, CE (See Approvals table for details)	0.02

** Normally open switch only. Cannot be converted to function as normally closed. Electrical ratings are for resistive loads ONLY. For inductive loads, maximum life will be obtained with the use of appropriate transient suppression such as an MOV or TVS.*

Caution: Not recommended for use with PLC AC inputs or other digital AC input devices due to damage that may occur to the switch or input device.

Dimensions

inches [mm]



ProSense® Float Level Switches, Vertical Top-Mount

Float Level Switch Specifications											
Part No.	*Price*	*Float Material*	*Stem Material*	*Temperature Range*	*Pressure*	*Float Specific Gravity*	*Electrical Rating**	*Lead Wires*	*Mounting Thread*	*Approvals*	*Weight (lbs)*
FLS-VD-100	$-05jbe:	Buna-N	Brass	-40°F to 221°F [-40°C to 105°C]	150 psig [10.3 bar]	0.5	SPST-NO, 30W max 240VAC, 0.14 A 120VAC, 0.28 A 120VDC, 0.07 A 24VDC, 0.28 A	22AWG, Halar 72in	3/4 in MNPT (Install w 30° max from vertical)	CE (See approvals table for details)	0.04

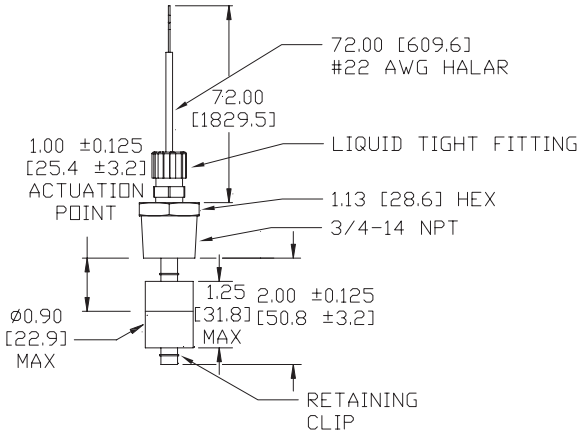
** Normally open switch only. Cannot be converted to function as normally closed. Electrical ratings are for resistive loads ONLY. For inductive loads, maximum life will be obtained with the use of appropriate transient suppression such as an MOV or TVS.*

Caution: Not recommended for use with PLC AC inputs or other digital AC input devices due to damage that may occur to the switch or input device.

Ideal for 55 gallon drum high level applications.

Dimensions

inches [mm]



Float Level Switch Specifications											
Part No.	*Price*	*Float Material*	*Stem Material*	*Temperature Range*	*Pressure*	*Float Specific Gravity*	*Electrical Rating**	*Lead Wires*	*Mounting Thread*	*Approvals*	*Weight (lbs)*
FLS-VD-200	$;-05jbf:	Buna-N	Brass	-40°F to 221°F [-40°C to 105°C]	150 psig [10.3 bar]	0.5	SPST-NC, 30W max 240VAC, 0.14 A 120VAC, 0.28 A 120VDC, 0.07 A 24VDC, 0.28 A	22AWG, Halar 72in	3/4 in MNPT (Install w 30° max from vertical)	CE (See approvals table for details)	4.0

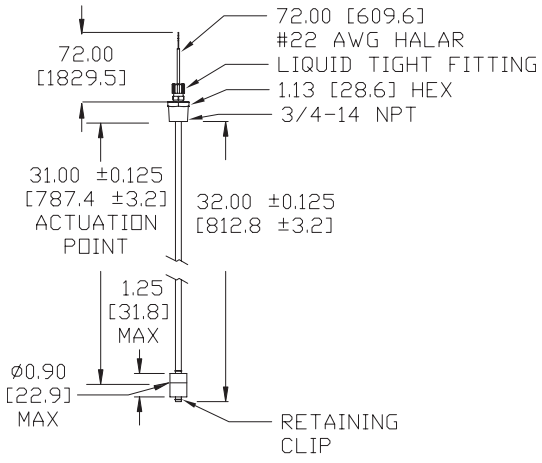
** Normally closed switch only. Cannot be converted to function as normally open. Electrical ratings are for resistive loads ONLY. For inductive loads, maximum life will be obtained with the use of appropriate transient suppression such as an MOV or TVS.*

Caution: Not recommended for use with PLC AC inputs or other digital AC input devices due to damage that may occur to the switch or input device.

Ideal for 55 gallon drum low level applications.

Dimensions

inches [mm]



ProSense® Float Level Switches, Vertical Top-Mount

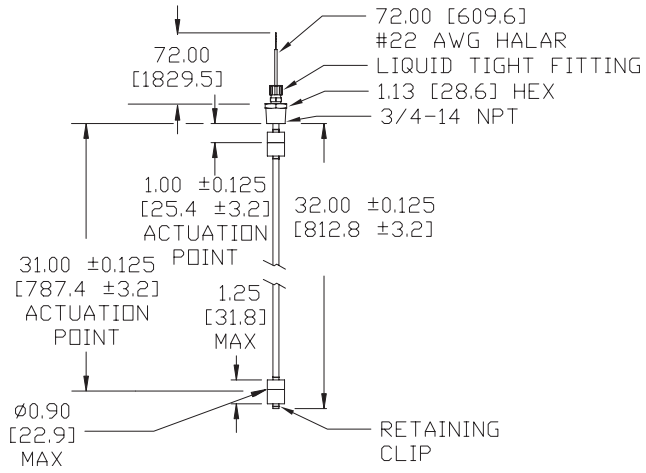
Float Level Switch Specifications											
Part No.	*Price*	*Float Material*	*Stem Material*	*Temperature Range*	*Pressure*	*Float Specific Gravity*	*Electrical Rating**	*Lead Wires*	*Mounting Thread*	*Approvals*	*Weight (lbs)*
FLS-VD-300	$-05jbg:	Buna-N	Brass	-40°F to 221°F [-40°C to 105°C]	150 psig [10.3 bar]	0.5	(1) SPST-NC (Bottom), (1) SPST-NO (Top), 30W max 240VAC, 0.14 A 120VAC, 0.28 A 120VDC, 0.07 A 24VDC, 0.28 A	22AWG, Halar 72in	3/4 in MNPT (Install w 30° max from vertical)	CE (See approvals table for details)	4.0

** Electrical ratings are for resistive loads ONLY. For inductive loads, maximum life will be obtained with the use of appropriate transient suppression such as an MOV or TVS.*
Caution: Not recommended for use with PLC AC inputs or other digital AC input devices due to damage that may occur to the switch or input device.

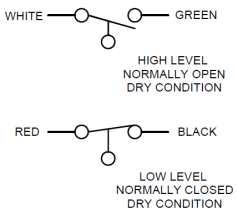
Ideal for 55 gallon drum high and low level applications.

Dimensions

inches [mm]

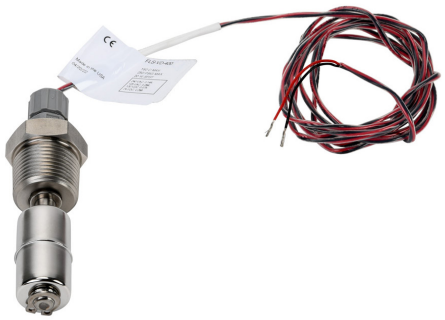


Wiring



Float Level Switch Specifications											
Part No.	*Price*	*Float Material*	*Stem Material*	*Temperature Range*	*Pressure*	*Float Specific Gravity*	*Electrical Rating**	*Lead Wires*	*Mounting Thread*	*Approvals*	*Weight (lbs)*
FLS-VD-400	$-05jbh:	316SS	316SS	-40°F to 302°F [-40°C to 150°C]	250 psig [17.2 bar]	0.73	SPST-NO, 30W max 240VAC, 0.14 A 120VAC, 0.28 A 120VDC, 0.07 A 24VDC, 0.28 A	22AWG, Halar 72in	3/4 in MNPT (Install w 30° max from vertical)	CE (See approvals table for details)	0.04

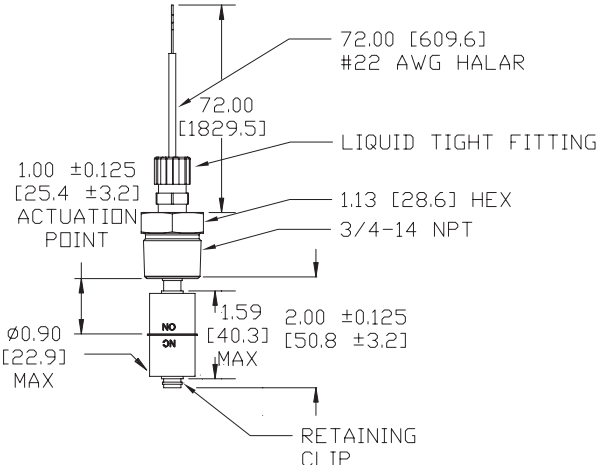
** Normally open switch only. Cannot be converted to function as normally closed. Electrical ratings are for resistive loads ONLY. For inductive loads, maximum life will be obtained with the use of appropriate transient suppression such as an MOV or TVS.*
Caution: Not recommended for use with PLC AC inputs or other digital AC input devices due to damage that may occur to the switch or input device.



Ideal for 55 gallon drum high level applications.

Dimensions

inches [mm]



ProSense® Float Level Switches, Vertical Top-Mount

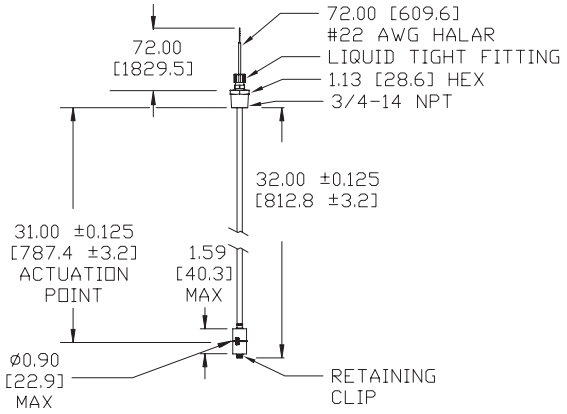
Float Level Switch Specifications											
Part No.	*Price*	*Float Material*	*Stem Material*	*Temperature Range*	*Pressure*	*Float Specific Gravity*	*Electrical Rating**	*Lead Wires*	*Mounting Thread*	*Approvals*	*Weight (lbs)*
FLS-VD-500	$--05jbi:	316SS	316SS	-40°F to 302°F [-40°C to 150°C]	250 psig [17.2 bar]	0.73	SPST-NC, 30W max 240VAC, 0.14 A 120VAC, 0.28 A 120VDC, 0.07 A 24VDC, 0.28 A	22AWG, Halar 72in	3/4 in MNPT (Install w 30° max from vertical)	CE (See approvals table for details)	4.0

** Normally closed switch only. Cannot be converted to function as normally open. Electrical ratings are for resistive loads ONLY. For inductive loads, maximum life will be obtained with the use of appropriate transient suppression such as an MOV or TVS.*
Caution: Not recommended for use with PLC AC inputs or other digital AC input devices due to damage that may occur to the switch or input device.

Ideal for 55 gallon drum low level applications.

Dimensions

inches [mm]



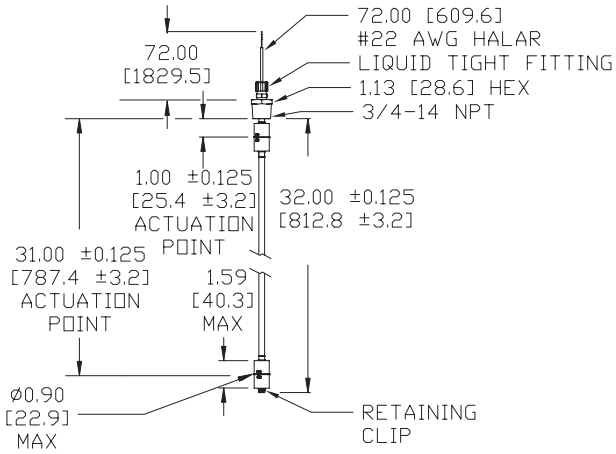
Float Level Switch Specifications											
Part No.	*Price*	*Float Material*	*Stem Material*	*Temperature Range*	*Pressure*	*Float Specific Gravity*	*Electrical Rating**	*Lead Wires*	*Mounting Thread*	*Approvals*	*Weight (lbs)*
FLS-VD-600	$--05jbj:	316SS	316SS	-40°F to 302°F [-40°C to 150°C]	250 psig [17.2 bar]	0.73	(1) SPST-NC (Bottom), (1) SPST-NO (Top), 30W max 240VAC, 0.14 A 120VAC, 0.28 A 120VDC, 0.07 A 24VDC, 0.28 A	22AWG, Halar 72in	3/4 in MNPT (Install w 30° max from vertical)	CE (See approvals table for details)	4.0

** Electrical ratings are for resistive loads ONLY. For inductive loads, maximum life will be obtained with the use of appropriate transient suppression such as an MOV or TVS.*
Caution: Not recommended for use with PLC AC inputs or other digital AC input devices due to damage that may occur to the switch or input device.

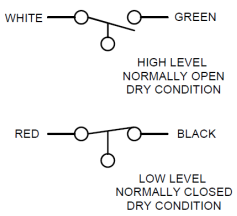
Ideal for 55 gallon drum high and low level applications.

Dimensions

inches [mm]



Wiring



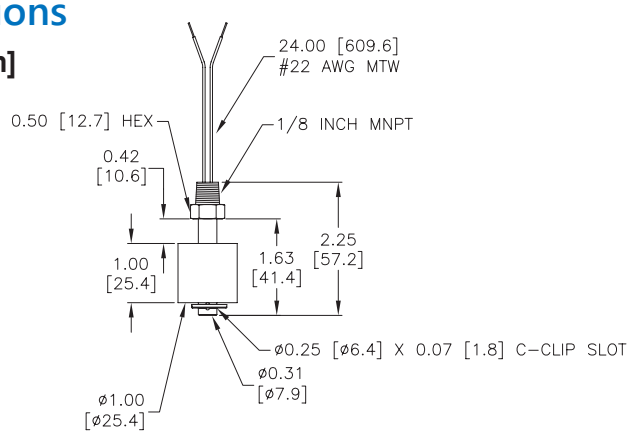
ProSense® Float Level Switches, Vertical Top-Mount

Float Level Switch Specifications											
Part No.	*Price*	*Float Material*	*Stem Material*	*Temperature Range*	*Pressure*	*Float Specific Gravity*	*Electrical Rating**	*Lead Wires*	*Mounting Thread*	*Approvals*	*Weight (lbs)*
FLS-VM-100	$;0d[0:	Polypropylene (PP)	Polypropylene (PP)	-40°F to 221°F [-40°C to 105°C]	100 psig [6.9 bar]	0.8	SPST-NC, 30W max 240VAC, 0.14 A 120VAC, 0.28 A 120VDC, 0.07 A 24VDC, 0.28 A	22AWG, MTW 24in	1/8 in MNPT (Install w 30° max from vertical)	cURus, CSA, CE (See Approvals table for details)	0.1

** Normally closed switch. Can be converted in the field to function as normally open as described under "Operation". Electrical ratings are for resistive loads ONLY. For inductive loads, maximum life will be obtained with the use of appropriate transient suppression such as an MOV or TVS.*
Caution: Not recommended for use with PLC AC inputs or other digital AC input devices due to damage that may occur to the switch or input device.

