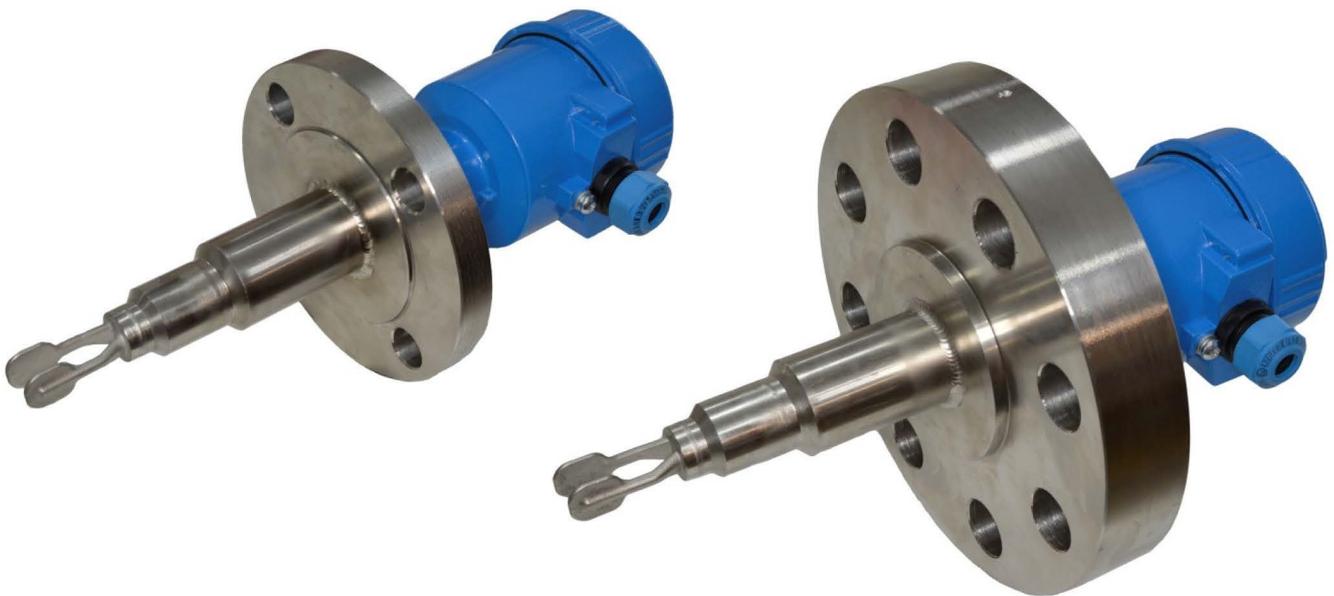


## VIBRATING LEVEL SWITCH FOR LIQUIDS

### WSP-5Ex

- user's manual -



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## 1. Introduction

Vibrating level switches WSP-5Ex are designed to indicate the limit levels of liquid in pressurized or open containers. With the flameproof enclosure the switches are allowed to work in hazardous area: Zone 2.

### 1. Marking

Each Vibrating Level Switch WSP-5Ex is equipped with a nameplate, which must contain the following: name and address of the manufacturer, CE mark, product name, type designation, serial number, symbol explosion-proof, explosion-proof feature:



## 2. Construction

The WSP-5Ex is build of body 3, extension tube 2, vibrating rods 1, electronics housing 4 and housing cover 5, gland 6 /Fig.1/. The front panel consist of a terminals, LEDs, mode switch and potentiometer of delay. The switch housing has a welded structure made of stainless steel 304. the cover is connected with the housing on the thread and the ring-ring. Housing 4 are equipped with restrictor housing rotation around the main axis of the switch only up to 350° to prevent twisting of the inside cables.

