


## Vibrating level switch



- For universal use as overflow or dry run protection system
- Setup without adjustment
- For food and beverage industry thanks to surface finishing  $< 0.8 \mu\text{m}$
- ATEX approvals 

Type 8111 can be combined with...



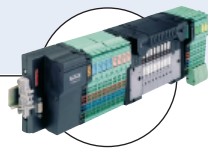
**Type 2030**

Diaphragm valve



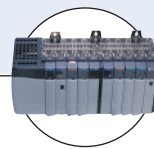
**Type 2712**

Globe control valve with TopControl



**Type 8644**

Valve islands with electronic I/O



**PLC**

The 8111 is a vibrating level switch for liquids, using a tuning fork for level detection.

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

Depending on the version it is also used for monitoring or control of levels in hazardous environments, even for combustible liquids, gases, fogs or vapours.

Due to the simple and rugged measuring system, the 8111 is virtually unaffected by the chemical and physical features of the liquid. It works even under unfavourable conditions such as turbulence, air bubbles, foam generation, buildup or varying products.

### General data

#### Materials

Housing / Cover / Seal ring	PBT, Stainless steel 316L (1.4404) / PC / EPDM
Wetted parts	
Tuning fork and process fitting	Stainless steel 316L (1.4435)
Process seal	Klingsil C 4400

#### Weight

approx. 890 g

#### Electrical connections

1 or 2 cable glands M20 x 1.5 (depends on output version)

#### Process fitting

Thread G, NPT 3/4", G, NPT 1" or Clamp 2"

#### Surface finishing quality

Ra < 3.2  $\mu\text{m}$  (thread) / Ra < 0.8  $\mu\text{m}$  (Clamp)

#### Viscosity dynamic

0.1 up to 10000 mPa.s (requirement: with density 1)

#### Density

0.5 up to 2.5 g/cm<sup>3</sup> (selected by DIP switch) or  
0.7 up to 2.5 g/cm<sup>3</sup>

#### Fluid temperature

-50 up to 150°C (-58 to 302°F)

#### Fluid pressure

-1 to 64 bar (-14.51 to 928.64 PSI)

#### Accuracy

Hysteresis	Approx. 2 mm with vertical installation
Delay time / Frequency	Approx. 500 ms / Approx. 1200 Hz

#### Output

Double relay output or Namur output

### Environment

#### Ambient temperature

-40 up to +70°C (-40 to 158°F) (Operating);  
-40 up to +80°C (-40 to 176°F) (Storage)

Electrical data - Sensor with relay output	
<b>Output</b>	Relay (DPDT), 2 floating spdts
<b>Power supply</b>	20 to 253 V AC, 50/60 Hz or 20 to 72 V DC (at U > 60 V DC the ambient temperature must be max. 50 °C (122°F))
<b>Power consumption</b>	1 to 8 VA (AC); approx. 1.3 W (DC)
<b>Turn-on voltage</b>	min.: 10 mV; max.: 253 V AC, 253 V DC
<b>Switching current</b>	min.: 10 µA; max.: 5 A (AC), 1 A (DC)
<b>Breaking capacitance</b>	max. 1250 VA, 50 W
<b>Modes (adjustable)</b>	A = max. detection or overflow protection B = min. detection or dry run protection
<b>Delay time</b>	when immersed: 0.5 s when laid bare: 1 s

Electrical data - Sensor with NAMUR output	
<b>Output</b>	2 wire current modulation according to NAMUR
<b>Power supply</b>	Voltage supply via connection to an interface according to NAMUR IEC 60947-5-6, approx. 8.2 V
Open-circuit voltage	U <sub>o</sub> approx. 8.2 V
Short-circuit current	I <sub>sc</sub> approx. 8.2 mA
<b>Current consumption</b>	Falling characteristic Rising characteristic Fault signal
	≥ 2.2 mA (blade uncovered) / ≤ 1.0 mA (blade covered) ≤ 1.0 mA (blade uncovered) / ≥ 2.2 mA (blade covered) ≤ 1.0 mA
<b>Necessary processing system</b>	NAMUR processing system acc. to IEC 60947-5-6 (EN50227/DIN19234)
<b>Modes (NAMUR output adjustable to falling or rising characteristics)</b>	Min.: rising characteristics (High current when immersed) Max.: falling characteristics (Low current when immersed)