Dimensions

inches [mm]

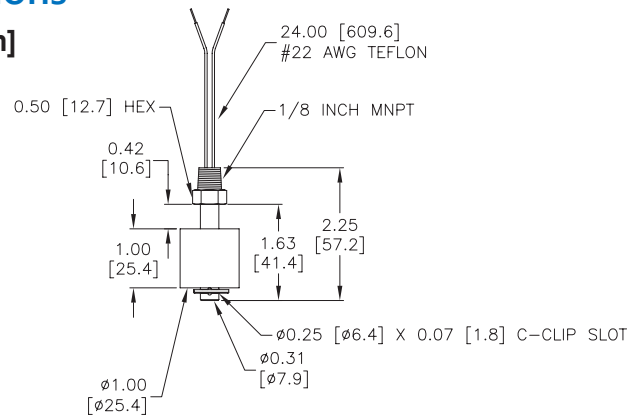


Float Level Switch Specifications											
Part No.	*Price*	*Float Material*	*Stem Material*	*Temperature Range**	*Pressure*	*Float Specific Gravity*	*Electrical Rating[1]*	*Lead Wires*	*Mounting Thread*	*Approvals*	*Weight (lbs)*
FLS-VM-200	$;0d[1:	Buna-N	Polybutylene Terephthalate (PBT)	-40°F to 221°F [-40°C to 105°C]	150 psig [10.4 bar]	0.45	SPST-NC, 30W max 240VAC, 0.14 A 120VAC, 0.28 A 120VDC, 0.07 A 24VDC, 0.28 A	22AWG, Teflon 24in	1/8 in MNPT (Install w 30° max from vertical)	cURus, CSA, CE (See Approvals table for details)	0.1

** Not for use in hot water at temperatures above 149ºF [65ºC]*
1 Normally closed switch. Can be converted in the field to function as normally open as described under "Operation". Electrical ratings are for resistive loads ONLY. For inductive loads, maximum life will be obtained with the use of appropriate transient suppression such as an MOV or TVS.
Caution: Not recommended for use with PLC AC inputs or other digital AC input devices due to damage that may occur to the switch or input device.

Dimensions

inches [mm]



ProSense® Float Level Switches, Vertical Top-Mount

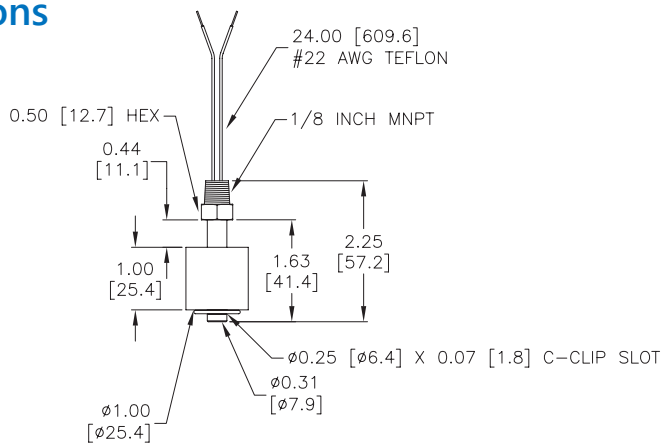
Float Level Switch Specifications											
Part No.	*Price*	*Float Material*	*Stem Material*	*Temperature Range*	*Pressure*	*Float Specific Gravity*	*Electrical Rating**	*Lead Wires*	*Mounting Thread*	*Approvals*	*Weight (lbs)*
FLS-VM-300	$;0d[2:	Buna-N	Brass	-40°F to 221°F [-40°C to 105°C]	150 psig [10.3 bar]	0.45	SPST-NC, 30W max 240VAC, 0.14 A 120VAC, 0.28 A 120VDC, 0.07 A 24VDC, 0.28 A	22AWG, Teflon 24in	1/8 in MNPT (Install w 30° max from vertical)	cURus, CSA, CE (See Approvals table for details)	0.1

** Normally closed switch. Can be converted in the field to function as normally open as described under "Operation". Electrical ratings are for resistive loads ONLY. For inductive loads, maximum life will be obtained with the use of appropriate transient suppression such as an MOV or TVS.*

Caution: Not recommended for use with PLC AC inputs or other digital AC input devices due to damage that may occur to the switch or input device.

Dimensions

inches [mm]



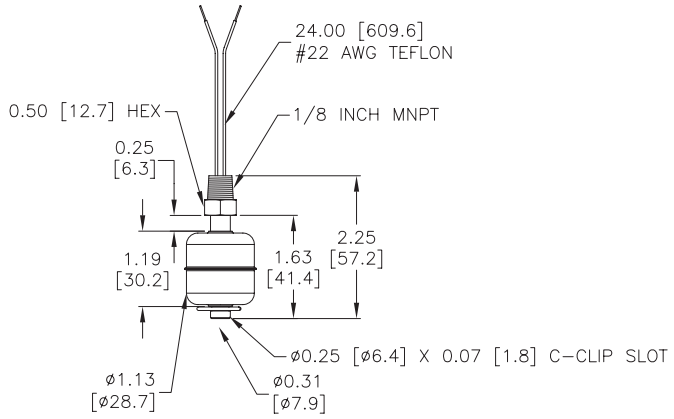
Float Level Switch Specifications											
Part No.	*Price*	*Float Material*	*Stem Material*	*Temperature Range*	*Pressure*	*Float Specific Gravity*	*Electrical Rating**	*Lead Wires*	*Mounting Thread*	*Approvals*	*Weight (lbs)*
FLS-VM-400	$;0d[3:	316SS	316SS	-40°F to 392°F [-40°C to 200°C]	300 psig [20.7 bar]	0.7	SPST-NC, 30W max 240VAC, 0.14 A 120VAC, 0.28 A 120VDC, 0.07 A 24VDC, 0.28 A	22AWG, Teflon 24in	1/8 in MNPT (Install w 30° max from vertical)	cURus, CSA, CE (See Approvals table for details)	0.1

** Normally closed switch. Can be converted in the field to function as normally open as described under "Operation". Electrical ratings are for resistive loads ONLY. For inductive loads, maximum life will be obtained with the use of appropriate transient suppression such as an MOV or TVS.*

Caution: Not recommended for use with PLC AC inputs or other digital AC input devices due to damage that may occur to the switch or input device.

Dimensions

inches [mm]



ProSense® Float Level Switches, Vertical Top-Mount

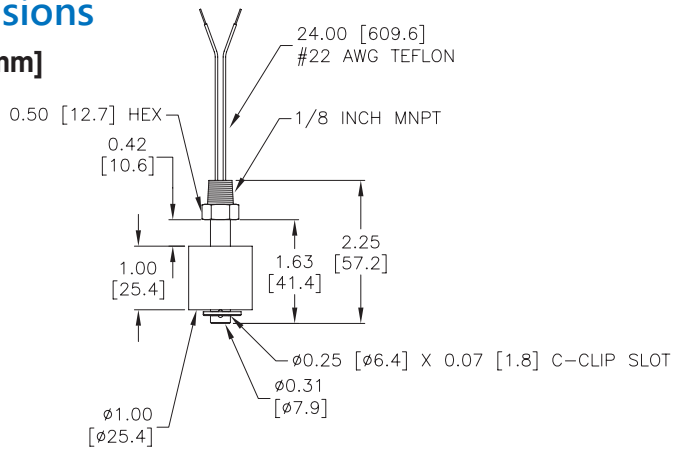
Float Level Switch Specifications											
Part No.	*Price*	*Float Material*	*Stem Material*	*Temperature Range*	*Pressure*	*Float Specific Gravity*	*Electrical Rating**	*Lead Wires*	*Mounting Thread*	*Approvals*	*Weight (lbs)*
FLS-VM-500	$;0d[4:	Kynar (PVDF)	Kynar (PVDF)	-40°F to 221°F [-40°C to 105°C]	15 psig [1bar]	0.85	SPST-NC, 60W max 240VAC, 0.4 A 120VAC, 0.5 A 120VDC, 0.2 A 24VDC, 0.5 A	22AWG, Teflon 24in	1/8 in MNPT (Install w 30° max from vertical)	cURus, CE (See Approvals table for details)	0.1

** Normally closed switch. Can be converted in the field to function as normally open as described under "Operation". Electrical ratings are for resistive loads ONLY. For inductive loads, maximum life will be obtained with the use of appropriate transient suppression such as an MOV or TVS.*

Caution: Not recommended for use with PLC AC inputs or other digital AC input devices due to damage that may occur to the switch or input device.

Dimensions

inches [mm]



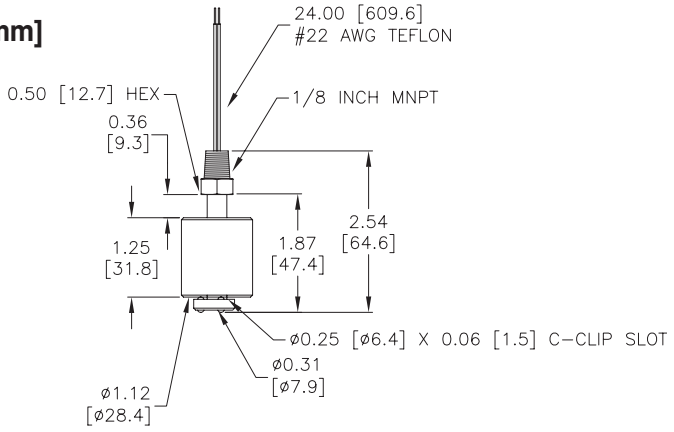
Float Level Switch Specifications											
Part No.	*Price*	*Float Material*	*Stem Material*	*Temperature Range*	*Pressure*	*Float Specific Gravity*	*Electrical Rating**	*Lead Wires*	*Mounting Thread*	*Approvals*	*Weight (lbs)*
FLS-VM-600	$;00d[5:	Polytetrafluoroethylene (PTFE) "Teflon"	PTFE "Teflon"	-40°F to 302°F [-40°C to 150°C]	25 psig [1.7 bar] @ 21°C [69.8°F]	0.69	SPST-NC, 60W max 240VAC, 0.4 A 120VAC, 0.5 A 120VDC, 0.2 A 24VDC, 0.5 A	22AWG, Teflon 24in	1/8 in MNPT (Install w 30° max from vertical)	CE (See Approvals table for details)	0.1

** Normally closed switch. Cannot be converted to function as normally open. Electrical ratings are for resistive loads ONLY. For inductive loads, maximum life will be obtained with the use of appropriate transient suppression such as an MOV or TVS.*

Caution: Not recommended for use with PLC AC inputs or other digital AC input devices due to damage that may occur to the switch or input device.

Dimensions

inches [mm]



ProSense® Float Level Switches, Vertical Top-Mount

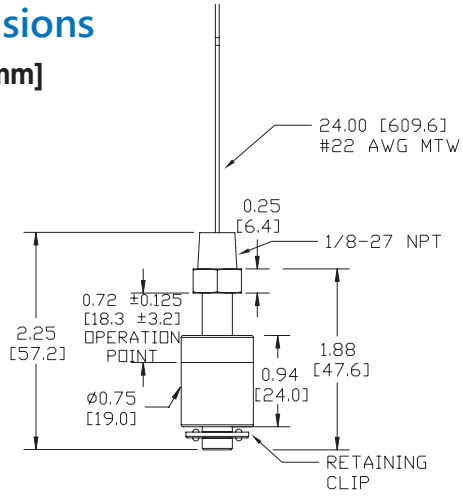
Float Level Switch Specifications											
Part No.	*Price*	*Float Material*	*Stem Material*	*Temperature Range*	*Pressure*	*Float Specific Gravity*	*Electrical Rating**	*Lead Wires*	*Mounting Thread*	*Approvals*	*Weight (lbs)*
FLS-VM-700	$-5jbs:	Polypropylene (PP)	Polypropylene (PP)	-40°F to 221°F [-40°C to 105°C]	150 psig [10.3 bar]	0.76	SPST-NC, 30W max 240VAC, 0.14 A 120VAC, 0.28 A 120VDC, 0.07 A 24VDC, 0.28 A	22AWG, MTW 24in	1/8 in MNPT (Install w 30° max from vertical)	cURus, CE (See Approvals table for details)	0.08

** Normally closed switch. Can be converted in the field to function as normally open as described under "Operation". Electrical ratings are for resistive loads ONLY. For inductive loads, maximum life will be obtained with the use of appropriate transient suppression such as an MOV or TVS.*

Caution: Not recommended for use with PLC AC inputs or other digital AC input devices due to damage that may occur to the switch or input device.

Dimensions

inches [mm]



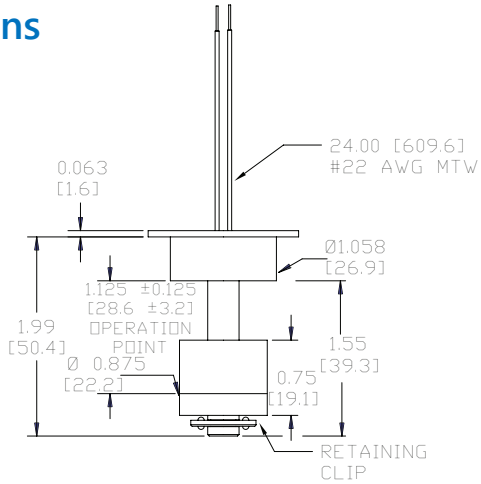
Float Level Switch Specifications											
Part No.	*Price*	*Float Material*	*Stem Material*	*Temperature Range*	*Pressure*	*Float Specific Gravity*	*Electrical Rating**	*Lead Wires*	*Mounting*	*Approvals*	*Weight (lbs)*
FLS-VM-800	$;-5jbt:	Polypropylene (PP)	PVC	-40°F to 140°F [-40°C to 60°C]	50 psig [3.4 bar]	0.85	SPST-NC, 30W max 240VAC, 0.14 A 120VAC, 0.28 A 120VDC, 0.07 A 24VDC, 0.28 A	22AWG, MTW 24in	3/4 in PVC pipe fitting	cURus, CE (See Approvals table for details)	0.08

** Normally closed switch. Cannot be converted to function as normally open. Electrical ratings are for resistive loads ONLY. For inductive loads, maximum life will be obtained with the use of appropriate transient suppression such as an MOV or TVS.*

Caution: Not recommended for use with PLC AC inputs or other digital AC input devices due to damage that may occur to the switch or input device.

Dimensions

inches [mm]



Ideal for use in HVAC condensate lines.

ProSense® Float Level Switches, Vertical Top-Mount

Float Level Switch Specifications

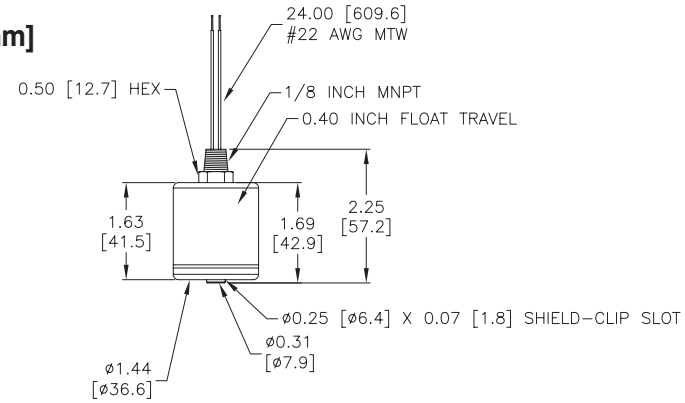
Part No.	Price	Float Material	Stem / Slosh Shield Material	Temperature Range	Pressure	Float Specific Gravity	Electrical Rating*	Lead Wires	Mounting Thread	Approvals	Weight (lbs)
FLS-VL-010	$;0d]v:	Polypropylene (PP)	Polypropylene (PP)	-40°F to 221°F [-40°C to 105°C]	100 psig [6.9 bar]	0.8	SPST-NC, 30W max 240VAC, 0.14 A 120VAC, 0.28 A 120VDC, 0.07 A 24VDC, 0.28 A	22AWG, MTW 24in	1/8 in MNPT (Install w 30° max from vertical)	cURus, CSA, CE (See Approvals table for details)	0.1

** Normally closed switch. Can be converted in the field to function as normally open as described under "Operation". Electrical ratings are for resistive loads ONLY. For inductive loads, maximum life will be obtained with the use of appropriate transient suppression such as an MOV or TVS.*

Caution: Not recommended for use with PLC AC inputs or other digital AC input devices due to damage that may occur to the switch or input device.

