Product Data Sheet
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Rosemount® 2110

Compact Vibrating Fork Liquid Level Switch



DIBt

- Virtually unaffected by turbulence, foam, vibration, coating, or changing liquid properties
- Built in diagnostics continuously monitors instrument health and Heartbeat LED provides visual indication
- Magnetic test point makes testing of the Rosemount 2110 and system easy
- Minimal installation and maintenance, and no calibration required, keeps costs down
- DIBt / WHG overfill protection certification keeps peace of mind
- Compact size makes the Rosemount 2110 suitable for use in small vessels and tanks or for in-pipe mounting.

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Process Management

Overview of the Rosemount 2110



Threaded process connection



Tri Clamp process connection



Compact and lightweight

Measurement principle

The Rosemount 2110 is designed using the principle of a tuning fork. A piezo-electric crystal oscillates the forks at their natural frequency. Changes to this frequency are continuously monitored. The frequency of the vibrating fork sensor changes depending on the medium in which it is immersed. The denser the liquid, the lower the frequency.

When used as a low level alarm, the liquid in the tank or pipe drains down past the fork, causing a change of natural frequency that is detected by the electronics and switches the output state.

When the 2110 is used as a high level alarm, the liquid rises in the tank or pipe, making contact with the fork which then causes the output state to switch.

Key features and benefits

- Stainless steel housing and plug/socket connection for fast- fit, high-volume users
- Compact and lightweight design for side or top mounting
- The industry standard DIN 43650 plug/socket is used for a fast connection. The polarity insensitivity and short circuit protection make electrical hook-up safe and easy
- The 2110 is designed for operation in temperatures from –40 to 302 °F (–40 to 150 °C)
- Rapid wet-to-dry time for highly responsive switching
- ‘Fast Drip’ fork design gives quicker response time, especially with viscous liquids
- The ‘heartbeat’ LED gives an instant visual indication that the unit is operational
- Hygienic connections available. The fork shape is optimized for hand polishing to meet hygienic requirements.
- No moving parts or crevices for virtually no maintenance
- Magnetic test point makes functional test easy

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Fit and forget

- Once installed, the 2110 is ready to go.
  It needs no calibration and requires minimum installation
- Functional testing of the instrument and system is easy with a magnetic test point
- You can install, and forget it

Superior performance

- Functionality is virtually unaffected by turbulence, foam, vibration, coating, or liquid properties
- The 'Fast Drip' design allows the liquid to be quickly drawn away from the fork tip, making the 2110 quicker and more responsive in high density or viscous liquid applications

Applications

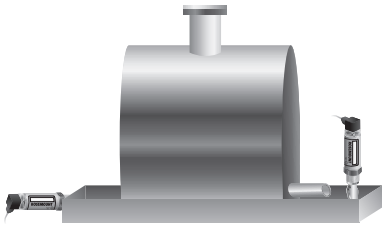
- Overfill protection
- High and low level alarms
- Leak detection
- Run dry or pump protection
- Pump control or limit detection
- Hygienic applications



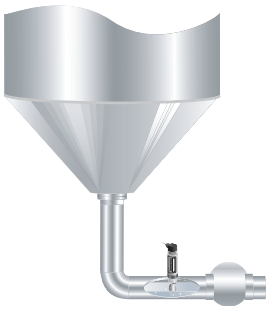
Overfill protection



High and low level alarm



Leak detection



Pump protection

Rosemount 2110 Level Switch Ordering

Specification and selection of product materials, options, or components must be made by the purchaser of the equipment. See page 6 for more information on Material Selection.

Table 1. Rosemount 2110 Ordering Information

The starred options (★) represent the most common options and should be selected for best delivery. The non-starred offerings are subject to additional delivery lead time.

Model	Product description	
2110	Compact Vibrating Fork Liquid Level Switch	
Electronic type		
0	Direct load switching with plug connection (2 wire) 21 to 264 Vac 50/60Hz, 21 to 264 Vdc	★
1	PNP/PLC low voltage switching with plug connection 18 to 60 Vdc	★
Process connection size / type		
0A	3/4-in. BSPT (R) thread	★
1A	1-in. BSPT (R) thread	★
0D	3/4-in. NPT thread	★
2R(1)	2-in. (51 mm) Tri Clamp	★
1B	1-in. BSPP (G) thread	★
1L	1-in. BSPP (G) Semi-extended 4.6 in. (116 mm)	★
Product certificates		
NA(2)	No hazardous locations certifications (safe area use only)	★
GP(3)	Korea Testing Laboratory (KTL), KCC mark for Ordinary Locations	★

