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1. APPLICATION

The conductive operating principle is suitable for liquids with a specific conductivity of over 10 µS / cm. The signal processor detects the resistance between the auxiliary probe and the sensing probes. Conductive devices can only be used to decide whether the level of the measured medium is at a particular level or not. The level of detection is determined by the length of the probe stem extending into the tank.

The level switch consists of the **NIVOCONT KRK-512-5** signal processor and probes selected for the particular application. The part of the probe that can be screwed into the tank is **NIVOCONT KS□-□□** probe head carrying one or more **KLN-2□□** probe stems. If the inside of the tank is coated or non-conductive, an auxiliary probe has to be installed, which is longer than both sensing probes. If the tank's walls are conductive, they can be used as an auxiliary probe. Conductive switches can control the filling and emptying of the tank or generic level detection.

2. TECHNICAL DATA

2.1 GENERAL DATA

2.1.1 Switch

	KRK-512-5
Probe voltage	max. 3.5 V AC
Probe current	< 0.1 mA AC
Sensitivity	Adjustable: 5...100 kΩ
Max. cable capacitance	800 nF (5 kΩ) 100nF (100 kΩ)
Response time	max. 400 ms
Mechanical accuracy	±5%
Delay	Adjustable: 0.5...10 s
t _r delay	1.5 s
Relay output	1× toggle (SPDT)
Switching voltage	250 V AC1, 24 V DC
Switching current	8 A AC1
Switching power	2000 VA AC1, 240 W DC
Min. output power DC	500 mW
Mechanical life-span	1 × 10 ⁷ switchings
Electrical life-span	1 × 10 ⁵ switchings
Power supply U _n	24...240 V AC/DC (AC 50-60 Hz)
Voltage range allowed	nominal voltage -15%...+10%
Power consumption	max. 2 VA
Ambient temperature	-20...+55 °C (-4...+131 °F)
Electrical connection	max. 2.5 mm ² (AWG14) / with insulation 1.5 mm ² (AWG16)
Electrical protection	Class II
Overvoltage category*	II
Pollution degree	2
Ingress protection	IP20
Mechanical connection	DIN (EN 60715) rail
Weight	72 g (0.16 lb)

*EN61010-1, tested with 3 kV

2.3 ACCESSORIES

- User's Manual
- Warranty Card
- EU declaration of conformity
- Seal (2 mm [0.08"] thick)
(KLINGER OILIT):
1× 3/8" (KSP-201, KSS-201, KSN-201)
1× 1 1/2" (KSH-20□)
- M6 nut (standard SW):
3× (KSH-202)
4× (KSH-203, KSH-204)
- M6 nut (non-st. SW)
1× (KSH-204)

2.1.2 Probe sockets

	KSK-201	KSP-201	KSS-201	KSN-201	202	203	204	301	302	303	304	KLN-2□□	KLP-201	KLP-204	
Number of probes	1				2+r	3+r	4+r	1+r	2+r	3+r	4+r	1	-	-	
Insulation of socket	ABS	PP	PFA				PP				-	-	-		
Cable gland	Pg7				M4 nut, protected by a rubber cap				M20x1.5				-	-	
Process conn.	-	-	3/8" BSP				1/2" BSP				M6	-			
Socket material	-	PP	A44 c. steel	KO35 stainless steel (1.4571)				PP				KO35 1.4571	-		
Housing material	-				Powder-coated cast aluminum				PBT				-	PP	PVDF
Medium temperature	max. +80 °C (+176 °F)		max. +200 °C (+391 °F)				max. +80 °C (+176 °F)				-	max. +80 °C (+176 °F)	max. +130 °C (+266 °F)		
Max. pressure	-	3 bar (43.5 psi)	16 bar (232 psi)				3 bar (43.5 psi)				-	-	-		
Ingress protection	-	-	IP20		IP65		IP67		IP67		-	-	-		
Mass	50 g (0.11 lb)	100 g (0.22 lb)		400 g (0.88 lb)				220 g/m (0.13 lb/ft)		-	-	-			

r = reference probe

2.2 ORDER CODES

Power supply	Code
24...240 V AC/DC	5

Code	Probe length	Code
0	0 m	0
1	1 m (3.3 ft)	5
2	2 m (6.6 ft)	
3	3 m (10 ft)	

Type	Code	Housing mat.	Code	Probe number	Code
Cable probe	K	Aluminum	2	1 + reference probe*	1*
SINGLE PROBE					
PP socket	P	Plastic	3	2 + reference probe	2
Carbon steel socket	S			3 + reference probe	3
Stainless steel socket	N			4 + reference probe	4
MULTIPLE PROBES					
Stainless steel socket	H				

*only plastic version

Separator:
NIVOCONT KLP-201 – for plastic version
NIVOCONT KLP-204 – for aluminum version

2.4 DIMENSIONS

Switch KRK-512-□	Cable Probe KSK-201	Probe Socket KSH-20□	Probe Socket KSP-201 / KSS-201 / KSN-201	Probe KLN-2□□
Probe Socket KRK-512-□	Separator KLP-204	Probe Socket KSH-30□	Separator KLP-201	

3. INSTALLATION

It is recommended to cut the **KLN-2□□** probes to the length required for the level of detection. The probes must be screwed into the **KSQ-□□□** type sockets.