Dimensions

inches [mm]



Float Level Switch Specifications

Part No.	Price	Float Material	Stem / Slosh Shield Material	Temperature Range*	Pressure	Float Specific Gravity	Electrical Rating[1]	Lead Wires	Mounting Thread	Approvals	Weight (lbs)
FLS-VL-020	$;0d]x:	Buna-N	Polybutylene Terephthalate (PBT)	-40°F to 221°F [-40°C to 105°C]	150 psig [10.3 bar]	0.45	SPST-NC, 30W max 240VAC, 0.14 A 120VAC, 0.28 A 120VDC, 0.07 A 24VDC, 0.28 A	22AWG, Teflon 24in	1/8 in MNPT (Install w 30° max from vertical)	cURus, CSA, CE (See Approvals table for details)	0.1

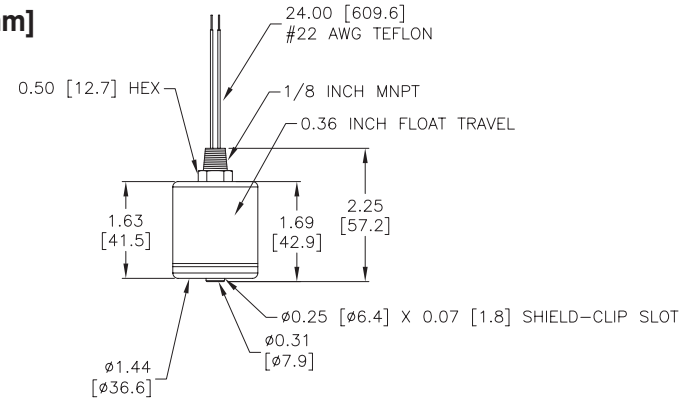
** Not for use in hot water at temperatures above 149ºF [65ºC]*

1 Normally closed switch. Can be converted in the field to function as normally open as described under "Operation". Electrical ratings are for resistive loads ONLY. For inductive loads, maximum life will be obtained with the use of appropriate transient suppression such as an MOV or TVS.

Caution: Not recommended for use with PLC AC inputs or other digital AC input devices due to damage that may occur to the switch or input device.

Dimensions

inches [mm]



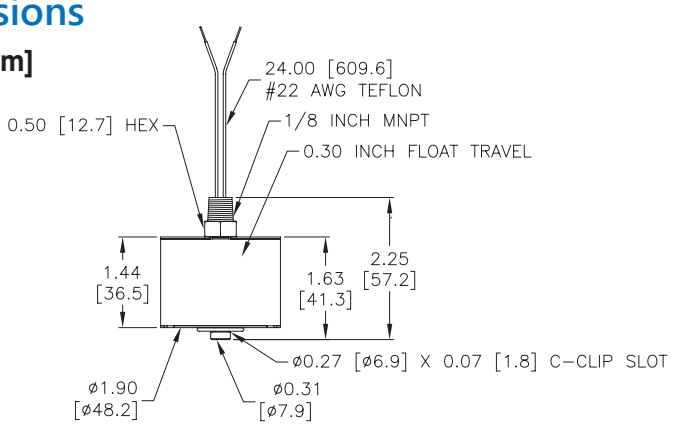
ProSense® Float Level Switches, Vertical Top-Mount

Float Level Switch Specifications											
Part No.	Price	Float Material	Stem / Slosh Shield Material	Temperature Range	Pressure	Float Specific Gravity	Electrical Rating*	Lead Wires	Mounting Thread	Approvals	Weight (lbs)
FLS-VL-030	$;0d]y:	316SS	316SS	-40°F to 392°F [-40°C to 200°C]	300 psig [20.7 bar]	0.7	SPST-NC, 30W max 240VAC, 0.14 A 120VAC, 0.28 A 120VDC, 0.07 A 24VDC, 0.28 A	22AWG, Teflon 24in	1/8 in MNPT (Install w 30° max from vertical)	cURus, CSA, CE (See Approvals table for details)	0.2

** Normally closed switch. Can be converted in the field to function as normally open as described under "Operation". Electrical ratings are for resistive loads ONLY. For inductive loads, maximum life will be obtained with the use of appropriate transient suppression such as an MOV or TVS.*
Caution: Not recommended for use with PLC AC inputs or other digital AC input devices due to damage that may occur to the switch or input device.

Dimensions

inches [mm]

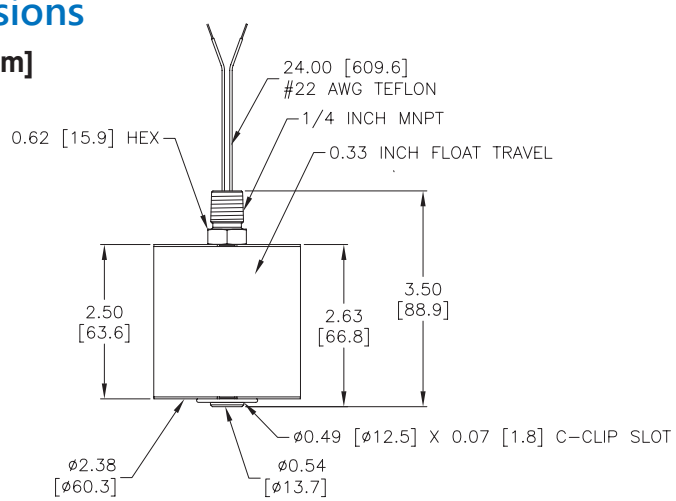


Float Level Switch Specifications											
Part No.	Price	Float Material	Stem / Slosh Shield Material	Temperature Range	Pressure	Float Specific Gravity	Electrical Rating*	Lead Wires	Mounting Thread	Approvals	Weight (lbs)
FLS-VL-040	$;00d]z:	316SS	316SS	-40°F to 392°F [-40°C to 200°C]	200 psig [13.8 bar]	0.55	SPST-NC, 60W max 240VAC, 0.4 A 120VAC, 0.5 A 120VDC, 0.2 A 24VDC, 0.5 A	22AWG, Teflon 24in	1/4 in MNPT (Install w 30° max from vertical)	CSA, CE, (See Approvals table for details)	0.4

** Normally closed switch. Can be converted in the field to function as normally open as described under "Operation". Electrical ratings are for resistive loads ONLY. For inductive loads, maximum life will be obtained with the use of appropriate transient suppression such as an MOV or TVS.*
Caution: Not recommended for use with PLC AC inputs or other digital AC input devices due to damage that may occur to the switch or input device.

Dimensions

inches [mm]



ProSense® Float Level Switches, Vertical Top-Mount

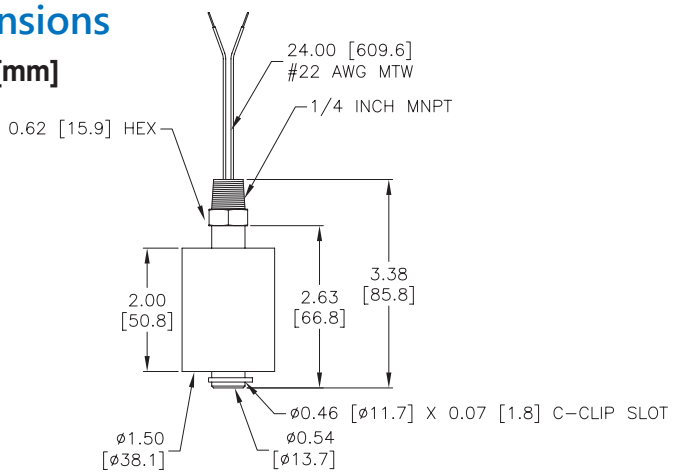
Float Level Switch Specifications											
Part No.	*Price*	*Float Material*	*Stem Material*	*Temperature Range*	*Pressure*	*Float Specific Gravity*	*Electrical Rating**	*Lead Wires*	*Mounting Thread*	*Approvals*	*Weight (lbs)*
FLS-VL-100	$;;0d]]:	Polypropylene (PP)	Polypropylene (PP)	-40°F to 221°F [-40°C to 105°C]	100 psig [6.9 bar]	0.75	SPST-NC, 60W max 240VAC, 0.4 A 120VAC, 0.5 A 120VDC, 0.2 A 24VDC, 0.5 A	22AWG, MTW 24in	1/4 in MNPT (Install w 30° max from vertical)	cURus, CSA, CE (See Approvals table for details)	0.1

** Normally closed switch. Can be converted in the field to function as normally open as described under "Operation". Electrical ratings are for resistive loads ONLY. For inductive loads, maximum life will be obtained with the use of appropriate transient suppression such as an MOV or TVS.*

Caution: Not recommended for use with PLC AC inputs or other digital AC input devices due to damage that may occur to the switch or input device.

Dimensions

inches [mm]



Float Level Switch Specifications											
Part No.	*Price*	*Float Material*	*Stem Material*	*Temperature Range**	*Pressure*	*Float Specific Gravity*	*Electrical Rating[1]*	*Lead Wires*	*Mounting Thread*	*Approvals*	*Weight (lbs)*
FLS-VL-200	$;;0d][:	Buna-N	Polybutylene Terephthalate (PBT)	-40°F to 221°F [-40°C to 105°C]	150 psig [10.3 bar]	0.45	SPST-NC, 60W max 240VAC, 0.4 A 120VAC, 0.5 A 120VDC, 0.2 A 24VDC, 0.5 A	22AWG, Teflon 24in	1/4 in MNPT (Install w 30° max from vertical)	cURus, CSA, CE (See Approvals table for details)	0.1

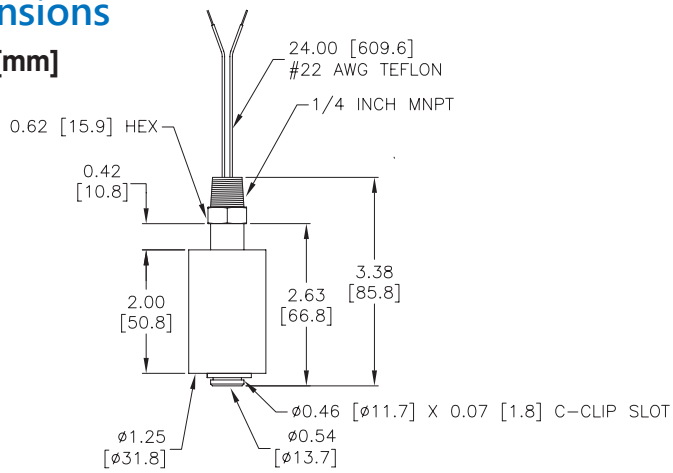
** Not for use in hot water at temperatures above 149°F [65°C]*

1 Normally closed switch. Can be converted in the field to function as normally open as described under "Operation". Electrical ratings are for resistive loads ONLY. For inductive loads, maximum life will be obtained with the use of appropriate transient suppression such as an MOV or TVS.

Caution: Not recommended for use with PLC AC inputs or other digital AC input devices due to damage that may occur to the switch or input device.

Dimensions

inches [mm]



ProSense® Float Level Switches, Vertical Top-Mount

Float Level Switch Specifications

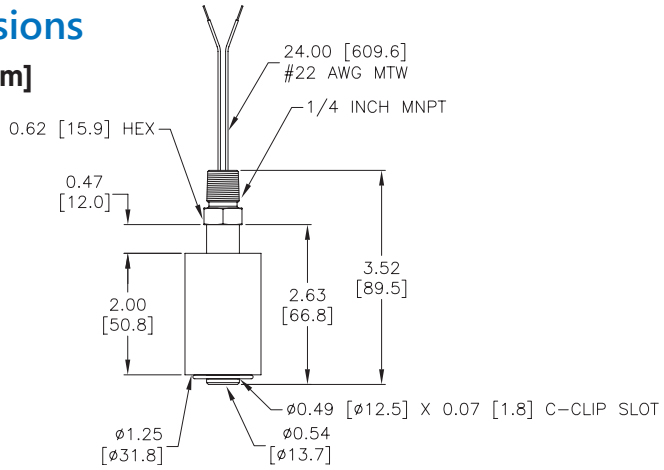
Part No.	Price	Float Material	Stem Material	Temperature Range	Pressure	Float Specific Gravity	Electrical Rating*	Lead Wires	Mounting Thread	Approvals	Weight (lbs)
FLS-VL-300	$;0d]_:	Buna-N	Brass	-40°F to 221°F [-40°C to 105°C]	150 psig [10.3 bar]	0.45	SPST-NC, 60W max 240VAC, 0.4 A 120VAC, 0.5 A 120VDC, 0.2 A 24VDC, 0.5 A	22AWG, MTW 24in	1/4 in MNPT (Install w 30° max from vertical)	cURus, CSA, CE (See Approvals table for details)	0.3

** Normally closed switch. Can be converted in the field to function as normally open as described under "Operation". Electrical ratings are for resistive loads ONLY. For inductive loads, maximum life will be obtained with the use of appropriate transient suppression such as an MOV or TVS.*

Caution: Not recommended for use with PLC AC inputs or other digital AC input devices due to damage that may occur to the switch or input device.

Dimensions

inches [mm]



Float Level Switch Specifications

Part No.	Price	Float Material	Stem Material	Minimum** Temperature	Maximum Temperature	Pressure	Float Specific Gravity	Electrical Rating*	Lead Wires	Mounting Thread	Approvals	Weight (lbs)
FLS-VL-400	$;0d]#:	316SS	316SS	-40°F [-40°C]	392°F [200°C]	200 psig [13.8 bar]	0.55	SPST-NC, 60W max 240VAC, 0.4 A 120VAC, 0.5 A 120VDC, 0.2 A 24VDC, 0.5 A	22AWG, Teflon 24in	1/4 in MNPT (Install w 30° max from vertical)	URus, CSA, CE, (See Approvals table for details) Haz-Loc Approvals	0.3

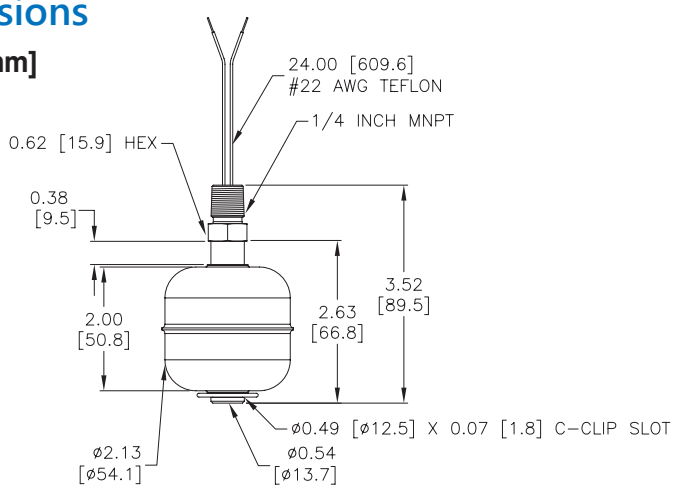
** Normally closed switch. Can be converted in the field to function as normally open as described under "Operation". Electrical ratings are for resistive loads ONLY. For inductive loads, maximum life will be obtained with the use of appropriate transient suppression such as an MOV or TVS.*

*** -40°F [-40°C] rating not UL tested*

Caution: Not recommended for use with PLC AC inputs or other digital AC input devices due to damage that may occur to the switch or input device.

Dimensions

inches [mm]



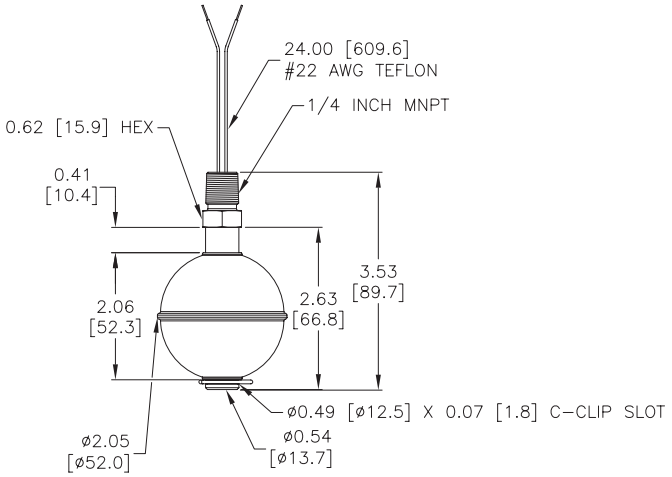
ProSense® Float Level Switches, Vertical Top-Mount

Float Level Switch Specifications											
Part No.	*Price*	*Float Material*	*Stem Material*	*Temperature Range*	*Pressure*	*Float Specific Gravity*	*Electrical Rating**	*Lead Wires*	*Mounting Thread*	*Approvals*	*Weight (lbs)*
FLS-VL-600	$;0d]?:	316SS	316SS	-40°F to 392°F [-40°C to 200°C]	500 psig [34.5 bar]	0.7	SPST-NC, 100W max 240VAC, 0.4 A 120VAC, 1A 120VDC, 0.4 A 24VDC, 1A	22AWG, Teflon 24in	1/4 in MNPT (Install w 30° max from vertical)	CE (See Approvals table for details)	0.3

** Normally closed switch. Can be converted in the field to function as normally open as described under "Operation". Electrical ratings are for resistive loads ONLY. For inductive loads, maximum life will be obtained with the use of appropriate transient suppression such as an MOV or TVS.*
Caution: Not recommended for use with PLC AC inputs or other digital AC input devices due to damage that may occur to the switch or input device.