## 3. Technical data

- power supply	24 VDC
- power consumption	<2 W
- electrical connection	cable gland M20x1,5 (cable diameter 6-8 mm)
- protection against electric shock	grounding
- output	DPDT
- connectable load	4A, 250V
- ambient temperature	-20 °C ÷ 70 °C
- proces temperature	-20 °C ÷ 120 °C
- process pressure	150psi and 900psi
- housing material	Aluminum
- sensor material	Steel 316
- IP degree of protection	IP66
- process connections	flange 2" @ 150psi flange 2" @ 900psi
- density of liquid	0,7 -1,2 g/dm <sup>3</sup>
- weight	4,5kg, @ 150psi 14kg, @ 900psi

## 4. Mounting

The vibrating level switch WSP-5Ex must be screwed to a connector flange 2". The housing 4 has two ground connections, one outside the connector gland and second inner housing. On the body of switches is the mark ">", which determines the orientation of the forks relative to the nut. After screwing the switch the 'P' sign should be oriented so as to fork put up the least resistance to liquid flow.

### 5. Principle of operation

The WSP-5Ex switch uses resonance phenomena occurring between the resonator latched to the inner side of the membrane, on the one hand and the vibrating rods 1 extending from the other side of the membrane. The electronic system controls the change in frequency of vibrating rods in relation to the frequency of the generator. When the pitch shift the frequency of vibration rods reaches the desired size then it will switch relay contacts or overdrive transistor switches and the LED from one to the other.

Mode of operation	Level	Output status	Signalling	
			LED diode yellow	LED diode red/green
Detection of maximum <b>MAX</b> (overflow protection)		 Relay POWERED		
		 Relay UNPOWERED		
Detection of minimum <b>MIN</b> (protection against dry running)		 Relay POWERED		
		 Relay UNPOWERED		

Legend: ● - diode switched off, ☀ - diode switched on,

### 6. Connecting Panel

Each siren WSP-5Ex is equipped with a connecting panel. The connecting panel includes: seat clamp, LEDs and protective conductor terminal. Figure 1 shows the view of the connecting panel with a description and the location of individual components.

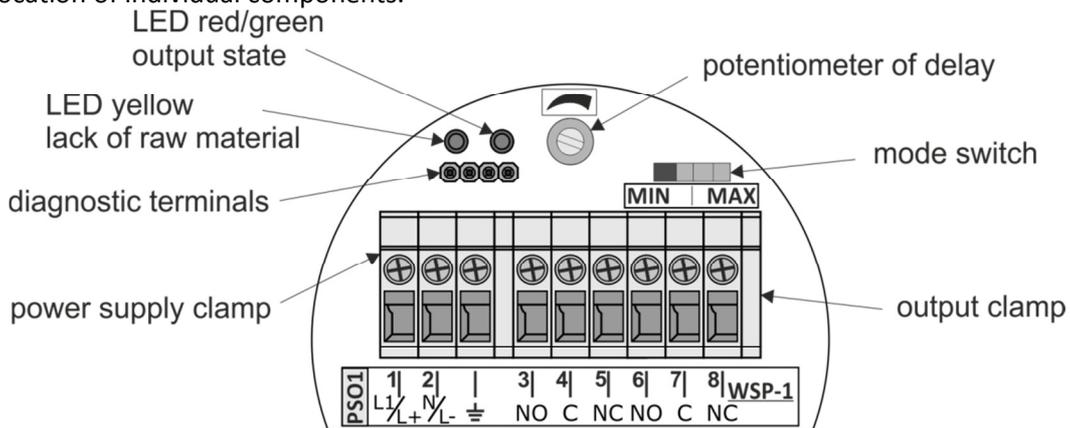


Fig. 1. Connecting panel WSP-5Ex.

### 7. Delayed output switching

The time delay of the output switch prevents excessive output switching in case of frequent and temporary overflow of the material to vibrating rods. Introducing a delay causes the output to change only if the vibrating rods are in one state for a certain time, as in Figure 2 and 3.