Options (include with the selected model number)

Calibration data certificate		
Q4	Certificate of functional test	★
Tag plate		
ST	Tag plate SST engraved plate (maximum 16 digits), wire-on	★
Overfill		
U1	DIBt/WHG Overfill protection	★
Typical Model Number: 2110 0 2R NA		

(1) Hand-polished for hygienic connections to better than 0.8 µm Ra such that there are no pits, folds, crevices or cracks discernible to the naked eye (i.e. no features larger than 75 micrometers based on resolving 1/60 degree at a distance of 250 mm).

(2) Includes the Technical Regulation Customs Union (EAC) ordinary location mark.

(3) Contact an Emerson Process Management representative for additional information.

Rosemount 2110 Spare Parts and Accessories

Specification and selection of product materials, options, or components must be made by the purchaser of the equipment.
See page 6 for more information on Material Selection.

Table 2. Rosemount 2110 Spare Parts and Accessories

The starred options (★) represent the most common options and should be selected for best delivery. The non-starred offerings are subject to additional delivery lead time.

Spares and accessories		
02100-1000-0001	Seal for 1-in. BSPP (G1A). Material: Non-asbestos BS7531 grade X carbon fiber with rubber binder	★
02100-1010-0001	Hygienic adaptor boss for 1-in. BSPP model. Material: 316 stainless steel fitting. Fluorocarbon (FPM/FKM) O-ring	★
02100-1020-0001	Hygienic mounting kit for 2-in. (51 mm) Tri Clamp model. Includes vessel fitting, clamp ring, and seal. Material: 316 stainless steel and NBR Nitrile	★
02100-1030-0001	Telescopic test magnet	★

Specifications

General

Product

Rosemount 2110 Compact Vibrating Fork Liquid Level Switch

Measuring principle

Vibrating fork

Applications

Most liquids including coating liquids, aerated liquids, and slurries

Mechanical

Mounting connections

3/4-in. BSPT (R) or NPT,
1-in. BSPT (R) or BSPP (G) thread, or
Hygienic 2-in. (51 mm) Tri Clamp fitting

Materials selection

Emerson provides a variety of Rosemount product with various product options and configurations including materials of construction that can be expected to perform well in a wide range of applications. The Rosemount product information presented is intended as a guide for the purchaser to make an appropriate selection for the application. It is the purchaser's sole responsibility to make a careful analysis of all process parameters (such as all chemical components, temperature, pressure, flow rate, abrasives, contaminants, etc.), when specifying product, materials, options and components for the particular application. Emerson Process Management is not in a position to evaluate or guarantee the compatibility of the process fluid or other process parameters with the product, options, configuration or materials of construction selected.

Process connection materials

316L stainless steel (1.4404)

For Tri Clamp connection, hand polished to better than 0.8 µm upon request.

Gasket material for 1 in. BSPP (G1) is Non-asbestos BS7531 Grade X carbon fiber with rubber binder.

Housing / enclosure materials

Body: 304 SST with polyester label

LED window: Flame retardant Polyamide (Pa12) UL94 V2

Plug: Polyamide glass reinforced

Plug seals: Nitrile butadiene rubber

Dimensional drawings

See "Dimensional Drawing" on page 9.

Ingress protection rating

IP66/67 to EN60529

Performance

Hysteresis (water)

±0.039-in. (± 1 mm) nominal

Switching point (water)

0.5 in. (13 mm) from fork tip if mounted vertically

0.5 in. (13 mm) from the fork edge if mounted horizontally

The switch point varies with different liquid densities.

Functional

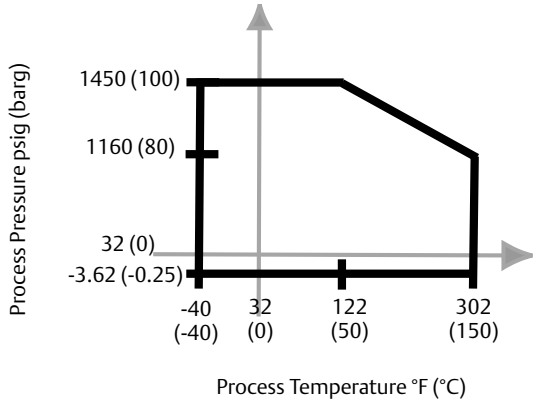
Maximum operating pressure

The final rating depends on the process connection.