ALWAYS REMEMBER TO TIGHTEN THE PROBE WITH AN M6 NUT!

When using **KSH-204** probe sockets, the reference probes must be tightened with special SW M6 hex nuts!

For multiple probe devices, it is recommended to use **KLP-□□□** separators every 0.5 m (1.64 ft) on the probes to keep them apart.

A **KSK-201** single probe attached to an insulated cable can be lowered into pits and wells without the risk of a short circuit.

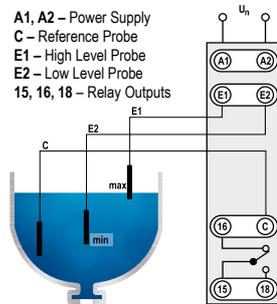
Two probes are required for limit switching in wells and plastic pipes.

4. WIRING

If the wall of the tank is conductive, no reference probe is needed.

In this case, terminal 'C' must be connected to the tank. On multiple probe units, E1 and E2 are marked '1...4', and the reference probe is marked 'C'.

The maximum cable length between the signal processor and the probes depends on the capacitance and conductivity of the cable.

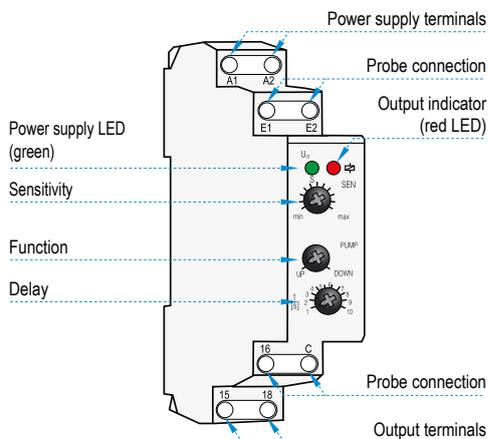


5. COMMISSIONING

5.1. ADJUSTMENT

The green LED (U_n) shows that the unit is on, and the red LED indicates the energized state of the relay. The operating mode and delay time (ON and OFF) can be set with the rotary selector switch and potentiometer on the front panel.

To set the sensitivity using the SENS potentiometer, do the following: submerge all probes into the liquid. Set a minimal delay time (t). Adjust the sensitivity from minimum to the maximal value until the relay becomes energized. Now set the sensitivity just a little higher.



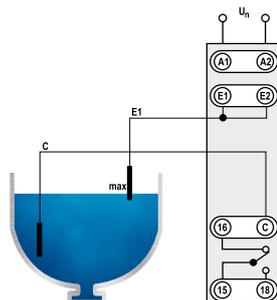
Front panel of NIVOCONT KRK-512-5

5.2. THE LEDS

- Green LED is on** – power supply is on
- Red LED is on** – relay is energized (contacts 15 and 18 are closed)
- Red LED is off** – relay is de-energized (contacts 15 and 16 are closed)
- Red LED blinking** – output delay indication

5.3. LIQUID LEVEL DETECTION

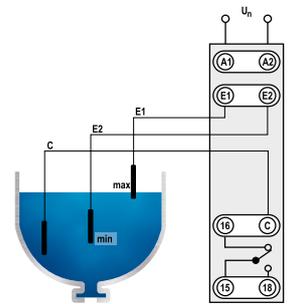
If the **KRK-512-5** monitors only one level, the sensing probe must be connected to the E1 and E2 terminals. For high fail-safe mode detection, the 'PUMP' switch should be in the 'UP' position and low level detection in the 'DOWN' position. Then the level alarm is indicated by a de-energized relay, just like a power outage.



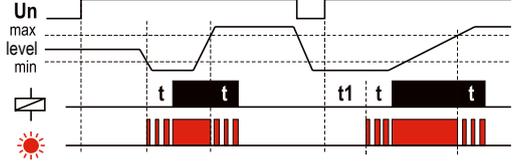
5.4. LEVEL CONTROL

NIVOCONT KRK-512-5 can be used for control of filling or emptying.

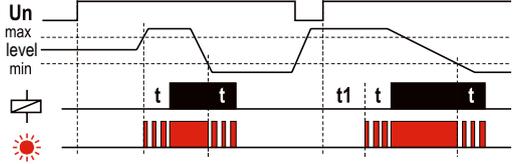
During filling control, the 'PUMP' switch should be in position 'UP' and during emptying control in position 'DOWN'. That way in case a power supply outage occurs (energized relay) overfilling or unwanted emptying is prevented.



FILLING



EMPTYING



9. MAINTENANCE, REPAIR

The device does not require regular maintenance. The warranty card contains the terms and conditions. Before returning the device for repairs, it must be cleaned thoroughly. The parts in contact with the medium may contain harmful substances; therefore, they must be decontaminated. Our official form (**Returned Equipment Handling Form**) must be filled and enclosed in the parcel. Download it from our website www.nivelco.com. The device must be sent back with a declaration of decontamination. A statement must be provided in the declaration that the decontamination process was successfully completed and that the device is clean from any hazardous substances.

10. STORAGE

Ambient temperature: $-30...+70$ °C ($-22...+158$ °F)
Relative humidity: max. 85%

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NIVELCO reserves the right to change anything in this manual without notice!