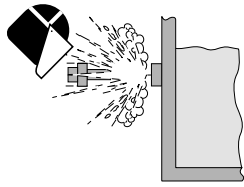




3-2211.090



C-9/01 English



## Safety Instructions

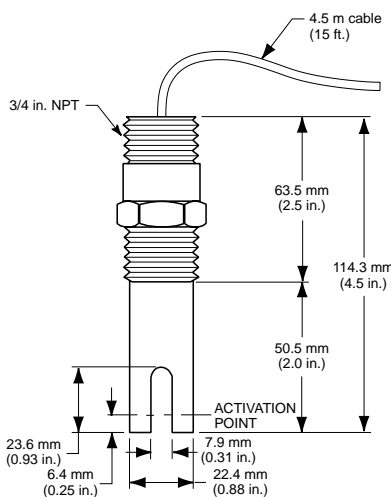
1. Remove power to unit before wiring input and output connections.
2. Prior to installation or removal:
  - Depressurize and vent system
  - Drain below sensor level
3. Do not exceed maximum temperature/pressure specifications.
4. Wear safety goggles and faceshield during installation/service.
5. Do not alter product construction.

## Contents

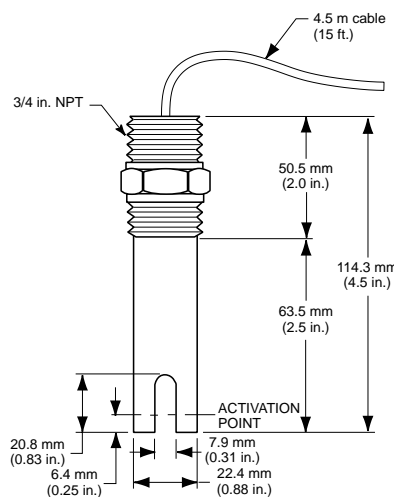
1. Description
2. Operation
3. Specifications
4. Installation
5. Wiring
6. Maintenance/Troubleshooting
7. Ordering Information

## 1. Description

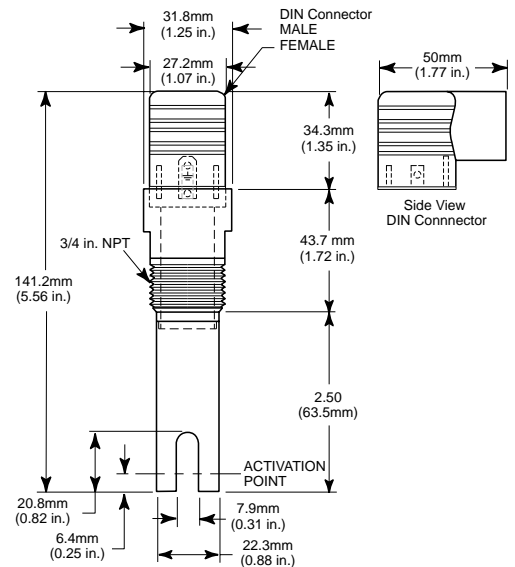
+GF+ SIGNET 2211/2212 Ultrasonic Point Level Sensors are an inexpensive means of obtaining highly reliable point level measurements. And with wetted materials of 316L Stainless Steel or Tefzel®, the sensors are suitable for operation in a wide variety of liquids. Output options include a 2-wire current loop (4 or 16 mA) or a 1 Amp relay. Dual 3/4" NPT process connections allow the sensors to be installed at the end of stand pipes, or through the side walls of tanks.



**Tefzel® with 3/4 in. NPT**  
(2212-TR, 2212-TL)



**316L SS with 3/4 in. NPT**  
(2212-SR, 2212-SL)



**316L SS with DIN Connector**  
(2211-SR, 2211-SL)

## 2. Operation

Ultrasonic signals propagate readily through virtually any kind of liquid, but are greatly attenuated by air. These Point Level Sensors make use of that fact with ultrasonic transducers located in the sensor tips, straddling the gap at the activation point. An internal microprocessor, sensitive to the difference between air and liquid by way of the ultrasonic signal strength across the sensing gap, energizes a relay or provides a current output corresponding to the sensing condition.

