



# F0-05

## Optoelectronic Level Switch High-Temperature Version



## Features

/ Up to +170°C media temperature

/ Accuracy  $\pm 2$  mm

/ Compact design

/ Easy to mount

/ No moving parts

/ Easy to maintain

## Description:

An optical sensor is mounted in a robust stainless steel housing. It consists of a borosilicate glass tip which contains an infrared diode, as a transmitter, and a light-sensitive semi-conductor as the receiver. If no fluid moisture touches the sensor tip, the infrared light will be fully reflected by the inside of the borosilicate glass. However, as soon as it dips into the medium a large portion of the transmitted light can pass into the fluid. Registering this, the receiver initiates a switching operation at the device's PNP transistor output which is then directly displayed by a red LED. For variants with trimmer, the switching status can be read directly on the sensor (internal red LED).

## Application:

The applications for the optoelectronic level switch include tapping limit values in a number of fluids. The main advantage is that the method of measurement is to a large extent independent of physical parameters like refractive index, colour, density, dielectric constant or conductivity. The compact construction guarantees minimum space; consequently, measurements in very small volumes becomes convenient. The possibility of mounting in any position as well as the property for use with fluids at high temperatures of up to +170°C assure a broad spectrum of applications.

### Typical applications:

- level detection of fluids, such as e.g. oil, water, aqueous media, etc.
- full or empty reporting
- overflow protection
- dry run protection

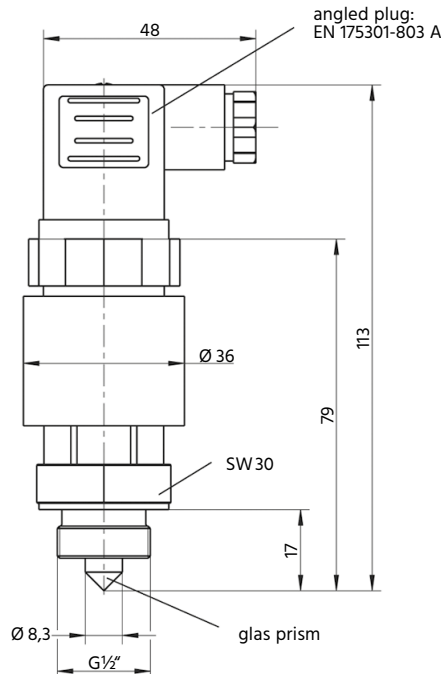


## Technical Specifications:

<b>Accuracy /</b>	± 2 mm
<b>Response sensitivity /</b>	preset, for the detection of watery media and oils
<b>max. Pressure /</b>	0 ... 25 bar
<b>max. Media temp. /</b>	-40 ... +170°C
<b>max. Ambient temp. /</b>	-30 ... +80°C
<b>Materials /</b>	
Light guide:	borosilicate glass
Housing:	stainless steel 1.4305 (non wetted part)
Process connection:	stainless steel 1.4571
<b>Mounting position /</b>	any
<b>min. Clearance from the glass tip to an opposite surface /</b>	≥ 10 mm ≥ 20 mm ( with electropolished surface)
<b>Process connection /</b>	G ½"-male

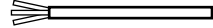
## Dimensions in mm:

Pictured: FO-05.1.4.x.x.0



## Electrical Specifications:

<b>Supply voltage /</b>	12 ... 32 VDC
<b>max. Current /</b>	40 mA
<b>Output /</b>	PNP transistor, protected against reverse polarity, 200 mA switching current
<b>Electric. connection /</b>	
circular connector:	M 12 x 1, 4-pin
angular connector:	as per EN 175301-803 A
PUR cable:	standard lengths: 2 m and 5 m diameter: 3 x 0.25 mm <sup>2</sup> cable end: cut to length
<b>Switching function /</b>	NO (closed in medium) or NC (open in medium)
<b>Switch points /</b>	1
<b>Protection class /</b>	IP 65 (counter plug screwed on)
<b>Cable configuration /</b>	BN: U <sub>+</sub> WN: U <sub>-</sub> GN: SP
<b>M12 x 1 rounded plug configuration /</b>	1: U <sub>+</sub> 3: U <sub>-</sub> 4: SP
<b>Angled plug configuration /</b>	1: U <sub>+</sub> 3: U <sub>-</sub> 4: SP



