Solid-state sensing for challenging liquids

ultrapure · dirty · viscous · coating · corrosive

Gems™ Sensors

Ultrasonic Liquid Level Sensors

SMARTER PRODUCTS

BETTER SOLUTIONS

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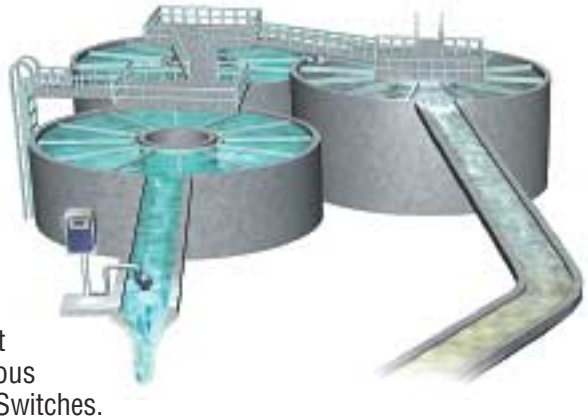
Ultrasonic Sensors—Continuous and Point Liquid Level Sensors



- Accurate and reliable sensing method
- Ideal technology for difficult fluids
- Sized and priced for most applications
- Easy to install—simple to use

Gems delivers the answer for challenging fluid measurement and monitoring with our new ultrasonic UCL Series Continuous Non-Contact Level Transmitters and ULS Series Point Level Switches. These accurate and reliable sensors are designed for the most difficult fluids to monitor—including ultrapure, dirty, coating, scaling or corrosive types.

Typical Media

■ Acids ■ Wastewater ■ Inks and Paints ■ Slurries ■ Food and Beverage
■ Semiconductor Process Chemicals ■ Oils and Petroleum Distillates

How Ultrasonic Monitoring Works

UCL Series Continuous Non-Contact Transmitters: Mounted at the top of a tank, the sensor continuously transmits pulses of high-frequency sound waves that travel away from the sensor, hit the surface of the liquid and return to the sensor. Solid-state electronics measure the time it takes from transmitted sound to return of the echo. With reference to the speed of sound in air, the exact distance of the liquid surface from the sensor can be calculated with high accuracy (±0.25% of maximum range). Level/Distance measurements are automatically temperature-compensated throughout the operating temperature range of the sensor.

ULS Series Switches: Mounted through the top or side wall of a tank, Gems **ULS-50 Series** single-point switches utilize a gap-tipped probe. Pulses of ultrasonic sound waves are continuously passed across the gap of the probe. The solid-state sensing electronics are tuned to ignore the greatly attenuated signals transmitted through air and actuate only on the stronger "valid" signals received when the probe is submerged in a liquid. **ULS-60 Series** multi-point switches are designed for easy automatic tank "Hi/Lo" liquid level control. They combine non-contact continuous sensing with two SPDT relays; actuation points are field adjustable in a range of 6 inches to 12 feet.

Gems Messenger™ Remote Monitoring

Gems Messenger™ products and services are the most advanced and robust method to monitor tank contents, regardless of location. Wireless telecommunication technologies bring sensor data directly to your desktop using our MessengerWare™ data acquisition software, or to any desktop in the world connected to the Internet via MessengerNet™. With MessengerNet™ your remote data is displayed in custom-designed screens, hosted on our reliable and redundant web servers. Gems Messenger™ continuously delivers the data you need for comprehensive inventory analysis, archiving and auditing. Messenger™ remote monitoring and communications products are your key to inventory and supply management. For more information, please visit our web site at **www.gemsremotemonitoring.com**.

UCL-210 Continuous Ultrasonic Sensor

- Accurate measurement to 12 feet
- Low-cost and compact solution for OEM and process applications
- PVDF transducer and NEMA 4 enclosure