Dimensions

inches [mm]

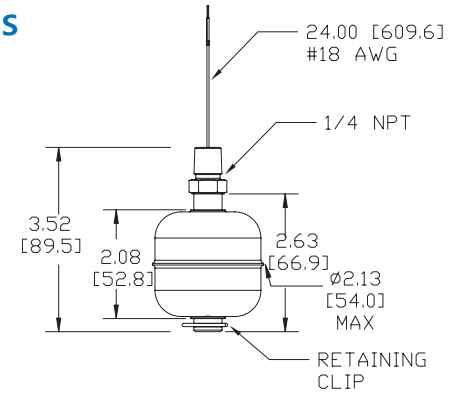


Float Level Switch Specifications											
Part No.	*Price*	*Float Material*	*Stem Material*	*Temperature Range*	*Pressure*	*Float Specific Gravity*	*Electrical Rating**	*Lead Wires*	*Mounting Thread*	*Approvals*	*Weight (lbs)*
FLS-VL-700	$-5jbo:	316SS	316SS	-40°F to 482°F [-40°C to 250°C]	200 psig [13.8 bar]	0.55	SPST-NC, 60W max 240VAC, 0.4 A 120VAC, 0.5 A 120VDC, 0.2 A 24VDC, 0.5 A	18AWG, Teflon 24in	1/4 in MNPT (Install w 30° max from vertical)	cURus, CE, (See Approvals table for details)	0.03

** Can be converted in the field to function as normally open as described under "Operation". Electrical ratings are for resistive loads ONLY. For inductive loads, maximum life will be obtained with the use of appropriate transient suppression such as an MOV or TVS.*
Caution: Not recommended for use with PLC AC inputs or other digital AC input devices due to damage that may occur to the switch or input device.

Dimensions

inches [mm]



Ideal for high temperature applications.

ProSense® Float Level Switches, Vertical Suspendible / Submersible

Float Level Switch Specifications												
Part No.	*Price*	*Float Material*	*Stem Material*	*Slosh Shield*	*Temperature Range**	*Pressure*	*Float Specific Gravity*	*Electrical Rating[1]*	*Lead Wires*	*Mounting*	*Approvals*	*Weight (lbs)*
FLS-VL-900	$;;00d],:	Buna-N	Brass	Polybutylene Terephthalate (PBT)	-40°F to 221°F [-40°C to 105°C]	50 psig [3.4 bar]	0.45	SPST-NC, 30W max 240VAC, 0.14 A 120VAC, 0.28 A 120VDC, 0.07 A 24VDC, 0.28 A	22AWG, Halar jacketed 20-foot cable	Suspendible cable	CE (See Approvals table for details)	0.3

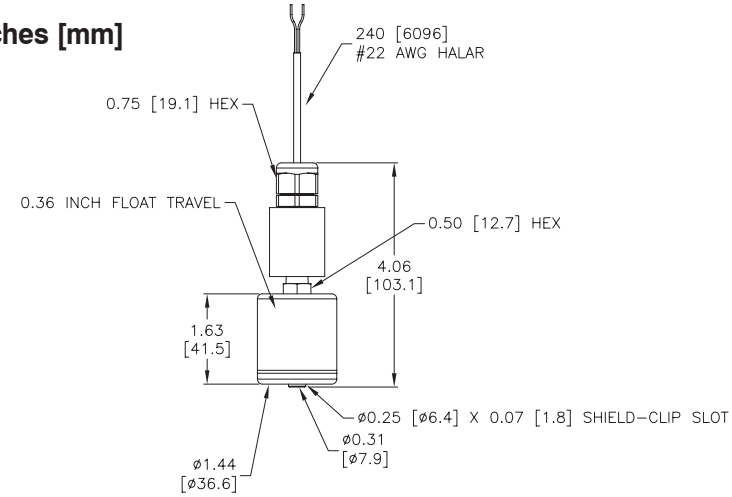
** Not for use in hot water at temperatures above 149ºF [65ºC]*

1 Normally closed switch. Can be converted in the field to function as normally open as described under "Operation". Electrical ratings are for resistive loads ONLY. For inductive loads, maximum life will be obtained with the use of appropriate transient suppression such as an MOV or TVS.

Caution: Not recommended for use with PLC AC inputs or other digital AC input devices due to damage that may occur to the switch or input device.

Dimensions

inches [mm]



ProSense® Float Level Switches, Horizontal Side-Mount

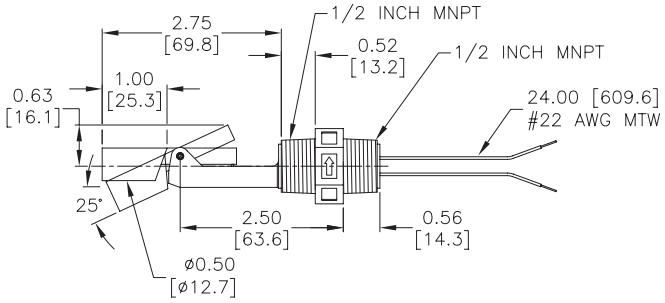
Float Level Switch Specifications											
Part No.	*Price*	*Float Material*	*Stem Material*	*Temperature Range*	*Pressure*	*Float Specific Gravity*	*Electrical Rating**	*Lead Wires*	*Mounting Thread*	*Approvals*	*Weight (lbs)*
FLS-HS-100	$;-0d]l:	Polypropylene (PP)	Polypropylene (PP)	-40°F to 221°F [-40°C to 105°C]	100 psig [6.9 bar]	0.6	SPST-NC, 30W max 240VAC, 0.14 A 120VAC, 0.28 A 120VDC, 0.07 A 24VDC, 0.28 A	22AWG, MTW 24in	Dual 1/2 in MNPT	cURus, CSA, CE (See Approvals table for details)	0.1

** Can be installed to function as either normally open or normally closed switch. Electrical ratings are for resistive loads ONLY. For inductive loads, maximum life will be obtained with the use of appropriate transient suppression such as an MOV or TVS.*

Caution: Not recommended for use with PLC AC inputs or other digital AC input devices due to damage that may occur to the switch or input device.

Dimensions

inches [mm]



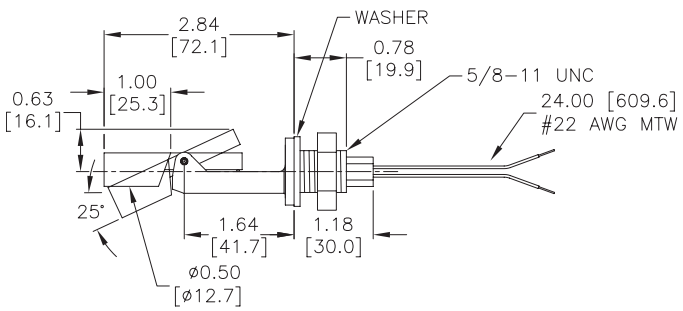
Float Level Switch Specifications												
Part No.	*Price*	*Float Material*	*Stem Material*	*Gasket Material*	*Temperature Range*	*Pressure*	*Float Specific Gravity*	*Electrical Rating**	*Lead Wires*	*Mounting Hole*	*Approvals*	*Weight (lbs)*
FLS-HS-200	$;0d]n:	Polypropylene (PP)	Polypropylene (PP)	Silicone	-40°F to 221°F [-40°C to 105°C]	100 psig [6.9 bar]	0.6	SPST-NC, 30W max 240VAC, 0.14 A 120VAC, 0.28 A 120VDC, 0.07 A 24VDC, 0.28 A	22AWG, MTW 24in	Ø 0.625 in [16 mm]	cURus, CSA, CE (See Approvals table for details)	0.1

** Can be installed to function as either normally open or normally closed switch. Electrical ratings are for resistive loads ONLY. For inductive loads, maximum life will be obtained with the use of appropriate transient suppression such as an MOV or TVS.*

Caution: Not recommended for use with PLC AC inputs or other digital AC input devices due to damage that may occur to the switch or input device.

Dimensions

inches [mm]



ProSense® Float Level Switches, Horizontal Side-Mount

Float Level Switch Specifications

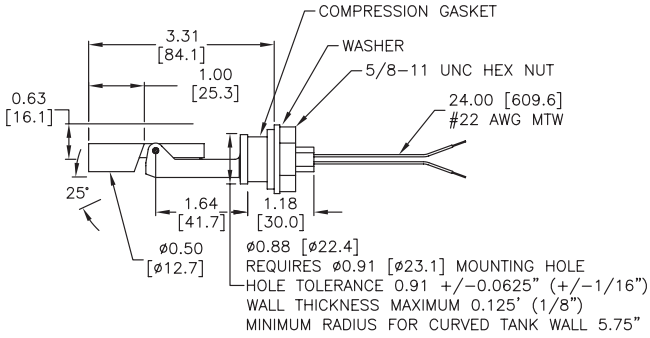
Part No.	Price	Float Material	Stem Material	Gasket Material	Temperature Range	Pressure	Float Specific Gravity	Electrical Rating*	Lead Wires	Mounting Hole	Approvals	Weight (lbs)
FLS-HS-300	$;0d]o:	Polypropylene (PP)	Polypropylene (PP)	Nitrile	-40°F to 221°F [-40°C to 105°C]	100 psig [6.9 bar]	0.6	SPST-NC, 30W max 240VAC, 0.14 A 120VAC, 0.28 A 120VDC, 0.07 A 24VDC, 0.28 A	22AWG, MTW 24in	Ø 0.91 in [23.1 mm]	CE (See Approvals table for details)	0.1

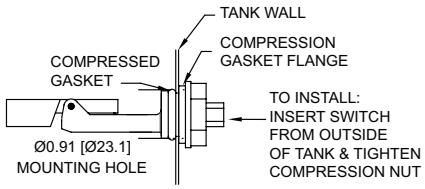
** Can be installed to function as either normally open or normally closed switch. Electrical ratings are for resistive loads ONLY. For inductive loads, maximum life will be obtained with the use of appropriate transient suppression such as an MOV or TVS.*

Caution: Not recommended for use with PLC AC inputs or other digital AC input devices due to damage that may occur to the switch or input device.

Dimensions

inches [mm]





Float Level Switch Specifications

Part No.	Price	Float Material	Stem Material	Temperature Range*	Pressure	Float Specific Gravity	Electrical Rating[1]	Lead Wires[2]	Mounting Thread	Approvals	Weight (lbs)
FLS-HM-100	$;-0d]i:	Polybutylene Terephthalate (PBT)	Polybutylene Terephthalate (PBT)	-40°F to 266°F [-40°C to 130°C]	100 psig [6.9 bar]	0.7	SPST-NC, 30W max 240VAC, 0.14 A 120VAC, 0.28 A 120VDC, 0.07 A 24VDC, 0.28 A	22AWG, Teflon 24in	Dual 1/2 in MNPT	cURus, CSA, CE (See Approvals table for details)	0.1

** Not for use in hot water at temperatures above 149ºF [65ºC]*

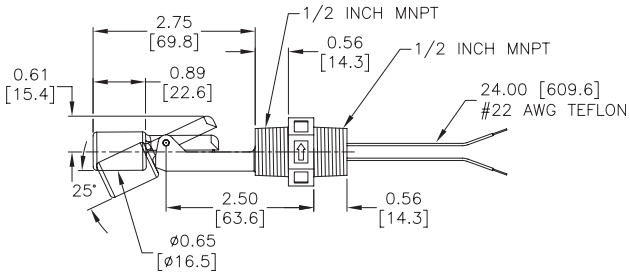
1 Can be installed to function as either normally open or normally closed switch. Electrical ratings are for resistive loads ONLY. For inductive loads, maximum life will be obtained with the use of appropriate transient suppression such as an MOV or TVS.

2 Leadwires rated for 140ºF [60ºC] max when exposed to oil

Caution: Not recommended for use with PLC AC inputs or other digital AC input devices due to damage that may occur to the switch or input device.

Dimensions

inches [mm]



ProSense® Float Level Switches, Horizontal Side-Mount

Float Level Switch Specifications

Part No.	Price	Float Material	Stem Material	Minimum** Temperature	Maximum Temperature	Pressure	Float Specific Gravity	Electrical Rating*	Lead Wires	Mounting Thread	Approvals	Weight (lbs)
FLS-HM-200	$;-00d]j:	316SS	316SS	-40°F [-40°C]	392°F [200°C]	300 psig [20.7 bar]	0.6	SPST-NO/NC (selectable) 240VAC, 0.14 A 120VAC, 0.28 A 120VDC, 0.07 A 24VDC, 0.28 A	22AWG, Teflon 24in	Dual 1/2 in MNPT	cURus, CSA, CE (See Approvals table for details) Haz-Loc Approvals	0.3

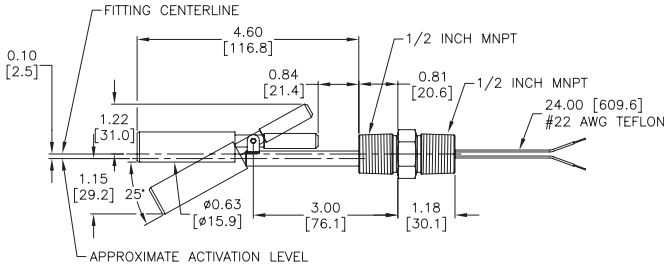
** Can be installed to function as either normally open or normally closed switch. Electrical ratings are for resistive loads ONLY. For inductive loads, maximum life will be obtained with the use of appropriate transient suppression such as an MOV or TVS.*

*** -40°F [-40°C] rating not UL tested*

Caution: Not recommended for use with PLC AC inputs or other digital AC input devices due to damage that may occur to the switch or input device.

Dimensions

inches [mm]



Float Level Switch Specifications

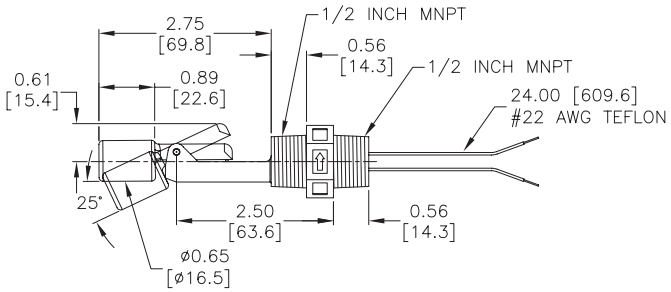
Part No.	Price	Float Material	Stem Material	Temperature Range	Pressure	Float Specific Gravity	Electrical Rating*	Lead Wires	Mounting Thread	Approvals	Weight (lbs)
FLS-HM-300	$;0d]k:	Kynar (PVDF)	Kynar (PVDF)	-40°F to 221°F [-40°C to 105°C]	100 psig [6.9 bar]	0.93	SPST-NO/NC (selectable), 30W max 240VAC, 0.14 A 120VAC, 0.28 A 120VDC, 0.07 A 24VDC, 0.28 A	22AWG, Teflon 24in	Dual 1/2 in MNPT	cURus, CE, (See Approvals table for details)	0.2

** Can be installed to function as either normally open or normally closed switch. Electrical ratings are for resistive loads ONLY. For inductive loads, maximum life will be obtained with the use of appropriate transient suppression such as an MOV or TVS.*

Caution: Not recommended for use with PLC AC inputs or other digital AC input devices due to damage that may occur to the switch or input device.

Dimensions

inches [mm]



ProSense® Float Level Switches, Horizontal Side-Mount

Float Level Switch Specifications

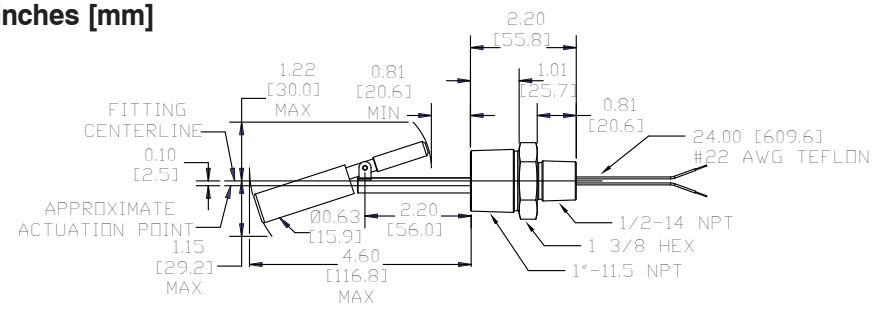
Part No.	Price	Float Material	Stem Material	Temperature Range	Pressure	Float Specific Gravity	Electrical Rating*	Lead Wires	Mounting Thread	Approvals	Weight (lbs)
FLS-HM-400	$-05jbn:	316SS	316SS	-40°F to 392°F [-40°C to 200°C]	300 psig [20.7 bar]	0.60	SPST-NO/NC (selectable), 30W max 240VAC, 0.14 A 120VAC, 0.28 A 120VDC, 0.07 A 24VDC, 0.28 A	22AWG, Teflon 24in	1in MNPT x 1/2 in MNPT	cURus, CE (See Approvals table for details) Haz-Loc Approvals	0.03

** Can be installed to function as either normally open or normally closed switch. Electrical ratings are for resistive loads ONLY. For inductive loads, maximum life will be obtained with the use of appropriate transient suppression such as an MOV or TVS.*

Caution: Not recommended for use with PLC AC inputs or other digital AC input devices due to damage that may occur to the switch or input device.