## 3. Specifications

### General

- Material: 316L SS, Tefzel®
- Weight: Tefzel®: 0.14 Kg/0.3 lb  
SS: 0.23 Kg/0.5 lb
- Cable Length: 4.5 m (15 ft.) on 2212 only (2211 has wiring terminals in DIN connector)  
Longer lengths: consult factory  
Can splice up to 300 m, (1000 ft.) max.
- Mounting: 3/4" NPT
- Accuracy: ±1 mm in water
- Repeatability: ±0.5 mm in water
- Delay: 0.5 second On  
2.0 seconds Off

### Environmental

- Operating temperature: -29° to 71°C (-20° to 160°F)
- Pressure Rating (over temperature range):
  - 316L SS: 1000 psig max. (68.9 bars)
  - Tefzel®: 100 psig max. (6.9 bars)

### Electrical

- Input Power: 12 to 24VDC ± 10%
- Outputs:
  - Two-wire loop: 4.0 ± 1.0 mA dry  
16.0 ± 1.0 mA wet
  - Loop impedance: 250Ω @ 12 VDC  
900Ω @ 24 VDC
  - 2212 Relay: SPDT, 1A, 42V AC/DC
  - 2211 Relay: SPST, 1A, 42V AC/DC  
Normally Open Contact is standard  
Normally Closed Contact available, consult factory
- Reverse polarity protected

### Standards and Approvals:

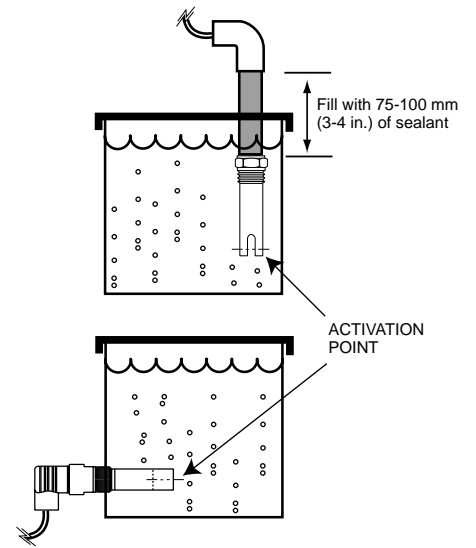
- CE

Tefzel® is a registered trademark of DuPont.

## 4. Installation

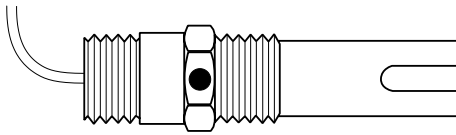
### 4.1 Vertical

1. Connect sensor to pipe using 3/4" FNPT coupling.
2. Do not allow moisture to accumulate at the cable end of the assembly.
  - For additional defense against the accumulation of condensation at the back seal area of the sensor, fill the lower 3 to 4 inches of conduit or extension pipe with a flexible sealant such as silicone.
3. Mount pipe for desired location of activation point.
4. Route power and control wiring to external equipment (user supplied).
5. See wiring details in Section 5.



### 4.2 Horizontal

1. Where a 3/4-inch NPT tank adapter is available and allowed by local regulation, horizontal mounting is feasible.
2. Apply sealant or PTFE tape to sensor threads, inspecting threads to ensure integrity. Do not install a sensor with damaged threads.
3. Hand tighten sensor into tank adapter and continue tightening only until aligned vertically. **DO NOT OVERTIGHTEN.**
  - The Tefzel® sensor (shown below) has a round dot on one flat edge of the hex nut which can be used as an alignment guide.



- To mount the stainless steel sensor horizontally make an alignment mark on the flat edge of the hex nut (i.e., using a pencil, marking pen, scribe, etc.).
  - On DIN sensors, mount with cable exiting downward.
4. Route power and control wiring to external equipment (user supplied).
  5. See wiring details in Section 5.

## 5. Wiring

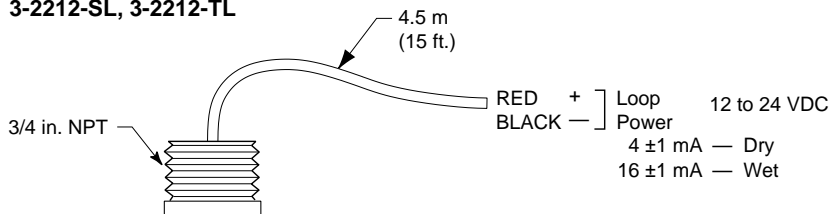
Remove power to unit before wiring input and output connections.

