



Zertifiziertes  
QM-System  
DIN EN ISO 9001  
Zertifikat-Nr. 01017

## Liquid Level Switches

according to the tuning fork principle



measuring  
•  
monitoring  
•  
analysing

### NWS



- Repeatability:  $\pm 1$  mm
- $p_{\max}$ : 45 bar  
 $t_{\max}$ : 130 °C,  
150 °C  
(for CIP process)
- Connections:  
pipe screw joints, NPT,  
flange, hygienic thread
- Material:  
stainless steel 1.4404
- Viscosity:  
max. 5000 mm<sup>2</sup>/s
- No moving parts
- Insensitive to plant  
vibrations
- ATEX/IECEX version



N

KOBOLD companies worldwide:

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### Description

The KOBOLD liquid level switch NWS is designed as a 2 and 3-wire switch and can be universally used in vessels and pipelines. The NWS operates on the tuning fork principle in air at resonance frequency. A piezoelectric crystal is used for excitation of oscillations and for monitoring the actual oscillation frequency. When the fork is immersed in liquid, the frequency changes: this change is detected electronically and the output signal is changed. The NWS operates as a 2-wire switch in series with the load. The simple electronic switch is operated by the liquid. The NWS can also be connected to a PLC through a third terminal.

### Special Features

The NWS has an output state indicator with an LED that can be seen through a lens in the cover. The LED flashes about once a second when the NWS has switched off and is permanently illuminated when the NWS is switched on. The LED is an optical confirmation that the NWS is working correctly and the condition of the wet side is correctly displayed. The NWS can be set as upper or lower limiter with a mode selector.

### Applications

- Oils and foamed oils
- Water
- Paints and transparent inks
- Sauces
- Milk
- Liquids containing carbon dioxide

The KOBOLD NWS is ideal for hygienic and sterile applications and for CIP cycles up to 150 °C.

### ATEX/IECEX version

- Type of protection: intrinsically safe ia
- Designation:  II 1G Ex ia IIC T6 Ga  
IECEX Ex ia IIC T6 Ga
- To use in connection with intrinsically safe Isolation Switching Amplifier according to IEC 60947-5-6

### Technical Details

#### Material

Fork: stainless steel 1.4404  
 Process connection: stainless steel 1.4404  
 Electronic housing: NWS-...200: PAG, glass-fibre-reinforced cover with window, 330° rotatable all other types: stainless steel 1.4301

Process connections: pipe thread DIN EN 10226-1, NPT-thread, Tri-Clamp®, pipe connection DIN 11851 (sanitary connection), aseptic-connection DIN 11864, DRD flange, flange B 25 PN 40 DIN 2527, flange B 50 PN 40 DIN 2527, flange ANSI B 16.5 - 1", 300 lbs, flange ANSI B 16.5 - 2", 300 lbs

Protection: plastic housing: IP 65 (NWS-...200) stainless steel housing, plug connection: IP 67 stainless steel housing, cable connection: IP 68

Max. operating pressure: 45 bar flange connection: see pressure steps

Max. medium temp.: -20 ... 130 °C (NWS-...200...) -20 ... 90 °C (for all other NWS) short-time 150 °C for CIP (valid for all models NWS)

Min. medium density: 800 g/l

Ambient temperature: -20 °C ... +70 °C

Min. immersion depth for switch points: 12 mm (marker on fork)

#### Power supply

NWS-...200...: 24...240 V<sub>DC/AC</sub> (50/60 Hz); 2-wire; 24 V<sub>DC</sub>, 3-wire

Leakage current in off state: <3.5 mA

NWS-...23/24: 24 V<sub>DC</sub>, 3-wire

NWS-...2E... (ATEX): Isolation Switching Amplifier to IEC 60947-5-6 (Namur) necessary (for example: KFD2-SR2-EX1.W or KFA6-SR2-EX1.W)

Delay: 1 s wet / dry  
1 s dry / wet

Viscosity: 5000 mm<sup>2</sup>/s max. at 25 °C (influence on the response time)

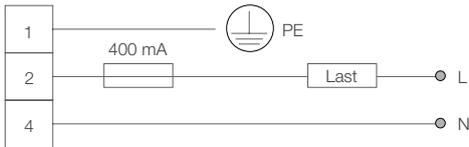
Hysteresis: 4 mm vertical, 1 mm horizontal

