Vibrating filling level switch

- For universal applications such as filling level detection or dry run protection system
- Installation without adjustment
- Smallest installation dimensions

Can be combined with

- **Type 2030**
  Pneumatically operated 2/2 way diaphragm valve CLASSIC with plastic body

- **Type 8644**
  Remote Process Actuation Control System AirLINE

- **Type 2301**
  Pneumatically operated 2 way Globe Control Valve ELEMENT

- **Type 8619**
  multiCELL - Multi-channel and multi-function transmitter/controller

Product variants described in the data sheet may differ from the product presentation and description.

Type description

The Type 8110 is a filling level switch for liquids, using a tuning fork as the sensor element.

It is designed for industrial use in all areas of process technology and can be used in liquids. Typical applications are overfill or dry run protection.

The small tuning fork (40 mm in length) can be used in vessels, tanks and tubes.

Due to the simple and rugged measuring system, the 8110 is virtually unaffected by the chemical and physical features of the liquid. It also works under unfavourable measurement conditions such as turbulence, air bubbles, foam generation (not suitable for measuring the foam thickness itself), adhesions, strong external vibrations or varying filling materials.
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1. General Technical Data

Note:
The vibrating level switch is available with transistor (PNP) output or with contactless electronic output. The technical data depends on the vibrating level switch version. The common technical data are described in this chapter and detailed information on the specifics can be found in chapter “2. Product versions” on page 4.

Product properties

Material
Please make sure the device materials are compatible with the fluid you are using. Detailed information can be found in chapter “3.1. Chemical Resistance Chart – Bürkert resistApp” on page 5.

Detailed information about material specifications can be found in chapter “3.2. Material specifications” on page 5.

Dimensions
Detailed information can be found in chapter “4. Dimensions” on page 6.

Surface quality
Ra < 3.2 μm (thread) / Ra < 0.8 μm (clamp)

Measured variable
Limit level of liquids.

Operating mode
- Min./max: changeover by electrical connection
  - Max.: max. detection or overflow protection
  - Min.: min. detection or dry run protection
- LED indication:
  - Green (voltage supply on)
  - Yellow (vibrating element covered)
  - Red (fault)

Weight
Approx. 250 g

Performance data

Dynamic viscosity $\eta$
0.1…10000 mPa.s

Density
Standard sensitivity: 0.7…2.5 g/cm$^3$ (High sensitivity: 0.5…2.5 g/cm$^3$ on request)

Flow velocity
Max. 6 m/s (with a viscosity of 10000 mPa.s)

Hysteresis
Approx. 2 mm with vertical installation

Switching delay
Approx. 500 ms (On/Off)

Electrical data

Operating voltage
Depending on the device version
Detailed information can be found in chapter “2. Product versions” on page 4.

Power Source (not supplied)
Limited power source according to UL/EN 60950-1 standards or limited energy circuit according to UL/EN 61010-1 §9.4

Power consumption
Max. 0.5 W

Current consumption
Depending on the device version
Detailed information can be found in chapter “2. Product versions” on page 4.

Resonance frequency
Approx. 1100 Hz

Output
- Transistor output PNP
- Contactless electronic switch

Media data

Process temperature
-40…+100 °C (-40…+212 °F) (+150 °C (+302 °F) for clamp process connection)

Process pressure
-1…64 bar/-100…6400 kPa (-14.51…+928.64 PSI)

Process/Port connection & communication

Process connection
Thread G or NPT, ½", ¾" or 1"; clamp 2"

Electrical connection
Depending on the device version
Detailed information can be found in chapter “2. Product versions” on page 4.

Approvals and certificates

Standards
Degree of protection according to IEC/EN 60529
Overvoltage category according to IEC 61010-1
Protection class according to IEC 61010-1

Depending on the device version
Category III
Depending on the device version
Detailed information can be found in chapter “2. Product versions” on page 4.