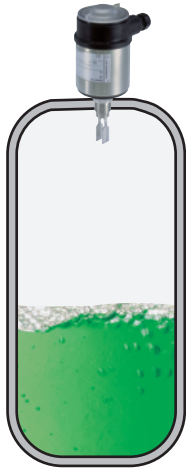
Standards and approvals	
<b>Protection</b>	IP66/IP67 with M20 x 1.5 gland mounted and tightened
<b>Overvoltage category</b>	III
<b>Protection class</b>	I (relay output); II (NAMUR output)
<b>Standards</b>	EMC Security ATEX <sup>1)</sup> NAMUR
	EN61326 EN61010-1 EN50014; EN50020; EN50284 IEC 60947-5-6 (EN 50227)

Specifications Ex	
<b>Ex - Protection</b>	Categories 1/2 G, 2G
<b>Ex - Certification</b>	Ex ia IIC T6
<b>Conformity specifications<sup>1)</sup></b>	Power supply U <sub>i</sub> Short circuit rating I <sub>sc</sub> Power limitation P <sub>i</sub> Ambient temperature Internal capacity C <sub>i</sub> Internal inductivity L <sub>i</sub>
	20 V 103 mA 516 mW -40 up to +85°C (-40 to 185°F) (depend on categories) negligible negligible

1) homologation certificate PTB 07 ATEX 2004X

## Target applications with type 8111

### Chemical industry - solvents



Beside the continuous level measurement, level detection is a main safety characteristic for storage tanks.

Many modern sensors for continuous level measurement, however, are approved as overflow protection system, but a second, physically different measuring principle offers optimum safety and redundancy.

Thanks to the manifold application possibilities, the Type 8111 vibrating level switch is ideal for all applications concerning stock-keeping of liquids. A number of electrical and mechanical versions ensures simple integration into existing processing systems.

Advantages:

- various electrical versions
- product-independent
- universal level detection for all liquids.

### Chemical industry - reactors



Thanks to the manifold application possibilities, the Type 8111 vibrating level switch is ideal for all applications concerning stock-keeping of liquids.

A number of electrical and mechanical versions ensures simple integration into existing processing systems.

Advantages:

- various electrical versions
- product-independent
- completely gas-tight
- high reliability
- universal level detection for all liquids.

### Water/sewage water plants



Chemicals are required for sewage water treatment. They are used for precipitation. Phosphate and nitrate are sedimented and separated. For the sludge treatment and neutralization, acids and solvents are stored apart from lime water and ferric chloride.

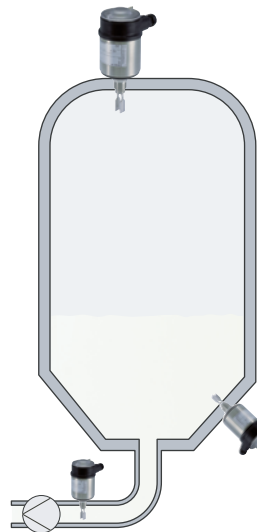
These substances are subject to the regulations for water-endangering substances. Therefore overflow protection systems must be mounted on storage tanks.

To avoid overflowing of vessels with toxic products, sensors for level detection are an important safety element.

Advantages:

- high reproducibility

### Food processing industry



The processes in food processing tanks such as e.g. for milk have a high demand to the installed technology. High pressures and temperatures are caused during sterilization and cleaning of the tanks. The installed level sensors must meet the requirements of the hygienic construction. The harmlessness of all wetted materials must be proven and optimum cleanability must be ensured by hygiene-technical design.

The Type 8111 is installed for level detection and as dry run protection system. The tuning fork is highly polished for the use in sensitive foodstuffs such as milk.

Advantages:

- universal level detection for all liquids.
- high resistance sensor materials
- adjustment and maintenance-free

## Principle of operation

The tuning fork is piezoelectrically energised and vibrates at its mechanical resonance frequency of approx. 1200 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.