Repeatability: ± 1 mm

Weight: 0.5 kg (for R ¾ and ¾" NPT)

**Electrical Connection**

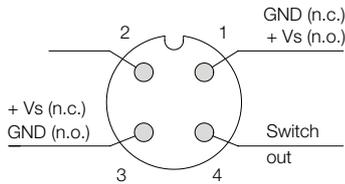
**NWS-... 200...**  
 2-wire 24-240 V<sub>AC/DC</sub>,  
 serial load,  
 I<sub>max</sub> ≤ 400 mA



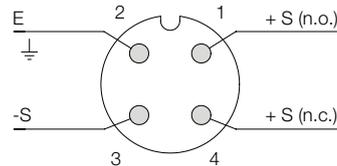
**NWS-... 200...**  
 3-wire, VS = 24 V<sub>DC</sub>  
 Output PNP: U<sub>HIGH</sub> - 16.5 V;  
 U<sub>LOW</sub> - 2.5 V; I<sub>max</sub> ≤ 400 mA



**NWS-... 23/24 (24 V<sub>DC</sub>)**



**NWS-... 2E... (ATEX)**



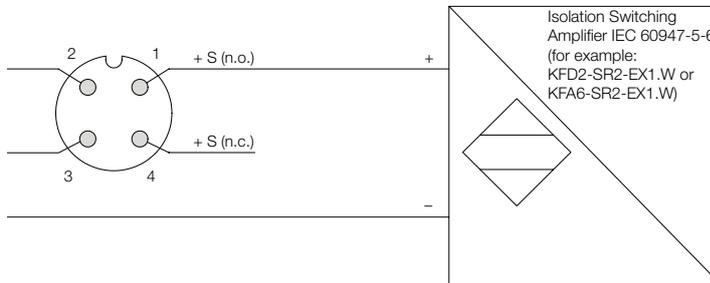
**Wiring diagram**

Colour of core	NWS-... 23/24
brown	+ Vs (n.o.) / GND
blue	GND / + Vs (n.c.)
black	Switch out

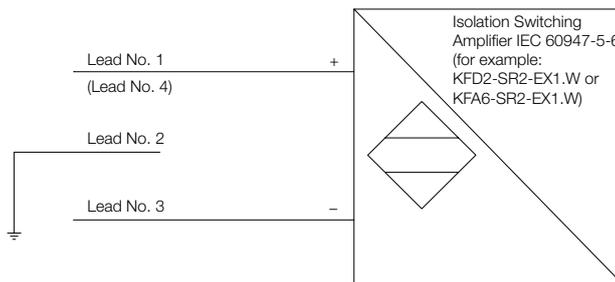
Lead-/pin number	NWS-... 2E (ATEX)
1	+ S (n.o.)
2	Earth
3	- S
4	+ S (n.c.)

**Wiring examples NWS-... 2E... with power supply unit acc. to IEC 60947-5-6**

**Plug M12x1**



**Cable 1.5 m**



**Order Details** (Example: **NWS-R20 200 0070**)

Connection	Model	Electrical connection	Sensor version
R ¾ male thread	NWS-R20...	<b>Plastic housing</b> <b>200</b> = 24...240 V <sub>AC/DC</sub> cable gland/terminal connection  <b>Stainless steel housing/plug connection</b> <b>23S</b> = 24 V <sub>DC</sub> , PNP, plug M12x1 <b>24S</b> = 24 V <sub>DC</sub> , NPN, plug M12x1 <b>2ES</b> = ATEX-approval, plug M12x1  <b>Stainless steel housing/cable connection</b> <b>23F</b> = 24 V <sub>DC</sub> , PNP, 1.5 m cable <b>24F</b> = 24 V <sub>DC</sub> , NPN, 1.5 m cable <b>2EF</b> = ATEX approval, 1.5 m cable	<b>0060</b> = 60 mm (only for NWS-T / NWS-L / NWS-H)  <b>0070</b> = 70 mm standard version, short (not for NWS-T / NWS-L)  <b>0117<sup>1)</sup></b> = 117 mm extended <b>0300<sup>1)</sup></b> = 300 mm sensor <b>0500<sup>1)</sup></b> = 500 mm sensor <b>1000<sup>1)</sup></b> = 1000 mm sensor  <b>XXXX<sup>1)</sup></b> = please specify special length 4-position in mm (140 to 3000 mm)
R 1 male thread	NWS-R25...*		
¾" NPT male thread	NWS-N20...		
1" NPT male thread	NWS-N25...*		
DIN flange DN 25	NWS-F25...		
DIN flange DN 50	NWS-F50...*		
1" ANSI flange	NWS-A25...		
2" ANSI flange	NWS-A50...*		
Tri-Clamp® DN 40	NWS-T40...		
Tri-Clamp® DN 50	NWS-T50...		
Sanitary conn. DN 40 (DIN 11851)	NWS-L40...		
Sanitary conn. DN 50 (DIN 11851)	NWS-L50...		
Aseptic conn. DN 50 (DIN 11864)	NWS-H50...		
DRD Ø 125 mm flange	NWS-D1Z...		
Special connection	NWS-YYY...		