Directives
CE directives
The applied standards, which verify conformity with the EU Directives, can be found on the EU Type Examination Certificate and/or the EU Declaration of conformity (if applicable).
2. Product versions

2.1. Vibrating level switch with PNP transistor output

<table>
<thead>
<tr>
<th>Product details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operating voltage</strong></td>
</tr>
<tr>
<td><strong>Load current</strong></td>
</tr>
<tr>
<td><strong>Voltage loss</strong></td>
</tr>
<tr>
<td><strong>Switching voltage</strong></td>
</tr>
<tr>
<td><strong>Blocking current</strong></td>
</tr>
<tr>
<td><strong>Electrical connection</strong></td>
</tr>
<tr>
<td><strong>Degree of protection according to IEC/EN 60529</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Protection class according to IEC 61010-1</strong></td>
</tr>
</tbody>
</table>

2.2. Vibrating level switch with contactless electronic switch output

<table>
<thead>
<tr>
<th>Product details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operating voltage</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Load current</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Electrical connection</strong></td>
</tr>
<tr>
<td><strong>Degree of protection according to IEC/EN 60529</strong></td>
</tr>
<tr>
<td><strong>Protection class according to IEC 61010-1</strong></td>
</tr>
</tbody>
</table>
3. Materials

3.1. Chemical Resistance Chart – Bürkert resistApp

Bürkert resistApp – Chemical Resistance Chart

You want to ensure the reliability and durability of the materials in your individual application case? Verify your combination of media and materials on our website or in our resistApp.

3.2. Material specifications

<table>
<thead>
<tr>
<th>No.</th>
<th>Element</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Screw</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>2</td>
<td>Cable plug EN175301-803</td>
<td>- Contact support, housing plug in PA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Contact surface in Sn</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Plug seal in silicone</td>
</tr>
<tr>
<td>3</td>
<td>Housing</td>
<td>Plastic PEI (Polyetherimide) and stainless steel 316L (1.4404)</td>
</tr>
<tr>
<td>4</td>
<td>Process connection</td>
<td>Stainless steel 316L (1.4435)</td>
</tr>
<tr>
<td>5</td>
<td>Tuning fork</td>
<td>Stainless steel 316L (1.4435)</td>
</tr>
<tr>
<td>6</td>
<td>Multipin M12×1 cable plug with cap</td>
<td>- Contact support in PA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Contacts in CuZn, nickel layer and 0.8 μm gold-plated</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Plug seal in FKM</td>
</tr>
<tr>
<td></td>
<td>Process seal (not shown)</td>
<td>NBR with aramid fibres</td>
</tr>
</tbody>
</table>
4. Dimensions

4.1. G ½" or NPT ½" connection

Note:
Dimensions in mm

<table>
<thead>
<tr>
<th>Flag</th>
<th>Dimensions in mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>AF32</td>
<td>Ø31.7</td>
</tr>
<tr>
<td>G/NPT ½&quot;</td>
<td>13.5</td>
</tr>
<tr>
<td>G/NPT ½&quot;</td>
<td>135.1</td>
</tr>
<tr>
<td>G/NPT ½&quot;</td>
<td>11</td>
</tr>
<tr>
<td>G/NPT ½&quot;</td>
<td>38</td>
</tr>
<tr>
<td>G/NPT ½&quot;</td>
<td>13.5</td>
</tr>
<tr>
<td>G/NPT ½&quot;</td>
<td>41</td>
</tr>
<tr>
<td>G/NPT ½&quot;</td>
<td>13.5</td>
</tr>
<tr>
<td>G/NPT ½&quot;</td>
<td>135.1</td>
</tr>
<tr>
<td>G/NPT ½&quot;</td>
<td>11</td>
</tr>
<tr>
<td>G/NPT ½&quot;</td>
<td>38</td>
</tr>
<tr>
<td>G/NPT ½&quot;</td>
<td>13.5</td>
</tr>
<tr>
<td>G/NPT ½&quot;</td>
<td>135.1</td>
</tr>
<tr>
<td>G/NPT ½&quot;</td>
<td>11</td>
</tr>
<tr>
<td>G/NPT ½&quot;</td>
<td>38</td>
</tr>
</tbody>
</table>

1.) Keep in mind that the total length is increased by the cable connection

4.2. G ¾" or NPT ¾" connection

Note:
Dimensions in mm

<table>
<thead>
<tr>
<th>Flag</th>
<th>Dimensions in mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>AF32</td>
<td>Ø31.7</td>
</tr>
<tr>
<td>G/NPT ¾&quot;</td>
<td>13.5</td>
</tr>
<tr>
<td>G/NPT ¾&quot;</td>
<td>135.1</td>
</tr>
<tr>
<td>G/NPT ¾&quot;</td>
<td>11</td>
</tr>
<tr>
<td>G/NPT ¾&quot;</td>
<td>38</td>
</tr>
<tr>
<td>G/NPT ¾&quot;</td>
<td>13.5</td>
</tr>
<tr>
<td>G/NPT ¾&quot;</td>
<td>135.1</td>
</tr>
<tr>
<td>G/NPT ¾&quot;</td>
<td>11</td>
</tr>
<tr>
<td>G/NPT ¾&quot;</td>
<td>38</td>
</tr>
</tbody>
</table>