Dimensions

inches [mm]



Float Level Switch Specifications

Part No.	Price	Float Material	Stem Material	Temperature Range**	Pressure	Float Specific Gravity	Electrical Rating*	Electrical Connection	Mounting Thread	Approvals	Weight (lbs)
FLS-HM-500	$-5jbp:	Polybutylene Terephthalate (PBT)	Polybutylene Terephthalate (PBT)	-40°F to 266°F [-40°C to 130°C]	100 psig [6.9 bar]	0.70	SPST-NO/NC (selectable), 30W max 220VAC, 0.14 A 110VAC, 0.28 A 120VDC, 0.07 A 24VDC, 0.28 A	Male spade 1/4 in quick connect	1/2 in MNPT	cURus, CE (See Approvals table for details)	0.1

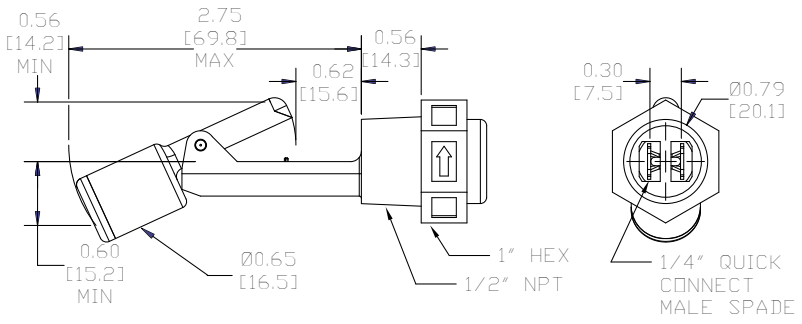
** Can be installed to function as either normally open or normally closed switch. Electrical ratings are for resistive loads ONLY. For inductive loads, maximum life will be obtained with the use of appropriate transient suppression such as an MOV or TVS.*

*** Not for use in hot water at temperatures above 149 deg F (65 deg C).*

Caution: Not recommended for use with PLC AC inputs or other digital AC input devices due to damage that may occur to the switch or input device.

Dimensions

inches [mm]



ProSense® Float Level Switches, Horizontal Side-Mount

Float Level Switch Specifications

Part No.	Price	Float Material	Stem Material	Temperature Range**	Pressure	Float Specific Gravity	Electrical Rating*	Lead Wires	Mounting Thread	Approvals	Weight (lbs)
FLS-HM-600	$-5jbq:	Polybutylene Terephthalate (PBT)	Polybutylene Terephthalate (PBT)	-40°F to 266°F [-40°C to 130°C]	100 psig [6.9 bar]	0.75	SPST-NO/NC (selectable), 30W max 240VAC, 0.14 A 120VAC, 0.28 A 120VDC, 0.07 A 24VDC, 0.28 A	22AWG, Teflon 24in	5/8-11 male UNC with washer and nut	cURus, CE (See Approvals table for details)	0.1

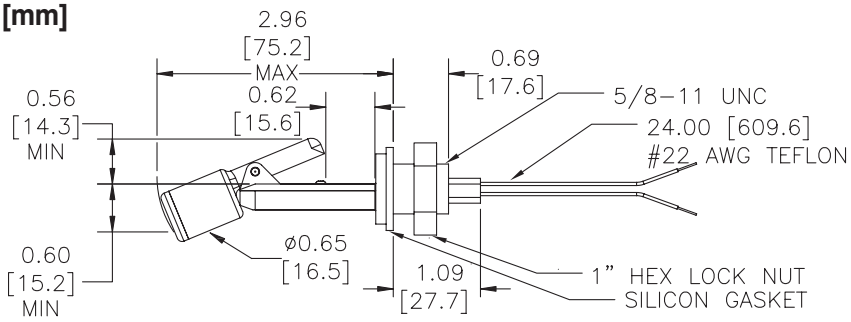
** Can be installed to function as either normally open or normally closed switch. Electrical ratings are for resistive loads ONLY. For inductive loads, maximum life will be obtained with the use of appropriate transient suppression such as an MOV or TVS.*

*** Not for use in hot water at temperatures above 149 deg F (65 deg C).*

Caution: Not recommended for use with PLC AC inputs or other digital AC input devices due to damage that may occur to the switch or input device.

Dimensions

inches [mm]



Float Level Switch Specifications

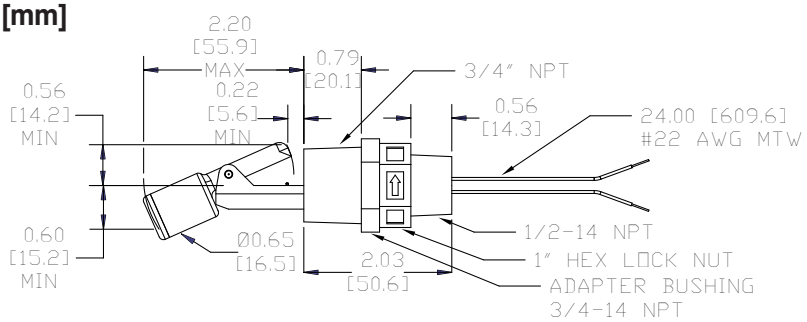
Part No.	Price	Float Material	Stem Material	Temperature Range	Pressure	Float Specific Gravity	Electrical Rating*	Lead Wires	Mounting Thread	Approvals	Weight (lbs)
FLS-HM-700	$-5jbu:	Polypropylene (PP)	Polypropylene (PP)	-40°F to 221°F [-40°C to 105°C]	100 psig [6.9 bar]	0.50	SPST-NO/NC (selectable), 30W max 240VAC, 0.14 A 120VAC, 0.28 A 120VDC, 0.07 A 24VDC, 0.28 A	22AWG, MTW 24in	3/4 in MNPT x 1/2 in MNPT	cURus, CE (See Approvals table for details)	0.1

** Can be installed to function as either normally open or normally closed switch. Electrical ratings are for resistive loads ONLY. For inductive loads, maximum life will be obtained with the use of appropriate transient suppression such as an MOV or TVS.*

Caution: Not recommended for use with PLC AC inputs or other digital AC input devices due to damage that may occur to the switch or input device.

Dimensions

inches [mm]



ProSense® Float Level Switches, Horizontal Side-Mount

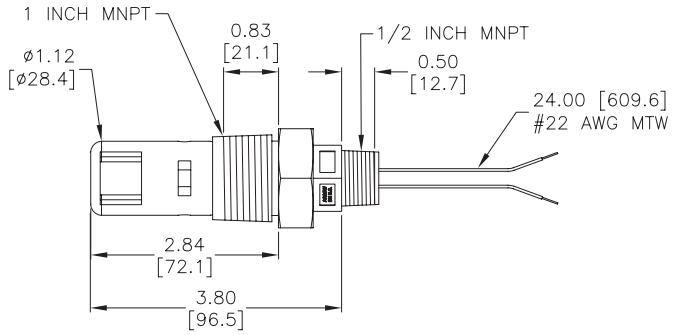
Float Level Switch SpecificationsId											
Part No.	*Price*	*Float Material*	*Stem / Slosh Shield Material*	*Temperature Range*	*Pressure*	*Float Specific Gravity*	*Electrical Rating**	*Lead Wires*	*Mounting Thread*	*Approvals*	*Weight (lbs)*
FLS-HL-010	$;0d]h:	Polypropylene (PP)	Polypropylene (PP)	-40°F to 221°F [-40°C to 105°C]	100 psig [6.9 bar]	0.6	SPST-NO/NC (selectable) 30W max 240VAC, 0.14 A 120VAC, 0.28 A 120VDC, 0.07 A 24VDC, 0.28 A	22AWG, MTW 24in	1in MNPT x 1/2 in MNPT	CE (See Approvals table for details)	0.2

** Can be installed to function as either normally open or normally closed switch. Electrical ratings are for resistive loads ONLY. For inductive loads, maximum life will be obtained with the use of appropriate transient suppression such as an MOV or TVS.*

Caution: Not recommended for use with PLC AC inputs or other digital AC input devices due to damage that may occur to the switch or input device.

Dimensions

inches [mm]



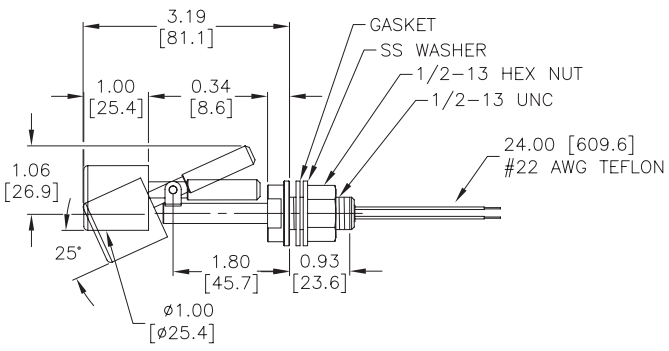
Float Level Switch Specifications											
Part No.	*Price*	*Float Material*	*Stem Material*	*Gasket Material*	*Temperature Range*	*Pressure*	*Float Specific Gravity*	*Electrical Rating**	*Lead Wires*	*Mounting Hole*	*Approvals*	*Weight (lbs)*
FLS-HL-200	$005dz:	316SS	316SS	Silicone	-40°F to 392°F [-40°C to 200°C]	100 psig [6.9 bar]	0.7	SPST-NO/NC (selectable), 30W max 240VAC, 0.14 A 120VAC, 0.28 A 120VDC, 0.07 A 24VDC, 0.28 A	22AWG, Teflon 24in	Ø 0.563 in [14.3 mm]	cURus, CE (See Approvals table for details)	0.3

** Can be installed to function as either normally open or normally closed switch. Electrical ratings are for resistive loads ONLY. For inductive loads, maximum life will be obtained with the use of appropriate transient suppression such as an MOV or TVS.*

Caution: Not recommended for use with PLC AC inputs or other digital AC input devices due to damage that may occur to the switch or input device.

Dimensions

inches [mm]



ProSense® Float Level Switches, Horizontal Side-Mount

Float Level Switch SpecificationsId											
Part No.	*Price*	*Float Material*	*Stem Material*	*Temperature Range*	*Pressure*	*Float Specific Gravity*	*Electrical Rating**	*Lead Wires*	*Mounting Thread*	*Approvals*	*Weight (lbs)*
FLS-HL-300	$-05jbk:	304SS	304SS	-40°F to 302°F [-40°C to 150°C]	150 psig [10.3 bar]	0.6	SPDT-NO/NC (selectable), 100W max 240VAC, 0.14 A 120VAC, 0.28 A 120VDC, 0.07 A 24VDC, 0.28 A	22AWG, Teflon 24in	1in MNPT	CE (See Approvals table for details)	0.5

** Can be installed to function as either normally open or normally closed switch. Electrical ratings are for resistive loads ONLY. For inductive loads, maximum life will be obtained with the use of appropriate transient suppression such as an MOV or TVS.*

Caution: Not recommended for use with PLC AC inputs or other digital AC input devices due to damage that may occur to the switch or input device.

Dimensions

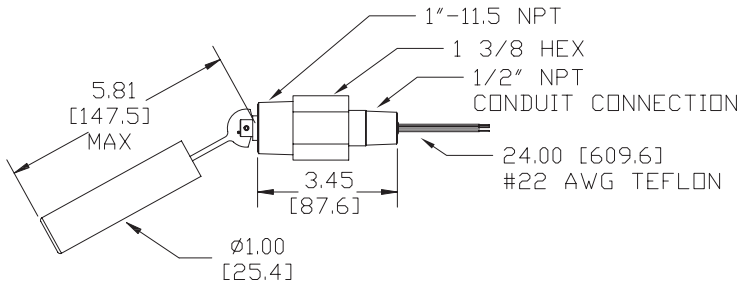
inches [mm]

Wiring

Black - Common

Orange - N.O.

Red - N.C.



Float Level Switch Specifications											
Part No.	*Price*	*Float Material*	*Stem Material*	*Temperature Range*	*Pressure*	*Float Specific Gravity*	*Electrical Rating**	*Lead Wires*	*Mounting Thread*	*Approvals*	*Weight (lbs)*
FLS-HL-400	$--05jbl:	Buna-N	304SS	-40°F to 221°F [-40°C to 105°C]	100 psig [6.9 bar]	0.45	SPDT-NO/NC (selectable), 100W max 240VAC, 0.14 A 120VAC, 0.28 A 120VDC, 0.07 A 24VDC, 0.28 A	22AWG, Teflon 24in	1in MNPT	CE (See Approvals table for details)	0.5

** Can be installed to function as either normally open or normally closed switch. Electrical ratings are for resistive loads ONLY. For inductive loads, maximum life will be obtained with the use of appropriate transient suppression such as an MOV or TVS.*

Caution: Not recommended for use with PLC AC inputs or other digital AC input devices due to damage that may occur to the switch or input device.

Dimensions

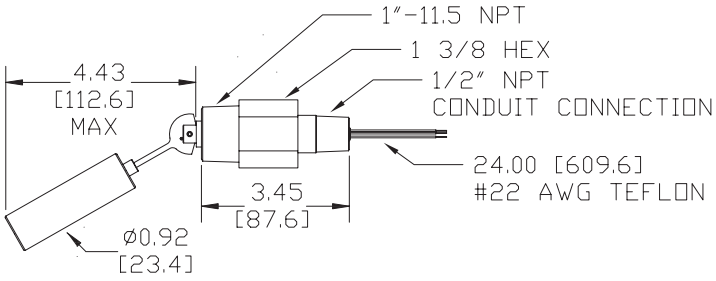
inches [mm]

Wiring

Black - Common

Orange - N.O.

Red - N.C.



ProSense® Float Level Switches, Horizontal Side-Mount

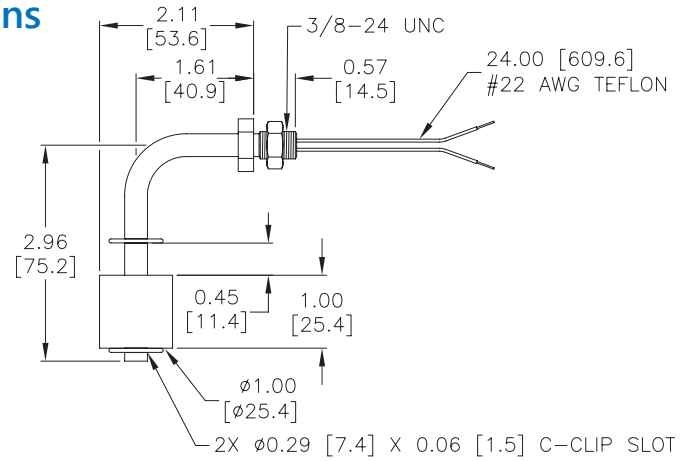
Float Level Switch Specifications											
Part No.	*Price*	*Float Material*	*Stem Material*	*Temperature Range*	*Pressure*	*Float Specific Gravity*	*Electrical Rating**	*Lead Wires*	*Mounting Hole*	*Approvals*	*Weight (lbs)*
FLS-BM-100	$;0d]e:	Polypropylene (PP)	316SS	-40°F to 221°F [-40°C to 105°C]	100 psig [6.9 bar]	0.8	SPST-NC, 30W max 240VAC, 0.14 A 120VAC, 0.28 A 120VDC, 0.07 A 24VDC, 0.28 A	22AWG, Teflon 24in	Ø 0.406 in [10.3 mm]	CE (See Approvals table for details)	0.2

** Can be installed to function as either normally open or normally closed switch. Electrical ratings are for resistive loads ONLY. For inductive loads, maximum life will be obtained with the use of appropriate transient suppression such as an MOV or TVS.*

Caution: Not recommended for use with PLC AC inputs or other digital AC input devices due to damage that may occur to the switch or input device.