Threaded connection: see Figure 1

Hygienic connection: 435 psig (30 barg)

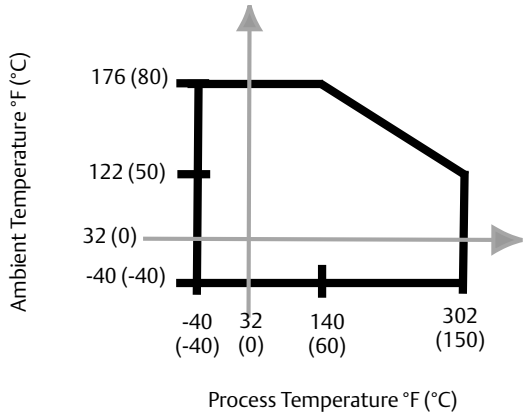
Figure 1. Process Pressure



Minimum and maximum operating temperatures

See Figure 2 on page 7 for the maximum and minimum operating temperatures.

Figure 2. Temperature



Liquid density requirement

Minimum 37.5 lb/ft^3 (600 kg/m^3)

Liquid Viscosity Range

0.2 to 10000 cP (centiPoise)

Solids content and coating

Maximum recommended diameter of solid particles in the liquid is 0.2 in. (5 mm). For coating product, avoid 'bridging' of forks.

Switching delay

1 second delay for dry-to-wet or wet-to-dry switching

CIP (Clean In Place) cleaning

Withstands steam cleaning routines up to 302 °F (150 °C)

Electrical

Switching mode

User selectable (Dry=on or Wet=on) by selecting plug wiring

Protection

Polarity insensitive – *Direct Load electronics only*

Over-current protection

Short-circuit protection

Load-missing protection

Surge protection (to IEC61326)

Magnetic test point

A magnetic test point is located on the side of the housing, allowing a functional test of the 2120 and a system connected to it. By holding a magnet to the target, the 2120 output changes state for as long as the magnet is held there.

Cable connection

Via 4-way plug provided (DIN43650)

Maximum conductor size is 15AWG

4-position orientation (90° / 180° / 270° / 360°)

Terminal connection (wire diameter)

Maximum 0.06 in.^{2} (1.5 mm^2)

Cable gland

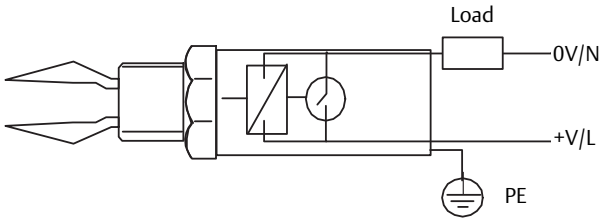
PG9 provided. Cable diameter 0.24 to 0.31 in. (6 to 8 mm)

Grounding

The 2110 should always be grounded either through the terminals or using the external ground connection provided.

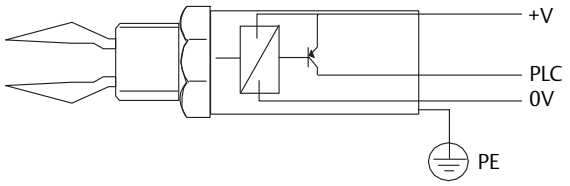
Electronics options

Figure 3. Direct Load Switching (Electronics Code 0)



Direct load switching (electronics code 0)	
Operating voltage	21 to 264 Vac (50 to 60 Hz)/dc
Maximum switched load	500 mA
Maximum peak load	5 A for 40 ms maximum
Minimum switched load	20 mA continuous
Voltage drop	6.5 V @ 24 Vdc / 5 V @ 240 Vac
Current draw (load off)	< 3.0 mA continuous

Figure 4. PNP Switching (Electronics Code 1)



PNP switching (electronics code 1)	
Operating voltage	18 to 60 Vdc
Maximum switched load	500 mA
Maximum peak load	5 A for 40 ms maximum
Voltage drop	< 3 V
Supply current	3 mA nominal
Output current (load off)	< 0.5 mA

Product Certifications

European directive information

A copy of the EC Declaration of Conformity can be found at the end of the Quick Start Guide. The most recent revision of the EC Declaration of Conformity can be found at EmersonProcess.com/Rosemount.