1.) Keep in mind that the total length is increased by the cable connection
4.3. G 1" or NPT 1" connection

Note:
Dimensions in mm

![Diagram of G 1" or NPT 1" connection]

With M12×1 male fixed connector
With cable plug acc. to EN 175301-803

1.) Keep in mind that the total length is increased by the cable connection

4.4. Clamp 2" connection

Note:
Dimensions in mm

![Diagram of Clamp 2" connection]

With M12×1 male fixed connector

1.) Keep in mind that the total length is increased by the cable connection
5. Performance specifications

5.1. Temperature derating diagram

G or NPT connection

G clamp connection

6. Product installation

6.1. Installation notes

Note:
- Inflowing material:
  If the Type 8110 vibrating level switch is mounted in the filling stream, unwanted switching signals can be generated. Mount the switch at a location in the vessel where no disturbing influence from e.g. filling openings, agitators, etc, can occur.
- Flow:
  If there is movement within the product, the tuning fork of the switch should be mounted in such a way that the surfaces of the fork are parallel to the product movement.

The 8110 vibrating level switch can be installed in any position. The instrument only has to be mounted in such a way that the tuning fork is at the height of the desired switching point.

The switching point refers to the medium water (1 g/cm³/0.036 lbs/ in³). Please keep in mind that the switching point of the instrument shifts when the medium has a different density than water.
7. Product operation

7.1. Measuring principle

The tuning fork is piezoelectrically energised and vibrates at a mechanical resonance frequency of approx. 1100 Hz. When the tuning fork is submerged in the product, the frequency changes. This change is detected by the integrated oscillator and converted into a switching command.

The integrated fault monitor detects the following faults:
- Interruption of the connection cable to the piezoelectric elements
- Extreme material wear on the tuning fork
- Breakage of the tuning fork
- Absence of vibration.

If one of these faults is detected or in case the power supply fails, the electronic system switches to a defined switching state, e.g. the relay de-energises (safe state).

8. Ordering information

8.1. Bürkert eShop – Easy ordering and quick delivery

Bürkert eShop – Easy ordering and fast delivery

You want to find your desired Bürkert product or spare part quickly and order directly? Our online shop is available for you 24/7. Sign up and enjoy all the benefits.

Order online now
8.2. Bürkert product filter

Bürkert product filter – Get quickly to the right product

You want to select products comfortably based on your technical requirements? Use the Bürkert product filter and find suitable articles for your application quickly and easily.

Try out our product filter

8.3. Ordering chart

<table>
<thead>
<tr>
<th>Output</th>
<th>Operating voltage</th>
<th>Process connection</th>
<th>Electrical connection</th>
<th>Article no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transistor PNP</td>
<td>9.6…35 V DC</td>
<td>G ½”</td>
<td>Cable plug EN 175301-803</td>
<td>563554</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NPT ½”</td>
<td>Multispin M12 x 1</td>
<td>563474</td>
</tr>
<tr>
<td></td>
<td></td>
<td>G ¾”</td>
<td>Cable plug EN 175301-803</td>
<td>563556</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NPT ¾”</td>
<td>Multispin M12 x 1</td>
<td>563555</td>
</tr>
<tr>
<td>Contactless electronic switching output (not with PLC)</td>
<td>20…253 V AC, 50/60 Hz or 20…253 V DC</td>
<td>G ½”</td>
<td>Cable plug EN 175301-803</td>
<td>563556</td>
</tr>
<tr>
<td></td>
<td></td>
<td>G 1”</td>
<td>Cable plug EN 175301-803</td>
<td>555296</td>
</tr>
</tbody>
</table>

Further versions on request

- Process connection
  - Clamp 1”; ½”
  - DIN 11851
  - Flange
  - SMS

- Hygienic
  - Ra < 0.8 µm for G or NPT threaded connection

- Electrical connection
  - Quick on connection (IP65)

8.4. Ordering chart accessories

<table>
<thead>
<tr>
<th>Description</th>
<th>Article no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 pin M12 female connector moulded on cable (2 m, shielded)</td>
<td>438680</td>
</tr>
<tr>
<td>5 pin M12 female cable connector with plastic threaded locking ring</td>
<td>917116</td>
</tr>
</tbody>
</table>