Dimensions

inches [mm]



ProSense® Float Level Switches, Horizontal Side-Mount

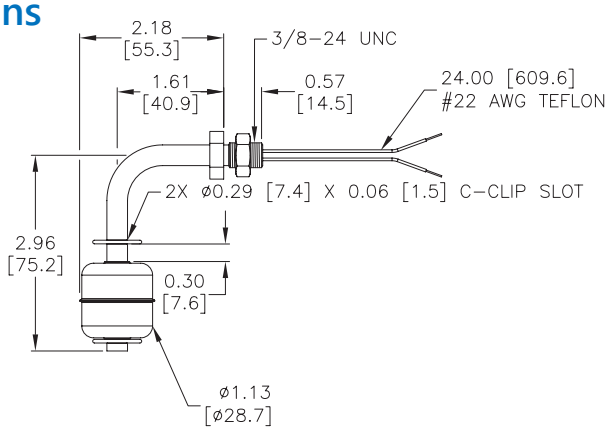
Float Level Switch Specifications											
Part No.	*Price*	*Float Material*	*Stem Material*	*Temperature Range*	*Pressure*	*Float Specific Gravity*	*Electrical Rating**	*Lead Wires*	*Mounting Hole*	*Approvals*	*Weight (lbs)*
FLS-BM-300	$;0d]g:	316SS	316SS	-40°F to 392°F [-40°C to 200°C]	300 psig [20.7 bar]	0.7	SPST-NC, 30W max 240VAC, 0.14 A 120VAC, 0.28 A 120VDC, 0.07 A 24VDC, 0.28 A	22AWG, Teflon 24in	Ø 0.406 in [10.3 mm]	CSA, cURus, CE (See Approvals table for details)	0.2

** Can be installed to function as either normally open or normally closed switch. Electrical ratings are for resistive loads ONLY. For inductive loads, maximum life will be obtained with the use of appropriate transient suppression such as an MOV or TVS.*

Caution: Not recommended for use with PLC AC inputs or other digital AC input devices due to damage that may occur to the switch or input device.

Dimensions

inches [mm]



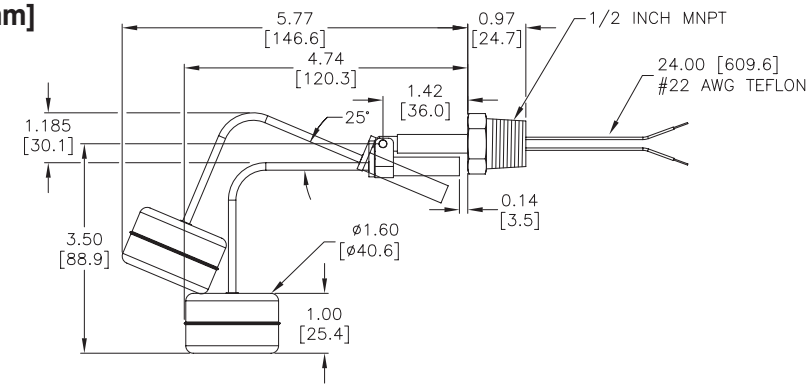
Float Level Switch Specifications											
Part No.	*Price*	*Float Material*	*Stem Material*	*Temperature Range*	*Pressure*	*Float Specific Gravity*	*Electrical Rating**	*Lead Wires*	*Mounting Thread*	*Approvals*	*Weight (lbs)*
FLS-BL-100	$;00d]d:	316SS	316SS	-40°F to 392°F [-40°C to 200°C]	50 psig (3.4 bar)	0.6	SPST-NC, 30W max 240VAC, 0.14 A 120VAC, 0.28 A 120VDC, 0.07 A 24VDC, 0.28 A	22AWG, Teflon 24in	1/2 in MNPT	CE (See Approvals table for details)	0.3

** Can be installed to function as either normally open or normally closed switch. Electrical ratings are for resistive loads ONLY. For inductive loads, maximum life will be obtained with the use of appropriate transient suppression such as an MOV or TVS.*

Caution: Not recommended for use with PLC AC inputs or other digital AC input devices due to damage that may occur to the switch or input device.

Dimensions

inches [mm]



ProSense® Float Level Switch Kits

Brass

Stainless Steel

Float Level Switch Kits

ProSense float level switch kits provide the opportunity to fabricate in the field a customized two-float level switch with a maximum stem length of 36 inches (914.4 mm) using the supplied kit components. Level switch kits are available in two different material constructions for compatibility with different liquids.

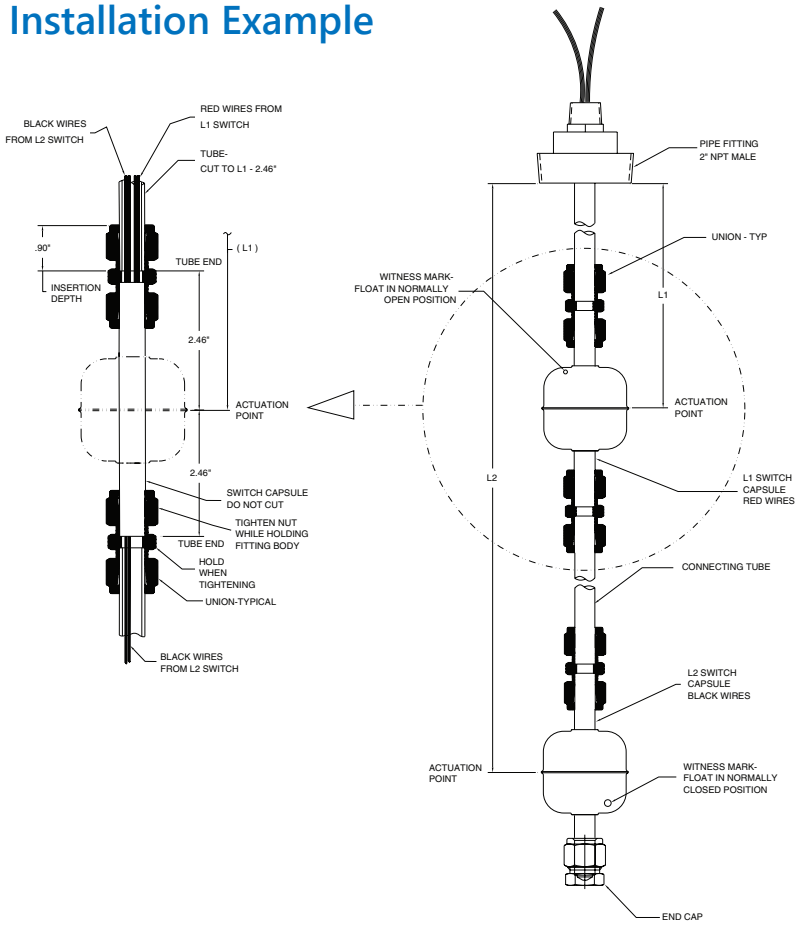
Each kit is furnished with the following components:

- 2-inch NPT male threaded pipe plug with attached cuttable mounting tube
- Two additional cuttable connecting tubes
- Two floats
- Two SPST switch capsules that can function as either normally closed or normally open depending on float orientation
- Four compression unions
- One compression end cap

Assembly of ProSense float level switch kits generally involves the following steps:

- Lay out the supplied components in the required configuration
- Determine the lengths of the connecting tubes and cut them accordingly
- De-burr and smooth the sharp edges of the cut tubes prior to installation
- Perform a trial assembly and using a continuity indicator (light, buzzer, Ohm meter, etc.), verify that the switch actuation levels are at the required levels and the switch action (normally open or normally closed) is correct for the application.
- When switch set-up is satisfactory, tighten the fittings and apply thread sealant to the pipe threads on the top fitting before installing the switch into the tank.

Installation Example



ProSense® Float Level Switch Kits

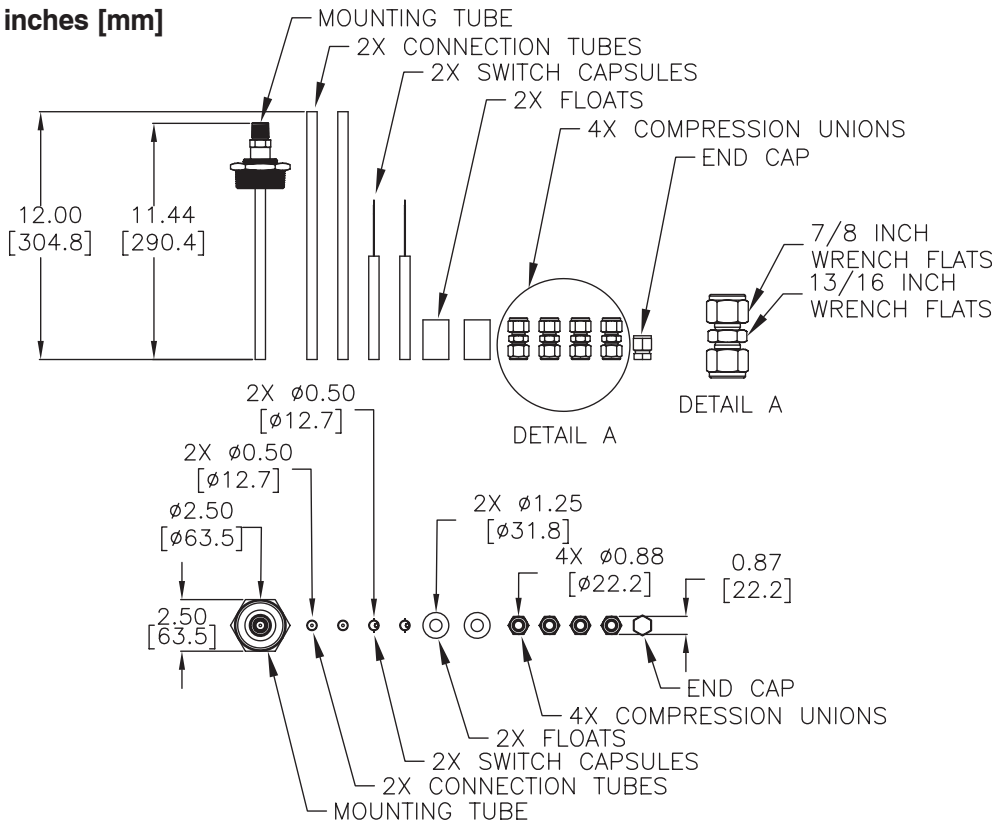
Float Level Switch Specifications											
Part No.	*Price*	*Float Material*	*Other Components Material*	*Temperature Range*	*Pressure*	*Float Specific Gravity*	*Electrical Rating**	*Lead Wires*	*Mounting Thread*	*Approvals*	*Weight (lbs)*
FLS-VK-200	$;;00d]t:	Buna-N	Brass	-40°F to 221°F [-40°C to 105°C]	150 psig [10.34 bar]	0.45	SPST NO or NC, 60W max 240VAC, 0.4 A 120VAC, 0.5 A 120VDC, 0.2 A 24VDC, 0.5 A	22AWG, Teflon 6ft	2in MNPT pipe plug / 1/2 in MNPT conduit	cURus, CE (See Approvals table for details)	4.0

** Each float can be installed to function as either normally open or normally closed switch. Electrical ratings are for resistive loads ONLY. For inductive loads, maximum life will be obtained with the use of appropriate transient suppression such as an MOV or TVS.*

Caution: Not recommended for use with PLC AC inputs or other digital AC input devices due to damage that may occur to the switch or input device.

Dimensions

inches [mm]



ProSense® Float Level Switch Kits

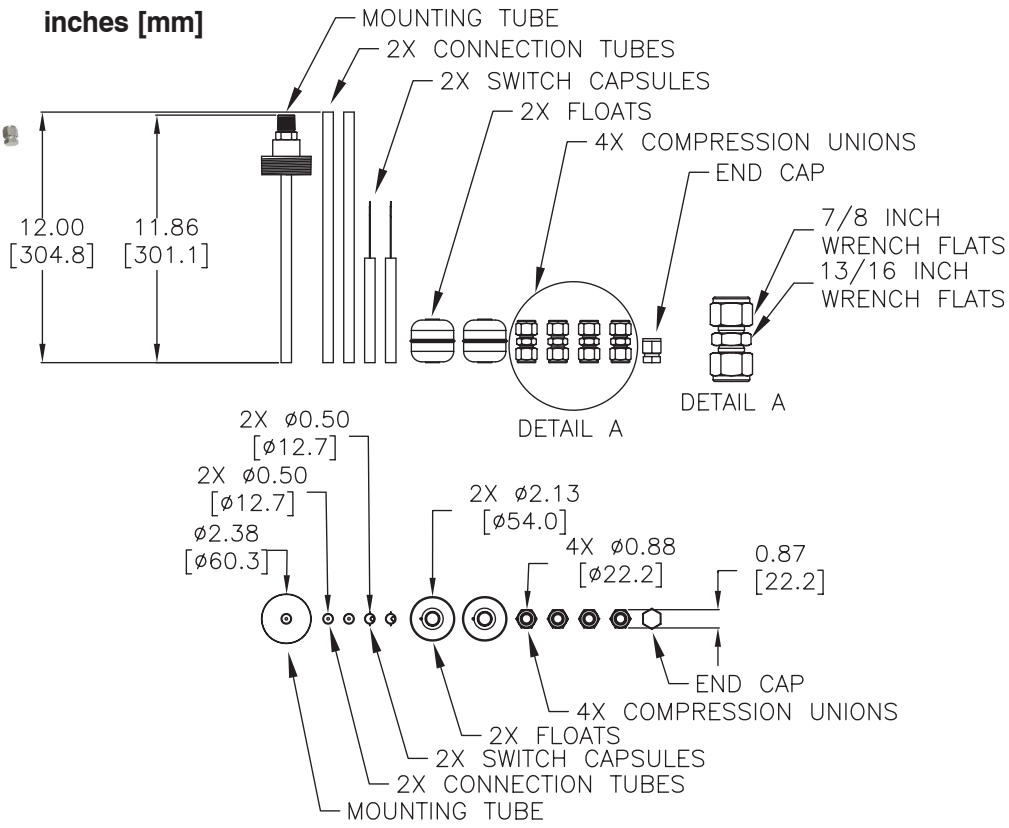
Float Level Switch Specifications											
Part No.	*Price*	*Float Material*	*Other Components Material*	*Temperature Range*	*Pressure*	*Float Specific Gravity*	*Electrical Rating**	*Lead Wires*	*Mounting Thread*	*Approvals*	*Weight (lbs)*
FLS-VK-300	$;00d]u:	316SS	316SS	-40°F to 392°F [-40°C to 200°C]	200 psig [13.79 bar]	0.55	SPST NO or NC, 60W max 240VAC, 0.4 A 120VAC, 0.5 A 120VDC, 0.2 A 24VDC, 0.5 A	22AWG, Teflon 6ft	2in MNPT pipe plug / 1/2 in MNPT conduit	cURus, CE (See Approvals table for details)	4.0

** Each float can be installed to function as either normally open or normally closed switch. Electrical ratings are for resistive loads ONLY. For inductive loads, maximum life will be obtained with the use of appropriate transient suppression such as an MOV or TVS.*

Caution: Not recommended for use with PLC AC inputs or other digital AC input devices due to damage that may occur to the switch or input device.

Dimensions

inches [mm]



ProSense® Float Level Tilt Switches

Float Level Tilt Switches

Float level tilt switches provide inexpensive, efficient and highly reliable level detection in open vessels, sumps and ponds.

The molded rubber float has an integral three-conductor cable and operates on a mercury-free micro-switch device that is located inside the float on an antivibration mount.

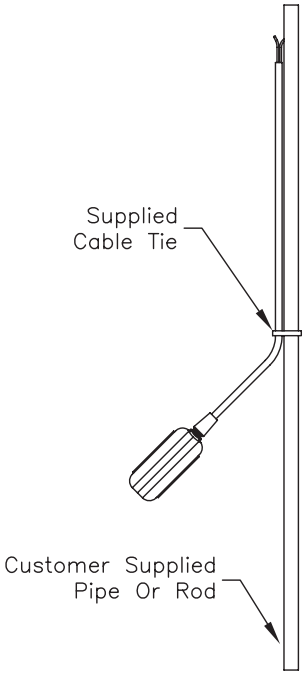
The rubber float is constructed of ethylene propylene diene (EPDM), a synthetic rubber with rigid and durable characteristics for long service life and resistance to heat, oxidation, ozone and aging due to weather. EPDM has good electrical resistivity, as well as resistance to solvents such as water, acids, alkalies, phosphate esters and many ketones and alcohols.