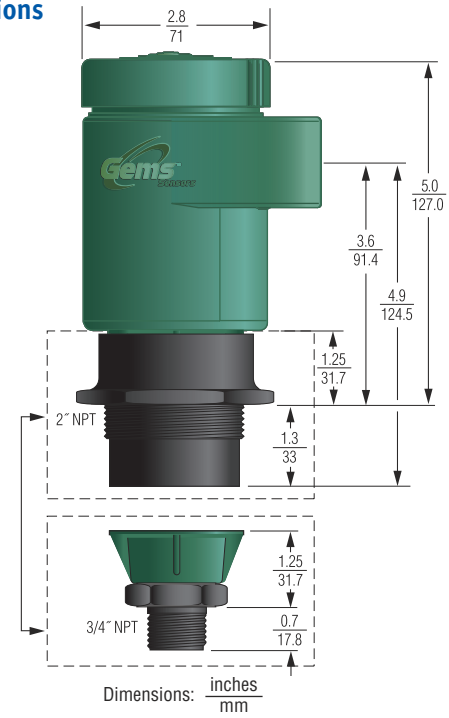
The two-wire UCL-210 Series level transmitters are mounted through the top wall of small or bulk tanks and provide non-contact measurement up to 12 feet. These general purpose devices are ideal for measuring intermediate bulk containers, day tanks, process vessels, plating lines and waste sumps.

Our non-contact technology makes these transmitters an excellent choice for applications with ultra-pure, dirty, coating, scaling or corrosive type liquids. Media examples include ink, ultra-pure water, brine solutions, acids and wastewater.

Specifications

Accuracy	±0.25% of span
Resolution	0.125˝
Output	4-20mA, 2-wire
Loop Resistance	600 ohms @ 36 VDC
Pulse Rate	3/sec. (201010); 2/sec. (201011)
Beam Width	8-degree conical
Failure Mode	22mA
Supply Voltage	12 to 36 VDC
Pressure	30 psi @ 77°F
Temperature	-40°F to +140°F (-40°C to +60°C)
Temperature Compensation	Automatic over entire range
Enclosure Rating	NEMA 4X (IP 65)
Enclosure Material	Polypropylene
Transducer Material	PVDF
Conduit Connection	0.5˝ NPT
CE Compliance	EN 50082-2 immunity EN 55011 emissions

Dimensions



Beam Dimensions

See diagram at right.

Part Number	201011											
	201010											
Range (ft)	1	2	3	4	5	6	7	8	9	10	11	12
Radius (in)	1.2	2.1	2.9	3.7	4.9	5.4	6.2	7.1	7.9	8.8	9.6	10.4
Radius (cm)	3.1	5.2	7.3	9.5	11.6	13.7	15.9	18.0	20.1	22.3	24.4	26.5

Beam Dimensions

How to Order

Specify by part number based on measurement range.

Range	Frequency	Dead Band	Mounting	Part Number
3.6´ to 6´	83 kHz	3.6˝	0.75˝ NPT	**201010** ⚡
6˝ to 12´	50 kHz	6˝	2˝ NPT	**201011** ⚡

⚡ = Stock item

UCL-200 Premier Continuous Ultrasonic Sensors

- Accuracy of ±0.25%
- Easy push-button calibration
- Automatic temperature compensation over entire range
- Filtration eliminates false echo signals
- Small beam (8°) allows installation in tight spaces

Our premier ultrasonic sensors are available in three models:

Intrinsically Safe (201001): This two-wire model provides non-contact measurement up to 18 feet. Approved for use in Class I, Groups A, B, C and D; Class II, Groups E, F and G; Class III; T3C environments, the transmitter is an excellent choice for use with solvent, hydrocarbon and petroleum type liquids.

General Purpose with Relays (201002): This three-wire model provides non-contact measurement up to 24.5 feet and features an integral relay for pump, valve or alarm control. This transmitter is an excellent choice for applications with dirty, coating, scaling or corrosive type liquids such as wastewater, crude oil or wax.

Long Range with Relays (201003): This flange mounted, three-wire model provides non-contact measurement up to 40 feet. Its deeper measuring range makes this general purpose transmitter ideal for large bulk storage tanks, water or chemical reservoirs and waste stations. Media examples include chemicals, acids and slurries.