### Wiring Tips:

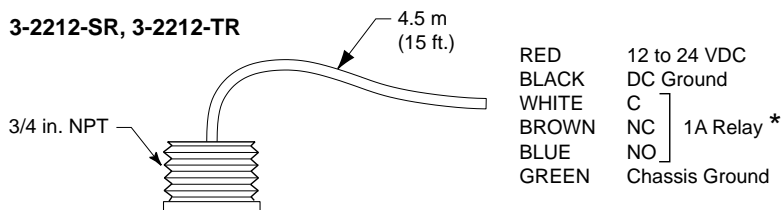
- Do not route sensor cable in conduit containing AC power wiring. Electrical noise may interfere with sensor signal.
- Seal cable connections to prevent moisture damage.
- Cable length may be extended up to 300 m (1000 feet).
- Recommended cables:
  - Loop output: Signet P/N 5523-0222 (Code 159 000 592), 22AWG, 2-conductor w/shield
  - Relay output: Signet P/N 5523-0624 (Code 159 000 636), 24AWG, 6-conductor w/shield

### 5.1 3/4 Inch NPT (316L SS and Tefzel®)

#### 3-2212-SL, 3-2212-TL



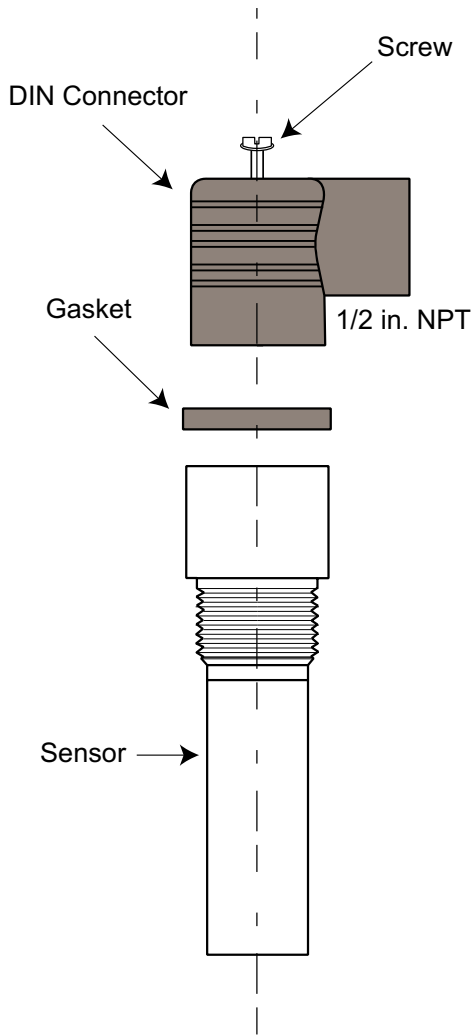
#### 3-2212-SR, 3-2212-TR



**CAUTION: Do not exceed relay voltage and current rating**

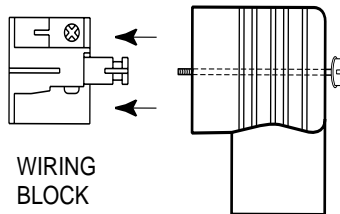
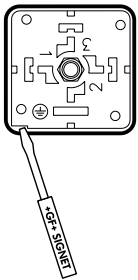
\* RC Filter Kit 3-8050.396 is recommended for inductive loads.

## 5.2 DIN Connector

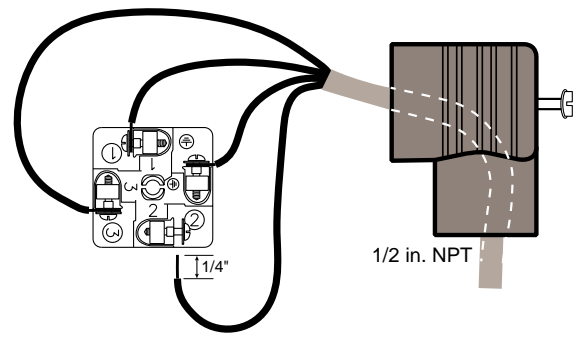


### Wiring Instructions

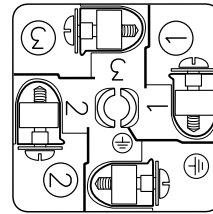
1. Remove screw from back of DIN connector.
2. Pull DIN connector away from sensor.
3. Remove gasket from face of DIN connector.
4. Insert a small screwdriver under the notched corner of the DIN connector wiring block and gently pry upward to remove wiring block from DIN connector.