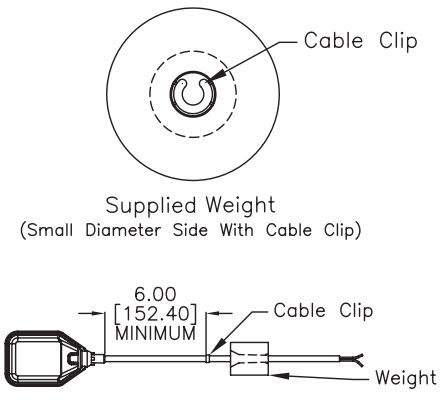
The basic operating principle is that as the fluid level rises, the float will rise, causing the microswitch to tilt and generate a signal that can be used to start or stop a pump, open or close a valve or actuate indicator alarms as required. Float travel is in an approximately ± 45˚ arc from its nominal position.

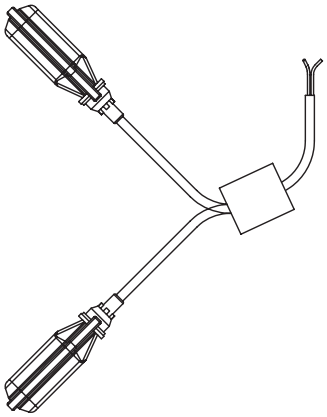
Features

- Low cost
- Easy installation
- Versatile application
- Mercury-free SPDT 16 amp switch
- 7 meter (22.9 foot) PVC jacketed cable

Installation Example







Float Travel is proportional to distance between float body and weight or anchor point.

Example 1: 6 inches between float body and weight will require 12 inches total float travel for proper opertaion of switch.

Example 2: 18 inches between float body and weight will require 36 inches total float travel to proper operation of switch.

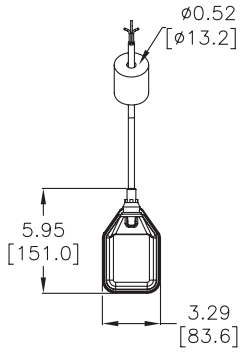
Switch point is approximately ± 45 deg from horizontal at tethered or weighted point on cable.

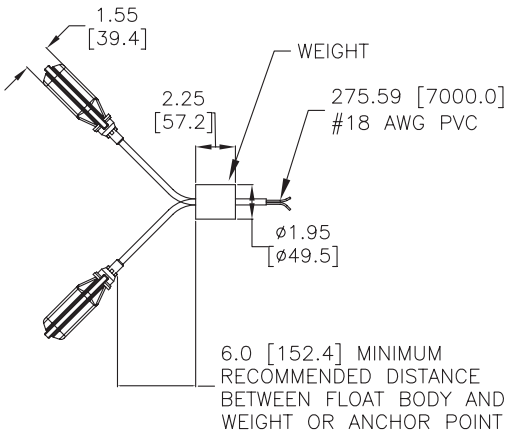
ProSense® Float Level Tilt Switches

Float Level Tilt Switch Specifications											
Part No.	*Price*	*Float Material*	*Sealed Weight Housing Material*	*Float Shape*	*Temperature Range*	*Pressure*	*Float Specific Gravity*	*Electrical Ratings**	*Cable*	*Approvals*	*Weight*
FLS-HT-100	$;0d]p:	EPDM Rubber	Polypropylene (PP)	Rectangle	32°F to 158°F [0°C to 70°C]	14.5 psig [1bar] Max submerged depth 65 feet [20 meters]	0.9 to 1.3	SPDT 16A 250VAC, 60Hz 1/2 HP, 250VAC, 60Hz 10A, 24VDC	3-conductor 18AWG PVC jacket 22.9 ft [7 meter]	CE	3.5

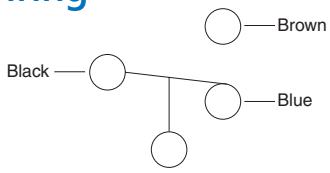
Dimensions

inches [mm]





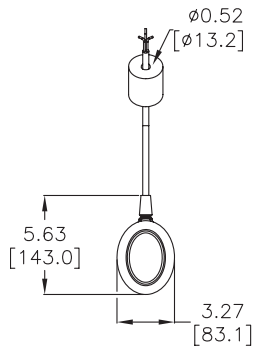
Wiring

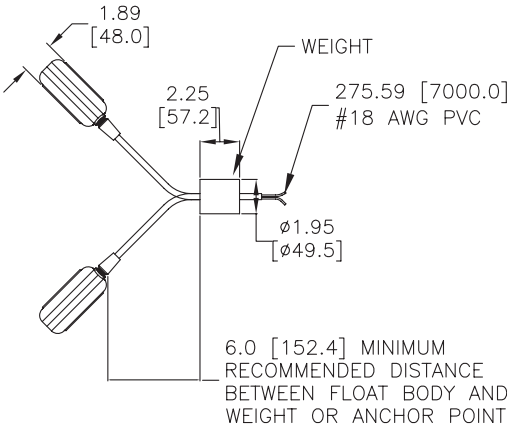


Float Level Tilt Switch Specifications											
Part No.	*Price*	*Float Material*	*Sealed Weight Housing Material*	*Float Shape*	*Temperature Range*	*Pressure*	*Float Specific Gravity*	*Electrical Ratings**	*Cable*	*Approvals*	*Weight*
FLS-HT-200	$;0d]q:	EPDM Rubber	Polypropylene (PP)	Oval	32°F to 158°F (0°C to 70°C)	14.5 psig [1bar] Max submerged depth 65 feet [20 meters]	0.7 to 1.3	SPDT 16A 250VAC, 60Hz 1/2 HP, 250VAC, 60Hz 10A, 24VDC	3-conductor 18AWG PVC jacket 22.9 ft [7 meter]	CE	3.5

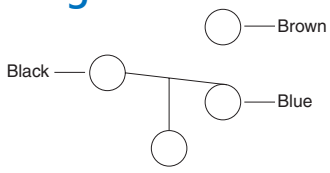
Dimensions

inches [mm]





Wiring



ProSense® Float Level Switches

Agency Approvals					
Part Number	cURus (E320431)	URus Class I, Group A,B,C,D / Class II, Group E, F, G / Class III (E366154)	CSA (2679134)	CSA Class I, Group A,B,C,D / Class II, Group E, F, G / Class III (2685021)	CE
FLS-VS-100	✓				✓
FLS-VS-200					✓
FLS-VS-300	✓				✓
FLS-VS-400	✓				✓
FLS-VD-100					✓
FLS-VD-200					✓
FLS-VD-300					✓
FLS-VD-400					✓
FLS-VD-500					✓
FLS-VD-600					✓
FLS-VM-100	✓		✓		✓
FLS-VM-200	✓		✓		✓
FLS-VM-300	✓		✓		✓
FLS-VM-400	✓		✓		✓
FLS-VM-500	✓				✓
FLS-VM-600					✓
FLS-VM-700	✓				✓
FLS-VM-800	✓				✓
FLS-VL-010	✓		✓		✓
FLS-VL-020	✓		✓		✓
FLS-VL-030	✓		✓		✓
FLS-VL-040			✓		✓
FLS-VL-100	✓		✓		✓
FLS-VL-200	✓		✓		✓
FLS-VL-300	✓		✓		✓
FLS-VL-400		✓		✓	✓
FLS-VL-600					✓
FLS-VL-700	✓		✓		
FLS-VL-900					✓
FLS-HS-100	✓		✓		✓
FLS-HS-200	✓		✓		✓
FLS-HS-300					✓
FLS-HM-100	✓		✓		✓
FLS-HM-200	✓	✓	✓	✓	✓
FLS-HM-300	✓				✓
FLS-HM-400	✓	✓	✓		✓
FLS-HM-500	✓				✓
FLS-HM-600	✓				✓
FLS-HM-700	✓				✓
FLS-HL-010					✓
FLS-HL-200	✓				✓
FLS-HL-300					✓
FLS-HL-400					✓
FLS-BM-100					✓
FLS-BM-300	✓		✓		✓
FLS-BL-100					✓
FLS-VK-200	✓				✓
FLS-VK-300	✓				✓
FLS-HT-100					✓
FLS-HT-200					✓

ProSense® PLS Series Rotating Paddle Bulk Solids Level Switches

Part No. PLS-4P-1-24D

Part No. PLS-4P-R-24D

PLS-4P-1-24D shown with optional indicator light PLS-L24

Overview

The ProSense PLS Series is a rotating paddle point level switch for dry, granular bulk solids. Its robust and compact design makes the level switch an ideal sensor for detecting the full, empty, refill, or point level status in silos, hoppers, and bins containing bulk solids such as cereals, sugar, animal feeds, washing powders, chalk, dry plaster, dry cement, granulates, or wood chips.

The PLS Series is available with three different shaft lengths or a rope version that can be shortened in the field based on the application. The industry standard 1-1/4" male NPT threads and hinged paddle make installation easy in most any type of mounting fitting and storage vessel wall thickness.

Operating voltages of 115VAC, 230VAC and 24VDC are available and a SPDT relay output is provided for use as a PLC input or for direct control of bulk solids handling equipment. An optional switch status indicating light is easily field installed.

Models are available with Factory Mutual (FM) certification for Dust Ignition Proof, Class II, III, Division 1, Groups EFG applications.

Features

- Rotating paddle point level switch for dry, granular bulk solids
- 1-1/4" male NPT threads and hinged paddle make installation easy
- 100mm, 200mm, 300mm shaft lengths or 2000mm cuttable rope version
- Operating voltages of 115VAC, 230VAC and 24VDC
- SPDT relay output for PLC input or direct control of bulk solids handling equipment
- Optional switch status amber indicating light
- Models with Factory Mutual (FM) certification for Dust Ignition Proof, Class II, III, Division 1, Groups EFG
- Adjustable switching sensitivity can be set without tools and even during operation in non-hazardous areas
- Screw-cover housing with captive clear cap
- Optical shaft rotation monitoring for operational verification is visible with the device installed
- Switch testing function is easily performed using just a screwdriver
- Push-in style wiring terminals
- Housing can be rotated 360° for optimal alignment after installation
- IP66 environmental protection rating

CE FM APPROVED

(-HAZ Models)

Rotating Paddle Bulk Solids Level Switch Operation

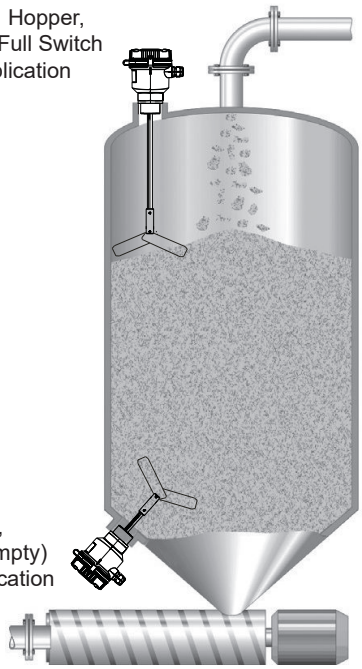
The ProSense PLS Series of Rotating Paddle Bulk Solids Level Switch is commonly used to detect the full or refill (empty) status in silos, hoppers and bins containing bulk solids. When used as a refill switch, it is typically mounted at an angled position at the bottom of the storage vessel. When used as a full switch, it is mounted at the top of the storage vessel.

The shaft and paddle are driven using a reduction gear and synchronous motor. If the paddle is stopped by material covering it, the motor in the housing moves from the rest to the switch position. This movement operates two switch contacts; the first is for external level indication and the second switches off the power to the motor.

The paddle starts to rotate once the material level is no longer in contact with the paddle, the motor returns to its rest position and the two contacts switch to normal operation.

Click on the thumbnail or go to https://www.automationdirect.com/VID-PC-0002 for a short video introduction to our ProSense Rotating Paddle Bulk Solids Level Switches.

Silo, Hopper, Bin Full Switch Application



Silo, Hopper, Bin Refill (Empty) Switch Application

ProSense® PLS Series Rotating Paddle Bulk Solids Level Switches

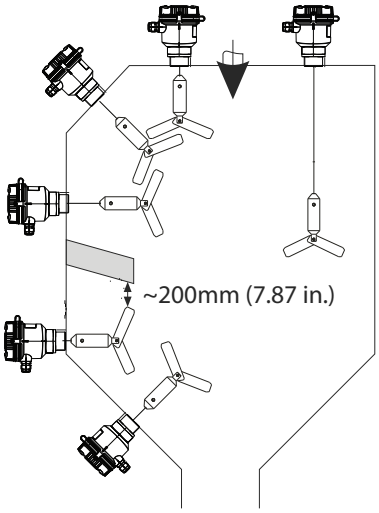
PLS Series Rotating Paddle Bulk Solids Level Switch Selection									
Model	*Price*	*Insertion Length*	*Process Connection*	*Output*	*Operating Voltage*	*Paddle Type*	*Hazardous Location Rated*	*Weight (lbs)*	*Drawing Link*
PLS-4P-1-115	$051qp:	100mm [3.94]	1-1/4" male NPT	(1) SPDT / optional indicator light (not for use with -HAZ models)	115VAC	Hinged	No	4.50	PDF
PLS-4P-1-230	$051qs:				230VAC			4.50	PDF
PLS-4P-1-24D	$051qq:				20 to 28 VDC			4.50	PDF
PLS-4P-1-115-HAZ	$051qy:				115VAC		Yes	4.50	PDF
PLS-4P-1-230-HAZ	$;051q]:				230VAC			4.50	PDF
PLS-4P-1-24D-HAZ	$051qz:				20 to 28 VDC			4.50	PDF
PLS-4P-2-115	$;051qt:	200mm [7.87]			115VAC		No	5.20	PDF
PLS-4P-2-230	$-051qj:				230VAC			5.20	PDF
PLS-4P-2-24D	$051qu:				20 to 28 VDC			5.20	PDF
PLS-4P-2-115-HAZ	$;051q[:				115VAC		Yes	5.20	PDF
PLS-4P-2-230-HAZ	$051q#:				230VAC			5.20	PDF
PLS-4P-2-24D-HAZ	$051q_:				20 to 28 VDC			5.20	PDF
PLS-4P-3-115	$051qk:	300mm [11.81]			115VAC		No	5.40	PDF
PLS-4P-3-230	$051qn:				230VAC			5.40	PDF
PLS-4P-3-24D	$-051ql:				20 to 28 VDC			5.40	PDF
PLS-4P-3-115-HAZ	$;051q!:				115VAC		Yes	5.40	PDF
PLS-4P-3-230-HAZ	$051s0:				230VAC			5.40	PDF
PLS-4P-3-24D-HAZ	$051q?:				20 to 28 VDC			5.40	PDF
PLS-4P-R-115	$051qo:	2000mm [78.74] rope insertion length			115VAC		No	5.90	PDF
PLS-4P-R-230	$051qx:				230VAC			5.90	PDF
PLS-4P-R-24D	$051qv:				20 to 28 VDC			5.90	PDF
PLS-4P-R-115-HAZ	$051s1:				115VAC		Yes	5.90	PDF
PLS-4P-R-230-HAZ	$051s3:				230VAC			5.90	PDF
PLS-4P-R-24D-HAZ	$051s2:				20 to 28 VDC			5.90	PDF

ProSense® PLS Series Rotating Paddle Bulk Solids Level Switches

PLS Series Rotating Paddle Bulk Solids Level Switch Specifications	
Input	
Measured Variable	Level (in line with the orientation and length)
Measuring Range	The measuring range depends on the installation location of the device and the selected length of the shaft 100, 200, 300 mm (3.94 to 11.81 in) or the rope extension up to max. 2m (6.56 ft).
Output	
Output Signal	Binary
Switch Output[1]	Function: Switch a floating changeover contact (SPDT). Switching behavior: On/off Switching time: From paddle standstill until output of the switch signal: 20°, corresponds to 3.5 s Switching capacity: According to EN 61058: 250VAC 5E4, 6(2) A 24VDC, 3A Min. switching load 300mW (5V or 5mA minimum)
Power Supply	
Supply Voltage[2]	20 to 28 VDC 115 VAC 50/60 Hz 230 VAC 50/60 Hz
Power Consumption	Max. 3.5 VA
Terminals[3]	Terminals with spring terminal design Permitted cable cross-sections Rigid - 0.2 to 2.5 mm² (24 to 14 AWG) Flexible - 0.2 to 2.5 mm² (24 to 14 AWG) Flexible with wire end ferrule without plastic ferrule - 0.5 to 2.5 mm² (22 to 14 AWG) Flexible with wire end ferrule with plastic ferrule - 0.5 to 1.5 mm² (22 to 16 AWG)
Performance	
Shaft Speed	1 rpm
Sensitivity	Can be adjusted using an operating element accessible from the top Minimum: 80 g/l (4.99 lb/ft³) Depending on the density of the bulk solids adjustable in three stages: low, medium (default), high
Mechanical operating life	500,000 switching operations
Installation	
Process Connection	1-1/4" male NPT
Paddle Type	Hinged, foldable
Mounting Location	Vertical from the top Angled from the top From the side From the side with protective cover against falling solids From the bottom (device must be protected against shock-type loads) See Mounting Orientations Illustration for more detail Do not use: In direction of solids flow
Special Mounting Instructions	
Side Load on the Shaft	Max. 60N
Load on the Rope	Max. 1,500N
Operating Pressure (abs.)	0.5 to 2.5 bar (7.25 to 36.3 psi)
Housing Rotation 360°	To adjust to the direction of the cable entries (pointing downwards)
Cable Entries	The plugs delivered with the device provide dust protection during transport and storage. If a cable entry is not used the cable gland must be tightened around the included plug or an appropriately rated M20 x 1.5 blanking plug must be installed to maintain IP rating.
Mechanical Load of Signal Lamp (Optional)	The optional signal lamp must be protected against mechanical load (impact energy > 1 J).

