

# Mobrey Mini-SQUING

## Compact Vibrating Fork Liquid Level Switch

- *Function virtually unaffected by flow, turbulence, bubbles, foam, vibration, solids content, coating, properties of the liquid, and product variations*
- *No need for calibration and requires minimum installation procedures*
- *Polarity insensitive and short circuit protection*
- *Industry standard plug/socket connection*
- *No moving parts or crevices means virtually no maintenance*
- *Electronic, self-checking, and condition monitoring - Heartbeat LED gives status and health information*
- *Magnetic test point makes functional test easy*
- *Compact design, small in size and weight*
- *“Fast Drip” Fork Design gives quicker response time especially with viscous liquids*
- *Hygienic connections*



DIBt

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## Reliable Performance...In Challenging Applications



Threaded Process Connection

Tri-Clamp Process Connection



Compact And Lightweight



'Fast Drip' Forks

### MEASUREMENT PRINCIPLE

The Mobrey Mini-SQUING 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 Mini-SQUING 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

- Virtually unaffected by turbulence, foam, vibration, solids content, coating, or liquid properties
- Stainless steel housing and plug/socket connection for the fast fit, high volume user
- 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 Mini-SQUING is designed for operation in temperatures from  $-40$  to  $302$  °F ( $-40$  to  $150$  °C)
- The 'heartbeat' LED gives status and health information on the Mini-SQUING
- 'Fast Drip' fork design gives quicker response time, especially with viscous liquids
- Rapid wet-to-dry time for highly responsive switching
- Fork shape is optimized for hand polishing to meet hygienic requirements
- No moving parts or crevices for virtually no maintenance

## Product Data Sheet

IP210, Rev DA  
March 2012

# Mobrey Mini-Squing

### Fit and Forget

- Once installed, the Mini-SQUING is ready to go. It needs no calibration and requires minimum installation
- The 'heartbeat' LED is visible through the end cap and gives an instant visual indication that the unit is operational
- Functional testing of the instrument and system is easy with a magnetic test point
- You can install, and forget it

### Superior Performance

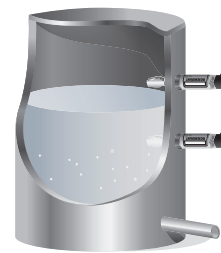
- Functionality is virtually unaffected by flow, turbulence, bubbles, foam, or vibration
- The 'Fast Drip' design allows the liquid to be quickly drawn away from the fork tip, making the Mini-SQUING quicker and more responsive in high density or viscous liquid applications
- With a user-selectable time delay feature, the risk of false switching is minimized in turbulent or splashing applications

### APPLICATIONS

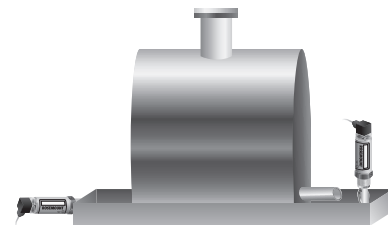
- Overfill protection
- High and low level alarms
- Leak detection
- Run dry or pump protection
- Pump control or limit detection
- Hygienic applications



Overfill Protection



High And Low Level Alarm



Leak Detection



Pump Protection

# Mobrey Mini-Squing

## Mobrey Mini-SQUING Compact Vibrating Fork Liquid Level Switch



Mini-SQUING Level Switch

Mobrey Mini-SQUING capabilities include:

- Rugged stainless steel body and fork, the ideal choice for OEM applications
- Compact design, small and lightweight, perfect for small tank or pipe installations
- Short fork or semi-extended lengths
- Direct load switching or PNP/PLC electronics
- Safe area only