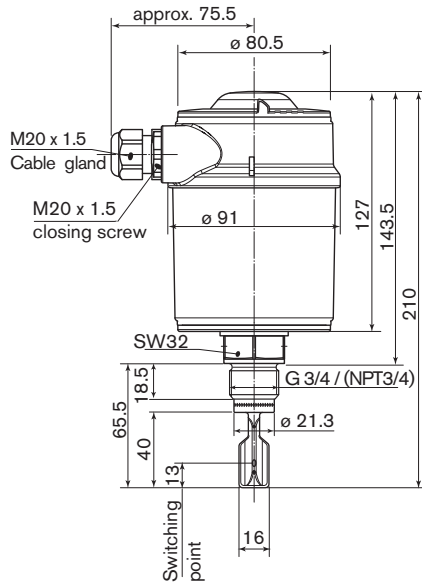
The integrated fault monitoring detects the following faults:

- interruption of the connection cable to the piezoelectric elements
- extreme material wear on the tuning fork
- break of the tuning fork
- absence of vibration.

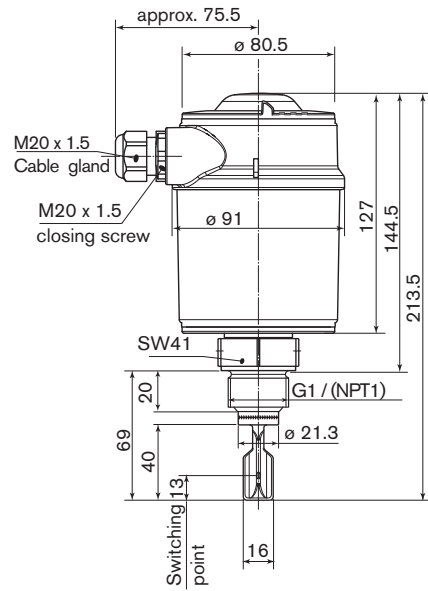
If one of these faults is detected or in case the power supply fails, the electronics takes on a defined switching condition, e.g. the output transistor blocks (safe condition).

Dimensions [mm]

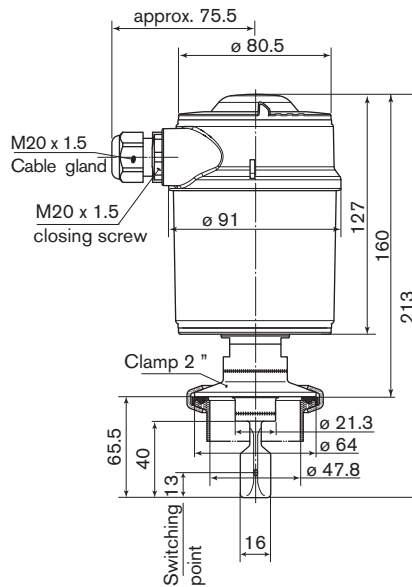
With G or NPT 3/4" connection



With G or NPT 1" connection



With Clamp 2" connection



## Ordering chart for the vibrating level switch Type 8111

Output	Power supply	Process connection	Electrical connection	Item no.
Double relay (DPDT) , 2 floating spdts	20-72 V DC / 20 - 250 V AC (5 A)	G 3/4"	2 cable glands M20 x 1.5	558 110
		NPT 3/4"	2 cable glands M20 x 1.5	558 111
		G 1"	2 cable glands M20 x 1.5	558 112
		NPT 1"	2 cable glands M20 x 1.5	558 113
		Clamp 2"	2 cable glands M20 x 1.5	558 114
Namur signal - Ex version ATEX approval	8.2 V DC - via an intrinsic safety interface with NAMUR input	G 3/4"	1 cable gland M20 x 1.5	558 115
		G 1"	1 cable gland M20 x 1.5	558 116

 Further versions on request
**Port connection**

Clamp 1"; 1"1/2  
DIN 11851  
Flange  
SMS  
Neumo BioControl®

**Materials**

ECTFE, enamel, Hastelloy C4 or PFA for flange connection

**Hygienic version**

Ra < 0.8 µm for G or NPT threaded connection  
Ra < 0.3 µm for Clamp connection

**Temperature**

-50... 250°C

## Ordering chart accessories

Description	Item no.
Set with 2 reductions M20 x 1.5 / NPT1/2" + 2 neoprene flat seals for cable gland + 2 screw-plugs M20 x 1.5	551 782