LCD display on
Part Number 201001

LED display on
Part Numbers 201002
and 201003

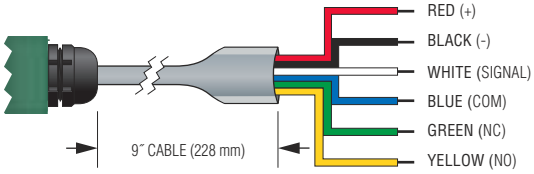
Specifications

Accuracy	±0.25% of span
Resolution	0.125˝
Output	4-20mA
Beam Width	8-degree conical
Failure Mode	22mA
Supply Voltage	14 to 36 VDC
Pressure	30 psi @ 77°F
Temperature	-40°F to +140°F (-40°C to +60°C)
Temperature Compensation	Automatic over entire range
Enclosure Rating	NEMA 4X (IP 65)
Enclosure Material	Polypropylene
Transducer Material	PVDF
Calibration	Push button
Display units	Inches (cm)
Conduit Connection	0.5˝ NPT
CE Compliance	EN 50082-2 immunity EN 55011 emissions ENN 61010-1 safety[1]

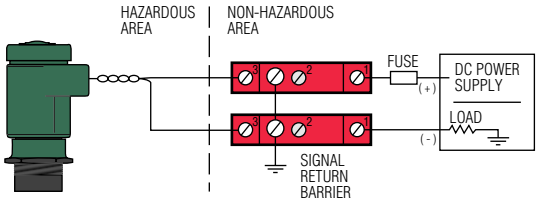
1. Not applicable to Part Number 201001.

Wiring Diagram

SPDT Relay
Part Numbers 201002 and 201003



Intrinsically Safe
Part Number 201001



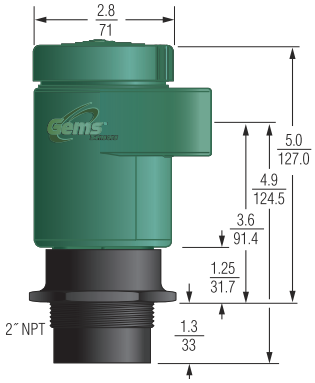
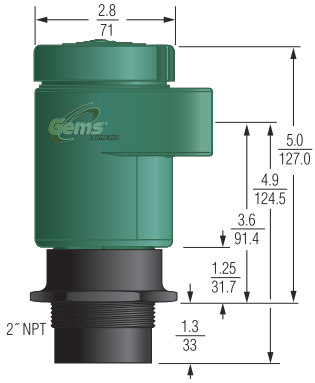
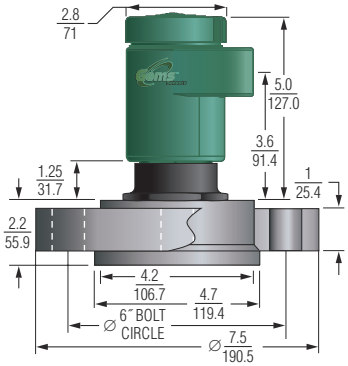
Part Number
111954 ⚡

The exceptionally compact, almost "wafer-thin" design of GEMS 65800 Series zener barriers saves space and simplifies installation. They limit D.C. voltage and current to the hazardous area and provide a path for fault current. Encapsulated construction is impervious to dust and moisture.

UCL-200 Premier Continuous Ultrasonic Sensors – Continued

How to Order

Specify part number based on mounting, range and output requirements.

Mounting	2″ NPT	2″ NPT	3″ 150# ANSI Flange[1]
Dimensions: inches / mm			
Parts Number	**201001** ⚡	**201002** ⚡	**201003** ⚡
Intrinsically Safe	Yes	No	No
Range (ft)	0.5 to 18	0.5 to 24.5	1.5 to 40
Display Type	LCD	LED	
Sensor Material	PVDF	PVDF	PVC
Frequency	50 kHz	50 kHz	26 kHz
Dead Band	6″	6″	18″
Pulse Rate/sec.	2	8	8
Output	2-wire loop; 4-20 mA	3-wire sourcing; 4-20 mA	
Relay	Not available	SPDT latching, 10A, 250 VAC, 0.5 Hp	
Relay Mode	Not available	Selectable NO or NC	

⚡ = Stock item

Note 1: Four (4) 0.75″ diameter bolt holes on a 6″ diameter circle.