### Additional Information

Specifications: page 5

Dimensions: page 7

Certifications: page 6

Table 1. Mini-SQUING Ordering Information

| Model                                 | Product Description  |
|---------------------------------------|--|
| VT                                    | Compact Vibrating Fork Liquid Level Switch   |
| <b>Electronic Type</b>                |  |
| <b>Standard</b>                       |  |
| 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                          |
| <b>Process Connection Size / Type</b> |  |
| <b>Standard</b>                       |  |
| 0                                     | <sup>3</sup> / <sub>4</sub> -in. BSPT (R) thread   |
| 3                                     | 1-in. BSPT (R) thread  |
| 5                                     | <sup>3</sup> / <sub>4</sub> -in. NPT thread  |
| 7                                     | 2-in. (51 mm) Tri-clamp  |
| F                                     | 1-in. BSPP (G) thread  |
| L                                     | 1-in. BSPP (G) Semi-extended 4.6 in. (116 mm)  |
| <b>Typical Model Number: VT 0 7</b>   |  |

Table 2. Spare Parts and Accessories

| <b>Spares and Accessories</b> |   |
|-------------------------------|---|
| <b>Standard</b>               |   |
| SK331                         | Seal for 1-in. BSPP (G1A). Material: Non-asbestos BS7531 grade X carbon fiber with rubber binder  |
| SK267                         | Hygienic adaptor boss for 1-in. BSPP model. Material: 316 SST fitting. Fluorocarbon (FPM/FKM) O-ring                                      |
| SK266                         | Hygienic mounting kit for 2-in. (51 mm) Tri-clamp model. Includes vessel fitting, clamp ring, and seal. Material: 316 SST and NBR Nitrile |
| MSP-MMS                       | Telescopic test magnet  |

# Product Data Sheet

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# Mobrey Mini-Squing

## Specifications

### PHYSICAL

#### Product

Mobrey Mini-SQUING Compact Liquid Level Switch

#### Measuring principle

Vibrating Fork

#### Applications

Most liquids including coating liquids, aerated liquids, and slurries

### Mechanical

#### Process Material

316L Stainless Steel (1.4404)

For Tri-Clamp connection, hand polished to better than 0.8  $\mu\text{m}$ . Gasket material for 1 in. BSPP (G1) is Non-asbestos BS7531 Grade X carbon fiber with rubber binder.

#### Housing Materials

Body: 304 SST with polyester label

LED window:

Flame retardant Polyamide (Pa12) UL94 V2

Plug: Polyamide glass reinforced

Plug seals: Nitrile butadiene rubber

#### Mounting

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

#### Dimensional Drawings

See "Dimensional Drawing" on page 7

#### Ingress of Protection Rating

IP66/67 to EN60529

### PERFORMANCE

#### Hysteresis (water)

$\pm 0.039$ -in. ( $\pm 1$  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)

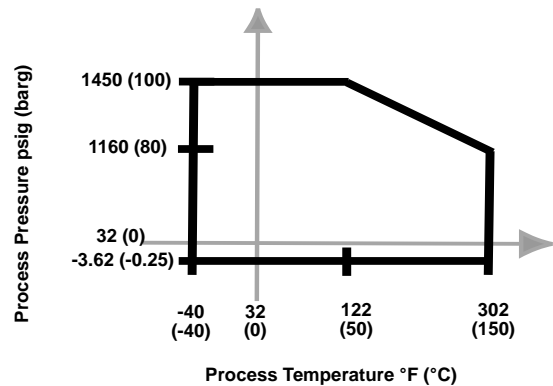
##### Threaded Connection

See Figure 1

##### Hygienic Connection

435 psig (30 barg)

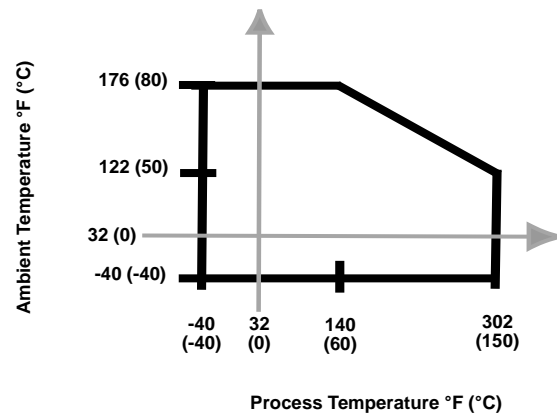
Figure 1. Process Pressure



#### Temperature

See Figure 2 for the maximum and minimum operating temperatures.