Low voltage directive

EN61010-1 Pollution degree 2, Category II (264V maximum), Pollution degree 2, Category III (150 V maximum)

Electro Magnetic Compatibility (EMC) directive

EN61326

Overfill protection

If required, select Product Certificates code U1 for DIBt/WHG overfill protection. The approval number is Z-65.11-236.

Canadian Registration Number (CRN)

The CRN is 0F04227.2C for model numbers with a NPT threaded process connection selected.

Technical Regulation Customs Union (EAC), ordinary locations mark

TRCU 004/2011

Certificate: TCRU C-GB.AB72.B.01385

EN61010-1 Pollution degree 2, Category II (264V maximum), Pollution degree 2, Category III (150 V maximum)

TRCU 020/2011

Certificate: TCRU C-GB.AB72.B.00916

EN61326

Korean Testing Laboratory (KTL), KCC mark for ordinary locations use

GP Certificate: KCC-REM-ERN-RMDSWIT2110XXX

Dimensional Drawing

Figure 5. Rosemount 2110 Dimensionsal Drawing

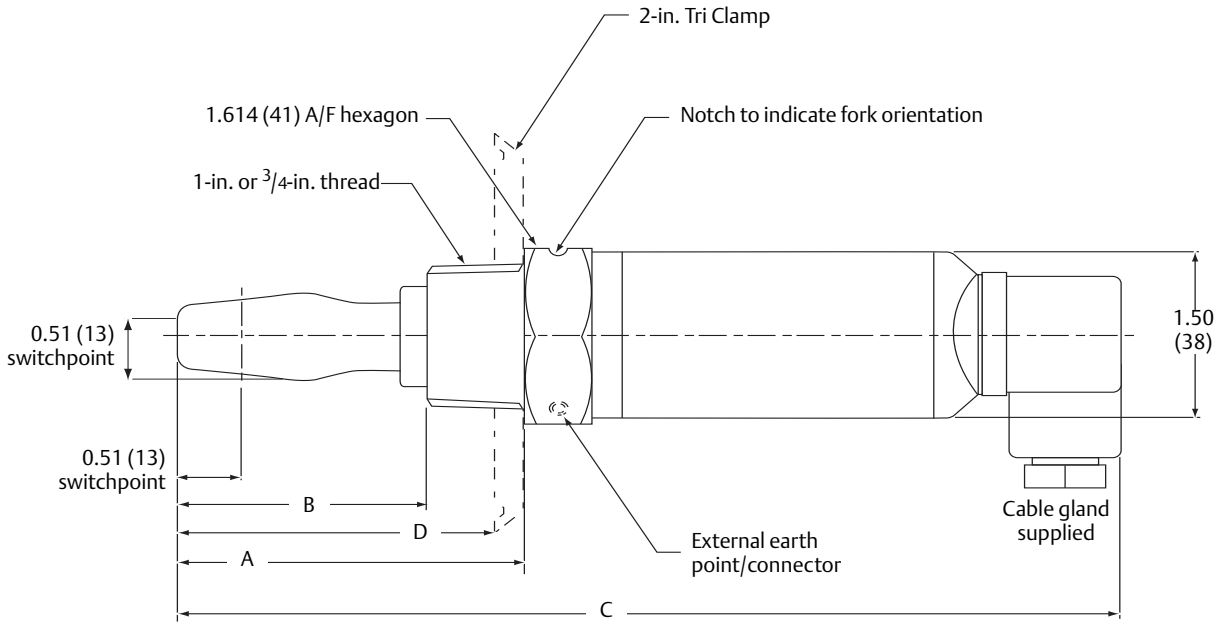


Table 3. Rosemount 2110 Dimensions A, B, C, and D

Process connections	A	B	C	D
3/4-in. BSPT (R)	2.72 (69)	1.97 (50)	7.40 (188)	N/A
3/4-in. NPT	2.72 (69)	1.97 (50)	7.40 (188)	N/A
1-in. BSPT (R)	2.72 (69)	1.97 (50)	7.40 (188)	N/A
1-in. BSPP (G)	3.07 (78)	2.36 (60)	7.91 (201)	N/A
2-in. (51 mm) Tri Clamp	2.72 (69)	1.97 (50)	7.40 (188)	2.52 (64)
1-in. Semi-extended	4.57 (116)	3.86 (98)	9.41 (239)	N/A

Note
Dimensions are in inches (millimeters).

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