[1] After a current >100mA is actuated, it is no longer possible to guarantee switching function with a switching current I <100mA.
[2] An overload protection element (rated current ≤ 10A) is required for the power cable.
[3] Use supply wires suitable for 10 °C (18 °F) above surrounding.

Mounting Orientations

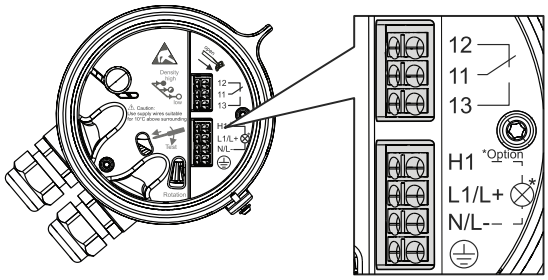


ProSense® PLS Series Rotating Paddle Bulk Solids Level Switches

PLS Series Rotating Paddle Bulk Solids Level Switch Specifications	
Process	
Process Temperature Range	–20 to 80 °C (–4 to 176 °F)
Process Pressure Range	≤ 1.5 bar (21.8 psi) overpressure (e.g. when silo is filled)
Solids Weight	≥ 80 g/l (4.99 lb/ft³)
Grain Size	≤ 50mm (1.97 in)
Environment	
Ambient Temperature Range	–20 to +60°C (–4 to +140°F)
Storage Temperature	–20 to +60°C (–4 to +140°F)
Climate Class	EN60654-1, Class C2
Degree of Protection	IP66
Shock Resistance	As per EN 60068-2-27: 30g
Vibration Resistance	As per EN 60068-2-64: 0.01g²/Hz
Electromagnetic Compatibility	Electromagnetic compatibility in accordance with all the relevant requirements of the EN 61326 series. - Interference immunity: as per IEC 61326-1, industrial environment - Interference emission: as per IEC 61326-1, Class B
Electrical Safety	Class I equipment, overvoltage category II, pollution degree 2
Altitude	< 2,000m (6,560ft) above sea level
Mechanical	
Housing	Polycarbonate (PC)
Captive Screw Cap	Polyamide (PA)
Cover Seal	Silicone
Housing Seal	Viton
Shaft	303 Stainless steel
Rope Extension	316 Stainless steel
Paddle	304 Stainless steel
Shaft Seal	NBR (Nitrile Butadiene Rubber)
Process Connections	PBT (Polybutylene Terephthalate)
Cable Entries	2 x cable gland, M20 x1.5 (optionally 1 x cable gland M20 x 1.5 and indicator lamp) Permitted cable diameter - 5 to 9 mm (0.2 to 0.35 in)
Approvals	
CE	The product meets the requirements of the harmonized European standards. As such, it complies with the legal specifications of the EC directives. The manufacturer confirms successful testing of the product by affixing to it the CE-mark.
FM (-HAZ Models)	FM Certified Dust Ignition Proof, Class II, III, Division 1, Groups EFG - Reference FM drawing PLS-4P-x-xxx-HAZ-DWG available at AutomationDirect.com

ProSense® PLS Series Rotating Paddle Bulk Solids Level Switches

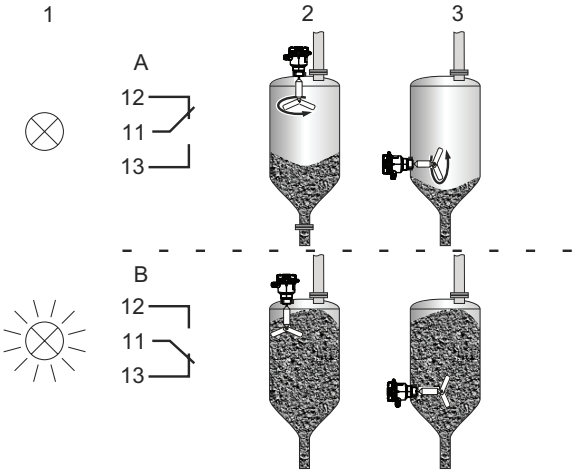
Wiring

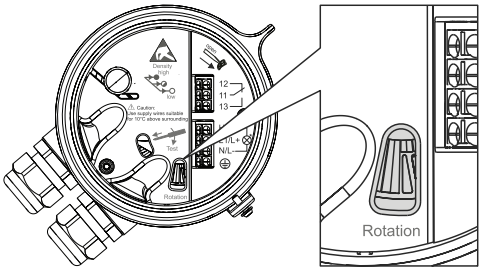


Symbol	Description	Symbol	Description
⏚	Protective ground	H1	Connections for optional PLS Series indicator light
N (AC) / L- (DC)	Power connection	N/L-	
L1 (AC) / L+ (DC)	Power connection	11	Changeover contact
		12	Normally closed contact
		13	Normally open contact

Switching States

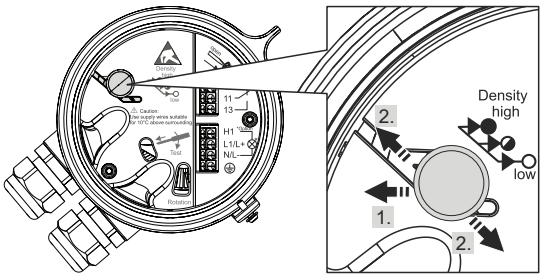
	1 = Indicator light (optional, not for -HAZ models)	2 = Full signaling	3 = Refill signaling	Shaft rotation	Internal light
A	OFF	OFF	ON	YES	ON
B	ON	ON	OFF	NO	ON





Rotational Movement Display

The ProSense PLS shaft rotational movement can be checked by visually observing the rotating disc in the lighted inpsection window through the clear cover.



Switching Threshold (Sensitivity)

The ProSense PLS switching threshold (sensitivity) is easily set to one of three settings depending on the density of the bulk solids.

Setting the switching threshold (sensitivity)

1. Move the operating element to the left until it can freely move up or down as illustrated.
2. Move the operating element to the desired position and let it move back to the right in the desired slot.

Click the QR Code or go to the following for a copy of the PLS Series Rotation Paddle Bulk Solids Level Switch Manual https://cdn.automationdirect.com/static/manuals/prosense/plsseriesmanual.pdf

ProSense® PLS Series Rotating Paddle Bulk Solids Level Switch Accessories

Rotating Paddle Bulk Solids Level Switch Accessories

The ProSense PLS Series point level switch can be fitted in the field with an optional amber incandescent indicating light that illuminates when the rotating paddle stops. **This accessory is NOT for use with the -HAZ hazardous area models.**

Part No. PLS-L24

PLS Series Rotating Paddle Bulk Solids Level Switch Accessories

Model	Description	Price	Weight (lbs)	Drawing Link
PLS-L24	ProSense indicating light, 20-28 VDC. For use with ProSense PLS Series 20-28 VDC rotating paddle level switches.	$;51q,:	0.07	PDF
PLS-L115	ProSense indicating light, 115 VAC. For use with ProSense PLS Series 115VAC rotating paddle level switches.	$51s4:	0.07	PDF
PLS-L230	ProSense indicating light, 230 VAC. For use with ProSense PLS Series 230VAC rotating paddle level switches.	$51s5:	0.07	PDF

Replacement bulbs are not available from AutomationDirect. We recommend purchasing a new indicating light assembly as a replacement.

PLS-4P-1-24D shown with optional indicator light PLS-L24

Endress+Hauser
People for Process Automation

Soliphant® Vibration Rod Bulk Solids Level Switches

Part No. FTM20-AM23A

Part No. FTM20-DN46A

Overview

The Endress+Hauser Soliphant series is a robust point level switch for use with fine-grained or coarse-grained, non-fluidized bulk solids. The FTM20's design has a wide range of applications and allows for installation in any orientation, making it useful for indication of full, demand, or empty status.

A piezoelectric drive excites the vibrating rod of the Soliphant FTM20 to its resonance frequency. If the medium covers the vibrating rod, the rod's vibrating amplitude changes (the vibration is damped). Soliphant's electronics compare the actual amplitude with a target value and indicate whether the vibrating rod is vibrating freely or whether it is covered by the medium.

Features

- No calibration: easy commissioning (plug and play)
- Insensitive to build-up: maintenance-free operation
- No mechanically moving parts: no wear, long operating life
- Sensor material 316L: resists abrasion even from coarse building materials
- Available with either a polyester plastic housing and clear cover that allows for switch status visibility or a rugged aluminum housing with solid cover
- Resistant to external vibration and flow noises
- Available with FM or CSA approval on select models
- Typical applications: cereals, coffee beans, sugar, animal feed, rice, detergents, dye powder, chalk, gypsum, cement, sand, plastic granules

FM APPROVED C SP US CE

Soliphant Vibration Rod Bulk Solids Level Switches

Model	Housing Material	Degree of Protection	Insertion Length	Wetted Parts Material	Process Connection	Output	Operating Voltage	Electrical Connection	Application Location	Weight (lb)	Price
FTM20-AM23A	Polyester	IP66 / IP67, NEMA4X	8.86 inches	316L stainless steel	1-1/4 inch male NPT	Switch PNP, 3-wire, N.O./N.C. selectable	10 to 45 VDC	Screw terminals	General Purpose / Non-hazardous	4.82	$;06fv0:
FTM20-AN23A					1-1/2 inch male NPT					5.12	$;06fv2:
FTM20-AM43A					1-1/4 inch male NPT	DPDT 6A relay	19 to 253 VAC, 19 to 55 VDC			4.87	$;06fv1:
FTM20-AN43A					1-1/2 inch male NPT					5.22	$;06fv3:
FTM20-CM26A	Aluminum				1-1/4 inch male NPT	Switch PNP, 3-wire, N.O./N.C. selectable	10 to 45 VDC		General Purpose, CSA C/US	5.55	$;06fv4:
FTM20-CN26A					1-1/2 inch male NPT					5.89	$;06fv6:
FTM20-CM46A					1-1/4 inch male NPT	DPDT 6A relay	19 to 253 VAC, 19 to 55 VDC			5.63	$;06fv5:
FTM20-CN46A					1-1/2 inch male NPT					5.96	$;06fv7:
FTM20-DM26A					1-1/4 inch male NPT	Switch PNP, 3-wire, N.O./N.C. selectable	10 to 45 VDC		FM DIP+CSA DIP Cl.II,III Div. 1+2 Gr. E-G, zone 20.21	5.55	$;06fv8:
FTM20-DN26A					1-1/2 inch male NPT					5.88	$;06fva:
FTM20-DM46A					1-1/4 inch male NPT	DPDT 6A relay	19 to 253 VAC, 19 to 55 VDC			5.86	$;06fv9:
FTM20-DN46A					1-1/2 inch male NPT					5.96	$;06fvb:

Note: Check the chemical compatibility of the sensor's wetted parts with the medium to be measured.

Endress+Hauser
People for Process Automation

Soliphant® Vibration Rod Bulk Solids Level Switches

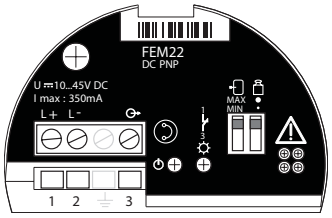
Soliphant Vibration Rod Bulk Solids Level Switch Resources			
Model	*Drawing Link*	*Vendor Technical Specifications*	*Vendor Operating Instructions*
FTM20-AM23A	PDF	PDF	PDF
FTM20-AN23A	PDF		
FTM20-AM43A	PDF		
FTM20-AN43A	PDF		
FTM20-CM26A	PDF		
FTM20-CN26A	PDF		
FTM20-CM46A	PDF		
FTM20-CN46A	PDF		
FTM20-DM26A	PDF		
FTM20-DN26A	PDF		
FTM20-DM46A	PDF		
FTM20-DN46A	PDF		

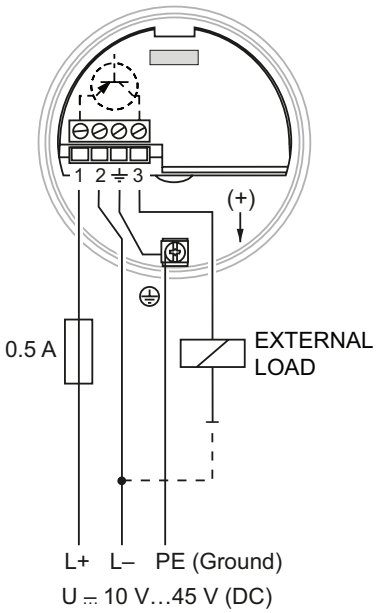
Note: For additional wiring, specifications and installation information refer to the additional Vendor Specs and Operating Instructions PDFs.

For a variety of wire and cable options see our website www.AutomationDirect.com

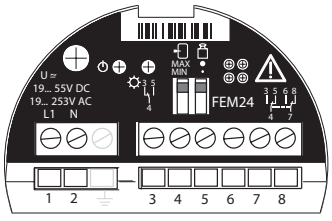
Wiring Information

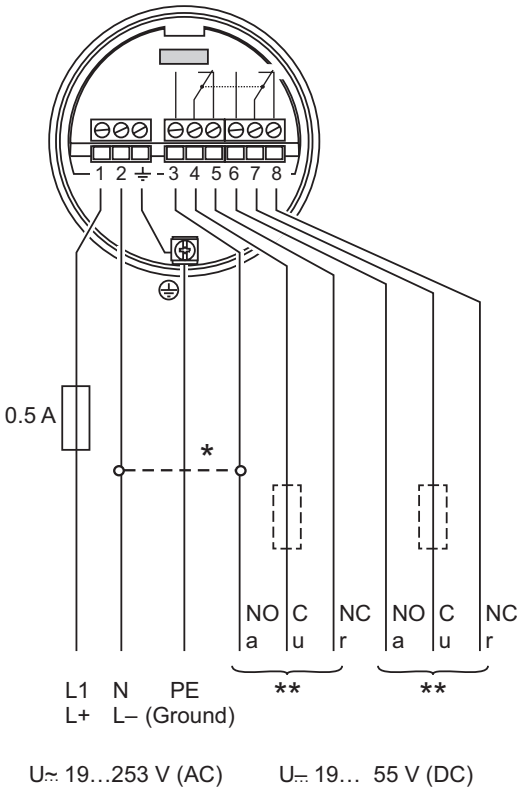
3-wire PNP Models





DPDT Relay Models





** When jumpered, the relay output works with NPN logic.*

*** Relay outputs:*

- *Loads switched via 2 floating change-over contacts.*
- *I~ max. 6 A, U~ max. 253 V; P~ max. 1500 VA, cos = 1, P~ max. 750 VA, cos > 0.7;*
- *I⎓ max. 6 A to 30 V, I⎓ max. 0.2 A to 125 V.*
- *The following applies when connecting a functional extra-low voltage circuit with double insulation as per IEC 1010: Sum of voltages of relay output and power supply max. 300 V*