## Ordering Codes:

<b>Order number</b>	<b>FO-05.</b>	<b>1.</b>	<b>3.</b>	<b>1.</b>	<b>1.</b>	<b>1</b>
<b>FO-05 Optoelectronic Level Switch High-Temperature Version</b>						
<b>Process connection /</b>	1 = G ½" male thread					
<b>Electrical connection /</b>	1 = 2 m PUR cable 2 = 5 m PUR cable 3 = circular connector M 12 x 1, 4-pin (without counter plug) 4 = angular connector as per EN 175301-803 A (with counter pl.)					
<b>Output /</b>	1 = switching when immersing (closed in medium) 2 = switching when surfacing (open in medium)					
<b>Medium /</b>	1 = water 9 = special (please specify in detailed text)					
<b>Option /</b>	0 = none 1 = counter plug M 12 x 1, 4-pin 2 = counter plug M 12 x 1 with 2 m cable 9 = special ( please specify in detailed text)					



# 2110 - Mini-SQUING

## Mobrey™ Mini-Squing Compact Vibrating Fork Level Switch



## Features

- / 3/4", 1" or 2" Tri-clamp
- / High operating frequency
- / 21...264V DC or AC voltage
- / Least depth for mounting
- / Diagnostic LED

## Description:

The 2110 vibrates in the air according to the principle of a tuning fork at the frequency of resonance. When the switch is dipped into a fluid the frequency changes due to the higher inertia of the medium. The integrated electronic components capture this change and link to a load connected in series. For the first time, we succeeded in shortening the sensor element that is contacted by the media to 50 mm length and in keeping its size so narrow that a 3/4" thread is absolutely adequate. The same device can be operated with supply voltages of 21 to 264 V AC or DC, thereby reducing the storage of spare parts to a minimum. The device is provided with a microprocessor that is capable of self-monitoring and fail-safe functions. It triggers a user-defined alarm that indicates a dry-run or wet status through an LED which changes from continuous light to blinking and, in the event of malfunctioning, changes again its frequency.

## Application:

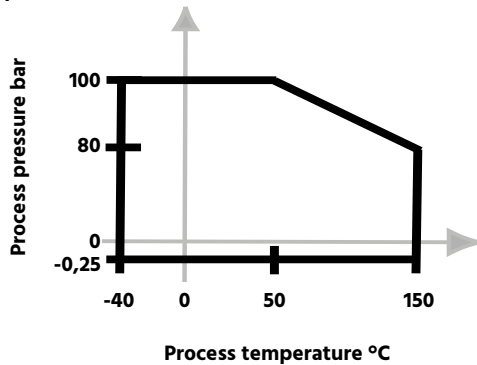
The 2110 series of limit switches is intended for recording limit levels in most of the fluids and slurries. The device can process also media with high viscosities or sticky properties without any problem since it is capable of „shaking away“ adhesions by virtue of its function. Irrespective of whether for overflow protection, pump protection, leakage monitoring or pump control, the 2110 is universally applicable and, due to its small dimensions, it can be mounted even in narrow spaces. The switch has a fully stainless steel facing to the media and can be connected with an R3/4" or R1" thread to the process. Optionally, a fitting is available for applications in food-processing industry which enables, together with the 1" variant and an O ring, a smooth joint to the fluid.



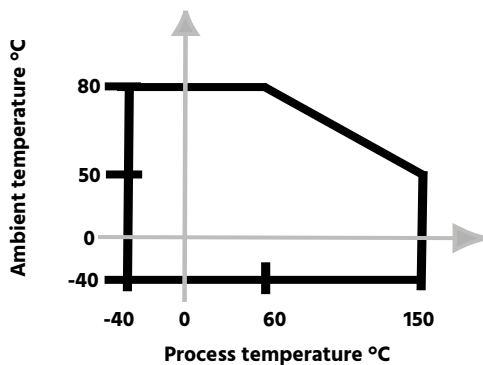
## Technical Specifications:

<b>Pressure range /</b>	-0.25...+100 bar at 50°C
<b>Temperature range /</b>	-40...+150°C
<b>Ambient temperature /</b>	-40...+80°C (50°C at 150°C on the wet side)
<b>CIP-cleaning /</b>	withstands steam cleaning routines up to max. 150°C
<b>Medium specific weight /</b>	600 kg/m <sup>3</sup>
<b>Viscosity /</b>	0.2...10000 cP
<b>Switching point (water) /</b>	approx. 13 mm immersion depth
<b>Hysteresis (water) /</b>	± 1 mm nom.
<b>Switching delay /</b>	1 sec.
<b>Housing /</b>	stainless steel 304
<b>Fork /</b>	stainless steel 316
<b>LED-window /</b>	anti-flammable polycarbonate
<b>Plug /</b>	polyamide, reinforced fiberglass
<b>Plug sealing /</b>	nitrile butadien rubber
<b>Function test /</b>	through magnetic test point during operation