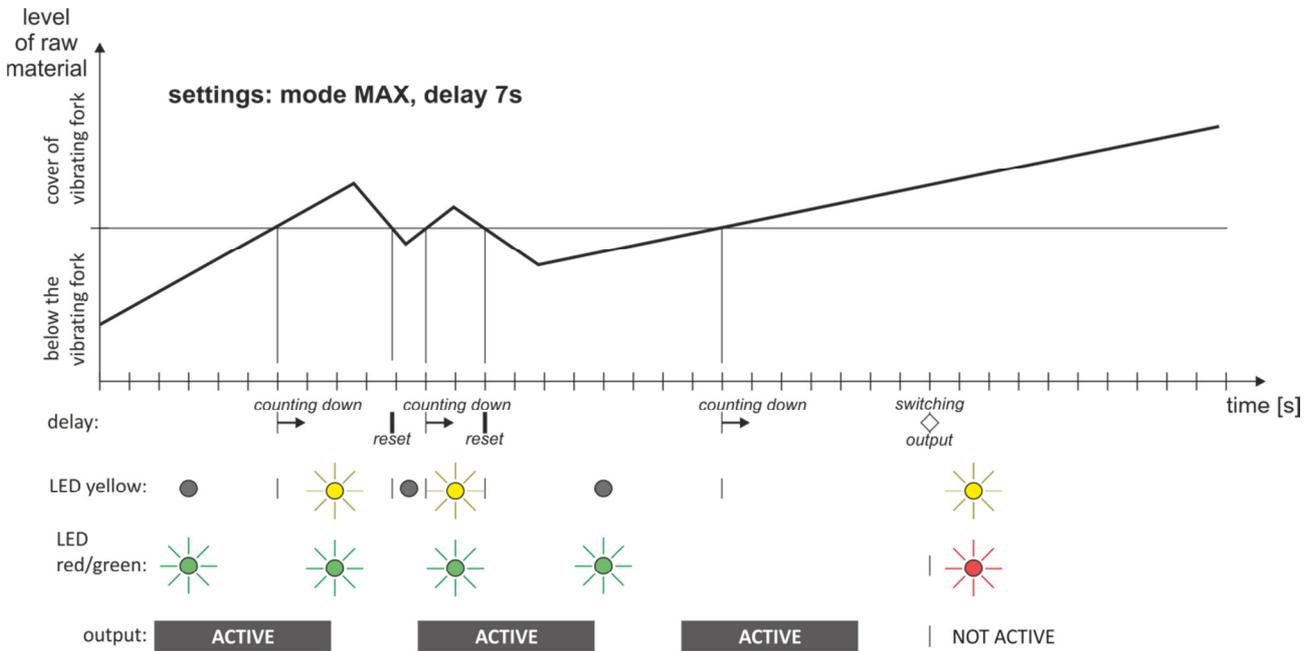


Fig. 2. LED status and WSP-5Ex signal output during tank filling in MAX mode.