Beam Dimension

2″ NPT Mount

Part Number	Depth (ft)	Radius (in)	Radius (cm)
201001	1	1.2	3.1
	2	2.1	5.2
	3	2.9	7.3
	4	3.7	9.5
	5	4.6	11.6
	6	5.4	13.7
	7	6.2	15.9
	8	7.1	18.0
	9	7.9	20.1
	10	8.8	22.3
	11	9.6	24.4
	12	10.4	26.5
	13	11.3	28.7
	14	12.1	30.8
	15	13.0	32.9
	16	13.8	35.1
	17	14.6	37.2
	18	15.5	39.3
201002	19	16.3	41.3
	20	17.2	43.6
	21	18.0	45.7
	22	18.8	47.8
	23	19.7	50.0
	24	20.5	52.1
	25	21.4	54.2

Flange Mount – Part Number 201003

Depth (ft)	Radius (in)	Radius (cm)
1	1.59	4.04
2	2.43	6.17
3	3.27	8.30
4	4.11	10.43
5	4.95	12.56
6	5.78	14.69
7	6.62	16.82
8	7.46	18.96
9	8.30	21.09
10	9.14	23.22
11	9.98	25.35
12	10.82	27.48
13	11.66	29.61
14	12.50	31.74
15	13.34	33.88
16	14.18	36.01
17	15.02	38.14
18	15.85	40.27
19	16.69	42.40
20	17.53	44.53

Depth (ft)	Radius (in)	Radius (cm)
21	18.37	4.04
22	19.21	6.17
23	20.05	8.30
24	20.89	10.43
25	21.73	12.56
26	22.57	14.69
27	23.41	16.82
28	24.25	18.96
29	25.08	21.09
30	25.92	23.22
31	26.76	25.35
32	27.60	27.48
33	28.44	29.61
34	29.28	31.74
35	30.12	33.88
36	30.96	36.01
37	31.80	38.14
38	32.64	40.27
39	33.48	42.40
40	34.31	44.53

ULS-50 Single Point Level Switches

- General purpose or intrinsically safe
- All-polypropylene or -Teflon® wetted materials
- Submersible IP68 construction for tanks or sumps

Gems ultrasonic switches are an excellent choice for a broad range of liquids including those with light coating or scaling type characteristics. Liquid examples include xylene, chromic acid and light cooking oils.

FET or relay output provides a reliable switch interface with remote devices such as a PLC, SCADA or alarm. For maximum flexibility, the sensor is offered in general purpose and intrinsically safe versions with two probe lengths and polypropylene or PFA Teflon® materials.

Specifications

Accuracy	±1mm
Repeatability	±0.5mm
Frequency	1.5 MHz
Supply Voltage	12 to 36 VDC
Pressure	150 psi @ 77°F (10 bar at 25°C)
Temperature	-40°F to +194°F (-40°C to +90°C)
Mounting	0.75˝ NPT
Sensor Rating	NEMA 6 (IP 68)
Consumption	Relay: 25mA
Switch Output	Selectable NO or NC
Cable	8 ft., 22 AWG cable, either PP or PFA[1]
CSA (IS) Approval	Class I, Grp A, B, C & D Class II, Grp E, F & G Class III
CE Compliance	EN 50082-2 immunity EN 55011 emissions

1. Jacket material will match body material selected.

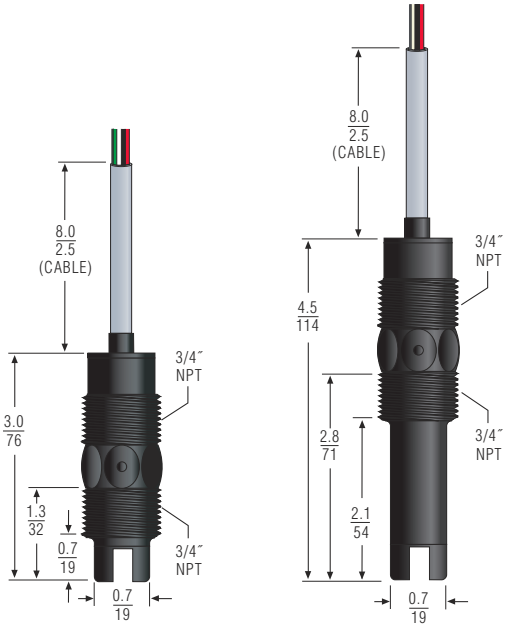
How to Order

Specify part number based on output, material and length.