Process pressure curve /



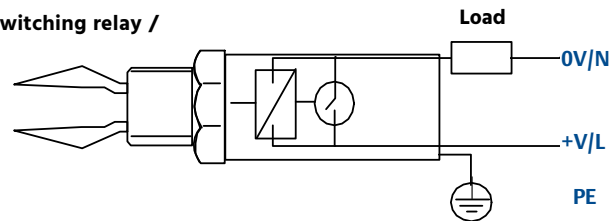
Process temperature curve /



## Electrical Specifications:

<b>Supply voltage /</b>	2-wire: 21...264 V (± 10%) DC or AC 3-wire: 18...60 VDC
<b>Leakage current (without load) /</b>	< 3.0 mA continuous (2-wire)
<b>max. Load /</b>	500 mA
<b>max. Peak load /</b>	5 A for max. 40 ms electr. protected
<b>min. Switching load /</b>	20 mA continuous (2-wire)
<b>Voltage drop 2-wire /</b>	6.5 V for 24 VDC, 5.0 V for 240 VAC
<b>Voltage drop 3-wire /</b>	< 3.0 V
<b>Electr. Protection /</b>	protection against polarity reversal and short-circuiting, protection when load is absent
<b>Electr. Connection /</b>	square plug as per DIN 43650
<b>Cable diameter /</b>	4...9 mm (PG9)
<b>Protection class /</b>	IP66/IP67 EN60529

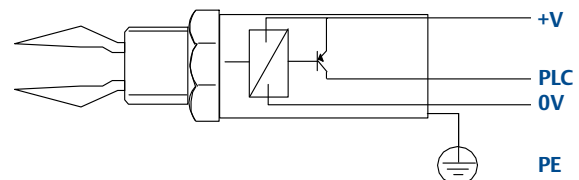
Switching relay /



### Switching relay

<b>Power supply</b>	21...264 Vac (50...60 Hz)/dc
<b>max. switching voltage</b>	500 mA
<b>max. peak voltage</b>	5 A for 40 ms
<b>min. switching voltage</b>	20 mA continuous
<b>Current drop</b>	6.5 V at 24 VDC
<b>Current consumption</b>	< 3.0 mA continuous

PNP Switch /

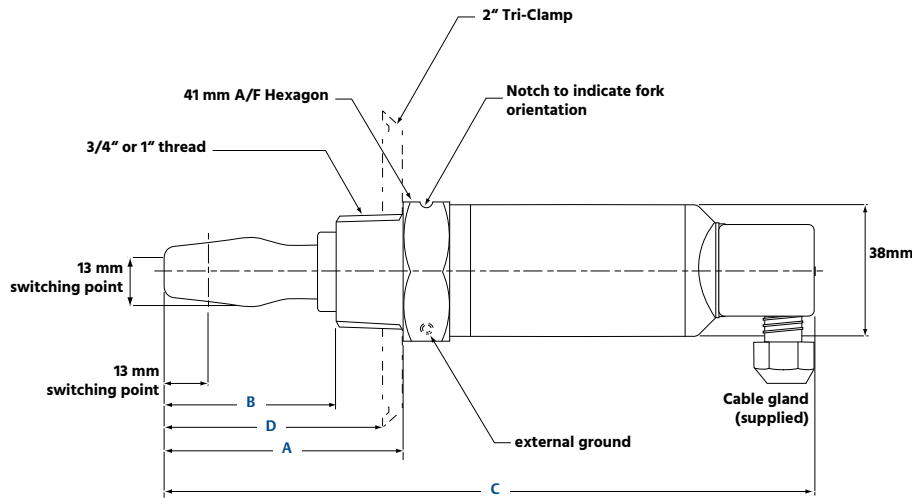


### PNP Switch

<b>Power supply</b>	18...60 VDC
<b>max. switching voltage</b>	500 mA
<b>max. peak voltage</b>	5 A for 40 ms
<b>Current drop</b>	< 3 V
<b>Current supply</b>	3 mA nominal
<b>Current output</b>	< 0.5 mA



# Dimensions in (mm):



Connection	A	B	C	D
R 3/4"-male	69 mm	50 mm	188 mm	-
NPT 3/4"-male	69 mm	50 mm	188 mm	-
R 1"-male	69 mm	50 mm	188 mm	-
G 1"-male	78 mm	60 mm	201 mm	-
2" Tri-clamp	69 mm	50 mm	188 mm	64 mm
R 1"-male extended	116 mm	98 mm	239 mm	-

# Ordering Codes:

<b>Order number</b>	<b>2110.</b>	<b>1.</b>	<b>1A</b>
<b>2110 Miniature Vibrating Fork</b>			
<b>Electrical function /</b>			
0 = 2-wire in series to load 1 = PNP-3-wire for SPS-operation			
<b>Process connection /</b>			
0A = R 3/4"-male DIN2999 1A = R 1"-male DIN2999 0D = NPT 3/4"-male 2R = 2" Tri-clamp, hygiene fitting 1B = G 1"-male 1L = G 1"-male extended			