5. Loosen cable gland and insert cable.



6. Strip 1-1/4-inch of cable jacket from the cable and remove foil shield.



7. Strip 1/4-inch of insulation from individual wires.
8. Connect wires to terminals (illustrated above) as shown in the following chart.

Pin #	4-20 mA Loop Power 3-2211-SL	1 Amp Relay 3-2211-SR
1	Loop +	Normally Open
2	Loop -	Common
3		+12 to 24 VDC
⊖	Chassis Ground	DC Ground



**CAUTION: Do not exceed relay voltage and current rating.**

9. Gently pull cable and guide wiring block back into connector housing. Align so ground terminal is located at 0 or 180°. Snap wiring block into housing and reinstall gasket onto connector face.
10. When sensor is mounted into vessel, the cable should exit downward. Seal the cable outlet with liquid-tight connector (3-9000.392-1)

## 6. Maintenance/Troubleshooting

- Periodically check and clean the sensors when used with liquids which can cause a coating buildup on the sensor. Always consider the sensor's materials of construction when selecting a cleanser.
- Remove the ultrasonic sensor before steam cleaning pipe or vessel.
- No other maintenance is required.

### Troubleshooting

Symptom	Possible Causes	Suggested Solutions
Constant 0 mA out	<ul style="list-style-type: none"> <li>• No power.</li> <li>• Electronic components damaged.</li> </ul>	<ul style="list-style-type: none"> <li>• Check power source.</li> <li>• Replace sensor.</li> </ul>
Constant 4 mA or 16 mA out	<ul style="list-style-type: none"> <li>• Defective sensor.</li> </ul>	<ul style="list-style-type: none"> <li>• Replace sensor.</li> </ul>
Equipment connected to relay does not respond correctly	<ul style="list-style-type: none"> <li>• Relay wired incorrectly.</li> <li>• Electronic components damaged.</li> </ul>	<ul style="list-style-type: none"> <li>• Review relay logic for correct wiring.</li> <li>• Replace sensor.</li> </ul>

## 7. Ordering Information

Mfr. Part No.	Code	Description
3-2211-SR	159 000 727	Ultrasonic Point Level Sensor - 316LSS, Relay, DIN connector
3-2211-SL	159 000 728	Ultrasonic Point Level Sensor - 316LSS, 4-20mA, DIN connector
3-2212-SR	159 000 729	Ultrasonic Point Level Sensor - 316LSS, Relay, 3/4 in. NPT
3-2212-SL	159 000 730	Ultrasonic Point Level Sensor - 316LSS, 4-20mA, 3/4 in. NPT
3-2212-TR	159 000 731	Ultrasonic Point Level Sensor - Tefzel <sup>®</sup> , Relay, 3/4 in. NPT
3-2212-TL	159 000 732	Ultrasonic Point Level Sensor - Tefzel <sup>®</sup> , 4-20mA, 3/4 in. NPT

Note:  
 S = 316LSS body                      T = Tefzel<sup>®</sup> body                      R = Relay                      L = 4-20mA Loop

### Accessories

Mfr. Part No.	Code	Description
5523-0624	159 000 636	Cable, 24AWG, 6 cond. w/ shield (specify length in feet)
3-8050-1	159 000 753	Universal mount junction box
3-8052-1	159 000 755	3/4 in. NPT mount junction box
3-9000.392	159 000 368	Liquid-tight Connection Kit, 1/2 in. NPT, 3 sets
3-9000.392-1	159 000 839	Liquid-tight Connection Kit, 1/2 in. NPT
3-9000.392-2	159 000 841	Liquid-tight Connection Kit, PG 13.5

## +GF+ SIGNET

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 For Worldwide Sales and Service, visit our website: [www.gfsignet.com](http://www.gfsignet.com) • Or call (in the U.S.): (800) 854-4090