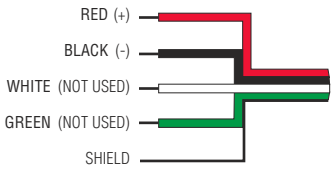
Output	Material	Sensor Length	Intrinsically Safe	Part Number
5mA (dry) 19mA (wet)	Polypropylene	0.7˝	Yes	**195050** ⚡
		2.1˝	Yes	**195051**
	PFA Teflon®	0.7˝	Yes	**195052** ⚡
		2.1˝	Yes	**195053**
SPDT Relay, 1A	Polypropylene	0.7˝	No	**195054** ⚡
		2.1˝	No	**195055**
	PFA Teflon®	0.7˝	No	**195056** ⚡
		2.1˝	No	**195057**

⚡ = Stock item

Dimensions



Wiring



ULS-60 Multi-Point Level Controller

- Accurate and reliable level detection to 12 feet
- Dual relay channels for pump, valve and alarm automation
- Automatic temperature compensation over entire range
- Simple potentiometer calibration for all relay set points

These versatile, general purpose ultrasonic liquid level switches mount in the top of your tank and provide non-contact level detection from 6 inches to 12 feet. With two integral relays, you can control pumps, valves or alarm controls.

Specifications

Accuracy	±0.25% of span
Resolution	0.125″
Pulse Rate	3 per second
Beam Width	8-degree conical
Supply Voltage	120 VAC
Pressure	30 psi @ 77°F
Temperature	-40°F to +140°F (-40°C to +60°C)
Enclosure Rating	NEMA 4X (IP 65)
Enclosure Material	Polypropylene
Conduit Connection	0.5″ NPT
Sensor Material	PVDF
CE Compliance	EN 50082-2 immunity EN 55011 emissions

Relays

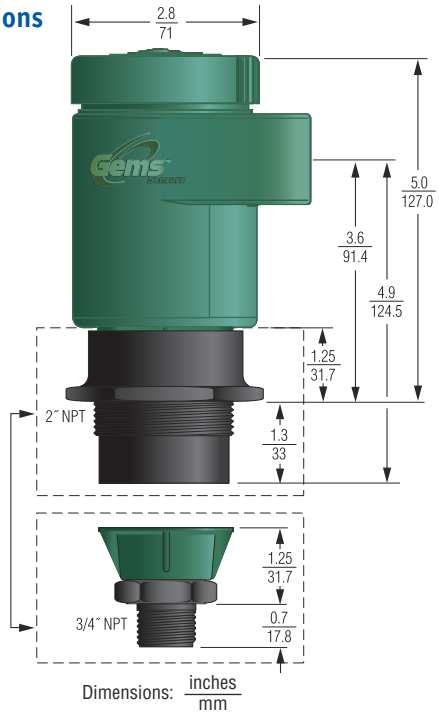
Set Points	2 per relay
Relay Types	(2) SPDT
Relay Rating	250 VAC, 10A, 0.5 hp
Adjustments	Potentiometer
Relay Mode	Selectable NO or NC
Relay Latch	ON or OFF

How to Order

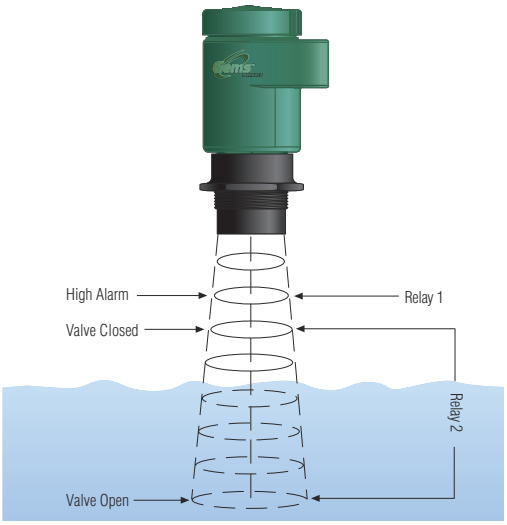
Specify by part number based on measurement range.

Range	Frequency	Dead Band	Mounting	Part Number
3.6″ to 6′	83 kHz	3.6″	0.75″ NPT	**195132**
6″ to 12′	50 kHz	6″	2″ NPT	**195130**

Dimensions



Typical Application



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Gems Sensors Inc.
One Cowles Road
Plainville, CT 06062-1198 USA
tel 860.747.3000
fax 860.747.4244
toll-free 800.378.1600

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