Figure 2. Temperature



#### Liquid Density

Minimum 37.5 lb/ft<sup>3</sup> (600 kg/m<sup>3</sup>)

#### Liquid Viscosity Range

0.2 to 10000 cP (centiPoise)

# Mobrey Mini-Squing

## 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 dry-to-wet or wet-to-dry

## 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

### Cable Connection

Via 4-way plug provided (DIN43650).

Max. conductor size is 15AWG.

4-position orientation (90/180/270/360 deg).

### Conductor Size

Maximum 0.06 in.<sup>2</sup> (1,5 mm<sup>2</sup>)

### Cable Gland

PG9 provided. Cable diameter 0.16 to 0.35 in. (4 to 9 mm)

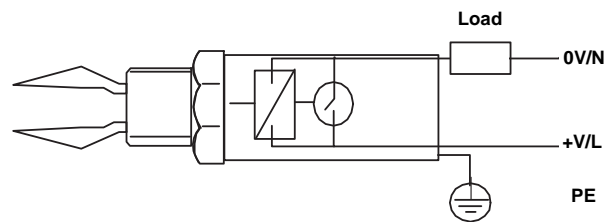
### Protection

Polarity insensitive. Over-current, short circuit, and load-missing protection. Surge protection to IEC61326.

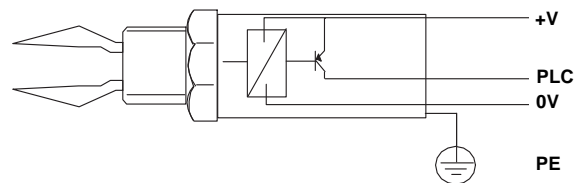
## Grounding

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

| Direct Load Switching (Electronics Type 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 max.             |
| 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             |



| PNP Switching (Electronics Type Code 1) |                    |
|---|--------------------|
| Operating Voltage                       | 18 to 60 Vdc       |
| Maximum switched load                   | 500 mA             |
| Maximum peak load                       | 5 A for 40 ms max. |
| Voltage drop                            | <3 V               |
| Supply Current                          | 3 mA nominal       |
| Output current (load off)               | <0.5 mA            |



## Product Certifications

### L.V. Directive

EN61010-1

Pollution degree 2, Category II (264V max),

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)

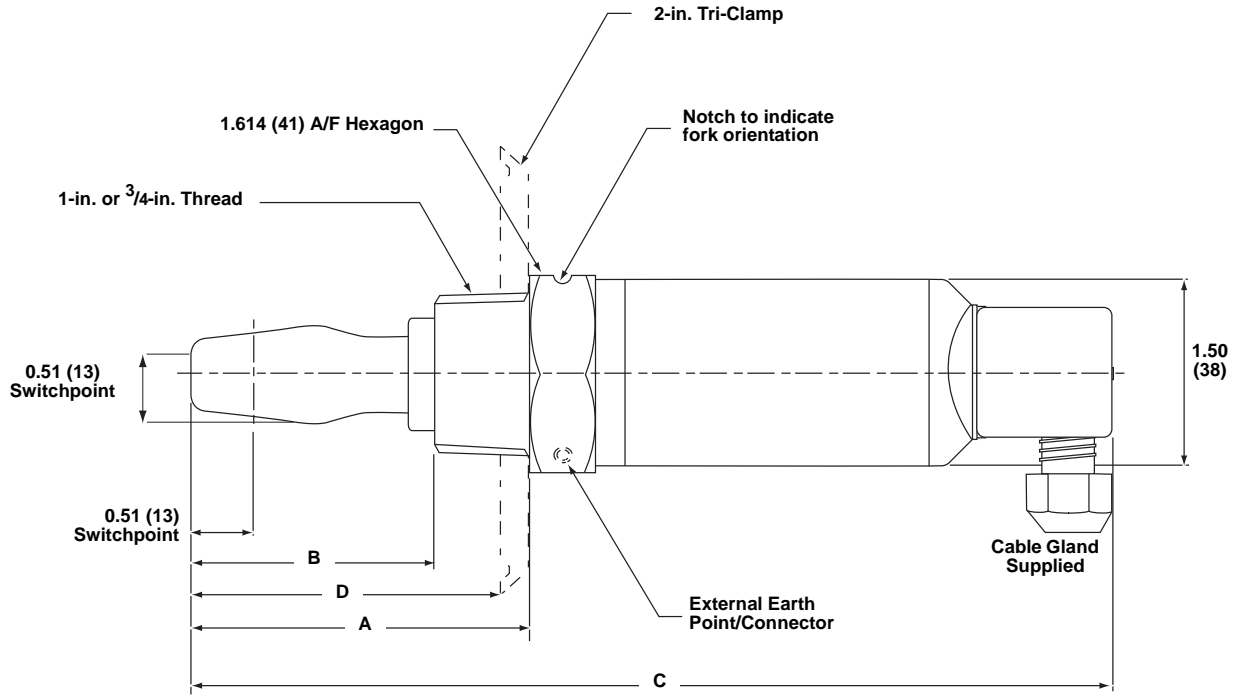
The CRN is 0F04227.2C for model numbers with a NPT threaded process connection selected.