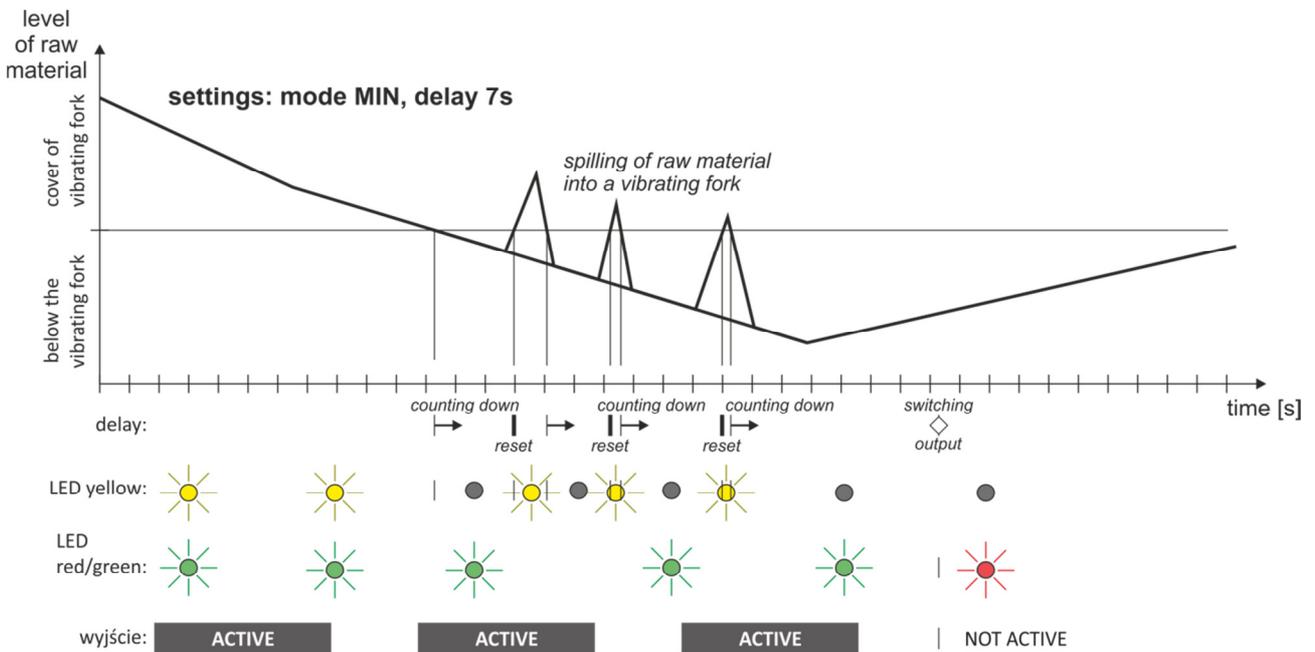


Fig. 3. LED status and WSP-1C alarm output while emptying the tank in MIN mode.

The switching delay of the output is controlled by a potentiometer on the front panel of the electronics module. It is possible to set a delay between 0s and 12s. A delay equal to 0s means that the output changes simultaneously with the detection of the change in the state of the vibrating rods, which in extreme cases can occur in 0.5s. The value of the delay depending on the position of the potentiometer is shown in the figure below.

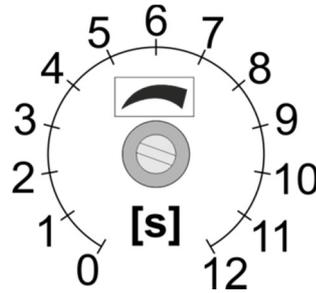


Fig. 4. Delay of switching output depending on potentiometer position.

### 8. Connection

When the power supply is connected to the switch one of the green LED lights up and simultaneously vibrating rods 1 are set into vibration. When the vibrating rods 1 are immersed in the liquid then the rods are damped. Vibration frequency decreases and when it reaches a preset value then it will switch relay contacts or override the transistor and changing light signal LED 11. After removing the vibrating rods of the fluid vibration frequency returns to the previous status with LEDs, transistor or relay contacts. The siren requires no adjustment and tuning.

Diagram of connecting the WSP-5 Ex is shown in Figure 5.

Table 2. Electrical parameters of the PSO1 module.

power supply:	<b>19...253VAC, 19...55VDC</b>
power consumption:	<b>&lt; 2W</b>
output:	<b>relay DPDT</b>
connectable load:	<b>4A @ 253VAC, 4A @ 55VDC</b>
protections:	<b>Reverse polarity, Overvoltage protection</b>
galvanic isolation:	<b>1,5kV</b>

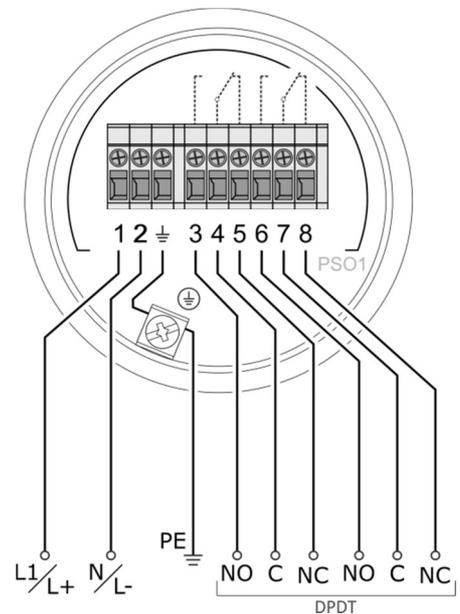


Fig. 5. Diagram of connecting the WSP-5Ex.

## 9. Compliance with regulatory requirements and standards

Vibrating level switch WSP-5Ex was made in accordance with the Ordinance on essential requirements for equipment and protective systems intended for use in potentially explosive atmospheres and meets the requirements of the following standards:

EN 60079-0:2012  
EN 60079-1:2014  
EN 60079-26:2015  
EN 60079-31:2014  
EN 50303:2000  
EN 61000-6-2:2005  
EN 61000-6-4:2007  
EN 60068-1:2013  
EN 60068-2-1:2007  
EN 60068-2-2:2007  
EN 60529:1991  
PN-G 50003:2003