<sup>1)</sup> Only models marked with \* are available with sensors in extended version

**Dimensions [mm]**

**NWS-...200**

24...V<sub>AC/DC</sub>

Plastic housing

**NWS-...23S/24S**

24 V<sub>DC</sub>

Plug connection

**NWS-...23F/24F**

24 V<sub>DC</sub>

Cable connection

**NWS-...2ES**

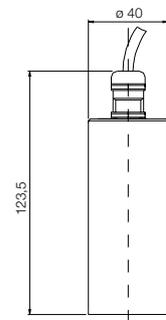
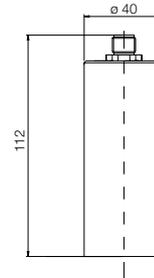
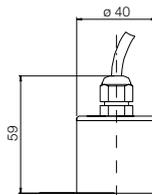
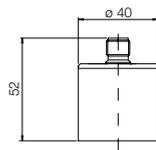
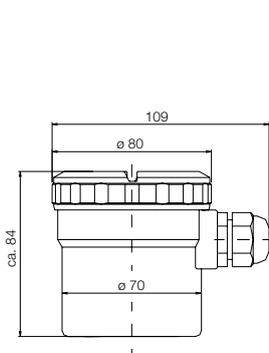
ATEX

Plug connection

**NWS-...2EF**

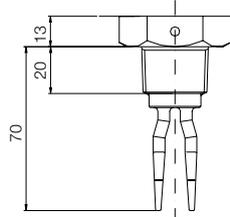
ATEX

Cable connection

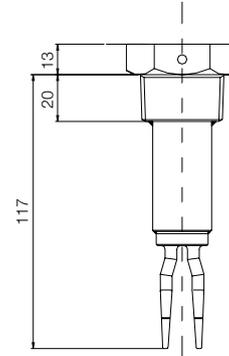


**Dimensions [mm] (continued)**

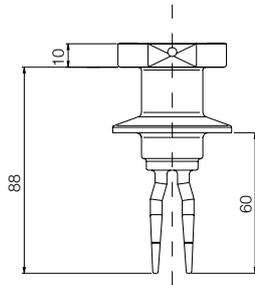
**NWS-... 0070**  
(Standard, short)



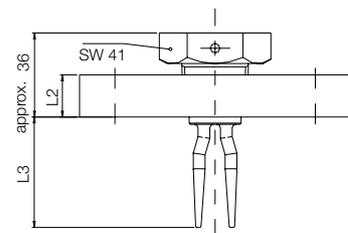
**NWS-R25...0117**  
**NWS-N25...0117**  
(extended)



**NWS-T...**  
Tri-Clamp®

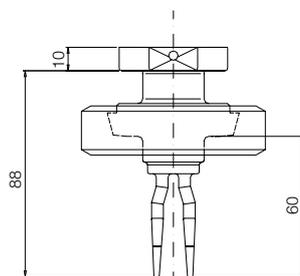


**NWS-F... / NWS-A...**  
Flange version



	<b>L 2</b>	<b>L 3 ±5 mm</b>
DN 25 / PN 40	18	approx. 47
DN 50 / PN 40	20	approx. 95
ANSI 1" 300 lbs	17.5	approx. 41
ANSI 2" 300 lbs	22.4	approx. 92

**NWS-L...**  
Sanitary  
connection  
(DIN 11851)



**NWS-H...**  
Aseptic  
connection  
(DIN 11864)