**Product Data Sheet**

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**Mobrey Mini-Squing**

**Dimensional Drawing**



| 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       |

# Mobrey Mini-Squing

## Mobrey Level Solutions

Emerson provides a wide range of Mobrey products for level measurement applications.

### POINT LEVEL DETECTION

#### Vibrating Fork Liquid Level Switches

For high and low alarms, overflow protection, pump control, including wide pressure and temperature requirements, and hygienic applications. Flexible mounting. Immune to changing process conditions and suitable for most liquids.

- Mobrey Mini-Squing (Compact)
- Mobrey Squing 2 (Full-featured)

#### Ultrasonic Gap Sensor Liquid Level Switches

For use in non-hazardous industrial processes to detect high or low liquid levels and liquid interface. Immune to changing density, and wide dielectric and pH variations. Suitable for use in most clean and non-aerated liquids, with options for sludges and slurries.

#### Float and Displacer Liquid Level Switches

Mobrey electromechanical float and displacer level switches are ideal for alarm and pump control duties, especially in critical applications or hazardous areas.

- Mobrey Horizontal Level Switches
- Mobrey Vertical Level Switches

Chambers are available for external mounting of these level switches on process vessels.

#### Dry Products Level Switches

For high and low level alarms. Including threaded mounting connections, extended lengths, high temperature capability, and multiple detection techniques. Suitable for a wide variety of powders, granules, and free flowing solids with wide variations in bulk densities.

- Mobrey VLS Series – Vibrating Rod Level Switch
- Mobrey PLS Series – Paddle Level Switch

### CONTINUOUS MEASUREMENT

#### Ultrasonic Continuous Level Transmitters and Controllers

Top mounted, non-contacting for simple tank and open-air process level measurements. Unaffected by fluid properties such as density, viscosity, dirty coating, and corrosiveness. Intrinsically Safe versions are available for operating in hazardous areas.

- Mobrey MSP Series Ultrasonic Level and Flow Transmitters
- Mobrey MCU900 Series Universal Controllers

#### Ultrasonic Sludge Density Blanket Monitoring and Control

Ultrasonic in-line pipe or tank mounted sensors for sludge density measurement and control in Industrial and Municipal effluent treatment processes.

- Mobrey MSM400 – Sludge Density Monitor

#### Displacer Continuous Level Measurement

Top mounted in a vessel or externally mounted in a vertical chamber. For use in hazardous areas.

- Mobrey MLT100 – Displacer Level Transmitter

#### Hydrostatic Continuous Level Transmitter

For level measurements in non-pressurized tanks where in-tank problems such as foaming, vapor layers, and temperature gradients prohibit the use of other instrumentation.

- Mobrey 9700 Series hydrostatic electronic level transmitters

### SPECIALIZED CONDUCTIVITY

#### Conductivity Water and Steam Interface Monitoring

Steam/water interface level gauges using specialized, high performance conductivity probes in external columns and manifolds, ideal for steam plants where reliable and redundant indication of boiler water level and turbine protection is critical.

- Hydratect 2462 – Water/Steam detection Systems
- Hydrastep 2468 – Water/Steam Monitoring Systems

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